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BEECH STREET TRANSPORT AND PUBLIC REALM IMPROVEMENTS

TRAFFIC IMPACT

CITY OF LONDON

QA RECORD:

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11 NOVEMBER 2019

1 INTRODUCTION

1.1 Background

1.1.1 The City of London (CoL) has commissioned NRP to assess the impact of restricting Beech Street to Zero Emission Vehicles (ZEVs) and cyclists in both directions. Bus service 153 would still be able to use Beech Street.

1.1.2 The objective of the changes to Beech Street is to significantly enhance the public realm and to improve air quality along the corridor.

1.1.3 A previous technical report (TR01) set out a desktop analysis of the impact of closing Beech Street to motorised traffic in an eastbound direction. This has been superseded by the new proposals set out in this document.

1.1.4 The method of assessment for the two-way restriction broadly follows the same methodology as that used for Phase 1, which was discussed and agreed with Transport for London (TfL). The main difference is that strategic modelling using TfL's ONE model has been undertaken to generate the predicted flow reassignment as a result of the two-way restriction (previously a desktop assessment was undertaken).

1.1.5 This report presents the following information:

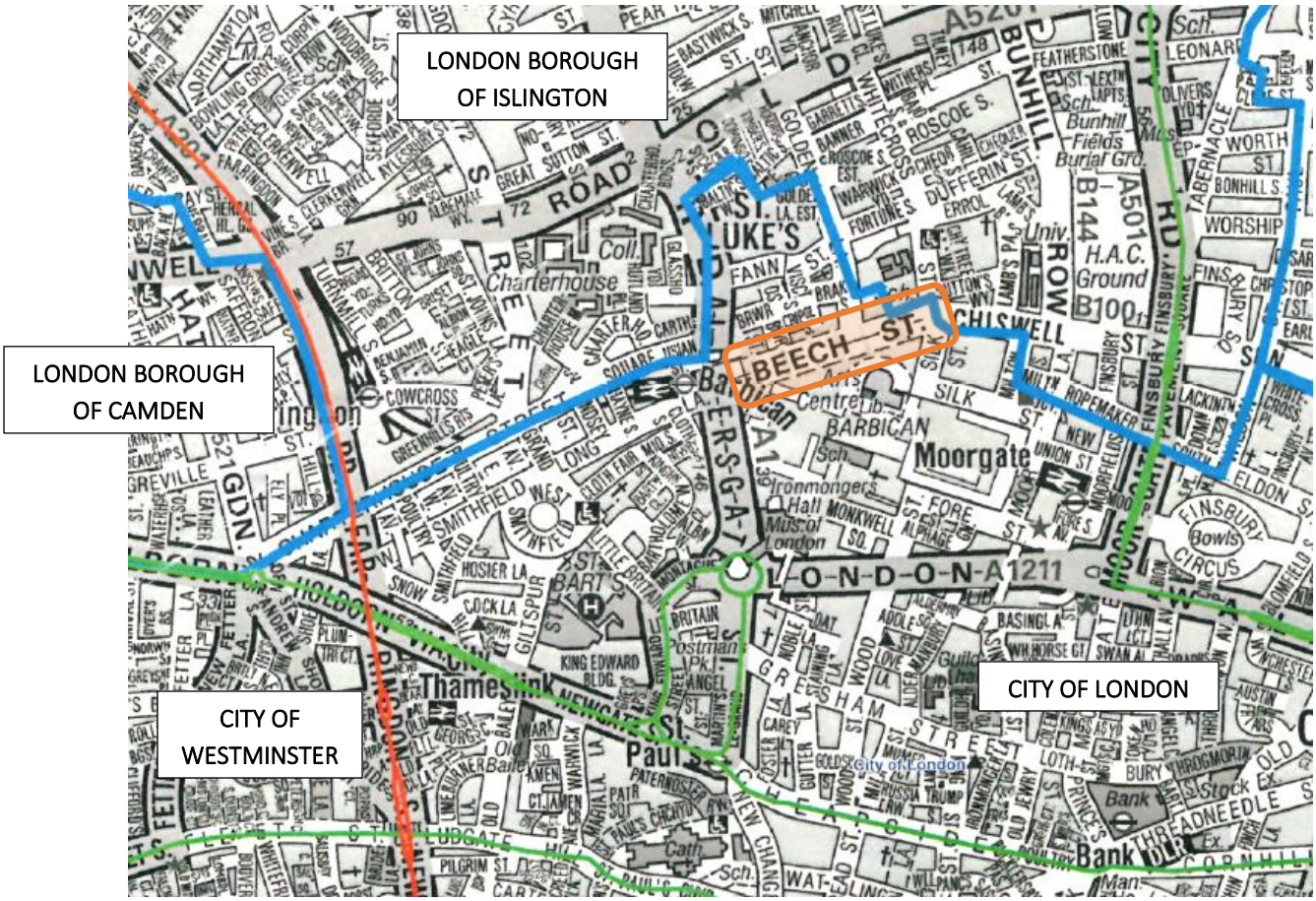
- Chapter 1: Traffic reassignment analysis
- Chapter 2: Traffic impact assessment
- Chapter 3: Conclusions

2 TRAFFIC REASSIGNMENT ANALYSIS

2.1 EXISTING SITUATION

2.1.1 Beech Street, Aldersgate Street and the surrounding highway network are local roads and do not form part of the Transport for London Road Network (TLRN) or Strategic Road Network (SRN). Figure 2.1 highlights Beech Street (orange box) and shows the TLRN (red line), SRN (green line) and borough boundary (blue line).

