Appendix E

Catford Town Centre MRN SOBC

Forecasting Report

Transport for London

May 2021

Quality information

Prepared by	Checked by	Verified by	Approved by
Steven Wybar Consultant	Aled Davies Associate Director	Siamak Khorgami Regional Director	Siamak Khorgami Regional Director

Revision History

Revision	Revision date	Details	Authorized	Name	Position
v0.1	23/02/2021	Internal draft			
v1.0	28/04/2021	Client draft	Yes	Siamak Khorgami	Regional Director
v2.1	28/05/2021	Final report following client comments	Yes	Siamak Khorgami	Regional Director

Prepared for:

Transport for London

Prepared by:

AECOM Limited
AECOM House
63-77 Victoria Street
St Albans
Hertfordshire AL1 3ER
United Kingdom

T: +44(0)1727 535000
aecom.com

Table of Contents

Figures

Tables

1. Introduction

1.1 Background

1.1.1 Transport for London (TfL) are currently working on the preparation of a Strategic Outline Business Case (SOBC) with a view to preparing a subsequent Outline Business Case (OBC) for the Catford Town Centre Major Road Network (MRN) scheme. The Catford scheme has been identified as one of the schemes that TfL are bringing forward for application to the Department for Transport (DfT) for funding through the Major Road Network and Large Local Majors programmes investment planning. The scheme aims to transform Catford Town Centre from an area dominated by motor traffic to a place that supports pedestrians, cyclists and public transport. TfL has commissioned AECOM to undertake transport modelling and transport economic assessment for an SOBC for this scheme which requires modelling and appraisal using a bespoke model of the Catford area derived from TfL's London Highway Assignment Model (LoHAM).

1.1.2 As part of this study AECOM undertook a review of the highway model base year, the findings of which are reported in a model review report[1]. The conclusions were that the model was deemed suitable for undertaking scheme assessment for SOBC (subject to some minor network edits explained in Section 2.4) with recommendations for further work to be undertaken ahead of OBC.

1.2 Purpose of this Report

1.2.1 This report sets out the work undertaken to produce the highway assignment forecasts for 2026, 2031 and 2041, both without and with the scheme. It explains the forecasting assumptions and presents the results from the Without Scheme and With Scheme forecasts, as well as results from the TAG high and low growth sensitivity tests. The report demonstrates that the results from the scheme testing are plausible and suitable to be carried forward to economic assessment.

1.2.2 It should be noted that as this is a strategic model the analysis does not focus on the assessment of bus or cycle impacts, or local access issues. These will be covered by operational modelling which is being undertaken in parallel.

1.3 Document Structure

1.3.1 The remainder of this document comprises the following sections:

- Chapter 2 - Forecasting Assumptions;
- Chapter 3 - Without Scheme Forecast Results;
- Chapter 4 - With Scheme Forecast Results;
- Chapter 5 - TAG High/Low Growth Sensitivity Testing; and
- Chapter 6 - Summary

[1] 'Catford MRN OBC Model Review Report v1.2.pdf' – March 2021

2. Forecasting Assumptions

2.1 Introduction

2.1.1 This section sets out the key assumptions adopted in modelling the Catford Town Centre scheme. Information on the derivation of the Catford model from LoHAM and other key forecast model information can be found in the Catford model forecasting report[2].

2.2 Modelled years and user classes

2.2.1 Catford model highway assignment forecasts have been produced for 2026, 2031 and 2041, without and with the scheme. The table below sets out the user classes modelled in each forecast year. The user classes modelled in 2026 differ from those in 2031 and 2041 (and the base year) due to the modelling of ULEZ which requires splitting of the matrix into user classes which are compliant and not compliant with the emissions thresholds required by ULEZ. ULEZ is expected to be removed by 2031 and therefore for later forecast years the number of user classes is the same as the base year model.

Table 2-1: Modelled User Classes by Forecast Year

2026	2031	2041
Car In Work (Compliant)	Car In Work	Car In Work
Car In Work (Non-Compliant)	Car Out of Work	Car Out of Work
Car Out of Work (Compliant)	Private Hire Vehicles	Private Hire Vehicles
Car Out of Work (Non-Compliant)	Taxi	Taxi
Private Hire Vehicles	LGV	LGV
Taxi	OGV	OGV
LGV (Compliant)		
LGV (Non-Compliant)		
OGV		

2.3 Growth and network assumptions

2.3.1 The forecast year matrices were created using growth derived from the standard TfL London Transportation Studies (LTS) Reference Case model scenarios, applied to the calibrated base year HAM matrices. These assume growth according to London Plan 2016 and do not allow for changes in behaviour arising from the COVID-19 pandemic. Further details can be found in Section 2 of the Catford model forecasting report.

2.3.2 Forecast year network schemes assumed within the area of impact are Lewisham Gateway and Crystal Palace Parade, both of which are assumed to be present in all forecast years. Further afield, the Silvertown Tunnel is also assumed to be present in all forecast years.

[2] '415912_TfL_Task189_MRN_Catford_Forecasting_v1.2.pdf' – Catford Town Centre – Healthy Streets scheme, Do Minimum Traffic Forecasts, November 2020

2.4 Base Year Network Changes

2.4.1 As part of the work undertaken to review the model base year, a number of minor network edits were undertaken to correct link length discrepancies identified in the network audit (see Section 3.2 of the model review report). These changes were applied in the base year network and the matrices reassigned to confirm that flow and delay changes were relatively small and had little impact on base year model performance. These changes were carried forward to the forecast year networks used in this assessment.

2.5 Scheme coding assumptions

2.5.1 The Catford town centre scheme was coded according to the scheme plan provided by TfL[3]. This included signal stage information. In summary, the scheme introduces two-way traffic two all sides of the existing gyratory, as well as moving the A205 Catford Road arm of the gyratory to the south of Laurence House to create a western arm to the existing Bromley Road/Rushey Green/Sangley Road junction.

2.5.2 Junction capacity was coded in line with the TfL coding guidance. In most cases the central saturation flows were used, however in cases where the base year network featured deviations from the central values and where junction layout remained broadly similar with the scheme, these deviations were retained.

2.5.3 Appropriate green and intergreen times were coded into the model networks according to the signal stage information provided which was then refined depending on the outcome of initial assignments to ensure that unreasonable levels of delay were removed. These signal timings were reviewed and verified by the TfL Network Management team.

2.6 Variable demand modelling

2.6.1 As part of the wider study, an assessment was undertaken to determine whether variable demand modelling was required to evaluate the impacts of the scheme. This assessment showed that the variable demand impacts were minimal and would likely fall within the range of model error. The details of this assessment as set out in Appendix A. As a result, demand has been fixed and the same highway assignment matrices have been used for the Without Scheme and With Scheme scenarios in each year and time period.

[3] "PJ569C-RSM-FEA-07-SK-TE-01.pdf" 28 February 2020

3. Without Scheme Forecast Results

3.1 Introduction

3.1.1 This section sets out the key information related to the Without Scheme scenario assignments in terms of highway statistics, traffic flows, delays and routeing through the Catford gyratory. These are based on core growth assumptions, in contrast to the next section which reports on the high and low growth sensitivity scenarios.

3.2 Borough Statistics

3.2.1 Table 3-1 to Table 3-3 show the key highway assignment statistics for the Base Year and Without Scheme scenarios for 2026 and 2041 in the AM Peak, Interpeak and PM Peak, for Lewisham and the surrounding boroughs. They demonstrate the impact of traffic growth due to forecast population and employment increases. Total distance travelled in Lewisham is forecast to increase by 3-4% to 2026 and 8-11% to 2041 from 2016, and total travel time is forecast to increase by 7-9% and 17-22% to 2026 and 2041 respectively. This translates into a reduction in average speed of 3-5% to 2026, and 5-10% to 2041. The other boroughs presented show similar patterns of change, with congestion in Greenwich and Bromley generally expected to increase more than in Southwark.

Table 3-1: Borough Statistics by Modelled Year – Base Year and Without Scheme – AM Peak

Borough	Metric	2016 Base	2026 Without Scheme	Change from 2016	2041 Without Scheme	Change from 2016
Lewisham	Travel Distance (pcu-km)	100,753	104,692	4%	110,524	10%
	Travel Time (pcu-hours)	5,691	6,227	9%	6,934	22%
	Average Speed (kph)	17.7	16.8	-5%	15.9	-10%
Greenwich	Travel Distance (pcu-km)	197,794	206,861	5%	222,445	12%
	Travel Time (pcu-hours)	7,634	8,694	14%	9,662	27%
	Average Speed (kph)	25.9	23.8	-8%	23.0	-11%
Bromley	Travel Distance (pcu-km)	245,261	261,970	7%	277,612	13%
	Travel Time (pcu-hours)	9,844	11,122	13%	12,744	29%
	Average Speed (kph)	24.9	23.6	-5%	21.8	-13%
Southwark	Travel Distance (pcu-km)	86,650	90,290	4%	97,524	13%
	Travel Time (pcu-hours)	4,919	5,271	7%	5,803	18%
	Average Speed (kph)	17.6	17.1	-3%	16.8	-5%

Table 3-2: Borough Statistics by Modelled Year – Base Year and Without Scheme – Interpeak

Borough	Metric	2016 Base	2026 Without Scheme	Change from 2016	2041 Without Scheme	Change from 2016
Lewisham	Travel Distance (pcu-km)	84,663	87,745	4%	93,746	11%
	Travel Time (pcu-hours)	4,108	4,380	7%	4,812	17%
	Average Speed (kph)	20.6	20.0	-3%	19.5	-5%
Greenwich	Travel Distance (pcu-km)	165,863	171,907	4%	185,299	12%
	Travel Time (pcu-hours)	5,482	5,789	6%	6,363	16%
	Average Speed (kph)	30.3	29.7	-2%	29.1	-4%
Bromley	Travel Distance (pcu-km)	183,173	195,364	7%	213,079	16%
	Travel Time (pcu-hours)	6,497	6,963	7%	7,701	19%
	Average Speed (kph)	28.2	28.1	0%	27.7	-2%
Southwark	Travel Distance (pcu-km)	75,826	78,690	4%	83,807	11%
	Travel Time (pcu-hours)	4,012	4,251	6%	4,637	16%
	Average Speed (kph)	18.9	18.5	-2%	18.1	-4%

Table 3-3: Borough Statistics by Modelled Year – Base Year and Without Scheme – PM Peak

Borough	Metric	2016 Base	2026 Without Scheme	Change from 2016	2041 Without Scheme	Change from 2016
Lewisham	Travel Distance (pcu-km)	99,022	102,070	3%	107,237	8%
	Travel Time (pcu-hours)	5,369	5,776	8%	6,416	19%
	Average Speed (kph)	18.4	17.7	-4%	16.7	-9%
Greenwich	Travel Distance (pcu-km)	203,711	212,485	4%	225,355	11%
	Travel Time (pcu-hours)	7,732	8,592	11%	9,438	22%
	Average Speed (kph)	26.3	24.7	-6%	23.9	-9%
Bromley	Travel Distance (pcu-km)	238,877	253,560	6%	271,335	14%
	Travel Time (pcu-hours)	9,402	10,335	10%	11,713	25%
	Average Speed (kph)	25.4	24.5	-3%	23.2	-9%
Southwark	Travel Distance (pcu-km)	84,964	87,015	2%	90,294	6%
	Travel Time (pcu-hours)	4,718	4,855	3%	5,197	10%
	Average Speed (kph)	18.0	17.9	0%	17.4	-4%

3.3 Traffic Flow Forecasts

3.3.1 Figure 3-1 to Figure 3-4 show forecast traffic flows in the vicinity of the scheme in the 2026 and 2041 Without Scheme scenario for the AM and PM Peaks.

3.3.2 In the 2026 AM Peak, forecast flows around the gyratory range from between 1,000 and 1,500 pcus/hour. In terms of the approach and exit arms, the western Catford Road arm carries the most traffic at around 1,000 to 1,500 pcus/hr with generally less traffic on the other arms. Flows in the PM Peak are generally higher with forecast flows consistently around 1,400 pcus/hr on the gyratory, and a similar pattern of higher flow on the western arm.

3.3.3 As would be expected in 2041, forecast flows increase generally while retaining the pattern observed in the 2026 forecasts. The increases in flow are relatively small which suggests growth in traffic is being constrained by capacity issues around the gyratory and in the wider area.

Figure 3-1: 2026 Without Scheme Traffic Flow - AM Peak

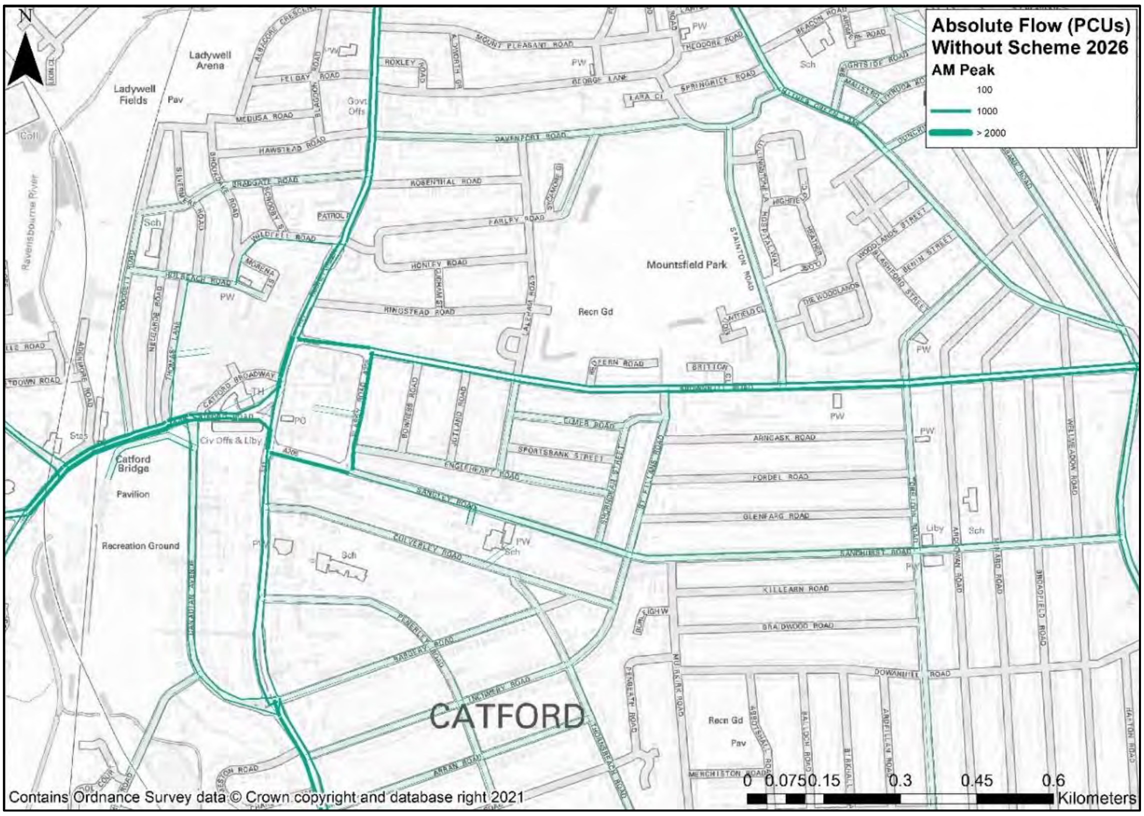


Figure 3-2: 2026 Without Scheme Traffic Flow - PM Peak

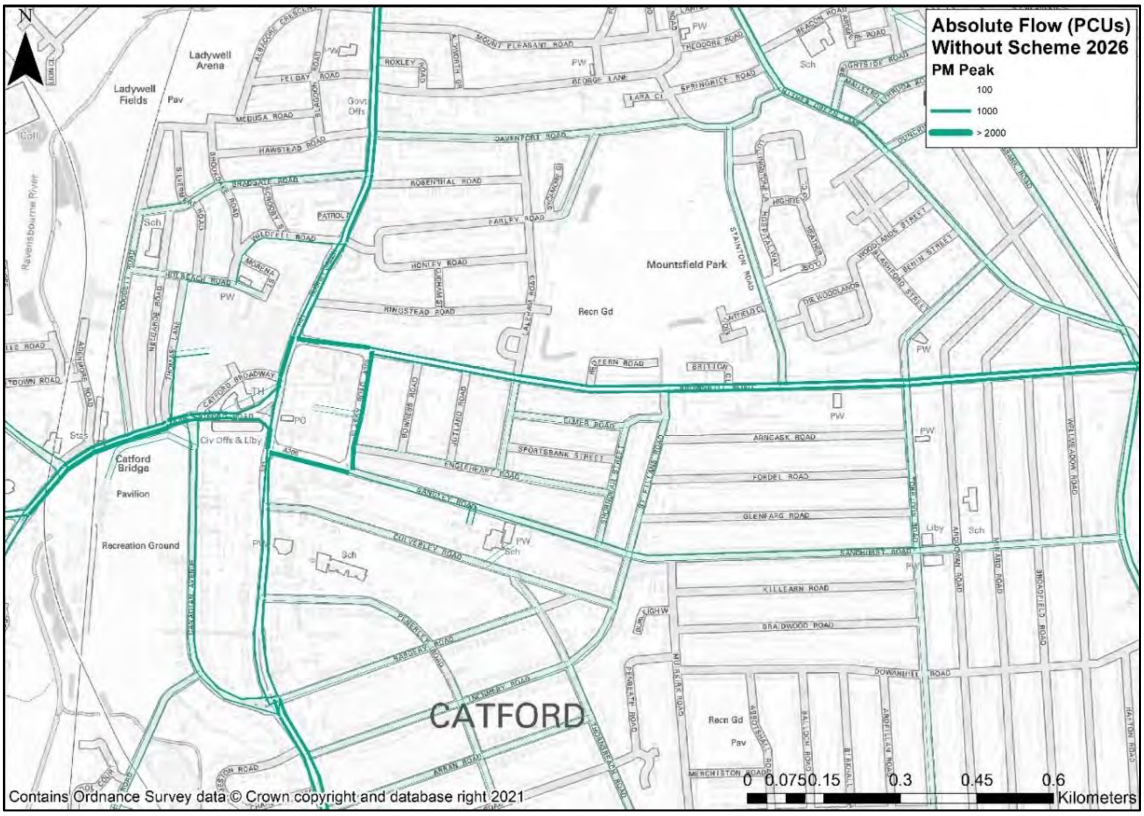


Figure 3-3: 2041 Without Scheme Traffic Flow - AM Peak

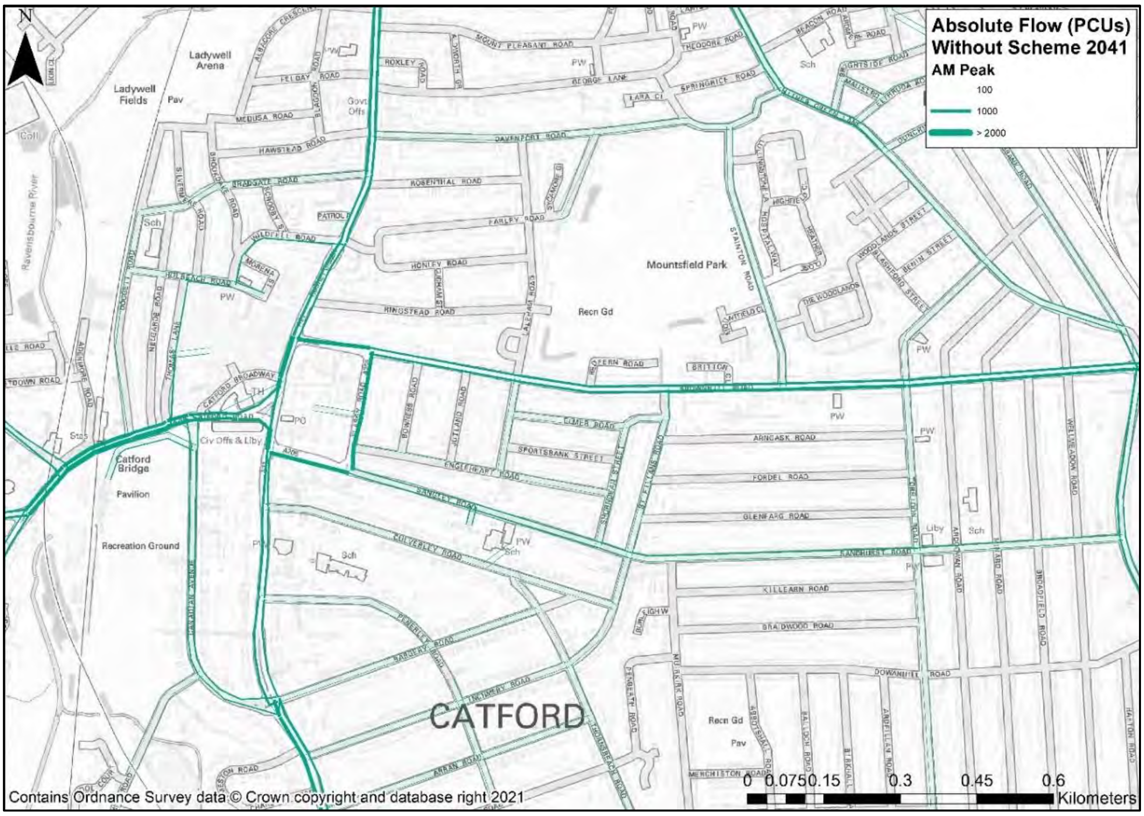
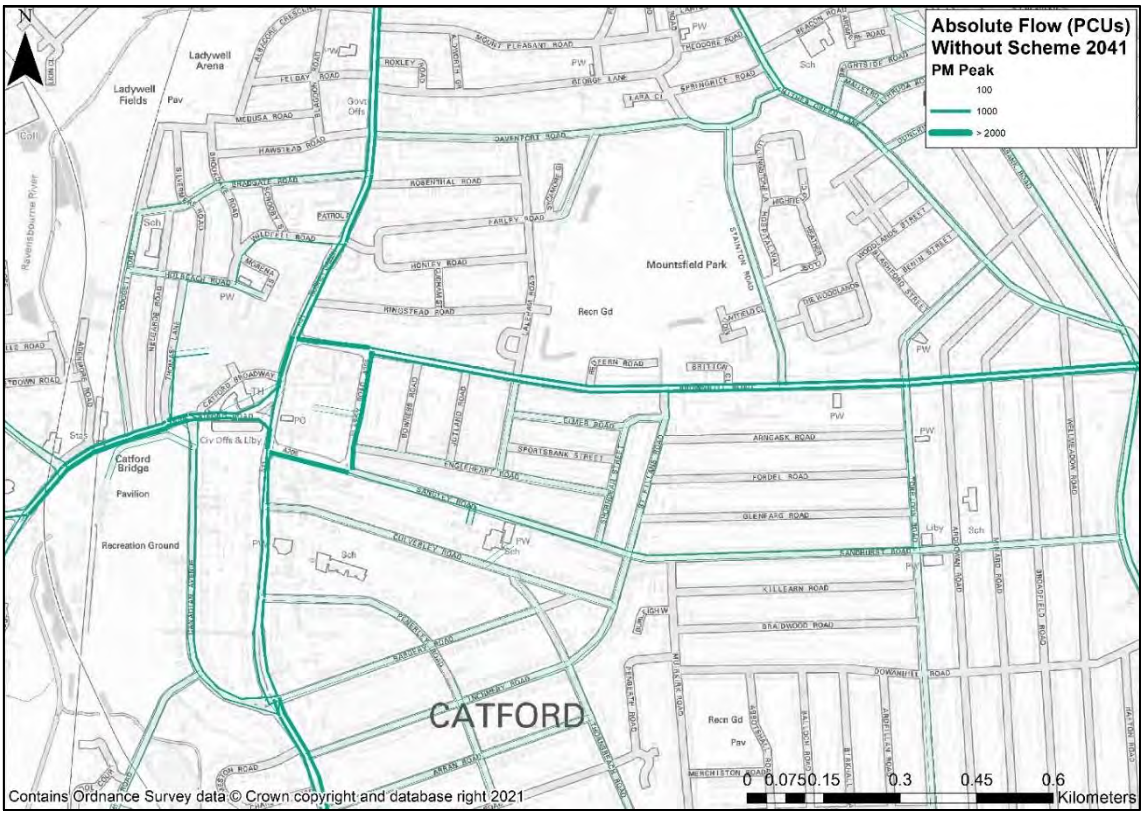


Figure 3-4: 2041 Without Scheme Traffic Flow - PM Peak



3.3.4 Figure 3-5 to Figure 3-8 show the change in traffic flows in the vicinity of the scheme from the 2016 Base Year to the Without Scheme scenario in 2026 and 2041 for the AM and PM Peaks.

3.3.5 Growth from 2016 to 2026 is relatively modest, with few links presenting growth of more than 50pcus in the AM Peak, and there is a pattern of limited increase in flow in the north to south movement through the gyratory. Growth to 2041 is more marked with consistent increases in flows on the gyratory and its approaches/exits, as well as the surrounding minor roads.

Figure 3-5: 2026 Without Scheme minus 2016 Base Year Traffic Flow - AM Peak

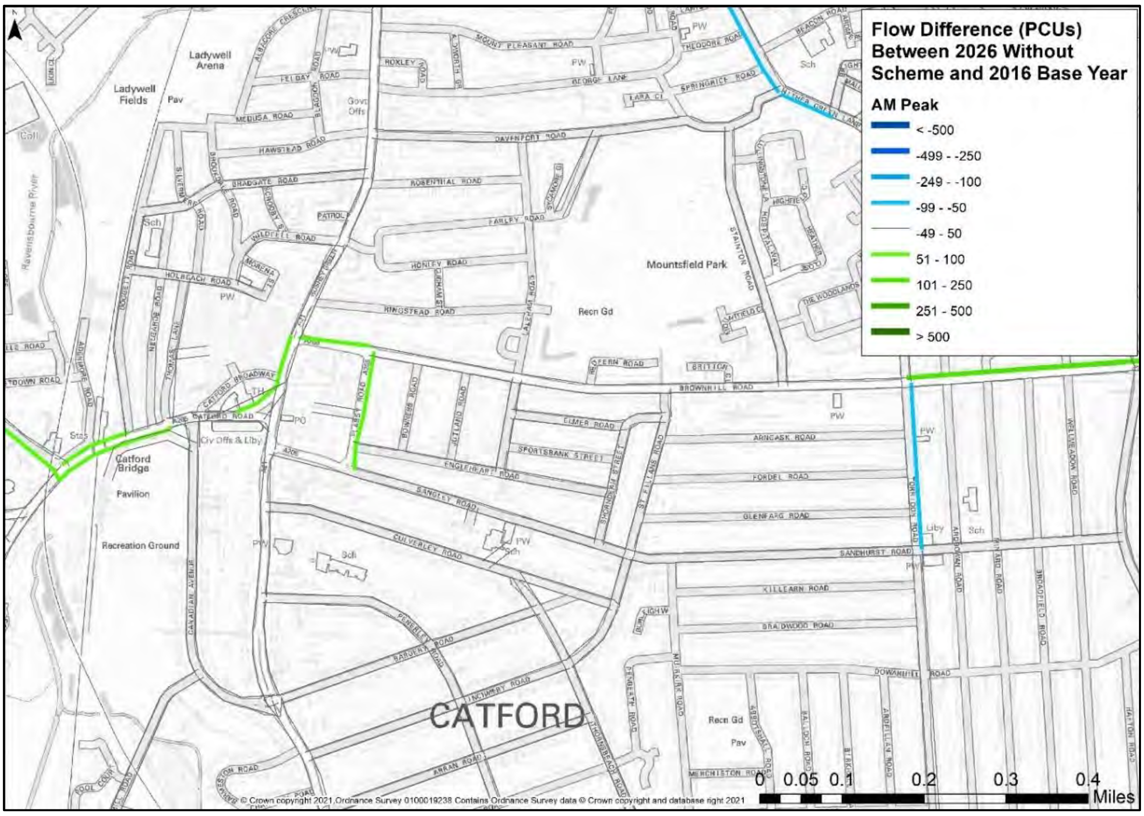


Figure 3-6: 2026 Without Scheme minus 2016 Base Year Traffic Flow - PM Peak

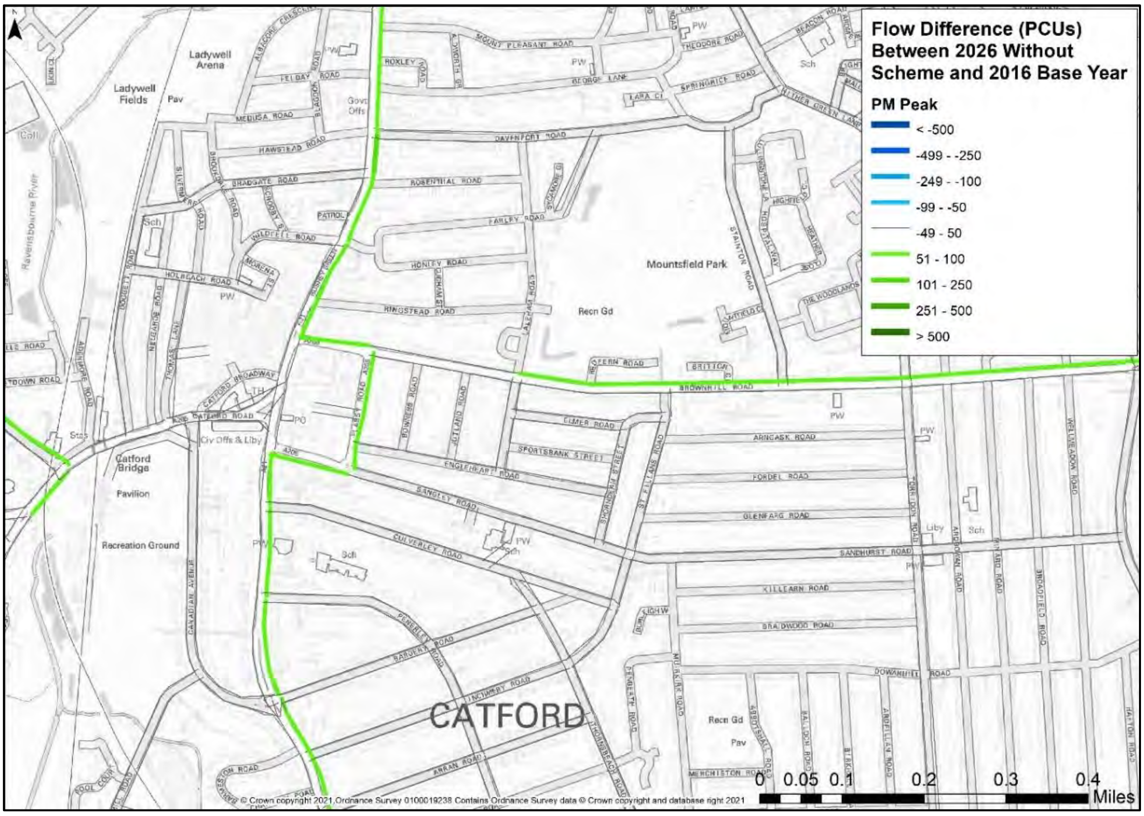


Figure 3-7: 2041 Without Scheme minus 2016 Base Year Traffic Flow - AM Peak

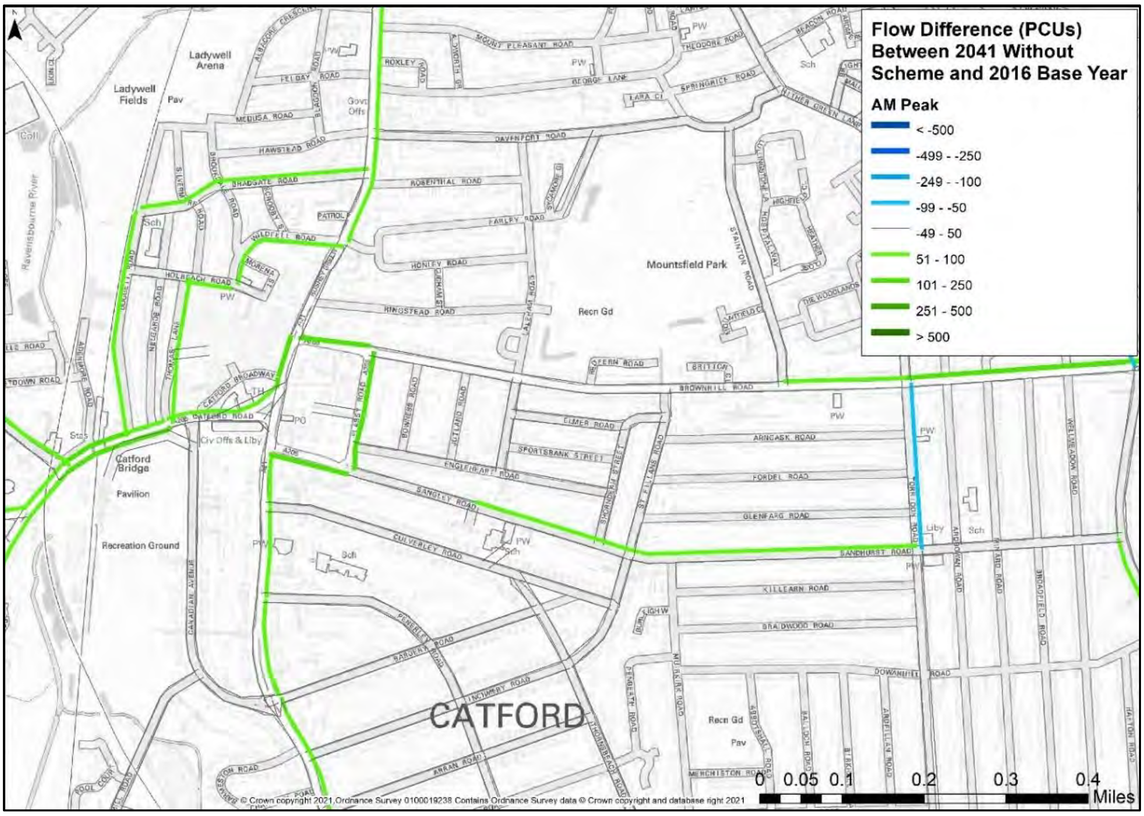
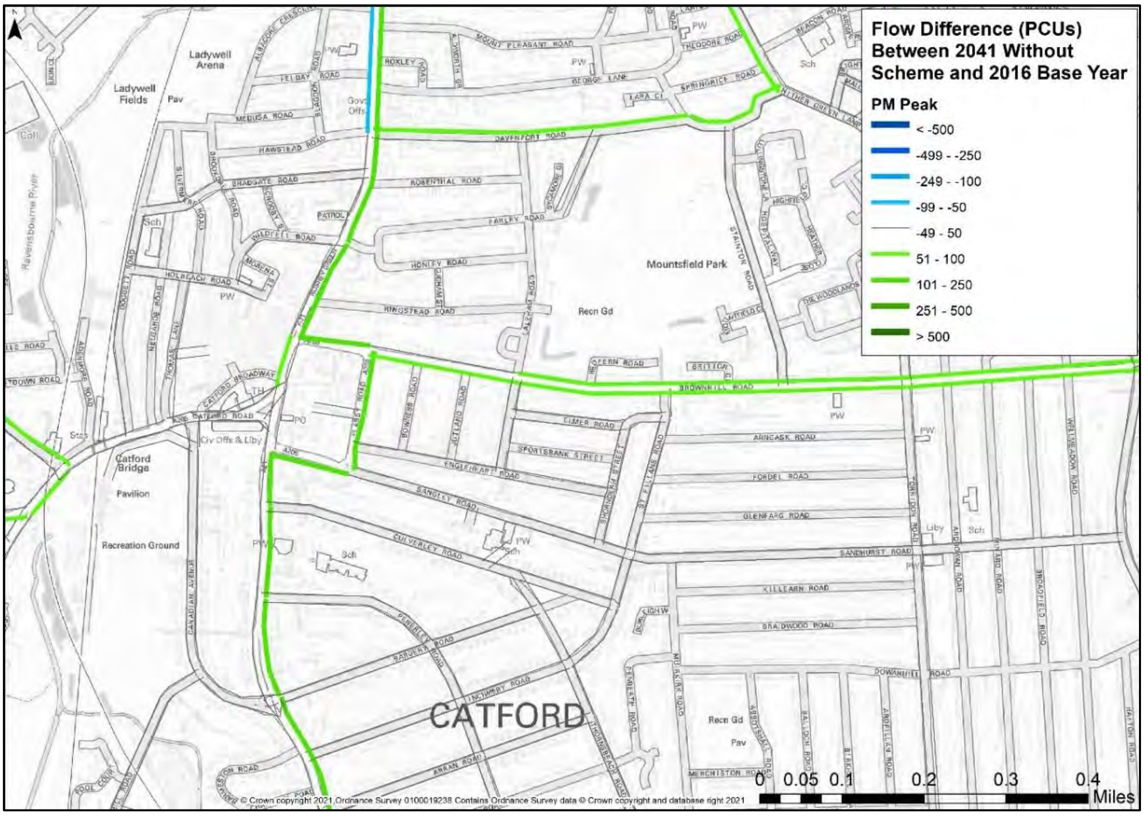


Figure 3-8: 2041 Without Scheme minus 2016 Base Year Traffic Flow - PM Peak



3.4 Traffic Delay Forecasts

3.4.1 Figure 3-9 to Figure 3-12 show forecast link delay in the vicinity of the scheme in the 2026 and 2041 Without Scheme scenario for the AM and PM Peaks.

3.4.2 Modest levels of forecast delay (generally up to one minute) can be seen in the 2026 AM Peak, particularly along the western side of the gyratory and also on Catford Road to the west. A similar pattern of delay can be seen in the 2026 PM Peak with generally more instances of delay above one minute that in the AM Peak.

3.4.3 The 2041 forecasts retain a similar pattern of delay in the area, with the additional growth in traffic resulting in those delays being generally higher than that of the 2026 forecasts.

