

## Appendix A8.3

### **Utilities ES Highways Assessment**



## Introduction

- A8.3.1 This appendix presents an assessment of the impact of general utilities works, including road strengthening at Monument Junction, on the surface transport network. This note describes the assumptions and the method of the assessment undertaken, which is reported in Chapter 8: Transport and Movement of the Environmental Statement.

## Description of Proposed Works

- A8.3.2 The broad phasing and programme of utilities strengthening work is shown in Table A8.3.1. This has subsequently been illustrated as the drawing in Figure A8.3.1.
- A8.3.3 The durations of all phases will vary, but will individually be longer than 4 weeks (the temporal threshold used to determine significant effects) - typically 3-6 months. The exception to this is for the road strengthening works at Monument Junction (in Phase 1) which is expected to require two weekend closures or 15 night-time closures from 20:00 to 06:00 hours.

## Scope, Method & Assumptions

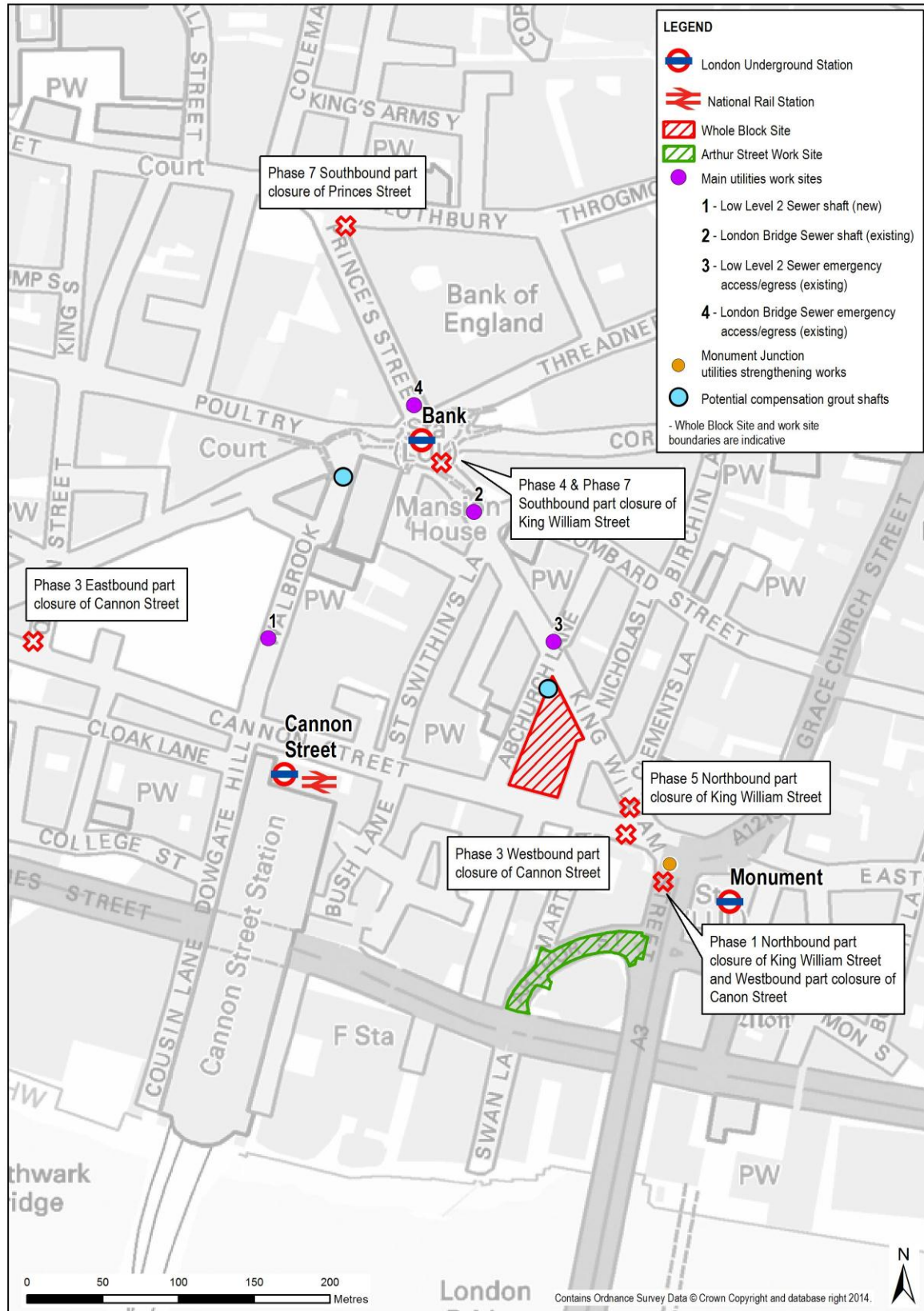
### Scope

- A8.3.4 The scope of this assessment includes partial closures of the following principal roads only (on the basis that the effects on minor roads will not be significant):
- Cannon Street;
  - Gresham Street;
  - King William Street; and
  - Prince's Street.
- A8.3.5 The resulting changes to traffic flows on the wider highways network have been assessed. To supplement this, the impact on the local bus network and on walking and cycling have also been considered.
- A8.3.6 As traffic flows are highest during the peak hours on weekdays, these have been assessed quantitatively. To minimise disruption some of the works will be programmed to occur either overnight (from 20:00 to 06:00 hours), or at weekends, when the baseline traffic flows will be much lower, and these are described qualitatively.
- A8.3.7 The impacts from the closure of Arthur Street are considered as part of the main construction assessment reported in the Transport Assessment (Appendix A8.1 to the ES) and Chapter 8: Transport and Movement of the ES.
- A8.3.8 A quantified assessment of the closures of Nicholas Lane and Abchurch Lane has been provided in the 10 King William Street Over Site Development Transport Assessment (URS, February 2014), which found there to be no significant impacts associated with the closures.

