

To blocwork (Eastleigh) LLP and Southampton International Airport Limited (SIAL)

From Steer

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Project Navigator Quarter

Technical Note

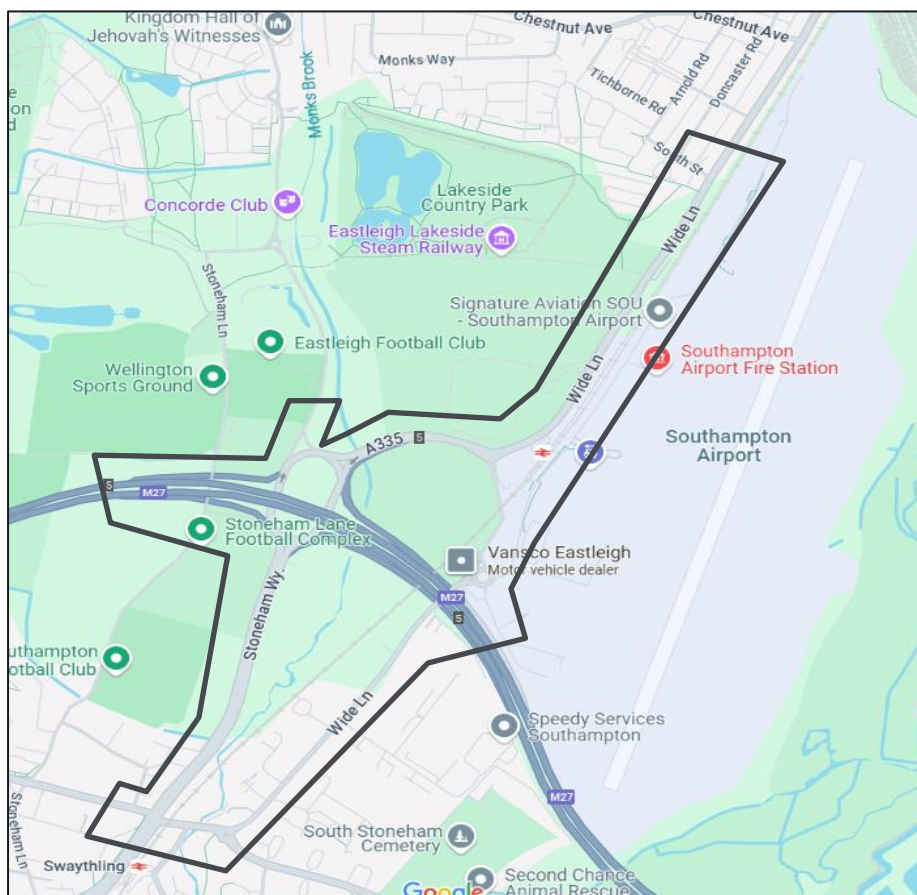
Project No. 24733101

Modelling Technical Note

1 Introduction

- 1.1 This technical note presents the transport modelling analysis for the Navigator Quarter study area, utilising Junctions 9 (J9) and LinSig v3 models.
- 1.2 The Base J9 and LinSig models have been developed to provide a robust representation of the base year (2023) traffic conditions in the Study Area (shown in **Figure 1-1**). This note describes the base model, validation process to ascertain the appropriateness of the models for assessment of the highway impacts of the Navigation Quarter development proposals. It also presents the methodology and findings of the junction capacity modelling results for the future year scenarios with and without the Proposed Development.

Figure 1-1: Study Area



- 1.3 The structure of this note is detailed as follows:
- Section 2: Presents the base modelling approach;
 - Section 3: Describes the data sources and collection methods;
 - Section 4: Summarises the results of the model validation for each junction;
 - Section 5: Presents the Proposed Development forecast scenarios and summarises the model outputs; and
 - Section 6: Summarise key findings and provides recommendations for next steps.

2 Base Modelling Approach

Modelling Software

- 2.1 Each junction has been modelled separately using J9 and LinSig v3 – these are industry standard local junction modelling software packages.
- 2.2 J9 incorporates both PICADY and ARCADY software packages, which are used to assess the performance of non-signalised priority junctions and non-signalised roundabouts, respectively.

Model Extents

- 2.3 Due to availability of traffic survey data, junctions within the study area have been developed to represent either a 2023 or 2025 base year, as detailed in **Table 2-1**. This technical note covers the five junction models with a 2023 base year, as summarised in **Table 2-1**. The models with a 2025 base year will be covered in a subsequent Transport Assessment Addendum, submitted after the initial planning application.

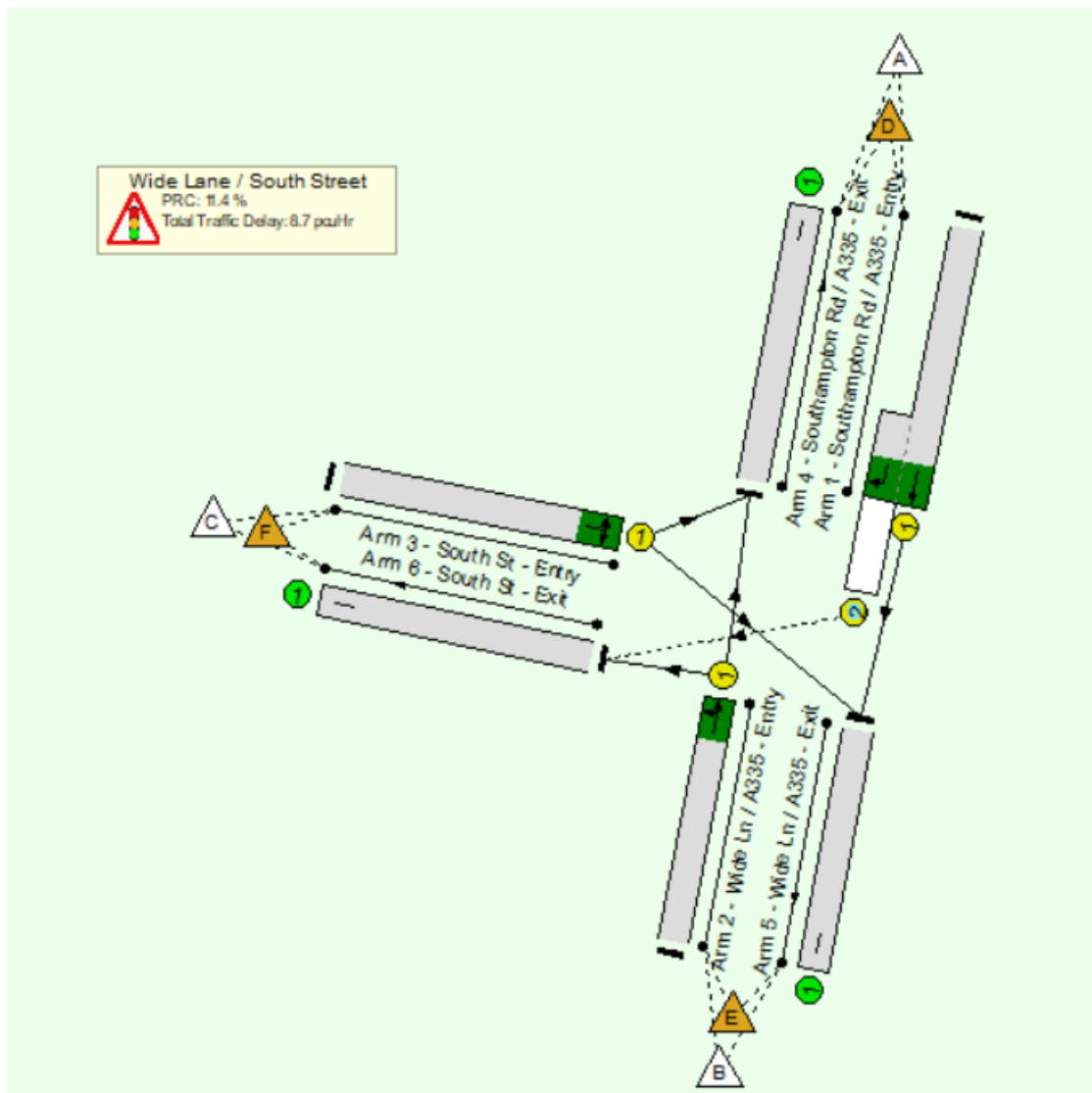
Table 2-1: Junction Model Summary

Steer ID	Location	Software	Base Year
J01	Wide Lane / South Street	LinSig	2023
J02	Wide Lane / Southampton Airport Parkway	LinSig	2023
J03	A335 / Wide Lane	J9	2023
J04	Spitfire Roundabout	J9	2023
J05	Wide Lane / Mountpark	LinSig	2023
J06	M27 J5	LinSig	2025
J07	Stoneham Way / Wide Ln / Wessex Ln and Wide Lane / Mansbridge Rd	LinSig	2025

J01 – Wide Lane / South Street

- 2.4 The J01 model includes the following approaches:
- Southampton Road / A335
 - Wide Lane / A335
 - South Street
- 2.5 The network layout of the J01 model is shown in Figure 2-1.

