

TECHNICAL NOTE



TOTON

TOTON – STRATEGIC MODELLING REPORT

IDENTIFICATION TABLE

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1. INTRODUCTION

- 1.1.1 SYSTRA has been commissioned by Mode Transport Planning on behalf of Bloor Homes to assess the impact of three housing sites (Toton North, Toton East and Toton West) in Toton with primary access provided from Stapleford Lane. The East Midlands Gateway Model (EMGM) will be used to assess the impacts and access strategies of the Toton sites.
- 1.1.2 There will be four 'Do Something' scenarios to test the phasing of the development. These are as follows:
- Scenario 1 – Toton West only
 - Scenario 2 – Toton West and East
 - Scenario 3 – 'Full Scenario' (Toton West, East and North, including Toton Link Road)
 - Scenario 4 – 'Full Scenario' plus Chetwynd sensitivity test
- 1.1.3 This Technical Note details the approach taken to develop and assess the four 'Do Something' scenarios. Analysis has been undertaken within the East Midlands Gateway Model (EMGM), with comparisons made against the reference case model defined in technical note TN03.



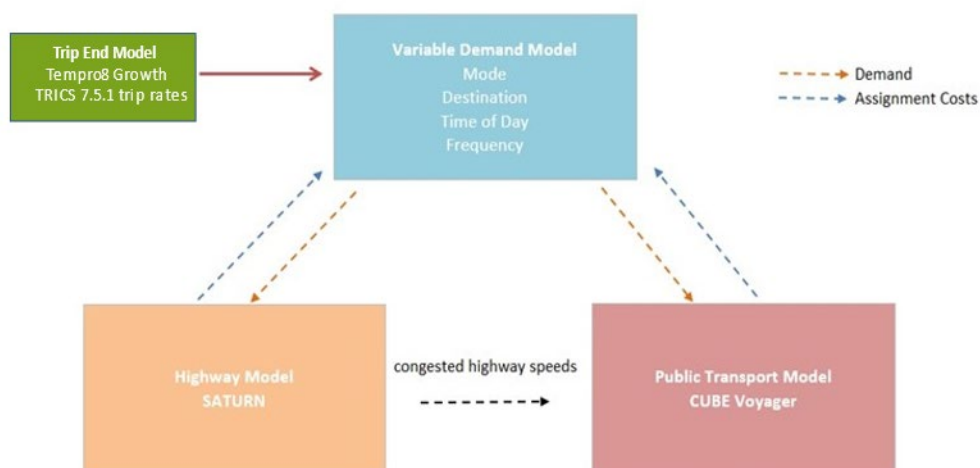
2. FORECASTING METHODOLOGY

2.1 Structure of the East Midlands Gateway Model (EMGM)

2.1.1 The EMGM was developed as a multimodal transport model built following guidance in the Department for Transport's (DfT) Transport Analysis Guidance (TAG). An overview of the structure of the EMGM is shown in Figure 1. In summary, the modelling suite is comprised of the following elements:

- SATURN Highway Model;
- CUBE Voyager Public Transport Model;
- CUBE Variable Demand Model including destination, mode choice, trip frequency and time of day responses; and,
- TRICS based Trip End Model.

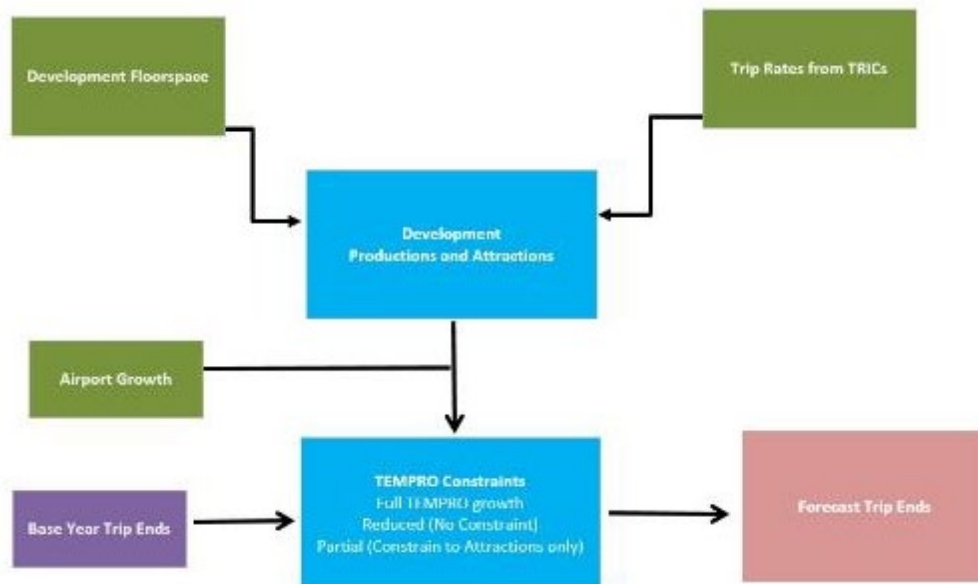
Figure 1. EMGM Technical Structure



2.2 Forecast Demand and the Trip End Model

- 2.2.1 Forecast demand is calculated in the Trip End Model, the structure of which is shown Figure 2.

Figure 2. Trip End Model Structure



- 2.2.2 The number of development trips is calculated from trip rates contained within TRICS software and applied to floorspace or the number of dwellings proposed at each development. The development trips are added to the base matrices and then background growth is applied to the matrix in a way that ensures that the outturn growth matches TEMPro 8 growth forecasts i.e. the EMGM is constrained to TEMPro growth.
- 2.2.3 Outturn generations for developments which have been entered specifically will closely align to the expected level of generations. Residual TEMPro growth is applied to surrounding wards within each MSOA and constrained at a district level.
- 2.2.4 East Midlands Airport growth provided by the airport is applied as a development zone to ensure that the growth in passengers and freight predicted by the airport is achieved within the model.
- 2.2.5 Trip rates have been extracted from TRICS 7.5.1 for different types of land-use and segmented by mode and time period. The final person trip rates applied in the trip end model are shown in Table 1. Trips rates exclude walk and cycling trips. These have been previously agreed during development of the model with the Local Authorities and National Highways for the development of previous EMGM Reference Cases.

Table 1. EMGM Person Trip Rates

	AM PEAK (08:00 – 09:00)			PM PEAK (17:00 – 18:00)		
	ARRIVAL	DEPARTURE	TOTAL	ARRIVAL	DEPARTURE	TOTAL
Residential 250> (per dwelling)	0.183	0.729	0.912	0.570	0.257	0.827
B1 Employment (per 100sqm)	1.631	0.115	1.746	0.102	1.479	1.581
B2 Employment (per 100sqm)	0.388	0.145	0.533	0.081	0.375	0.456
B8 Employment (per 100sqm)	0.087	0.023	0.110	0.011	0.042	0.090
Primary Education (per 100sqm)	7.193	1.613	8.806	0.311	0.658	0.969
Secondary Education (per 100sqm)	2.341	0.256	2.597	0.066	0.634	0.700
Food Retail (per 100sqm)	3.518	2.624	6.142	6.558	6.887	13.445
Non-Food Retail (per 100sqm)	0.287	0.069	0.356	0.253	0.206	0.459
Café/Restaurant/Bar (per 100sqm)	0.000	0.000	0.000	6.256	2.874	9.130
Health Centre (Clinic) (per 100sqm)	1.952	0.355	2.307	0.124	0.805	0.929

3. SCENARIO 1 – TOTON WEST

3.1 Introduction

- 3.1.1 This chapter details the development and infrastructure schemes that have been included in the 2026 and 2041 Scenario 1 test.
- 3.1.2 This Scenario includes 420 residential units associated with Toton West, situated to the West of Stapleford Lane.

3.2 Trip Rates

- 3.2.1 Trip Rates are assumed to be the standard EMGM rates for residential.

3.3 Infrastructure

- 3.3.1 Access to Toton West is assumed to be directly off Stapleford Lane, to the south of the Toton Lane Park and Ride site.
- 3.3.2 It is accessed by a single access road. No other infrastructure is provided.



4. SCENARIO 2 – TOTON WEST AND EAST

4.1 Introduction

- 4.1.1 This chapter details the development and infrastructure schemes that have been included in the 2026 and 2041 Scenario 2 test.
- 4.1.2 This Scenario includes 420 residential units associated with Toton West and 155 residential units associated with Toton East, both accessed off Stapleford Lane.

4.2 Trip Rates

- 4.2.1 Trip Rates are assumed to be the standard EMGM rates for residential.

4.3 Infrastructure

- 4.3.1 Access to Toton West and East are both assumed to be off Stapleford Lane, south of Toton Lane Park and Ride.



5. SCENARIO 3 – ‘FULL SCENARIO’

5.1 Introduction

- 5.1.1 This chapter details the development and infrastructure schemes that have been included in the 2026 and 2041 Scenario 3 test.
- 5.1.2 This Scenario includes 420 residential units associated with Toton West, situated to the West of Stapleford Lane.
- 5.1.3 It also includes 155 residential units associated with Toton East and 880 residential units associated with Toton North.

5.2 Trip Rates

- 5.2.1 Trip Rates are assumed to be the standard EMGM rates for residential.

5.3 Infrastructure

- 5.3.1 Access to Toton West is assumed to be directly off Stapleford Lane, to the south of the Toton Lane Park and Ride site.
- 5.3.2 It is assumed that the Toton Link Road will be built for this scenario, with access between Stapleford Lane and the A52 possible without having to traverse Bardills Roundabout.
- 5.3.3 Access to the Toton East and Toton North sites will be off the link road, with the East site closer to Stapleford Lane and Toton North closer to the A52.



6. SCENARIO 4 – ‘FULL SCENARIO’ PLUS CHETWYND SENSITIVITY

6.1 Introduction

- 6.1.1 This chapter details the development and infrastructure schemes that have been included in the 2026 and 2041 Scenario 4 test.
- 6.1.2 This Scenario has the same profile of developments as Scenario 3.

6.2 Trip Rates

- 6.2.1 Trip Rates are assumed to be the standard EMGM rates for residential.

6.3 Infrastructure

- 6.3.1 The infrastructure is the same as in Scenario 3, apart from the following difference:
 - Access to Swiney Way will be provided from Toton Link Road (this will be called the “Chetwynd Link”)
 - Access to Chetwynd Barracks will be off the Chetwynd Link, so it can be accessed from the North or South.



7. SCENARIO 1 ANALYSIS

7.1 Introduction

Scenario 1 includes Toton West, consisting of 420 residential units in both 2026 and 2041. It has been compared against their respective Reference Case.

7.2 Key Highway Impacts

Development Distribution

- 7.2.1 Site distribution represents the extent to which development traffic utilises the highway network.
- 7.2.2 For the 2026 year, distribution is shown in Figure 3 and Figure 4. For 2041 this is illustrated in Figure 5 and Figure 6. These show the routes that the newly generated traffic takes on the network.
- 7.2.3 The Toton West development is located close to the A52 and M1, off Toton Lane. As such, the vast majority of traffic exits the development North on Toton Lane in the AM peak, dispersing to the A52 East, West and the M1 South. In the PM peak the reverse happens, with traffic arriving at the development from the A52 East, West and the M1 South.

Figure 3. 2026 Do Something – AM Distribution

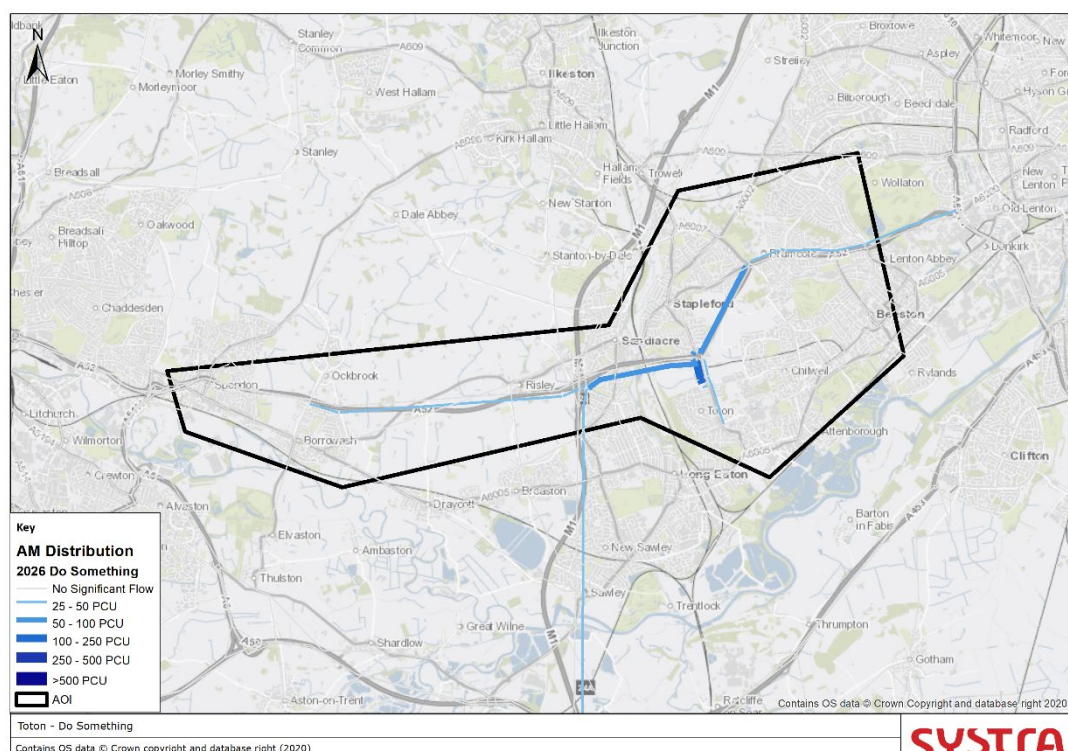


Figure 4. 2026 Do Something – PM Distribution

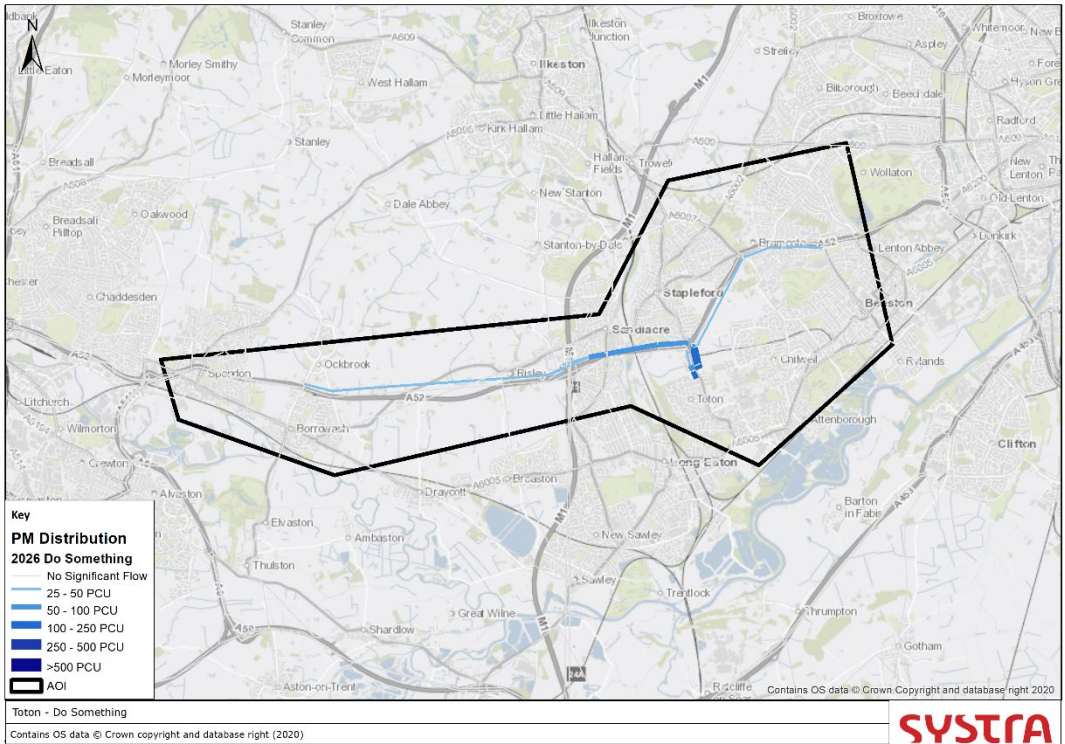


Figure 5. 2041 Do Something – AM Distribution

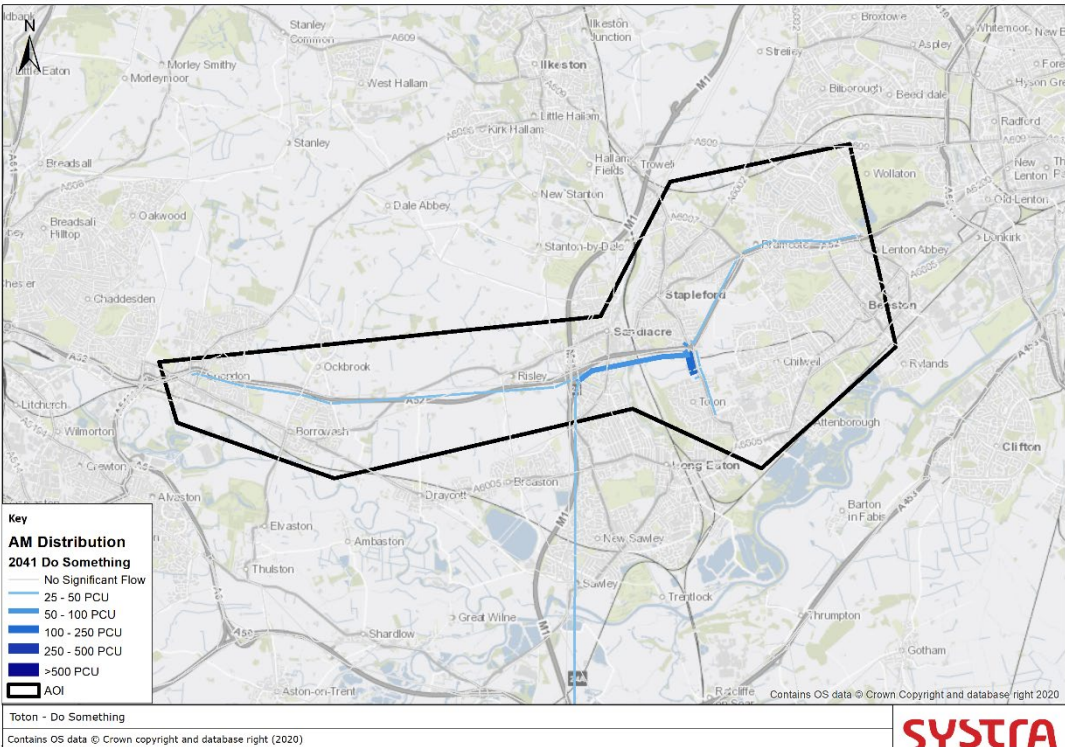
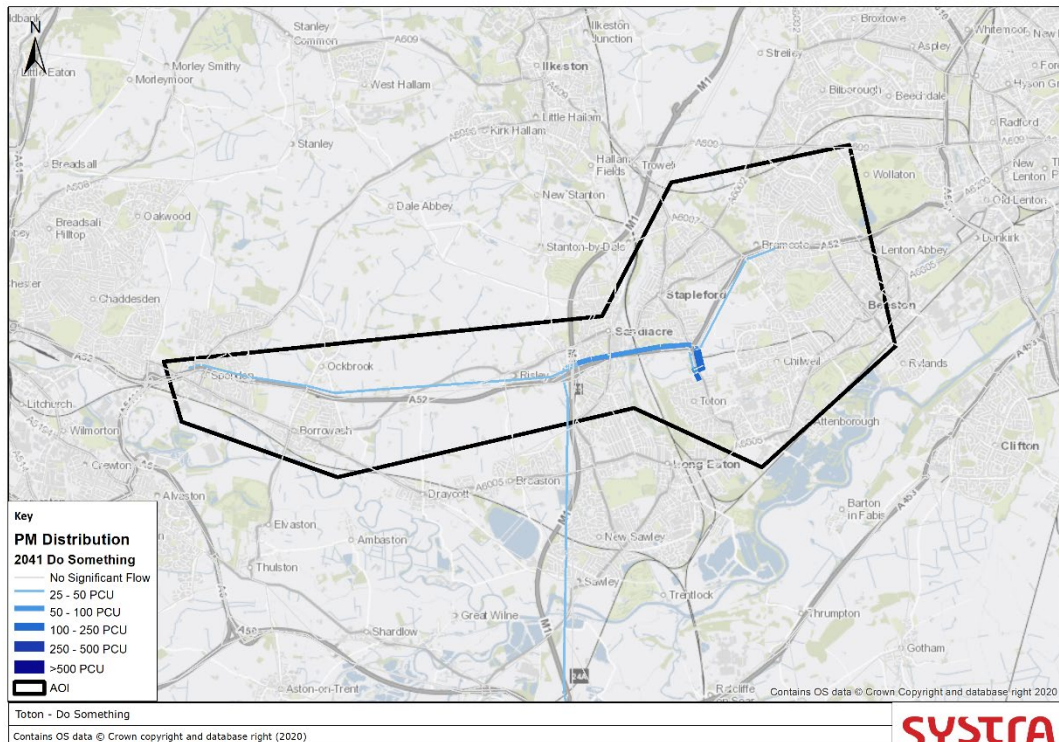


Figure 6. 2041 Do Something – PM Distribution



Background Traffic Reassignment

- 7.2.4 Traffic reassignment plots show the impact on non-development traffic with the introduction of the new development.
- 7.2.5 Figure 7 and Figure 8 show the reassignment in 2026, with Figure 9 and Figure 10 show the same for 2041.
- 7.2.6 Blue links represent roads which background traffic is moving away from, whilst red links represent roads which experience an increase in traffic. Since demand tends to reassign away from major routes and spread over several minor routes, these plots can often be misinterpreted as an overall flow reduction.
- 7.2.7 In the AM peak of 2028 there is minimal impact of the development. There is a reduction in non-development traffic using the A52 and M1 South, as well as Northbound on the B6003 past the development. Whilst there is no clear route that the redistributed traffic uses, some does use the A6005 and B6540 Westbound towards Long Eaton and Eastbound towards Nottingham in small numbers, below what is visible in the plot bands.
- 7.2.8 In the PM peak of 2028, there is an increase in non-development traffic using the A6005 through Beeston and the B6540 through Long Eaton towards the A50. This is traffic rerouting to avoid using the A52 or the B6003 near the development. It is moving away as a result of increased congestion at Bardills roundabout, specifically where the B6003 meets the roundabout. There is already congestion at the junction of the A52 West with the roundabout, with traffic backing up on the roundabout towards the B6003. Adding a small amount of development traffic from the B6003 to the junction worsens the block back and congestion such that the A52 Westbound is no longer as an attractive a route.

