Appendix 27
VISSIM Modelling Summary
Proposed site access

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Client:	**ADC Infrastructure**	**Date:**	**23/01/18**

VISSIM Modelling Summary – Proposed Site Access

1. INTRODUCTION

1.1.1. This Technical Note (TN) summarises the VISSIM modelling undertaken on behalf of ADC Infrastructure (ADC) for the proposed Strategic Rail Freight Interchange (SRFI) known as Northampton Gateway, located south of M1 J15 (see **Figure 1**).

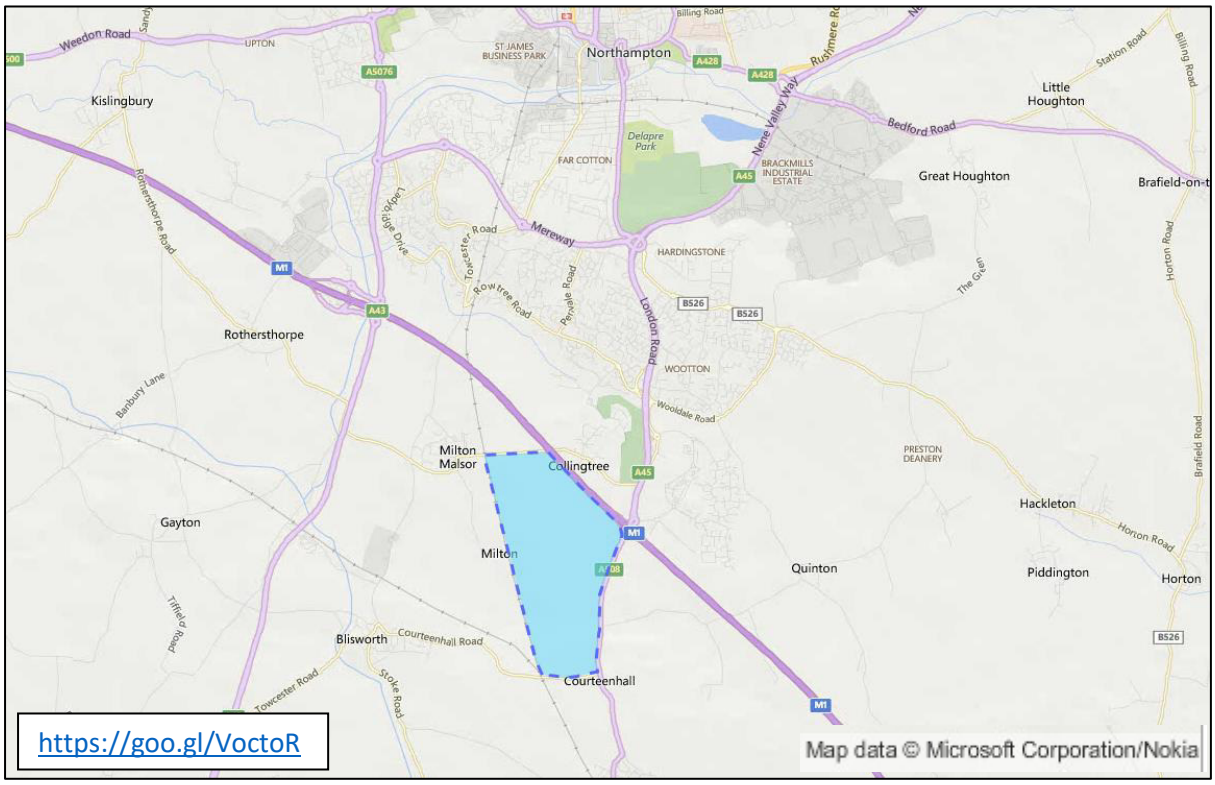

Figure 1 – Proposed Northampton Gateway SFRI

1.1.2. This TN follows on from Multimodal's previous note – *'171218 MM TN - Modelling Summary'* and provides details of the proposed site access performance in the 2031 future year.