Figure 2-1: J01 model – network layout



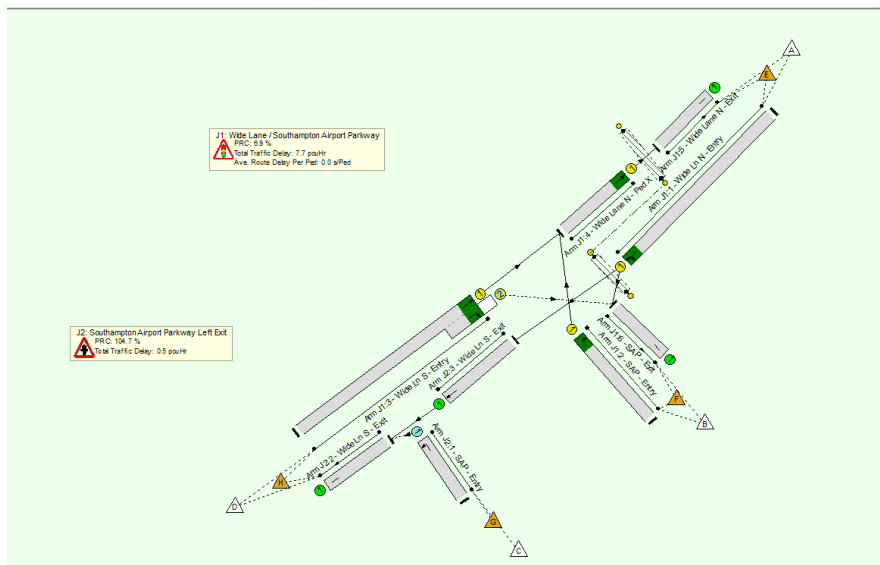
J02 – Wide Lane / Southampton Airport Parkway

2.6 The J02 model includes the following approaches:

- Wide Lane (N)
- Southampton Airport Parkway – Right Turn Only (Signalised)
- Southampton Airport Parkway – Left Turn Only (Priority)
- Wide Lane (S)

2.7 The network layout of the J02 model is shown in **Figure 2-2**.

Figure 2-2: J02 model – network layout



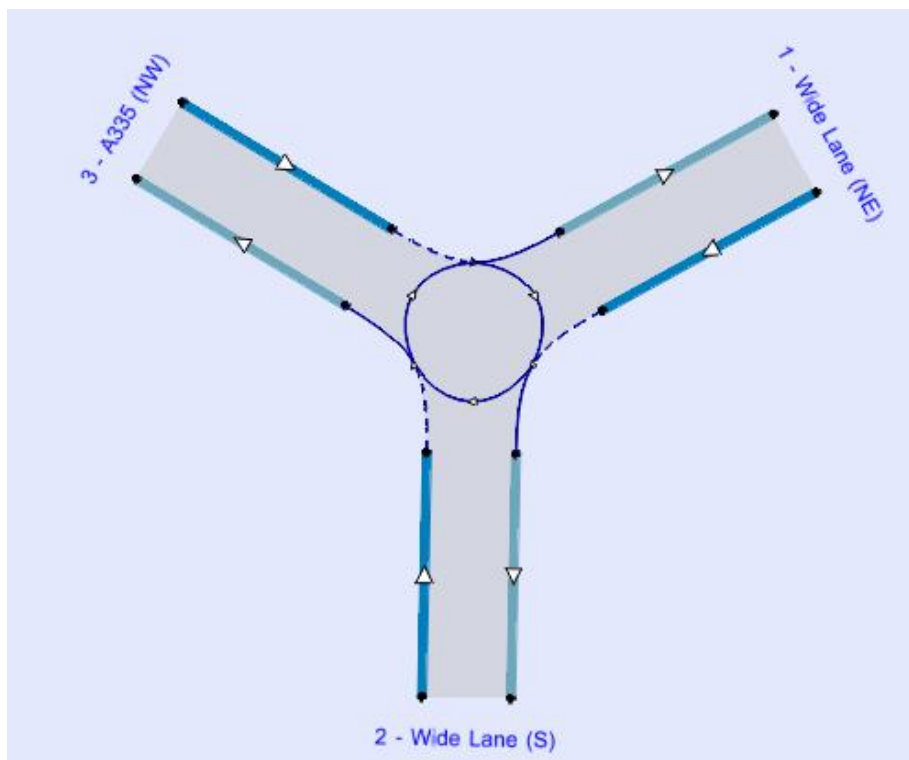
J03 – A335 / Wide Lane

2.8 The J03 model includes the following approaches:

- Wide Lane (E)
- Wide Lane (S)
- A335

2.9 The network layout of the J03 model is shown in **Figure 2-3**.

Figure 2-3: J03 model – network layout



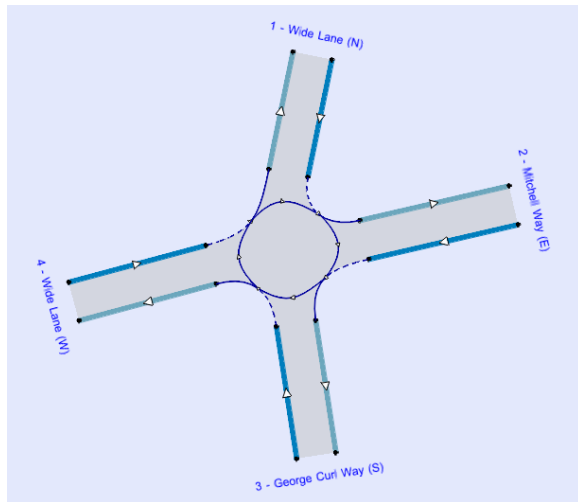
J04 – Spitfire Roundabout

2.10 The J04 model includes the following approaches:

- Wide Lane (N)
- Mitchell Way
- George Curl Way
- Wide Lane (W)

2.11 The network layout of the J04 model is shown in **Figure 2-4**.

Figure 2-4: J04 model – network layout



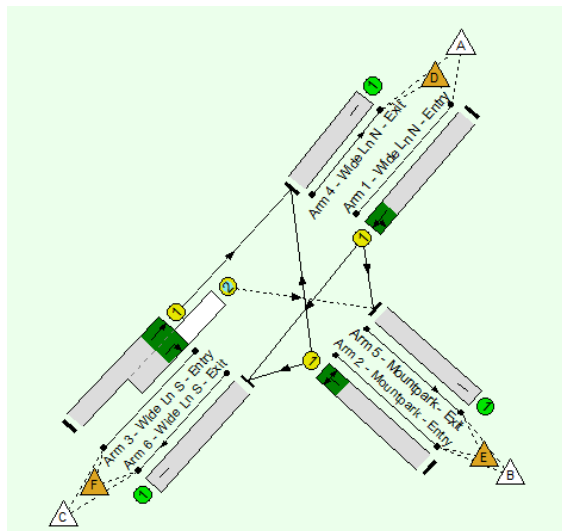
J05 – Wide Lane / Mountpark

2.12 The J05 model includes the following approaches:

- Wide Lane (N)
- Mountpark
- Wide Lane (S)

2.13 The network layout of the J05 model is shown in **Figure 2-5**.

Figure 2-5: J05 model – network layout



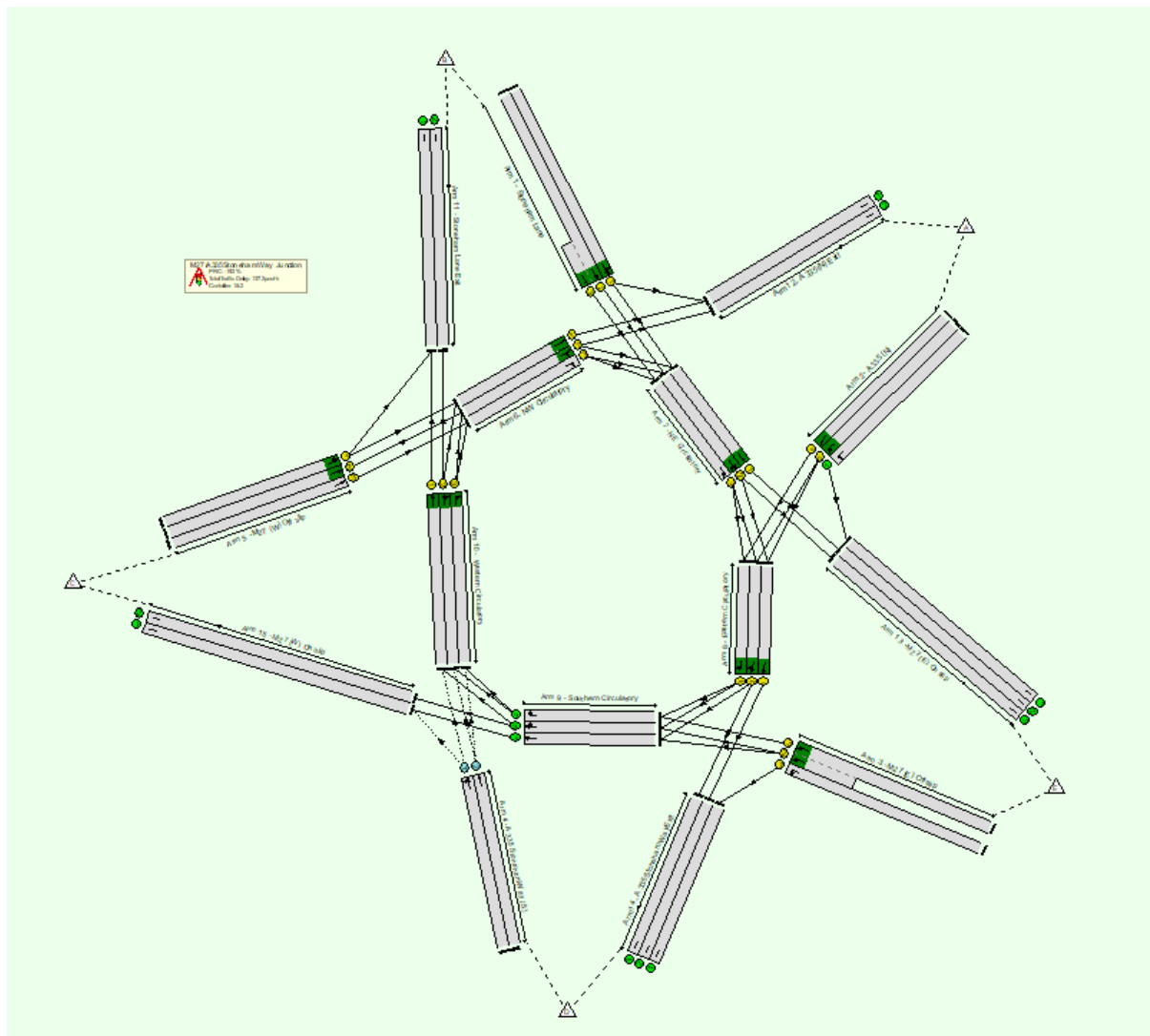
J06 – M27 J5

2.14 The J06 model includes the following approaches:

- Stoneham Lane
- A335 (N)
- M27 (E) Off-slip
- A335 Stoneham Way (S)
- M27 (W) Off-slip

2.15 The network layout of the J06 model is shown in **Figure 2-5**.

Figure 2-6: J06 model – network layout



J07 – Stoneham Way / Wide Ln / Wessex Ln and Wide Lane / Mansbridge Rd

2.16 The J07 model is a multi-junction network including the Stoneham Way / Wide Lane / Wessex Lane signalised junction (J1) and the Wide Lane / Mansbridge Road roundabout (J2). J1 has the following approaches:

- Bassett Green Road

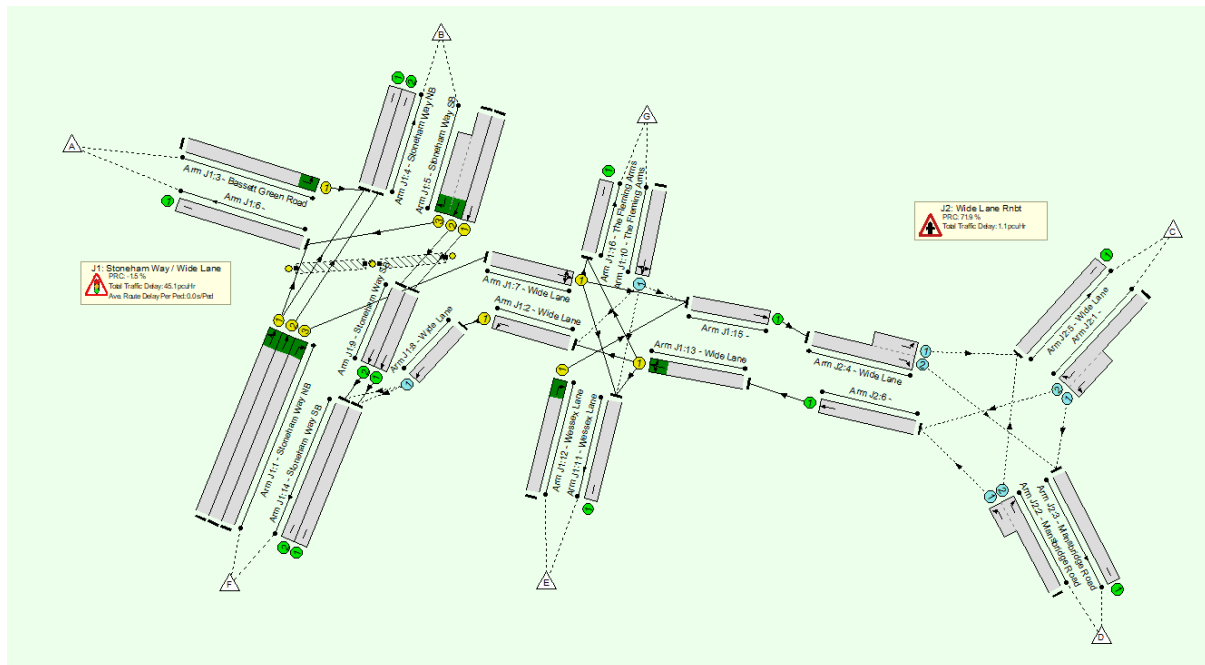
- Stoneham Way (N)
- Stoneham Way (S)
- Wessex Lane
- The Fleming Arms access
- Wide Lane (External)
- Wide Lane EB (Internal)
- Wide Lane WB (Internal)

J2 has the following approaches:

- Wide Lane N
- Mansbridge Road
- Wide Lane W

2.17 The network layout of the J07 model is shown in **Figure 2-5**.

Figure 2-7: J06 model – network layout



Time Periods Modelled

- 2.18 Given the close proximity of junctions within the study area, it was deemed appropriate to identify consistent network peak time periods across all junctions. The time periods modelled were based on the peak hours for the entire network determined by the ATC hourly data. However, at the request of Hampshire CC, junction turning counts were also analysed.
- 2.19 A comparison of flows at each junction between the network peaks and the individual junction peaks was undertaken using the GEH statistic. The GEH statistic is a standard measure used in transport modelling to compare traffic flows. It accounts for both absolute and relative differences, making it more robust than simple percentage comparisons. A GEH value below 5 is generally considered a good match.

2.20 The formula for the GEH Statistic is:

$$GEH = \sqrt{\frac{2(M - C)^2}{M + C}}$$

Where M is the hourly traffic volume from the junction peak hour and C is the traffic volume from the network-wide peak hour

2.21 As shown in **Table 2-2**, the GEH statistic has been used to compare traffic flows at each junction and time period.

Table 2-2: GEH Summary

Junction	GEH AM	GEH PM
A335/ South Street	2	0
A335 Wide Lane/ Airport Parkway	1	0
A335/Wide Lane	1	0
Spitfire Roundabout	2	0
Wide Lane/ Mount Park	6	2

2.22 The analysis shows that GEH values are mostly below 5, indicating that the differences in flows between the network peak and the individual junction peak are statistically insignificant.

2.23 This confirms that 08:00-09:00 remains a suitable and representative AM peak hour for network-wide analysis. However, for Wide Lane/ Mount Park, the AM peak hour flows will be taken for 07:30-08:30 as this is the only junction where the GEH exceeds 5

Therefore, the time periods were modelled are as follows:

- Network peak:
 - AM Peak – 08:00-09:00
 - PM Peak – 17:00-18:00
- J05 – Wide Lane / Mountpark peak:
 - AM Peak – 07:30-08:30
 - PM Peak – 17:00-18:00

2.24 As part of the 2025 model update, a similar peak hour analysis was undertaken. This determined the peak hours for the J06 and J07 models to be as follows:

- Network peak:
 - AM Peak – 07:30-08:30
 - PM Peak – 16:00-17:00

3 Data Collection

Traffic Surveys

- 3.1 For the 2023 models, traffic flow inputs were sourced from the traffic surveys conducted in June 2023. Manual Classified Counts (MCC) were carried out on 29th June 2023 coinciding with queue length surveys and Automatic Traffic Counts (ATC). ATC surveys were conducted from 28/06/23 to 04/07/23.
- 3.2 MCC and queue length data were collected over a 6-hour period (07:00-10:00 and 16:00-19:00) at the following junctions (also shown in Error! Reference source not found.):
- Site 1 – Wide Lane / South Street
 - Site 2 – Wide Lane / Southampton Airport Parkway
 - Site 3 – A335 / Wide Lane
 - Site 4 – M27 Roundabout / Wide Lane
 - Site 5 – Spitfire Roundabout
 - Site 6 – Wide Lane / Mountpark
 - Site 7 – Mansbridge Road Roundabout
 - Site 8 – Wide Lane / Romsey Road / Bishopstoke Road
- 3.3 Sites 4, 6 and 8 were not analysed as part of the modelling exercise. This is because Site 4 and 6 will be resurveyed in 2025 due to incomplete datasets in 2023 and Site 8 was agreed unnecessary to be modelled given its distance from the development area.
- 3.4 ATC data was collected over a 24-hour period at the following locations (also shown in Error! Reference source not found.).
- A1 – A335 Station Hill
 - A2 – A335 Wide Lane
 - A3 – A335 east of M27 Junction 5.
 - A4 – Wide Lane south of Wide Lane roundabout.
 - A5 – Mitchell Way (north of the Royal Mail car park).
 - A6 – Wide Lane (north of Mountpark).
- 3.5 For the 2025 models, traffic flow inputs were sourced from the traffic surveys conducted in February 2025. MCC's were carried out on 13th February 2025 coinciding with queue length surveys and Automatic Traffic Counts (ATC). ATC surveys were conducted from 08/02/25 to 14/02/25.
- 3.6 MCC and queue length data were collected over a 6-hour period (07:00-10:00 and 16:00-19:00) at the following junctions:
- Site 1&2 – Stoneham Way/Wide Lane/Wessex Lane/Bassett Green Rd
 - Site 3 – Wide Lane/Mansbridge Road
 - Site 4 – M27 J5 (Stoneham Interchange)
- 3.7 ATC and Radar data was collected over a 24-hour period at the following locations:
- ATC1 – A335 Station Hill
 - ATC2 – A335 Wide Lane
 - ATC4 – Wide Lane
 - ATC5 – Mitchell Way
 - ATC6 – Wide Lane
 - ATC7 – Wide Lane
 - ATC8 – Mansbridge Road

- RAD3 – A335
- RAD9 – Stoneham Way
- RAD10 – A335 Stoneham Way

Signal Data

3.8 Timing sheets, stage timings and signal layout drawing files were provided by Hampshire CC and Southampton CC for the five signalised junctions within the study area:

- J01 – Wide Lane / South Street
- J02 – Wide Lane / Southampton Airport Parkway (SAP)
- J05 – Wide Lane / Mountpark
- J06 – M27 J5
- J07 – Stoneham Way / Wide Lane / Wessex Lane

4 Base Model Validation

Validation Criteria

- 4.1 The local junction models were developed to evaluate the queue lengths, delays and Degree of Saturation/ Ratio of Flow to Capacity (DoS/RFC) at all junctions. DoS/RFC is a quantitative analysis of the level of congestion on the network and is used as the primary indicator of the operational performance of a junction. Generally, when a junction reaches 90 percent DoS/RFC it is considered to be at practical capacity and when it reaches 100 percent, at theoretical capacity.
- 4.2 The relationship between queues and DoS/RFC is such that queues begin to increase significantly at high DoS (>85%) and so become sensitive to increases in traffic flow or reductions in the traffic capacity provided.
- 4.3 The queues are presented in terms of the average maximum queue in PCUs (passenger car units) from the surveys and the Mean Max Queue (MMQ) in PCUs in LinSig.
- 4.4 For validation purposes, comparisons of the modelling results were undertaken against observed queue data and DoS, where observed.
- 4.5 The following criteria was used to indicate model validation:
- Average modelled queue (in PCU) for the peak period within 2 PCU of the average observed queue, where the average observed queue is 10 PCU or less;
 - Average modelled queue (in PCU) for the peak period within 20% of the average observed queue, where the average observed queue is greater than 10 PCU; and
 - DoS for the peak period within 10% of the average observed DoS

2023 Base Model Validation Results

- 4.6 The results of the queue comparison and the other model results are presented in the tables below for each model.

J01 – Wide Lane / South Street

- 4.7 The tables below summarise the validation results for this junction. See Appendix A for full results.