- 7.2.9 In the AM peak of 2041, there is block back on the B6003 southbound in both the Reference Case and Do Something. This is as a result of traffic waiting to turn right into Woodstock Road, with traffic queueing behind. This goes as far back as the Park and Ride site in both models, however the addition of the junction at Toton West provides a small uplift in capacity for southbound traffic between the Park and Ride junction and the Toton West junction, with two lanes for straight ahead traffic, rather than one in the Reference Case. This makes the route along the B6003 slightly more favourable and explains why there is a small increase in non-development traffic using the route.
- 7.2.10 There is also an increase in non-development traffic using the A6005 through Beeston and Long Eaton. This is partially the re-routed traffic above continuing its journey, but it is also made up of traffic avoiding the A52, that development traffic is using.
- 7.2.11 There is minimal impact in the PM peak of 2041, this is because many of the junctions are already congested, so there is little benefit of route flipping.

Figure 7. 2026 Do Something vs Reference Case – AM Reassignment

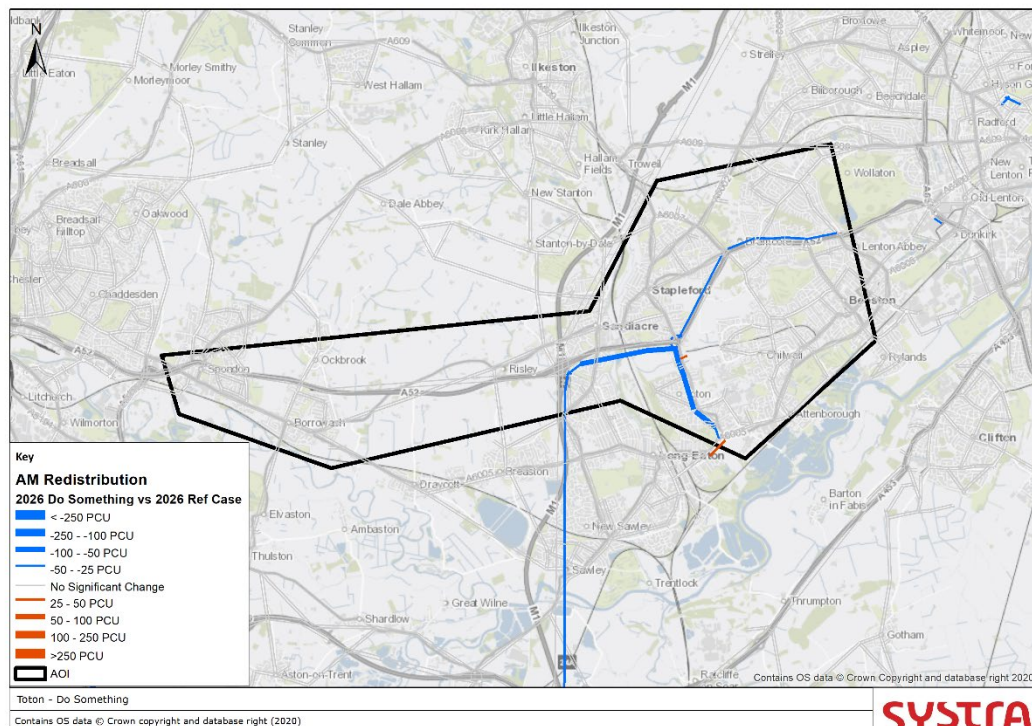


Figure 8. 2026 Do Something vs Reference Case – PM Reassignment

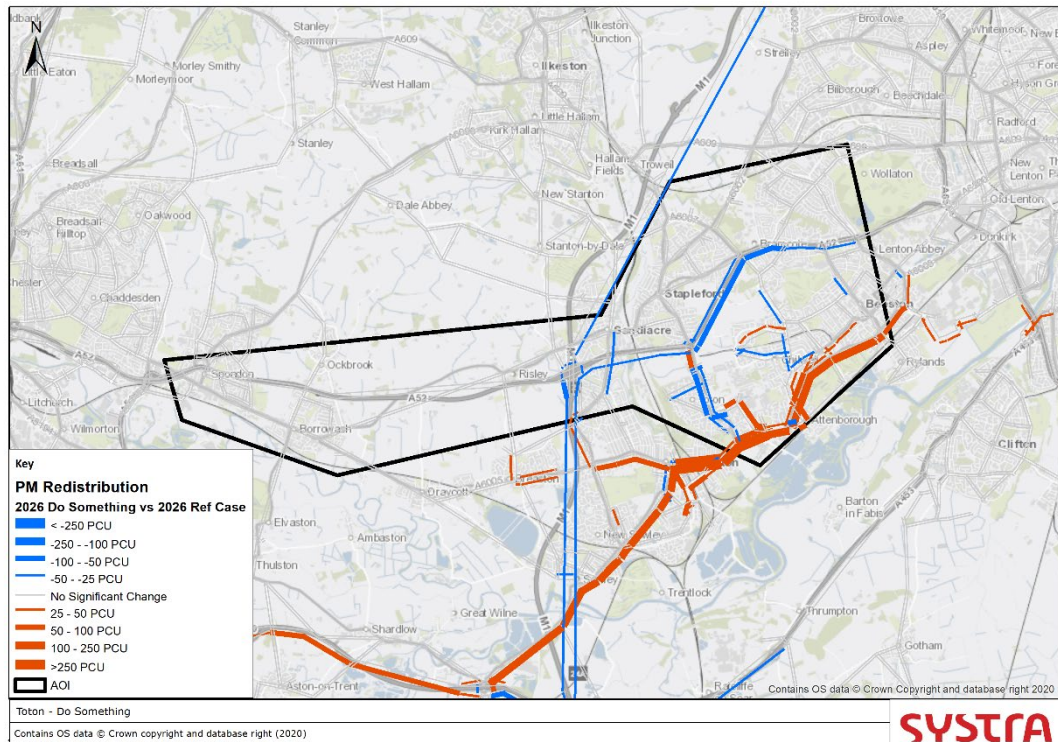


Figure 9. 2041 Do Something vs Reference Case – AM Reassignment

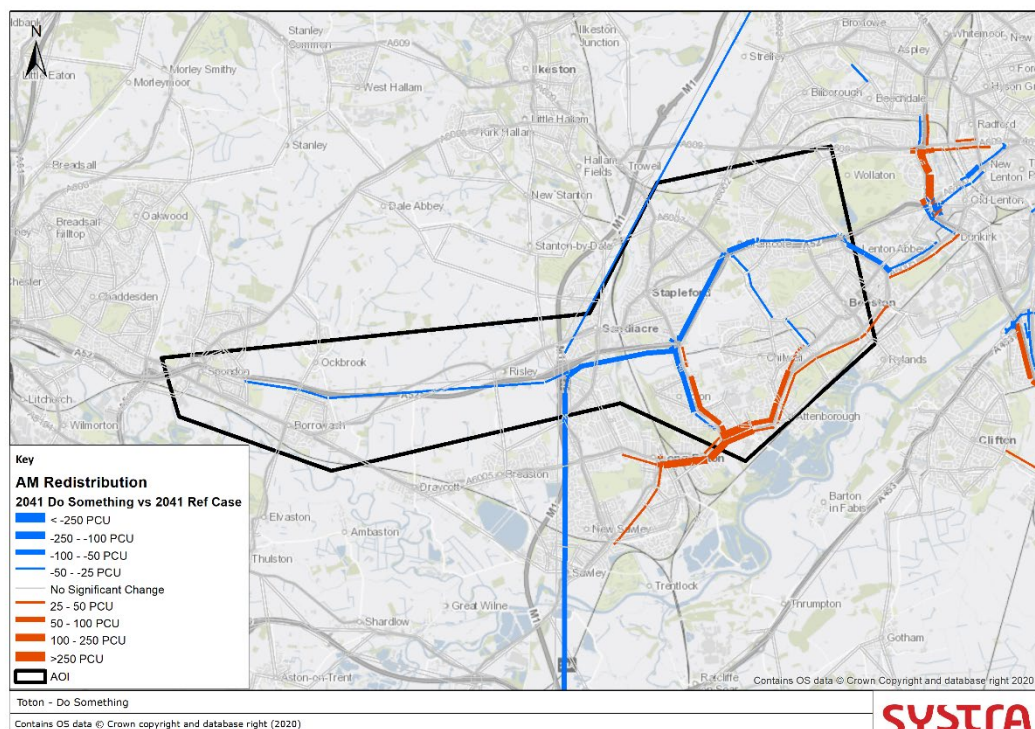
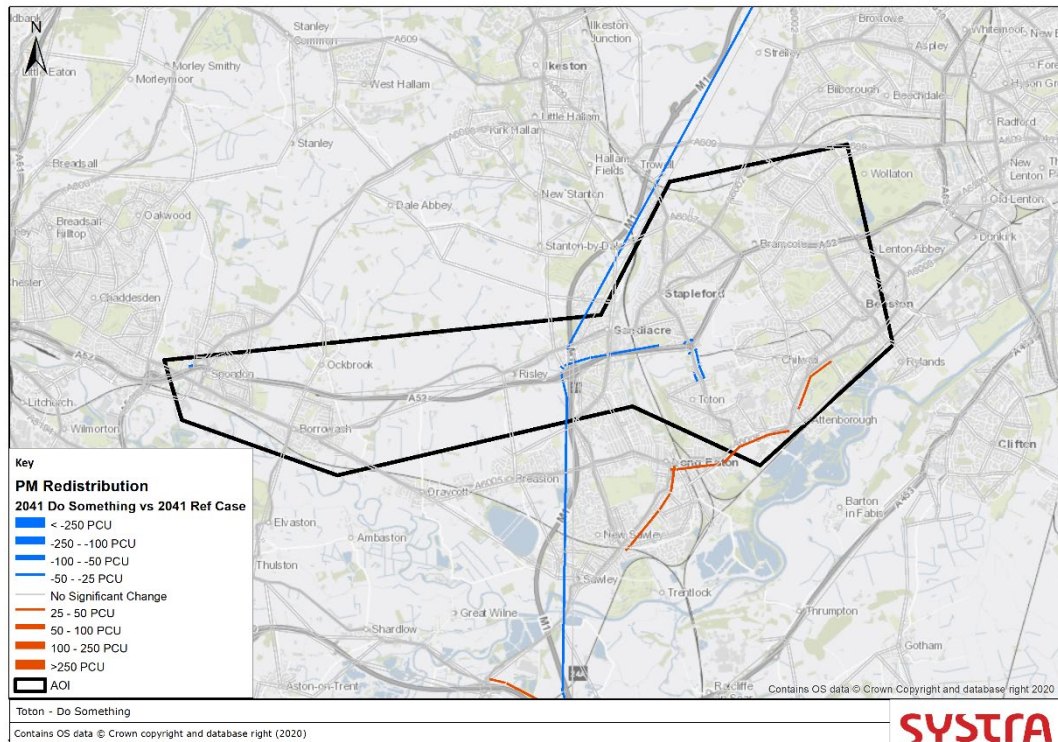


Figure 10. 2041 Do Something vs Reference Case – PM Reassignment



Flow Change

- 7.2.12 Flow change is measured by determining change in actual flow between the Reference Case and the Do Something scenario. Red lines represent roads which experience a net increase in traffic whilst green lines represent roads which experience a net reduction in traffic.
- 7.2.13 The flow change plots below show the additional flow to/from the development to be minimal to the network across both years.
- 7.2.14 They also show the secondary impacts in the PM peak of 2026 and AM peak of 2041 (the reassignment effect highlighted above), are larger than the direct impact of the flow to/from the development.