2. PROPOSED MITIGATION

2.1.1. As a recap, the new site access junction is proposed on the A508 south of M1 J15, with a detailed layout shown in **Figure 2**.

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New Site Access / A508 Junction

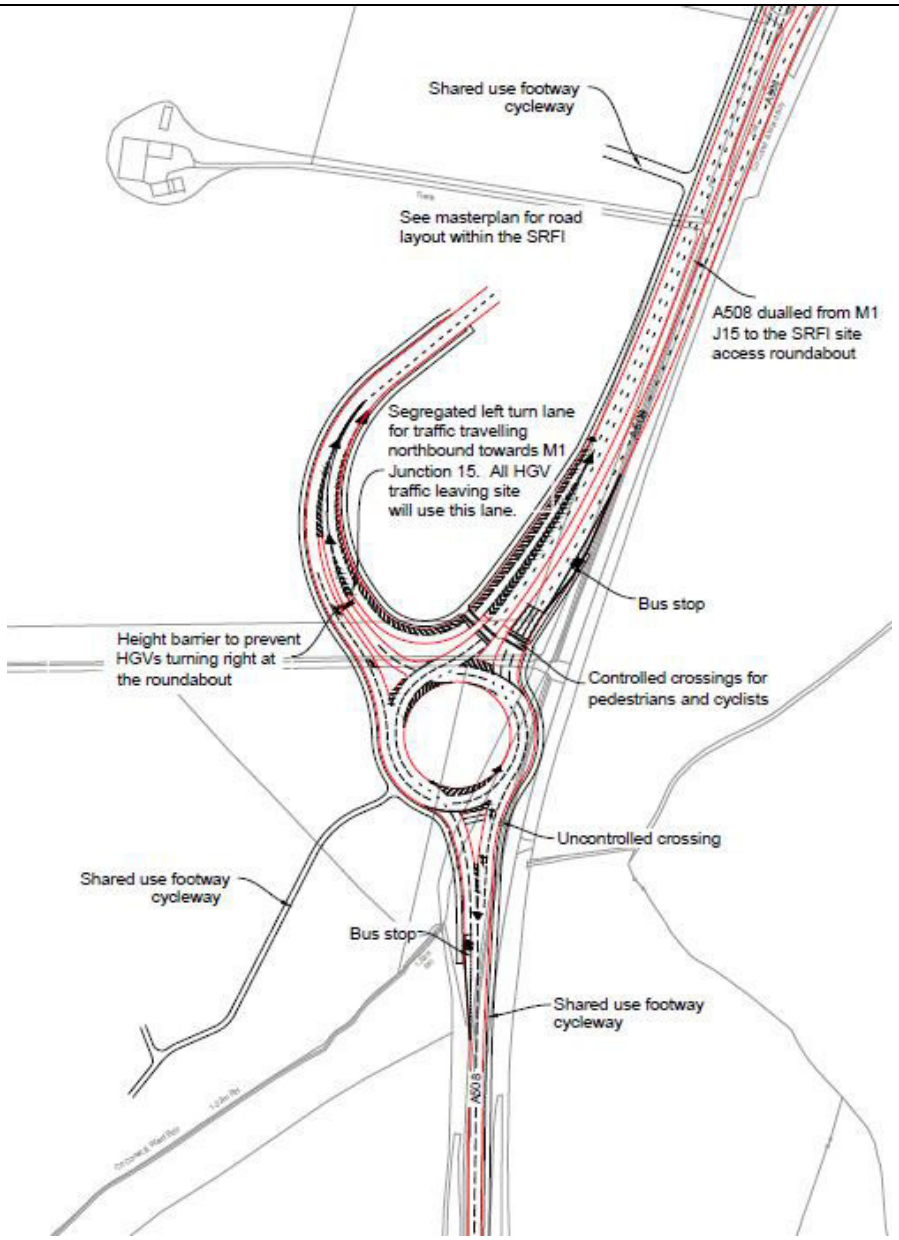

Figure 2 – New A508 / Site Access Roundabout

- New roundabout on the A508, with 2 lane link travelling southbound from M1 J15 and 3 lane link travelling northbound to M1 J15.
- 2 lane approach and 2 lane exit on the A508 south.
- Toucan crossing on the A508 north of the junction.