Table 4-1: Summary of Queue Validation Results – J01 AM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	Difference (%)	Validates?
A335 Southampton Road	10	7	-3	-30%	NO
A335 Wide Lane	26	21	-5	-18%	YES
South Street	7	6	-1	-15%	YES

Table 4-2: Summary of Queue Validation Results – J01 PM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates?
A335 Southampton Road	9	10	1	12%	YES
A335 Wide Lane	13	13	0	2%	YES
South Street	8	3	-5	-68%	NO

Table 4-3: Summary of DoS Validation Results – J01 AM Model

Lane	Observed (%)	Modelled (%)	Difference	Validates?
A335 Southampton Road	-	47	-	-
A335 Wide Lane	79	83	4	YES
South Street	-	89	-	-

Table 4-4: Summary of DoS Validation Results – J01 PM Model

Lane	Observed (%)	Modelled (%)	Difference	Validates?
A335 Southampton Road	-	65	-	-
A335 Wide Lane	71	75	4	YES
South Street	-	63	-	-

- 4.8 The queue results presented in the previous tables show a good level of validation between the observed and modelled queues in both time periods. The modelled queues on A335 Southampton Road in the AM and on South Street in the PM are the only instances where the queue does not validate against the observed. However, this is a minor difference in both cases.
- 4.9 Only the A335 Wide Lane approach had observed DoS values, and these validated well against the modelled values.

J02 – Wide Lane / Southampton Airport Parkway

- 4.10 The tables below summarise the validation results for this junction. See Appendix B for full results

Table 4-5: Summary of Queue Validation Results – J02 AM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates?
Wide Lane N	-	10	-	-	-
SAP Right	2	1	-1	-71%	YES
SAP Left	2	0	-2	-96%	YES
Wide Lane S	-	16	-	-	-

Table 4-6: Summary of Queue Validation Results – J02 PM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates ?
Wide Lane N	-	14	-	-	-
SAP Right	2*	1	-1	-50%	YES
SAP Left	4	0	-4	-93%	NO
Wide Lane S	-	6	-	-	-

*based on spot checks following video data review

Table 4-7: Summary of DoS Validation Results – J02 AM Model

Lane	Observed (%)	Modelled (%)	Difference	Validates?
Wide Lane N	-	60	-	-
SAP Right	19	9	-10	YES
SAP Left	-	14	-	-
Wide Lane S	80	81	2	YES

Table 4-8: Summary of DoS Validation Results – J02 PM Model

Lane	Observed (%)	Modelled (%)	Difference	Validates?
Wide Lane N	-	71	-	-
SAP Right	24	14	-10	YES
SAP Left	-	38	-	-
Wide Lane S	64	59	-5	YES

- 4.11 The queue results presented in the tables above show a good level of validation between the observed and modelled queues in the AM. However, the PM shows that the modelled and observed queue lengths differ on the Southampton Airport (SAP) left arm.
- 4.12 Only the SAP Right and Wide Lane South approach had observed DoS values, and these validated well against the modelled values.

J03 – A335 / Wide Lane Roundabout

- 4.13 The tables below summarise the validation results for this junction. See Appendix C for full results

Table 4-9: Summary of Queue Validation Results – J03 AM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates?
A335 Wide Lane 1	1	0.5	-1	-60%	YES
A335 Wide Lane 2	3	3.7	1	23%	YES
Wide Lane - Lane 1	1	1.2	1	140%	YES
Wide Lane - Lane 2	1	1.3	1	95%	YES
A335 Lane 1	17*	14.1	-3	-17%	YES
A335 Lane 2	2	2.5	1	30%	YES

*based on spot checks following video data review

Table 4-10: Summary of Queue Validation Results – J03 PM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates ?
A335 Wide Lane 1	1	0.7	0	5%	YES
A335 Wide Lane 2	10*	11.5	1.5	15%	YES
Wide Lane - Lane 1	2	3.3	1	52%	YES
Wide Lane - Lane 2	2	0.5	-1	-70%	YES
A335 Lane 1	1	2.5	2	400%	NO
A335 Lane 2	1	1.5	1	200%	YES

*based on spot checks following video data review

- 4.14 The queue results presented in the tables above show a good level of validation between the observed and modelled queues in both time periods. The modelled queue on A335 Lane 1 in the AM and Wide Lane 2 in the PM are the only instances where the queue differs greatly against the observed.

J04 – Spitfire Roundabout

- 4.15 The tables overleaf summarise the validation results for this junction. See Appendix D for full results.

Table 4-11: Summary of Queue Validation Results – J05 AM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	Difference (%)	Validates?
Wide Lane (N) Lane 1	0	1.0	-1	N/A	YES
Wide Lane (N) Lane 2	0	1.0	-1	N/A	YES
Mitchell Way (E) Lane 1	0	0.1	0	N/A	YES
Mitchell Way (E) Lane 2	0	0.1	0	N/A	YES
George Curl Way (S) Lane 1	0	0.1	0	20%	YES
George Curl Way (S) Lane 2	0	0.1	0	20%	YES

Wide Lane (W) Lane 1	1	0.9	0	2%	YES
Wide Lane (W) Lane 2	0	0.9	-1	0%	YES

Table 4-12: Summary of Queue Validation Results – J05 PM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates?
Wide Lane (N) Lane 1	0	1.1	-1	0%	YES
Wide Lane (N) Lane 2	1	1.1	0	20%	YES
Mitchell Way (E) Lane 1	0	0.2	0	20%	YES
Mitchell Way (E) Lane 2	0	0.2	0	20%	YES
George Curl Way (S) Lane 1	0	0.2	0	-4%	YES
George Curl Way (S) Lane 2	0	0.2	0	-4%	YES
Wide Lane (W) Lane 1	0	0.5	-1	0%	YES
Wide Lane (W) Lane 2	0	0.5	0	100%	YES

- 4.16 The queue results presented in the tables above show a good level of validation between the observed and modelled queues for both time periods.

J05 – Wide Lane / Mountpark

4.17 The tables below summarise the validation results for this junction. See Appendix E for results

Table 4-13: Summary of Queue Validation Results – J06 AM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates ?
Wide Lane N	9	5	-4	-48%	NO
Mountpark	2	1	-1	-32%	YES
Wide Lane S	11	9	-2	-15%	YES

Table 4-14: Summary of Queue Validation Results – J06 PM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates ?
Wide Lane	11	11	0	-1%	YES
Mountpark	2	2	0	21%	YES
Wide Lane S	2	4	2	96%	YES

4.18 The queue results presented in the tables above show a good level of validation between the observed and modelled queues at both junctions. The modelled queue on Wide Lane N in the AM is the only instance where the queue does not validate against the observed. However, this is a minor difference in one time period and does validate well in the PM.

2025 Base Model Validation Results

J06 – M27 J5

4.19 The tables below summarise the validation results for this junction. See Appendix E for results

Table 4-15: Summary of Queue Validation Results – J06 AM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates ?
A335 (N) Ahead	12	8.8	-3	-26%	NO
A335 (N) Ahead	8	8.9	1	14%	YES
Stoneham Lane Ahead Left	12	10.3	-2	-14%	YES
Stoneham Lane Ahead	10	6.7	-3	-32%	NO
Stoneham Lane Ahead	3	6.7	4	110%	NO
M27 (W) Off slip Ahead	8	7.2	0	-5%	YES
M27 (W) Off slip Ahead	5	2.9	-2	-39%	YES
M27 (W) Off slip Ahead	9	9.3	0	2%	YES
M27 (E) Off slip Ahead	10	6.9	-3	-30%	NO
M27 (E) Off slip Ahead	8	6.9	-1	-13%	YES

NE Circulatory Ahead	9	7.3	-2	-18%	YES
NE Circulatory Ahead Ahead2	8	1.9	-6	-75%	NO
NE Circulatory Ahead	3	7.3	4	116%	NO
NW Circulatory Ahead	12	14	2	22%	NO
NW Circulatory Right Ahead	7	11.3	4	52%	NO
NW Circulatory Right	3	7	4	130%	NO
Western Circulatory Ahead	12	9.7	-2	-20%	YES
Western Circulatory Right Ahead	8	9.6	1	14%	YES
Western Circulatory Right	7	7.4	1	9%	YES
Eastern Circulatory Ahead	11	5.7	-5	-46%	NO
Eastern Circulatory Right Ahead	9	5.9	-3	-35%	NO
Eastern Circulatory Right	4	3.9	-1	-13%	YES

Table 4-16: Summary of Queue Validation Results – J06 PM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates ?
A335 (N) Ahead	8	8.3	0	-26%	YES
A335 (N) Ahead	10	7.4	-3	14%	NO
Stoneham Lane Ahead Left	13	10	-3	-14%	NO
Stoneham Lane Ahead	10	5.6	-5	-32%	NO
Stoneham Lane Ahead	4	5.6	2	110%	YES
M27 (W) Off slip Ahead	6	5.3	-1	-5%	YES
M27 (W) Off slip Ahead	3	5	2	-39%	NO
M27 (W) Off slip Ahead	7	12	5	2%	NO
M27 (E) Off slip Ahead	8	4.2	-3	-30%	NO
M27 (E) Off slip Ahead	5	4.2	-1	-13%	YES
NE Circulatory Ahead	9	11.5	3	-18%	NO
NE Circulatory Ahead Ahead2	5	3	-2	-75%	YES
NE Circulatory Ahead	2	5.3	3	116%	NO
NW Circulatory Ahead	11	8	-3	22%	NO

NW Circulatory Right Ahead	11	6.7	-5	52%	NO
NW Circulatory Right	6	3.6	-2	130%	NO
Western Circulatory Ahead	4	5.6	1	-20%	YES
Western Circulatory Right Ahead	6	5.5	0	14%	YES
Western Circulatory Right	6	7.5	1	9%	YES
Eastern Circulatory Ahead	7	4.8	-2	-46%	NO
Eastern Circulatory Right Ahead	7	8.3	2	-35%	YES
Eastern Circulatory Right	6	6.4	0	-13%	YES

4.20 The queue results presented in the tables above show a good level of validation between the observed and modelled queues at both junctions. In some cases, the queues do not validate on certain arms but the queues remain within a maximum of 5 PCUs.

