Appendix 26
VISSIM Modelling Summary

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Client:	**ADC Infrastructure**	**Date:**	**23/01/2018**

VISSIM Modelling Summary

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**).

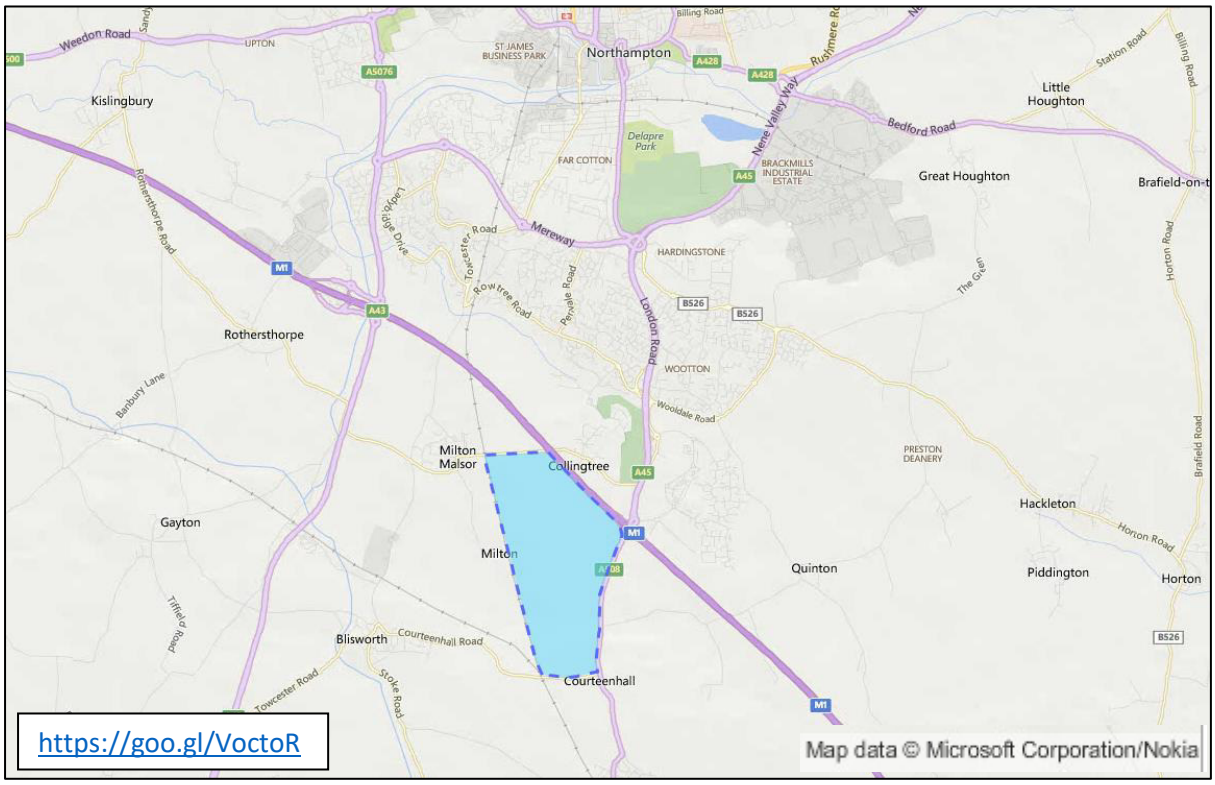

Figure 1 – Proposed Northampton Gateway SFRI

1.1.2. The format of this note is as follows:

- Section 2 – Background – describing the model origins and update to the base model;
- Section 3 – Proposed Mitigation – details the junction improvements proposed by the Northampton Gateway SRFI
- Section 4 – Future Year Flows – detailing the origin of the future year flows used in the modelling;
- Section 5 – Scenarios Modelled – describes the scenarios tested to determine the impact of the proposed Northampton Gateway SRFI on the road network;
- Section 6 – Modelling Outputs – detailing the outputs used to compare the various modelled scenarios;
- Section 7 – 2021 Network Performance Comparison – detailing the DfT Circular 02/2013 modelling performance;
- Section 8 – 2031 Network Performance Comparison – detailing the 2031 modelling performance;
- Section 9 – Overall Summary & Conclusions – providing summarising comments and conclusions.

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2. BACKGROUND

2.1.1. The modelling has been undertaken using the approved 2009 M1 J15 and J15a VISSIM model developed by Highways England (HE), which has been updated to a 2015 base year. Details of Multimodal's changes can be found in the document *'02664TN_LMVR Addendum_170426_v1'*, which can be found in **Appendix A**.

2.1.2. This was signed off by HE's transport consultants, AECOM, on 22nd June 2017 as being a suitable model for future year testing. The extents of the approved 2015 model can be seen in orange in **Figure 2**.

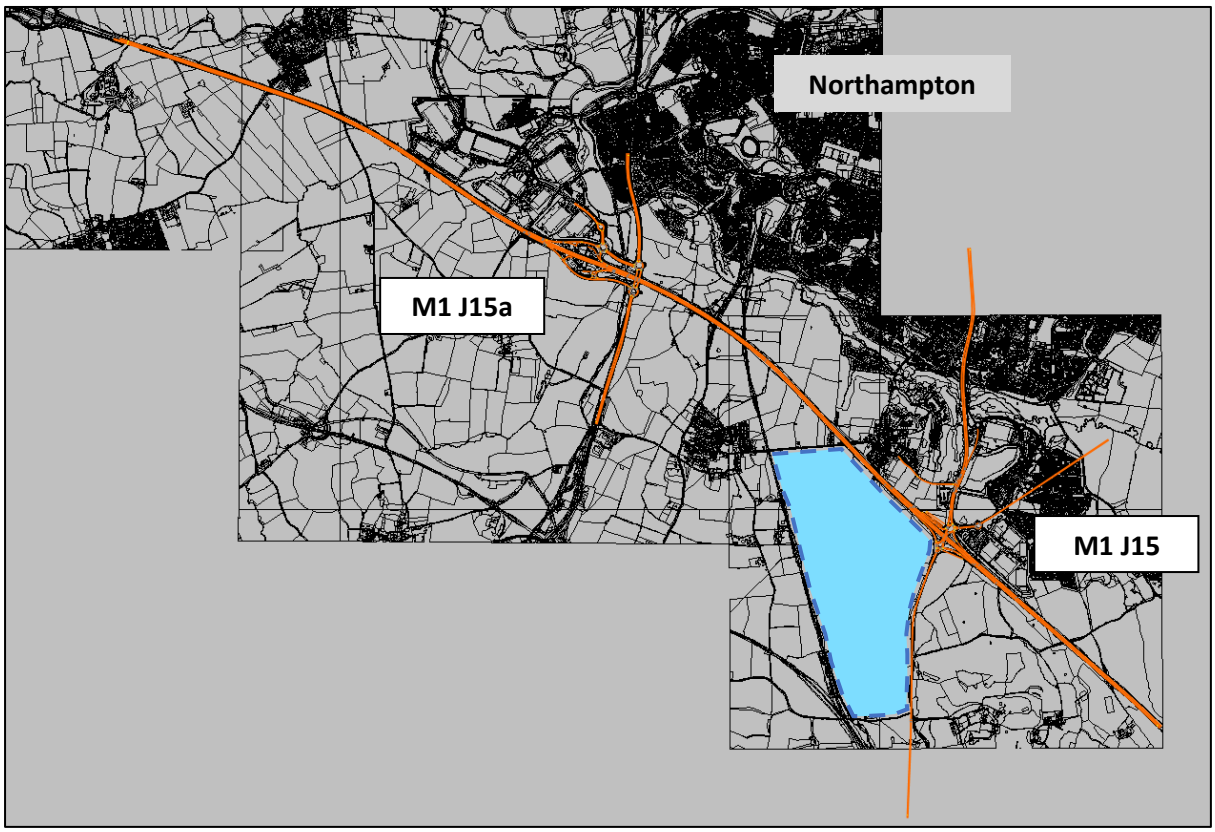

Figure 2 – Approved VISSIM Model Extents

3. PROPOSED MITIGATION

3.1.1. Due to the proximity of the site to M1 J15, the scale of the development proposed, and the existing capacity issues at the junction, significant improvements are proposed at M1 J15 as part of the development. This includes widening of the A45 to the north of the junction and the signalisation of the A45 / Watering Lane junction. A new site access junction is proposed on the A508 south of M1 J15, and the section of the A508 between the site access and M1 J15 would be widened to provide 3 lanes northbound and 2 lanes southbound.

3.1.2. The VISSIM modelling has also identified queuing problems at M1 J15a in the reference case scenarios and as a result, improvements are proposed at this junction to prevent significant queuing on the Strategic Road Network (SRN).

3.1.3. The improvements at each junction are illustrated in Figures 3-6. AutoCAD drawings detailing each of the improvements were provided by ADC Infrastructure Ltd and coded into the model. The full drawings can be found in **Appendix B**, along with the proposed traffic signal set-up diagrams.

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M1 J15

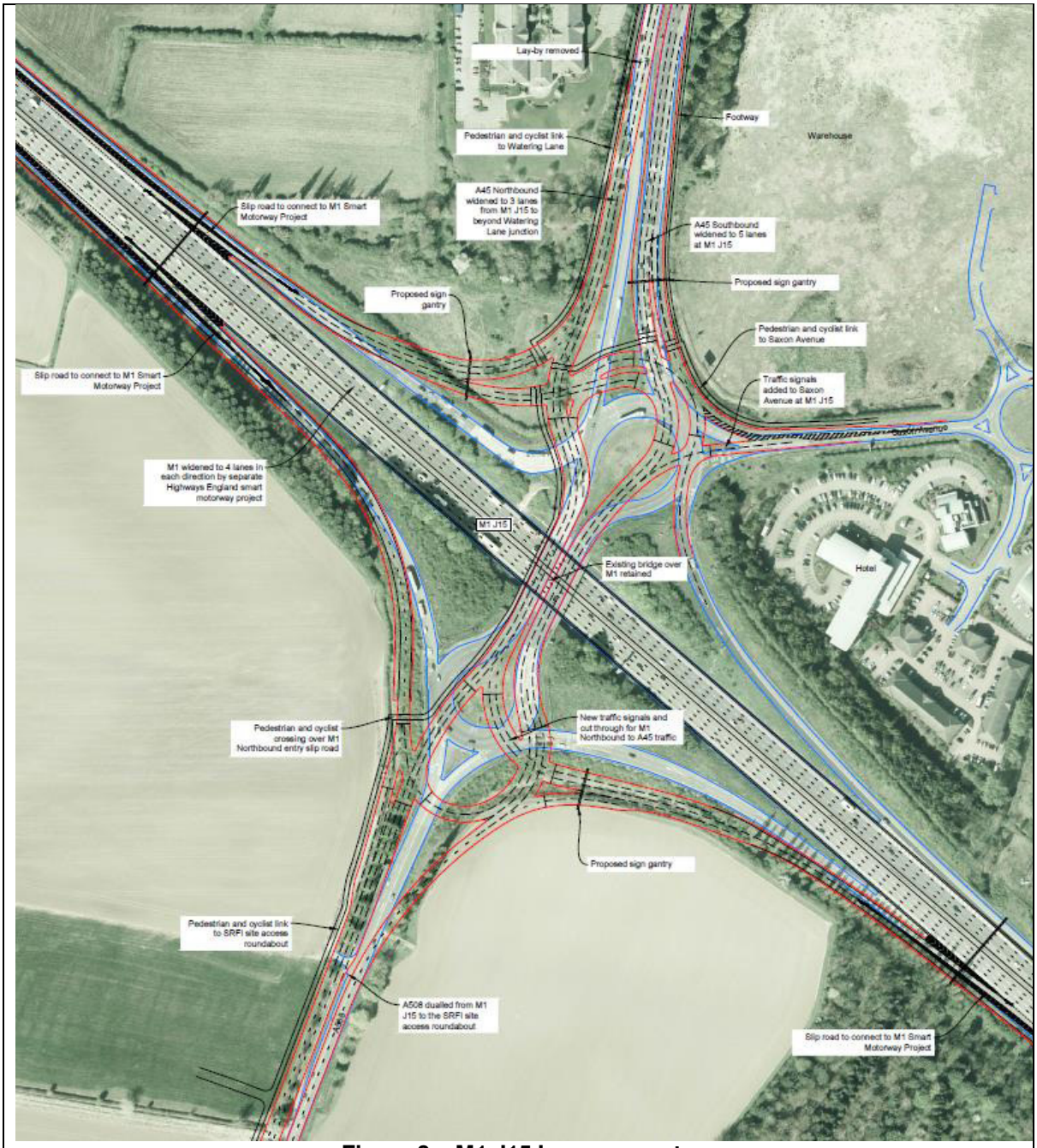

Figure 3 – M1 J15 Improvements

- 5 lane approaches on the A45, M1 Northbound Off-Slip, A508 and M1 Southbound Off-Slip.
- 2 lane approach on Saxon Avenue, which is also now signalised.
- Increased number of lanes on the circulatory sections over the M1.
- New signalised, right turn 'cut throughs' on both the north and south circulatory sections.
- 3 lane exit from M1 J15 to the A45 / Watering Lane junction (northbound direction).
- 2 lane exit from M1 J15 to a new A508 / Site Access junction (southbound direction).
- Proposed 50mph speed limit through and around the junction.

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A45 / Watering Lane

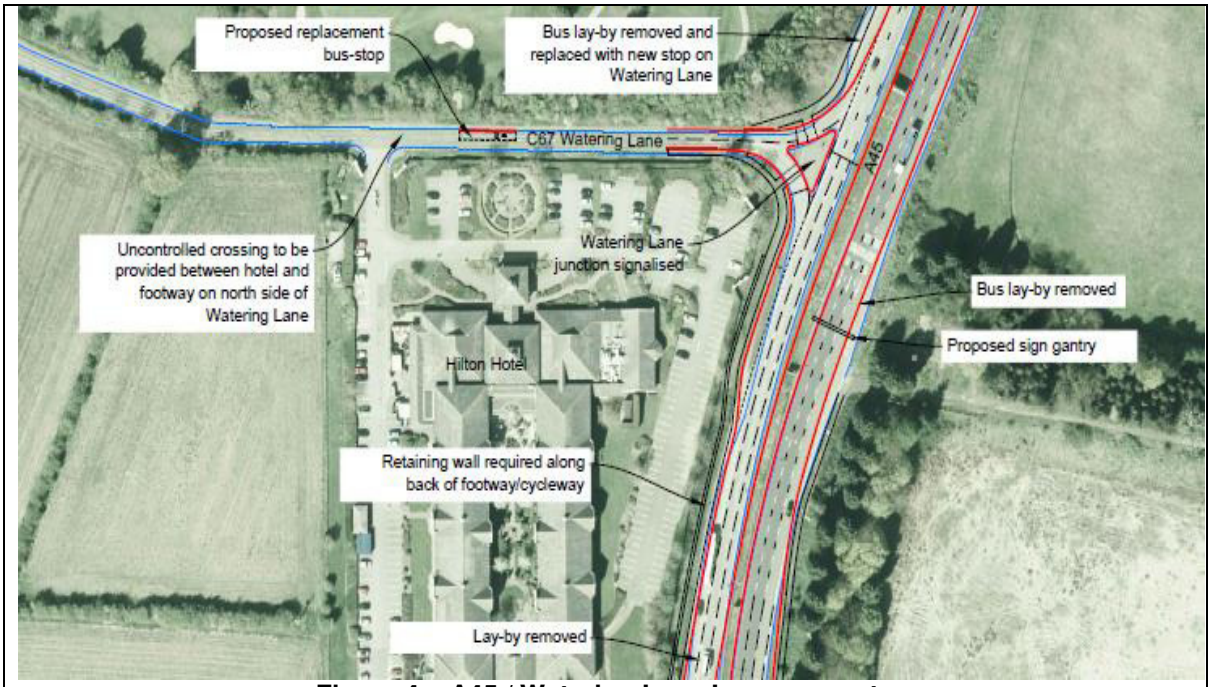

Figure 4 – A45 / Watering Lane Improvements

- Signalisation of A45 Northbound and Watering Lane approaches.
- 3 lanes on A45 travelling northbound, with a merge down to 2 lanes north of the junction.
- Relocation of bus stop from A45 to Watering Lane.

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New Site Access / A508 Junction

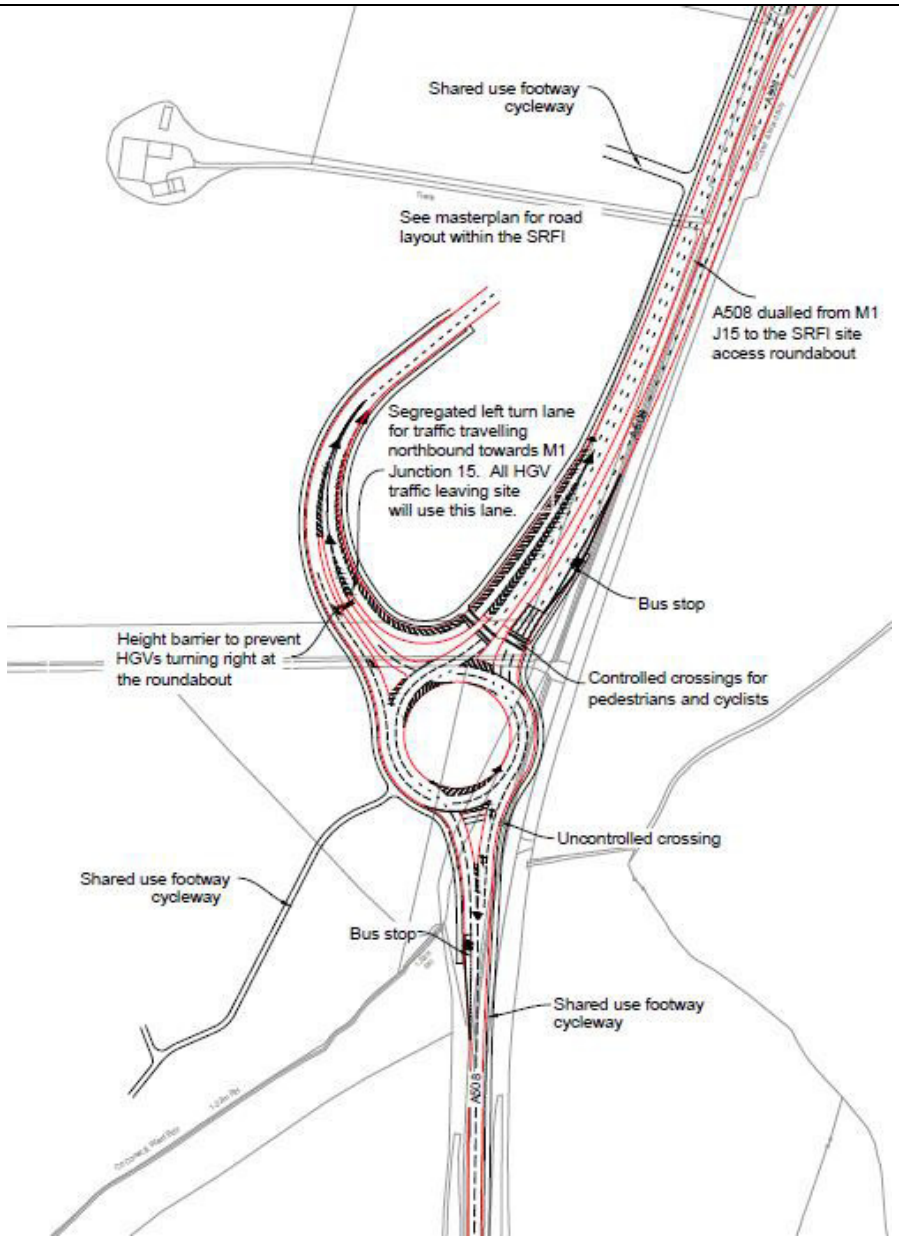

Figure 5 – New A508 / Site Access Roundabout

- 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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M1 J15a

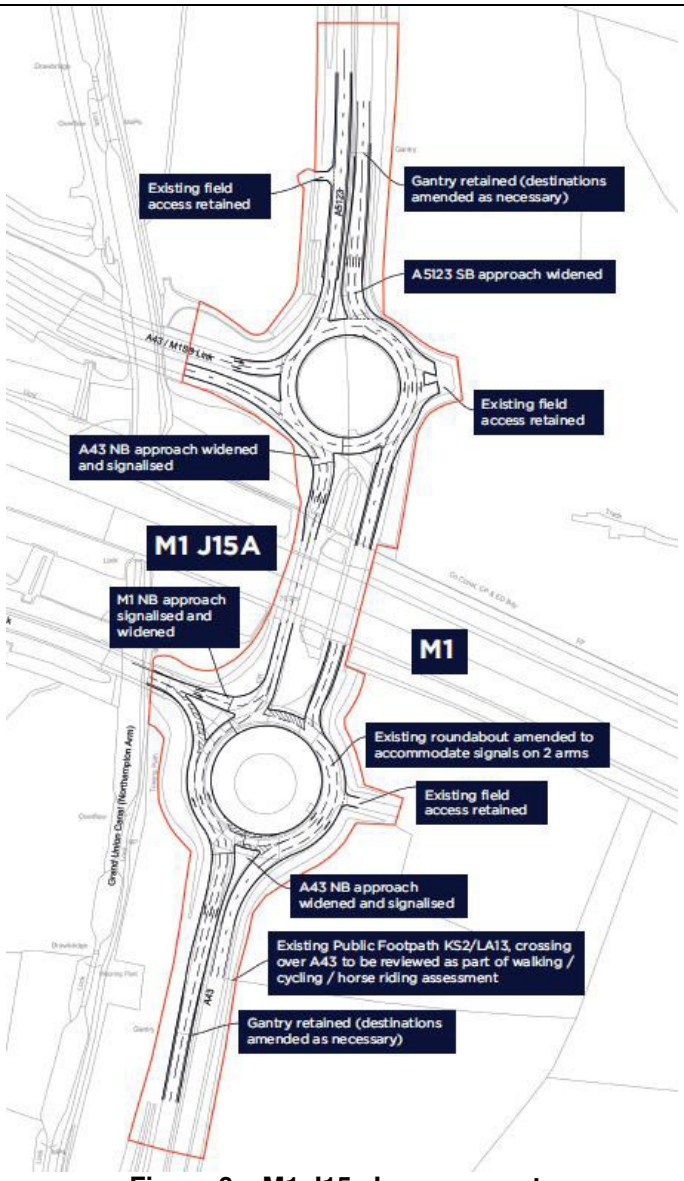

Figure 6 – M1 J15a Improvements

North Roundabout

- 3 lane approach to the roundabout on the A5123 North.
- Additional lane on the eastern circulatory section.
- Signalisation of the A43 South approach and adjacent circulatory section.
- 3 lane approach to the roundabout from the A43 South.
- 2 lanes able to turn right from the M1 Southbound link approach.

South Roundabout

- Additional lanes on the eastern and western circulatory sections.
- Signalisation of the A43 South approach and adjacent circulatory section.
- 3 lane approach to the roundabout on the A43 South.
- Signalisation of the M1 Northbound link approach and adjacent circulatory section
- 2 lane approach to the roundabout from the M1 Northbound link

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4. FUTURE YEAR FLOWS

4.1.1. To test the impacts of the proposed development, future year flows were required. These were obtained by ADC from the Northamptonshire Strategic Transport Model (NSTM2), which is owned by Northamptonshire County Council (NCC) and operated by WSP.

4.1.2. NSTM2 outputs were provided in an origin-destination (O-D) matrix format for lights, heavies, total vehicles and Passenger Car Units (PCUs).

4.1.3. These hourly NSTM2 O-D matrices were converted into 15-minute VISSIM O-D matrices for the warm-up, peak and cool-down periods using factors derived from the observed survey data.

4.1.4. NSTM2 flows were provided 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.

4.1.5. Further details of the NSTM2 outputs and conversion process for each of the above flow-sets can be found in **Appendix C**.

5. SCENARIOS MODELLED

5.1.1. 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*

5.1.2. More details on the changes made to the approved base model to create the various scenarios above can be found in the TNs provided in **Appendix D**.

5.1.3. It should be noted that the VISSIM model and NSTM2 model have different times for the AM and PM peak periods. The VISSIM model uses 0715-0815hrs and 1645-1745hrs, whereas the NSTM2 model uses 0800-0900hrs and 1700-1800hrs. As the NSTM2 peak hour flows have been used in the assessment, the results are reported using the NSTM2 (0800-0900hrs and 1700-1800hrs) peak hour convention, i.e. 0715hrs in the VISSIM model corresponds with the 0800hrs and is reported as such within this Technical Note.

6. MODELLING OUTPUTS

6.1.1. To compare the effects on the network in the four scenarios listed in Section 5, the following outputs have been obtained from the VISSIM models:

1) Journey Times;
2) Traffic Volumes;
3) Queue Lengths;
4) Overall Network Performance.

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6.1.2. Before running the models for results, a convergence exercise was undertaken for each scenario. The results of the convergence levels can be found in **Appendix E**.

6.1.3. It can be seen that not all of the *WebTAG* criteria has been met. However, the percentages achieved between the runs are similar, indicating a relatively stable model for each scenario. To account for the slightly lower convergence levels when running for results, each scenario model was run for double the amount of seed runs (20 instead of 10) to allow a better average to be obtained.

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7. 2021 DFT CIRCULAR 02/2013 PERFORMANCE COMPARISON

7.1.1. The following headings provide details on the key comparisons between the 2021 Reference Case VISSIM model and the 2021 Mitigation model.

Journey Times & Traffic Volumes

7.1.2. A comparison of the journey times and queue lengths between various routes in the network for the AM and PM peak periods can be seen in **Tables 1-4**. **Tables 1 and 2** detail the effects on Cars and **Tables 3 and 4** detail the effects on HGVs. Each zone-to-zone route has been included to allow both network-wide impacts and more specific journey impacts to be understood. It should be noted that **Tables 1-4** compare only the existing network routes. Therefore, the tables summarise the direct impact of the development traffic and highway mitigation on background traffic journey time and the volume of background traffic accommodated by the network.

Table 1: 2021 Journey Time & Volume Comparisons – Cars – AM Peak

AM PEAK												
Cars												
JT No.	From		To		REF CASE	MIT CASE	Difference		REF CASE	MIT CASE	Difference	
					Overall Avg JT (s)	Overall Avg JT (s)			Overall Traffic Volume (Cars)	Overall Traffic Volume (Cars)		
	Zone No.	Site	Zone No.	Site	0800-0900	0800-0900	Time	%	0800-0900	0800-0900	No.	%
1	1	A508	2	M1 South	00:04:25	00:04:27	00:00:02	1%	52	70	18	35%
50			3	Saxon Avenue	00:03:35	00:03:32	-00:00:02	-1%	22	18	-4	-18%
2			4	A45	00:03:45	00:03:23	-00:00:22	-10%	329	384	55	17%
3			5	A43	-	-	-	-	0	0	0	-
51			6	A5123	00:16:26	00:06:48	-00:09:38	-59%	11	56	45	409%
52			12	M1 North	00:07:16	00:06:02	-00:01:14	-17%	237	323	86	36%
76			13	Watering Lane	-	-	-	-	0	0	0	-
53	2	M1 South	1	A508	00:02:48	00:03:13	00:00:25	15%	73	60	-13	-18%
54			3	Saxon Avenue	00:03:20	00:03:40	00:00:20	10%	46	46	0	0%
4			4	A45	00:03:09	00:03:41	00:00:32	17%	1117	1171	54	5%
5			5	A43	00:14:20	00:06:03	-00:08:17	-58%	23	66	43	187%
6			6	A5123	00:14:13	00:06:12	-00:08:00	-56%	94	167	73	78%
7			12	M1 North	00:05:15	00:05:16	00:00:01	0%	2061	2009	-52	-3%
77			13	Watering Lane	00:03:18	00:03:42	00:00:25	12%	38	50	12	32%
55	3	Saxon Avenue	1	A508	00:02:43	00:02:57	00:00:14	9%	4	16	12	300%
56			2	M1 South	00:02:10	00:02:16	00:00:06	4%	38	36	-2	-5%
57			4	A45	00:02:51	00:04:11	00:01:21	47%	16	20	4	25%
58			5	A43	00:25:51	00:07:00	-00:18:51	-73%	1	17	16	1600%
59			6	A5123	-	00:07:12	-	-	0	4	4	-
60			12	M1 North	00:05:55	00:06:24	00:00:30	8%	4	9	5	125%
78			13	Watering Lane	00:02:58	00:04:13	00:01:15	42%	4	11	7	175%
8	4	A45	1	A508	00:05:50	00:03:55	-00:01:55	-33%	498	777	279	56%
61			2	M1 South	00:05:33	00:02:44	-00:02:49	-51%	724	911	187	26%
62			3	Saxon Avenue	00:05:21	00:01:43	-00:03:37	-68%	30	42	12	40%
63			5	A43	00:16:38	00:07:57	-00:08:42	-52%	163	278	115	71%
64			6	A5123	00:16:55	00:08:08	-00:08:47	-52%	5	12	7	140%
9			12	M1 North	00:09:03	00:07:18	-00:01:44	-19%	761	872	111	15%
79			13	Watering Lane	00:18:59	00:12:14	-00:06:45	-36%	77	80	3	4%
10	5	A43	1	A508	-	-	-	-	0	0	0	-
11			2	M1 South	00:06:10	00:06:19	00:00:09	2%	140	139	-1	-1%
65			3	Saxon Avenue	00:06:56	00:06:36	-00:00:21	-5%	20	19	-1	-5%
66			4	A45	00:06:40	00:06:47	00:00:07	2%	101	107	6	6%
12			6	A5123	00:02:45	00:02:40	-00:00:05	-3%	991	906	-85	-9%
13			12	M1 North	00:03:24	00:03:40	00:00:15	8%	371	465	94	25%
80			13	Watering Lane	00:06:55	00:06:50	-00:00:05	-1%	10	6	-4	-40%
67	6	A5123	1	A508	00:07:24	00:07:43	00:00:18	4%	53	45	-8	-15%
68			2	M1 South	00:05:23	00:05:44	00:00:21	6%	221	108	-113	-51%
69			3	Saxon Avenue	00:06:10	00:05:59	-00:00:11	-3%	8	4	-4	-50%
70			4	A45	00:05:53	00:06:15	00:00:22	6%	4	10	6	150%
14			5	A43	00:02:09	00:02:20	00:00:11	8%	1350	1616	266	20%
71			12	M1 North	00:03:45	00:04:08	00:00:23	10%	150	199	49	33%
81			13	Watering Lane	00:06:06	00:06:18	00:00:13	3%	12	10	-2	-17%
72	12	M1 North	1	A508	00:07:16	00:07:20	00:00:05	1%	208	282	74	36%
18			2	M1 South	00:05:11	00:05:17	00:00:06	2%	1981	1969	-12	-1%
73			3	Saxon Avenue	00:06:04	00:05:43	-00:00:20	-6%	55	53	-2	-4%
19			4	A45	00:05:48	00:05:51	00:00:03	1%	712	584	-128	-18%
20			5	A43	00:08:07	00:04:25	-00:03:42	-46%	132	180	48	36%
74			6	A5123	00:05:19	00:03:41	-00:01:39	-31%	233	340	107	46%
82			13	Watering Lane	00:06:02	00:05:56	-00:00:05	-2%	168	165	-3	-2%
75	13	Watering Lane	4	A45	00:01:12	00:01:30	00:00:18	24%	419	322	-97	-23%
Total					**05:17:17**	**04:05:17**	**-01:12:00**	**-23%**	**13767**	**15034**	**1267**	**9%**

7.1.3. **Table 1** shows that overall, with the development traffic and highway mitigation in place, the journey times are reduced in comparison to the reference case. Considering all of the routes, there is an average journey time reduction of 23%.

7.1.4. The most notable routes which benefit from the improvements are from the A508 (to the A5123), M1 South (to A43 & A5123), Saxon Avenue (to A43), A45 (all routes) and the M1 North

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(to A43 & A5123). This is indicated by the cells in green, where the journey times are reduced by 20-70%.

7.1.5. The routes with the greatest increase in journey times are from Saxon Avenue to the A45 and to Watering Lane, where the increases are around 45%. This is due to the improvements introducing additional signalised stop-lines for these routes, along with having to travel around a physically larger junction, both of which would add delays to these vehicles. It should be noted that, considering the overall traffic volumes (15,034), the number of vehicles undertaking these movements (20 & 11) are low in comparison to the majority of the other routes (0.2% of the total volume).

7.1.6. With regards to the overall background traffic volumes, the mitigation schemes are successful in allowing more movements within the network, with an extra 9%, an increase of 1267 cars in comparison to the reference case. This increase is in addition to the development traffic.

Table 2: 2021 Journey Time & Volume Comparisons – Cars – PM Peak

PM PEAK												
Cars												
JT No.	From		To		REF CASE	MIT CASE	Difference		REF CASE	MIT CASE	Difference	
					Overall Avg JT (s)	Overall Avg JT (s)			Overall Traffic Volume (Cars)	Overall Traffic Volume (Cars)		
	Zone No.	Site	Zone No.	Site	1700-1800	1700-1800	Time	%	1700-1800	1700-1800	No.	%
1	1	A508	2	M1 South	00:08:12	00:04:13	-00:03:59	-49%	55	43	-12	-22%
50			3	Saxon Avenue	00:07:27	00:03:18	-00:04:09	-56%	11	19	8	73%
2			4	A45	00:07:49	00:03:26	-00:04:22	-56%	468	664	196	42%
3			5	A43	-	-	-	-	0	0	0	-
51			6	A5123	00:50:49	00:07:07	-00:43:42	-86%	3	40	37	1233%
52			12	M1 North	00:11:58	00:06:03	-00:05:55	-49%	208	325	117	56%
76			13	Watering Lane	00:07:52	-	-	-	4	0	-4	-100%
53	2	M1 South	1	A508	00:02:54	00:03:08	00:00:15	8%	143	99	-44	-31%
54			3	Saxon Avenue	00:03:17	00:03:24	00:00:07	4%	28	32	4	14%
4			4	A45	00:03:05	00:03:33	00:00:27	15%	1059	1091	32	3%
5			5	A43	00:42:27	00:06:10	-00:36:17	-85%	58	132	74	128%
6			6	A5123	00:42:57	00:06:30	-00:36:27	-85%	131	507	376	287%
7			12	M1 North	00:05:43	00:05:19	-00:00:25	-7%	2143	1996	-147	-7%
77			13	Watering Lane	00:03:13	00:03:32	00:00:19	10%	93	149	56	60%
55	3	Saxon Avenue	1	A508	00:03:00	00:02:49	-00:00:11	-6%	8	9	1	13%
56			2	M1 South	00:02:21	00:02:17	-00:00:04	-3%	44	42	-2	-5%
57			4	A45	00:02:48	00:04:07	00:01:20	48%	20	17	-3	-15%
58			5	A43	-	-	-	-	0	0	0	-
59			6	A5123	00:46:31	-	-	-	1	0	-1	-100%
60			12	M1 North	00:06:53	00:06:25	-00:00:28	-7%	30	35	5	17%
78			13	Watering Lane	-	-	-	-	0	0	0	-
8	4	A45	1	A508	00:04:54	00:03:09	-00:01:45	-36%	684	861	177	26%
61			2	M1 South	00:04:28	00:02:32	-00:01:56	-43%	779	777	-2	0%
62			3	Saxon Avenue	00:03:55	00:01:31	-00:02:24	-61%	64	72	8	13%
63			5	A43	00:44:11	-	-	-	17	0	-17	-100%
64			6	A5123	00:43:48	-	-	-	6	0	-6	-100%
9			12	M1 North	00:08:48	00:06:36	-00:02:11	-25%	1043	1128	85	8%
79			13	Watering Lane	00:46:07	00:11:49	-00:34:18	-74%	42	86	44	105%
10	5	A43	1	A508	-	-	-	-	0	0	0	-
11			2	M1 South	00:11:40	00:06:39	-00:05:00	-43%	188	245	57	30%
65			3	Saxon Avenue	00:12:22	-	-	-	7	0	-7	-100%
66			4	A45	00:12:03	-	-	-	4	0	-4	-100%
12			6	A5123	00:08:38	00:02:57	-00:05:42	-66%	962	1000	38	4%
13			12	M1 North	00:08:46	00:03:50	-00:04:56	-56%	310	481	171	55%
80			13	Watering Lane	-	-	-	-	0	0	0	-
67	6	A5123	1	A508	00:07:13	00:07:33	00:00:19	4%	39	19	-20	-51%
68			2	M1 South	00:05:24	00:05:53	00:00:29	9%	270	204	-66	-24%
69			3	Saxon Avenue	00:05:50	00:06:05	00:00:15	4%	12	11	-1	-8%
70			4	A45	00:05:41	00:06:20	00:00:38	11%	40	16	-24	-60%
14			5	A43	00:02:04	00:02:06	00:00:03	2%	796	951	155	19%
71			12	M1 North	00:03:54	00:03:56	00:00:02	1%	302	239	-63	-21%
81			13	Watering Lane	-	-	-	-	0	0	0	-
72	12	M1 North	1	A508	00:07:10	00:06:59	-00:00:11	-3%	131	193	62	47%
18			2	M1 South	00:05:16	00:05:19	00:00:04	1%	2300	2305	5	0%
73			3	Saxon Avenue	00:05:49	00:05:39	-00:00:10	-3%	37	48	11	30%
19			4	A45	00:05:38	00:05:53	00:00:15	4%	830	737	-93	-11%
20			5	A43	00:23:43	00:04:37	-00:19:06	-81%	252	387	135	54%
74			6	A5123	00:21:22	00:04:10	-00:17:12	-80%	264	406	142	54%
82			13	Watering Lane	-	-	-	-	0	0	0	-
75	13	Watering Lane	4	A45	00:01:09	00:01:33	00:00:24	35%	233	161	-72	-31%
Total					**09:29:11**	**02:56:30**	**-06:32:41**	**-69%**	**14119**	**15527**	**1408**	**10%**

7.1.7. In the PM peak, the overall picture is a greater reduction in journey times with the mitigation schemes in place. Overall, there is a 69% average reduction in journey times, when considering all routes.

7.1.8. There are notable routes with significantly reduced journey times, including the A508 (all routes), M1 South (to the A43 & A5123), A45 (all routes), A43 (all routes) and the M1 North (to the A43 & A4123). These have benefits ranging from 35% to 85%.

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7.1.9. The routes with the greatest increases in journey time are from Saxon Avenue to the A45 and from Watering Lane to the A45, where the journey time increases are 48% and 35% respectively. For the Saxon Avenue route, this is a result of vehicles having to navigate a larger junction, as well as an increased number of signalised stop-lines. For the Watering Lane route, this will be due to the junction with the A45 now being signalised, whereas before it was priority controlled. Despite these increases, it should be noted that these routes have 178 vehicles in total, which equates to 1.1% of the total traffic volume in the network.

7.1.10. Looking at the overall background traffic volumes, the mitigation schemes are allowing an additional 10% of traffic to use the network, an increase of 1,408 cars in comparison to the reference case. This increase is in addition to the development traffic.

Table 3: 2021 Journey Time & Volume Comparisons – HGVs – AM Peak

AM PEAK												
HGVs												
JT No.	From		To		REF CASE Overall Avg JT (s)	MIT CASE Overall Avg JT (s)	Difference		REF CASE Overall Traffic Volume (Cars)	MIT CASE Overall Traffic Volume (Cars)	Difference	
	Zone No.	Site	Zone No.	Site	0800-0900	0800-0900	Time	%	0800-0900	0800-0900	No.	%
1	1	A508	2	M1 South	-	-	-	-	0	0	0	-
50			3	Saxon Avenue	-	-	-	-	0	0	0	-
2			4	A45	00:03:56	00:03:38	-00:00:18	-8%	8	4	-4	-50%
3			5	A43	-	-	-	-	0	0	0	-
51			6	A5123	-	-	-	-	0	0	0	-
52			12	M1 North	00:07:55	00:06:51	-00:01:05	-14%	8	30	22	275%
76			13	Watering Lane	-	-	-	-	0	0	0	-
53	2	M1 South	1	A508	-	-	-	-	0	0	0	-
54			3	Saxon Avenue	00:03:35	00:04:01	00:00:26	12%	12	12	0	0%
4			4	A45	00:03:26	00:04:01	00:00:35	17%	117	118	1	1%
5			5	A43	-	-	-	-	0	0	0	-
6			6	A5123	00:15:14	00:06:41	-00:08:33	-56%	7	14	7	100%
7			12	M1 North	00:06:08	00:06:08	-00:00:01	0%	386	374	-12	-3%
77			13	Watering Lane	-	-	-	-	0	0	0	-
55	3	Saxon Avenue	1	A508	-	-	-	-	0	0	0	-
56			2	M1 South	-	-	-	-	0	0	0	-
57			4	A45	-	-	-	-	0	0	0	-
58			5	A43	-	-	-	-	0	0	0	-
59			6	A5123	-	-	-	-	0	0	0	-
60			12	M1 North	-	-	-	-	0	0	0	-
78			13	Watering Lane	-	-	-	-	0	0	0	-
8	4	A45	1	A508	00:05:54	00:04:07	-00:01:47	-30%	4	8	4	100%
61			2	M1 South	00:05:37	00:02:58	-00:02:39	-47%	39	50	11	28%
62			3	Saxon Avenue	-	-	-	-	0	0	0	-
63			5	A43	-	-	-	-	0	0	0	-
64			6	A5123	-	-	-	-	0	0	0	-
9			12	M1 North	00:09:47	00:08:01	-00:01:46	-18%	166	162	-4	-2%
79			13	Watering Lane	-	-	-	-	0	0	0	-
10	5	A43	1	A508	-	-	-	-	0	0	0	-
11			2	M1 South	-	-	-	-	0	0	0	-
65			3	Saxon Avenue	-	-	-	-	0	0	0	-
66			4	A45	-	-	-	-	0	0	0	-
12			6	A5123	00:02:57	00:02:51	-00:00:06	-3%	138	146	8	6%
13			12	M1 North	00:03:47	00:03:58	00:00:11	5%	4	4	0	0%
80			13	Watering Lane	-	-	-	-	0	0	0	-
67	6	A5123	1	A508	-	-	-	-	0	0	0	-
68			2	M1 South	-	-	-	-	0	0	0	-
69			3	Saxon Avenue	-	-	-	-	0	0	0	-
70			4	A45	-	-	-	-	0	0	0	-
14			5	A43	00:02:21	00:02:30	00:00:09	6%	105	105	0	0%
71			12	M1 North	00:04:09	00:04:28	00:00:19	8%	10	22	12	120%
81			13	Watering Lane	-	-	-	-	0	0	0	-
72	12	M1 North	1	A508	00:07:47	00:07:52	00:00:05	1%	48	63	15	31%
18			2	M1 South	00:06:02	00:06:09	00:00:08	2%	544	525	-19	-3%
73			3	Saxon Avenue	-	-	-	-	0	0	0	-
19			4	A45	00:06:20	00:06:23	00:00:03	1%	70	72	2	3%
20			5	A43	00:08:24	00:04:40	-00:03:44	-44%	77	87	10	13%
74			6	A5123	00:05:43	00:03:52	-00:01:51	-32%	8	3	-5	-63%
82			13	Watering Lane	-	-	-	-	0	0	0	-
75	13	Watering Lane	4	A45	-	-	-	-	0	0	0	-
Total					**01:49:02**	**01:29:09**	**-00:19:53**	**-18%**	**1751**	**1799**	**48**	**3%**

7.1.11. **Table 3** shows that the overall picture is a greater reduction in journey times with the mitigation in place. When considering all routes, there is a 18% reduction in journey times.

7.1.12. There are five notable routes with journey time reductions – M1 South to A5123, A45 to the A508 and the M1 South, M1 North to the A43 and M1 North to the A5123. These have reductions in the region of 30-55%.

7.1.13. The journey time with the biggest increase is from the M1 South to the A45, where the increase is 17% (35 seconds). A likely reason for this is the negotiation of additional signalised stop-lines at J15 and the new signalised junction at the A45 / Watering Lane junction.

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As with the Cars in the AM peak, the improvements allow more HGVs to navigate the network, with a 3% increase over the reference case. This increase is in addition to the development traffic.

Table 4: 2021 Journey Time & Volume Comparisons – HGVs – PM Peak

PM PEAK												
HGVs												
JT No.	From		To		REF CASE	MIT CASE	Difference		REF CASE	MIT CASE	Difference	
					Overall Avg JT (s)	Overall Avg JT (s)			Overall Traffic Volume (Cars)	Overall Traffic Volume (Cars)		
	Zone No.	Site	Zone No.	Site	1700-1800	1700-1800	Time	%	1700-1800	1700-1800	No.	%
1	1	A508	2	M1 South	-	-	-	-	0	0	0	-
50			3	Saxon Avenue	-	-	-	-	0	0	0	-
2			4	A45	00:08:04	00:03:33	-00:04:30	-56%	4	4	0	0%
3			5	A43	-	-	-	-	0	0	0	-
51			6	A5123	-	-	-	-	0	0	0	-
52			12	M1 North	00:13:23	00:06:48	-00:06:35	-49%	33	40	7	21%
76			13	Watering Lane	-	-	-	-	0	0	0	-
53	2	M1 South	1	A508	-	-	-	-	0	0	0	-
54			3	Saxon Avenue	-	-	-	-	0	0	0	-
4			4	A45	00:03:23	00:03:52	00:00:29	14%	98	92	-6	-6%
5			5	A43	-	-	-	-	0	0	0	-
6			6	A5123	00:44:29	00:06:51	-00:37:38	-85%	8	12	4	50%
7			12	M1 North	00:07:28	00:06:08	-00:01:20	-18%	360	360	0	0%
77			13	Watering Lane	-	-	-	-	0	0	0	-
55	3	Saxon Avenue	1	A508	-	-	-	-	0	0	0	-
56			2	M1 South	00:02:34	00:02:35	00:00:00	0%	16	16	0	0%
57			4	A45	-	-	-	-	0	0	0	-
58			5	A43	-	-	-	-	0	0	0	-
59			6	A5123	-	-	-	-	0	0	0	-
60			12	M1 North	00:08:39	00:07:05	-00:01:34	-18%	27	31	4	15%
78			13	Watering Lane	-	-	-	-	0	0	0	-
8	4	A45	1	A508	00:04:56	00:03:17	-00:01:38	-33%	25	24	-1	-4%
61			2	M1 South	00:04:38	00:02:45	-00:01:53	-41%	26	32	6	23%
62			3	Saxon Avenue	-	-	-	-	0	0	0	-
63			5	A43	-	-	-	-	0	0	0	-
64			6	A5123	-	-	-	-	0	0	0	-
9			12	M1 North	00:10:21	00:07:20	-00:03:01	-29%	34	41	7	21%
79			13	Watering Lane	-	-	-	-	0	0	0	-
10	5	A43	1	A508	-	-	-	-	0	0	0	-
11			2	M1 South	-	-	-	-	0	0	0	-
65			3	Saxon Avenue	-	-	-	-	0	0	0	-
66			4	A45	-	-	-	-	0	0	0	-
12			6	A5123	00:08:51	00:03:08	-00:05:43	-65%	101	123	22	22%
13			12	M1 North	-	-	-	-	0	0	0	-
80			13	Watering Lane	-	-	-	-	0	0	0	-
67	6	A5123	1	A508	-	-	-	-	0	0	0	-
68			2	M1 South	00:06:04	00:06:38	00:00:34	9%	16	13	-3	-19%
69			3	Saxon Avenue	-	-	-	-	0	0	0	-
70			4	A45	-	-	-	-	0	0	0	-
14			5	A43	00:02:18	00:02:20	00:00:02	1%	65	61	-4	-6%
71			12	M1 North	00:04:14	00:04:17	00:00:03	1%	8	4	-4	-50%
81			13	Watering Lane	-	-	-	-	0	0	0	-
72	12	M1 North	1	A508	00:07:40	00:07:30	-00:00:10	-2%	56	66	10	18%
18			2	M1 South	00:06:05	00:06:08	00:00:04	1%	392	392	0	0%
73			3	Saxon Avenue	00:06:15	00:06:08	-00:00:07	-2%	16	16	0	0%
19			4	A45	00:06:11	00:06:24	00:00:13	4%	77	76	-1	-1%
20			5	A43	-	-	-	-	0	0	0	-
74			6	A5123	00:21:27	00:04:21	-00:17:07	-80%	41	76	35	85%
82			13	Watering Lane	-	-	-	-	0	0	0	-
75	13	Watering Lane	4	A45	-	-	-	-	0	0	0	-
Total					**02:57:01**	**01:37:10**	**-01:19:51**	**-45%**	**1403**	**1479**	**76**	**5%**

7.1.14. **Table 4** shows that that the overall picture is a greater reduction in journey times with the mitigation in place, with a 45% reduction in HGV journey times when considering all routes.

7.1.15. There are three routes with notable journey time reductions – M1 South to A5123, A43 to the A4123 and the M1 North to the A5123. These routes have reductions ranging from 65% to 85%.

7.1.16. The route with the greatest increase in journey time is the M1 South to the A45, where the increase is 14%. This increase is likely to be a result of the increased number of signals that the HGVs must negotiate through with the improvements in place.

7.1.17. For the overall background traffic volumes, there is a 5% increase in HGV movements with the improvement schemes in place over the reference case scenario. This increase is in addition to the development traffic.

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Queue Lengths

7.1.18. A comparison of the average and maximum (average) queue lengths (in metres) at M1 J15 and M1 J15a can be seen in **Figures 7, 8, 10 and 11** for the AM and PM peaks, with **Appendix F** providing more detailed queue results.

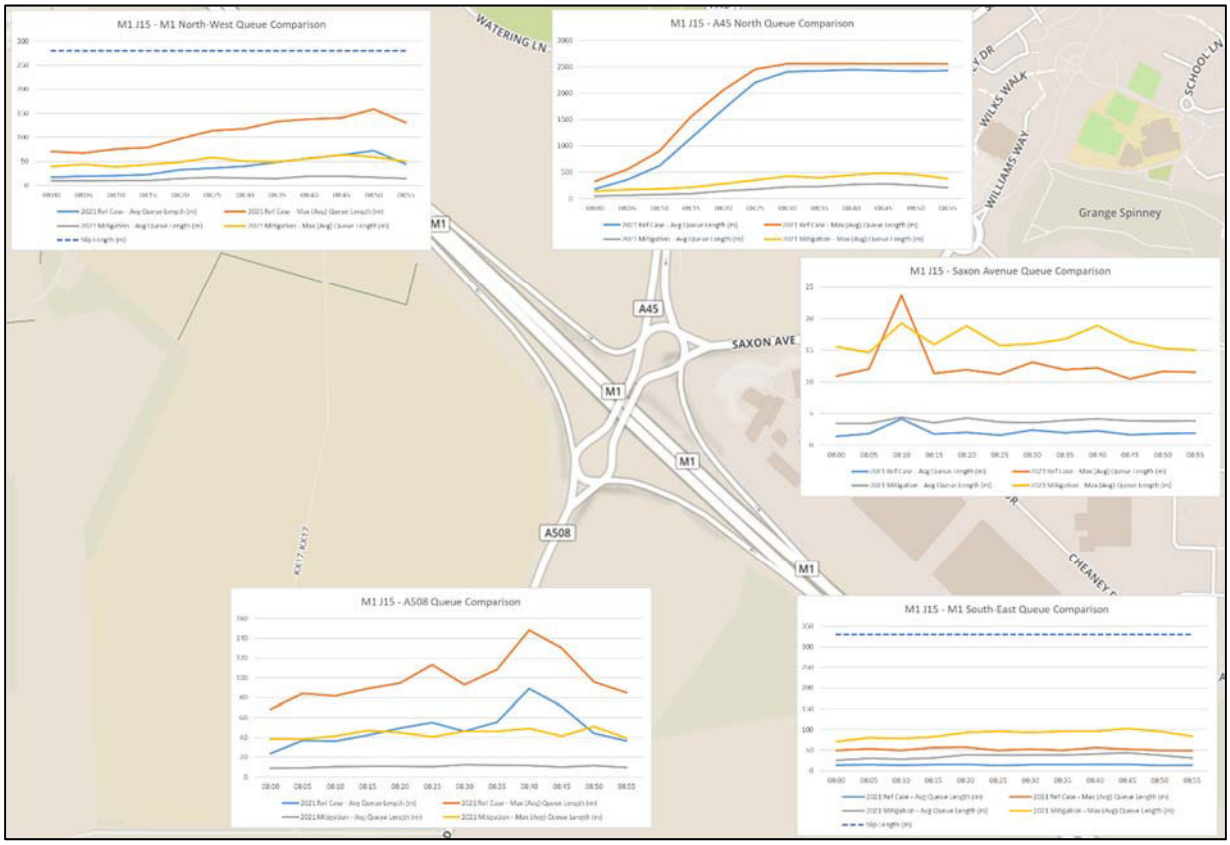

Figure 7 – 2021 M1 J15 Queue Comparison – AM (queue in metres)

7.1.19. At M1 Junction 15 in the AM peak hour (**Figure 7**) on the M1 NW approach, the average and maximum queue lengths in both scenarios are consistent until 0810hrs. After this point, the reference case queues increase up to ~70m at 0850hrs, before starting to fall again. The mitigation scenario queues remain constant at ~15m on average.

7.1.20. The A45 North approach queues extend to 2.5km in the reference case, which is the extent of the VISSIM network. Given that the lengths plateau at around 0830hrs, it is likely that the queues would extend further than the 2.5km specified. In the mitigation scenario, the average queues reach up to ~200m, providing a significant improvement over the reference case.

7.1.21. The M1 SE approach has higher average queues in the mitigation scenario compared to the reference case, with lengths reaching ~100m in comparison to ~40m. The reason for this is the new junction configuration and increased flows from the A45 North approach travelling south to the A508 and to the M1 northbound off-slip, which causes additional calling of the signals and in turn affects the length of queue on the M1 SE approach. Despite this, it should be noted that whilst the queue lengths are increased, they do not reach back to the M1 mainline and facilitate the significant reduction in queuing on the A45 reported above.

7.1.22. The A508 approach has increased average queue lengths in the reference case as the AM peak progresses, with queues reaching ~90m at their highest. Conversely, the mitigation scheme has average queues of ~10m, a significant improvement over the reference case.

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7.1.23. Finally, the Saxon Avenue approach has similar queue lengths when comparing the average (~2m compared to 5m), but has a higher maximum (average) length in the mitigation scenario (~18m compared to ~13m in the reference case). This is expected given this approach is now being signalised, which will add delay compared to the previous priority controlled arrangement.

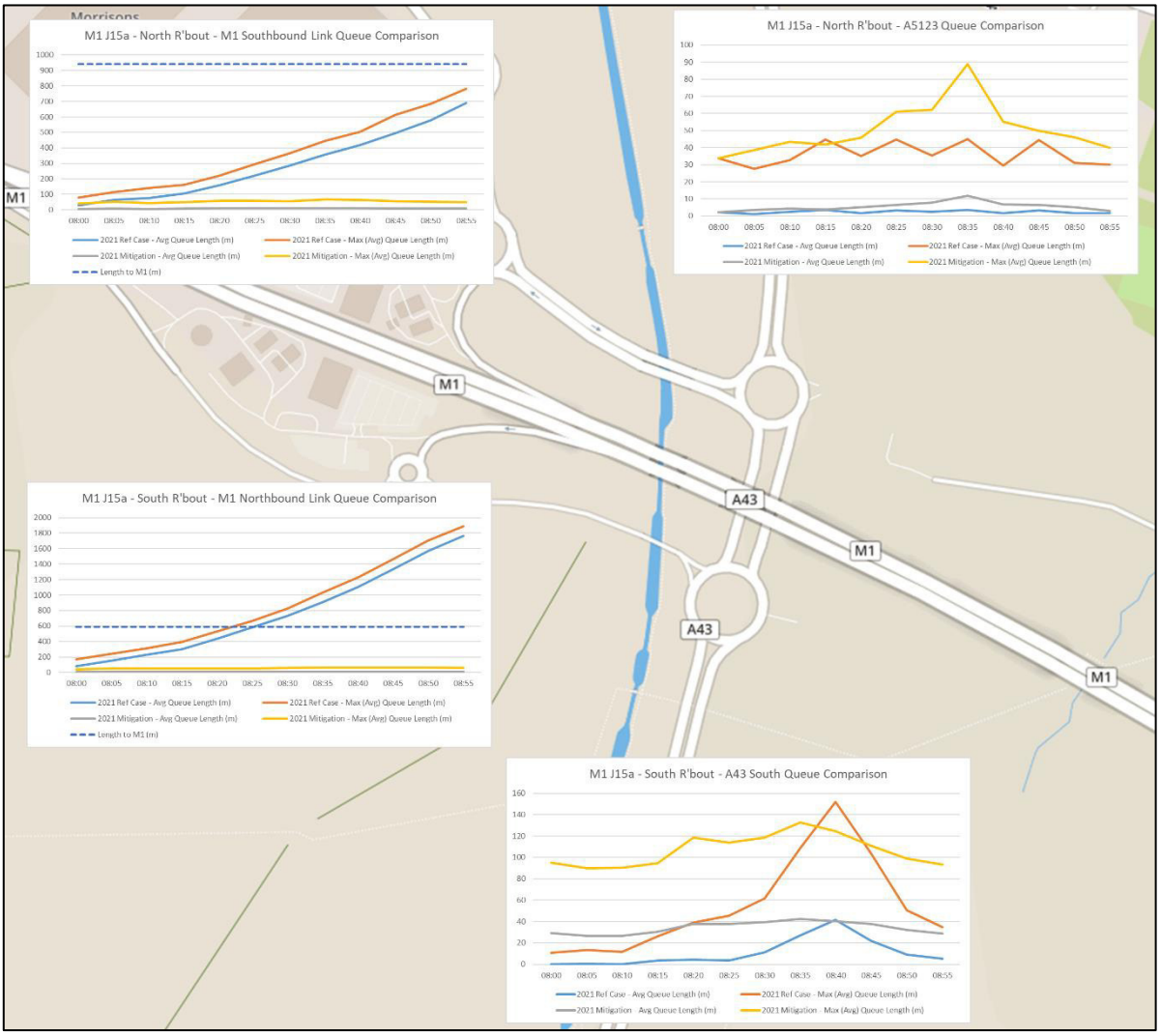

Figure 8 – 2021 M1 J15a Queue Comparison – AM (queue in metres)

7.1.24. At M1 Junction 15a in the AM peak hour (**Figure 8**), at the North roundabout, the average and maximum queue lengths in both scenarios are consistent on the M1 SB link until 0815hrs. After this point, the reference case queues increase sharply for the rest of the peak period (up to ~800m in length), whilst the mitigation scenario remains the same (~100m).

7.1.25. The A5123 approach has similar average queue lengths through the peak period, with both scenarios ~5m in length. There is more variation in the average (maximum) queues, with the mitigation case reaching 90m and the reference case ~50m. This is likely due to more traffic being able to enter the roundabout from the M1 SB link, which will reduce the gaps available to pull out in some instances.

7.1.26. At the South roundabout, the M1 NB link has significant queuing in the reference case, with average queues reaching back to the mainline at 0825hrs and continuing to increase. This has safety implications for the M1. The mitigation scenario dramatically reduces this queue and

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allows the length to be contained within the M1 NB link, removing any M1 mainline safety issues. A network performance comparison is shown in **Figure 9**.

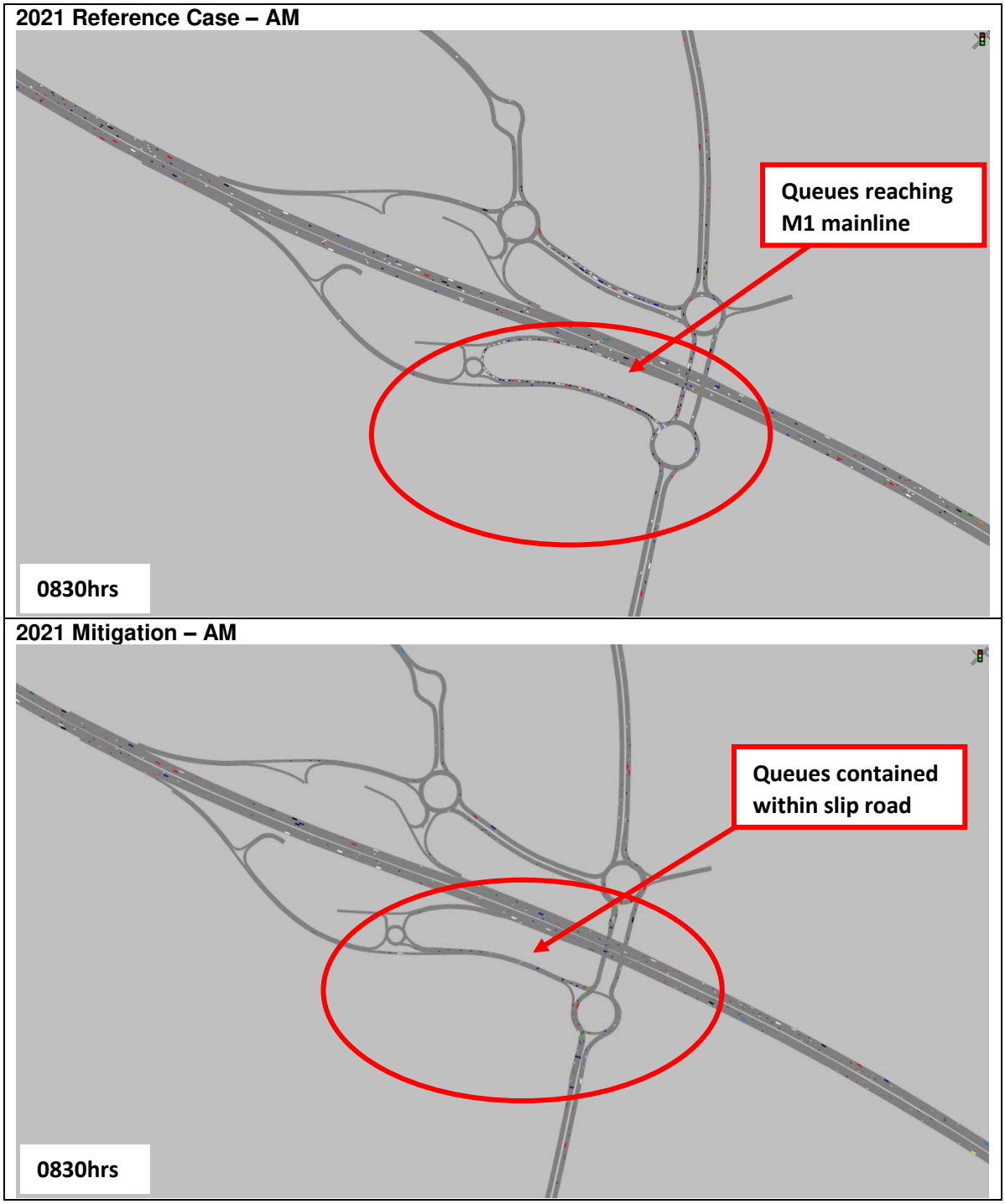

Figure 9 – 2021 VISSIM Comparison – M1 J15a – M1 NB Link

7.1.27. On the A43 approach, the mitigation scheme has larger average and maximum (average) queues in comparison to the reference case. This is due to the new configuration and signalisation of this approach. Whilst this helps to reduce the queuing elsewhere, the requirement to manage the A43 approach traffic more formally leads to the increased queue lengths.

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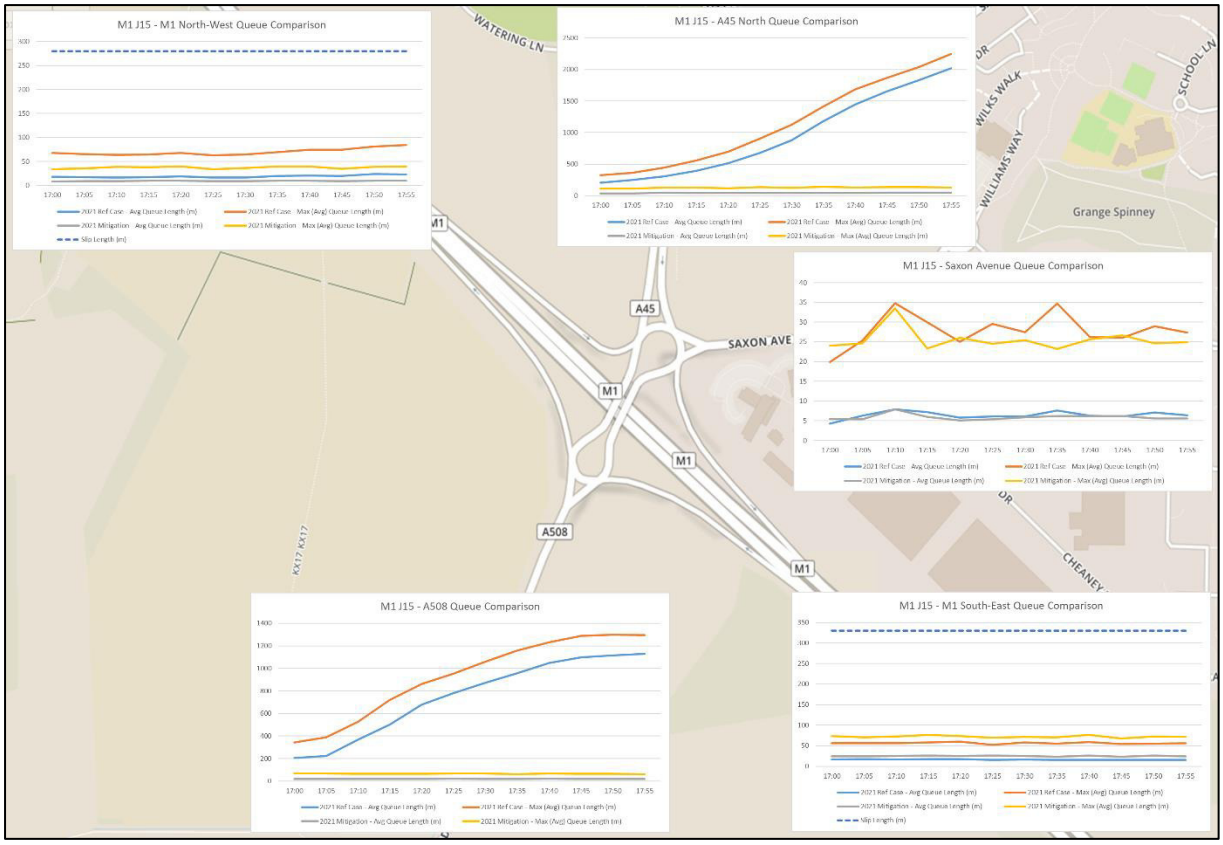

Figure 10 – 2021 M1 J15 Queue Comparison – PM (queue in metres)

7.1.28. At M1 Junction 15 in the PM peak hour (**Figure 10**), the M1 SE approach queues are relatively similar between the two scenarios, with average queues ~25m in length. However, the mitigation scenario does have slightly larger maximum (average) queue lengths (~75m in comparison to 50m in the reference case), but these are still within the length of the slip road.

7.1.29. As in the AM peak, the A45 North approach in the reference case scenario reaches towards the end of the modelled network (2.5km in length). The mitigation scenario drastically reduces this queue, with average and maximum (average) queues of ~50m and ~100m respectively.

7.1.30. The M1 NW approach has similar average queues in the two scenarios (~20-30m), but has slightly higher maximum (average) queues in the reference case (~75m compared to 40m). However, it should be noted that both scenarios have queue lengths within the lengths of the slip road.

7.1.31. The mitigation scenario reduces the queues on the A508 approach, with both the average and maximum (average) queues being significantly lower than the reference case. The reference case queues reach up to 1.3km in length, whereas the mitigation scenario has queues ~50m.

7.1.32. Finally, the Saxon Avenue approach has similar average queue lengths between the two scenarios (~8m) and slightly higher maximum (average) queue lengths in the reference case.