Figure 11. 2026 Do Something vs Reference Case – AM Flow Change

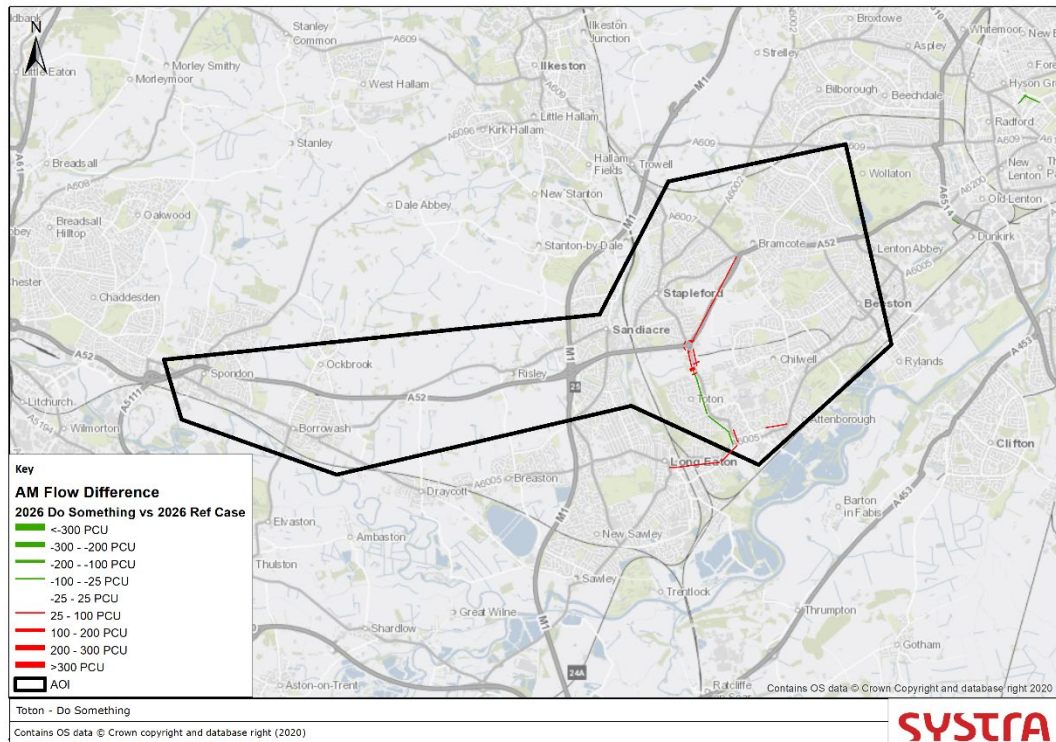


Figure 12. 2026 Do Something vs Reference Case – PM Flow Change

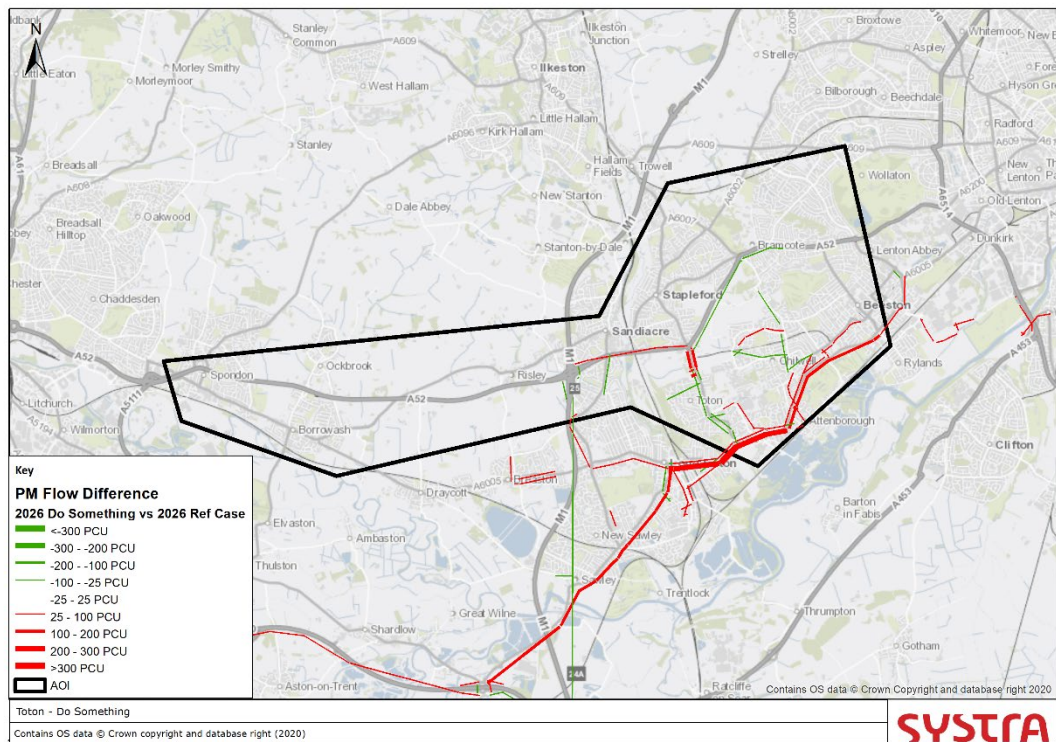


Figure 13. 2041 Do Something vs Reference Case – AM Flow Change

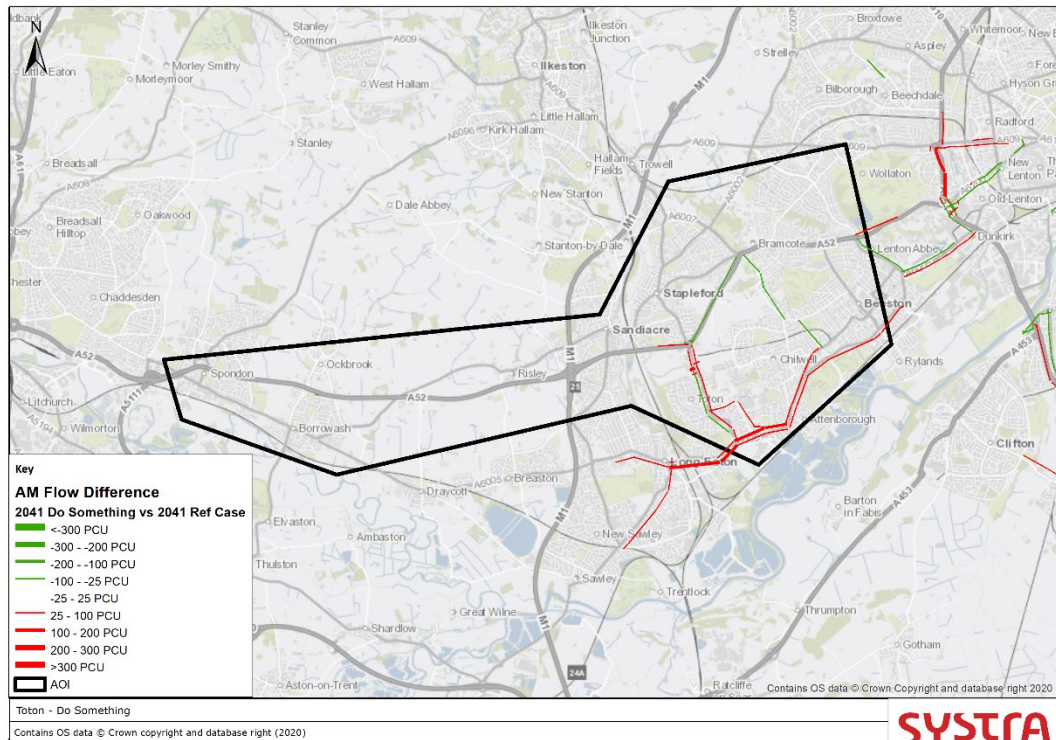
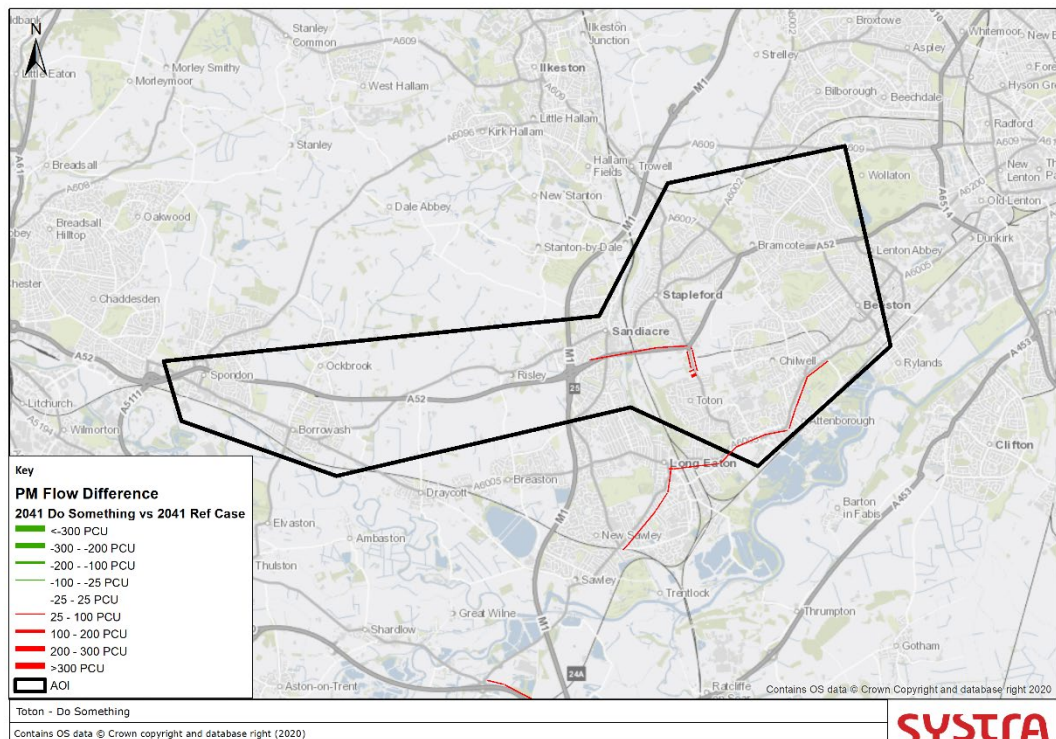


Figure 14. 2041 Do Something vs Reference Case – PM Flow Change



Change in Congestion (V/C%)

7.2.15 Junction congestion is measured by determining the ratio of the volume of traffic to the capacity of traffic that can be accommodated by a junction. A Volume to Capacity percentage

(V/C%) of 85% is considered to be the upper threshold at which the junction is operating effectively. Increasing beyond this increases the likelihood of operational problems including congestion and associated delays and queues. A V/C percentage of $\geq 100\%$ indicates that the junction is being forced to operate beyond its theoretical maximum capacity.

- 7.2.16 Those junctions identified as being $>85\%$ congested within the 'Reference Case' or 'Do Something' scenario are assessed, with 'Do Something' scenario compared to the 'Reference Case' scenario. Figure 15 and Figure 16 show the change in congestion for the AM and PM peaks respectively for 2026. Figure 17 and Figure 18 show the same for 2041.
- 7.2.17 There is minimal change to congestion across all years. This includes an increase in congestion at Bardills roundabout, specifically the arm of the roundabout that meets the B6003 South. This occurs in the AM peaks of both years and the PM peak of 2026. In both AM peaks, this is caused by the increase in development traffic accessing the roundabout from the B6003 to join the A52. This is also the case in the PM peak of 2026, however the impact is larger because of existing congestion and block back at other arms of the junction.
- 7.2.18 As a result of the reassignment effects in the PM peak of 2026 and AM peak of 2041, there is also an increase in congestion at junctions along the A6005 in these models in comparison to the Reference Case.
- 7.2.19 In the AM peak of 2041 there is an increase in congestion at the A52 Derby Road/Clifton Boulevard junction. The A52 Clifton Boulevard Southbound on slip blocks back onto the roundabout in the Reference Case, affecting its performance. As a result, many of the arms are close to, or at 85% V/C. This is caused by a small-scale change in route choice from the A6200 to the A609 and A6514. This means that there is more traffic on the A6514 Clifton Boulevard underpass, disturbing the ability of traffic off the roundabout to merge on and causing an increase in congestion on the roundabout and the Southbound exit slip road of the A6514.
- 7.2.20 There is minimal impact in the PM peak of 2041 as this peak is already significantly congested in the Reference Case.



Figure 15. 2026 Do Something vs Reference Case – AM Change in Congestion

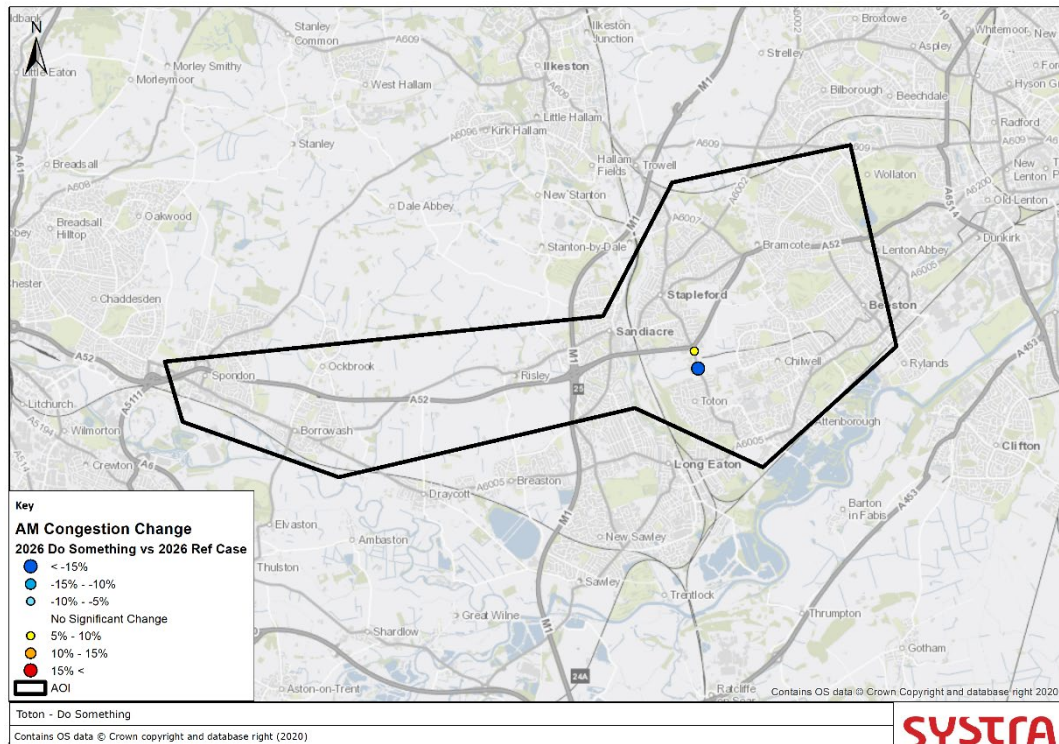


Figure 16. 2026 Do Something vs Reference Case – PM Change in Congestion

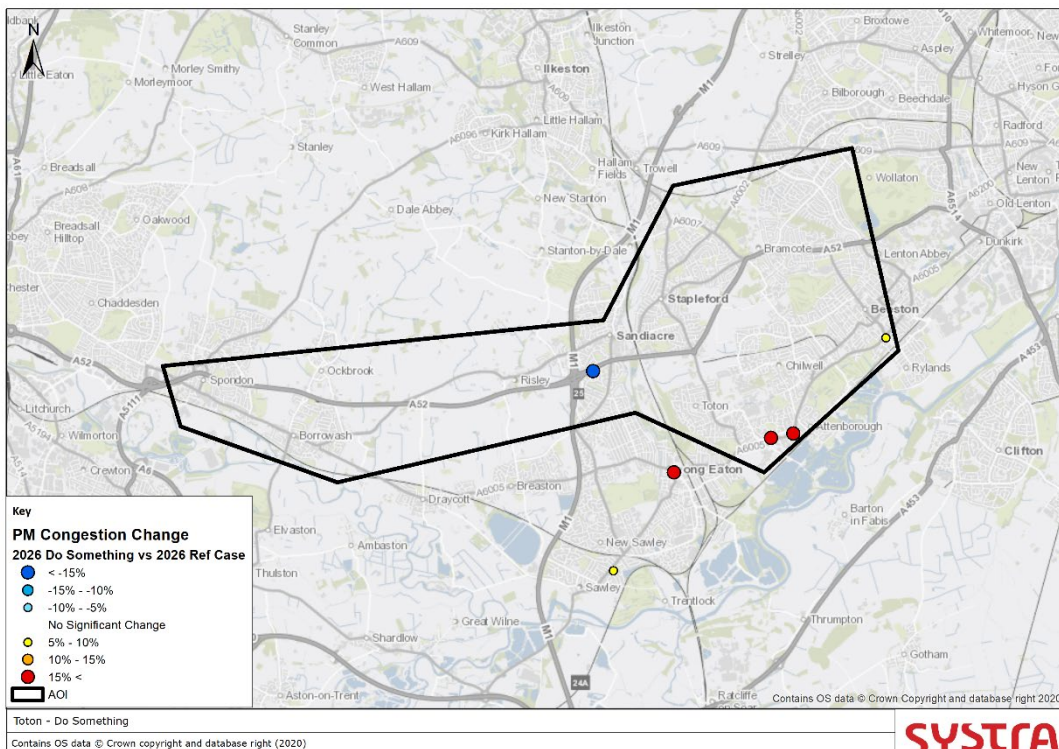


Figure 17. 2041 Do Something vs Reference Case – AM Change in Congestion

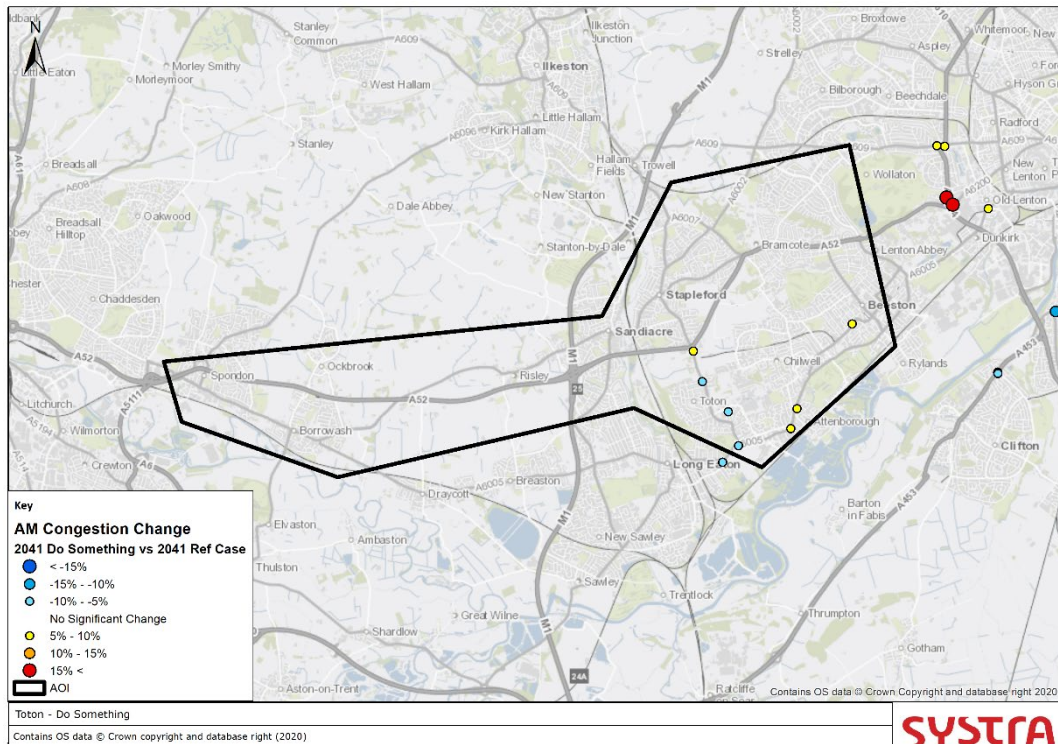
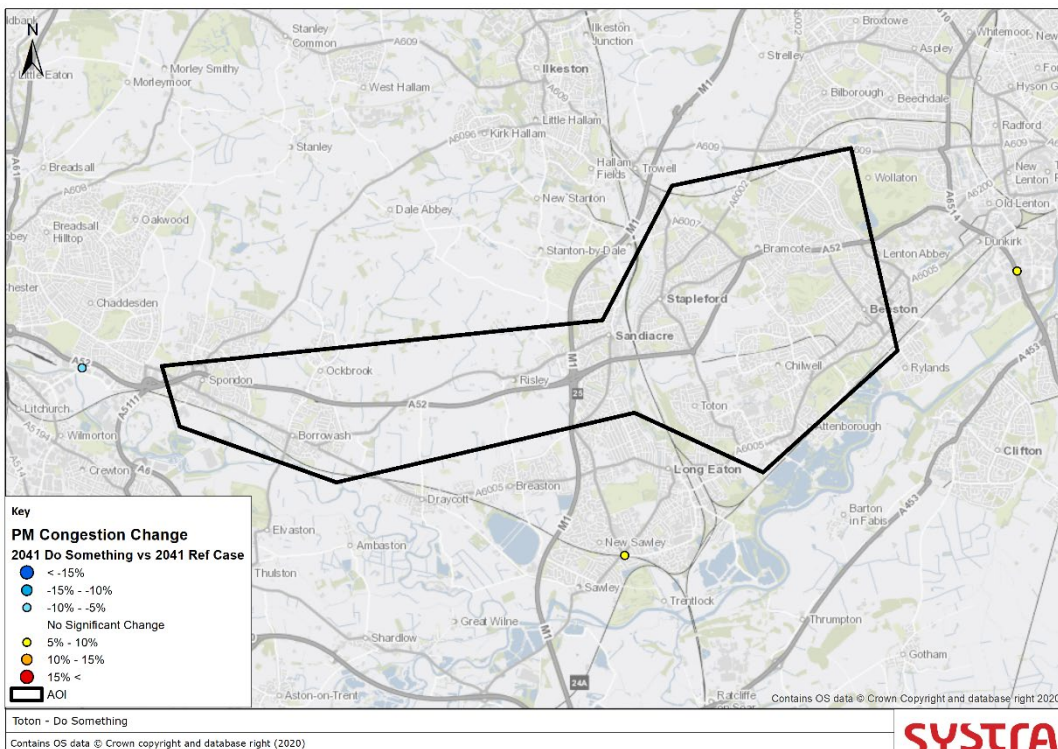


Figure 18. 2041 Do Something vs Reference Case – PM Change in Congestion



Network Statistics

7.2.21 Network statistics provide a way of gauging the overall impact from the addition of trips associated with the development sites. An explanation of the key indicators is as follows:

- Congestion / Over Capacity Queues – reflect the change in overall congestion and is the time spent queuing at junctions that are over capacity. As traffic levels increase, a growing number of junctions reach capacity, and the time spent queuing at junctions can increase.
- Total Travel Time – across the highway network in PCU hours.
- Total Travel Distance – across the highway network in PCU kilometres.
- Average Speed – expressed as kilometres per hour, averaged for all traffic. Increased traffic levels lead to greater delays, potentially resulting in a lower average travel speed.

7.2.22 Table 2 displays key network statistics for the 2026 Do Something Scenario compared against the Reference Case, across the whole modelled area. Table 3 shows the same for 2041.

Table 2. 2026 Network Statistics - Do Something Comparison

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 1		% DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Over Capacity Queues (PCU hrs)	8113	7917	8148	7852	0%	-1%
Total Travel Time (PCU hrs)	123229	119911	123266	119910	0%	0%
Total Travel Distance (PCU km)	4989561	4882801	4989844	4883342	0%	0%
Average Speed (km/hr)	41	41	41	41	0%	0%

Table 3. 2041 Network Statistics - Do Something Comparison

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 1		% DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Over Capacity Queues (PCU hrs)	13701	12677	13650	12702	0%	0%
Total Travel Time (PCU hrs)	144534	138765	144517	138818	0%	0%
Total Travel Distance (PCU km)	5602270	5440693	5602266	5439516	0%	0%
Average Speed (km/hr)	39	39	39	39	0%	0%

Matrix Totals

7.2.23 Table 4 displays the highway and public transport matrix totals plus the highway mode share for the model area in 2026. Table 5 shows the same for 2041.



Table 4. 2026 Do Something Matrix Totals

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 1		DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Highway Person Demand	419609	467350	419798	467498	189	148
PT Person Demand	38405	34628	38464	34680	58	52
Highway Mode Share	92%	93%	92%	93%		

Table 5. 2041 Do Something Matrix Totals

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 1		DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Highway Person Demand	451262	495049	451598	495311	333	268
PT Person Demand	39723	35793	39842	35888	117	101
Highway Mode Share	92%	93%	92%	93%		

8. SCENARIO 3 ANALYSIS

8.1 Introduction

Scenario 3 includes Toton West, Toton East and Toton North, with a total of 1,455 residential units in both 2026 and 2041. It has been compared against their respective Reference Case.

8.2 Key Highway Impacts

Development Distribution

- 8.2.1 Site distribution represents the extent to which development traffic utilises the highway network.
- 8.2.2 For the 2026 year, distribution is shown in Figure 3 and Figure 4. For 2041 this is shown in Figure 5 and Figure 6. These show the routes that the newly generated traffic takes on the network.
- 8.2.3 The Toton developments are close to the A52 and M1, so the vast majority of traffic interacts with the SRN. In the AM peak, the largest flows are out of the development, towards Nottingham on the A52 Eastbound and towards Derby and the M1 on the A52 Westbound. In the PM peak the reverse is true, with traffic returning to the development.