Table 4-17: Summary of DoS Validation Results – J06 AM Model

Lane	Observed (%)	Modelled (%)	Difference	Validates?
A335 (N) Ahead	86	82	-4	YES
A335 (N) Ahead	74	82	8	YES
Stoneham Lane Ahead Left	80	79	-1	YES
Stoneham Lane Ahead	66	70	4	YES
Stoneham Lane Ahead	27	70	43	NO
M27 (W) Off slip Ahead	78	69	-8	YES
M27 (W) Off slip Ahead	No Data	33	0	YES
M27 (W) Off slip Ahead	88	83	-5	YES
M27 (E) Off slip Ahead	78	75	-3	YES
M27 (E) Off slip Ahead	70%	75	5	YES
NE Circulatory Ahead	48	50	2	YES
NE Circulatory Ahead Ahead2	40	43	3	YES
NE Circulatory Ahead	No Data	28	0	YES
NW Circulatory Ahead	73	73	0	YES
NW Circulatory Right Ahead	49	55	6	YES
NW Circulatory Right	47	37	-10	YES
Western Circulatory Ahead	58	56	-2	YES
Western Circulatory Right Ahead	52	57	5	YES
Western Circulatory Right	44	47	3	YES
Eastern Circulatory Ahead	79	74	-5	YES

Eastern Circulatory Right Ahead	76	74	-2%	YES
Eastern Circulatory Right	No Data	56	0%	YES

Table 4-18: Summary of DoS Validation Results – J06 PM Model

Lane	Observed (%)	Modelled (%)	Difference	Validates?
A335 (N) Ahead	73	82	9	YES
A335 (N) Ahead	85	77	-8	YES
Stoneham Lane Ahead Left	85	75	-11	NO
Stoneham Lane Ahead	69	59	-9	YES
Stoneham Lane Ahead	42	59	17	NO
M27 (W) Off slip Ahead	74	72	-2	YES
M27 (W) Off slip Ahead	No Data	69	0	YES
M27 (W) Off slip Ahead	91	96	5	YES
M27 (E) Off slip Ahead	70	56	-14	NO
M27 (E) Off slip Ahead	57	56	0	YES
NE Circulatory Ahead	65	58	-6	YES
NE Circulatory Ahead Ahead2	40	51	11	NO
NE Circulatory Ahead	No Data	22	0	YES
NW Circulatory Ahead	68	62	-6	YES
NW Circulatory Right Ahead	59	61	1	YES
NW Circulatory Right	51	49	-2	YES
Western Circulatory Ahead	44	37	-7	YES
Western Circulatory Right Ahead	49	43	-7	YES
Western Circulatory Right	48	53	5	YES
Eastern Circulatory Ahead	72	59	-13	NO
Eastern Circulatory Right Ahead	66	61	-5	YES
Eastern Circulatory Right	No Data	38	0	YES

- 4.21 The DoS results presented in the tables above show a very good level of validation between the observed and modelled DoS in both time periods, with only arm (Stoneham Way Ahead) exceeding 15% difference – this is attributed to the fact that this lane is a right turn flare. However, generally where the DoS difference exceeds 10%, the modelled queue data validates well. Therefore, this model can be considered fit for purpose in testing future scenarios.

J07 – Stoneham Way / Wide Lane / Wessex Lane and Wide Lane / Mansbridge Road

- 4.22 The tables below summarise the validation results for this junction. See Appendix B for full results

Table 4-19: Summary of Queue Validation Results – J07 AM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates?
Stoneham Way / Wessex Lane					
Stoneham Way SB Ahead	23.1	25.1	2	9%	YES
Stoneham Way SB Right Ahead	6.3	8.1	2	30%	YES
Stoneham Way SB Right Ahead	9.6	8.1	-1	-15%	YES
Bassett Green Road Left	6.1	5.9	0	-3%	YES
Stoneham Way NB Ahead Left	12.7	12.2	0	-4%	YES
Stoneham Way NB Ahead	11.4	12.2	1	7%	YES
Stoneham Way NB Right	11.1	11.8	1	7%	YES
Wessex Lane Right	5.9	3.9	-2	-33%	YES
Wide Lane Ahead Left Right	13.5	13.6	0	1%	YES
Wide Lane Right Ahead Left	0.8	1.4	1	75%	YES
Wide Lane Left	0.1	0.5	0	317%	YES
Mansbridge Roundabout					
Wide Lane N Right Left	0.2	0.1	0	-40%	YES
Mansbridge Road Right Left	1.5	0.3	-1	-81%	YES
Wide Lane W Right Left	1.9	0.1	-2	-95%	YES

Table 4-20: Summary of Queue Validation Results – J02 PM Model

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates?
Stoneham Way / Wessex Lane					
Stoneham Way SB Ahead	14.4	19.5	5	36%	NO
Stoneham Way SB Right Ahead	5.9	6.8	1	16%	YES

Lane	Observed (PCUs)	Modelled (PCUs)	Difference	%age Difference	Validates?
Stoneham Way SB Right Ahead	9.7	6.8	-3	-30%	NO
Bassett Green Road Left	14.6	12.5	-2	-14%	YES
Stoneham Way NB Ahead Left	9.8	10.5	1	7%	YES
Stoneham Way NB Ahead	12.0	10.5	-2	-13%	YES
Stoneham Way NB Right	11.8	11.2	-1	-5%	YES
Wessex Lane Right	3.8	3.0	-1	-21%	YES
Wide Lane Ahead Left Right	13.6	13.9	0	2%	YES
Wide Lane Right Ahead Left	0.0	1.6	2	0%	YES
Wide Lane Left	0.0	0.3	0	0%	YES
Mansbridge Roundabout					
Wide Lane N Right Left	0.5	0.2	0	-60%	YES
Mansbridge Road Right Left	0.6	0.2	0	-68%	YES
Wide Lane W Right Left	0.1	0.1	0	20%	YES

Table 4-21: Summary of DoS Validation Results – J02 AM Model

Lane	Observed (%)	Modelled (%)	Difference	Validates?
Stoneham Way SB Ahead	82	80	-2	YES
Stoneham Way SB Right Ahead	70	71	1	YES
Stoneham Way SB Right Ahead	70	71	1	YES
Bassett Green Road Left	63	47	-16	NO
Stoneham Way NB Ahead Left	50	50	1	YES
Stoneham Way NB Ahead	40	48	8	YES
Stoneham Way NB Right	84	70	-15	NO
Wessex Lane Right	64	66	2	YES
Wide Lane Ahead Left Right	77	69	-8	YES
Wide Lane Right Ahead Left	38	25	-13	NO
Wide Lane Left	-	47	-	-

Table 4-22: Summary of DoS Validation Results – J07 PM Model

Lane	Observed (%)	Modelled (%)	Difference	Validates?
Stoneham Way SB Ahead	68	75	7	YES
Stoneham Way SB Right Ahead	68	59	-8	YES
Stoneham Way SB Right Ahead	68	59	-8	YES
Bassett Green Road Left	85	78	-7	YES
Stoneham Way NB Ahead Left	56	48	-7	YES
Stoneham Way NB Ahead	50	49	-1	YES
Stoneham Way NB Right	83	74	-9	YES
Wessex Lane Right	70	62	-7	YES
Wide Lane Ahead Left Right	74	83	9	YES
Wide Lane Right Ahead Left	40	29	-11	NO
Wide Lane Left	-	36	-	-

4.23 The queue results presented in the tables above show a good level of validation between the observed and modelled queues in the AM. However, the PM shows that the modelled and observed queue lengths differ on the Stoneham Way SB arm.

4.24 The DoS results presented in the tables above show a good level of validation between the observed and modelled DoS in both time periods, with no arm exceeding 15% difference. However, where the DoS difference exceeds 10%, the modelled queue data validates well. Therefore, this model can be considered fit for purpose in testing future scenarios.

Results Summary

4.25 The tables below show the queue, and DoS results for each approach for all of the junctions, across both time periods.

Table 4-23: Summary of base model results – J01 Model – Wide Lane/ South Street

Lane	AM Queue (PCUs)	AM DoS (%)	PM Queue (PCUs)	PM DoS (%)
A335 Southampton Road	7	47	10	65
A335 Wide Lane	21	83	13	75
South Street	6	89	3	63

Table 4-24: Summary of base model results – J02 Model – Wide Lane/ Southampton Airport Parkway

Lane	AM Queue (PCUs)	AM DoS (%)	PM Queue (PCUs)	PM DoS (%)
Wide Lane N	10	60	14	71
SAP Right	1	9	1	14
SAP Left	0	14	0	38
Wide Lane S	16	81	6	59

Table 4-25: Summary of base model results – J03 Model – A335/ Wide Lane

Lane	AM Queue (PCUs)	AM RFC (%)	PM Queue (PCUs)	PM RFC (%)
A335 Wide Lane 1	0.5	32	0.7	41
A335 Wide Lane 2	3.7	77	11.5	95
Wide Lane - Lane 1	1.2	54	3.3	77
Wide Lane - Lane 2	1.3	57	0.5	36
A335 Lane 1	14.1	96	2.5	71
A335 Lane 2	2.5	71	1.5	59

Table 4-26: Summary of base model results – J04 Model – Spitfire Roundabout

Lane	AM Queue (PCUs)	AM RFC (%)	PM Queue (PCUs)	PM RFC (%)
Wide Lane (N) Lane 1	1.0	54	1.1	57
Wide Lane (N) Lane 2	1.0	54	1.1	57
Mitchell Way (E) Lane 1	0.1	11	0.2	14
Mitchell Way (E) Lane 2	0.1	11	0.2	14
George Curl Way (S) Lane 1	0.1	6	0.2	16
George Curl Way (S) Lane 2	0.1	6	0.2	16
Wide Lane (W) Lane 1	0.9	50	0.5	35
Wide Lane (W) Lane 2	0.9	50	0.5	35

Table 4-27: Summary of base model results – J05 Model – Wide Lane/ Mount Park

Lane	AM Queue (PCUs)	AM DoS (%)	PM Queue (PCUs)	PM DoS (%)
Wide Lane N	5	38	11	72
Mountpark	1	44	2	64
Wide Lane S	9	66	4	41

Table 4-28: Summary of base model results – J06 Model – M27 J5

Lane	AM Queue (PCUs)	AM DoS (%)	PM Queue (PCUs)	PM DoS (%)
Stoneham Lane Ahead Left	10.3	79	10	75
Stoneham Lane Ahead	6.6	70	5.6	59
A335 (N) Left	0.1	20	0.2	31
A335 (N) Ahead	8.9	82	8.3	82
A335 (N) Ahead	8.9	82	7.4	77
M27 (E) Off slip Left	0.3	41	0.2	31
M27 (E) Off slip Ahead	7.1	76	4.2	56
A335 Stoneham Way (S) Ahead Left	1.6	76	1.4	62

