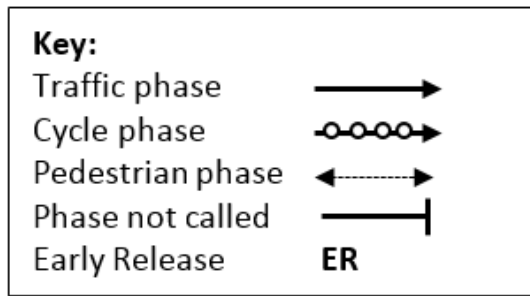


TRAFFIC IMPACT

- i. This is the additional information on modelling referred to in page 6 of the consultation leaflet and traffic impact referred to in page 7 of the consultation leaflet for the Torrington Place / Tavistock Place corridor.
- ii. Section 1 of this report presents the signal staging for the eastbound (current layout) option and the westbound option, section 2 provides more detail on the local traffic modelling results (LinSig) and section 3 outlines the strategic modelling undertaken and presents a further scenario to the scenario presented in the consultation leaflet, not including the Gordon Street (HS2) closure (but still including the changes being made for the West End Project, Judd Street / Midland Road and Brunswick Square – as set out in the consultation leaflet).
- iii. In addition to the modelling mentioned in this note and in the main consultation document Vissim microsimulation traffic modelling has been undertaken to provide a visual representation of the predicted traffic impact of eastbound and westbound options. These videos are available on the council's website (www.camden.gov.uk/torringtontavistock).

1. Traffic Signal Staging

Traffic signal staging plans show the sequences in which individual traffic signals (phases) appear. The key shown below shows how different types of phases are shown diagrammatically within the staging plan, which forms the traffic signal cycle. The number in the top left corner of each box shows the sequence in the traffic signal cycle which each stage is called. An early release is when a green light is given for cyclists ahead of the main traffic green light to allow cyclists to move ahead of general traffic.



Gower Street / Torrington Place

Eastbound option

Figure 1.1 – Gower Street / Torrington Place - Eastbound

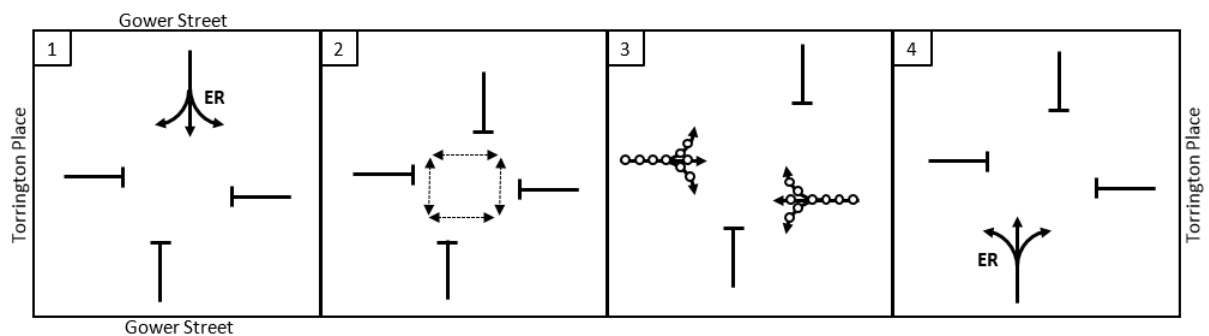


Figure 1.1 shows the signal staging plan for the eastbound option. This includes the changes that are currently being built on Gower Street as part of the West End Project.

The staging diagram shows that in the first stage southbound cyclists will receive an early start at the signals before the traffic light for motor vehicles goes green. In the second stage all vehicles (including cyclists) will stop and pedestrians will get a green man to cross all arms of the junction. In the third stage cyclists traveling east and west on Torrington Place will get a green light and then in the fourth stage there will be an early release for northbound cyclists before northbound motor traffic receives a green light.

Westbound option

Figure 1.2 – Gower Street / Torrington Place - Westbound

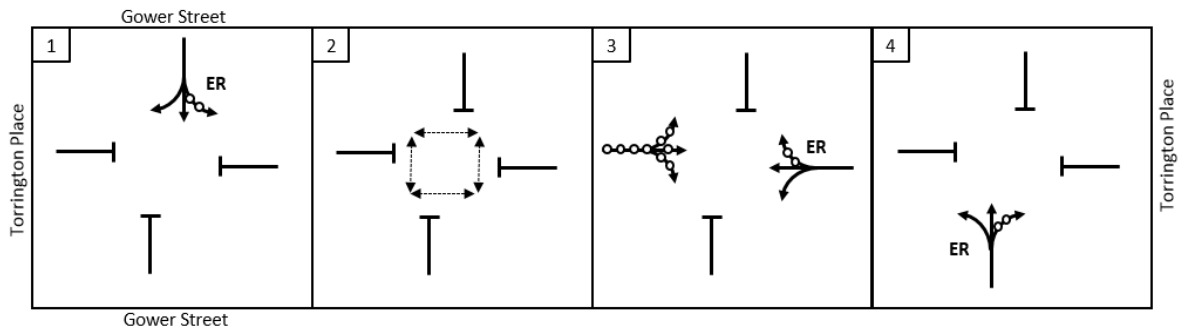


Figure 1.2 shows the signal staging plan for a westbound arrangement. This also includes the changes that are currently being built on Gower Street as part of the West End Project.

The staging diagram is similar but motor traffic is only permitted to travel westbound on Torrington Place towards the junction (whereas in the eastbound option it travels eastbound away from the Gower Street junction), the northbound right turns and the southbound left turns from Gower Street into Torrington Place (east) are for cycles only. The westbound movement in stage 3 is open to all traffic although motor traffic is not permitted to turn right into Gower Street.