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3. FUTURE YEAR FLOWS & SCENARIOS MODELLED

3.1.1. Future year flows were obtained by ADC from the Northamptonshire Strategic Transport Model (NSTM2), which is owned by Northamptonshire County Council (NCC) and operated by WSP, for the following:

- 2021 DfT Circular 02/2013 Reference Case – Flowset C1;
- 2021 DfT Circular 02/2013 Mitigation Case – Flowset I1;
- 2031 Reference Case – Flowset D1;
- 2031 Mitigation Case – Flowset J1d.

3.1.2. To test the impact of the proposed Northampton Gateway SRFI on the SRN and local highway network, the following scenarios have been modelled in VISSIM:

1) 2021 (DfT Circular 02/2013) Reference Case – background growth* only
2) 2021 (DfT Circular 02/2013) Mitigation Case – background growth* + proposed development + proposed improvements.
3) 2031 Reference Case – background growth only
4) 2031 Mitigation Case – background growth + proposed development + proposed improvements

**It should be noted that in the 2021 opening year the background growth includes relevant committed development traffic flows to meet the criteria for future year scenarios as specified in DfT Circular 02/2013*

3.1.3. Reference should be made to the previous note - *'171218 MM TN - Modelling Summary'* for details on the NSTM2 outputs, conversion process into VISSIM and VISSIM model updates to allow the specified scenarios to be tested (*Section 4 and Appendix C*).

3.1.4. For the purposes of this TN, only Scenario 4 (2031 Mitigation Case) has been analysed, to understand the proposed site access performance in a horizon future year.

4. MODELLING OUTPUTS

4.1.1. To identify the effects on the network, the following outputs have been obtained from the VISSIM models:

1) Journey Times;
2) Traffic Volumes;
3) Queue Lengths.

4.1.2. The outputs have been based on the average of 20 random seed runs, following comments on the convergence levels in the previous note (*Section 6 and Appendix E*).

5. 2031 ASSESSMENT YEAR PERFORMANCE ANALYSIS

5.1.1. The following headings provide details of the performance in the 2031 Mitigation model, with the proposed site access in place.

Journey Times & Traffic Volumes

5.1.2. The journey times and traffic volumes between various routes in the network for the AM and PM peak periods can be seen in **Tables 1 – 4.**

5.1.3. **Tables 1 and 2** detail the results for Cars and **Tables 3 and 4** detail the results for HGVs. Each zone-to-zone route has been included to allow both network-wide impacts and more specific journey impacts to be understood.

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Table 1: 2031 Journey Time & Volume Comparisons – Cars – AM Peak

AM PEAK						
Cars						
JT No.	From		To		2021 MIT CASE	
					Overall Avg JT (s)	Overall Traffic Volume (Cars)
	Zone No.	Site	Zone No.	Site	0800-0900	0800-0900
100	14	Site Access	1	A508	00:01:10	8
101			2	M1 South	00:04:06	23
102			3	Saxon Avenue	-	0
103			4	A45	00:03:10	31
104			5	A43	-	0
105			6	A5123	00:06:20	4
106			12	M1 North	00:05:35	16
107			13	Watering Lane	-	0
108	1	A508	14	Site Access	00:01:10	92
109	2	M1 South			00:03:18	112
110	3	Saxon Avenue			00:03:09	2
111	4	A45			00:04:05	347
112	5	A43			-	0
113	6	A5123			00:08:09	14
114	12	M1 North			00:07:36	73
Total					**00:47:48**	**722**