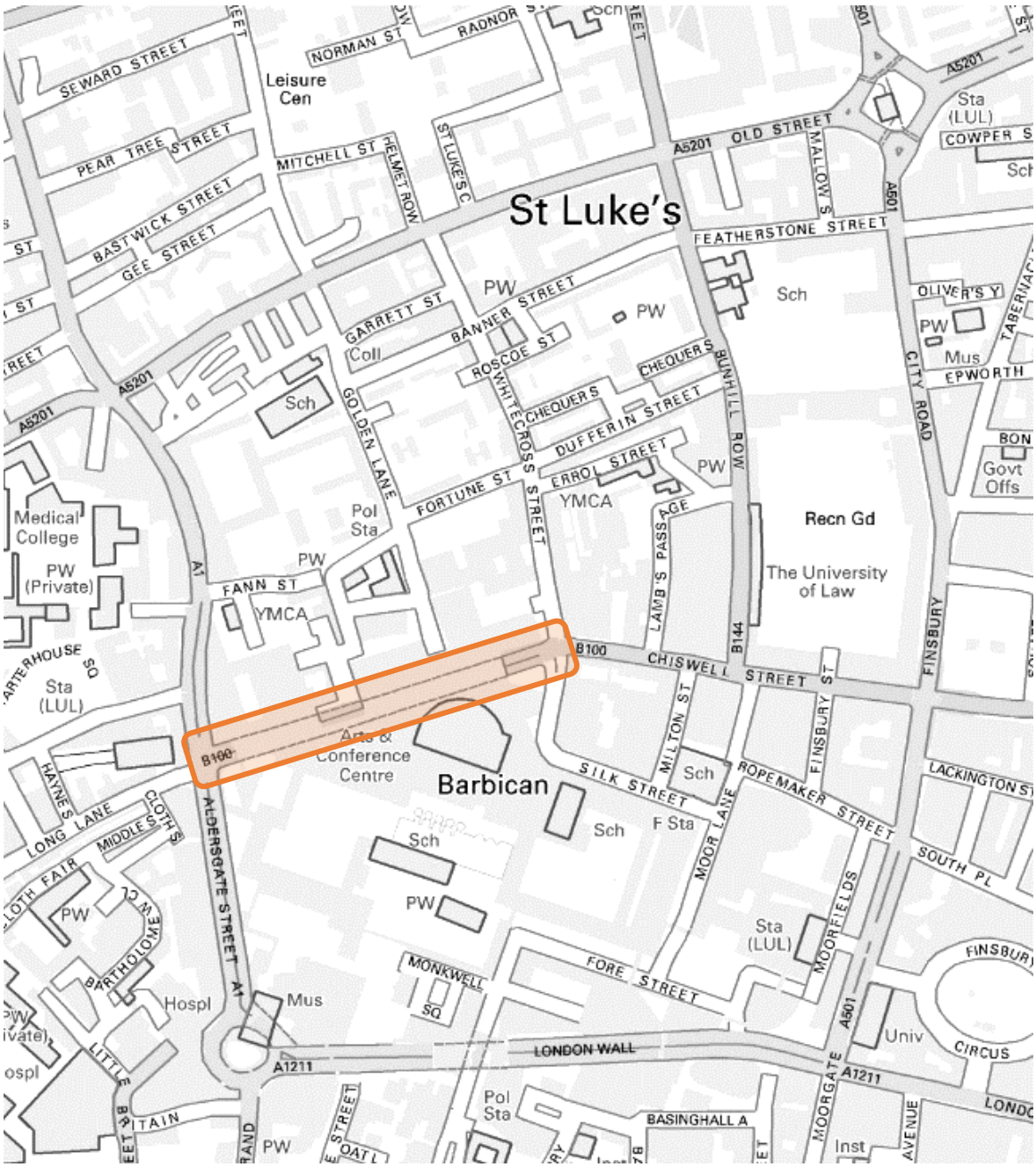
Figure 2.1: Beech Street location (wider context)



2.1.2 The highway network immediately surrounding Beech Street in shown in Figure 2.2.

2.1.3 Beech Street forms part of bus route 153, which runs in both directions between Finsbury Park and Finsbury Square/Moorgate. Aldersgate Street forms part of two north-south bus services (Routes 4 and 56).

Figure 2.2: Beech Street location

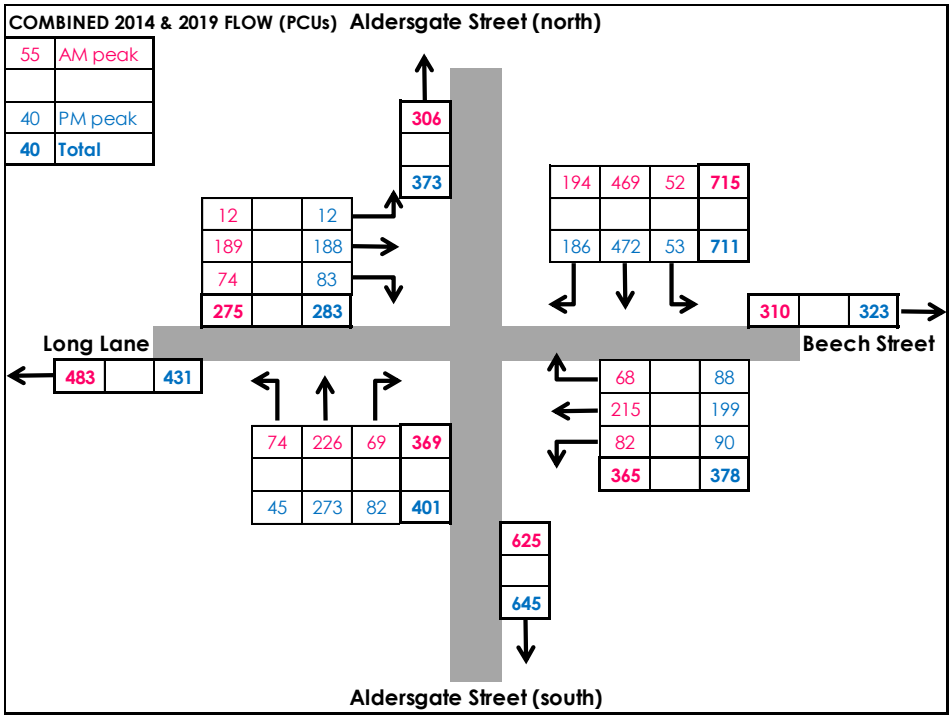


2.2 Traffic data

2.2.1 The analysis for Phase 1 used a mix of traffic survey data at the Aldersgate Street/ Beech Street/ Long Lane junction that was collected in 2014 and 2018. Since then new data was collected in March 2019. As with the data used for the Phase 1 analysis, the 2019 survey was undertaken when Long Lane was closed to general traffic, which meant the 2014 data had to be used to obtain the Long Lane traffic flow. The AM peak is 0815-0915 and the PM peak is 1730-1830.