Bedford Way / Gordon Square / Tavistock Square

Eastbound option

Figure 2.1 – Bedford Way / Gordon Square / Tavistock Square - Eastbound

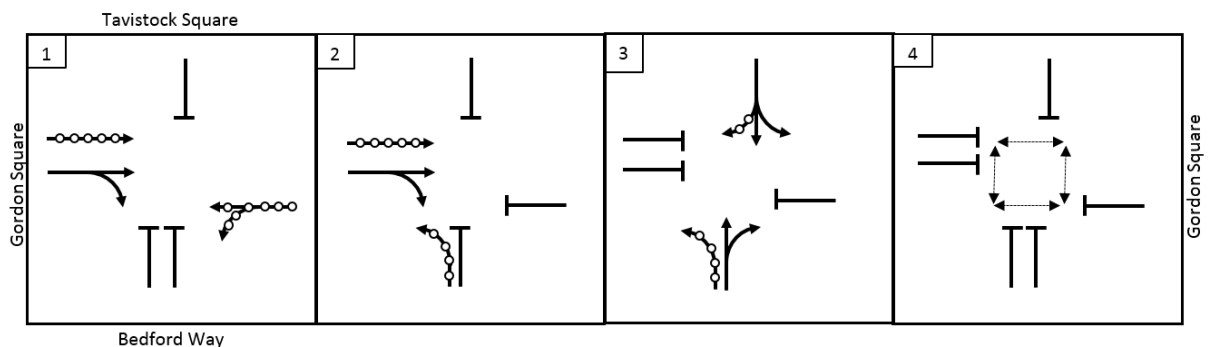


Figure 2.1 shows the signal staging plan for an eastbound arrangement at the junction with Bedford Way.

The staging diagram shows that in the first stage eastbound motor vehicles and cyclists will get a green light along with westbound cyclists, then in the second stage westbound cyclists will stop to allow right turning traffic to turn into Bedford Way without conflicting with cycles. In the third stage northbound and southbound traffic will get a green light and in the fourth stage pedestrians will receive a green man to cross all of the arms of the junction.

Westbound option

Figure 2.2 – Bedford Way / Gordon Square / Tavistock Square - Westbound

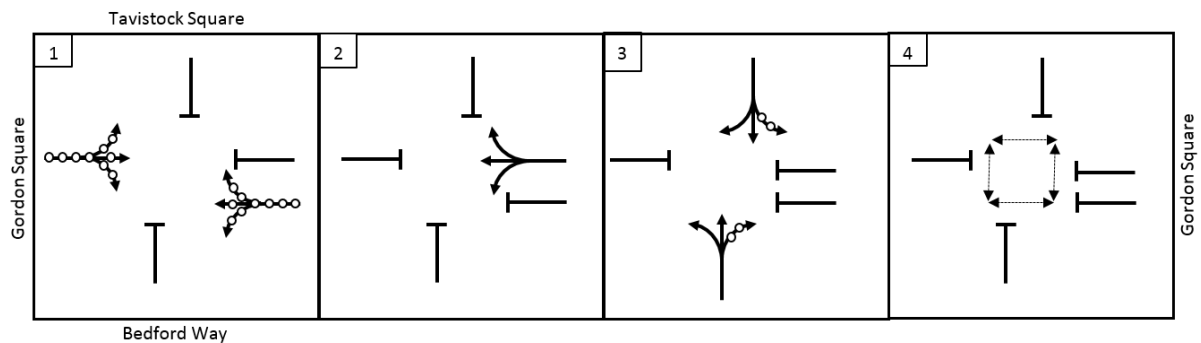


Figure 2.2 shows the signal staging plan for a westbound arrangement. The staging diagram is similar but as motor traffic is only permitted to travel westbound on Tavistock Place / Gordon Square there are some changes. In the westbound option, motor traffic phase does not run in stage 1 to allow additional cycle movements (turns in Bedford Way and Tavistock Square) and to avoid conflicts as right turning motor traffic is allowed in this design to facilitate movements northbound from the corridor. Therefore westbound motor traffic runs in stage 2, without the cycle phases. As in the eastbound option the third stage is for northbound and southbound traffic and the fourth for pedestrians.

Woburn Place / Tavistock Square / Tavistock Place

Eastbound option

Figure 3.1 – Woburn Place / Tavistock Square / Tavistock Place - Eastbound

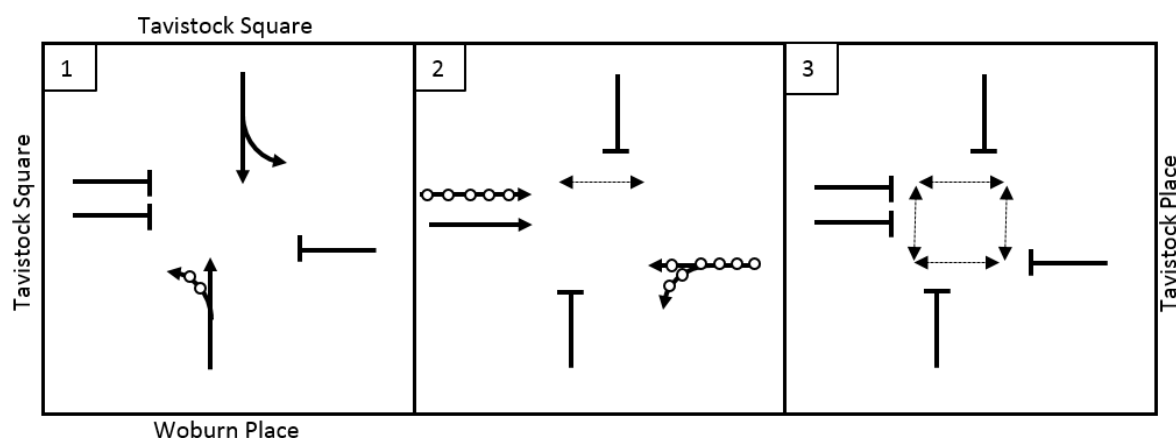


Figure 3.1 shows the signal staging plan for an eastbound arrangement at the junction with Woburn Place.