Table 2: 2031 Journey Time & Volume Comparisons – Cars – PM Peak

PM PEAK						
Cars						
JT No.	From		To		2021 MIT CASE	
					Overall Avg JT (s)	Overall Traffic Volume (Cars)
	Zone No.	Site	Zone No.	Site	1700-1800	1700-1800
100	14	Site Access	1	A508	00:01:17	71
101			2	M1 South	00:03:56	85
102			3	Saxon Avenue	00:03:03	4
103			4	A45	00:03:13	393
104			5	A43	00:06:31	8
105			6	A5123	00:06:47	32
106			12	M1 North	00:05:41	179
107			13	Watering Lane	00:03:08	20
108	1	A508	14	Site Access	00:01:02	24
109	2	M1 South			00:02:58	50
110	3	Saxon Avenue			-	0
111	4	A45			00:03:06	116
112	5	A43			-	0
113	6	A5123			-	0
114	12	M1 North			00:06:59	24
Total					**00:47:40**	**1006**

5.1.4. From **Tables 1 and 2**, it can be seen that the PM peak is busier than the AM, with around 300 more vehicle movements.

5.1.5. The nature of the proposed development means that more traffic enters than exits the site in the AM peak (640 compared to 82), with the A45, M1 South and A508 zones the main origins.

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In the PM peak, this is reversed (792 out and 214 in), with the A45 and M1 North being the main destinations, followed by the M1 South and the A508.

Table 3: 2031 Journey Time & Volume Comparisons – HGVs – AM Peak

AM PEAK						
HGVs						
JT No.	From		To		2021 MIT CASE	
					Overall Avg JT (s)	Overall Traffic Volume (HGVs)
	Zone No.	Site	Zone No.	Site	0800-0900	0800-0900
100	14	Site Access	1	A508	00:01:17	16
101			2	M1 South	00:04:27	31
102			3	Saxon Avenue	00:03:23	4
103			4	A45	00:03:21	43
104			5	A43	00:06:39	10
105			6	A5123	00:06:48	4
106			12	M1 North	00:06:21	23
107			13	Watering Lane	-	0
108	1	A508	14	Site Access	00:01:12	35
109	2	M1 South			00:03:36	29
110	3	Saxon Avenue			-	0
111	4	A45			00:04:21	39
112	5	A43			-	0
113	6	A5123			00:08:57	2
114	12	M1 North			00:08:07	26
Total					**00:58:29**	**262**

Table 4: 2031 Journey Time & Volume Comparisons – HGVs – PM Peak

PM PEAK						
HGVs						
JT No.	From		To		2021 MIT CASE	
					Overall Avg JT (s)	Overall Traffic Volume (HGVs)
	Zone No.	Site	Zone No.	Site	1700-1800	1700-1800
100	14	Site Access	1	A508	00:01:22	24
101			2	M1 South	00:04:15	30
102			3	Saxon Avenue	-	0
103			4	A45	00:03:24	45
104			5	A43	00:06:55	4
105			6	A5123	00:07:12	4
106			12	M1 North	00:06:23	24
107			13	Watering Lane	-	0
108	1	A508	14	Site Access	00:01:04	30
109	2	M1 South			00:03:15	36
110	3	Saxon Avenue			-	0
111	4	A45			00:03:14	39
112	5	A43			-	0
113	6	A5123			00:08:13	1
114	12	M1 North			00:07:31	27
Total					**00:52:48**	**264**

5.1.6. From **Tables 3 and 4**, it can be seen that the movements to and from the site access junction are similar in both the AM and PM peak periods.

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5.1.7. The main origins and destinations for HGV traffic are the A45, M1 South, M1 North and A508 (origin). This is common across both peak periods.

5.1.8. It should be noted that **Tables 3 and 4** also include a demand of 16 HGVs in the AM and 24 HGVs in the PM peak associated with development HGVs exiting the site for the A508 South (highlighted in grey). This is the demand forecast by the strategic transport model (NSTM2) without the automatic number plate recognition (ANPR) camera control measures and 'fining' system proposed to discourage exiting development HGVs from using M1 J15 to U-turn and travel south on the A508. In reality, these movements would not occur, but as the ANPR control measures have not been included in the NSTM2, these movements are transferred to the VISSIM modelling.