Figure 3-9: 2026 Without Scheme Delay - AM Peak

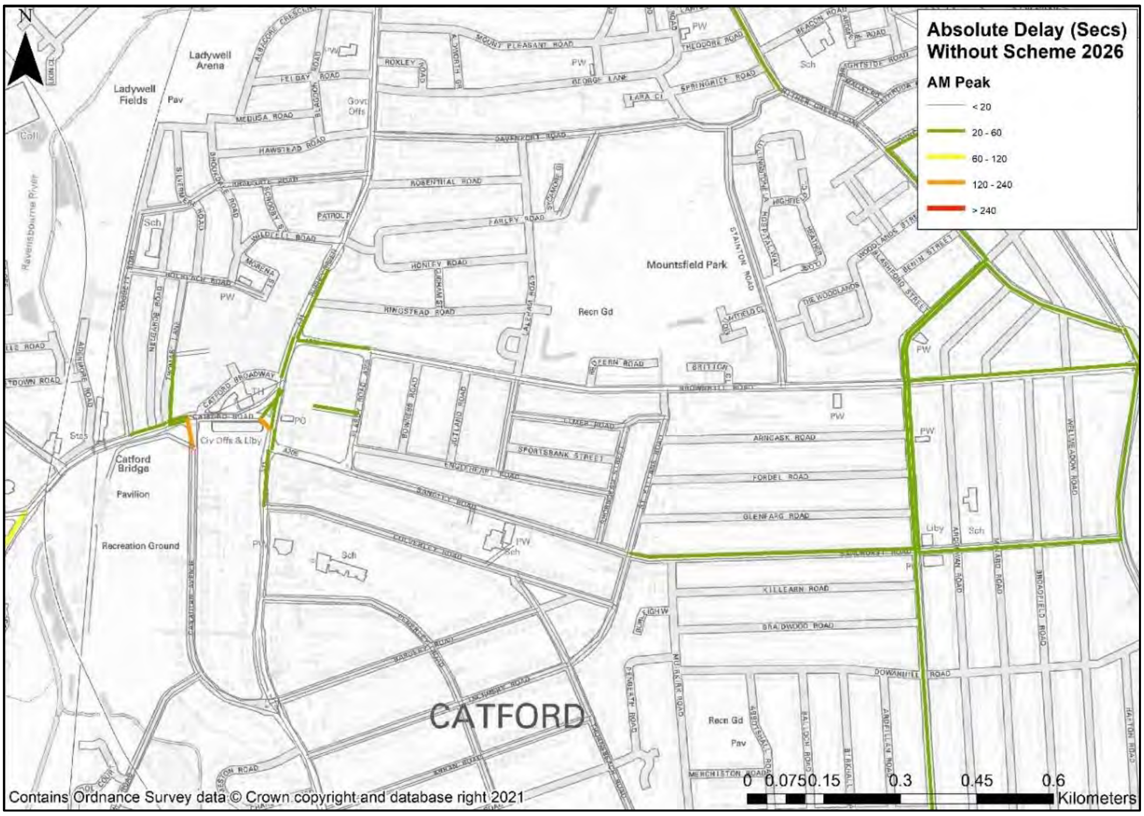


Figure 3-10: 2026 Without Scheme Delay - PM Peak

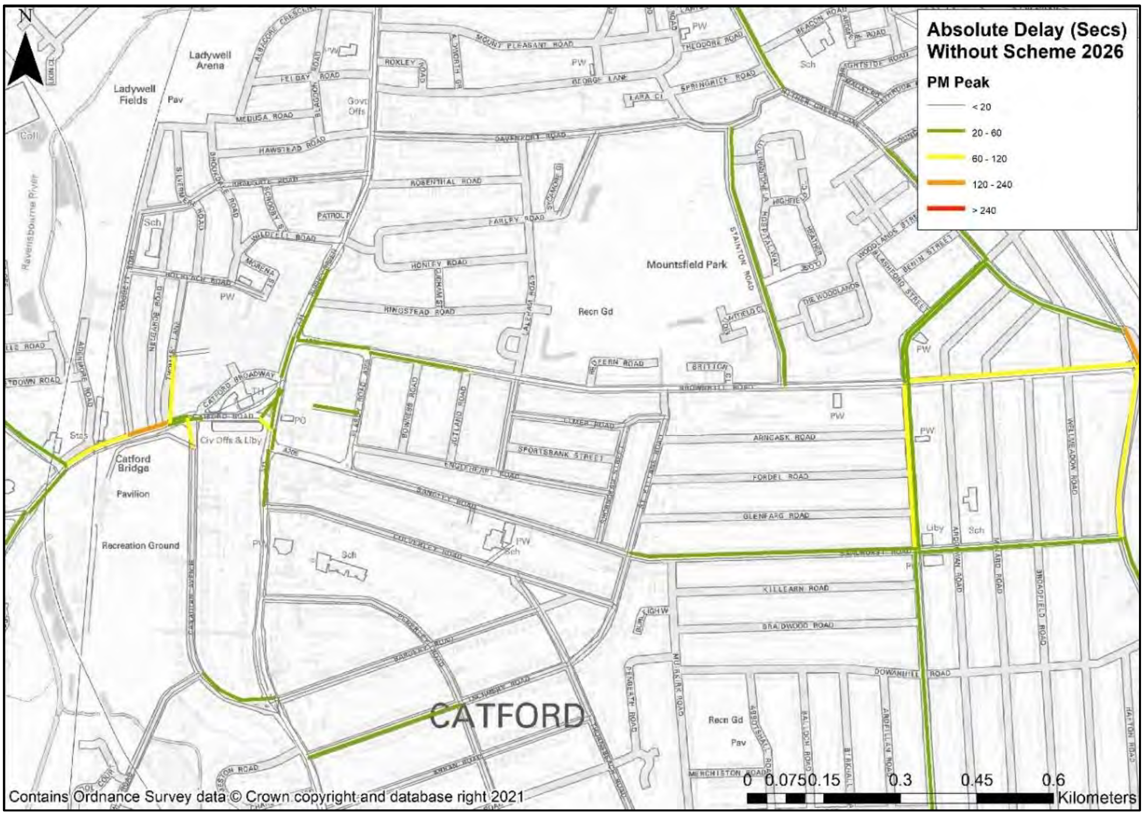


Figure 3-11: 2041 Without Scheme Delay - AM Peak

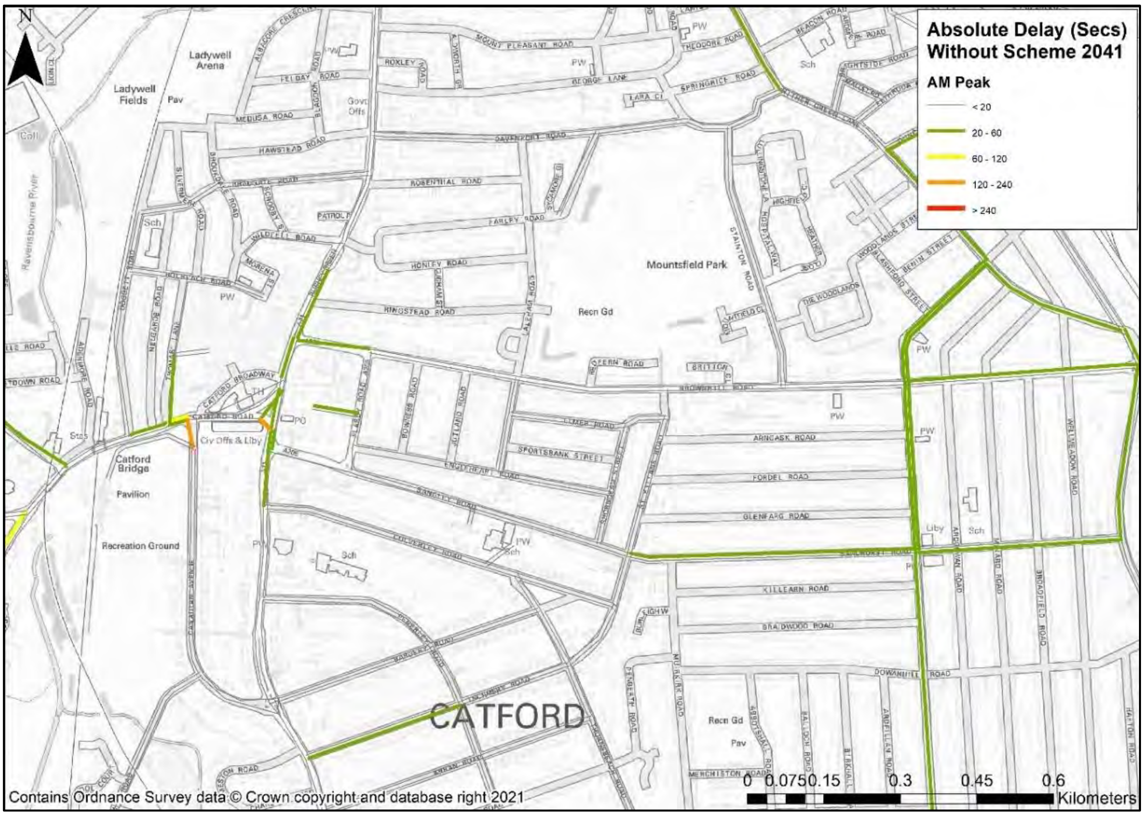
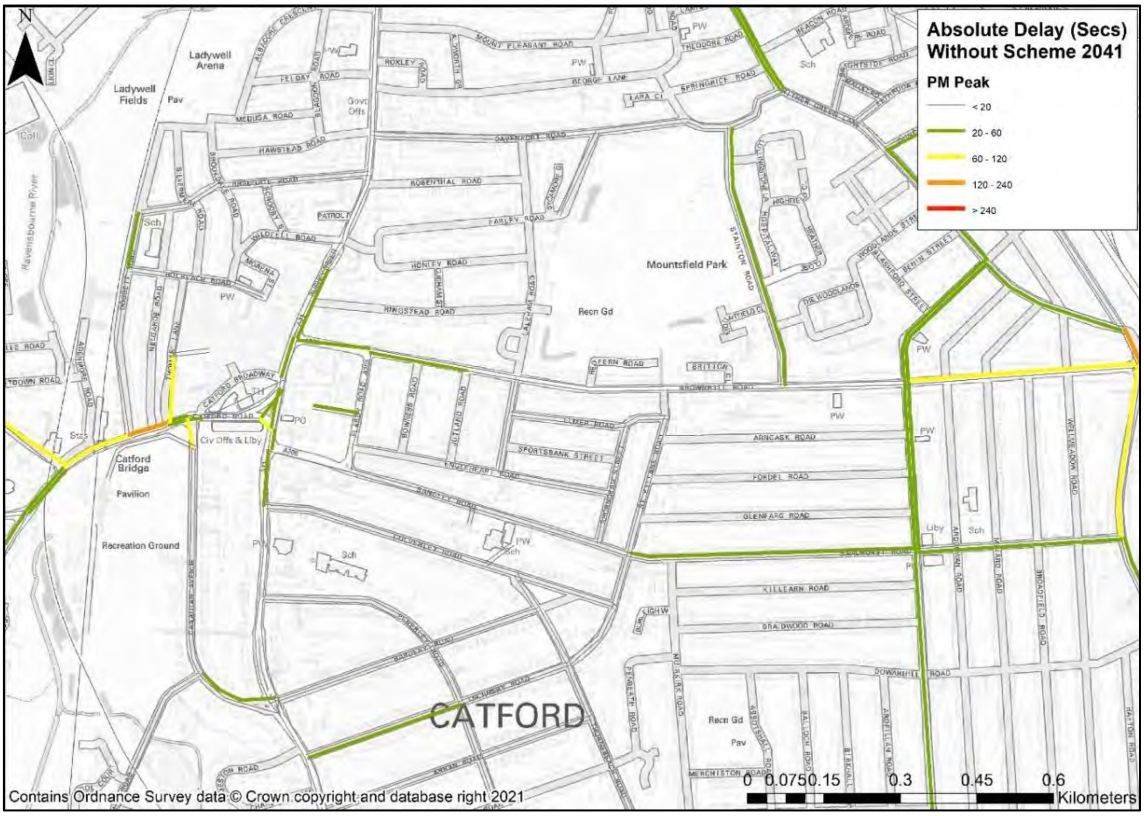


Figure 3-12: 2041 Without Scheme Delay - PM Peak



3.4.4 Figure 3-13 to Figure 3-16 show the forecast change in link delay between the 2016 Base Year and the 2026 and 2041 Without Scheme scenarios, for the AM and PM Peaks.

3.4.5 The increase in delay from 2016 to 2026 is minimal, reflecting the modest increases in flow observed in Section 3.3. The only marked increase can be seen in the PM Peak on the western approach to the gyratory. In 2041, increases in delay are more widespread, particularly in the PM Peak where the western approach again stands out as the area with the greatest increase in delay.

Figure 3-13: 2026 Without Scheme minus 2016 Base Year Delay - AM Peak

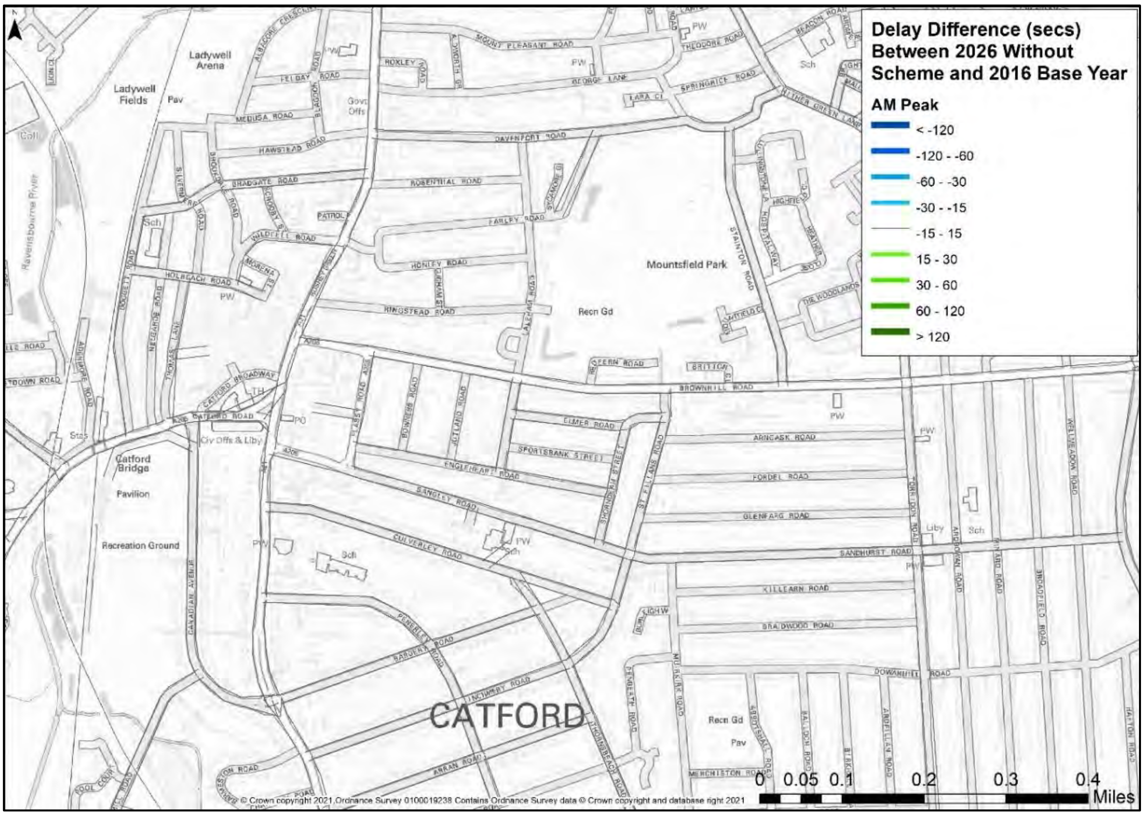


Figure 3-14: 2026 Without Scheme minus 2016 Base Year Delay - PM Peak

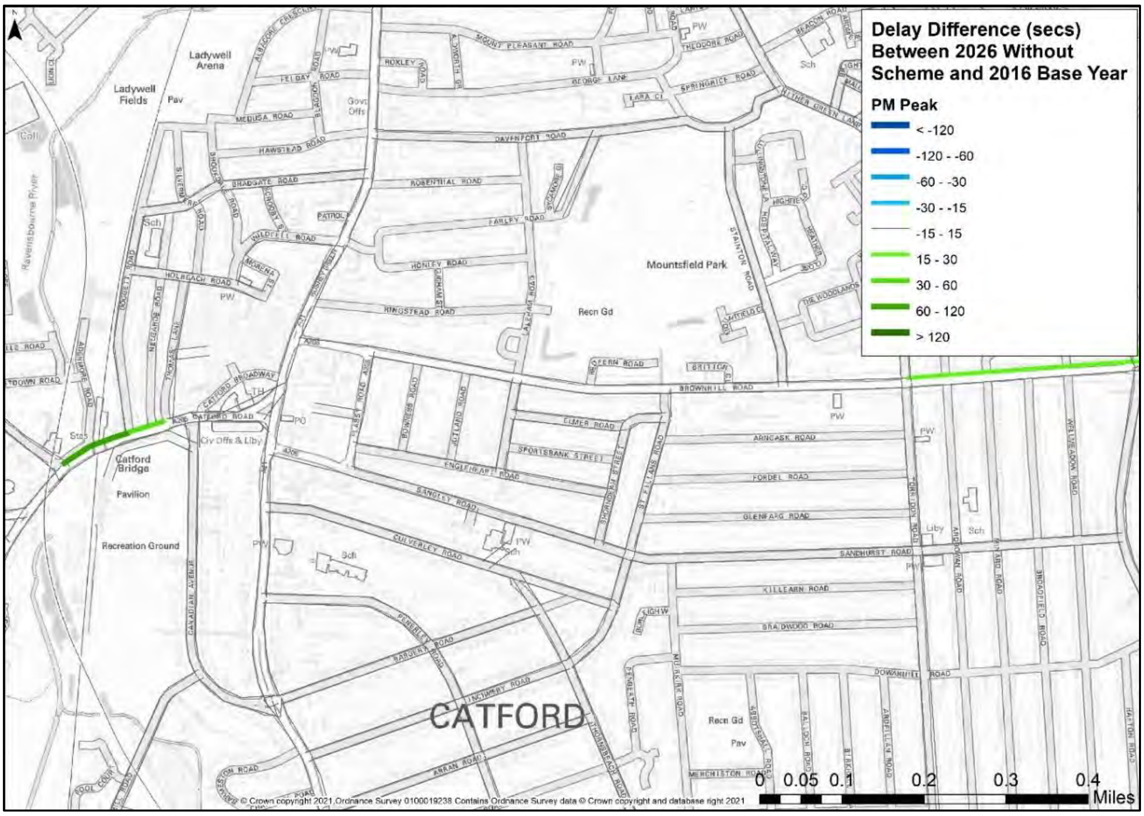


Figure 3-15: 2041 Without Scheme minus 2016 Base Year Delay - AM Peak

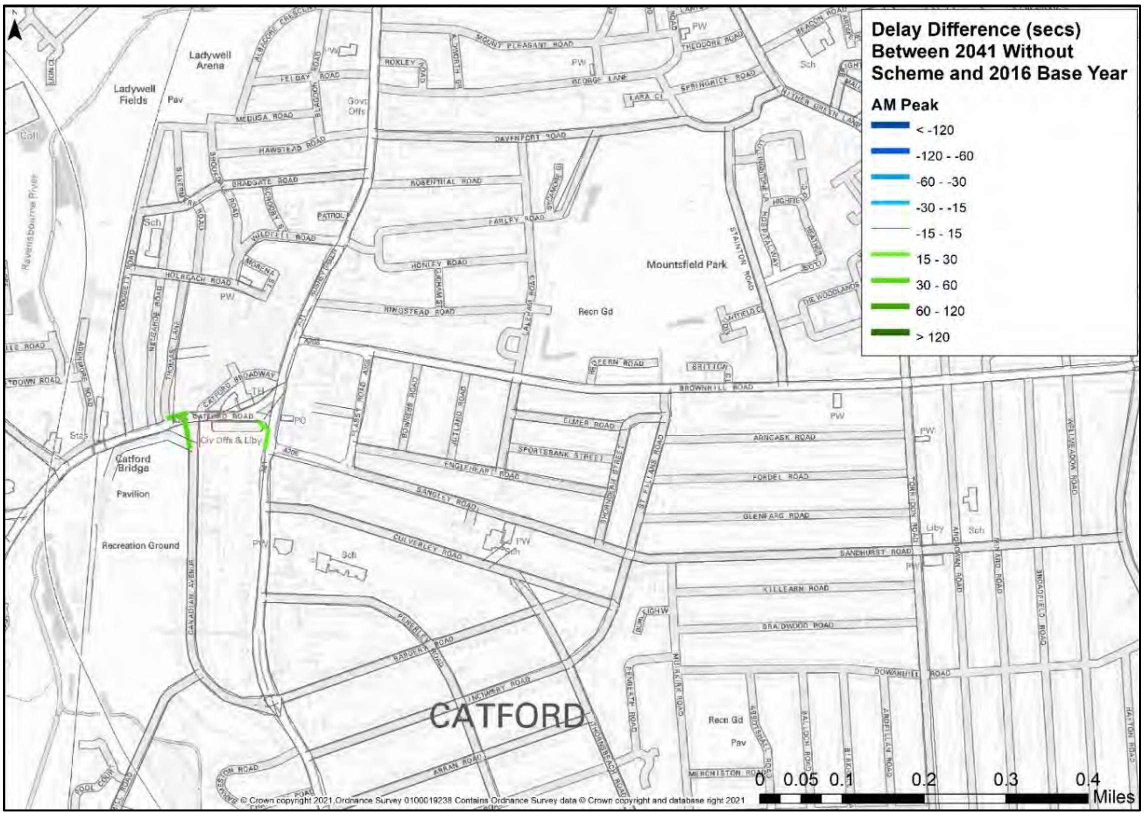
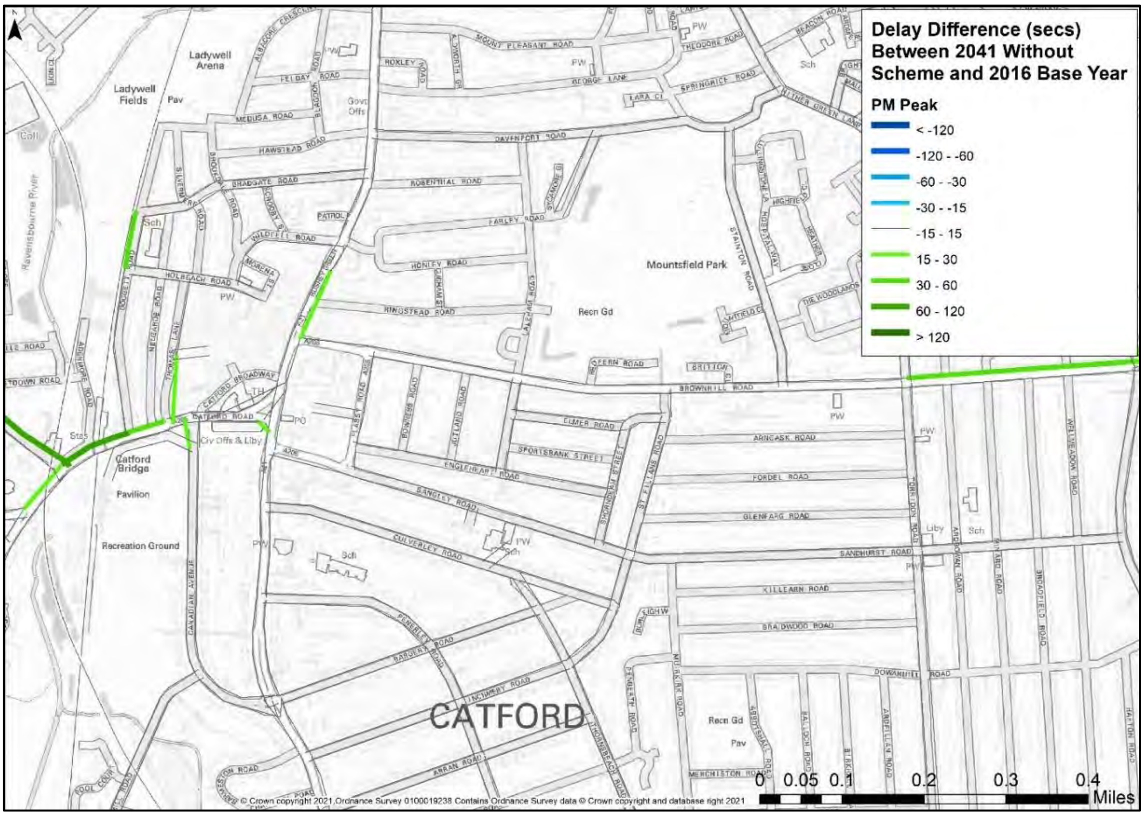


Figure 3-16: 2041 Without Scheme minus 2016 Base Year Delay - PM Peak



3.5 Routeing analysis

3.5.1 As well as impacting on delay around the gyratory, the scheme will result in changes to the routeing options available to vehicles travelling through the area. Figure 3-17 and Figure 3-18 show the Without Scheme scenario routeing for journeys using the A205 Catford Road to the west, and the A205 Brownhill Road to the east, in the 2026 AM Peak. Figure 3-19 and Figure 3-20 show the Without Scheme scenario routeing for journeys using the A21 Rushey Green to the north, and the A21 Bromley Road to the south, in the 2026 AM Peak.

3.5.2 The plots show that trips that are currently travelling from west to south through the gyratory must either traverse around the whole of the gyratory clockwise, or turn right onto Canadian Avenue southbound. Similarly, traffic travelling from east to north is forced to route south along the bottom of the gyratory before turning north up Rushey Green. Possibly the most circuitous route is taken by traffic travelling from the north to the south which is required to travel three sides of the gyratory.

Figure 3-17: 2026 AM Peak Without Scheme A205 Catford Road Select Link

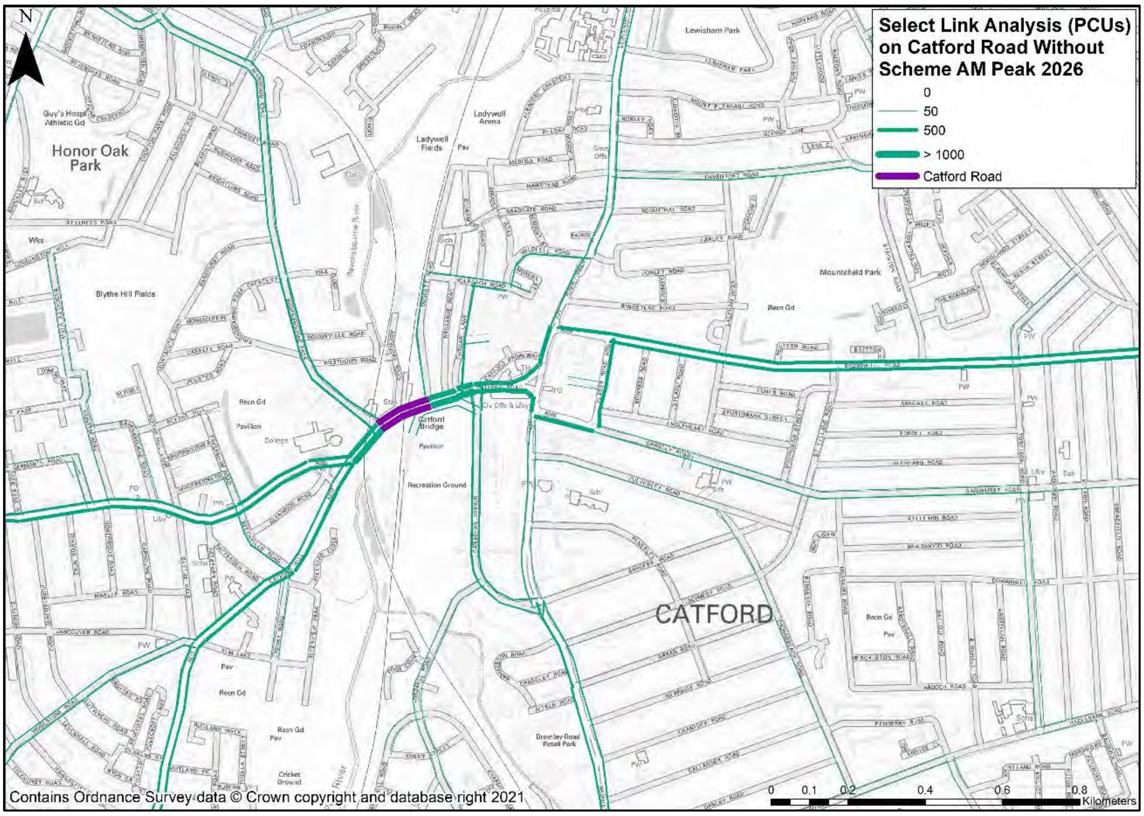


Figure 3-18: 2026 AM Peak Without Scheme A205 Brownhill Road Select Link

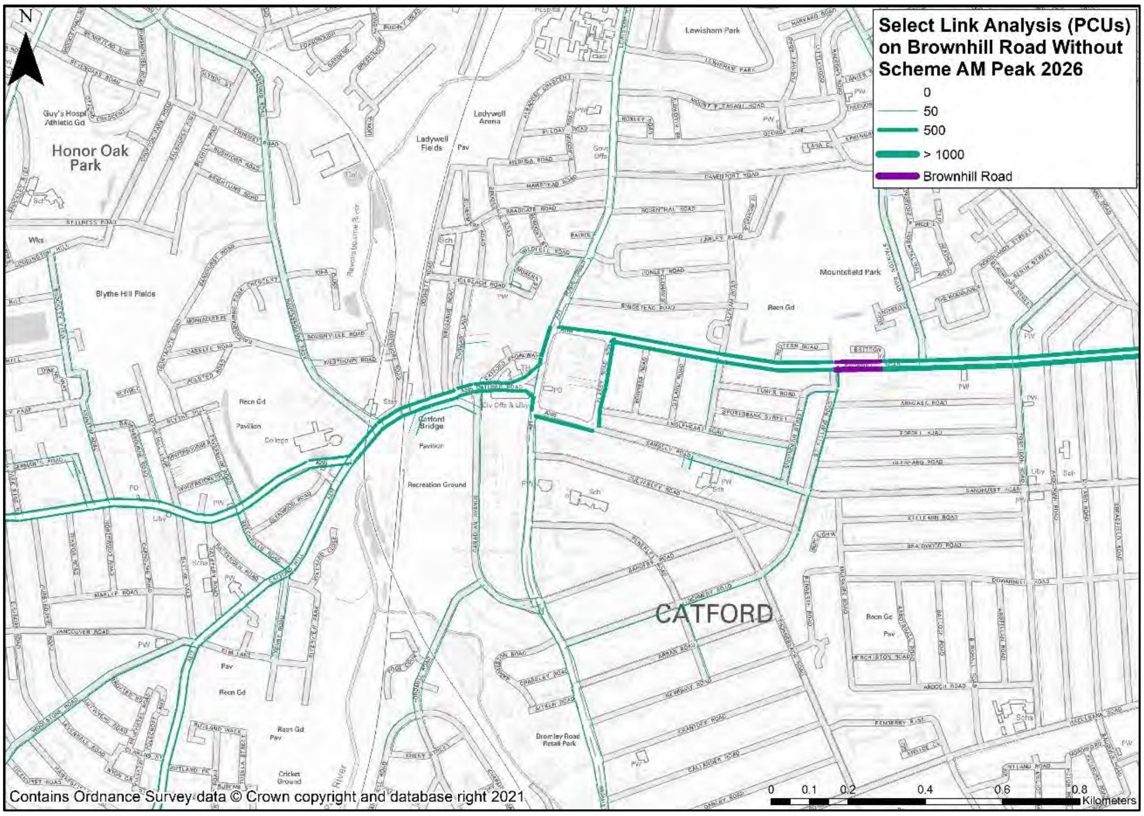


Figure 3-19: 2026 AM Peak Without Scheme A21 Rushey Green Select Link

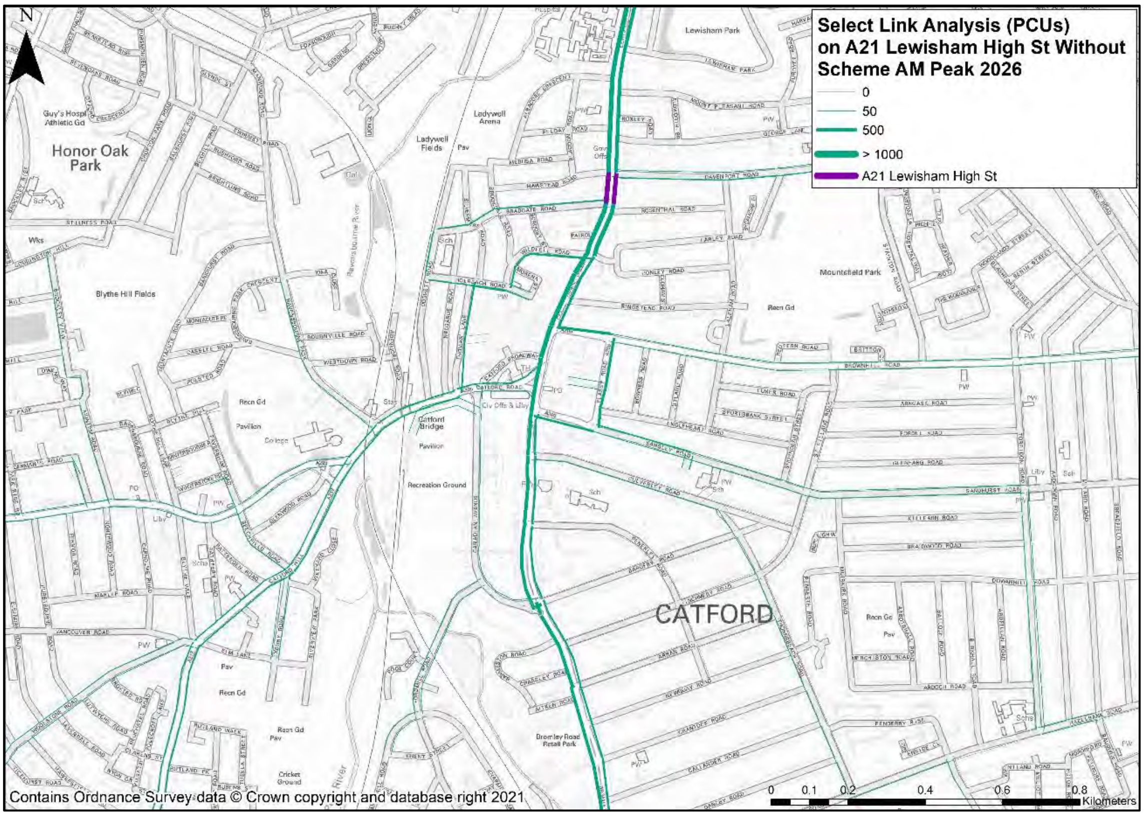
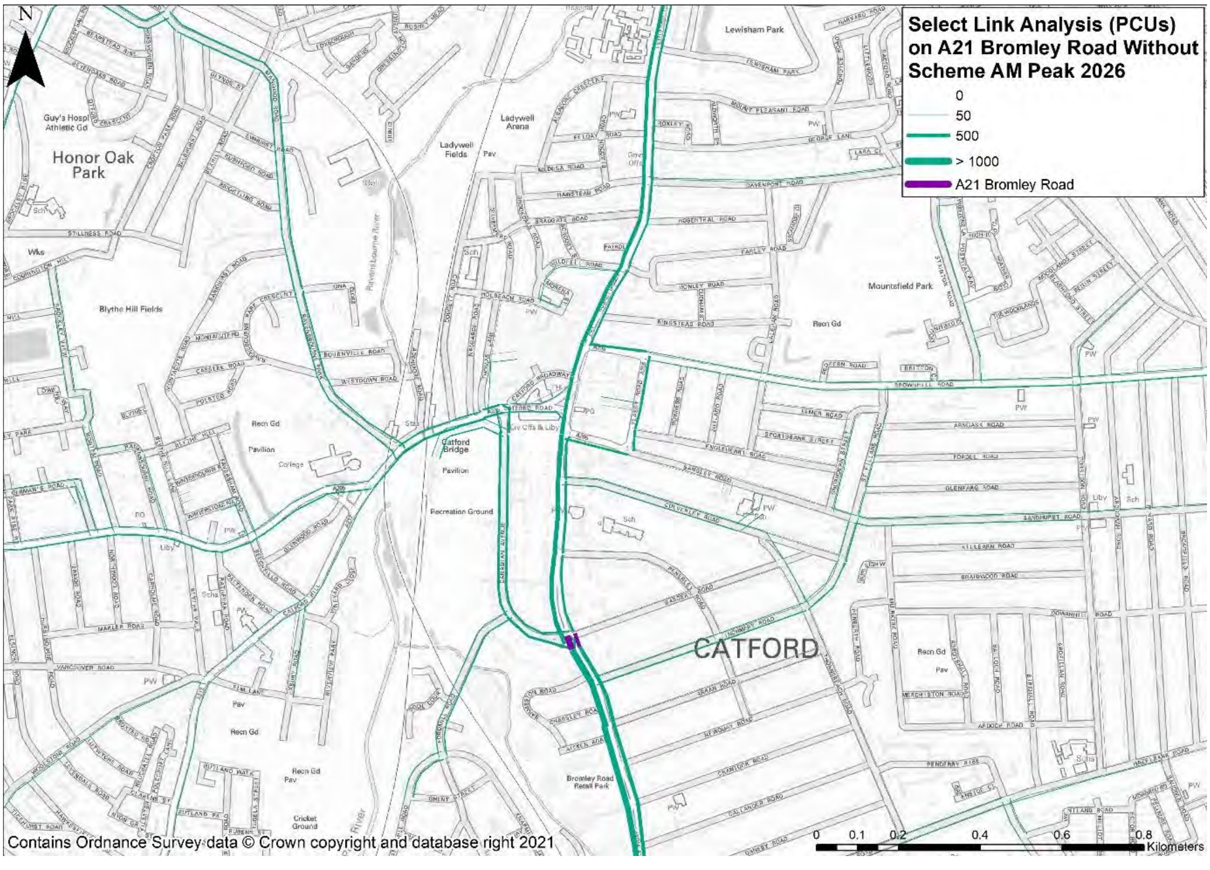


Figure 3-20: 2026 AM Peak Without Scheme A21 Bromley Road Select Link



3.5.3 Analysis of the trip length distribution of car trips using the A205 is shown in Table 3-4. This shows that 15-25% of car trips on this route are less than 5km in length, with a further 20-30% between 5km and 10km in length. Around 50-60% of trips are greater than 10km. In general, trips using Catford Road are shorter than those using Brownhill Road.

Table 3-4: Trip Length Distribution Analysis of A205 Car Trips, 2026 AM Peak

Trip Length (km)	Proportion of Total Car Trips	
	A205 Catford Road	A205 Brownhill Road
0-2	3%	3%
2-5	20%	14%
5-10	28%	21%
10-20	31%	31%
20-50	12%	19%
50-100	6%	11%

4. With Scheme Forecast Results

4.1 Introduction

4.1.1 This section sets out the With Scheme scenario forecast results, comparing back to the analysis presented in Section 3. In addition, analysis of journey times through the gyratory is presented, comparing Without Scheme and With Scheme conditions and routeing.

4.2 Borough Statistics

4.2.1 Table 4-1 to Table 4-3 show the key highway assignment statistics for the 2026 and 2041 Without Scheme and With Scheme scenarios in the AM and PM Peaks, for Lewisham and the surrounding boroughs. The results show that the scheme has a marginal impact on traffic conditions overall, with a small reduction in travel distance and travel time of up to 1.1% across both years and all time periods in Lewisham. This translates into a very small (less than 0.5%) reduction in average speed in all cases, apart from the 2026 PM Peak, where average speed increases slightly. Across the other boroughs the impact of the scheme is negligible.

Table 4-1: Borough Statistics by Modelled Year – Without and With Scheme – AM Peak

Borough	Metric	2026 Without Scheme	2026 With Scheme	Change from Without Scheme	2041 Without Scheme	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	104,692	104,090	-0.6%	110,524	109,699	-0.7%
	Travel Time (pcu-hours)	6,227	6,200	-0.4%	6,934	6,916	-0.3%
	Average Speed (kph)	16.8	16.8	-0.1%	15.9	15.9	-0.5%
Greenwich	Travel Distance (pcu-km)	206,861	206,884	0.0%	222,445	222,407	0.0%
	Travel Time (pcu-hours)	8,694	8,693	0.0%	9,662	9,653	-0.1%
	Average Speed (kph)	23.8	23.8	0.0%	23.0	23.0	0.1%
Bromley	Travel Distance (pcu-km)	261,970	262,017	0.0%	277,612	277,669	0.0%
	Travel Time (pcu-hours)	11,122	11,123	0.0%	12,744	12,751	0.1%
	Average Speed (kph)	23.6	23.6	0.0%	21.8	21.8	0.0%
Southwark	Travel Distance (pcu-km)	90,290	90,349	0.1%	97,524	97,568	0.0%
	Travel Time (pcu-hours)	5,271	5,272	0.0%	5,803	5,797	-0.1%
	Average Speed (kph)	17.1	17.1	0.0%	16.8	16.8	0.2%

Table 4-2: Borough Statistics by Modelled Year – Without and With Scheme – Interpeak

Borough	Metric	2026 Without Scheme	2026 With Scheme	Change from Without Scheme	2041 Without Scheme	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	87,745	87,146	-0.7%	93,746	93,106	-0.7%
	Travel Time (pcu-hours)	4,380	4,359	-0.5%	4,812	4,790	-0.5%
	Average Speed (kph)	20.0	20.0	-0.2%	19.5	19.4	-0.2%
Greenwich	Travel Distance (pcu-km)	171,907	171,941	0.0%	185,299	185,274	0.0%
	Travel Time (pcu-hours)	5,789	5,790	0.0%	6,363	6,361	0.0%
	Average Speed (kph)	29.7	29.7	0.0%	29.1	29.1	0.0%
Bromley	Travel Distance (pcu-km)	195,364	195,397	0.0%	213,079	213,096	0.0%
	Travel Time (pcu-hours)	6,963	6,968	0.1%	7,701	7,703	0.0%
	Average Speed (kph)	28.1	28.0	0.0%	27.7	27.7	0.0%
Southwark	Travel Distance (pcu-km)	78,690	78,718	0.0%	83,807	83,822	0.0%
	Travel Time (pcu-hours)	4,251	4,253	0.0%	4,637	4,636	0.0%
	Average Speed (kph)	18.5	18.5	0.0%	18.1	18.1	0.1%

Table 4-3: Borough Statistics by Modelled Year – Without and With Scheme – PM Peak

Borough	Metric	2026 Without Scheme	2026 With Scheme	Change from Without Scheme	2041 Without Scheme	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	102,070	101,442	-0.6%	107,237	106,589	-0.6%
	Travel Time (pcu-hours)	5,776	5,710	-1.1%	6,416	6,387	-0.4%
	Average Speed (kph)	17.7	17.8	0.5%	16.7	16.7	-0.2%
Greenwich	Travel Distance (pcu-km)	212,485	212,448	0.0%	225,355	225,272	0.0%
	Travel Time (pcu-hours)	8,592	8,588	0.0%	9,438	9,447	0.1%
	Average Speed (kph)	24.7	24.7	0.0%	23.9	23.8	-0.1%
Bromley	Travel Distance (pcu-km)	253,560	253,635	0.0%	271,335	271,424	0.0%
	Travel Time (pcu-hours)	10,335	10,350	0.1%	11,713	11,724	0.1%
	Average Speed (kph)	24.5	24.5	-0.1%	23.2	23.2	-0.1%
Southwark	Travel Distance (pcu-km)	87,015	87,052	0.0%	90,294	90,367	0.1%
	Travel Time (pcu-hours)	4,855	4,858	0.1%	5,197	5,211	0.3%
	Average Speed (kph)	17.9	17.9	0.0%	17.4	17.3	-0.2%

4.3 Traffic Flow Forecasts

4.3.1 Figure 4-1 to Figure 4-4 show the forecast impact of the scheme on traffic flows in 2026 and 2041 for the AM and PM Peaks.