**Table A8.3.1: Phases of potential work to inform the assessment**

Phase	Assets Affected	Notes and Road Closure Required
Phase 1	Arthur Street - All utilities diverted to allow build of shaft. Shaft will provide access to King William Street station for the main tunnel build.	Closure of Arthur Street.
	Low Level No 2 Sewer - All utilities diverted to allow build of shaft. Shaft will provide access to sewer.	Closure of Walbrook (currently closed long-term).
	Monument Junction - Road strengthening works to protect a BT chamber (telecoms).	Part closure of Cannon Street westbound and King William Street northbound (between Arthur Street and Monument).
Phase 2	Sewer Reline	Closure of Nicholas Lane.
Phase 3	Sewer Reline	Closure of Abchurch Lane.
	UKPN; Gas Main Replacement; Water Main Replacement	Closure of Abchurch Lane.
	Gas Main Replacement	Eastbound part closure of Cannon Street and Westbound part closure of Cannon Street to occur consecutively.
Phase 4	Access/emergency egress to Low Level No 2 Sewer via manhole on southbound King William Street carriageway	Narrowing of King William Street. Worksite will require suspension of bus stop and cycle lanes, and will block exit on Abchurch Lane onto King William Street and therefore Abchurch Lane (south side) requires a full closure too.
Phase 5	Water Main Replacement/Repair	Northbound part closure of King William Street.
	Gas Main Replacement/Repair and Water Main Pipe Replacement	Full closure of Nicholas Lane.
Phase 6	Gas: Joint repair/encapsulation	Westbound and Eastbound part closure of Gresham Street to occur consecutively.
	Gas: Joint repair/encapsulation and Water Main Repair	Queen Victoria Street closure - phased to allow one lane maintained, with one lane closed.
Phase 7	London Bridge Sewer Reline	Night time full closure of King William Street and night time Southbound part closure of Prince's Street to access the Sewer.
Phase 8	Prince's Street Water Main Replacement	Southbound part closure of Prince's Street.

**Figure A8.3.1: Utility and Road Strengthening Works Assessed Road Closures**



### **General Assumptions**

- A8.3.9 There are a number of instances when there may be an overlap between phases:
- King William Street southbound and Gresham Street eastbound and westbound; and
  - King William Street southbound and Prince's Street southbound.
- A8.3.10 LUL has confirmed that there will be no daytime (week day) two-way closures of any roads considered in this assessment.
- A8.3.11 Traffic management assumptions have been devised in response to comments from the City of London Corporation and TfL Surface Transport.
- A8.3.12 A westbound diversion of Cannon Street is preferable to an eastbound diversion because it is easier to manage. It is therefore assumed that although works are required to both sides of Cannon Street, eastbound traffic will continue to use this road while a westbound diversion remains in place throughout Phase 3. This will be achieved by directing eastbound traffic onto the westbound side of the carriageway when necessary.
- A8.3.13 Similarly a southbound diversion on King William Street is preferable to a northbound diversion, when this can be achieved.
- A8.3.14 Shuttle working around utilities works is unlikely to be acceptable because of the risk of blocking back to key junctions such as Cannon Street/ King William Street/ Gracechurch Street.
- A8.3.15 Works associated with the road strengthening of A3 King William Street at Monument Junction could be completed over two weekend closures or 15 night-time closures from 20:00 to 06:00 hours. Traffic management options include a contraflow on the southbound carriageway of A3 King William Street or a diversion of all traffic. The preferred approach is night-time closures with the implementation of a contraflow.
- A8.3.16 Total closures to footways on individual roads are not anticipated as a result of the proposed works.

### **Assessed Scenarios**

- A8.3.17 The phasing of the utilities works therefore generates five scenarios for assessment:
- Cannon Street closed westbound;
  - King William Street southbound;
  - King William Street southbound closed with the closure of Gresham Street eastbound;
  - King William Street southbound closed with the closure of Gresham Street westbound; and
  - King William Street southbound closed with the closure of Prince's Street southbound.

### Assessed Diversion Routes

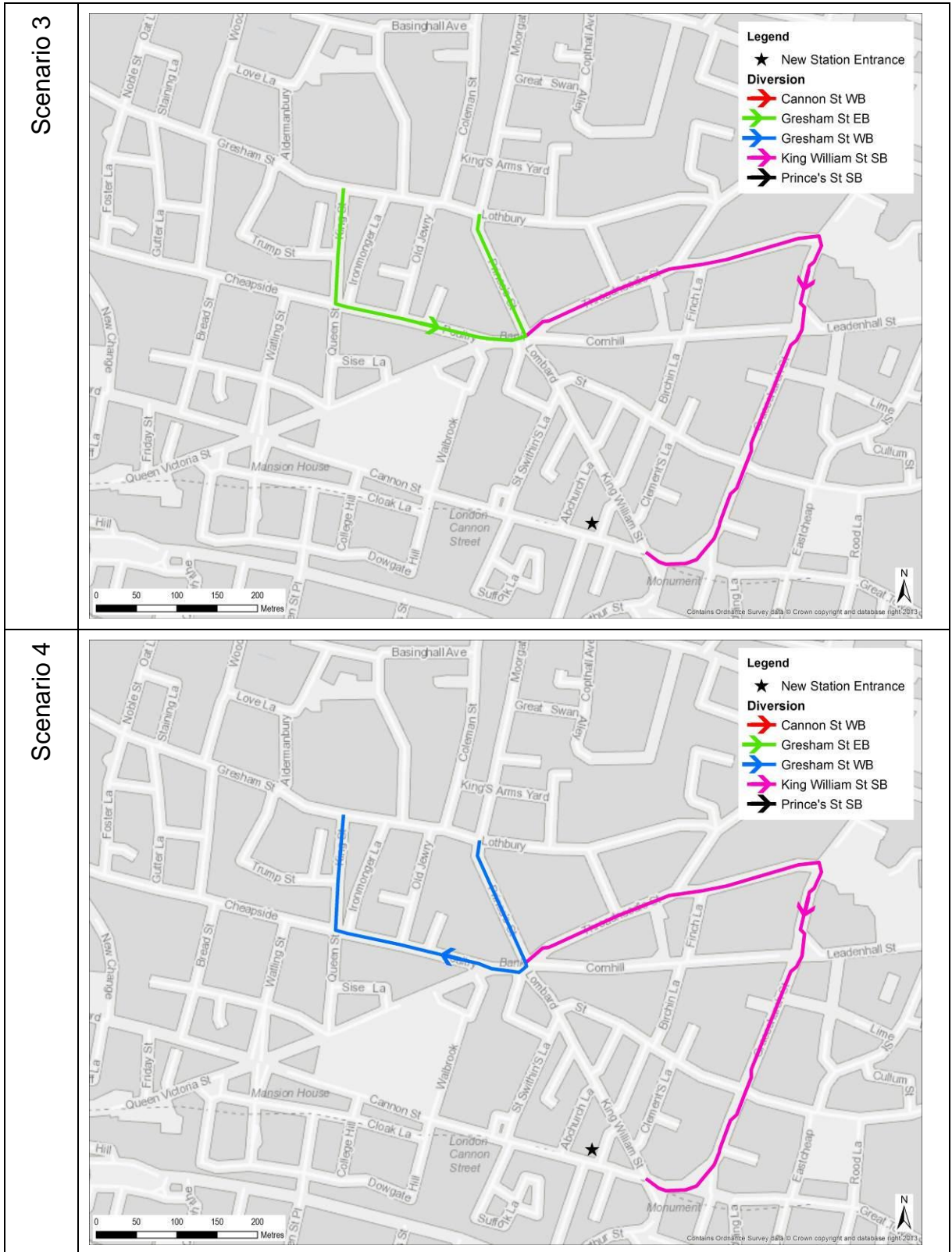
A8.3.18 The City of London Corporation was approached to establish approved diversion routes for the road closures indicated in Table A8.3.1 and Figure A8.3.1. The routes in Table A8.3.2 were confirmed, which are illustrated in Figure A8.3.2. Based upon the scope of works indicated in Figure A8.3.1 the King William Street and Lothbury diversion is assumed in both directions for Gresham Street.