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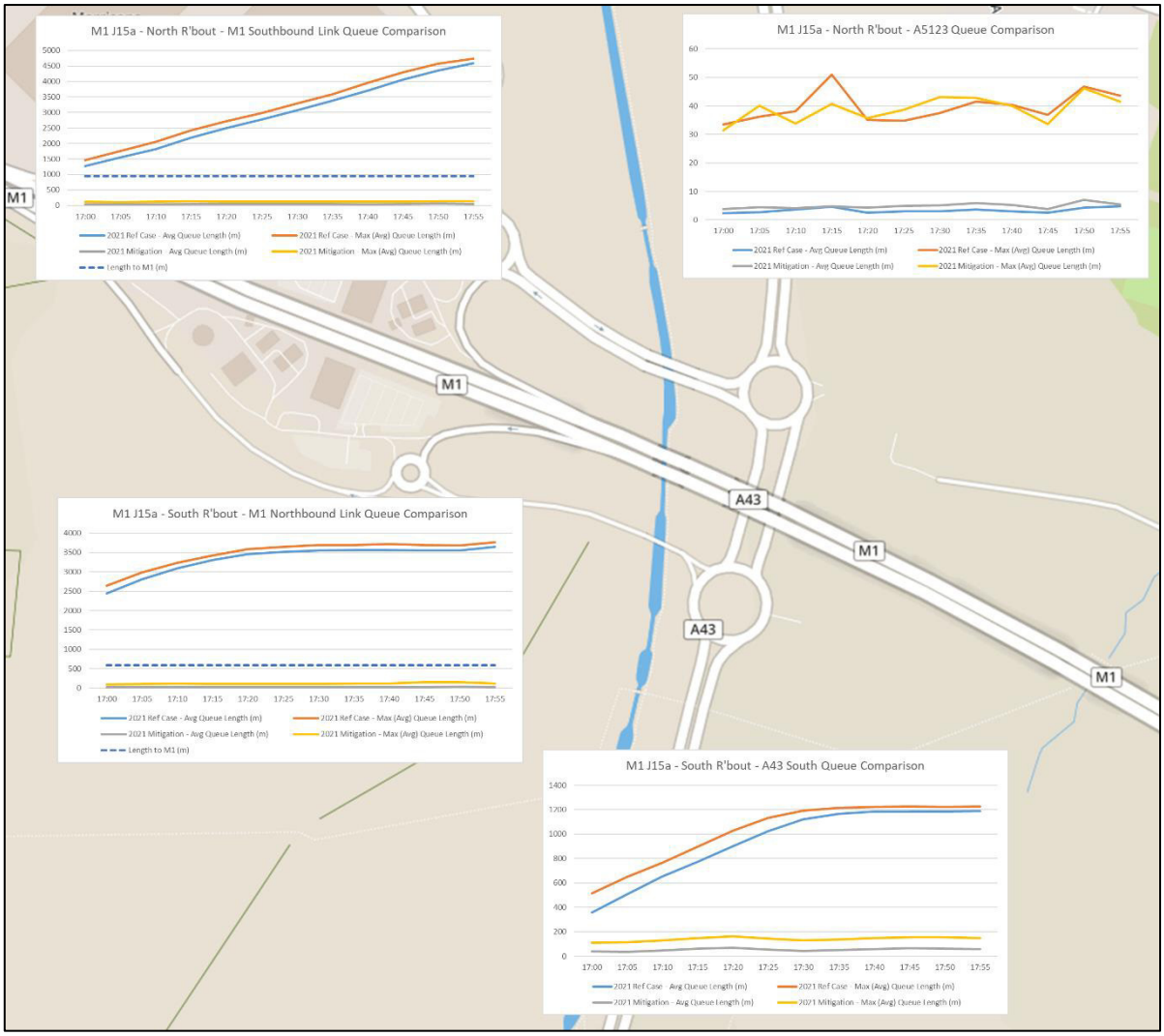

Figure 11 – 2021 M1 J15a Queue Comparison – PM (queue in metres)

7.1.33. At M1 Junction 15a in the PM peak hour (**Figure 11**), at the North roundabout, the M1 SB link experiences significant queuing back to the M1 mainline, even before the peak period has begun in the reference case. These queues reach back as far as the model extents, ~5km in length and will have safety implications. In the mitigation scenario, the junction improvements reduce this queue drastically and allow the queues to be contained within the SB link. A network comparison is shown in **Figure 12**.

7.1.34. On the A5123 approach, the average queues in the reference case and mitigation scenario are similar (~5m). There is a bit more fluctuation with the maximum (average) queues, but these are still not significant lengths (~40m).

7.1.35. On the M1 NB link, the queues in the reference case have already stretched beyond the length of the link before the start of the peak and cause M1 mainline flow breakdown. This queue continues to lengthen, up to nearly 4km in length by the end of the peak. In the mitigation scenario, the junction improvements reduce this queue significantly and allow the queues to be contained within the NB link and cause no issues to the flows on the M1 mainline. A network comparison is shown in **Figure 12**.

7.1.36. Finally, the A43 approach has significantly reduced queues in the mitigation scenario. The reference case queues reach up to 1.2km in length (the edge of the modelled network). With

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the junction improvements in place, the queues are drastically reduced to ~50m on average and 150m at most.

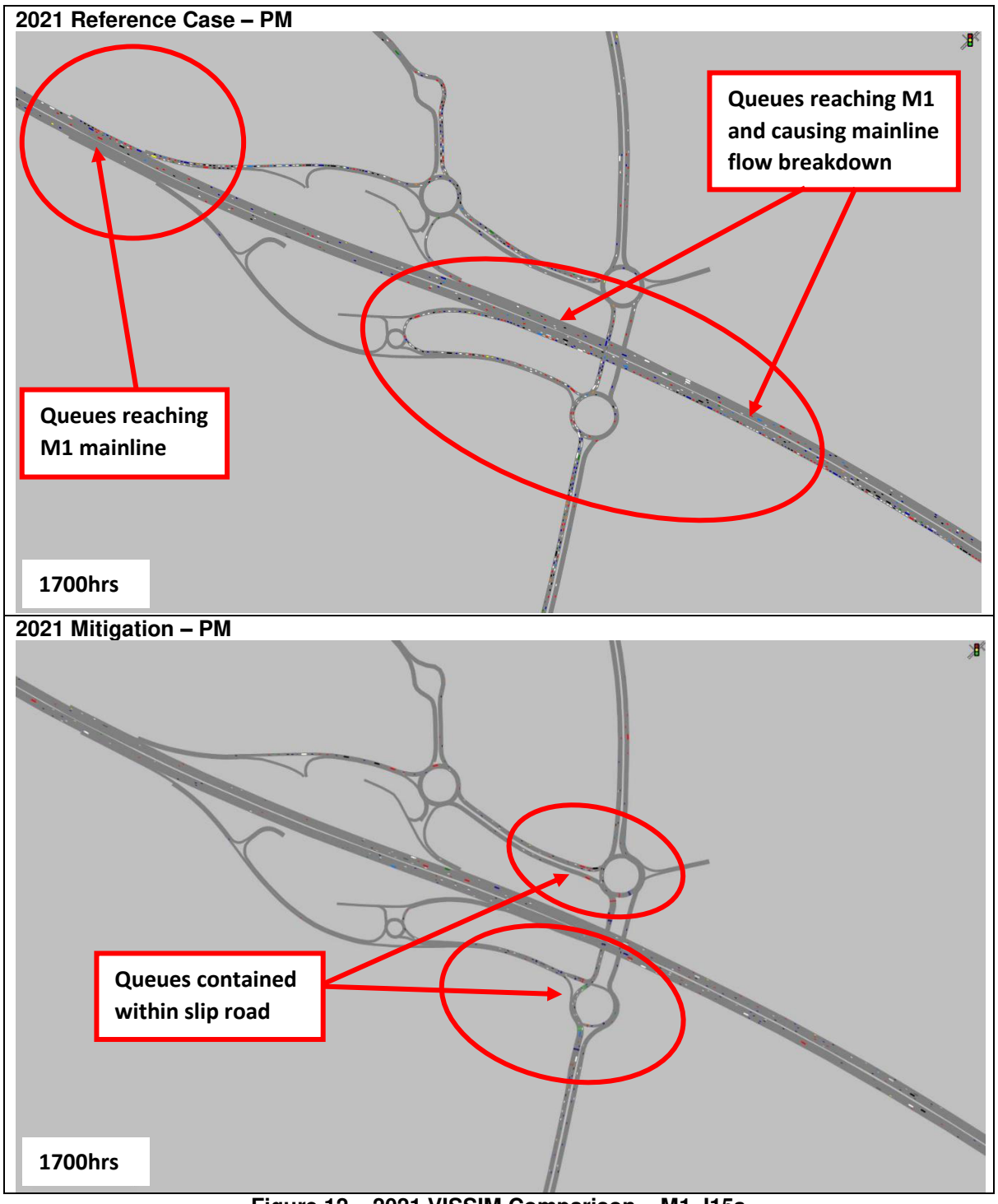

Figure 12 – 2021 VISSIM Comparison – M1 J15a

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Overall Network Performance

7.1.37. The network performance comparisons are in **Figures 13 and 14** for the AM and PM peaks.

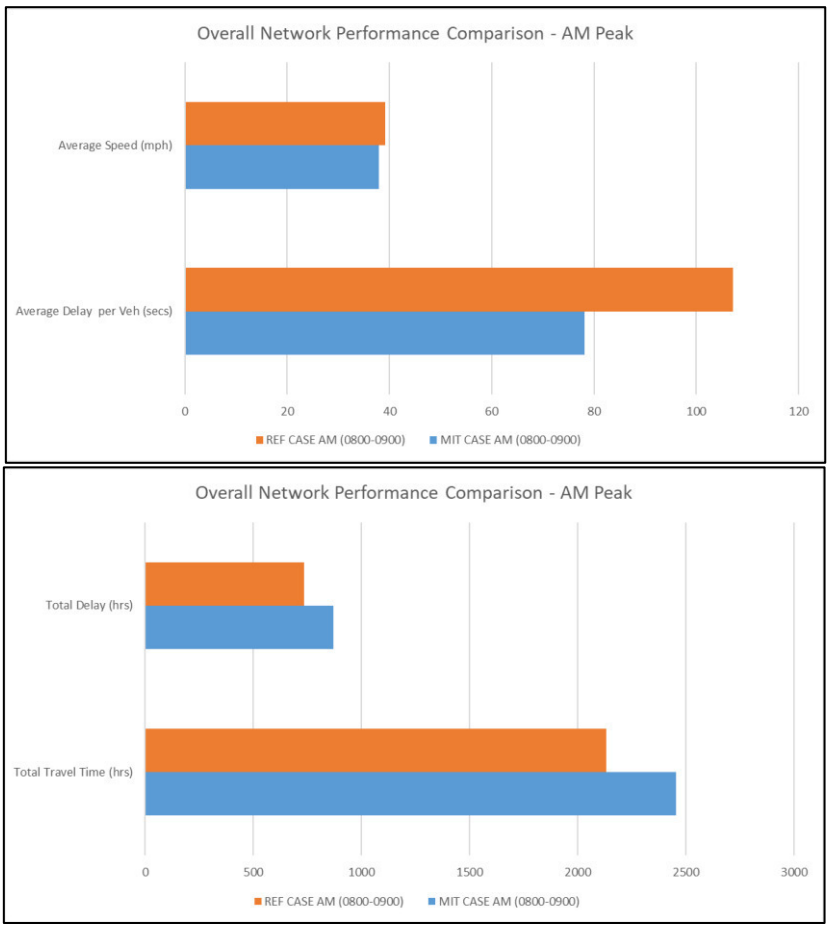

Figure 13 – 2021 Overall Network Performance – AM

7.1.38. From **Figure 13**, the total delay and total travel time is higher in the mitigation scenario, but the average delay time per vehicle is lower in comparison to the reference case. The main reason for this is that the mitigation scenario allows more traffic into the network, indicated within the *Journey Time* analysis section. These vehicles, which experience less delay, increase the total travel time as more journeys can be made within the network. The increased amount of traffic also means a higher total delay and slightly lower average speed (38mph compared to 39mph), as more vehicles are using the network. As a result, whilst the reference case has a lower total travel time, total delay and slightly higher average vehicle speed, this is for a lower number of vehicles within the network. The key performance indicator is therefore the delay per vehicle, which reduces with the development traffic and highway mitigation in place.

7.1.39. As a further measure of network performance, the numbers of unreleased vehicles from the model zones has been compared. This demonstrates an improved network performance with the junction improvements in place. The reference case has 1,000 unreleased vehicles, whereas there were none in the mitigation scenario (based on the average of 20 random seed runs).

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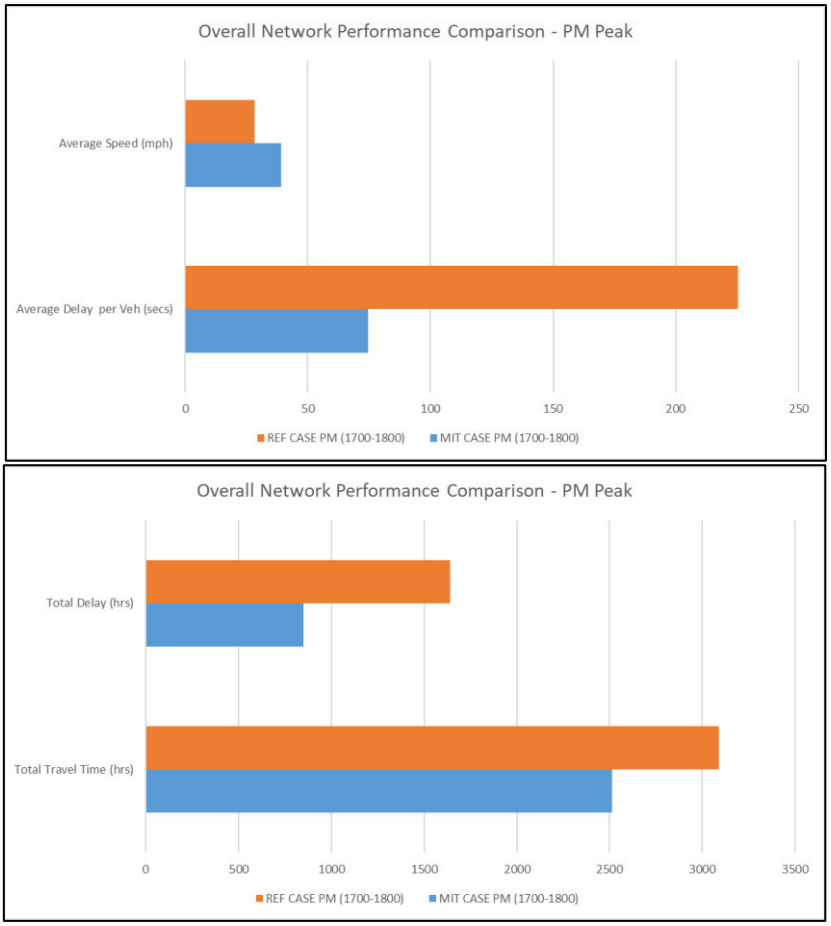

Figure 14 – 2021 Overall Network Performance – PM

7.1.40. In **Figure 14**, the mitigation scenario shows a reduced total delay, total travel time and average delay per vehicle values in comparison to the reference case. This is due to the significant queuing and mainline flow breakdown on the M1 in the reference case, which means more vehicles are being delayed and take longer to complete their journeys. The average speed within the network is also higher in the mitigation scenario, further indicating an improved network performance.

7.1.41. A review of the unreleased vehicles has 600 in the reference case and none in the mitigation scenario. This further demonstrates the improved 2021 network operation with the junction improvements in place.

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8. 2031 ASSESSMENT YEAR PERFORMANCE COMPARISON

8.1.1. The following headings provide details on the key comparisons between the 2031 Reference Case VISSIM model and the 2031 Mitigation model.

Journey Times & Traffic Volumes

8.1.2. A comparison of the journey times and queue lengths between various routes in the network for the AM and PM peak periods can be seen in **Tables 5-8**. **Tables 5 and 6** detail the effects on Cars and **Tables 7 and 8** detail the effects on HGVs. Each zone-to-zone route has been included to allow both network-wide impacts and more specific journey impacts to be understood. It should be noted that **Tables 5-8** compare only the existing network routes. Therefore, the tables summarise the direct impact of the development traffic and highway mitigation on background traffic journey time and the volume of background traffic accommodated by the network.

Table 5: 2031 Journey Time & Volume Comparisons – Cars – AM Peak

AM PEAK												
Cars												
JT No.	From		To		REF CASE	MIT CASE	Difference		REF CASE	MIT CASE	Difference	
					Overall Avg JT (s)	Overall Avg JT (s)			Overall Traffic Volume (Cars)	Overall Traffic Volume (Cars)		
	Zone No.	Site	Zone No.	Site	0800-0900	0800-0900	Time	%	0800-0900	0800-0900	No.	%
1	1	A508	2	M1 South	00:09:38	00:04:43	-00:04:55	-51%	23	98	75	326%
50			3	Saxon Avenue	00:08:55	00:03:46	-00:05:09	-58%	7	20	13	186%
2			4	A45	00:09:16	00:03:41	-00:05:35	-60%	304	546	242	80%
3			5	A43	-	-	-	-	0	0	0	-
51			6	A5123	00:18:11	00:06:56	-00:11:15	-62%	3	19	16	533%
52			12	M1 North	00:12:01	00:06:08	-00:05:53	-49%	173	417	244	141%
76			13	Watering Lane	-	-	-	-	0	0	0	-
53	2	M1 South	1	A508	00:02:56	00:03:30	00:00:33	19%	145	171	26	18%
54			3	Saxon Avenue	00:04:00	00:04:12	00:00:12	5%	66	16	-50	-76%
4			4	A45	00:03:38	00:04:15	00:00:37	17%	1213	1307	94	8%
5			5	A43	00:14:29	00:06:03	-00:08:26	-58%	185	229	44	24%
6			6	A5123	00:14:41	00:06:13	-00:08:28	-58%	128	221	93	73%
7			12	M1 North	00:05:16	00:05:18	00:00:02	1%	1877	1701	-176	-9%
77			13	Watering Lane	00:03:48	00:04:16	00:00:27	12%	118	180	62	53%
55	3	Saxon Avenue	1	A508	00:02:58	00:03:05	00:00:08	4%	4	17	13	325%
56			2	M1 South	00:02:10	00:02:15	00:00:04	3%	21	22	1	5%
57			4	A45	00:03:11	00:04:30	00:01:19	41%	18	26	8	44%
58			5	A43	00:15:22	00:07:11	-00:08:11	-53%	4	24	20	500%
59			6	A5123	-	00:07:20	-	-	0	7	7	-
60			12	M1 North	00:06:06	00:06:34	00:00:28	8%	12	40	28	233%
78			13	Watering Lane	00:03:12	00:04:28	00:01:15	39%	5	20	15	300%
8	4	A45	1	A508	00:05:36	00:04:16	-00:01:20	-24%	513	720	207	40%
61			2	M1 South	00:05:12	00:02:51	-00:02:21	-45%	693	885	192	28%
62			3	Saxon Avenue	00:04:59	00:01:48	-00:03:10	-64%	29	33	4	14%
63			5	A43	00:16:23	00:08:20	-00:08:03	-49%	73	95	22	30%
64			6	A5123	00:16:04	00:08:27	-00:07:37	-47%	5	15	10	200%
9			12	M1 North	00:08:45	00:07:44	-00:01:00	-12%	971	1059	88	9%
79			13	Watering Lane	00:19:18	00:12:50	-00:06:28	-33%	40	35	-5	-13%
10	5	A43	1	A508	-	-	-	-	0	0	0	-
11			2	M1 South	00:06:07	00:06:25	00:00:18	5%	60	73	13	22%
65			3	Saxon Avenue	00:08:00	00:06:59	-00:01:02	-13%	10	8	-2	-20%
66			4	A45	00:07:37	00:07:03	-00:00:35	-8%	197	130	-67	-34%
12			6	A5123	00:02:29	00:02:36	00:00:07	5%	881	838	-43	-5%
13			12	M1 North	00:03:19	00:03:36	00:00:17	9%	345	372	27	8%
80			13	Watering Lane	00:07:55	00:07:09	-00:00:47	-10%	7	6	-1	-14%
67	6	A5123	1	A508	00:08:41	00:08:14	-00:00:27	-5%	36	26	-10	-28%
68			2	M1 South	00:05:42	00:05:57	00:00:15	4%	245	112	-133	-54%
69			3	Saxon Avenue	00:07:30	00:06:29	-00:01:01	-13%	8	9	1	13%
70			4	A45	00:07:15	00:06:35	-00:00:40	-9%	43	23	-20	-47%
14			5	A43	00:02:14	00:02:24	00:00:10	7%	1140	1341	201	18%
71			12	M1 North	00:03:49	00:04:13	00:00:23	10%	215	234	19	9%
81			13	Watering Lane	00:07:22	00:06:44	-00:00:38	-9%	8	4	-4	-50%
72	12	M1 North	1	A508	00:08:21	00:07:46	-00:00:35	-7%	246	332	86	35%
18			2	M1 South	00:05:16	00:05:23	00:00:07	2%	2128	2178	50	2%
73			3	Saxon Avenue	00:07:06	00:05:58	-00:01:07	-16%	50	73	23	46%
19			4	A45	00:06:50	00:06:05	-00:00:45	-11%	645	642	-3	0%
20			5	A43	00:12:41	00:04:34	-00:08:07	-64%	241	389	148	61%
74			6	A5123	00:10:23	00:03:49	-00:06:35	-63%	300	376	76	25%
82			13	Watering Lane	00:07:00	00:06:08	-00:00:52	-12%	154	152	-2	-1%
75	13	Watering Lane	4	A45	00:01:16	00:01:37	00:00:22	29%	553	303	-250	-45%
Total					**05:53:00**	**04:16:23**	**-01:36:37**	**-27%**	**14142**	**15544**	**1402**	**10%**

8.1.3. **Table 5** shows that, in general, the journey times are reduced with the development traffic and mitigation schemes in place, in comparison to the reference case. Considering all the routes, there is an average journey time reduction of 27%.

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8.1.4. The most notable routes which benefit from the improvements are from the A508 (all routes), M1 South (to A43 & A5123), A45 (all routes) and the M1 North (to A43 & A5123). This is indicated by the cells in green, where the journey times are reduced by around 60%.

8.1.5. There are three routes which would see notable increases in journey times. These are from Saxon Avenue to the A45, to Watering Lane and from Watering Lane to the A45, where the increases are 30-40%. This is likely to be due to the improvements signalising both the Saxon Avenue and Watering Lane approaches, which will add delays to these routes which were previously under priority control. It should be noted that, considering the overall traffic volumes (15,544), the number of vehicles undertaking these movements (26, 20 and 303) are low in comparison to the majority of the other routes (2.2% of the total volume).

8.1.6. Considering the traffic volumes, the mitigation schemes are successful in allowing more movements within the network, with an extra 10% (1,402 cars) overall in comparison to the reference case. This increase in traffic is in addition to the development traffic.

Table 6: 2031 Journey Time & Volume Comparisons – Cars – PM Peak

PM PEAK												
Cars												
JT No.	From		To		REF CASE	MIT CASE	Difference		REF CASE	MIT CASE	Difference	
					Overall Avg JT (s)	Overall Avg JT (s)			Overall Traffic Volume (Cars)	Overall Traffic Volume (Cars)		
	Zone No.	Site	Zone No.	Site	1700-1800	1700-1800	Time	%	1700-1800	1700-1800	No.	%
1			2	M1 South	00:04:59	00:04:22	-00:00:37	-12%	15	47	32	213%
50			3	Saxon Avenue	00:04:06	00:03:22	-00:00:44	-18%	4	8	4	100%
2			4	A45	00:04:29	00:03:36	-00:00:54	-20%	585	842	257	44%
3	1	A508	5	A43	-	-	-	-	0	0	0	-
51			6	A5123	00:35:03	00:07:11	-00:27:51	-79%	3	24	21	700%
52			12	M1 North	00:08:35	00:06:05	-00:02:30	-29%	171	267	96	56%
76			13	Watering Lane	-	-	-	-	0	0	0	-
53			1	A508	00:02:49	00:03:16	00:00:26	15%	93	84	-9	-10%
54			3	Saxon Avenue	00:03:18	00:03:30	00:00:12	6%	54	25	-29	-54%
4			4	A45	00:03:09	00:03:40	00:00:31	17%	1013	1104	91	9%
5	2	M1 South	5	A43	00:35:35	00:06:14	-00:29:21	-82%	47	52	5	11%
6			6	A5123	00:35:18	00:06:36	-00:28:41	-81%	166	524	358	216%
7			12	M1 North	00:05:47	00:05:22	-00:00:25	-7%	2534	2402	-132	-5%
77			13	Watering Lane	00:03:18	00:03:36	00:00:19	9%	88	136	48	55%
55			1	A508	00:02:50	00:03:01	00:00:12	7%	12	17	5	42%
56			2	M1 South	00:02:18	00:02:19	00:00:01	1%	86	86	0	0%
57			4	A45	00:02:51	00:04:12	00:01:21	47%	24	27	3	13%
58	3	Saxon Avenue	5	A43	-	-	-	-	0	0	0	-
59			6	A5123	-	-	-	-	0	0	0	-
60			12	M1 North	00:07:05	00:06:26	-00:00:39	-9%	12	20	8	67%
78			13	Watering Lane	-	00:04:12	-	-	0	4	4	-
8			1	A508	00:06:04	00:03:22	-00:02:43	-45%	701	949	248	35%
61			2	M1 South	00:05:45	00:02:35	-00:03:09	-55%	738	918	180	24%
62			3	Saxon Avenue	00:05:31	00:01:33	-00:03:59	-72%	70	88	18	26%
63	4	A45	5	A43	00:38:03	00:07:30	-00:30:33	-80%	30	71	41	137%
64			6	A5123	-	00:07:57	-	-	0	4	4	-
9			12	M1 North	00:10:02	00:06:47	-00:03:16	-32%	903	1106	203	22%
79			13	Watering Lane	00:39:28	00:12:13	-00:27:15	-69%	49	115	66	135%
10			1	A508	-	-	-	-	0	0	0	-
11			2	M1 South	00:06:20	00:06:52	00:00:32	9%	290	249	-41	-14%
65			3	Saxon Avenue	-	-	-	-	0	0	0	-
66	5	A43	4	A45	00:06:38	00:07:25	00:00:47	12%	12	38	26	217%
12			6	A5123	00:02:52	00:02:59	00:00:08	4%	960	867	-93	-10%
13			12	M1 North	00:03:26	00:03:48	00:00:21	10%	320	390	70	22%
80			13	Watering Lane	-	-	-	-	0	0	0	-
67			1	A508	00:07:09	00:07:42	00:00:33	8%	16	7	-9	-56%
68			2	M1 South	00:05:23	00:06:00	00:00:37	12%	184	147	-37	-20%
69			3	Saxon Avenue	00:05:56	00:06:16	00:00:20	6%	12	8	-4	-33%
70	6	A5123	4	A45	00:05:43	00:06:35	00:00:51	15%	32	16	-16	-50%
14			5	A43	00:02:01	00:02:03	00:00:03	2%	798	886	88	11%
71			12	M1 North	00:03:41	00:03:49	00:00:08	4%	216	182	-34	-16%
81			13	Watering Lane	-	00:06:31	-	-	0	4	4	-
72			1	A508	00:07:13	00:07:14	00:00:02	0%	99	348	249	252%
18			2	M1 South	00:05:24	00:05:24	-00:00:00	0%	2454	2657	203	8%
73			3	Saxon Avenue	00:06:02	00:05:46	-00:00:17	-5%	19	24	5	26%
19	12	M1 North	4	A45	00:05:48	00:06:02	00:00:14	4%	910	755	-155	-17%
20			5	A43	00:40:47	00:04:29	-00:36:18	-89%	185	310	125	68%
74			6	A5123	00:38:25	00:03:59	-00:34:26	-90%	112	294	182	163%
82			13	Watering Lane	00:05:53	00:06:02	00:00:09	2%	4	8	4	100%
75	13	Watering Lane	4	A45	00:01:11	00:01:38	00:00:27	39%	306	148	-158	-52%
Total					**07:06:15**	**03:39:33**	**-03:26:42**	**-48%**	**14327**	**16258**	**1931**	**13%**

8.1.7. In the PM peak, the general trend is the same as the AM peak, with journey times improved with the development traffic and mitigation schemes in place in comparison to the reference case. Overall, there is a 48% average reduction in journey times, when considering all of the routes.

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8.1.8. There are notable routes with significantly reduced journey times, including the A508 to the A5123, M1 South to the A43 and A4123, all routes from the A45 and two routes from the M1 – one to the A43 and the other to the A5123. These have benefits ranging from 30% to 90%.

8.1.9. In terms of increased journey times, there are two routes of note. These are Saxon Avenue to the A45, where the journey time increases by 47% and from Watering Lane to the A45 where the increase is 39%. For the Saxon Avenue route, this is likely to be due to vehicles having to negotiate a larger junction, as well as an increased number of signalised stop-lines. The Watering Lane route to the A45 is now signalised, which will cause delay to a route which was previously priority controlled. However, it should be noted that these 28 and 148 vehicles respectively, which equates to 1.1% of the total traffic volume in the network.

8.1.10. Looking at the overall background traffic volumes, the mitigation schemes are allowing an additional 13% of traffic to use the network, an increase of 1,931 cars in comparison to the reference case. This increase is in addition to the development traffic.

Table 7: 2031 Journey Time & Volume Comparisons – HGVs – AM Peak

AM PEAK												
HGVs												
JT No.	From		To		REF CASE	MIT CASE	Difference		REF CASE	MIT CASE	Difference	
					Overall Avg JT (s)	Overall Avg JT (s)			Overall Traffic Volume (Cars)	Overall Traffic Volume (Cars)		
	Zone No.	Site	Zone No.	Site	0800-0900	0800-0900	Time	%	0800-0900	0800-0900	No.	%
1			2	M1 South	-	-	-	-	0	0	0	-
50			3	Saxon Avenue	-	-	-	-	0	0	0	-
2			4	A45	00:09:30	00:03:53	-00:05:37	-59%	20	28	8	40%
3	1	A508	5	A43	-	-	-	-	0	0	0	-
51			6	A5123	-	-	-	-	0	0	0	-
52			12	M1 North	00:12:38	00:06:54	-00:05:44	-45%	30	45	15	50%
76			13	Watering Lane	-	-	-	-	0	0	0	-
53			1	A508	00:03:10	-	-	-	4	0	-4	-100%
54			3	Saxon Avenue	00:04:20	00:04:29	00:00:09	3%	11	13	2	18%
4			4	A45	00:03:54	00:04:34	00:00:39	17%	109	105	-4	-4%
5	2	M1 South	5	A43	-	-	-	-	0	0	0	-
6			6	A5123	00:14:44	00:06:39	-00:08:05	-55%	13	28	15	115%
7			12	M1 North	00:06:09	00:06:08	-00:00:01	0%	393	397	4	1%
77			13	Watering Lane	-	-	-	-	0	0	0	-
55			1	A508	-	-	-	-	0	0	0	-
56			2	M1 South	-	-	-	-	0	0	0	-
57			4	A45	-	-	-	-	0	0	0	-
58	3	Saxon Avenue	5	A43	-	-	-	-	0	0	0	-
59			6	A5123	-	-	-	-	0	0	0	-
60			12	M1 North	-	-	-	-	0	0	0	-
78			13	Watering Lane	-	-	-	-	0	0	0	-
8			1	A508	00:05:47	00:04:33	-00:01:14	-21%	8	14	6	75%
61			2	M1 South	00:05:18	00:03:05	-00:02:13	-42%	32	41	9	28%
62			3	Saxon Avenue	-	-	-	-	0	0	0	-
63	4	A45	5	A43	-	-	-	-	0	0	0	-
64			6	A5123	-	-	-	-	0	0	0	-
9			12	M1 North	00:09:27	00:08:28	-00:00:58	-10%	177	189	12	7%
79			13	Watering Lane	-	-	-	-	0	0	0	-
10			1	A508	-	-	-	-	0	0	0	-
11			2	M1 South	-	-	-	-	0	0	0	-
65			3	Saxon Avenue	-	-	-	-	0	0	0	-
66	5	A43	4	A45	-	-	-	-	0	0	0	-
12			6	A5123	00:02:41	00:02:48	00:00:07	5%	116	111	-5	-4%
13			12	M1 North	00:03:40	00:03:55	00:00:15	7%	4	4	0	0%
80			13	Watering Lane	-	-	-	-	0	0	0	-
67			1	A508	-	-	-	-	0	0	0	-
68			2	M1 South	-	-	-	-	0	0	0	-
69			3	Saxon Avenue	-	-	-	-	0	0	0	-
70	6	A5123	4	A45	-	-	-	-	0	0	0	-
14			5	A43	00:02:26	00:02:35	00:00:08	6%	95	89	-6	-6%
71			12	M1 North	00:04:08	00:04:34	00:00:25	10%	14	29	15	107%
81			13	Watering Lane	-	-	-	-	0	0	0	-
72			1	A508	00:08:51	00:08:13	-00:00:38	-7%	48	49	1	2%
18			2	M1 South	00:06:06	00:06:11	00:00:05	1%	581	580	-1	0%
73			3	Saxon Avenue	00:07:27	-	-	-	4	0	-4	-100%
19	12	M1 North	4	A45	00:07:18	00:06:35	-00:00:43	-10%	75	82	7	9%
20			5	A43	00:12:23	00:04:46	-00:07:37	-62%	58	101	43	74%
74			6	A5123	00:10:57	-	-	-	4	0	-4	-100%
82			13	Watering Lane	-	-	-	-	0	0	0	-
75	13	Watering Lane	4	A45	-	-	-	-	0	0	0	-
Total					**02:20:54**	**01:28:19**	**-00:52:35**	**-37%**	**1796**	**1905**	**109**	**6%**

8.1.11. **Table 7** shows a general improvement in HGV journey times in the network including for the development traffic and highway mitigation. When considering all the routes, there is a 37% reduction in journey times.

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8.1.12. There are five notable routes with journey time reductions – A508 to A45, A508 to M1 North, M1 South to A5123, A45 to M1 South and M1 North to A43. These have improvements in the range of 40-65%.

8.1.13. The journey time with the biggest increase is from the M1 South to the A45, where the increase is 17%. This is due to the vehicles having to negotiate additional signalised stop-lines at J15 and the new signalised junction at the A45 / Watering Lane junction.

8.1.14. As with the Cars in the AM peak, the mitigation schemes allow more HGVs to navigate around the network, with a 6% increase in comparison to the reference case. This increase is in addition to the development traffic.

Table 8: 2031 Journey Time & Volume Comparisons – HGVs – PM Peak

PM PEAK													
HGVs													
JT No.	From		To		REF CASE	MIT CASE	Difference		REF CASE	MIT CASE	Difference		
					Overall Avg JT (s)	Overall Avg JT (s)			Overall Traffic Volume (Cars)	Overall Traffic Volume (Cars)			
	Zone No.	Site	Zone No.	Site	1700-1800	1700-1800	Time	%	1700-1800	1700-1800	No.	%	
1	1	A508	2	M1 South	-	-	-	-	0	0	0	-	
50			3	Saxon Avenue	-	-	-	-	0	0	0	-	
2			4	A45	00:04:46	00:03:50	-00:00:56	-20%	8	4	-4	-50%	
3			5	A43	-	-	-	-	0	0	0	-	
51			6	A5123	-	-	-	-	0	0	0	-	
52			12	M1 North	00:09:52	00:06:48	-00:03:03	-31%	33	40	7	21%	
76			13	Watering Lane	-	-	-	-	0	0	0	-	
53	2	M1 South	1	A508	-	-	-	-	0	0	0	-	
54			3	Saxon Avenue	-	-	-	-	0	0	0	-	
4			4	A45	00:03:26	00:03:57	00:00:32	16%	89	96	7	8%	
5			5	A43	-	-	-	-	0	0	0	-	
6			6	A5123	00:34:49	00:07:00	-00:27:50	-80%	10	16	6	60%	
7			12	M1 North	00:07:17	00:06:10	-00:01:07	-15%	388	398	10	3%	
77			13	Watering Lane	-	-	-	-	0	0	0	-	
55	3	Saxon Avenue	1	A508	-	-	-	-	0	0	0	-	
56			2	M1 South	00:02:28	00:02:34	00:00:06	4%	18	18	0	0%	
57			4	A45	-	-	-	-	0	0	0	-	
58			5	A43	-	-	-	-	0	0	0	-	
59			6	A5123	-	-	-	-	0	0	0	-	
60			12	M1 North	00:08:10	00:07:08	-00:01:02	-13%	27	34	7	26%	
78			13	Watering Lane	-	-	-	-	0	0	0	-	
8	4	A45	1	A508	00:06:11	00:03:29	-00:02:42	-44%	28	16	-12	-43%	
61			2	M1 South	00:05:59	00:02:47	-00:03:11	-53%	19	22	3	16%	
62			3	Saxon Avenue	-	-	-	-	0	0	0	-	
63			5	A43	-	-	-	-	0	0	0	-	
64			6	A5123	-	-	-	-	0	0	0	-	
9			12	M1 North	00:11:45	00:07:28	-00:04:17	-36%	26	25	-1	-4%	
79			13	Watering Lane	-	-	-	-	0	0	0	-	
10	5	A43	1	A508	-	-	-	-	0	0	0	-	
11			2	M1 South	-	-	-	-	0	0	0	-	
65			3	Saxon Avenue	-	-	-	-	0	0	0	-	
66			4	A45	-	-	-	-	0	0	0	-	
12			6	A5123	00:03:04	00:03:09	00:00:05	3%	117	118	1	1%	
13			12	M1 North	-	-	-	-	0	0	0	-	
80			13	Watering Lane	-	-	-	-	0	0	0	-	
67	6	A5123	1	A508	-	-	-	-	0	0	0	-	
68			2	M1 South	00:06:02	00:06:47	00:00:45	13%	19	25	6	32%	
69			3	Saxon Avenue	-	-	-	-	0	0	0	-	
70			4	A45	-	-	-	-	0	0	0	-	
14			5	A43	00:02:16	00:02:18	00:00:02	2%	53	77	24	45%	
71			12	M1 North	-	-	-	-	0	0	0	-	
81			13	Watering Lane	-	-	-	-	0	0	0	-	
72	12	M1 North	1	A508	00:07:47	00:07:43	-00:00:04	-1%	29	64	35	121%	
18			2	M1 South	00:06:18	00:06:10	-00:00:08	-2%	382	419	37	10%	
73			3	Saxon Avenue	00:06:43	00:06:13	-00:00:30	-7%	14	24	10	71%	
19			4	A45	00:06:25	00:06:30	00:00:06	1%	75	72	-3	-4%	
20			5	A43	00:36:58	-	-	-	3	0	-3	-100%	
74			6	A5123	00:37:48	00:04:12	-00:33:36	-89%	22	79	57	259%	
82			13	Watering Lane	-	-	-	-	0	0	0	-	
75	13	Watering Lane	4	A45	-	-	-	-	0	0	0	-	
Total					**03:28:03**	**01:34:15**	**-01:53:47**	**-55%**	**1360**	**1547**	**187**	**14%**	

8.1.15. **Table 8** shows that, as with the AM peak for HGVs, there is a general improvement in HGV journey times, with a 55% reduction overall with the improvements in place.

8.1.16. There are three routes with notable journey time reductions – M1 South to A5123, A45 to M1 South and M1 North to A5123. These routes have reductions ranging from 50% to 90%.

8.1.17. In terms of the routes with increased journey times, the only route of note is from the M1 South, where the increase is 16%. As in the AM peak, this may be affected by the increased number of signals that the HGVs have to negotiate through.

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8.1.18. For the overall background traffic volumes, there is a 14% increase in HGV movements with the mitigation schemes in place over the reference case scenario. This increase in traffic is in addition to the development traffic.

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Queue Lengths

8.1.19. A comparison of the average and maximum (average) queue lengths (in metres) at M1 J15 and M1 J15a can be seen in **Figures 15, 17, 19 and 20** for the AM and PM peaks, with **Appendix F** providing more detailed queue results.

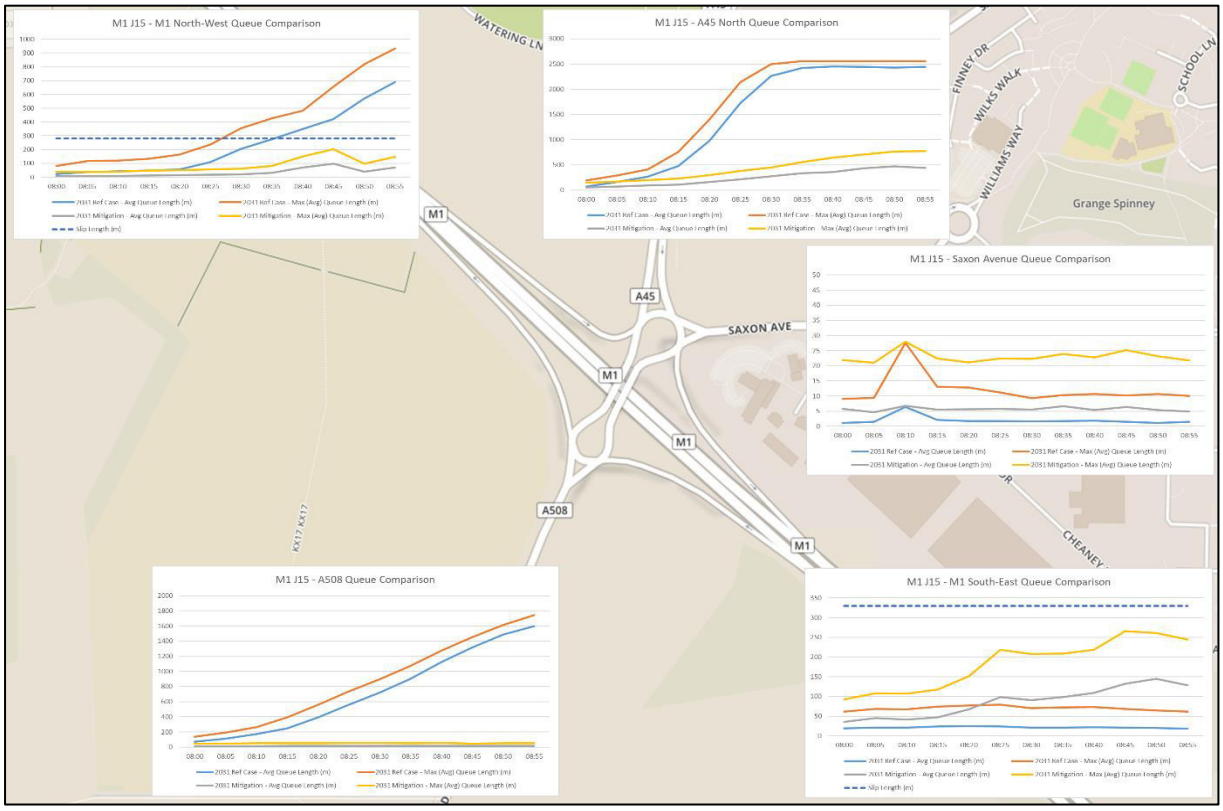

Figure 15 – 2031 M1 J15 Queue Comparison – AM (queue in metres)

8.1.20. On the M1 NW approach, the reference case average queues reach back to the M1 mainline at around 0835hrs and continue to increase as the peak progresses. This will have safety implications for the M1 mainline. The mitigation scenario has average queues which are lower and contained within the slip road length, providing a more satisfactory performance and reduced impact on the M1 mainline. A network performance comparison is shown in **Figure 16**.

8.1.21. The A45 North approach queues extend to 2.5km in the reference case, which is the extent of the VISSIM network. Given that the lengths plateau at around 0830hrs, it is expected that the queues would extend further than the 2.5km specified. In the mitigation scenario, the average queues reach up to ~500m, providing a significant improvement over the reference case.

8.1.22. The M1 SE approach has higher average queues in the mitigation scenario compared to the reference case, with lengths reaching ~150m in comparison to ~25m. This is the result of the new junction configuration and increased flows from the A45 North approach travelling south to the A508 and to the M1 northbound off-slip, which causes additional calling of the signals and in turn affects the length of queue on the M1 SE approach. Despite this, it should be noted that whilst the queue lengths are increased, they do not reach back to the M1 mainline.

8.1.23. The A508 approach has increased average queue lengths in the reference case as the AM peak progresses, with queues reaching ~1.6km by the end of the peak. Conversely, the mitigation scheme has average queues ~100m, a significant improvement over the reference case.

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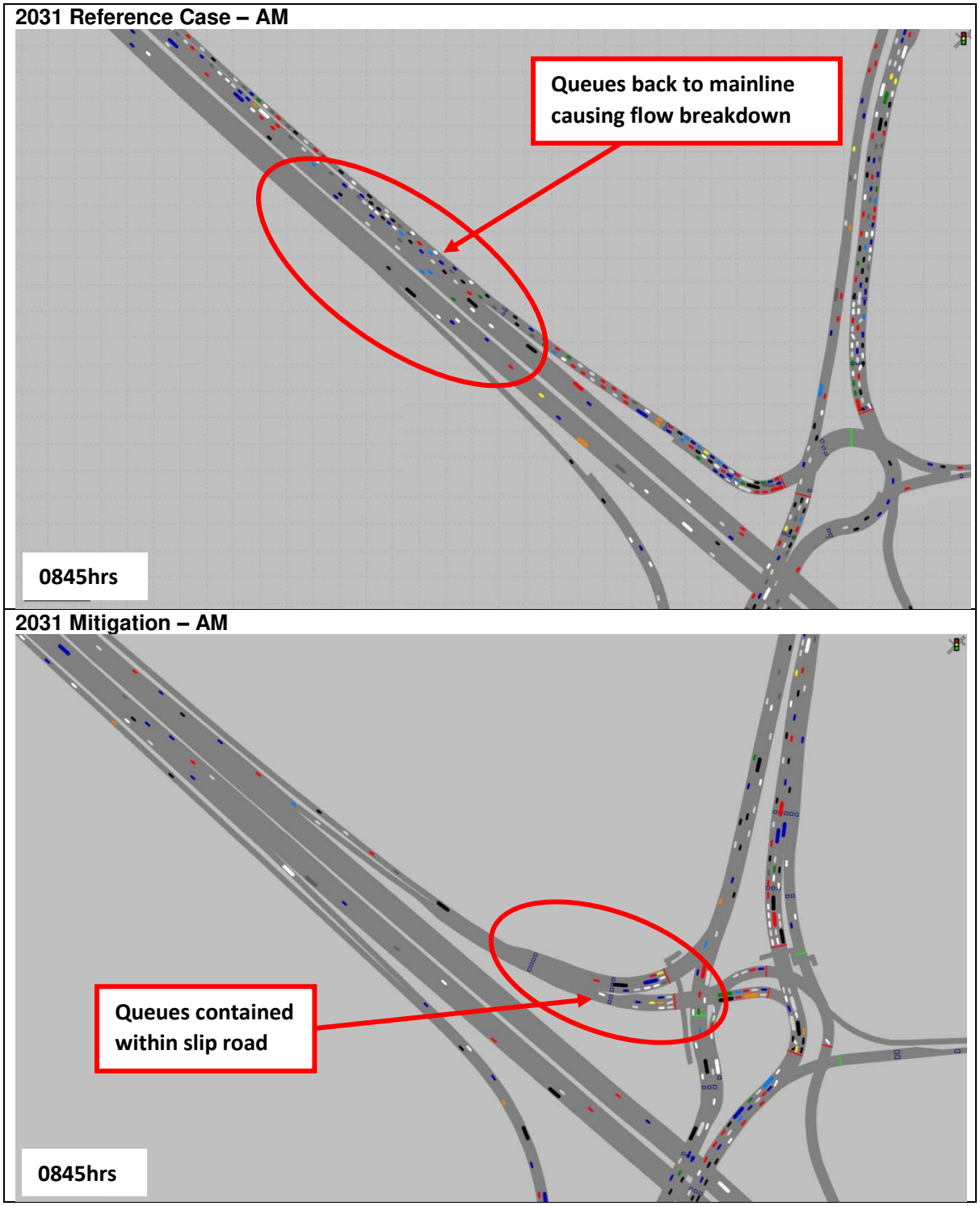

Figure 16 – 2031 VISSIM Comparison – M1 J15 – M1 NW Approach

8.1.24. Finally, the Saxon Avenue approach has similar queue lengths when comparing the average (~2m compared to 5m), but has a higher maximum (average) length in the mitigation scenario (~25m compared to 10m in the reference case). This will be due to this approach now being signalised, which will add delay compared to the previous priority controlled arrangement.

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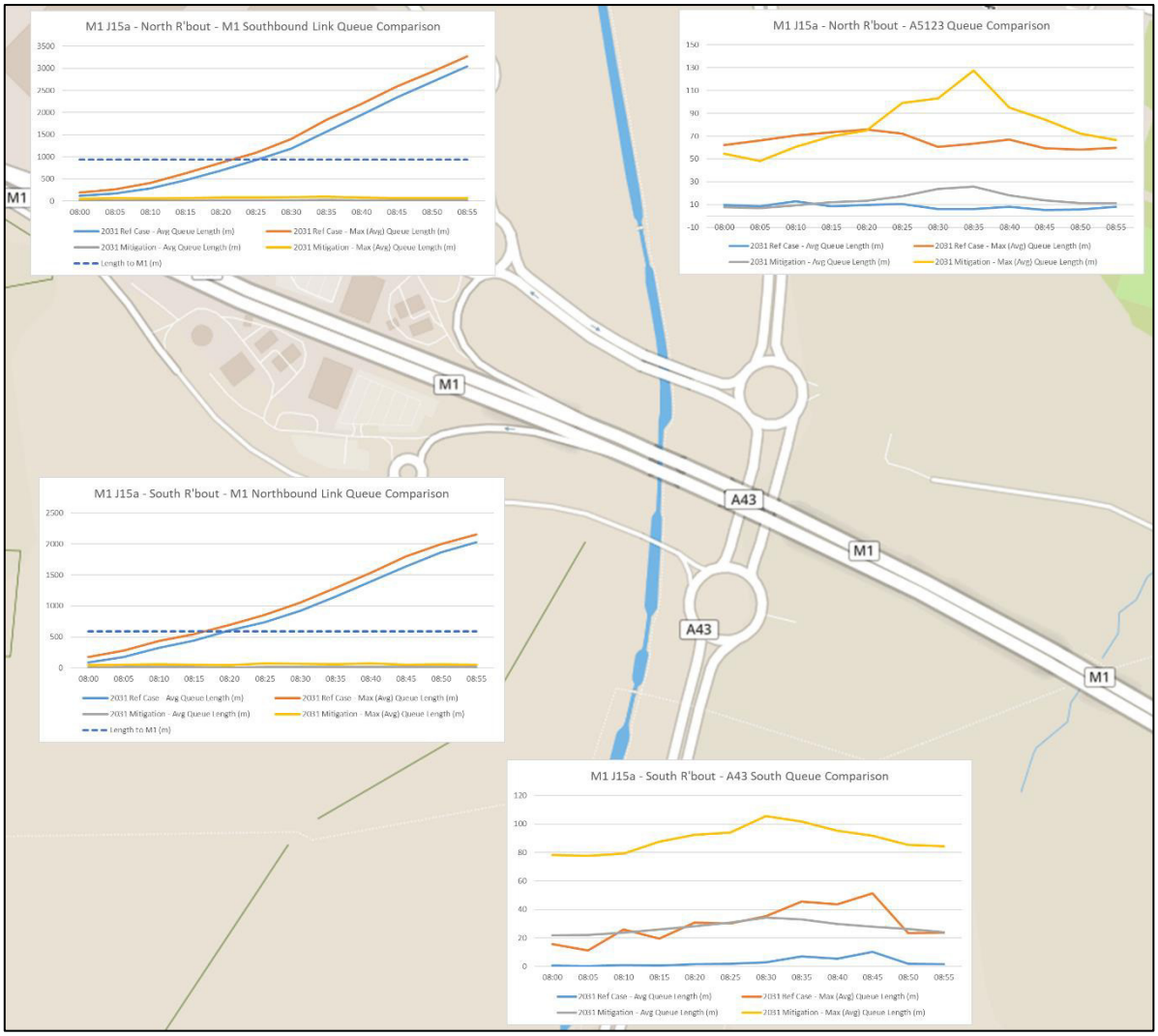

Figure 17 – 2031 M1 J15a Queue Comparison – AM (queue in metres)

8.1.25. At the North roundabout, the M1 SB link experiences significant queuing in the reference case, with average queues reaching back to the M1 mainline at around 0830hrs. This continues to increase (up to 3km) and will have safety implications for the M1. In the mitigation scenario, the improvements have a drastic impact on the queues, reducing the lengths to ~100m at most (see **Figure 18** for a network comparison).

8.1.26. The A5123 approach has similar average queue lengths between the two scenarios (~10m and ~25m), but the mitigation scenario has increased maximum (average) queues (reaching ~130m as opposed to 70m in the reference case). This will be due to the improvements allowing additional traffic to travel around the roundabout from the M1 SB link, which impacts on the gaps available for vehicles to pull out.

8.1.27. At the South roundabout, the M1 NB link has significant queuing in the reference case, with average queues reaching back to the mainline at 0820hrs and continuing to increase. This will have safety implications for the M1. The mitigation scenario dramatically reduces this queue and allows the length to be contained within the M1 NB link, removing any M1 mainline safety issues. See network comparison in **Figure 18**.

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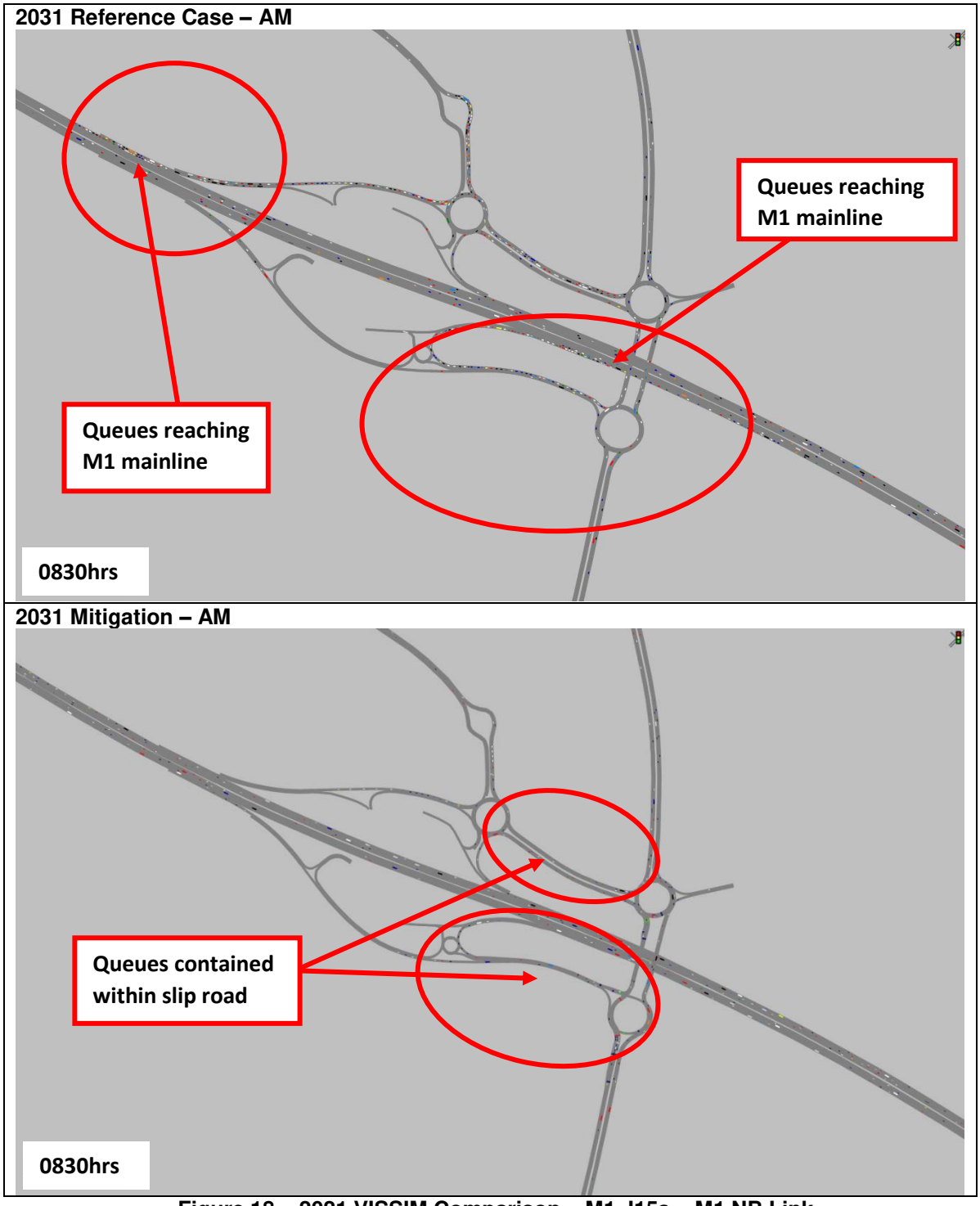

Figure 18 – 2021 VISSIM Comparison – M1 J15a – M1 NB Link

8.1.28. On the A43 approach, the mitigation scheme has larger average and maximum (average) queues in comparison to the reference case, due to the new configuration and signalisation of this approach. Whilst this helps to reduce the queuing elsewhere, the requirement to manage the A43 approach traffic more formally leads to the increased queue lengths.

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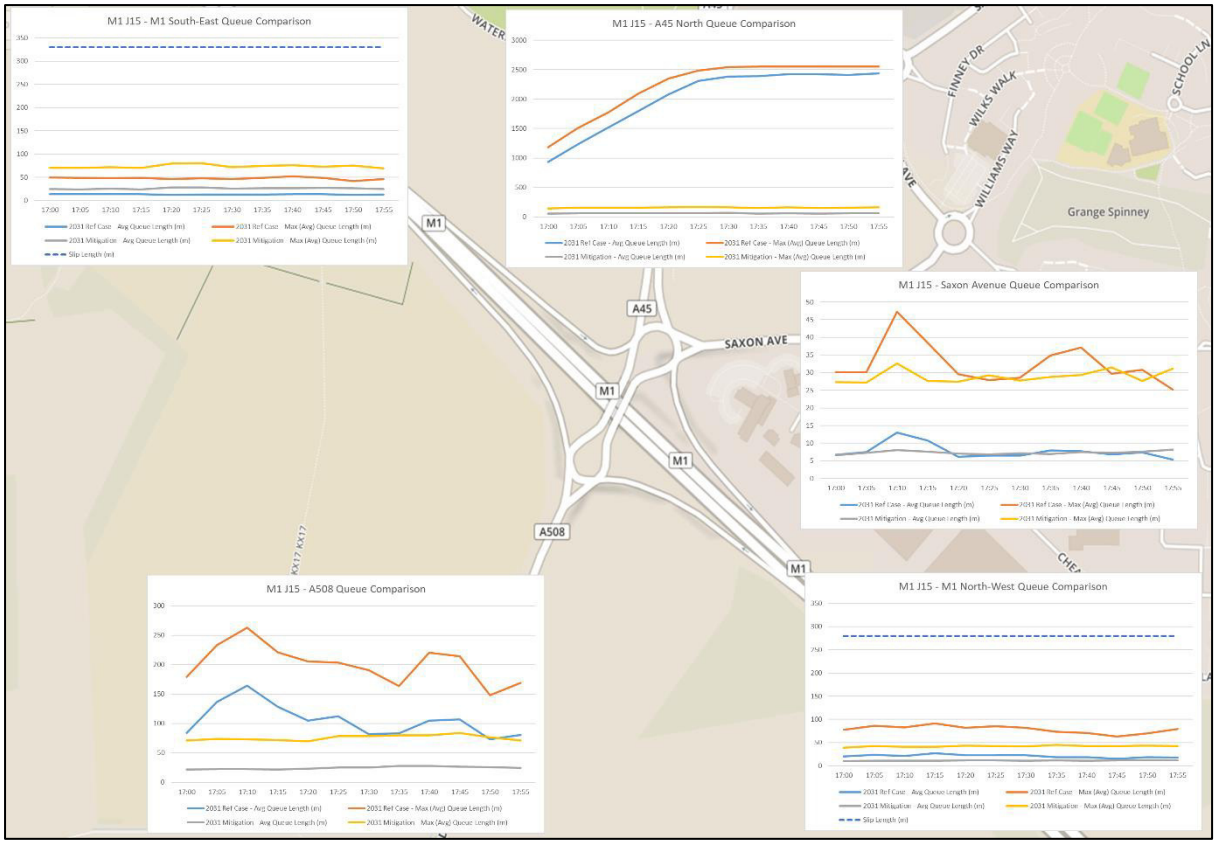

Figure 19 – 2031 M1 J15 Queue Comparison – PM (queue in metres)

8.1.29. In the PM peak, the M1 SE approach queues are relatively similar between the two scenarios, with average queues ~25m in length. However, the mitigation scenario does have slightly larger maximum (average) queue lengths (~80m in comparison to 50m in the reference case), but these are still within the length of the slip road.

8.1.30. As in the AM peak, the A45 North approach in the reference case scenario reaches the end of the modelled network (2.5km in length). The mitigation scenario drastically reduces this queue, with average and maximum (average) queues of ~50m and ~100m respectively.

8.1.31. The M1 NW approach has similar average queues in the two scenarios (~20-30m), but has slightly higher maximum (average) queues in the reference case (~90m compared to 50m). However, it should be noted that both scenarios have queue lengths within the lengths of the slip road.

8.1.32. The mitigation scenario reduces the queues on the A508 approach, with both the average and maximum (average) queues being lower than the reference case.

8.1.33. Finally, the Saxon Avenue approach has similar average queue lengths between the two scenarios (~8m) and slightly higher maximum (average) queue lengths in the reference case.

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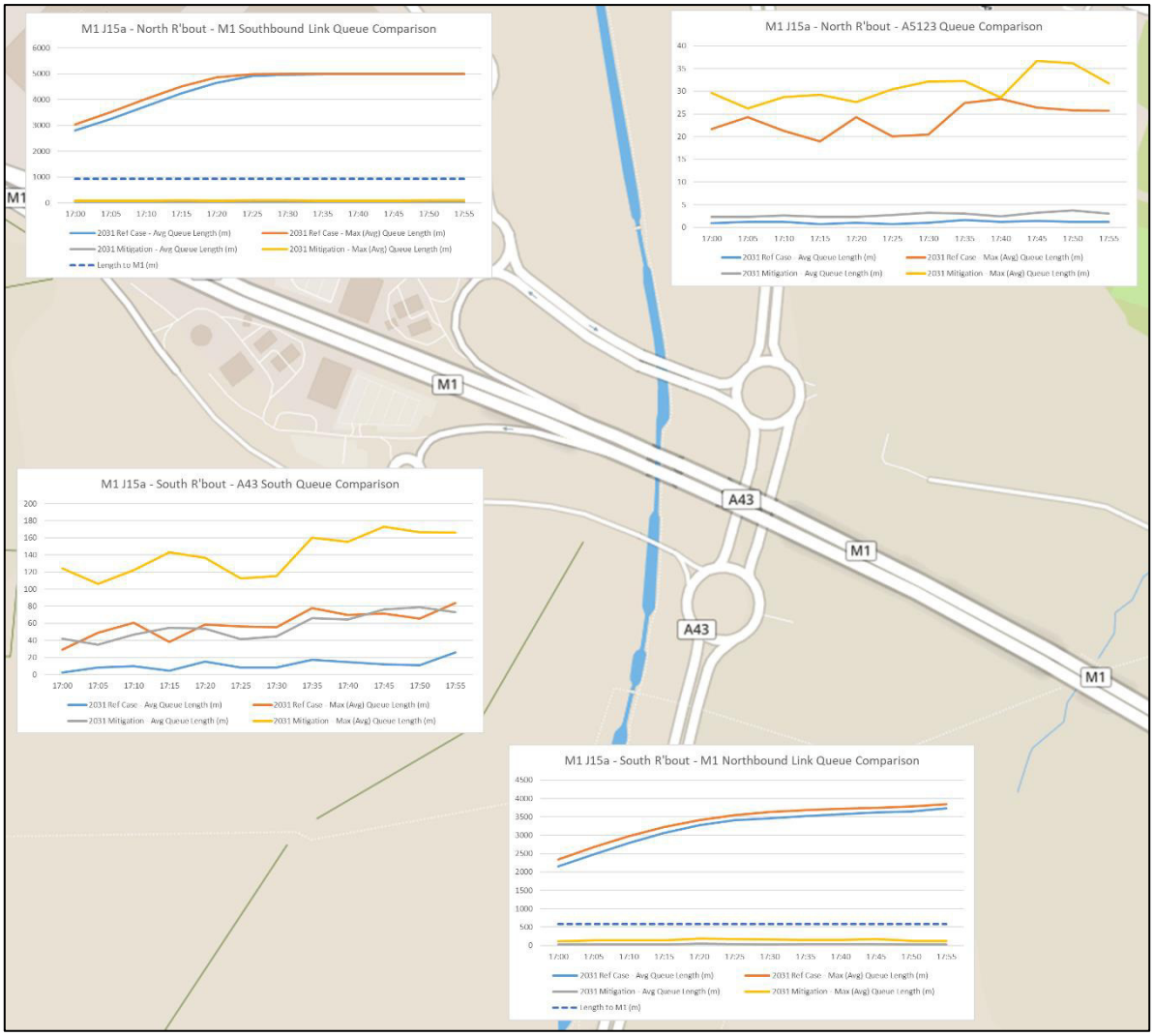

Figure 20 – 2031 M1 J15a Queue Comparison – PM (queue in metres)

8.1.34. At the North roundabout, the M1 SB link experiences significant queuing back to the M1 mainline and beyond in the reference case . These queues reach back as far as the model extents, ~5km in length and will result in safety concerns for the M1. In the mitigation scenario, the junction improvements reduce this queue drastically and allow the queues to be contained within the SB link. A network comparison is shown in **Figure 21**.

8.1.35. On the A5123 approach, the average queues in the reference case and mitigation scenario are similar (~3m). There is a bit more fluctuation with the maximum (average) queues, but these are still not significant lengths (~30m).

8.1.36. On the M1 NB link, the queues in the reference case have already stretched beyond the length of the link, affecting the M1 mainline flow. This queue continues to be grow as the peak period progresses, up to nearly 4km in length by the end of the peak. In the mitigation scenario, the junction improvements reduce this queue significantly and allow the queues to be contained within the NB link and cause no issues to the flows on the M1 mainline. A comparison is shown in **Figure 21**.

8.1.37. Finally, the A43 approach has increased queues in the mitigation scenario. As stated before, this approach is now signalised and this approach requires management to improve the queuing elsewhere at the junction.

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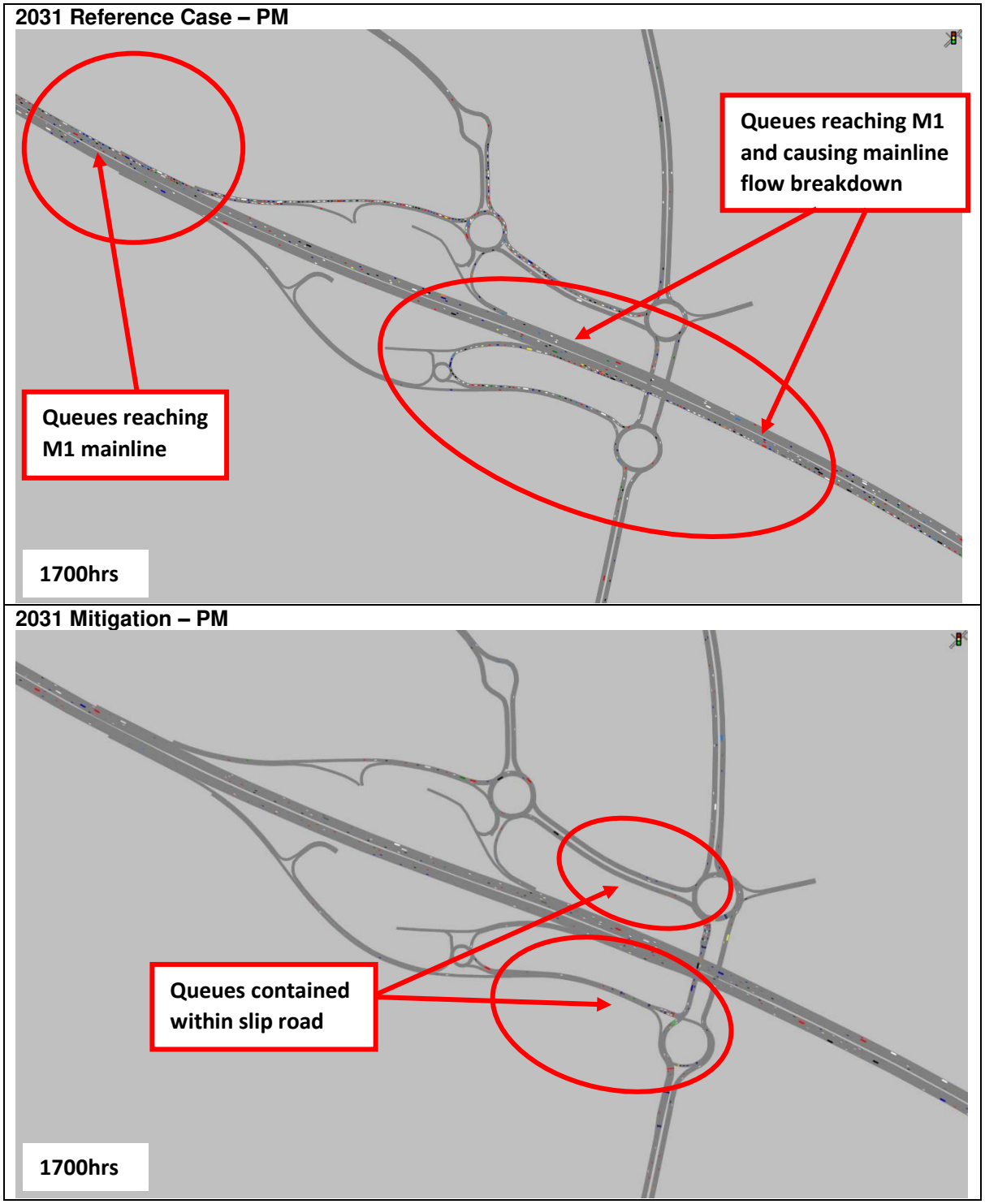

Figure 21 – 2031 VISSIM Comparison – M1 J15a

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Overall Network Performance

8.1.38. The comparison of the overall network performance can be seen in **Figures 22 and 23** for the AM and PM peak periods.