4.3.2 In the 2026 AM Peak, clockwise flows on the gyratory generally reduce due to anti-clockwise movements being permitted with the scheme in place. The scheme also results in some wider re-routeing on minor roads around the gyratory. For example, traffic using the rat-run along Station Road and Davenport Road in the Without Scheme scenario switches to staying on Brownhill Road as the route westbound along Brownhill Road is available in the With Scheme scenario. Also, traffic that appeared to be rat-running along Wildfell Road, Thomas' Lane and Canadian Avenue in the Without Scheme scenario switches to the direct route south along Rushey Green and Bromley Road in the With Scheme scenario.

4.3.3 In the 2026 PM Peak, there is a similar pattern of clockwise reduction and anti-clockwise increases in flow around the gyratory. However, there is little in terms of wider re-routeing compared to the AM Peak.

4.3.4 In 2041, the AM and PM Peak re-routeing impacts of the scheme are similar in pattern to that seen in the 2026 AM and PM Peaks. This gives confidence that the forecast impact of the scheme produced by the model is stable and can be relied upon.

4.3.5 It is also worth noting that the impacts of the scheme are relatively local, with little impact on traffic outside of a 1km radius from the gyratory. This is consistent with the borough level highway statistics presented above.

Figure 4-1: 2026 With Scheme minus Without Scheme Traffic Flow - AM Peak

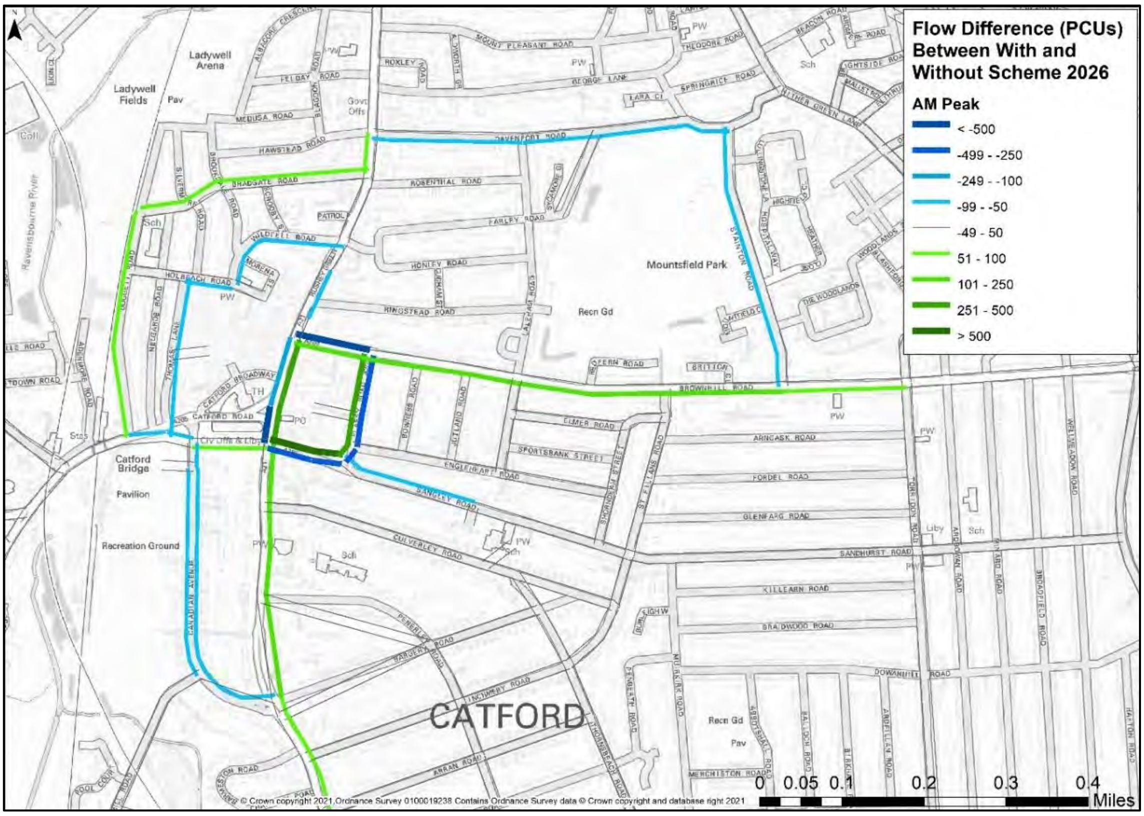


Figure 4-2: 2026 With Scheme minus Without Scheme Traffic Flow - PM Peak

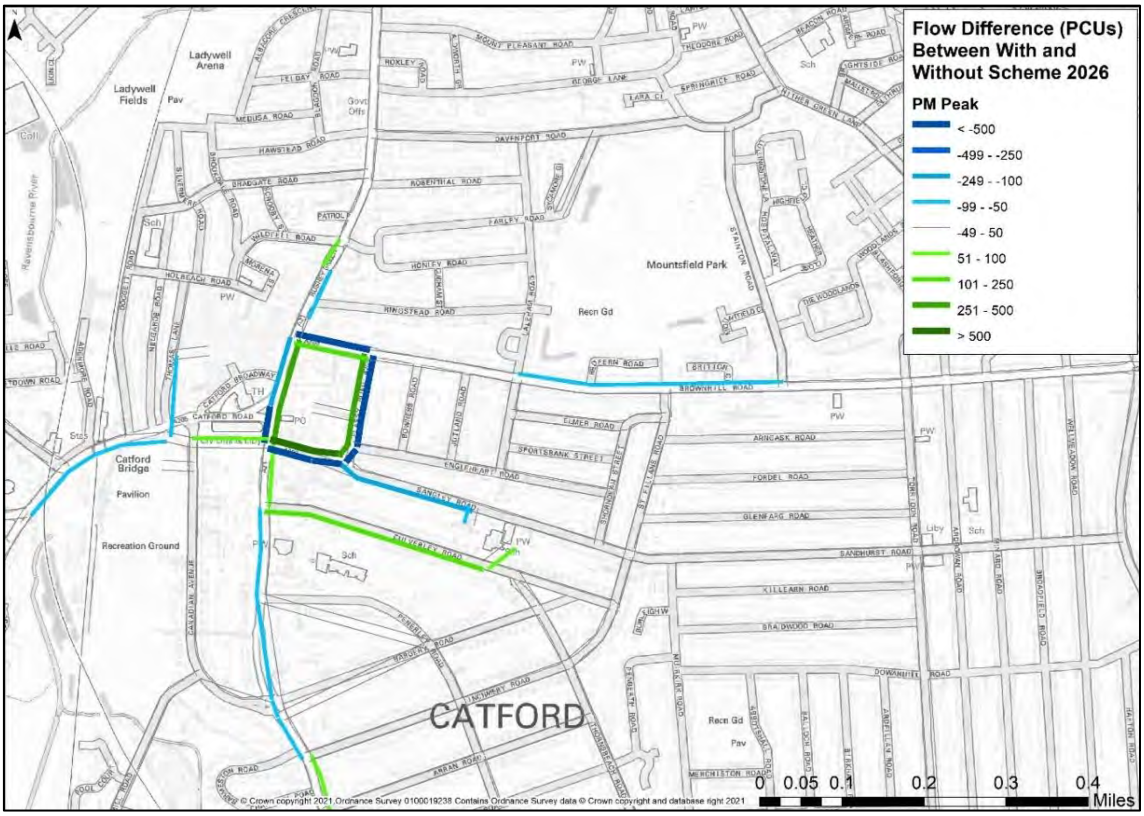


Figure 4-3: 2041 With Scheme minus Without Scheme Traffic Flow - AM Peak

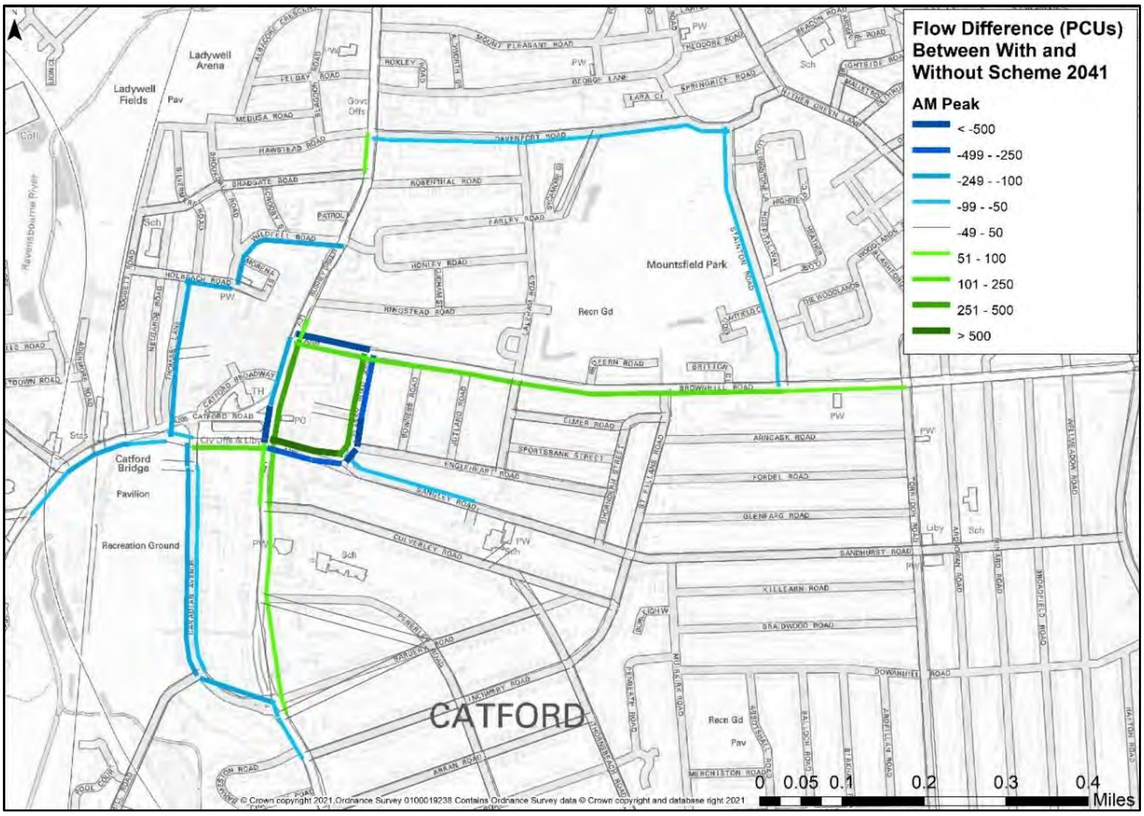
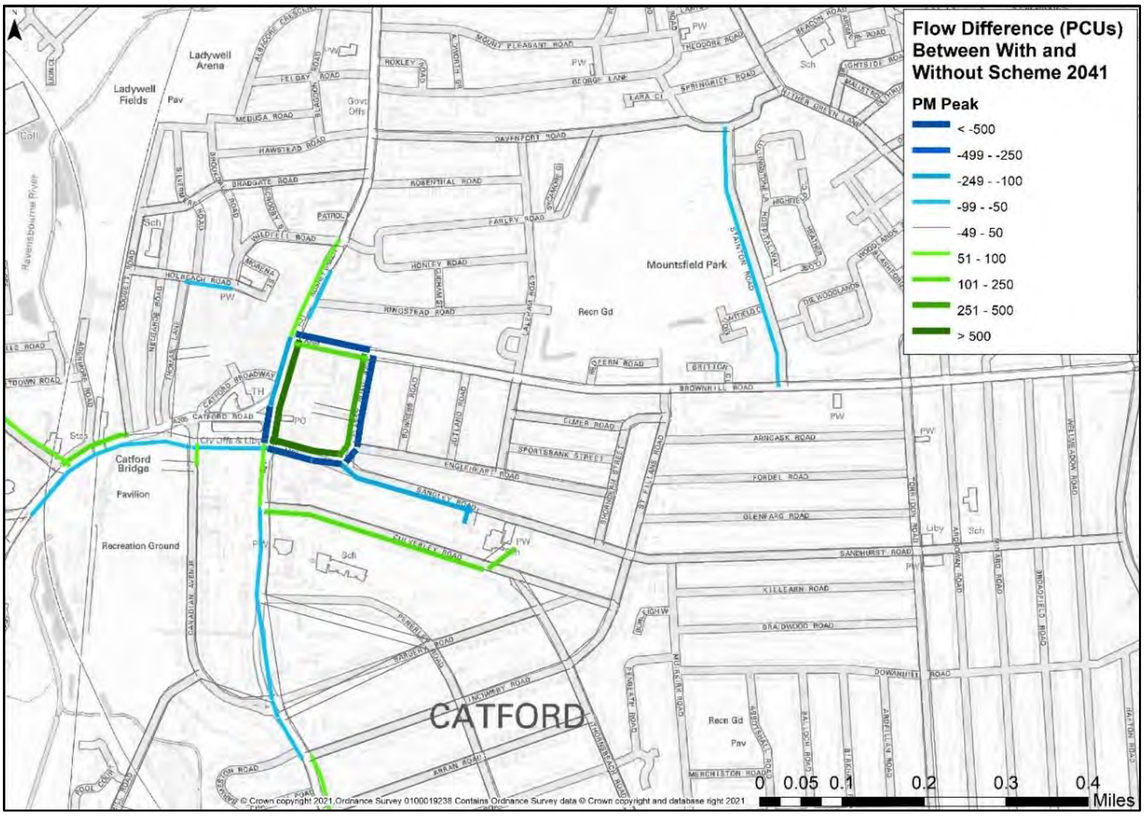


Figure 4-4: 2041 With Scheme minus Without Scheme Traffic Flow - PM Peak



4.4 Traffic Delay Forecasts

4.4.1 Figure 4-5 to Figure 4-8 show the forecast change in link delay brought about by the scheme in 2026 and 2041 for the AM and PM Peaks.

4.4.2 In the 2026 AM Peak, delay increases can be seen on many of the roads around and on the gyratory due to the additional conflicts that exist at the signalised junctions. These include the A205 Catford Road in both directions, the A205 Brownhill Road approach to the gyratory, and the A21 Bromley Road approach. Some roads experience some reduction in delay, particularly on the Canadian Avenue northbound approach to A205 Catford Road.

4.4.3 In the 2026 PM Peak, there is again generally an increase in delay on roads around the gyratory, although not as widespread as in the AM Peak. Reductions in delay exist on the A205 Catford Road eastbound, Canadian Avenue northbound and on the A21 Rushey Green southbound approach to the gyratory.

4.4.4 The pattern of forecast delay change in the 2041 AM and PM Peaks is very similar to that seen in 2026.

Figure 4-5: 2026 With Scheme minus Without Scheme Delay - AM Peak

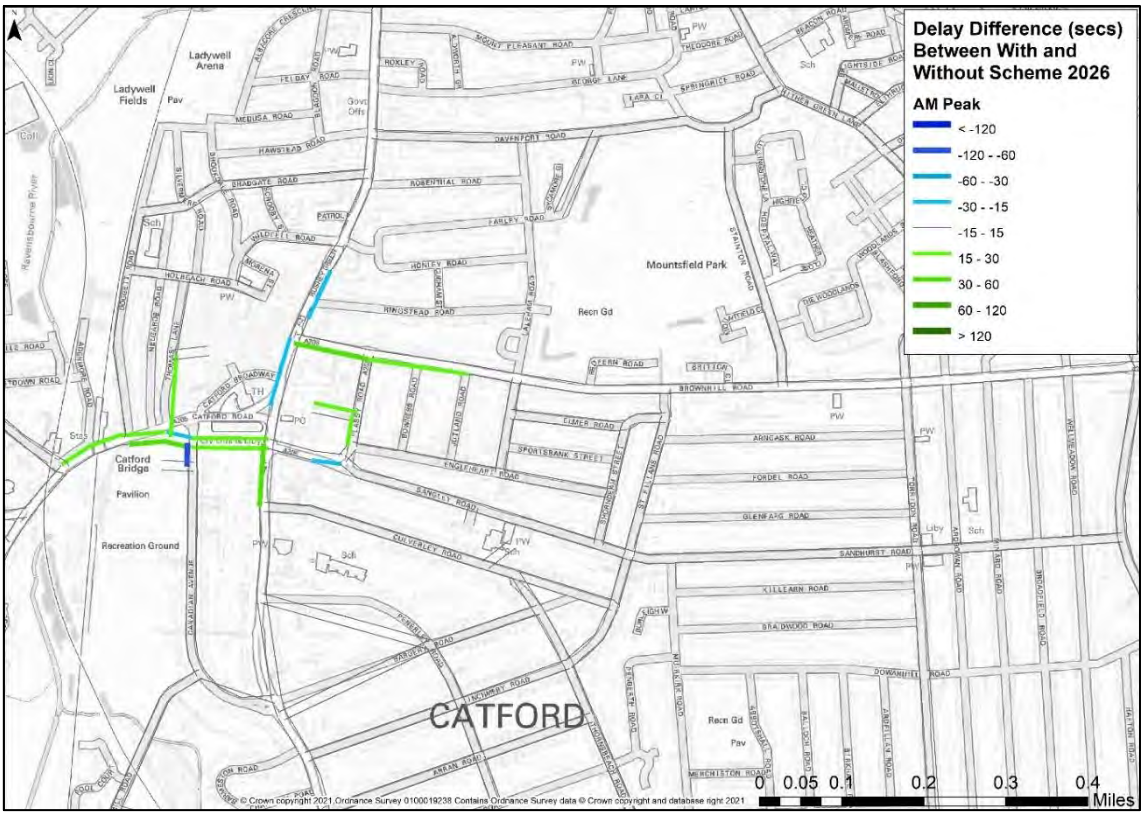


Figure 4-6: 2026 With Scheme minus Without Scheme Delay - PM Peak

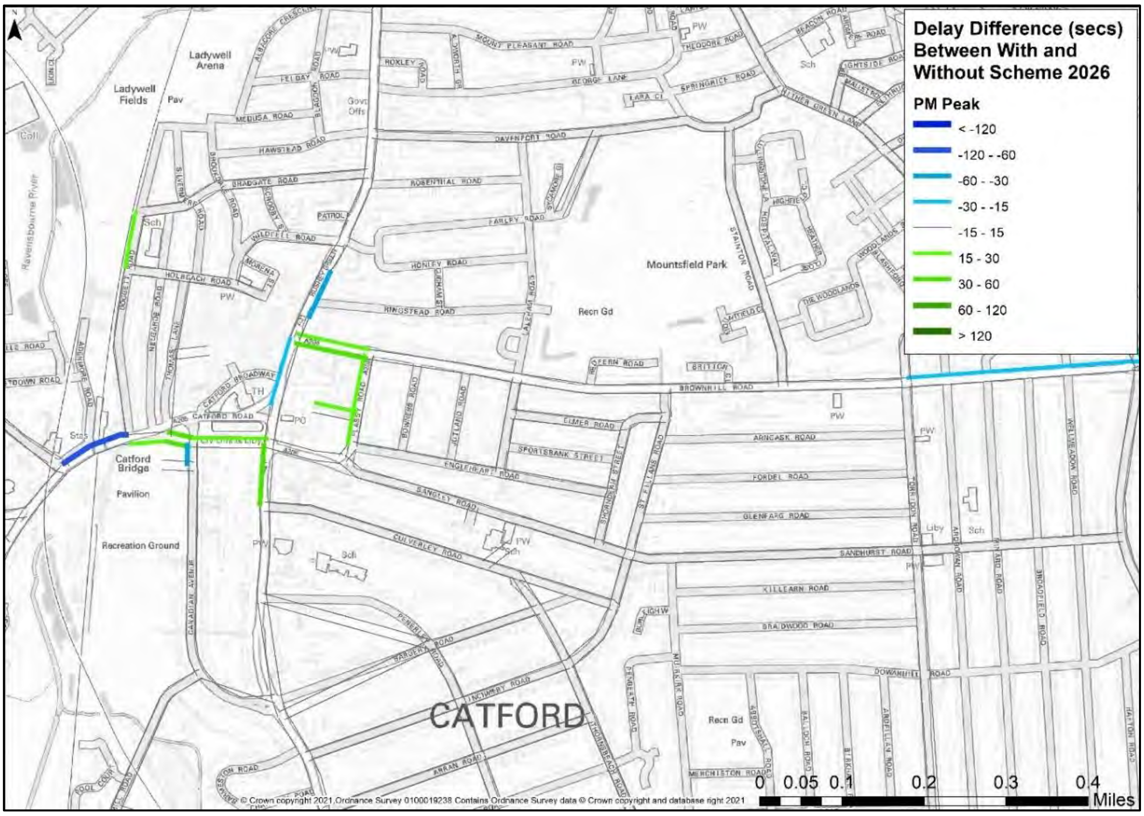


Figure 4-7: 2041 With Scheme minus Without Scheme Delay - AM Peak

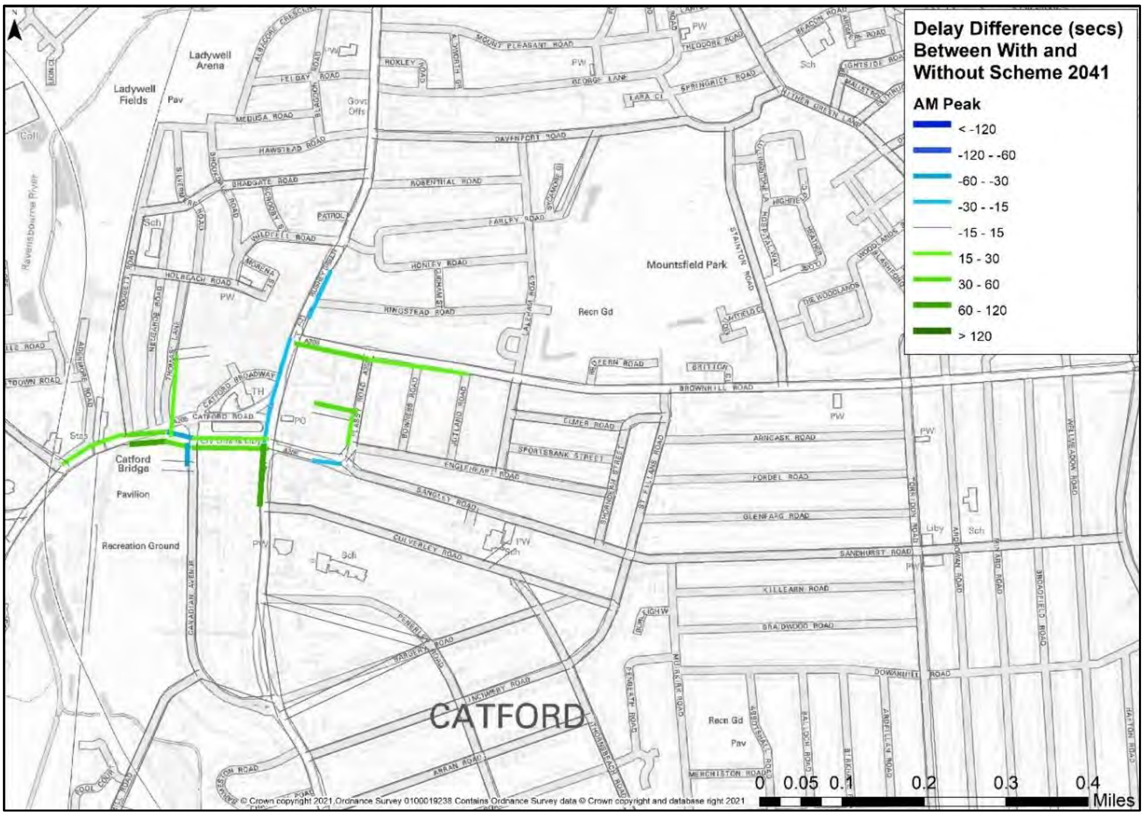
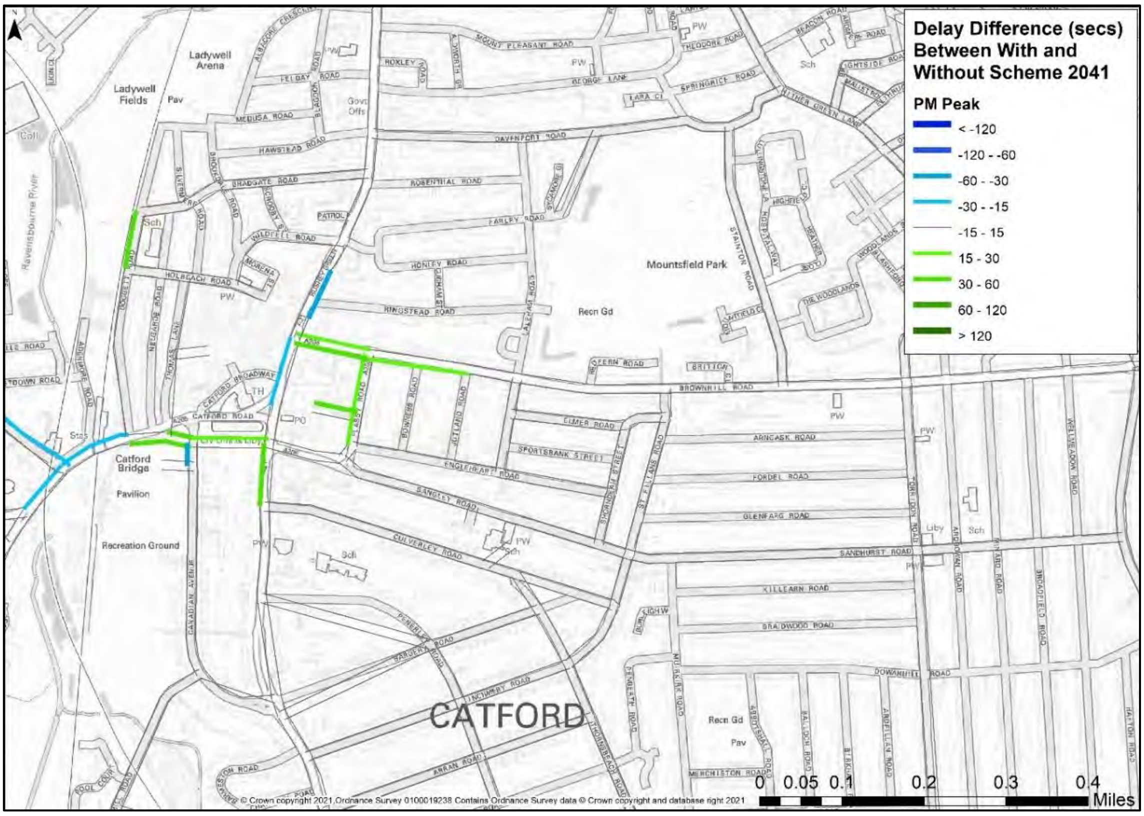


Figure 4-8: 2041 With Scheme minus Without Scheme Delay - PM Peak



4.5 Routeing analysis

4.5.1 Figure 4-9 to Figure 4-12 show the routeing of journeys using the same locations plotted in Figure 3-17 and Figure 3-20 in the With Scheme scenario for the 2026 AM Peak. These demonstrate how routeing options change with the introduction of the scheme.

4.5.2 For example, traffic travelling from the west to the east (either onto Sangley Road or the A205 Brownhill Road) is able to use the southern end of the gyratory. There is also a slight reduction in traffic using Canadian Avenue southbound as right turns from the A205 onto the A21 southbound are made possible by the scheme. For traffic travelling from east to north, routeing through the gyratory is now more direct, leading to more traffic making this movement through the gyratory in the With Scheme scenario than the Without Scheme scenario. Routeing for traffic travelling from north to south is made particularly more efficient with traffic able to take the direct route along the western side of the gyratory.

Figure 4-9: 2026 AM Peak With Scheme A205 Catford Road Select Link

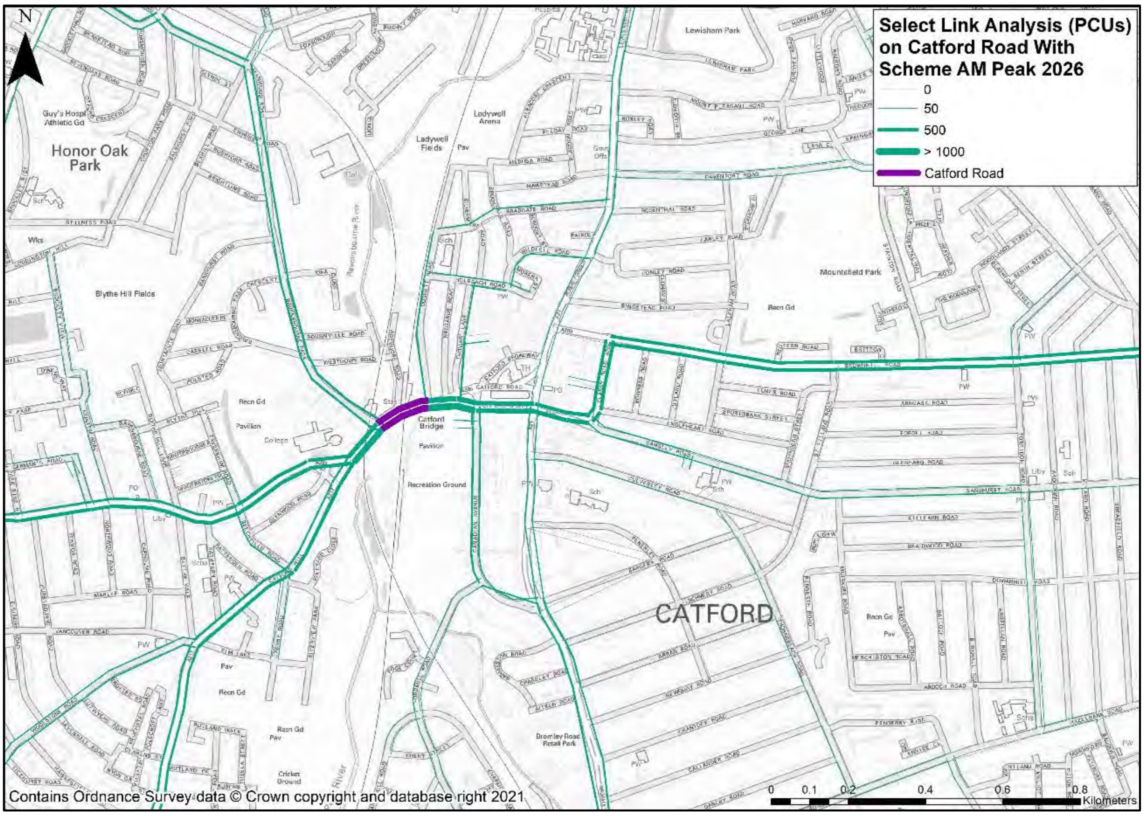


Figure 4-10: 2026 AM Peak With Scheme A205 Brownhill Road Select Link

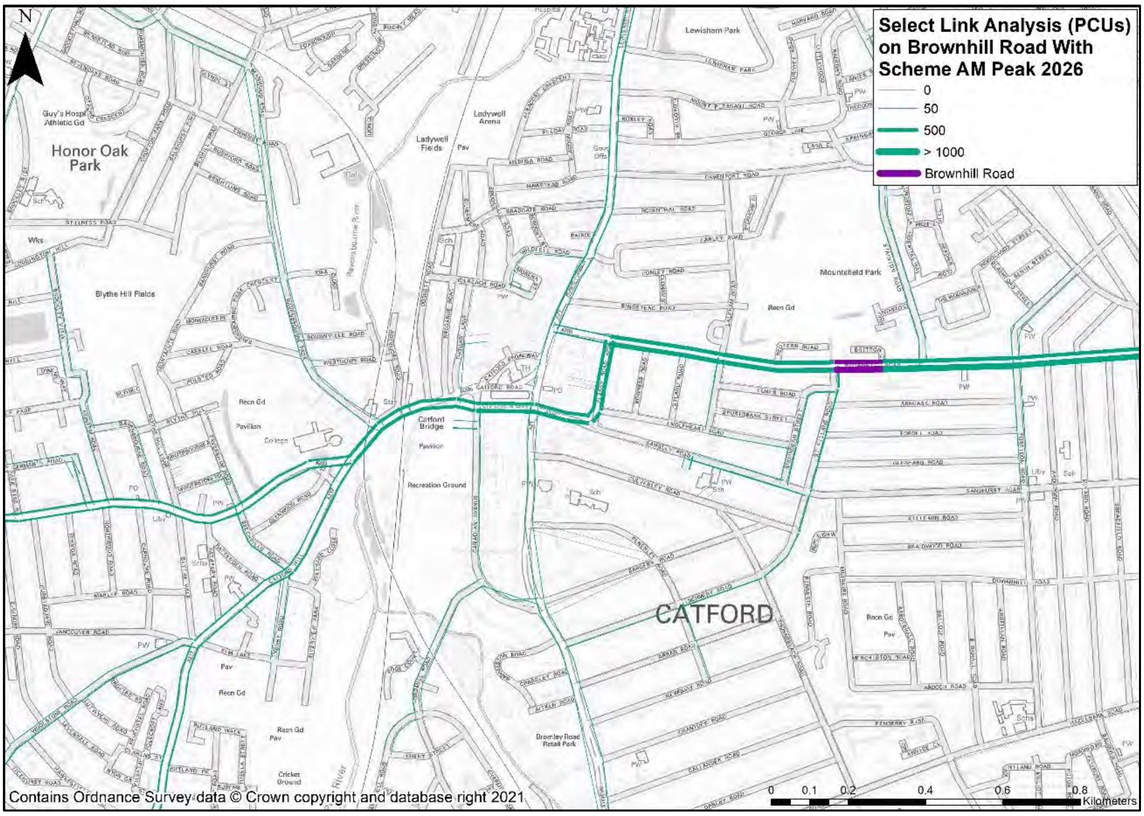


Figure 4-11: 2026 AM Peak With Scheme A21 Rushey Green Select Link

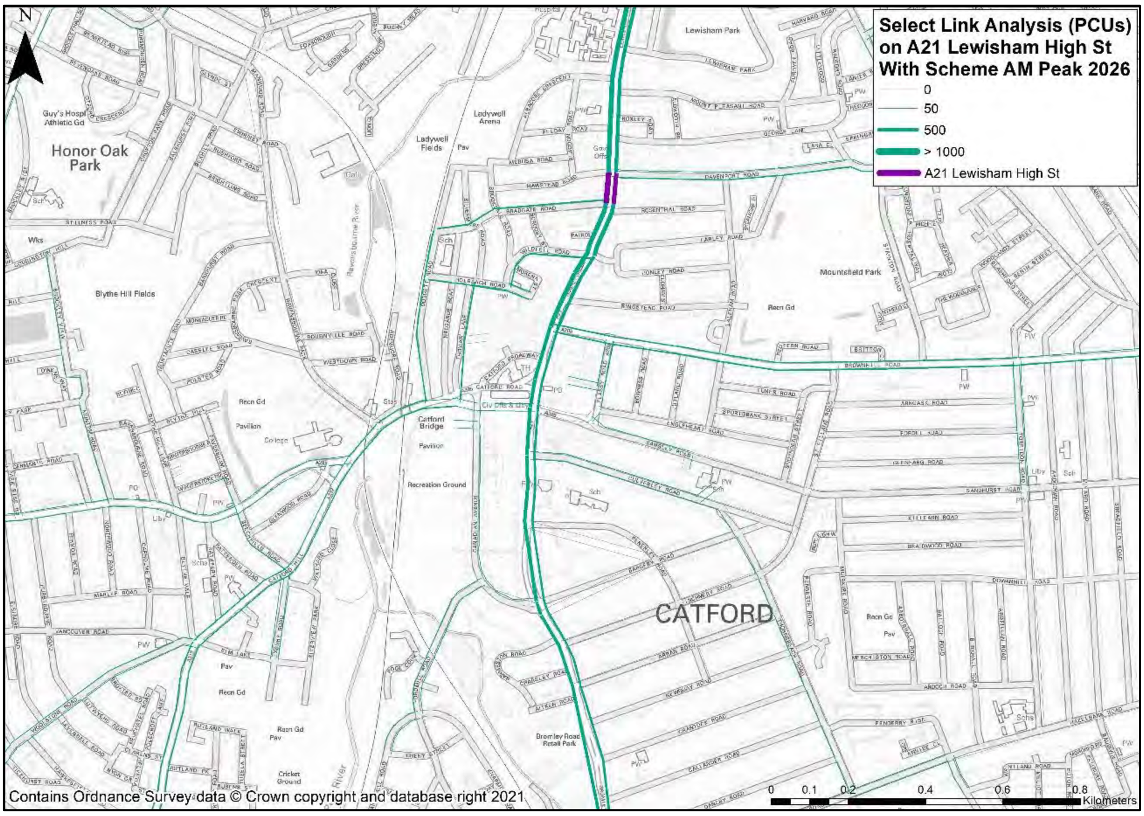
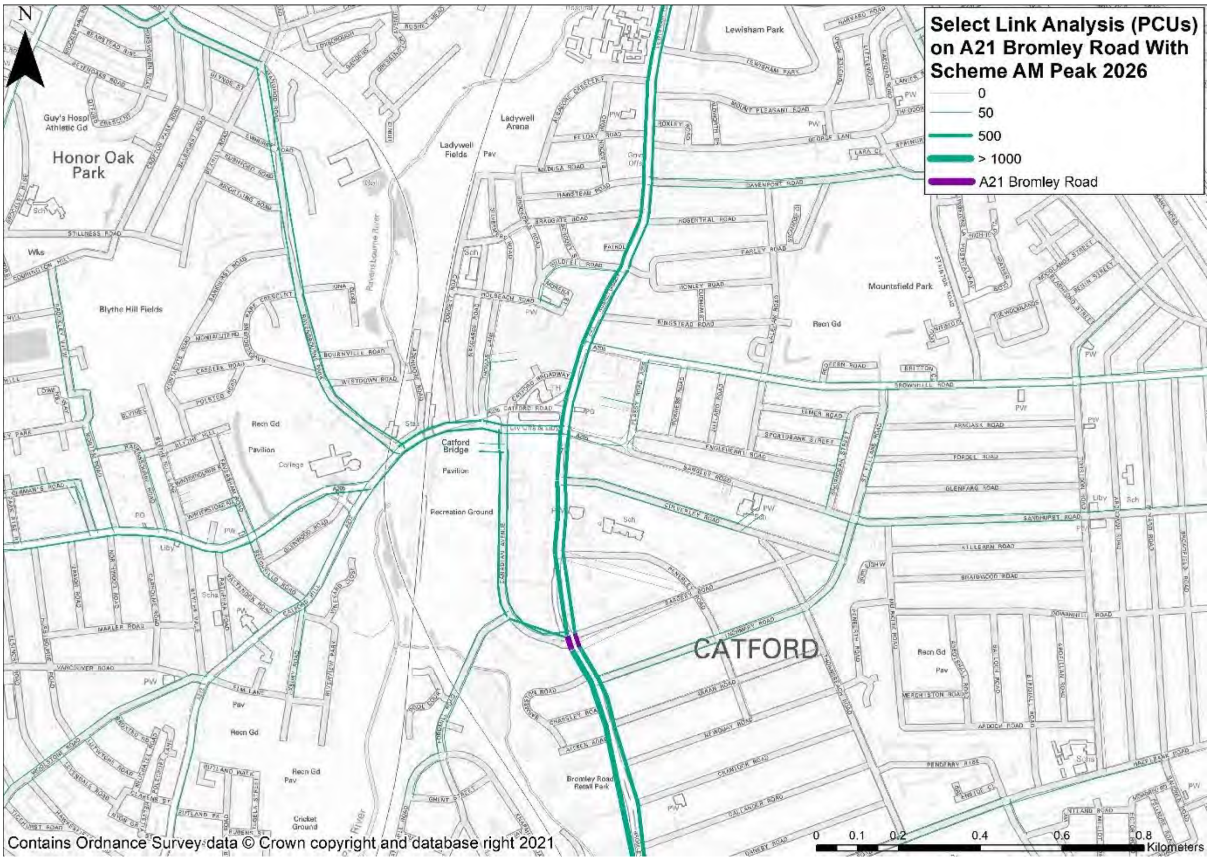


Figure 4-12: 2026 AM Peak With Scheme A21 Bromley Road Select Link



4.6 Journey time analysis

4.6.1 As seen in Section 4.5 the scheme brings about some changes in routeing through the gyratory which means that the scheme will generate journey distance benefits for certain movements. In some cases this will also result in journey time benefits however this will depend on the extent to which this is outweighed by the general increase in delay experienced at junctions around the scheme presented in Section 4.4.