The staging diagram shows that the first stage is for northbound and southbound traffic with right turns not permitted for northbound or southbound vehicles, the northbound left turn is only permitted for cycles and the southbound left turn is available for all vehicles (including cyclists). In the second stage, eastbound vehicles are only permitted to travel straight ahead (both motor traffic and cycles) and westbound cycles can travel straight ahead or turn left into Woburn Place southbound, pedestrian can also cross the northern arm of the junction. In the third stage pedestrians will receive a green man to cross all arms of the junction.

Westbound option

Figure 3.2 – Woburn Place / Tavistock Square / Tavistock Place -Westbound

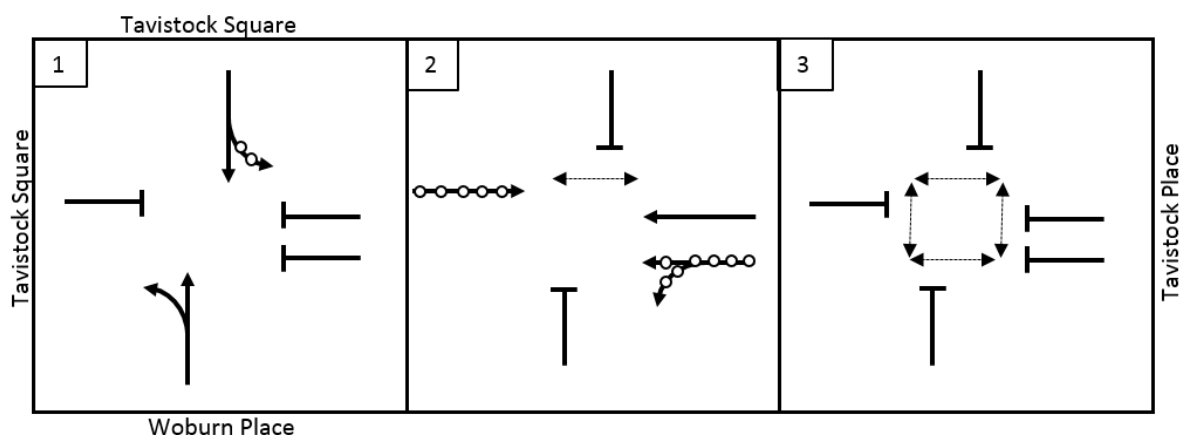


Figure 3.2 shows the signal staging plan for a westbound arrangement.

The staging diagram is similar but as motor traffic is only permitted to travel westbound on Tavistock Place / Tavistock Square there are some changes. In stage 1 the difference is that all traffic can turn left northbound from Woburn Place and in the southbound direction only cycles can turn left and in the second stage the direction of motor traffic switches.

Marchmont Street / Tavistock Place

Eastbound option

Figure 4.1 – Marchmont Street / Tavistock Place - Eastbound

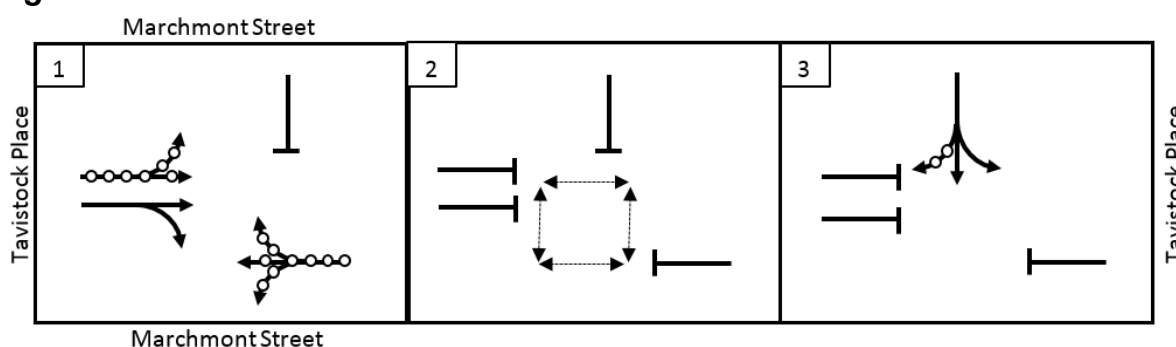


Figure 4.1 shows the signal staging plan for an eastbound arrangement at the junction with Marchmont Street.

The staging diagram shows that the first stage is for eastbound and westbound cycles with motor vehicles only permitted to travel eastbound and travel straight ahead or turn right into Marchmont Street. In the second stage pedestrians will receive a green man to cross all arms of the junction and in the third stage southbound traffic will receive a green light, cycles are able to make all turns however, motor traffic is only permitted to travel straight ahead or turn left.

Westbound option

Figure 4.2 – Marchmont Street / Tavistock Place - Westbound

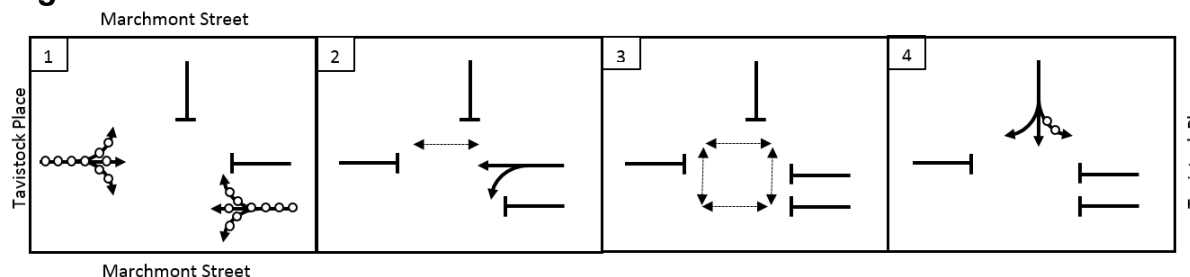


Figure 4.2 shows the signal staging plan for a westbound arrangement. The staging diagram is similar but the first stage is split in two so that stage 1 is for cycles only and the stage 2 is for westbound motor traffic and for pedestrians to cross the northern arm of the junction. In the third stage pedestrians will receive a green man to cross all arms of the junction. In the fourth stage all vehicles travelling southbound are permitted turn right and straight ahead but only cycles are permitted to turn left.