Lane	AM Queue (PCUs)	AM DoS (%)	PM Queue (PCUs)	PM DoS (%)
A335 Stoneham Way (S) Ahead	5.2	77	21.6	91
M27 (W) Off slip Ahead Left	7.1	68	5.3	72
M27 (W) Off slip Ahead	2.9	34	5	69
M27 (W) Off slip Ahead	9.3	83	12	96
NW Circulatory Ahead	11.8	66	8	62
NW Circulatory Right Ahead	12.2	58	6.7	61
NW Circulatory Right	7.5	39	3.6	49
NE Circulatory Ahead	7.3	48	11.5	58
NE Circulatory Ahead Ahead2	1.9	45	3	51
NE Circulatory Ahead	7.3	28	5.3	22
Eastern Circulatory Ahead	5.6	74	4.8	59
Eastern Circulatory Right Ahead	5.9	74	8.3	61
Eastern Circulatory Right	3.9	56	6.4	38
Southern Circulatory Ahead	0	5	0	7

Table 4-29: Summary of base model results – J07 Model – Stoneham Way / Wide Lane / Wessex Lane and Wide Lane / Mansbridge Road

Lane	AM Queue (PCUs)	AM DoS (%)	PM Queue (PCUs)	PM DoS (%)
Stoneham Way NB Ahead Left	12.4	50.8	10.5	48.1
Stoneham Way NB Ahead	12	48.3	11.2	48.8
Stoneham Way NB Right	9.5	77.3	9.8	74.3
Wide Lane Left	0.5	45.8	0.3	36.2
Bassett Green Road Left	6	47.2	12.5	77.6
Stoneham Way SB Ahead	25.2	79.9	19.5	74.7
Stoneham Way SB Right Ahead	8.3	72.4	6.8	59.3
Wide Lane Right Ahead Left	2.4	29.7	1.6	29.3
Wide Lane Ahead	10.3	32.5	0.1	19
The Fleming Arms Right Ahead Left	0	0	0	0.7
Wessex Lane Right	3.2	61.3	3	62.3

Lane	AM Queue (PCUs)	AM DoS (%)	PM Queue (PCUs)	PM DoS (%)
Wide Lane Ahead Left Right	13.5	65.9	13.9	83.4
Wide Lane Right Left	0.1	21.5	0.2	26.2
Mansbridge Road Right Left	0.4	42	0.2	23.9
Mansbridge Road	0.1	16.3	0.1	21.5

- 4.26 The DoS results show that most junctions are currently operating below their practical capacity except for J03 A335 / Wide Lane roundabout. In particular, the A335 Lane 1 (western arm) is operating close to its theoretical capacity in the AM. It was noted through site observations that queuing can extend back towards the M27 roundabout and is mostly caused by the blocking back from J02 – Wide Lane/ Southampton Airport Parkway. The A335 Wide Lane 2 (western arm) is over capacity in the PM, and this has a knock-on effect on the traffic turning left out of Southampton Airport Parkway heading towards the M27.

The 2025 models also show that most arms operate below their practical capacity. However, there are a few arms from M27 J5 model that operate close to theoretical capacity in the PM such as M27 (W) Off slip Ahead and Stoneham Way Ahead.

5 Forecast Modelling

Scenarios

- 5.1 Using the validated base local junction models as the basis for the future year forecast modelling, five future demand scenarios were tested. The modelled scenarios are summarised in **Table 5-1**.

Table 5-1: Forecast modelled scenarios

Scenario	Demand	Network
2025 Baseline**	Uplifted base flows to current year	Same as base (except for J05 model*)
2028 Baseline	Uplifted base flows to future 2028 flows	Same as base (except for J05 model*)
2028 Baseline + Proposed Development	Uplifted base flows to future 2028 flows + development trips	Same as base (except for J05 model*)
2036 Baseline	Uplifted base flows to future 2036 flows	Same as base (except for J05 model*)
2036 Baseline + Proposed Development	Uplifted base flows to future 2036 flows + development trips	Same as base (except for J05 model*)

* As requested by Hampshire CC, J05 future models include the priority junction for access to the coffee drive through

** Only applies to 2023 models

2023 Model Forecast Results

J01 – Wide Lane / South Street

5.2 The junction capacity assessment results for this junction are shown in the tables below.

Table 5-2: Forecast Results – J01 AM Model – Wide Lane/ South Street

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2025 Baseline	A335 Southampton Road	49	1.5	7.6
	A335 Wide Lane	87	6.0	24.2
	South Street	80	3.2	4.8
2028 Baseline	A335 Southampton Road	51	1.6	8.1
	A335 Wide Lane	90	7.3	27.2
	South Street	81	3.3	5.0
2028 Baseline + Proposed Development	A335 Southampton Road	54	1.7	8.8
	A335 Wide Lane	91	8.0	28.8
	South Street	82	3.5	5.2
2036 Baseline	A335 Southampton Road	55	1.8	8.9
	A335 Wide Lane	97	14.4	40.1
	South Street	86	4.0	5.8
2036 Baseline + Proposed Development	A335 Southampton Road	58	2.0	9.9
	A335 Wide Lane	98	17.3	44.0
	South Street	87	4.1	5.9

Table 5-3: Forecast Results – J01 PM Model -Wide Lane/ South Street

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2025 Baseline	A335 Southampton Road	66	2.5	10.5
	A335 Wide Lane	77	3.7	14.4
	South Street	65	1.7	2.7

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2028 Baseline	A335 Southampton Road	69	2.7	11.4
	A335 Wide Lane	81	4.2	15.8
	South Street	66	1.8	2.8
2028 Baseline + Proposed Development	A335 Southampton Road	69	2.8	11.5
	A335 Wide Lane	84	4.8	17.6
	South Street	66	1.8	2.8
2036 Baseline	A335 Southampton Road	74	3.2	13.0
	A335 Wide Lane	88	6.2	20.8
	South Street	70	2.0	3.1
2036 Baseline + Proposed Development	A335 Southampton Road	74	3.3	13.4
	A335 Wide Lane	91	7.4	22.9
	South Street	70	2.0	3.1

- 5.3 The results show that even by 2028 Baseline, the junction will be at practical capacity in the AM period on the A335 Wide Lane south arm, regardless of the Proposed Development trips. The junction will also be approaching practical capacity in the 2036 Baseline and the additional Proposed Development trips, will not significantly exacerbate the capacity issues.

J02 – Wide Lane / Southampton Airport Parkway

- 5.4 The junction capacity assessment results for this junction are shown in the tables below.

Table 5-4: Forecast Results – J02 AM Model – Wide Lane/ Southampton Airport Parkway

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2025 Baseline	Wide Lane N	58	1.8	9.0
	SAP Right	13	0.3	0.6
	SAP Left	15	0.1	0.1
	Wide Lane S	80	3.0	13.1
2028 Baseline	Wide Lane N	59	1.9	9.6
	SAP Right	13	0.3	0.6
	SAP Left	15	0.1	0.1
	Wide Lane S	83	3.6	15.4
	Wide Lane N	62	2.2	10.6
	SAP Right	13	0.3	0.6

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2028 Baseline + Proposed Development	SAP Left	16	0.1	0.1
	Wide Lane S	84	3.9	16.2
2036 Baseline	Wide Lane N	64	2.3	11.1
	SAP Right	13	0.3	0.7
	SAP Left	17	0.1	0.1
	Wide Lane S	90	5.6	22.1
2036 Baseline + Proposed Development	Wide Lane N	67	2.5	12
	SAP Right	13	0.3	0.7
	SAP Left	17	0.1	0.1
	Wide Lane S	91	6.3	23.6

Table 5-5: Forecast Results – J02 PM Model - Wide Lane/ Southampton Airport Parkway

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2025 Baseline	Wide Lane N	69	2.5	12.4
	SAP Right	19	0.5	0.9
	SAP Left	38	0.3	0.3
	Wide Lane S	58	1.2	4.8
2028 Baseline	Wide Lane N	71	2.8	13.2
	SAP Right	19	0.5	1.0
	SAP Left	40	0.3	0.3
	Wide Lane S	61	1.4	5.3
2028 Baseline + Proposed Development	Wide Lane N	72	2.9	13.6
	SAP Right	19	0.5	1.0
	SAP Left	41	0.3	0.3
	Wide Lane S	63	1.5	5.6
2036 Baseline	Wide Lane N	76	3.4	15.6
	SAP Right	20	0.5	1
	SAP Left	44	0.4	0.4
	Wide Lane S	66	1.8	6.9
2036 Baseline + Proposed Development	Wide Lane N	77	3.5	15.8
	SAP Right	20	0.5	1.0
	SAP Left	44	0.4	0.4
	Wide Lane S	69	2.0	7.3

- 5.5 The results show that by the 2036 Baseline, the junction will be at practical capacity in the AM period regardless of the Proposed Development trips. This is due to the traffic on Wide Lane south. This is significant because the resultant queues, will block back onto the A335 / Wide Lane roundabout, having a knock-on impact on congestion at that junction.