4.6.2 Figure 4-15 to Figure 4-18 demonstrate the impact on journey times for a selection of movements through the gyratory in the 2026 AM Peak, comparing the Without Scheme scenario with the With Scheme scenario. The routes for which the analysis has been undertaken are shown in Figure 4-13 and Figure 4-14.

4.6.3 For three out of four routes, the distance benefit brought about by the scheme is minimal, and therefore in most cases there is a small journey time disbenefit brought about by additional delay at the junctions. However, for the A21 Southbound route, there is a distance benefit of 350m and therefore a journey time benefit of one minute. This balance of increased delay and, in some cases, more efficient routeing will be borne out in the TUBA assessment reported on in the TUBA Assessment Report.

4.6.4 The journey time patterns for these routes are broadly similar in the Interpeak and PM Peak, however the A205 Eastbound route in the PM Peak shows faster journey times in the With Scheme scenario than the Without Scheme, as shown in Figure 4-19. The With Scheme route is just over a minute faster that the Without Scheme route.

Figure 4-13: Without Scheme Scenario Routes

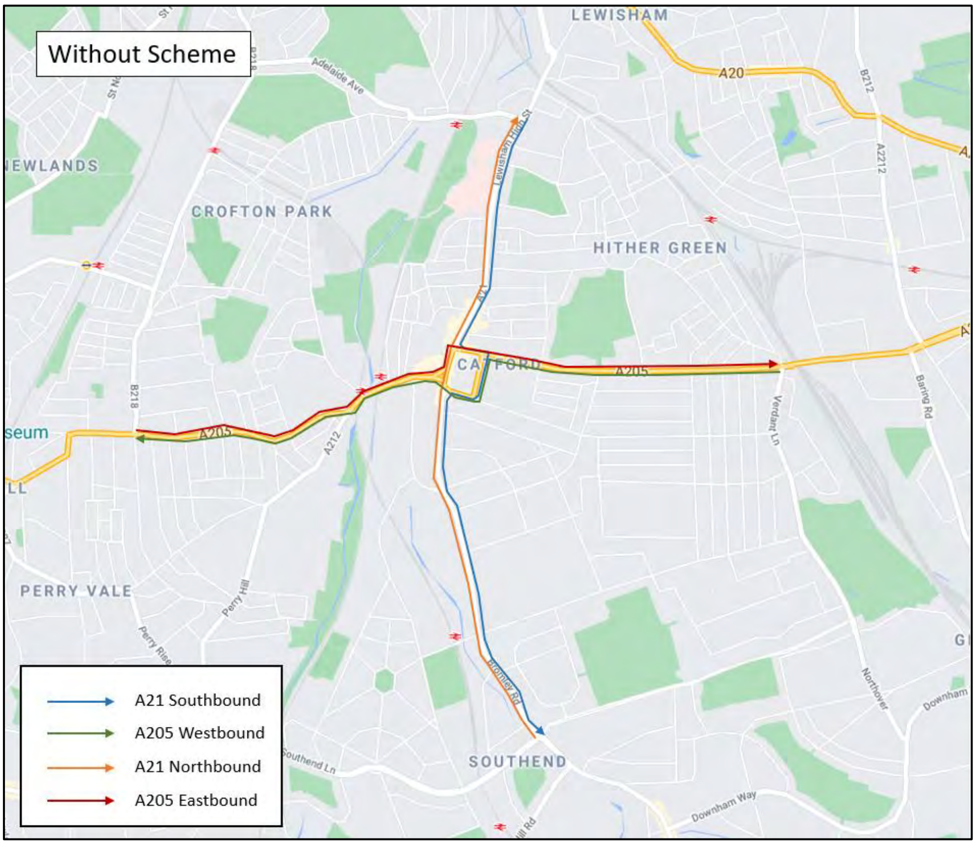


Figure 4-14: With Scheme Scenario Routes

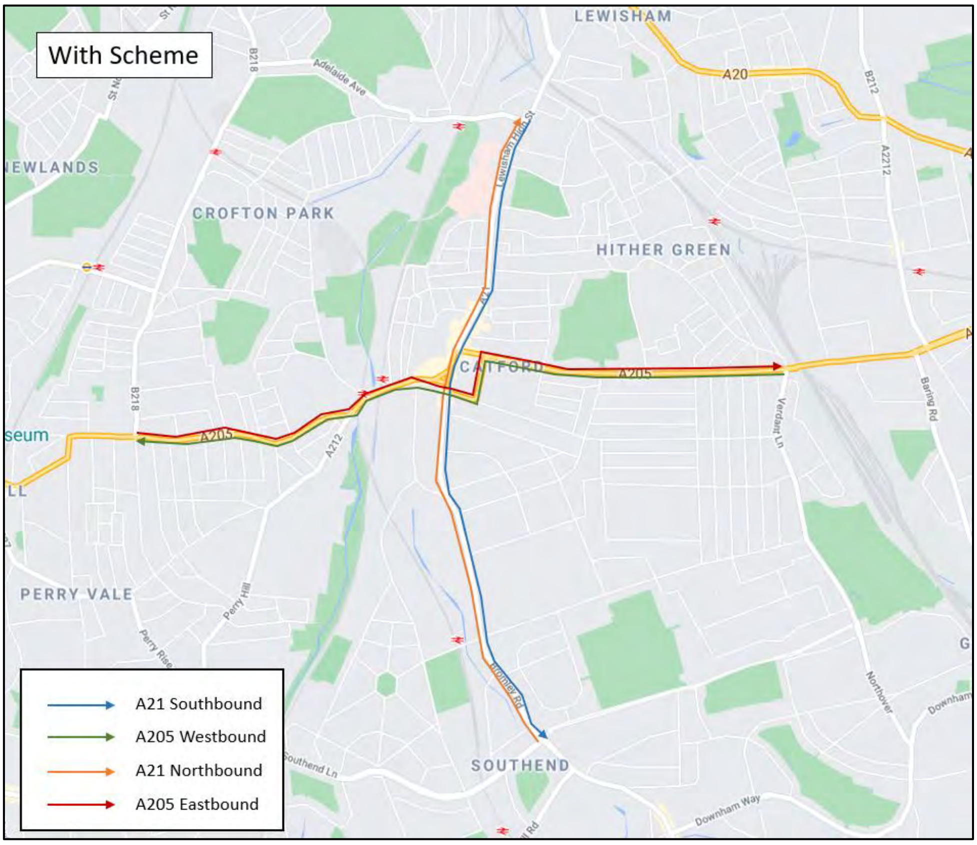


Figure 4-15: 2026 AM Peak Journey Times – A21 Southbound

Figure 4-16: 2026 AM Peak Journey Times – A205 Westbound

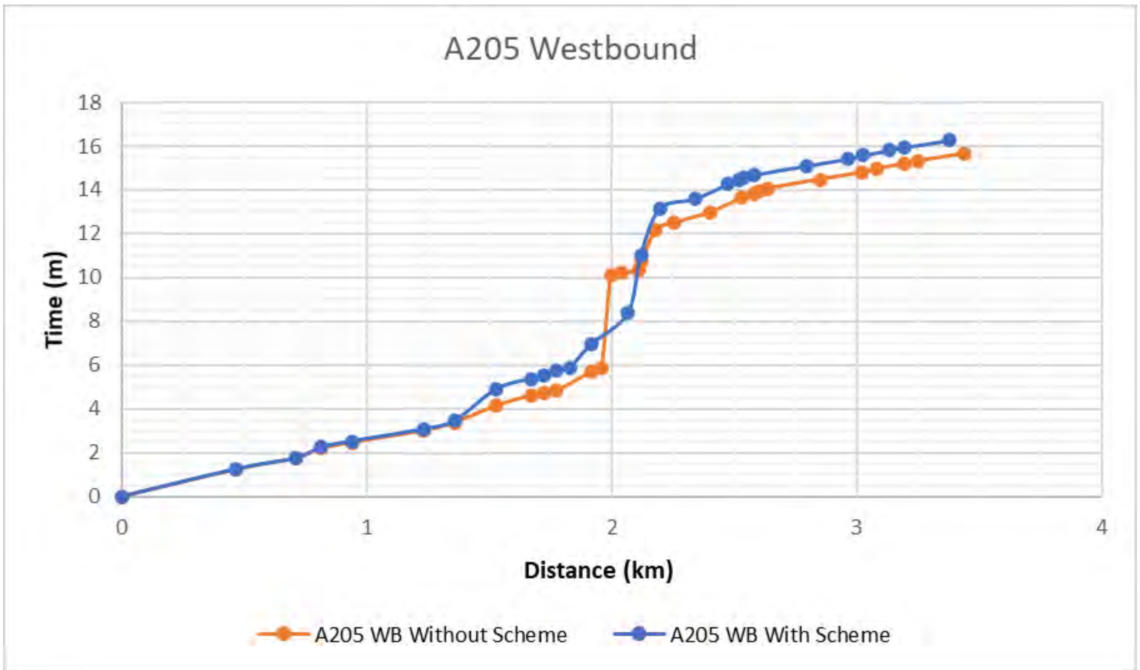


Figure 4-17: 2026 AM Peak Journey Times – A21 Northbound

Figure 4-18: 2026 AM Peak Journey Times – A205 Eastbound

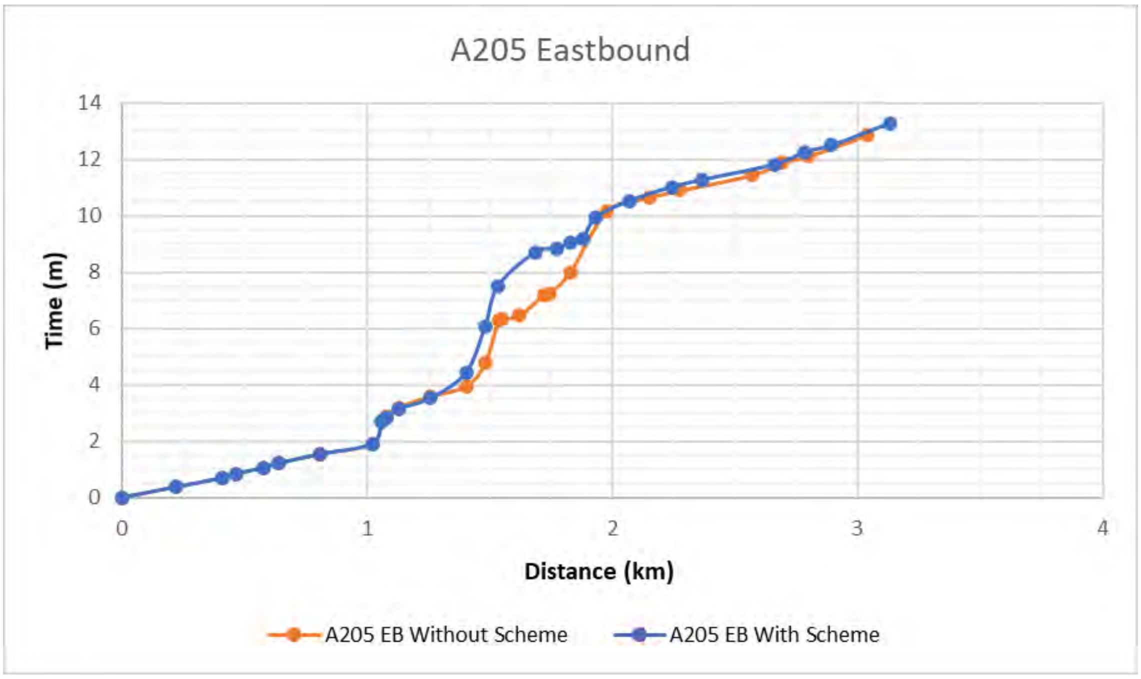
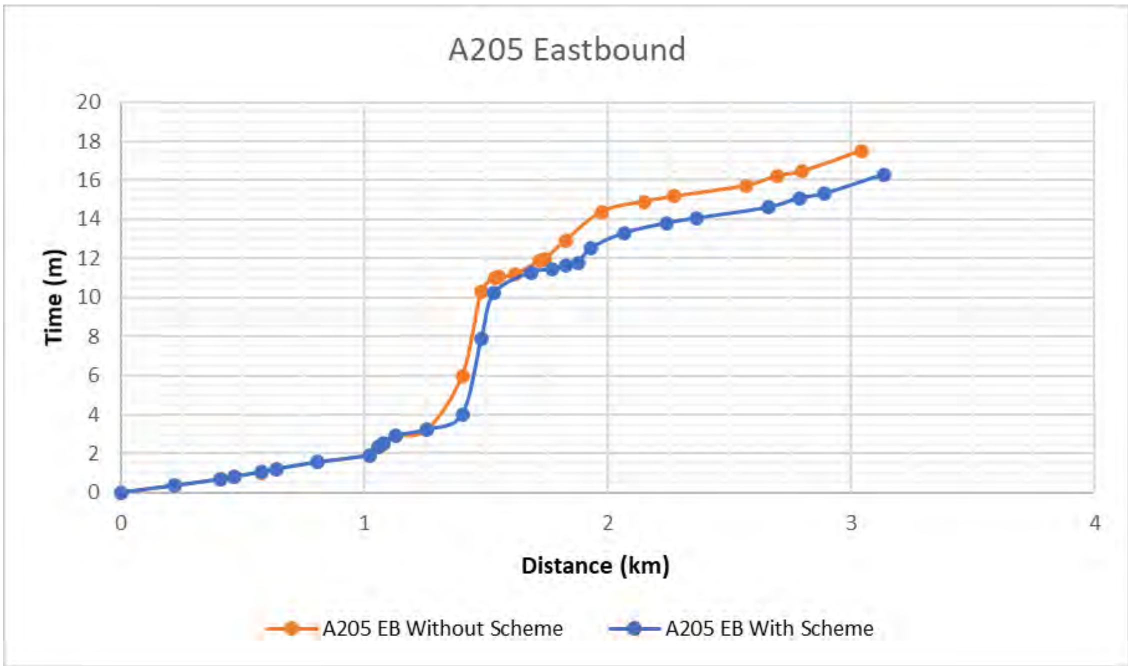


Figure 4-19: 2026 PM Peak Journey Times – A205 Eastbound



5. TAG High/Low Growth Sensitivity Testing

5.1 Introduction

5.1.1 Stress testing was undertaken by increasing and decreasing core matrix growth by a proportion of the base year demand and evaluating the effect on the model results in accordance with TAG Unit M4 guidance.

5.1.2 The formula applied to each forecast year matrix is:

High/Low Growth Scenario = Core Demand ± (N x P x Base Demand)

where

N = the square root of the number of years between forecast and base year;

and

P = 0.025 (2.5% reflects uncertainty around annual forecasts from the National Transport Model)

5.1.3 Table 5-1 present the proportion of base year demand applied to the core demand in order to create the high and low growth demand in each forecast year.

Table 5-1: Proportion of Base Year Demand by Forecast Year

Forecast Year	Difference from Base Year	N	P	NxP
2026	10	3.162	0.025	0.079
2031	15	3.873	0.025	0.097
2041	25	5	0.025	0.125

5.1.4 The high and low growth matrices were assigned to the Without and With Scheme networks and the findings are presented in the rest of this section.

5.2 Borough Statistics

Table 5-2 to Table 5-7 present the borough highway assignment statistics for the high and low growth scenarios, in the AM and PM Peaks for 2026 and 2041. They demonstrate the difference in traffic conditions compared to the core growth scenario, and the impact of the scheme in the high and low growth scenarios. The results are as expected, with higher levels of congestion in the high growth scenario and lower levels in the low growth scenario, compared to the core growth scenario. The impact of the scheme at borough level in the high and low growth scenarios is very similar to that seen in the core growth scenario which demonstrates a level of stability in the model's representation of the scheme.

Table 5-2: Borough Statistics by Modelled Year – With and Without Scheme, High Growth – AM Peak

Borough	Metric	2026 Without (Core Growth)	2026 Without Scheme	Change from Core	2026 With Scheme	Change from Without Scheme	2041 Without (Core Growth)	2041 Without Scheme	Change from Core	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	104,692	111,440	6%	110,574	-0.8%	110,524	119,024	14%	117,877	-1.0%
	Travel Time (pcu-hours)	6,227	7,099	14%	7,076	-0.3%	6,934	8,404	35%	8,381	-0.3%
	Average Speed (kph)	16.8	15.7	-7%	15.6	-0.5%	15.9	14.2	-16%	14.1	-0.7%
Greenwich	Travel Distance (pcu-km)	206,861	218,838	6%	218,852	0.0%	222,445	240,504	16%	240,485	0.0%
	Travel Time (pcu-hours)	8,694	9,805	13%	9,816	0.1%	9,662	11,602	33%	11,629	0.2%
	Average Speed (kph)	23.8	22.3	-6%	22.3	-0.1%	23.0	20.7	-13%	20.7	-0.2%
Bromley	Travel Distance (pcu-km)	261,970	276,478	6%	276,557	0.0%	277,612	299,925	14%	300,054	0.0%
	Travel Time (pcu-hours)	11,122	12,528	13%	12,536	0.1%	12,744	15,443	39%	15,459	0.1%
	Average Speed (kph)	23.6	22.1	-6%	22.1	0.0%	21.8	19.4	-18%	19.4	-0.1%
Southwark	Travel Distance (pcu-km)	90,290	96,314	7%	96,367	0.1%	97,524	107,548	19%	107,631	0.1%
	Travel Time (pcu-hours)	5,271	5,663	7%	5,664	0.0%	5,803	6,485	23%	6,491	0.1%
	Average Speed (kph)	17.1	17.0	-1%	17.0	0.0%	16.8	16.6	-3%	16.6	0.0%

Table 5-3: Borough Statistics by Modelled Year – With and Without Scheme, High Growth – Interpeak

Borough	Metric	2026 Without (Core Growth)	2026 Without Scheme	Change from Core	2026 With Scheme	Change from Without Scheme	2041 Without (Core Growth)	2041 Without Scheme	Change from Core	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	87,745	93,887	7%	93,265	-0.7%	93,746	103,035	17%	102,331	-0.7%
	Travel Time (pcu-hours)	4,380	4,824	10%	4,808	-0.3%	4,812	5,622	28%	5,602	-0.4%
	Average Speed (kph)	20.0	19.5	-3%	19.4	-0.3%	19.5	18.3	-8%	18.3	-0.3%
Greenwich	Travel Distance (pcu-km)	171,907	182,797	6%	182,820	0.0%	185,299	201,099	17%	201,722	0.3%
	Travel Time (pcu-hours)	5,789	6,351	10%	6,351	0.0%	6,363	7,424	28%	7,323	-1.4%
	Average Speed (kph)	29.7	28.8	-3%	28.8	0.0%	29.1	27.1	-9%	27.5	1.7%
Bromley	Travel Distance (pcu-km)	195,364	208,588	7%	208,594	0.0%	213,079	233,422	19%	233,496	0.0%
	Travel Time (pcu-hours)	6,963	7,567	9%	7,568	0.0%	7,701	8,751	26%	8,779	0.3%
	Average Speed (kph)	28.1	27.6	-2%	27.6	0.0%	27.7	26.7	-5%	26.6	-0.3%
Southwark	Travel Distance (pcu-km)	78,690	83,464	6%	83,496	0.0%	83,807	91,567	16%	91,596	0.0%
	Travel Time (pcu-hours)	5,271	5,663	7%	5,664	0.0%	5,803	6,485	23%	6,491	0.1%
	Average Speed (kph)	17.1	17.0	-1%	17.0	0.0%	16.8	16.6	-3%	16.6	0.0%

Table 5-4: Borough Statistics by Modelled Year – With and Without Scheme, High Growth – PM Peak

Borough	Metric	2026 Without (Core Growth)	2026 Without Scheme	Change from Core	2026 With Scheme	Change from Without Scheme	2041 Without (Core Growth)	2041 Without Scheme	Change from Core	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	102,070	108,495	6%	107,977	-0.5%	107,237	116,086	14%	115,258	-0.7%
	Travel Time (pcu-hours)	5,776	6,597	14%	6,545	-0.8%	6,416	8,005	39%	7,954	-0.6%
	Average Speed (kph)	17.7	16.4	-7%	16.5	0.3%	16.7	14.5	-18%	14.5	-0.1%
Greenwich	Travel Distance (pcu-km)	212,485	224,184	6%	224,065	-0.1%	225,355	241,123	13%	241,116	0.0%
	Travel Time (pcu-hours)	8,592	9,785	14%	9,766	-0.2%	9,438	11,825	38%	11,797	-0.2%
	Average Speed (kph)	24.7	22.9	-7%	22.9	0.1%	23.9	20.4	-18%	20.4	0.2%
Bromley	Travel Distance (pcu-km)	253,560	270,164	7%	270,310	0.1%	271,335	297,316	17%	297,483	0.1%
	Travel Time (pcu-hours)	10,335	11,564	12%	11,557	-0.1%	11,713	14,050	36%	14,056	0.0%
	Average Speed (kph)	24.5	23.4	-5%	23.4	0.1%	23.2	21.2	-14%	21.2	0.0%
Southwark	Travel Distance (pcu-km)	87,015	92,399	6%	92,576	0.2%	90,294	99,110	14%	99,177	0.1%
	Travel Time (pcu-hours)	4,855	5,215	7%	5,215	0.0%	5,197	5,799	19%	5,800	0.0%
	Average Speed (kph)	17.9	17.7	-1%	17.8	0.2%	17.4	17.1	-5%	17.1	0.1%

Table 5-5: Borough Statistics by Modelled Year – With and Without Scheme, Low Growth – AM Peak

Borough	Metric	2026 Without (Core Growth)	2026 Without Scheme	Change from Core	2026 With Scheme	Change from Without Scheme	2041 Without (Core Growth)	2041 Without Scheme	Change from Core	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	104,692	98,038	-6%	97,537	-0.5%	110,524	100,127	-4%	99,552	-0.6%
	Travel Time (pcu-hours)	6,227	5,494	-12%	5,464	-0.5%	6,934	5,698	-9%	5,673	-0.4%
	Average Speed (kph)	16.8	17.8	6%	17.9	0.0%	15.9	17.6	5%	17.5	-0.1%
Greenwich	Travel Distance (pcu-km)	206,861	194,749	-6%	194,750	0.0%	222,445	203,898	-1%	203,889	0.0%
	Travel Time (pcu-hours)	8,694	7,761	-11%	7,759	0.0%	9,662	8,021	-8%	8,013	-0.1%
	Average Speed (kph)	23.8	25.1	5%	25.1	0.0%	23.0	25.4	7%	25.4	0.1%
Bromley	Travel Distance (pcu-km)	261,970	245,239	-6%	245,207	0.0%	277,612	252,674	-4%	252,644	0.0%
	Travel Time (pcu-hours)	11,122	9,911	-11%	9,908	0.0%	12,744	10,534	-5%	10,535	0.0%
	Average Speed (kph)	23.6	24.7	5%	24.7	0.0%	21.8	24.0	2%	24.0	0.0%
Southwark	Travel Distance (pcu-km)	90,290	84,206	-7%	84,259	0.1%	97,524	87,609	-3%	87,633	0.0%
	Travel Time (pcu-hours)	5,271	4,876	-7%	4,878	0.0%	5,803	5,122	-3%	5,123	0.0%
	Average Speed (kph)	17.1	17.3	1%	17.3	0.0%	16.8	17.1	0%	17.1	0.0%

Table 5-6: Borough Statistics by Modelled Year – With and Without Scheme, Low Growth – Interpeak

Borough	Metric	2026 Without (Core Growth)	2026 Without Scheme	Change from Core	2026 With Scheme	Change from Without Scheme	2041 Without (Core Growth)	2041 Without Scheme	Change from Core	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	87,745	81,561	-7%	81,038	-0.6%	93,746	84,059	-4%	83,492	-0.7%
	Travel Time (pcu-hours)	4,380	3,973	-9%	3,961	-0.3%	4,812	4,138	-6%	4,116	-0.5%
	Average Speed (kph)	20.0	20.5	2%	20.5	-0.3%	19.5	20.3	1%	20.3	-0.1%
Greenwich	Travel Distance (pcu-km)	171,907	160,865	-6%	160,847	0.0%	185,299	168,594	-2%	168,539	0.0%
	Travel Time (pcu-hours)	5,789	5,258	-9%	5,254	-0.1%	6,363	5,518	-5%	5,515	-0.1%
	Average Speed (kph)	29.7	30.6	3%	30.6	0.1%	29.1	30.6	3%	30.6	0.0%
Bromley	Travel Distance (pcu-km)	195,364	181,793	-7%	181,804	0.0%	213,079	192,115	-2%	192,168	0.0%
	Travel Time (pcu-hours)	6,963	6,392	-8%	6,392	0.0%	7,701	6,761	-3%	6,770	0.1%
	Average Speed (kph)	28.1	28.4	1%	28.4	0.0%	27.7	28.4	1%	28.4	-0.1%
Southwark	Travel Distance (pcu-km)	78,690	73,674	-6%	73,694	0.0%	83,807	75,850	-4%	75,865	0.0%
	Travel Time (pcu-hours)	4,251	3,957	-7%	3,958	0.0%	4,637	4,154	-2%	4,154	0.0%
	Average Speed (kph)	18.5	18.6	1%	18.6	0.0%	18.1	18.3	-1%	18.3	0.0%

Table 5-7: Borough Statistics by Modelled Year – With and Without Scheme, Low Growth – PM Peak

Borough	Metric	2026 Without (Core Growth)	2026 Without Scheme	Change from Core	2026 With Scheme	Change from Without Scheme	2041 Without (Core Growth)	2041 Without Scheme	Change from Core	2041 With Scheme	Change from Without Scheme
Lewisham	Travel Distance (pcu-km)	102,070	95,329	-7%	94,714	-0.6%	107,237	96,762	-5%	96,060	-0.7%
	Travel Time (pcu-hours)	5,776	5,096	-12%	5,075	-0.4%	6,416	5,238	-9%	5,233	-0.1%
	Average Speed (kph)	17.7	18.7	6%	18.7	-0.2%	16.7	18.5	5%	18.4	-0.6%
Greenwich	Travel Distance (pcu-km)	212,485	199,002	-6%	199,000	0.0%	225,355	206,861	-3%	206,785	0.0%
	Travel Time (pcu-hours)	8,592	7,629	-11%	7,626	0.0%	9,438	7,794	-9%	7,786	-0.1%
	Average Speed (kph)	24.7	26.1	5%	26.1	0.0%	23.9	26.5	7%	26.6	0.1%
Bromley	Travel Distance (pcu-km)	253,560	237,230	-6%	237,254	0.0%	271,335	245,748	-3%	245,749	0.0%
	Travel Time (pcu-hours)	10,335	9,294	-10%	9,298	0.0%	11,713	9,902	-4%	9,917	0.2%
	Average Speed (kph)	24.5	25.5	4%	25.5	0.0%	23.2	24.8	1%	24.8	-0.2%
Southwark	Travel Distance (pcu-km)	87,015	81,352	-7%	81,360	0.0%	90,294	81,410	-6%	81,432	0.0%
	Travel Time (pcu-hours)	4,855	4,508	-7%	4,508	0.0%	5,197	4,622	-5%	4,624	0.1%
	Average Speed (kph)	17.9	18.0	1%	18.0	0.0%	17.4	17.6	-2%	17.6	0.0%

5.3 Traffic Flow Forecasts

5.3.1 Figure 5-1 to Figure 5-4 show the forecast flow differences comparing the high and low growth scenarios against the core growth scenarios for the AM and PM Peaks in 2026. As expected, the high growth scenario exhibits modest increases in flow compared to the core scenario, with the low growth scenario exhibiting modest reductions in flow.

Figure 5-1: 2026 Without Scheme High – Core Growth Traffic Flow - AM Peak

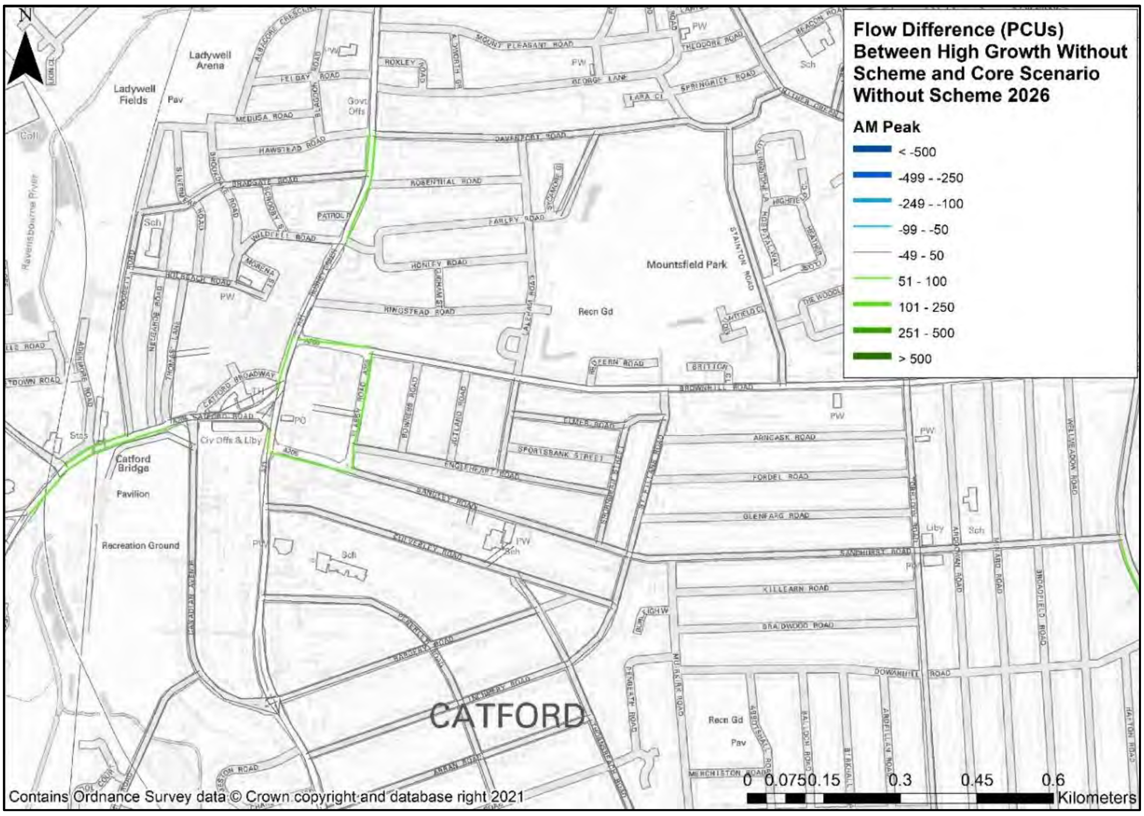


Figure 5-2: 2026 Without Scheme High – Core Growth Traffic Flow - PM Peak

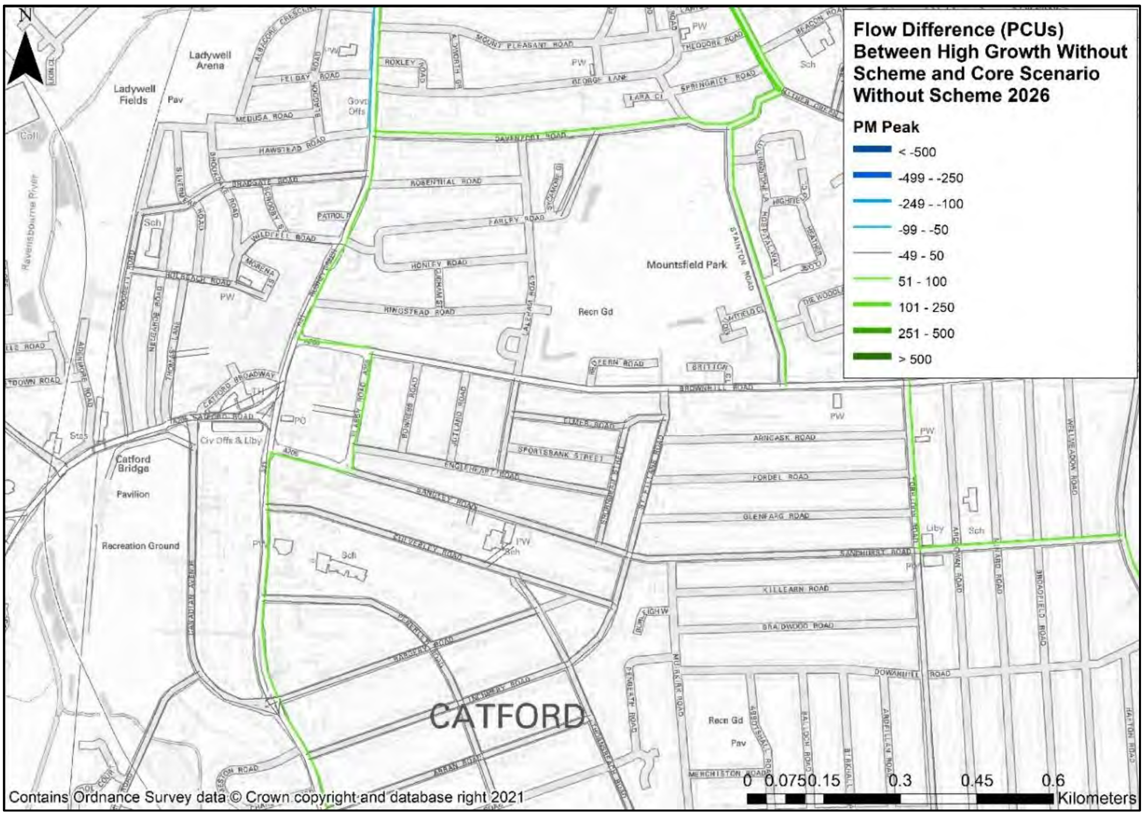


Figure 5-3: 2026 Without Scheme Low – Core Growth Traffic Flow - AM Peak

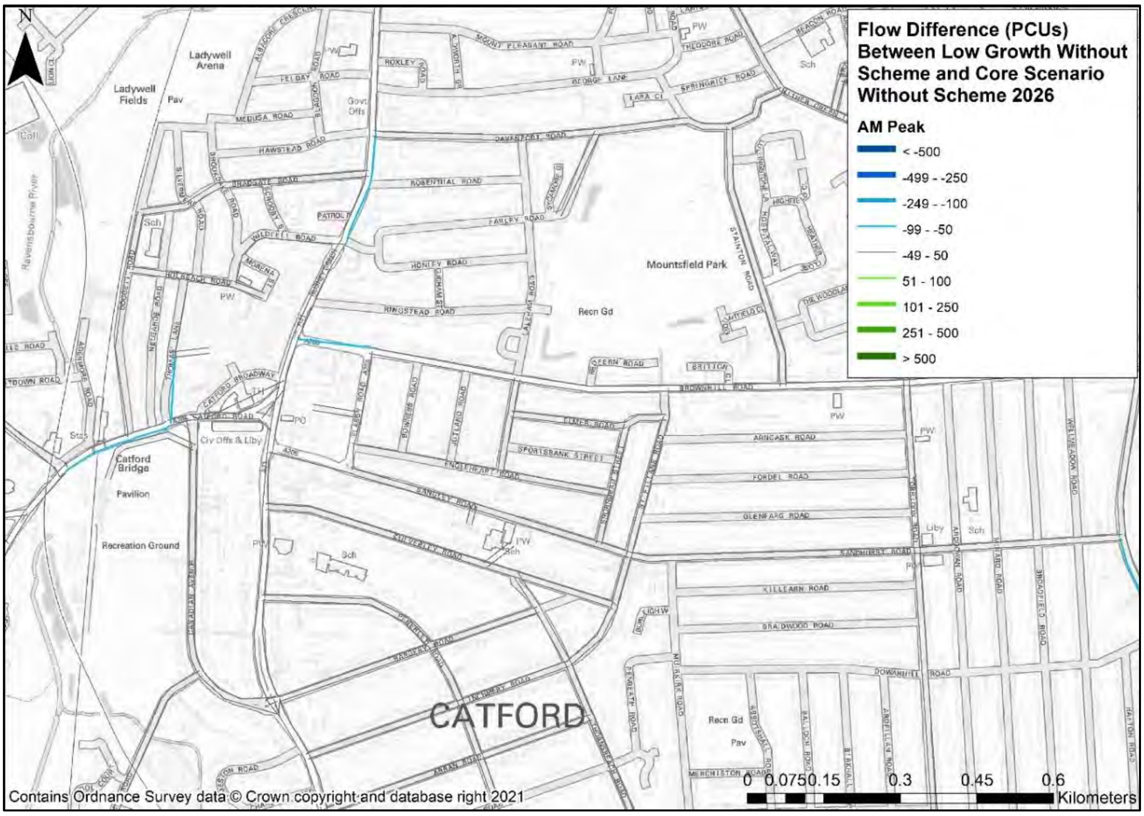
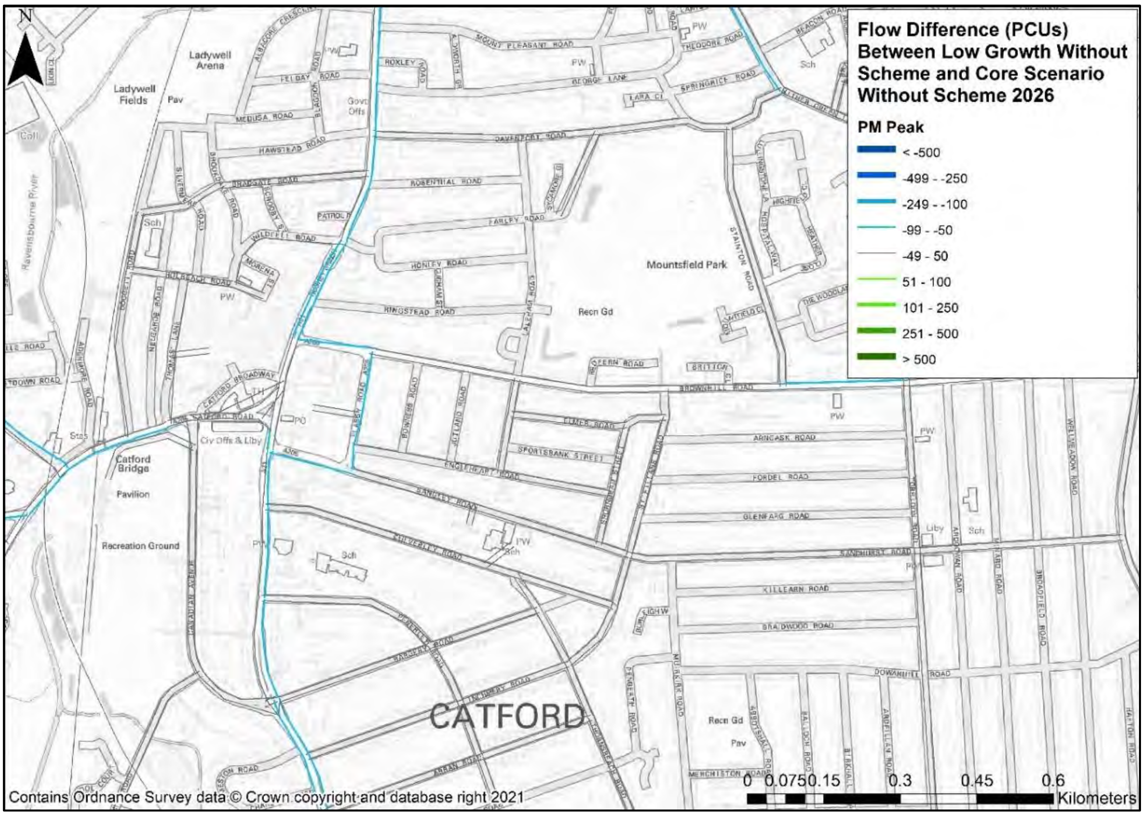


Figure 5-4: 2026 Without Scheme Low – Core Growth Traffic Flow - PM Peak



5.3.2 Figure 5-5 to Figure 5-8 show the forecast impact of the scheme in the 2026 high and low growth scenarios for the AM and PM Peaks. The scheme impact is similar to that reported on in Section 4 for the core growth scenario which suggests that the results provided by the model are stable and reliable.