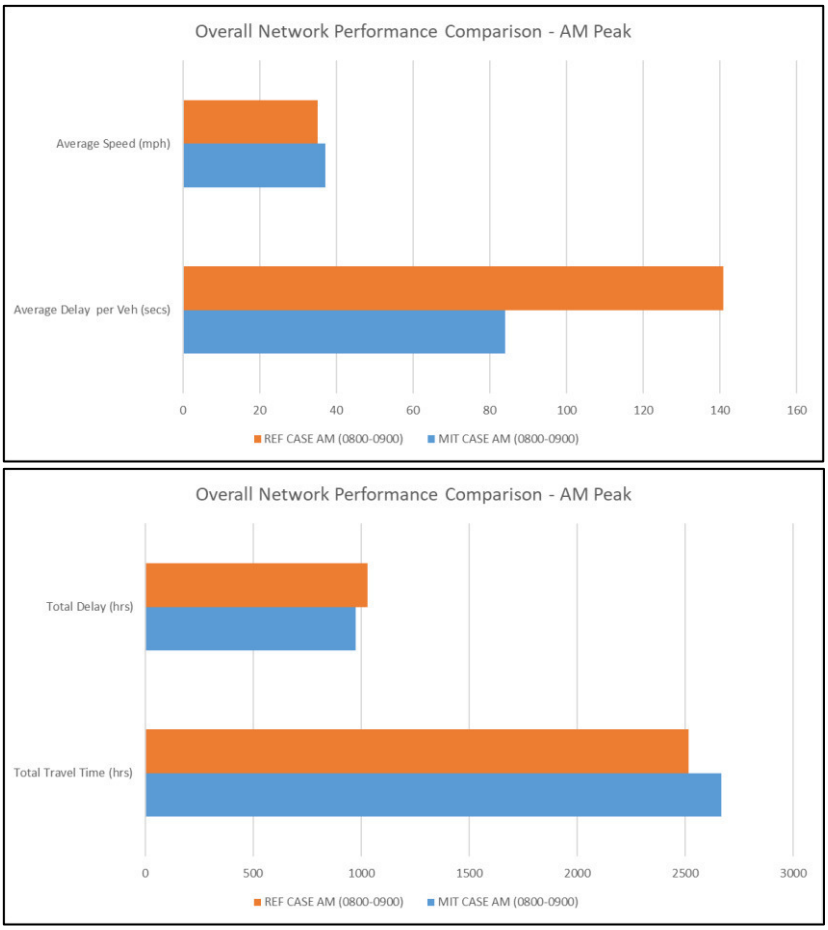

Figure 22 – 2031 Overall Network Performance – AM

8.1.39. From **Figure 22**, the mitigation scenario has a lower total delay, average delay per vehicle and higher average speed compared to the reference case. The total travel time is increased which, like in in the 2021 scenario, is due to a higher number of total trips being able to be made as a result of more vehicles in the network. This suggests that overall, the junction improvements have a positive impact on the network in 2031.

8.1.40. The numbers of unreleased vehicles from the model zones have also been considered and these further indicate the improved performance in the mitigation scenario. The reference case had 800 unreleased vehicles, whereas there were none in the mitigation scenario (based on the average of 20 random seed runs).

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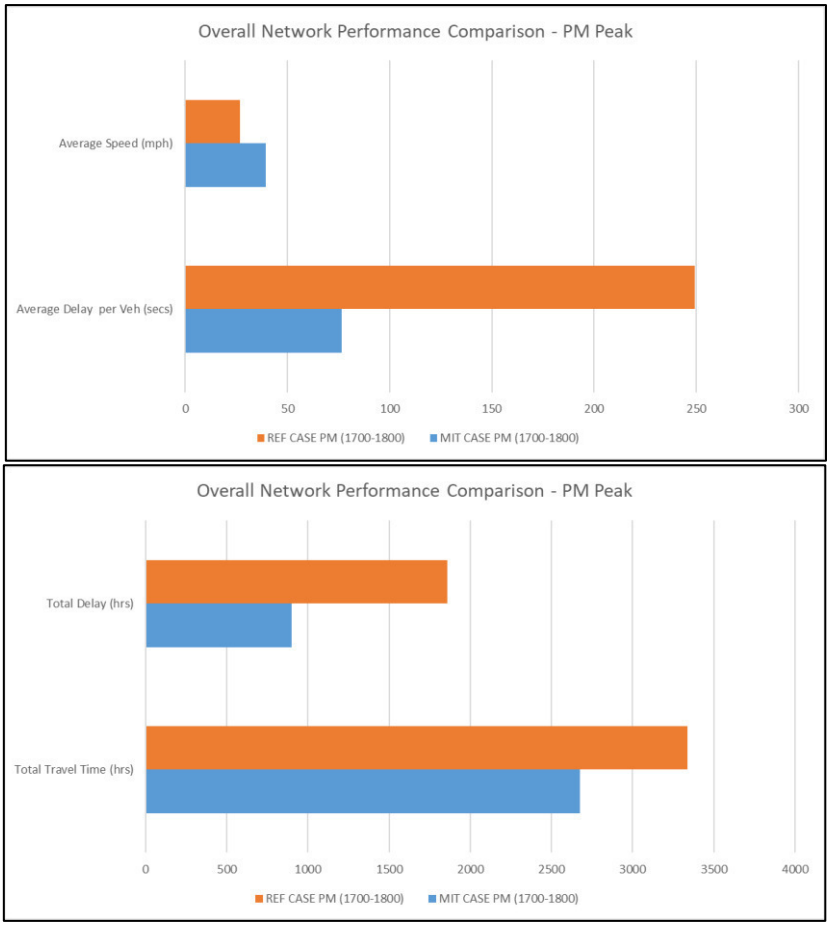

Figure 23 – 2031 Overall Network Performance - PM

8.1.41. From **Figure 23**, the same pattern as the AM peak can be seen, with the mitigation scenario producing reduced total delay, average delay per vehicle and an increased average speed. One difference is the total travel time, which for the PM peak is higher in the reference case. This is a result of significant queuing and M1 mainline flow breakdown, which means vehicles are taking longer to complete their journeys.

8.1.42. A review of the unreleased vehicles has around 1,800 in the reference case and none in the mitigation scenario. This also indicates an improved 2031 network operation with the junction improvements in place.

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9. OVERALL SUMMARY & CONCLUSIONS

9.1.1. The following headings provide summarising comments and conclusions on the VISSIM modelling undertaken for the proposed Northampton Gateway SRFI.

2021 DfT Circular 02/2013 Scenario Performance

9.1.2. From a review of the journey times, traffic volumes and queue lengths, the junction improvements and overall network performance associated with the development have a significant overall benefit on the network.

9.1.3. At M1 J15, the queues on the A45 and A508 are significantly reduced, which improve journey times for routes using these approaches.

9.1.4. The instances of queuing back to the mainline at J15a are also removed entirely with the improvements in place, which in turn helps the network to accommodate more traffic.

2031 Assessment Year Scenario Performance

9.1.5. From a review of the journey times, traffic volumes, queue lengths and overall network performance, the junction improvements associated with the development have a significant improvement on the network.

9.1.6. As in the 2021 scenario, the performance at M1 J15 and M1 J15a is improved, with queues back to the M1 mainline removed entirely with the improvements in place. This in turn helps the network to accommodate more traffic and reduce journey times from previously problem routes such as the A45 and A508.

Overall Conclusions

9.1.7. 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.

9.1.8. The overall conclusions of this modelling are that in both 2021 and 2031 future year scenarios, the network performance is improved as a result of the junction improvements associated with the proposed development.

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10. APPENDICES

Appendix A – Multimodal Base Model Update Note

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Prepared by:	**Daniel Bent**	Reviewed by:	**Luke Best**
Client:	**ADC infrastructure**	Date:	**25/04/17**

M1 J15 – Local Model Validation Report Addendum

1. Introduction

This Technical Note details changes made to the *'M1 J15 and 15a'* VISSIM model provided by Highways England (HE) to ADC Infrastructure (ADC) for use in testing the proposed Strategic Rail Freight Interchange (SFRI) proposals at M1 J15 in Northampton.

The key change is the update of the model from VISSIM version 5.40 to version 9.00-05, which has required a calibration and validation exercise to be undertaken to ensure the model is still fit for purpose and representative of current conditions.

It should be noted that aside from the changes described in this note, no other network elements, parameters or set-ups have been modified from the models originally provided to Multimodal by ADC.

2. Model Changes

Along with the VISSIM version change, the following changes have also been made to the model.

2.1. Watering Lane Junction

The SFRI proposals are required to consider the effects of their development traffic on the A45 / Watering Lane junction, which accesses the village of Collingtree. This is situated north of M1 J15 and can be seen in **Figure 1**.

Figure 1 – Location of A45 / Watering Lane Junction

As this junction was not part of the original HE VISSIM model, the model has been updated to include this left in, left out junction.

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Traffic count data for the Watering Lane junction was provided by ADC in the form of base model flows from the Northamptonshire Strategic Transport Model (NSTM). A new traffic zone (Zone 13) has been created and the proportions of traffic travelling to this zone have been based on the proportions of traffic looking to travel towards Northampton.

Further details on the NSTM flows and calculations to update the VISSIM flow matrices can be found in **Appendix A**.

2.2. M1 J15 Signals

A review of the MOVA datasets and intelligence from the on-site operators has revealed that the three signal controllers (East Stream 0, East Stream 1 and West Stream 1) have linking between them.

The linking between the signals is as follows:

- A *'Hold'* message from East Stream 1 to East Stream 0 when Phase B has Right of Way (MOVA Det. 30;
- A *'Pulse'* message from East Stream 1 to East Stream 0 when Phase A has Right of Way (MOVA Det. 31);
- A *'Hold'* message from East Stream 1 to East Stream 0 when Phase A has Right of Way (MOVA Det. 32);
- A *'Hold'* message from East Stream 0 to West Stream 1 when Phase A has Right of Way (MOVA Det. 32);
- A *'H*old' message from East Stream 0 to East Stream 1 when Phase A has Right of Way (MOVA Det. 64).

The associated link/lane diagram (edited in reference to the VISSIM signal controllers) is provided in **Appendix B**, with the linking highlighted in yellow.

To model the traffic signal linking between the controllers in PC MOVA and VISSIM, the preferred method would be to use the Phase and Stage Confirmation elements within the PC MOVA Connection file. However, PC MOVA has limitations with regards to the linking of traffic signals, notably in how messages are sent and maintained between the controllers. For the *'Pulse'* messages, these can be modelled with PC MOVA, as they only require a message to be sent once. However, *'Hold'* messages require a signal to be continuously sent, which cannot be modelled effectively using PC MOVA alone.

As such, a tailored workaround has been developed, which uses dummy links to send and maintain '*Hold*' messages. A constant traffic flow on these dummy links running over the MOVA detector helps to mimic the operation of the signals during the peak hours as closely as can be achieved. There may still be a slight lag and subsequent offset of the signals using this method (~two seconds), but the efficiency in the model is likely to counteract this and provides a better linking facility overall than what was previously modelled.

Pulse Message

The *pulse* message (which looks to initiate a stage move) has been configured within the PC MOVA connection file using the 'Stage Confirms Between Junctions' tab. The associated set-up shown in **Figure 2**.

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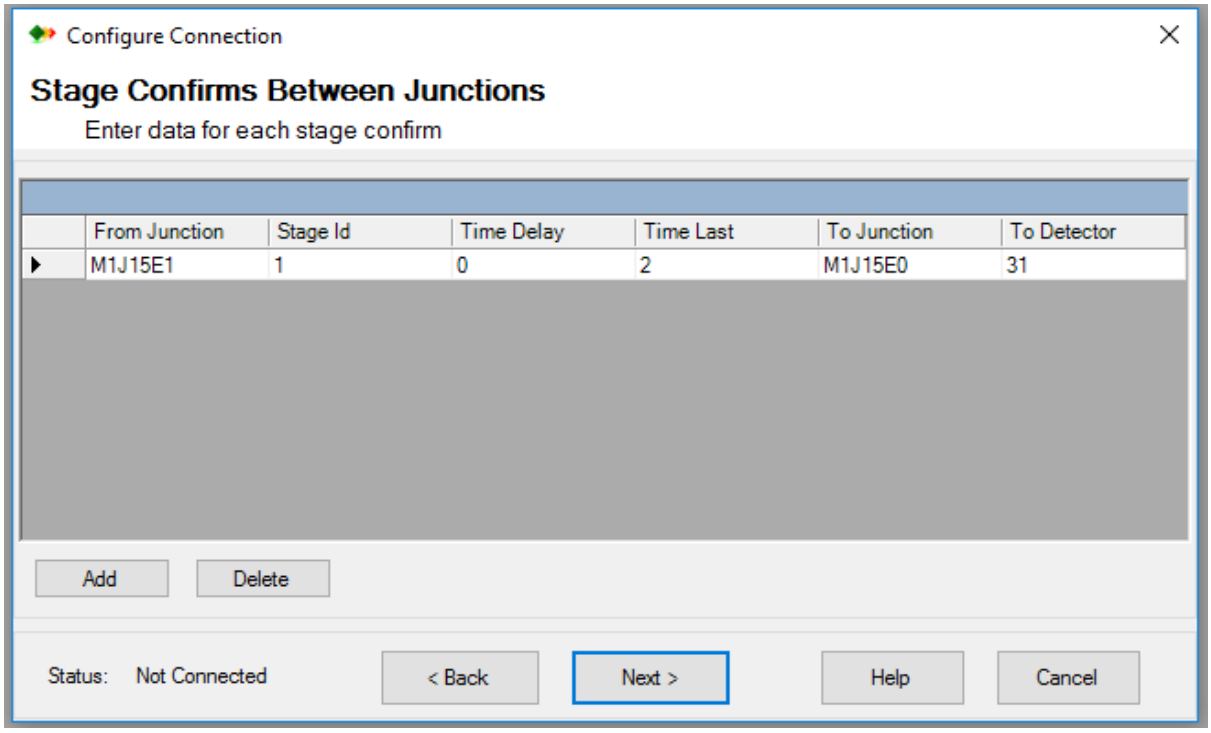

Figure 2 – PC MOVA Set-Up for Pulse Message

No further network elements are required as PC MOVA has been reviewed using the COMMS tool to check that this detector is being called appropriately when the model is running.

Hold Messages
To allow PC MOVA to replicate *hold* messages in VISSIM, which look to hold a certain stage, dummy links have been included in the model. Each dummy link includes:

- A signal head which is linked to the appropriate phase;
- The associated MOVA detector placed after the stop-line;
- A vehicle input of 3600 vehs/hr to model a constant demand;
- A custom speed distribution (69-74mph) to ensure high speeds on the link;
- A custom driver behaviour to keep the vehicles close together and create a constant flow on the link.

The custom speed and driver behaviour for the dummy link is detailed in **Appendix C**.

The idea of the dummy link set-up is that when the signal head turns green (which is linked to a phase at M1 J15), the traffic passes the stop-line and runs over the MOVA detector. The detector, which has been linked in the PC MOVA Connection File, generates a demand and triggers a *hold* message. The constant flow of traffic keeps this *hold* message active until the phase turns red (in line with the associated phase at M1 J15).

The set-up and configuration has been checked using the COMMS tool within PC MOVA, which shows that the detectors are being called and holding stages where applicable.

An example of the set-up is shown in **Figure 3**.

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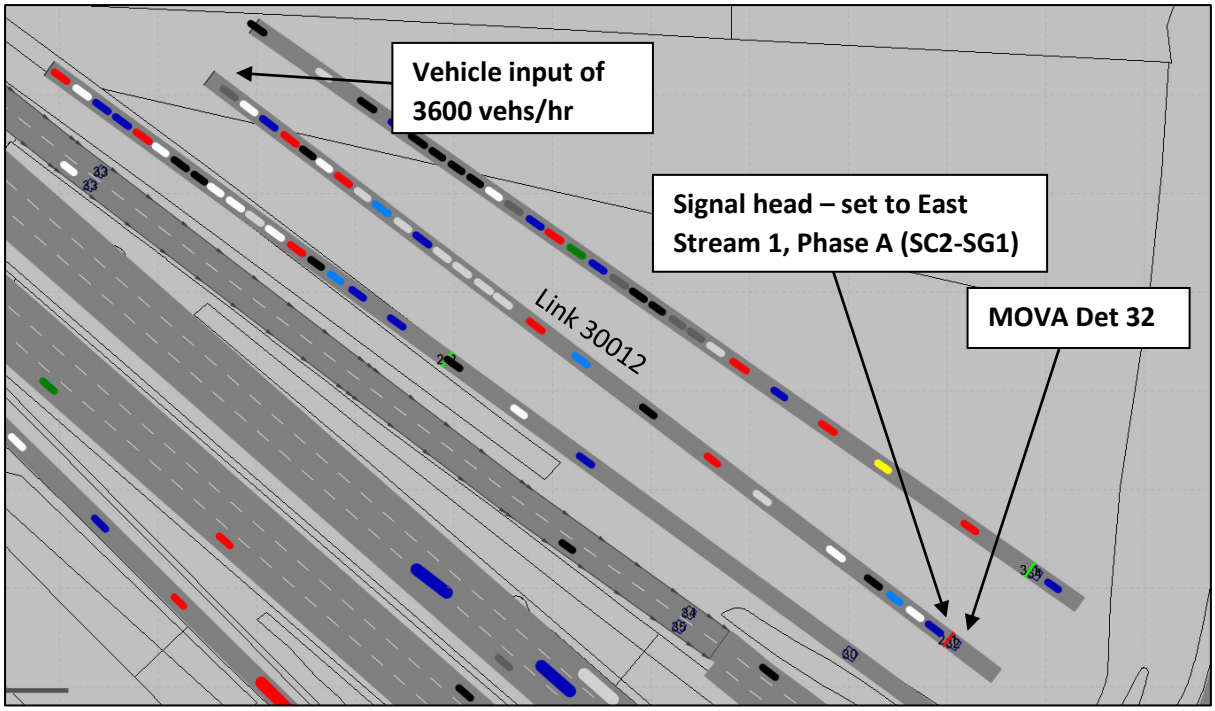

Figure 3 – Dummy Link Set-Up for 'Hold' MOVA Detector 32

Link 30018, which accommodates MOVA Detector 30 for East Stream 0, has a different set-up to the other dummy links. Instead of the signal head being at the end of the link, it is placed in the middle of the link and the detector is placed 100m after the stop-line. This is because there is a 10 second delay from when the hold message is transmitted and placing the detector a sufficient distance away from the signal head allows this delay to be replicated in VISSIM. The different set-up is shown in **Figure 4**.

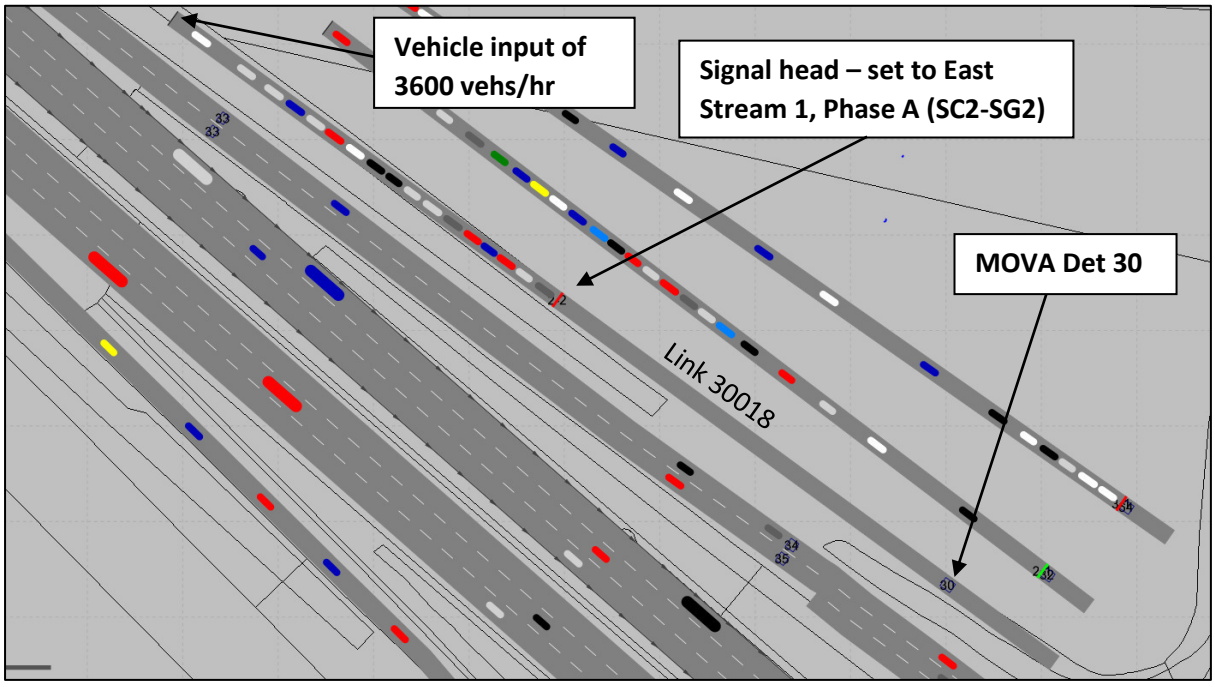

Figure 4 – Dummy Link Set-Up for 'Hold' MOVA Detector 30

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2.3. Link/Connector Structure

A review of the link and connector structure has been undertaken at M1 J15 and some minor changes have been made to neaten up the model visually and for realistic vehicle behaviour. The main change included the removal of Link 138 in the existing model and instead extending Link 127 back to the circulatory stop-line (see **Figure 5**).

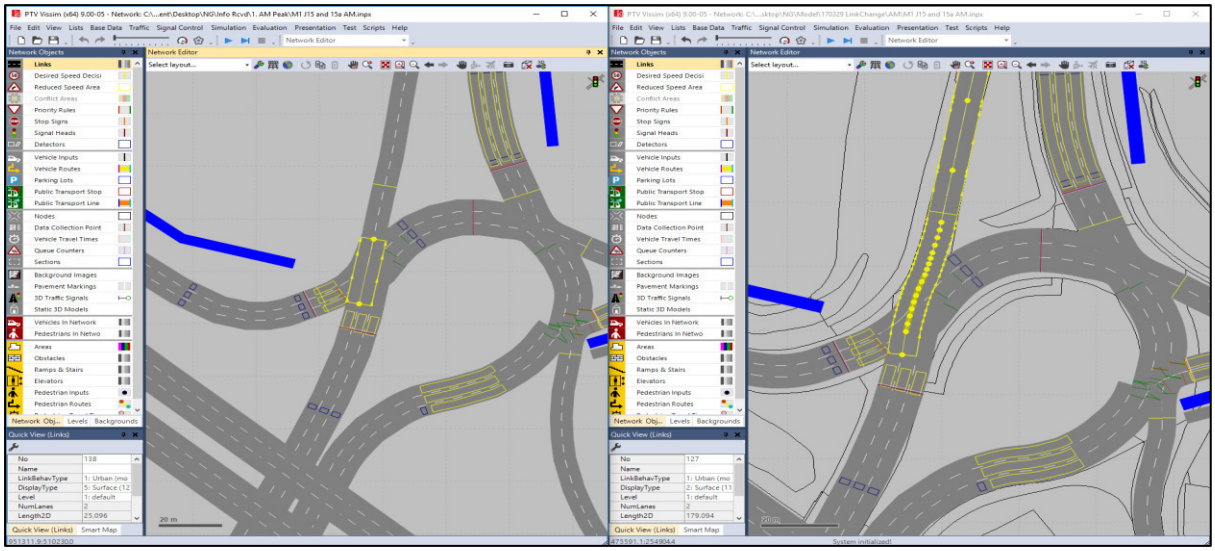

Figure 5 – Link Amendments – Previous vs. Revised

Other changes included extending links to shorten connectors on the A45 North approach and the A508 exit. Two connectors towards the M1 SB on-slip have also been amended from 100m/120m to 200m to help assist with lane changing. All associated routing was checked to ensure this was consistent with the previously validated base model.

2.4. Priority Rules

The priority rules for the Saxon Avenue and A508 approaches at M1 J15 have been modified to improve the journey time validation of routes from this approach. Rather than having gap time priority rules which apply to 'All Vehicles', these have been amended to 'Cars' with a gap time of 3.0 seconds. These priority rules have also been duplicated so that 'HGVs and Buses' could be modelled with a gap time of 3.5 seconds.

2.5. Scenario Management

Following the above changes and the conversion to VISSIM version 9.00-05, the base model has been placed under scenario management. This has allowed both the AM and PM peak periods to be integrated into one model and uses modification files to distinguish between the two.

3. Model Convergence

Having made changes to the model, there was a requirement to re-run the model for convergence and ensure the model was suitably stable before running for calibration and validation outputs.

DMRB (*Volume 12, Section 2, Part 1, Chapter 4*) and TfL's '*Traffic Modelling Guidelines: TfL Traffic Manager and Network Performance Best Practice Version 3.0*' provide convergence criteria should be used to assess the stability of dynamic assignment traffic models. Within VISSIM, the following criteria can be assessed:

- 95% of all path volumes should change by less than 5% for at least four consecutive iterations;
- 95% of all travel times on paths should change by less than 20% for four consecutive interaction; and
- The percentage change in user costs or time spent in the network (V) should be less than 1% for four consecutive iterations.

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After an initial batch run to build up a cost (*BEW file) for the AM and PM peaks, the models were then run on Random Seed 42 for 10 seed runs with no increment. The results of each run are shown in **Tables 1 and 2**.

Table 1 – AM Peak Convergence Results

AM PEAK (0745-0845)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time	Difference from
Run Number	Paths	Edges	Paths	Edges	(h)	prev. run
1	100%	94%	100%	96%	6265774.4	-
2	100%	94%	98%	95%	6293132.59	0.4%
3	100%	93%	99%	97%	6312732.39	0.3%
4	100%	95%	99%	96%	6304957.19	-0.1%
5	100%	94%	95%	96%	6303944.89	0.0%
6	100%	95%	99%	97%	6291320.39	-0.2%
7	100%	93%	100%	96%	6290090.39	0.0%
8	100%	93%	99%	95%	6284691.59	-0.1%
9	100%	93%	98%	96%	6308931.99	0.4%
10	100%	94%	98%	96%	6300159.69	-0.1%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

Table 1 shows a stable AM peak model, with only the volume difference on edges slightly below the required 95% across all 10 runs. Going forward with the results reporting, the cost file for Run 6 has been utilised as this had 95% of the edges within 5 and had four consecutive runs with an overall network Total Travel Time within 1%.

Table 2 – PM Peak Convergence Results

PM PEAK (1645-1745)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time	Difference from
Run Number	Paths	Edges	Paths	Edges	(h)	prev. run
1	88%	74%	97%	89%	6269391.5	-
2	100%	93%	95%	91%	6306321.49	0.6%
3	100%	93%	89%	89%	6464097.19	2.5%
4	100%	93%	99%	93%	6254434.3	-3.2%
5	100%	93%	99%	92%	6276998.99	0.4%
6	100%	94%	99%	93%	6247489.8	-0.5%
7	100%	95%	99%	92%	6262728.7	0.2%
8	100%	95%	99%	95%	6267169.1	0.1%
9	100%	94%	98%	94%	6291750.89	0.4%
10	100%	94%	95%	93%	6306933.19	0.2%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

Table 2 shows that the PM model had slightly more variance compared to the AM peak, with volume difference and travel time difference on edges slightly below the 95% criteria. For the PM peak results running, Run 8 of the batch run meets all of the convergence criteria and has therefore been utilised.

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4. Model Calibration & Validation

For consistency with the M1 J15 and J15a Local Model Validation Report (LMVR) produced by AECOM in October 2016, the following criteria have been utilised for checking the model calibration and validation:

- Calibration – Entry Flow Checks
- Validation – Journey Time Comparisons
- Validation – Exit Flow Checks

4.1. Calibration – Entry Flow Checks

To ensure that the correct flows were entering the model, a comparison of the entry flows was required.

TfL's Modelling Guidelines state that model flows should be within 5% of the observed values to ensure that all traffic is successfully loaded into the model. The GEH statistic has also been compared, with a value less than 3 deemed suitable in accordance with TfL Guidelines.

The results are shown in **Tables 3 and 4**, which are based on 10 random seed runs, starting with Seed 42 and having an increment of 10. More detailed results on the individual vehicle types can be found in **Appendix D**.

Table 3 – AM Peak Entry Flow Comparisons – All Vehicles

AM (0730-0830hrs) SUMMARY STATISTICS	
Total number of counts considered	11
VISSIM model counts with <5% difference	9
% of VISSIM counts with <5% difference	81.82%
VISSIM model counts with GEH <3	11
% of VISSIM counts with GEH <3	100.00%

Entry			DATA		DIFFERENCE		GEH	
			Matrix	Modelled	Diff.	% Diff.	GEH	GEH
Zone	Location	Data Measurement No.	All Vehicles	All Vehicles				
1	A508 South	1	986	1049	63	6%	1.98	YES
2	M1 South-East	3	3640	3718	78	2%	1.29	YES
3	Saxon Avenue	5	662	665	3	0%	0.12	YES
4	A45 North	7	2527	2533	6	0%	0.12	YES
5	A43 South	9	1285	1279	-6	0%	0.17	YES
6	A5123 North	11	1701	1691	-10	-1%	0.24	YES
7	EB Services Area	13	33	35	2	6%	0.34	YES
9	WB Services Area	15	17	17	0	0%	0.00	YES
11	Swan Valley	17	126	124	-2	-2%	0.18	YES
12	M1 North West	19	4476	4551	75	2%	1.12	YES
13	Watering Lane	21	494	495	1	0%	0.04	YES

From **Table 3**, there are two approaches which have a difference of 6% (against the desired 5%) – the A508 South approach to M1 J15 and the Eastbound Services Area at M1 J15a. Given the percentage differences are not significant and the GEH values are within 3, the modelled entry flows for these approaches are considered suitable.

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Table 4 – PM Peak Entry Flow Comparisons – All Vehicles

PM SUMMARY STATISTICS	
Total number of counts considered	11
VISSIM model counts with <5% difference	11
% of VISSIM counts with <5% difference	100.00%
VISSIM model counts with GEH <3	11
% of VISSIM counts with GEH <3	100.00%

PM PEAK – 1645-1745hrs

Entry			DATA		DIFFERENCE		GEH		FLOW			
			Observed	Modelled								
Zone	Location	Data Measurement No.	All Vehicles	All Vehicles	Diff.	% Diff.	GEH	GEH	FLOW	<700	700 – 2700	>2700
1	A508 South	1	887	901	14	2%	0.47	YES	YES	0	0	0
2	M1 South-East	3	4530	4549	19	0%	0.28	YES	YES	0	0	0
3	Saxon Avenue	5	725	728	3	0%	0.11	YES	YES	0	0	0
4	A45 North	7	2287	2290	3	0%	0.06	YES	YES	0	0	0
5	A43 South	9	1668	1645	-23	-1%	0.57	YES	YES	0	0	0
6	A5123 North	11	1036	1023	-13	-1%	0.41	YES	YES	0	0	0
7	EB Services Area	13	30	29	-1	-3%	0.18	YES	YES	0	0	0
9	WB Services Area	15	24	24	0	0%	0.00	YES	YES	0	0	0
11	Swan Valley	17	158	151	-7	-4%	0.56	YES	YES	0	0	0
12	M1 North West	19	4162	4176	14	0%	0.22	YES	YES	0	0	0
13	Watering Lane	21	109	109	0	0%	0.00	YES	YES	0	0	0

From **Table 4**, all approaches in the model have a difference within 5% and within a GEH of 3, indicating they are all suitable.

4.2. Validation – Journey Time Comparisons

Journey times within the model have been compared against the observed values detailed in Tables 16 and 17 of AECOM's LMVR.

Tables 5 and 6 detail the journey time comparisons, with the model needing to be within 15% or 60 seconds to meet DMRB criteria. The model results are based on 10 random seed runs, starting with Seed 42 and having an increment of 10.

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Table 5 – AM Peak Journey Time Comparisons

AM Peak 0745-0845hrs			Observed	Modelled	Validation						
No.	From	To	Av. journey time (s)	Av. journey time (s)	Actual Diff.	% Diff.	Within 15%	Within 1 minute	Validates	Summary Statistics	
1	A508 South	M1 South	00:03:39	00:03:40	00:01	1%	✓	✓	PASS	Vehicle Class	All
2		A45 North	00:02:45	00:02:51	00:06	3%	✓	✓	PASS	Number of routes considered	20
3		A43 South	00:05:49	00:06:28	00:39	11%	✓	✓	PASS	Number of routes within 15% of observed	19
4	M1 South	A45 North	00:03:09	00:03:15	00:06	3%	✓	✓	PASS	% of VISSIM routes within 15% of observed	95%
5		A43 South	00:05:20	00:05:58	00:38	12%	✓	✓	PASS	Number of routes within 60 secs of observed	20
6		A5123 North	00:05:18	00:05:56	00:38	12%	✓	✓	PASS	% of VISSIM routes within 60 secs of observed	100%
7		M1 North	00:04:31	00:05:05	00:34	13%	✓	✓	PASS	Number of routes meeting at least one set of criteria	20
8	A45 North	A508 South	00:02:25	00:01:40	00:45	31%	✗	✓	PASS	% of routes meeting at least one set of criteria	100%
9		M1 North	00:05:53	00:05:20	00:33	9%	✓	✓	PASS		
10	A43 South	A508 South	00:06:25	00:06:26	00:01	0%	✓	✓	PASS		
11		M1 South	00:06:07	00:06:05	00:02	0%	✓	✓	PASS		
12		A5123 North	00:02:01	00:02:03	00:02	1%	✓	✓	PASS		
13		M1 North	00:02:26	00:02:39	00:13	9%	✓	✓	PASS		
14	A5123 North	A43 South	00:02:23	00:02:17	00:06	4%	✓	✓	PASS		
15	EB Service Area	M1 South	00:04:15	00:04:17	00:02	1%	✓	✓	PASS		
16	Swan Valley	M1 South	00:04:34	00:04:27	00:07	2%	✓	✓	PASS		
17		A43 South	00:02:15	00:02:08	00:07	5%	✓	✓	PASS		
18	M1 North	M1 South	00:06:02	00:06:00	00:02	1%	✓	✓	PASS		
19		A45 North	00:06:14	00:05:55	00:19	5%	✓	✓	PASS		
20		A43 South	00:04:18	00:04:20	00:02	1%	✓	✓	PASS		

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Table 6 – PM Peak Journey Time Comparisons

PM Peak 1645-1745hrs			Observed	Modelled	Validation						
No.	From	To	Av. journey time (s)	Av. journey time (s)	Actual Diff.	% Diff.	Within 15%	Within 1 minute	Validates	Summary Statistics	
1	A508 South	M1 South	00:04:47	00:04:25	00:22	8%	✓	✓	PASS	Vehicle Class	All
2		A45 North	00:04:07	00:03:56	00:11	5%	✓	✓	PASS	Number of routes considered	20
3		A43 South	00:07:43	00:07:50	00:07	2%	✓	✓	PASS	Number of routes within 15% of observed	18
4	M1 South	A45 North	00:04:29	00:03:10	01:19	29%	×	×	FAIL	% of VISSIM routes within 15% of observed	90%
5		A43 South	00:06:13	00:06:03	00:10	3%	✓	✓	PASS	Number of routes within 60 secs of observed	19
6		A5123 North	00:06:13	00:06:03	00:10	3%	✓	✓	PASS	% of VISSIM routes within 60 secs of observed	95%
7		M1 North	00:05:23	00:05:09	00:14	4%	✓	✓	PASS	Number of routes meeting at least one set of criteria	19
8	A45 North	A508 South	00:01:54	00:01:31	00:23	20%	×	✓	PASS	% of routes meeting at least one set of criteria	95%
9		M1 North	00:06:02	00:05:23	00:39	11%	✓	✓	PASS		
10	A43 South	A508 South	00:06:29	00:06:10	00:19	5%	✓	✓	PASS		
11		M1 South	00:05:51	00:05:58	00:07	2%	✓	✓	PASS		
12		A5123 North	00:02:02	00:02:05	00:03	3%	✓	✓	PASS		
13		M1 North	00:02:43	00:02:43	00:00	0%	✓	✓	PASS		
14	A5123 North	A43 South	00:02:02	00:02:03	00:01	1%	✓	✓	PASS		
15	EB Service Area	M1 South	00:03:57	00:04:06	00:09	4%	✓	✓	PASS		
16	Swan Valley	M1 South	00:04:16	00:04:20	00:04	2%	✓	✓	PASS		
17		A43 South	00:02:31	00:02:35	00:04	3%	✓	✓	PASS		
18	M1 North	M1 South	00:05:35	00:05:50	00:15	4%	✓	✓	PASS		
19		A45 North	00:05:58	00:05:47	00:11	3%	✓	✓	PASS		
20		A43 South	00:04:27	00:04:45	00:18	7%	✓	✓	PASS		

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Tables 5 and 6 show that both the AM and PM peak models validate for journey times, with 100% and 95% of the routes respectively meeting either the 15% or 60 second criteria.

4.3. Validation – Exit Flow Checks

As well as entry flows, the model exit flows can be checked to ensure that the model is suitably validated.

DMRB requires that modelled exit flows should have a GEH of less than 5 and meet Individual Flow criteria as detailed in **Figure 6**.

Table 4.2: Assignment Validation: Acceptability Guidelines

Criteria and Measures	Acceptability Guideline
Assigned Hourly flows * compared with observed flows	
1. Individual flows within 15% for flows 700 - 2,700 vph 2. Individual flows within 100 vph for flows < 700 vph 3. Individual flows within 400 vph for flows > 2,700 vph	> 85% of cases
4. Total screenline flows (normally > 5 links) to be within 5%	All (or nearly all) screenlines
5. GEH statistic: i) individual flows : GEH < 5	> 85% of cases
ii) screenline (+) totals: GEH < 4	All (or nearly all) screenlines
Notes + Screenlines containing high flow routes such as Motorways should be presented both including and excluding such routes * links or turning movements (but see Paragraph 4.4.37).	
Modelled journey times compared with observed times	
6. Times within 15% (or 1 minute, if higher)	> 85% of routes

Figure 6 – DMRB Criteria for Individual Flows

The results are shown in **Tables 7 and 8**, which are based on 10 random seed runs, starting with Seed 42 and having an increment of 10.

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Table 7 – AM Peak Exit Flow Comparisons – All Vehicles

AM SUMMARY STATISTICS	
Total number of counts considered	11
VISSIM model counts with GEH <5	11
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts meeting WebTAG Unit 3.1 flow criteria	11
% of VISSIM counts meeting WebTAG Unit 3.1 flow criteria	100.00%

AM PEAK – 0745-0845hrs

Exit			DATA		DIFFERENCE		GEH		FLOW			
			Observed	Modelled								
Zone	Location	Data Measurement No.	All Vehicles	All Vehicles	Diff.	% Diff.	GEH	GEH	FLOW	<700	700 – 2700	>2700
1	A508 South	2	1203	1144	-59	-5%	1.72	YES	YES	0	0	0
2	M1 South-East	4	4639	4498	-141	-3%	2.09	YES	YES	0	0	0
3	Saxon Avenue	6	243	229	-14	-6%	0.91	YES	YES	0	0	0
4	A45 North	8	3350	3162	-188	-6%	3.29	YES	YES	0	0	0
5	A43 South	10	1748	1731	-17	-1%	0.41	YES	YES	0	0	0
6	A5123 North	12	712	691	-21	-3%	0.79	YES	YES	0	0	0
7	EB Services Area	14	51	51	0	0%	0.00	YES	YES	0	0	0
9	WB Services Area	16	155	151	-4	-3%	0.32	YES	YES	0	0	0
11	Swan Valley	18	141	133	-8	-6%	0.68	YES	YES	0	0	0
12	M1 North West	20	3675	3586	-89	-2%	1.48	YES	YES	0	0	0
13	Watering Lane	22	250	245	-5	-2%	0.32	YES	YES	0	0	0

2856 plus 494 (from Watering Lane)

Table 8 – PM Peak Exit Flow Comparisons – All Vehicles

PM SUMMARY STATISTICS	
Total number of counts considered	11
VISSIM model counts with GEH <5	11
% of VISSIM counts with GEH <5	100.00%
VISSIM model counts meeting WebTAG Unit 3.1 flow criteria	11
% of VISSIM counts meeting WebTAG Unit 3.1 flow criteria	100.00%

PM PEAK – 1645-1745hrs

Exit			DATA		DIFFERENCE		GEH		FLOW			
			Observed	Modelled								
Zone	Location	Data Measurement No.	All Vehicles	All Vehicles	Diff.	% Diff.	GEH	GEH	FLOW	<700	700 – 2700	>2700
1	A508 South	2	845	844	-1	0%	0.03	YES	YES	0	0	0
2	M1 South-East	4	4049	3973	-76	-2%	1.20	YES	YES	0	0	0
3	Saxon Avenue	6	373	373	0	0%	0.00	YES	YES	0	0	0
4	A45 North	8	3065	3062	-3	0%	0.05	YES	YES	0	0	0
5	A43 South	10	1427	1405	-22	-2%	0.58	YES	YES	0	0	0
6	A5123 North	12	1048	1032	-16	-2%	0.50	YES	YES	0	0	0
7	EB Services Area	14	32	32	0	0%	0.00	YES	YES	0	0	0
9	WB Services Area	16	162	159	-3	-2%	0.24	YES	YES	0	0	0
11	Swan Valley	18	97	95	-2	-2%	0.20	YES	YES	0	0	0
12	M1 North West	20	4489	4487	-2	0%	0.03	YES	YES	0	0	0
13	Watering Lane	22	51	51	0	0%	0.00	YES	YES	0	0	0

2956 plus 109 (from Watering Lane)

Tables 7 and 8 show that modelled exit flows validate in both peak periods, with all exit links meeting GEH and Individual Flow criteria.

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5. Summary

This Technical Note details changes made to the 'M1 J15 and 15a' VISSIM model provided by Highways England (HE) to ADC Infrastructure (ADC) for use in testing the proposed Strategic Rail Freight Interchange (SFRI) proposals at M1 J15 in Northampton.

The main conclusions are:

- The model has been successfully updated from VISSIM 5.40 to VISSIM 9.00-05, with additional changes made including:
    - Addition of the A45 / Watering Lane junction, north of M1 J15;
    - Linking of the MOVA signals at M1 J15, consisting of a tailored approach for modelling *'Hold'* messages;
    - Minor link and connector changes at M1 J15;
    - Amendments to the priority rules at the Saxon Avenue and A508 approaches to M1 J15;
    - Placing the model under Scenario Management.
- Following the changes to the model, a calibration and validation exercise has determined that the model is representative of exiting conditions and is suitable for testing the SRFI proposals.

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6. APPENDICES

Appendix A – Watering Lane Flow Calculations & Revised Flow Matrices

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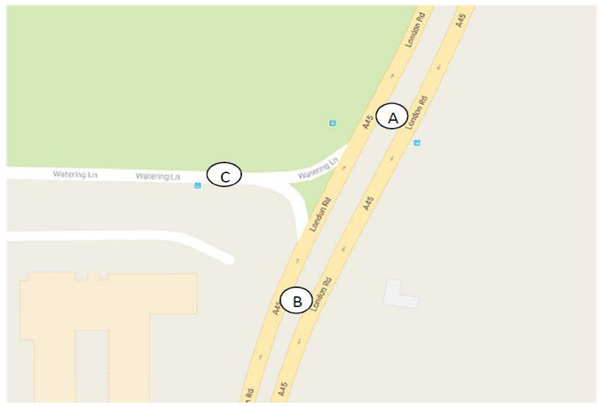
MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

Raw Data Received from ADC Infrastructure

Location: L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\170327 Watering Lane Flows

BASE MODEL
Junction: Watering Lane / A45 London Road



ALL VEHICLES

AM (0800-0900)

Jct Node Number			TO ARM			
		Road name	A	B	C	Total
FROM ARM	A	A45 London Road NB	0	0	0	**0**
	B	A45 London Road SB	3046	0	250	**3296**
	C	Watering Lane	494	0	0	**494**
	Total		**3540**	**0**	**250**	**3790**

PM (1700-1800)

Jct Node Number			TO ARM			
		Road name	A	B	C	Total
FROM ARM	A	A45 London Road NB	0	0	0	**0**
	B	A45 London Road SB	2670	0	51	**2721**
	C	Watering Lane	109	0	0	**109**
	Total		**2779**	**0**	**51**	**2830**

HGV

AM (0800-0900)

Jct Node Number			TO ARM			
		Road name	A	B	C	Total
FROM ARM	A	A45 London Road NB	0	0	0	**0**
	B	A45 London Road SB	311	0	0	**311**
	C	Watering Lane	0	0	0	**0**
	Total		**311**	**0**	**0**	**311**

PM (1700-1800)

Jct Node Number			TO ARM			
		Road name	A	B	C	Total
FROM ARM	A	A45 London Road NB	0	0	0	**0**
	B	A45 London Road SB	159	0	0	**159**
	C	Watering Lane	0	0	0	**0**
	Total		**159**	**0**	**0**	**159**

	AM		PM	
	LIGHTS	HEAVIES	LIGHTS	HEAVIES
IN	250	0	51	0
OUT	494	0	109	0

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

Watering Lane - AM Peak Matrix Calcs

	AM Lights	Heavies
In	250	0
Out	494	0

Assumptions

Assumed 85% of demand in build up and cool down periods 85%
Proportions to Z13 (Watering Lane) based on proportions to and from Zone 4 (A45 towards Northampton)
All flows from Z13 (Watering Lane) turn left to Z4 - assume survey data would pick up any vehicles then travelling towards M1 J15

LGV BUILD UP (0615-0715)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	13	7	279	21	6	0	0	0	4	2	231	52		
2	15	16	9	362	134	38	0	0	0	24	12	1465	67		
3	58	63	0	4	24	7	0	0	0	5	2	262	1		
4	596	1068	50	40	19	5	0	0	0	4	2	210	7	1994	
5	3	64	1	17	0	210	18	0	0	21	8	165	3		
6	7	182	3	49	791	1	60	0	0	8	10	110	9		
7	0	7	0	2	0	0	0	0	0	0	0	0	0		
8	0	0	0	0	0	3	4	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	9	0		
10	0	0	0	0	2	0	0	0	0	0	0	1	0		
11	1	19	0	5	22	1	2	0	0	1	0	2	1		
12	59	1458	21	390	296	19	11	29	0	0	11	0	72		Check
13	0	0	0	420	0	0	0	0	0	0	0	0	0	420	420
				1148									213		
												Check	213		

HGV BUILD UP (0615-0715)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	0	1	12	7	1	0	0	0	2	2	61	0		
2	1	5	4	79	54	6	0	0	0	14	14	459	0		
3	3	2	0	0	7	1	0	0	0	2	2	58	0		
4	43	140	8	4	4	1	0	0	0	1	1	37	0	239	
5	0	28	0	6	0	10	0	0	0	13	3	45	0		
6	0	20	0	4	90	0	3	0	0	0	1	8	0		
7	0	4	0	1	0	0	0	0	0	0	0	0	0		
8	0	1	0	0	2	1	1	0	0	0	1	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	4	0		
10	0	0	0	0	0	0	0	0	0	1	1	0	0		
11	0	10	0	2	2	0	1	0	0	0	0	0	0		
12	8	606	3	118	108	2	2	17	0	2	8	3	0		Check
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				226									0		
												Check	0		

LGV PEAK (0715-0815)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	17	31	609	18	10	0	0	0	5	3	222	58		
2	25	24	43	843	149	82	0	0	0	37	26	1808	80		
3	116	111	0	10	26	14	0	0	0	6	5	314	1		
4	801	1129	56	66	22	12	0	0	0	5	4	264	6	2359	
5	14	181	6	77	1	524	11	0	0	42	28	295	7		
6	23	301	11	128	915	1	18	0	0	26	15	134	12		
7	1	18	1	8	0	0	0	0	0	0	0	0	1		
8	0	0	0	0	5	0	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	13	0		
10	0	0	0	0	1	2	0	0	0	0	1	1	0		
11	3	34	1	15	50	1	3	0	0	1	1	1	1		
12	159	2079	74	885	292	45	6	34	0	0	27	5	84		Check
13	0	0	0	494	0	0	0	0	0	0	0	0	0	494	494
				2641									250		
												Check	250		

HGV PEAK (0715-0815)

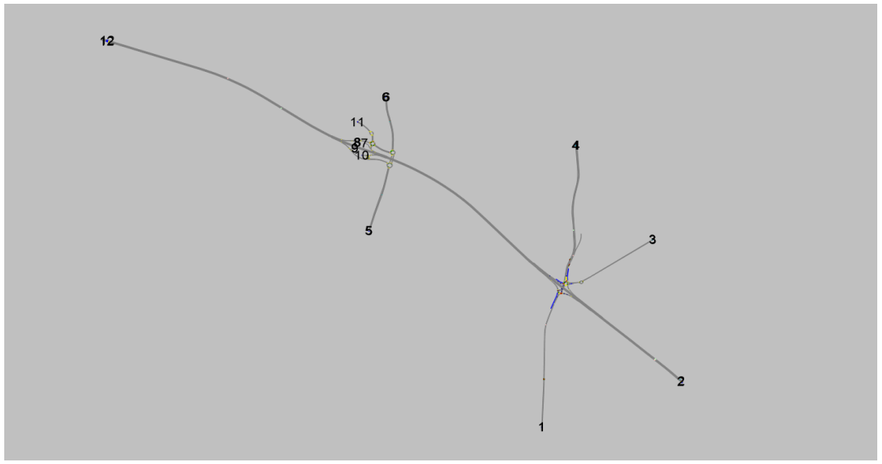
	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	0	1	16	5	1	0	0	0	2	1	46	0		
2	9	1	3	70	51	6	0	0	0	13	14	434	0		
3	4	5	0	1	5	1	0	0	0	1	1	42	0		
4	39	66	12	8	4	0	0	0	0	1	1	36	0	167	
5	0	28	0	5	0	10	0	0	0	13	3	45	0		
6	0	21	0	4	92	0	4	0	0	0	1	8	0		
7	0	5	0	1	0	0	0	0	0	0	0	0	0		
8	0	1	0	0	2	1	1	0	0	0	1	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	4	0		
10	0	0	0	0	0	0	0	0	0	1	1	0	0		
11	0	11	0	2	3	0	1	0	0	0	0	0	0		
12	9	607	4	108	107	2	2	17	0	2	8	3	0		Check
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				215									0		
												Check	0		

LGV COOL DOWN (0815-0845)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	5	17	277	8	4	0	0	0	2	2	72	48		
2	8	6	21	341	63	31	0	0	0	20	13	591	60		
3	62	28	1	11	14	7	0	0	0	5	3	135	2		
4	319	411	45	54	10	5	0	0	0	3	2	95	9	944	
5	4	67	4	34	4	267	2	0	0	16	14	146	6		
6	6	96	6	48	446	2	5	0	0	1	8	61	8		
7	0	4	0	2	0	0	0	0	0	0	0	0	0		
8	0	2	0	1	2	1	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	2	0		
10	0	0	0	0	0	1	0	0	0	0	0	0	0		
11	2	23	1	11	22	3	0	0	0	0	0	0	2		
12	58	867	55	438	160	38	1	24	0	0	12	1	76		Check
13	0	0	0	420	0	0	0	0	0	0	0	0	0	420	420
				1217									213		
												Check	213		

HGV COOL DOWN (0815-0845)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	0	1	13	3	0	0	0	0	0	1	25	0		
2	0	0	1	16	60	7	0	0	0	16	16	509	0		
3	5	3	0	1	2	0	0	0	0	0	1	19	0		
4	35	34	2	4	2	0	0	0	0	0	1	16	0	94	
5	1	30	0	3	0	10	0	0	0	13	3	44	0		
6	0	23	0	2	93	0	4	0	0	0	1	8	0		
7	0	5	0	0	0	0	0	0	0	0	0	0	0		
8	0	1	0	0	2	1	1	0	0	0	1	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	4	0		
10	0	0	0	0	0	0	0	0	0	1	1	0	0		
11	0	12	0	1	3	0	1	0	0	0	0	0	0		
12	12	656	1	56	107	2	2	17	0	2	8	3	0		Check
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				96									0		
												Check	0		



MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

Watering Lane - PM Peak Matrix Calcs

	PM	
	Lights	Heavies
In	51	0
Out	109	0

Assumptions

Assumed 85% of demand in build up and cool down periods 85%
Proportions to Z13 (Watering Lane) based on proportions to and from Zone 4 (A45 towards Northampton)
All flows from Z13 (Watering Lane) turn left to Z4 - assume survey data would pick up any vehicles then travelling towards M1 J15

LGV BUILD UP (1545-1645)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	7	35	508	14	11	0	0	0	3	2	262	8		
2	31	14	74	1071	132	107	0	0	0	32	15	2540	17		
3	107	46	2	29	23	19	0	0	0	6	3	441	0		
4	612	913	136	166	16	13	0	0	0	4	2	307	3	2169	
5	5	159	8	68	2	544	17	0	0	48	14	427	1		
6	4	135	7	57	549	4	13	0	0	6	7	57	1		
7	1	25	1	11	0	0	0	0	0	0	0	0	0		
8	0	1	0	1	7	2	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	28	0		
10	0	0	0	0	2	2	0	0	0	1	1	2	0		
11	1	40	2	17	30	22	5	0	0	3	1	18	0		
12	61	1909	93	813	367	54	3	22	0	0	7	1	13		Check
13	0	0	0	93	0	0	0	0	0	0	0	0	0	93	93
				2741									43		
												Check	43		

LGV PEAK (1645-1745)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	7	35	508	14	16	0	0	0	5	2	255	9		
2	31	14	74	1071	136	155	0	0	0	43	22	2493	20		
3	107	46	2	29	23	27	0	0	0	7	4	429	1		
4	612	913	136	166	16	19	0	0	0	5	3	298	3	2168	
5	6	226	10	83	1	687	19	0	0	60	19	404	2		
6	5	181	8	67	621	6	14	0	0	11	12	51	1		
7	0	17	1	6	0	0	0	0	0	0	0	0	0		
8	0	1	0	0	7	0	3	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	17	0		
10	0	0	0	0	2	2	0	0	0	1	0	2	0		
11	1	44	2	16	48	13	4	0	0	0	1	8	0		
12	59	2156	91	794	408	90	3	31	0	0	16	1	15		Check
13	0	0	0	109	0	0	0	0	0	0	0	0	0	109	109
				2740									51		
												Check	51		

LGV COOL DOWN (1745-1815)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	4	27	281	7	10	0	0	0	2	1	108	9		
2	22	6	49	510	66	90	0	0	3	20	8	1006	17		
3	50	19	1	12	12	16	0	0	1	4	1	182	0		
4	261	408	61	61	8	11	0	0	0	2	1	119	2	932	
5	3	96	7	42	2	298	14	0	25	0	8	192	1		
6	3	77	5	34	308	0	11	0	7	0	4	31	1		
7	0	6	0	3	0	0	0	0	0	0	0	0	0		
8	0	0	0	0	7	0	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	5	0		
10	0	0	0	0	1	5	0	0	1	0	0	0	0		
11	1	14	1	6	10	3	3	0	0	0	0	1	0		
12	30	843	59	369	174	37	2	12	0	0	4	2	12		Check
13	0	0	0	93	0	0	0	0	0	0	0	0	0	93	93
				1318									43		
												Check	43		

HGV BUILD UP (1545-1645)

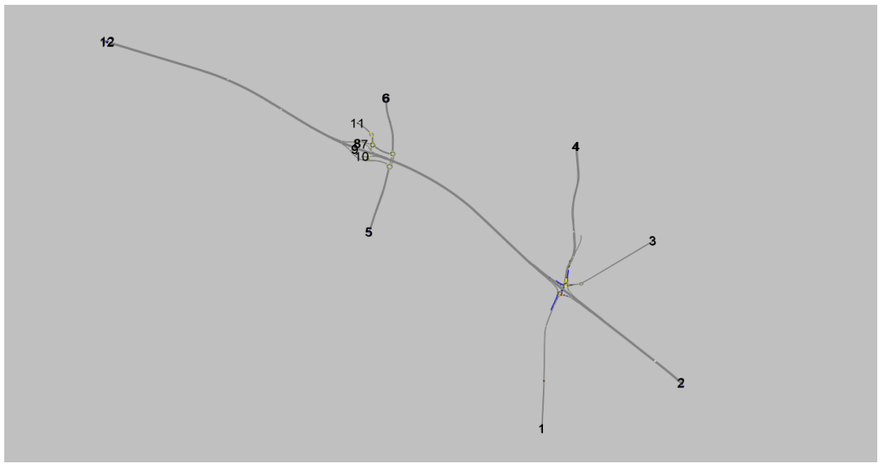
	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	0	1	19	2	0	0	0	0	1	1	22	0		
2	3	2	4	59	30	5	1	0	0	15	9	376	0		
3	2	2	0	1	3	1	0	0	0	1	1	40	0		
4	17	49	7	10	2	0	0	0	0	1	1	30	0	117	
5	0	34	0	11	1	25	6	1	0	11	5	59	0		
6	0	9	0	3	41	0	1	0	0	1	1	5	0		
7	0	4	0	1	0	0	0	0	0	0	0	0	0		
8	0	1	0	0	1	0	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	7	0		
10	0	0	0	0	1	1	0	0	0	0	0	1	0		
11	0	11	0	3	3	1	3	0	0	0	0	1	0		
12	2	337	2	109	68	0	0	0	0	0	0	0	0		Check
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				216									0		
												Check	0		

HGV PEAK (1645-1745)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	0	1	19	2	0	0	0	0	1	1	22	0		
2	3	2	4	59	29	5	1	0	0	14	9	365	0		
3	2	2	0	1	3	1	0	0	0	1	1	40	0		
4	17	49	7	10	2	0	0	0	0	1	1	31	0	118	
5	0	34	0	11	1	25	6	1	0	11	5	59	0		
6	0	9	0	3	41	0	1	0	0	1	1	5	0		
7	0	4	0	1	0	0	0	0	0	0	0	0	0		
8	0	1	0	0	1	0	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	7	0		
10	0	0	0	0	1	1	0	0	0	0	0	1	0		
11	0	10	0	3	3	1	3	0	0	0	0	1	0		
12	2	333	2	109	68	0	0	0	0	0	0	0	0		Check
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				216									0		
												Check	0		

HGV COOL DOWN (1745-1815)

	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	0	0	1	6	1	0	0	0	0	1	0	17	0		
2	0	0	3	41	34	6	1	0	0	16	10	426	0		
3	3	1	0	1	1	0	0	0	0	1	0	18	0		
4	14	23	6	5	1	0	0	0	0	0	0	13	0	62	
5	0	40	0	5	1	25	6	1	0	11	5	59	0		
6	0	11	0	1	41	0	1	0	0	1	1	5	0		
7	0	5	0	1	0	0	0	0	0	0	0	0	0		
8	0	1	0	0	1	0	0	0	0	0	0	0	0		
9	0	0	0	0	0	0	0	0	0	0	0	7	0		
10	0	0	0	0	1	1	0	0	0	1	0	1	0		
11	0	13	0	1	3	1	3	0	0	0	0	1	0		
12	1	396	4	48	68	0	0	0	0	0	0	0	0		Check
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
				109									0		
												Check	0		



Appendix B – Revised MOVA Link/Lane Diagram

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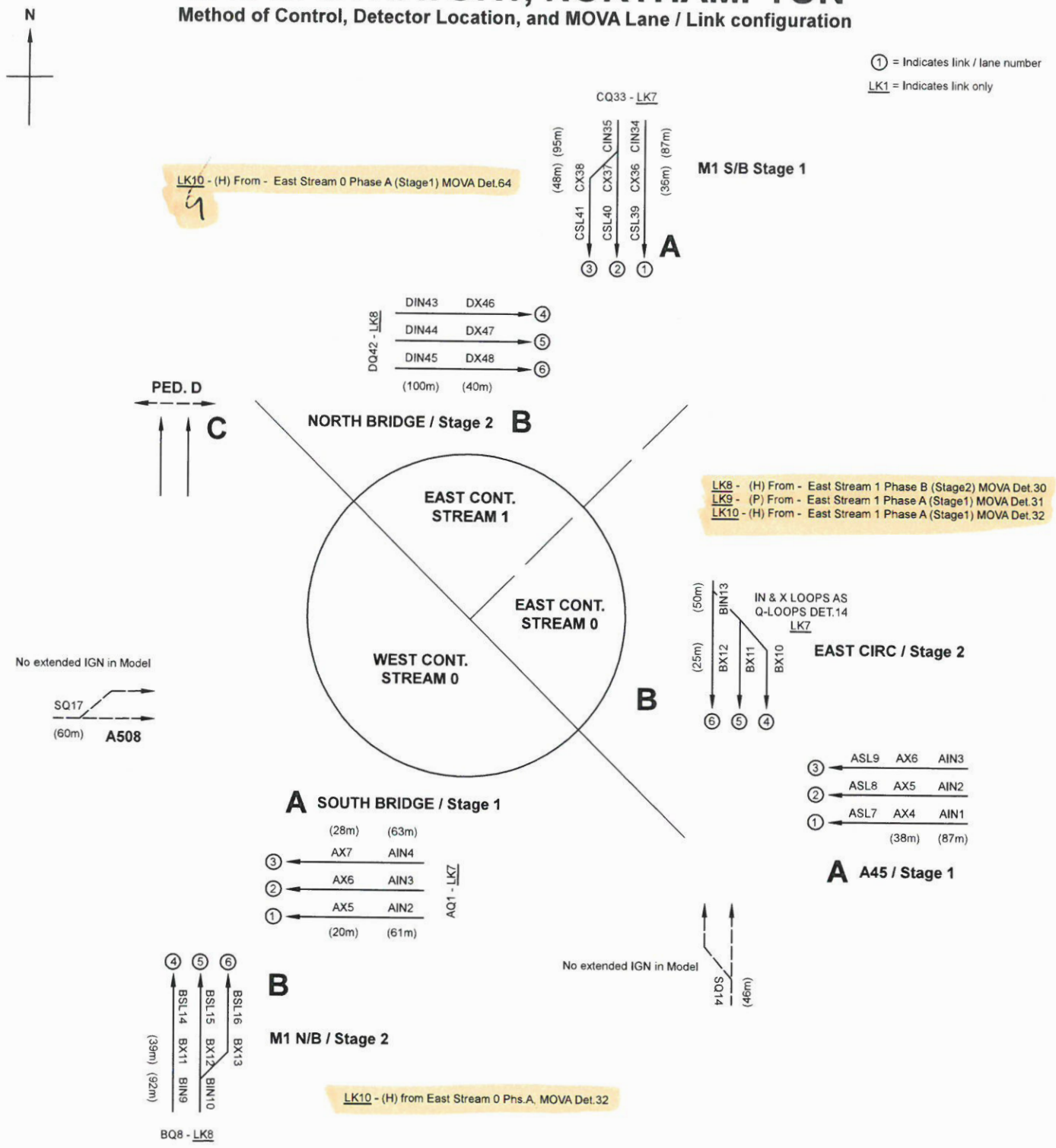
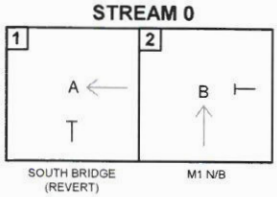
M1J15 GYRATORY, NORTHAMPTON

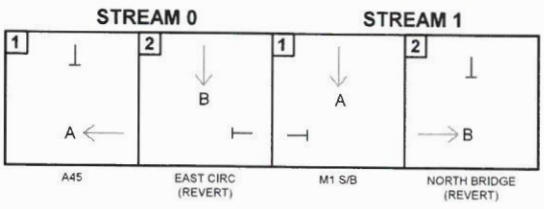
Method of Control, Detector Location, and MOVA Lane / Link configuration



WEST CONTROLLER

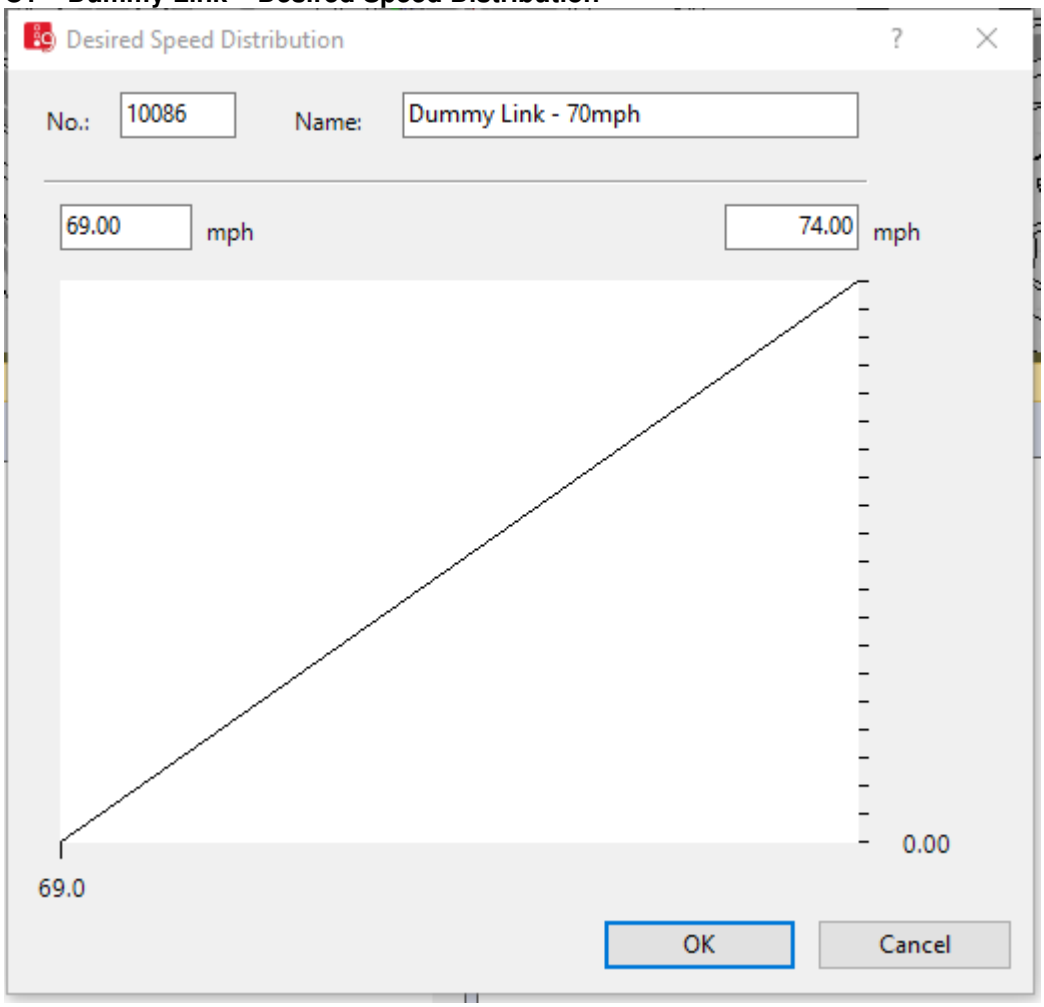


EAST CONTROLLER



Appendix C – Custom Speed and Driver Behaviour Parameters

C1 – Dummy Link – Desired Speed Distribution



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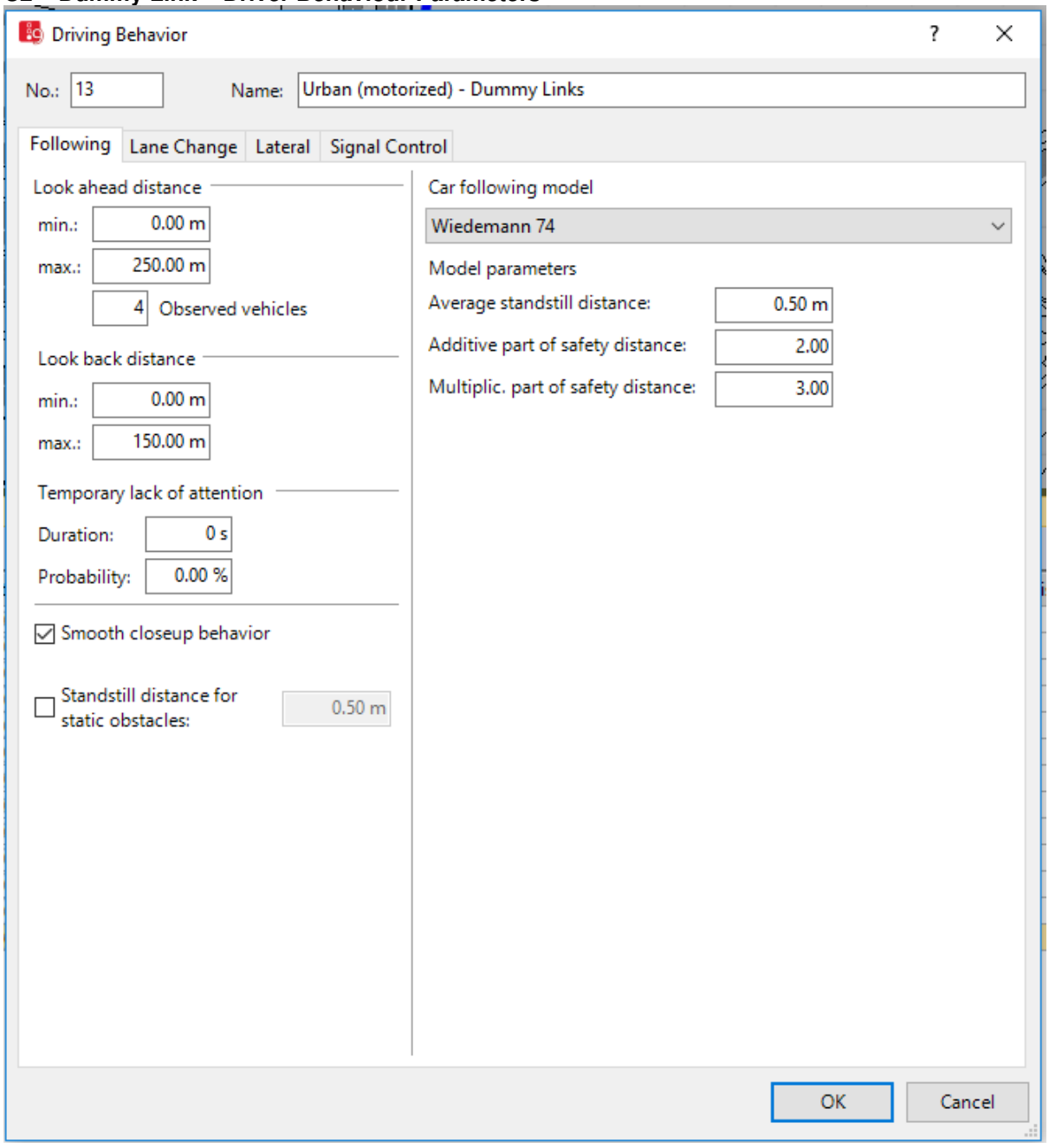
C2 – Dummy Link – Driver Behaviour Parameters