J03 – A335 / Wide Lane Roundabout

5.6 The junction capacity assessment results for this junction are shown in the tables below.

Table 5-6: Forecast Results – J03 AM Model – A335/ Wide Lane Roundabout

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2025 Baseline	1/1 - Wide Lane (NE)	0.34	7.26	0.5
	1/2 - Wide Lane (NE)	0.81	26.75	4.4
	2/1 - Wide Lane (S)	0.58	11.64	1.4
	2/2 - Wide Lane (S)	0.6	9.74	1.5
	3/1 - A335 (NW)	1	88.03	20
	3/2 - A335 (NW)	0.75	18.73	3.1
2028 Baseline	1/1 - Wide Lane (NE)	0.39	8.14	0.6
	1/2 - Wide Lane (NE)	0.86	37.17	6.2
	2/1 - Wide Lane (S)	0.65	14.03	1.9
	2/2 - Wide Lane (S)	0.64	10.97	1.8
	3/1 - A335 (NW)	1.04	122.57	29.8
	3/2 - A335 (NW)	0.86	30.99	5.6
2028 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.51	11.36	1
	1/2 - Wide Lane (NE)	0.98	90.41	15.4
	2/1 - Wide Lane (S)	0.84	33.23	5.6
	2/2 - Wide Lane (S)	0.66	11.66	1.9
	3/1 - A335 (NW)	1.05	135.48	33.4
	3/2 - A335 (NW)	1.18	303.98	81.1
2036 Baseline	1/1 - Wide Lane (NE)	0.45	9.4	0.8
	1/2 - Wide Lane (NE)	0.95	67.12	11.8
	2/1 - Wide Lane (S)	0.77	21.93	3.4
	2/2 - Wide Lane (S)	0.73	14.76	2.6
	3/1 - A335 (NW)	1.15	242.91	64.7
	3/2 - A335 (NW)	1.04	121.5	28
2036 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.56	12.59	1.3
	1/2 - Wide Lane (NE)	1.03	134.29	25.2
	2/1 - Wide Lane (S)	0.98	82.38	16.1

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
	2/2 - Wide Lane (S)	0.75	15.95	2.9
	3/1 - A335 (NW)	1.16	257.09	68.3
	3/2 - A335 (NW)	1.38	717.08	171.3

Table 5-7: Forecast Results – J03 PM Model – A335/ Wide Lane Roundabout

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2025 Baseline	1/1 - Wide Lane (NE)	0.43	8.11	0.8
	1/2 - Wide Lane (NE)	0.98	78.49	16.5
	2/1 - Wide Lane (S)	0.83	30.78	4.6
	2/2 - Wide Lane (S)	0.38	7.07	0.6
	3/1 - A335 (NW)	0.73	14.64	2.8
	3/2 - A335 (NW)	0.62	10.35	1.7
2028 Baseline	1/1 - Wide Lane (NE)	0.48	9.21	0.9
	1/2 - Wide Lane (NE)	1.04	124.39	28.5
	2/1 - Wide Lane (S)	0.93	58.32	9.6
	2/2 - Wide Lane (S)	0.43	7.74	0.8
	3/1 - A335 (NW)	0.76	16.66	3.2
	3/2 - A335 (NW)	0.69	12.91	2.3
2028 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.56	12.13	1.3
	1/2 - Wide Lane (NE)	1.17	273.65	64.9
	2/1 - Wide Lane (S)	1.27	444.56	99.2
	2/2 - Wide Lane (S)	0.48	8.33	0.9
	3/1 - A335 (NW)	0.78	18.26	3.5
	3/2 - A335 (NW)	0.88	33.15	6.9
2036 Baseline	1/1 - Wide Lane (NE)	0.54	10.85	1.2
	1/2 - Wide Lane (NE)	1.16	257.27	64.4
	2/1 - Wide Lane (S)	1.13	221.87	49.5
	2/2 - Wide Lane (S)	0.52	9.33	1.1
	3/1 - A335 (NW)	0.83	23.96	4.7
	3/2 - A335 (NW)	0.8	20.57	4

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2036 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.62	14.95	1.6
	1/2 - Wide Lane (NE)	1.31	517.63	106.7
	2/1 - Wide Lane (S)	1.47	873.02	191.4
	2/2 - Wide Lane (S)	0.56	10.29	1.3
	3/1 - A335 (NW)	0.84	25.81	5.1
	3/2 - A335 (NW)	0.99	80.66	19.3

- 5.7 The results show that even in the 2025 Baseline, the junction will be approaching/ at theoretical capacity in both peak periods. In both the 2028 and 2036 Baseline scenarios the junction will also exceed theoretical capacity. As the junction is over theoretical capacity associated queues on the impacted arms are therefore increasing exponentially, which then rise further as a result of the Proposed Development in the 2028 and 2036 Baseline + Proposed Development scenarios.
- 5.8 Although the junction is clearly over theoretical capacity and failing in the future baseline, even without the additional Proposed Development trips, it is considered that mitigation will need to be explored for this junction, given that a high proportion of the Proposed Development trips will be passing through this junction to access either M27 J5 or to use Wide Lane or Stoneham Lane to access Eastleigh.
- 5.9 Due to the capacity issues recorded at all arms in the 2036 Baseline + Proposed Development scenarios, a fundamental re-design of the roundabout was considered to mitigate these issues. These network changes included:
- Addition of left-turn bypass on A335 (NW) arm.
 - This bypass would run parallel to the existing Wide Lane road until the next stop-line at the adjacent SAP junction, also resulting in increased capacity at this approach.
 - Allowance of right-turners from the nearside lane on A335 (NW) arm.
 - Replacement of nearside lane on Wide Lane (S) with left-turn bypass.
 - Allowance of ahead movement on nearside lane on Wide Lane (NE) arm.
- 5.10 To assess this, the mitigation option was tested in Junctions 9 with the same level of demand. However, it should be noted that in the absence of network origin-destination data, it has been assumed 85% of traffic travelling ahead from the A335 (NW) arm uses the bypass. The remaining 15% would use the nearside lane on this arm. This is based on turning proportions at the Southampton Airport Parkway (SAP) junction, where 13% of Base AM traffic on Wide Lane S turns right into SAP. This has been rounded up to the nearest 5% to represent a more robust test.
- 5.11 The Proposed 2036 results are presented in **Table 5-8** and **Table 5-9** below.

Table 5-8: A335/ Wide Lane Roundabout Mitigation Option – Proposed 2036 AM results

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2028 Baseline	1/1 - Wide Lane (NE)	0.61	6.60	1.7
	2/1 - Wide Lane (S)	0.52	6.75	1.1
	3/1 - A335 (NW)	0.48	4.32	1.0

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2028 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.72	10.49	2.8
	2/1 - Wide Lane (S)	0.54	7.01	1.2
	3/1 - A335 (NW)	0.64	6.30	1.9
2036 Baseline	1/1 - Wide Lane (NE)	0.69	8.66	2.4
	2/1 - Wide Lane (S)	0.59	8.06	1.5
	3/1 - A335 (NW)	0.57	5.28	1.4
2036 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.82	16.86	4.7
	2/1 - Wide Lane (S)	0.61	8.40	1.6
	3/1 - A335 (NW)	0.73	8.53	2.8

Table 5-9: A335/ Wide Lane Roundabout Mitigation Option – Proposed 2036 PM results

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2028 Baseline	1/1 - Wide Lane (NE)	0.74	9.12	2.9
	2/1 - Wide Lane (S)	0.35	5.46	0.5
	3/1 - A335 (NW)	0.40	3.32	0.7
2028 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.81	13.04	4.1
	2/1 - Wide Lane (S)	0.38	5.73	0.6
	3/1 - A335 (NW)	0.49	4.21	1.1
2036 Baseline	1/1 - Wide Lane (NE)	0.81	12.74	4.2
	2/1 - Wide Lane (S)	0.42	6.21	0.7
	3/1 - A335 (NW)	0.46	3.75	0.9
2036 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.88	21.48	6.9
	2/1 - Wide Lane (S)	0.45	6.63	0.8
	3/1 - A335 (NW)	0.55	4.84	1.3

5.12 The model results show that by implementing these changes, we see a vastly improved performing junction with only slight capacity issues occurring in the 2036 PM on Arm 1 – 88% RFC. However, that still compares favourably to even the existing Base PM model, where the RFC on the offside lane (Arm 1 Lane 2) is 98%.

5.13 In addition, the provision of the additional lane/ stop line on the southern arm at the SAP junction, will provide that junction with enhanced capacity at the southern entry signals.

J04 – Spitfire Roundabout

- 5.14 The junction capacity assessment results for this junction are shown in the tables below and overleaf.

Table 5-10: Forecast Results – J05 AM Model – Spitfire Roundabout

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
Future Base 2025	1 - Wide Lane (N)	0.57	5.91	1.4
	2 - Mitchell Way (E)	0.13	2.75	0.2
	3 - George Curl Way (S)	0.07	2.89	0.1
	4 - Wide Lane (W)	0.52	4.23	1.1
Future Base 2028	1 - Wide Lane (N)	0.64	7.01	1.8
	2 - Mitchell Way (E)	0.19	2.9	0.2
	3 - George Curl Way (S)	0.07	3.05	0.1
	4 - Wide Lane (W)	0.57	4.75	1.3
Proposed 2028	1 - Wide Lane (N)	0.87	20.65	6.8
	2 - Mitchell Way (E)	0.31	3.75	0.5
	3 - George Curl Way (S)	0.08	3.38	0.1
	4 - Wide Lane (W)	0.67	6.58	2
Future Base 2036	1 - Wide Lane (N)	0.75	10.22	3
	2 - Mitchell Way (E)	0.28	3.28	0.4
	3 - George Curl Way (S)	0.08	3.35	0.1
	4 - Wide Lane (W)	0.65	6.07	1.9
Proposed 2036	1 - Wide Lane (N)	1.0	66.04	25.2
	2 - Mitchell Way (E)	0.4	4.23	0.8
	3 - George Curl Way (S)	0.09	3.72	0.1
	4 - Wide Lane (W)	0.76	9.41	3.2

Table 5-11: Forecast Results – J05 PM Model – Spitfire Roundabout

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
Future Base 2025	1 - Wide Lane (N)	0.59	6.01	1.5
	2 - Mitchell Way (E)	0.17	2.84	0.2
	3 - George Curl Way (S)	0.17	3.78	0.2
	4 - Wide Lane (W)	0.37	3.48	0.6

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
Future Base 2028	1 - Wide Lane (N)	0.65	7.15	1.9
	2 - Mitchell Way (E)	0.24	3.07	0.3
	3 - George Curl Way (S)	0.18	4.14	0.2
	4 - Wide Lane (W)	0.43	3.89	0.8
Proposed 2028	1 - Wide Lane (N)	0.77	11.33	3.5
	2 - Mitchell Way (E)	0.45	4.28	0.8
	3 - George Curl Way (S)	0.23	5.35	0.3
	4 - Wide Lane (W)	0.49	4.86	1
Future Base 2036	1 - Wide Lane (N)	0.75	9.98	2.9
	2 - Mitchell Way (E)	0.35	3.62	0.6
	3 - George Curl Way (S)	0.22	4.89	0.3
	4 - Wide Lane (W)	0.51	4.81	1.1
Proposed 2036	1 - Wide Lane (N)	0.87	19.49	6.4
	2 - Mitchell Way (E)	0.56	5.45	1.3
	3 - George Curl Way (S)	0.28	6.66	0.4
	4 - Wide Lane (W)	0.59	6.39	1.5

- 5.15 The results show that the Spitfire Roundabout will operate within capacity during all scenarios except for the 2036 Baseline + Proposed Development, where the Wide Lane north arm will be at theoretical capacity. Upon review of the capacity modelling this arm experiences poorly balanced flows on the northern arm approach, and therefore, a mitigation option for this junction has been identified subsequently within this note.
- 5.16 Due to the imbalance of movements from the northern approach, improving lane discipline was expected to enhance junction performance. To assess this, a mitigation option was tested, separating the two lanes of the northern approach: one designated for left-turn movements to Mitchell Way and the other for ahead movements to George Curl Way and right-turn movements to Wide Lane (W). The Proposed 2036 results are presented in **Table 5-12** below and overleaf.