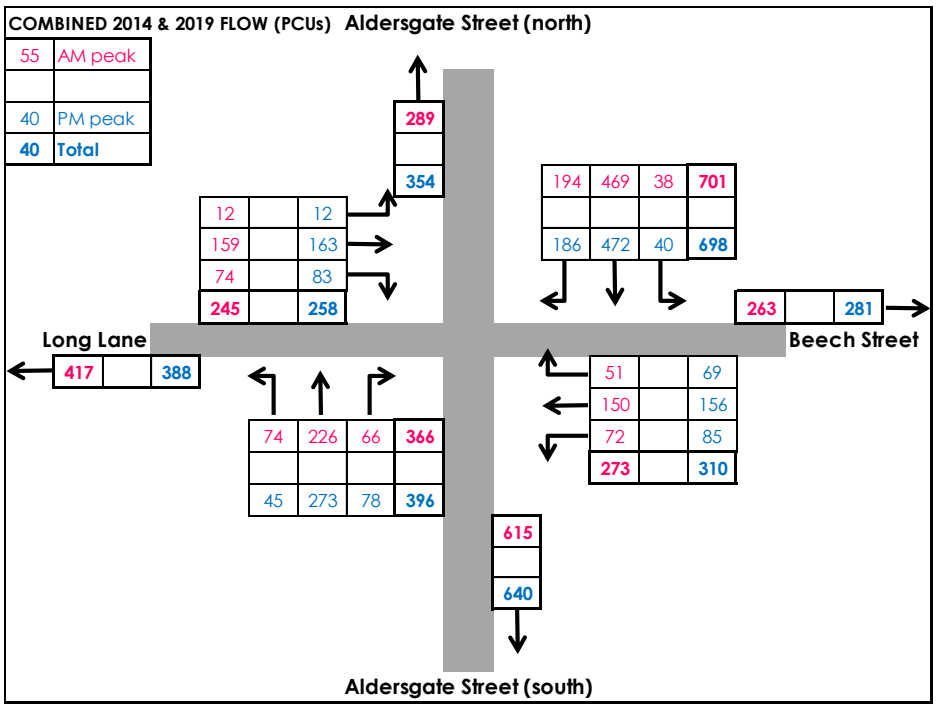
2.2.2 The combined 2014 and 2019 traffic flows are shown in Figure 2.3.

Figure 2.3: Aldersgate Street/ Beech Street/ Long Lane (00/028) 2014 and 2019 combined traffic flow (PCUs)



2.2.3 The proposed restriction on Beech Street would allow ZEVs, cyclists and bus 153 to use Beech Street. The traffic flows without ZEVs (2% of total flow assumed), cyclists and bus 153 entering Beech Street are shown in Figure 2.4. These are the flows that will reassign away from Beech Street.

Figure 2.4: Aldersgate Street/ Beech Street/ Long Lane (00/028) 2019 traffic flow with ZEVs, cyclists and bus 153 removed entering Beech Street eastbound (PCUs)



2.2.4 The traffic (excluding ZEVs, cyclists and bus 153) to be reassigned is as follows:

- 159 PCUs (AM peak) and 163 PCUs (PM peak) eastbound from Long Lane
- 38 PCUs (AM peak) and 40 PCUs (PM peak) southbound from Aldersgate Street
- 66 PCUs (AM peak) and 78 PCUs (PM peak) northbound from Aldersgate Street
- 263 PCUs (AM peak) and 281 PCUs (PM peak) eastbound on Beech Street
- 273 PCUs (AM peak) and 310 PCUs (PM peak) westbound on Beech Street
- 536 PCUs (AM peak) and 591 PCUs (PM peak) in total

2.3 Methodology

2.3.1 TfL's ONE model has been used to predict the volume and location of traffic reassignment as a result of the two-way restriction on Beech Street. The model has been through several iterations to ensure that it provides a realistic and accurate estimate of traffic reassignment.

