

## File Note

### 1 Introduction

- 1.1 As part of the proposed highway mitigation measures for the IAMP, a new vehicular bridge over the A19 is proposed. This Note has been produced to provide a background to the micro-simulation traffic modelling work which has been undertaken to support the proposal.
- 1.2 This Note summarises the results of the network performance reported from the micro-simulation modelling of the envisaged junction improvements at Testos's and Downhill Lane with and without the inclusion of a new bridge over the A19 as part of the IAMP development.

### 2 Downhill Lane Junction

- 2.1 For the purposes of assessment, it is considered that the preferred Highways England option for the Downhill Lane junction improvements will broadly comprise of the construction of a new bridge to the south of the existing bridge to create a raised roundabout above the A19 and construction of new slip roads connecting to the A19 and Testos junction.

### 3 Journey Time paths

- 3.1 To provide a measurable comparison between the 'with' and 'without' bridge scenarios, journey time paths have been coded between various origins and destinations (OD) in order to determine the shortest journey times between OD pairs.
- 3.2 The origin and destinations used for coding journey time paths can be summarised as:
  1. A1290 West
  2. IAMP East of A1290
  3. IAMP North West of A1290
  4. A19 North of Downhill Lane
  5. Downhill Lane east of A19 Junction
  6. Washington Road, east of A19
  7. IAMP East of A1290
  8. Ferryboat Lane
  9. Nissan Access
  10. A19 South of Downhill Lane
- 3.3 The main movements between the locations listed above are presented in the Table 3.1. These selected OD pairs have been analysed in terms of journey time paths.

**Table 3.1: Main journey movements in study area**

O-D	1	2	3	4	5	6	7	8	9	10
1		✓	✓	✓		✓	✓	✓	✓	
2	✓									
3	✓			✓						✓
4	✓		✓			✓	✓	✓	✓	✓
5							✓			
6	✓			✓				✓	✓	✓
7	✓			✓	✓					✓
8	✓			✓		✓				
9	✓			✓		✓				✓
10			✓	✓		✓	✓		✓	

## 4 Hourly flows via Washington Bridge

- 4.1 To gain an understanding of the level of traffic movement likely to use the new bridge over A19, hourly flows for eastbound and westbound movements via the new bridge and shown in the Table 3.2.

**Table 4.1: Hourly flows via Washington Bridge**

Tested option:	Option 2A	
	EB	WB
Direction:		
07:00-08:00	280	262
08:00-09:00	258	238
09:00-10:00	220	140
15:00-16:00	302	246
16:00-17:00	338	346
17:00-18:00	346	202

- 4.2 Table 4.1 shows the hourly movements via the new IAMP bridge and interestingly, demonstrates that there is a consistent volume of traffic using the bridge each hour.

- 4.3 Trips using the bridge in the morning peak\_hour are mostly routing:

Eastbound direction:

- From Nissan and IAMP to East Boldon and Hylton – around 45% of the traffic;
- From Washington to East Boldon and Hylton – around 25% of the traffic;

Westbound direction:

- From East Boldon and Hylton to Nissan and IAMP - nearly 50% of the trips;
- From East Boldon and Hylton to Washington area – around 16% of trips;

- 4.4 Trips using the bridge in the evening peak\_hour are mostly routing:

Eastbound direction:

- From Nissan and IAMP to East Boldon and Hylton area – around 41% of the traffic;
- From Washington area to East Boldon and Hylton area – almost 33% of the traffic;

Westbound direction:

- From Testos (zones 1 and 2) to Nissan and IAMP – 5% trips;
- From Hylton and East Boldon (zones 4, 5 & 6) to Nissan and IAMP - 49% of the traffic;
- From Hylton and East Boldon to Washington – around 14% of the traffic;

## 5 Overview of Network Operation

5.1 The following commentary is provided of the network operations reported from the micro-simulation modelling.

➤ **With New IAMP bridge over A19**

The morning period operates well, with no notable queuing, although queuing is noted at Testo's and this has been discussed in other studies and notes. In the evening period queuing is noted on the southbound movement on the A1290 approach to the first junction from Downhill Lane; this is caused by the high volume of right turn movements into IAMP area. The queuing is brief and disperses over a short period of time, importantly, it does not block back to the Downhill Lane junction.

➤ **Without New IAMP bridge over A19**

This option considers the same layout as one above, but without the inclusion of a new bridge over the A19 as part of the IAMP development.

Notable queuing occurs from the A19 southbound approaching the Downhill Lane roundabout in the morning peak, which is caused by traffic redirected from / to the Hylton area to the Downhill Lane roundabout; the traffic signals at this junction were adjusted to accommodate this traffic. In the evening peak, significant queuing occurs, which is caused by right turn movements from the A1290 (North) to IAMP. Queuing blocks back to the Downhill Lane roundabout, as well as having an impact on queues at the A1290 northbound, as a result of time being provided for right-turning vehicles to IAMP from the opposite direction.

5.2 Traffic flows at the Downhill Lane roundabout have been checked for the peak hours to establish the routing implications of not having the new bridge over the A19. The main movements affected are the East – West and West – East, which are increased by approximately 250 trips on the eastbound direction in the morning peak hour and 340 trips in the evening peak hour. Westbound movements in the morning peak have an additional 200 trips and 260 trips in the evening peak. Without the new bridge over the A19, this additional traffic requires to be accommodated at the Downhill Lane roundabout and causes queuing.

**Table 5.1: Downhill Lane Roundabout Movements**

	DHL with new IAMP Bridge		DHL without new IAMP Bridge	
	07:00 -08:00	16:00 – 17:00	07:00 -08:00	16:00 – 17:00
A1290 West – Washington Road	98	84	356	398
Washington Road – A1290 West	86	74	288	332

## 6 Queue Length Comparison

6.1 The following tables provide a summary of the noted maximum queue lengths on the local highway network on the approaches to the Downhill Lane junction. Results are presented for both the 'with bridge' and 'without bridge' scenarios considered. Queue length values are presented in 'metres'.

**Table 6.1: Comparison of peak period queue lengths**

	DHL: North		DHL: South East		DHL: South		DHL: West	
	AM	PM	AM	PM	AM	PM	AM	PM
<b>With Bridge</b>	81	78	49	82	50	174	46	89
<b>Without Bridge</b>	121	133	571	727	54	298	98	297
<b>Difference</b>	+40	+55	+522	+645	+4	+124	+52	+208