Figure 5-5: 2026 With Scheme minus Without Scheme High Growth Traffic Flow - AM Peak

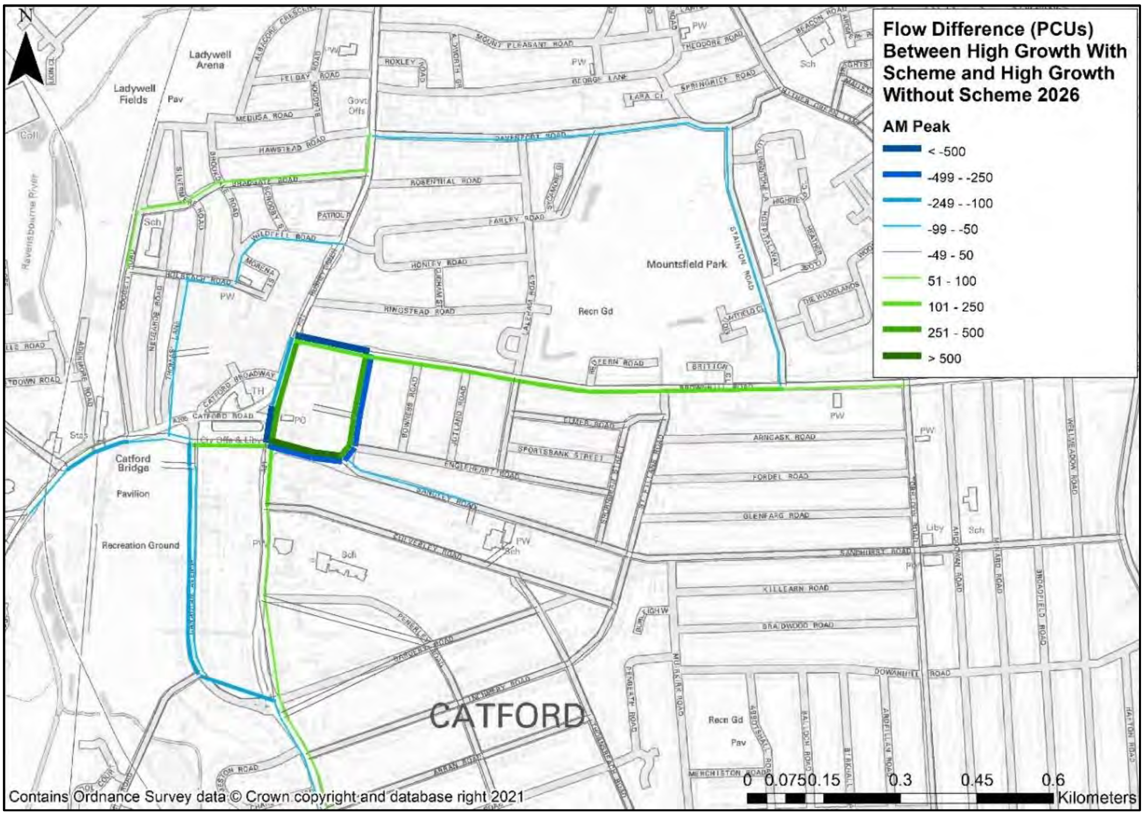


Figure 5-6: 2026 With Scheme minus Without Scheme High Growth Traffic Flow - PM Peak

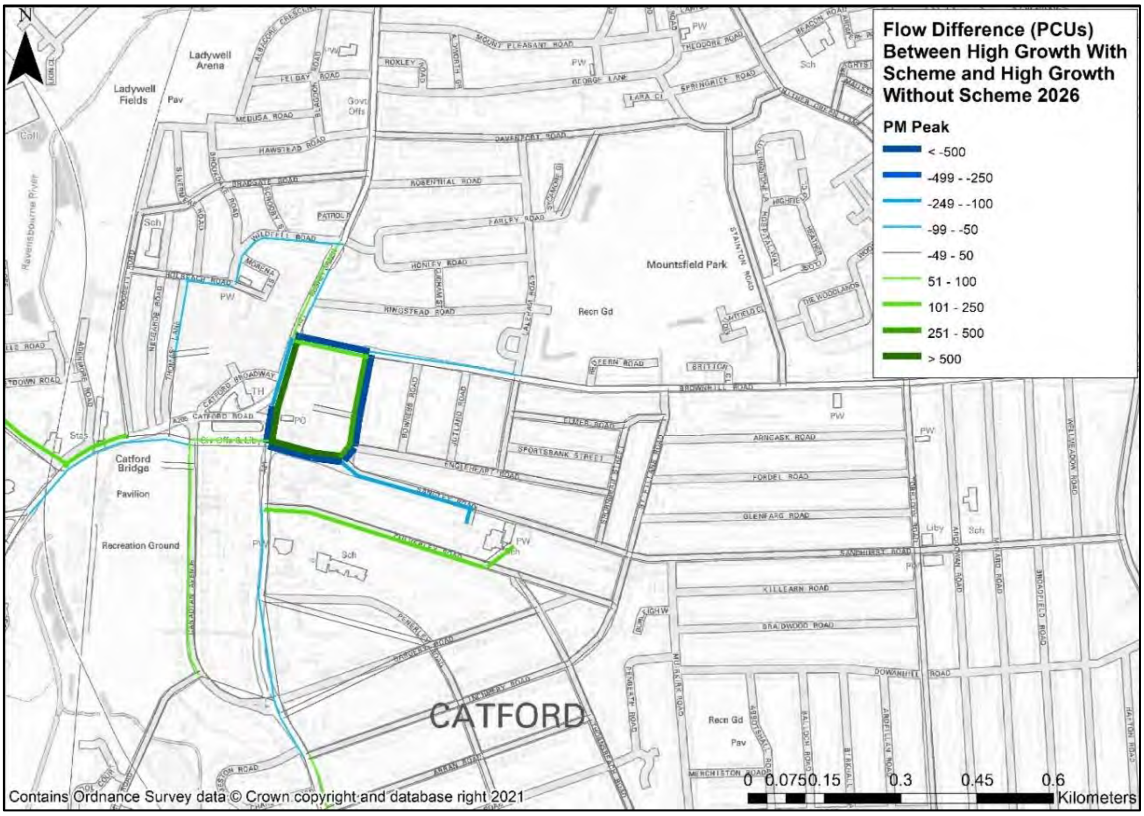


Figure 5-7: 2026 With Scheme minus Without Scheme Low Growth Traffic Flow - AM Peak

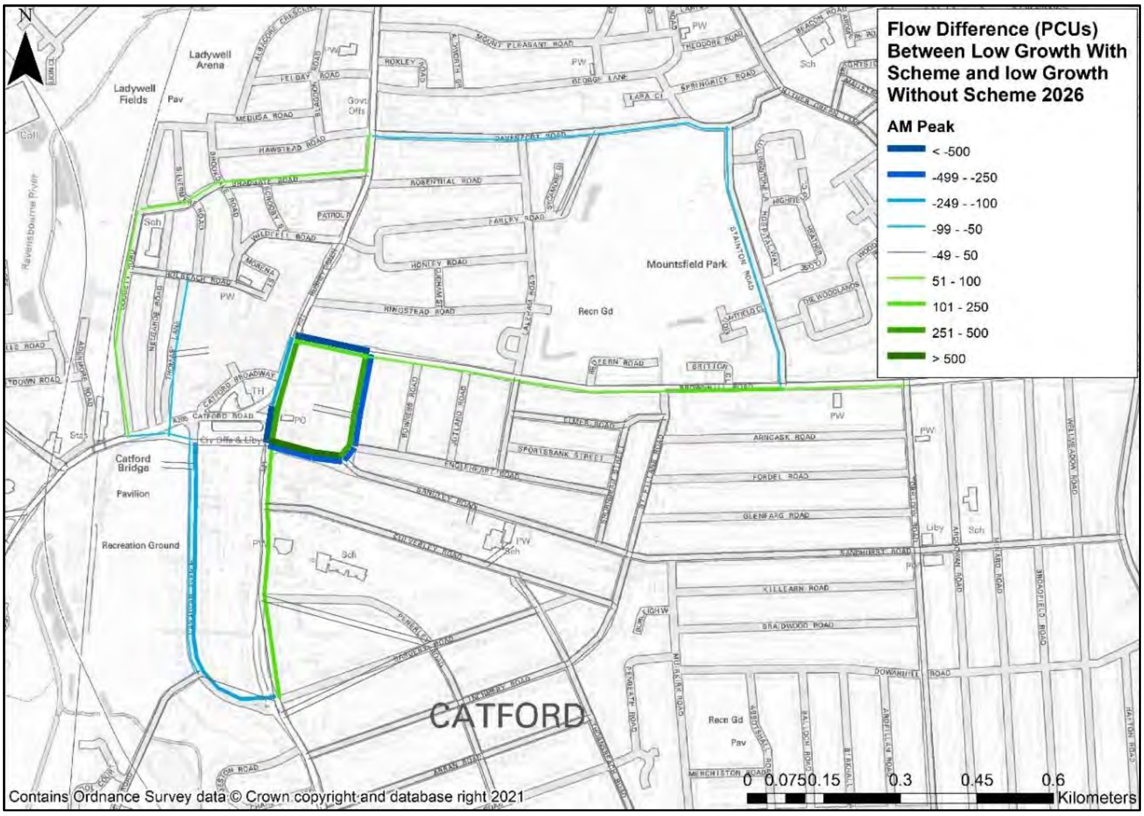
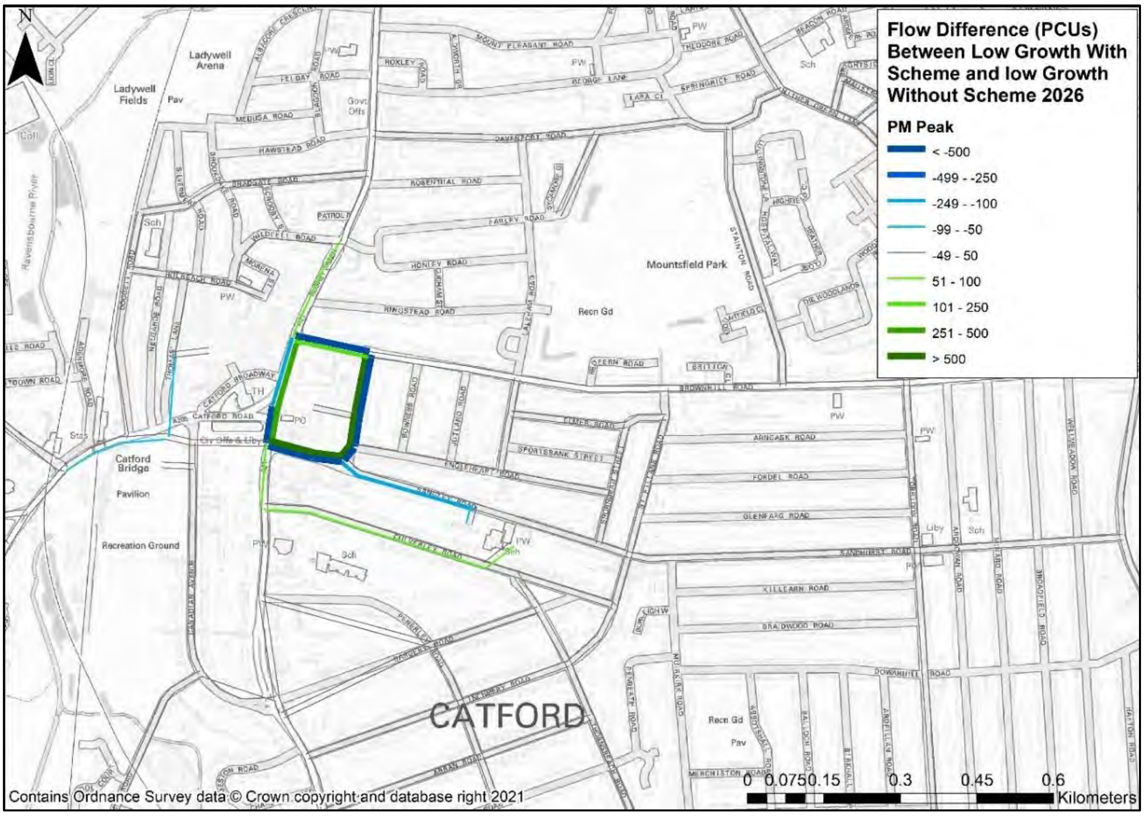


Figure 5-8: 2026 With Scheme minus Without Scheme Low Growth Traffic Flow - PM Peak



5.3.3 Figure 5-9 to Figure 5-16 show the difference in traffic flow in the high and low growth scenarios compared to the core growth scenario for the 2041 AM and PM Peaks, and the forecast impact of the scheme in the 2041 high and low growth scenarios for the AM and PM Peaks. These plots demonstrate similar results to the 2026 plots reported above, with differences in flow from the core growth scenario somewhat more pronounced, as would be expected, and the impact of the scheme remaining stable.

Figure 5-9: 2041 Without Scheme High – Core Growth Traffic Flow - AM Peak

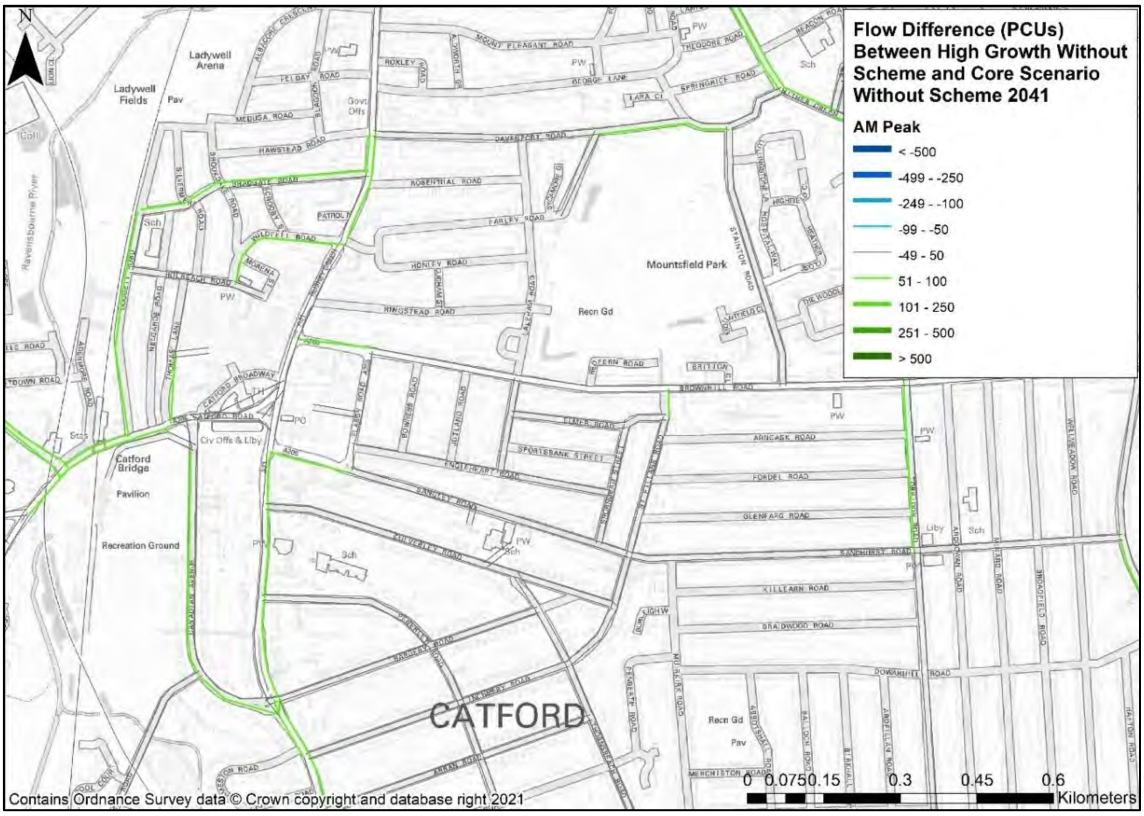


Figure 5-10: 2041 Without Scheme High – Core Growth Traffic Flow - PM Peak

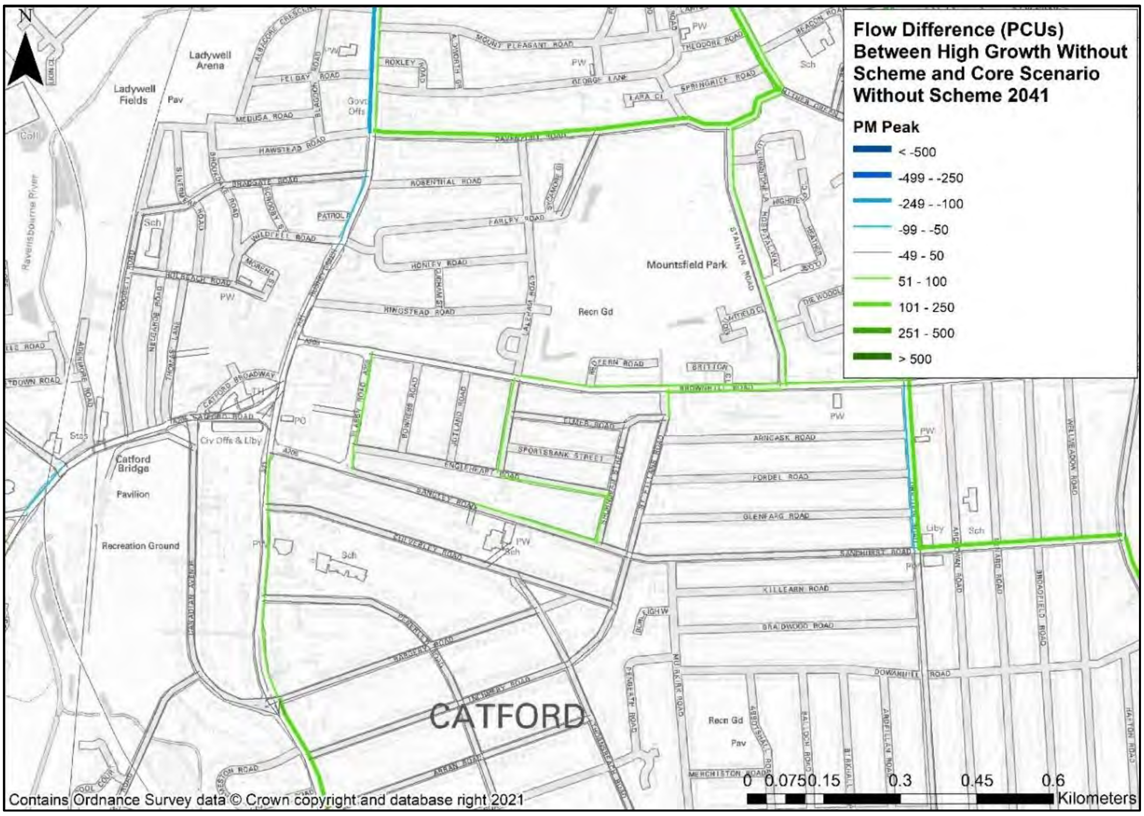


Figure 5-11: 2041 Without Scheme Low – Core Growth Traffic Flow - AM Peak

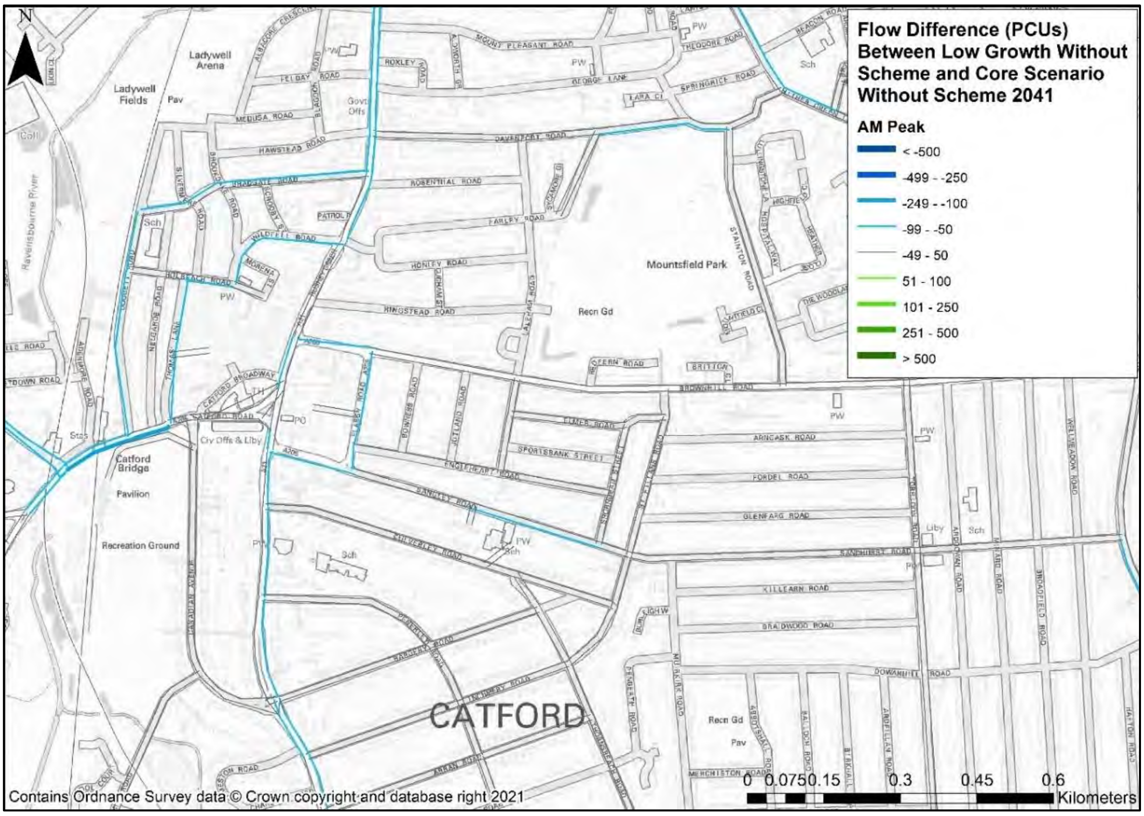


Figure 5-12: 2041 Without Scheme Low – Core Growth Traffic Flow - PM Peak

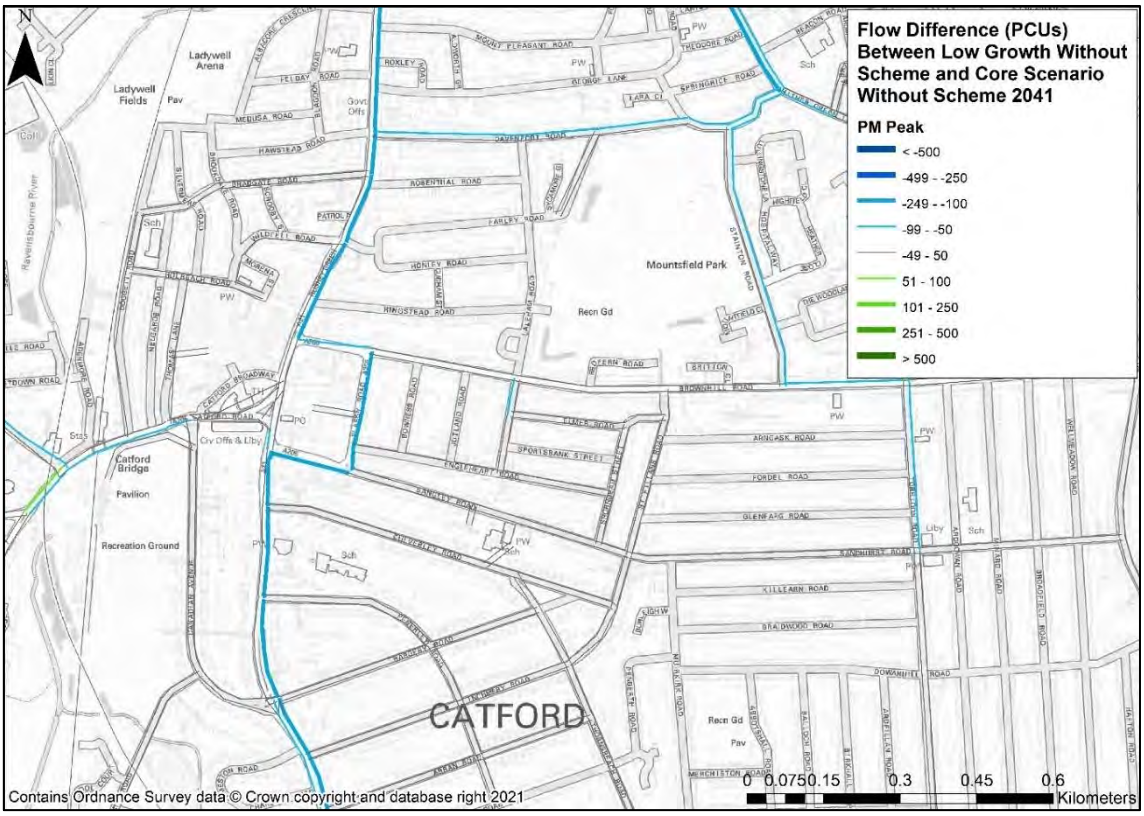


Figure 5-13: 2041 With Scheme minus Without Scheme High Growth Traffic Flow - AM Peak

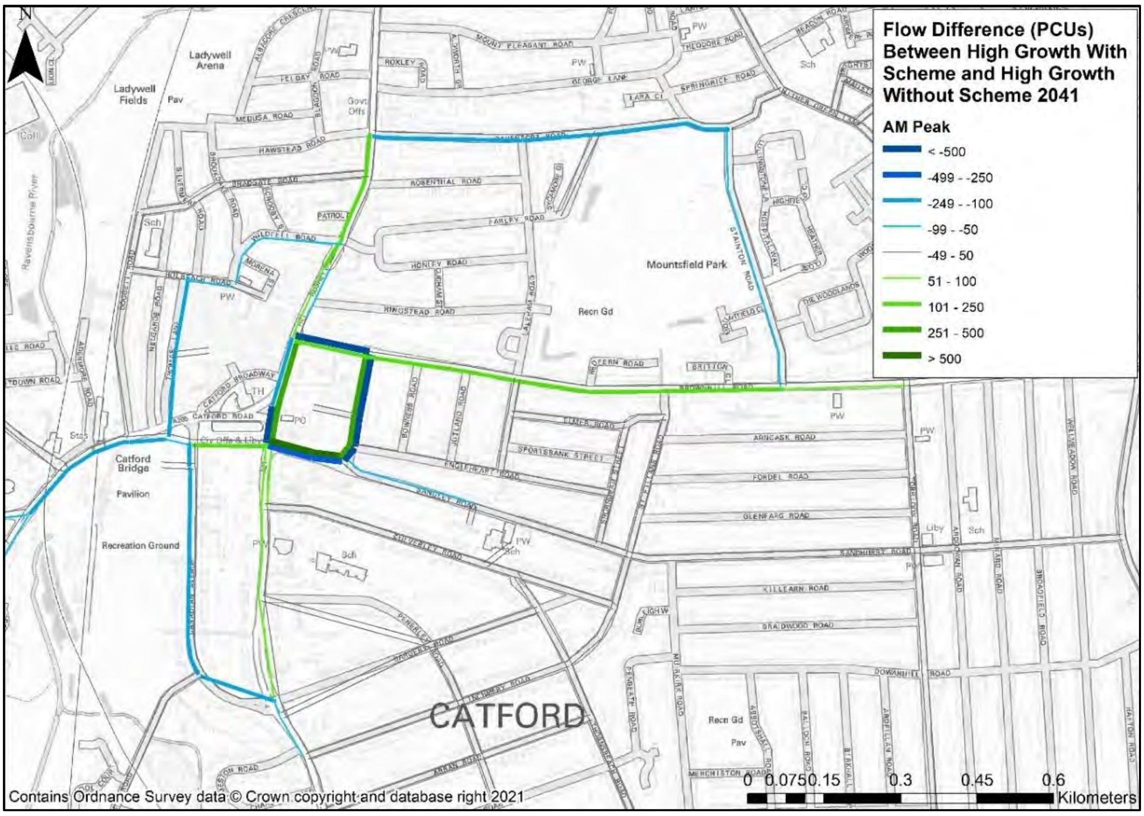


Figure 5-14: 2041 With Scheme minus Without Scheme High Growth Traffic Flow - PM Peak

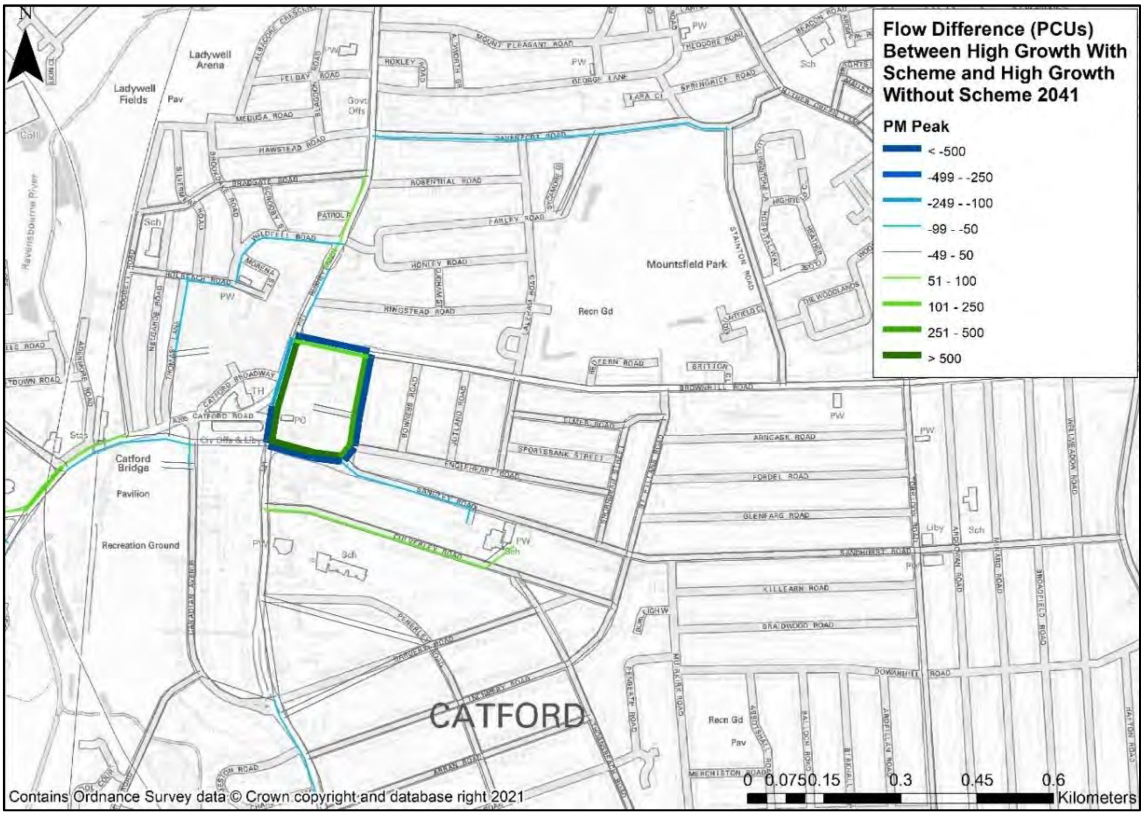


Figure 5-15: 2041 With Scheme minus Without Scheme Low Growth Traffic Flow - AM Peak

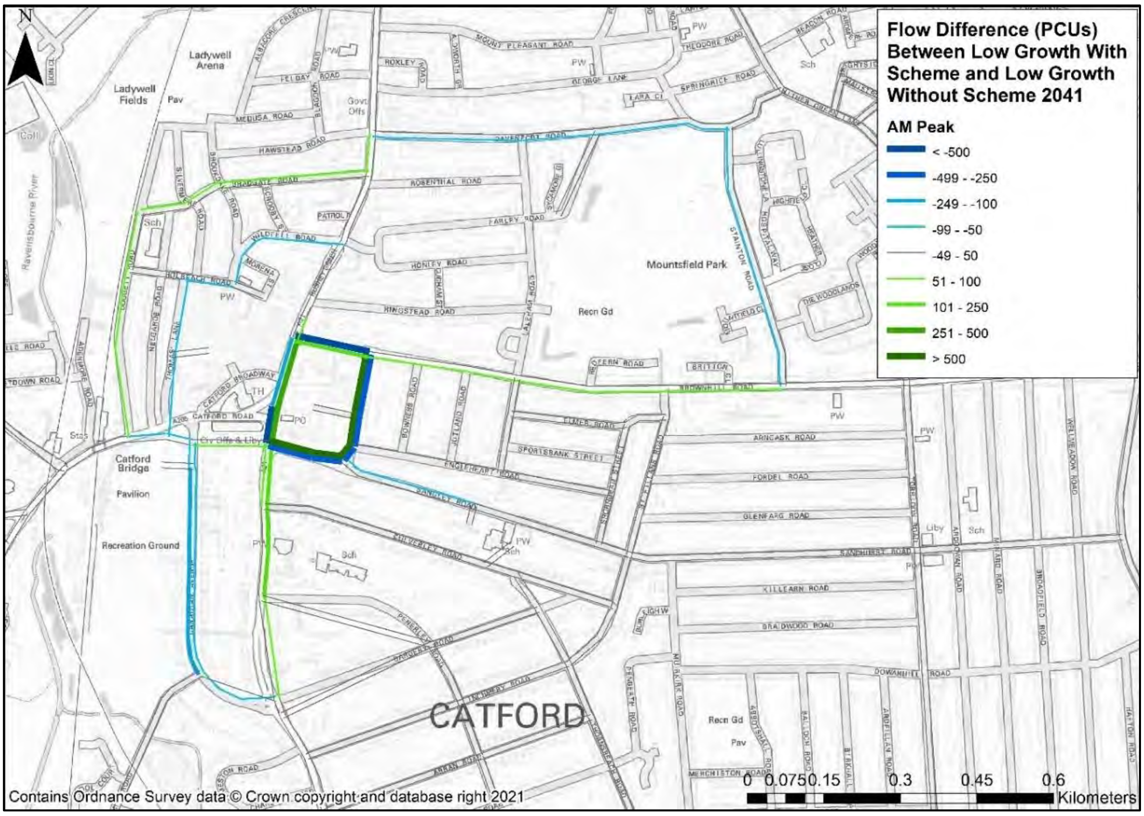
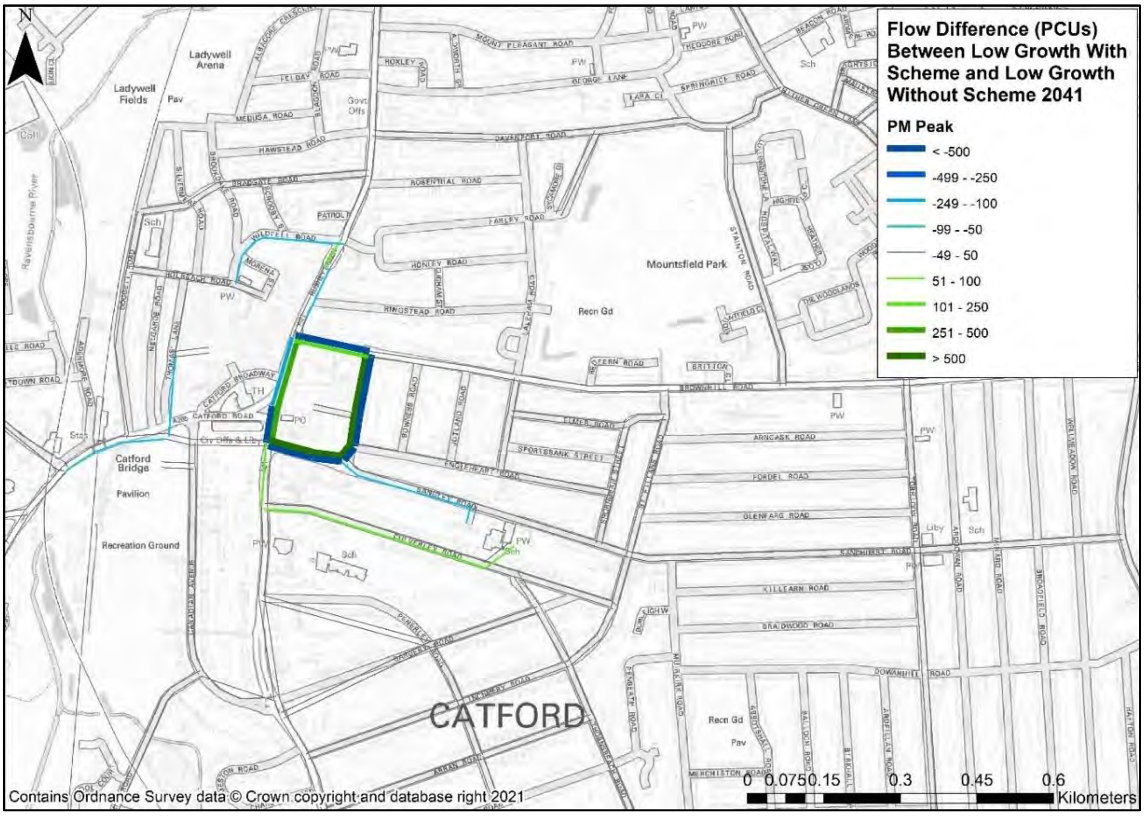


Figure 5-16: 2041 With Scheme minus Without Scheme Low Growth Traffic Flow - PM Peak



5.4 Traffic Delay Forecasts

5.4.1 Figure 5-17 to Figure 5-20 show the forecast delay differences from the core growth scenario to the low and high growth scenarios in the 2026 AM and PM Peaks. The impacts of changed growth assumptions in the AM Peak are relatively minor. However, in the PM Peak it can be seen that additional growth in the high growth scenario increases delay on the western approaches to the gyratory, and reduced growth in the low growth scenario reduces delay in the same area.