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Appendix D – Calibration – Entry Flow Comparisons

D1 – AM Peak Entry Flow Comparison – Lights & Heavies

AM (0730-0830hrs) SUMMARY STATISTICS	
Total number of counts considered	11
VISSIM model counts with <5% difference	9
% of VISSIM counts with <5% difference	81.82%
VISSIM model counts with GEH <3	11
% of VISSIM counts with GEH <3	100.00%

Entry			DATA		DIFFERENCE		GEH	
			Matrix	Modelled	Diff.	% Diff.	GEH	GEH
Zone	Location	Data Measurement No.	Lights	Lights				
1	A508 South	1	915	973	58	6%	1.89	YES
2	M1 South-East	3	3038	3117	79	3%	1.42	YES
3	Saxon Avenue	5	602	603	1	0%	0.04	YES
4	A45 North	7	2359	2365	6	0%	0.12	YES
5	A43 South	9	1180	1175	-5	0%	0.15	YES
6	A5123 North	11	1572	1563	-9	-1%	0.23	YES
7	EB Services Area	13	27	29	2	7%	0.38	YES
9	WB Services Area	15	13	13	0	0%	0.00	YES
11	Swan Valley	17	110	108	-2	-2%	0.19	YES
12	M1 North West	19	3605	3685	80	2%	1.33	YES
13	Watering Lane	21	494	495	1	0%	0.04	YES

AM (0730-0830hrs) SUMMARY STATISTICS	
Total number of counts considered	11
VISSIM model counts with <5% difference	11
% of VISSIM counts with <5% difference	100.00%
VISSIM model counts with GEH <3	11
% of VISSIM counts with GEH <3	100.00%

Entry			DATA		DIFFERENCE		GEH	
			Matrix	Modelled	Diff.	% Diff.	GEH	GEH
Zone	Location	Data Measurement No.	Heavies	Heavies				
1	A508 South	1	71	72	1	1%	0.12	YES
2	M1 South-East	3	602	601	-1	0%	0.04	YES
3	Saxon Avenue	5	60	60	0	0%	0.00	YES
4	A45 North	7	168	167	-1	-1%	0.08	YES
5	A43 South	9	105	104	-1	-1%	0.10	YES
6	A5123 North	11	129	126	-3	-2%	0.27	YES
7	EB Services Area	13	6	6	0	0%	0.00	YES
9	WB Services Area	15	4	4	0	0%	0.00	YES
11	Swan Valley	17	16	16	0	0%	0.00	YES
12	M1 North West	19	871	867	-4	0%	0.14	YES
13	Watering Lane	21	0	0	0	0%	0.00	YES

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D2 – PM Peak Entry Flow Comparison – Lights & Heavies

PM (1645-1745hrs) SUMMARY STATISTICS	
Total number of counts considered	11
VISSIM model counts with <5% difference	11
% of VISSIM counts with <5% difference	100.00%
VISSIM model counts with GEH <3	11
% of VISSIM counts with GEH <3	100.00%

Entry			DATA		DIFFERENCE		GEH	
			Observed	Modelled	Diff.	% Diff.	GEH	GEH
Zone	Location	Data Measurement No.	Lights	Lights				
1	A508 South	1	841	851	10	1%	0.34	YES
2	M1 South-East	3	4040	4059	19	0%	0.30	YES
3	Saxon Avenue	5	674	675	1	0%	0.04	YES
4	A45 North	7	2168	2171	3	0%	0.06	YES
5	A43 South	9	1515	1498	-17	-1%	0.44	YES
6	A5123 North	11	975	962	-13	-1%	0.42	YES
7	EB Services Area	13	25	24	-1	-4%	0.20	YES
9	WB Services Area	15	17	17	0	0%	0.00	YES
11	Swan Valley	17	137	133	-4	-3%	0.34	YES
12	M1 North West	19	3648	3662	14	0%	0.23	YES
13	Watering Lane	21	109	109	0	0%	0.00	YES

PM (1645-1745hrs) SUMMARY STATISTICS	
Total number of counts considered	11
VISSIM model counts with <5% difference	10
% of VISSIM counts with <5% difference	90.91%
VISSIM model counts with GEH <3	11
% of VISSIM counts with GEH <3	100.00%

Entry			DATA		DIFFERENCE		GEH	
			Observed	Modelled	Diff.	% Diff.	GEH	GEH
Zone	Location	Data Measurement No.	Heavies	Heavies				
1	A508 South	1	46	46	0	0%	0.00	YES
2	M1 South-East	3	490	490	0	0%	0.00	YES
3	Saxon Avenue	5	51	51	0	0%	0.00	YES
4	A45 North	7	119	118	-1	-1%	0.09	YES
5	A43 South	9	153	147	-6	-4%	0.49	YES
6	A5123 North	11	61	60	-1	-2%	0.13	YES
7	EB Services Area	13	5	5	0	0%	0.00	YES
9	WB Services Area	15	7	7	0	0%	0.00	YES
11	Swan Valley	17	21	18	-3	-14%	0.68	YES
12	M1 North West	19	514	514	0	0%	0.00	YES
13	Watering Lane	21	0	0	0	0%	0.00	YES

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Appendix B – Junction Improvements – Drawings and Proposed Signal Set-Up

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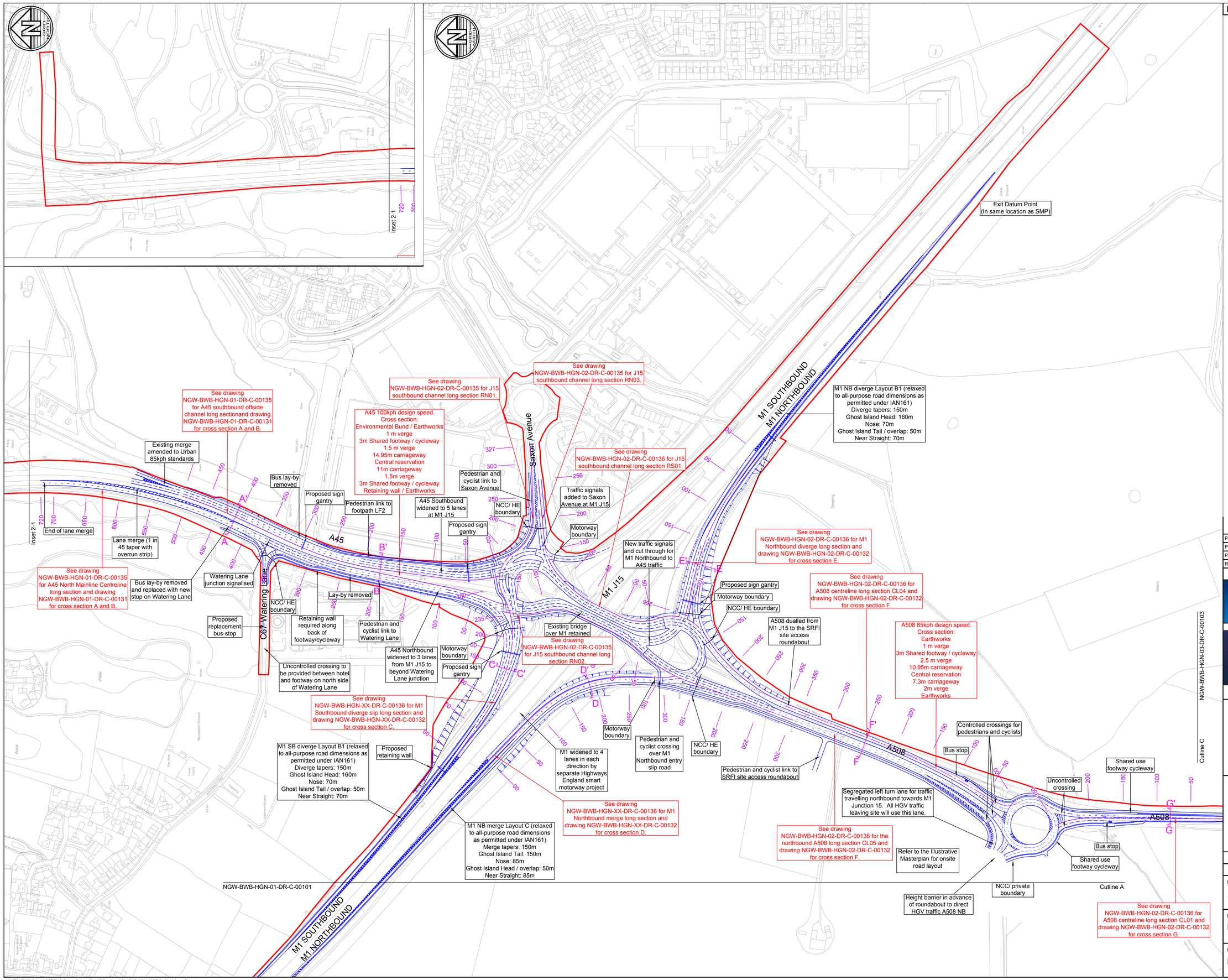

Legend

- Order Limits
- Proposed Highway Works
- Cross Sections
- Proposed Noise Fence

0 50 100 150 200

SCALE: METRES

Rev	Date	Details of issue / revision	Drw	Rev
P3	08.12.17	M1 SB Diverge slip revised	PG	SRH
P2	02.10.17	Issued for Stage 2 Consultation	GDJ	SRH
P1	28.09.17	Preliminary Issue	PG	SRH

ISSUES & REVISIONS

ROXHILL

NORTHAMPTON GATEWAY
STRATEGIC RAIL FREIGHT INTERCHANGE

THE NORTHAMPTON GATEWAY RAIL FREIGHT INTERCHANGE ORDER 201X

Drawing Title

HIGHWAY PLANS GENERAL ARRANGEMENT SHEET 2 OF 6

Scale	1:2,500	Drawn	P. Goodyear
Size	A1	Reviewed	S. Hilditch

Regulation: **5(2) (o)**

Document: **2.4B**

Drawing Status: **FOR COMMENT**

Drawing No.: **NGW-BWB-HGN-02-DR-C-00102**

Revision: **P3**

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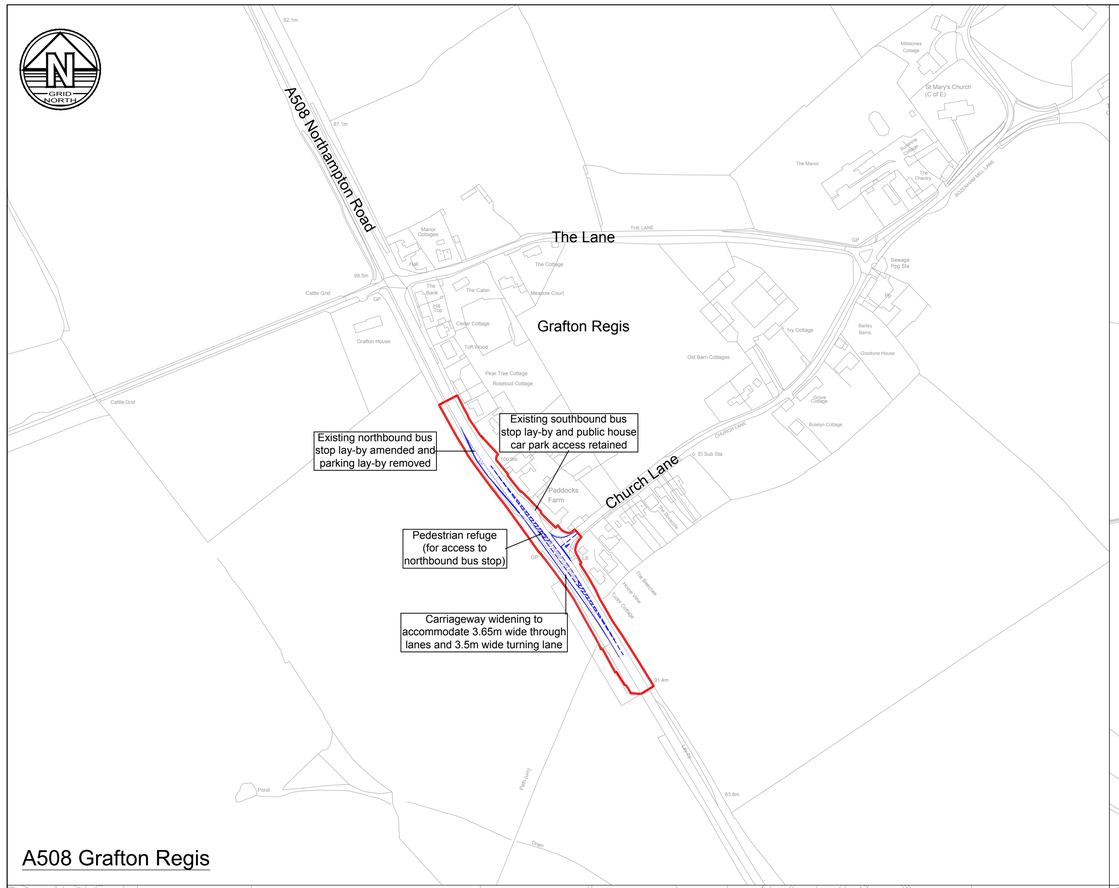
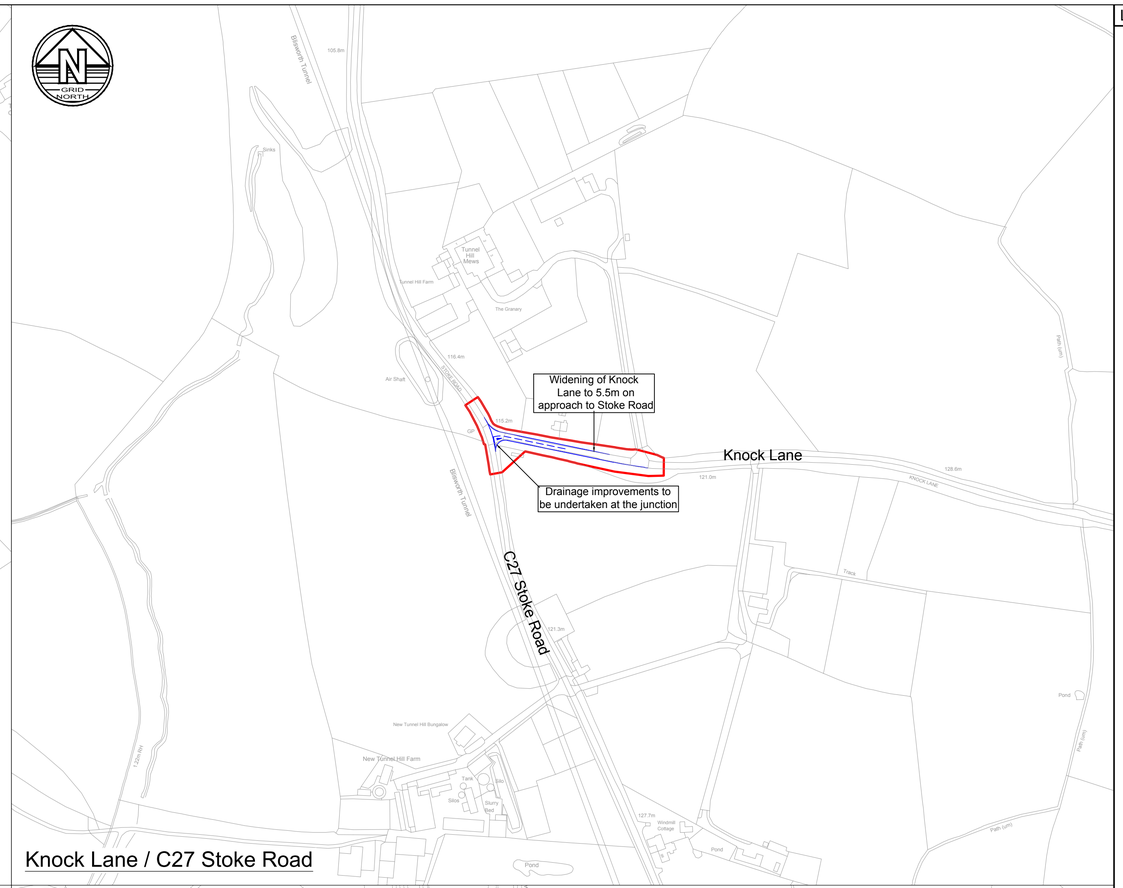
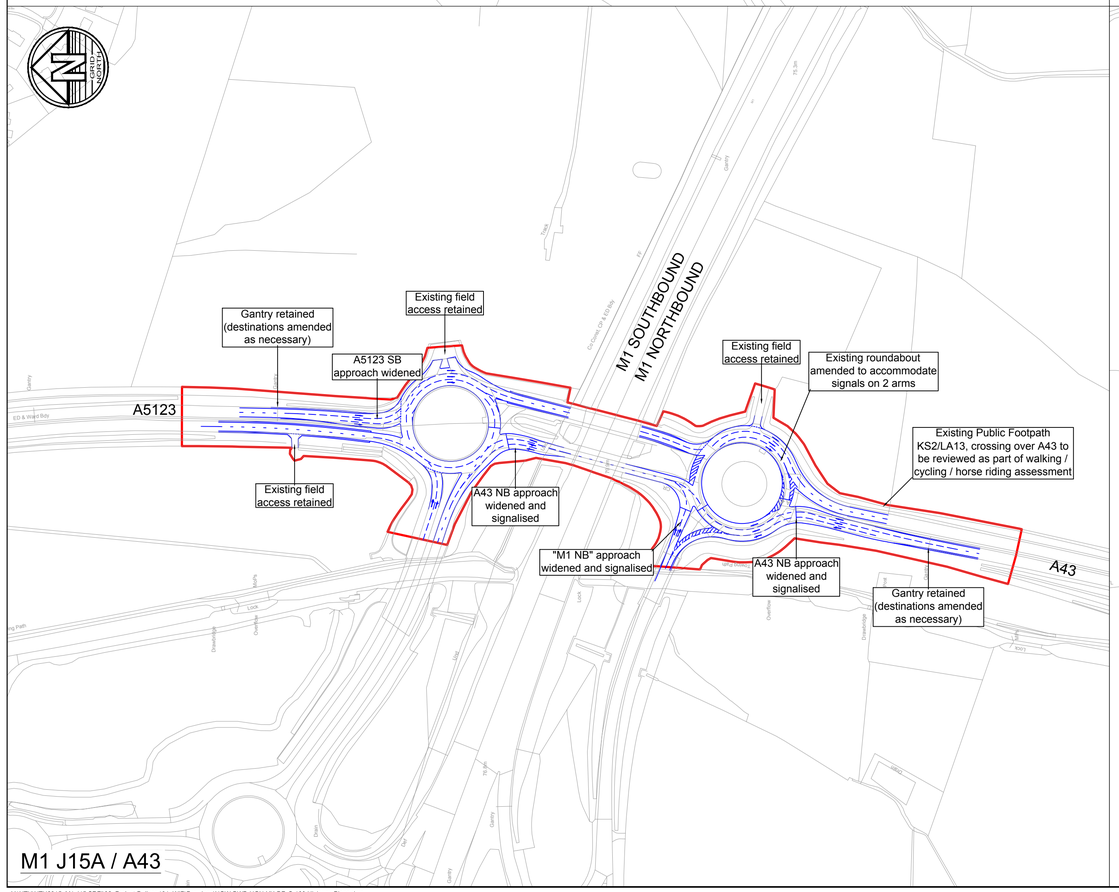


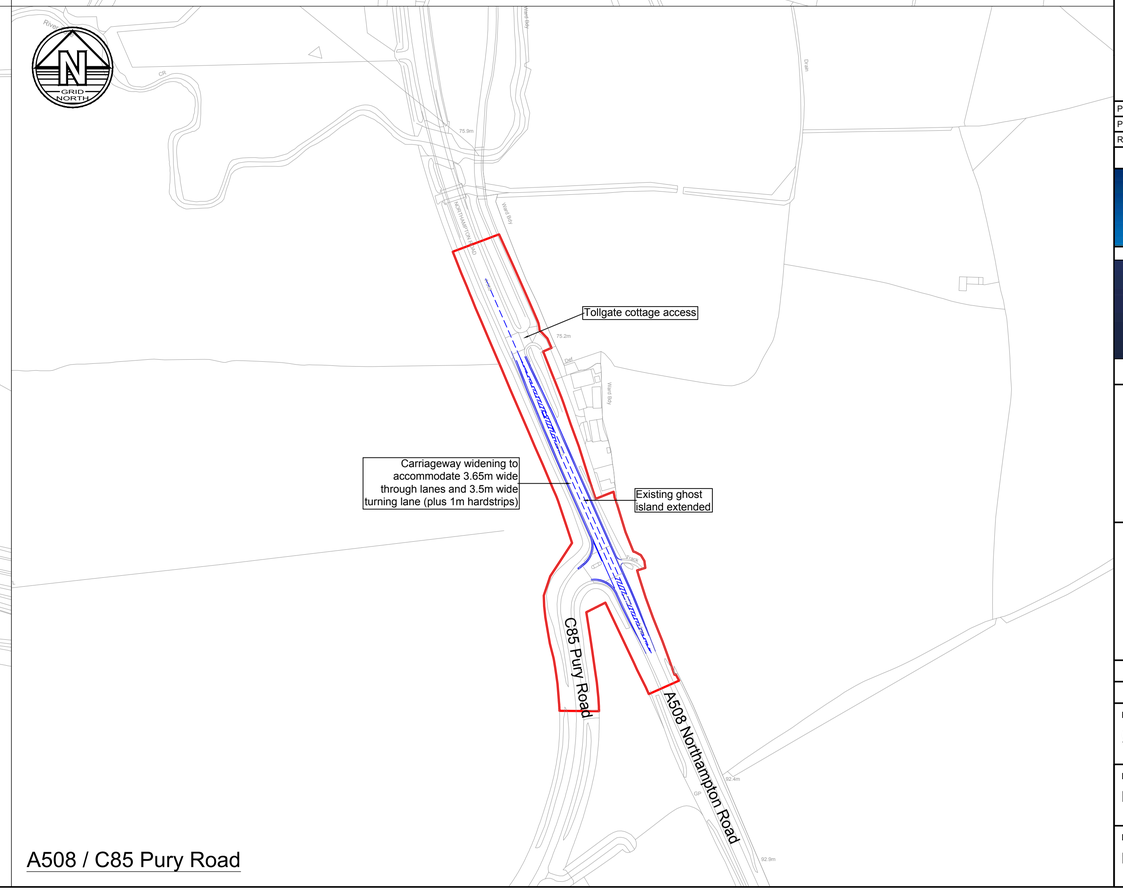
A508 Grafton Regis



Knock Lane / C27 Stoke Road



M1 J15A / A43



A508 / C85 Pury Road

Legend

- Order Limits
- Proposed Highway Works
- Cross Sections (X – X')

0 50 100 150 200

SCALE: METRES

Rev	Date	Details of issue / revision	Drw	Rev
P2	02.10.17	Issued for Stage 2 Consultation	GDJ	SRH
P1	28.09.17	Preliminary Issue	GDJ	SRH

ISSUES & REVISIONS

ROXHILL

NORTHAMPTON GATEWAY
STRATEGIC RAIL FREIGHT INTERCHANGE

THE NORTHAMPTON GATEWAY RAIL FREIGHT INTERCHANGE ORDER 201X

Drawing Title

HIGHWAY PLANS GENERAL ARRANGEMENT SHEET 6 OF 6

Scale	1:2,500	Drawn	P. Goodyear
Size	A1	Reviewed	S. Hilditch

Regulation: **5(2) (o)**

Document: **2.4F**

Drawing Status: **DRAFT - STAGE 2 CONSULTATION**

Drawing No.: **NGW-BWB-HGN-06-DR-C-00106**

Revision: **P2**

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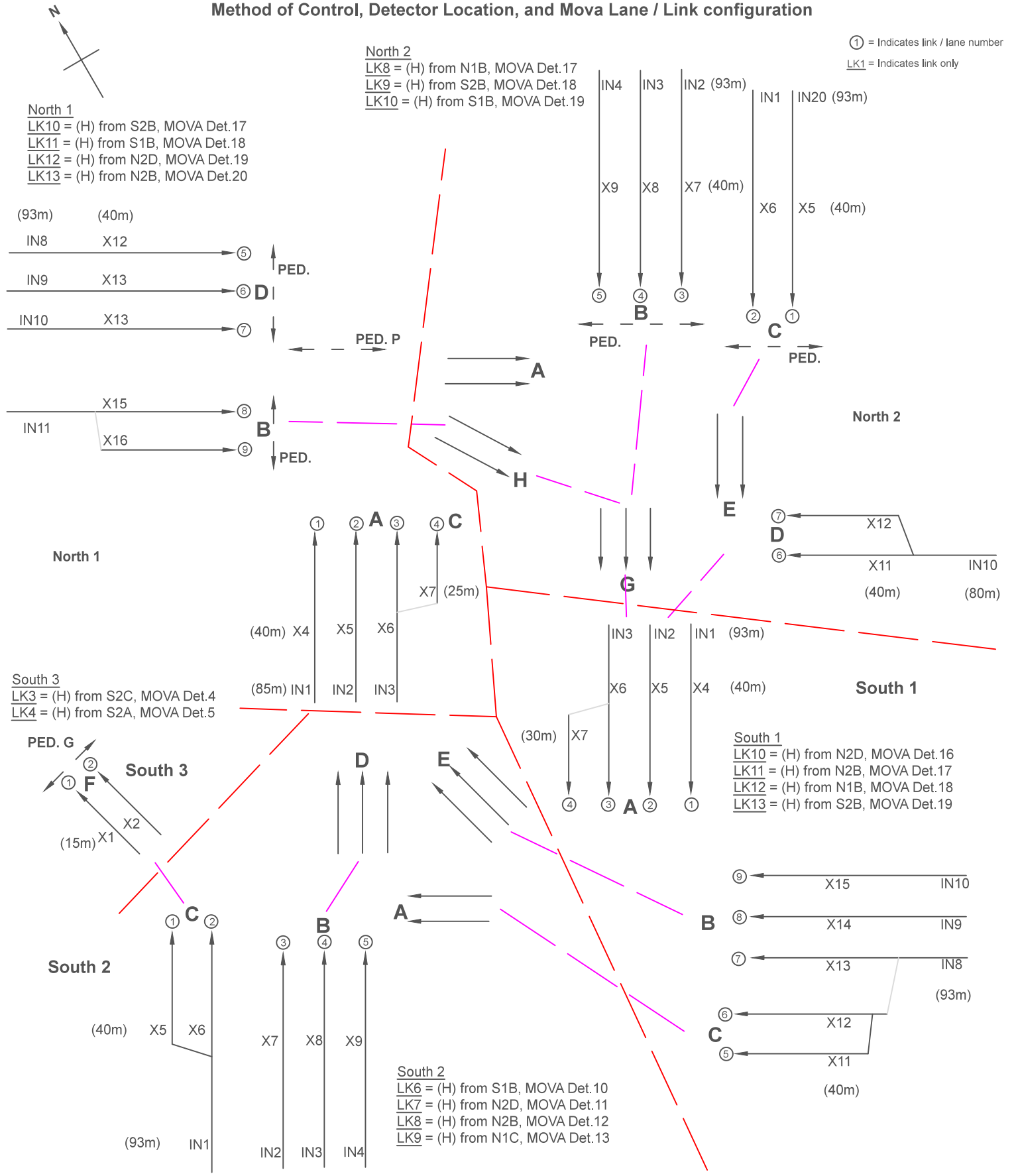
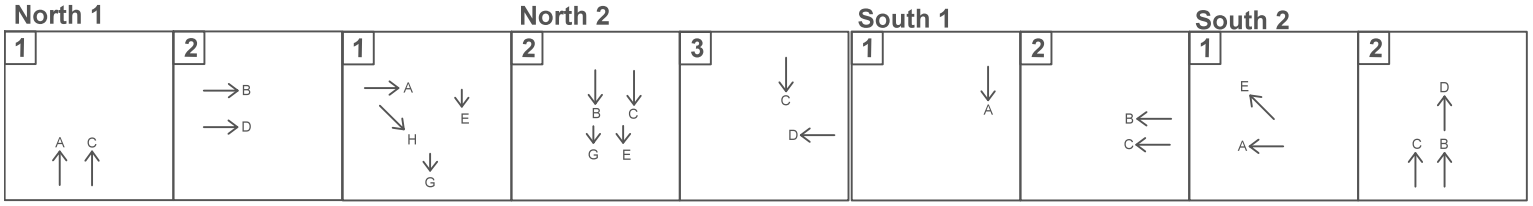
M1 J15 - Alternate Option

Method of Control, Detector Location, and Mova Lane / Link configuration





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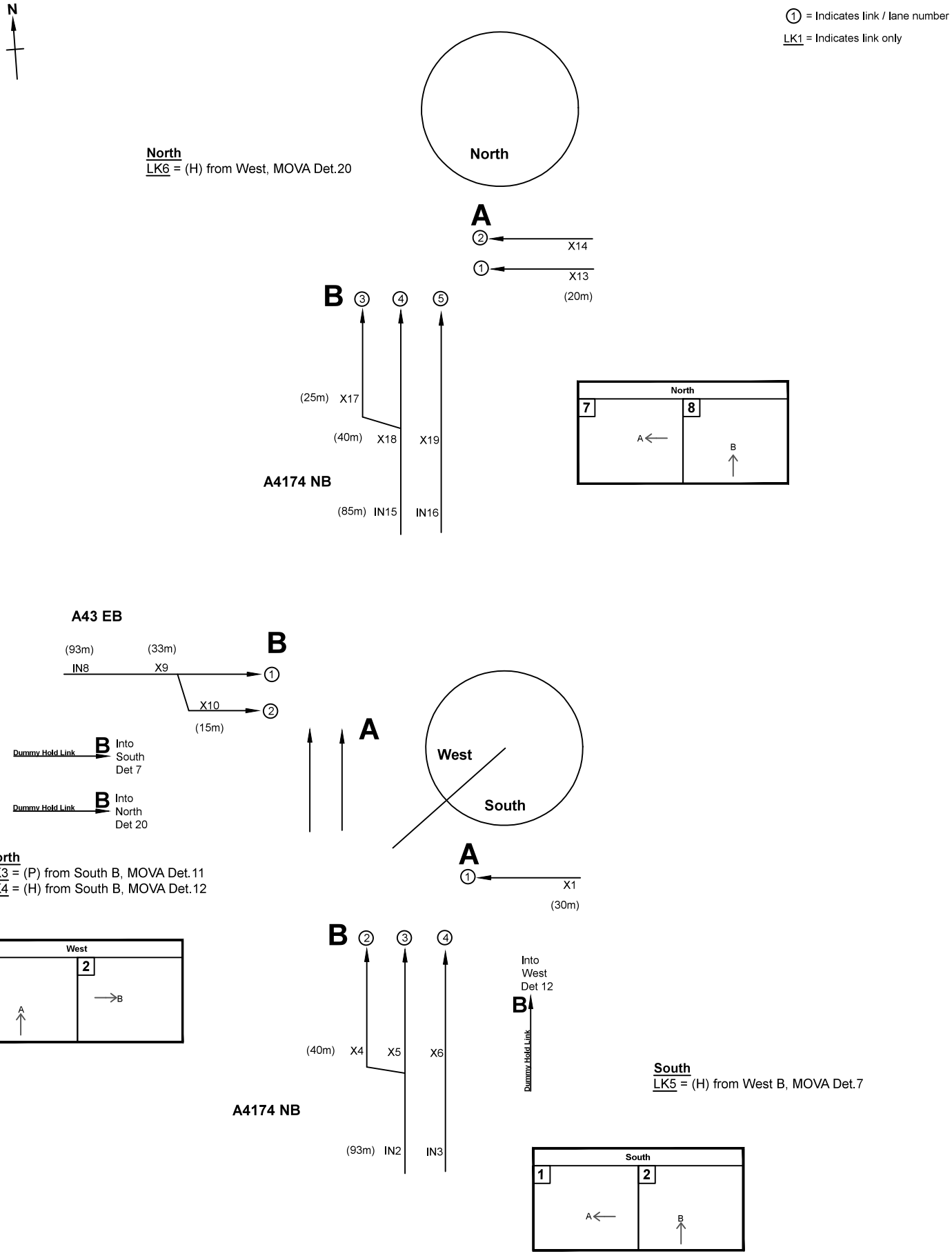
Issue-D, November 2017

A43 / M1 Junction 15a: Microsimulation

Method of Control, Detector Location, and Mova Lane / Link configuration



Issue-B, November 2017

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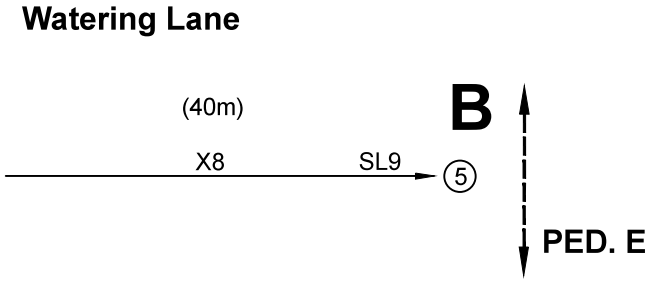
A45 London Rd / Watering Lane (M1J15a): Microsimulation

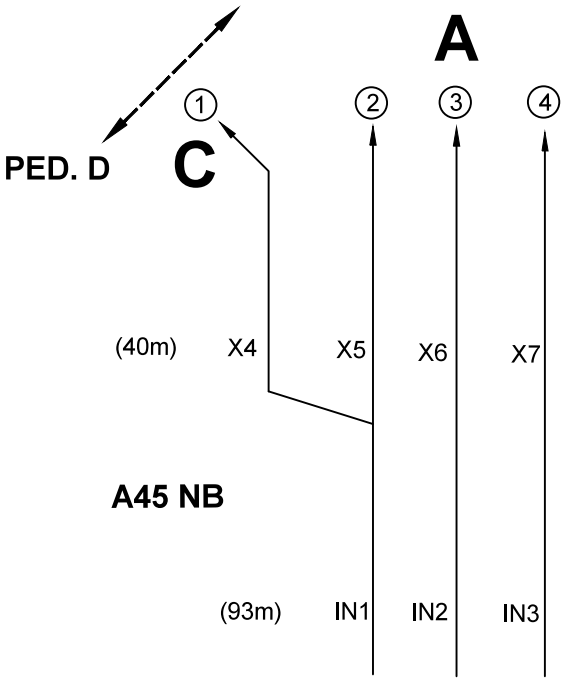
Method of Control, Detector Location, and Mova Lane / Link configuration

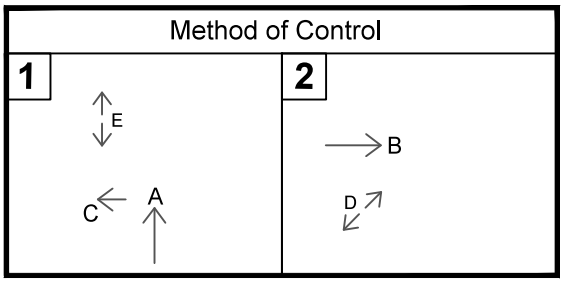
① = Indicates link / lane number

LK1 = Indicates link only



LK6 = (WC) Pedestrian D, MOVA Det.10
LK7 = (WC) Pedestrian E, MOVA Det.11





Issue-A, November 2017

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Watering Lane – Operational Notes / MOVA control: Issue A 21/11/17

The left slip has been included in the main junction. On street, this may well be a separate stream though may be linked in certain conditions form the main stream to prevent it losing right of way during stage 1. For the purpose of the model I see no reason to add the complexity of this as long as flows making this movement are light. I have suggested that it is run under a separate phase in the model so that if required it can be easily adjusted to run separately.

Pedestrian links are included and can be set up in PC MOVA to create demand if required, if there is no data or very few pedestrian movements then these links can be ignored or set up in PC MOVA to have no flow.

Method of control is simple 2 stage operation with intergreens as shown in the table below.

The table shown assumes min clearance on the ped phase if operated with on crossings.

	A	B	C	D	E
A	-	7			
B	5	-			5
C			-	7	
D			5	-	
E		5			-

The junction is approx. 400m away from Junction 15 so linking would be problematic and not particularly effective. MOVA naturally likes to platoon vehicles if set up correctly which usually works well at these sorts of distances. If there is interaction between the junctions then we can look at some form of linking as required.

The dataset has been set up to bias the A45 approach. This will need validating to get the most efficiency but should be good enough for early indication.

Dan preece

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Appendix C – 2021 & 2031 Flow Calculations

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NSTM2 OUTPUTS - 2021 REFERENCE CASE (FLOWSET C1)

SCENARIO 2021 C1 - AM PEAK

LIGHTS (VEH)

15772	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	52	22	332	0	17	0	0	0	0	2	240	1
2	73	0	48	1128	36	150	0	0	0	0	7	2090	37
3	4	38	0	16	2	0	0	0	0	0	0	3	3
4	675	982	42	12	333	10	0	0	0	0	1	1022	155
5	0	144	21	104	0	1005	0	0	0	0	164	374	10
6	53	223	8	3	1350	0	0	0	0	0	0	151	12
7	0	0	0	3	1	10	0	0	0	0	13	5	0
8	0	0	0	3	1	10	0	0	0	0	13	5	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0
10	0	0	0	0	1	2	0	0	0	0	0	16	0
11	68	252	16	30	87	0	0	0	0	0	0	0	15
12	213	2009	53	723	157	266	17	17	1	1	2	0	167
13	0	0	0	421	0	0	0	0	0	0	0	0	0

HGV (VEH)

1968	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	1	0	9	0	0	0	0	0	0	0	9	0
2	2	0	11	119	0	10	0	0	0	0	0	392	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	55	0	0	0	0	0	0	0	0	0	224	0
5	0	0	0	0	0	139	0	0	0	0	0	3	0
6	0	0	0	0	106	0	0	0	0	0	0	10	0
7	0	0	0	0	0	0	0	0	0	0	8	0	0
8	0	0	0	0	0	0	0	0	0	0	8	0	0
9	0	0	0	0	0	0	0	0	0	0	0	2	0
10	0	0	0	0	0	0	0	0	0	0	0	2	0
11	0	63	0	0	0	0	0	0	0	0	0	0	0
12	50	552	0	71	94	7	4	4	2	2	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (VEH)

17740	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	53	22	340	0	17	0	0	0	0	2	249	1
2	74	0	59	1247	36	160	0	0	0	0	8	2482	37
3	4	38	0	16	2	0	0	0	0	0	0	3	3
4	680	1037	42	12	333	10	0	0	0	0	1	1245	155
5	0	144	21	104	0	1144	0	0	0	0	164	377	10
6	53	223	8	3	1455	0	0	0	0	0	0	160	12
7	0	0	0	3	1	11	0	0	0	0	21	5	0
8	0	0	0	3	1	11	0	0	0	0	21	5	0
9	0	0	0	0	1	2	0	0	0	0	0	18	0
10	0	0	0	0	1	2	0	0	0	0	0	18	0
11	68	316	16	30	87	0	0	0	0	0	0	0	15
12	263	2561	53	794	251	273	21	21	3	3	2	0	167
13	0	0	0	421	0	0	0	0	0	0	0	0	0

TOTAL (PCU)

20298	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	53	22	352	0	17	0	0	0	0	2	261	1
2	77	0	73	1402	36	173	0	0	0	0	8	2992	37
3	4	39	0	16	2	0	0	0	0	0	0	3	3
4	685	1109	42	12	333	10	0	0	0	0	1	1536	155
5	0	144	21	104	0	1325	0	0	0	0	165	382	10
6	53	223	8	3	1593	0	0	0	0	0	0	173	12
7	0	0	0	3	1	11	0	0	0	0	31	5	0
8	0	0	0	3	1	11	0	0	0	0	31	5	0
9	0	0	0	0	1	2	0	0	0	0	0	21	0
10	0	0	0	0	1	2	0	0	0	0	0	21	0
11	68	398	16	30	88	0	0	0	0	0	0	0	15
12	329	3279	53	886	373	282	27	27	5	5	2	0	167
13	0	0	0	421	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - PM PEAK

LIGHTS (VEH)

16553	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	61	11	518	0	7	0	0	0	0	0	233	3
2	143	0	27	1062	152	341	0	0	0	0	6	2176	92
3	6	45	0	19	0	3	0	0	0	0	0	31	1
4	778	887	74	12	51	19	0	0	2	2	2	1202	115
5	0	219	9	3	0	1131	1	1	1	1	64	364	0
6	39	271	13	42	798	0	2	2	1	1	0	303	0
7	0	0	0	1	0	1	0	0	0	0	5	6	0
8	0	0	0	1	0	1	0	0	0	0	5	6	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0
11	35	444	10	50	135	0	2	2	1	1	0	0	1
12	134	2330	36	840	378	393	54	54	5	5	14	0	2
13	0	0	0	233	0	0	0	0	0	0	0	0	0

HGV (VEH)

1547	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	0	0	4	0	0	0	0	0	0	0	38	0
2	0	0	0	99	0	19	0	0	0	0	39	375	0
3	0	17	0	0	0	0	0	0	0	0	0	28	0
4	29	29	0	0	0	0	0	0	0	0	0	41	0
5	0	0	0	0	0	118	0	0	0	0	0	0	0
6	0	16	0	0	65	0	0	0	0	0	0	7	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0
12	56	397	14	79	1	73	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (VEH)

18100	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	62	11	522	0	7	0	0	0	0	0	271	3
2	143	0	27	1161	152	360	0	0	0	0	45	2550	92
3	7	63	0	19	0	3	0	0	0	0	0	59	1
4	808	916	74	12	51	19	0	0	2	2	2	1244	115
5	0	219	9	3	0	1249	1	1	1	1	64	364	0
6	39	288	13	42	863	0	2	2	1	1	0	310	0
7	0	0	0	1	0	1	0	0	0	0	5	6	0
8	0	0	0	1	0	1	0	0	0	0	5	6	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0
11	35	444	10	50	135	0	2	2	1	1	0	0	1
12	190	2727	50	918	378	466	54	54	5	5	14	0	2
13	0	0	0	233	0	0	0	0	0	0	0	0	0

TOTAL (PCU)

20112	1	2	3	4	5	6	7	8	9	10	11	12	13
1	0	62	11	526	0	7	0	0	0	0	0	321	3
2	143	0	27	1289	152	385	0	0	0	0	95	3037	92
3	7	85	0	19	0	3	0	0	0	0	0	96	1
4	846	953	75	12	51	19	0	0	2	2	2	1298	115
5	0	219	9	3	0	1403	1	1	1	1	64	364	0
6	39	309	13	42	947	0	2	2	1	1	0	319	0
7	0	0	0	1	0	1	0	0	0	0	5	6	0
8	0	0	0	1	0	1	0	0	0	0	5	6	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0
11	35	445	10	50	135	0	2	2	1	1	0	0	1
12	263	3244	69	1021	379	561	54	54	5	5	14	0	2
13	0	0	0	233	0	0	0	0	0	0	0	0	0

NSTM2 OUTPUTS - 2021 MITIGATION (FLOWSET I1)

SCENARIO 2021 Circular Compliant I1 - AM PEAK

LIGHTS (VEH)

16902	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	70	18	389	0	56	0	0	0	0	5	330	1	75	0
2	61	0	47	1182	67	171	0	0	0	0	10	2037	49	107	0
3	16	36	0	19	17	3	0	0	0	0	0	10	12	2	0
4	797	925	42	0	289	13	0	0	0	0	2	914	86	359	0
5	0	142	18	109	0	914	0	0	0	0	132	468	6	1	0
6	45	109	5	10	1621	0	0	0	0	0	0	199	10	13	0
7	1	0	0	2	1	5	0	0	0	0	17	6	0	0	0
8	1	0	0	2	1	5	0	0	0	0	17	6	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
11	125	261	17	42	100	0	1	1	0	0	0	0	16	22	0
12	288	1998	53	591	182	341	17	17	1	1	2	0	168	121	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	7	24	0	27	2	2	0	0	0	0	0	24	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HGV (VEH)

2213	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	3	0	1	0	0	0	0	0	30	0	32	0
2	0	0	11	120	0	14	0	0	0	0	0	384	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	7	51	0	0	0	0	0	0	0	0	0	168	0	44	0
5	0	0	0	0	0	146	0	0	0	0	0	4	0	0	0
6	0	0	0	0	105	0	0	0	0	0	0	21	0	3	0
7	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
11	0	82	0	0	0	0	0	0	0	0	0	0	0	2	0
12	64	532	0	72	88	2	4	4	2	2	0	0	0	26	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	19	31	1	45	6	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (VEH)

19115	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	70	18	392	0	57	0	0	0	0	5	360	1	107	0
2	61	0	58	1302	67	185	0	0	0	0	10	2421	49	137	0
3	16	36	0	19	17	3	0	0	0	0	0	10	12	3	0
4	804	977	42	0	290	13	0	0	0	0	2	1082	86	403	0
5	0	142	18	109	0	1061	0	0	0	0	133	472	6	1	0
6	45	109	5	10	1727	0	0	0	0	0	0	220	10	16	0
7	1	0	0	3	1	6	0	0	0	0	25	6	0	0	0
8	1	0	0	3	1	6	0	0	0	0	25	6	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	18	0	0	0
10	0	0	0	0	1	2	0	0	0	0	0	18	0	0	0
11	125	343	17	42	100	0	1	1	0	0	0	0	16	24	0
12	352	2530	53	663	270	343	21	21	3	3	2	0	168	147	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	26	55	1	72	8	7	0	0	0	0	0	48	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (PCU)

21993	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	71	18	396	0	58	0	0	0	0	5	400	1	149	0
2	61	0	72	1458	67	204	0	0	0	0	10	2920	49	176	0
3	17	37	0	19	17	3	0	0	0	0	0	10	12	4	0
4	813	1043	42	0	290	13	0	0	0	0	2	1301	86	460	0
5	0	142	18	110	0	1251	0	0	0	0	133	477	6	1	0
6	45	109	5	10	1864	0	0	0	0	0	0	248	10	20	0
7	1	0	0	3	1	6	0	0	0	0	35	6	0	0	0
8	1	0	0	3	1	6	0	0	0	0	35	6	0	0	0
9	0	0	0	0	1	3	0	0	0	0	0	20	0	0	0
10	0	0	0	0	1	3	0	0	0	0	0	20	0	0	0
11	125	450	17	42	100	0	1	1	0	0	0	0	16	27	0
12	435	3221	53	757	384	346	27	27	5	5	2	0	168	181	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	50	96	2	131	16	12	0	0	0	0	1	80	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 Circular Compliant I1 - PM PEAK

LIGHTS (VEH)

17718	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	667	0	41	0	0	0	0	5	325	1	25	0
2	99	0	31	1095	132	511	0	0	0	0	18	2015	149	45	0
3	8	44	0	17	1	2	0	0	0	0	1	36	1	0	0
4	865	781	73	6	0	0	1	1	2	2	3	1144	87	100	0
5	0	248	2	1	0	1007	1	1	1	1	86	484	0	0	0
6	22	211	10	14	955	0	2	2	1	1	0	237	0	3	0
7	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
8	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
11	62	476	16	35	138	0	2	2	1	1	0	0	0	7	0
12	196	2320	49	745	392	405	54	54	5	5	7	0	2	49	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	80	85	4	340	2	27	0	0	0	0	5	249	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

HGV (VEH)

1821	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	39	0	32	0
2	0	0	0	93	0	13	0	0	0	0	63	364	0	32	0
3	0	17	0	0	0	0	0	0	0	0	0	31	0	1	0
4	23	32	0	0	0	0	0	0	0	0	0	41	0	43	0
5	0	0	0	0	0	123	0	0	0	0	0	0	0	0	0
6	0	14	0	0	62	0	0	0	0	0	0	4	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12	66	394	14	76	0	75	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	24	30	1	44	5	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (VEH)

19539	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	671	0	41	0	0	0	0	5	363	1	57	0
2	99	0	31	1188	132	524	0	0	0	0	81	2378	149	77	0
3	9	62	0	17	1	2	0	0	0	0	1	67	1	1	0
4	889	813	74	6	0	0	1	1	2	2	3	1185	87	143	0
5	0	248	2	1	0	1131	1	1	1	1	86	484	0	0	0
6	22	225	10	14	1017	0	2	2	1	1	0	241	0	5	0
7	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
8	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
11	62	476	16	35	138	0	2	2	1	1	0	0	0	9	0
12	261	2713	64	820	393	481	54	54	5	5	7	0	2	76	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	104	114	4	384	6	31	0	0	0	0	5	273	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

TOTAL (PCU)

21908	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	677	0	41	0	0	0	0	5	414	1	99	0
2	99	0	31	1310	132	542	0	0	0	0	162	2851	149	119	0
3	9	84	0	17	1	2	0	0	0	0	1	108	1	2	0
4	919	855	74	6	0	0	1	1	2	2	3	1238	87	199	0
5	0	248	2	1	0	1291	1	1	1	1	86	484	0	0	0
6	22	243	10	14	1098	0	2	2	1	1	0	247	0	8	0
7	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
8	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
11	62	476	16	35	138	0	2	2	1	1	0	0	0	12	0
12	346	3225	82	919	393	578	54	54	5	5	7	0	2	111	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	135	153	5	441	12	36	0	0	0	0	5	304	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

NSTM2 OUTPUTS - 2031 REFERENCE CASE (FLOWSET D1)

SCENARIO 2031 D1 - AM PEAK

LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	10	391	0	6	0	0	0	0	3	224	0	0	1
2	145	0	66	1236	271	188	0	0	0	0	13	1904	118	0	2
3	4	20	0	18	5	1	0	0	0	0	0	11	5	0	0
4	664	902	40	10	129	9	0	0	0	0	10	1251	72	0	5
5	0	61	10	211	0	892	0	0	0	0	232	349	7	0	7
6	38	249	9	47	1147	0	1	1	0	0	1	216	8	0	49
7	0	0	0	3	1	2	0	0	0	0	14	12	0	0	0
8	0	0	0	3	1	2	0	0	0	0	14	12	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
10	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
11	74	503	28	107	74	0	1	1	0	0	0	0	35	0	8
12	266	2162	55	687	358	433	16	16	1	1	4	0	166	0	14
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	38	0	0	0
2	3	0	10	112	0	20	0	0	0	0	1	402	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	11	43	0	0	0	0	0	0	0	0	0	228	0	0	0
5	0	0	0	0	0	117	0	0	0	0	2	5	0	0	0
6	0	2	0	0	97	0	0	0	0	0	0	14	0	0	0
7	0	0	0	0	0	1	0	0	0	0	8	0	0	0	0
8	0	0	0	0	0	1	0	0	0	0	8	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	590	4	79	92	6	5	5	2	2	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	10	418	0	6	0	0	0	0	3	262	0	0	1
2	148	0	76	1348	271	209	0	0	0	0	13	2306	118	0	2
3	4	20	0	18	6	1	0	0	0	0	0	11	5	0	0
4	675	944	40	10	129	9	0	0	0	0	10	1479	72	0	5
5	0	61	10	211	0	1009	0	0	0	0	234	354	7	0	7
6	38	250	9	47	1245	0	1	1	0	0	1	230	8	0	49
7	0	0	0	4	1	3	0	0	0	0	22	12	0	0	0
8	0	0	0	4	1	3	0	0	0	0	22	12	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	19	0	0	0
10	0	0	0	1	1	2	0	0	0	0	0	19	0	0	0
11	74	549	28	107	74	0	1	1	0	0	0	0	35	0	8
12	316	2752	59	766	450	439	20	20	3	3	4	0	166	0	14
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

TOTAL (PCU)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	30	10	453	0	6	0	0	0	0	3	312	0	0	1
2	151	0	89	1494	271	235	0	0	0	0	14	2828	118	0	2
3	4	21	0	18	6	1	0	0	0	0	0	11	5	0	0
4	690	1000	40	10	129	9	0	0	0	0	10	1776	72	0	5
5	0	61	10	212	0	1161	0	0	0	0	237	361	7	0	7
6	38	252	9	47	1371	0	1	1	0	0	1	248	8	0	49
7	0	0	0	4	1	4	0	0	0	0	32	13	0	0	0
8	0	0	0	4	1	4	0	0	0	0	32	13	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	22	0	0	0
10	0	0	0	1	1	3	0	0	0	0	0	22	0	0	0
11	74	609	28	107	74	0	1	1	0	0	0	0	35	0	8
12	380	3518	63	869	569	447	26	26	6	6	4	0	166	0	15
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

SCENARIO 2031 D1 - PM PEAK

LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	5	587	0	10	0	0	0	0	1	177	0	0	0
2	91	0	54	1017	116	398	0	0	0	0	8	2587	87	0	0
3	13	86	0	25	1	1	0	0	0	0	0	13	2	0	0
4	902	940	89	36	80	1	0	0	1	1	0	1181	133	0	0
5	0	295	1	10	0	975	0	0	0	0	161	322	0	0	1
6	17	188	11	33	800	0	2	2	0	0	0	216	1	0	5
7	0	0	0	2	0	1	0	0	0	0	5	6	0	0	0
8	0	0	0	2	0	1	0	0	0	0	5	6	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	32	369	17	152	156	0	3	3	1	1	0	0	2	0	2
12	109	2711	22	1001	459	282	54	54	8	8	18	0	4	0	2
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	13	6	30	0	0	0	0	12	15	0	0	0

HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	37	0	0	0
2	0	0	0	87	0	26	0	0	0	0	51	410	0	0	0
3	0	18	0	0	0	0	0	0	0	0	0	28	0	0	0
4	37	24	1	0	0	0	0	0	0	0	0	35	0	0	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	21	0	0	54	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	32	432	17	85	8	78	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	17	5	594	0	10	0	0	0	0	1	214	0	0	0
2	91	0	54	1104	116	424	0	0	0	0	59	2997	87	0	0
3	13	104	0	25	1	1	0	0	0	0	0	41	2	0	0
4	939	964	90	36	80	1	0	0	1	1	1	1215	133	0	0
5	0	295	1	10	0	1093	0	0	0	0	162	322	0	0	1
6	17	208	11	33	854	0	2	2	0	0	0	217	1	0	5
7	0	0	0	2	0	1	0	0	0	0	5	6	0	0	0
8	0	0	0	2	0	1	0	0	0	0	5	6	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	32	370	17	152	156	0	3	3	1	1	0	0	2	0	2
12	141	3143	39	1086	466	360	54	54	8	8	18	0	4	0	2
13	0	0	0	33	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	2	6	30	0	0	0	0	12	15	0	0	0

TOTAL (PCU)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	17	5	152	0	10	0	0	0	0	1	262	0	0	0
2	91	0	55	1196	116	458	0	0	0	0	125	3530	87	0	0
3	14	127	0	306	1	1	0	0	0	0	0	78	2	0	0
4	986	995	91	0	80	1	0	0	1	1	1	1260	133	0	0
5	0	295	1	13	0	1246	0	0	0	0	163	323	0	0	1
6	17	235	11	33	924	0	2	2	0	0	0	218	1	0	5
7	0	0	0	2	0	1	0	0	0	0	5	6	0	0	0
8	0	0	0	2	0	1	0	0	0	0	5	6	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	32	372	17	152	156	0	3	3	1	1	0	0	2	0	2
12	183	3704	61	1196	476	461	54	54	8	8	18	0	4	0	2
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	13	6	30	0	0	0	0	12	15	0	0	0

NSTM2 OUTPUTS - 2031 MITIGATION (FLOWSET J1d)

SCENARIO 2031 J1d - AM PEAK

LIGHTS (VEH)

18003	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	549	0	18	0	0	0	0	5	427	0	93	1
2	175	0	16	1339	233	225	0	0	0	0	30	1724	184	114	3
3	17	21	0	26	25	7	0	0	0	0	1	41	20	2	0
4	757	906	35	1	101	16	0	0	0	0	10	1129	37	363	3
5	0	75	7	131	0	845	0	0	0	0	179	376	6	1	6
6	28	114	7	24	1352	1	1	1	0	0	1	237	6	14	49
7	0	0	0	3	1	2	0	0	0	0	11	15	0	0	0
8	0	0	0	3	1	2	0	0	0	0	11	15	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
10	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
11	104	514	33	97	78	0	1	1	0	0	0	0	37	38	7
12	346	2209	74	656	393	378	16	16	1	1	4	0	156	75	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	9	24	0	31	1	3	0	0	0	0	1	17	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

HGV (VEH)

2307	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	46	0	35	0
2	0	0	14	107	0	27	0	0	0	0	3	406	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	14	40	0	0	0	0	0	0	0	0	0	202	0	41	0
5	0	0	0	0	0	111	0	0	0	0	2	5	0	0	0
6	0	1	0	0	89	0	0	0	0	0	0	31	0	2	0
7	0	0	0	0	0	1	0	0	0	0	7	1	0	0	0
8	0	0	0	0	0	1	0	0	0	0	7	1	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	3	0
12	49	589	0	85	101	1	5	5	2	2	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	15	31	3	43	10	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (VEH)

20311	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	577	0	19	0	0	0	0	6	473	0	128	1
2	175	0	30	1446	233	252	0	0	0	0	33	2129	184	144	3
3	17	22	0	26	25	7	0	0	0	0	2	41	20	3	0
4	771	947	35	1	101	16	0	0	0	0	10	1330	37	404	3
5	0	75	7	132	0	956	0	0	0	0	181	381	6	1	7
6	28	115	7	24	1440	1	1	1	0	0	1	267	6	16	49
7	0	0	0	3	1	3	0	0	0	0	19	16	0	0	0
8	0	0	0	3	1	3	0	0	0	0	19	16	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	19	0	0	0
10	0	0	0	1	1	3	0	0	0	0	0	19	0	0	0
11	104	560	33	97	78	0	1	1	0	0	0	0	37	41	7
12	395	2799	74	742	494	380	20	20	3	3	4	0	156	102	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	25	55	3	74	11	7	0	0	0	0	1	41	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

TOTAL (PCU)

23310	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	612	0	20	0	0	0	0	6	533	0	174	1
2	175	0	48	1584	233	287	0	0	0	0	36	2657	184	183	3
3	18	22	0	26	25	7	0	0	0	0	2	41	20	4	0
4	789	1000	35	1	101	16	0	0	0	0	10	1593	37	457	3
5	0	75	7	132	0	1100	0	0	0	0	184	387	6	1	7
6	28	117	7	24	1555	1	1	1	0	0	1	307	6	19	49
7	0	0	0	3	1	4	0	0	0	0	28	16	0	0	0
8	0	0	0	3	1	4	0	0	0	0	28	16	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	21	0	0	0
10	0	0	0	1	1	3	0	0	0	0	0	21	0	0	0
11	104	619	33	98	78	0	1	1	0	0	0	0	37	45	7
12	459	3565	75	853	626	382	26	26	6	6	4	0	156	137	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	45	95	7	130	24	13	0	0	0	0	2	72	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

SCENARIO 2031 J1d - PM PEAK

LIGHTS (VEH)

18679	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	46	7	845	0	25	0	0	0	0	7	271	0	25	0
2	84	0	25	1110	52	530	0	0	0	0	53	2421	137	50	0
3	18	87	0	29	1	2	0	0	0	0	1	19	3	0	0
4	955	924	87	0	73	3	1	1	1	1	19	1121	117	115	1
5	0	253	1	38	0	876	0	0	0	0	146	396	0	0	1
6	6	147	8	14	890	0	1	1	1	1	0	181	4	1	4
7	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0
8	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	49	430	21	103	129	0	3	3	1	1	0	0	17	14	2
12	352	2674	26	764	311	294	53	53	8	8	7	0	9	24	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	70	85	4	390	7	34	0	0	0	0	12	183	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

HGV (VEH)

1895	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	41	0	30	0
2	0	0	0	98	0	16	0	0	0	0	65	402	0	35	0
3	0	18	0	0	0	0	0	0	0	0	0	34	0	1	0
4	15	22	0	0	0	0	0	0	0	0	0	24	0	41	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	23	0	0	77	0	0	0	0	0	0	0	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
12	66	421	23	73	1	78	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	23	30	1	43	5	5	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TOTAL (VEH)

20570	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	47	8	851	0	25	0	0	0	0	7	311	0	55	0
2	85	0	25	1208	52	546	0	0	0	0	118	2824	137	85	0
3	18	105	0	29	1	2	0	0	0	0	2	53	3	1	0
4	970	946	88	0	73	3	1	1	1	1	19	1145	117	156	1
5	0	253	1	38	0	994	0	0	0	0	146	396	0	0	1
6	6	170	8	14	968	0	1	1	1	1	0	181	4	3	4
7	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0
8	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	49	432	21	103	129	0	3	3	1	1	0	0	17	17	2
12	417	3095	48	837	312	373	53	53	8	8	7	0	9	51	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	93	115	4	432	13	38	0	0	0	0	12	205	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

TOTAL (PCU)

23034	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	47	8	859	0	25	0	0	0	0	7	365	0	94	0
2	85	0	25	1335	52	567	0	0	0	0	202	3347	137	131	0
3	18	128	0	29	1	2	0	0	0	0	2	97	3	2	0
4	989	975	88	0	73	3	1	1	1	1	19	1176	117	209	1
5	0	253	1	38	0	1147	0	0	0	0	147	396	0	0	1
6	6	200	8	14	1068	0	1	1	1	1	0	182	4	6	4
7	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0
8	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	49	435	21	103	130	0	3	3	1	1	0	0	17	21	2
12	502	3643	78	932	313	474	53	53	8	8	7	0	9	86	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	122	154	5	488	19	44	0	0	0	0	13	236	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

Calculation of 15 Minute Matrix Factors

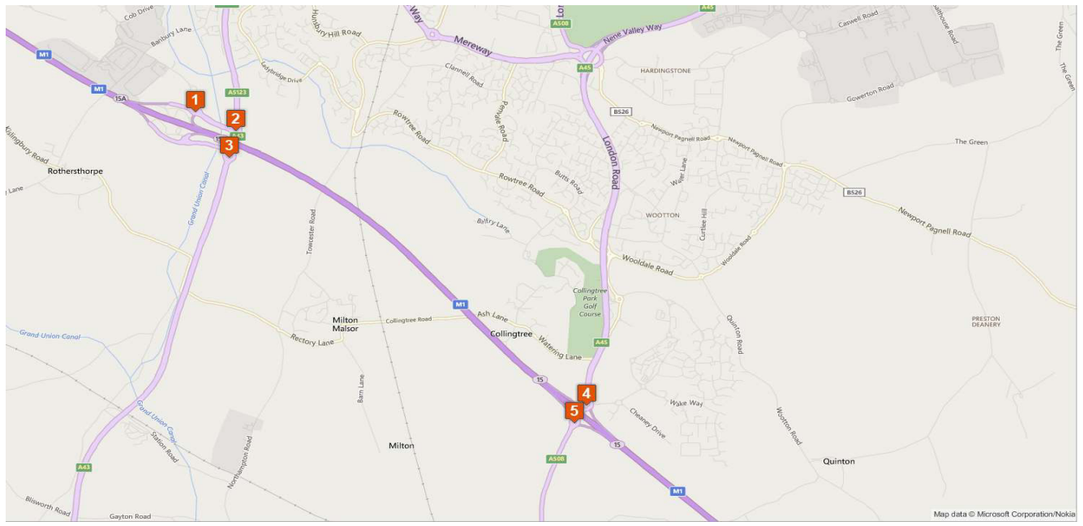
Base VISSIM Model Matrix Times

AM	PM
0615-0715	1545-1645
0715-0815	1645-1745
0815-0845	1745-1815

Traffic Count data received:

L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\170526 Alternative Layout & Data for Factors\M1 J15_J15a Survey Data\MCC
ID02564 M1 J15 and 15A - Turning Counts - Site 1
ID02564 M1 J15 and 15A - Turning Counts - Site 2
ID02564 M1 J15 and 15A - Turning Counts - Site 3
ID02564 M1 J15 and 15A - Turning Counts - Site 4
ID02564 M1 J15 and 15A - Turning Counts - Site 5

Site 1 = A43 / Swan Valley Way (M1 J15a)
Site 2 = M1 / A43 North Roundabout (M1 J15a)
Site 3 = M1 / A43 South Roundabout (M1 J15a)
Site 4 = Saxon Ave / M1 slips / A45 (M1 J15)
Site 5 = M1 slips / A508 (M1 J15)



Time	Junc. Total	Junc. Total	Junc. Total	Junc. Total	Junc. Total	Grand Total
06:00	225	446	448	644	341	**2104**
06:15	215	469	525	835	490	**2534**
06:30	261	607	645	981	540	**3034**
06:45	296	684	734	1190	700	**3604**
07:00	335	746	772	1395	873	**4121**
07:15	394	849	862	1515	953	**4573**
07:30	399	944	982	1646	1013	**4984**
07:45	434	887	897	1724	1078	**5020**
08:00	397	830	879	1607	970	**4683**
08:15	400	867	930	1354	882	**4433**
08:30	372	828	831	1525	845	**4401**
08:45	365	705	756	1500	860	**4186**
09:00	379	727	739	1294	793	**3932**
09:15	297	541	595	1195	722	**3350**
09:30	249	543	597	1082	667	**3138**
09:45	234	467	530	991	614	**2836**
15:00	293	577	637	1152	815	**3474**
15:15	276	589	709	1177	784	**3535**
15:30	320	626	739	1189	783	**3657**
15:45	370	675	760	1238	821	**3864**
16:00	322	696	806	1376	914	**4114**
16:15	367	753	860	1509	1014	**4503**
16:30	355	771	883	1498	1022	**4529**
16:45	371	801	906	1601	1066	**4745**
17:00	404	832	945	1566	1005	**4752**
17:15	387	860	964	1587	1013	**4811**
17:30	416	841	910	1631	1036	**4834**
17:45	374	823	897	1490	1024	**4608**
18:00	332	761	862	1477	951	**4383**
18:15	273	657	765	1391	915	**4001**
18:30	258	597	711	1101	764	**3431**
18:45	233	479	544	1032	721	**3009**

AM PEAK

	Total	Time From	Count	Factor
0615-0715	13293	06:15	2534	0.191
		06:30	3034	0.228
		06:45	3604	0.271
		07:00	4121	0.310
0715-0815	19260	07:15	4573	0.237
		07:30	4984	0.259
		07:45	5020	0.261
		08:00	4683	0.243
0815-0845	8834	08:15	4433	0.502
		08:30	4401	0.498

Factors for Warm Up and Cool Down periods:

Time	Total	Factor
0615-0715	13293	0.690
0815-0845	8834	0.459

PM PEAK

	Total		Count	Factor
1545-1645	17010	15:45	3864	0.227
		16:00	4114	0.242
		16:15	4503	0.265
		16:30	4529	0.266
1645-1745	19142	16:45	4745	0.248
		17:00	4752	0.248
		17:15	4811	0.251
		17:30	4834	0.253
1745-1815	8991	17:45	4608	0.513
		18:00	4383	0.487

Factors for Warm Up and Cool Down periods:

Time	Total	Factor
1545-1645	17010	0.889
1745-1815	8991	0.470

MULTIMODAL

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02 COMMS\Received\171026 ADC-2021 Ref Case NSTM Flows
Microsim Output C1 v3_Final

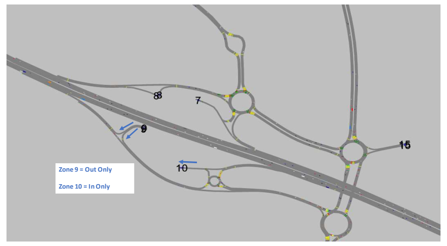
Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data to account for M1 J15a Services.