Figure 19. 2026 Do Something – AM Distribution

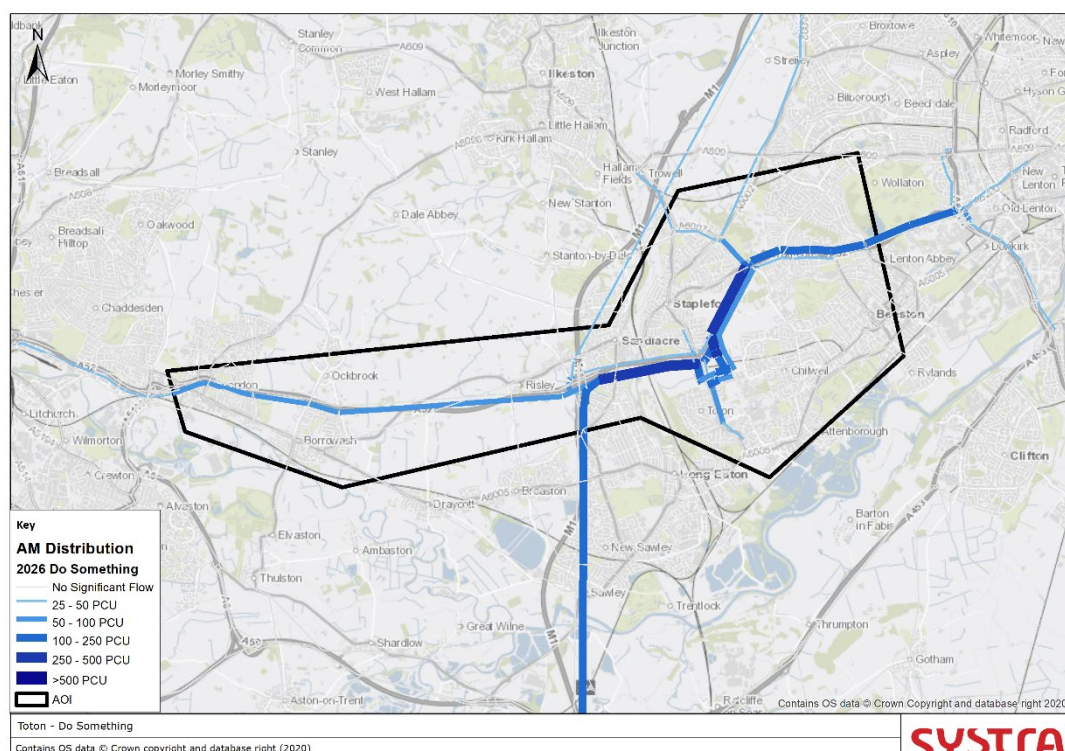


Figure 20. 2026 Do Something – PM Distribution

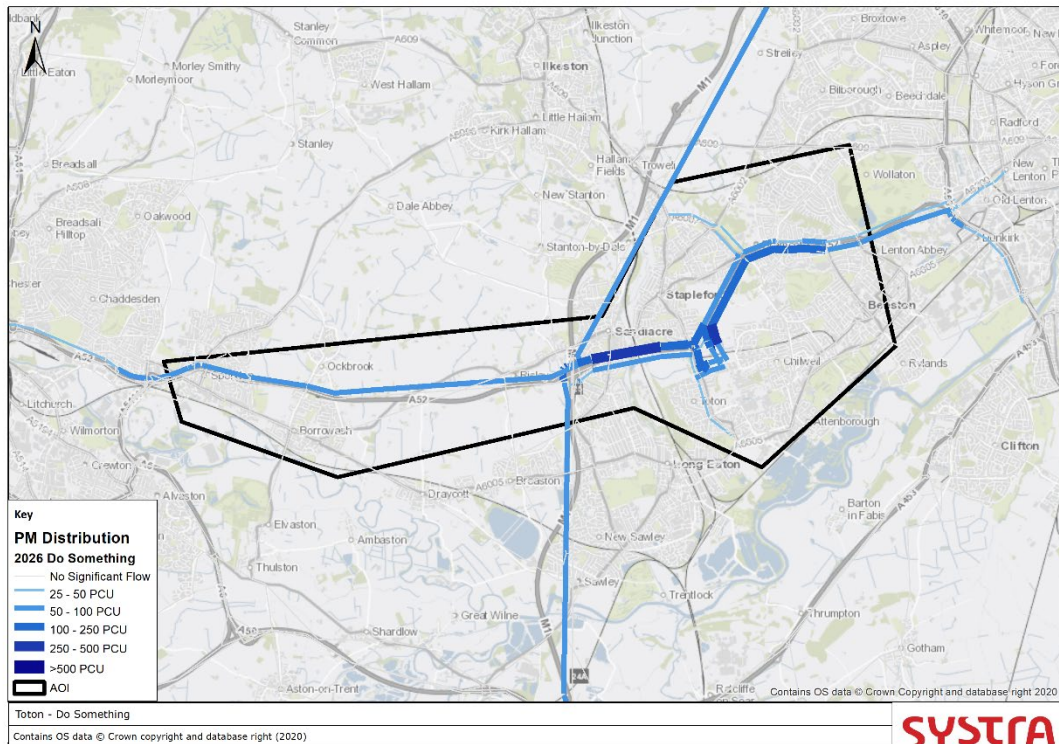


Figure 21. 2041 Do Something – AM Distribution

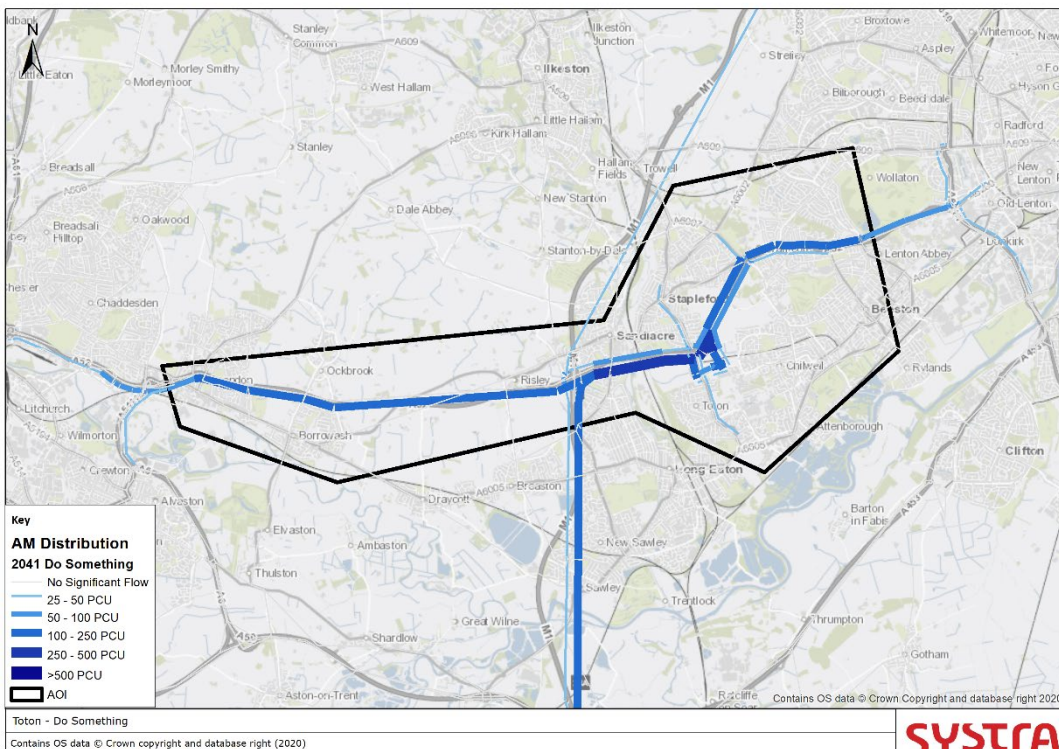
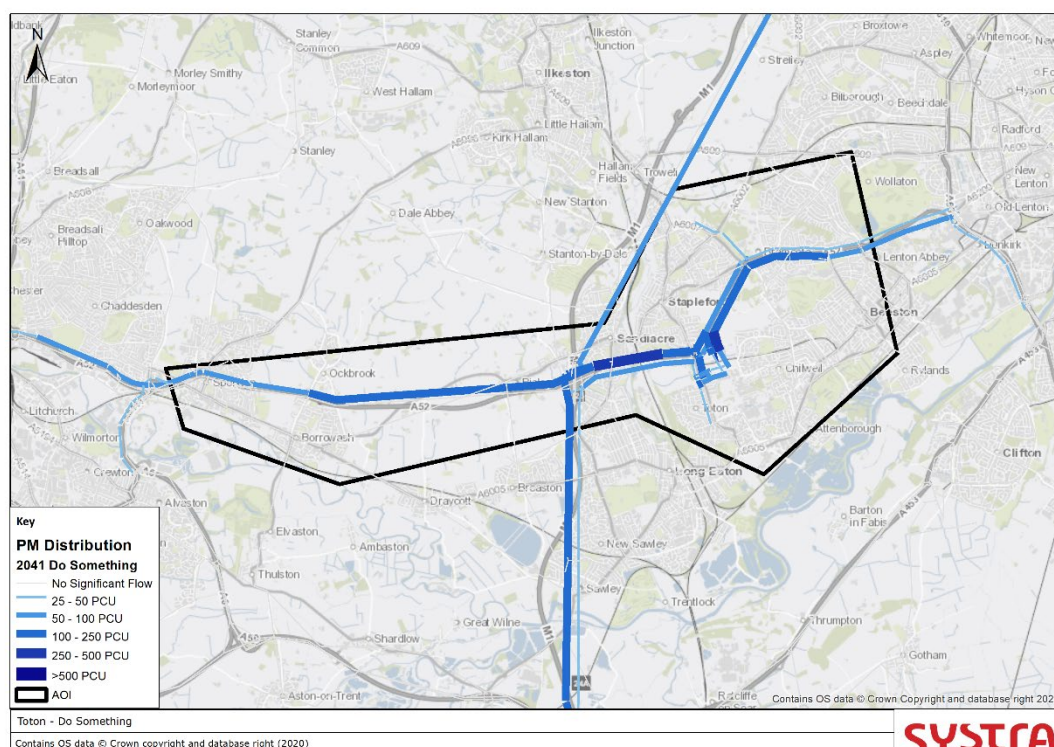


Figure 22. 2041 Do Something – PM Distribution



Background Traffic Reassignment

- 8.2.4 Traffic reassignment plots show the impact on non-development traffic with the introduction of the new development.
- 8.2.5 Figure 7 and Figure 8 show the reassignment in 2026, with Figure 9 and Figure 10 showing the same for 2041.
- 8.2.6 Blue links represent roads which background traffic is moving away from, whilst red links represent roads which experience an increase in traffic. Since demand tends to reassign away from major routes and spread over several minor routes, these plots can often be misinterpreted as an overall flow reduction.
- 8.2.7 There is a reduction in non-development traffic using the A52 and M1 south of M1 J25 across both years. The reduction on the A52 is in part caused by development traffic displacing non-development traffic, but it is also caused by the reduction in speed between Bardills and Bramcote roundabouts between the Reference Case and Do Something, with the addition of the Toton Link Road junction. This reduction in speed is because the junction is signalised, meaning traffic on the A52 is no longer free flowing and often needs to stop.
- 8.2.8 The traffic that is displaced from these routes does not use a single alternative; traffic reassigns in small numbers to individual roads. This includes routes away from the immediate vicinity of the development, such as the A38 between Derby and M1 and the A46 between Leicester and the A606 (both not shown in the plots). In 2026, some traffic moves to the A453 between the M1 and Nottingham.
- 8.2.9 There is also a reduction in traffic on the A6005 through Beeston in all peaks and years. In the AM peak of 2026, there is a reassignment to Town Street. The reduction in flow along the A52

allows more traffic to join Bramcote roundabout here. This means that less non-development traffic now travels through Beeston and joins the A52 further East. In the PM peak, the redistribution through Beeston is a result of the improved conditions of the A52. Whilst there is no significant change south of Long Eaton, the reduction in flow Eastbound begins at A50 J1 and increases along the B6540. Westbound, there is a reduction as far as Sawley, then an increase in flow all the way to A50 J1. Traffic from Sawley to Nottingham is therefore rerouting to the A50, M1 and A52 instead of using the A6005.

- 8.2.10 In the AM peak of 2041, conditions on the A52 improve such that traffic that travelled along Toton Lane, Swiney Way, A6005 and Wollaton road is now faster using the Link Road and A52. In the PM peak, traffic that used the A6005 now routes up Toton Lane, along the Link Road and A52.
- 8.2.11 In the PM peak of 2041 there is a reassignment from Tamworth Road to Wilsthorpe Road. Instead of travelling down Tamworth Road and up Wilsthorpe Road, traffic now travels via Derby Road. This is route flipping in the model due to small changes in flow/delays.

Figure 23. 2026 Do Something vs Reference Case – AM Reassignment

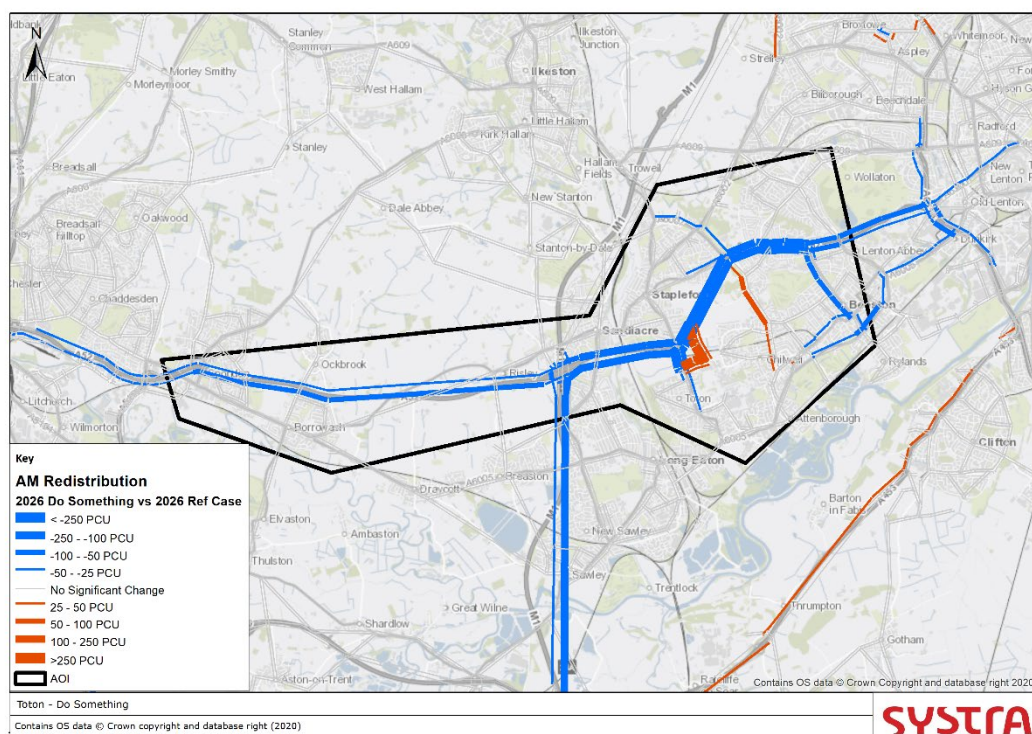


Figure 24. 2026 Do Something vs Reference Case – PM Reassignment

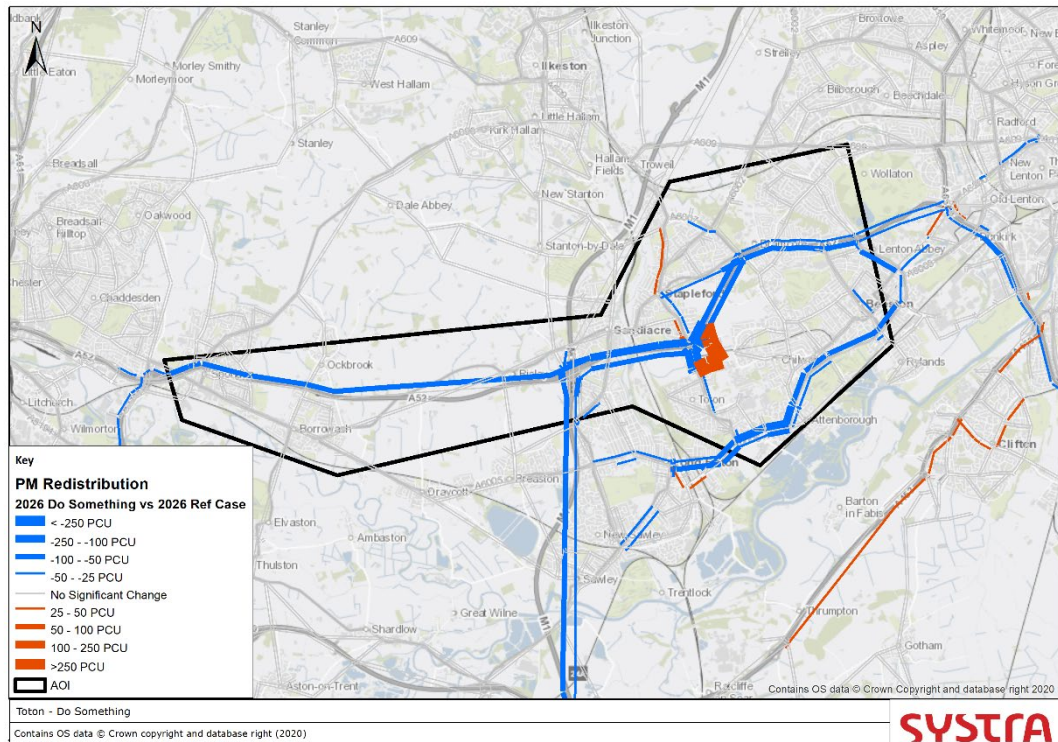


Figure 25. 2041 Do Something vs Reference Case – AM Reassignment

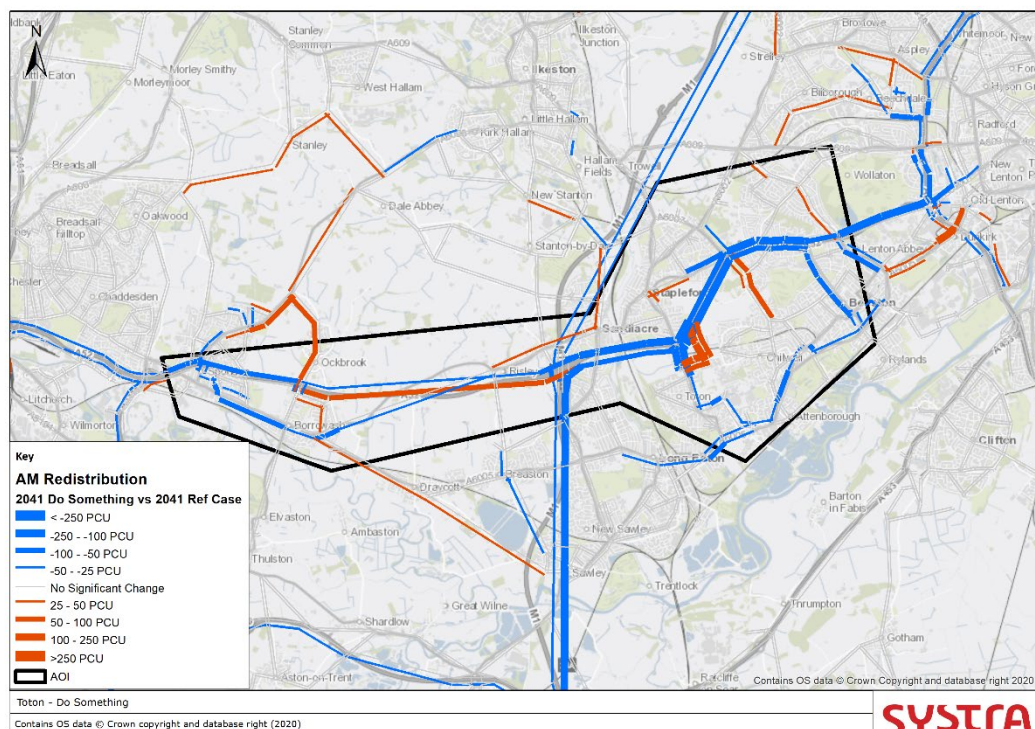
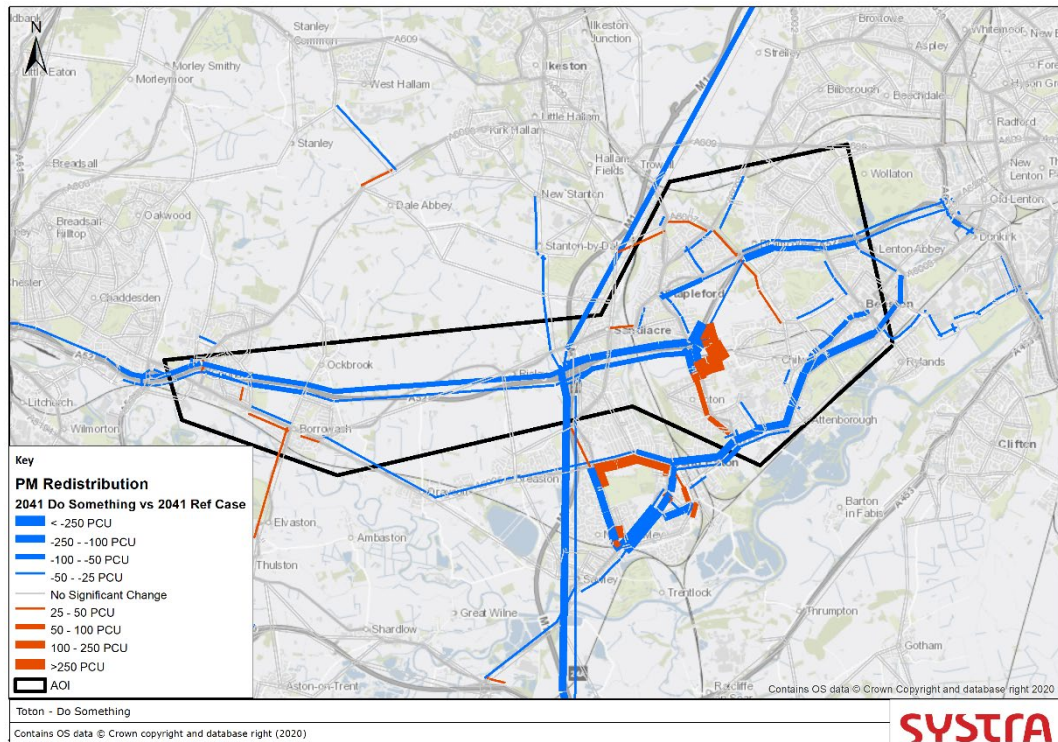


Figure 26. 2041 Do Something vs Reference Case – PM Reassignment



Flow Change

- 8.2.12 Flow change is measured by determining change in actual flow between the Reference Case and the Do Something scenario. Red lines represent roads which experience a net increase in traffic whilst green lines represent roads which experience a net reduction in traffic.
- 8.2.13 The addition of a signalised junction on the A52 between Bardills and Bramcote Roundabouts to connect the Toton Link Road serves to slow down traffic. This changes the type of traffic using the route.
- 8.2.14 In all cases there is a reduction in traffic using Toton Lane between the Link Road and Bardills Roundabout, as well as on the A52 between the Link Road and Bardills Roundabout in both directions. This is because traffic heading between Toton and Nottingham can now avoid Bardills Roundabout entirely.
- 8.2.15 In the AM Peak, there is a reduction in flow from M1 J25 and Bardills Roundabout, also between Wollaton Road and Toton Link Road. This is because traffic seeks an alternative route to avoid the delay of the signals. There is an increase in the opposite direction, from Bardills roundabout towards Derby and from Toton Link Road towards Nottingham. This increase is traffic from the Toton developments.
- 8.2.16 In the PM Peak, the reverse is generally true, with an increase in traffic on the A52 towards the development, although there is an increase in flow on the A52 between Toton Link Road and Bramcote Roundabout.