Figure 5-17: 2026 Without Scheme High – Core Growth Delay - AM Peak

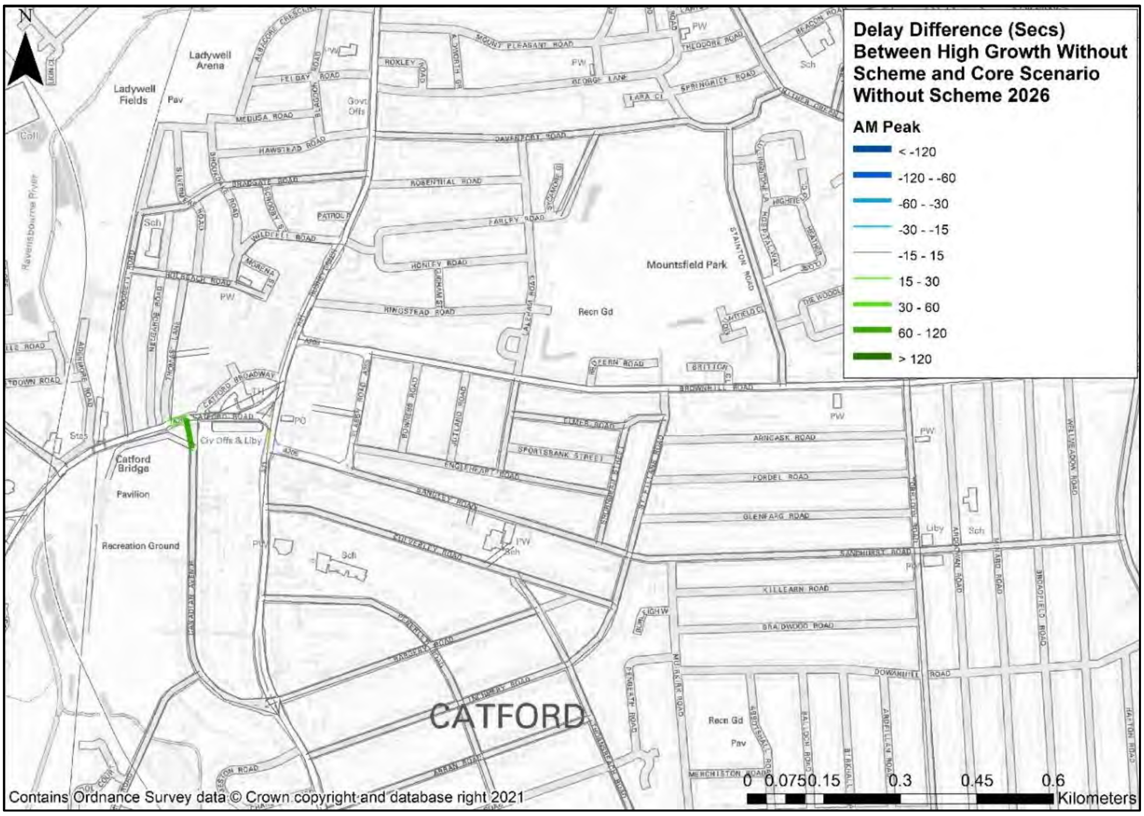


Figure 5-18: 2026 Without Scheme High – Core Growth Delay - PM Peak

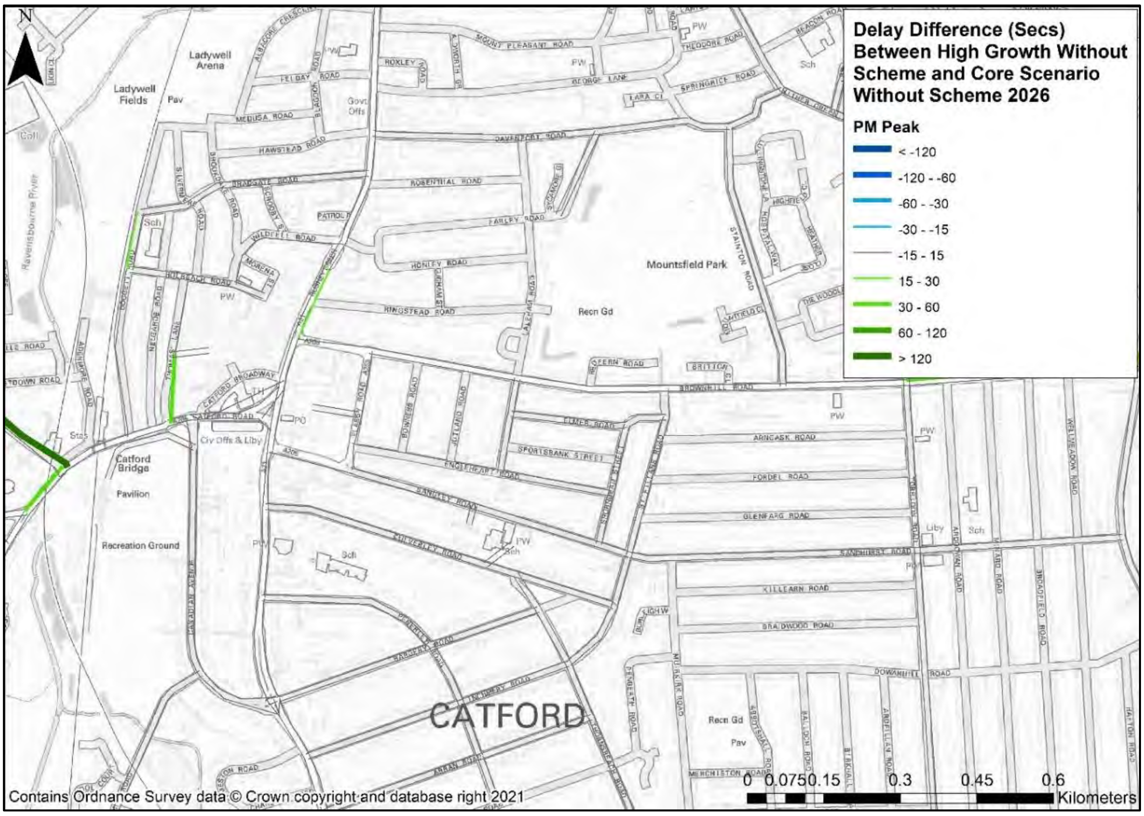


Figure 5-19: 2026 Without Scheme Low – Core Growth Delay - AM Peak

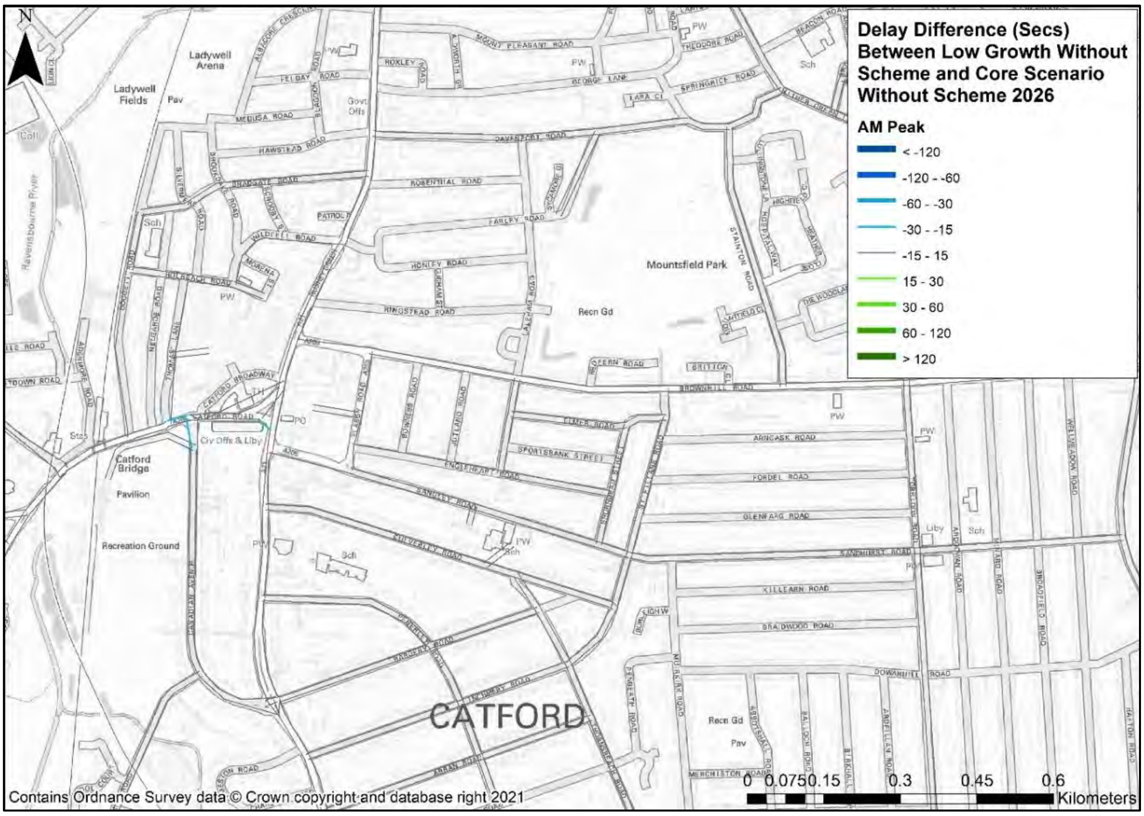
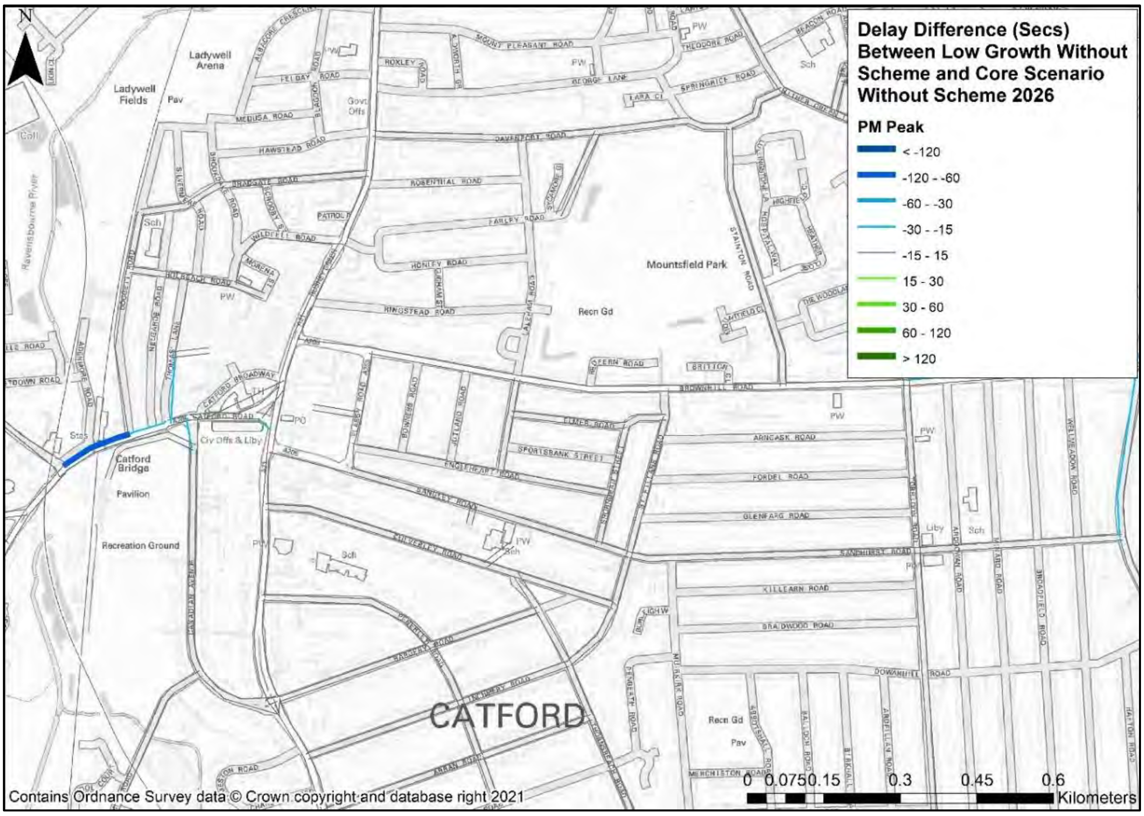


Figure 5-20: 2026 Without Scheme Low – Core Growth Delay - PM Peak



5.4.2 Figure 5-21 to Figure 5-24 show the forecast delay change as a result of the scheme in the 2026 AM and PM Peaks, for the high and low growth scenarios. The patterns of change are similar to that seen in the core growth scenario, with the impacts in the high growth scenario tending to be greater in magnitude and the impacts in the low growth scenario tending to be less in magnitude.

Figure 5-21: 2026 With Scheme minus Without Scheme High Growth Delay - AM Peak

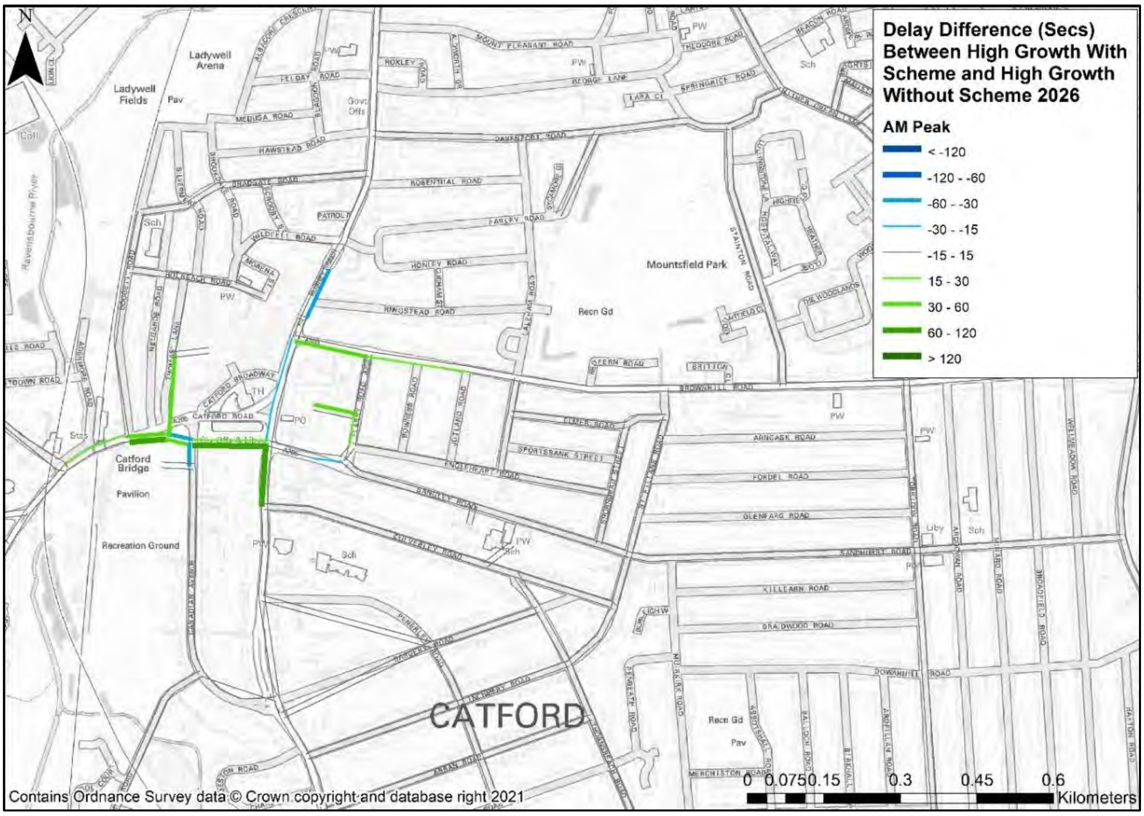


Figure 5-22: 2026 With Scheme minus Without Scheme High Growth Delay - PM Peak

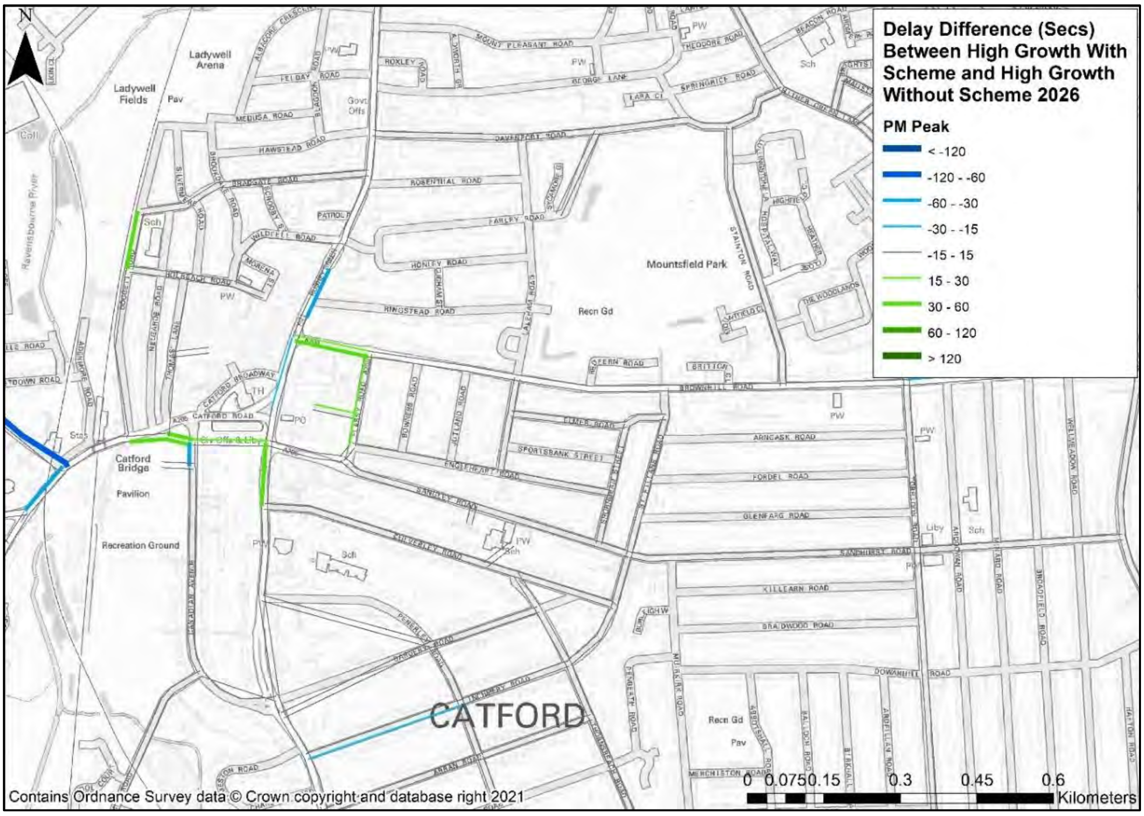


Figure 5-23: 2026 With Scheme minus Without Scheme Low Growth Delay - AM Peak

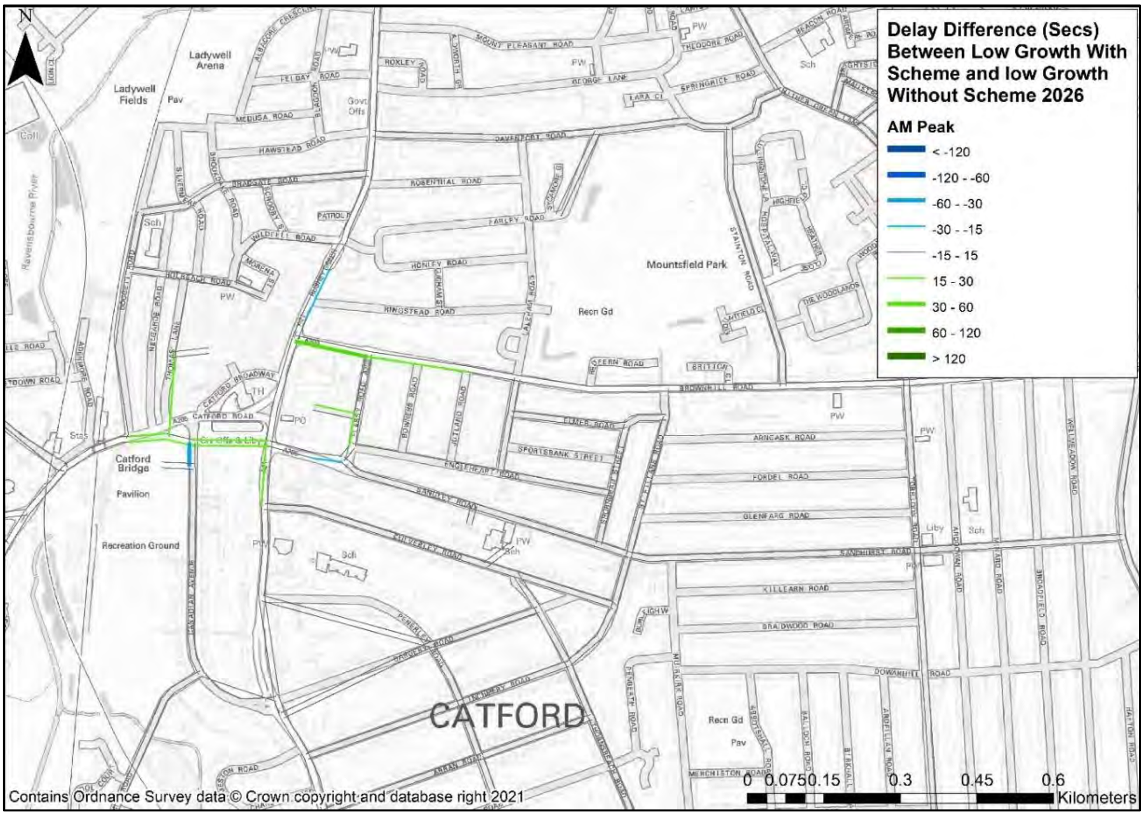
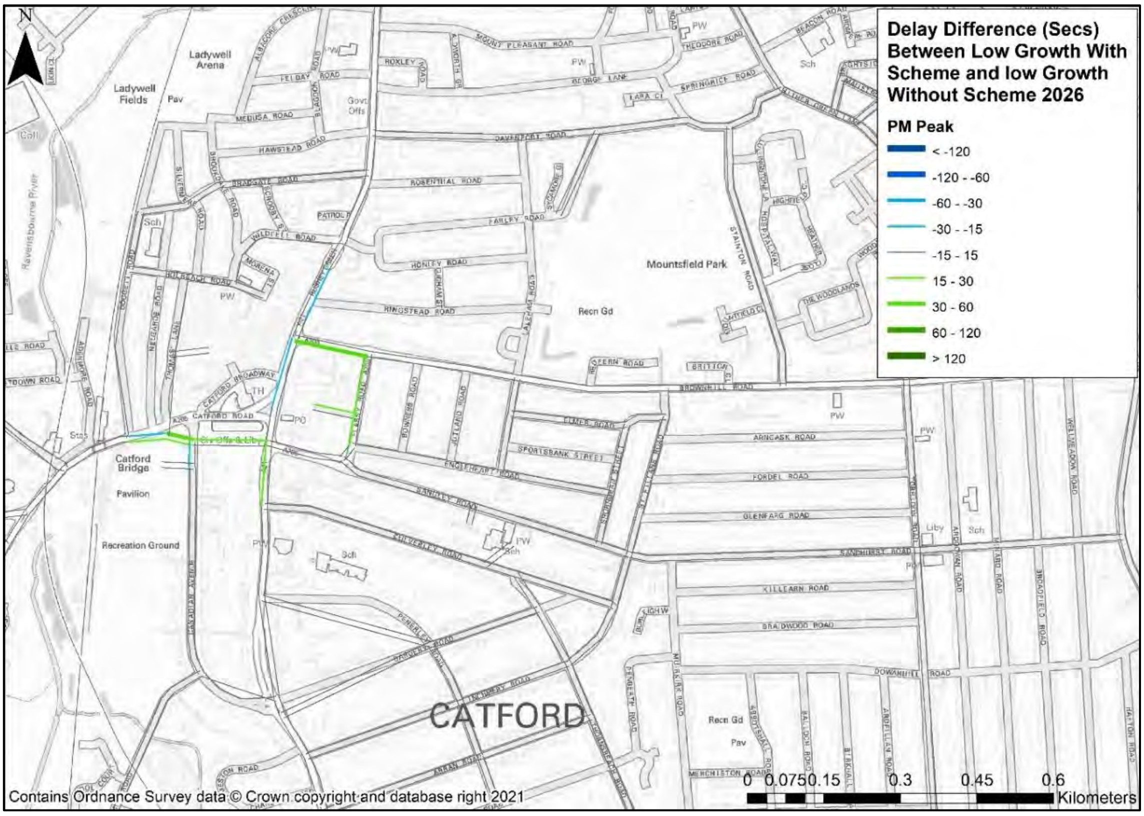


Figure 5-24: 2026 With Scheme minus Without Scheme Low Growth Delay - PM Peak



5.4.3 Figure 5-25 to Figure 5-28 show the forecast change in delay in the high and low growth scenarios compared to the core growth scenario for the 2041 AM and PM Peaks. As was seen for 2026, delays in the area to the west of the gyratory appear to be most sensitive to changes in forecast demand, with the PM Peak being more sensitive than the AM Peak.

Figure 5-25: 2041 Without Scheme High – Core Growth Delay - AM Peak

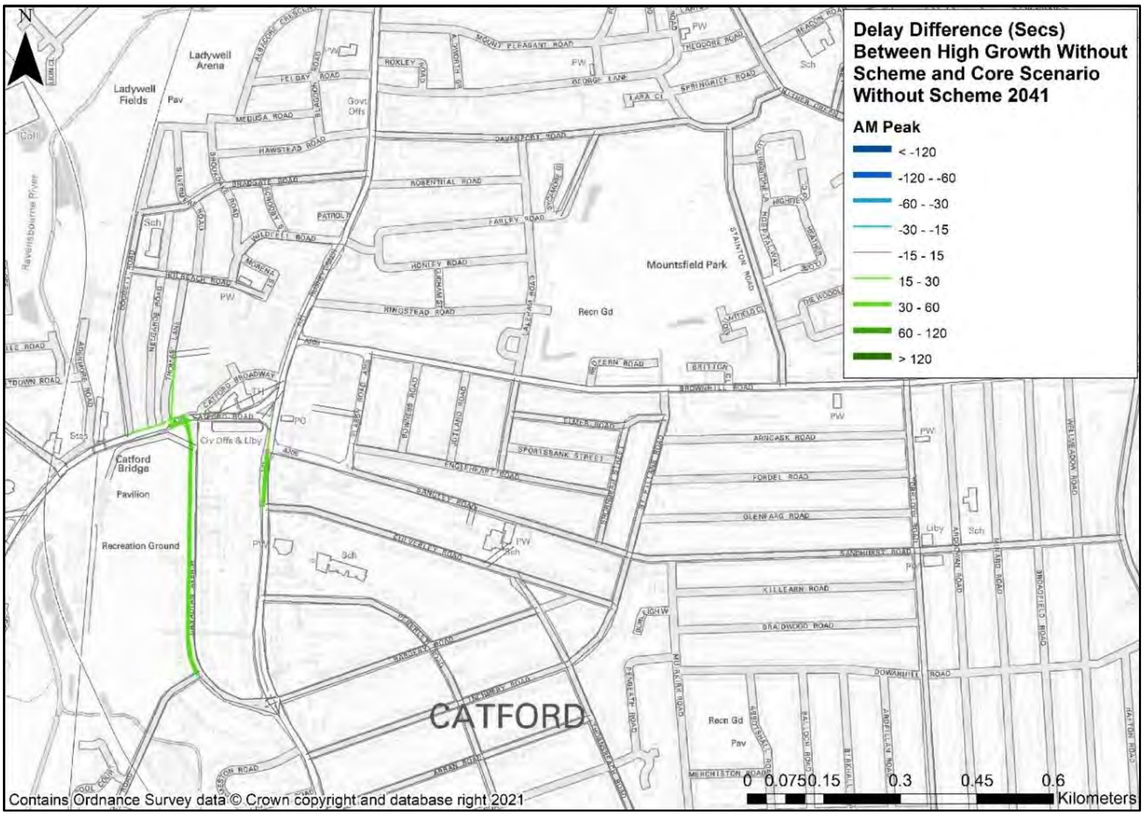


Figure 5-26: 2041 Without Scheme High – Core Growth Delay - PM Peak

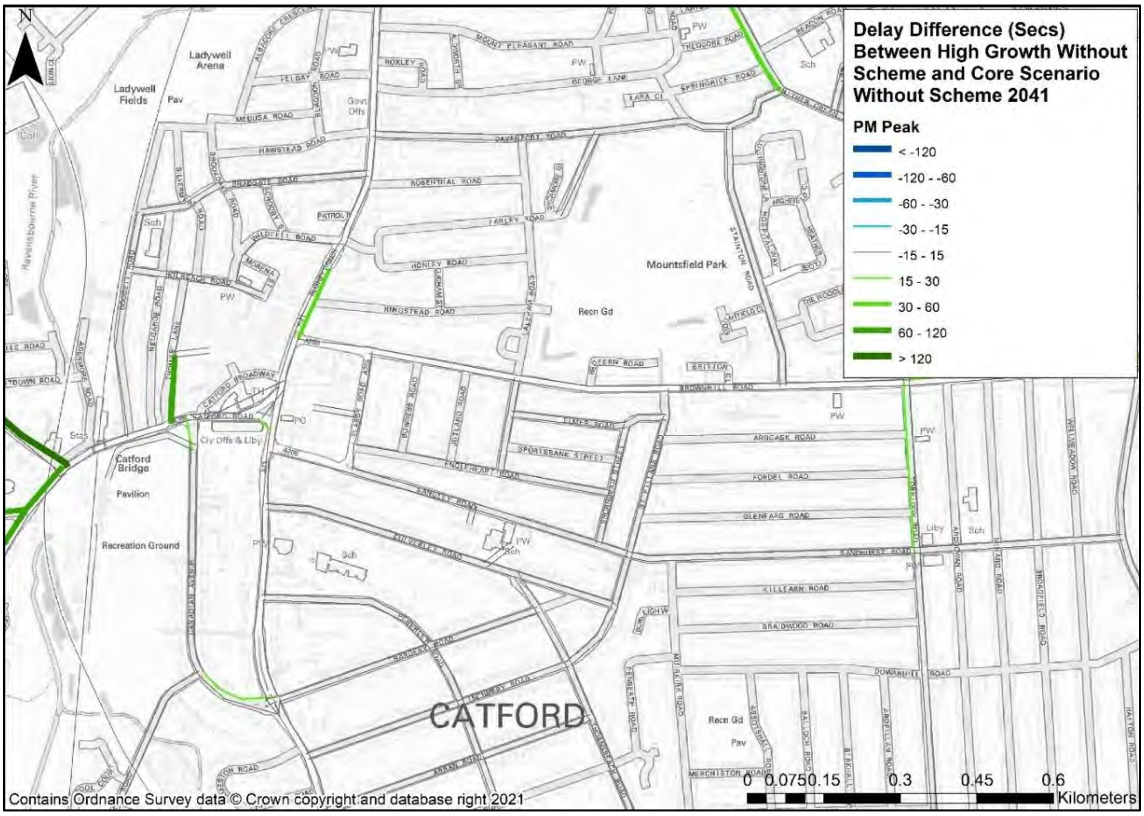


Figure 5-27: 2041 Without Scheme Low – Core Growth Delay - AM Peak

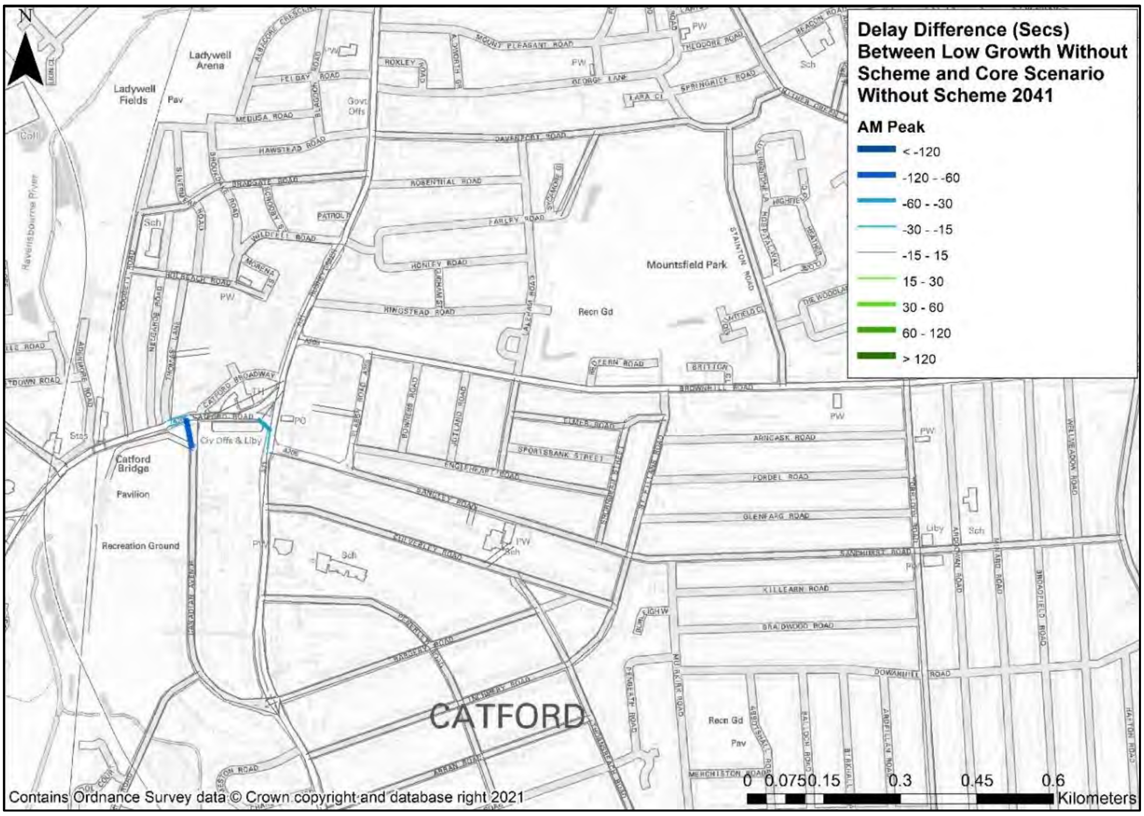
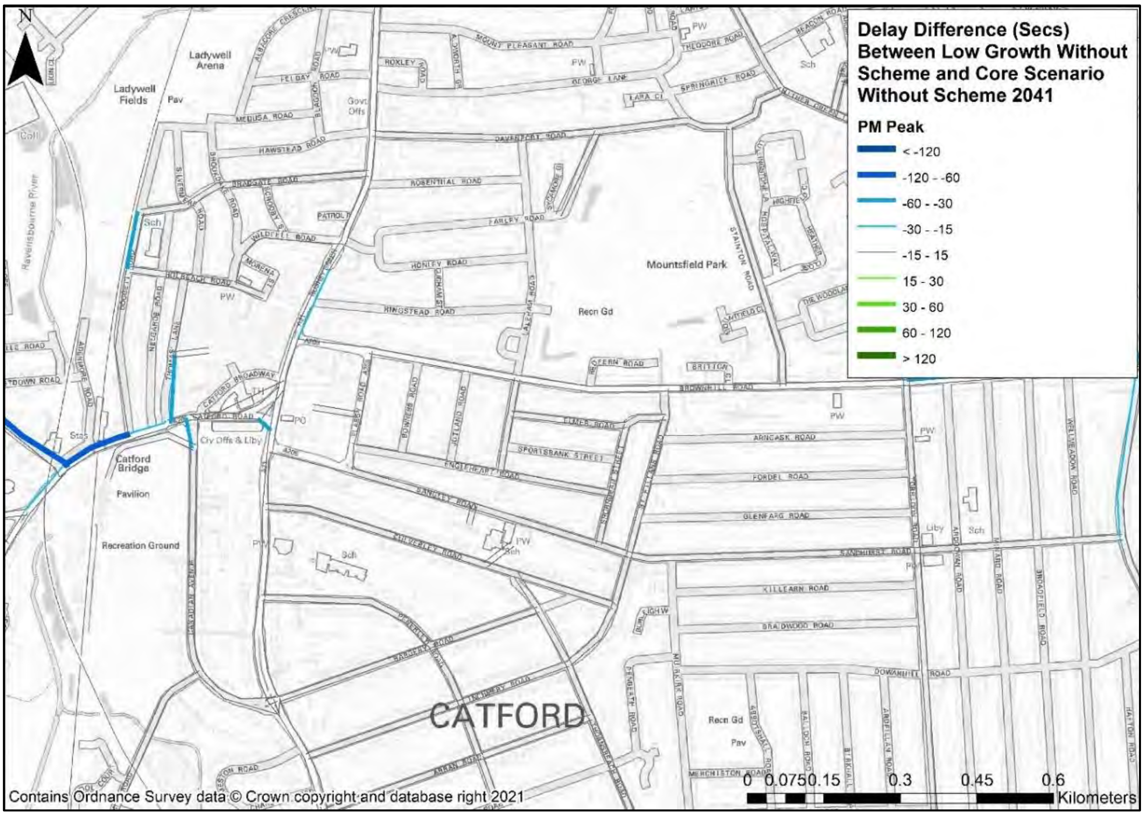


Figure 5-28: 2041 Without Scheme Low – Core Growth Delay - PM Peak



5.4.4 Figure 5-29 to Figure 5-32 show the forecast delay impact of the scheme in the 2041 high and low growth scenarios for the AM and PM Peaks. The patterns observed here reflect the patterns seen for the equivalent 2026 plots and demonstrate the consistency of results being produced by the model for the impacts of the scheme.

Figure 5-29: 2041 With Scheme minus Without Scheme High Growth Delay - AM Peak

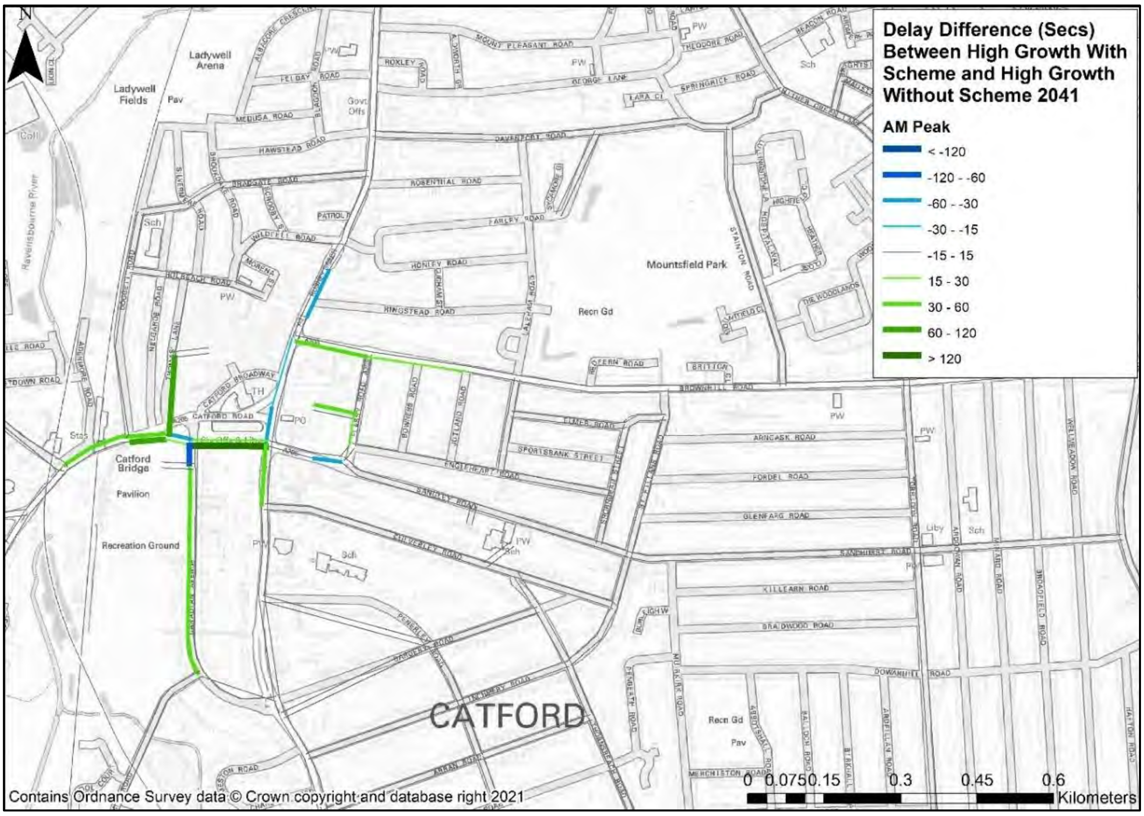


Figure 5-30: 2041 With Scheme minus Without Scheme High Growth Delay - PM Peak

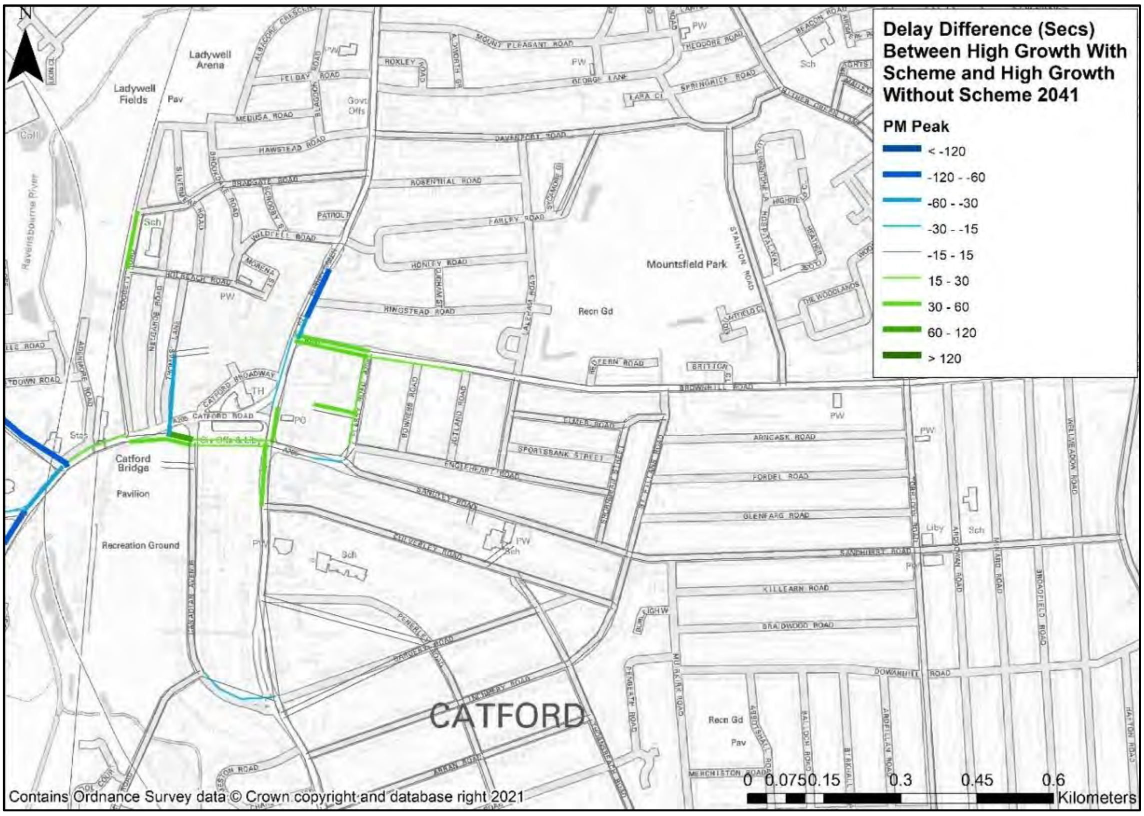


Figure 5-31: 2041 With Scheme minus Without Scheme Low Growth Delay - AM Peak

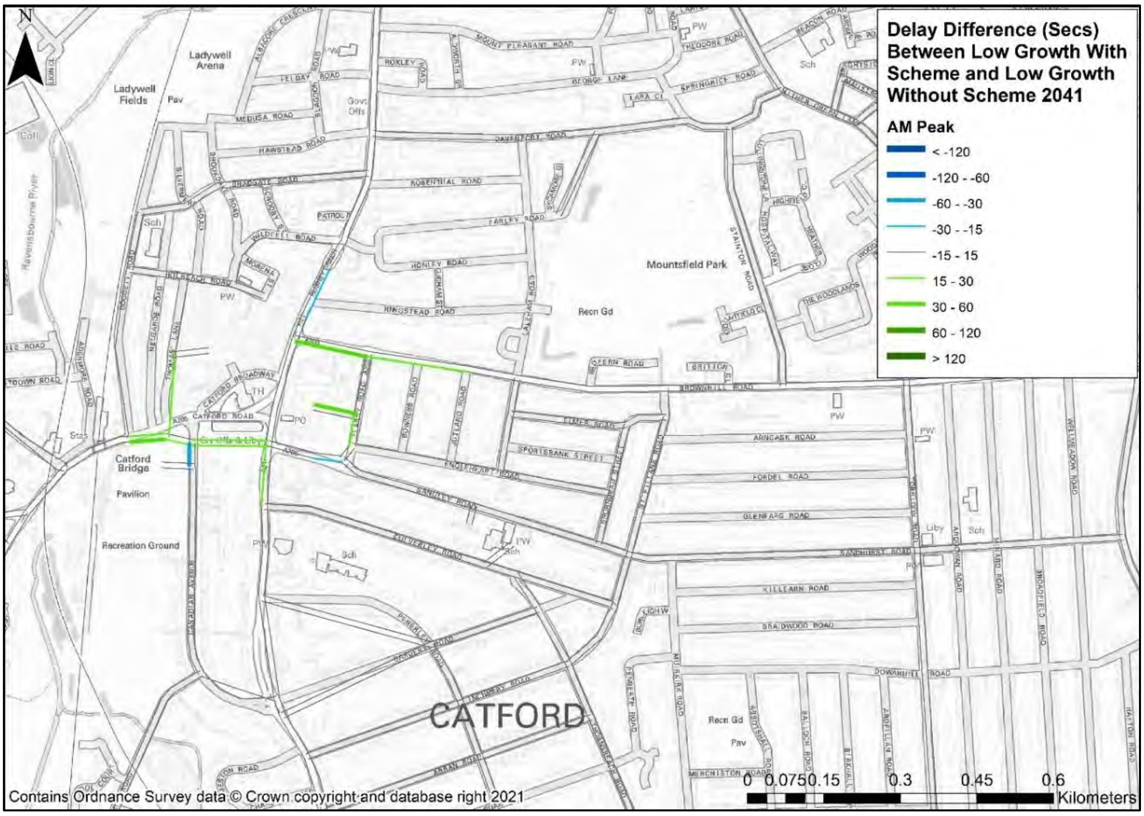
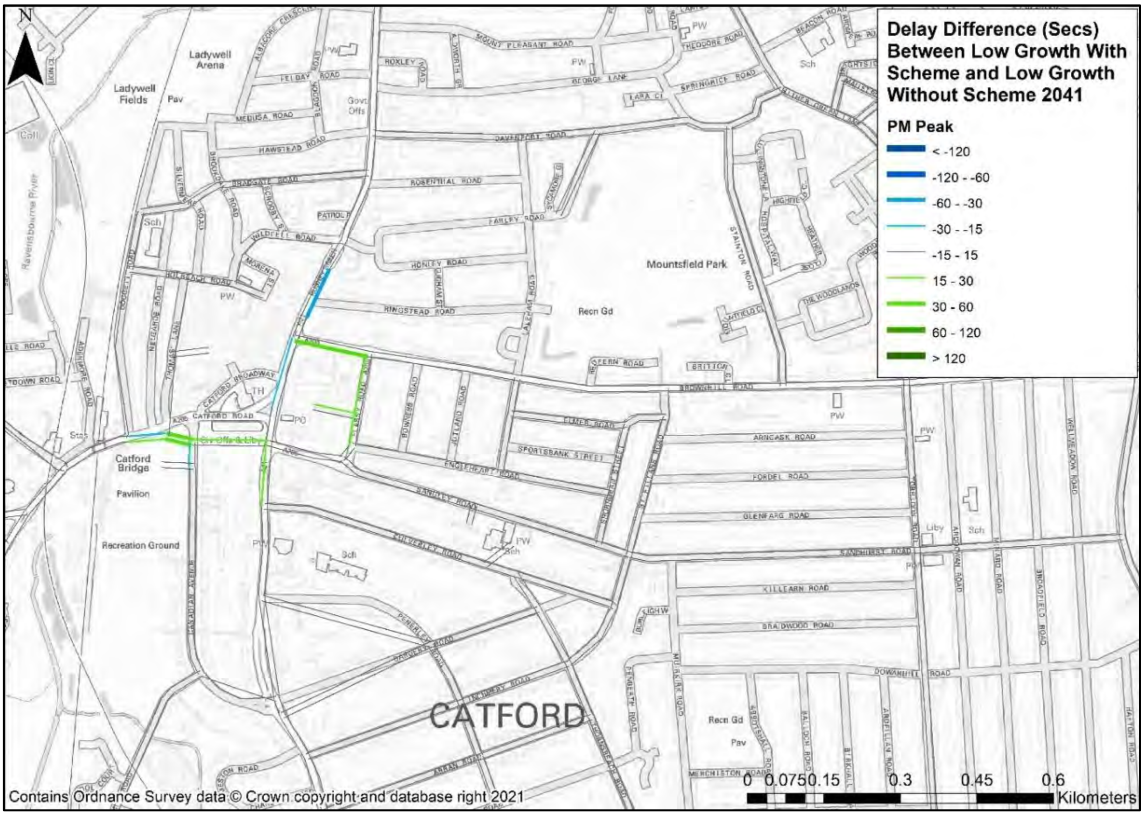