Site Access Junction Turning Counts

5.1.9. As well as the movements to and from various zones around the network, the specific site access junction movements have also been collected. These are shown in **Tables 5 and 6** for all vehicle types.

Table 5: 2031 Site Access Junction Turning Counts – All Vehs – AM Peak

AM PEAK (0800-0900)				
Approach	**Destination**	**Cars**	**HGVs**	**Total**
A508 North	A508 South	1368	62	**1430**
	Site Access	585	101	**686**
	A508 North	0	0	**0**
A508 South	Site Access	92	35	**127**
	A508 North	1112	72	**1184**
	A508 South	0	0	**0**
Site Access	A508 North	75	115	**190**
	A508 South	8	16	**24**
	Site Access	0	0	**0**
Total		**3240**	**401**	**3641**

Table 6: 2031 Site Access Junction Turning Counts – All Vehs – PM Peak

PM PEAK (1700-1800)				
Approach	**Destination**	**Cars**	**HGVs**	**Total**
A508 North	A508 South	1452	80	**1532**
	Site Access	203	108	**311**
	A508 North	0	0	**0**
A508 South	Site Access	24	30	**54**
	A508 North	1197	44	**1241**
	A508 South	0	0	**0**
Site Access	A508 North	734	106	**840**
	A508 South	70	24	**94**
	Site Access	0	0	**0**
Total		**3680**	**392**	**4072**

5.1.10. As in **Tables 3 and 4**, **Tables 5 and 6** show the error with HGVs leaving the site and heading to the A508 South. As stated in *paragraph 5.1.8*, this will not happen in reality due to the ANPR camera system and 'fining' system proposed.

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5.1.11. In terms of the analysis, **Tables 5 and 6** show the A508 North approach is the busiest arm in both peak periods and as previously identified, the PM peak is busier than the AM at the junction when considering all movements.

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Queue Lengths

5.1.12. The average and maximum (average) queue lengths (in metres) at the site access junction can be seen in **Figures 3 and 4** for the AM and PM peaks.