Figure 27. 2026 Do Something vs Reference Case – AM Flow Change

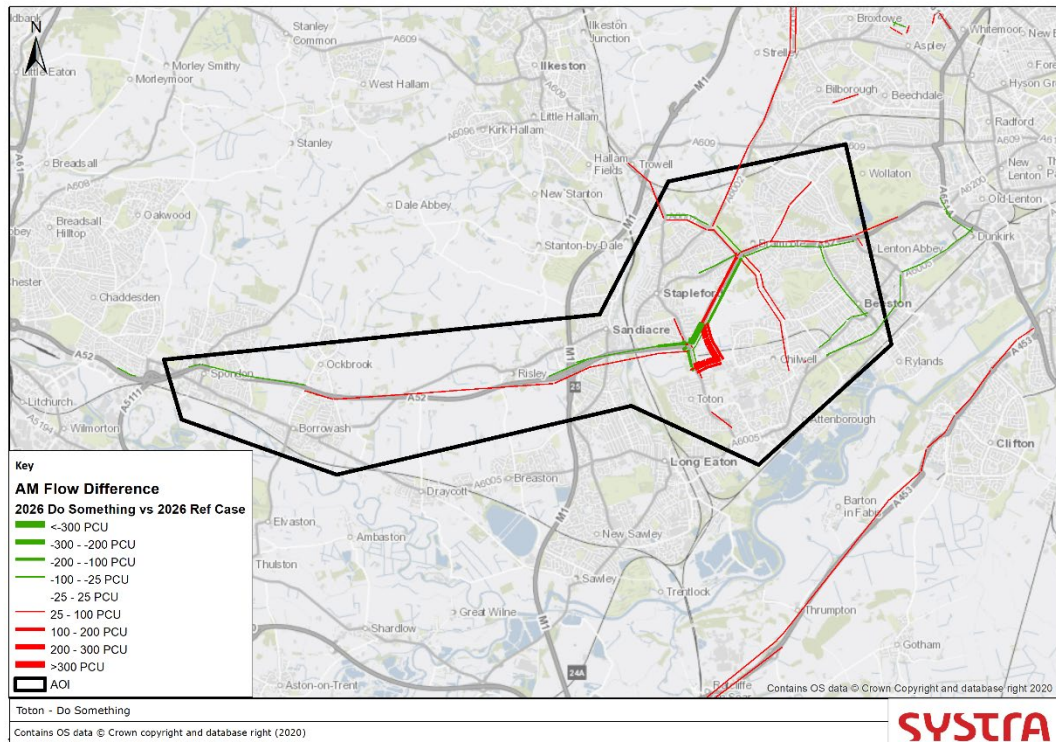


Figure 28. 2026 Do Something vs Reference Case – PM Flow Change

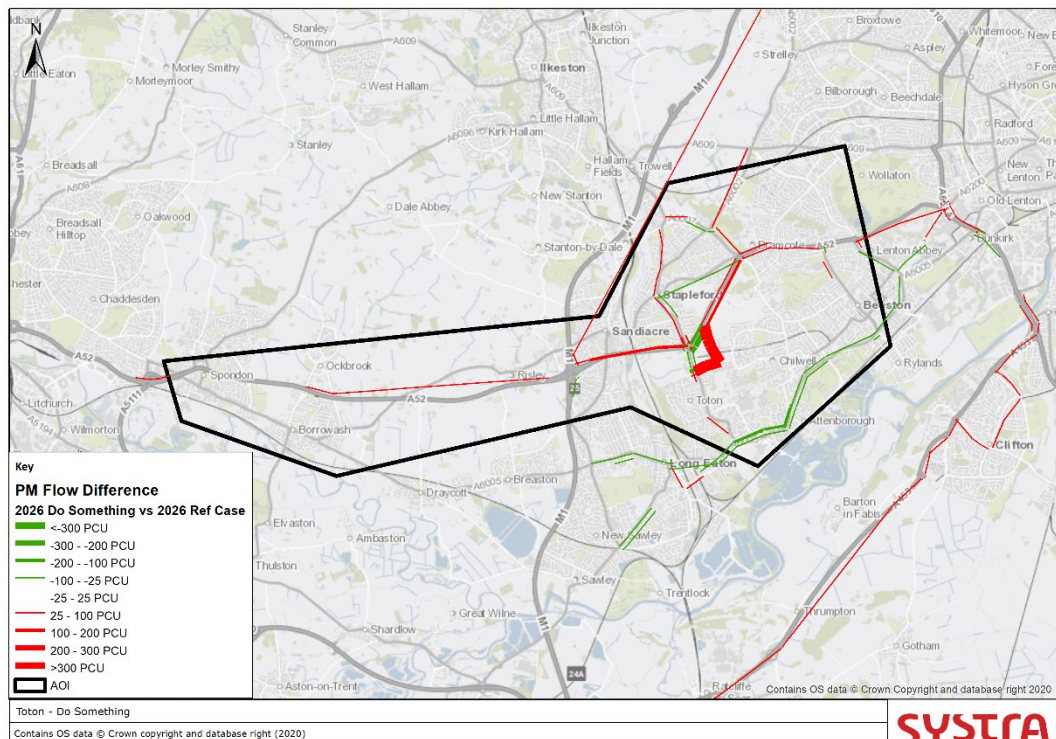


Figure 29. 2041 Do Something vs Reference Case – AM Flow Change

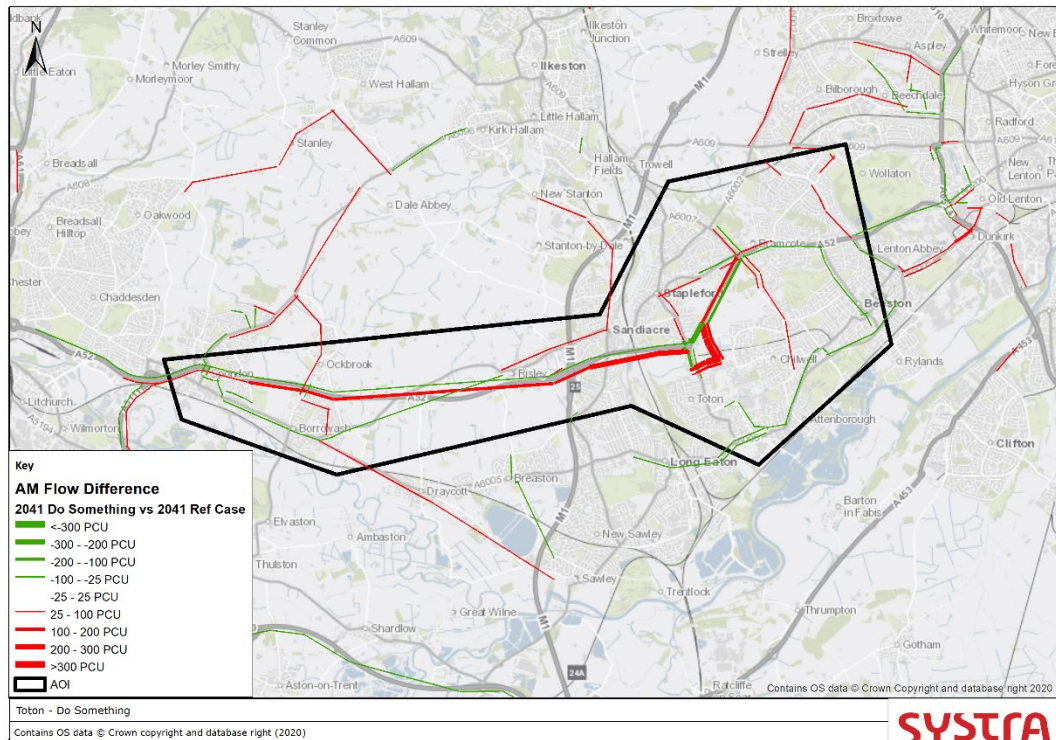
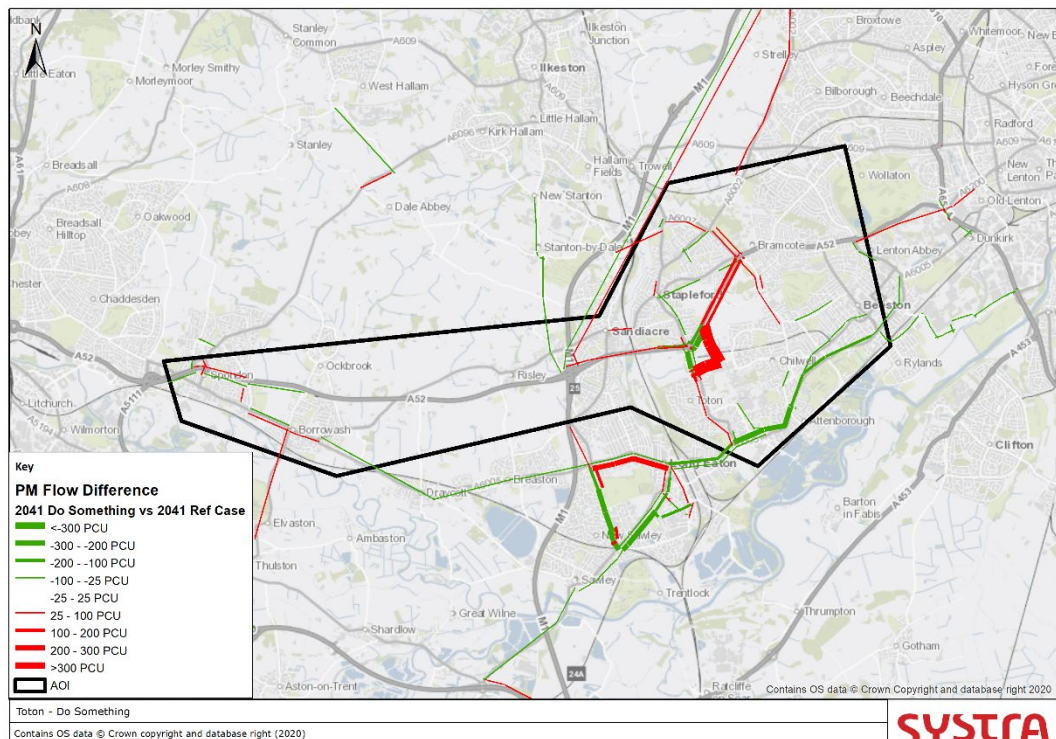


Figure 30. 2041 Do Something vs Reference Case – PM Flow Change



Change in Congested Junctions (V/C%)

8.2.17 Junction congestion is measured by determining the ratio of the volume of traffic to the capacity of traffic that can be accommodated by a junction. A Volume to Capacity percentage

(V/C%) of 85% is considered to be the upper threshold at which the junction is operating effectively. Increasing beyond this increases the likelihood of operational problems including congestion and associated delays and queues. A V/C percentage of $\geq 100\%$ indicates that the junction is being forced to operate beyond its theoretical maximum capacity.

- 8.2.18 Those junctions identified as being $>85\%$ congested within the 'Reference Case' or 'Do Something' scenario are assessed, with 'Do Something' scenario compared to the 'Reference Case' scenario. Figure 15 and Figure 16 show the change in congestion for the AM and PM peaks respectively for 2026. Figure 17 and Figure 18 show the same for 2041.
- 8.2.19 The reduction in flow on Toton Lane between Bardills Roundabout and Toton Link Road results in a reduction in congestion across all years and peaks at:
- Toton Lane P&R junction
 - The Toton Lane approach/exit of Bardills Roundabout
- 8.2.20 In the AM peak of 2026, the increase in flow along the A52 Eastbound from the Toton developments towards Nottingham and Ilkeston/M1 J26 leads to a small increase in congestion at:
- The A52 West (Brian Clough Way) approach/exit of Bramcote Roundabout
 - The A52 East (Derby Road) approach/exit of Bramcote Roundabout
 - The junction of A6007 (Ilkeston Road) with A6002 (Coventry Lane)
- 8.2.21 In 2041 there are more changes to congestion. In both peaks, the congestion at both ends of the Toton Link Road, where it meets the A52 and the B6003 (Toton Lane) is greater than 85% in the Do Something scenario. These junctions are not modelled in the Reference Case, so while a difference cannot technically be calculated, an assumption that they are zero in the Reference Case has been used to show that the junctions are over capacity.
- 8.2.22 In the AM peak of 2041 there is an increase in congestion at the A52 Derby Road/Clifton Boulevard junction. The A52 Clifton Boulevard Southbound on slip blocks back onto the roundabout in the Reference Case, affecting its performance. As a result, many of the arms are close to, or at 85% V/C. The addition of a small amount of flow from Nottingham on the A6200 in the Do Something scenario worsens congestion at the junction, including on the mainline of Clifton Boulevard.
- 8.2.23 Also in the AM peak is a reduction in congestion at junctions on the A52 between Priory Roundabout and Bramcote Roundabout. This is caused by the reduction in flow on the A52 westbound. Additionally, there is a reduction in congestion at junctions on Wollaton Road, this is because fewer vehicles are turning left onto the A52, reducing the block back.
- 8.2.24 In the PM peak there is an increase in V/C on Swiney Way, as a result of traffic blocking back from the junction with the B6003.