Hunter Street / Judd Street / Tavistock Place

Eastbound option

Figure 5.1 – Hunter Street / Judd Street / Tavistock Place - Eastbound

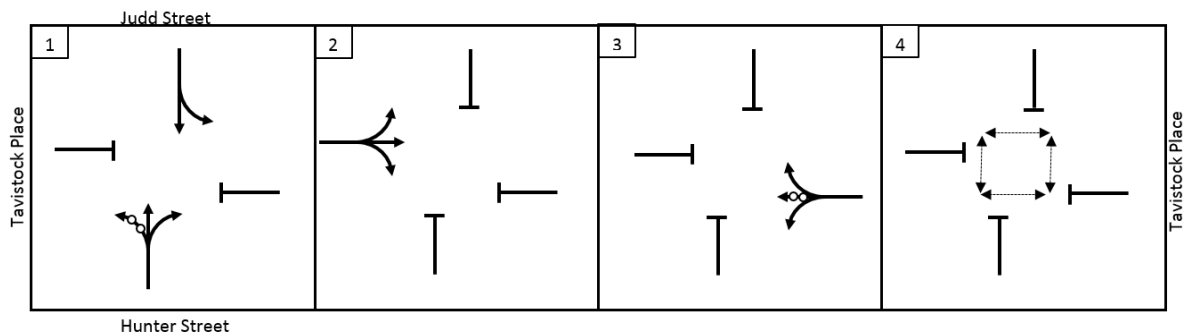


Figure 5.1 shows the signal staging plan for an eastbound arrangement at the junction with Hunter Street / Judd Street.

The staging diagram shows that the first stage is for northbound and southbound traffic; in the northbound direction motor vehicles can only travel straight ahead and turn right with cycles additionally able to turn left, in the southbound direction all vehicles are only permitted to travel straight ahead or turn left. In the second stage all vehicles exit Tavistock Place (west) eastbound and can make all turns, and in the third stage westbound vehicles exit Tavistock Place (east) westbound and all vehicles can turn left or right but only cyclists can travel straight ahead. The fourth stage is a pedestrian crossing stage.

Westbound option

Figure 5.2 – Hunter Street / Judd Street / Tavistock Place - Westbound

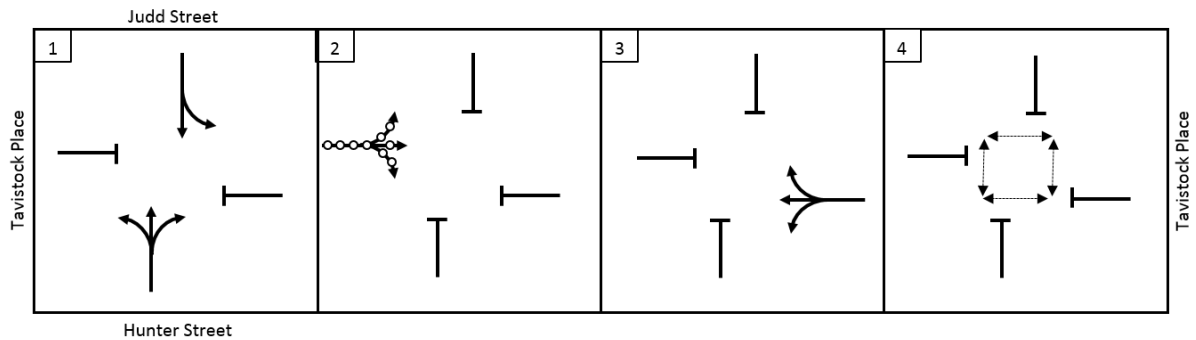


Figure 5.2 shows the signal staging plan for a westbound arrangement.

The staging diagram is similar but in the first stage all vehicles are able to turn left from Hunter Street into Tavistock Place (west). The second stage is for cycles only and in the third stage the straight ahead movement is permitted for all vehicles.

Gray's Inn Road / Sidmouth Street / Ampton Street

Eastbound and Westbound options

Figure 6.1 – Gray's Inn Road / Sidmouth Street / Ampton Street

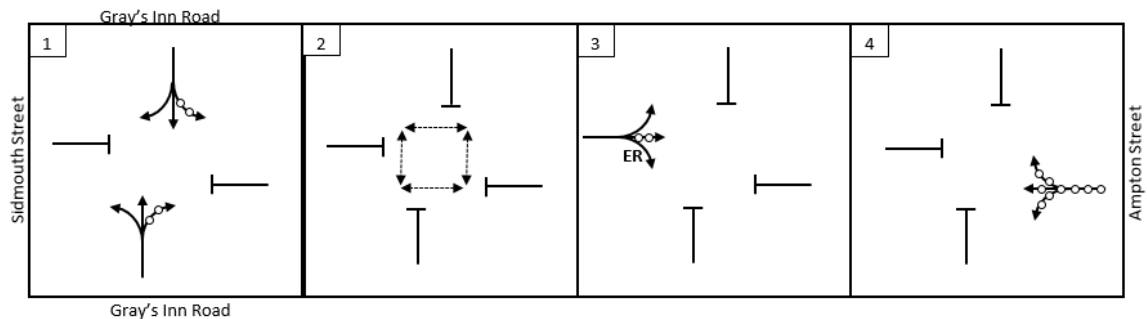


Figure 6.1 shows the signal staging plan for the Gray's Inn Road / Sidmouth Street / Ampton Street junction. There are no changes proposed to this junction but there are expected to be impacts on the junction due to traffic reassignment, which will result in a change in traffic flow through the junction.