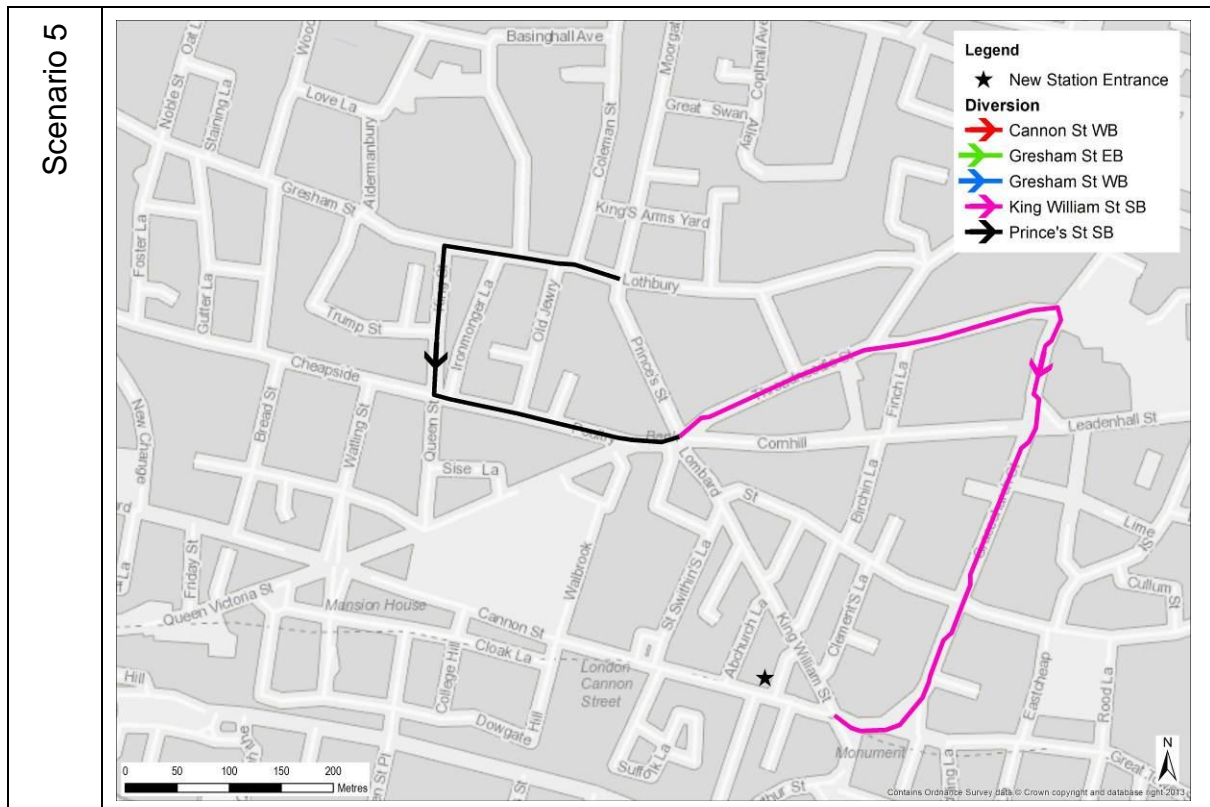
**Table A8.3.2: City of London Approved Diversion Routes**

<b>Diversion</b>	<b>Route</b>
Cannon Street WB	<b>between King William Street &amp; Queen Victoria Street</b> - King William Street, Lombard Street, Mansion House Street, Queen Victoria Street, Cannon Street, Friday Street, Queen Victoria Street & Cannon Street
King William Street SB	<b>between Cannon Street &amp; Bank Junction</b> - Mansion House Street, Threadneedle Street, Gracechurch Street & King William Street
King William Street NB	<b>between Bank Junction &amp; Cannon Street</b> - King William Street, Gracechurch Street
Gresham Street EB	<b>between King St &amp; Lothbury</b> – King Street, Poultry, Mansion House Street, Prince’s Street & Lothbury <b>between Wood Street &amp; King Street</b> – Gresham St, Wood Street, Love Lane, Aldermanbury & Basinghall Street <b>between St Martins Le Grand &amp; Wood Street</b> – St Martins Le Grand, Newgate Street, Cheapside & Wood Street
Gresham Street WB	<b>between Lothbury &amp; King Street</b> – Prince’s Street, Mansion House Street, Poultry & King Street & Moorgate, London Wall, Aldersgate St & Gresham Street <b>between King Street &amp; St Martins Le Grand</b> – Gresham Street, Moorgate, London Wall, Aldersgate St & Gresham St
Prince’s Street SB	<b>between Lothbury &amp; Bank Junction</b> – FOR GENERAL TRAFFIC – Lothbury, Gresham Street, King Street, Poultry & Mansion House Street. Please note that buses will have to be diverted via South Place & Eldon Street









### Vehicle Demand and Routes Associated with the Works

A8.3.19 The vehicle trips associated with the utilities and road strengthening works for the purpose of this assessment are:

- General utility and road strengthening works, 5 construction vehicles per hour (although under typical operations there will be no more than 1-2 vehicles per hour); and
- No vehicle demand at the two emergency egress shafts on King William Street and Princes Street.