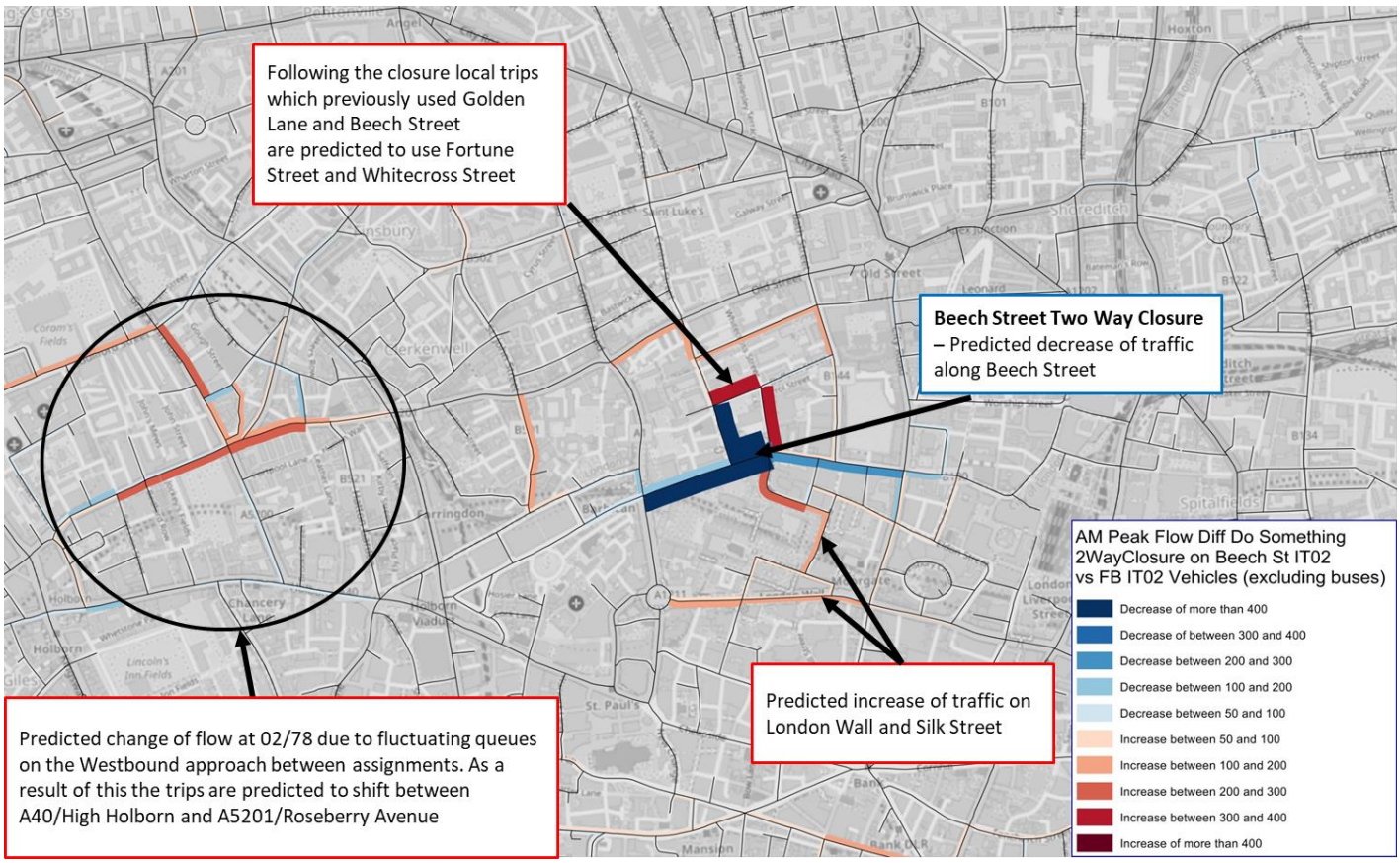
2.3.2 Two scenarios have been modelled:

- Scenario 1: Beech Street two-way closure. This assumes full closure to all vehicles because it has been estimated that the current proportion of ZEVs is less than 5%. Therefore, the results presented are a worse case in terms of vehicle reassignment.
- Scenario 2: As Scenario 1 but with Fortune Street fully closed. The restriction on Beech Street may result in traffic using Fortune Street as a new rat-running route. This would be undesirable and so this test is to see where traffic would reassign if Fortune Street was closed.

2.4 Scenario 1

2.4.1 The ONE model outputs for Scenario 1 are shown in Figure 2.5 for the AM peak and Figure 2.6 for the PM peak. The outputs show the predicted flow difference between the 2021 Future Base model and the 2021 Future Base model with Beech Street closed. The text on the images are TfL's notes of explanation.

Figure 2.5: Scenario 1 ONE model flow difference output (AM peak)