Current VISSIM model has two xones for northbound access and two zones for southbound access.

NSTM data provides flows to both of these zones, so amended the matrices to ensure 'IN' and 'OUT' traffic was correctly assigned.



SCENARIO: 2021 REFERENCE CASE FUTURE YEAR ASSESSMENT

FLOWSET: C1

SCENARIO 2021 C1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	52	22	332	0	17	0	0	0	0	2	240	1	0	0
2	73	0	48	1128	36	150	0	0	0	0	7	2090	37	0	0
3	4	38	0	16	2	0	0	0	0	0	0	3	3	0	0
4	675	982	42	12	333	10	0	0	0	0	1	1022	155	0	0
5	0	144	21	104	0	1005	0	0	0	0	164	374	10	0	0
6	53	223	8	3	1350	0	0	0	0	0	0	151	12	0	0
7	0	0	0	3	1	10	0	0	0	0	13	5	0	0	0
8	0	0	0	3	1	10	0	0	0	0	13	5	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
11	68	252	16	30	87	0	0	0	0	0	0	0	15	0	0
12	213	2009	53	723	157	266	17	17	1	1	2	0	167	0	0
13	0	0	0	421	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	52	22	332	0	17	0	0	0	0	2	240	1	0	0
2	73	0	48	1128	36	150	0	0	0	0	7	2090	37	0	0
3	4	38	0	16	2	0	0	0	0	0	0	3	3	0	0
4	675	982	42	12	333	10	0	0	0	0	1	1022	155	0	0
5	0	144	21	104	0	1005	0	0	0	0	164	374	10	0	0
6	53	223	8	3	1350	0	0	1	0	0	0	151	12	0	0
7	1	0	0	5	2	21	0	0	0	0	26	9	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
11	68	252	16	30	87	0	0	1	0	0	0	0	15	0	0
12	213	2009	53	723	157	266	0	33	1	1	2	0	167	0	0
13	0	0	0	421	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	52	22	332	0	17	0	0	0	0	2	240	1	0	0
2	73	0	48	1128	36	150	0	0	0	0	7	2090	37	0	0
3	4	38	0	16	2	0	0	0	0	0	0	3	3	0	0
4	675	982	42	12	333	10	0	0	0	0	1	1022	155	0	0
5	0	144	21	104	0	1005	0	0	0	0	164	374	10	0	0
6	53	223	8	3	1350	0	0	1	0	0	0	151	12	0	0
7	1	0	0	5	2	21	0	0	0	0	26	9	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	2	3	0	0	0	0	0	32	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	68	252	16	30	87	0	0	1	0	0	0	0	15	0	0
12	213	2009	53	723	157	266	0	33	0	2	2	0	167	0	0
13	0	0	0	421	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	52	22	332	0	17	0	0	0	0	2	240	1	0	0
2	73	0	48	1128	36	150	0	0	0	0	7	2090	37	0	0
3	4	38	0	16	2	0	0	0	0	0	0	3	3	0	0
4	675	982	42	12	333	10	0	0	0	0	1	1022	155	0	0
5	0	144	21	104	0	1005	0	0	0	0	164	374	10	0	0
6	53	223	8	3	1350	0	0	1	0	0	0	151	12	0	0
7	1	0	0	5	2	21	0	0	0	0	26	9	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	2	3	0	0	0	0	0	32	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	68	252	16	30	87	0	0	1	0	0	0	0	15	0	0
12	213	2009	53	723	157	266	0	33	0	2	2	0	167	0	0
13	0	0	0	421	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO: 2021 REFERENCE CASE FUTURE YEAR ASSESSMENT

FLOWSET: C1

SCENARIO 2021 C1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	9	0	0	0	0	0	0	0	9	0	0	0
2	2	0	11	119	0	10	0	0	0	0	0	392	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	55	0	0	0	0	0	0	0	0	0	224	0	0	0
5	0	0	0	0	0	139	0	0	0	0	0	3	0	0	0
6	0	0	0	0	106	0	0	0	0	0	0	10	0	0	0
7	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
11	0	63	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	552	0	71	94	7	4	4	2	2	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	9	0	0	0	0	0	0	0	9	0	0	0
2	2	0	11	119	0	10	0	0	0	0	0	392	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	55	0	0	0	0	0	0	0	0	0	224	0	0	0
5	0	0	0	0	0	139	0	0	0	0	0	3	0	0	0
6	0	0	0	0	106	0	0	0	0	0	0	10	0	0	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
11	0	63	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	552	0	71	94	7	0	9	2	2	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	9	0	0	0	0	0	0	0	9	0	0	0
2	2	0	11	119	0	10	0	0	0	0	0	392	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	55	0	0	0	0	0	0	0	0	0	224	0	0	0
5	0	0	0	0	0	139	0	0	0	0	0	3	0	0	0
6	0	0	0	0	106	0	0	0	0	0	0	10	0	0	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	63	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	552	0	71	94	7	0	9	0	4	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	9	0	0	0	0	0	0	0	9	0	0	0
2	2	0	11	119	0	10	0	0	0	0	0	392	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	55	0	0	0	0	0	0	0	0	0	224	0	0	0
5	0	0	0	0	0	139	0	0	0	0	0	3	0	0	0
6	0	0	0	0	106	0	0	0	0	0	0	10	0	0	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	63	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	552	0	71	94	7	0	9	0	4	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO: 2021 REFERENCE CASE FUTURE YEAR ASSESSMENT

FLOWSET: C1

SCENARIO 2021 C1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	61	11	518	0	7	0	0	0	0	0	233	3	0	0
2	143	0	27	1062	152	341	0	0	0	0	6	2176	92	0	0
3	6	45	0	19	0	3	0	0	0	0	0	31	1	0	0
4	778	887	74	12	51	19	0	0	2	2	2	1202	115	0	0
5	0	219	9	3	0	1131	1	1	1	1	64	364	0	0	0
6	39	271	13	42	798	0	2	2	1	1	0	303	0	0	0
7	0	0	0	1	0	1	0	0	0	0	5	6	0	0	0
8	0	0	0	1	0	1	0	0	0	0	5	6	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
11	35	444	10	50	135	0	2	2	1	1	0	0	1	0	0
12	134	2330	36	840	378	393	54	54	5	5	14	0	2	0	0
13	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	61	11	518	0	7	0	0	0	0	0	233	3	0	0
2	143	0	27	1062	152	341	0	0	0	0	6	2176	92	0	0
3	6	45	0	19	0	3	0	0	0	0	0	31	1	0	0
4	778	887	74	12	51	19	0	0	2	2	2	1202	115	0	0
5	0	219	9	3	0	1131	0	1	1	1	64	364	0	0	0
6	39	271	13	42	798	0	0	4	1	1	0	303	0	0	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
11	35	444	10	50	135	0	0	4	1	1	0	0	1	0	0
12	134	2330	36	840	378	393	0	108	5	5	14	0	2	0	0
13	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	61	11	518	0	7	0	0	0	1	0	233	3	0	0
2	143	0	27	1062	152	341	0	0	0	0	6	2176	92	0	0
3	6	45	0	19	0	3	0	0	0	0	0	31	1	0	0
4	778	887	74	12	51	19	0	0	0	3	2	1202	115	0	0
5	0	219	9	3	0	1131	0	1	0	1	64	364	0	0	0
6	39	271	13	42	798	0	0	4	0	2	0	303	0	0	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	35	444	10	50	135	0	0	4	0	3	0	0	1	0	0
12	134	2330	36	840	378	393	0	108	0	10	14	0	2	0	0
13	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	61	11	518	0	7	0	0	0	1	0	233	3	0	0
2	143	0	27	1062	152	341	0	0	0	0	6	2176	92	0	0
3	6	45	0	19	0	3	0	0	0	0	0	31	1	0	0
4	778	887	74	12	51	19	0	0	0	3	2	1202	115	0	0
5	0	219	9	3	0	1131	0	1	0	1	64	364	0	0	0
6	39	271	13	42	798	0	0	4	0	2	0	303	0	0	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	35	444	10	50	135	0	0	4	0	3	0	0	1	0	0
12	134	2330	36	840	378	393	0	108	0	10	14	0	2	0	0
13	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO: 2021 REFERENCE CASE FUTURE YEAR ASSESSMENT

FLOWSET: C1

SCENARIO 2021 C1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	38	0	0	0
2	0	0	0	99	0	19	0	0	0	0	39	375	0	0	0
3	0	17	0	0	0	0	0	0	0	0	0	28	0	0	0
4	29	29	0	0	0	0	0	0	0	0	0	41	0	0	0
5	0	0	0	0	0	118	0	0	0	0	0	0	0	0	0
6	0	16	0	0	65	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	56	397	14	79	1	73	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	38	0	0	0
2	0	0	0	99	0	19	0	0	0	0	39	375	0	0	0
3	0	17	0	0	0	0	0	0	0	0	0	28	0	0	0
4	29	29	0	0	0	0	0	0	0	0	0	41	0	0	0
5	0	0	0	0	0	118	0	0	0	0	0	0	0	0	0
6	0	16	0	0	65	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	56	397	14	79	1	73	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	38	0	0	0
2	0	0	0	99	0	19	0	0	0	0	39	375	0	0	0
3	0	17	0	0	0	0	0	0	0	0	0	28	0	0	0
4	29	29	0	0	0	0	0	0	0	0	0	41	0	0	0
5	0	0	0	0	0	118	0	0	0	0	0	0	0	0	0
6	0	16	0	0	65	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	56	397	14	79	1	73	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2021 C1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	38	0	0	0
2	0	0	0	99	0	19	0	0	0	0	39	375	0	0	0
3	0	17	0	0	0	0	0	0	0	0	0	28	0	0	0
4	29	29	0	0	0	0	0	0	0	0	0	41	0	0	0
5	0	0	0	0	0	118	0	0	0	0	0	0	0	0	0
6	0	16	0	0	65	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	56	397	14	79	1	73	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171026 ADC-2021 Ref Case NSTM Flows
Microsim Output C1 v3_Final

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

SCENARIO:	2021 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	C1

SCENARIO 2021 C1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	52	22	332	0	17	0	0	0	0	2	240	1	0	0
2	73	0	48	1128	36	150	0	0	0	0	7	2090	37	0	0
3	4	38	0	16	2	0	0	0	0	0	0	3	3	0	0
4	675	982	42	12	333	10	0	0	0	0	1	1022	155	0	0
5	0	144	21	104	0	1005	0	0	0	0	164	374	10	0	0
6	53	223	8	3	1350	0	0	1	0	0	0	151	12	0	0
7	1	0	0	5	2	21	0	0	0	0	26	9	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	2	3	0	0	0	0	0	32	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	68	252	16	30	87	0	0	1	0	0	0	0	15	0	0
12	213	2009	53	723	157	266	0	33	0	2	2	0	167	0	0
13	0	0	0	421	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR =	0.690

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	36	15	229	0	11	0	0	0	0	1	166	1	0	0
2	50	0	33	778	25	103	0	0	0	0	5	1442	25	0	0
3	3	26	0	11	1	0	0	0	0	0	0	2	2	0	0
4	466	678	29	8	230	7	0	0	0	0	1	705	107	0	0
5	0	99	14	72	0	693	0	0	0	0	113	258	7	0	0
6	36	154	5	2	931	0	0	1	0	0	0	104	8	0	0
7	0	0	0	4	1	14	0	0	0	0	18	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	22	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	47	174	11	21	60	0	0	1	0	0	0	0	10	0	0
12	147	1386	37	499	109	183	0	23	0	1	2	0	116	0	0
13	0	0	0	291	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0615-0630 FACTOR	0.191

VISSIM MATRIX - LIGHTS - WARM UP (0615-0630)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	7	3	44	0	2	0	0	0	0	0	32	0	0	0
2	10	0	6	149	5	20	0	0	0	0	1	275	5	0	0
3	1	5	0	2	0	0	0	0	0	0	0	0	0	0	0
4	89	129	6	2	44	1	0	0	0	0	0	135	20	0	0
5	0	19	3	14	0	132	0	0	0	0	22	49	1	0	0
6	7	29	1	0	178	0	0	0	0	0	0	20	2	0	0
7	0	0	0	1	0	3	0	0	0	0	3	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	9	33	2	4	11	0	0	0	0	0	0	0	2	0	0
12	28	265	7	95	21	35	0	4	0	0	0	0	22	0	0
13	0	0	0	56	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR	0.228

VISSIM MATRIX - LIGHTS - WARM UP (0630-0645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	8	3	52	0	3	0	0	0	0	0	38	0	0	0
2	11	0	8	177	6	24	0	0	0	0	1	329	6	0	0
3	1	6	0	3	0	0	0	0	0	0	0	0	0	0	0
4	106	155	7	2	52	2	0	0	0	0	0	161	24	0	0
5	0	23	3	16	0	158	0	0	0	0	26	59	2	0	0
6	8	35	1	1	212	0	0	0	0	0	0	24	2	0	0
7	0	0	0	1	0	3	0	0	0	0	4	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	11	40	2	5	14	0	0	0	0	0	0	0	2	0	0
12	33	316	8	114	25	42	0	5	0	0	0	0	26	0	0
13	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0645-0700 FACTOR	0.271

VISSIM MATRIX - LIGHTS - WARM UP (0645-0700)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	10	4	62	0	3	0	0	0	0	0	45	0	0	0
2	14	0	9	211	7	28	0	0	0	0	1	391	7	0	0
3	1	7	0	3	0	0	0	0	0	0	0	1	1	0	0
4	126	184	8	2	62	2	0	0	0	0	0	191	29	0	0
5	0	27	4	19	0	188	0	0	0	0	31	70	2	0	0
6	10	42	1	1	252	0	0	0	0	0	0	28	2	0	0
7	0	0	0	1	0	4	0	0	0	0	5	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	13	47	3	6	16	0	0	0	0	0	0	0	3	0	0
12	40	376	10	135	29	50	0	6	0	0	0	0	31	0	0
13	0	0	0	79	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0700-0715 FACTOR	0.310

VISSIM MATRIX - LIGHTS - WARM UP (0700-0730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	11	5	71	0	4	0	0	0	0	0	51	0	0	0
2	16	0	10	241	8	32	0	0	0	0	2	447	8	0	0
3	1	8	0	4	0	0	0	0	0	0	0	1	1	0	0
4	144	210	9	3	71	2	0	0	0	0	0	219	33	0	0
5	0	31	4	22	0	215	0	0	0	0	35	80	2	0	0
6	11	48	2	1	289	0	0	0	0	0	0	32	3	0	0
7	0	0	0	1	0	4	0	0	0	0	6	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	15	54	3	6	19	0	0	0	0	0	0	0	3	0	0
12	45	430	11	155	34	57	0	7	0	0	0	0	36	0	0
13	0	0	0	90	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	52	22	332	0	17	0	0	0	0	2	240	1	0	0
2	73	0	48	1128	36	150	0	0	0	0	7	2090	37	0	0
3	4	38	0	16	2	0	0	0	0	0	0	3	3	0	0
4	675	982	42	12	333	10	0	0	0	0	1	1022	155	0	0
5	0	144	21	104	0	1005	0	0	0	0	164	374	10	0	0
6	53	223	8	3	1350	0	0	1	0	0	0	151	12	0	0
7	1	0	0	5	2	21	0	0	0	0	26	9	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	2	3	0	0	0	0	0	32	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	68	252	16	30	87	0	0	1	0	0	0	0	15	0	0
12	213	2009	53	723	157	266	0	33	0	2	2	0	167	0	0
13	0	0	0	421	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0715-0730 FACTOR	0.237

VISSIM MATRIX - LIGHTS - PEAK (0715-0730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	12	5	79	0	4	0	0	0	0	0	57	0	0	0
2	17	0	11	267	8	36	0	0	0	0	2	495	9	0	0
3	1	9	0	4	0	0	0	0	0	0	0	1	1	0	0
4	160	233	10	3	79	2	0	0	0	0	0	242	37	0	0
5	0	34	5	25	0	238	0	0	0	0	39	89	2	0	0
6	13	53	2	1	320	0	0	0	0	0	0	36	3	0	0
7	0	0	0	1	0	5	0	0	0	0	6	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	60	4	7	21	0	0	0	0	0	0	0	4	0	0
12	50	476	13	171	37	63	0	8	0	0	1	0	40	0	0
13	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0730-0745 FACTOR	0.259

VISSIM MATRIX - LIGHTS - PEAK (0730-0745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	14	6	86	0	4	0	0	0	0	0	62	0	0	0
2	19	0	12	292	9	39	0	0	0	0	2	541	10	0	0
3	1	10	0	4	1	0	0	0	0	0	0	1	1	0	0
4	175	254	11	3	86	2	0	0	0	0	0	265	40	0	0
5	0	37	5	27	0	260	0	0	0	0	42	97	3	0	0
6	14	58	2	1	350	0	0	0	0	0	0	39	3	0	0
7	0	0	0	1	0	5	0	0	0	0	7	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	18	65	4	8	23	0	0	0	0	0	0	0	4	0	0
12	55	520	14	187	41	69	0	9	0	1	1	0	43	0	0
13	0	0	0	109	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0745-0800 FACTOR	0.261

VISSIM MATRIX - LIGHTS - PEAK (0745-0800)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	14	6	87	0	4	0	0	0	0	0	63	0	0	0
2	19	0	12	294	9	39	0	0	0	0	2	545	10	0	0
3	1	10	0	4	1	0	0	0	0	0	0	1	1	0	0
4	176	256	11	3	87	2	0	0	0	0	0	267	41	0	0
5	0	38	5	27	0	262	0	0	0	0	43	98	3	0	0
6	14	58	2	1	352	0	0	0	0	0	0	39	3	0	0
7	0	0	0	1	0	5	0	0	0	0	7	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	18	66	4	8	23	0	0	0	0	0	0	0	4	0	0
12	55	524	14	189	41	69	0	9	0	1	1	0	44	0	0
13	0	0	0	110	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR	0.243

VISSIM MATRIX - LIGHTS - PEAK (0800-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	13	5	81	0	4	0	0	0	0	0	58	0	0	0
2	18	0	12	274	9	36	0	0	0	0	2	508	9	0	0
3	1	9	0	4	0	0	0	0	0	0	0	1	1	0	0
4	164	239	10	3	81	2	0	0	0	0	0	248	38	0	0
5	0	35	5	25	0	244	0	0	0	0	40	91	2	0	0
6	13	54	2	1	328	0	0	0	0	0	0	37	3	0	0
7	0	0	0	1	0	5	0	0	0	0	6	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	17	61	4	7	21	0	0	0	0	0	0	0	4	0	0
12	52	488	13	176	38	65	0	8	0	1	1	0	41	0	0
13	0	0	0	102	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR =	0.459

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	24	10	152	0	8	0	0	0	0	1	110	1	0	0
2	33	0	22	518	16	69	0	0	0	0	3	959	17	0	0
3	2	17	0	8	1	0	0	0	0	0	0	1	1	0	0
4	310	451	19	5	153	4	0	0	0	0	1	469	71	0	0
5	0	66	10	48	0	461	0	0	0	0	75	172	4	0	0
6	24	102	4	2	619	0	0	0	0	0	0	69	6	0	0
7	0	0	0	2	1	9	0	0	0	0	12	4	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	1	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	31	116	7	14	40	0	0	0	0	0	0	0	7	0	0
12	98	922	24	332	72	122	0	15	0	1	1	0	77	0	0
13	0	0	0	193	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0815-0830 FACTOR	0.502

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0830)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	12	5	76	0	4	0	0	0	0	0	55	0	0	0
2	17	0	11	260	8	35	0	0	0	0	2	481	8	0	0
3	1	9	0	4	0	0	0	0	0	0	0	1	1	0	0
4	156	226	10	3	77	2	0	0	0	0	0	235	36	0	0
5	0	33	5	24	0	231	0	0	0	0	38	86	2	0	0
6	12	51	2	1	311	0	0	0	0	0	0	35	3	0	0
7	0	0	0	1	0	5	0	0	0	0	6	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	58	4	7	20	0	0	0	0	0	0	0	3	0	0
12	49	463	12	167	36	61	0	8	0	0	1	0	39	0	0
13	0	0	0	97	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0830-0845 FACTOR	0.498

VISSIM MATRIX - LIGHTS - COOL DOWN (0830-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	12	5	76	0	4	0	0	0	0	0	55	0	0	0
2	17	0	11	258	8	34	0	0	0	0	2	478	8	0	0
3	1	9	0	4	0	0	0	0	0	0	0	1	1	0	0
4	154	225	10	3	76	2	0	0	0	0	0	234	35	0	0
5	0	33	5	24	0	230	0	0	0	0	37	85	2	0	0
6	12	51	2	1	308	0	0	0	0	0	0	34	3	0	0
7	0	0	0	1	0	5	0	0	0	0	6	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	58	4	7	20	0	0	0	0	0	0	0	3	0	0
12	49	459	12	165	36	61	0	8	0	0	1	0	38	0	0
13	0	0	0	96	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Title: 171109 2021 REF CASE VISSIM FLOWS.xlsx
Sheet Name: 2021 REF CASE FLOWS_AM_HEAVIES
Date: 06/12/2017

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171026 ADC-2021 Ref Case NSTM Flows
Microsim Output C1 v3_Final

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

SCENARIO:	2021 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	C1

SCENARIO 2031 D1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	9	0	0	0	0	0	0	0	9	0	0	0
2	2	0	11	119	0	10	0	0	0	0	0	392	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	55	0	0	0	0	0	0	0	0	0	224	0	0	0
5	0	0	0	0	0	139	0	0	0	0	0	3	0	0	0
6	0	0	0	0	106	0	0	0	0	0	0	10	0	0	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	63	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	552	0	71	94	7	0	9	0	4	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR =	0.690

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	6	0	0	0
2	1	0	7	82	0	7	0	0	0	0	0	271	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	38	0	0	0	0	0	0	0	0	0	154	0	0	0
5	0	0	0	0	0	96	0	0	0	0	0	2	0	0	0
6	0	0	0	0	73	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	1	0	0	0	0	11	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	44	0	0	0	0	0	0	0	0	0	0	0	0	0
12	35	381	0	49	65	5	0	6	0	3	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0615-0630 FACTOR	0.191

VISSIM MATRIX - LIGHTS - WARM UP (0615-0630)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
2	0	0	1	16	0	1	0	0	0	0	0	52	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	7	0	0	0	0	0	0	0	0	0	29	0	0	0
5	0	0	0	0	0	18	0	0	0	0	0	0	0	0	0
6	0	0	0	0	14	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0
12	7	73	0	9	12	1	0	1	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR	0.228

VISSIM MATRIX - LIGHTS - WARM UP (0630-0645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0
2	0	0	2	19	0	2	0	0	0	0	0	62	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	9	0	0	0	0	0	0	0	0	0	35	0	0	0
5	0	0	0	0	0	22	0	0	0	0	0	1	0	0	0
6	0	0	0	0	17	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	87	0	11	15	1	0	1	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0645-0700 FACTOR	0.271

VISSIM MATRIX - LIGHTS - WARM UP (0645-0700)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
2	0	0	2	22	0	2	0	0	0	0	0	73	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	10	0	0	0	0	0	0	0	0	0	42	0	0	0
5	0	0	0	0	0	26	0	0	0	0	0	1	0	0	0
6	0	0	0	0	20	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0
12	9	103	0	13	17	1	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0700-0715 FACTOR	0.310

VISSIM MATRIX - LIGHTS - WARM UP (0700-0730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
2	0	0	2	25	0	2	0	0	0	0	0	84	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	12	0	0	0	0	0	0	0	0	0	48	0	0	0
5	0	0	0	0	0	30	0	0	0	0	0	1	0	0	0
6	0	0	0	0	23	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0
12	11	118	0	15	20	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	9	0	0	0	0	0	0	0	9	0	0	0
2	2	0	11	119	0	10	0	0	0	0	0	392	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	55	0	0	0	0	0	0	0	0	0	224	0	0	0
5	0	0	0	0	0	139	0	0	0	0	0	3	0	0	0
6	0	0	0	0	106	0	0	0	0	0	0	10	0	0	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	63	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	552	0	71	94	7	0	9	0	4	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0715-0730 FACTOR	0.237

VISSIM MATRIX - LIGHTS - PEAK (0715-0730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
2	0	0	3	28	0	2	0	0	0	0	0	93	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	13	0	0	0	0	0	0	0	0	0	53	0	0	0
5	0	0	0	0	0	33	0	0	0	0	0	1	0	0	0
6	0	0	0	0	25	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0
12	12	131	0	17	22	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0730-0745 FACTOR	0.259

VISSIM MATRIX - LIGHTS - PEAK (0730-0745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
2	0	0	3	31	0	3	0	0	0	0	0	102	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	14	0	0	0	0	0	0	0	0	0	58	0	0	0
5	0	0	0	0	0	36	0	0	0	0	0	1	0	0	0
6	0	0	0	0	27	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	143	0	18	24	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0745-0800 FACTOR	0.261

VISSIM MATRIX - LIGHTS - PEAK (0745-0800)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
2	0	0	3	31	0	3	0	0	0	0	0	102	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	14	0	0	0	0	0	0	0	0	0	58	0	0	0
5	0	0	0	0	0	36	0	0	0	0	0	1	0	0	0
6	0	0	0	0	28	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	144	0	19	24	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR	0.243

VISSIM MATRIX - LIGHTS - PEAK (0800-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
2	0	0	3	29	0	2	0	0	0	0	0	95	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	13	0	0	0	0	0	0	0	0	0	54	0	0	0
5	0	0	0	0	0	34	0	0	0	0	0	1	0	0	0
6	0	0	0	0	26	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0
12	12	134	0	17	23	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR =	0.459

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	4	0	0	0
2	1	0	5	55	0	5	0	0	0	0	0	180	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	25	0	0	0	0	0	0	0	0	0	103	0	0	0
5	0	0	0	0	0	64	0	0	0	0	0	2	0	0	0
6	0	0	0	0	49	0	0	0	0	0	0	4	0	0	0
7	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	29	0	0	0	0	0	0	0	0	0	0	0	0	0
12	23	254	0	33	43	3	0	4	0	2	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0815-0830 FACTOR	0.502

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0830)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
2	0	0	3	27	0	2	0	0	0	0	0	90	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	13	0	0	0	0	0	0	0	0	0	52	0	0	0
5	0	0	0	0	0	32	0	0	0	0	0	1	0	0	0
6	0	0	0	0	24	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0
12	12	127	0	16	22	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0830-0845 FACTOR	0.498

VISSIM MATRIX - LIGHTS - COOL DOWN (0830-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0
2	0	0	2	27	0	2	0	0	0	0	0	90	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	13	0	0	0	0	0	0	0	0	0	51	0	0	0
5	0	0	0	0	0	32	0	0	0	0	0	1	0	0	0
6	0	0	0	0	24	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0
12	12	126	0	16	21	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171026 ADC-2021 Ref Case NSTM Flows
Microsim Output C1 v3_Final

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

SCENARIO:	2021 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	C1

SCENARIO 2031 D1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	61	11	518	0	7	0	0	0	1	0	233	3	0	0
2	143	0	27	1062	152	341	0	0	0	0	6	2176	92	0	0
3	6	45	0	19	0	3	0	0	0	0	0	31	1	0	0
4	778	887	74	12	51	19	0	0	0	3	2	1202	115	0	0
5	0	219	9	3	0	1131	0	1	0	1	64	364	0	0	0
6	39	271	13	42	798	0	0	4	0	2	0	303	0	0	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	35	444	10	50	135	0	0	4	0	3	0	0	1	0	0
12	134	2330	36	840	378	393	0	108	0	10	14	0	2	0	0
13	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR =	0.889

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	54	10	461	0	7	0	0	0	0	0	207	2	0	0
2	127	0	24	944	135	303	0	0	0	0	5	1934	81	0	0
3	6	40	0	17	0	2	0	0	0	0	0	28	1	0	0
4	692	788	66	10	45	17	0	0	0	3	2	1069	102	0	0
5	0	195	8	3	0	1005	0	1	0	1	57	324	0	0	0
6	34	241	12	37	710	0	0	4	0	2	0	269	0	0	0
7	0	0	0	2	1	1	0	0	0	0	9	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	31	394	9	45	120	0	0	3	0	3	0	0	1	0	0
12	119	2071	32	747	336	350	0	96	0	9	12	0	2	0	0
13	0	0	0	207	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1545-1600 FACTOR	0.227

VISSIM MATRIX - LIGHTS - WARM UP (1545-1600)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	12	2	105	0	1	0	0	0	0	0	47	1	0	0
2	29	0	5	214	31	69	0	0	0	0	1	439	18	0	0
3	1	9	0	4	0	1	0	0	0	0	0	6	0	0	0
4	157	179	15	2	10	4	0	0	0	1	0	243	23	0	0
5	0	44	2	1	0	228	0	0	0	0	13	74	0	0	0
6	8	55	3	8	161	0	0	1	0	0	0	61	0	0	0
7	0	0	0	1	0	0	0	0	0	0	2	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	7	90	2	10	27	0	0	1	0	1	0	0	0	0	0
12	27	470	7	170	76	79	0	22	0	2	3	0	0	0	0
13	0	0	0	47	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1600-1615 FACTOR	0.242

VISSIM MATRIX - LIGHTS - WARM UP (1600-1615)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	13	2	111	0	2	0	0	0	0	0	50	1	0	0
2	31	0	6	229	33	73	0	0	0	0	1	468	20	0	0
3	1	10	0	4	0	1	0	0	0	0	0	7	0	0	0
4	167	191	16	2	11	4	0	0	0	1	0	259	25	0	0
5	0	47	2	1	0	243	0	0	0	0	14	78	0	0	0
6	8	58	3	9	172	0	0	1	0	0	0	65	0	0	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	7	95	2	11	29	0	0	1	0	1	0	0	0	0	0
12	29	501	8	181	81	85	0	23	0	2	3	0	0	0	0
13	0	0	0	50	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1615-1630 FACTOR	0.265

VISSIM MATRIX - LIGHTS - WARM UP (1615-1630)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	14	3	122	0	2	0	0	0	0	0	55	1	0	0
2	34	0	6	250	36	80	0	0	0	0	1	513	22	0	0
3	2	11	0	4	0	1	0	0	0	0	0	7	0	0	0
4	183	209	17	3	12	4	0	0	0	1	0	283	27	0	0
5	0	52	2	1	0	266	0	0	0	0	15	86	0	0	0
6	9	64	3	10	188	0	0	1	0	0	0	71	0	0	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	105	2	12	32	0	0	1	0	1	0	0	0	0	0
12	32	549	9	198	89	93	0	25	0	2	3	0	0	0	0
13	0	0	0	55	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1630-1645 FACTOR	0.266

VISSIM MATRIX - LIGHTS - WARM UP (1630-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	14	3	123	0	2	0	0	0	0	0	55	1	0	0
2	34	0	6	251	36	81	0	0	0	0	1	515	22	0	0
3	2	11	0	4	0	1	0	0	0	0	0	7	0	0	0
4	184	210	17	3	12	4	0	0	0	1	0	284	27	0	0
5	0	52	2	1	0	267	0	0	0	0	15	86	0	0	0
6	9	64	3	10	189	0	0	1	0	0	0	72	0	0	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	105	2	12	32	0	0	1	0	1	0	0	0	0	0
12	32	551	9	199	89	93	0	25	0	2	3	0	0	0	0
13	0	0	0	55	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (1645-1745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	61	11	518	0	7	0	0	0	1	0	233	3	0	0
2	143	0	27	1062	152	341	0	0	0	0	6	2176	92	0	0
3	6	45	0	19	0	3	0	0	0	0	0	31	1	0	0
4	778	887	74	12	51	19	0	0	0	3	2	1202	115	0	0
5	0	219	9	3	0	1131	0	1	0	1	64	364	0	0	0
6	39	271	13	42	798	0	0	4	0	2	0	303	0	0	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	35	444	10	50	135	0	0	4	0	3	0	0	1	0	0
12	134	2330	36	840	378	393	0	108	0	10	14	0	2	0	0
13	0	0	0	233	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1645-1700 FACTOR	0.248

VISSIM MATRIX - LIGHTS - PEAK (1645-1700)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	15	3	128	0	2	0	0	0	0	0	58	1	0	0
2	35	0	7	263	38	84	0	0	0	0	1	540	23	0	0
3	2	11	0	5	0	1	0	0	0	0	0	8	0	0	0
4	193	220	18	3	13	5	0	0	0	1	0	298	29	0	0
5	0	54	2	1	0	280	0	0	0	0	16	90	0	0	0
6	10	67	3	10	198	0	0	1	0	0	0	75	0	0	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	9	110	2	12	33	0	0	1	0	1	0	0	0	0	0
12	33	578	9	208	94	98	0	27	0	3	3	0	0	0	0
13	0	0	0	58	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1700-1715 FACTOR	0.248

VISSIM MATRIX - LIGHTS - PEAK (1700-1715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	15	3	128	0	2	0	0	0	0	0	58	1	0	0
2	35	0	7	263	38	84	0	0	0	0	1	540	23	0	0
3	2	11	0	5	0	1	0	0	0	0	0	8	0	0	0
4	193	220	18	3	13	5	0	0	0	1	0	298	29	0	0
5	0	54	2	1	0	280	0	0	0	0	16	90	0	0	0
6	10	67	3	10	198	0	0	1	0	0	0	75	0	0	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	9	110	2	12	33	0	0	1	0	1	0	0	0	0	0
12	33	578	9	208	94	98	0	27	0	3	3	0	0	0	0
13	0	0	0	58	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1715-1730 FACTOR	0.251

VISSIM MATRIX - LIGHTS - PEAK (1715-1730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	15	3	130	0	2	0	0	0	0	0	58	1	0	0
2	36	0	7	267	38	85	0	0	0	0	1	546	23	0	0
3	2	11	0	5	0	1	0	0	0	0	0	8	0	0	0
4	195	223	19	3	13	5	0	0	0	1	0	302	29	0	0
5	0	55	2	1	0	284	0	0	0	0	16	91	0	0	0
6	10	68	3	11	200	0	0	1	0	0	0	76	0	0	0
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	9	111	2	13	34	0	0	1	0	1	0	0	0	0	0
12	34	585	9	211	95	99	0	27	0	3	3	0	0	0	0
13	0	0	0	59	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1730-1745 FACTOR	0.253

VISSIM MATRIX - LIGHTS - PEAK (1730-1745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	15	3	131	0	2	0	0	0	0	0	59	1	0	0
2	36	0	7	269	38	86	0	0	0	0	1	550	23	0	0
3	2	11	0	5	0	1	0	0	0	0	0	8	0	0	0
4	197	224	19	3	13	5	0	0	0	1	1	304	29	0	0
5	0	55	2	1	0	286	0	0	0	0	16	92	0	0	0
6	10	69	3	11	202	0	0	1	0	0	0	77	0	0	0
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	9	112	2	13	34	0	0	1	0	1	0	0	0	0	0
12	34	590	9	213	96	100	0	27	0	3	3	0	0	0	0
13	0	0	0	59	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR =	0.470

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	5	244	0	3	0	0	0	0	0	109	1	0	0
2	67	0	13	499	71	160	0	0	0	0	3	1023	43	0	0
3	3	21	0	9	0	1	0	0	0	0	0	15	1	0	0
4	366	417	35	5	24	9	0	0	0	2	1	565	54	0	0
5	0	103	4	2	0	531	0	1	0	1	30	171	0	0	0
6	18	127	6	20	375	0	0	2	0	1	0	142	0	0	0
7	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	209	5	24	63	0	0	2	0	1	0	0	1	0	0
12	63	1095	17	395	178	185	0	51	0	5	6	0	1	0	0
13	0	0	0	110	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1745-1800 FACTOR	0.513

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1800)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	15	3	125	0	2	0	0	0	0	0	56	1	0	0
2	34	0	7	256	37	82	0	0	0	0	1	525	22	0	0
3	2	11	0	5	0	1	0	0	0	0	0	7	0	0	0
4	188	214	18	3	12	5	0	0	0	1	0	290	28	0	0
5	0	53	2	1	0	273	0	0	0	0	15	88	0	0	0
6	9	65	3	10	192	0	0	1	0	0	0	73	0	0	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	107	2	12	33	0	0	1	0	1	0	0	0	0	0
12	32	562	9	203	91	95	0	26	0	2	3	0	0	0	0
13	0	0	0	56	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1800-1815 FACTOR	0.487

VISSIM MATRIX - LIGHTS - COOL DOWN (1800-1815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	14	3	119	0	2	0	0	0	0	0	53	1	0	0
2	33	0	6	243	35	78	0	0	0	0	1	498	21	0	0
3	1	10	0	4	0	1	0	0	0	0	0	7	0	0	0
4	178	203	17	3	12	4	0	0	0	1	0	275	26	0	0
5	0	50	2	1	0	259	0	0	0	0	15	83	0	0	0
6	9	62	3	10	183	0	0	1	0	0	0	69	0	0	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	102	2	11	31	0	0	1	0	1	0	0	0	0	0
12	31	533	8	192	86	90	0	25	0	2	3	0	0	0	0
13	0	0	0	53	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Title: 171109 2021 REF CASE VISSIM FLOWS.xlsx
Sheet Name: 2021 REF CASE FLOWS_PM_HEAVIES
Date: 06/12/2017

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171026 ADC-2021 Ref Case NSTM Flows
Microsim Output C1 v3_Final

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

SCENARIO:	2031 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	D1

SCENARIO 2031 D1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	38	0	0	0
2	0	0	0	99	0	19	0	0	0	0	39	375	0	0	0
3	0	17	0	0	0	0	0	0	0	0	0	28	0	0	0
4	29	29	0	0	0	0	0	0	0	0	0	41	0	0	0
5	0	0	0	0	0	118	0	0	0	0	0	0	0	0	0
6	0	16	0	0	65	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	56	397	14	79	1	73	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR =	0.889

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	3	0	0	0	0	0	0	0	34	0	0	0
2	0	0	0	88	0	17	0	0	0	0	35	333	0	0	0
3	0	15	0	0	0	0	0	0	0	0	0	25	0	0	0
4	26	26	0	0	0	0	0	0	0	0	0	37	0	0	0
5	0	0	0	0	0	105	0	0	0	0	0	0	0	0	0
6	0	15	0	0	57	0	0	0	0	0	0	6	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	353	13	70	1	65	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (1645-1745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	38	0	0	0
2	0	0	0	99	0	19	0	0	0	0	39	375	0	0	0
3	0	17	0	0	0	0	0	0	0	0	0	28	0	0	0
4	29	29	0	0	0	0	0	0	0	0	0	41	0	0	0
5	0	0	0	0	0	118	0	0	0	0	0	0	0	0	0
6	0	16	0	0	65	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	56	397	14	79	1	73	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR =	0.470

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	18	0	0	0
2	0	0	0	46	0	9	0	0	0	0	18	176	0	0	0
3	0	8	0	0	0	0	0	0	0	0	0	13	0	0	0
4	14	13	0	0	0	0	0	0	0	0	0	19	0	0	0
5	0	0	0	0	0	56	0	0	0	0	0	0	0	0	0
6	0	8	0	0	30	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	26	187	7	37	0	34	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1545-1600 FACTOR	0.227

VISSIM MATRIX - LIGHTS - WARM UP (1545-1600)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0
2	0	0	0	20	0	4	0	0	0	0	8	76	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	6	0	0	0
4	6	6	0	0	0	0	0	0	0	0	0	8	0	0	0
5	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0
6	0	3	0	0	13	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	11	80	3	16	0	15	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1600-1615 FACTOR	0.242

VISSIM MATRIX - LIGHTS - WARM UP (1600-1615)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0
2	0	0	0	21	0	4	0	0	0	0	8	81	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	6	0	0	0
4	6	6	0	0	0	0	0	0	0	0	0	9	0	0	0
5	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0
6	0	4	0	0	14	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	12	85	3	17	0	16	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1615-1630 FACTOR	0.265

VISSIM MATRIX - LIGHTS - WARM UP (1615-1630)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	23	0	5	0	0	0	0	9	88	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	7	7	0	0	0	0	0	0	0	0	0	10	0	0	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	4	0	0	15	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	94	3	19	0	17	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1630-1645 FACTOR	0.266

VISSIM MATRIX - LIGHTS - WARM UP (1630-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	23	0	5	0	0	0	0	9	89	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	7	7	0	0	0	0	0	0	0	0	0	10	0	0	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	4	0	0	15	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	94	3	19	0	17	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1645-1700 FACTOR	0.248

VISSIM MATRIX - LIGHTS - PEAK (1645-1700)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	0	0
2	0	0	0	24	0	5	0	0	0	0	10	93	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	7	7	0	0	0	0	0	0	0	0	0	10	0	0	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	4	0	0	16	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	14	99	4	19	0	18	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1700-1715 FACTOR	0.248

VISSIM MATRIX - LIGHTS - PEAK (1700-1715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	0	0
2	0	0	0	24	0	5	0	0	0	0	10	93	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	7	7	0	0	0	0	0	0	0	0	0	10	0	0	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	4	0	0	16	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	14	99	4	19	0	18	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1715-1730 FACTOR	0.251

VISSIM MATRIX - LIGHTS - PEAK (1715-1730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	0	0
2	0	0	0	25	0	5	0	0	0	0	10	94	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	7	7	0	0	0	0	0	0	0	0	0	10	0	0	0
5	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
6	0	4	0	0	16	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	14	100	4	20	0	18	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1730-1745 FACTOR	0.253

VISSIM MATRIX - LIGHTS - PEAK (1730-1745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	0	0
2	0	0	0	25	0	5	0	0	0	0	10	95	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	7	7	0	0	0	0	0	0	0	0	0	10	0	0	0
5	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
6	0	4	0	0	16	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	14	101	4	20	0	18	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1745-1800 FACTOR	0.513

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1800)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	24	0	5	0	0	0	0	9	90	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	7	7	0	0	0	0	0	0	0	0	0	10	0	0	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	4	0	0	16	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	14	96	3	19	0	18	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1800-1815 FACTOR	0.487

VISSIM MATRIX - LIGHTS - COOL DOWN (1800-1815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	23	0	4	0	0	0	0	9	86	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	6	0	0	0
4	7	7	0	0	0	0	0	0	0	0	0	9	0	0	0
5	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0
6	0	4	0	0	15	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	91	3	18	0	17	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Matrix Conversion

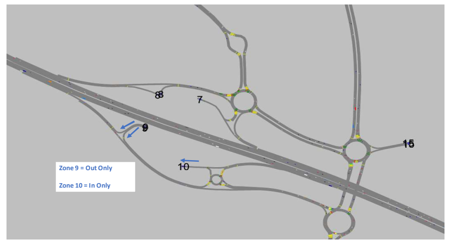
Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171124 ADC-2021 Mit NSTM Flows
NSTM2 2021 I1 Circular Compliant Cordon Matrices - Adjusted v1

Calculation Details

Conversion of NSTM data to account for M1 J15a Services.

Current VISSIM model has two xones for northbound access and two zones for southbound access.

NSTM data provides flows to both of these zones, so amended the matrices to ensure 'IN' and 'OUT' traffic was correctly assigned.



SCENARIO: 2021 WITH TRANSPORT MITIGATION DEVELOPMENT CASE

FLOWSET: J1i

SCENARIO 2031 J1d - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	70	18	389	0	56	0	0	0	0	5	330	1	75	0
2	61	0	47	1182	67	171	0	0	0	0	10	2037	49	107	0
3	16	36	0	19	17	3	0	0	0	0	0	10	12	2	0
4	797	925	42	0	289	13	0	0	0	0	2	914	86	359	0
5	0	142	18	109	0	914	0	0	0	0	132	468	6	1	0
6	45	109	5	10	1621	0	0	0	0	0	0	199	10	13	0
7	1	0	0	2	1	5	0	0	0	0	17	6	0	0	0
8	1	0	0	2	1	5	0	0	0	0	17	6	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
11	125	261	17	42	100	0	1	1	0	0	0	0	16	22	0
12	288	1998	53	591	182	341	17	17	1	1	2	0	168	121	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	7	24	0	27	2	2	0	0	0	0	0	24	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	70	18	389	0	56	0	0	0	0	5	330	1	75	0
2	61	0	47	1182	67	171	0	0	0	0	10	2037	49	107	0
3	16	36	0	19	17	3	0	0	0	0	0	10	12	2	0
4	797	925	42	0	289	13	0	0	0	0	2	914	86	359	0
5	0	142	18	109	0	914	0	0	0	0	132	468	6	1	0
6	45	109	5	10	1621	0	0	1	0	0	0	199	10	13	0
7	1	0	0	5	2	11	0	0	0	0	33	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	1	2	0	0	0	0	0	16	0	0	0
11	125	261	17	42	100	0	0	1	0	0	0	0	16	22	0
12	288	1998	53	591	182	341	0	33	1	1	2	0	168	121	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	7	24	0	27	2	2	0	0	0	0	0	24	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	70	18	389	0	56	0	0	0	0	5	330	1	75	0
2	61	0	47	1182	67	171	0	0	0	0	10	2037	49	107	0
3	16	36	0	19	17	3	0	0	0	0	0	10	12	2	0
4	797	925	42	0	289	13	0	0	0	0	2	914	86	359	0
5	0	142	18	109	0	914	0	0	0	0	132	468	6	1	0
6	45	109	5	10	1621	0	0	1	0	0	0	199	10	13	0
7	1	0	0	5	2	11	0	0	0	0	33	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1	0	0	1	1	4	0	0	0	0	0	31	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	125	261	17	42	100	0	0	1	0	0	0	0	16	22	0
12	288	1998	53	591	182	341	0	33	0	2	2	0	168	121	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	7	24	0	27	2	2	0	0	0	0	0	24	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	70	18	389	0	56	0	0	0	0	5	330	1	75	0
2	61	0	47	1182	67	171	0	0	0	0	10	2037	49	107	0
3	16	36	0	19	17	3	0	0	0	0	0	10	12	2	0
4	797	925	42	0	289	13	0	0	0	0	2	914	86	359	0
5	0	142	18	109	0	914	0	0	0	0	132	468	6	1	0
6	45	109	5	10	1621	0	0	1	0	0	0	199	10	13	0
7	1	0	0	5	2	11	0	0	0	0	33	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1	0	0	1	1	4	0	0	0	0	0	31	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	125	261	17	42	100	0	0	1	0	0	0	0	16	22	0
12	288	1998	53	591	182	341	0	33	0	2	2	0	168	121	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	7	24	0	27	2	2	0	0	0	0	0	24	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO: 2021 WITH TRANSPORT MITIGATION DEVELOPMENT CASE

FLOWSET: J1i

SCENARIO 2031 J1i - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	3	0	1	0	0	0	0	0	30	0	32	0
2	0	0	11	120	0	14	0	0	0	0	0	384	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	7	51	0	0	0	0	0	0	0	0	0	168	0	44	0
5	0	0	0	0	0	146	0	0	0	0	0	4	0	0	0
6	0	0	0	0	105	0	0	0	0	0	0	21	0	3	0
7	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
11	0	82	0	0	0	0	0	0	0	0	0	0	0	2	0
12	64	532	0	72	88	2	4	4	2	2	0	0	0	26	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	19	31	1	45	6	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	3	0	1	0	0	0	0	0	30	0	32	0
2	0	0	11	120	0	14	0	0	0	0	0	384	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	7	51	0	0	0	0	0	0	0	0	0	168	0	44	0
5	0	0	0	0	0	146	0	0	0	0	0	4	0	0	0
6	0	0	0	0	105	0	0	0	0	0	0	21	0	3	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
11	0	82	0	0	0	0	0	0	0	0	0	0	0	2	0
12	64	532	0	72	88	2	0	9	2	2	0	0	0	26	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	19	31	1	45	6	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	3	0	1	0	0	0	0	0	30	0	32	0
2	0	0	11	120	0	14	0	0	0	0	0	384	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	7	51	0	0	0	0	0	0	0	0	0	168	0	44	0
5	0	0	0	0	0	146	0	0	0	0	0	4	0	0	0
6	0	0	0	0	105	0	0	0	0	0	0	21	0	3	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	82	0	0	0	0	0	0	0	0	0	0	0	2	0
12	64	532	0	72	88	2	0	9	0	4	0	0	0	26	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	19	31	1	45	6	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	3	0	1	0	0	0	0	0	30	0	32	0
2	0	0	11	120	0	14	0	0	0	0	0	384	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	7	51	0	0	0	0	0	0	0	0	0	168	0	44	0
5	0	0	0	0	0	146	0	0	0	0	0	4	0	0	0
6	0	0	0	0	105	0	0	0	0	0	0	21	0	3	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	82	0	0	0	0	0	0	0	0	0	0	0	2	0
12	64	532	0	72	88	2	0	9	0	4	0	0	0	26	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	19	31	1	45	6	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO: 2021 WITH TRANSPORT MITIGATION DEVELOPMENT CASE

FLOWSET: J1i

SCENARIO 2031 J1i - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	667	0	41	0	0	0	0	5	325	1	25	0
2	99	0	31	1095	132	511	0	0	0	0	18	2015	149	45	0
3	8	44	0	17	1	2	0	0	0	0	1	36	1	0	0
4	865	781	73	6	0	0	1	1	2	2	3	1144	87	100	0
5	0	248	2	1	0	1007	1	1	1	1	86	484	0	0	0
6	22	211	10	14	955	0	2	2	1	1	0	237	0	3	0
7	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
8	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
11	62	476	16	35	138	0	2	2	1	1	0	0	0	7	0
12	196	2320	49	745	392	405	54	54	5	5	7	0	2	49	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	80	85	4	340	2	27	0	0	0	0	5	249	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

SCENARIO 2031 J1i - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	667	0	41	0	0	0	0	5	325	1	25	0
2	99	0	31	1095	132	511	0	0	0	0	18	2015	149	45	0
3	8	44	0	17	1	2	0	0	0	0	1	36	1	0	0
4	865	781	73	6	0	0	0	1	2	2	3	1144	87	100	0
5	0	248	2	1	0	1007	0	1	1	1	86	484	0	0	0
6	22	211	10	14	955	0	0	3	1	1	0	237	0	3	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
11	62	476	16	35	138	0	0	4	1	1	0	0	0	7	0
12	196	2320	49	745	392	405	0	108	5	5	7	0	2	49	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	80	85	4	340	2	27	0	0	0	0	5	249	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

SCENARIO 2031 J1i - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	667	0	41	0	0	0	1	5	325	1	25	0
2	99	0	31	1095	132	511	0	0	0	0	18	2015	149	45	0
3	8	44	0	17	1	2	0	0	0	0	1	36	1	0	0
4	865	781	73	6	0	0	0	1	0	3	3	1144	87	100	0
5	0	248	2	1	0	1007	0	1	0	1	86	484	0	0	0
6	22	211	10	14	955	0	0	3	0	1	0	237	0	3	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	62	476	16	35	138	0	0	4	0	3	0	0	0	7	0
12	196	2320	49	745	392	405	0	108	0	10	7	0	2	49	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	80	85	4	340	2	27	0	0	0	0	5	249	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

SCENARIO 2031 J1i - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	667	0	41	0	0	0	1	5	325	1	25	0
2	99	0	31	1095	132	511	0	0	0	0	18	2015	149	45	0
3	8	44	0	17	1	2	0	0	0	0	1	36	1	0	0
4	865	781	73	6	0	0	0	1	0	3	3	1144	87	100	0
5	0	248	2	1	0	1007	0	1	0	1	86	484	0	0	0
6	22	211	10	14	955	0	0	3	0	1	0	237	0	3	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	62	476	16	35	138	0	0	4	0	3	0	0	0	7	0
12	196	2320	49	745	392	405	0	108	0	10	7	0	2	49	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	80	85	4	340	2	27	0	0	0	0	5	249	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

SCENARIO: 2021 WITH TRANSPORT MITIGATION DEVELOPMENT CASE

FLOWSET: J1i

SCENARIO 2031 J1i - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	39	0	32	0
2	0	0	0	93	0	13	0	0	0	0	63	364	0	32	0
3	0	17	0	0	0	0	0	0	0	0	0	31	0	1	0
4	23	32	0	0	0	0	0	0	0	0	0	41	0	43	0
5	0	0	0	0	0	123	0	0	0	0	0	0	0	0	0
6	0	14	0	0	62	0	0	0	0	0	0	4	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12	66	394	14	76	0	75	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	24	30	1	44	5	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	39	0	32	0
2	0	0	0	93	0	13	0	0	0	0	63	364	0	32	0
3	0	17	0	0	0	0	0	0	0	0	0	31	0	1	0
4	23	32	0	0	0	0	0	0	0	0	0	41	0	43	0
5	0	0	0	0	0	123	0	0	0	0	0	0	0	0	0
6	0	14	0	0	62	0	0	0	0	0	0	4	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12	66	394	14	76	0	75	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	24	30	1	44	5	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	39	0	32	0
2	0	0	0	93	0	13	0	0	0	0	63	364	0	32	0
3	0	17	0	0	0	0	0	0	0	0	0	31	0	1	0
4	23	32	0	0	0	0	0	0	0	0	0	41	0	43	0
5	0	0	0	0	0	123	0	0	0	0	0	0	0	0	0
6	0	14	0	0	62	0	0	0	0	0	0	4	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12	66	394	14	76	0	75	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	24	30	1	44	5	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1i - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	39	0	32	0
2	0	0	0	93	0	13	0	0	0	0	63	364	0	32	0
3	0	17	0	0	0	0	0	0	0	0	0	31	0	1	0
4	23	32	0	0	0	0	0	0	0	0	0	41	0	43	0
5	0	0	0	0	0	123	0	0	0	0	0	0	0	0	0
6	0	14	0	0	62	0	0	0	0	0	0	4	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12	66	394	14	76	0	75	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	24	30	1	44	5	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171124 ADC-2021 Mit NSTM Flows
NSTM2 2021 I1 Circular Compliant Cordon Matrices - Adjusted v1

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data into:
1) Warm Up, Peak and Cool Down Matrices
2) 15 minute matrices within Warm Up, Peak and Cool Down periods.

Conversion based on observed turning counts, with factors to split the traffic appropriately.

SCENARIO:	2021 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1i

SCENARIO 2031 I1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	70	18	389	0	56	0	0	0	0	5	330	1	75	0
2	61	0	47	1182	67	171	0	0	0	0	10	2037	49	107	0
3	16	36	0	19	17	3	0	0	0	0	0	10	12	2	0
4	797	925	42	0	289	13	0	0	0	0	2	914	86	359	0
5	0	142	18	109	0	914	0	0	0	0	132	468	6	1	0
6	45	109	5	10	1621	0	0	1	0	0	0	199	10	13	0
7	1	0	0	5	2	11	0	0	0	0	33	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1	0	0	1	1	4	0	0	0	0	0	31	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	125	261	17	42	100	0	0	1	0	0	0	0	16	22	0
12	288	1998	53	591	182	341	0	33	0	2	2	0	168	121	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	7	24	0	27	2	2	0	0	0	0	0	24	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR =	0.690

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	48	13	268	0	39	0	0	0	0	4	227	1	52	0
2	42	0	33	816	46	118	0	0	0	0	7	1406	34	74	0
3	11	25	0	13	12	2	0	0	0	0	0	7	8	1	0
4	550	638	29	0	200	9	0	0	0	0	1	630	59	248	0
5	0	98	12	75	0	631	0	0	0	0	91	323	4	1	0
6	31	76	3	7	1119	0	0	1	0	0	0	137	7	9	0
7	1	0	0	3	1	7	0	0	0	0	23	8	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	21	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	86	180	12	29	69	0	0	1	0	0	0	0	11	15	0
12	199	1379	37	408	126	235	0	23	0	1	1	0	116	83	0
13	0	0	0	224	0	0	0	0	0	0	0	0	0	0	0
14	5	16	0	18	1	2	0	0	0	0	0	17	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0615-0630 FACTOR	0.191

VISSIM MATRIX - LIGHTS - WARM UP (0615-0630)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	9	2	51	0	7	0	0	0	0	1	43	0	10	0
2	8	0	6	156	9	23	0	0	0	0	1	269	6	14	0
3	2	5	0	3	2	0	0	0	0	0	0	1	2	0	0
4	105	122	6	0	38	2	0	0	0	0	0	120	11	47	0
5	0	19	2	14	0	121	0	0	0	0	17	62	1	0	0
6	6	14	1	1	214	0	0	0	0	0	0	26	1	2	0
7	0	0	0	1	0	1	0	0	0	0	4	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	34	2	6	13	0	0	0	0	0	0	0	2	3	0
12	38	263	7	78	24	45	0	4	0	0	0	0	22	16	0
13	0	0	0	43	0	0	0	0	0	0	0	0	0	0	0
14	1	3	0	4	0	0	0	0	0	0	0	3	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR	0.228

VISSIM MATRIX - LIGHTS - WARM UP (0630-0645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	11	3	61	0	9	0	0	0	0	1	52	0	12	0
2	10	0	7	186	11	27	0	0	0	0	2	321	8	17	0
3	3	6	0	3	3	1	0	0	0	0	0	2	2	0	0
4	125	146	7	0	46	2	0	0	0	0	0	144	14	56	0
5	0	22	3	17	0	144	0	0	0	0	21	74	1	0	0
6	7	17	1	2	255	0	0	0	0	0	0	31	2	2	0
7	0	0	0	1	0	2	0	0	0	0	5	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	20	41	3	7	16	0	0	0	0	0	0	0	3	3	0
12	45	314	8	93	29	54	0	5	0	0	0	0	26	19	0
13	0	0	0	51	0	0	0	0	0	0	0	0	0	0	0
14	1	4	0	4	0	0	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0645-0700 FACTOR	0.271

VISSIM MATRIX - LIGHTS - WARM UP (0645-0700)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	13	3	73	0	11	0	0	0	0	1	62	0	14	0
2	11	0	9	221	13	32	0	0	0	0	2	381	9	20	0
3	3	7	0	4	3	1	0	0	0	0	0	2	2	0	0
4	149	173	8	0	54	2	0	0	0	0	0	171	16	67	0
5	0	26	3	20	0	171	0	0	0	0	25	88	1	0	0
6	8	20	1	2	303	0	0	0	0	0	0	37	2	2	0
7	0	0	0	1	0	2	0	0	0	0	6	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	23	49	3	8	19	0	0	0	0	0	0	0	3	4	0
12	54	374	10	111	34	64	0	6	0	0	0	0	31	23	0
13	0	0	0	61	0	0	0	0	0	0	0	0	0	0	0
14	1	4	0	5	0	0	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0700-0715 FACTOR	0.310

VISSIM MATRIX - LIGHTS - WARM UP (0700-0730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	15	4	83	0	12	0	0	0	0	1	71	0	16	0
2	13	0	10	253	14	37	0	0	0	0	2	436	11	23	0
3	3	8	0	4	4	1	0	0	0	0	0	2	3	0	0
4	170	198	9	0	62	3	0	0	0	0	0	195	18	77	0
5	0	30	4	23	0	196	0	0	0	0	28	100	1	0	0
6	10	23	1	2	347	0	0	0	0	0	0	43	2	3	0
7	0	0	0	1	0	2	0	0	0	0	7	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	27	56	4	9	21	0	0	0	0	0	0	0	3	5	0
12	62	427	11	126	39	73	0	7	0	0	0	0	36	26	0
13	0	0	0	69	0	0	0	0	0	0	0	0	0	0	0
14	1	5	0	6	0	0	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	70	18	389	0	56	0	0	0	0	5	330	1	75	0
2	61	0	47	1182	67	171	0	0	0	0	10	2037	49	107	0
3	16	36	0	19	17	3	0	0	0	0	0	10	12	2	0
4	797	925	42	0	289	13	0	0	0	0	2	914	86	359	0
5	0	142	18	109	0	914	0	0	0	0	132	468	6	1	0
6	45	109	5	10	1621	0	0	1	0	0	0	199	10	13	0
7	1	0	0	5	2	11	0	0	0	0	33	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	1	0	0	1	1	4	0	0	0	0	0	31	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	125	261	17	42	100	0	0	1	0	0	0	0	16	22	0
12	288	1998	53	591	182	341	0	33	0	2	2	0	168	121	0
13	0	0	0	324	0	0	0	0	0	0	0	0	0	0	0
14	7	24	0	27	2	2	0	0	0	0	0	24	1	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0715-0730 FACTOR	0.237

VISSIM MATRIX - LIGHTS - PEAK (0715-0730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	17	4	92	0	13	0	0	0	0	1	78	0	18	0
2	14	0	11	280	16	40	0	0	0	0	2	483	12	25	0
3	4	8	0	5	4	1	0	0	0	0	0	2	3	0	0
4	189	219	10	0	69	3	0	0	0	0	0	217	20	85	0
5	0	34	4	26	0	217	0	0	0	0	31	111	1	0	0
6	11	26	1	2	384	0	0	0	0	0	0	47	2	3	0
7	0	0	0	1	0	3	0	0	0	0	8	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	30	62	4	10	24	0	0	0	0	0	0	0	4	5	0
12	68	474	13	140	43	81	0	8	0	0	0	0	40	29	0
13	0	0	0	77	0	0	0	0	0	0	0	0	0	0	0
14	2	6	0	6	0	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0730-0745 FACTOR	0.259

VISSIM MATRIX - LIGHTS - PEAK (0730-0745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	18	5	101	0	15	0	0	0	0	1	85	0	19	0
2	16	0	12	306	17	44	0	0	0	0	2	528	13	28	0
3	4	9	0	5	4	1	0	0	0	0	0	3	3	1	0
4	206	240	11	0	75	3	0	0	0	0	0	237	22	93	0
5	0	37	5	28	0	237	0	0	0	0	34	121	2	0	0
6	12	28	1	3	420	0	0	0	0	0	0	52	3	3	0
7	0	0	0	1	0	3	0	0	0	0	9	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	32	68	4	11	26	0	0	0	0	0	0	0	4	6	0
12	75	518	14	153	47	88	0	9	0	1	0	0	43	31	0
13	0	0	0	84	0	0	0	0	0	0	0	0	0	0	0
14	2	6	0	7	0	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0745-0800 FACTOR	0.261

VISSIM MATRIX - LIGHTS - PEAK (0745-0800)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	18	5	101	0	15	0	0	0	0	1	86	0	20	0
2	16	0	12	309	17	45	0	0	0	0	3	532	13	28	0
3	4	9	0	5	5	1	0	0	0	0	0	3	3	1	0
4	208	241	11	0	76	3	0	0	0	0	0	238	22	94	0
5	0	37	5	29	0	239	0	0	0	0	35	122	2	0	0
6	12	29	1	3	423	0	0	0	0	0	0	52	3	3	0
7	0	0	0	1	0	3	0	0	0	0	9	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	33	68	4	11	26	0	0	0	0	0	0	0	4	6	0
12	75	522	14	154	48	89	0	9	0	1	0	0	44	32	0
13	0	0	0	85	0	0	0	0	0	0	0	0	0	0	0
14	2	6	0	7	0	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR	0.243

VISSIM MATRIX - LIGHTS - PEAK (0800-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	17	4	94	0	14	0	0	0	0	1	80	0	18	0
2	15	0	12	287	16	42	0	0	0	0	2	495	12	26	0
3	4	9	0	5	4	1	0	0	0	0	0	2	3	0	0
4	194	225	10	0	70	3	0	0	0	0	0	222	21	87	0
5	0	34	4	27	0	222	0	0	0	0	32	114	1	0	0
6	11	27	1	2	394	0	0	0	0	0	0	48	3	3	0
7	0	0	0	1	0	3	0	0	0	0	8	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	30	63	4	10	24	0	0	0	0	0	0	0	4	5	0
12	70	486	13	144	44	83	0	8	0	0	0	0	41	29	0
13	0	0	0	79	0	0	0	0	0	0	0	0	0	0	0
14	2	6	0	6	0	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR =	0.459

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	32	8	178	0	26	0	0	0	0	2	151	0	34	0
2	28	0	22	543	31	78	0	0	0	0	4	935	23	49	0
3	7	16	0	9	8	1	0	0	0	0	0	4	5	1	0
4	366	425	19	0	133	6	0	0	0	0	1	419	40	165	0
5	0	65	8	50	0	420	0	0	0	0	61	215	3	0	0
6	21	50	2	5	744	0	0	0	0	0	0	91	5	6	0
7	0	0	0	2	1	5	0	0	0	0	15	5	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	1	2	0	0	0	0	0	14	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	57	120	8	19	46	0	0	0	0	0	0	0	7	10	0
12	132	917	24	271	84	157	0	15	0	1	1	0	77	56	0
13	0	0	0	149	0	0	0	0	0	0	0	0	0	0	0
14	3	11	0	12	1	1	0	0	0	0	0	11	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0815-0830 FACTOR	0.502

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0830)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	4	90	0	13	0	0	0	0	1	76	0	17	0
2	14	0	11	272	15	39	0	0	0	0	2	469	11	25	0
3	4	8	0	4	4	1	0	0	0	0	0	2	3	0	0
4	184	213	10	0	67	3	0	0	0	0	0	211	20	83	0
5	0	33	4	25	0	211	0	0	0	0	30	108	1	0	0
6	10	25	1	2	374	0	0	0	0	0	0	46	2	3	0
7	0	0	0	1	0	2	0	0	0	0	8	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	29	60	4	10	23	0	0	0	0	0	0	0	4	5	0
12	66	460	12	136	42	79	0	8	0	0	0	0	39	28	0
13	0	0	0	75	0	0	0	0	0	0	0	0	0	0	0
14	2	5	0	6	0	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0830-0845 FACTOR	0.498

VISSIM MATRIX - LIGHTS - COOL DOWN (0830-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	4	89	0	13	0	0	0	0	1	75	0	17	0
2	14	0	11	270	15	39	0	0	0	0	2	466	11	24	0
3	4	8	0	4	4	1	0	0	0	0	0	2	3	0	0
4	182	211	10	0	66	3	0	0	0	0	0	209	20	82	0
5	0	32	4	25	0	209	0	0	0	0	30	107	1	0	0
6	10	25	1	2	371	0	0	0	0	0	0	45	2	3	0
7	0	0	0	1	0	2	0	0	0	0	8	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	29	60	4	10	23	0	0	0	0	0	0	0	4	5	0
12	66	457	12	135	42	78	0	8	0	0	0	0	38	28	0
13	0	0	0	74	0	0	0	0	0	0	0	0	0	0	0
14	2	5	0	6	0	0	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171124 ADC-2021 Mit NSTM Flows
NSTM2 2021 I1 Circular Compliant Cordon Matrices - Adjusted v1

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data into:
1) Warm Up, Peak and Cool Down Matrices
2) 15 minute matrices within Warm Up, Peak and Cool Down periods.

Conversion based on observed turning counts, with factors to split the traffic appropriately.