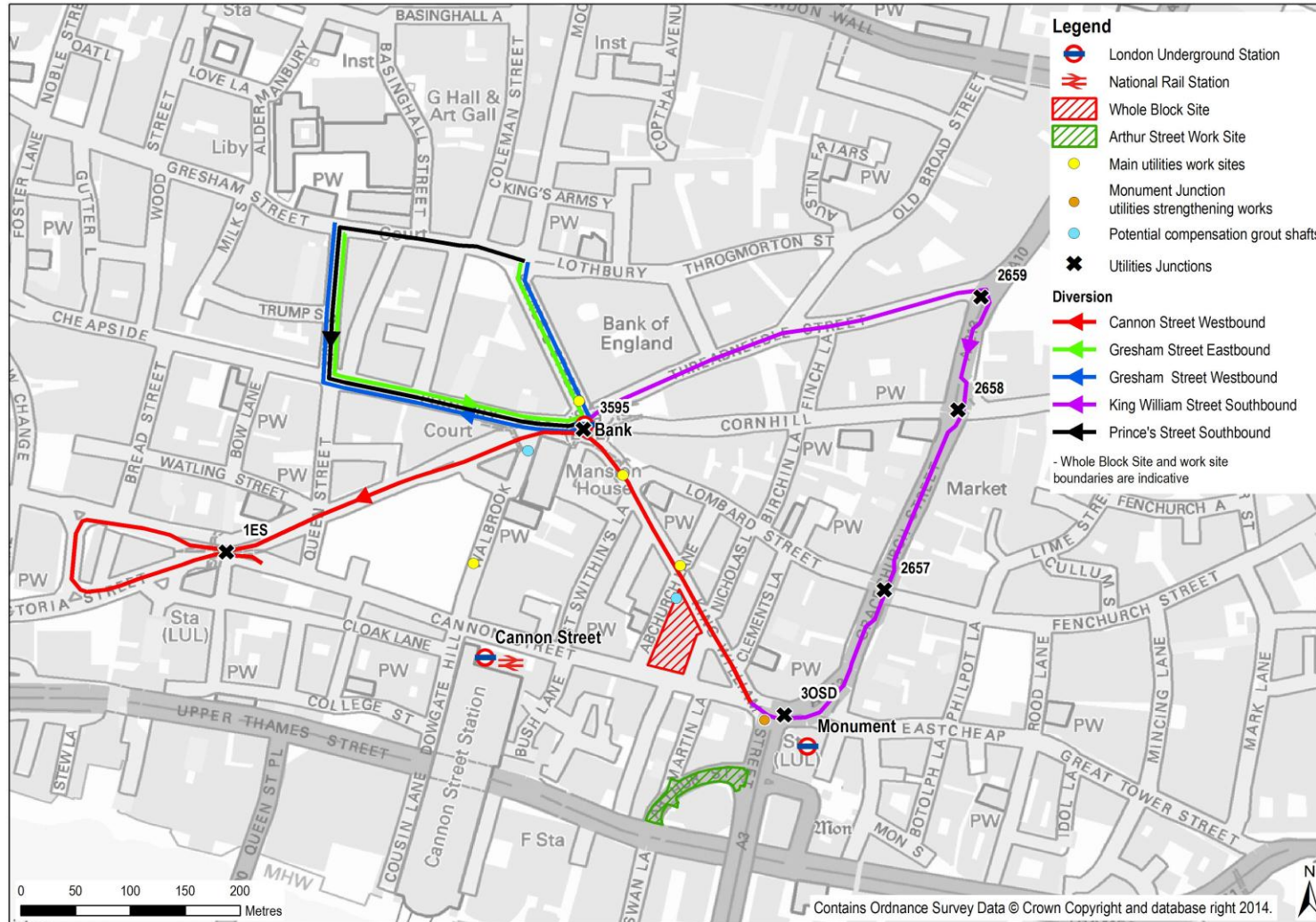
A8.3.20 All vehicles are assumed to be Heavy Goods Vehicles (HGVs). It is assumed that working hours will be restricted to a 10 hour working day.

A8.3.21 For each scenario the HGVs have been routed to access the site from the direction of general traffic on that road. To approach the area the principles of the Transport Assessment were adopted, so that construction traffic approaches and departs via routes to the east as this is assumed to be the most likely focus for the removal of excavated material and to avoid construction traffic travelling by less suitable routes through London. Vehicles approach from the east along the A1211 then southbound on the A10 Bishopsgate to allow for the closure of Arthur Street, which accommodates the work site there. To depart, vehicles are assumed to travel eastbound on Eastcheap and then onwards along routes connecting with the A100 Byward Street.

### **Traffic Data and Background Growth**

- A8.3.22 Locations of traffic count data used to inform the assessment is provided as Figure A8.3.3 overlaid on the diversion routes described in Table A8.3.2. Sites 3OSD and 1ES were collected in October 2013 to inform the Transport Assessment. Data for all other sites were obtained from TfL from its traffic count database. Data collected for the Transport Assessment cover a 12-hour period of analysis and therefore provides factors to calculate 12-hour flows from the TfL counts. The calculation of 16, 18 and 24 hour flows required for noise and air quality assessments used ATC data to factor up to these periods. The ATCs were collected in October 2013 and are described in more detail in the Transport Assessment (Appendix A8.1 of the ES). Junction throughput for 3OSD was required to factor up TfL counts to 12-hour as they are only available for selected hours of the day compared with 3OSD and 1ES. 3OSD was chosen as the most representative site for factoring because it falls approximately central to counts available from TfL and is located more closely to them than 1ES. Not all diversion routes have complete traffic count data available.
- A8.3.23 Consistent with the Transport Assessment it is assumed that there is no growth in background traffic. This assumption is in contrast to the 25 per cent reduction forecast by the Mayor's Vision for Cycling – Central London Grid to provide a robust assessment.

**Figure A8.3.3: Traffic Count Sites Used for the Utilities Assessment**



## Assessment of Highway Impacts

- A8.3.24 Adopting the scenarios and assumptions described in Section 3, each scenario was assessed in turn for the period 08:00 to 09:00 hours. The detailed analysis for all motorised vehicles and Heavy Duty Vehicles (HDVs) is provided in Table A8.3.3, which shows the actual change in traffic flows for each scenario compared with the baseline, and in Table 8.3.4 that shows the percentage change in vehicle flows. The analysis was completed for two-way flows on all links.
- A8.3.25 Cells highlighted orange in Table A8.3.3 indicate where traffic flows increase by more than 40 vehicles in the AM peak hour. The relatively large changes in the 'All vehicles' category reflects that there is a nearby road closure with adjacent routes accommodating traffic for one or more diversions. With the exception of Scenario 1, changes of more than 40 vehicles occur on the same roads.<sup>1</sup>
- A8.3.26 The assessment in Table 8.3.4 highlights increases in traffic flows of 30 per cent or more with orange and increases in traffic flows of 100 per cent or more with red<sup>2</sup>. When assessed using these criteria the same roads are generally identified, however particular exceptions to this include:
- Impacts on the A3 of 'All vehicles' between Threadneedle Street and Eastcheap in Scenarios 3, 4 and 5; and
  - Mansion House Place (the location of the Walbrook grouting shaft) because of the low baseline traffic demand at this location.
- A8.3.27 It must be noted that the count data at Junction 2659 only provides for limited movements. Therefore the increase in flows on all approaches is correct but an accurate comparison of the percentage change can only be provided for Threadneedle Street because not all movements are provided for Bishopsgate north and south in the original data source.
- A8.3.28 The same analysis was completed for 'all day' 24-hours and is provided in Table A8.3.5. and Table A8.3.6 with Table A8.3.7 highlighting where links have both an increase of 40 vehicles and of 30 per cent over 24-hours.