2. Local Traffic Modelling Results

As described in the consultation leaflet, local traffic modelling has been undertaken to assess the impact on junction capacity along the corridor. Visual representations of these outputs are shown within figures 5.1, 5.2, 6.1, 6.2, 7 and 8 in the leaflet. The detailed outputs from the modelling are included below in tables 1.1 to 5.2.

In the tables queues are referred to in PCUs. A Passenger Car Unit (PCU) is a measure used to assess highway capacity, for modelling purposes. Different vehicles are assigned different values, according to the space they take up on the road. A car has a value of 1; smaller vehicles will have lower values, and larger vehicles will have higher values, for example a cyclist has a PCU value of 0.2 and a bus of 2.0.

The outputs are shown in three measurements, Degree of Saturation (DoS), delay and Mean Maximum Queue (MMQ).

The capacity of a junction is generally measured by its DoS, the higher the percentage figure, the closer the junction is to its maximum capacity. A DoS of less than 80% means that the junction operates with plenty of spare capacity, between 80% and 89% means that the junction is operating efficiently, over 90% means that the junction is close to capacity and operates less efficiently and over 100% means that the junction is at capacity.

The delay shows the additional time in seconds spent traveling through the junction on the arm shown per PCU compared to undertaking that movement at a free flow speed.

MMQ is the mean maximum queue, this calculates the average queue length, in PCUs, across the peak hour on that approach, measuring this length as the distance to the back of the longest predicted queue during each cycle.

Gower Street / Torrington Place

Table 1.1 – Gower Street / Torrington Place - Eastbound

Approach	Gower Street/Torrington Place					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	94.0%	-	-	99.7%		
Gower Street Southbound	92.3%	67.0	16.1	99.7%	112.5	22.0
Gower Street Northbound	94.0%	102.4	11.5	95.2%	101.6	13.4
Torrington Place Westbound (Cycle Lane)	55.0%	108.3	1.3	55.0%	108.3	1.3
Torrington Place Eastbound (Cycle Lane)	55.0%	108.3	1.3	55.0%	108.3	1.3

Table 1.2 – Gower Street / Torrington Place - Westbound

Approach	Gower Street/Torrington Place					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	97.8%	-	-	101.0%	-	-
Gower Street Southbound	93.1%	80.2	14.2	95.7%	95.1	15.4
Gower Street Northbound	87.8%	79.5	9.1	95.1%	104.6	12.7
Torrington Place Westbound	97.8%	154.7	10.1	101.0%	182.5	11.9
Torrington Place Eastbound (Cycle Lane)	73.3%	176.8	1.9	73.3%	176.8	1.9

Bedford Way / Gordon Square / Tavistock Square

Table 2.1 – Bedford Way / Gordon Square / Tavistock Square - Eastbound

Approach	Bedford Way / Gordon Square / Tavistock Square					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	57.9%			67.6%		
Tavistock Square Southbound	8.5%	16.9	1.2	11.5%	17.4	1.5
Bedford Way Northbound	57.9%	25.9	8.9	67.6%	29.3	10.2
Gordon Square Eastbound	54.7%	55.9	2.9	54.0%	43.4	3.6
Tavistock Place Westbound (Cycle Lane)	48.6%	74.7	4.6	22.8%	18.0	0.4
Gordon Square Eastbound (Cycle Lane)	16.3%	40.3	1.3	41.4%	42.6	3.1

Table 2.2 – Bedford Way / Gordon Square / Tavistock Square - Westbound

Approach	Bedford Way / Gordon Square / Tavistock Square					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	79.1%	-	-	90.0%	-	-
Tavistock Square Southbound	43.8%	30.4	6.3	44.2%	30.7	5.4
Bedford Way Northbound	79.1%	46.3	7.8	90.0%	63.1	11.8
Tavistock Place Westbound	64.8%	63.7	1.6	83.6%	96.7	4.0
Tavistock Place Westbound (Cycle Lane)	48.6%	80.4	4.6	26.3%	70.0	1.9
Gordon Square Eastbound (Cycle Lane)	16.3%	40.3	1.3	47.8%	47.3	3.3

Woburn Place / Tavistock Square / Tavistock Place

Table 3.1 – Woburn Place / Tavistock Square / Tavistock Place - Eastbound

Approach	Woburn Place / Tavistock Square / Tavistock Place					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	93.3%			80.1%		
Tavistock Square Southbound	93.3%	47.0	22.7	67.5%	23.1	8.6
Woburn Place Northbound	71.2%	27.9	13.5	75.3%	30.4	12.6
Tavistock Place Eastbound	38.0%	43.9	2.6	80.1%	53.9	5.1
Tavistock Place Westbound (Cycle Lane)	46.2%	44.6	4.1	20.5%	37.5	1.5
Tavistock Place Eastbound (Cycle Lane)	16.3%	21.4	1.5	40.6%	20.0	0.9

Table 3.2 – Woburn Place / Tavistock Square / Tavistock Place - Westbound

Approach	Woburn Place / Tavistock Square / Tavistock Place					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	82.4%	-	-	77.0%	-	-
Tavistock Square Southbound	82.4%	37.2	15.8	66.1%	31.1	9.6
Woburn Place Northbound	71.8%	30.4	13.1	77.0%	37.6	11.4
Tavistock Place Westbound	22.4%	37.8	2.0	30.7%	32.6	2.9
Tavistock Place Westbound (Cycle Lane)	41.6%	41.1	4.0	14.9%	30.4	1.4
Tavistock Place Eastbound (Cycle Lane)	14.7%	16.4	1.5	29.6%	14.6	3.4

Marchmont Street / Tavistock Place

Table 4.1 – Marchmont Street / Tavistock Place - Eastbound

Approach	Marchmont Street / Tavistock Place					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	39.1%			33.0%		
Marchmont Street Southbound	39.1%	33.1	2.9	19.8%	44.8	0.9
Tavistock Place Eastbound	36.9%	18.8	4.4	33.0%	12.4	4.5
Tavistock Place Westbound (Cycle Lane)	14.8%	32.7	2.0	6.0%	8.8	0.5
Tavistock Place Eastbound (Cycle Lane)	7.3%	15.3	0.7	15.3%	11.0	1.7