Figure 31. 2026 Do Something vs Reference Case – AM Congestion Change

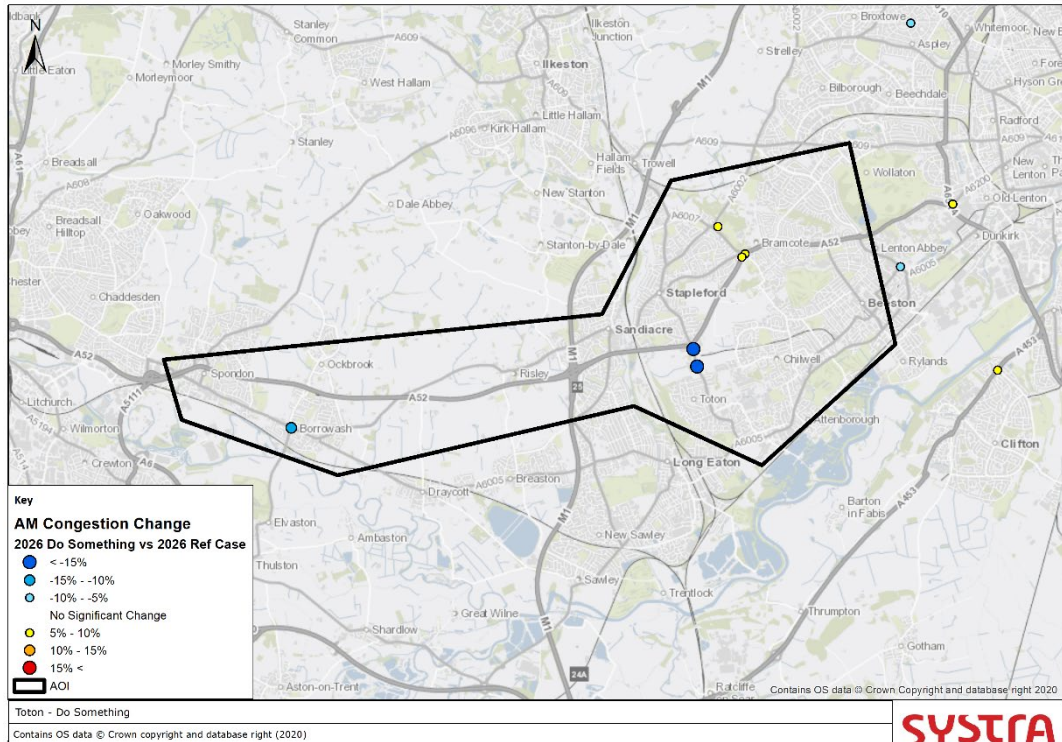


Figure 32. 2026 Do Something vs Reference Case – PM Congestion Change

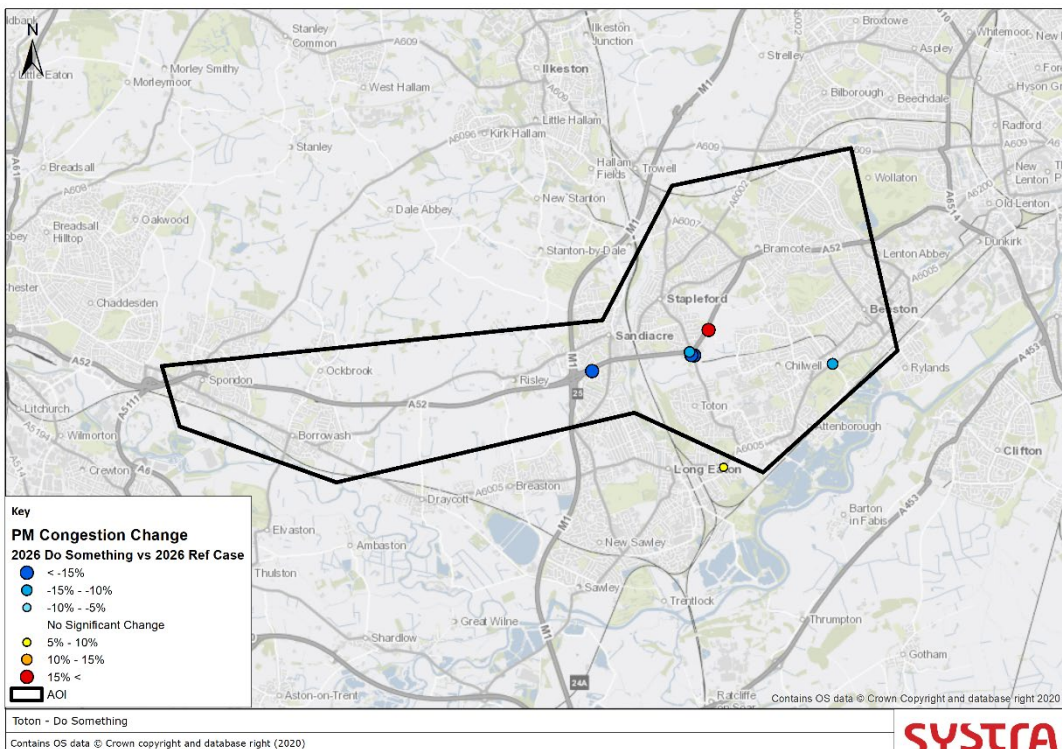


Figure 33. 2041 Do Something vs Reference Case – AM Congestion Change

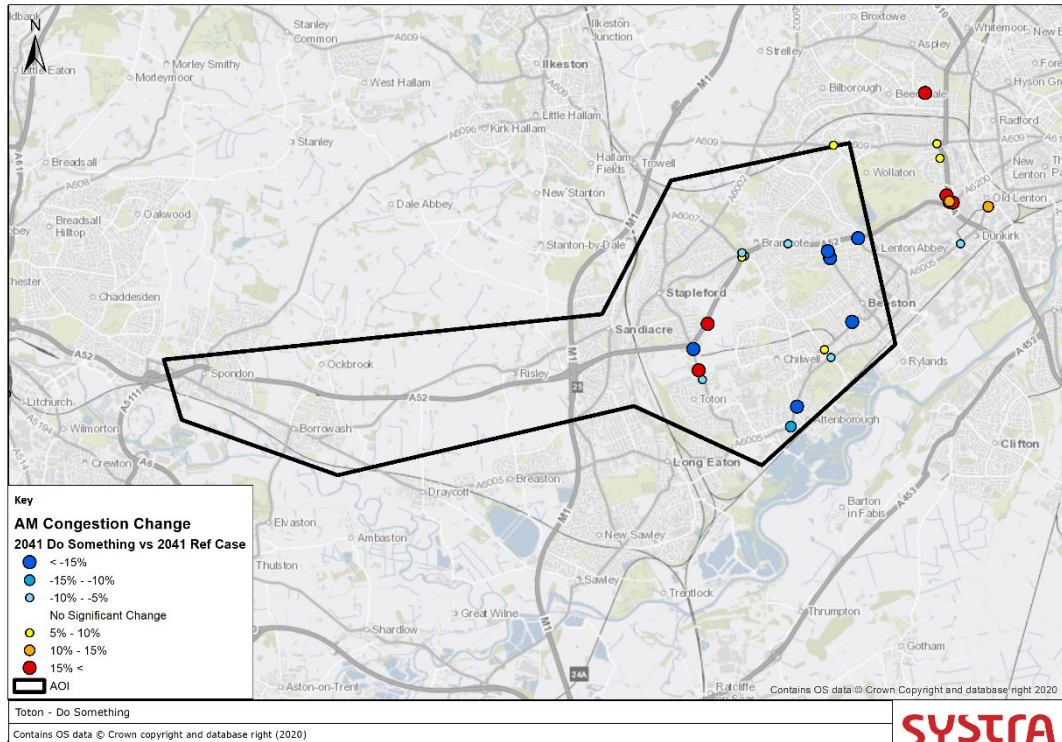
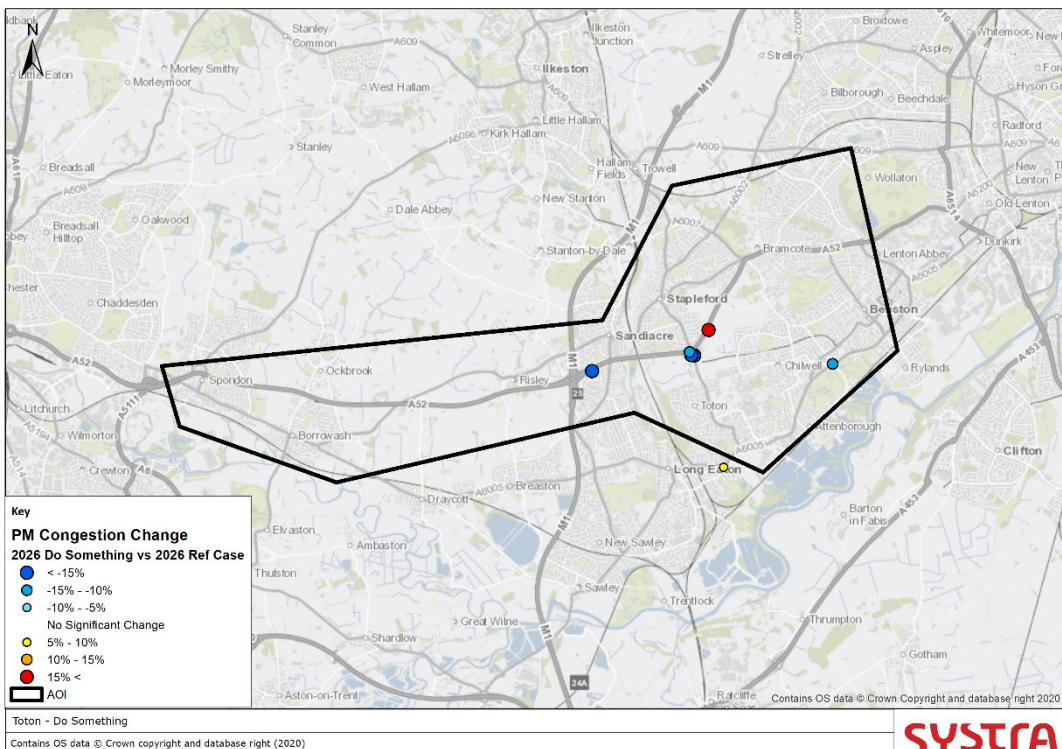


Figure 34. 2041 Do Something vs Reference Case – PM Congestion Change



Network Statistics

8.2.25 Network statistics provide a way of gauging the overall impact from the addition of trips associated with the development sites. An explanation of the key indicators is as follows:

- Congestion / Over Capacity Queues – reflect the change in overall congestion and is the time spent queuing at junctions that are over capacity. As traffic levels increase, a growing number of junctions reach capacity, and the time spent queuing at junctions can increase.
- Total Travel Time – across the highway network in PCU hours.
- Total Travel Distance – across the highway network in PCU kilometres.
- Average Speed – expressed as kilometres per hour, averaged for all traffic. Increased traffic levels lead to greater delays, potentially resulting in a lower average travel speed.

8.2.26 Table 6 displays key network statistics for the 2026 Do Something Scenario compared against the Reference Case, across the whole modelled area. Table 7 shows the same for 2041.

Table 6. 2026 Network Statistics - Do Something Comparison

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 3		% DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Over Capacity Queues (PCU hrs)	8113	7917	8145	8010	0%	1%
Total Travel Time (PCU hrs)	123229	119911	123406	120067	0%	0%
Total Travel Distance (PCU km)	4989561	4882801	4993845	4883299	0%	0%
Average Speed (km/hr)	41	41	41	41	0%	0%

Table 7. 2041 Network Statistics - Do Something Comparison

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 3		% DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Over Capacity Queues (PCU hrs)	13701	12677	13718	12742	0%	1%
Total Travel Time (PCU hrs)	144534	138765	144714	138820	0%	0%
Total Travel Distance (PCU km)	5602270	5440693	5606170	5441483	0%	0%
Average Speed (km/hr)	39	39	39	39	0%	0%

Matrix Totals

8.2.27 Table 8 displays the highway and public transport matrix totals plus the highway mode share for the model area in 2026. Table 9 shows the same for 2041.



Table 8. 2026 Do Something Matrix Totals

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 3		DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Highway Person Demand	419609	467350	420382	467899	774	549
PT Person Demand	38405	34628	38580	34784	174	156
Highway Mode Share	92%	93%	92%	93%		

Table 9. 2041 Do Something Matrix Totals

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 3		DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Highway Person Demand	451262	495049	452139	495677	877	628
PT Person Demand	39723	35793	39914	35959	191	166
Highway Mode Share	92%	93%	92%	93%		

9. SCENARIO 4 ANALYSIS

9.1 Introduction

Scenario 4 includes the same developments as in Scenario 3. The only difference to this scenario is the addition of the Chetwynd Link from Toton Link Road through to Swiney Way, including access to the Chetwynd Barracks development. This scenario has been compared to the Reference Case.

9.2 Key Highway Impacts

Development Distribution

- 9.2.1 Site distribution represents the extent to which development traffic utilises the highway network.
- 9.2.2 For the 2026 year, distribution is shown in Figure 35 and Figure 36. For 2041 this is shown in Figure 37 and Figure 38. These show the routes that the newly generated traffic takes on the network.
- 9.2.3 Despite the addition of the link from Toton Link Road to Swiney Way, most development traffic uses the A52 to enter or exit the development, travelling to/from Derby and Nottingham, with a large proportion also using the M1 South.

Figure 35. 2026 Do Something – AM Distribution

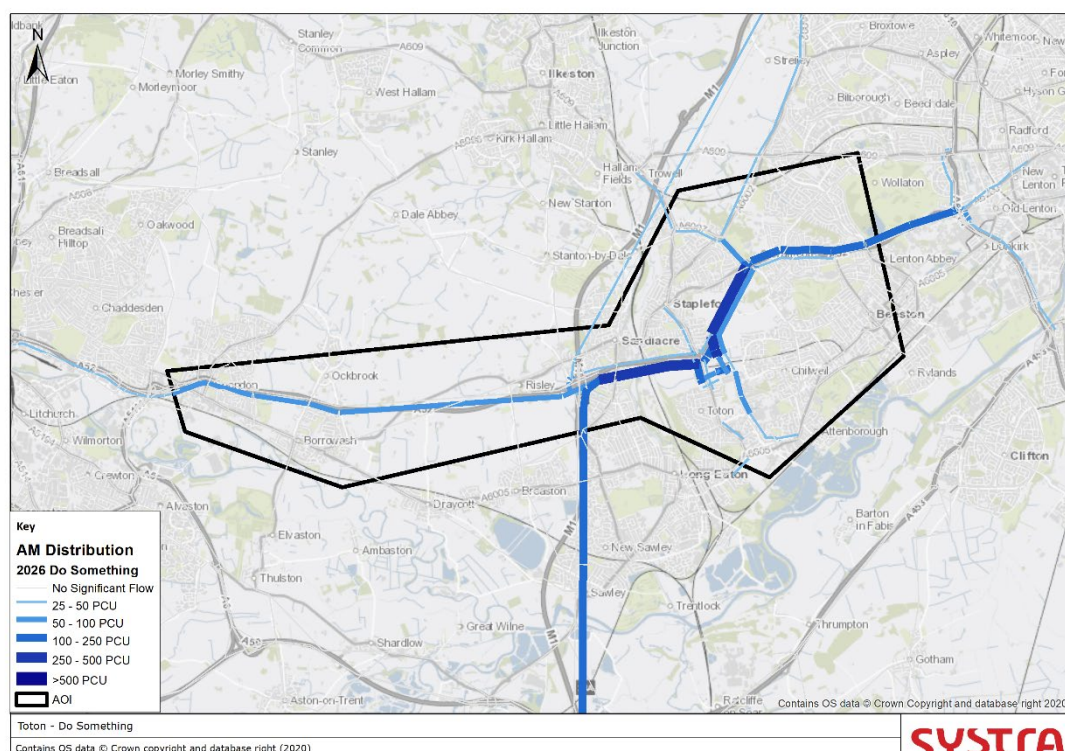


Figure 36. 2026 Do Something – PM Distribution

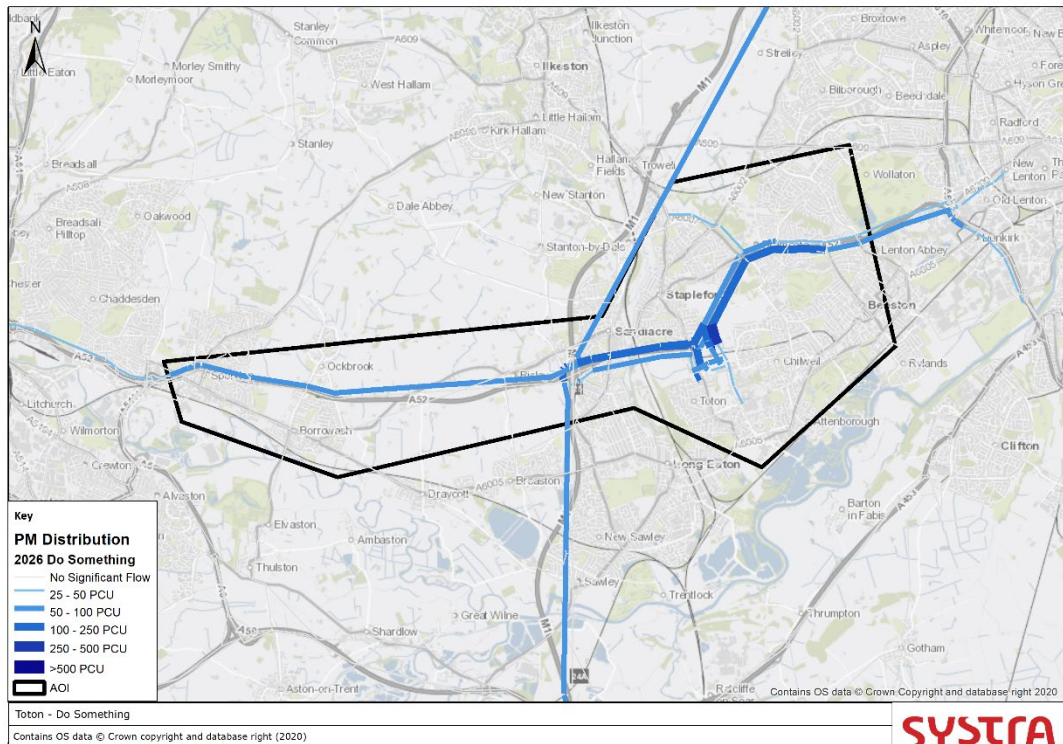


Figure 37. 2041 Do Something – AM Distribution

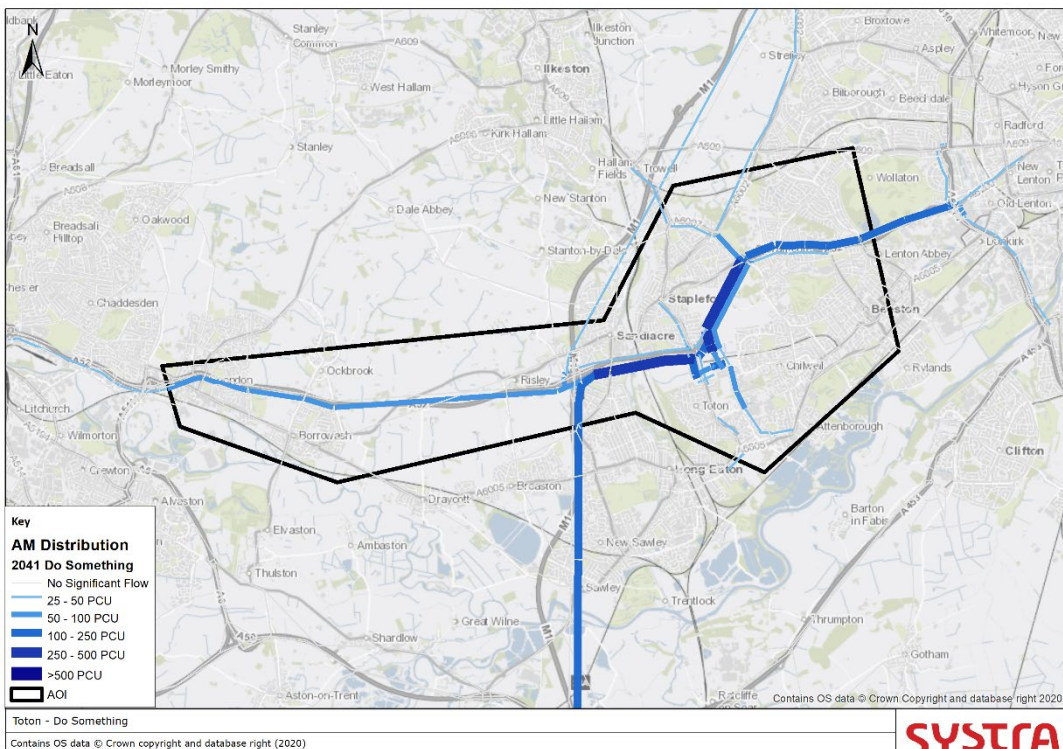
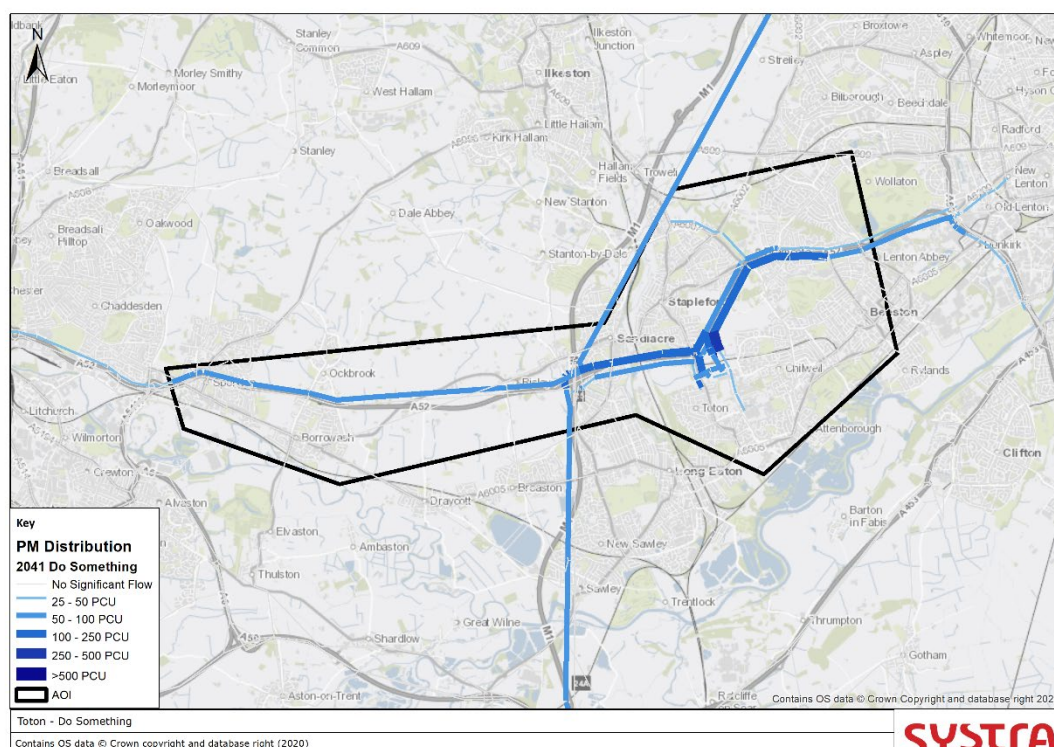


Figure 38. 2041 Do Something – PM Distribution



Background Traffic Reassignment

- 9.2.4 Traffic reassignment plots show the impact on non-development traffic with the introduction of the new development.
- 9.2.5 Figure 39 and Figure 40 show the reassignment in 2026, with Figure 41 and Figure 42 showing the same for 2041.
- 9.2.6 Blue links represent roads which background traffic is moving away from, whilst red links represent roads which experience an increase in traffic. Since demand tends to reassign away from major routes and spread over several minor routes, these plots can often be misinterpreted as an overall flow reduction.
- 9.2.7 As in scenario 3, there is a reduction in non-development traffic using the A52 because of the slower speeds between Bardills and Bramcote. The traffic does not use one singular route to reassign to, instead using many, and including some routes outside of the AOI.
- 9.2.8 This scenario includes a new link between the Toton Link Road and Swiney Way, ultimately providing a new through route between the A6005 Nottingham Road and A52. This adds North – South capacity between the A6005 and A52. Combined with the reduction in non-development traffic using the A52, the Swiney Way, Chetwynd Link, Toton Link Road and A52 all become an attractive routing for traffic between Long Eaton and Nottingham.
- 9.2.9 As a result, traffic reassigns from other North – South routes such as Wollaton Road and Chilwell Lane in favour of the Link Road and A52. This also reduces flow along the A6005, where traffic turns off at Swiney Way rather than continuing.

- 9.2.10 Note that whilst there is an overall reduction in the AM peak of 2026, that reduction is smaller than in other scenarios, showing that some of the traffic that avoids the A52 has been replaced in this scenario by through traffic, towards the A6005.
- 9.2.11 Another result of the addition of the link through Chetwynd is that traffic accessing the Chetwynd Barracks can now do so from the North or South, where in the Reference Case it could only access from the South. There is a shift in the routing used to access/egress the site with the majority of traffic now approaching from/leaving towards the A52.
- 9.2.12 In the PM peak, there is a reassignment away from the A52 westbound towards Derby, with an increase in traffic using the A6005, B6540 and A50 as an alternative. This change in route is caused by:
- Development traffic using the A52 Westbound from Nottingham and the Toton Link Road to access the development sites.
 - Non development traffic using the A52 Westbound and the Toton Link Road as a through route/to access the Chetwynd Barracks site.
 - Block back at the Bardills Roundabout in the Reference Case.