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<sup>1</sup> 40 vehicles was adopted to correspond with criteria to be used for the Environmental Statement significance criteria.

<sup>2</sup> 30% and 100% was adopted to correspond with criteria to be used for the Environmental Statement significance criteria.



**Table A8.3.3: 08:00-09:00 Two-Way Changes in Traffic Flows:**

Junction	Approach	Baseline		Scenario 1 Change		Scenario 2 Change		Scenario 3 Change		Scenario 4 Change		Scenario 5 Change	
		All	HDV	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV
3OSD	Gracechurch Street	1,039	191	3	3	220	43	220	43	220	43	220	43
3OSD	Eastcheap	341	53	8	8	8	8	8	8	8	8	8	8
3OSD	King William Street south	1,597	325	0	0	0	0	0	0	0	0	0	0
3OSD	Cannon Street	544	145	-242	-76	5	5	5	5	5	5	5	5
3OSD	King William Street north	513	124	248	82	1	1	1	1	1	1	1	1
1ES	Cannon Street west	580	197	252	86	5	5	5	5	5	5	5	5
1ES	Queen Victoria Street east	971	156	252	86	5	5	5	5	5	5	5	5
1ES	Cannon Street east	614	161	0	0	0	0	0	0	0	0	0	0
1ES	Garlick Hill	10	2	0	0	0	0	0	0	0	0	0	0
1ES	Queen Victoria Street west	1,009	122	252	86	5	5	5	5	5	5	5	5
3595	Prince's Street	496	83	0	0	0	0	0	0	0	0	0	0
3595	Threadneedle Street	396	90	10	10	227	50	227	50	227	50	227	50
3595	Cornhill	415	75	0	0	0	0	0	0	0	0	0	0
3595	King William Street	610	119	248	82	-216	-39	-216	-39	-216	-39	-216	-39
3595	Mansion House Place	1	0	2	2	2	2	2	2	2	2	2	2
3595	Mansion House Street	1,038	213	1,291	301	1,044	220	1,044	220	1,044	220	1,044	220
2659	Bishopsgate south	Partial traffic data. No assessment.											
2659	Threadneedle St	298	67	11	11	228	51	228	51	228	51	228	51
2659	Bishopsgate north	Partial traffic data. No assessment.											
2658	Cornhill	396	64	0	0	0	0	0	0	0	0	0	0
2658	Bishopsgate north	838	123	4	4	221	44	221	44	221	44	221	44
2658	Leadenhall St	478	73	0	0	0	0	0	0	0	0	0	0
2658	Gracechurch St	772	120	4	4	221	44	221	44	221	44	221	44

Junction	Approach	Baseline		Scenario 1 Change		Scenario 2 Change		Scenario 3 Change		Scenario 4 Change		Scenario 5 Change	
		All	HDV	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV
2657	Lombard St	102	7	0	0	0	0	0	0	0	0	0	0
2657	Gracechurch St north	623	112	4	4	221	44	221	44	221	44	221	44
2657	Fenchurch St	553	93	0	0	0	0	0	0	0	0	0	0
2657	Gracechurch St south	946	174	4	4	221	44	221	44	221	44	221	44

**Table A8.3.4: 08:00-09:00 Percentage Change in Traffic Flows:**

08:00-09:00		Baseline		Scenario 1 % Change		Scenario 2 % Change		Scenario 3 % Change		Scenario 4 % Change		Scenario 5 % Change	
Junction	Approach	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV
3OSD	Gracechurch Street	1,039	191	0%	2%	21%	23%	21%	23%	21%	23%	21%	23%
3OSD	Eastcheap	341	53	2%	15%	2%	15%	2%	15%	2%	15%	2%	15%
3OSD	King William Street south	1,597	325	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3OSD	Cannon Street	544	145	-44%	-52%	1%	3%	1%	3%	1%	3%	1%	3%
3OSD	King William Street north	513	124	48%	66%	0%	1%	0%	1%	0%	1%	0%	1%
1ES	Cannon Street west	580	197	43%	44%	1%	3%	1%	3%	1%	3%	1%	3%
1ES	Queen Victoria Street east	971	156	26%	55%	1%	3%	1%	3%	1%	3%	1%	3%
1ES	Cannon Street east	614	161	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1ES	Garlick Hill	10	2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1ES	Queen Victoria Street west	1,009	122	25%	70%	0%	4%	0%	4%	0%	4%	0%	4%
3595	Prince's Street	496	83	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3595	Threadneedle Street	396	90	3%	11%	57%	56%	57%	56%	57%	56%	57%	56%
3595	Cornhill	415	75	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3595	King William Street	610	119	41%	69%	-35%	-33%	-35%	-33%	-35%	-33%	-35%	-33%
3595	Mansion House Place	1	0	200%	100%	200%	100%	200%	100%	200%	100%	200%	100%
3595	Mansion House Street	1	0	200%	-	200%	-	200%	-	200%	-	200%	-
2659	Bishopsgate south	Partial traffic data. No assessment.											
2659	Threadneedle St	298	67	4%	16%	77%	76%	77%	76%	77%	76%	77%	76%
2659	Bishopsgate north	Partial traffic data. No assessment.											
2658	Cornhill	396	64	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2658	Bishopsgate north	838	123	0%	3%	26%	36%	26%	36%	26%	36%	26%	36%
2658	Leadenhall St	478	73	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2658	Gracechurch St	772	120	1%	3%	29%	37%	29%	37%	29%	37%	29%	37%