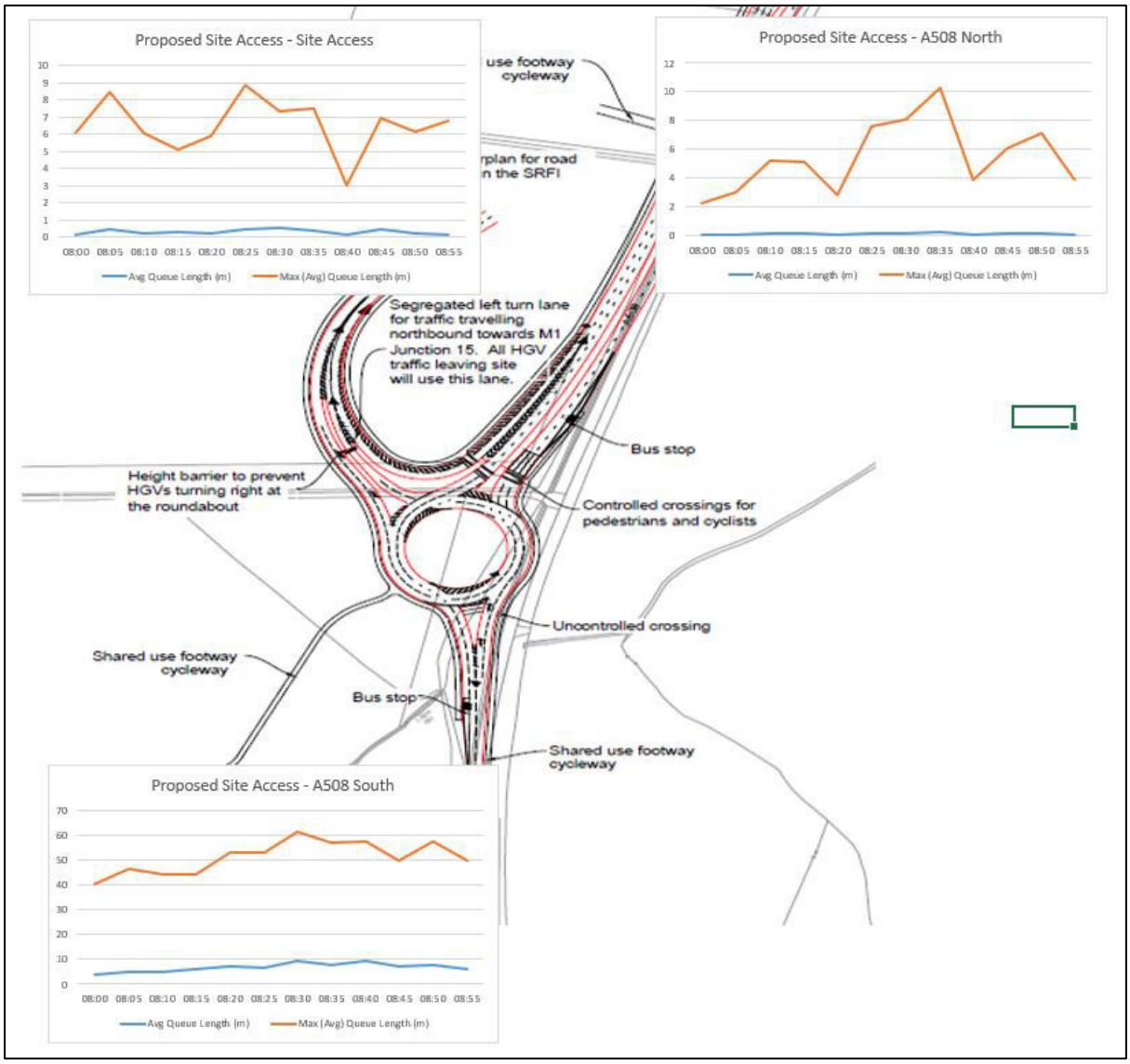

Figure 3 – 2031 Site Access Queues – AM (queue in metres)

5.1.13. From **Figure 3**, it can be seen that the longest queues are on the A508 South approach, where the maximum (average) queues reach 60m (12 vehicles) in the AM peak. The average queue lengths are around 10m – the equivalent of 2 vehicles.

5.1.14. The maximum (average) queues on the A508 North and Site Access approaches are around 10m and 9m respectively (2 vehicles), with both approaches having minimal average queue lengths.