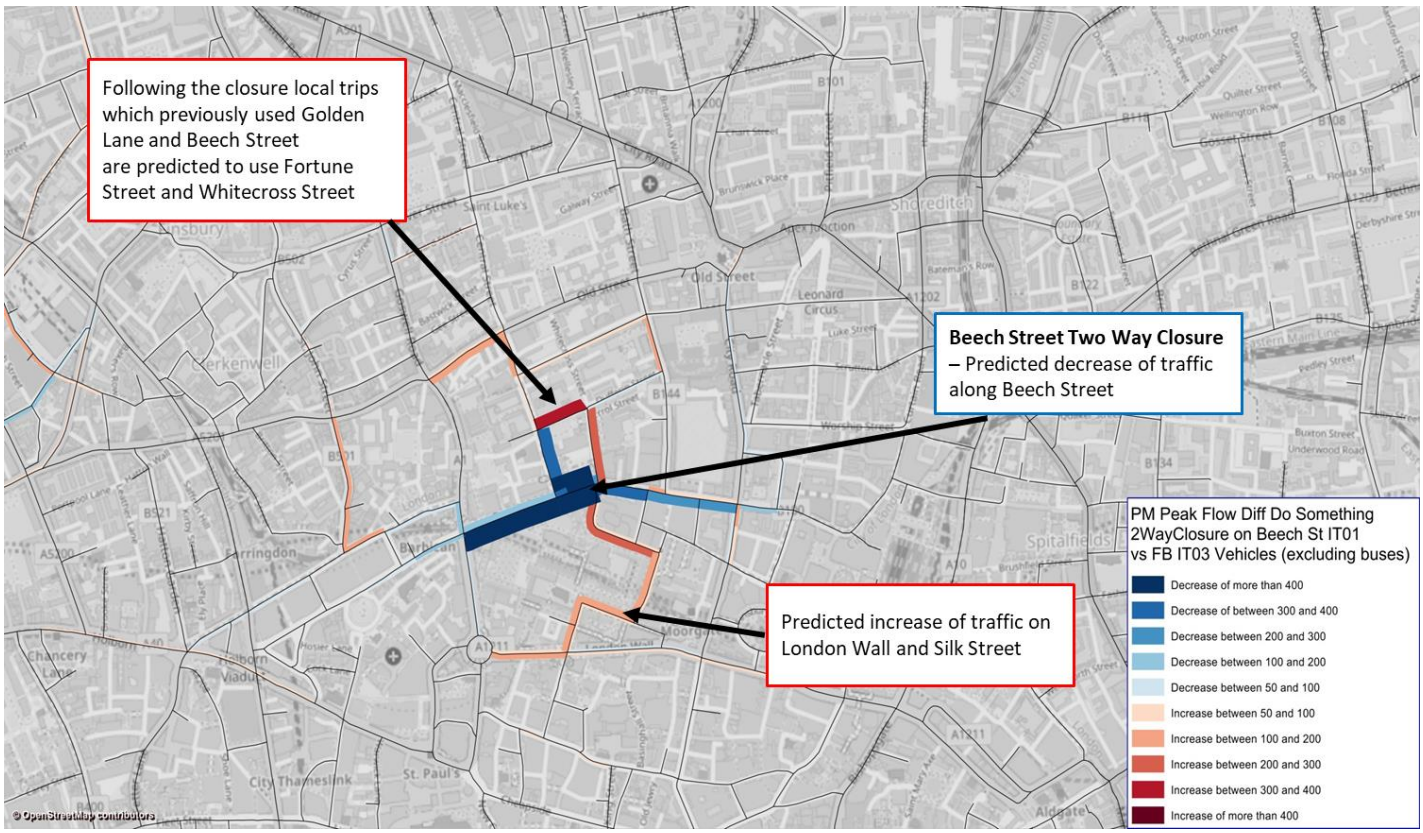


2.4.2 A summary of the flow reassignment for the AM peak is as follows:

- London Wall. Flow increase of 50-100 eastbound and 100-200 westbound between Rotunda and Moorgate.
- Moor Lane. Flow increase of 100-200 northbound.
- Silk Street. Flow increase of 200-300 northbound.
- Fortune Street. Flow increase of 300-400 eastbound.
- Whitecross Street. Flow increase of 300-400 southbound south of Fortune Street.
- Bunhill Row. Flow increase of 50-100 northbound south of Dufferin Street. Flow increase of 100-200 northbound north of Dufferin Street.
- Banner Street. Flow increase of 100-200 westbound.
- Golden Lane. Flow increase of 100-200 northbound north of Banner Street.
- Old Street. Flow increase of 100-200 westbound west of Golden Lane.
- St John Street. Flow increase of 100-200 southbound.

2.4.3 Flow changes are also shown on the approaches to the Clerkenwell Road/ Rosebery Avenue/ Theobalds Rd/ Grays Inn Road junction (02/078). However, TfL has suggested that this may not be something that would occur in reality, particularly given the current capacity restraints at the junction.

Figure 2.6: Scenario 1 ONE model flow difference output (PM peak)



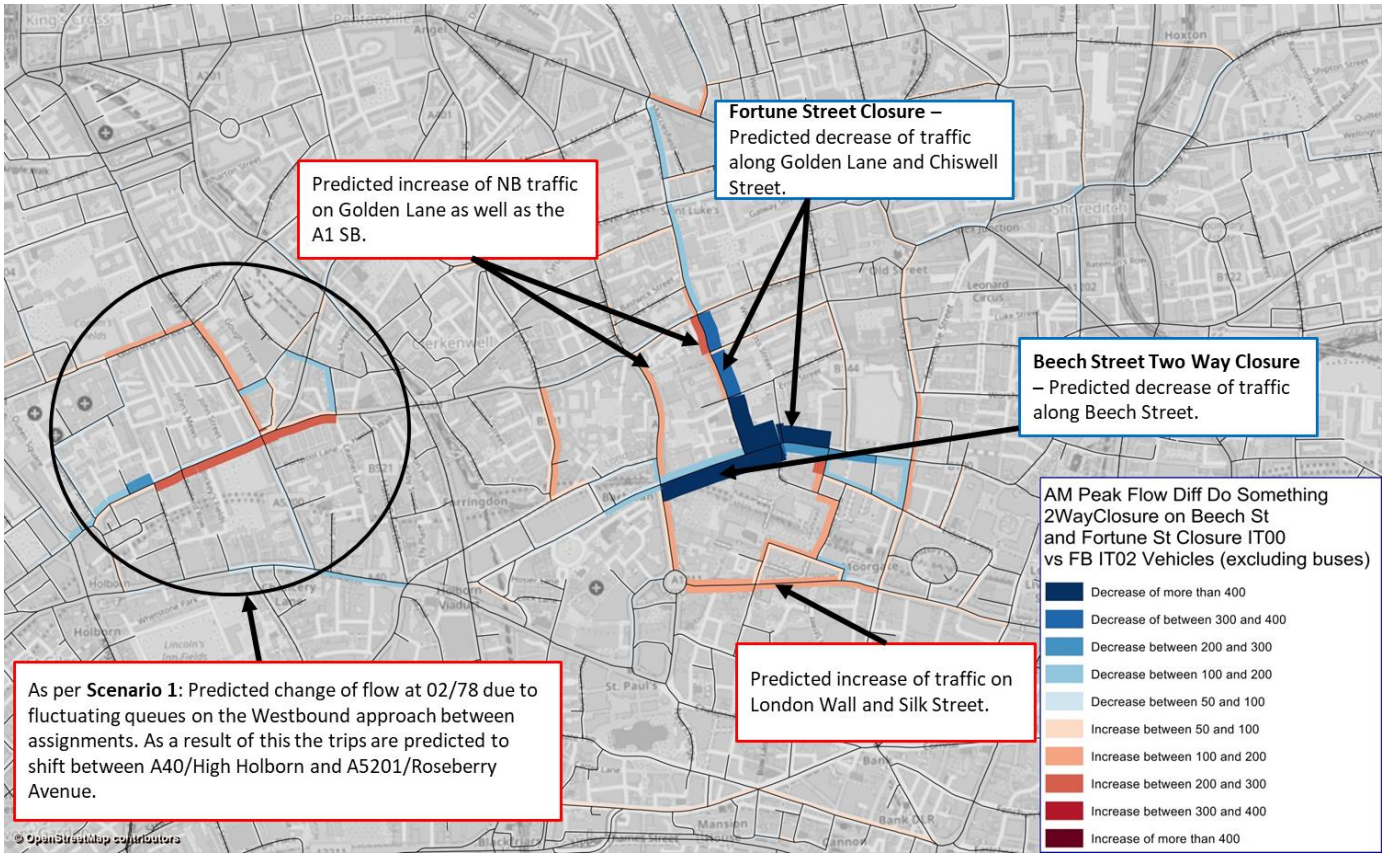
2.4.4 A summary of the flow reassignment for the PM peak is as follows:

- London Wall. Flow increase of 50-100 eastbound and 100-200 westbound between Rotunda and Wood Street.
- Wood Street. Flow increase of 100-200 northbound.
- Fore Street. Flow increase of 100-200 eastbound.
- Moor Lane. Flow increase of 100-200 northbound.
- Silk Street. Flow increase of 200-300 northbound.
- Fortune Street. Flow increase of 300-400 eastbound.
- Whitecross Street. Flow increase of 200-300 southbound south of Fortune Street.
- Bunhill Row. Flow increase of 100-200 northbound north of Dufferin Street.
- Banner Street. Flow increase of 50-100 westbound.
- Golden Lane. Flow increase of 100-200 northbound north of Banner Street.
- Old Street. Flow increase of 100-200 westbound west of Golden Lane.
- St John Street. Flow increase of 100-200 southbound.