08:00-09:00		Baseline		Scenario 1 % Change		Scenario 2 % Change		Scenario 3 % Change		Scenario 4 % Change		Scenario 5 % Change	
Junction	Approach	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV
2657	Lombard St	102	7	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2657	Gracechurch St north	623	112	1%	4%	35%	39%	35%	39%	35%	39%	35%	39%
2657	Fenchurch St	553	93	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2657	Gracechurch St south	946	174	0%	2%	23%	25%	23%	25%	23%	25%	23%	25%

**Table A8.3.5: 24-hour Two-Way Changes in Traffic Flows:**

Junction	Approach	Baseline		Scenario 1 Change		Scenario 2 Change		Scenario 3 Change		Scenario 4 Change		Scenario 5 Change	
		All	HDV	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV
3OSD	Gracechurch Street	17,988	2,950	25	25	4,477	828	4,477	828	4,477	828	4,477	828
3OSD	Eastcheap	7,783	1,236	99	99	99	99	99	99	99	99	99	99
3OSD	King William Street south	26,946	5,389	0	0	0	0	0	0	0	0	0	0
3OSD	Cannon Street	10,224	2,080	-4,140	-825	74	74	74	74	74	74	74	74
3OSD	King William Street north	8,755	2,069	4,223	908	9	9	9	9	9	9	9	9
1ES	Cannon Street west	11,623	3,302	4,288	973	74	74	74	74	74	74	74	74
1ES	Queen Victoria Street east	15,893	2,582	4,288	973	74	74	74	74	74	74	74	74
1ES	Cannon Street east	11,387	2,160	0	0	0	0	0	0	0	0	0	0
1ES	Garlick Hill	160	9	0	0	0	0	0	0	0	0	0	0
1ES	Queen Victoria Street west	15,739	1,455	4,288	973	74	74	74	74	74	74	74	74
3595	Prince's Street	8,859	1,437	0	0	0	0	0	0	0	0	0	0
3595	Threadneedle Street	6,289	1,511	115	115	4,568	918	4,568	918	4,568	918	4,568	918
3595	Cornhill	7,613	1,376	0	0	0	0	0	0	0	0	0	0
3595	King William Street	11,685	2,231	4,223	908	-4,443	-794	-4,443	-794	-4,443	-794	-4,443	-794
3595	Mansion House Place	27	3	16	16	16	16	16	16	16	16	16	16
3595	Mansion House Street	18,098	3,635	22,375	4,622	18,161	3,723	18,161	3,723	18,161	3,723	18,161	3,723
2659	Bishopsgate south	Partial traffic data. No assessment.											
2659	Threadneedle St	6,277	1,476	124	124	4,577	927	4,577	927	4,577	927	4,577	927
2659	Bishopsgate north	Partial traffic data. No assessment.											
2658	Cornhill	7,529	1,218	0	0	0	0	0	0	0	0	0	0
2658	Bishopsgate north	12,863	2,014	34	34	4,486	837	4,486	837	4,486	837	4,486	837
2658	Leadenhall St	9,020	1,340	0	0	0	0	0	0	0	0	0	0
2658	Gracechurch St	11,964	1,964	34	34	4,486	837	4,486	837	4,486	837	4,486	837

Junction	Approach	Baseline		Scenario 1 Change		Scenario 2 Change		Scenario 3 Change		Scenario 4 Change		Scenario 5 Change	
		All	HDV	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV
2657	Lombard St	1,881	81	0	0	0	0	0	0	0	0	0	0
2657	Gracechurch St north	10,382	1,792	34	34	4,486	837	4,486	837	4,486	837	4,486	837
2657	Fenchurch St	10,070	1,145	0	0	0	0	0	0	0	0	0	0
2657	Gracechurch St south	16,309	2,639	34	34	4,486	837	4,486	837	4,486	837	4,486	837

**Table A8.3.6:** 24-hour Percentage Change in Traffic Flows:

Junction	Approach	Baseline		Scenario 1 % Change		Scenario 2 % Change		Scenario 3 % Change		Scenario 4 % Change		Scenario 5 % Change	
		All	HDV	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV
3OSD	Gracechurch Street	17,988	2,950	0%	1%	25%	28%	25%	28%	25%	28%	25%	28%
3OSD	Eastcheap	7,783	1,236	1%	8%	1%	8%	1%	8%	1%	8%	1%	8%
3OSD	King William Street south	26,946	5,389	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3OSD	Cannon Street	10,224	2,080	-40%	-40%	1%	4%	1%	4%	1%	4%	1%	4%
3OSD	King William Street north	8,755	2,069	48%	44%	0%	0%	0%	0%	0%	0%	0%	0%
1ES	Cannon Street west	11,623	3,302	37%	29%	1%	2%	1%	2%	1%	2%	1%	2%
1ES	Queen Victoria Street east	15,893	2,582	27%	38%	0%	3%	0%	3%	0%	3%	0%	3%
1ES	Cannon Street east	11,387	2,160	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1ES	Garlick Hill	160	9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
1ES	Queen Victoria Street west	15,739	1,455	27%	67%	0%	5%	0%	5%	0%	5%	0%	5%
3595	Prince's Street	8,859	1,437	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3595	Threadneedle Street	6,289	1,511	2%	8%	73%	61%	73%	61%	73%	61%	73%	61%
3595	Cornhill	7,613	1,376	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3595	King William Street	11,685	2,231	36%	41%	-38%	-36%	-38%	-36%	-38%	-36%	-38%	-36%
3595	Mansion House Place	27	3	60%	100%	60%	100%	60%	100%	60%	100%	60%	100%
3595	Mansion House Street	27	3	60%	590%	60%	590%	60%	590%	60%	590%	60%	590%
2659	Bishopsgate south	Partial traffic data. No assessment.											
2659	Threadneedle St	6,277	1,476	2%	8%	73%	63%	73%	63%	73%	63%	73%	63%
2659	Bishopsgate north	Partial traffic data. No assessment.											
2658	Cornhill	7,529	1,218	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2658	Bishopsgate north	12,863	2,014	0%	2%	35%	42%	35%	42%	35%	42%	35%	42%
2658	Leadenhall St	9,020	1,340	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2658	Gracechurch St	11,964	1,964	0%	2%	37%	43%	37%	43%	37%	43%	37%	43%

Junction	Approach	Baseline		Scenario 1 % Change		Scenario 2 % Change		Scenario 3 % Change		Scenario 4 % Change		Scenario 5 % Change	
		All	HDV	All	HDV	All	HDV	All	HDV	All	HDV	All	HDV
2657	Lombard St	1,881	81	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2657	Gracechurch St north	10,382	1,792	0%	2%	43%	47%	43%	47%	43%	47%	43%	47%
2657	Fenchurch St	10,070	1,145	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2657	Gracechurch St south	16,309	2,639	0%	1%	28%	32%	28%	32%	28%	32%	28%	32%