SCENARIO: 2021 WITH TRANSPORT MITIGATION DEVELOPMENT CASE

FLOWSET: J1i

SCENARIO 2031 I1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	3	0	1	0	0	0	0	0	30	0	32	0
2	0	0	11	120	0	14	0	0	0	0	0	384	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	7	51	0	0	0	0	0	0	0	0	0	168	0	44	0
5	0	0	0	0	0	146	0	0	0	0	0	4	0	0	0
6	0	0	0	0	105	0	0	0	0	0	0	21	0	3	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	82	0	0	0	0	0	0	0	0	0	0	0	2	0
12	64	532	0	72	88	2	0	9	0	4	0	0	0	26	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	19	31	1	45	6	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR = 0.690

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	21	0	22	0
2	0	0	7	83	0	10	0	0	0	0	0	265	0	21	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	5	35	0	0	0	0	0	0	0	0	0	116	0	30	0
5	0	0	0	0	0	101	0	0	0	0	0	2	0	0	0
6	0	0	0	0	73	0	0	0	0	0	0	15	0	2	0
7	0	0	0	0	0	1	0	0	0	0	11	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	57	0	0	0	0	0	0	0	0	0	0	0	1	0
12	44	367	0	50	61	1	0	6	0	3	0	0	0	18	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	13	22	0	31	4	3	0	0	0	0	0	17	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0615-0630 FACTOR 0.191

VISSIM MATRIX - LIGHTS - WARM UP (0615-0630)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	4	0	4	0
2	0	0	1	16	0	2	0	0	0	0	0	51	0	4	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	7	0	0	0	0	0	0	0	0	0	22	0	6	0
5	0	0	0	0	0	19	0	0	0	0	0	0	0	0	0
6	0	0	0	0	14	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	70	0	9	12	0	0	1	0	0	0	0	0	3	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	2	4	0	6	1	1	0	0	0	0	0	3	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR 0.228

VISSIM MATRIX - LIGHTS - WARM UP (0630-0645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	5	0	5	0
2	0	0	2	19	0	2	0	0	0	0	0	60	0	5	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	8	0	0	0	0	0	0	0	0	0	26	0	7	0
5	0	0	0	0	0	23	0	0	0	0	0	1	0	0	0
6	0	0	0	0	17	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	13	0	0	0	0	0	0	0	0	0	0	0	0	0
12	10	84	0	11	14	0	0	1	0	1	0	0	0	4	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	3	5	0	7	1	1	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0645-0700 FACTOR 0.271

VISSIM MATRIX - LIGHTS - WARM UP (0645-0700)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	6	0	6	0
2	0	0	2	22	0	3	0	0	0	0	0	72	0	6	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	10	0	0	0	0	0	0	0	0	0	31	0	8	0
5	0	0	0	0	0	27	0	0	0	0	0	1	0	0	0
6	0	0	0	0	20	0	0	0	0	0	0	4	0	1	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0
12	12	99	0	13	16	0	0	2	0	1	0	0	0	5	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	6	0	8	1	1	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0700-0715 FACTOR 0.310

VISSIM MATRIX - LIGHTS - WARM UP (0700-0730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	7	0	7	0
2	0	0	2	26	0	3	0	0	0	0	0	82	0	6	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	11	0	0	0	0	0	0	0	0	0	36	0	9	0
5	0	0	0	0	0	31	0	0	0	0	0	1	0	0	0
6	0	0	0	0	23	0	0	0	0	0	0	5	0	1	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	18	0	0	0	0	0	0	0	0	0	0	0	0	0
12	14	114	0	15	19	0	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	7	0	10	1	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	1	0	3	0	1	0	0	0	0	0	30	0	32	0
2	0	0	11	120	0	14	0	0	0	0	0	384	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	7	51	0	0	0	0	0	0	0	0	0	168	0	44	0
5	0	0	0	0	0	146	0	0	0	0	0	4	0	0	0
6	0	0	0	0	105	0	0	0	0	0	0	21	0	3	0
7	0	0	0	0	0	1	0	0	0	0	16	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	82	0	0	0	0	0	0	0	0	0	0	0	2	0
12	64	532	0	72	88	2	0	9	0	4	0	0	0	26	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	19	31	1	45	6	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0715-0730 FACTOR 0.237

VISSIM MATRIX - LIGHTS - PEAK (0715-0730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	7	0	8	0
2	0	0	3	28	0	3	0	0	0	0	0	91	0	7	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	12	0	0	0	0	0	0	0	0	0	40	0	10	0
5	0	0	0	0	0	35	0	0	0	0	0	1	0	0	0
6	0	0	0	0	25	0	0	0	0	0	0	5	0	1	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0
12	15	126	0	17	21	0	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	7	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0730-0745 FACTOR 0.259

VISSIM MATRIX - LIGHTS - PEAK (0730-0745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	8	0
2	0	0	3	31	0	4	0	0	0	0	0	99	0	8	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	13	0	0	0	0	0	0	0	0	0	44	0	11	0
5	0	0	0	0	0	38	0	0	0	0	0	1	0	0	0
6	0	0	0	0	27	0	0	0	0	0	0	5	0	1	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	21	0	0	0	0	0	0	0	0	0	0	0	1	0
12	17	138	0	19	23	1	0	2	0	1	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	8	0	12	2	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0745-0800 FACTOR 0.261

VISSIM MATRIX - LIGHTS - PEAK (0745-0800)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	8	0
2	0	0	3	31	0	4	0	0	0	0	0	100	0	8	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	13	0	0	0	0	0	0	0	0	0	44	0	11	0
5	0	0	0	0	0	38	0	0	0	0	0	1	0	0	0
6	0	0	0	0	28	0	0	0	0	0	0	6	0	1	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	21	0	0	0	0	0	0	0	0	0	0	0	1	0
12	17	139	0	19	23	1	0	2	0	1	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	8	0	12	2	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR 0.243

VISSIM MATRIX - LIGHTS - PEAK (0800-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	7	0	8	0
2	0	0	3	29	0	3	0	0	0	0	0	93	0	7	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	12	0	0	0	0	0	0	0	0	0	41	0	11	0
5	0	0	0	0	0	36	0	0	0	0	0	1	0	0	0
6	0	0	0	0	26	0	0	0	0	0	0	5	0	1	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	20	0	0	0	0	0	0	0	0	0	0	0	0	0
12	16	129	0	18	21	1	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	8	0	11	2	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR = 0.459

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	14	0	15	0
2	0	0	5	55	0	7	0	0	0	0	0	176	0	14	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	24	0	0	0	0	0	0	0	0	0	77	0	20	0
5	0	0	0	0	0	67	0	0	0	0	0	2	0	0	0
6	0	0	0	0	48	0	0	0	0	0	0	10	0	1	0
7	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	38	0	0	0	0	0	0	0	0	0	0	0	1	0
12	29	244	0	33	40	1	0	4	0	2	0	0	0	12	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	9	14	0	21	3	2	0	0	0	0	0	11	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0815-0830 FACTOR 0.502

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0830)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	7	0	7	0
2	0	0	3	28	0	3	0	0	0	0	0	88	0	7	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	12	0	0	0	0	0	0	0	0	0	39	0	10	0
5	0	0	0	0	0	34	0	0	0	0	0	1	0	0	0
6	0	0	0	0	24	0	0	0	0	0	0	5	0	1	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0
12	15	123	0	17	20	0	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	7	0	10	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0830-0845 FACTOR 0.498

VISSIM MATRIX - LIGHTS - COOL DOWN (0830-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	7	0	7	0
2	0	0	2	27	0	3	0	0	0	0	0	88	0	7	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	12	0	0	0	0	0	0	0	0	0	38	0	10	0
5	0	0	0	0	0	33	0	0	0	0	0	1	0	0	0
6	0	0	0	0	24	0	0	0	0	0	0	5	0	1	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	19	0	0	0	0	0	0	0	0	0	0	0	0	0
12	15	122	0	16	20	0	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	7	0	10	1	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171124 ADC-2021 Mit NSTM Flows
NSTM2 2021 I1 Circular Compliant Cordon Matrices - Adjusted v1

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data into:
1) Warm Up, Peak and Cool Down Matrices
2) 15 minute matrices within Warm Up, Peak and Cool Down periods.

Conversion based on observed turning counts, with factors to split the traffic appropriately.

SCENARIO: 2021 WITH TRANSPORT MITIGATION DEVELOPMENT CASE

FLOWSET: J1i

SCENARIO 2031 I1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	667	0	41	0	0	0	1	5	325	1	25	0
2	99	0	31	1095	132	511	0	0	0	0	18	2015	149	45	0
3	8	44	0	17	1	2	0	0	0	0	1	36	1	0	0
4	865	781	73	6	0	0	0	1	0	3	3	1144	87	100	0
5	0	248	2	1	0	1007	0	1	0	1	86	484	0	0	0
6	22	211	10	14	955	0	0	3	0	1	0	237	0	3	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	62	476	16	35	138	0	0	4	0	3	0	0	0	7	0
12	196	2320	49	745	392	405	0	108	0	10	7	0	2	49	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	80	85	4	340	2	27	0	0	0	0	5	249	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

WARM UP FACTOR = 0.889

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	38	18	593	0	37	0	0	0	0	4	289	1	22	0
2	88	0	27	973	117	454	0	0	0	0	16	1791	133	40	0
3	8	39	0	15	1	2	0	0	0	0	1	32	1	0	0
4	769	694	65	6	0	0	0	1	0	3	3	1017	77	89	0
5	0	221	1	0	0	896	0	1	0	1	76	431	0	0	0
6	19	187	9	13	849	0	0	3	0	1	0	211	0	3	0
7	0	0	0	2	1	1	0	0	0	0	9	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	14	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	55	423	14	31	123	0	0	3	0	3	0	0	0	6	0
12	174	2062	44	662	349	360	0	96	0	9	6	0	2	44	0
13	0	0	0	143	0	0	0	0	0	0	0	0	0	0	0
14	71	75	3	302	2	24	0	0	0	0	4	221	8	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

1545-1600 FACTOR 0.227

VISSIM MATRIX - LIGHTS - WARM UP (1545-1600)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	9	4	135	0	8	0	0	0	0	1	66	0	5	0
2	20	0	6	221	27	103	0	0	0	0	4	407	30	9	0
3	2	9	0	3	0	0	0	0	0	0	0	7	0	0	0
4	175	158	15	1	0	0	0	0	0	1	1	231	18	20	0
5	0	50	0	0	0	203	0	0	0	0	17	98	0	0	0
6	4	42	2	3	193	0	0	1	0	0	0	48	0	1	0
7	0	0	0	1	0	0	0	0	0	0	2	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	13	96	3	7	28	0	0	1	0	1	0	0	0	1	0
12	39	468	10	150	79	82	0	22	0	2	1	0	0	10	0
13	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0
14	16	17	1	69	0	5	0	0	0	0	1	50	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1600-1615 FACTOR 0.242

VISSIM MATRIX - LIGHTS - WARM UP (1600-1615)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	9	4	144	0	9	0	0	0	0	1	70	0	5	0
2	21	0	7	236	28	110	0	0	0	0	4	433	32	10	0
3	2	10	0	4	0	0	0	0	0	0	0	8	0	0	0
4	186	168	16	1	0	0	0	0	0	1	1	246	19	22	0
5	0	53	0	0	0	217	0	0	0	0	19	104	0	0	0
6	5	45	2	3	205	0	0	1	0	0	0	51	0	1	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	13	102	3	7	30	0	0	1	0	1	0	0	0	2	0
12	42	499	11	160	84	87	0	23	0	2	2	0	0	11	0
13	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0
14	17	18	1	73	0	6	0	0	0	0	1	54	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1615-1630 FACTOR 0.265

VISSIM MATRIX - LIGHTS - WARM UP (1615-1630)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	10	5	157	0	10	0	0	0	0	1	77	0	6	0
2	23	0	7	258	31	120	0	0	0	0	4	475	35	11	0
3	2	10	0	4	0	0	0	0	0	0	0	8	0	0	0
4	204	184	17	1	0	0	0	0	0	1	1	270	21	24	0
5	0	58	0	0	0	237	0	0	0	0	20	114	0	0	0
6	5	50	2	3	225	0	0	1	0	0	0	56	0	1	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	15	112	4	8	32	0	0	1	0	1	0	0	0	2	0
12	46	547	12	175	92	96	0	25	0	2	2	0	0	12	0
13	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0
14	19	20	1	80	0	6	0	0	0	0	1	59	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1630-1645 FACTOR 0.266

VISSIM MATRIX - LIGHTS - WARM UP (1630-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	10	5	158	0	10	0	0	0	0	1	77	0	6	0
2	23	0	7	259	31	121	0	0	0	0	4	476	35	11	0
3	2	10	0	4	0	0	0	0	0	0	0	8	0	0	0
4	205	185	17	1	0	0	0	0	0	1	1	271	21	24	0
5	0	59	0	0	0	238	0	0	0	0	20	115	0	0	0
6	5	50	2	3	226	0	0	1	0	0	0	56	0	1	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	15	112	4	8	33	0	0	1	0	1	0	0	0	2	0
12	46	549	12	176	93	96	0	26	0	2	2	0	0	12	0
13	0	0	0	38	0	0	0	0	0	0	0	0	0	0	0
14	19	20	1	80	0	6	0	0	0	0	1	59	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (1645-1745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	43	20	667	0	41	0	0	0	1	5	325	1	25	0
2	99	0	31	1095	132	511	0	0	0	0	18	2015	149	45	0
3	8	44	0	17	1	2	0	0	0	0	1	36	1	0	0
4	865	781	73	6	0	0	0	1	0	3	3	1144	87	100	0
5	0	248	2	1	0	1007	0	1	0	1	86	484	0	0	0
6	22	211	10	14	955	0	0	3	0	1	0	237	0	3	0
7	0	0	0	3	1	1	0	0	0	0	10	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	62	476	16	35	138	0	0	4	0	3	0	0	0	7	0
12	196	2320	49	745	392	405	0	108	0	10	7	0	2	49	0
13	0	0	0	161	0	0	0	0	0	0	0	0	0	0	0
14	80	85	4	340	2	27	0	0	0	0	5	249	9	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

1645-1700 FACTOR 0.248

VISSIM MATRIX - LIGHTS - PEAK (1645-1700)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	11	5	165	0	10	0	0	0	0	1	81	0	6	0
2	25	0	8	272	33	127	0	0	0	0	4	500	37	11	0
3	2	11	0	4	0	0	0	0	0	0	0	9	0	0	0
4	215	194	18	2	0	0	0	0	0	1	1	284	22	25	0
5	0	62	0	0	0	250	0	0	0	0	21	120	0	0	0
6	5	52	3	4	237	0	0	1	0	0	0	59	0	1	0
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	15	118	4	9	34	0	0	1	0	1	0	0	0	2	0
12	48	575	12	185	97	101	0	27	0	3	2	0	0	12	0
13	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0
14	20	21	1	84	0	7	0	0	0	0	1	62	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1700-1715 FACTOR 0.248

VISSIM MATRIX - LIGHTS - PEAK (1700-1715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	11	5	165	0	10	0	0	0	0	1	81	0	6	0
2	25	0	8	272	33	127	0	0	0	0	4	500	37	11	0
3	2	11	0	4	0	0	0	0	0	0	0	9	0	0	0
4	215	194	18	2	0	0	0	0	0	1	1	284	22	25	0
5	0	62	0	0	0	250	0	0	0	0	21	120	0	0	0
6	5	52	3	4	237	0	0	1	0	0	0	59	0	1	0
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	15	118	4	9	34	0	0	1	0	1	0	0	0	2	0
12	48	575	12	185	97	101	0	27	0	3	2	0	0	12	0
13	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0
14	20	21	1	84	0	7	0	0	0	0	1	62	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1715-1730 FACTOR 0.251

VISSIM MATRIX - LIGHTS - PEAK (1715-1730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	11	5	167	0	10	0	0	0	0	1	82	0	6	0
2	25	0	8	275	33	128	0	0	0	0	4	506	37	11	0
3	2	11	0	4	0	0	0	0	0	0	0	9	0	0	0
4	217	196	18	2	0	0	0	0	0	1	1	287	22	25	0
5	0	62	0	0	0	253	0	0	0	0	22	122	0	0	0
6	5	53	3	4	240	0	0	1	0	0	0	60	0	1	0
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	119	4	9	35	0	0	1	0	1	0	0	0	2	0
12	49	582	12	187	98	102	0	27	0	3	2	0	0	12	0
13	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0
14	20	21	1	85	0	7	0	0	0	0	1	62	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1730-1745 FACTOR 0.253

VISSIM MATRIX - LIGHTS - PEAK (1730-1745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	11	5	169	0	10	0	0	0	0	1	82	0	6	0
2	25	0	8	277	33	129	0	0	0	0	5	510	38	11	0
3	2	11	0	4	0	0	0	0	0	0	0	9	0	0	0
4	219	198	19	2	0	0	0	0	0	1	1	290	22	25	0
5	0	63	0	0	0	255	0	0	0	0	22	123	0	0	0
6	5	53	3	4	242	0	0	1	0	0	0	60	0	1	0
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	120	4	9	35	0	0	1	0	1	0	0	0	2	0
12	49	587	12	188	99	103	0	27	0	3	2	0	0	12	0
13	0	0	0	41	0	0	0	0	0	0	0	0	0	0	0
14	20	21	1	86	0	7	0	0	0	0	1	63	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR = 0.470

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	20	9	314	0	19	0	0	0	0	2	153	0	12	0
2	47	0	15	515	62	240	0	0	0	0	8	947	70	21	0
3	4	21	0	8	0	1	0	0	0	0	0	17	1	0	0
4	407	367	35	3	0	0	0	1	0	2	1	538	41	47	0
5	0	117	1	0	0	473	0	1	0	1	40	228	0	0	0
6	10	99	5	7	449	0	0	1	0	1	0	111	0	1	0
7	0	0	0	1	0	0	0	0	0	0	5	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	29	224	7	16	65	0	0	2	0	1	0	0	0	3	0
12	92	1090	23	350	184	191	0	51	0	5	3	0	1	23	0
13	0	0	0	76	0	0	0	0	0	0	0	0	0	0	0
14	38	40	2	160	1	13	0	0	0	0	2	117	4	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1745-1800 FACTOR 0.513

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1800)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	10	5	161	0	10	0	0	0	0	1	78	0	6	0
2	24	0	7	264	32	123	0	0	0	0	4	486	36	11	0
3	2	11	0	4	0	0	0	0	0	0	0	9	0	0	0
4	209	188	18	2	0	0	0	0	0	1	1	276	21	24	0
5	0	60	0	0	0	243	0	0	0	0	21	117	0	0	0
6	5	51	2	3	230	0	0	1	0	0	0	57	0	1	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	15	115	4	8	33	0	0	1	0	1	0	0	0	2	0
12	47	559	12	180	95	98	0	26	0	2	2	0	0	12	0
13	0	0	0	39	0	0	0	0	0	0	0	0	0	0	0
14	19	20	1	82	0	6	0	0	0	0	1	60	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1800-1815 FACTOR 0.487

VISSIM MATRIX - LIGHTS - COOL DOWN (1800-1815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	10	5	153	0	9	0	0	0	0	1	74	0	6	0
2	23	0	7	251	30	117	0	0	0	0	4	461	34	10	0
3	2	10	0	4	0	0	0	0	0	0	0	8	0	0	0
4	198	179	17	1	0	0	0	0	0	1	1	262	20	23	0
5	0	57	0	0	0	231	0	0	0	0	20	111	0	0	0
6	5	48	2	3	219	0	0	1	0	0	0	54	0	1	0
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	14	109	4	8	32	0	0	1	0	1	0	0	0	2	0
12	45	531	11	170	90	93	0	25	0	2	2	0	0	11	0
13	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0
14	18	19	1	78	0	6	0	0	0	0	1	57	2	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171124 ADC-2021 Mit NSTM Flows
NSTM2 2021 I1 Circular Compliant Cordon Matrices - Adjusted v1

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data into:
1) Warm Up, Peak and Cool Down Matrices
2) 15 minute matrices within Warm Up, Peak and Cool Down periods.

Conversion based on observed turning counts, with factors to split the traffic appropriately.

SCENARIO: 2021 WITH TRANSPORT MITIGATION DEVELOPMENT CASE

FLOWSET: J1i

SCENARIO 2031 I1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	39	0	32	0
2	0	0	0	93	0	13	0	0	0	0	63	364	0	32	0
3	0	17	0	0	0	0	0	0	0	0	0	31	0	1	0
4	23	32	0	0	0	0	0	0	0	0	0	41	0	43	0
5	0	0	0	0	0	123	0	0	0	0	0	0	0	0	0
6	0	14	0	0	62	0	0	0	0	0	0	4	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12	66	394	14	76	0	75	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	24	30	1	44	5	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR = 0.889

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	34	0	28	0
2	0	0	0	83	0	12	0	0	0	0	56	323	0	28	0
3	0	15	0	0	0	0	0	0	0	0	0	28	0	1	0
4	21	29	0	0	0	0	0	0	0	0	0	36	0	38	0
5	0	0	0	0	0	110	0	0	0	0	0	0	0	0	0
6	0	12	0	0	55	0	0	0	0	0	0	4	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12	58	350	13	67	0	67	0	0	0	0	0	0	0	24	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	21	26	1	39	4	4	0	0	0	0	0	21	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (1645-1745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	39	0	32	0
2	0	0	0	93	0	13	0	0	0	0	63	364	0	32	0
3	0	17	0	0	0	0	0	0	0	0	0	31	0	1	0
4	23	32	0	0	0	0	0	0	0	0	0	41	0	43	0
5	0	0	0	0	0	123	0	0	0	0	0	0	0	0	0
6	0	14	0	0	62	0	0	0	0	0	0	4	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12	66	394	14	76	0	75	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	24	30	1	44	5	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR = 0.470

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	18	0	15	0
2	0	0	0	44	0	6	0	0	0	0	30	171	0	15	0
3	0	8	0	0	0	0	0	0	0	0	0	15	0	0	0
4	11	15	0	0	0	0	0	0	0	0	0	19	0	20	0
5	0	0	0	0	0	58	0	0	0	0	0	0	0	0	0
6	0	7	0	0	29	0	0	0	0	0	0	2	0	1	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
12	31	185	7	36	0	35	0	0	0	0	0	0	0	13	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	11	14	0	21	2	2	0	0	0	0	0	11	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1545-1600 FACTOR 0.227

VISSIM MATRIX - LIGHTS - WARM UP (1545-1600)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	6	0
2	0	0	0	19	0	3	0	0	0	0	13	73	0	6	0
3	0	4	0	0	0	0	0	0	0	0	0	6	0	0	0
4	5	7	0	0	0	0	0	0	0	0	0	8	0	9	0
5	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0
6	0	3	0	0	13	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	79	3	15	0	15	0	0	0	0	0	0	0	5	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	6	0	9	1	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1645-1700 FACTOR 0.248

VISSIM MATRIX - LIGHTS - PEAK (1645-1700)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	8	0
2	0	0	0	23	0	3	0	0	0	0	16	90	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	6	8	0	0	0	0	0	0	0	0	0	10	0	11	0
5	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0
6	0	3	0	0	15	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	16	98	4	19	0	19	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	7	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1745-1800 FACTOR 0.513

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1800)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	8	0
2	0	0	0	23	0	3	0	0	0	0	15	88	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	6	8	0	0	0	0	0	0	0	0	0	10	0	10	0
5	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
6	0	3	0	0	15	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	16	95	3	18	0	18	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	7	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1600-1615 FACTOR 0.242

VISSIM MATRIX - LIGHTS - WARM UP (1600-1615)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	7	0
2	0	0	0	20	0	3	0	0	0	0	14	78	0	7	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	5	7	0	0	0	0	0	0	0	0	0	9	0	9	0
5	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0
6	0	3	0	0	13	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	14	85	3	16	0	16	0	0	0	0	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	6	0	9	1	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1700-1715 FACTOR 0.248

VISSIM MATRIX - LIGHTS - PEAK (1700-1715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	8	0
2	0	0	0	23	0	3	0	0	0	0	16	90	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	6	8	0	0	0	0	0	0	0	0	0	10	0	11	0
5	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0
6	0	3	0	0	15	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	16	98	4	19	0	19	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	7	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1800-1815 FACTOR 0.487

VISSIM MATRIX - LIGHTS - COOL DOWN (1800-1815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	7	0
2	0	0	0	21	0	3	0	0	0	0	14	83	0	7	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	5	7	0	0	0	0	0	0	0	0	0	9	0	10	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	3	0	0	14	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	15	90	3	17	0	17	0	0	0	0	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	7	0	10	1	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1615-1630 FACTOR 0.265

VISSIM MATRIX - LIGHTS - WARM UP (1615-1630)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	8	0
2	0	0	0	22	0	3	0	0	0	0	15	86	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	5	8	0	0	0	0	0	0	0	0	0	10	0	10	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	3	0	0	15	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	15	93	3	18	0	18	0	0	0	0	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	7	0	10	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1715-1730 FACTOR 0.251

VISSIM MATRIX - LIGHTS - PEAK (1715-1730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	8	0
2	0	0	0	23	0	3	0	0	0	0	16	91	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	6	8	0	0	0	0	0	0	0	0	0	10	0	11	0
5	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0
6	0	4	0	0	16	0	0	0	0	0	0	1	0	1	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
12	16	99	4	19	0	19	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	7	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1630-1645 FACTOR 0.266

VISSIM MATRIX - LIGHTS - WARM UP (1630-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	8	0
2	0	0	0	22	0	3	0	0	0	0	15	86	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	6	8	0	0	0	0	0	0	0	0	0	10	0	10	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	3	0	0	15	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	16	93	3	18	0	18	0	0	0	0	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	7	0	10	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1730-1745 FACTOR 0.253

VISSIM MATRIX - LIGHTS - PEAK (1730-1745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	8	0
2	0	0	0	24	0	3	0	0	0	0	16	92	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	6	8	0	0	0	0	0	0	0	0	0	10	0	11	0
5	0	0	0	0	0	31	0	0	0	0	0	0	0	0	0
6	0	4	0	0	16	0	0	0	0	0	0	1	0	1	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
12	17	100	4	19	0	19	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	8	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MULTIMODAL

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02 COMMS\Received\170808 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v4

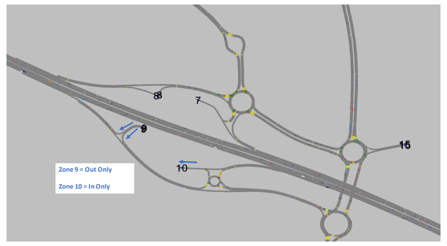
Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data to account for M1 J15a Services.

Current VISSIM model has two xones for northbound access and two zones for southbound access.

NSTM data provides flows to both of these zones, so amended the matrices to ensure 'IN' and 'OUT' traffic was correctly assigned.



SCENARIO:	2031 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	D1

SCENARIO 2031 D1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	10	391	0	6	0	0	0	0	3	224	0	0	1
2	145	0	66	1236	271	188	0	0	0	0	13	1904	118	0	2
3	4	20	0	18	5	1	0	0	0	0	0	11	5	0	0
4	664	902	40	10	129	9	0	0	0	0	10	1251	72	0	5
5	0	61	10	211	0	892	0	0	0	0	232	349	7	0	7
6	38	249	9	47	1147	0	1	1	0	0	1	216	8	0	49
7	0	0	0	3	1	2	0	0	0	0	14	12	0	0	0
8	0	0	0	3	1	2	0	0	0	0	14	12	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
10	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
11	74	503	28	107	74	0	1	1	0	0	0	0	35	0	8
12	266	2162	55	687	358	433	16	16	1	1	4	0	166	0	14
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

SCENARIO 2031 D1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	10	391	0	6	0	0	0	0	3	224	0	0	1
2	145	0	66	1236	271	188	0	0	0	0	13	1904	118	0	2
3	4	20	0	18	5	1	0	0	0	0	0	11	5	0	0
4	664	902	40	10	129	9	0	1	0	0	10	1251	72	0	5
5	0	61	10	211	0	892	0	0	0	0	232	349	7	0	7
6	38	249	9	47	1147	0	0	2	0	0	1	216	8	0	49
7	1	0	0	7	1	4	0	0	0	0	28	24	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
10	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
11	74	503	28	107	74	0	0	2	0	0	0	0	35	0	8
12	266	2162	55	687	358	433	0	31	1	1	4	0	166	0	14
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

SCENARIO 2031 D1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	10	391	0	6	0	0	0	0	3	224	0	0	1
2	145	0	66	1236	271	188	0	0	0	0	13	1904	118	0	2
3	4	20	0	18	5	1	0	0	0	0	0	11	5	0	0
4	664	902	40	10	129	9	0	1	0	0	10	1251	72	0	5
5	0	61	10	211	0	892	0	0	0	0	232	349	7	0	7
6	38	249	9	47	1147	0	0	2	0	0	1	216	8	0	49
7	1	0	0	7	1	4	0	0	0	0	28	24	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	35	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	74	503	28	107	74	0	0	2	0	0	0	0	35	0	8
12	266	2162	55	687	358	433	0	31	0	2	4	0	166	0	14
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

SCENARIO 2031 D1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	10	391	0	6	0	0	0	0	3	224	0	0	1
2	145	0	66	1236	271	188	0	0	0	0	13	1904	118	0	2
3	4	20	0	18	5	1	0	0	0	0	0	11	5	0	0
4	664	902	40	10	129	9	0	1	0	0	10	1251	72	0	5
5	0	61	10	211	0	892	0	0	0	0	232	349	7	0	7
6	38	249	9	47	1147	0	0	2	0	0	1	216	8	0	49
7	1	0	0	7	1	4	0	0	0	0	28	24	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	35	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	74	503	28	107	74	0	0	2	0	0	0	0	35	0	8
12	266	2162	55	687	358	433	0	31	0	2	4	0	166	0	14
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

SCENARIO:	2031 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	D1

SCENARIO 2031 D1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	38	0	0	0
2	3	0	10	112	0	20	0	0	0	0	1	402	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	11	43	0	0	0	0	0	0	0	0	0	228	0	0	0
5	0	0	0	0	0	117	0	0	0	0	2	5	0	0	0
6	0	2	0	0	97	0	0	0	0	0	0	14	0	0	0
7	0	0	0	0	0	1	0	0	0	0	8	0	0	0	0
8	0	0	0	0	0	1	0	0	0	0	8	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	590	4	79	92	6	5	5	2	2	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 D1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	38	0	0	0
2	3	0	10	112	0	20	0	0	0	0	1	402	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	11	43	0	0	0	0	0	0	0	0	0	228	0	0	0
5	0	0	0	0	0	117	0	0	0	0	2	5	0	0	0
6	0	2	0	0	97	0	0	0	0	0	0	14	0	0	0
7	0	0	0	0	0	2	0	0	0	0	16	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	590	4	79	92	6	0	9	2	2	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 D1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	38	0	0	0
2	3	0	10	112	0	20	0	0	0	0	1	402	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	11	43	0	0	0	0	0	0	0	0	0	228	0	0	0
5	0	0	0	0	0	117	0	0	0	0	2	5	0	0	0
6	0	2	0	0	97	0	0	0	0	0	0	14	0	0	0
7	0	0	0	0	0	2	0	0	0	0	16	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	590	4	79	92	6	0	9	0	4	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 D1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	38	0	0	0
2	3	0	10	112	0	20	0	0	0	0	1	402	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	11	43	0	0	0	0	0	0	0	0	0	228	0	0	0
5	0	0	0	0	0	117	0	0	0	0	2	5	0	0	0
6	0	2	0	0	97	0	0	0	0	0	0	14	0	0	0
7	0	0	0	0	0	2	0	0	0	0	16	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	590	4	79	92	6	0	9	0	4	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO:	2031 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	D1

SCENARIO 2031 D1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	5	587	0	10	0	0	0	0	1	177	0	0	0
2	91	0	54	1017	116	398	0	0	0	0	8	2587	87	0	0
3	13	86	0	25	1	1	0	0	0	0	0	13	2	0	0
4	902	940	89	36	80	1	0	0	1	1	0	1181	133	0	0
5	0	295	1	10	0	975	0	0	0	0	161	322	0	0	1
6	17	188	11	33	800	0	2	2	0	0	0	216	1	0	5
7	0	0	0	2	0	1	0	0	0	0	5	6	0	0	0
8	0	0	0	2	0	1	0	0	0	0	5	6	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	32	369	17	152	156	0	3	3	1	1	0	0	2	0	2
12	109	2711	22	1001	459	282	54	54	8	8	18	0	4	0	2
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	13	6	30	0	0	0	0	12	15	0	0	0

SCENARIO 2031 D1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	5	587	0	10	0	0	0	0	1	177	0	0	0
2	91	0	54	1017	116	398	0	0	0	0	8	2587	87	0	0
3	13	86	0	25	1	1	0	0	0	0	0	13	2	0	0
4	902	940	89	36	80	1	0	0	1	1	0	1181	133	0	0
5	0	295	1	10	0	975	0	1	0	0	161	322	0	0	1
6	17	188	11	33	800	0	0	4	0	0	0	216	1	0	5
7	0	0	0	3	1	2	0	0	0	0	11	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	32	369	17	152	156	0	0	5	1	1	0	0	2	0	2
12	109	2711	22	1001	459	282	0	107	8	8	18	0	4	0	2
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	13	6	30	0	0	0	0	12	15	0	0	0

SCENARIO 2031 D1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	5	587	0	10	0	0	0	0	1	177	0	0	0
2	91	0	54	1017	116	398	0	0	0	0	8	2587	87	0	0
3	13	86	0	25	1	1	0	0	0	0	0	13	2	0	0
4	902	940	89	36	80	1	0	0	0	2	0	1181	133	0	0
5	0	295	1	10	0	975	0	1	0	0	161	322	0	0	1
6	17	188	11	33	800	0	0	4	0	1	0	216	1	0	5
7	0	0	0	3	1	2	0	0	0	0	11	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	32	369	17	152	156	0	0	5	0	2	0	0	2	0	2
12	109	2711	22	1001	459	282	0	107	0	16	18	0	4	0	2
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	13	6	30	0	0	0	0	12	15	0	0	0

SCENARIO 2031 D1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	5	587	0	10	0	0	0	0	1	177	0	0	0
2	91	0	54	1017	116	398	0	0	0	0	8	2587	87	0	0
3	13	86	0	25	1	1	0	0	0	0	0	13	2	0	0
4	902	940	89	36	80	1	0	0	0	2	0	1181	133	0	0
5	0	295	1	10	0	975	0	1	0	0	161	322	0	0	1
6	17	188	11	33	800	0	0	4	0	1	0	216	1	0	5
7	0	0	0	3	1	2	0	0	0	0	11	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	32	369	17	152	156	0	0	5	0	2	0	0	2	0	2
12	109	2711	22	1001	459	282	0	107	0	16	18	0	4	0	2
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	13	6	30	0	0	0	0	12	15	0	0	0

SCENARIO:	2031 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	D1

SCENARIO 2031 D1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	37	0	0	0
2	0	0	0	87	0	26	0	0	0	0	51	410	0	0	0
3	0	18	0	0	0	0	0	0	0	0	0	28	0	0	0
4	37	24	1	0	0	0	0	0	0	0	0	35	0	0	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	21	0	0	54	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	32	432	17	85	8	78	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 D1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	37	0	0	0
2	0	0	0	87	0	26	0	0	0	0	51	410	0	0	0
3	0	18	0	0	0	0	0	0	0	0	0	28	0	0	0
4	37	24	1	0	0	0	0	0	0	0	0	35	0	0	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	21	0	0	54	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	32	432	17	85	8	78	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 D1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	37	0	0	0
2	0	0	0	87	0	26	0	0	0	0	51	410	0	0	0
3	0	18	0	0	0	0	0	0	0	0	0	28	0	0	0
4	37	24	1	0	0	0	0	0	0	0	0	35	0	0	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	21	0	0	54	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	32	432	17	85	8	78	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 D1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	37	0	0	0
2	0	0	0	87	0	26	0	0	0	0	51	410	0	0	0
3	0	18	0	0	0	0	0	0	0	0	0	28	0	0	0
4	37	24	1	0	0	0	0	0	0	0	0	35	0	0	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	21	0	0	54	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	32	432	17	85	8	78	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\170808 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v4

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

SCENARIO: 2031 REFERENCE CASE FUTURE YEAR ASSESSMENT

FLOWSET: D1

SCENARIO 2031 D1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	10	391	0	6	0	0	0	0	3	224	0	0	1
2	145	0	66	1236	271	188	0	0	0	0	13	1904	118	0	2
3	4	20	0	18	5	1	0	0	0	0	0	11	5	0	0
4	664	902	40	10	129	9	0	1	0	0	10	1251	72	0	5
5	0	61	10	211	0	892	0	0	0	0	232	349	7	0	7
6	38	249	9	47	1147	0	0	2	0	0	1	216	8	0	49
7	1	0	0	7	1	4	0	0	0	0	28	24	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	35	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	74	503	28	107	74	0	0	2	0	0	0	0	35	0	8
12	266	2162	55	687	358	433	0	31	0	2	4	0	166	0	14
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

WARM UP FACTOR = 0.690

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	20	7	270	0	4	0	0	0	0	2	155	0	0	0
2	100	0	46	853	187	130	0	0	0	0	9	1314	81	0	1
3	2	14	0	13	4	1	0	0	0	0	0	7	3	0	0
4	458	622	28	7	89	6	0	1	0	0	7	863	50	0	3
5	0	42	7	146	0	616	0	0	0	0	160	241	5	0	5
6	26	172	6	32	791	0	0	1	0	0	0	149	6	0	34
7	1	0	0	5	1	3	0	0	0	0	20	17	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	24	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	51	347	19	74	51	0	0	1	0	0	0	0	24	0	5
12	184	1492	38	474	247	299	0	22	0	2	3	0	115	0	10
13	0	0	0	383	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	2	1	4	0	0	0	0	2	1	0	0	0

0615-0630 FACTOR 0.191

VISSIM MATRIX - LIGHTS - WARM UP (0615-0630)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	52	0	1	0	0	0	0	0	30	0	0	0
2	19	0	9	163	36	25	0	0	0	0	2	251	16	0	0
3	0	3	0	2	1	0	0	0	0	0	0	1	1	0	0
4	88	119	5	1	17	1	0	0	0	0	1	165	10	0	1
5	0	8	1	28	0	118	0	0	0	0	31	46	1	0	1
6	5	33	1	6	151	0	0	0	0	0	0	29	1	0	6
7	0	0	0	1	0	0	0	0	0	0	4	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	10	66	4	14	10	0	0	0	0	0	0	0	5	0	1
12	35	285	7	91	47	57	0	4	0	0	1	0	22	0	2
13	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR 0.228

VISSIM MATRIX - LIGHTS - WARM UP (0630-0645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	5	1	62	0	1	0	0	0	0	0	35	0	0	0
2	23	0	10	194	43	30	0	0	0	0	2	300	19	0	0
3	1	3	0	3	1	0	0	0	0	0	0	2	1	0	0
4	105	142	6	2	20	1	0	0	0	0	1	197	11	0	1
5	0	10	2	33	0	140	0	0	0	0	37	55	1	0	1
6	6	39	1	7	180	0	0	0	0	0	0	34	1	0	8
7	0	0	0	1	0	1	0	0	0	0	4	4	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	12	79	4	17	12	0	0	0	0	0	0	0	5	0	1
12	42	340	9	108	56	68	0	5	0	0	1	0	26	0	2
13	0	0	0	87	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

0645-0700 FACTOR 0.271

VISSIM MATRIX - LIGHTS - WARM UP (0645-0700)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	5	2	73	0	1	0	0	0	0	1	42	0	0	0
2	27	0	12	231	51	35	0	0	0	0	2	356	22	0	0
3	1	4	0	3	1	0	0	0	0	0	0	2	1	0	0
4	124	169	7	2	24	2	0	0	0	0	2	234	14	0	1
5	0	11	2	39	0	167	0	0	0	0	43	65	1	0	1
6	7	47	2	9	214	0	0	0	0	0	0	40	2	0	9
7	0	0	0	1	0	1	0	0	0	0	5	5	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	14	94	5	20	14	0	0	0	0	0	0	0	7	0	1
12	50	404	10	128	67	81	0	6	0	0	1	0	31	0	3
13	0	0	0	104	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0

0700-0715 FACTOR 0.310

VISSIM MATRIX - LIGHTS - WARM UP (0700-0730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	6	2	84	0	1	0	0	0	0	1	48	0	0	0
2	31	0	14	264	58	40	0	0	0	0	3	407	25	0	0
3	1	4	0	4	1	0	0	0	0	0	0	2	1	0	0
4	142	193	9	2	28	2	0	0	0	0	2	268	15	0	1
5	0	13	2	45	0	191	0	0	0	0	50	75	1	0	1
6	8	53	2	10	245	0	0	0	0	0	0	46	2	0	10
7	0	0	0	1	0	1	0	0	0	0	6	5	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	108	6	23	16	0	0	0	0	0	0	0	7	0	2
12	57	462	12	147	77	93	0	7	0	0	1	0	36	0	3
13	0	0	0	119	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	29	10	391	0	6	0	0	0	0	3	224	0	0	1
2	145	0	66	1236	271	188	0	0	0	0	13	1904	118	0	2
3	4	20	0	18	5	1	0	0	0	0	0	11	5	0	0
4	664	902	40	10	129	9	0	1	0	0	10	1251	72	0	5
5	0	61	10	211	0	892	0	0	0	0	232	349	7	0	7
6	38	249	9	47	1147	0	0	2	0	0	1	216	8	0	49
7	1	0	0	7	1	4	0	0	0	0	28	24	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	35	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	74	503	28	107	74	0	0	2	0	0	0	0	35	0	8
12	266	2162	55	687	358	433	0	31	0	2	4	0	166	0	14
13	0	0	0	554	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	2	0	0	0

0715-0730 FACTOR 0.237

VISSIM MATRIX - LIGHTS - PEAK (0715-0730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	7	2	93	0	1	0	0	0	0	1	53	0	0	0
2	34	0	16	293	64	45	0	0	0	0	3	451	28	0	0
3	1	5	0	4	1	0	0	0	0	0	0	3	1	0	0
4	157	214	9	2	31	2	0	0	0	0	2	296	17	0	1
5	0	15	2	50	0	211	0	0	0	0	55	83	2	0	2
6	9	59	2	11	272	0	0	0	0	0	0	51	2	0	12
7	0	0	0	2	0	1	0	0	0	0	7	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	17	119	7	25	18	0	0	0	0	0	0	0	8	0	2
12	63	512	13	163	85	103	0	7	0	1	1	0	39	0	3
13	0	0	0	131	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0

0730-0745 FACTOR 0.259

VISSIM MATRIX - LIGHTS - PEAK (0730-0745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	7	2	101	0	2	0	0	0	0	1	58	0	0	0
2	38	0	17	320	70	49	0	0	0	0	3	493	31	0	1
3	1	5	0	5	1	0	0	0	0	0	0	3	1	0	0
4	172	234	10	3	33	2	0	0	0	0	2	324	19	0	1
5	0	16	3	55	0	231	0	0	0	0	60	90	2	0	2
6	10	64	2	12	297	0	0	0	0	0	0	56	2	0	13
7	0	0	0	2	0	1	0	0	0	0	7	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	9	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	19	130	7	28	19	0	0	1	0	0	0	0	9	0	2
12	69	560	14	178	93	112	0	8	0	1	1	0	43	0	4
13	0	0	0	144	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	2	0	0	0	0	1	0	0	0	0

0745-0800 FACTOR 0.261

VISSIM MATRIX - LIGHTS - PEAK (0745-0800)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	8	2	102	0	2	0	0	0	0	1	58	0	0	0
2	38	0	17	323	71	49	0	0	0	0	3	497	31	0	1
3	1	5	0	5	1	0	0	0	0	0	0	3	1	0	0
4	173	235	10	3	34	2	0	0	0	0	2	326	19	0	1
5	0	16	3	55	0	233	0	0	0	0	61	91	2	0	2
6	10	65	2	12	299	0	0	0	0	0	0	56	2	0	13
7	0	0	0	2	0	1	0	0	0	0	7	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	9	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	19	131	7	28	19	0	0	1	0	0	0	0	9	0	2
12	69	564	14	179	93	113	0	8	0	1	1	0	43	0	4
13	0	0	0	145	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	2	0	0	0	0	1	0	0	0	0

0630-0645 FACTOR 0.243

VISSIM MATRIX - LIGHTS - PEAK (0800-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	7	2	95	0	2	0	0	0	0	1	54	0	0	0
2	35	0	16	300	66	46	0	0	0	0	3	463	29	0	1
3	1	5	0	4	1	0	0	0	0	0	0	3	1	0	0
4	161	219	10	2	31	2	0	0	0	0	2	304	18	0	1
5	0	15	2	51	0	217	0	0	0	0	56	85	2	0	2
6	9	60	2	11	279	0	0	0	0	0	0	53	2	0	12
7	0	0	0	2	0	1	0	0	0	0	7	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	18	122	7	26	18	0	0	1	0	0	0	0	8	0	2
12	65	525	13	167	87	105	0	8	0	1	1	0	40	0	3
13	0	0	0	135	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR = 0.459

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	13	4	180	0	3	0	0	0	0	1	103	0	0	0
2	67	0	31	567	124	87	0	0	0	0	6	874	54	0	1
3	2	9	0	8	3	0	0	0	0	0	0	5	2	0	0
4	305	414	18	5	59	4	0	0	0	0	4	574	33	0	2
5	0	28	4	97	0	409	0	0	0	0	107	160	3	0	3
6	17	114	4	21	527	0	0	1	0	0	0	99	4	0	22
7	0	0	0	3	1	2	0	0	0	0	13	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	1	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	34	231	13	49	34	0	0	1	0	0	0	0	16	0	4
12	122	992	25	315	164	199	0	14	0	1	2	0	76	0	7
13	0	0	0	254	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	3	0	0	0	0	1	1	0	0	0

0815-0830 FACTOR 0.502

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0830)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	7	2	90	0	1	0	0	0	0	1	52	0	0	0
2	33	0	15	285	62	43	0	0	0	0	3	439	27	0	0
3	1	5	0	4	1	0	0	0	0	0	0	2	1	0	0
4	153	208	9	2	30	2	0	0	0	0	2	288	17	0	1
5	0	14	2	49	0	206	0	0	0	0	54	80	2	0	2
6	9	57	2	11	264	0	0	0	0	0	0	50	2	0	11
7	0	0	0	2	0	1	0	0	0	0	7	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	17	116	6	25	17	0	0	0	0	0	0	0	8	0	2
12	61	498	13	158	82	100	0	7	0	1	1	0	38	0	3
13	0	0	0	128	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0

0830-0845 FACTOR 0.498

VISSIM MATRIX - LIGHTS - COOL DOWN (0830-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	7	2	89	0	1	0	0	0	0	1	51	0	0	0
2	33	0	15	283	62	43	0	0	0	0	3	435	27	0	0
3	1	5	0	4	1	0	0	0	0	0	0	2	1	0	0
4	152	206	9	2	29	2	0	0	0	0	2	286	17	0	1
5	0	14	2	48	0	204	0	0	0	0	53	80	2	0	2
6	9	57	2	11	262	0	0	0	0	0	0	49	2	0	11
7	0	0	0	2	0	1	0	0	0	0	7	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	17	115	6	25	17	0	0	0	0	0	0	0	8	0	2
12	61	494	13	157	82	99	0	7	0	1	1	0	38	0	3
13	0	0	0	127	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	1	0	1	0	0	0	0	1	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Title: 170808 2031 REF CASE VISSIM FLOWS_Rev2.xlsx
Sheet Name: 2031 REF CASE FLOWS_AM_HEAVIES
Date: 06/12/2017

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\170808 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v4

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

SCENARIO:	2031 REFERENCE CASE FUTURE YEAR ASSESSMENT
FLOWSET:	D1

SCENARIO 2031 D1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	38	0	0	0
2	3	0	10	112	0	20	0	0	0	0	1	402	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	11	43	0	0	0	0	0	0	0	0	0	228	0	0	0
5	0	0	0	0	0	117	0	0	0	0	2	5	0	0	0
6	0	2	0	0	97	0	0	0	0	0	0	14	0	0	0
7	0	0	0	0	0	2	0	0	0	0	16	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	590	4	79	92	6	0	9	0	4	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR =	0.690

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	18	0	0	0	0	0	0	0	26	0	0	0
2	2	0	7	77	0	14	0	0	0	0	1	277	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	8	29	0	0	0	0	0	0	0	0	0	157	0	0	0
5	0	0	0	0	0	81	0	0	0	0	1	4	0	0	0
6	0	1	0	0	67	0	0	0	0	0	0	10	0	0	0
7	0	0	0	0	0	1	0	0	0	0	11	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	32	0	0	0	0	0	0	0	0	0	0	0	0	0
12	34	407	2	55	63	4	0	6	0	3	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0615-0630 FACTOR	0.191

VISSIM MATRIX - LIGHTS - WARM UP (0615-0630)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	5	0	0	0
2	0	0	1	15	0	3	0	0	0	0	0	53	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	1	6	0	0	0	0	0	0	0	0	0	30	0	0	0
5	0	0	0	0	0	15	0	0	0	0	0	1	0	0	0
6	0	0	0	0	13	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0
12	7	78	0	10	12	1	0	1	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR	0.228

VISSIM MATRIX - LIGHTS - WARM UP (0630-0645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	6	0	0	0
2	0	0	2	18	0	3	0	0	0	0	0	63	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	7	0	0	0	0	0	0	0	0	0	36	0	0	0
5	0	0	0	0	0	18	0	0	0	0	0	1	0	0	0
6	0	0	0	0	15	0	0	0	0	0	0	2	0	0	0
7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	93	1	12	14	1	0	1	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0645-0700 FACTOR	0.271

VISSIM MATRIX - LIGHTS - WARM UP (0645-0700)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	5	0	0	0	0	0	0	0	7	0	0	0
2	0	0	2	21	0	4	0	0	0	0	0	75	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	8	0	0	0	0	0	0	0	0	0	43	0	0	0
5	0	0	0	0	0	22	0	0	0	0	0	1	0	0	0
6	0	0	0	0	18	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	9	0	0	0	0	0	0	0	0	0	0	0	0	0
12	9	110	1	15	17	1	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0700-0715 FACTOR	0.310

VISSIM MATRIX - LIGHTS - WARM UP (0700-0730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	8	0	0	0
2	1	0	2	24	0	4	0	0	0	0	0	86	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	9	0	0	0	0	0	0	0	0	0	49	0	0	0
5	0	0	0	0	0	25	0	0	0	0	0	1	0	0	0
6	0	0	0	0	21	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0
12	11	126	1	17	20	1	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	38	0	0	0
2	3	0	10	112	0	20	0	0	0	0	1	402	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	11	43	0	0	0	0	0	0	0	0	0	228	0	0	0
5	0	0	0	0	0	117	0	0	0	0	2	5	0	0	0
6	0	2	0	0	97	0	0	0	0	0	0	14	0	0	0
7	0	0	0	0	0	2	0	0	0	0	16	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	0	0
12	50	590	4	79	92	6	0	9	0	4	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0715-0730 FACTOR	0.237

VISSIM MATRIX - LIGHTS - PEAK (0715-0730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	9	0	0	0
2	1	0	2	27	0	5	0	0	0	0	0	95	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	10	0	0	0	0	0	0	0	0	0	54	0	0	0
5	0	0	0	0	0	28	0	0	0	0	0	1	0	0	0
6	0	0	0	0	23	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	12	140	1	19	22	1	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0730-0745 FACTOR	0.259

VISSIM MATRIX - LIGHTS - PEAK (0730-0745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	7	0	0	0	0	0	0	0	10	0	0	0
2	1	0	3	29	0	5	0	0	0	0	0	104	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	11	0	0	0	0	0	0	0	0	0	59	0	0	0
5	0	0	0	0	0	30	0	0	0	0	1	1	0	0	0
6	0	0	0	0	25	0	0	0	0	0	0	4	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	153	1	21	24	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0745-0800 FACTOR	0.261

VISSIM MATRIX - LIGHTS - PEAK (0745-0800)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	7	0	0	0	0	0	0	0	10	0	0	0
2	1	0	3	29	0	5	0	0	0	0	0	105	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	11	0	0	0	0	0	0	0	0	0	60	0	0	0
5	0	0	0	0	0	30	0	0	0	0	1	1	0	0	0
6	0	0	0	0	25	0	0	0	0	0	0	4	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0
12	13	154	1	21	24	2	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR	0.243

VISSIM MATRIX - LIGHTS - PEAK (0800-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	9	0	0	0
2	1	0	2	27	0	5	0	0	0	0	0	98	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	10	0	0	0	0	0	0	0	0	0	55	0	0	0
5	0	0	0	0	0	28	0	0	0	0	0	1	0	0	0
6	0	0	0	0	24	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	12	143	1	19	22	1	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR =	0.459

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	12	0	0	0	0	0	0	0	18	0	0	0
2	1	0	4	51	0	9	0	0	0	0	0	184	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	5	20	0	0	0	0	0	0	0	0	0	105	0	0	0
5	0	0	0	0	0	54	0	0	0	0	1	2	0	0	0
6	0	1	0	0	45	0	0	0	0	0	0	6	0	0	0
7	0	0	0	0	0	1	0	0	0	0	7	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0
12	23	271	2	36	42	3	0	4	0	2	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0815-0830 FACTOR	0.502

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0830)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	9	0	0	0
2	1	0	2	26	0	5	0	0	0	0	0	93	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	10	0	0	0	0	0	0	0	0	0	53	0	0	0
5	0	0	0	0	0	27	0	0	0	0	0	1	0	0	0
6	0	0	0	0	22	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	11	136	1	18	21	1	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0830-0845 FACTOR	0.498

VISSIM MATRIX - LIGHTS - COOL DOWN (0830-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	9	0	0	0
2	1	0	2	26	0	5	0	0	0	0	0	92	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	10	0	0	0	0	0	0	0	0	0	52	0	0	0
5	0	0	0	0	0	27	0	0	0	0	0	1	0	0	0
6	0	0	0	0	22	0	0	0	0	0	0	3	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0
12	11	135	1	18	21	1	0	2	0	1	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Title: 170808 2031 REF CASE VISSIM FLOWS_Rev2.xlsx
Sheet Name: 2031 REF CASE FLOWS_PM_LIGHTS
Date: 06/12/2017

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\170808 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v4

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

SCENARIO: 2031 REFERENCE CASE FUTURE YEAR ASSESSMENT

FLOWSET: D1

SCENARIO 2031 D1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	5	587	0	10	0	0	0	0	1	177	0	0	0
2	91	0	54	1017	116	398	0	0	0	0	8	2587	87	0	0
3	13	86	0	25	1	1	0	0	0	0	0	13	2	0	0
4	902	940	89	36	80	1	0	0	0	2	0	1181	133	0	0
5	0	295	1	10	0	975	0	1	0	0	161	322	0	0	1
6	17	188	11	33	800	0	0	4	0	1	0	216	1	0	5
7	0	0	0	3	1	2	0	0	0	0	11	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	32	369	17	152	156	0	0	5	0	2	0	0	2	0	2
12	109	2711	22	1001	459	282	0	107	0	16	18	0	4	0	2
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	13	6	30	0	0	0	0	12	15	0	0	0

WARM UP FACTOR = 0.889

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	14	4	522	0	9	0	0	0	0	1	157	0	0	0
2	81	0	48	904	103	354	0	0	0	0	7	2300	77	0	0
3	12	76	0	22	1	1	0	0	0	0	0	12	2	0	0
4	802	835	79	32	71	1	0	0	0	2	0	1050	118	0	0
5	0	263	1	9	0	867	0	1	0	0	143	287	0	0	1
6	15	167	10	30	712	0	0	3	0	1	0	192	0	0	5
7	0	0	0	3	1	2	0	0	0	0	10	11	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	1	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	28	328	15	135	139	0	0	5	0	1	0	0	2	0	2
12	97	2410	19	890	408	250	0	95	0	14	16	0	3	0	2
13	0	0	0	272	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	11	5	26	0	0	0	0	10	13	0	0	0

1545-1600 FACTOR 0.227

VISSIM MATRIX - LIGHTS - WARM UP (1545-1600)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	3	1	119	0	2	0	0	0	0	0	36	0	0	0
2	18	0	11	205	23	80	0	0	0	0	2	522	18	0	0
3	3	17	0	5	0	0	0	0	0	0	0	3	0	0	0
4	182	190	18	7	16	0	0	0	0	0	0	238	27	0	0
5	0	60	0	2	0	197	0	0	0	0	33	65	0	0	0
6	3	38	2	7	162	0	0	1	0	0	0	44	0	0	1
7	0	0	0	1	0	0	0	0	0	0	2	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	6	74	3	31	32	0	0	1	0	0	0	0	0	0	0
12	22	547	4	202	93	57	0	22	0	3	4	0	1	0	0
13	0	0	0	62	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	2	3	0	0	0

1600-1615 FACTOR 0.242

VISSIM MATRIX - LIGHTS - WARM UP (1600-1615)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	126	0	2	0	0	0	0	0	38	0	0	0
2	20	0	12	219	25	86	0	0	0	0	2	557	19	0	0
3	3	19	0	5	0	0	0	0	0	0	0	3	0	0	0
4	194	202	19	8	17	0	0	0	0	0	0	254	29	0	0
5	0	64	0	2	0	210	0	0	0	0	35	69	0	0	0
6	4	40	2	7	172	0	0	1	0	0	0	47	0	0	1
7	0	0	0	1	0	0	0	0	0	0	2	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	7	79	4	33	34	0	0	1	0	0	0	0	0	0	0
12	23	583	5	215	99	61	0	23	0	3	4	0	1	0	0
13	0	0	0	66	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	6	0	0	0	0	3	3	0	0	0

1615-1630 FACTOR 0.265

VISSIM MATRIX - LIGHTS - WARM UP (1615-1630)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	138	0	2	0	0	0	0	0	42	0	0	0
2	21	0	13	240	27	94	0	0	0	0	2	609	20	0	0
3	3	20	0	6	0	0	0	0	0	0	0	3	0	0	0
4	213	221	21	8	19	0	0	0	0	0	0	278	31	0	0
5	0	70	0	2	0	230	0	0	0	0	38	76	0	0	0
6	4	44	3	8	189	0	0	1	0	0	0	51	0	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	7	87	4	36	37	0	0	1	0	0	0	0	0	0	0
12	26	639	5	236	108	66	0	25	0	4	4	0	1	0	0
13	0	0	0	72	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	7	0	0	0	0	3	3	0	0	0

1630-1645 FACTOR 0.266

VISSIM MATRIX - LIGHTS - WARM UP (1630-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	139	0	2	0	0	0	0	0	42	0	0	0
2	22	0	13	240	27	94	0	0	0	0	2	612	21	0	0
3	3	20	0	6	0	0	0	0	0	0	0	3	0	0	0
4	213	222	21	9	19	0	0	0	0	0	0	279	31	0	0
5	0	70	0	2	0	231	0	0	0	0	38	76	0	0	0
6	4	44	3	8	189	0	0	1	0	0	0	51	0	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	87	4	36	37	0	0	1	0	0	0	0	0	0	0
12	26	641	5	237	108	67	0	25	0	4	4	0	1	0	0
13	0	0	0	72	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	7	0	0	0	0	3	3	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (1645-1745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	5	587	0	10	0	0	0	0	1	177	0	0	0
2	91	0	54	1017	116	398	0	0	0	0	8	2587	87	0	0
3	13	86	0	25	1	1	0	0	0	0	0	13	2	0	0
4	902	940	89	36	80	1	0	0	0	2	0	1181	133	0	0
5	0	295	1	10	0	975	0	1	0	0	161	322	0	0	1
6	17	188	11	33	800	0	0	4	0	1	0	216	1	0	5
7	0	0	0	3	1	2	0	0	0	0	11	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	16	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	32	369	17	152	156	0	0	5	0	2	0	0	2	0	2
12	109	2711	22	1001	459	282	0	107	0	16	18	0	4	0	2
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	13	6	30	0	0	0	0	12	15	0	0	0

1645-1700 FACTOR 0.248

VISSIM MATRIX - LIGHTS - PEAK (1645-1700)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	146	0	2	0	0	0	0	0	44	0	0	0
2	23	0	13	252	29	99	0	0	0	0	2	642	22	0	0
3	3	21	0	6	0	0	0	0	0	0	0	3	0	0	0
4	224	233	22	9	20	0	0	0	0	0	0	293	33	0	0
5	0	73	0	3	0	242	0	0	0	0	40	80	0	0	0
6	4	47	3	8	198	0	0	1	0	0	0	54	0	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	92	4	38	39	0	0	1	0	0	0	0	0	0	0
12	27	672	5	248	114	70	0	27	0	4	5	0	1	0	0
13	0	0	0	76	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	2	7	0	0	0	0	3	4	0	0	0

1700-1715 FACTOR 0.248

VISSIM MATRIX - LIGHTS - PEAK (1700-1715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	146	0	2	0	0	0	0	0	44	0	0	0
2	23	0	13	252	29	99	0	0	0	0	2	642	22	0	0
3	3	21	0	6	0	0	0	0	0	0	0	3	0	0	0
4	224	233	22	9	20	0	0	0	0	0	0	293	33	0	0
5	0	73	0	3	0	242	0	0	0	0	40	80	0	0	0
6	4	47	3	8	198	0	0	1	0	0	0	54	0	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	92	4	38	39	0	0	1	0	0	0	0	0	0	0
12	27	672	5	248	114	70	0	27	0	4	5	0	1	0	0
13	0	0	0	76	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	2	7	0	0	0	0	3	4	0	0	0

1715-1730 FACTOR 0.251

VISSIM MATRIX - LIGHTS - PEAK (1715-1730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	147	0	3	0	0	0	0	0	44	0	0	0
2	23	0	14	255	29	100	0	0	0	0	2	649	22	0	0
3	3	22	0	6	0	0	0	0	0	0	0	3	0	0	0
4	226	236	22	9	20	0	0	0	0	0	0	296	33	0	0
5	0	74	0	3	0	245	0	0	0	0	40	81	0	0	0
6	4	47	3	8	201	0	0	1	0	0	0	54	0	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	93	4	38	39	0	0	1	0	0	0	0	0	0	0
12	27	680	5	251	115	71	0	27	0	4	5	0	1	0	0
13	0	0	0	77	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	2	7	0	0	0	0	3	4	0	0	0

1730-1745 FACTOR 0.253

VISSIM MATRIX - LIGHTS - PEAK (1730-1745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	149	0	3	0	0	0	0	0	45	0	0	0
2	23	0	14	257	29	101	0	0	0	0	2	654	22	0	0
3	3	22	0	6	0	0	0	0	0	0	0	3	0	0	0
4	228	238	23	9	20	0	0	0	0	0	0	299	34	0	0
5	0	75	0	3	0	247	0	0	0	0	41	82	0	0	0
6	4	47	3	8	202	0	0	1	0	0	0	55	0	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	93	4	39	39	0	0	1	0	0	0	0	0	0	0
12	27	686	6	253	116	71	0	27	0	4	5	0	1	0	0
13	0	0	0	77	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	2	8	0	0	0	0	3	4	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR = 0.470

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	8	2	276	0	5	0	0	0	0	0	83	0	0	0
2	43	0	25	478	55	187	0	0	0	0	4	1216	41	0	0
3	6	40	0	12	0	1	0	0	0	0	0	6	1	0	0
4	424	442	42	17	38	0	0	0	0	1	0	555	62	0	0
5	0	139	1	5	0	458	0	0	0	0	76	152	0	0	0
6	8	88	5	16	376	0	0	2	0	0	0	102	0	0	2
7	0	0	0	1	0	1	0	0	0	0	5	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	15	173	8	72	73	0	0	2	0	1	0	0	1	0	1
12	51	1274	10	471	216	132	0	50	0	8	9	0	2	0	1
13	0	0	0	144	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	1	0	6	3	14	0	0	0	0	5	7	0	0	0

1745-1800 FACTOR 0.513

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1800)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	142	0	2	0	0	0	0	0	43	0	0	0
2	22	0	13	245	28	96	0	0	0	0	2	624	21	0	0
3	3	21	0	6	0	0	0	0	0	0	0	3	0	0	0
4	217	227	22	9	19	0	0	0	0	0	0	285	32	0	0
5	0	71	0	2	0	235	0	0	0	0	39	78	0	0	0
6	4	45	3	8	193	0	0	1	0	0	0	52	0	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	8	89	4	37	38	0	0	1	0	0	0	0	0	0	0
12	26	654	5	241	111	68	0	26	0	4	4	0	1	0	0
13	0	0	0	74	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	7	0	0	0	0	3	4	0	0	0

1800-1815 FACTOR 0.487

VISSIM MATRIX - LIGHTS - COOL DOWN (1800-1815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	4	1	134	0	2	0	0	0	0	0	40	0	0	0
2	21	0	12	233	27	91	0	0	0	0	2	592	20	0	0
3	3	20	0	6	0	0	0	0	0	0	0	3	0	0	0
4	206	215	20	8	18	0	0	0	0	0	0	270	30	0	0
5	0	68	0	2	0	223	0	0	0	0	37	74	0	0	0
6	4	43	3	8	183	0	0	1	0	0	0	50	0	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	7	84	4	35	36	0	0	1	0	0	0	0	0	0	0
12	25	620	5	229	105	64	0	25	0	4	4	0	1	0	0
13	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	3	1	7	0	0	0	0	3	3	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\170808 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v4

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

SCENARIO: 2031 REFERENCE CASE FUTURE YEAR ASSESSMENT

FLOWSET: D1

SCENARIO 2031 D1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	37	0	0	0
2	0	0	0	87	0	26	0	0	0	0	51	410	0	0	0
3	0	18	0	0	0	0	0	0	0	0	0	28	0	0	0
4	37	24	1	0	0	0	0	0	0	0	0	35	0	0	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	21	0	0	54	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	32	432	17	85	8	78	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR = 0.889

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	33	0	0	0
2	0	0	0	77	0	23	0	0	0	0	45	364	0	0	0
3	0	16	0	0	0	0	0	0	0	0	0	25	0	0	0
4	32	21	1	0	0	0	0	0	0	0	0	31	0	0	0
5	0	0	0	0	0	105	0	0	0	0	1	0	0	0	0
6	0	18	0	0	48	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	29	384	15	75	7	69	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1545-1600 FACTOR 0.227

VISSIM MATRIX - LIGHTS - WARM UP (1545-1600)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0
2	0	0	0	18	0	5	0	0	0	0	10	83	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	6	0	0	0
4	7	5	0	0	0	0	0	0	0	0	0	7	0	0	0
5	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0
6	0	4	0	0	11	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	6	87	3	17	2	16	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1600-1615 FACTOR 0.242

VISSIM MATRIX - LIGHTS - WARM UP (1600-1615)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	0	0
2	0	0	0	19	0	6	0	0	0	0	11	88	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	6	0	0	0
4	8	5	0	0	0	0	0	0	0	0	0	7	0	0	0
5	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0
6	0	4	0	0	12	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	7	93	4	18	2	17	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1615-1630 FACTOR 0.265

VISSIM MATRIX - LIGHTS - WARM UP (1615-1630)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	20	0	6	0	0	0	0	12	97	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	9	6	0	0	0	0	0	0	0	0	0	8	0	0	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	5	0	0	13	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	102	4	20	2	18	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1630-1645 FACTOR 0.266

VISSIM MATRIX - LIGHTS - WARM UP (1630-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	21	0	6	0	0	0	0	12	97	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	9	6	0	0	0	0	0	0	0	0	0	8	0	0	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	5	0	0	13	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	102	4	20	2	18	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (1645-1745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	37	0	0	0
2	0	0	0	87	0	26	0	0	0	0	51	410	0	0	0
3	0	18	0	0	0	0	0	0	0	0	0	28	0	0	0
4	37	24	1	0	0	0	0	0	0	0	0	35	0	0	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	21	0	0	54	0	0	0	0	0	0	1	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	32	432	17	85	8	78	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1645-1700 FACTOR 0.248

VISSIM MATRIX - LIGHTS - PEAK (1645-1700)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	22	0	6	0	0	0	0	13	102	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	9	6	0	0	0	0	0	0	0	0	0	9	0	0	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	5	0	0	13	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	107	4	21	2	19	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1700-1715 FACTOR 0.248

VISSIM MATRIX - LIGHTS - PEAK (1700-1715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	22	0	6	0	0	0	0	13	102	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	9	6	0	0	0	0	0	0	0	0	0	9	0	0	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	5	0	0	13	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	107	4	21	2	19	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1715-1730 FACTOR 0.251

VISSIM MATRIX - LIGHTS - PEAK (1715-1730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	22	0	6	0	0	0	0	13	103	0	0	0
3	0	5	0	0	0	0	0	0	0	0	0	7	0	0	0
4	9	6	0	0	0	0	0	0	0	0	0	9	0	0	0
5	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
6	0	5	0	0	13	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	108	4	21	2	20	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1730-1745 FACTOR 0.253

VISSIM MATRIX - LIGHTS - PEAK (1730-1745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	22	0	7	0	0	0	0	13	104	0	0	0
3	0	5	0	0	0	0	0	0	0	0	0	7	0	0	0
4	9	6	0	0	0	0	0	0	0	0	0	9	0	0	0
5	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
6	0	5	0	0	14	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	109	4	21	2	20	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR = 0.470

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	3	0	0	0	0	0	0	0	18	0	0	0
2	0	0	0	41	0	12	0	0	0	0	24	193	0	0	0
3	0	8	0	0	0	0	0	0	0	0	0	13	0	0	0
4	17	11	0	0	0	0	0	0	0	0	0	16	0	0	0
5	0	0	0	0	0	55	0	0	0	0	0	0	0	0	0
6	0	10	0	0	25	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
12	15	203	8	40	4	37	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1745-1800 FACTOR 0.513

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1800)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	2	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	21	0	6	0	0	0	0	12	99	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	9	6	0	0	0	0	0	0	0	0	0	8	0	0	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	5	0	0	13	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	104	4	20	2	19	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1800-1815 FACTOR 0.487

VISSIM MATRIX - LIGHTS - COOL DOWN (1800-1815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	0	0
2	0	0	0	20	0	6	0	0	0	0	12	94	0	0	0
3	0	4	0	0	0	0	0	0	0	0	0	6	0	0	0
4	8	6	0	0	0	0	0	0	0	0	0	8	0	0	0
5	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0
6	0	5	0	0	12	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	7	99	4	19	2	18	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Title: 171116 2031 MIT VISSIM FLOWS_Rev5.xlsx
Sheet Name: 2031 MIT FLOWS_CONVERSION
Date: 06/12/2017

MULTIMODAL

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Matrix Conversion

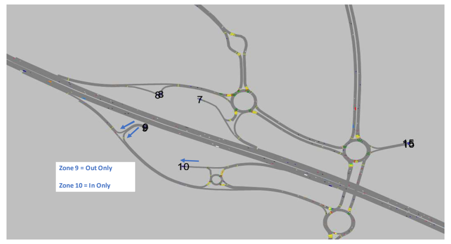
Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02 COMMS\Received\171116 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v6

Calculation Details

Conversion of NSTM data to account for M1 J15a Services.