Table 4.2 – Marchmont Street / Tavistock Place - Westbound

Approach	Marchmont Street / Tavistock Place					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	69.7%	-	-	58.3%	-	-
Marchmont Street Southbound	61.4%	51.5	3.3	45.8%	50.8	2.3
Tavistock Place Westbound	69.7%	44.0	5.2	58.3%	38.7	5.3
Tavistock Place Westbound (Cycle Lane)	25.6%	14.3	2.2	12.5%	29.9	1.1
Tavistock Place Eastbound (Cycle Lane)	12.9%	26.6	0.9	32.0%	29.4	2.9

Hunter Street / Judd Street / Tavistock Place

Table 5.1 – Hunter Street / Judd Street / Tavistock Place - Eastbound

Approach	Hunter Street / Judd Street / Tavistock Place					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	88.9%			75.6%		
Judd Street Southbound	59.9%	51.1	3.2	58.5%	57.9	2.9
Tavistock Place Westbound	88.9%	57.9	11.0	75.6%	45.3	7.8
Hunter Street Northbound	46.0%	43.8	2.3	58.8%	52.4	3.5
Tavistock Place Eastbound	79.3%	68.2	5.2	75.3%	47.4	5.8

Table 5.2 – Hunter Street / Judd Street / Tavistock Place - Westbound

Approach	Hunter Street / Judd Street / Tavistock Place					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	94.2%	-	-	90.7%	-	-
Judd Street Southbound	47.0%	43.3	2.5	23.5%	34.5	1.7
Tavistock Place Westbound	94.2%	70.9	14.7	88.0%	62.2	11.0
Hunter Street Northbound	89.6%	85.1	7.7	90.7%	71.4	11.7
Tavistock Place Eastbound (Cycle Lane)	22.7%	31.3	1.2	39.6%	19.2	1.6

Gray's Inn Road / Sidmouth Street / Ampton Street

Table 6.1 – Gray's Inn Road / Sidmouth Street / Ampton Street - Eastbound

Approach	Gray's Inn Road / Sidmouth Street / Ampton Street					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	85.3%			81.8%		
Gray's Inn Road Southbound	78.9%	53.4	6.2	48.1%	39.6	2.4
Gray's Inn Road Northbound	85.3%	52.1	11.2	77.4%	41.0	10.7
Sidmouth Street Eastbound	66.9%	56.2	4.3	81.8%	62.7	7.4
Ampton Street Westbound (Cycle Lane)	38.9%	50.0	1.8	17.1%	47.6	0.7

Table 6.2 – Gray's Inn Road / Sidmouth Street / Ampton Street - Westbound

Approach	Gray's Inn Road / Sidmouth Street / Ampton Street					
	AM Peak			PM Peak		
	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)	DoS (%)	Delay (Sec/PCU)	MMQ (PCU)
Max DoS	83.9%	-	-	78.4%	-	-
Gray's Inn Road Southbound	68.1%	38.6	6.4	61.6%	42.0	3.7
Gray's Inn Road Northbound	83.9%	44.5	12.2	78.4%	39.3	11.6
Sidmouth Street Eastbound	57.4%	56.7	2.9	76.4%	64.8	5.3
Ampton Street Westbound (Cycle Lane)	51.9%	62.9	2.0	15.0%	44.7	0.6

Junction Capacity

In the AM peak there are a couple of junctions expected to operate close to capacity in both options (Gower Street and Woburn Place in the eastbound option and Gower Street and Hunter Street / Judd Street in the westbound option), while the remainder are operating efficiently or well within capacity. In general, the degree of saturation is higher and network resilience is lower

under the westbound option, particularly at the Gower Street and Judd Street/ Hunter Street junctions. The degree of saturation is only significantly higher under the eastbound option at the Woburn Place junction.

In the PM peak, apart from Gower Street, all junctions operate efficiently or well within capacity in the eastbound option. The Gower Street junction is expected to be at capacity in both options. The junctions with Bedford Way and Judd Street/ Hunter Street are both close to capacity, with low network resilience, in the westbound option.

Queue Lengths

In the morning and evening peak hour in general the queue lengths for the westbound option are likely to be broadly similar in length to the queue lengths experienced for the eastbound option.

The eastbound option shows a small queue on the eastbound approach to the Judd Street/ Hunter Street junction, which is removed under the westbound option.

The eastbound option does not have any westbound queue on the approach to the Gower Street junction, yet under the westbound option it is expected that there would be a westbound queue approximately 60m (around 10 PCUs) in length during the peak hours. This queue could extend back into Byng Place.

Delay

In terms of delay, some movements experience an increase in delay in the westbound option compared to the eastbound option, others a reduction but in general the delays for the northbound and southbound movements along the network increase in the westbound option. The highest increases in delay occur at Bedford Way, with the northbound and southbound movements increasing by 13-34 seconds and at Hunter Street/Judd Street, where there are delay savings on the southbound approach in the westbound option but these are offset by increases in delay on the westbound and northbound approaches. At the Gower Street junction, overall there are lower delays for north/south movements in the westbound option.

3. Strategic Traffic Modelling

We have carried out strategic traffic modelling of the eastbound and westbound options to allow us to predict what impact the proposed changes could have on road users for the busiest times of the day, with results presented for the morning (0800-0900) and evening (1700-1800) peak hours. Strategic traffic modelling is intended to give an idea of where the impacts of changes in journey choice are most likely to be felt. It assumes that drivers have perfect knowledge of the network and will always choose the quickest route available. The strategic modelling has been carried out using the ONE model, which covers the whole of London within the M25.