**Table A8.3.7: 24 Hour Correlation of Increase in 40 Vehicles with Increase of 30%:**

		Scenario 1 Change				Scenario 2 Change				Scenario 3 Change				Scenario 4 Change				Scenario 5 Change			
		All		HDV		All		HDV		All		HDV		All		HDV		All		HDV	
		+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%
30SD	Gracechurch Street	-	-	-	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-
30SD	Eastcheap	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-
30SD	King William Street south	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30SD	Cannon Street	-	-	-	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-
30SD	King William Street north	YES	YES	YES	YES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1ES	Cannon Street west	YES	YES	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-
1ES	Queen Victoria Street east	YES	-	YES	YES	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-
1ES	Cannon Street east	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1ES	Garlick Hill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1ES	Queen Victoria Street west	YES	-	YES	YES	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-
3595	Prince's Street	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3595	Threadneedle Street	YES	-	YES	-	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
3595	Cornhill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3595	King William Street	YES	YES	YES	YES	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3595	Mansion House Place	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES	-	YES
3595	Mansion House Street	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2659	Bishopsgate south	Partial traffic data. No assessment.																			
2659	Threadneedle St	YES	-	YES	-	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2659	Bishopsgate north	Partial traffic data. No assessment.																			
2658	Cornhill	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2658	Bishopsgate north	-	-	-	-	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2658	Leadenhall St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2658	Gracechurch St	-	-	-	-	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

		Scenario 1 Change				Scenario 2 Change				Scenario 3 Change				Scenario 4 Change				Scenario 5 Change			
		All		HDV		All		HDV		All		HDV		All		HDV		All		HDV	
		+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%	+40	+30%
2657	Lombard St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2657	Gracechurch St north	-	-	-	-	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2657	Fenchurch St	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2657	Gracechurch St south	-	-	-	-	YES	-	YES	YES	YES	-	YES	YES	YES	-	YES	YES	YES	-	YES	YES

A8.3.29 Existing baseline journey distances using the diversion routes are provided in Table A8.3.8. This shows that the maximum increase in journey distance is 572 metres.

**Table A8.3.8: General Traffic Journey Distance Impacts**

Closure	Cannon Street WB	King William Street SB	Gresham Street EB	Gresham Street WB	Prince's Street SB
Baseline Distance (m)	493	327	175	175	170
Diversion Distance (m)	1,025	899	549	558	558
<i>Difference (m)</i>	+532	+572	+374	+383	+388

A8.3.30 For any road closure, access to premises for deliveries, servicing and parking will be retained. Impacts on private parking along the closures cannot be accurately considered until more exact details of the utilities works can be defined.

#### **Qualitative Assessment of Impacts from Road Strengthening Works**

A8.3.31 Works at Monument Junction for road strengthening would require the closure of A3 King William Street northbound from London Bridge and also result in access to Cannon Street westbound and King William Street northbound (between Monument Junction and Cannon Street Junction) being suspended during the works closures. A temporary traffic light installation would be required to accommodate the contraflow of northbound traffic on the southbound carriageway.

A8.3.32 The closure of Cannon Street westbound is assessed above for the AM peak and 24 hours. In keeping with the preference for traffic management on King William Street north of Monument Junction (see Figure A8.3.2) northbound traffic would be accommodated on the southbound carriageway with southbound traffic following the diversion assessed within Figure A8.3.2. This lends itself to a comparison with Scenarios 1 and 2 in Table A8.3.7 indicating impacts exceeding the ES significance criteria on:

- Cannon Street;
- King William Street north of Monument Junction;
- Queen Victoria Street;
- Mansion House Street;
- A1213 Bishopsgate; and
- A1213 Gracechurch Street.



A8.3.33 A contraflow solution on A3 King William Street would allow all vehicles currently travelling north along A3 King William Street to continue to do so. The existing 18 tonne weight restriction would continue to require vehicles exceeding this maximum gross weight to avoid routes requiring passage through Monument Junction via A3 King William Street. Following completion of the road strengthening works the 18 tonne gross vehicle weight restriction for movements from A3 King William Street northbound can be revoked.

### Bus Impacts

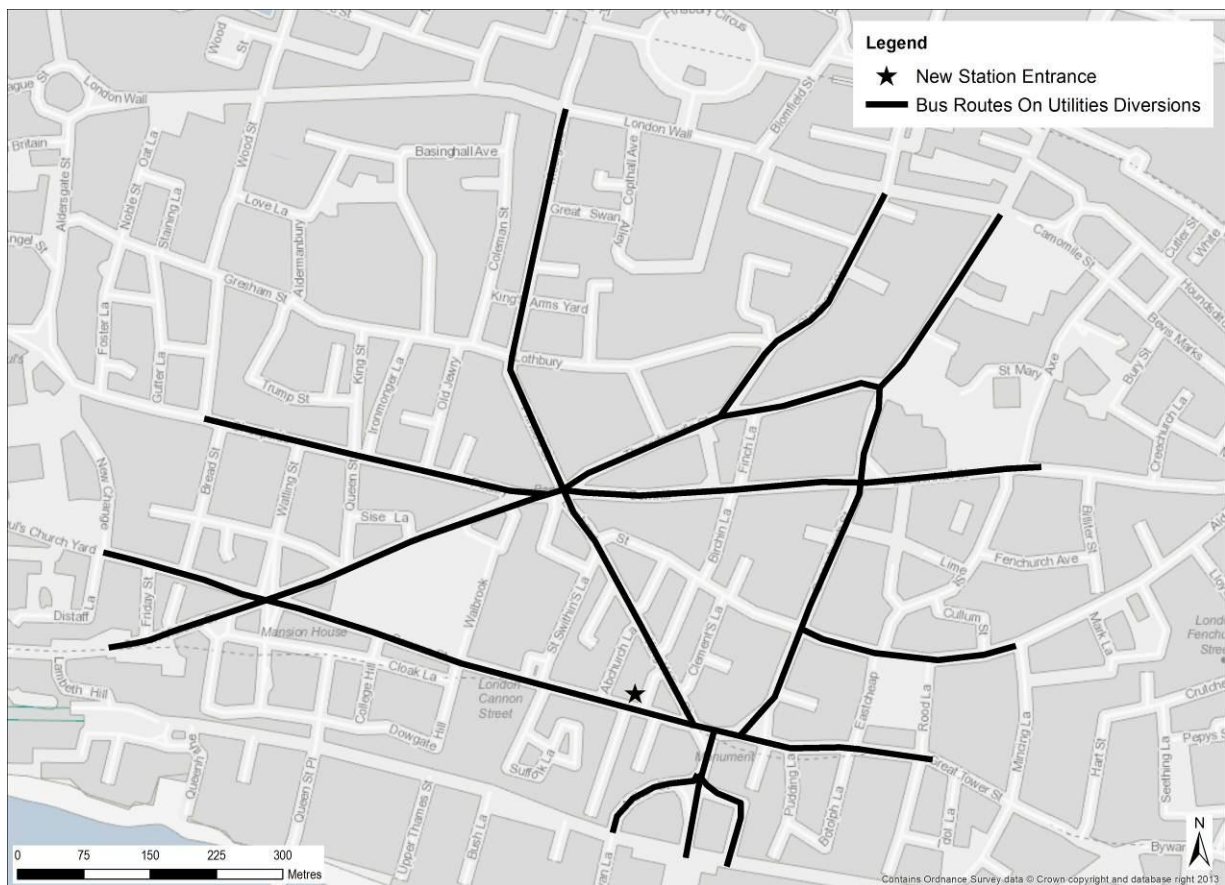
A8.3.34 During the general utility works and road strengthening, bus diversions will be of the same length as those for general traffic with the exception of the diversion for Prince's Street. This diversion would be South Place, Eldon Street, A1211 London Wall, A10 Bishopsgate and Threadneedle to reflect the diversion routes provided by the City of London Corporation, listed in Table A8.3.2.