Current VISSIM model has two xones for northbound access and two zones for southbound access.

NSTM data provides flows to both of these zones, so amended the matrices to ensure 'IN' and 'OUT' traffic was correctly assigned.



SCENARIO:	2031 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1d

SCENARIO 2031 J1d - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	549	0	18	0	0	0	0	5	427	0	93	1
2	175	0	16	1339	233	225	0	0	0	0	30	1724	184	114	3
3	17	21	0	26	25	7	0	0	0	0	1	41	20	2	0
4	757	906	35	1	101	16	0	0	0	0	10	1129	37	363	3
5	0	75	7	131	0	845	0	0	0	0	179	376	6	1	6
6	28	114	7	24	1352	1	1	1	0	0	1	237	6	14	49
7	0	0	0	3	1	2	0	0	0	0	11	15	0	0	0
8	0	0	0	3	1	2	0	0	0	0	11	15	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
10	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
11	104	514	33	97	78	0	1	1	0	0	0	0	37	38	7
12	346	2209	74	656	393	378	16	16	1	1	4	0	156	75	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	9	24	0	31	1	3	0	0	0	0	1	17	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

SCENARIO 2031 J1d - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	549	0	18	0	0	0	0	5	427	0	93	1
2	175	0	16	1339	233	225	0	0	0	0	30	1724	184	114	3
3	17	21	0	26	25	7	0	0	0	0	1	41	20	2	0
4	757	906	35	1	101	16	0	1	0	0	10	1129	37	363	3
5	0	75	7	131	0	845	0	0	0	0	179	376	6	1	6
6	28	114	7	24	1352	1	0	1	0	0	1	237	6	14	49
7	1	0	0	6	1	4	0	0	0	0	22	30	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
10	0	0	0	1	1	2	0	0	0	0	0	17	0	0	0
11	104	514	33	97	78	0	0	2	0	0	0	0	37	38	7
12	346	2209	74	656	393	378	0	32	1	1	4	0	156	75	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	9	24	0	31	1	3	0	0	0	0	1	17	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

SCENARIO 2031 J1d - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	549	0	18	0	0	0	0	5	427	0	93	1
2	175	0	16	1339	233	225	0	0	0	0	30	1724	184	114	3
3	17	21	0	26	25	7	0	0	0	0	1	41	20	2	0
4	757	906	35	1	101	16	0	1	0	0	10	1129	37	363	3
5	0	75	7	131	0	845	0	0	0	0	179	376	6	1	6
6	28	114	7	24	1352	1	0	1	0	0	1	237	6	14	49
7	1	0	0	6	1	4	0	0	0	0	22	30	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	2	1	4	0	0	0	0	0	33	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	104	514	33	97	78	0	0	2	0	0	0	0	37	38	7
12	346	2209	74	656	393	378	0	32	0	2	4	0	156	75	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	9	24	0	31	1	3	0	0	0	0	1	17	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

SCENARIO 2031 J1d - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	549	0	18	0	0	0	0	5	427	0	93	1
2	175	0	16	1339	233	225	0	0	0	0	30	1724	184	114	3
3	17	21	0	26	25	7	0	0	0	0	1	41	20	2	0
4	757	906	35	1	101	16	0	1	0	0	10	1129	37	363	3
5	0	75	7	131	0	845	0	0	0	0	179	376	6	1	6
6	28	114	7	24	1352	1	0	1	0	0	1	237	6	14	49
7	1	0	0	6	1	4	0	0	0	0	22	30	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	2	1	4	0	0	0	0	0	33	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	104	514	33	97	78	0	0	2	0	0	0	0	37	38	7
12	346	2209	74	656	393	378	0	32	0	2	4	0	156	75	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	9	24	0	31	1	3	0	0	0	0	1	17	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

SCENARIO:	2031 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1d

SCENARIO 2031 J1d - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	46	0	35	0
2	0	0	14	107	0	27	0	0	0	0	3	406	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	14	40	0	0	0	0	0	0	0	0	0	202	0	41	0
5	0	0	0	0	0	111	0	0	0	0	2	5	0	0	0
6	0	1	0	0	89	0	0	0	0	0	0	31	0	2	0
7	0	0	0	0	0	1	0	0	0	0	7	1	0	0	0
8	0	0	0	0	0	1	0	0	0	0	7	1	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	3	0
12	49	589	0	85	101	1	5	5	2	2	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	15	31	3	43	10	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1d - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	46	0	35	0
2	0	0	14	107	0	27	0	0	0	0	3	406	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	14	40	0	0	0	0	0	0	0	0	0	202	0	41	0
5	0	0	0	0	0	111	0	0	0	0	2	5	0	0	0
6	0	1	0	0	89	0	0	0	0	0	0	31	0	2	0
7	0	0	0	0	0	2	0	0	0	0	15	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	3	0
12	49	589	0	85	101	1	0	9	2	2	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	15	31	3	43	10	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1d - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	46	0	35	0
2	0	0	14	107	0	27	0	0	0	0	3	406	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	14	40	0	0	0	0	0	0	0	0	0	202	0	41	0
5	0	0	0	0	0	111	0	0	0	0	2	5	0	0	0
6	0	1	0	0	89	0	0	0	0	0	0	31	0	2	0
7	0	0	0	0	0	2	0	0	0	0	15	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	3	0
12	49	589	0	85	101	1	0	9	0	4	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	15	31	3	43	10	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1d - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	46	0	35	0
2	0	0	14	107	0	27	0	0	0	0	3	406	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	14	40	0	0	0	0	0	0	0	0	0	202	0	41	0
5	0	0	0	0	0	111	0	0	0	0	2	5	0	0	0
6	0	1	0	0	89	0	0	0	0	0	0	31	0	2	0
7	0	0	0	0	0	2	0	0	0	0	15	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	3	0
12	49	589	0	85	101	1	0	9	0	4	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	15	31	3	43	10	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO:	2031 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1d

SCENARIO 2031 J1d - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	46	7	845	0	25	0	0	0	0	7	271	0	25	0
2	84	0	25	1110	52	530	0	0	0	0	53	2421	137	50	0
3	18	87	0	29	1	2	0	0	0	0	1	19	3	0	0
4	955	924	87	0	73	3	1	1	1	1	19	1121	117	115	1
5	0	253	1	38	0	876	0	0	0	0	146	396	0	0	1
6	6	147	8	14	890	0	1	1	1	1	0	181	4	1	4
7	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0
8	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	49	430	21	103	129	0	3	3	1	1	0	0	17	14	2
12	352	2674	26	764	311	294	53	53	8	8	7	0	9	24	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	70	85	4	390	7	34	0	0	0	0	12	183	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

SCENARIO 2031 J1d - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	46	7	845	0	25	0	0	0	0	7	271	0	25	0
2	84	0	25	1110	52	530	0	0	0	0	53	2421	137	50	0
3	18	87	0	29	1	2	0	0	0	0	1	19	3	0	0
4	955	924	87	0	73	3	0	2	1	1	19	1121	117	115	1
5	0	253	1	38	0	876	0	1	0	0	146	396	0	0	1
6	6	147	8	14	890	0	0	2	1	1	0	181	4	1	4
7	0	0	0	2	1	2	0	0	0	0	12	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	1	0	1	0	0	0	0	0	8	0	0	0
11	49	430	21	103	129	0	0	5	1	1	0	0	17	14	2
12	352	2674	26	764	311	294	0	107	8	8	7	0	9	24	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	70	85	4	390	7	34	0	0	0	0	12	183	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

SCENARIO 2031 J1d - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	46	7	845	0	25	0	0	0	0	7	271	0	25	0
2	84	0	25	1110	52	530	0	0	0	0	53	2421	137	50	0
3	18	87	0	29	1	2	0	0	0	0	1	19	3	0	0
4	955	924	87	0	73	3	0	2	0	2	19	1121	117	115	1
5	0	253	1	38	0	876	0	1	0	0	146	396	0	0	1
6	6	147	8	14	890	0	0	2	0	1	0	181	4	1	4
7	0	0	0	2	1	2	0	0	0	0	12	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	49	430	21	103	129	0	0	5	0	2	0	0	17	14	2
12	352	2674	26	764	311	294	0	107	0	16	7	0	9	24	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	70	85	4	390	7	34	0	0	0	0	12	183	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

SCENARIO 2031 J1d - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	46	7	845	0	25	0	0	0	0	7	271	0	25	0
2	84	0	25	1110	52	530	0	0	0	0	53	2421	137	50	0
3	18	87	0	29	1	2	0	0	0	0	1	19	3	0	0
4	955	924	87	0	73	3	0	2	0	2	19	1121	117	115	1
5	0	253	1	38	0	876	0	1	0	0	146	396	0	0	1
6	6	147	8	14	890	0	0	2	0	1	0	181	4	1	4
7	0	0	0	2	1	2	0	0	0	0	12	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	49	430	21	103	129	0	0	5	0	2	0	0	17	14	2
12	352	2674	26	764	311	294	0	107	0	16	7	0	9	24	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	70	85	4	390	7	34	0	0	0	0	12	183	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

SCENARIO:	2031 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1d

SCENARIO 2031 J1d - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	41	0	30	0
2	0	0	0	98	0	16	0	0	0	0	65	402	0	35	0
3	0	18	0	0	0	0	0	0	0	0	0	34	0	1	0
4	15	22	0	0	0	0	0	0	0	0	0	24	0	41	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	23	0	0	77	0	0	0	0	0	0	0	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
12	66	421	23	73	1	78	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	23	30	1	43	5	5	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1d - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	41	0	30	0
2	0	0	0	98	0	16	0	0	0	0	65	402	0	35	0
3	0	18	0	0	0	0	0	0	0	0	0	34	0	1	0
4	15	22	0	0	0	0	0	0	0	0	0	24	0	41	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	23	0	0	77	0	0	0	0	0	0	0	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
12	66	421	23	73	1	78	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	23	30	1	43	5	5	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1d - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	41	0	30	0
2	0	0	0	98	0	16	0	0	0	0	65	402	0	35	0
3	0	18	0	0	0	0	0	0	0	0	0	34	0	1	0
4	15	22	0	0	0	0	0	0	0	0	0	24	0	41	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	23	0	0	77	0	0	0	0	0	0	0	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
12	66	421	23	73	1	78	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	23	30	1	43	5	5	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SCENARIO 2031 J1d - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	41	0	30	0
2	0	0	0	98	0	16	0	0	0	0	65	402	0	35	0
3	0	18	0	0	0	0	0	0	0	0	0	34	0	1	0
4	15	22	0	0	0	0	0	0	0	0	0	24	0	41	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	23	0	0	77	0	0	0	0	0	0	0	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
12	66	421	23	73	1	78	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	23	30	1	43	5	5	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Title: 171116 2031 MIT VISSIM FLOWS_Rev5.xlsx
Sheet Name: 2031 MIT FLOWS_AM_LIGHTS
Date: 06/12/2017

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171116 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v6

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data into:
1) Warm Up, Peak and Cool Down Matrices
2) 15 minute matrices within Warm Up, Peak and Cool Down periods.

Conversion based on observed turning counts, with factors to split the traffic appropriately.

SCENARIO:	2031 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1d

SCENARIO 2031 D1 - AM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	549	0	18	0	0	0	0	5	427	0	93	1
2	175	0	16	1339	233	225	0	0	0	0	30	1724	184	114	3
3	17	21	0	26	25	7	0	0	0	0	1	41	20	2	0
4	757	906	35	1	101	16	0	1	0	0	10	1129	37	363	3
5	0	75	7	131	0	845	0	0	0	0	179	376	6	1	6
6	28	114	7	24	1352	1	0	1	0	0	1	237	6	14	49
7	1	0	0	6	1	4	0	0	0	0	22	30	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	2	1	4	0	0	0	0	0	33	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	104	514	33	97	78	0	0	2	0	0	0	0	37	38	7
12	346	2209	74	656	393	378	0	32	0	2	4	0	156	75	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	9	24	0	31	1	3	0	0	0	0	1	17	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

WARM UP FACTOR = 0.690

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	69	14	379	0	13	0	0	0	0	4	295	0	64	1
2	120	0	11	924	161	155	0	0	0	0	21	1189	127	79	2
3	12	15	0	18	17	5	0	0	0	0	1	28	14	1	0
4	522	625	24	0	70	11	0	0	0	0	7	779	26	250	2
5	0	52	5	91	0	583	0	0	0	0	124	260	4	1	4
6	19	79	5	17	933	1	0	1	0	0	1	163	4	10	34
7	1	0	0	4	1	3	0	0	0	0	16	21	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	3	0	0	0	0	0	23	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	72	355	23	67	54	0	0	2	0	0	0	0	26	26	5
12	239	1524	51	453	271	261	0	22	0	2	3	0	108	52	10
13	0	0	0	211	0	0	0	0	0	0	0	0	0	0	0
14	6	16	0	22	1	2	0	0	0	0	0	12	0	0	0
15	0	0	0	1	1	4	0	0	0	0	1	2	0	0	0

0615-0630 FACTOR 0.191

VISSIM MATRIX - LIGHTS - WARM UP (0615-0630)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	13	3	72	0	2	0	0	0	0	1	56	0	12	0
2	23	0	2	176	31	30	0	0	0	0	4	227	24	15	0
3	2	3	0	3	3	1	0	0	0	0	0	5	3	0	0
4	100	119	5	0	13	2	0	0	0	0	1	149	5	48	0
5	0	10	1	17	0	111	0	0	0	0	24	50	1	0	1
6	4	15	1	3	178	0	0	0	0	0	0	31	1	2	6
7	0	0	0	1	0	1	0	0	0	0	3	4	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	14	68	4	13	10	0	0	0	0	0	0	0	5	5	1
12	46	291	10	86	52	50	0	4	0	0	1	0	21	10	2
13	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0
14	1	3	0	4	0	0	0	0	0	0	0	2	0	0	0
15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR 0.228

VISSIM MATRIX - LIGHTS - WARM UP (0630-0645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	16	3	86	0	3	0	0	0	0	1	67	0	15	0
2	27	0	2	211	37	35	0	0	0	0	5	271	29	18	0
3	3	3	0	4	4	1	0	0	0	0	0	6	3	0	0
4	119	143	5	0	16	3	0	0	0	0	2	178	6	57	1
5	0	12	1	21	0	133	0	0	0	0	28	59	1	0	1
6	4	18	1	4	213	0	0	0	0	0	0	37	1	2	8
7	0	0	0	1	0	1	0	0	0	0	4	5	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	5	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	16	81	5	15	12	0	0	0	0	0	0	0	6	6	1
12	54	348	12	103	62	59	0	5	0	0	1	0	25	12	2
13	0	0	0	48	0	0	0	0	0	0	0	0	0	0	0
14	1	4	0	5	0	0	0	0	0	0	0	3	0	0	0
15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

0645-0700 FACTOR 0.271

VISSIM MATRIX - LIGHTS - WARM UP (0645-0700)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	19	4	103	0	3	0	0	0	0	1	80	0	17	0
2	33	0	3	250	44	42	0	0	0	0	6	322	34	21	0
3	3	4	0	5	5	1	0	0	0	0	0	8	4	0	0
4	141	170	6	0	19	3	0	0	0	0	2	211	7	68	1
5	0	14	1	25	0	158	0	0	0	0	34	70	1	0	1
6	5	21	1	5	253	0	0	0	0	0	0	44	1	3	9
7	0	0	0	1	0	1	0	0	0	0	4	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	6	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	19	96	6	18	15	0	0	0	0	0	0	0	7	7	1
12	65	413	14	123	74	71	0	6	0	0	1	0	29	14	3
13	0	0	0	57	0	0	0	0	0	0	0	0	0	0	0
14	2	4	0	6	0	1	0	0	0	0	0	3	0	0	0
15	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

0700-0715 FACTOR 0.310

VISSIM MATRIX - LIGHTS - WARM UP (0700-0730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	22	4	118	0	4	0	0	0	0	1	91	0	20	0
2	37	0	3	286	50	48	0	0	0	0	6	369	39	24	1
3	4	5	0	6	5	1	0	0	0	0	0	9	4	0	0
4	162	194	7	0	22	3	0	0	0	0	2	241	8	78	1
5	0	16	1	28	0	181	0	0	0	0	38	80	1	0	1
6	6	24	1	5	289	0	0	0	0	0	0	51	1	3	10
7	0	0	0	1	0	1	0	0	0	0	5	6	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	7	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	22	110	7	21	17	0	0	0	0	0	0	0	8	8	2
12	74	473	16	140	84	81	0	7	0	1	1	0	33	16	3
13	0	0	0	65	0	0	0	0	0	0	0	0	0	0	0
14	2	5	0	7	0	1	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	101	20	549	0	18	0	0	0	0	5	427	0	93	1
2	175	0	16	1339	233	225	0	0	0	0	30	1724	184	114	3
3	17	21	0	26	25	7	0	0	0	0	1	41	20	2	0
4	757	906	35	1	101	16	0	1	0	0	10	1129	37	363	3
5	0	75	7	131	0	845	0	0	0	0	179	376	6	1	6
6	28	114	7	24	1352	1	0	1	0	0	1	237	6	14	49
7	1	0	0	6	1	4	0	0	0	0	22	30	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	2	1	4	0	0	0	0	0	33	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	104	514	33	97	78	0	0	2	0	0	0	0	37	38	7
12	346	2209	74	656	393	378	0	32	0	2	4	0	156	75	15
13	0	0	0	306	0	0	0	0	0	0	0	0	0	0	0
14	9	24	0	31	1	3	0	0	0	0	1	17	1	0	0
15	1	0	0	2	1	6	0	0	0	0	2	2	0	0	0

0715-0730 FACTOR 0.237

VISSIM MATRIX - LIGHTS - PEAK (0715-0730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	24	5	130	0	4	0	0	0	0	1	101	0	22	0
2	41	0	4	317	55	53	0	0	0	0	7	409	44	27	1
3	4	5	0	6	6	2	0	0	0	0	0	10	5	0	0
4	179	215	8	0	24	4	0	0	0	0	2	268	9	86	1
5	0	18	2	31	0	200	0	0	0	0	43	89	1	0	2
6	7	27	2	6	320	0	0	0	0	0	0	56	1	3	12
7	0	0	0	1	0	1	0	0	0	0	5	7	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	25	122	8	23	19	0	0	1	0	0	0	0	9	9	2
12	82	524	18	155	93	90	0	7	0	1	1	0	37	18	4
13	0	0	0	73	0	0	0	0	0	0	0	0	0	0	0
14	2	6	0	7	0	1	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0

0730-0745 FACTOR 0.259

VISSIM MATRIX - LIGHTS - PEAK (0730-0745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	26	5	142	0	5	0	0	0	0	1	111	0	24	0
2	45	0	4	347	60	58	0	0	0	0	8	446	48	30	1
3	4	6	0	7	6	2	0	0	0	0	0	11	5	1	0
4	196	235	9	0	26	4	0	0	0	0	3	292	10	94	1
5	0	19	2	34	0	219	0	0	0	0	46	97	2	0	2
6	7	30	2	6	350	0	0	0	0	0	0	61	1	4	13
7	0	0	0	2	0	1	0	0	0	0	6	8	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	9	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	27	133	9	25	20	0	0	1	0	0	0	0	10	10	2
12	90	572	19	170	102	98	0	8	0	1	1	0	40	19	4
13	0	0	0	79	0	0	0	0	0	0	0	0	0	0	0
14	2	6	0	8	0	1	0	0	0	0	0	4	0	0	0
15	0	0	0	1	0	2	0	0	0	0	1	1	0	0	0

0745-0800 FACTOR 0.261

VISSIM MATRIX - LIGHTS - PEAK (0745-0800)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	26	5	143	0	5	0	0	0	0	1	111	0	24	0
2	46	0	4	349	61	59	0	0	0	0	8	450	48	30	1
3	5	6	0	7	6	2	0	0	0	0	0	11	5	1	0
4	198	237	9	0	26	4	0	0	0	0	3	295	10	95	1
5	0	20	2	34	0	220	0	0	0	0	47	98	2	0	2
6	7	30	2	6	353	0	0	0	0	0	0	62	1	4	13
7	0	0	0	2	0	1	0	0	0	0	6	8	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	9	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	27	134	9	25	20	0	0	1	0	0	0	0	10	10	2
12	90	577	19	171	103	99	0	8	0	1	1	0	41	20	4
13	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0
14	2	6	0	8	0	1	0	0	0	0	0	4	0	0	0
15	0	0	0	1	0	2	0	0	0	0	1	1	0	0	0

0630-0645 FACTOR 0.243

VISSIM MATRIX - LIGHTS - PEAK (0800-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	24	5	134	0	4	0	0	0	0	1	104	0	23	0
2	42	0	4	325	57	55	0	0	0	0	7	419	45	28	1
3	4	5	0	6	6	2	0	0	0	0	0	10	5	0	0
4	184	220	8	0	25	4	0	0	0	0	2	274	9	88	1
5	0	18	2	32	0	205	0	0	0	0	44	91	1	0	2
6	7	28	2	6	328	0	0	0	0	0	0	57	1	3	12
7	0	0	0	2	0	1	0	0	0	0	5	7	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	25	125	8	24	19	0	0	1	0	0	0	0	9	9	2
12	84	537	18	159	96	92	0	8	0	1	1	0	38	18	4
13	0	0	0	74	0	0	0	0	0	0	0	0	0	0	0
14	2	6	0	8	0	1	0	0	0	0	0	4	0	0	0
15	0	0	0	1	0	1	0	0	0	0	1	1	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR = 0.459

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	46	9	252	0	8	0	0	0	0	2	196	0	43	1
2	80	0	7	614	107	103	0	0	0	0	14	791	85	52	1
3	8	10	0	12	11	3	0	0	0	0	1	19	9	1	0
4	347	416	16	0	46	7	0	0	0	0	5	518	17	167	2
5	0	34	3	60	0	388	0	0	0	0	82	173	3	0	3
6	13	52	3	11	620	1	0	1	0	0	0	109	3	6	22
7	0	0	0	3	1	2	0	0	0	0	10	14	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	0	2	0	0	0	0	0	15	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	48	236	15	45	36	0	0	1	0	0	0	0	17	17	3
12	159	1014	34	301	181	174	0	15	0	1	2	0	72	34	7
13	0	0	0	140	0	0	0	0	0	0	0	0	0	0	0
14	4	11	0	14	0	1	0	0	0	0	0	8	0	0	0
15	0	0	0	1	1	3	0	0	0	0	1	1	0	0	0

0815-0830 FACTOR 0.502

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0830)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	23	5	127	0	4	0	0	0	0	1	98	0	21	0
2	40	0	4	308	54	52	0	0	0	0	7	397	42	26	1
3	4	5	0	6	6	2	0	0	0	0	0	9	5	0	0
4	174	209	8	0	23	4	0	0	0	0	2	260	9	84	1
5	0	17	2	30	0	195	0	0	0	0	41	87	1	0	1
6	6	26	2	6	311	0	0	0	0	0	0	54	1	3	11
7	0	0	0	1	0	1	0	0	0	0	5	7	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	24	118	8	22	18	0	0	1	0	0	0	0	9	9	2
12	80	509	17	151	91	87	0	7	0	1	1	0	36	17	4
13	0	0	0	71	0	0	0	0	0	0	0	0	0	0	0
14	2	5	0	7	0	1	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	1	0	0	0	0	1	1	0	0	0

0830-0845 FACTOR 0.498

VISSIM MATRIX - LIGHTS - COOL DOWN (0830-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	23	5	126	0	4	0	0	0	0	1	98	0	21	0
2	40	0	4	306	53	51	0	0	0	0	7	394	42	26	1
3	4	5	0	6	6	2	0	0	0	0	0	9	5	0	0
4	173	207	8	0	23	4	0	0	0	0	2	258	9	83	1
5	0	17	2	30	0	193	0	0	0	0	41	86	1	0	1
6	6	26	2	6	309	0	0	0	0	0	0	54	1	3	11
7	0	0	0	1	0	1	0	0	0	0	5	7	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	8	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	24	117	8	22	18	0	0	1	0	0	0	0	8	9	2
12	79	505	17	150	90	86	0	7	0	1	1	0	36	17	3
13	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0
14	2	5	0	7	0	1	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171116 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v6

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data into:
1) Warm Up, Peak and Cool Down Matrices
2) 15 minute matrices within Warm Up, Peak and Cool Down periods.

Conversion based on observed turning counts, with factors to split the traffic appropriately.

SCENARIO:	2031 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1d

SCENARIO 2031 D1 - AM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	46	0	35	0
2	0	0	14	107	0	27	0	0	0	0	3	406	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	14	40	0	0	0	0	0	0	0	0	0	202	0	41	0
5	0	0	0	0	0	111	0	0	0	0	2	5	0	0	0
6	0	1	0	0	89	0	0	0	0	0	0	31	0	2	0
7	0	0	0	0	0	2	0	0	0	0	15	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	3	0
12	49	589	0	85	101	1	0	9	0	4	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	15	31	3	43	10	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR = 0.690

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	19	0	0	0	0	0	0	0	32	0	24	0
2	0	0	10	74	0	19	0	0	0	0	2	280	0	21	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	10	28	0	0	0	0	0	0	0	0	0	139	0	28	0
5	0	0	0	0	0	77	0	0	0	0	1	3	0	0	0
6	0	1	0	0	61	0	0	0	0	0	0	21	0	1	0
7	0	0	0	0	0	1	0	0	0	0	10	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	32	0	0	0	0	0	0	0	0	0	0	0	2	0
12	34	407	0	59	70	1	0	6	0	3	0	0	0	19	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	11	21	2	30	7	3	0	0	0	0	0	17	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0615-0630 FACTOR 0.191

VISSIM MATRIX - LIGHTS - WARM UP (0615-0630)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	6	0	5	0
2	0	0	2	14	0	4	0	0	0	0	0	53	0	4	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	5	0	0	0	0	0	0	0	0	0	27	0	5	0
5	0	0	0	0	0	15	0	0	0	0	0	1	0	0	0
6	0	0	0	0	12	0	0	0	0	0	0	4	0	0	0
7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0
12	6	78	0	11	13	0	0	1	0	0	0	0	0	4	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	2	4	0	6	1	1	0	0	0	0	0	3	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR 0.228

VISSIM MATRIX - LIGHTS - WARM UP (0630-0645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	4	0	0	0	0	0	0	0	7	0	6	0
2	0	0	2	17	0	4	0	0	0	0	0	64	0	5	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2	6	0	0	0	0	0	0	0	0	0	32	0	6	0
5	0	0	0	0	0	17	0	0	0	0	0	1	0	0	0
6	0	0	0	0	14	0	0	0	0	0	0	5	0	0	0
7	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0
12	8	93	0	13	16	0	0	1	0	1	0	0	0	4	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	2	5	0	7	2	1	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0645-0700 FACTOR 0.271

VISSIM MATRIX - LIGHTS - WARM UP (0645-0700)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	5	0	0	0	0	0	0	0	9	0	7	0
2	0	0	3	20	0	5	0	0	0	0	0	76	0	6	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	8	0	0	0	0	0	0	0	0	0	38	0	8	0
5	0	0	0	0	0	21	0	0	0	0	0	1	0	0	0
6	0	0	0	0	17	0	0	0	0	0	0	6	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	9	0	0	0	0	0	0	0	0	0	0	0	1	0
12	9	110	0	16	19	0	0	2	0	1	0	0	0	5	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	3	6	1	8	2	1	0	0	0	0	0	4	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0700-0715 FACTOR 0.310

VISSIM MATRIX - LIGHTS - WARM UP (0700-0730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	10	0	7	0
2	0	0	3	23	0	6	0	0	0	0	1	87	0	6	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	9	0	0	0	0	0	0	0	0	0	43	0	9	0
5	0	0	0	0	0	24	0	0	0	0	0	1	0	0	0
6	0	0	0	0	19	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	10	0	0	0	0	0	0	0	0	0	0	0	1	0
12	11	126	0	18	22	0	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	3	7	1	9	2	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (0615-0715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	27	0	0	0	0	0	0	0	46	0	35	0
2	0	0	14	107	0	27	0	0	0	0	3	406	0	30	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
4	14	40	0	0	0	0	0	0	0	0	0	202	0	41	0
5	0	0	0	0	0	111	0	0	0	0	2	5	0	0	0
6	0	1	0	0	89	0	0	0	0	0	0	31	0	2	0
7	0	0	0	0	0	2	0	0	0	0	15	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	46	0	0	0	0	0	0	0	0	0	0	0	3	0
12	49	589	0	85	101	1	0	9	0	4	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	15	31	3	43	10	4	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0715-0730 FACTOR 0.237

VISSIM MATRIX - LIGHTS - PEAK (0715-0730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	11	0	8	0
2	0	0	3	25	0	6	0	0	0	0	1	96	0	7	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	10	0	0	0	0	0	0	0	0	0	48	0	10	0
5	0	0	0	0	0	26	0	0	0	0	0	1	0	0	0
6	0	0	0	0	21	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	11	0	0	0	0	0	0	0	0	0	0	0	1	0
12	12	140	0	20	24	0	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	7	1	10	2	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0730-0745 FACTOR 0.259

VISSIM MATRIX - LIGHTS - PEAK (0730-0745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	7	0	0	0	0	0	0	0	12	0	9	0
2	0	0	4	28	0	7	0	0	0	0	1	105	0	8	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	10	0	0	0	0	0	0	0	0	0	52	0	11	0
5	0	0	0	0	0	29	0	0	0	0	1	1	0	0	0
6	0	0	0	0	23	0	0	0	0	0	0	8	0	1	0
7	0	0	0	0	0	1	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	12	0	0	0	0	0	0	0	0	0	0	0	1	0
12	13	153	0	22	26	0	0	2	0	1	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	8	1	11	3	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0745-0800 FACTOR 0.261

VISSIM MATRIX - LIGHTS - PEAK (0745-0800)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	7	0	0	0	0	0	0	0	12	0	9	0
2	0	0	4	28	0	7	0	0	0	0	1	106	0	8	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	11	0	0	0	0	0	0	0	0	0	53	0	11	0
5	0	0	0	0	0	29	0	0	0	0	1	1	0	0	0
6	0	0	0	0	23	0	0	0	0	0	0	8	0	1	0
7	0	0	0	0	0	1	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	12	0	0	0	0	0	0	0	0	0	0	0	1	0
12	13	154	0	22	26	0	0	2	0	1	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	8	1	11	3	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0630-0645 FACTOR 0.243

VISSIM MATRIX - LIGHTS - PEAK (0800-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	7	0	0	0	0	0	0	0	11	0	9	0
2	0	0	3	26	0	7	0	0	0	0	1	99	0	7	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	10	0	0	0	0	0	0	0	0	0	49	0	10	0
5	0	0	0	0	0	27	0	0	0	0	0	1	0	0	0
6	0	0	0	0	22	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	11	0	0	0	0	0	0	0	0	0	0	0	1	0
12	12	143	0	21	25	0	0	2	0	1	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	8	1	10	2	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR = 0.459

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	13	0	0	0	0	0	0	0	21	0	16	0
2	0	0	7	49	0	12	0	0	0	0	1	186	0	14	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	6	19	0	0	0	0	0	0	0	0	0	93	0	19	0
5	0	0	0	0	0	51	0	0	0	0	1	2	0	0	0
6	0	0	0	0	41	0	0	0	0	0	0	14	0	1	0
7	0	0	0	0	0	1	0	0	0	0	7	1	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	1	0	0	0	0	0	2	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	21	0	0	0	0	0	0	0	0	0	0	0	1	0
12	23	271	0	39	46	1	0	4	0	2	0	0	0	12	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	7	14	1	20	5	2	0	0	0	0	0	11	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0815-0830 FACTOR 0.502

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0830)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	11	0	8	0
2	0	0	3	25	0	6	0	0	0	0	1	93	0	7	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	9	0	0	0	0	0	0	0	0	0	46	0	9	0
5	0	0	0	0	0	26	0	0	0	0	0	1	0	0	0
6	0	0	0	0	20	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	11	0	0	0	0	0	0	0	0	0	0	0	1	0
12	11	136	0	20	23	0	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	7	1	10	2	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

0830-0845 FACTOR 0.498

VISSIM MATRIX - LIGHTS - COOL DOWN (0830-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	10	0	8	0
2	0	0	3	24	0	6	0	0	0	0	1	93	0	7	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	3	9	0	0	0	0	0	0	0	0	0	46	0	9	0
5	0	0	0	0	0	25	0	0	0	0	0	1	0	0	0
6	0	0	0	0	20	0	0	0	0	0	0	7	0	0	0
7	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	10	0	0	0	0	0	0	0	0	0	0	0	1	0
12	11	135	0	20	23	0	0	2	0	1	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4	7	1	10	2	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MULTIMODAL
MODELLING | ANALYSIS | PRESENTATION

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171116 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v6

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data into:
1) Warm Up, Peak and Cool Down Matrices
2) 15 minute matrices within Warm Up, Peak and Cool Down periods.

Conversion based on observed turning counts, with factors to split the traffic appropriately.

SCENARIO:	2031 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1d

SCENARIO 2031 D1 - PM PEAK
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	46	7	845	0	25	0	0	0	0	7	271	0	25	0
2	84	0	25	1110	52	530	0	0	0	0	53	2421	137	50	0
3	18	87	0	29	1	2	0	0	0	0	1	19	3	0	0
4	955	924	87	0	73	3	0	2	2	19	1121	117	115	1	1
5	0	253	1	38	0	876	0	1	0	0	146	396	0	0	1
6	6	147	8	14	890	0	0	2	0	1	0	181	4	1	4
7	0	0	0	2	1	2	0	0	0	0	12	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	15	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	49	430	21	103	129	0	0	5	0	2	0	17	14	2	
12	352	2674	26	764	311	294	0	107	0	16	7	0	9	24	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	70	85	4	390	7	34	0	0	0	0	12	183	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

WARM UP FACTOR = 0.889

CDOL DOWN FACTOR = 0.470

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	41	7	752	0	22	0	0	0	0	6	241	0	22	0
2	75	0	22	987	46	471	0	0	0	0	47	2152	122	44	0
3	16	77	0	26	1	1	0	0	0	0	1	17	3	0	0
4	849	822	78	0	65	3	0	2	0	2	17	997	104	102	1
5	0	225	1	34	0	779	0	1	0	0	129	352	0	0	1
6	6	131	7	13	792	0	0	2	0	1	0	161	4	1	4
7	0	0	0	2	1	2	0	0	0	0	11	10	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	14	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	44	382	18	92	115	0	0	5	0	1	0	0	15	12	1
12	313	2378	23	679	276	262	0	95	0	14	6	0	8	21	2
13	0	0	0	132	0	0	0	0	0	0	0	0	0	0	0
14	62	76	3	347	6	30	0	0	0	0	11	163	16	0	0
15	0	1	0	9	6	27	0	0	0	0	11	13	0	1	0

1545-1600 FACTOR 0.227

VISSIM MATRIX - LIGHTS - PEAK (1645-1745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	46	7	845	0	25	0	0	0	0	7	271	0	25	0
2	84	0	25	1110	52	530	0	0	0	0	53	2421	137	50	0
3	18	87	0	29	1	2	0	0	0	0	1	19	3	0	0
4	955	924	87	0	73	3	0	2	0	2	19	1121	117	115	1
5	0	253	1	38	0	876	0	1	0	0	146	396	0	0	1
6	6	147	8	14	890	0	0	2	0	1	0	181	4	1	4
7	0	0	0	2	1	2	0	0	0	0	12	12	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	1	2	0	0	0	0	15	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	49	430	21	103	129	0	0	5	0	2	0	17	14	2	
12	352	2674	26	764	311	294	0	107	0	16	7	0	9	24	2
13	0	0	0	148	0	0	0	0	0	0	0	0	0	0	0
14	70	85	4	390	7	34	0	0	0	0	12	183	18	0	0
15	0	1	0	10	7	31	0	0	0	0	12	15	0	1	0

1645-1700 FACTOR 0.248

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	22	4	397	0	12	0	0	0	0	3	127	0	12	0
2	40	0	12	522	24	249	0	0	0	0	25	1138	65	24	0
3	8	41	0	14	1	1	0	0	0	0	1	9	1	0	0
4	449	434	41	0	34	1	0	1	0	1	9	527	55	54	1
5	0	119	1	18	0	412	0	0	0	0	68	186	0	0	0
6	3	69	4	7	419	0	0	0	1	0	1	0	85	2	0	2
7	0	0	0	1	0	1	0	0	0	0	6	6	0	0	0	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9	0	0	0	1	0	1	0	0	0	0	0	7	0	0	0	
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11	23	202	10	48	61	0	0	2	0	1	0	0	8	7	1	
12	165	1257	12	359	146	138	0	50	0	8	3	0	4	11	1	
13	0	0	0	70	0	0	0	0	0	0	0	0	0	0	0	
14	33	40	2	183	3	16	0	0	0	0	6	86	9	0	0	
15	0	1	0	5	3	14	0	0	0	0	6	7	0	0	0	

1745-1800 FACTOR 0.513

VISSIM MATRIX - LIGHTS - WARM UP (1600-1615)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	9	2	171	0	5	0	0	0	0	1	55	0	5	0
2	17	0	5	224	10	107	0	0	0	0	11	489	28	10	0
3	4	18	0	6	0	0	0	0	0	0	0	4	1	0	0
4	193	187	18	0	15	1	0	0	0	0	4	226	24	23	0
5	0	51	0	8	0	177	0	0	0	0	29	80	0	0	0
6	1	30	2	3	180	0	0	0	0	0	0	37	1	0	1
7	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	10	87	4	21	26	0	0	1	0	0	0	0	3	3	0
12	71	540	5	154	63	59	0	21	0	3	1	0	2	5	0
13	0	0	0	30	0	0	0	0	0	0	0	0	0	0	0
14	14	17	1	79	1	7	0	0	0	0	2	37	4	0	0
15	0	0	0	2	1	6	0	0	0	0	2	3	0	0	0

1600-1615 FACTOR 0.242

VISSIM MATRIX - LIGHTS - PEAK (1700-1715)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	12	2	210	0	6	0	0	0	0	2	67	0	6	0
2	21	0	6	275	13	131	0	0	0	0	13	600	34	12	0
3	4	22	0	7	0	0	0	0	0	0	0	5	1	0	0
4	237	229	22	0	18	1	1	0	0	0	5	278	29	29	0
5	0	63	0	9	0	217	0	0	0	0	36	98	0	0	0
6	2	37	2	4	221	0	0	1	0	0	0	45	1	0	1
7	0	0	0	1	0	1	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	0	1	0	0	0	0	4	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	12	107	5	26	32	0	0	1	0	0	0	4	3	0	0
12	87	663	6	190	77	73	0	26	0	4	2	0	2	6	0
13	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0
14	17	21	1	97	2	8	0	0	0	0	3	45	5	0	0
15	0	0	0	2	2	8	0	0	0	0	3	4	0	0	0

1700-1715 FACTOR 0.248

VISSIM MATRIX - LIGHTS - COOL DOWN (1800-1815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	11	2	194	0	6	0	0	0	0	2	62	0	6	0
2	19	0	6	254	12	121	0	0	0	0	12	554	31	11	0
3	4	20	0	7	0	0	0	0	0	0	0	4	1	0	0
4	219	212	20	0	17	1	0	0	0	0	4	257	27	26	0
5	0	58	0	9	0	201	0	0	0	0	33	91	0	0	0
6	1	34	2	3	204	0	0	1	0	0	0	41	1	0	1
7	0	0	0	1	0	1	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	0	1	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	11	98	5	24	30	0	0	1	0	0	0	4	3	0	0
12	81	612	6	175	71	67	0	24	0	4	2	0	2	5	0
13	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0
14	16	19	1	89	2	8	0	0	0	0	3	42	4	0	0
15	0	0	0	2	2	7	0	0	0	0	3	3	0	0	0

1800-1815 FACTOR 0.487

VISSIM MATRIX - LIGHTS - WARM UP (1615-1630)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	10	2	182	0	5	0	0	0	0	1	58	0	5	0
2	18	0	5	239	11	114	0	0	0	0	11	521	30	11	0
3	4	19	0	6	0	0	0	0	0	0	0	4	1	0	0
4	205	199	19	0	16	1	0	0	0	0	4	241	25	25	0
5	0	54	0	8	0	188	0	0	0	0	31	85	0	0	0
6	1	32	2	3	192	0	0	1	0	0	0	39	1	0	1
7	0	0	0	1	0	0	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	11	93	4	22	28	0	0	1	0	0	0	4	3	0	
12	76	575	5	164	67	63	0	23	0	3	2	0	2	5	0
13	0	0	0	32	0	0	0	0	0	0	0	0	0	0	0
14	15	18	1	84	2	7	0	0	0	0	3	39	4	0	0
15	0	0	0	2	1	7	0	0	0	0	3	3	0	0	0

1615-1630 FACTOR 0.265

VISSIM MATRIX - LIGHTS - PEAK (1715-1730)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	12	2	212	0	6	0	0	0	0	2	68	0	6	0
2	21	0	6	279	13	133	0	0	0	0	13	608	34	13	0
3	4	22	0	7	0	0	0	0	0	0	0	5	1	0	0
4	240	232	22	0	18	1	1	0	0	0	5	281	29	29	0
5	0	64	0	10	0	220	0	0	0	0	37	99	0	0	0
6	2	37	2	4	224	0	0	1	0	0	0	45	1	0	1
7	0	0	0	1	0	1	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	1	0	1	0	0	0	0	4	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	12	108	5	26	32	0	0	1	0	0	0	4	4	0	0
12	88	671	6	192	78	74	0	27	0	4	2	0	2	6	0
13	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0
14	18	21	1	98	2	8	0	0	0	0	3	46	5	0	0
15	0	0	0	2	2	8	0	0	0	0	3	4	0	0	0

1730-1745 FACTOR 0.253

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (1630-1645)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	11	2	200	0	6	0	0	0	0	2	64	0	6	0
2	20	0	6	263	12	125	0	0	0	0	13	573	32	12	0
3	4	21	0	7	0	0	0	0	0	0	0	4	1	0	0
4	226	219	21	0	17	1	0	0	0	0	4	265	28	27	0
5	0	60	0	9	0	207	0	0	0	0	34	94	0	0	0
6	1	35	2	3	211	0	0	1	0	0	0	43	1	0	1
7	0	0	0	1	0	1	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	12	102	5	24	31	0	0	1	0	0	0	0	4	3	0
12	83	632	6	181	73	70	0	25	0	4	2	0	2	6	0
13	0	0	0	35	0	0	0	0	0	0	0	0	0	0	0
14	17	20	1	92	2	8	0	0	0	0	3	43	4	0	0
15	0	0	0	2	2	7	0	0	0	0	3	4	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (1730-1745)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	12	2	214	0	6	0	0	0	0	2	68	0	6	0
2	21	0	6	281	13	134	0	0	0	0	13	613	35	13	0
3	5	22	0	7	0	0	0	0	0	0	0	5	1	0	0
4	242	234	22	0	19	1	0	0	0	0	5	284	30	29	0
5	0	64	0	10	0	222	0	0	0	0	37	100	0	0	0
6	2	37	2	4	225	0	0	1	0	0	0	46	1	0	1
7	0	0	0	1	0	1	0	0	0	0	3	3	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	12	109	5	26	33	0	0	1	0	0	0	0	4	4	0
12	89	677	6	193	79	74	0	27	0	4	2	0	2	6	0
13	0	0	0	37	0	0	0	0	0	0	0	0	0	0	0
14	18	22	1	99	2	9	0	0	0	0	3	46	5	0	0
15	0	0	0	2	2	8	0	0	0	0	3	4	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
LIGHTS (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Project: 02664 Northampton Gateway
Prepared by: DB
Checked by: LB

NSTM to VISSIM - Flow Matrix Calculations

Location of NSTM Outputs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\02_COMMS\Received\171116 ADC-Updated 2031 NSTM Flows
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v6

Location of 15 Min and Hourly Factor Calcs:
L:\Team Folders\PROJECTS\02664 M1J15 Northampton Gateway\03_TECH\01_VISSIM\non TfL\02 REF CASE\Traffic Flows
170526 15 MIN FACTORS

Calculation Details

Conversion of NSTM data into:
1) Warm Up, Peak and Cool Down Matrices
2) 15 minute matrices within Warm Up, Peak and Cool Down periods.

Conversion based on observed turning counts, with factors to split the traffic appropriately.

SCENARIO:	2031 WITH TRANSPORT MITIGATION DEVELOPMENT CASE
FLOWSET:	J1d

SCENARIO 2031 D1 - PM PEAK
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	41	0	30	0
2	0	0	0	98	0	16	0	0	0	0	65	402	0	35	0
3	0	18	0	0	0	0	0	0	0	0	0	34	0	1	0
4	15	22	0	0	0	0	0	0	0	0	0	24	0	41	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	23	0	0	77	0	0	0	0	0	0	0	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
12	66	421	23	73	1	78	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	23	30	1	43	5	5	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

WARM UP FACTOR =	0.889

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	5	0	0	0	0	0	0	0	36	0	27	0
2	0	0	0	87	0	14	0	0	0	0	58	358	0	31	0
3	0	16	0	0	0	0	0	0	0	0	0	30	0	1	0
4	13	20	0	0	0	0	0	0	0	0	0	21	0	36	0
5	0	0	0	0	0	105	0	0	0	0	0	0	0	0	0
6	0	20	0	0	69	0	0	0	0	0	0	0	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
12	58	374	20	65	1	70	0	0	0	0	0	0	0	24	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	20	27	1	39	5	4	0	0	0	0	0	21	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1545-1600 FACTOR	0.227

VISSIM MATRIX - LIGHTS - WARM UP (1545-1600)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	8	0	6	0
2	0	0	0	20	0	3	0	0	0	0	13	81	0	7	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	3	4	0	0	0	0	0	0	0	0	0	5	0	8	0
5	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0
6	0	5	0	0	16	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
12	13	85	5	15	0	16	0	0	0	0	0	0	0	5	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	6	0	9	1	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1600-1615 FACTOR	0.242

VISSIM MATRIX - LIGHTS - WARM UP (1600-1615)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	6	0
2	0	0	0	21	0	3	0	0	0	0	14	87	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	7	0	0	0
4	3	5	0	0	0	0	0	0	0	0	0	5	0	9	0
5	0	0	0	0	0	25	0	0	0	0	0	0	0	0	0
6	0	5	0	0	17	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	14	91	5	16	0	17	0	0	0	0	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	6	0	9	1	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1615-1630 FACTOR	0.265

VISSIM MATRIX - LIGHTS - WARM UP (1615-1630)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	7	0
2	0	0	0	23	0	4	0	0	0	0	15	95	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	3	5	0	0	0	0	0	0	0	0	0	6	0	10	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	5	0	0	18	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	15	99	5	17	0	18	0	0	0	0	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	7	0	10	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1630-1645 FACTOR	0.266

VISSIM MATRIX - LIGHTS - WARM UP (1630-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	7	0
2	0	0	0	23	0	4	0	0	0	0	15	95	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	3	5	0	0	0	0	0	0	0	0	0	6	0	10	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	5	0	0	18	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	15	100	5	17	0	19	0	0	0	0	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	7	0	10	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - WARM UP (1545-1645)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

VISSIM MATRIX - LIGHTS - PEAK (1645-1745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	6	0	0	0	0	0	0	0	41	0	30	0
2	0	0	0	98	0	16	0	0	0	0	65	402	0	35	0
3	0	18	0	0	0	0	0	0	0	0	0	34	0	1	0
4	15	22	0	0	0	0	0	0	0	0	0	24	0	41	0
5	0	0	0	0	0	118	0	0	0	0	1	0	0	0	0
6	0	23	0	0	77	0	0	0	0	0	0	0	0	2	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	2	0	0	0	0	0	0	0	0	0	0	0	3	0
12	66	421	23	73	1	78	0	0	0	0	0	0	0	27	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	23	30	1	43	5	5	0	0	0	0	0	24	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1645-1700 FACTOR	0.248

VISSIM MATRIX - LIGHTS - PEAK (1645-1700)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	7	0
2	0	0	0	24	0	4	0	0	0	0	16	100	0	9	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	4	5	0	0	0	0	0	0	0	0	0	6	0	10	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	6	0	0	19	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	16	104	6	18	0	19	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	7	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1700-1715 FACTOR	0.248

VISSIM MATRIX - LIGHTS - PEAK (1700-1715)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	7	0
2	0	0	0	24	0	4	0	0	0	0	16	100	0	9	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	4	5	0	0	0	0	0	0	0	0	0	6	0	10	0
5	0	0	0	0	0	29	0	0	0	0	0	0	0	0	0
6	0	6	0	0	19	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	16	104	6	18	0	19	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	7	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1715-1730 FACTOR	0.251

VISSIM MATRIX - LIGHTS - PEAK (1715-1730)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	8	0
2	0	0	0	25	0	4	0	0	0	0	16	101	0	9	0
3	0	5	0	0	0	0	0	0	0	0	0	9	0	0	0
4	4	6	0	0	0	0	0	0	0	0	0	6	0	10	0
5	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
6	0	6	0	0	19	0	0	0	0	0	0	0	0	1	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	16	106	6	18	0	20	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	8	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1730-1745 FACTOR	0.253

VISSIM MATRIX - LIGHTS - PEAK (1730-1745)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	8	0
2	0	0	0	25	0	4	0	0	0	0	16	102	0	9	0
3	0	5	0	0	0	0	0	0	0	0	0	9	0	0	0
4	4	6	0	0	0	0	0	0	0	0	0	6	0	10	0
5	0	0	0	0	0	30	0	0	0	0	0	0	0	0	0
6	0	6	0	0	20	0	0	0	0	0	0	0	0	1	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	17	107	6	19	0	20	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	6	8	0	11	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - PEAK (0715-0815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

COOL DOWN FACTOR =	0.470

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	3	0	0	0	0	0	0	0	19	0	14	0
2	0	0	0	46	0	7	0	0	0	0	30	189	0	16	0
3	0	8	0	0	0	0	0	0	0	0	0	16	0	0	0
4	7	10	0	0	0	0	0	0	0	0	0	11	0	19	0
5	0	0	0	0	0	55	0	0	0	0	0	0	0	0	0
6	0	11	0	0	36	0	0	0	0	0	0	0	0	1	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	31	198	11	34	0	37	0	0	0	0	0	0	0	13	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	11	14	0	20	2	2	0	0	0	0	0	11	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1745-1800 FACTOR	0.513

VISSIM MATRIX - LIGHTS - COOL DOWN (1745-1800)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	10	0	7	0
2	0	0	0	24	0	4	0	0	0	0	16	97	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	4	5	0	0	0	0	0	0	0	0	0	6	0	10	0
5	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
6	0	6	0	0	19	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	16	102	5	18	0	19	0	0	0	0	0	0	0	7	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	7	0	10	1	1	0	0	0	0	0	6	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1800-1815 FACTOR	0.487

VISSIM MATRIX - LIGHTS - COOL DOWN (1800-1815)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	1	0	0	0	0	0	0	0	9	0	7	0
2	0	0	0	22	0	4	0	0	0	0	15	92	0	8	0
3	0	4	0	0	0	0	0	0	0	0	0	8	0	0	0
4	3	5	0	0	0	0	0	0	0	0	0	5	0	9	0
5	0	0	0	0	0	27	0	0	0	0	0	0	0	0	0
6	0	5	0	0	18	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
12	15	96	5	17	0	18	0	0	0	0	0	0	0	6	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	5	7	0	10	1	1	0	0	0	0	0	5	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

CHECK - ALL VALUES SHOULD EQUAL 0 IF CORRECT

VISSIM MATRIX - LIGHTS - COOL DOWN (0815-0845)
HGV (VEH)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix D – Model Changes Technical Notes

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Client:	ADC Infrastructure	Date:	02/10/2017

Summary VISSIM Model Changes – Reference Case

1. INTRODUCTION

This Technical Note (TN) summarises the key changes made to the approved M1 J15 and M1 J15a base VISSIM model to create the 2031 Reference Case model for the proposed Strategic Rail Freight Interchange (SRFI) known as Northampton Gateway.

This document has been produced for auditing purposes, to allow the 2031 VISSIM model development process to be understood, following numerous internal edits and iterations.

2. KEY CHANGES MADE

The following headings provide details on the key changes made to create the 2031 Reference Case VISSIM model.

1) Backgrounds – J15 and J15a Mitigation Layouts

The following DWG files have been used to code in the SMART motorway improvements at M1 J15 and J15a (see **Appendix A**):

- **ACAD-HA549348-AMAR-HML-J15A-M2-CH-900001-Model.dwg**
- **ACAD-HA549348-AMAR-HML-J15-M2-CH-900001-Model.dwg**

2) Matrices – 2031 Flows Modelled

The flows modelled have been taken from the following spreadsheet:

NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v5.xlsx

The conversion process from NSTM to VISSIM O-D matrices is described within the following spreadsheets:

- **170912 2031 MIT VISSIM FLOWS_Rev4.xlsx**
- **170526 15 MIN FACTORS.xlsx**

In summary, the spreadsheets convert the hourly NSTM flows into 15-minute matrices for the warm up, peak and cool down periods using factors derived from the observed survey data. Further details are provided in **Appendix B**.

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3) Base Data – Network Wide Changes

Driver Behaviour / Link Behaviour Types
The following new driver behaviour profiles have been created within the reference case model:

No.	Name	Description
13	Urban (motorised) – Dummy Link	Originally used on Dummy Links in base model, but now superseded by Driver Behaviour No. 14.
14	Urban-AV-Dummy Link.	Used on Dummy Links to achieve constant flows in close proximity for MOVA Hold Messages. This has been based on AV example sent to Multimodal by PTV and provides improved signal performance over previous 'dummy link' behaviour. The number of observed vehicles has been amended from 4 to 8 to make vehicles observe and stop at signals on dummy links. With 4 observed vehicles, these were found to be travelling through a signal on red.

The VISSIM model from PTV which contains the AV parameters the model can be found in **Appendix C**.

The driver behaviour type '11 – Motorway' has been modified, with the 'Lane Change – General Behaviour' setting amended to 'Slow Lane Rule' from 'Free Lane Selection'. This was to provide more realistic behaviour on the M1 mainline.

Desired Speeds
Three additional desired speed distributions have been added to the model:

No.	Name	Description
10087	Dummy Link – 70mph - AVs	This has been based on the PTV AV example, with tighter upper and lower limits to keep vehicles at more constant speeds on the dummy links. This assists with the modelling of the Hold Messages in PC MOVA.
1088	Dummy Link – 60mph - AVs	This has been based on the PTV AV example, with tighter upper and lower limits to keep vehicles at more constant speeds on the dummy links. This assists with the modelling of the Delayed Hold Message in PC MOVA.

Vehicle Types / Classes
An extra vehicle type and class has been added to the model – '**Car-AV**'. This has been assigned to the dummy links to improve the MOVA signal operation and has been based on the PTV AV example.

The vehicle inputs on the dummy links have been subsequently amended to apply to this new vehicle type.

4) Signal Controllers

There have been no changes to the signal controllers or MOVA datasets for this scenario.

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5) Local Changes – M1 J15

Links / Connectors

Most of the connectors have been kept the same as the previously validated base model. However, there are some exceptions as detailed below:

No.	Location	Emergency Stop	Lane Change
30030	M1 NB Off-Slip	5m	1000m
10142		5m	1000m
30050	M1 SB Off-Slip	5m	1000m (per lane)
30045		5m	1000m (per lane)

The lane change distances on these connectors have been changed to provide more realistic lane behaviour as vehicles merge off the M1 towards J15.

The driver behaviour on the links and connectors around J15 have remained as per the validated base model. Where the on-slip and off-slip configuration has changed as a result of the SMART motorway scheme, the 'merges' behaviour (where not previously assigned) has been included as shown in **Figure 1**.

Figure 1 – M1 J15 Driver Behaviour

Desired Speeds & Reduced Speed Areas

No changes from previously validated base model.

Priority Rules & Conflict Areas

No changes from previously validated base model.

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Signal Heads & Detectors
No changes from previously validated base model.

Vehicle Inputs, Routes & Parking Lots
No changes from previously validated base model.

Public Transport Stops & Lines
No changes from previously validated base model.

Nodes
Node 115 has been modified to suit the new link / connector layout and all edges have been checked for suitable paths and movements around the junction.

Nodes 127, 128, 129 and 130 have been added around the M1 merge areas to ensure appropriate vehicle movements.

Evaluation Markers
New output markers have been placed around the junction for collection of data including flows, queues, journey times and delay measurements.

6) Local Changes – M1 J15a

Links / Connectors
The North roundabout (A43 / A5123) has had an additional arm added to account for the proposed Milton Ham development.

Most of the connectors have been kept the same as the previously validated base model. However, there are some exceptions as detailed below:

No.	Location	Emergency Stop	Lane Change
10030	Swan Valley R'bout – M1 SB Exit	20m	250m
10120	M1 NB Off-Slip	50m	1500m (per lane)
10121		50m	1500m (per lane)
10091	M1 SB Off-Slip	5m	2500m (per lane)

The lane change distances on these connectors have been changed to provide more realistic lane behaviour as vehicles turn off the M1 towards J15a and to prevent an issue of disappearing vehicles at the Swan Valley roundabout.

The connector layout on M1 SB exit at the Swan Valley roundabout has been amended slightly to prevent an issue where large numbers of vehicles were disappearing at the end of Connector 10108 as they could not change lanes. The before and after layouts are shown in **Figure 2**.

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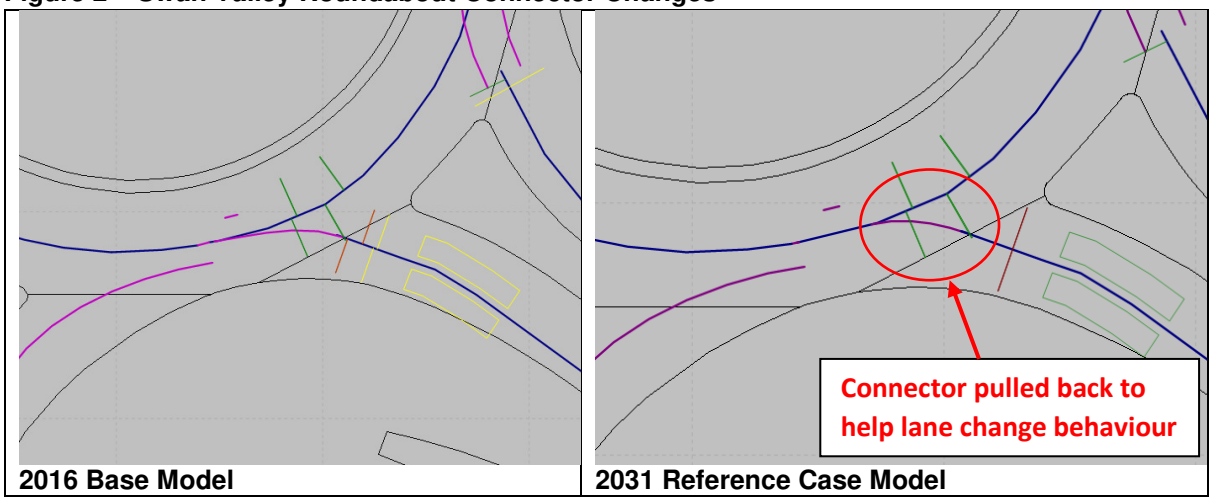
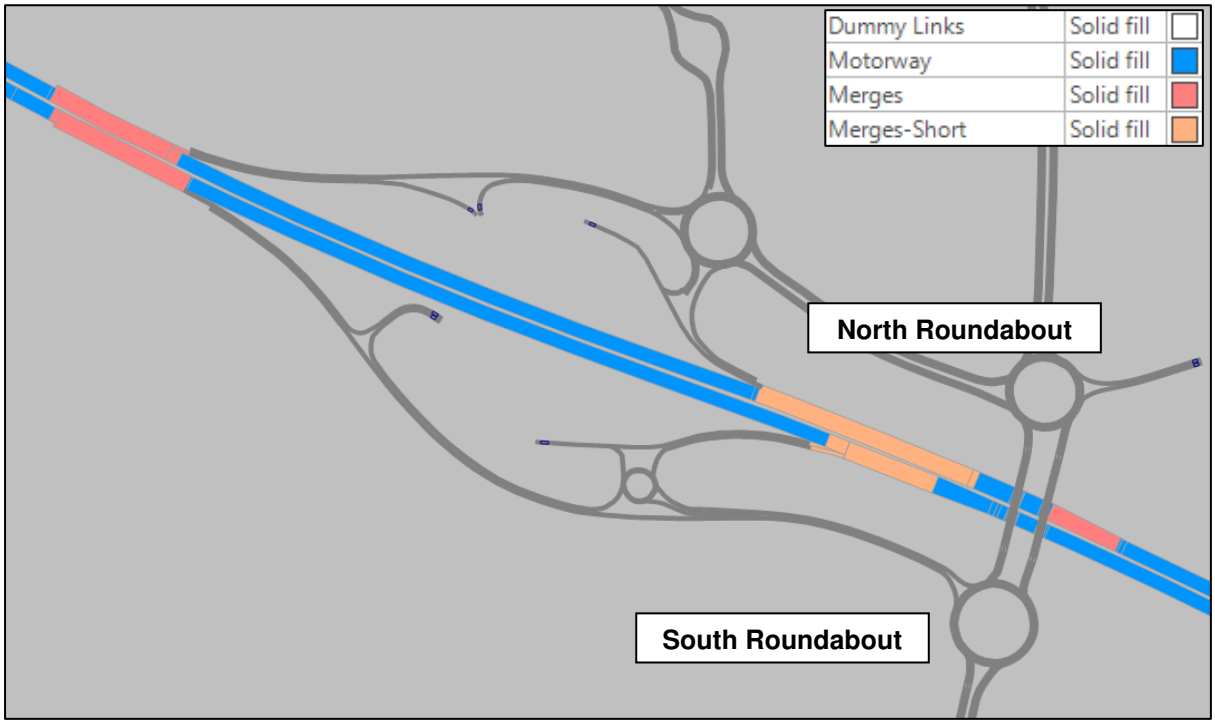
Figure 2 – Swan Valley Roundabout Connector Changes



The driver behaviour on the links and connectors around J15a have remained as per the validated base model. Where the on-slip and off-slip configuration has changed as a result of the SMART motorway scheme, the 'merges' or 'merges-short' behaviour (where previously not assigned) have been included as shown in **Figure 3**.

Figure 3 – M1 J15a Driver Behaviour



Desired Speeds & Reduced Speed Areas
No changes from previously validated base model.

Priority Rules & Conflict Areas
Priority rules have been added to the Milton Ham access to model the give-way out of the site. All other priority rules are as per the validated base model.

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Signal Heads & Detectors
No changes from previously validated base model.

Vehicle Inputs, Routes & Parking Lots
An additional zone (Zone 15) and associated in and out parking lots have been included for the proposed Milton Ham development, accessing J15a off the East approach

Public Transport Stops & Lines
No changes from previously validated base model.

Nodes
Nodes 28, 29, 32, 22, 25 and 26 have been checked to ensure all paths are suitable with the new SMART motorway arrangements.

Evaluation Markers
New output markers have been placed around the junction for collection of data including flows, queues and journey times measurements.

7) Local Changes – M1 Mainline

Links / Connectors
All M1 mainline links and connectors have been amended to 4 lanes of 3.65m width to tie in with the associated SMART motorway DWG files.

Slip Road merge and diverge areas have also been modelled in accordance with the DWG files, with use of the 0.1m lane widths to model the various lane gains and drops. These have been modelled in a similar manner to the PTV Example 'Merging and Diverging' in the 'Examples Training' folder. This utilises a 0.1m lane at the end of the merge to join two lanes together. This process has also been reversed to model one lane to two for flare lengths.

The majority of the connectors have been assigned emergency stop and lane change values of 5m and 200m respectively. However, there are some exceptions as detailed below (which are different from the validated base model received):

No.	Location	Emergency Stop	Lane Change
10140	M1 – J15 – NB Off-Slip	5m	1000m
30027		5m	1000m
30044	M1 – J15 – SB Off-Slip	5m	1000m
30049		5m	1000m

The lane distance on this connector has been changed to provide more realistic lane behaviour at diverge areas off the M1 mainline.

The driver behaviour on the links and connectors has been kept to the 'Motorway' behaviour. There were some connectors on the mainline which were assigned to other driving behaviours, which have been updated to 'Motorway'. This has been done for consistency on the mainline and given the small lengths of these connectors, is unlikely to affect any modelled results.

At M1 J15a, the previously used 'merges' and 'merges short' behaviour has been retained for consistency with the received validated base model.

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Desired Speeds & Reduced Speed Areas
No M1 mainline changes from validated base model.

Priority Rules & Conflict Areas
Not applicable – no priority rules / conflict areas on M1 mainline.

Signal Heads & Detectors
Not applicable – no signals / detectors on M1 mainline.

Vehicle Inputs, Routes & Parking Lots
No M1 mainline changes from validated base model.

Public Transport Stops & Lines
Not applicable – no PT stops or lines on M1 mainline.

Nodes
As previously stated, the nodes at J15 and J15a have been reviewed to suit the new link / connector layout and all edges have been checked for suitable paths and movements on the M1 mainline.

Evaluation Markers
New output markers have been placed at various locations on the M1 mainline for collection of data including flows, queues and journey times measurements.

3. SUMMARY

This Technical Note (TN) summarises the key changes made to the approved M1 J15 and M1 J15a validated base VISSIM model to create the 2031 Reference Case model for the proposed Strategic Rail Freight Interchange (SRFI) known as Northampton Gateway.

All global parameters and network elements amended have been listed, detailed and explained for auditing purposes.

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Prepared by:	Daniel Bent	Reviewed by:	Luke Best
Client:	ADC Infrastructure	Date:	26/09/2017

Summary VISSIM Model Changes – Proposed Mitigation

1. INTRODUCTION

This Technical Note (TN) summarises the key changes made to the approved M1 J15 and M1 J15a base VISSIM model to create the 2031 Mitigation model for the proposed Strategic Rail Freight Interchange (SRFI) known as Northampton Gateway.

This document has been produced for auditing purposes, to allow the 2031 VISSIM model development process to be understood, following numerous internal edits and iterations.

2. KEY CHANGES MADE

The following headings provide details on the key changes made to create the 2031 Mitigation VISSIM model.

1) Backgrounds – J15 and J15a Mitigation Layouts

The following DWG files have been used to code in the mitigation at M1 J15 and J15a (see **Appendix A**):

- M1 J15, Site Access & A45 / Watering Lane:
  - **170719 NGW-BWB-HGN-HW-M2-D-100_Highway GA.dwg**
- M1 J15a:
  - **170726 NGW-BWB-HGN-HW-M2-D-100_Highway GA.dwg**
- SMART motorway improvements:
  - **ACAD-HA549348-AMAR-HML-J15A-M2-CH-900001-Model.dwg**
  - **ACAD-HA549348-AMAR-HML-J15-M2-CH-900001-Model.dwg**

2) Matrices – 2031 Flows Modelled

The flows modelled have been taken from the following spreadsheet:
NSTM2 M1 Gateway Micro Sim Cordon Matrices - Adjusted v5.xlsx

The conversion process from NSTM to VISSIM O-D matrices is described within the following spreadsheets:
- **170912 2031 MIT VISSIM FLOWS_Rev4.xlsx**
- **170526 15 MIN FACTORS.xlsx**

In summary, the spreadsheets convert the hourly NSTM flows into 15-minute matrices for the warm up, peak and cool down periods using factors derived from the observed survey data. Further details are provided in **Appendix B**.

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3) Base Data – Network Wide Changes

Driver Behaviour / Link Behaviour Types
The following new driver behaviour profiles have been created within the mitigation model:

No.	Name	Description
15	Urban (merging)	Used for mitigation merging areas.
16	Urban (flare)	Used for areas where mitigation includes flaring of lanes.
17	Urban (motorised) – Dummy Link	Originally used on Dummy Links in base model, but now superseded by Driver Behaviour No. 18.
18	Urban-AV-Dummy Link.	Used on Dummy Links to achieve constant flows in close proximity for MOVA Hold Messages. This has been based on AV example sent to Multimodal by PTV and provides improved signal performance over previous 'dummy link' behaviour. The number of observed vehicles has been amended from 4 to 8 to make vehicles observe and stop at signals on dummy links. With 4 observed vehicles, these were found to be travelling through a signal on red.

Further details on the parameter choices for the Urban (merging) and Urban (flare) behaviour used in the model can be found in **Appendix C**, along with the VISSIM model from PTV which contains the AV parameters.