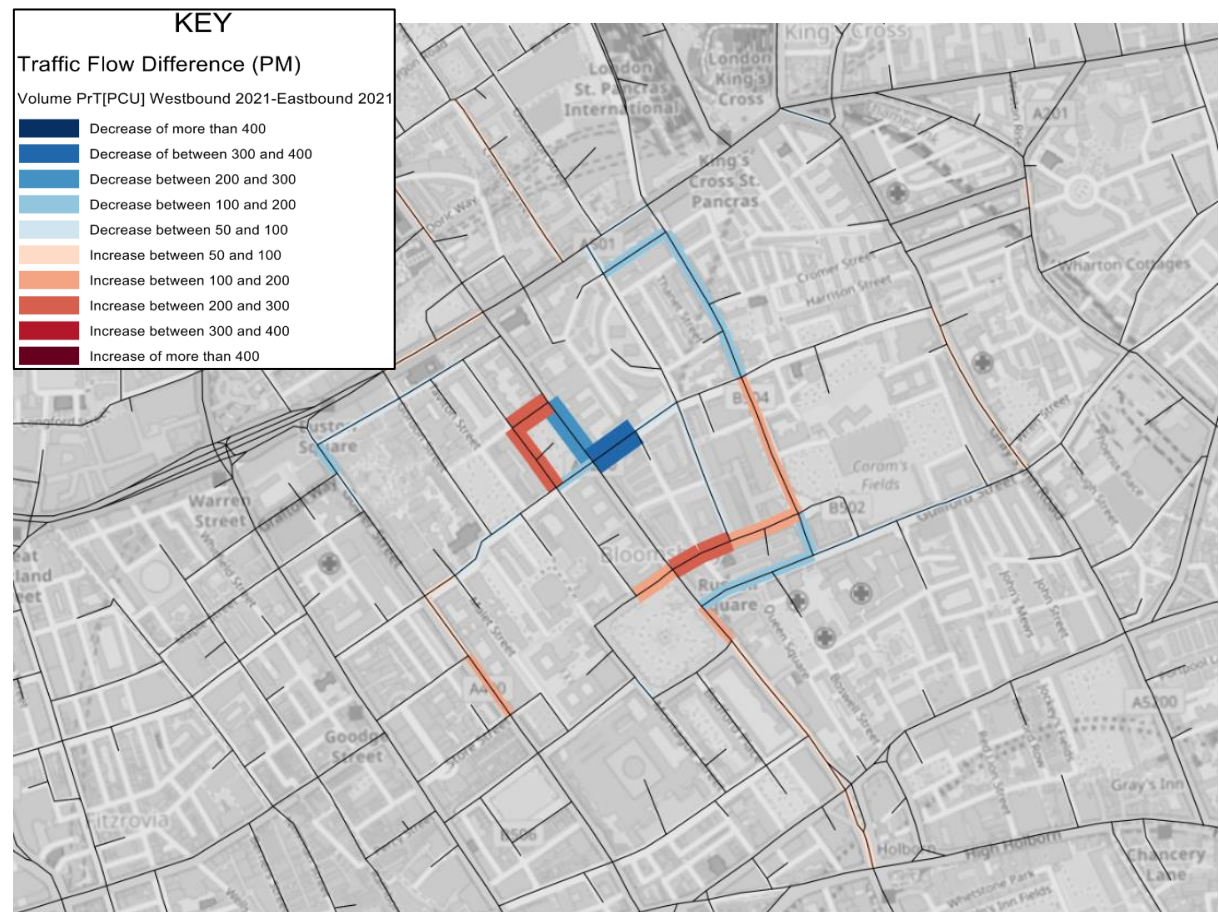
The impacts predicted may differ from the actual outcome in the future due to changes such as motorists changing the timing of their trips away from peak times; using different modes such as public transport, walking or cycling, and making journeys to alternative locations or not carrying out journeys at all.

To understand the impacts of the westbound option against the eastbound option (current layout), we assess how London's roads would operate in 2021, considering other road improvements planned for implementation. As stated within the consultation leaflet the modelling includes a number of projects in the local area that are definitely taking place, these are:

- The West End Project (making Gower Street and Tottenham Court Road two-way with Tottenham Court Road having restrictions for general motor traffic during the day);
- Closure of Judd Street at the junction with Euston Road (and associated changes on Midland Road north of Euston Road);
- Changes to Brunswick Square including the closure of Lansdowne Terrace at its western end;
- Closure of the north end of Gordon Street (as per the HS2 works).

The outputs for this scenario are shown in Figure 7.1 and Figure 7.2. A further scenario which does not include the closure of Gordon Street has also been assessed. This will show the predicted impact of the options before the closure of Gordon Street but after the completion of the other projects which

**Figure 7.2 – Westbound Traffic Reassignment (with Gordon Street closure)
– Evening Peak**



The effects are broadly similar for the morning and the evening peak hours. Traffic flows are generally expected to decrease on side streets north of the corridor and increase on the side streets to the south. On the corridor itself the only significant change in overall traffic flow is expected to be a reduction in flow between Herbrand Street and Woburn Place.

Figure 8.1 – Westbound Traffic Reassignment (without Gordon Street closure) – Morning Peak