A8.3.35 With the exception of both Gresham Street closures, all diversions are in excess of 400m longer than the closed route.

**Table A8.3.9: Bus Journey Distance Impacts**

Closure	Cannon Street WB	King William Street SB	Gresham Street EB	Gresham Street WB	Prince's Street SB
Baseline Distance (m)	493	327	175	175	684
Diversion Distance (m)	1,025	899	549	558	1,350
<i>Difference (m)</i>	+532	+572	+374	+383	+666

A8.3.36 To consider how bus routes may be affected by diversions, Figure A8.3.4 shows roads where bus routes are present along roads affected by diversions (traffic routed away from and onto) or roads approaching diversions. Percentage traffic changes on the roads that are affected by diversions are given in Table A8.3.3.

**Figure A8.3.4:** Roads with Bus Routes on or Approaching Road Diversions

A8.3.37 Along roads where closures are required bus stops will need to be suspended for the duration of the works. Buses will be re-routed to re-join their original route as soon as practicable based upon the stated diversions and in consultation with London Buses. Buses will be able to use alternative stops at Bank and Monument junctions, which provide the key opportunities for interchange from bus to bus and between bus and London Underground/ Docklands Light Rail services in the vicinity of the diversions.

### Cycling Impacts

A8.3.38 12-hour two-way cyclist movements are summarised in Table A8.3.10. With the exception of the following locations all roads have a two-way flow in excess of 100 cyclists:

- Garlick Hill; and
- Mansion House Place.

A8.3.39 Similar to the highway assessment the analysis at Junction 2659 can only be completed accurately for Threadneedle Street because of incomplete information in the source data for Bishopgate.

A8.3.40 The daily change in traffic flow at the locations included in Table A8.3.10 is provided in Table A8.3.5 and Table A8.3.6.

**Table A8.3.10: 12-Hour Two-Way Cyclist Movements**

<b>Junction</b>	<b>Approach</b>	<b>2-way Cyclists</b>
3OSD	Gracechurch Street	4,024
3OSD	Eastcheap	1,307
3OSD	King William Street south	7,076
3OSD	Cannon Street	1,354
3OSD	King William Street north	2,493
1ES	Cannon Street west	1,926
1ES	Queen Victoria Street east	2,093
1ES	Cannon Street east	1,828
1ES	Garlick Hill	0
1ES	Queen Victoria Street west	1,996
3595	Prince's Street	1,805
3595	Threadneedle Street	1,233
3595	Cornhill	1,130
3595	King William Street	2,275
3595	Mansion House Place	0
3595	Mansion House Street	2,991
2659	Bishopsgate south	-
2659	Threadneedle St	563
2659	Bishopsgate north	-
2658	Cornhill	865
2658	Bishopsgate north	2,261
2658	Leadenhall St	954
2658	Gracechurch St	2,172
2657	Lombard St	284
2657	Gracechurch St north	1,838
2657	Fenchurch St	1,037
2657	Gracechurch St south	2,582

A8.3.41 Cyclists benefit from much greater flexibility in route choice compared with motorised vehicles. Consequently any diversions will be small and are all expected to be below 1.5 kilometres.

### **Walking Impacts**

A8.3.42 Pedestrian surveys were completed for the Transport Assessment. These are illustrated in Figure A8.3.5 for 12 hours, from 07:00 to 19:00. Closures to footways are not anticipated and if this should become necessary footways on the opposite side of the road provide an alternative with negligible change in journey distance.

A8.3.43 Total closures, however could have a greater impact because of the inconvenience that may be required to travel along an alternative route. The additional footfall along alternative routes may adversely impact the journey experience for existing pedestrians and those diverting as footways may become increasingly crowded.

### **Summary of Impacts**

A8.3.44 The assessment shows there are large increases in traffic flows along the diversion routes as a result of the general utility and road strengthening works. This is to be expected given location of the road closures in Central London. Three out of the five diversion routes will require an increase in journey distance in excess of 400 metres.

A8.3.45 Bus route journey distances will experience the same increases as general traffic with the exception of Scenario 5 (Prince's Street southbound) where an alternative longer diversion is required following information received from the City of London Corporation. Although the closure of roads will require route diversions and the suspension of bus stops the key interchange locations for bus at Monument and Bank junctions will be largely unaffected, ensuring that a good level of interchange is maintained both with other bus services and with London Underground and Docklands Light Rail services.

A8.3.46 In common with many locations in Central London there is a high use of pedal cycle, with two-way 12-hour flows generally ranging between 1,000 and 3,000 cyclists on the diversion routes where data exists. Cyclists benefit from greater flexibility in route choice, including the opportunity to use routes closed to general traffic. This helps to mitigate the impact to cyclists to some extent.

A8.3.47 Pedestrians may be diverted onto alternative routes of pavements, which will not result in significant changes in journey times, but may increasingly lead to crowding on footways, with an adverse impact on journey experience.

**Figure A8.3.5: 12-Hour Pedestrian Movements Baseline Data Collection**