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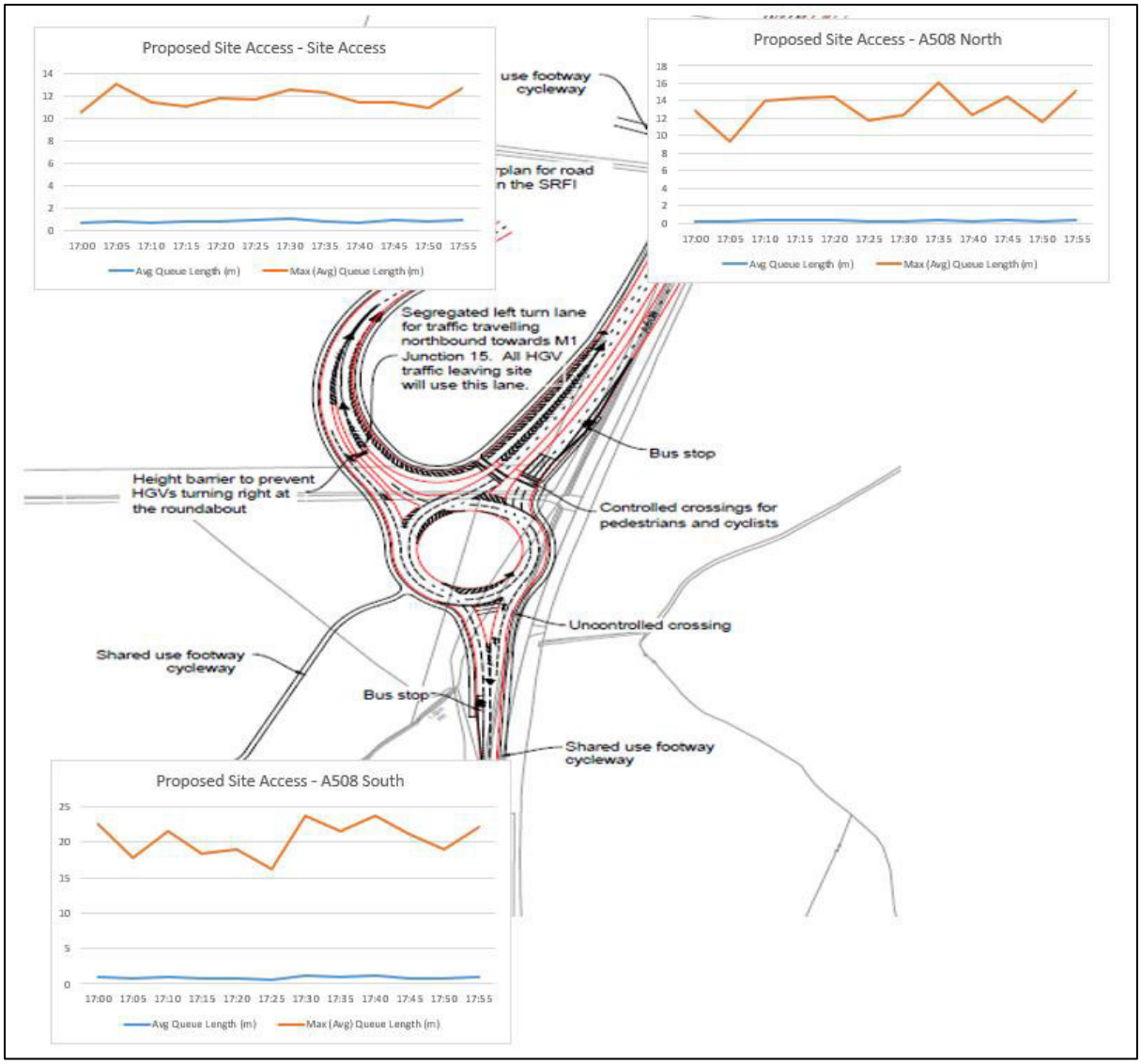

Figure 4 – 2031 Site Access Queues – PM (queue in metres)

5.1.15. From **Figure 4**, it can be seen that the longest queues are on the A508 South approach, as in the AM peak. However, unlike the AM peak, the maximum (average) queues are not as long, reaching around 25m (5 vehicles) in length instead of 60m. The average queue lengths are minimal, indicating no prolonged queuing issue.

5.1.16. The maximum (average) queues on the A508 North and Site Access approaches are slightly longer in the PM peak than the AM, around 16m and 14m (3 vehicles) respectively compared to 10m and 9m. As in the AM peak, both approaches having minimal average queue lengths, indicating no queuing issues on these approaches.

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6. OVERALL SUMMARY & CONCLUSIONS

6.1.1. This Technical Note (TN) summarises the VISSIM modelling undertaken on behalf of ADC Infrastructure (ADC) for the proposed Strategic Rail Freight Interchange (SRFI) known as Northampton Gateway, located south of M1 J15.

6.1.2. This TN follows on from Multimodal's previous note – *'171218 MM TN - Modelling Summary'* and provides details of the proposed site access performance in the 2031 future year.

6.1.3. The overall conclusion of this modelling is that the site access junction does not have any significant impacts on the network and accommodates the proposed development traffic.

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