2.5 Scenario 2

2.5.1 The ONE model outputs for Scenario 2 are shown in Figure 2.7 for the AM peak and Figure 2.8 for the PM peak. The outputs show the predicted flow difference between the 2021 Future Base model and the 2021 Future Base model with Beech Street closed. The text on the images are TfL's notes of explanation.

Figure 2.7: Scenario 2 ONE model flow difference output (AM peak)

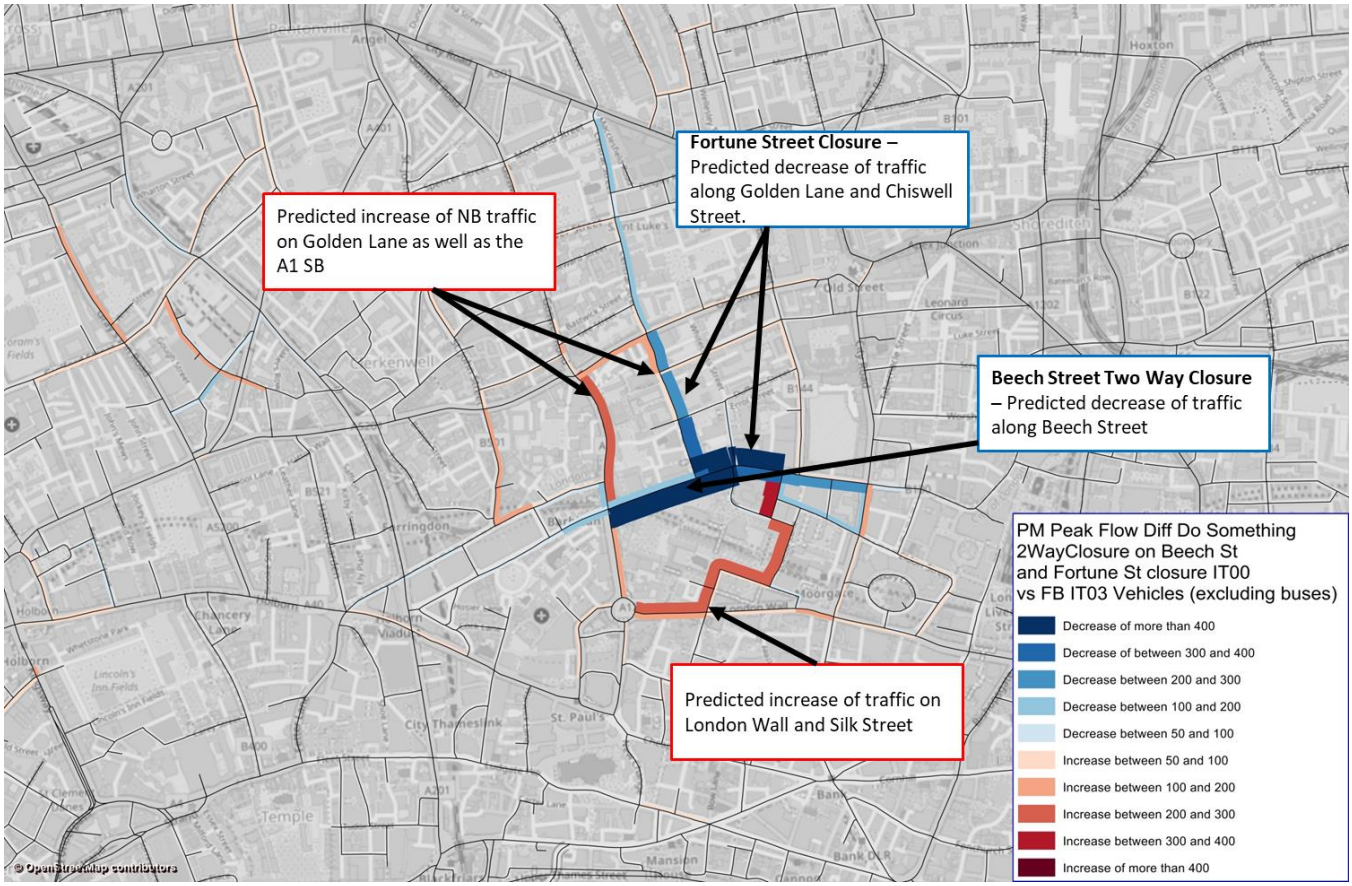


2.5.2 A summary of the flow reassignment for the M peak is as follows:

- London Wall. Flow increase of 100-200 eastbound and westbound between Rotunda and Moorgate.
- Wood Street. Flow increase of 100-200 northbound.
- Fore Street. Flow increase of 100-200 eastbound.
- Moor Lane. Flow increase of 100-200 northbound.
- Silk Street. Flow increase of 100-200 northbound.
- Milton Street. Flow increase of 200-300 northbound.
- Bunhill Row. Flow increase of 50-100 northbound.
- Banner Street. Flow increase of 50-100 westbound.
- Golden Lane. Flow increase of 200-300 northbound north of Banner Street.
- Old Street. Flow increase of 50-100 westbound west of Golden Lane.
- St John Street. Flow increase of 100-200 southbound.
- Aldersgate Street. Flow increase of 100-200 southbound.

2.5.3 Flow changes are also shown on the approaches to the Clerkenwell Road/ Rosebery Avenue/ Theobalds Rd/ Grays Inn Road junction (02/078). However, TfL has suggested that this may not be something that would occur in reality, particularly given the current capacity restraints at the junction.