Figure 39. 2026 Do Something vs Reference Case – AM Reassignment

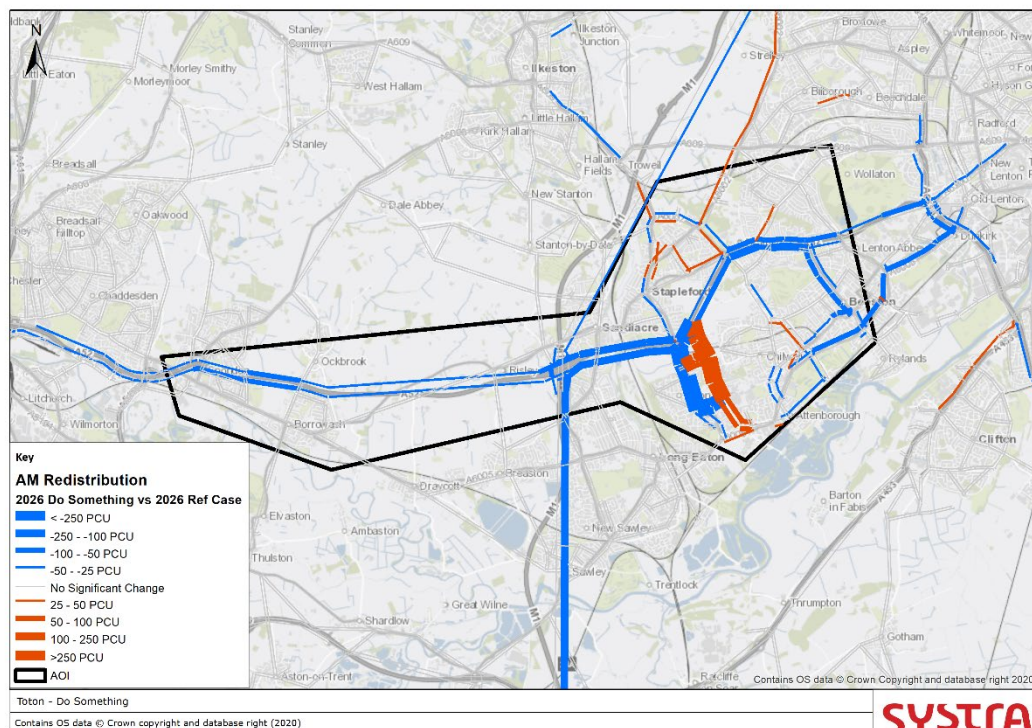


Figure 40. 2026 Do Something vs Reference Case – PM Reassignment

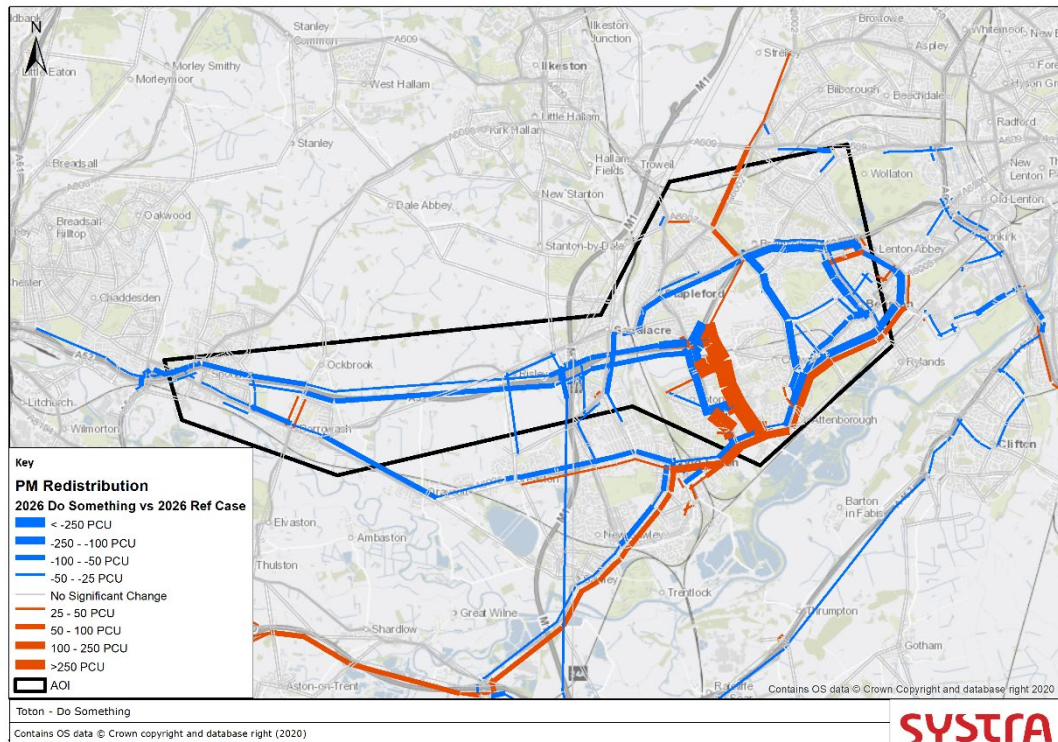


Figure 41. 2041 Do Something vs Reference Case – AM Reassignment

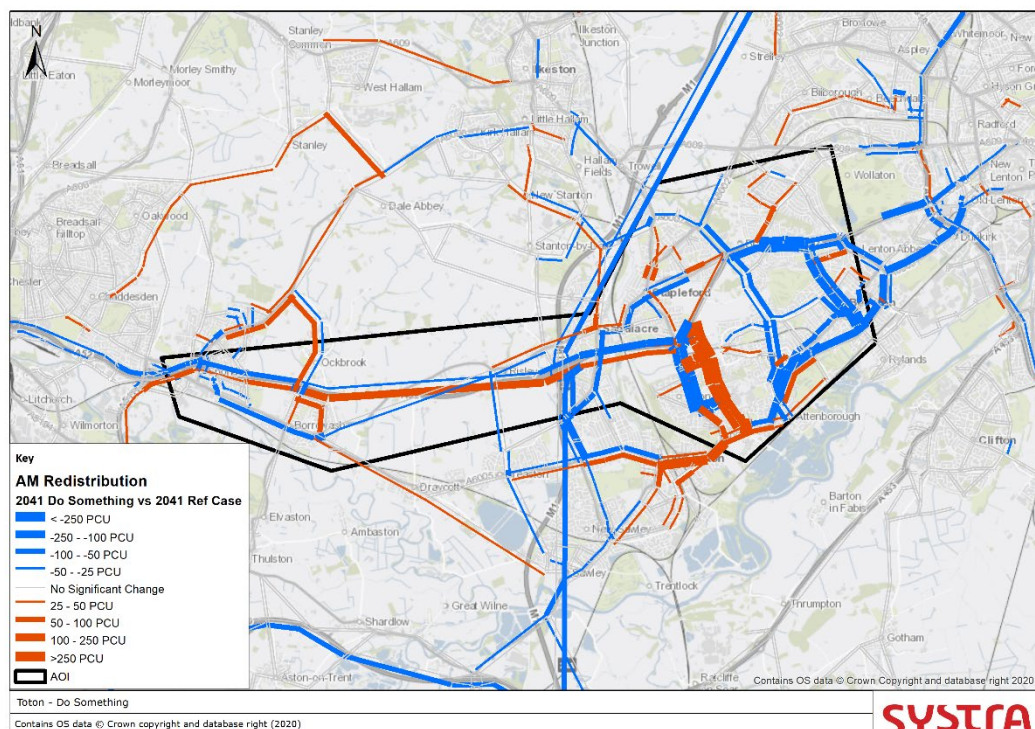
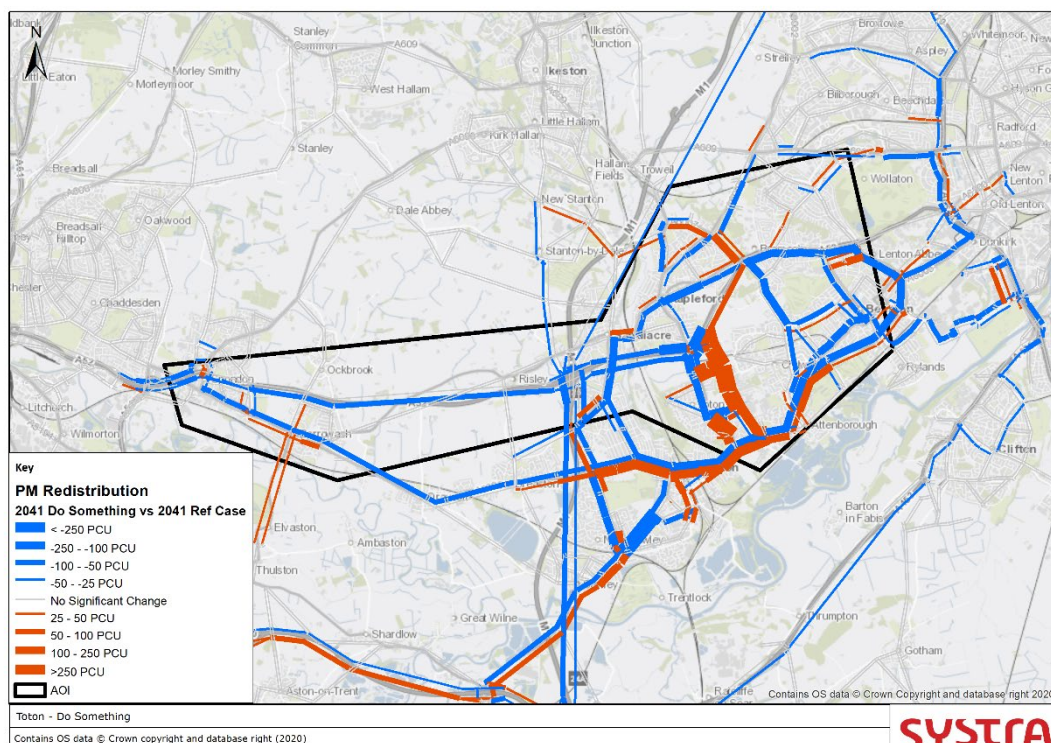


Figure 42. 2041 Do Something vs Reference Case – PM Reassignment



Flow Change

- 9.2.13 Flow change is measured by determining change in actual flow between the Reference Case and the Do Something scenario. Red lines represent roads which experience a net increase in traffic whilst green lines represent roads which experience a net reduction in traffic.
- 9.2.14 In all cases there is a reduction in traffic using Toton Lane between Swiney Way and Bardills Roundabout, as well as on the A52 between the Link Road and Bardills Roundabout in both directions. This is because traffic can now use avoid Toton Lane and instead use Swiney Way and Toton Link Road.
- 9.2.15 In the AM Peak, there is a reduction in flow from M1 J25 and Bardills Roundabout. This is because traffic seeks an alternative route to avoid the delay of the signals. There is an increase in the opposite direction, from Bardills roundabout towards Derby. This increase is traffic leaving the Toton development. There is also an increase on the A52 between the Toton Link Road and Bramcote Island. From here the flow increase is spread between the A52 towards Nottingham, Ilkeston Road and Coventry Lane. This is in part caused by traffic leaving the development, but is also a result of through traffic using Swiney Way, Toton Link Road and the A52 instead of the A6005.
- 9.2.16 In the PM Peak, the reverse is generally true, with an increase in traffic on the A52 towards the development, although there is also an increase in flow on the A52 between Toton Link Road and Bramcote Roundabout, which is caused by the through traffic using Swiney Way, Toton Link Road and the A52 instead of the A6005. There is also an increase in flow along the A6005, B6540 and A50. This is the redistributive effect highlighted above.

Figure 43. 2026 Do Something vs Reference Case – AM Flow Change

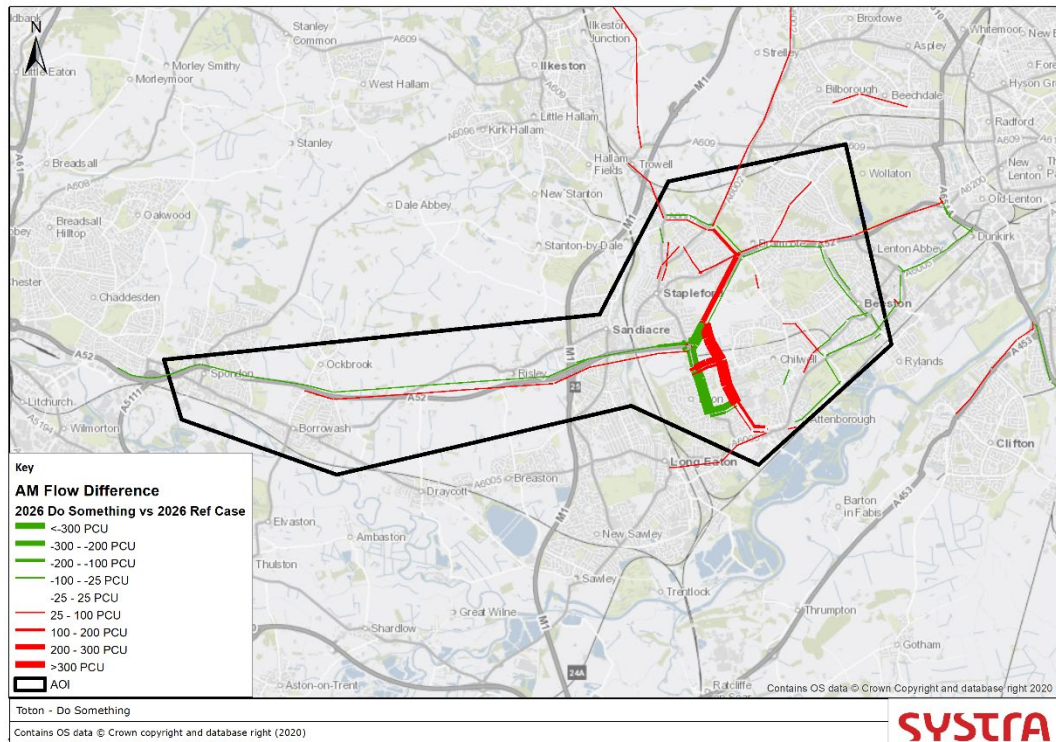


Figure 44. 2026 Do Something vs Reference Case – PM Flow Change

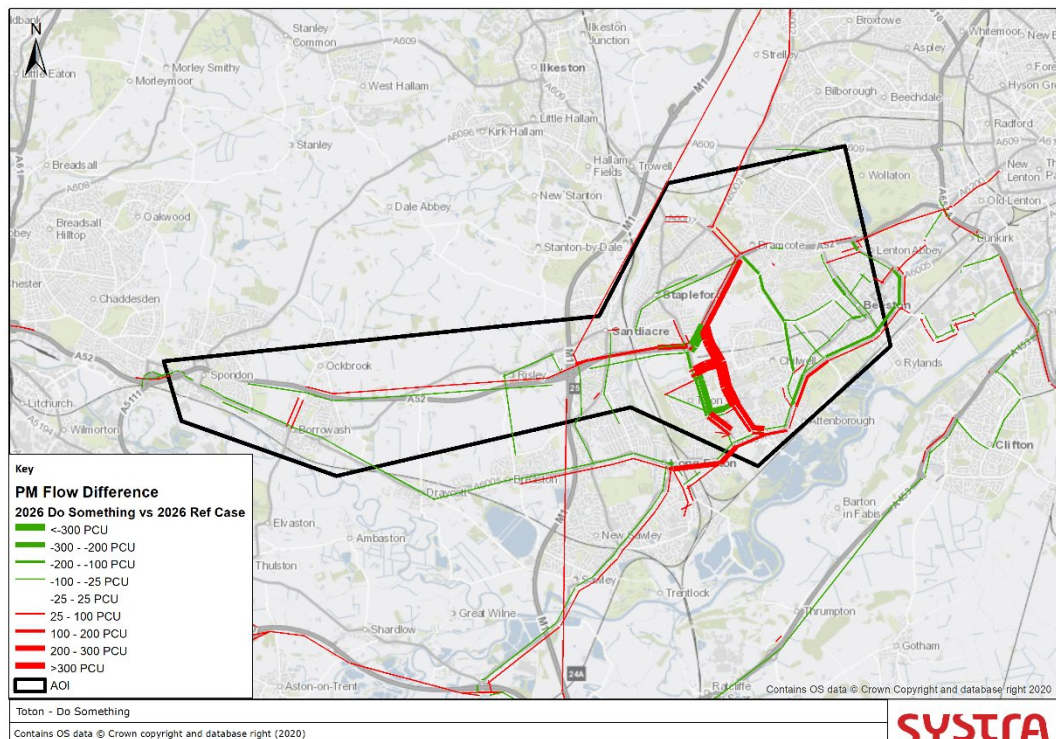


Figure 45. 2041 Do Something vs Reference Case – AM Flow Change

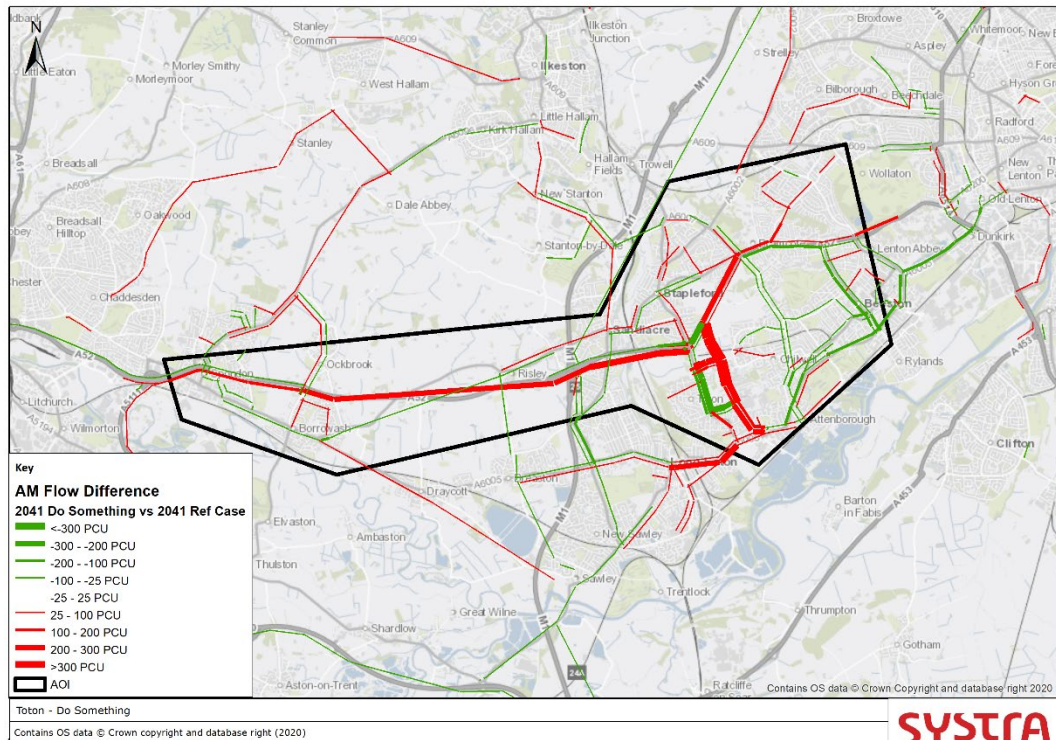
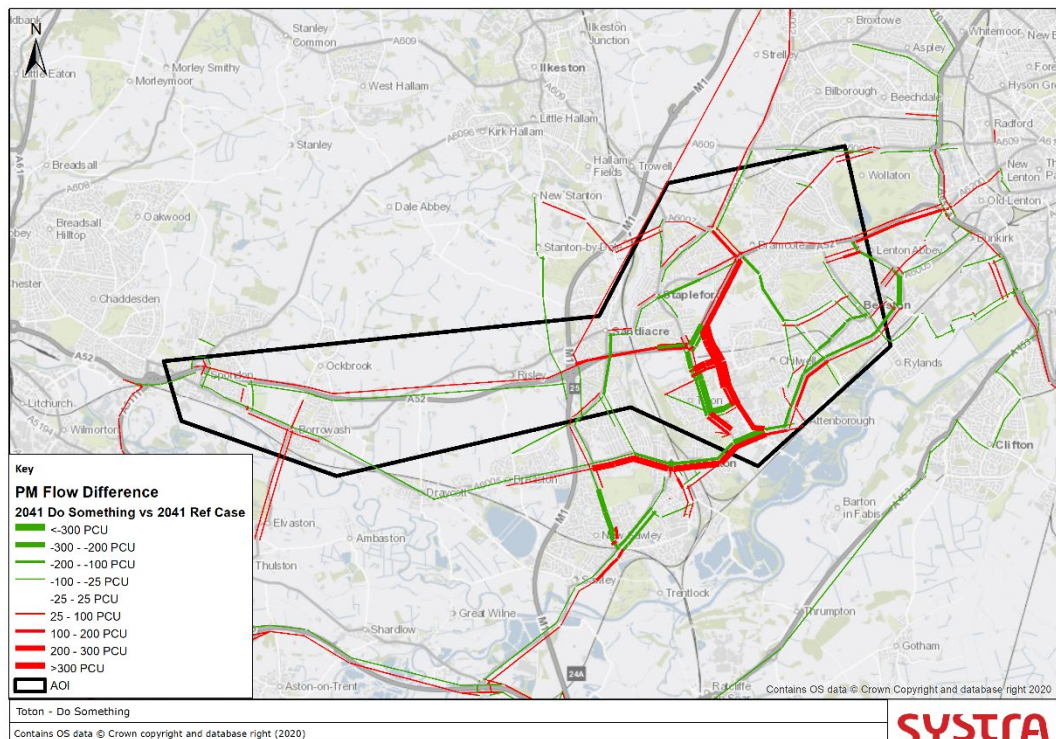


Figure 46. 2041 Do Something vs Reference Case – PM Flow Change



Change in Congested Junctions (V/C%)

9.2.17 Junction congestion is measured by determining the ratio of the volume of traffic to the capacity of traffic that can be accommodated by a junction. A Volume to Capacity percentage

(V/C%) of 85% is considered to be the upper threshold at which the junction is operating effectively. Increasing beyond this increases the likelihood of operational problems including congestion and associated delays and queues. A V/C percentage of $\geq 100\%$ indicates that the junction is being forced to operate beyond its theoretical maximum capacity.