Figure 5-32: 2041 With Scheme minus Without Scheme Low Growth Delay - PM Peak



6. Summary

6.1.1 This report has described the approach to testing the Catford Town Centre scheme using the Catford highway assignment model derived from LoHAM, and the results obtained under the core growth, and high and low growth sensitivity tests. The sensitivity tests can be considered a proxy for the uncertainty that is inherent in all transport model forecasts, as well as any minor variable demand model impacts which are not represented, or any subsequent improvements to the base year model. Some of these variables will be considered in later stages of the scheme development.

6.1.2 The core growth results demonstrate that the impact of the scheme is relatively local, with increases in flow on the anti-clockwise movements within the existing gyratory, and some local re-routeing as a result of increased options for routeing through the area.

6.1.3 Junction delay generally increases as a result of the scheme, however more efficient routeing for some traffic on movements such as the A21 southbound through the gyratory means that some trips are forecast to experience an reduction in journey time through the area. For other movements, such as the A21 northbound, the routeing impact is neutral.

6.1.4 The high and low growth sensitivity tests demonstrate a level of stability in the results produced by the model and give confidence that the conclusions are reliable. They also give confidence that outputs used to undertaken subsequent economic assessment in TUBA are likely to produce sensible results.

Appendix A Assessment of the Need for Variable Demand Modelling

Introduction

An assessment to determine the need for variable demand modelling has been undertaken for the Catford Town Centre scheme in order to determine the most suitable modelling approach in proportion to the anticipated scheme effects.

The Catford model utilises disaggregated matrices from LoHAM which in turn uses TfL's LTS model for its variable demand model response. The local nature of the scheme suggests that its impact will be restricted to local re-routeing of traffic. This appendix reports on the work undertaken to demonstrate the scale of the variable demand impact observed in LTS.

Approach

In order to carry out the assessment, the following methodology was undertaken. For the purposes of this assessment, LTS was run for a single model year only, 2041.

1. The LTS 2041 Reference Case was run without the scheme present to provide a reference case to compare against.
2. A 2041 LTS scenario was run with the scheme included.
3. TfL's CHAMP process was used to convert the highway matrices to LoHAM for both LTS scenarios.
4. The LoHAM matrices were converted into Catford zoning.
5. Highway assignments were run with the scheme with both the Reference Case and with scheme matrices.
6. Comparisons were undertaken between:
    a. LTS Top-Line Statistics;
    b. SATURN matrix demand; and
    c. with scheme flows.

Results

The first comparison of the impacts of variable demand modelling was carried out using the LTS Top-Line Statistics. This tool presents the differences between the two scenarios at a high level. The total trips by mode for the two scenarios within Greater London and for the whole model is shown in Table A-1 and Table A-2. The tables show the variable demand model is having a negligible impact on trips by mode in the model.

Table A-1: LTS Top Line Stats - Total Trips - To/From/Intra GLA

			Change from Run1 to Run2	
Mode	**A241rf09**	**A241ct01**	**Absolute**	**Percentage**
Car	6,136,030	6,136,437	408	0.0%
PT	10,419,545	10,417,976	-1,569	0.0%
Slow	5,684,175	5,685,455	1,281	0.0%
All	22,239,749	22,239,868	119	0.0%

Table A-2: LTS Top Line Stats - Total Trips – Whole Model

			Change from Run1 to Run2	
Mode	A241rf09	A241ct01	Absolute	Percentage
Car	6,136,030	6,136,437	408	0.0%
PT	10,419,545	10,417,976	-1,569	0.0%
Slow	5,684,175	5,685,455	1,281	0.0%
All	22,239,749	22,239,868	119	0.0%

The resulting differences in the highway matrices assigned to the network following the conversion to LoHAM and then subsequently the Catford model zoning are shown in Table A-3 for the AM Peak, Interpeak and PM Peak time periods. The differences are presented for the Lewisham area only to show impacts on the immediate area around the scheme.

The matrix differences again show that the variable demand response is minimal, with the range of differences for origins and destinations between 0.1% and 0.2%. Across all London Boroughs, the variable demand response is strongest within Lewisham Borough. This is expected given the schemes sits within this borough.

Table A-3: SATURN Matrix Differences – Fixed vs Variable Demand

AM Peak		Interpeak		PM Peak	
Total Origin % Change	Total Destination % Change	Total Origin % Change	Total Destination % Change	Total Origin % Change	Total Destination % Change
0.2%	0.1%	0.1%	0.1%	0.1%	0.1%

The resulting differences in flow between the 2041 fixed matrix assignments and 2041 variable demand assignments with the scheme in place can be seen in Figure A-1 to Figure A-3. The Interpeak model shows little to no difference, while the AM Peak and PM Peak models show some localised differences in flows. The localised nature of the differences in flow indicate the changes are due to the assignment itself as opposed to more strategic changes which would be expected if the variable demand response was significant.

Figure A-1: 2041 AM Peak With Scheme - Variable vs Fixed Demand Flow Difference

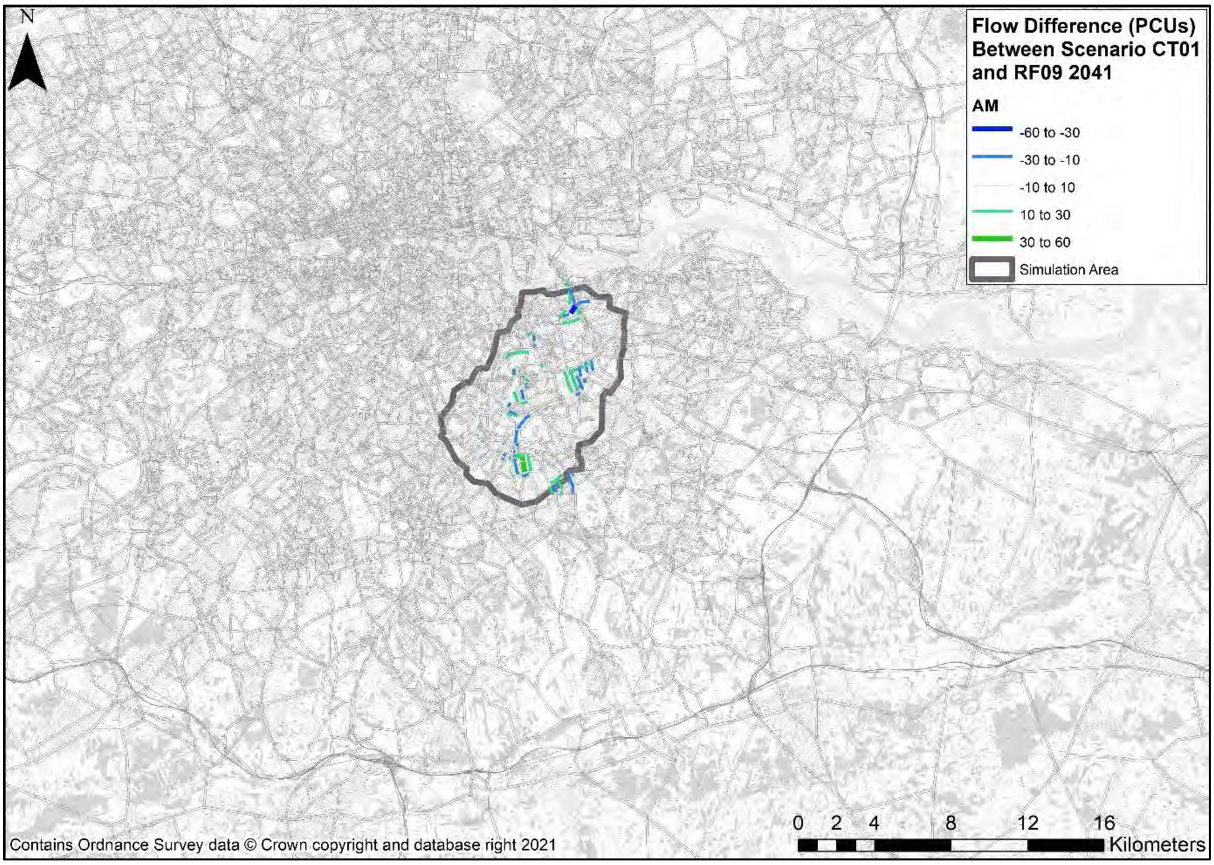


Figure A-2: 2041 Interpeak With Scheme - Variable vs Fixed Demand Flow Difference

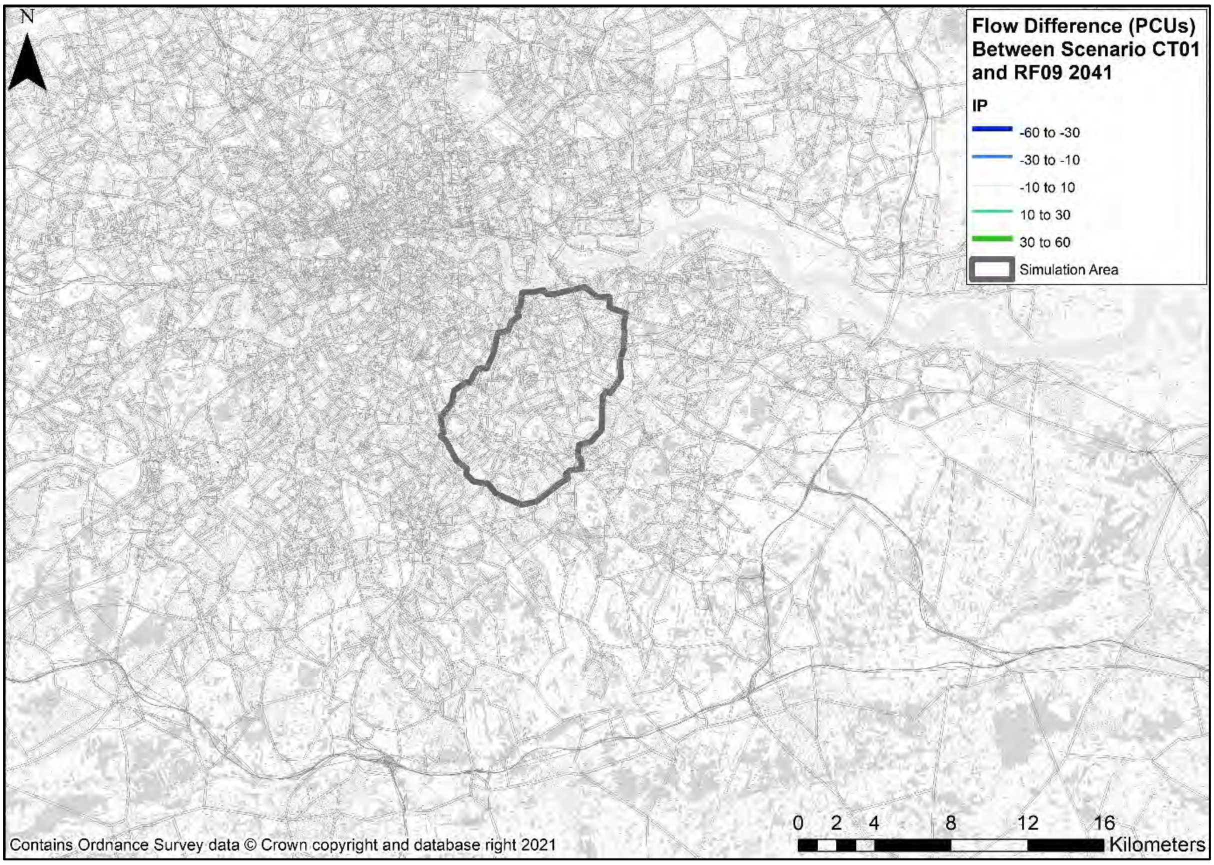
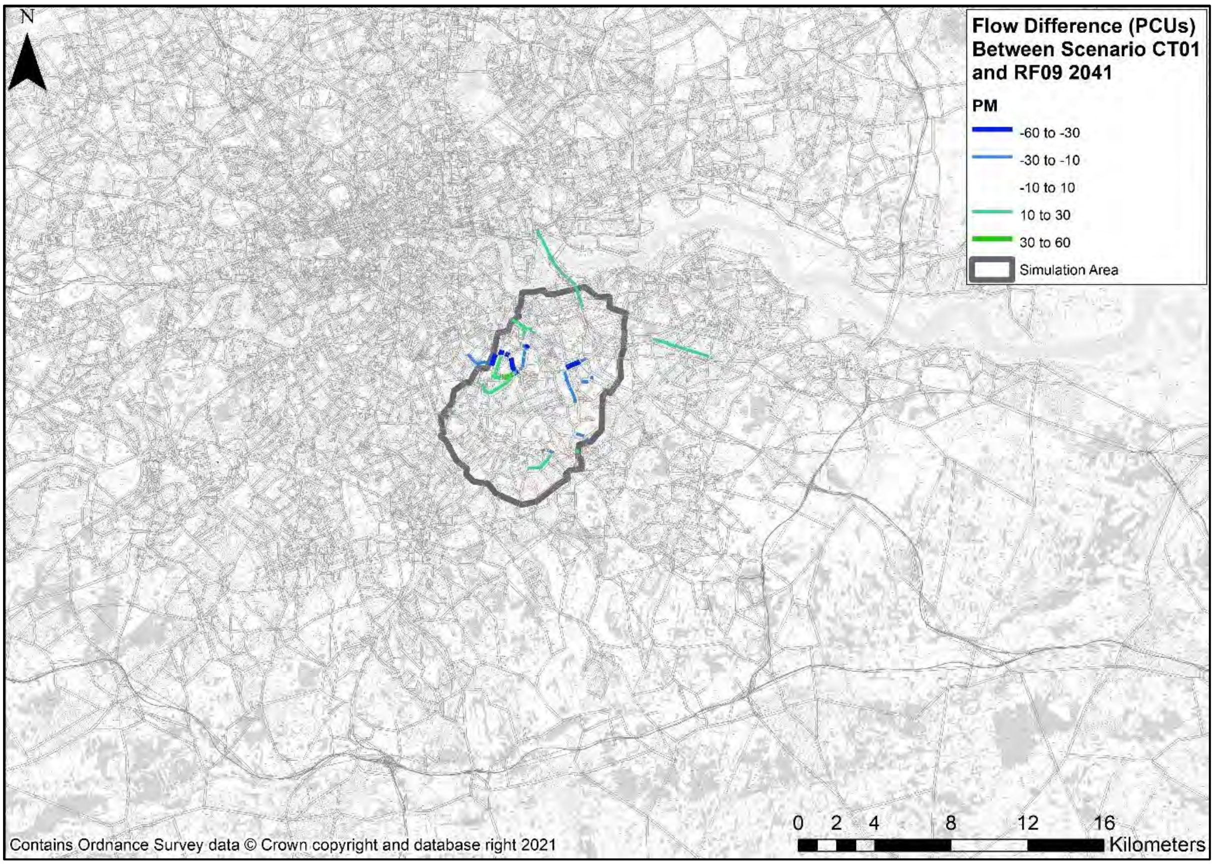


Figure A-3: 2041 PM Peak With Scheme - Variable vs Fixed Demand Flow Difference



Conclusions

The variable demand model impacts of the scheme do not appear to have a significant impact on the travel patterns or demand for this scheme, and are likely to fall within the range of model error. The results from the Top-Line Statistics, assignment matrix differences and flow difference plots suggest the use of a variable demand model is not required for the assessment of this scheme and the use of fixed demand matrices is appropriate.

Catford Town Centre Gyratory Removal

VISSIM Modelling (LoHAM based)
Local Model Validation Report (LMVR) & Scheme Assessment Report

Transport for London

Project reference: 60655466.03
Project number: 60655466
60655466.03.LMVR

11 October 2021

TfL Surface Transport
Palestra
197 Blackfriars Road
London
SE1 8NJ

Quality information

Prepared by	Checked by	Verified by	Approved by
Harry Miller Engineer	Richard Rolph Senior Engineer	Marino Gonzalez Principal Engineer	Marino Gonzalez Principal Engineer

Revision History

Revision	Revision date	Details	Authorized	Name	Position
00001	04/05/2021	First issue	Y	Marino Gonzalez	Principal Engineer
00002	20/05/2021	Revised	Y	Marino Gonzalez	Principal Engineer
00003	25/05/2021	Revised	Y	Marino Gonzalez	Principal Engineer
00004	02/07/2021	FB revision	Y	Marino Gonzalez	Principal Engineer
00005	02/09/2021	DS revision	Y	Marino Gonzalez	Principal Engineer
00006	14/10/2021	TfL comments	Y	Marino Gonzalez	Principal Engineer

Prepared for:

Transport for London

TfL Surface Transport
Palestra
197 Blackfriars Road
London
SE1 8NJ

Prepared by:

Harry Miller
Engineer
T: +44 020 8639 3500
M: +44 020 8663 6723
E: harry.miller@aecom.com

AECOM Limited
Sunley House
4 Bedford Park, Surrey
Croydon CRO 2AP
United Kingdom

T: +44 20 8639 3500
aecom.com

Table of Contents

Figures

Tables

1. Introduction

Background

1.1 AECOM has been commissioned by Transport for London (TfL) to provide VISSIM traffic modelling support to help evaluate and finalise a single proposed design option to transform Catford Town Centre from an area dominated by motor traffic to a place that supports pedestrians, cyclists and public transport. As a separate commission, strategic modelling (LoHAM) was undertaken by AECOM, the outputs of which will feed into the VISSIM modelling.

1.2 This modelling builds on the previous Catford Town Centre commission where the strategic modelling work was undertaken using the ONE model, which due to the coronavirus pandemic was put on hold in April 2020. Following new requirements and funding, VISSIM traffic modelling of Catford Town Centre has recommenced, with the major change from the previous commission being the move to using LoHAM for the strategic modelling inputs instead of the ONE Model.

1.3 This project has used the VISSIM model produced under the previous commission as a starting point, and in collaboration with TfL, it has been re-validated so that the model is fit for purpose to evaluate proposed improvements to Catford Town Centre. This report outlines the calibration and validation of the VISSIM models.

Scope

1.4 The South Circular severs Catford Town Centre, creating an unpleasant environment for pedestrians and cyclists dominated by multiple lanes of high-speed motorised traffic. The realignment of the South Circular to the south of Lawrence House and the removal of the gyratory system will be key to delivering transformational benefits and maximising the potential for the regeneration of Catford Town Centre.

1.5 The models were built in accordance with TfL's Traffic Modelling Guidelines[1]. These models are being built in collaboration with TfL, therefore the formal VISSIM Model Audit Process (VMAP) checking and approving stages are not required. TfL will undertake quality checks and approvals of the models at various stages during the model build, but there will not be a formal submission of models via the conventional VMAP process. This process will ensure the models meet acceptable levels of quality from both a data validation and on-site operational point of view.

1.6 The modelled area includes the following signalised nodes within Region 88 and Region 488:

- J07/015 – Rushey Green / Brownhill Road
- J07/029 – Brownhill Road / Plassey Road
- J07/030 – Sangley Road / Bromley Road
- J07/031 – Catford Road / Canadian Avenue
- J07/034 – Catford Road / Rushey Green
- J07/156 – Plassy Road / Catford Island Development Access Road
- J07/163 – Catford Road / Thomas Lane
- J07/165 – Rushey Green Northbound by Brownhills Road
- J07/177 – Brownhill Road Eastbound by Plassy Road
- J07/166 – Stansted Road / Catford Hill
- J07/187 – Stansted Road / Catford Hill
- J07/213 – Stanstead Road North / Glenwood Road
- J07/214 – Stanstead Road North Eastbound Bus Gate West of Glenwood Road

[1] TfL Traffic Modelling Guidelines 3.0, Transport for London, September 2010

1.7 The extent of the modelled area is highlighted blue in Figure 1.

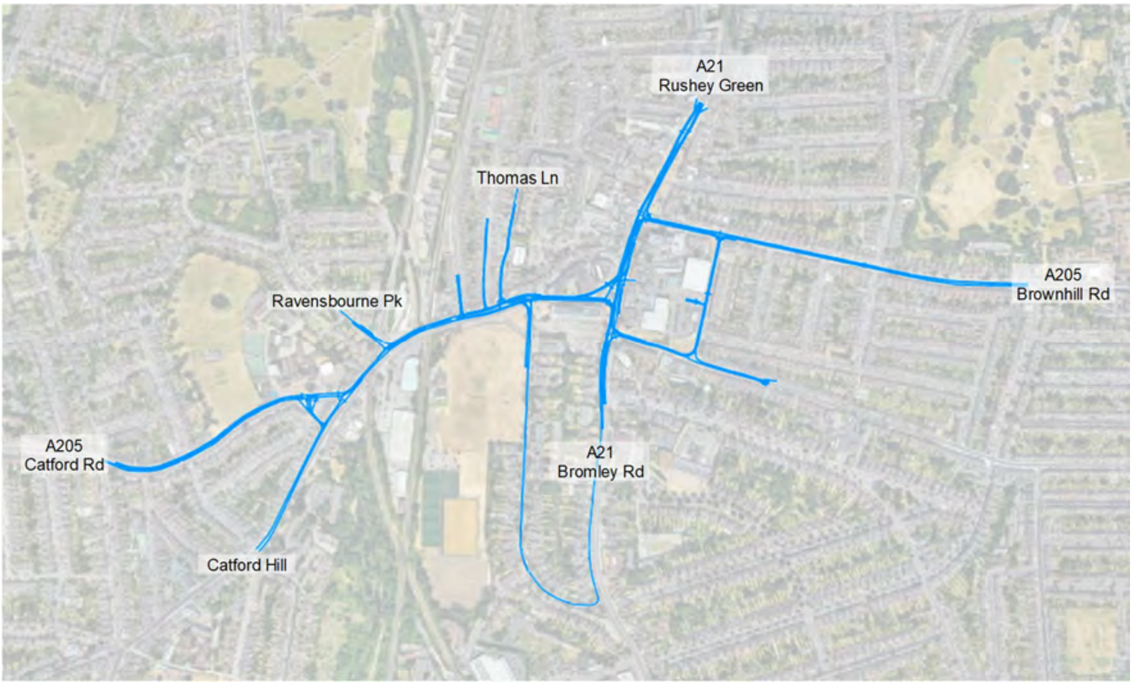


Figure 1 Model Scope

Purpose of Model

1.8 The purpose of the model is to form the basis for the testing of the changes that are proposed at Catford Town Centre.

1.9 This report describes the methodology and assumptions used in the development of the base model and presents results of the validation exercise. In doing so, the model will be shown to have been developed in a robust manner which meets TfL Modelling Guidelines criteria; and ultimately is fit for purpose to appraise the impacts of the proposed network layout.

2. Base Model Calibration

Modelling Periods

2.1 The modelled periods are as follows:

- AM Weekday Period
  - Warmup: 0730 - 0800
  - Peak: 0800 - 0900
  - Cool down: 0900 - 0915
- PM Weekday Period
  - Warmup: 1630 - 1700
  - Peak: 1700 - 1800
  - Cool down: 1800 - 1815

2.2 These peak times were used in order to match the peak hours of the LoHAM model that was used to provide future base and proposed flows as the modelling progressed. The models have a warmup period of 1800 seconds and a cool down period of 900 seconds.

Simulation Parameters

2.3 At the outset of the previous Catford Town Centre Project, TfL provided a TfL developed model A205_AM_vap.inp and A205_PM_vap.inp which was used as a starting point in the development of this model. The model provided by TfL was built using VISSIM version 5.40-12 and has been updated to VISSIM version 10.00-16.

2.4 Traffic regulation is set to ‘left hand side’.

2.5 Simulation period is 6300 seconds, consisting of 1800s warm up, 3600s modelled period and 900s cool down.

2.6 Simulation resolution is set as 5 time steps / simulation second for both AM and PM models.

2.7 Random seeds 1 to 20 are used for model outputs.

Model Units

2.8 Model units are set as:

- Distance: m and km
- Speed: mph
- Acceleration: ms^{-2}

Background Files

2.9 Due to the model being built from a pre-existing model, there was no need to undertake a new topographic survey of the modelled area. Instead, site visits and OS imagery were utilised to ensure that the modelled network matches to what is actually ‘on street’. These OS images were included in the model to provide a background view of the modelled area.

Site Observations

2.10 A site visit was carried out on 29th October 2019 to observe vehicle behaviour at stoplines and in queues, and to identify bottlenecks and congested links.

2.11 The TfL provided model featured several bespoke vehicle behaviour types which were retained. It was decided that there was no need to create any more based on the site observations.

Functions

2.12 No changes to the maximum and desired acceleration / deceleration profiles as used in the TfL provided model were made. All functions used are the same as in the TfL provided model.

Desired Speed Distributions

2.13 The speed limit in the study area is mostly 30mph with some parts of the network 20mph. As such, desired speed decisions suitable for the road speed limit were set to match the site conditions.

Vehicle Type Data

2.14 Vehicle data remains unchanged from the TfL provided model.

Driving Behaviour and Link Type

2.15 Driving Behaviour 'Car – 74Mixed' and 'Cyclist – 74Mixed' was used for the entirety of the model expect for footpaths. These behaviour types are unchanged from a TfL provided model template and no adjustment has been made to their parameters. These were taken from a TfL template model and are used to more accurately model cyclists filtering through traffic. The link behaviour "74Mixed" is for a general traffic lane with either no cycle lane or an advisory cycle lane.

Network Structure

2.16 The model network structure was developed based on the current 'on-street' situation using a combination of satellite imagery, site visits and signal layout diagrams. The link and connector structure is principally the same as in the model provided by TfL, expect for the following changes:

- Culverley Road was added to the model in order to match the LoHAM network to ensure consistent transfer of flow and routing.
- A side road off Canadian Avenue was added to the model in order to match the LoHAM network to ensure consistent transfer of flow and routing.
- Catford Hill was extended to increase the length of the journey time route
- Every approach was extended to capture its maximum queue
- Other minor changes to connectors and link lengths to better replicate on-site conditions of traffic merging and bus/traffic interaction.

Traffic Survey Data

2.17 Due to the coronavirus pandemic impacting on-street traffic flows and commuting behaviours, we were unfortunately unable to obtain any new traffic survey data that could be considered representative of 'normal' traffic conditions. However, TfL were able to provide manual classified traffic count (MCC) data collected before the coronavirus pandemic, from surveys carried out in 2019 and 2016.

2.18 This data is summarised below and in paragraphs 2019 MCC and 2016 MCC. The full data can be found in Appendix A.

2019 MCC

2.19 This survey was undertaken by TfL on Wednesday 6th February 2019. It covered the four junctions on each corner of the gyratory, plus a two-way traffic count on the A205 (Catford Road) by Thomas' Lane. The full data analysis is included in Appendix A.

2016 MCC

2.20 This survey was undertaken by Intelligent Data (ID) on Tuesday 9th September 2016. It covers a corridor along the A205 but does not include any of junctions on the gyratory itself. This data was analysed and is internally consistent, with no errors identified. Survey sites are included in orange in Figure 2.

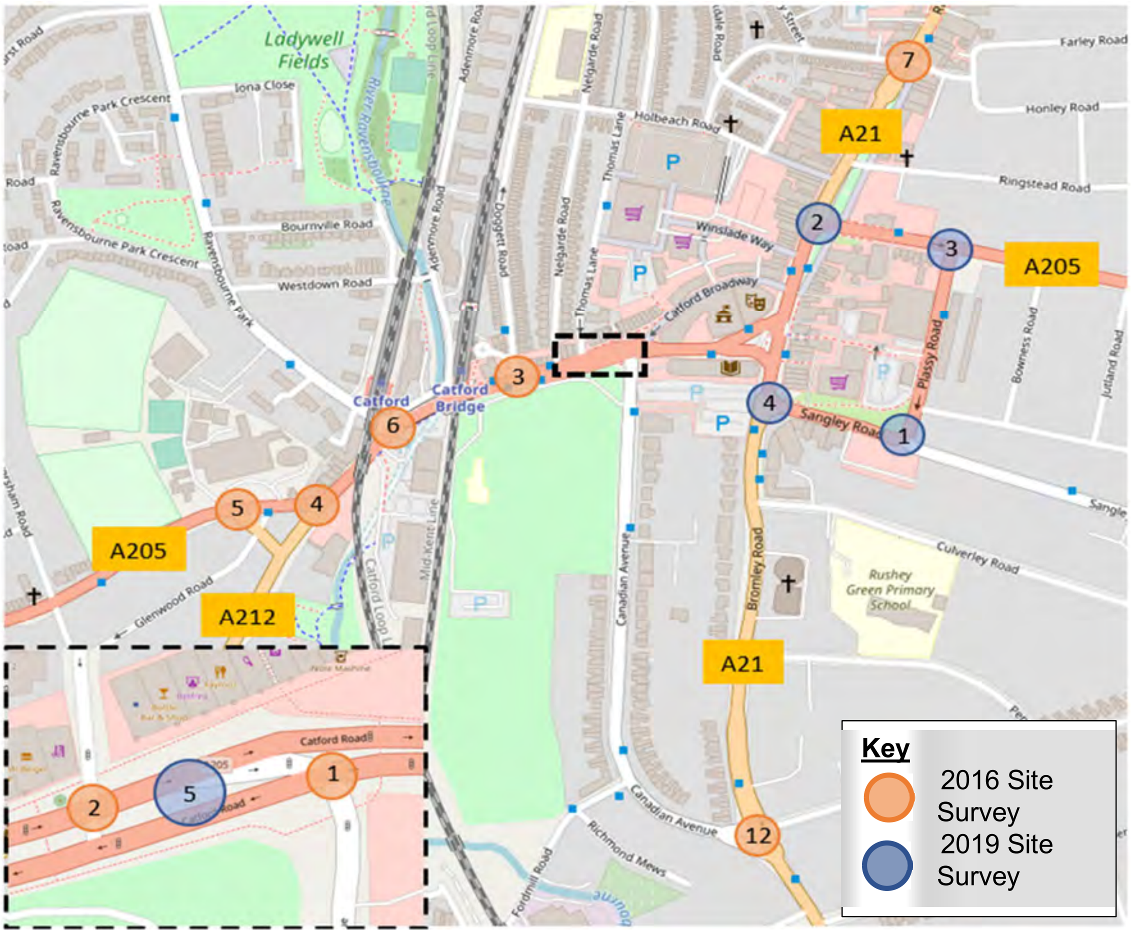


Figure 2 MCC Survey Locations

2.21 Traffic Master Data for 2018 was provided by TfL and will be used for validation of journey times, this can be found in Appendix B.

Traffic Data

2.22 Due to the MCC surveys being undertaken on different dates, an analysis was undertaken to compare surveyed flow with LoHAM flows in order to understand if LoHAM flows could be used. The analysis showed LoHAM base model flows matching well to the MCC site survey data (full details can be found in Appendix A). After discussion with TfL it was agreed that the best approach would be to use LoHAM flows as the VISSIM inputs in order to reduce any potential issues arising out of the MCC data being collected on different dates.

2.23 The VISSIM base model traffic flows will be compared against both the 2016/2019 MCC and LoHAM data. Due to the MCC surveys being undertaken on different days and some inconsistencies in the 2019 data, it is expected that at the validation stage the turning counts in VISSIM will not match precisely to the MCC data. However, because of the analysis showing correlation between MCC and LoHAM this is considered acceptable.

2.24 The model consists of the following vehicle compositions:

– General Traffic
– Taxis
– HGVs
– Cyclists

2.25 The warm-up and cool down periods use the same relative traffic flow and routing as the peak period, with no scaling applied.

2.26 Due to using the LoHAM outputs motorcycles were not included. Cyclist flow and routing is unchanged from the TfL provided VISSIM model.

Route Assignment Choice

2.27 As mentioned in 2.22 and 2.23, vehicle routing was taking directly from LoHAM and has been input into VISSIM using the path search feature in order to obtain static routes. An origin-destination matrix for each vehicle composition can be found in Appendix C.

2.28 The following flow increases to the LoHAM routing were made in the process of inputting them into VISSIM. This was in order to ensure VISSIM flows matched closer to the MCC survey data.

Table 1. Route Assignment Choice – Flow Increases

From Zone	To Zone	AM [vehs]		PM [vehs]	
		Flow	%Total*	Flow	%Total*
A205 Brownhill Rd East	A212 Catford Hill	10	2%	30	4%
A205 Brownhill Rd East	A205 Stanstead Rd	60	10%	10	1%
A205 Brownhill Rd East	Ravensbourne Park	40	6%	30	4%
A205 Brownhill Rd East	A21 Bromley Rd South	50	8%	40	6%
A21 Rushey Green North	A205 Brownhill Rd East	30	7%	20	3%
A21 Rushey Green North	A21 Bromley Rd South	10	2%	60	10%
Sangley Rd East	Ravensbourne Park	20	12%	-	-
A21 Bromley Rd South	A205 Stanstead Rd	20	3%	-	-
A21 Bromley Rd South	Ravensbourne Park	40	6%	-	-
A21 Bromley Rd South	A21 Rushey Green North	10	1%	13	2%
A21 Bromley Rd South	Doggett Rd	10	1%	37	6%
A21 Bromley Rd South	A212 Catford Hill	-	-	10	2%
Canadian Avenue	A205 Stanstead Rd	50	11%	40	14%
Canadian Avenue	Ravensbourne Park	60	14%	20	7%
Canadian Avenue	Doggett Rd	10	2%	-	-
A212 Catford Hill	A205 Brownhill Rd East	18	5%	25	8%
A212 Catford Hill	Sangley Rd East	10	3%	10	3%
A212 Catford Hill	A21 Bromley Rd South	-	-	10	3%
A212 Catford Hill	A205 Stanstead Rd	2	1%	5	1%
A205 Stanstead Rd	Doggett Rd	20	3%	40	7%
A205 Stanstead Rd	A205 Brownhill Rd East	50	8%	60	11%
A205 Stanstead Rd	Sangley Rd East	10	2%	40	7%
A205 Stanstead Rd	Canadian Avenue	-	-	40	7%
A205 Stanstead Rd	A212 Catford Hill	5	1%	5	1%

*Relative proportions in relation to the total entry zone flow

2.29 These modifications should also be applied when inputting the FB and DS model flows from LoHAM to ensure consistency.

Public Transport

2.30 15 peak hour bus services in the modelled area were included, 30 routes in total. Table 2 shows the bus route frequencies, dwell times and route descriptions.

2.31 Bus frequencies and dwell times were coded into the model based on the iBus data for the month of February 2019.

– The iBus data provided by TfL covered the day of 06/02/2019, averaged data for the month of February 2019, as well as data for the month of April 2019 broken down by day. The compete iBus dataset can be found in Appendix B.