Figure 2.8: Scenario 2 ONE model flow difference output (PM peak)



2.5.4 A summary of the flow reassignment for the PM peak is as follows:

- London Wall. Flow increase of 200-300 eastbound and 100-200 westbound between Rotunda and Wood Street.
- Wood Street. Flow increase of 200-300 northbound.
- Fore Street. Flow increase of 200-300 eastbound.
- Moor Lane. Flow increase of 200-300 northbound.
- Silk Street. Flow increase of 200-300 northbound.
- Milton Street. Flow increase of 300-400 northbound.
- Bunhill Row. Flow increase of 50-100 northbound.
- Banner Street. Flow increase of 50-100 westbound.
- Golden Lane. Flow increase of 100-200 northbound north of Banner Street.
- Old Street. Flow increase of 100-200 westbound west of Golden Lane.
- St John Street. Flow increase of 100-200 southbound.
- Aldersgate Street. Flow increase of 200-300 southbound.

3 TRAFFIC IMPACT ASSESSMENT

3.1 Methodology

3.1.1 The previous chapter set out the predicted traffic reassignment away from Beech Street based on the strategic modelling outputs. This chapter provides an initial assessment of the impact of this traffic reassignment using existing traffic models that were developed for other City of London schemes. This modelling has not been audited by TfL and thus the results are subject to change.

3.1.2 Only Scenario 2 has been tested as this is the worst case for traffic reassignment, and it is also the most likely scheme to be implemented.

3.1.3 The ONE model outputs show the total flow change for each street. However, they do not show the change in turning counts at each junction. These have been estimated using the desktop study of changes in vehicle movement, applying the traffic volumes from the ONE model outputs.

3.2 Aldersgate Street/ Beech Street/ Long Lane junction

3.2.1 It is predicted that there will be less traffic at the Aldersgate Street/ Beech Street/ Long Lane junction, due to the restriction on Beech Street, that also results in a reduction on Long Lane. The ONE model outputs show a flow increase southbound on Aldersgate Street, and a small flow increase northbound.

3.2.2 In order to mitigate the impact of the additional southbound traffic, Aldersgate Street requires a greater proportion of green signal time than it currently receives. A summary of the traffic capacity (degree of saturation) and green time is shown in Tables 3.1 and 3.2 for the AM and PM peaks respectively.

Table 3.1: Aldersgate Street/ Beech Street/ Long Lane junction impact summary (AM peak)

	Degree of saturation			Green time (seconds)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Aldersgate Street (north)	73%	90%	77%	36	36	42
Beech Street	97%	4%	5%	21	21	15
Aldersgate Street (south)	61%	65%	56%	36	36	42
Long Lane	87%	48%	66%	21	21	15

Table 3.2: Aldersgate Street/ Beech Street/ Long Lane junction impact summary (PM peak)

	Degree of saturation			Green time (seconds)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Aldersgate Street (north)	78%	111%	85%	34	34	45
Beech Street	96%	3%	6%	23	23	12
Aldersgate Street (south)	47%	38%	29%	34	34	45
Long Lane	95%	45%	83%	23	23	12

3.2.3 Tables 3.1 and 3.2 show that Aldersgate Street would be at 90% capacity in the AM peak and over capacity in the PM peak. However, with more green time (6s in AM peak and 11s in PM peak) it would operate within capacity. Beech Street and Long Lane can cope with having less green time due to the flow reduction on these links.

3.3 Rotunda

3.3.1 The traffic reassignment shows that there will be more traffic at the Rotunda on Montague Street eastbound and on Aldersgate Street southbound.

3.3.2 A summary of the traffic capacity (degree of saturation) and Mean Maximum Queue (MMQ) lengths is shown in Tables 3.3 and 3.4 for the AM and PM peaks respectively.

Table 3.3: Rotunda junction impact summary (AM peak)

	Degree of saturation			Mean maximum Queue (PCUs)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Aldersgate Street (north)	73%	87%	N/A	1.3	3.2	N/A
London Wall	42%	61%	N/A	0.4	0.8	N/A
Montague Street	70%	70%	N/A	8.6	8.6	N/A

Table 3.4: Rotunda junction impact summary (PM peak)

	Degree of saturation			Mean maximum Queue (PCUs)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Aldersgate Street (north)	50%	68%	N/A	0.5	3.1	N/A
London Wall	43%	61%	N/A	0.4	0.4	N/A
Montague Street	64%	71%	N/A	7.3	8.6	N/A

3.3.3 Tables 3.3 and 3.4 show that the degrees of saturation increase on Aldersgate Street southbound. This is because there is some traffic reassigned from Beech Street to Aldersgate Street and it is opposed by more traffic from Montague Street to London Wall (in PM peak only). The degree of saturation on Montague Street also increases due to a higher traffic flow in the PM peak. Overall the Rotunda operates within capacity with the proposed Beech Street scheme, which means no mitigation measures are required.

3.3.4 There are various complexities of the Rotunda junction, including Zebra crossings on entries and exits, which means that micro-simulation VISSIM modelling would help to provide further detail at this junction if required.

3.4 London Wall

3.4.1 Traffic is predicted to reassign from Beech Street London Wall eastbound and westbound. A summary of the traffic capacity (degree of saturation) and Mean Maximum Queue (MMQ) lengths is shown in Tables 3.5 and 3.6 for the AM and PM peaks respectively.

3.4.2 The traffic model used for this analysis is the TMAP approved proposed model developed for the Bank on Safety project. No updates have been made to the model other than increasing the traffic flow by the values set out in the traffic reassignment chapter.