The driver behaviour type '11 – Motorway' has been modified, with the 'Lane Change – General Behaviour' setting amended to 'Slow Lane Rule' from 'Free Lane Selection'. This was to provide more realistic behaviour on the M1 mainline.

Desired Speeds
Three additional desired speed distributions have been added to the model:

No.	Name	Description
11000	50mph Car – TfL	This has been based on the latest TfL template, as no DfT statistics are available for 50mph limits.
11001	50mph Bus - TfL	
11002	Dummy Link – 70mph - AVs	This has been based on the PTV AV example, with tighter upper and lower limits to keep vehicles at more constant speeds on the dummy links. This assists with the modelling of the Hold Messages in PC MOVA.

Further details on the speed distributions used can be found in **Appendix D**.

Vehicle Types / Classes
An extra vehicle type and class has been added to the model – '**Car-AV**'. This has been assigned to the dummy links to improve the MOVA signal operation and has been based on the PTV AV example.

The vehicle inputs on the dummy links have been subsequently amended to apply to this new vehicle type.

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4) Signal Controllers

The following signal controllers have been added within the Mitigation model:

No.	Name	Type	Description
5	005 - Site Access - SB Toucan	VAP	Demand dependent toucan for toucan crossing to north of site access junction
6	006 - Site Access - NB1 Toucan	VAP	
7	007 - Site Access - NB2 Toucan	VAP	
10	Alt Proposed - J15 - North1	External	MOVA controlled signals for the five nodes at M1 J15
11	Alt Proposed - J15 - North2	External	
12	AltProposed - J15 - South1	External	
13	AltProposed - J15 - South2	External	
14	Watering Lane	VAP	Demand dependent signals for allowing traffic to access and exit Watering Lane to the A45.
15	AltProposed - J15 - South3	External	MOVA controlled signals for the five nodes at M1 J15
16	J15a South - Proposed Signals	Fixed time	Used for initial J15a mitigation, but now superseded by SC20,21 & 22
17	J15a North - Proposed Signals	Fixed time	
20	J15a - MOVA - North Rbout	External	MOVA controlled signals for the three nodes at M1 J15a.
21	J15a - MOVA - South Rbout - South	External	
22	J15a - MOVA - South Rbout - West	External	

The MOVA signals at M1 J15 and M1 J15a have been designed by Dan Preece at Integrated Traffic Systems Ltd. These designs have been input into VISSIM and validated by visual assessment of the VISSIM models. The link / lane diagrams, MOVA Tools files and MOVA datasets can be found in **Appendix E**.

For J15, it should be noted that the demand dependent pedestrian crossing in the south-west section of the junction has been brought within the overall MOVA control of the junction.

The number of dummy links has increased because of additional linking between the different streams at both J15 and J15a. As previously mentioned, these have been updated to include PTV's AV behaviour to improve the flow on these links and help with the signal linking performance.

The site access toucan crossing has been modelled using a TfL template VAP file and modelled as demand dependent.

The Watering Lane signals have been indicatively modelled at this stage and may be subject to further refinement. The current set-up aims to keep queues on Watering Lane to a minimum, without affecting the performance or cause queuing back to J15 on the A45.

5) Local Changes – M1 J15

Links / Connectors

The links and connectors have been adjusted to suit the J15 layout as per the associated CAD drawing.

The junction also features a number of 0.1m lane widths, which have been used for merges and flares. These model approaches to flares in a similar manner to the PTV Example 'Merging and Diverging' in the 'Examples Training' folder. This utilises a 0.1m lane at the end of the merge to join two lanes together. This process has also been reversed to model one lane to two for flare lengths.

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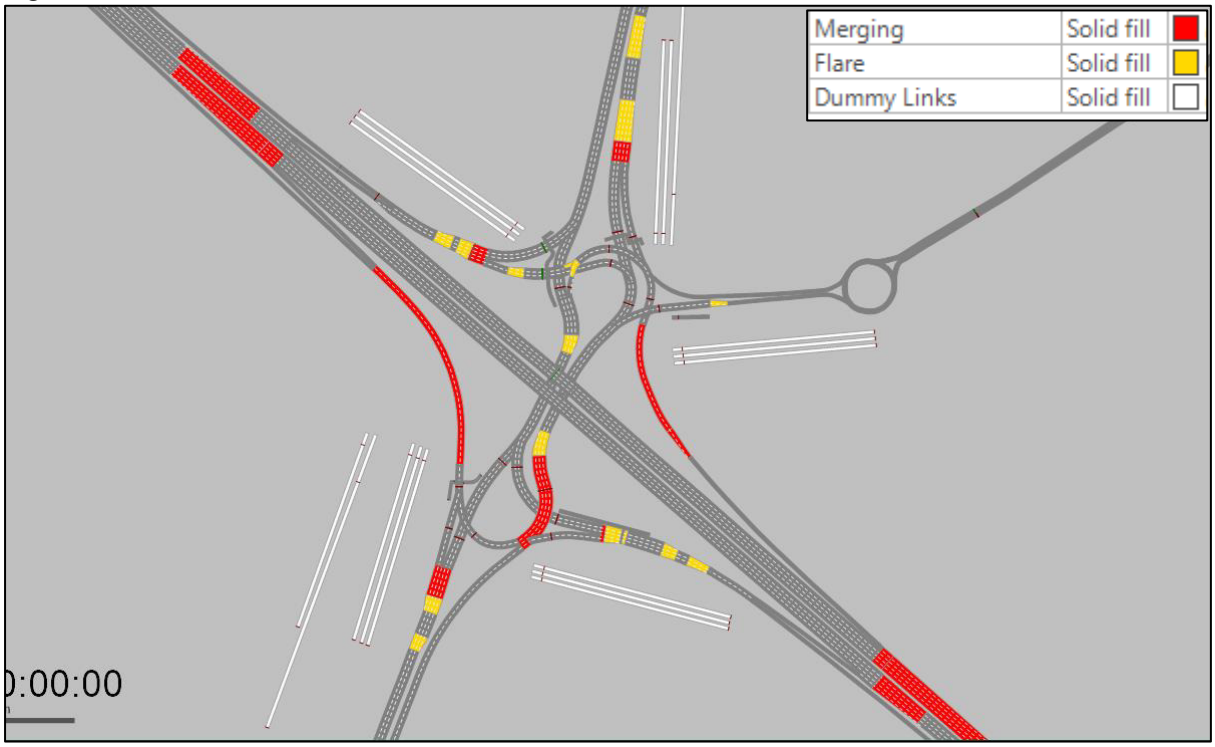
The majority of the connectors have been assigned emergency stop and lane change values of 5m and 200m respectively. However, there are some exceptions as detailed below:

No.	Location	Emergency Stop	Lane Change
30032	A45 approach	5m	300m
30083	SE Circulatory	5m	450m
10131		5m	300m
30081	M1 NB Off-Slip	5m	250m
30203		5m	1000m
30191		5m	1000m
30164	M1 NB Off-Slip Exit	5m	250m
30166		5m	250m
10138		5m	1000m (per lane)
30179		5m	1000m (per lane)

The lane distances on these connectors have been changed to provide more realistic lane behaviour as vehicles drive around J15.

The driver behaviour on the links and connectors has been kept to the 'Urban (motorised)' behaviour as much as possible. However, there were some areas that required either the 'flare' or 'merging' behaviour, which are shown in the **Figure 1** below.

Figure 1 – M1 J15 Driver Behaviour



Desired Speeds & Reduced Speed Areas

Desired speed markers have been added to model a 50mph speed limit from just north of the A45 / Watering Lane junction to south of the A508 / Site Access junction.

Reduced speed areas (RSAs) of length 5m have been placed at every signalised stop-line at J15, with a 30mph speed limit applied to Cars and HGVs / Buses.

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Priority Rules & Conflict Areas
Priority rules have been placed in the areas where the M1 NB and M1 SB off-slips meet the circulatory sections, in a bid to prevent overlapping vehicles during times of congestion.

Gap time rules use the conventional 3.0s time for Cars and 3.5s for HGVs / Buses. Any headway rules use a length of 5m and maximum speed of 20mph.

Signal Heads & Detectors
Signal heads and detectors are based on the associated DWG background and as per the locations specified in the link / lane diagrams created by Dan Preece.

Vehicle Inputs, Routes & Parking Lots
The inputs for the pedestrian crossing in the south-west section of the junction has been kept as the previously validated base model.

Public Transport Stops & Lines
PT lines 33 / 33A, X4, 801, X7, 455 and 707 have been updated to suit the new link / connector structure at J15.

Nodes
Node 115 has been modified to suit the new link / connector layout and all edges have been checked for suitable paths and movements around the junction.

Evaluation Markers
New output markers have been placed around the junction for collection of data including flows, queues, journey times and delay measurements.

6) Local Changes – M1 J15a

Links / Connectors
The links and connectors at the North and South roundabouts of J15a (not Services roundabouts) have been adjusted to suit the layout in the associated CAD drawing.

The North roundabout (A43 / A5123) has had an additional arm added to account for the proposed Milton Ham development.

The junction also features a number of 0.1m lane widths, which have been used for merges and flares. These model approaches to flares in a similar manner to the PTV Example 'Merging and Diverging' in the 'Examples Training' folder. This utilises a 0.1m lane at the end of the merge to join two lanes together. This process has also been reversed to model one lane to two for flare lengths.

The majority of the connectors have been assigned emergency stop and lane change values of 5m and 200m respectively. However, there are some exceptions as detailed below:

No.	Location	Emergency Stop	Lane Change
10025	North R'bout - SE Circulatory	5m	300m
10022	North R'bout – Swan Valley Approach	30m	280m (per lane)
10041		5m	280m (per lane)
10120	M1 NB Off-Slip	50m	1500m (per lane)
10121		50m	1500m (per lane)
10091	M1 SB Off-Slip	5m	2500m (per lane)

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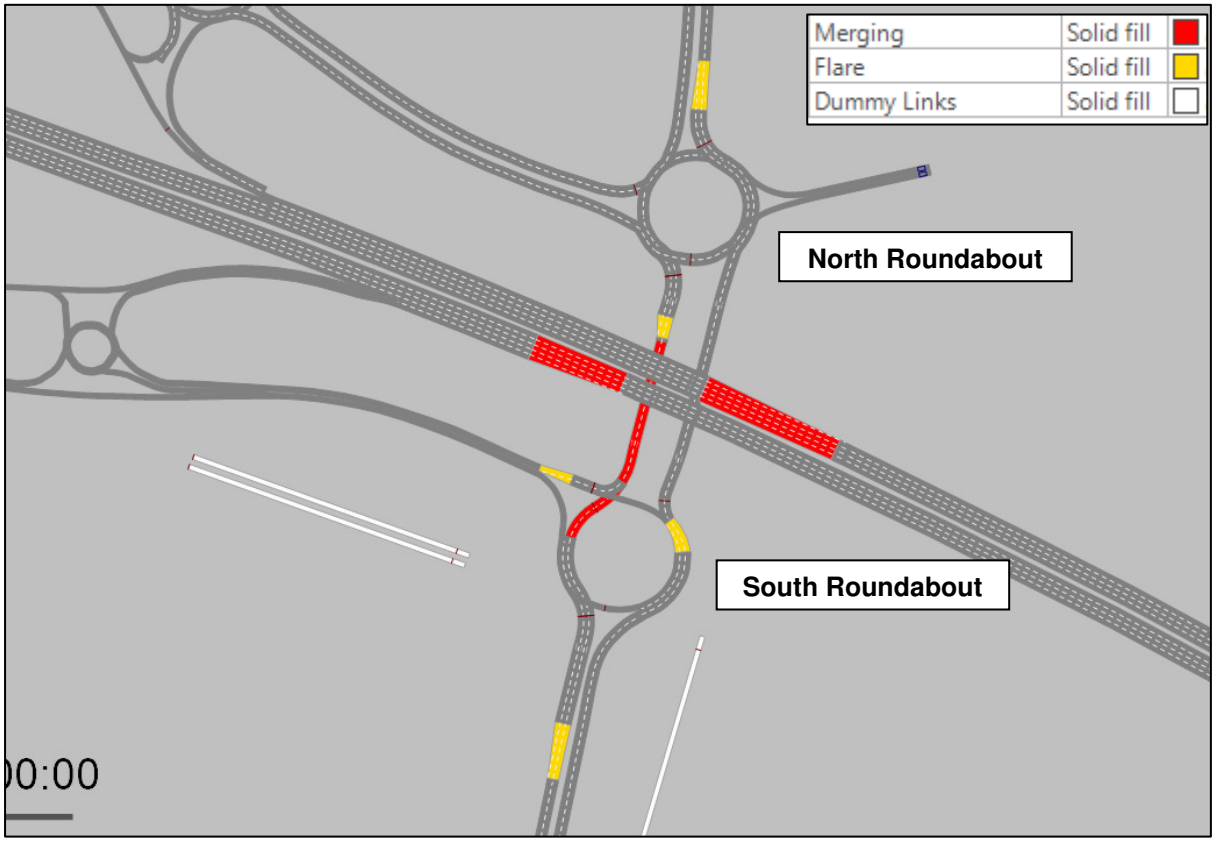
These stop and lane change distances have been kept to be consistent with the previously validated model received from AECOM.

The driver behaviour on the links and connectors has been kept to the 'Urban (motorised)' behaviour as much as possible. However, there were some areas that required either the 'flare' or 'merging' behaviour, which are shown in the **Figure 2**.

Figure 2 – M1 J15a Driver Behaviour



Desired Speeds & Reduced Speed Areas

Desired speed markers have been added to model a 30mph speed limit in the vicinity of the North and South roundabouts of J15a. The approaches and links in between the two roundabouts have been kept as the previously validated model for consistency.

RSAs of length 5m have been placed at every signalised stop-line and give-way line at J15a, with a 30mph speed limit applied to Cars and HGVs / Buses.

Priority Rules & Conflict Areas

Priority rules have been placed on the following North and South roundabout approaches at J15a where giving way is required:

- North Roundabout – A5123 approach;
- North Roundabout – Milton Ham access;
- North Roundabout – A43 West approach;
- South Roundabout – A43 North approach.

Priority rules have also been placed in the area where the A43 South meets the circulatory at the South Roundabout. This is to prevent overlapping vehicles during periods of heavy traffic.

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Gap time rules use the conventional 3.0s time for Cars and 3.5s for HGVs / Buses. Any headway rules use a length of 5m and maximum speed of 20mph.

Signal Heads & Detectors
Signal heads and detectors are based on the associated DWG background and as per the locations specified in the link / lane diagrams created by Dan Preece.

Vehicle Inputs, Routes & Parking Lots
An additional zone (Zone 15) and associated in and out parking lots have been included for the proposed Milton Ham development, accessing J15a off the East approach

Public Transport Stops & Lines
PT line 302 has been updated to suit the new link / connector structure at J15a.

Nodes
Nodes 28 and 29 have been modified to suit the new link / connector layout and all edges have been checked for suitable paths and movements around the junction.

Evaluation Markers
New output markers have been placed around the junction for collection of data including flows, queues and journey times measurements.

7) Local Changes – A45 / Watering Lane

Links / Connectors
The links and connectors at the A45 / Watering Lane junction have been adjusted to suit the layout in the associated CAD drawing.

The junction also features a number of 0.1m lane widths, which have been used for merges and flares. These model approaches to flares in a similar manner to the PTV Example 'Merging and Diverging' in the 'Examples Training' folder. This utilises a 0.1m lane at the end of the merge to join two lanes together. This process has also been reversed to model one lane to two for flare lengths.

The connectors have been assigned emergency stop and lane change values of 5m and 200m respectively.

The driver behaviour on the links and connectors has been kept to the 'Urban (motorised)' behaviour as much as possible. However, there were some areas that required either the 'flare' or 'merging' behaviour, which are shown in the **Figure 3**.

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Figure 3 – A45 / Watering Lane Driver Behaviour

Desired Speeds & Reduced Speed Areas
Desired speed markers have been added to model a 50mph speed limit from just north of the A45 / Watering Lane junction. A 40mph and 20mph speed limit has been modelled on Watering Lane to replicate the speed limits through Collingtree.

RSAs of length 5m have been placed at every signalised stop-line at J15, with a 30mph speed limit applied to Cars and HGVs / Buses.

Priority Rules & Conflict Areas
No priority rules or conflict areas have been modelled at this junction.

Signal Heads & Detectors
Signal head locations are based on the associated DWG background. Detectors have been placed to tie in with the demand dependent VA signals. These signals have been developed to try and keep queues on Watering Lane to a minimum, without affecting the performance of the A45 significantly.

Vehicle Inputs, Routes & Parking Lots
No specific changes in this location.

Public Transport Stops & Lines
The bus stop, which was originally located north of Watering Lane on the A45, has been relocated to Watering Lane in line with the proposed improvements.

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No PT lines are currently included from Watering Lane in the model. However, from a review of public transport data, there is one route – No. 86 – which services Watering Lane. This has one service in each direction between 0700-1000hrs and three services in total between 1600-1900hrs. Therefore, whilst it would be preferable to include this route within the model, the non-inclusion will not significantly affect the model performance.

Nodes
Node 126 has been modified to suit the new link / connector layout and all edges have been checked for suitable paths and movements around the junction.

Evaluation Markers
New output markers have been placed around the junction for collection of data including flows, queues and journey times measurements.

8) Local Changes – A508 / Site Access

Links / Connectors
The links and connectors at the A45 / Watering Lane junction have been adjusted to suit the layout in the associated CAD drawing.

The junction also features a number of 0.1m lane widths, which have been used for merges and flares. These model approaches to flares in a similar manner to the PTV Example 'Merging and Diverging' in the 'Examples Training' folder. This utilises a 0.1m lane at the end of the merge to join two lanes together. This process has also been reversed to model one lane to two for flare lengths.

The majority of the connectors have been assigned emergency stop and lane change values of 5m and 200m respectively. However, there are some exceptions as detailed below:

No.	Location	Emergency Stop	Lane Change
30217	SE Circulatory	5m	450m

The lane distance on this connector has been changed to provide more realistic lane behaviour as vehicles drive around the roundabout.

The driver behaviour on the links and connectors has been kept to the 'Urban (motorised)' behaviour as much as possible. However, there were some areas that required either the 'flare' or 'merging' behaviour, which are shown in the **Figure 4**.

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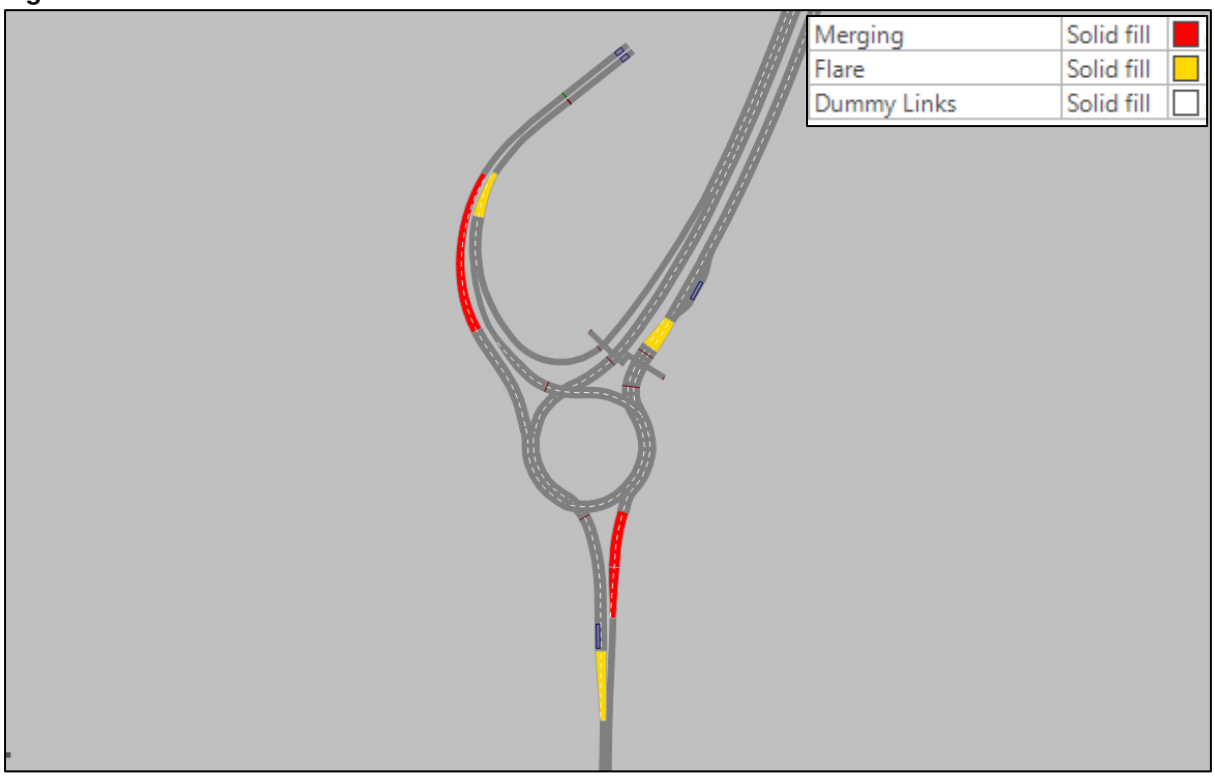
Figure 4 – A508 / Site Access Driver Behaviour



Desired Speeds & Reduced Speed Areas
Desired speed markers have been added to model a 30mph speed limit in the vicinity of the Site Access roundabout. The site access approach has been modelled as a 30mph speed limit and the A508 North and South approaches have been modelled as 50mph.

RSAs of length 3-5m have been placed at every signalised stop-line at J15, with a 30mph speed limit applied to Cars and HGVs / Buses.

An additional RSA has been placed on the left turn out of the site access to slow down vehicles as they make the turn. The existing 'Cars – Reduced speed' and 'HGV – Reduced speed' profiles have been used for this RSA.

Priority Rules & Conflict Areas
Priority rules have been placed on all of the A508 / Site Access junction approaches to model the give-way behaviour.

Gap time rules use the conventional 3.0s time for Cars and 3.5s for HGVs / Buses. Any headway rules use a length of 5m and maximum speed of 20mph.

A conflict area has been automatically added following the creation of a bus-stop layby on the A508 North approach.

Signal Heads & Detectors
Signal head locations are based on the associated DWG background. Detectors have been placed to tie in with the demand dependent VA signals.

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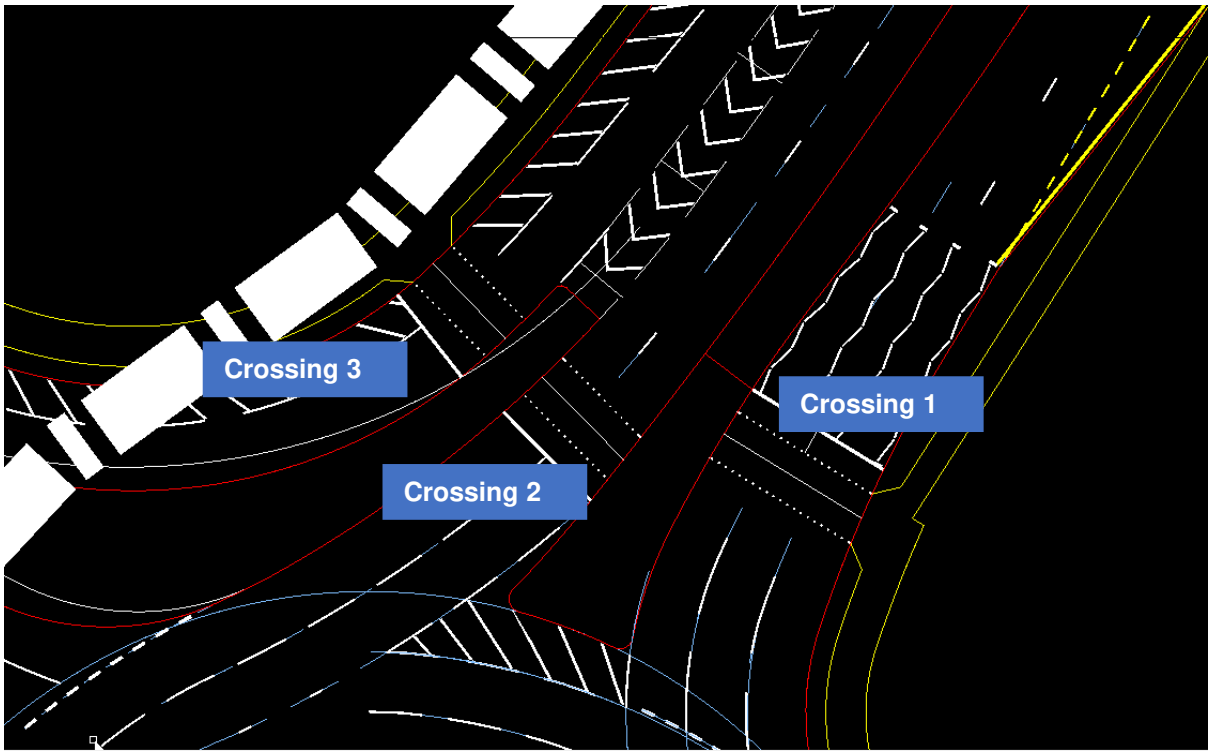
The signal logic used has been based on a TfL template for toucan crossings, with three different signal controllers created to model the three different crossing locations.

The parameters used for each of the crossings have been derived based on guidance in DfT's *'The Design of Pedestrian Crossings – Local Transport Note 2/95'*, dated April 1995, specifically Chapter 8 for Toucan Crossings. The parameters are detailed below, with further calculations provided in **Appendix F**.



VAP Setting	Crossing 1	Crossing 2	Crossing 3
PeriodB	3	3	3
PeriodC	3	3	3
PeriodD	6	5	5
PeriodE	3	3	3
PeriodG	0	0	0
PeriodH	3	3	3
PeriodI	2	2	2
PeriodF	8	7	7
MinTrafficGreen	30	30	30

Vehicle Inputs, Routes & Parking Lots

Pedestrian inputs have been created for the toucan crossing north of the site access junction. To model a modest demand over the AM and PM modelled periods, 15 pedestrians per 2.5 hours have been modelled in each direction and in each peak.

This represents a demand of roughly one pedestrian every 10 minutes.

An additional zone (Zone 14) and associated in and out parking lots have been included for the proposed access to the SRFI site. This access the network off the western arm of the A508 / Site Access junction.

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Public Transport Stops & Lines
A new PT stop has been added on the A508 southbound, north of the Site Access junction. This is proposed to be serviced by Bus Routes 33 / 33A, X4 and X7.

PT lines 33 / 33A, X4 and X7 have been updated to suit the new link / connector structure at the Site Access junction.

Nodes
Node 127 has been added around the new A508 / Site Access junction to suit the new link / connector layout and all edges have been checked for suitable paths and movements around the junction.

Evaluation Markers
New output markers have been placed around the junction for collection of data including flows, queues and journey times measurements.

9) Local Changes – M1 Mainline

Links / Connectors
All M1 mainline links and connectors have been amended to 4 lanes of 3.65m width to tie in with the associated SMART motorway DWG files.

Slip Road merge and diverge areas have also been modelled in accordance with the DWG files, with use of the 0.1m lane widths to model the various lane gains and drops. These have been modelled in a similar manner to the PTV Example 'Merging and Diverging' in the 'Examples Training' folder. This utilises a 0.1m lane at the end of the merge to join two lanes together. This process has also been reversed to model one lane to two for flare lengths.

The majority of the connectors have been assigned emergency stop and lane change values of 5m and 200m respectively. However, there are some exceptions as detailed below (which are different from the validated base model received):

No.	Location	Emergency Stop	Lane Change
30190	M1 – J15 – NB Off-Slip	5m	1000m
10140		5m	1000m
30176	M1 – J15 – SB Off-Slip	5m	1000m
30173		5m	1000m

The lane distance on this connector has been changed to provide more realistic lane behaviour at diverges off the M1 mainline.

The driver behaviour on the links and connectors has been kept to the 'Motorway' behaviour as much as possible. However, there were some areas at M1 J15 that required the 'merging' behaviour, which are shown in the **Figure 5**.

At M1 J15a, the previously used 'merges' and 'merges short' behaviour has been retained for consistency with the received validated base model.

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Figure 5 – M1 mainline (J15) Driver Behaviour

Desired Speeds & Reduced Speed Areas
No M1 mainline changes from received validated base model.

Priority Rules & Conflict Areas
Not applicable – no priority rules / conflict areas on M1 mainline.

Signal Heads & Detectors
Not applicable – no signals / detectors on M1 mainline.

Vehicle Inputs, Routes & Parking Lots
No M1 mainline changes from received validated base model.

Public Transport Stops & Lines
Not applicable – no PT stops or lines on M1 mainline.

Nodes
At J15, Nodes 130, 131, 129 and 128 were reviewed to suit the new link / connector layout and all edges have been checked for suitable paths and movements on the M1 mainline.

At J15a, Nodes 28, 22, 26 and 25 were reviewed to suit the new link / connector layout and all edges have been checked for suitable paths and movements on the M1 mainline.

Evaluation Markers
New output markers have been placed at various locations on the M1 mainline for collection of data including flows, queues and journey times measurements.

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3. SUMMARY

This Technical Note (TN) summarises the key changes made to the approved M1 J15 and M1 J15a validated base VISSIM model to create the 2031 Mitigation model for the proposed Strategic Rail Freight Interchange (SRFI) known as Northampton Gateway.

All global parameters and network elements amended have been listed, detailed and explained for auditing purposes.

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Prepared by:	**Daniel Bent**	Reviewed by:	**Luke Best**
Client:	**ADC Infrastructure**	Date:	**05/12/2017**

Summary VISSIM Model Changes – Proposed Mitigation – Revision 1

1. INTRODUCTION

This Technical Note (TN) summarises the changes made to the 2031 Mitigation VISSIM for the proposed Strategic Rail Freight Interchange (SRFI) known as Northampton Gateway.

The changes have been made following an audit by AECOM and responds to comments made in the following documents:

- *'171017 2031 Mitigation Multimodal* (dated 02/10/17);
- *'171023 2031 Mitigation MOVA Review'* (dated 23/10/17).

2. CHANGES MADE FOLLOWING AUDIT

The following headings and bullet points provide details on the changes made to update the 2031 Mitigation VISSIM model. The original documents and annotations for all comments can be found in **Appendix A**.

1) Network Set-Up

Link / Connector Structure

- Link 30040 has been updated to remove the 0.1m wide lane.
- Connector 30276 has been amended to have "Urban (motorised)" behaviour.
- Connectors 10022 and 10041 have been amended to model the proposed amendment to the markings to allow two lanes to turn right from the M1 southbound off-slip link to the A43 South.
- Connectors 10025 and 10022 have been amended to model the proposed improvement of 3 lanes on the east side of the circulatory.

Link Types

- 6 observed vehicles have been used for the 'Urban (flare)' and 'Urban (merging)' driver behaviour to allow vehicles to 'see' more of the network elements. The model contains a lot of desired speed decisions, reduced speed areas and priority rules, all of which are all treated as 'vehicles' to the cars in the network. These need to be 'seen' and considered by the vehicles in the network, particularly on junction approaches.
- The M1 mainline merge behaviour previously set to "Urban (merging)" has been updated to AECOM's "Merges" behaviour.

Lane Discipline

- The lane change discipline has been reviewed and lane change distances have been amended on the following connectors:
    - M1 J15 – Connectors 30021, 30032, 30083, 10131 and 30041,
        -
    - M1 J15a Connectors 30312 and 10001

Lane Closures

- For the merge areas on Links 79 and 86, Lane 4 has been opened to all traffic.

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Flare Lengths

- It is acknowledged that the flare on the east circulatory is not quite as the drawing suggests. Whilst it would be preferred to model the correct layout, this is difficult in VISSIM due to limitations on how connectors join to links. If the correct layout was to be modelled, Link 30235 would be modelled with lane widths of 3.5m,3.5m,0.1m and 3.5m for lanes 1-4 respectively. This would be suitable for joining to the downstream 4-lane link (Link 30233), but the upstream link (Link 121) would require a connection to Lanes 1,3 and 4, which is not possible in VISSIM. There is a further workaround (see **Figure 1**), but this causes vehicles to 'flip' between lanes and looks awkward from a visual perspective (see **Figure 1**). As such, it was considered more suitable to use the current layout.

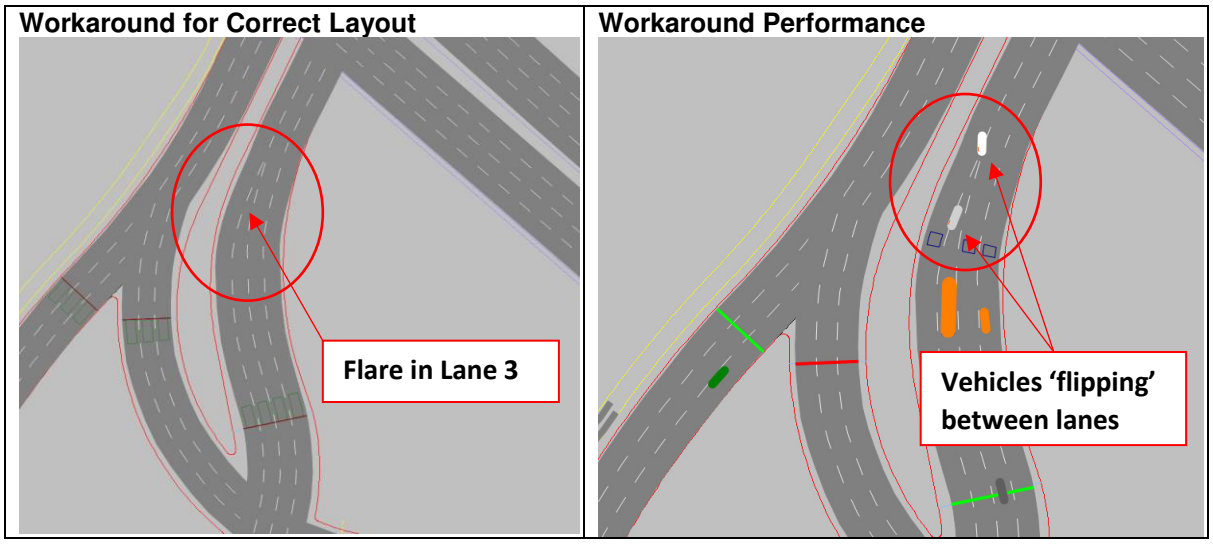

Figure 1 – East Circulatory Flare

Overlapping Vehicles

- Additional headway and gap time priority rules have been added to the north-west and south-east sections of J15 to reduce the overlapping vehicles. It is acknowledged that there are still some instances of overlapping vehicles, but these instances are not frequent and are not likely to significantly affect the modelled results obtained.

2) Local Model Development

Speed Distributions

- The 40mph speed distribution profile has been updated based on AECOM's data from 2014.

Priority Markers

- The rules on the north approach to J15a have been moved closer to the stop-line and have been amended back to match the base model.
- Rule 352 has been amended to 3.6s to match the other rules.
- Rules 81 and 124 have only been amended in terms of position, the gap times are still the same.
- Rule 148 has been amended to 3.4s to match the other rules.
- Rules 88 and 146 were amended to reduce the numbers of overlapping vehicles.

Reduced Speed Areas

- The reduced speed areas on the A45 North approach to J15 have been extended to match the base model.

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Desired Speed Distributions

- A 50mph speed limit has been implemented from south of the A508/Site Access junction to north of the A45/Watering Lane junction to model a proposed speed limit change along this section of the network.

3) Traffic Signals

Signal Specifications

- For the VAP signal controllers, the assumption is correct that the period names selected refer to the period numbers stated in LTN 2/95.
- For the toucan crossings north of the A508/Site Access junction, periods Vi and VII have been amended to account for the different crossing distances.
- The A45 / Watering Lane junction has been reconfigured under MOVA control in line with TD 35/06.

Location of Detectors

- M1 J15 – North 1
    - Detector X7 has been amended to 40m in MOVA dataset.
    - IN detectors 8,9,10 & 11 have been placed as close to 93m as possible. AECOM are correct in assumption that the link/connector set-up prevents the correct distance from being used. It is not expected that the difference in detector locations will significantly affect model performance and results.
- M1 J15 – North 2
    - The link and connector layout has been amended and a new detector (20) has been added for the 5th lane. This has been added to the MOVA dataset. It is acknowledged that this is not the correct number for the type of detector, but has been done for simplicity.
- M1 J15 – South 1
    - The MOVA dataset has been amended to 30m for detector X7.
    - Detectors IN 1,2 and 3 have been reviewed and these appear to be modelled correctly – 93m from stop-line.
- M1 J15 – South 2
    - The link/connector layout has been amended so that vehicles do not miss Detectors 5 and 6.
- M1 J15a – North
    - The MOVA dataset has been amended to 25m for detector X17.
- M1 J15a – West
    - The link/lane diagram has been updated to match the MOVA dataset and model for the X detectors.

4) Dynamic Assignment

Nodes

- Node 130 has been adjusted to cover both the off-slip lanes.

5) MOVA Model Review

As well as the VISSIM model review, the MOVA set-up was reviewed following AECOM's comments and the main changes and comments are detailed below. The updated MOVA datasets and link/lane diagrams can be found in **Appendix B**.

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M1 J15 North 1 Controller

- The conflict between phases A & C has been corrected in the dataset.
- Detector X7 location has been amended in the dataset to 25m.
- SD code of 1 in stage 1 has been included.
- IN detectors 8,9,10 and 11 placed as close to 93m as possible, link/connector structure prevent actual distance being used.

M1 J15 North 2 Controller

- SDCODES – Links 1 & 5 and 6 & 7 – the SD codes have been set-up intentionally in this way to demand stage 1 as a positive revert.
- The link/lane diagram has been updated to show the correct hold links.
- Additional detector added (No. 20) to the A45 North approach to J15 to prevent vehicles being missed on the flared approach.

M1 J15 South 1 Controller

- The conflict between B & C has been reviewed and there doesn't seem to be a conflict in the datasets or model. Therefore, this has not been amended.
- The location for Detector X7 has been amended to 30m in the dataset.
- The locations of Detectors 1,2 and 3 have been checked and these appear to be at 93m in the model. Therefore, no changes have been made.

M1 J15 South 2 Controller

- No detector/link has been used as stage 1 is a revert stage and there are only 2 stages. As a result, no changes have been made to the dataset.
- The link/lane diagram has been updated to show the correct hold links.
- The link/connector structure around detectors 5 and 6 has been amended to prevent any vehicles missing these detectors.

M1 J15a North Controller

- The link/lane diagram has been amended to correct the link numbers.
- The detector has been amended to No. 20 and updated in diagram and dataset.
- Whilst it is acknowledged that the linking could be improved, the most sensible and suitable way of modelling the linking has been used, within the limitations of the PC MOVA software. As such, no changes have been made on this.
- Detectors X13 and X14 have been amended to 20m and IN15 and IN16 have been amended to 85m in the dataset.
- The link/lane diagram has been amended for detectors X9 and X10 to 42m and 15m respectively.
- Detector X17 has been amended to 25m in the dataset.

3. ADDITIONAL MODEL CHANGES

As well as the changes made to satisfy AECOM's audit comments, a revised drawing was received from ADC which included changes to the exit to the A508 South at the Site Access roundabout, as well as some minor amendments to the alignment of the M1 Southbound off-slip at M1 J15.

The latest drawing received is titled *'171107 NGW-BWB-HGN-HW-M2-D-100_Highway GA.dwg'* and can be found in **Appendix C**.

In terms of VISSIM model changes, this included a slightly extended two-lane exit on the A508 travelling southbound and some minor link/connector alignment changes at M1 J15. All corresponding network elements were also checked to ensure their positions were still suitable following the link and connector adjustments.

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The most notable change was that links 30112 and 30113 have been amended from 'Urban (merging)' to 'Merges Short' to improve the merging behaviour as vehicles exit the network on the A508 travelling southbound.

4. SUMMARY

This Technical Note (TN) summarises the changes made to the 2031 Mitigation model for the proposed Strategic Rail Freight Interchange (SRFI) known as Northampton Gateway.

This addresses AECOM's audit comments, with model elements either changed back to the approved base model, or justifications provided on no changes or further changes made.

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Appendix E – Model Convergence

2021 Reference Case – AM

AM PEAK (0715-0815)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time	Difference from
Run Number	Paths	Edges	Paths	Edges	(h)	prev. run
1	98%	89%	73%	82%	7689515.99	-
2	98%	87%	82%	83%	7726812.19	0.5%
3	99%	90%	78%	84%	7762527.59	0.5%
4	98%	90%	83%	83%	7609041.99	-2.0%
5	99%	91%	75%	82%	7689879.59	1.1%
6	98%	90%	81%	85%	7692932.79	0.0%
7	99%	90%	86%	86%	7608248.59	-1.1%
8	99%	90%	78%	84%	7718245.59	1.4%
9	98%	90%	80%	82%	7689463.09	-0.4%
10	98%	89%	84%	85%	7657680.99	-0.4%
11	98%	88%	81%	84%	7664848.39	0.1%
12	99%	90%	82%	85%	7639990.19	-0.3%
13	99%	91%	85%	83%	7618738.09	-0.3%
14	98%	90%	78%	84%	7724646.39	1.4%
15	98%	90%	85%	84%	7604263.39	-1.6%
16	99%	90%	90%	88%	7561921.39	-0.6%
17	99%	91%	81%	88%	7636137.59	1.0%
18	99%	90%	85%	84%	7663814.59	0.4%
19	99%	92%	84%	83%	7706580.79	0.6%
20	99%	89%	84%	87%	7659349.89	-0.6%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

2021 Reference Case – PM

PM PEAK (1645-1745)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time	Difference from
Run Number	Paths	Edges	Paths	Edges	(h)	prev. run
1	100%	87%	75%	83%	11070889.28	-
2	99%	87%	72%	83%	11191514.98	1.1%
3	98%	86%	79%	80%	11206806.78	0.1%
4	98%	83%	73%	82%	11058370.58	-1.3%
5	97%	81%	76%	84%	11228881.98	1.5%
6	97%	84%	71%	84%	11044999.88	-1.6%
7	99%	87%	81%	83%	11127842.58	0.8%
8	98%	86%	82%	85%	11113807.28	-0.1%
9	99%	87%	79%	84%	11102419.98	-0.1%
10	99%	86%	82%	82%	11063511.68	-0.4%
11	99%	85%	77%	80%	11134818.88	0.6%
12	99%	87%	79%	81%	11194840.58	0.5%
13	99%	85%	80%	85%	11001323.88	-1.7%
14	99%	87%	80%	84%	11156314.08	1.4%
15	99%	86%	81%	84%	11105801.78	-0.5%
16	99%	86%	73%	83%	11395092.78	2.6%
17	98%	83%	80%	83%	10775339.08	-5.4%
18	99%	83%	78%	82%	11163390.98	3.6%
19	99%	84%	83%	83%	10962612.38	-1.8%
20	99%	85%	86%	83%	11100409.98	1.3%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

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2021 Mitigation – AM

AM PEAK (0715-0815)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time (h)	Difference from prev. run
Run Number	Paths	Edges	Paths	Edges		
1	89%	71%	88%	78%	9061594.28	-
2	100%	89%	86%	77%	9072099.88	0.1%
3	100%	88%	91%	80%	9131164.08	0.7%
4	100%	87%	84%	80%	9061303.38	-0.8%
5	100%	88%	91%	80%	9033179.78	-0.3%
6	100%	90%	92%	81%	9071439.98	0.4%
7	100%	90%	93%	82%	9034852.58	-0.4%
8	100%	92%	91%	81%	9079632.28	0.5%
9	100%	91%	88%	82%	9044004.88	-0.4%
10	100%	91%	92%	81%	9051550.98	0.1%
11	100%	90%	89%	83%	9067960.88	0.2%
12	100%	90%	91%	82%	9071783.48	0.0%
13	100%	89%	93%	84%	9031223.58	-0.4%
14	100%	88%	93%	84%	9038568.28	0.1%
15	100%	90%	96%	85%	9033554.68	-0.1%
16	100%	91%	94%	83%	9047271.48	0.2%
17	100%	90%	94%	84%	9051441.78	0.0%
18	100%	88%	94%	86%	9127830.98	0.8%
19	100%	89%	94%	85%	9040913.38	-1.0%
20	100%	90%	94%	83%	9081268.68	0.4%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

2021 Mitigation – PM

PM PEAK (1645-1745)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time (h)	Difference from prev. run
Run Number	Paths	Edges	Paths	Edges		
1	91%	70%	88%	75%	9102395.88	-
2	100%	90%	89%	77%	9068652.68	-0.4%
3	100%	91%	91%	80%	9064588.68	0.0%
4	100%	92%	93%	80%	9017886.58	-0.5%
5	100%	91%	92%	79%	9046126.98	0.3%
6	100%	90%	91%	80%	9063948.18	0.2%
7	100%	89%	93%	80%	9058919.28	-0.1%
8	100%	89%	91%	80%	9089637.58	0.3%
9	100%	90%	92%	82%	9070045.68	-0.2%
10	100%	91%	93%	83%	9052644.98	-0.2%
11	100%	90%	92%	79%	9074654.68	0.2%
12	100%	90%	94%	85%	9052435.78	-0.2%
13	100%	91%	94%	84%	9050165.78	0.0%
14	100%	92%	95%	84%	9023912.58	-0.3%
15	100%	90%	96%	84%	9069505.58	0.5%
16	100%	91%	96%	84%	9050472.58	-0.2%
17	100%	92%	94%	84%	9056772.68	0.1%
18	100%	92%	96%	87%	9053360.38	0.0%
19	100%	89%	94%	85%	9078387.48	0.3%
20	100%	90%	97%	85%	9040554.88	-0.4%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

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2031 Reference Case – AM

AM PEAK (0715-0815)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time	Difference from
Run Number	Paths	Edges	Paths	Edges	(h)	prev. run
1	98%	87%	86%	87%	9077547.88	-
2	99%	87%	76%	80%	9113915.38	0.4%
3	99%	86%	90%	84%	8968146.38	-1.6%
4	99%	88%	85%	84%	9000331.38	0.4%
5	99%	85%	74%	82%	9170461.78	1.9%
6	99%	85%	83%	81%	9115842.38	-0.6%
7	99%	87%	82%	83%	9169056.08	0.6%
8	99%	88%	90%	87%	9098344.38	-0.8%
9	98%	89%	83%	84%	9140515.88	0.5%
10	99%	88%	86%	84%	9054995.78	-0.9%
11	99%	87%	79%	84%	9059576.48	0.1%
12	98%	87%	78%	82%	9200239.78	1.6%
13	99%	86%	79%	85%	9156027.88	-0.5%
14	99%	87%	86%	84%	9042968.98	-1.2%
15	99%	86%	85%	84%	9154095.78	1.2%
16	99%	87%	85%	83%	9034363.08	-1.3%
17	99%	86%	84%	84%	9076609.48	0.5%
18	98%	87%	83%	83%	9203892.08	1.4%
19	98%	86%	87%	84%	9151633.78	-0.6%
20	98%	86%	86%	86%	9004435.08	-1.6%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

2031 Reference Case – PM

PM PEAK (1645-1745)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time	Difference from
Run Number	Paths	Edges	Paths	Edges	(h)	prev. run
1	96%	75%	91%	82%	11970973.37	-
2	97%	83%	87%	83%	12291081.37	2.7%
3	97%	84%	87%	84%	12315030.07	0.2%
4	96%	84%	85%	81%	12121900.57	-1.6%
5	95%	82%	90%	84%	11895386.97	-1.9%
6	94%	84%	86%	85%	12091151.77	1.6%
7	96%	84%	89%	83%	12005277.97	-0.7%
8	95%	85%	85%	86%	12307997.47	2.5%
9	94%	83%	84%	83%	11994366.47	-2.5%
10	96%	83%	93%	84%	11993048.67	0.0%
11	95%	83%	86%	85%	12153630.97	1.3%
12	98%	84%	84%	84%	12119567.47	-0.3%
13	97%	86%	83%	87%	12221179.17	0.8%
14	95%	82%	80%	82%	12191328.37	-0.2%
15	95%	85%	86%	84%	12032500.37	-1.3%
16	98%	84%	92%	86%	12127913.87	0.8%
17	95%	83%	91%	85%	12201498.47	0.6%
18	97%	84%	88%	86%	12179606.87	-0.2%
19	97%	83%	91%	84%	12144275.57	-0.3%
20	97%	83%	86%	84%	12386885.97	2.0%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

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2031 Mitigation – AM

AM PEAK (0715-0815)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time	Difference from
Run Number	Paths	Edges	Paths	Edges	(h)	prev. run
1	92%	67%	93%	85%	9594632.18	-
2	100%	86%	95%	84%	9550455.28	-0.5%
3	100%	85%	93%	86%	9636256.48	0.9%
4	100%	88%	91%	85%	9680031.88	0.5%
5	100%	88%	95%	87%	9593109.58	-0.9%
6	100%	88%	96%	87%	9544242.68	-0.5%
7	100%	87%	90%	82%	9663895.48	1.3%
8	100%	88%	94%	89%	9645455.88	-0.2%
9	100%	89%	96%	87%	9567515.18	-0.8%
10	100%	88%	95%	86%	9596710.88	0.3%
11	100%	86%	93%	86%	9685021.98	0.9%
12	100%	89%	97%	87%	9583902.28	-1.0%
13	100%	88%	96%	87%	9555811.58	-0.3%
14	100%	89%	97%	89%	9584596.78	0.3%
15	100%	87%	96%	86%	9600679.88	0.2%
16	100%	86%	95%	89%	9628787.18	0.3%
17	100%	85%	96%	86%	9588268.48	-0.4%
18	100%	87%	95%	87%	9621010.18	0.3%
19	100%	89%	97%	88%	9565257.98	-0.6%
20	100%	89%	95%	85%	9636005.28	0.7%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

2031 Mitigation – PM

PM PEAK (1645-1745)						
	DMRB / TfL CRITERIA				Network Performance	
	Volume Difference (0-5)		Travel Time (0-20%)		Total Travel Time	Difference from
Run Number	Paths	Edges	Paths	Edges	(h)	prev. run
1	100%	89%	95%	88%	9628263.18	-
2	100%	90%	94%	88%	9618361.38	-0.1%
3	100%	91%	97%	89%	9597271.98	-0.2%
4	100%	89%	96%	88%	9596620.18	0.0%
5	100%	88%	97%	89%	9639095.98	0.4%
6	100%	90%	97%	89%	9632010.38	-0.1%
7	100%	89%	94%	88%	9653087.38	0.2%
8	100%	88%	96%	91%	9625426.88	-0.3%
9	100%	88%	97%	88%	9638273.48	0.1%
10	100%	89%	96%	89%	9662077.18	0.2%
11	100%	91%	95%	89%	9651028.48	-0.1%
12	100%	88%	97%	91%	9618423.48	-0.3%
13	100%	90%	97%	89%	9623089.78	0.0%
14	100%	90%	99%	92%	9590826.68	-0.3%
15	100%	91%	98%	91%	9605583.78	0.2%
16	100%	91%	95%	88%	9689962.48	0.9%
17	100%	90%	98%	90%	9622527.28	-0.7%
18	100%	90%	98%	91%	9613614.88	-0.1%
19	100%	90%	98%	91%	9593064.58	-0.2%
20	100%	87%	95%	90%	9690220.58	1.0%
	Target is 95% for 4 consecutive runs		*Target is 95% for 4 consecutive runs*		*Target is <1.0% difference for 4 consecutive runs*	

Used for VISSIM modelling results

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Appendix F – Queue Results

2021 Queue Comparison – M1 J15 – AM PEAK

		2021 Reference Case		2021 Mitigation	
Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	A45 North	187	330	47	144
08:05		359	555	68	172
08:10		623	901	82	188
08:15		1154	1564	94	215
08:20		1697	2057	145	287
08:25		2203	2451	180	349
08:30		2403	2555	227	429
08:35		2419	2555	228	393
08:40		2444	2555	269	449
08:45		2431	2554	281	489
08:50		2418	2555	254	459
08:55		2429	2555	211	382

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	Saxon Avenue	1	11	3	16
08:05		2	12	3	15
08:10		4	24	4	19
08:15		2	11	4	16
08:20		2	12	4	19
08:25		2	11	4	16
08:30		2	13	4	16
08:35		2	12	4	17
08:40		2	12	4	19
08:45		2	10	4	16
08:50		2	12	4	15
08:55		2	12	4	15

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	M1 South-East	14	50	25	71
08:05		15	53	30	80
08:10		14	49	29	79
08:15		15	56	31	82
08:20		16	57	39	93
08:25		13	50	38	95
08:30		15	52	38	93
08:35		15	49	38	96
08:40		15	56	41	96
08:45		15	53	44	103
08:50		13	49	38	96
08:55		14	48	31	84

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	A508	24	68	9	39
08:05		37	84	9	38
08:10		36	82	10	41
08:15		42	89	11	47
08:20		49	95	11	45
08:25		55	113	10	41
08:30		46	93	13	46
08:35		55	108	12	46
08:40		89	148	12	49
08:45		71	130	10	41
08:50		44	96	11	51
08:55		37	85	9	39

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	M1 North-West	17	71	10	40
08:05		19	68	10	44
08:10		20	76	10	39
08:15		22	79	11	44
08:20		32	97	14	49
08:25		36	114	17	59
08:30		41	118	15	50
08:35		49	133	15	49
08:40		57	138	19	56
08:45		64	141	20	65
08:50		72	159	17	60
08:55		45	130	15	50

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2021 Queue Comparison – M1 J15a – AM PEAK

		2021 Reference Case		2021 Mitigation	
Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - North Rbout - M1 SB Link	29	79	6	41
08:05		64	115	8	52
08:10		75	140	7	43
08:15		105	163	7	49
08:20		159	221	10	60
08:25		222	293	11	60
08:30		287	366	11	57
08:35		356	445	12	67
08:40		418	503	12	65
08:45		497	613	9	54
08:50		578	683	9	54
08:55		690	781	8	50

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - North Rbout - A5123	2	34	2	34
08:05		1	28	4	38
08:10		2	33	4	43
08:15		4	45	4	42
08:20		2	35	5	46
08:25		3	45	7	61
08:30		2	35	8	62
08:35		4	45	12	89
08:40		2	30	7	55
08:45		3	45	7	50
08:50		2	31	5	46
08:55		2	30	3	40

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - North Rbout - A43 South	16	101	8	66
08:05		16	101	7	63
08:10		16	105	9	71
08:15		48	163	10	67
08:20		57	185	11	80
08:25		65	204	10	78
08:30		86	221	9	80
08:35		104	231	10	77
08:40		105	246	10	76
08:45		110	242	9	77
08:50		71	204	10	78
08:55		45	177	9	65

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - South Rbout - A43 North	1	20	4	53
08:05		1	20	5	54
08:10		1	18	6	72
08:15		0	13	7	77
08:20		1	18	9	95
08:25		0	16	15	123
08:30		0	10	11	103
08:35		0	10	11	96
08:40		0	8	11	95
08:45		0	10	14	109
08:50		0	8	9	79
08:55		0	14	8	78

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - South Rbout - A43 South	0	11	29	95
08:05		0	13	26	90
08:10		0	11	27	90
08:15		3	26	31	95
08:20		4	39	38	118
08:25		3	45	38	114
08:30		11	62	39	119
08:35		27	109	42	133
08:40		42	152	40	125
08:45		22	104	38	111
08:50		9	50	32	99
08:55		5	35	29	93

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - South Rbout - M1 NB Link	80	171	8	44
08:05		155	242	10	50
08:10		230	315	10	50
08:15		298	395	10	52
08:20		433	529	11	52
08:25		584	668	11	51
08:30		731	829	11	60
08:35		906	1033	12	63
08:40		1104	1229	12	66
08:45		1334	1461	12	67
08:50		1568	1704	12	66
08:55		1766	1889	11	56

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2021 Queue Comparison – M1 J15 – PM PEAK

		2021 Reference Case		2021 Mitigation	
Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	A45 North	204	325	35	109
17:05		250	364	37	112
17:10		307	449	46	128
17:15		395	557	45	131
17:20		512	700	40	117
17:25		679	907	46	136
17:30		878	1123	43	122
17:35		1184	1418	45	141
17:40		1447	1685	45	132
17:45		1655	1870	48	138
17:50		1829	2042	49	134
17:55		2021	2247	46	133

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	Saxon Avenue	4	20	6	24
17:05		6	25	5	25
17:10		8	35	8	33
17:15		7	30	6	23
17:20		6	25	5	26
17:25		6	30	5	25
17:30		6	27	6	25
17:35		8	35	6	23
17:40		6	26	6	26
17:45		6	26	6	27
17:50		7	29	6	25
17:55		6	27	6	25

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	M1 South-East	17	56	25	73
17:05		17	57	24	71
17:10		17	56	25	72
17:15		17	58	26	76
17:20		18	60	25	74
17:25		15	52	26	69
17:30		16	58	25	71
17:35		16	55	24	71
17:40		16	60	27	76
17:45		16	55	24	68
17:50		15	55	26	73
17:55		15	56	25	72

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	A508	204	345	19	67
17:05		222	391	21	70
17:10		368	526	20	66
17:15		501	721	19	64
17:20		679	861	19	66
17:25		782	954	21	69
17:30		874	1058	20	68
17:35		956	1158	17	62
17:40		1047	1231	21	67
17:45		1097	1290	19	64
17:50		1117	1300	21	65
17:55		1128	1296	20	62

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	M1 North-West	18	68	8	34
17:05		17	65	9	35
17:10		16	63	9	39
17:15		17	65	9	38
17:20		19	68	10	39
17:25		16	63	9	34
17:30		17	64	9	36
17:35		19	69	10	40
17:40		20	74	10	40
17:45		20	74	9	35
17:50		24	81	10	38
17:55		23	84	10	40

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2021 Queue Comparison – M1 J15a – PM PEAK

		2021 Reference Case		2021 Mitigation	
Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - North Rbout - M1 SB Link	1266	1468	39	119
17:05		1550	1756	33	113
17:10		1818	2050	36	121
17:15		2187	2416	54	130
17:20		2500	2719	44	120
17:25		2775	2984	40	120
17:30		3072	3300	49	125
17:35		3374	3588	46	121
17:40		3708	3960	36	117
17:45		4057	4294	48	125
17:50		4361	4575	58	140
17:55		4586	4743	53	138

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - North Rbout - A5123	2	33	4	31
17:05		3	36	4	40
17:10		4	38	4	34
17:15		5	51	5	41
17:20		2	35	4	36
17:25		3	35	5	39
17:30		3	38	5	43
17:35		4	41	6	43
17:40		3	40	5	40
17:45		3	37	4	34
17:50		4	47	7	46
17:55		5	44	5	42

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - North Rbout - A43 South	185	279	25	110
17:05		196	280	25	120
17:10		170	272	31	131
17:15		190	279	35	135
17:20		176	274	32	133
17:25		160	270	34	150
17:30		157	269	26	125
17:35		189	278	34	127
17:40		168	270	35	143
17:45		163	270	30	125
17:50		186	269	38	141
17:55		192	273	30	132

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - South Rbout - A43 North	0	1	0	9
17:05		0	4	0	10
17:10		0	2	0	13
17:15		0	2	0	12
17:20		0	2	0	10
17:25		0	3	0	10
17:30		0	3	0	13
17:35		0	1	0	13
17:40		0	2	0	14
17:45		0	2	0	14
17:50		0	2	0	10
17:55		0	3	0	12

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - South Rbout - A43 South	359	516	38	110
17:05		506	649	37	114
17:10		652	767	47	130
17:15		772	897	60	147
17:20		902	1029	69	161
17:25		1024	1132	55	145
17:30		1123	1193	44	128
17:35		1165	1216	52	138
17:40		1183	1224	57	147
17:45		1184	1224	65	156
17:50		1186	1224	62	155
17:55		1190	1226	58	148

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - South Rbout - M1 NB Link	2443	2641	19	98
17:05		2804	2982	24	108
17:10		3097	3238	22	118
17:15		3302	3428	22	110
17:20		3452	3589	24	111
17:25		3512	3651	20	102
17:30		3556	3692	23	109
17:35		3564	3700	24	116
17:40		3567	3717	27	122
17:45		3550	3695	28	148
17:50		3549	3682	36	155
17:55		3648	3763	25	122

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2031 Queue Comparison – M1 J15 – AM PEAK

		2031 Reference Case		2031 Mitigation	
Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	A45 North	74	193	56	146
08:05		160	292	71	168
08:10		269	411	94	195
08:15		481	757	107	233
08:20		978	1399	163	297
08:25		1723	2139	214	377
08:30		2262	2496	274	448
08:35		2421	2554	337	556
08:40		2449	2555	359	643
08:45		2444	2555	435	703
08:50		2429	2556	474	767
08:55		2439	2555	444	773

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	Saxon Avenue	1	9	6	22
08:05		2	9	5	21
08:10		6	28	7	28
08:15		2	13	6	22
08:20		2	13	6	21
08:25		2	11	6	22
08:30		2	9	5	22
08:35		2	10	7	24
08:40		2	11	5	23
08:45		2	10	6	25
08:50		1	11	5	23
08:55		1	10	5	22

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	M1 South-East	19	61	35	93
08:05		21	68	45	108
08:10		21	68	41	107
08:15		24	74	47	118
08:20		25	77	67	151
08:25		24	79	98	219
08:30		21	70	91	208
08:35		21	72	98	208
08:40		22	73	109	218
08:45		21	69	132	265
08:50		20	65	145	261
08:55		18	62	128	244

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	A508	73	137	12	48
08:05		112	190	14	48
08:10		175	263	12	49
08:15		246	392	16	53
08:20		396	563	14	53
08:25		560	737	18	57
08:30		724	899	16	55
08:35		901	1073	16	52
08:40		1123	1277	18	57
08:45		1314	1452	14	48
08:50		1486	1614	14	51
08:55		1597	1745	15	52

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	M1 North-West	24	82	10	40
08:05		37	118	10	39
08:10		44	120	11	41
08:15		48	135	12	48
08:20		58	166	15	51
08:25		108	236	17	58
08:30		206	354	21	63
08:35		275	426	32	81
08:40		349	482	72	151
08:45		423	657	98	202
08:50		570	820	40	99
08:55		689	932	70	148

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2031 Queue Comparison – M1 J15a – AM PEAK

		2031 Reference Case		2031 Mitigation	
Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - North Rbout - M1 SB Link	116	198	8	52
08:05		177	267	12	69
08:10		290	407	11	63
08:15		471	622	12	68
08:20		692	868	17	77
08:25		930	1090	19	84
08:30		1180	1399	19	87
08:35		1569	1837	23	95
08:40		1952	2195	18	81
08:45		2344	2592	14	70
08:50		2692	2922	13	71
08:55		3047	3273	13	68

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - North Rbout - A5123	10	62	8	55
08:05		8	66	7	48
08:10		13	71	10	61
08:15		9	74	12	70
08:20		10	76	13	75
08:25		11	72	17	99
08:30		6	60	24	103
08:35		6	63	26	128
08:40		8	67	18	95
08:45		5	59	14	85
08:50		6	58	11	72
08:55		8	60	11	66

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - North Rbout - A43 South	10	84	9	62
08:05		11	92	9	61
08:10		24	114	11	69
08:15		26	139	8	68
08:20		46	168	12	85
08:25		52	173	11	79
08:30		47	157	11	92
08:35		54	180	10	78
08:40		56	188	9	66
08:45		53	176	11	79
08:50		25	119	11	71
08:55		25	126	10	65

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - South Rbout - A43 North	1	20	2	30
08:05		1	20	4	44
08:10		0	15	6	67
08:15		1	20	4	51
08:20		0	17	6	60
08:25		1	17	10	79
08:30		0	13	12	104
08:35		0	16	8	72
08:40		0	14	15	96
08:45		0	17	7	68
08:50		1	21	6	61
08:55		1	19	4	53

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - South Rbout - A43 South	0	16	22	78
08:05		0	11	22	78
08:10		1	26	24	79
08:15		1	19	26	88
08:20		1	31	28	93
08:25		2	30	31	94
08:30		3	35	34	106
08:35		7	45	33	102
08:40		5	43	30	95
08:45		10	51	28	92
08:50		2	23	26	85
08:55		1	24	24	84

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
08:00	J15a - South Rbout - M1 NB Link	88	177	8	42
08:05		178	281	10	49
08:10		325	434	10	58
08:15		438	542	10	50
08:20		603	689	9	44
08:25		735	853	13	70
08:30		920	1054	13	67
08:35		1146	1287	11	61
08:40		1391	1535	13	73
08:45		1633	1798	10	50
08:50		1868	1996	11	55
08:55		2028	2156	10	52

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2031 Queue Comparison – M1 J15 – PM PEAK

		2031 Reference Case		2031 Mitigation	
Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	A45 North	934	1182	52	140
17:05		1234	1513	59	153
17:10		1517	1774	62	158
17:15		1794	2097	62	158
17:20		2079	2350	63	165
17:25		2308	2488	65	172
17:30		2387	2545	65	160
17:35		2391	2554	57	151
17:40		2423	2555	61	163
17:45		2426	2554	56	151
17:50		2409	2553	60	154
17:55		2440	2554	65	162

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	Saxon Avenue	7	30	7	27
17:05		7	30	7	27
17:10		13	47	8	33
17:15		11	38	8	28
17:20		6	30	7	27
17:25		7	28	7	29
17:30		7	29	7	28
17:35		8	35	7	29
17:40		8	37	7	29
17:45		7	30	7	31
17:50		7	31	8	28
17:55		5	25	8	31

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	M1 South-East	14	50	25	70
17:05		13	48	24	70
17:10		13	48	25	72
17:15		13	49	24	70
17:20		12	46	28	80
17:25		13	48	28	81
17:30		13	46	25	72
17:35		13	49	27	74
17:40		14	52	27	76
17:45		13	49	27	73
17:50		12	42	27	75
17:55		12	46	24	69

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	A508	84	179	22	71
17:05		137	233	23	74
17:10		164	263	23	73
17:15		129	221	22	72
17:20		105	206	23	70
17:25		112	204	25	79
17:30		82	191	25	79
17:35		83	163	28	80
17:40		105	220	28	80
17:45		107	214	27	84
17:50		73	148	26	77
17:55		81	169	25	71

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	M1 North-West	21	77	10	40
17:05		23	86	11	43
17:10		21	82	11	41
17:15		27	92	11	41
17:20		23	82	12	43
17:25		23	85	12	43
17:30		23	82	11	42
17:35		19	74	12	46
17:40		19	71	11	43
17:45		15	63	12	43
17:50		19	70	12	43
17:55		18	79	12	43

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2031 Queue Comparison – M1 J15a – PM PEAK

		2031 Reference Case		2031 Mitigation	
Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - North Rbout - M1 SB Link	2805	3048	25	90
17:05		3256	3510	21	84
17:10		3755	4031	22	81
17:15		4251	4511	30	96
17:20		4660	4863	22	78
17:25		4917	4989	29	95
17:30		4973	5010	26	97
17:35		4982	5010	21	81
17:40		4988	5010	26	91
17:45		4984	5010	23	85
17:50		4980	5010	29	95
17:55		4988	5010	30	96

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - North Rbout - A5123	1	22	2	30
17:05		1	24	2	26
17:10		1	21	3	29
17:15		1	19	2	29
17:20		1	24	2	28
17:25		1	20	3	30
17:30		1	20	3	32
17:35		2	27	3	32
17:40		1	28	2	29
17:45		1	26	3	37
17:50		1	26	4	36
17:55		1	26	3	32

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - North Rbout - A43 South	42	173	24	114
17:05		69	200	24	123
17:10		70	211	44	166
17:15		55	194	36	133
17:20		72	198	41	148
17:25		77	223	44	151
17:30		85	208	37	140
17:35		94	233	42	140
17:40		97	229	36	139
17:45		85	239	33	136
17:50		73	203	29	124
17:55		95	233	32	138

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - South Rbout - A43 North	0	3	0	9
17:05		0	2	0	11
17:10		0	3	0	13
17:15		0	5	0	12
17:20		0	3	0	9
17:25		0	2	0	10
17:30		0	2	0	12
17:35		0	2	0	12
17:40		0	2	0	9
17:45		0	2	0	11
17:50		0	2	0	10
17:55		0	2	0	14

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - South Rbout - A43 South	2	29	42	125
17:05		8	49	35	106
17:10		10	61	47	122
17:15		4	38	55	143
17:20		15	59	54	137
17:25		8	56	41	112
17:30		9	55	45	115
17:35		18	78	66	160
17:40		15	70	64	156
17:45		12	71	76	173
17:50		11	65	79	167
17:55		26	84	73	166

Time	Approach	Average		Average	
		Avg Queue Length (m)	Max Queue Length (m)	Avg Queue Length (m)	Max Queue Length (m)
17:00	J15a - South Rbout - M1 NB Link	2156	2342	23	117
17:05		2479	2671	26	133
17:10		2787	2970	28	139
17:15		3056	3219	28	138
17:20		3277	3407	46	188
17:25		3410	3548	39	173
17:30		3457	3636	33	166
17:35		3522	3678	37	154
17:40		3572	3716	38	154
17:45		3618	3750	40	177
17:50		3652	3778	27	127
17:55		3733	3840	30	131

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