- 9.2.18 Those junctions identified as being $>85\%$ congested within the 'Reference Case' or 'Do Something' scenario are assessed, with 'Do Something' scenario compared to the 'Reference Case' scenario. Figure 47 and Figure 48 show the change in congestion for the AM and PM peaks respectively for 2026. Figure 49 and Figure 50 show the same for 2041.
- 9.2.19 The reassignment of flow from Toton Lane to Swiney Way and the Toton Link Road means that there are increases in congestion at the junctions of the Toton Link road with:
- A52 (Brian Clough Way)
 - B6003 (Toton Lane)
 - Swiney Way
- 9.2.20 Where traffic no longer uses Toton Lane, there is a reduction in congestion at many junctions, such as:
- Bardills Roundabout (specifically the Toton Lane South approach)
 - Swiney Way
 - Woodstock Road
- 9.2.21 In the 2041 year there is a more noticeable impact than in 2026. In this case there are actually many reductions in congestion. Beyond Toton Lane, there are reductions in congestion at junctions on the A52 and on Wollaton Road. These are associated with the reduced flow on the A52, meaning traffic from the minor arms of the junction can exit onto the A52 more easily.
- 9.2.22 There is also a reduction in congestion on the A6005 and Chilwell Road/Middle Street in Beeston. This is caused by the reduction in flow on both routes.



Figure 47. 2026 Do Something vs Reference Case – AM Congestion Change

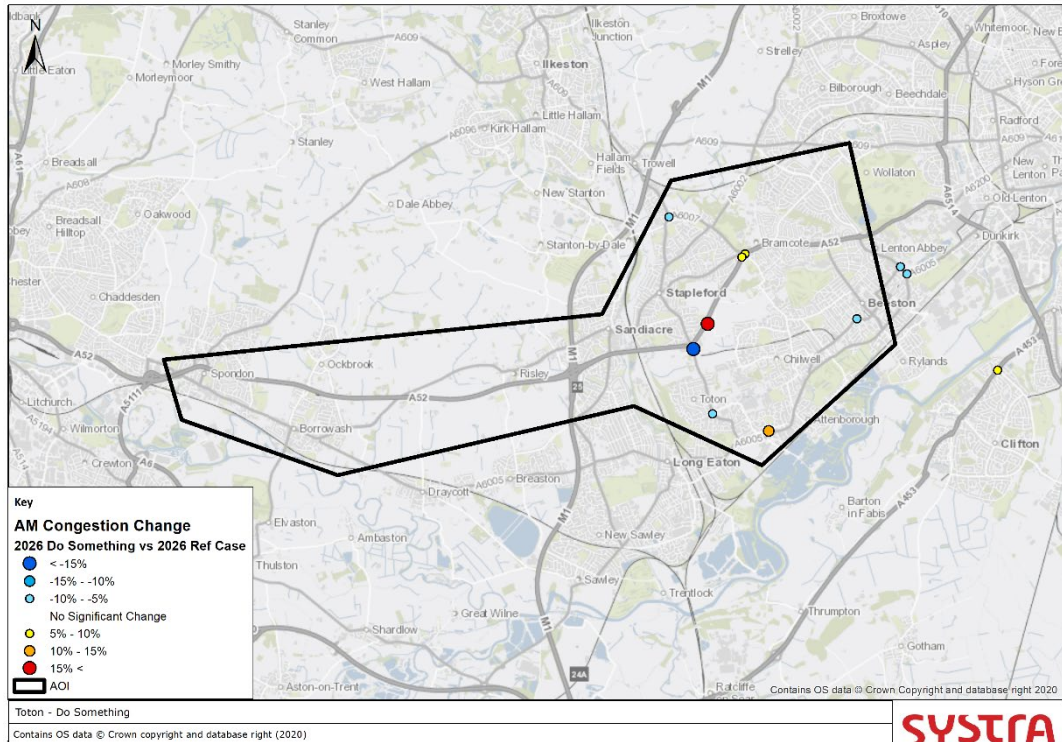


Figure 48. 2026 Do Something vs Reference Case – PM Congestion Change

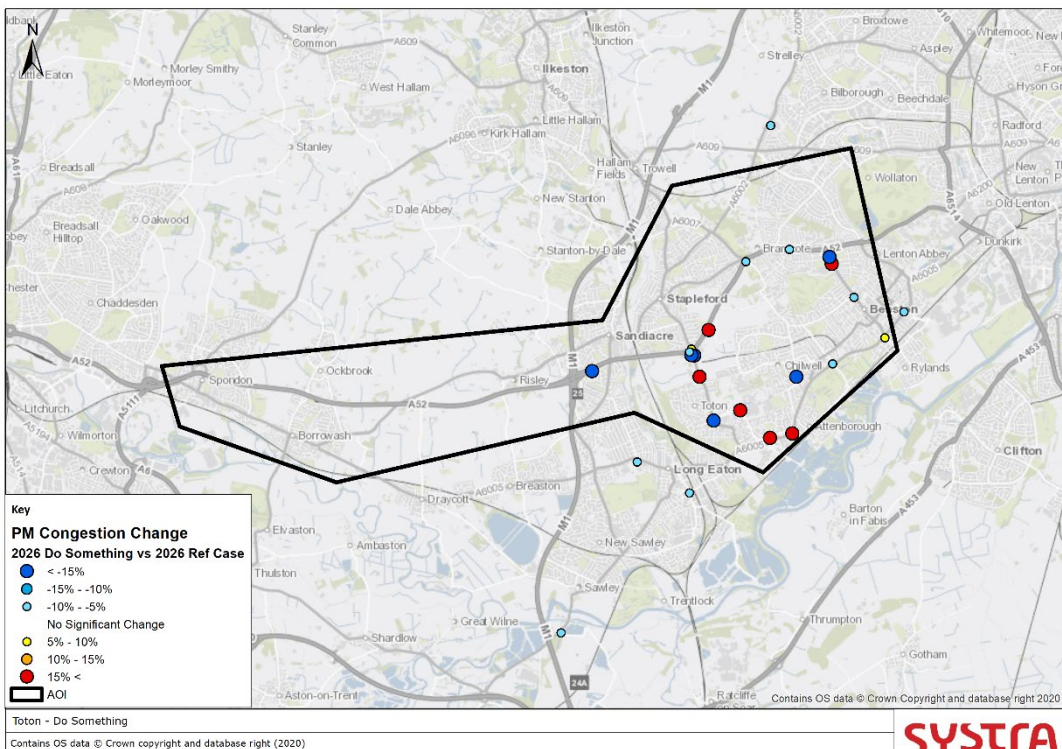


Figure 49. 2041 Do Something vs Reference Case – AM Congestion Change

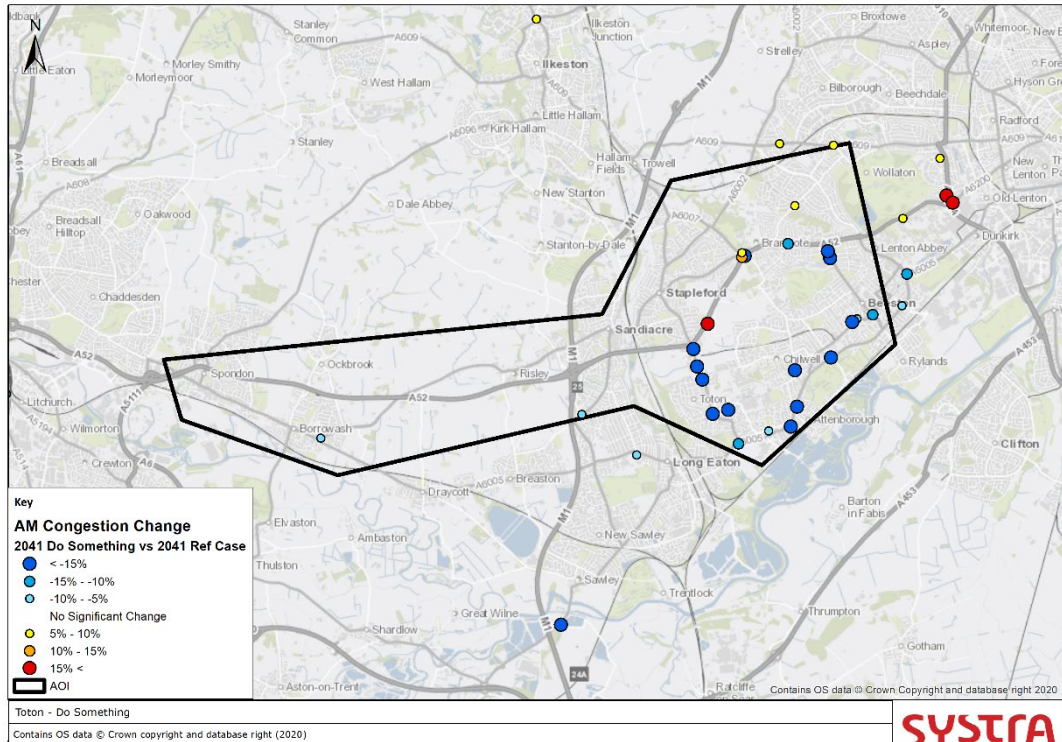
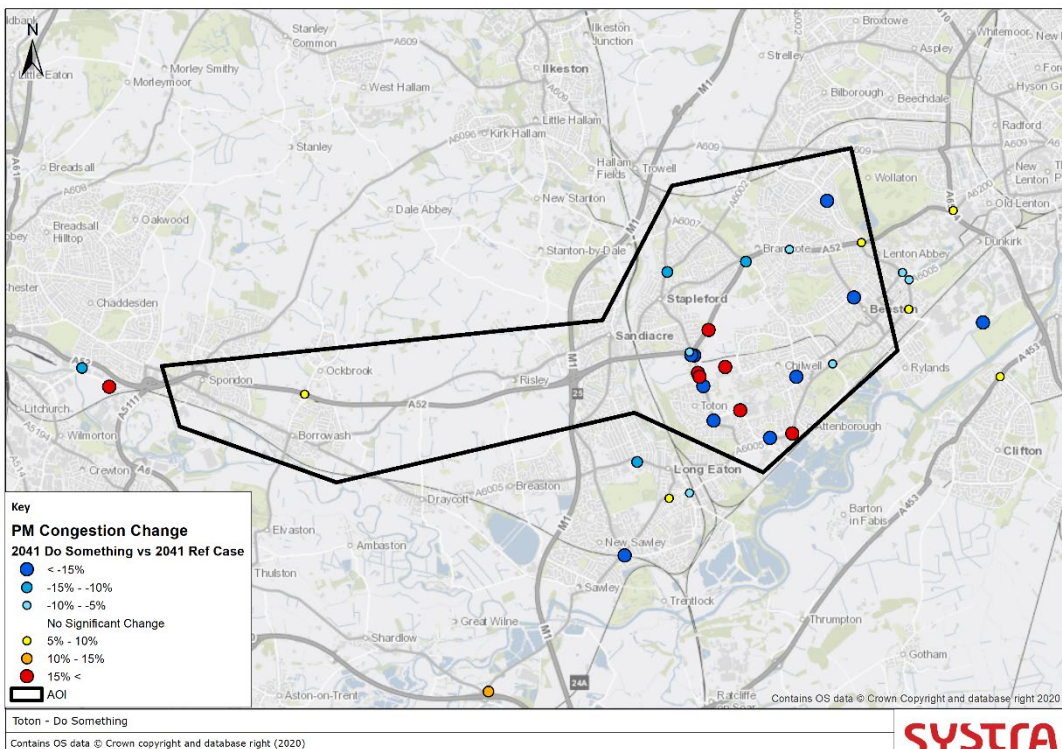


Figure 50. 2041 Do Something vs Reference Case – PM Congestion Change



9.2.23 Network statistics provide a way of gauging the overall impact from the addition of trips associated with the development sites. An explanation of the key indicators is as follows:

- Congestion / Over Capacity Queues – reflect the change in overall congestion and is the time spent queuing at junctions that are over capacity. As traffic levels increase, a growing number of junctions reach capacity, and the time spent queuing at junctions can increase.
- Total Travel Time – across the highway network in PCU hours.
- Total Travel Distance – across the highway network in PCU kilometres.
- Average Speed – expressed as kilometres per hour, averaged for all traffic. Increased traffic levels lead to greater delays, potentially resulting in a lower average travel speed.

9.2.24 Table 10 displays key network statistics for the 2026 Do Something Scenario compared against the Reference Case, across the whole modelled area. Table 11 shows the same for 2041.

9.2.25 In the AM peak of 2026, the addition of the Toton development traffic as well as traffic rerouting away from Beeston, instead using Toton Link Road and the A52 contributes to an increase in travel distance. The increase in use of the Link Road and the A52 towards Bramcote Island leads to increasing congestion at junctions on this route, thus an increase in Over-Capacity Queues. The combination of the increase in distance and queueing means that the increase in travel time is inevitable.

9.2.26 It is worth noting that the congestion in Beeston does not improve significantly following the removal of some traffic. It therefore stands to reason that if more traffic was routed this way, the network statistics would likely be significantly worse than reported below.

9.2.27 As in the AM peak, in the PM peak of 2026, the addition of the Toton development traffic and the traffic rerouting away from Beeston contributes to an increase in travel distance. However, unlike in the AM peak, there is a decrease in congestion at some junctions on the A52 and through Beeston, leading to a reduction in Over-Capacity Queues. The reduction in queueing means that traffic travelling through these junctions does so faster, leading to a reduction in the travel time.

9.2.28 In the AM peak of 2041, there is an increase in the travel distance, for the same reasons identified above. There is a reduction in Over-Capacity Queues as a result of the traffic that reroutes away from the A6005 through Beeston, as evidenced by the congestion plot. However, there is a slight increase in travel time, which is caused by the rerouted traffic using the A52 which becomes more congested at Bardills Roundabout and the junction of Derby Road/Clifton Boulevard and slows traffic down.

9.2.29 The reductions in congestion associated with the A6005 are caused by the reduction in through traffic, allowing traffic on side streets to turn onto the A6005 with less delay. If more traffic was routed along the A6005, there would be a worsening in speeds in the area and journey time across the model would be slower than currently reported.

9.2.30 In the PM peak, there is the same addition of Toton development traffic and rerouting of traffic away from Beeston causes an increase in travel distance. There is also a reduction in congestion in key areas, such as on the A52 and on routes through Beeston like the A6005. This causes a reduction in Over-Capacity Queues. Unlike in the AM peak, whilst there is some increase in congestion on the A52 in places, the reductions are significant and overall reduce

journey times for the rerouted traffic. The reductions in congestion in Beeston also reduce journey time, leading to an overall reduction in journey time in this peak.

Table 10. 2026 Network Statistics - Do Something Comparison

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 4		% DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Over Capacity Queues (PCU hrs)	8113	7917	8160	7727	1%	-2%
Total Travel Time (PCU hrs)	123229	119911	123387	119807	0%	0%
Total Travel Distance (PCU km)	4989561	4882801	4993909	4887054	0%	0%
Average Speed (km/hr)	41	41	41	41	0%	0%



Table 11. 2041 Network Statistics - Do Something Comparison

	REFERENCE CASE SCENARIO		DO SOMETHING SCENARIO 4		% DIFFERENCE	
	AM	PM	AM	PM	AM	PM
Over Capacity Queues (PCU hrs)	13701	12677	13620	12440	-1%	-2%
Total Travel Time (PCU hrs)	144534	138765	144547	138683	0%	0%
Total Travel Distance (PCU km)	5602270	5440693	5607539	5446733	0%	0%
Average Speed (km/hr)	39	39	39	39	0%	0%



10. CONCLUSIONS

10.1 Scenario 1 - Conclusions

- 10.1.1 The addition of 420 houses at Toton West causes a relatively modest increase in flow on the network when compared to the Reference Case.
- 10.1.2 The traffic conditions in the Reference Cases in the area around the proposed development are not ideal, with block back on Bardills roundabout in the PM peak of 2026 and block back on the B6003 as a result of right turning traffic onto Woodstock Road in the AM peak of 2041. The addition of the development exacerbates these issues, with non-development flows being pushed onto the A6005 through Beeston and the B6540 through Long Eaton towards the A50. This flow change is higher than the flow leaving the development.
- 10.1.3 In the other two peaks, the reassignment affect is much less noticeable, with less non-development traffic using the A52 and M1 South, rerouting in smaller numbers to routes such as the A6005.
- 10.1.4 There is also a minimal impact on congestion, with the most noticeable impacts being the increase in V/C at Bardills Roundabout, specifically the arm with the B6003 South, where development traffic accesses the SRN and at junctions along the A6005.

10.2 Scenario 3 - Conclusions

- 10.2.1 The addition of the Toton Link Road slows down traffic on the A52 because the junction is signalised. Traffic that is not associated with the development reroutes to avoid the area, giving development traffic access to the M1, Derby and Nottingham without contributing to increasing congestion.
- 10.2.2 The rerouted non-development traffic uses many different routes including local roads and routes away from the AOI, as far away as the A38 north of Derby and A46 north of Leicester.
- 10.2.3 There is also a secondary effect on the A6005 in Beeston, where the improvement in conditions on the A52 makes that route more attractive. Traffic reassigns from as far away as A50 J1 and uses the M1 and A52 instead of the route through Long Eaton and Beeston to reach Nottingham.
- 10.2.4 With higher levels of traffic in 2041 compared to 2026, the junctions at either end of the Toton Link Road become congested ($V/C > 85\%$). This is a result of more through traffic using the link road.

10.3 Scenario 4 - Conclusions

- 10.3.1 The addition of the connection to Chetwynd Barracks and Swiney Way provides a complete North – South route and a new way to access the Chetwynd Barracks site. At the same time, the introduction of the signalised junction of the A52 with Toton Lane slows down traffic on the A52. This makes the A52 less attractive for through trips.
- 10.3.2 The capacity that is gained by the rerouting of through trips on the A52 is taken up by development traffic to/from the Toton development, as well as traffic which is using a combination of Toton Link Road and the A52 as a more attractive route between Long Eaton and Nottingham. This causes a reduction in flow through Beeston and also on other North to South routes such as the B6003 (Toton Lane/Stapleford Lane) and the B6006 (Wollaton Road).



- 10.3.3 The increased use of Swiney Way, Toton Link Road and the A52 cause increases in congestion at key junctions like the A6005 junction with Swiney Way and Bardills Roundabout, whilst also creating congestion at the new junction of the A52 with Toton Link Road.
- 10.3.4 There are also reductions in congestion at many junctions in 2041, most notably at junctions in Beeston along the A6005 and Chilwell Road/Middle Street. These routes were near or at capacity, meaning that turns onto them incur delay. A slight reduction in flow on them therefore improves delay and congestion significantly.



APPROVAL

Version	Name		Position	Date	Modifications
1	Author	Huw Harrhy	Consultant	10/06/2026	
	Checked by	Helen O'Mara	Associate Director	10/06/2026	
	Approved by				
2	Author	Huw Harrhy	Consultant	08/07/2026	Addition of Scenario 1 (Toton West)
	Checked by	Helen O'Mara	Associate Director	15/07/2026	
	Approved by				
3	Author	Huw Harrhy	Consultant	30/07/2026	Addition of Scenario 4 (Full Scenario + Chetwynd)
	Checked by	Helen O'Mara	Associate Director	30/07/2026	
	Approved by				