Table 3.5: London Wall junctions impact summary (AM peak)

	Degree of saturation			Mean maximum Queue (PCUs)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Wood Street (north)	82%	94%	N/A	6	9	N/A
London Wall (east)	52%	85%	N/A	7	15	N/A
Wood Street (south)	93%	93%	N/A	10	10	N/A
London Wall (west)	66%	96%	N/A	10	22	N/A
Moorgate (north)	80%	95%	N/A	12	19	N/A
London Wall (east)	85%	96%	N/A	13	23	N/A
Moorgate (south)	65%	65%	N/A	9	9	N/A
London Wall (west)	62%	77%	N/A	10	13	N/A
Blomfield Street	27%	27%	N/A	2	2	N/A
London Wall (east)	78%	87%	N/A	13	18	N/A
London Wall (west)	21%	28%	N/A	5	7	N/A
Old Broad Street (north)	42%	42%	N/A	3	3	N/A
Wormwood Street	35%	44%	N/A	5	7	N/A
Old Broad Street (south)	68%	68%	N/A	5	5	N/A
London Wall (west)	30%	41%	N/A	3	4	N/A

Table 3.6: London Wall junctions impact summary (PM peak)

	Degree of saturation			Mean maximum Queue (PCUs)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Wood Street (north)	58%	91%	N/A	3	7	N/A
London Wall (east)	37%	61%	N/A	6	9	N/A
Wood Street (south)	92%	92%	N/A	10	10	N/A
London Wall (west)	90%	98%	N/A	17	24	N/A
Moorgate (north)	73%	89%	N/A	9	14	N/A
London Wall (east)	62%	73%	N/A	9	11	N/A
Moorgate (south)	58%	58%	N/A	7	7	N/A
London Wall (west)	71%	85%	N/A	12	17	N/A
Blomfield Street	42%	56%	N/A	3	5	N/A
London Wall (east)	38%	38%	N/A	4	4	N/A
London Wall (west)	49%	60%	N/A	11	13	N/A
Old Broad Street (north)	74%	74%	N/A	6	6	N/A
Wormwood Street	27%	27%	N/A	3	3	N/A
Old Broad Street (south)	80%	80%	N/A	9	9	N/A
London Wall (west)	78%	93%	N/A	8	12	N/A

3.4.3 The results in Tables 3.5 and 3.6 show that the degrees of saturation on London Wall eastbound and westbound would increase due to the traffic reassignment from Beech Street. However, all junctions would operate within capacity in the both peak hours.

3.4.4 The traffic flows on London Wall used in this model are ~600 PCUs eastbound and ~700 PCUs westbound. These are the predicted proposed flows taken from the traffic modelling undertaken for the Bank on Safety scheme. However, the traffic flows taken from the January 2018 survey (with the Bank on Safety scheme implemented for just over 6 months) showed flows on London Wall of ~450 PCUs eastbound and ~650 PCUs westbound. Therefore, the results presented can be considered a worst-case scenario.

3.5 Old Street

3.5.1 The strategic modelling predicts that traffic will reassign through the Clerkenwell Road/ Goswell Road/ Old Street junction and the Old Street/ Central Street/ Golden Lane junction. The impact of this is summarised in Tables 3.7-3.10.

Table 3.7: Goswell Road/ Old Street/ Clerkenwell Road junction impact summary (AM peak)

	Degree of saturation			Mean maximum Queue (PCUs)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Goswell Road (north)	79%	79%	90%	12.2	12.2	14.4
Old Street	87%	102%	90%	12.3	24.7	14.9
Goswell Road (south)	80%	80%	89%	10.5	10.5	12.5
Clerkenwell Road	82%	82%	75%	12.8	12.8	11.7

Table 3.8: Goswell Road/ Old Street/ Clerkenwell Road junction impact summary (PM peak)

	Degree of saturation			Mean maximum Queue (PCUs)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Goswell Road (north)	66%	66%	69%	8.3	8.3	8.5
Old Street	79%	99%	95%	10.5	22.7	19.0
Goswell Road (south)	93%	93%	95%	15.2	15.2	17.2
Clerkenwell Road	93%	93%	90%	20.1	20.1	18.8

3.5.2 The Clerkenwell Road/ Goswell Road/ Old Street junction can accommodate the predicted flow reassignment if the signal timings are altered in order to give more time to The Old Street westbound approach.

Table 3.9: Old Street/ Central Street/ Golden Lane junction impact summary (AM peak)

	Degree of saturation			Mean maximum Queue (PCUs)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Central Street (north)	65%	65%	61%	5.0	5.0	4.6
Old Street (east)	98%	98%	99%	20.8	20.8	14.1
Golden Lane (south)	41%	122%	91%	3.5	48.4	14.0
Old Street (west)	50%	50%	56%	6.7	6.7	6.1

Table 3.10: Old Street/ Central Street/ Golden Lane junction impact summary (PM peak)

	Degree of saturation			Mean maximum Queue (PCUs)		
Approach	Base	Proposed	Proposed with mitigation	Base	Proposed	Proposed with mitigation
Central Street (north)	50%	62%	N/A	3.4	3.8	N/A
Old Street (east)	77%	77%	N/A	14.7	14.7	N/A
Golden Lane (south)	33%	89%	N/A	2.7	10.0	N/A
Old Street (west)	85%	85%	N/A	14.6	14.6	N/A

3.5.3 In the AM peak, at the Old Street/ Central Street/ Golden Lane junction, the reassigned traffic could not be accommodated. It is not possible to alter the signal timings to give more time to Golden Lane and less time to Old Street because that would cause Old Street to operate over 100% capacity.

3.5.4 The junction would operate within capacity in the PM peak without any changes to the existing layout or signal timings.

4 CONCLUSIONS

4.1 Summary

4.1.1 This document presents the predicted traffic reassignment and consequent traffic impact as a result of restricting vehicle movement on Beech Street in both directions to Zero Emission Vehicles, cyclists and buses only.

4.1.2 The results of the preliminary traffic modelling demonstrate that there would some locations where there would be increased traffic flow, but this could be catered for with the existing junction arrangement or mitigated by changing the signal timings. The one exception is northbound on Golden Lane in the AM peak.

4.1.3 In general, the impact on network operation, and specifically bus journey times, is not expected to be significant.

4.1.4 The traffic impact results support the Healthy Streets assessment, which demonstrates the benefits of the scheme to pedestrians, air quality, noise, public realm, and safety.