Table 2. Bus Routes – Frequencies and Dwell Times

Service / Route	Frequency [buses/h]		Average Dwell Time [s]	
	AM	PM	AM	PM
47 Shoreditch	5	5	19	21
47 Catford Garage	5	5	12	15
54 Plumstead Road / Burrage Road	6	6	21	24
54 Elmers End Interchange	6	6	23	21
75 Fairfield Halls	4	4	42	57
75 Lewisham Station	4	4	22	83
124 Southend Crescent / Southend Close	5	5	24	33
124 Stanstead Road / St Dunstans College	6	5	4	2
136 Elephant & Castle / Newington Causeway	6	6	26	28
136 Grove Park Bus Station	6	6	22	34
160 Catford Bridge Station	4	3	0	0
160 Sidcup Station	4	4	9	25
171 Catford Garage	6	7	13	16
171 Holborn Station	7	7	16	16
181 Grove Park Bus Station	5	5	8	20
181 Lewisham Station	5	5	20	30
185 Lewisham Station	7	8	23	33
185 Victoria Station	7	7	19	19
199 Canada Water Bus Station	5	5	21	20
199 Catford Garage	5	5	11	13
202 Blackheath / Royal Standard	5	6	18	26
202 Crystal Palace Parade	6	6	21	25
208 Lewisham Station	5	5	20	19
208 Orpington / Perry Hall Road	5	5	23	29
284 Grove Park Cemetery	5	5	17	49
284 Lewisham Station	6	5	11	7
320 Biggin Hill Valley	4	4	18	23
320 Catford Bridge Station	4	3	9	12
336 Catford Bridge Station	4	4	8	4
336 Locksbottom / Pallant Way	4	4	10	29

Signal Data

2.32 Signal timing data was obtained from LinSig models provided by TfL covering the two UTC regions, R88 and R488.

2.33 The LinSig files provided by TfL are as follows:

– Catford Town Centre Base AM.lsg3x

– Catford Town Centre Base PM.lsg3x

– Catford Town Centre R488 Base.lsg3x

2.34 The staging and timing information that was present in the provided LinSig files was input into VISSIM via the use of VAP and PUA files. The AM and PM timings are unchanged from the previously agreed signal timings between AECOM and TfL.

2.35 TfL also provided demand dependency data which covered the AM and PM peaks

2.36 The LinSig files and demand dependent data can be found in Appendix D.

Priority Rules / Conflict Areas

2.37 Vehicular give ways and yellow boxes were represented in the model using priority rules which have then been calibrated to reflect the on-site situation of vehicle interaction.

2.38 No conflict areas have also been used.

2.39 Priority rules and conflict areas were implemented in accordance with TfL's Modelling Guidelines, ensuring appropriate gap times were used.

Reduced Speed Areas

2.40 Reduced speed areas were input where vehicles would slow down due to bends, curves, give-ways and stop lines. The following reduced speed areas were used:

- Very Low Saturation Flow (15 mph)
- Low Saturation Flow (17.5 mph)
- Medium Saturation Flow (20 mph)
- High Saturation Flow (22.5 mph)
- Very High Saturation Flow (25 mph)
- Average Turn (12 mph – 13 mph)

3. Base Model Validation

Saturation Flows

3.1 Modelled saturation flows were validated against values obtained from TfL approved LinSig models for all general traffic stoplines. Reduced speed areas were used to ensure that the saturation flows reported by VISSIM remained within 10%.

3.2 Saturation flows were calculated by a Python script, which mimics the TfL's saturation flow excel template, using the following parameters:

- No. vehicles ignored at start of green: 2
- Maximum gap between crossing vehicles in seconds: 2.5
- Minimum gap between crossing vehicles in seconds: 1.25
- Maximum gap increase between consecutive vehicles in seconds: 50%
- Minimum no. vehicles per measurement: 2
- Minimum no. cycles for run average measurement: 2.

Table 3. Saturation Flow Validation

Junction	Approach	Lane	LinSig	VISSIM	%	<10%?
J07/015	A21 Rushey Green SB	Nearside	1820	1951	-7%	Y
	A21 Rushey Green SB	Offside	1800	-*	-*	-*
	A205 Rushey Green EB RT	Nearside	1760	1980	-12%	N
	A205 Rushey Green EB RT	Offside	1760	1951	-11%	N
J07/029	A205 Brownhill Rd EB RT	Nearside	1950	1897	3%	Y
	A205 Brownhill Rd EB RT	Offside	1950	1878	4%	Y
	A205 Brownhill Rd WB	Nearside	1890	1766	7%	Y
	A205 Brownhill Rd WB	Offside	1890	1857	2%	Y
J07/030	A21 Bromley Rd NB	Nearside	1870	1945	-4%	Y
	A21 Bromley Rd NB	Offside	1870	1944	-4%	Y
	A205 Sangley Rd WB	Nearside	1920	1974	-3%	Y
	A205 Sangley Rd WB	Middle	1820	1934	-6%	Y
	A205 Sangley Rd WB	Offside	1820	1899	-4%	Y
	Rushey Green SB	-	1800	-*	-*	-*
J07/031	A205 Catford Rd EB	Nearside	1795	1623	10%	Y
	A205 Catford Rd EB	Offside	1795	1923	-7%	Y
	A205 Catford Rd EB RT	-	1800	1835	-2%	Y
	A205 Catford Rd WB	Nearside	1795	1829	-2%	Y
	A205 Catford Rd WB	Offside	1795	1773	1%	Y
	Canadian Avenue	Nearside	1915	1867	3%	Y
	Canadian Avenue	Offside	1735	1813	-5%	Y
J07/033	A205 Rushey Green WB	Nearside	1770	1941	-10%	Y
	A205 Rushey Green WB	Offside	1770	1900	-7%	Y
J07/034	A205 Rushey Green NB	Nearside	1850	2047	-11%	N

Junction	Approach	Lane	LinSig	VISSIM	%	<10%?
	A205 Rushey Green NB	Offside	1850	-*	-*	-*
	A205 Rushey Green SB	Nearside	1800	-*	-*	-*
	A205 Rushey Green SB RT	Offside	1800	-*	-*	-*
	A205 Rushey Green WB RT	-	1800	-*	-*	-*
	A205 Catford Rd EB	Nearside	1921	-*	-*	-*
	A205 Catford Rd EB	Offside	1921	2004	-4%	Y
J07/156	A205 Plassy Rd SB	Nearside	1963	1970	0%	Y
	A205 Plassy Rd SB	Offside	1963	1943	1%	Y
	Supermarket Island	-	1800	1717	5%	Y
J07/163	A205 Catford Rd EB	Nearside	1830	1928	-5%	Y
	A205 Catford Rd EB	Offside	1830	1882	-3%	Y
	A205 Catford Rd WB	Nearside	1830	1900	-4%	Y
	A205 Catford Rd WB	Offside	1850	1895	-2%	Y
	Thomas Lane	Nearside	1737	1800	-4%	Y
	Thomas Lane	Offside	1840	1847	0%	Y
J07/165	A205 Rushey Green NB	Nearside	2057	-*	-*	-*
	A205 Rushey Green NB	Offside	2057	2032	1%	Y
J07/177	A205 Brownhill Rd EB	-	1800	1956	-9%	Y
J07/188	A205 Rushey Green SB	-	1800	-*	-*	-*
J07/166	A205 Catford Rd EB	-	1800	1847	-3%	Y
	A205 Catford Rd WB	-	1800	1892	-5%	Y
	A212 Catford Hill EB	-	1800	1875	-4%	Y
J07/187	A205 Catford Hill SB	-	1800	1935	-7%	Y
J07/213	A205 Stanstead Rd EB	-	1800	1884	-5%	Y
	A205 Stanstead Rd WB	-	1800	1917	-7%	Y
	A212 Stanstead Rd NB	-	1800	-*	-*	-*
J07/214	A205 Stanstead Rd EB	-	1800	1920	-7%	Y

*Unobtainable due to low flow/low green time

3.3 93% of stoplines within the model validate to within 10%, with all stoplines showing differences below 12% to the LinSig data.

Demand Dependency

3.4 The pedestrian phases in junctions coded with AnyPlan use detection and a fine-tuned pedestrian input to create the correct number of stage calls. Those that were coded with AnyPelican have a customised valPX value instead. Traffic junctions with demand dependent stages used detectors. The placement of detectors was based on aerial photography.

– The number of calls of demand dependent stages in both traffic junctions and pedestrian crossings was provided by TfL. This data was used to validate the modelled number of calls and is shown for the AM and PM peaks in Table 4 .

Table 4. Demand Dependency Validation

Region	Junction	Stage	AM [s/cycle]			PM [s/cycle]		
			Obs.	Mod.	%	Obs.	Mod.	%
R88	J07/030	Rushey Green SB + Peds F & G	43	47	8%	46	46	6%
	J07/033	A205 Rushey Green WB + Ped J	44	45	1%	47	47	5%
	J07/156	Supermarket Island + Ped C	39	43	10%	49	49	1%
		Ped D	1	1	11%	6	6	-6%
	J07/163	Thomas Lane	50	50	0%	50	50	0%
	J07/165	Ped H	23	25	6%	32	32	7%
	J07/177	Ped F	6	7	3%	11	11	8%
	J07/188	Ped G	50	49	-2%	50	50	-2%
	P07/079	Ped B	7	8	4%	14	14	6%
	P07/080	Ped B	5	5	0%	18	18	4%
R488	J07/187	Ped G	6	6	3%	4	4	-3%
	J07/213	A212 Stanstead Rd NB + Peds G & H	17	18	2%	17	17	-4%
		A212 Stanstead Rd NB	10	12	15%	13	13	0%
	J07/214	A205 Stanstead Rd EB (Bus Gate)	56	57	1%	56	56	1%

3.5 All signal stages validate to within 10% with the exception of J07/213 Stanstead Road Buses Outbound in the AM. This was observed to be called 10 times but is modelled as 12, this is a 15% difference but only an absolute difference of 2s.

Traffic Flows & Turning Movements

3.6 The GEH statistic was used to demonstrate that modelled traffic flows match closely to the observed traffic flows (MCC surveyed data) to an acceptable level of accuracy. GEH values of less than 3.0 for critical links, and of less than 5.0 for all others considered a good fit.

3.7 All modelled flows were averaged over 20 seeds. The number of seeds was determined as the minimum number of runs required to obtain high-confidence averages for all journey times along bus routes.

3.8 All modelled turning movements were compared with the MCC data for both peak periods in Table 5. The modelled data was obtained by using the nodes function within VISSIM.

Table 5. Turning Movement Validation – Observed MCC v LoHAM v VISSIM

Junction	From	To	AM [vehs/h]					PM [vehs/h]				
			MCC	LoHAM	VISSIM	GEH (MCC v LoHAM	GEH (MCC v VISSIM	MCC	LoHAM	VISSIM	GEH (MCC v LoHAM	GEH (MCC v VISSIM
A205 Plassy Rd / Sangley Rd	Sangley Rd East	Sangley Rd West	184	209	192	1.8	0.6	186	254	232	4.6	3.1
A205 Rushey Green / A205 Brownhill Rd	Rushey Green North	Brownhill Rd East	417	396	430	1.0	0.6	577	572	637	0.2	2.4
	Rushey Green North	Rushey Green South	102	94	89	0.8	1.3	110	94	83	1.6	2.8
	Rushey Green South	Brownhill Rd East	882	582	679	11.1	7.3	868	707	759	5.7	3.8
A205 Brownhill Rd / A205 Plassy Rd	Brownhill Rd East	Plassy Rd South	626	580	691	1.9	2.5	596	642	708	1.9	4.4
	Brownhill Rd West*	Brownhill Rd East*	497	533	606	1.6	4.6	379	644	689	11.7	13.4
	Brownhill Rd West	Plassy Rd South	395	441	499	2.3	4.9	608	627	708	0.8	3.9
A21 Bromley Rd / A205 Sangley Rd	Bromley Rd North	Bromley Rd South	63	65	60	0.2	0.4	79	64	60	1.8	2.3
	Sangley Rd East	Bromley Rd North	797	805	844	0.3	1.6	827	874	891	1.6	2.2
	Sangley Rd East	Bromley Rd South	374	293	376	4.4	0.1	566	470	552	4.2	0.6
	Bromley Rd South	Bromley Rd North	875	740	846	4.7	1.0	842	690	726	5.5	4.1
A205 Catford Rd	A205 Catford Rd East	A205 Catford Rd West	1335	1147	1307	5.3	0.8	1117	1095	1175	0.7	1.7
	A205 Catford Rd West	A205 Catford Rd East	912	1021	1031	3.5	3.8	989	1075	1113	2.7	3.8
A205 Catford Rd / Canadian Avenue	A205 Catford Rd East	Canadian Avenue	24	67	62	6.4	5.8	23	45	45	3.7	3.8
	A205 Catford Rd East	A205 Catford Rd West	970	797	903	5.8	2.2	862	818	860	1.5	0.1
	Canadian Avenue	A205 Catford Rd West	393	350	404	2.2	0.5	315	277	315	2.2	0.0
	Canadian Avenue	A205 Catford Rd East	0	0	0	0.0	0.0	1	0	0	1.3	1.3
	A205 Catford Rd West	A205 Catford Rd East	812	717	749	3.4	2.3	818	715	746	3.7	2.6
	A205 Catford Rd West	Canadian Avenue	265	304	282	2.3	1.0	355	360	367	0.3	0.6
A205 Stanstead Rd / Stanstead Rd / Glenwood Rd	A205 East	Stanstead Rd	13	0	10	5.1	0.9	19	3	10	4.9	2.4
	A205 East	A205 West	659	580	657	3.2	0.1	556	611	602	2.3	1.9
	Stanstead Rd	A205 West	16	0	2	5.6	4.6	10	0	5	4.4	1.7
	Stanstead Rd	A205 East	13	14	12	0.4	0.2	13	14	12	0.4	0.2
	A205 West	A205 East	543	585	649	1.7	4.3	464	422	512	2.0	2.2
	A205 West	Stanstead Rd	5	0	9	3.3	1.3	5	0	8	3.2	1.2
A205 Stanstead Road / A212 Catford Hill	A205 East	A212	452	533	510	3.6	2.6	503	547	506	1.9	0.1
	A205 East	A205 West	672	580	656	3.7	0.7	560	614	606	2.2	1.9
	A212	A205 West	0	0	0	0.0	0.0	0	0	0	0.0	0.0
	A212	A205 East	365	347	338	0.9	1.4	343	327	331	0.9	0.7
	A205 West	A205 East	579	602	660	0.9	3.3	503	437	523	3.0	0.9
	A205 West	A212	0	0	0	0.0	0.0	0	0	0	0.0	0.0
A205 Catford Rd / Thomas Lane	Thomas Lane	A205 East	104	97	98	0.7	0.6	167	227	223	4.3	4.0
	Thomas Lane	A205 West	220	255	254	2.3	2.2	222	327	276	6.3	3.4
	A205 East	A205 West	1359	1140	1306	6.2	1.5	1189	1087	1174	3.0	0.4
	A205 East	Thomas Lane	0	0	0	0.0	0.0	0	0	0	0.0	0.0
	A205 West	Thomas Lane	0	0	0	0.0	0.0	0	0	0	0.0	0.0
	A205 West	A205 East	972	906	932	2.1	1.3	1007	837	891	5.6	3.8
A205 Catford Rd / Doggett Rd	A205 East	A205 West	1493	1367	1508	3.3	0.4	1274	1379	1379	2.9	2.9
	A205 East	Doggett Rd	92	27	53	8.5	4.7	117	34	70	9.5	4.8
	A205 West	Doggett Rd	149	93	111	5.1	3.4	157	120	142	3.1	1.2
	A205 West	A205 East	959	916	933	1.4	0.8	981	847	892	4.4	2.9
	Doggett Rd	A205 East	1	0	0	1.5	1.5	7	0	0	3.7	3.7
	Doggett Rd	A205 West	0	0	0	0.4	0.4	1	0	0	1.4	1.4
A205 Catford Rd / Ravensbourne Park	A205 North	A205 South	1142	1113	1166	0.9	0.7	1048	1161	1111	3.4	1.9
	A205 North	Ravensbourne Park	349	258	340	5.2	0.5	238	221	269	1.1	2.0
	A205 South	Ravensbourne Park	45	203	185	14.2	13.1	13	83	76	10.1	9.4
	A205 South	A205 North	896	757	806	4.9	3.1	833	686	768	5.3	2.3
	Ravensbourne Park	A205 North	217	255	237	2.5	1.3	302	283	261	1.1	2.4
	Ravensbourne Park	A205 South	1	0	0	1.4	1.4	1	0	0	1.2	1.2
*Count inconsistency between consecutive junctions						78%	94%				84%	96%

3.9 LoHAM counts show an overall validation of 78% and 84% in the AM and PM when compared to MCC data. Although not tabulated in summary above, 100% of modelled counts are with 5.0 GEH when compared to LoHAM. A more detail breakdown on flow comparisons can be found in Appendix E.

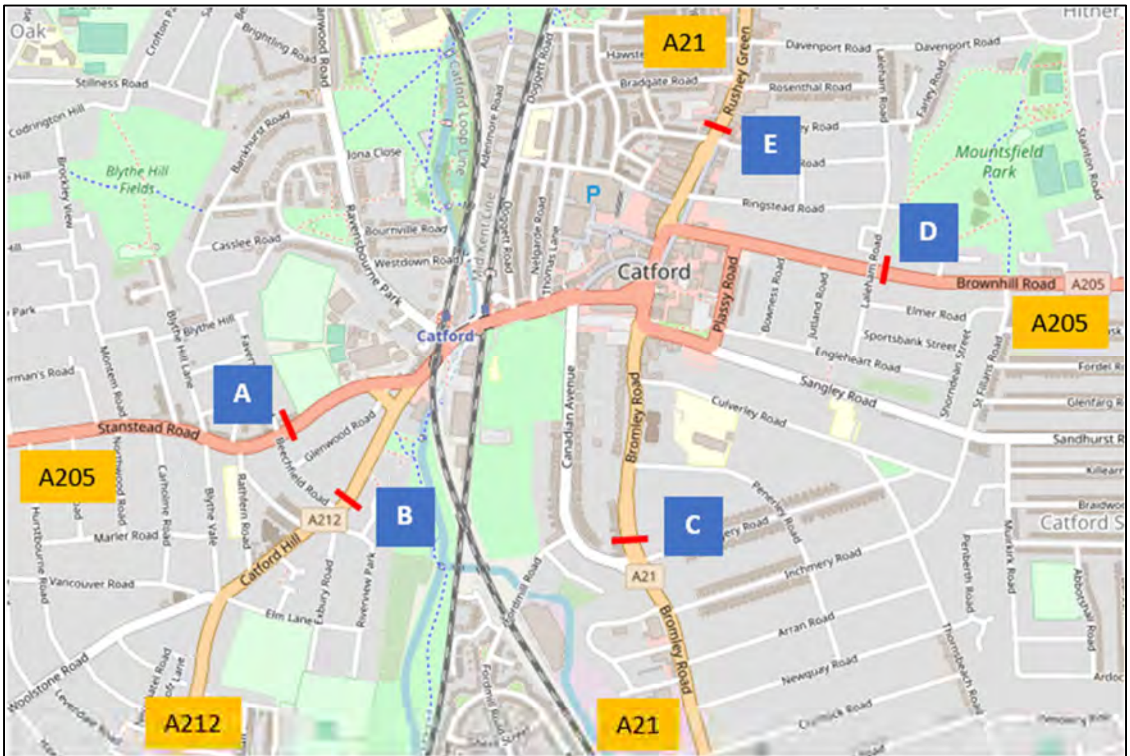
3.10 VISSIM counts show a higher correlation with MCC data, increasing the number of turning counts within GEH of 5.0 to 94% and 96% in the AM and PM peaks. This indicates that the flow increases tabulated in Table 1 resulted in a better representation of the observed counts.

3.11 All turning counts outside the validation criteria are either close to GEH of 5 or are low-flow movements, expect for eastbound flows through A205 Brownhill Rd / A205 Plassy Rd and A205 Rushey Green / A205 Brownhill Rd junctions. As explained in Appendix A, observed MCC counts on these two junctions contain flow inconsistencies.

Journey Times

3.12 Observed journey times were obtained from 2018 Traffic Master data provided by TfL. For the VISSIM modelled journey times to be considered to validate according to MAP standards they should be shown to be within 15% of the observed journey times. Due to the variability in input data to the model it was agreed with TfL that we should allow some reasonable flexibility in this criteria. That is, even if 15% is not achievable the model could still be considered a good representation of the base conditions. In addition to the validation exercise, TfL will undertake checks from an operational perspective to ensure the model is representative of 'on-site' traffic behaviour.

3.13 Six 'model-wide' sections were used for journey time validation, as shown below in Figure 3.



Route	From	To	
A205 West-East	A205 Stanstead Road	A205 Brownhill Road	A to D
A212 West-East	A212 Catford Hill	A205 Brownhill Road	B to D
A205 East-West	A205 Brownhill Road	A205 Stanstead Road	D to A
A212 East-West	A205 Brownhill Road	A212 Catford Hill	D to B
A21 North-South	A21 Rushey Green	A21 Bromley Road	E to C
A21 South-North	A21 Bromley Road	A21 Rushey Green	C to E

Figure 3 Model-Wide Journey Time Sections

3.14 Table 6 below shows the journey time comparisons for general traffic for the AM and PM peaks. Twenty random seeds were averaged to provide an average modelled journey time output.

Table 6. Journey Time Comparison – General Traffic

Route	AM [s]				PM [s]			
	Obs.	Mod.	Diff	%	Obs.	Mod.	Diff	%
A205 West-East	390	376	-14	-4%	712	644	-67	-9%
A212 West-East	487	509	22	5%	637	667	31	5%
A205 East-West	530	492	-38	-7%	395	365	-31	-8%
A212 East-West	506	480	-26	-5%	367	350	-17	-5%
A21 North-South	245	226	-19	-8%	171	152	-19	-11%
A21 South-North	186	191	4	2%	175	191	16	9%

3.15 Overall, there is a good validation of the general traffic journey times, with all journey times being within the 15% tolerance.

3.16 All 30 bus routes in the model were recorded for public transport journey time validation, see Table 7

Table 7. Journey Time Comparison – Buses

Route	AM [s]				PM [s]			
	Obs.	Mod.	Diff	%	Obs.	Mod.	Diff	%
47 Shoreditch	203	190	-13	-6%	194	193	-1	0%
47 Catford Garage	174	158	-16	-9%	188	191	3	1%
54 Plumstead Road / Burrage Road	207	184	-23	-11%	197	191	-7	-3%
54 Elmers End Interchange	204	214	10	5%	196	201	6	3%
75 Fairfield Halls	409	401	-8	-2%	451	417	-34	-8%
75 Lewisham Station	197	182	-15	-8%	314	267	-46	-15%
124 Southend Crescent / Southend Close	364	356	-9	-2%	436	436	0	0%
124 Stanstead Road / St Dunstans College	143	158	15	11%	147	144	-3	-2%
136 Elephant & Castle / Newington	216	196	-21	-10%	206	200	-6	-3%
136 Grove Park Bus Station	198	202	3	2%	224	209	-15	-7%
160 Catford Bridge Station	72	120	47	65%	66	92	26	40%
160 Sidcup Station	306	278	-28	-9%	312	320	7	2%
171 Catford Garage	530	528	-3	-1%	514	569	54	11%
171 Holborn Station	412	428	16	4%	401	399	-2	-1%
181 Grove Park Bus Station	94	100	6	7%	98	96	-3	-3%
181 Lewisham Station	274	257	-17	-6%	290	295	5	2%
185 Lewisham Station	353	330	-22	-6%	420	452	33	8%
185 Victoria Station	492	507	14	3%	499	505	6	1%
199 Canada Water Bus Station	212	182	-30	-14%	190	183	-7	-4%
199 Catford Garage	167	187	20	12%	181	189	8	4%
202 Blackheath / Royal Standard	260	272	12	5%	307	315	8	3%

Route	AM [s]				PM [s]			
	Obs.	Mod.	Diff	%	Obs.	Mod.	Diff	%
202 Crystal Palace Parade	587	583	-5	-1%	424	380	-43	-10%
208 Lewisham Station	202	188	-15	-7%	187	179	-8	-4%
208 Orpington / Perry Hall Road	199	211	12	6%	218	249	31	14%
284 Grove Park Cemetery	335	321	-15	-4%	473	436	-37	-8%
284 Lewisham Station	173	176	4	2%	157	160	4	2%
320 Biggin Hill Valley	470	455	-15	-3%	435	407	-28	-7%
320 Catford Bridge Station	239	254	15	6%	226	242	16	7%
336 Catford Bridge Station	249	261	12	5%	191	208	17	9%
336 Locksbottom / Pallant Way	167	151	-15	-9%	184	200	16	8%

3.17 29 bus routes out of 30 validate to within 15% during the AM and PM peaks respectively.

3.18 All of bus routes validate to within either 15% or with an absolute difference to the observed of no more than 60 seconds.

4. Future Base Modelling

Model Calibration

4.1 In order to model the 2026 future base year scenario, the base model has been updated with traffic flow and routing data from the LoHAM strategic model for that year and has been run to obtain journey time results.

4.2 The following has been unaltered from the base model:

- Modelling Periods
- Simulation Parameters
- Model Units
- Functions
- Desired Speed Distributions
- Vehicle Type
- Driving Behaviour
- Network Structure
- Priority Rules
- Reduced Speed Areas

4.3 Following discussion with TfL, it was agreed to use the same signal timings in the future base LoHAM model as was used in the base LoHAM model. This was due to similar traffic routing predicted by the FB LoHAM model.

Traffic Flow and Routing

4.4 Vehicle routing was taking directly from the future base LoHAM model and has been input into VISSIM using the path search feature in order to obtain static routes. An origin-destination matrix for each vehicle composition can be found in Appendix C.

4.5 During the calibration of the base VISSIM model adjustments were applied to the LoHAM traffic flows, this was done to ensure VISSIM base flows matched closer to the MCC survey data (as described in 2.28 and Table 1). These same flow adjustments have been carried forward into the future base VISSIM models in order to ensure consistency.

4.6 A global uplift factor of 1.18 has been applied to the cyclist flows in the AM and 1.14 in the PM. These factors were provided by TfL's City Planning team and are based on forecast cycle km travelled within the study area.

4.7 Pedestrian flows remain unchanged from the base VISSIM model.

Signal Optimisation

4.8 Following updating the model for traffic flow and routing, the signal timings were analysed in order to try to reduce the average delay experienced by vehicles and to reduce journey times for buses and general traffic.

4.9 At key junctions along Catford Road and on the gyratory itself signal timings were changed slightly and then the models were re-run. Following several iterations and model runs the signals at J07/163 and J07/031 were changed in the AM to give Catford Road an additional 2 seconds for each controller. This was done to improve the East-West movement journey times.

Journey Time Results

4.10 Table 8 below shows the journey times for general traffic for the AM and PM peaks and comparison with the base model. Twenty random seeds were averaged to provide an average modelled journey time output.

4.11 The journey time sections used in the future year models (FB and DS) were lengthened from those used in the Base model. This was to account for the network changes that will happen and to ensure a like-for-like comparison can be made between the FB and DS. By lengthening the journey time sections in the future year model this also enables us to account for any increased queueing.

Table 8 Journey Times – General Traffic

Route	AM [s]				PM [s]			
	Base	FB	Diff	%	Base	FB	Diff	%
A205 West-East	399	494	95	24%	894	890	-3	0%
A212 West-East	568	717	149	26%	804	843	39	5%
A205 East-West	485	533	48	10%	353	377	24	7%
A212 East-West	478	527	49	10%	340	361	21	6%
A21 North-South	219	236	17	8%	162	206	45	28%
A21 South-North	271	298	27	10%	261	284	24	9%

4.12 Table 9 below shows the journey times for buses for the AM and PM peaks and comparison with the base model. Twenty random seeds were averaged to provide an average modelled journey time output.

Table 9 Journey Times - Buses

Route	AM [s]				PM [s]			
	Base	FB	Diff	%	Base	FB	Diff	%
47 Shoreditch	259	263	3	1%	255	261	6	2%
47 Catford Garage	200	202	2	1%	236	263	27	11%
54 Plumstead Road / Burrage Road	249	251	2	1%	256	260	4	2%
54 Elmers End Interchange	262	264	2	1%	252	271	18	7%
75 Fairfield Halls	478	484	7	1%	497	522	25	5%
75 Lewisham Station	646	782	136	21%	1017	1077	60	6%
124 Southend Crescent / Southend Close	426	451	25	6%	480	487	7	2%
124 Stanstead Road / St Dunstans College	476	531	54	11%	254	271	18	7%
136 Elephant & Castle / Newington	257	260	3	1%	268	267	-1	0%
136 Grove Park Bus Station	253	251	-2	-1%	258	279	21	8%
160 Catford Bridge Station	426	473	47	11%	230	238	8	3%
160 Sidcup Station	466	504	38	8%	468	464	-4	-1%
171 Catford Garage	628	671	43	7%	706	714	8	1%
171 Holborn Station	478	486	8	2%	442	450	8	2%
181 Grove Park Bus Station	466	527	61	13%	295	317	22	7%
181 Lewisham Station	732	891	160	22%	985	1007	22	2%
185 Lewisham Station	442	469	27	6%	594	604	10	2%
185 Victoria Station	541	553	12	2%	545	576	31	6%
199 Canada Water Bus Station	237	240	3	1%	241	240	-1	-1%
199 Catford Garage	230	231	1	0%	234	248	14	6%

Route	AM [s]				PM [s]			
	Base	FB	Diff	%	Base	FB	Diff	%
202 Blackheath / Royal Standard	676	815	139	21%	945	983	39	4%
202 Crystal Palace Parade	695	746	51	7%	492	510	19	4%
208 Lewisham Station	250	249	-1	0%	243	244	0	0%
208 Orpington / Perry Hall Road	254	253	-1	0%	299	318	18	6%
284 Grove Park Cemetery	429	449	21	5%	520	760	240	46%
284 Lewisham Station	478	542	64	13%	267	278	10	4%
320 Biggin Hill Valley	546	582	36	7%	516	517	1	0%
320 Catford Bridge Station	304	303	-1	0%	289	296	6	2%
336 Catford Bridge Station	309	310	2	1%	255	274	18	7%
336 Locksbottom / Pallant Way	289	319	30	11%	358	355	-3	-1%

5. Do Something Modelling

Model Calibration

5.1 In order to model the 2026 Do-Something scenario the Base VISSIM model has been updated with traffic flow and routing data from the LoHAM strategic model for that year and scenario. The VISSIM network structure was updated based on AutoCAD drawings provided by TfL. Signal timing data was obtained from LinSig Models, provided by TfL, and updated by AECOM. The VISSIM model was then run to obtain journey time results.

5.2 The following is unchanged from the base model:

- Modelling Periods
- Simulation Parameters
- Model Units
- Functions
- Desired Speed Distributions
- Vehicle Type
- Driving Behaviour

Network Structure Changes

5.3 The base model network structure was updated in order to reflect the proposed scheme. The network beyond the scheme extents of the drawings remains unchanged from the Base VISSIM model.

5.4 The key change is the removal of the clockwise gyratory system, which had little provision for cyclists. The proposed design makes Rushey Green, Brownhill Road, Plassy Road and Sangley Road available to two-way traffic. The major junctions are:

- Rushey Green / Brownhill Road
- Brownhill Road / Plassy Road
- Plassy Road / Sangley Road
- Sangley Road / Rushey Green / Bromley Road

5.5 Two segregated cycle paths were added. The east-west cycle paths go from Sangley Road to Catford Bridge, with a toucan crossing replacing a pedestrian crossing at Catford Bridge. The North-South cycle paths go from Rushey Green to Bromley Road with toucan crossings across Rushey Green.

5.6 Bus stops were updated in the model to reflect the proposed changes.

5.7 The right turn from Sangley Road to Rushey Green has been banned. All movements are now allowed in and out of the east entrance to Catford Island.

5.8 Link types have been kept consistent with the base, using the ‘74_mixed’ or ‘74_mixed_sl’ types.

5.9 Reduced Speed Areas and Priority Rules were inserted for the new links and connectors as appropriate and in accordance with the proposed design.

5.10 Occasionally, network changes beyond the design provided were made in order to ensure the model does not lock up. These are as follows:

- Conflict areas were added to ensure the right turns into Doggett Road and Ravensbourne Park were not blocked.
- A priority rule was added to ensure the right turn into Bromley Road from Catford Road was not blocked.

– Priority rules and conflict areas were added to ensure that vehicles exiting Thomas Lane do not overlap with vehicles queuing on Catford Road. The addition of these network elements create the effect of a yellow box/keep clear markings and cooperative merge type behaviour by those on Catford Road. It is in our opinion that the model with these changes closer reflects how vehicles would likely behave during the peak periods, i.e. when there is high congestion and queuing.

Traffic Flow and Routing

5.11 Vehicle routing was taking directly from the Do Something LoHAM model and has been input into VISSIM using the path search feature in order to obtain static routes. An origin-destination matrix for each vehicle composition can be found in Appendix C.

5.12 Following the implementation of the proposed scheme, two possible routes were made available for the eastbound traffic to travel along the A205. The demand split was iteratively optimised and set to:

– Via Plassy Road, 80%; and

– Via Brownhill Road, 20%.

5.13 Pedestrian flows remain unchanged from the base VISSIM model.

5.14 Buses have been re-routed to match as closely as possible to the bus routes in the base model. Some bus routes are shorter in distance than they were in the base model due to new turns opening up and bus stop locations changing.

5.15 The proposed design changes bus stop locations and also total number of bus stops. In order to ensure a like-for-like comparison of bus journey times, the overall dwell time of buses on each route has been kept the same as they are in the base and future base.

Signal Timings

5.16 TfL provided LinSig models for the proposed scheme which set out the proposed phasing and staging data including phase minimums and intergreens. The VAP and PUA files have been updated accordingly.

5.17 AECOM updated the traffic flow in the LinSig models to ensure it reflected the VISSIM do-something scenario flows. Following this, signal timings within LinSig were optimised on an individual basis where DoS values were >90%. These optimised signal timings were then programmed into the VAP files to ensure the VISSIM model signal timings matched exactly to those in the LinSig model.

5.18 The coordination between Signal Controller 30 and Signal Controller 31 was optimised to ensure that queues formed on the west approach at the new junction were cleared up before upstream eastbound flows were released. This was done to avoid queueing-back issues and to reduce the amount of start-stop traffic.

5.19 There may be further scope for signal timing optimisation depending on the on-street signal timing strategy TfL wish to implement. AECOM suggests that TfL reviews the VISSIM model and signal timings in order and provide comments for any changes or optimisations they feel are necessary.

5.20 The DS LinSig model can be found in Appendix F.

Journey Time Results

5.21 Table 10 below shows the journey times for general traffic for the AM and PM peaks and comparison with the future base model. Twenty random seeds were averaged to provide an average modelled journey time output. The journey time sections are the same as in the FB.

Table 10 Journey Times - General Traffic

Route	AM [s]				PM [s]			
	FB	DS	Diff	%	FB	DS	Diff	%
A205 West-East	494	503	9	2%	890	1058	168	19%
A212 West-East	717	694	-22	-3%	843	934	91	11%
A205 East-West	533	488	-45	-9%	377	350	-28	-7%
A212 East-West	527	478	-49	-9%	361	326	-35	-10%
A21 North-South	236	168	-68	-29%	206	209	3	1%
A21 South-North	298	382	84	28%	284	221	-63	-22%

5.22 Table 11 below shows the journey times for buses for the AM and PM peaks and comparison with the future base model. Twenty random seeds were averaged to provide an average modelled journey time output.

Table 11 Journey Time - Buses

Route	AM [s]				PM [s]			
	FB	DS	Diff	%	FB	DS	Diff	%
47 Shoreditch	263	284	22	8%	261	283	22	9%
47 Catford Garage	202	270	69	34%	263	301	38	14%
54 Plumstead Road / Burrage Road	251	268	17	7%	260	282	23	9%
54 Elmers End Interchange	264	301	37	14%	271	304	34	12%
75 Fairfield Halls	484	472	-13	-3%	522	595	73	14%
75 Lewisham Station	782	717	-65	-8%	1077	1140	63	6%
124 Southend Crescent / Southend Close	451	391	-59	-13%	487	499	12	2%
124 Stanstead Road / St Dunstans College	531	273	-257	-49%	271	251	-20	-7%
136 Elephant & Castle / Newington	260	290	30	11%	267	278	11	4%
136 Grove Park Bus Station	251	274	23	9%	279	296	17	6%
160 Catford Bridge Station	473	259	-214	-45%	238	202	-35	-15%
160 Sidcup Station	504	383	-121	-24%	464	502	38	8%
171 Catford Garage	671	580	-91	-14%	714	664	-50	-7%
171 Holborn Station	486	416	-70	-14%	450	413	-37	-8%
181 Grove Park Bus Station	527	285	-242	-46%	317	282	-35	-11%
181 Lewisham Station	891	661	-230	-26%	1007	959	-49	-5%
185 Lewisham Station	469	521	53	11%	604	697	93	15%
185 Victoria Station	553	488	-65	-12%	576	604	27	5%
199 Canada Water Bus Station	240	265	25	10%	240	240	1	0%
199 Catford Garage	231	289	58	25%	248	302	55	22%
202 Blackheath / Royal Standard	815	754	-61	-8%	983	1044	60	6%
202 Crystal Palace Parade	746	683	-62	-8%	510	473	-37	-7%
208 Lewisham Station	249	278	29	12%	244	259	15	6%

Route	AM [s]				PM [s]			
	FB	DS	Diff	%	FB	DS	Diff	%
208 Orpington / Perry Hall Road	253	296	43	17%	318	327	9	3%
284 Grove Park Cemetery	449	368	-81	-18%	760	858	98	13%
284 Lewisham Station	542	282	-259	-48%	278	245	-32	-12%
320 Biggin Hill Valley	582	492	-90	-15%	517	529	12	2%
320 Catford Bridge Station	303	261	-42	-14%	296	272	-24	-8%
336 Catford Bridge Station	310	276	-35	-11%	274	269	-5	-2%
336 Locksbottom / Pallant Way	319	282	-37	-12%	355	444	89	25%

Other Observations

5.23 During the AM DS and PM DS model runs, it was observed that long queues were formed on Canadian Avenue northbound on approach to the junction with Catford Road A205. Based on model results, these queues are forecasted to be 1.5km long, reaching the limits of the model. This represents a significant increase when compared to the FB models, where queues were contained within 250m.

5.24 The effect of this queue is not captured in the journey times presented in the above tables. This is due to the fact that Canadian Avenue links do not fall within the area of interest defined during the scope of the study since no buses run through this link.

5.25 It is the modeller's opinion that this queue is likely present due to the LoHAM model overestimating the capacity available on Canadian Avenue and therefore has assigned more vehicles to use this link than would be the case in reality. As such, this queue and any potential delay to vehicles travelling northbound along Canadian Avenue should be investigated further and reviewed as part of any future design considerations.

6. Summary and Conclusion

Base Model

6.1 The models were built in accordance with TfL's Traffic Modelling Guidelines. It has been agreed with TfL that some reasonable flexibility in validation criteria tolerance should be allowed due to the variability of input data. In addition to undertaking the technical validation exercise, TfL has undertaken an operational assessment of the model to ensure that it is operationally representative of 'on-site' conditions.

6.2 The models validate to a good standard in terms of traffic flow, 94% and 96% of turning movements have a GEH less than 5.0, when compared to MCC data, and 100% when compared to LoHAM counts.

6.3 The journey times for general traffic validate well, with all AM and PM times within 15% of observed.

6.4 The journey times for public bus services also validate well, 97% of bus routes validating to within 15% and with 100% within an absolute difference to the observed of no more than 60 seconds.

6.5 These base models provide a suitably accurate representation of site conditions as they were in February 2019, and the models can be considered fit for purpose to be used in future year scenario testing.

Future Base Model

6.6 In the AM Future Base Model, the journey times for the major movements for both general traffic and buses have on average increased. General traffic journey times have increased by between 0% and 26% of their base journey times, the average increase is 15%. Bus journey times have changed by between -1% and 22% of the base, with the average increase being 7%.

6.7 In the PM Future Base Model, the journey times for the major movements for both general traffic and buses have on average increased. General traffic journey times have changed by between 0% and 28% of their base journey times, the average increase is 5%. Bus journey times have changed by between -1% and 46% of the base, with the average increase being 6%.

Do-Something Model

6.8 In the AM Do-Something Model, the journey times for the major movements for both general traffic and buses have on average decreased. General traffic journey times have changed by between -29% and 28% of their future base journey times, the average decrease is 1%. Bus journey times have changed by between -49% and 34% of the future base, with the average decrease being 12%.

6.9 In the PM Do-Something Model, the journey times for the major movements for general traffic have on average decreased while buses have on average increased. General traffic journey times have changed by between -22% and 19% of their future base journey times, the average decrease is 5%. Bus journey times have changed by between -15% and 25% of the future base, with the average increase being 3%.

Appendix A Traffic Survey Data & Analysis

Appendix B Traffic Master & iBus Data

Appendix C Origin Destination Matrices (Base, Future Base & Do-Something)

Appendix D LinSig Models & Demand Dependency Data

Appendix E Flow & Journey Time Validation Data

Appendix F Do-Something LinSig Model