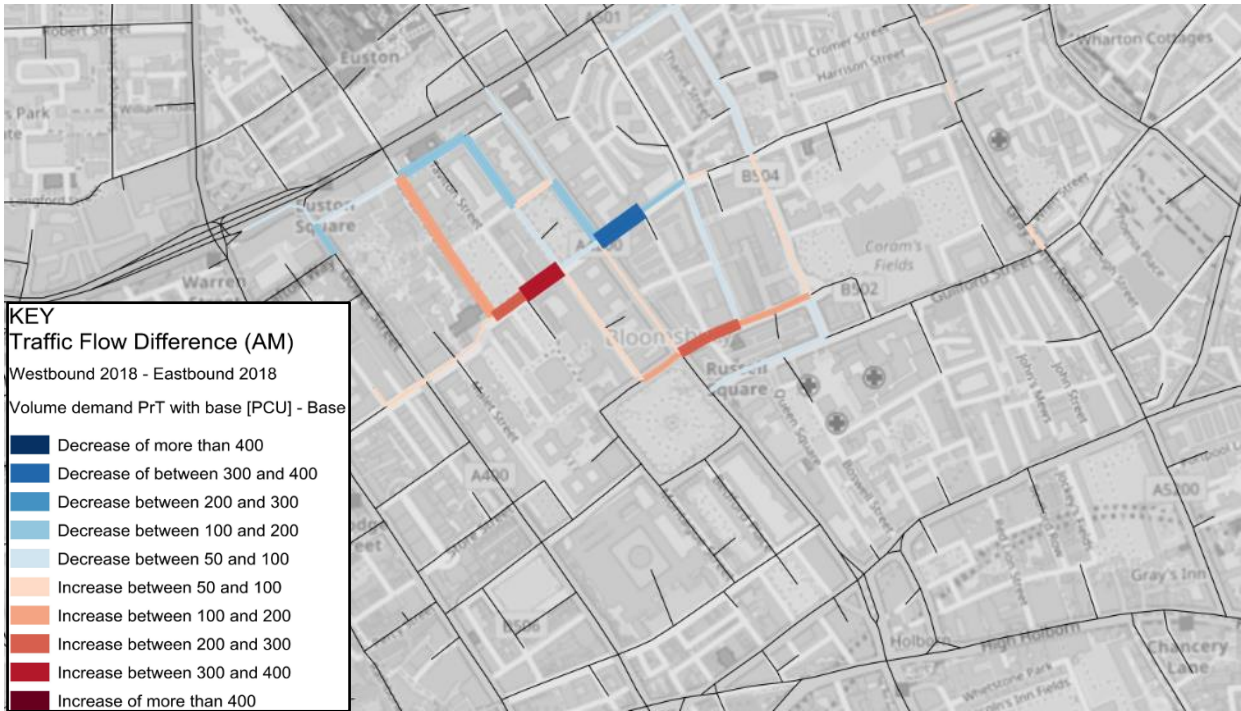
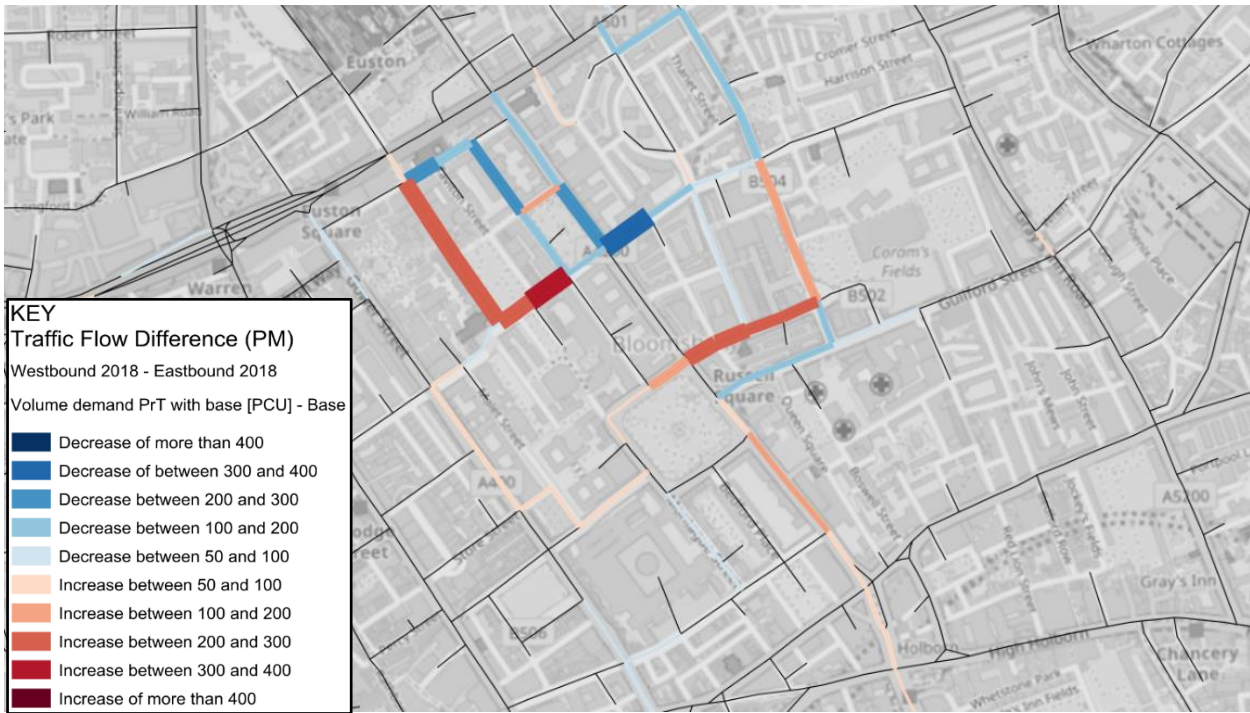


Figure 8.2 – Westbound Traffic Reassignment (without Gordon Street closure) – Evening Peak



Figures 8.1 and 8.2 show the flow differences between the westbound and eastbound options in the future scenario without the closure to Gordon Street. As per the previous scenario there are limited differences in the flow differences between the morning and evening peaks. However, in general the flow differences are higher in the evening peak. The westbound option is predicted to result in an increase in traffic flows on Tavistock Place between Bedford Way and Gordon Square (west) and a decrease between Bedford Way and Marchmont Street when compared to the eastbound layout. There are predicted to be decreases in traffic flows along Tavistock Square (east, north of Tavistock Place) and along Endsleigh Gardens, this traffic reassigns to Gordon Square / Gordon Street which see a corresponding predicted increase in traffic flows. As per the scenario with a closure to the north end of Gordon Street closed, there are also predicted to be increases of traffic flow on Bernard Street, to the south of the corridor, with a smaller decrease in traffic flow predicted on Guilford Street.