Table 5-12: Spitfire Roundabout Mitigation Option – Proposed 2036 results

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2028 Baseline	1/1 - Wide Lane (NE)	0.61	6.60	1.7
	2/1 - Wide Lane (S)	0.52	6.75	1.1
	3/1 - A335 (NW)	0.48	4.32	1.0
	1/1 - Wide Lane (NE)	0.72	10.49	2.8

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2028 Baseline + Proposed Development	2/1 - Wide Lane (S)	0.54	7.01	1.2
	3/1 - A335 (NW)	0.64	6.30	1.9
2036 Baseline	1/1 - Wide Lane (NE)	0.69	8.66	2.4
	2/1 - Wide Lane (S)	0.59	8.06	1.5
	3/1 - A335 (NW)	0.57	5.28	1.4
2036 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.82	16.86	4.7
	2/1 - Wide Lane (S)	0.61	8.40	1.6
	3/1 - A335 (NW)	0.73	8.53	2.8

Table 5-13: Spitfire Roundabout Mitigation Option – Proposed 2036 results

Scenario	Lane	RFC	Delay (s)	Queue (PCU)
2028 Baseline	1/1 - Wide Lane (NE)	0.74	9.12	2.9
	2/1 - Wide Lane (S)	0.35	5.46	0.5
	3/1 - A335 (NW)	0.40	3.32	0.7
2028 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.81	13.04	4.1
	2/1 - Wide Lane (S)	0.38	5.73	0.6
	3/1 - A335 (NW)	0.49	4.21	1.1
2036 Baseline	1/1 - Wide Lane (NE)	0.81	12.74	4.2
	2/1 - Wide Lane (S)	0.42	6.21	0.7
	3/1 - A335 (NW)	0.46	3.75	0.9
2036 Baseline + Proposed Development	1/1 - Wide Lane (NE)	0.88	21.48	6.9
	2/1 - Wide Lane (S)	0.45	6.63	0.8
	3/1 - A335 (NW)	0.55	4.84	1.3

- 5.17 **Table 5-12** shows that by improving lane discipline in 2036, the junction will be able to cope with the additional demand generated from the proposed development. Further design work will need to be undertaken to finalise the layout of the junction.

J05 – Wide Lane / Mountpark

- 5.18 The junction capacity results for this junction are shown in the tables below.

Table 5-14: Forecast Results – J05 AM Model – Wide Lane/ Mount Park

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
Future Base 2025	Wide Lane N	40	1.2	5.2
	Mountpark	44	0.8	1.4
	Wide Lane S	68	2.2	10.4
Future Base 2028	Wide Lane N	44	1.4	5.9
	Mountpark	46	0.9	1.4
	Wide Lane S	72	2.5	11.8
Proposed 2028	Wide Lane N	46	1.5	6.1
	Mountpark	46	0.9	1.4
	Wide Lane S	78	3.3	14.9
Future Base 2036	Wide Lane N	51	1.7	7.1
	Mountpark	49	1.0	1.5
	Wide Lane S	79	3.5	15.4
Proposed 2036	Wide Lane N	52	1.8	7.4
	Mountpark	49	1.0	1.5
	Wide Lane S	85	4.8	19.7

Table 5-15: Forecast Results – J05 PM Model – Wide Lane/ Mount Park

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
Future Base 2025	Wide Lane N	77	4.1	11.0
	Mountpark	65	1.5	2.3
	Wide Lane S	44	1.3	4.7
Future Base 2028	Wide Lane N	83	5.1	12.8
	Mountpark	66	1.6	2.3
	Wide Lane S	50	1.5	5.5
Proposed 2028	Wide Lane N	90	7.5	16.6
	Mountpark	66	1.6	2.4
	Wide Lane S	51	1.6	5.9
Future Base 2036	Wide Lane N	92	8.4	17.7
	Mountpark	70	1.8	2.6
	Wide Lane S	57	2.0	7.0
Proposed 2036	Wide Lane N	99	17.7	28.5
	Mountpark	71	1.8	2.7
	Wide Lane S	58	2.1	7.2

5.19 The results demonstrate that this junction would perform within capacity within all scenarios, during the AM peak period. However, during the PM peak the junction would be at practical

capacity in the 2036 Baseline, even before the addition of future development trips. No mitigation is proposed for this junction, as a result.

2025 Model Forecast Results

J06 - M27 J5

5.20 The junction capacity results for this junction are shown in the tables below.

Table 5-16: Forecast Results – J06 AM Model – M27 J5

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2028 Baseline	Stoneham Lane Ahead Left	76.30%	4.7	10
	Stoneham Lane Ahead	69.00%	4.9	6.6
	A335 (N) Left	20.40%	0.1	0.1
	A335 (N) Ahead	57.70%	3	7
	A335 (N) Ahead	57.70%	3.1	7.1
	M27 (E) Off slip Left	40.90%	0.3	0.3
	M27 (E) Off slip Ahead	75.30%	5	7.3
	A335 Stoneham Way (S) Ahead Left	78.40%	1.8	4.2
	A335 Stoneham Way (S) Ahead	79.20%	2.2	8
	M27 (W) Off slip Ahead Left	57.00%	2.9	6.5
	M27 (W) Off slip Ahead	31.60%	1.4	3.2
	M27 (W) Off slip Ahead	66.50%	3.5	7.6
	NW Circulatory Ahead	69.80%	2.8	9.8
	NW Circulatory Right Ahead	61.00%	2.4	7.9
	NW Circulatory Right	42.20%	0.8	2.8
	NE Circulatory Ahead	54.00%	2.3	12
	NE Circulatory Ahead Ahead2	54.80%	1.6	4
	NE Circulatory Ahead	32.90%	0.4	0.9
	Eastern Circulatory Ahead	77.50%	3.7	8.5
	Eastern Circulatory Right Ahead	77.50%	4.2	8.3
	Eastern Circulatory Right	61.60%	2.5	8.2
	Southern Circulatory Ahead	5.20%	0	0
	Southern Circulatory Right Ahead	44.00%	0.4	0.4

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	Southern Circulatory Right	29.20%	0.2	0.2
	Western Circulatory Ahead	59.80%	2.6	10.9
	Western Circulatory Right Ahead	59.40%	2.4	10.1
	Western Circulatory Right	58.20%	2.9	10.9
2028 Baseline + Proposed Development	Stoneham Lane Ahead Left	78.80%	5.1	10.9
	Stoneham Lane Ahead	75.30%	5.6	7.9
	A335 (N) Left	23.80%	0.2	0.2
	A335 (N) Ahead	58.60%	3.2	7.6
	A335 (N) Ahead	58.70%	3.2	7.7
	M27 (E) Off slip Left	40.90%	0.3	0.3
	M27 (E) Off slip Ahead	82.10%	6.1	8.9
	A335 Stoneham Way (S) Ahead Left	81.20%	2.2	6.1
	A335 Stoneham Way (S) Ahead	82.80%	2.7	9.2
	M27 (W) Off slip Ahead Left	44.10%	2.2	6
	M27 (W) Off slip Ahead	29.00%	1.3	3.6
	M27 (W) Off slip Ahead	46.80%	2.4	6.1
	NW Circulatory Ahead	76.40%	4.5	11.2
	NW Circulatory Right Ahead	66.30%	3.6	10
	NW Circulatory Right	48.40%	2	9.4
	NE Circulatory Ahead	47.40%	1.8	9.1
	NE Circulatory Ahead Ahead2	66.60%	2	7
	NE Circulatory Ahead	34.40%	0.6	6
	Eastern Circulatory Ahead	78.70%	4.5	9.8
	Eastern Circulatory Right Ahead	81.50%	4.5	8.1
	Eastern Circulatory Right	68.80%	3	9.1
	Southern Circulatory Ahead	6.80%	0	0
	Southern Circulatory Right Ahead	47.00%	0.4	0.4
	Southern Circulatory Right	32.00%	0.2	0.2
	Western Circulatory Ahead	75.50%	6	15.8

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	Western Circulatory Right Ahead	72.40%	5	14
	Western Circulatory Right	76.40%	5.3	15.2
2036 Baseline	Stoneham Lane Ahead Left	75.10%	4.6	10.1
	Stoneham Lane Ahead	71.40%	5.3	7
	A335 (N) Left	22.30%	0.1	0.1
	A335 (N) Ahead	55.90%	3	7.4
	A335 (N) Ahead	56.10%	3.1	7.5
	M27 (E) Off slip Left	43.00%	0.4	0.4
	M27 (E) Off slip Ahead	80.40%	5.9	8.3
	A335 Stoneham Way (S) Ahead Left	84.60%	2.7	6.8
	A335 Stoneham Way (S) Ahead	86.90%	3.7	10.6
	M27 (W) Off slip Ahead Left	65.10%	3.4	7.5
	M27 (W) Off slip Ahead	42.80%	1.9	4.4
	M27 (W) Off slip Ahead	73.60%	4.1	8.5
	NW Circulatory Ahead	76.20%	3.5	10.7
	NW Circulatory Right Ahead	66.60%	2.6	9.3
	NW Circulatory Right	49.70%	1.3	8.9
	NE Circulatory Ahead	55.70%	3	12.1
	NE Circulatory Ahead Ahead2	67.00%	2.4	4.8
	NE Circulatory Ahead	37.40%	0.7	6.5
	Eastern Circulatory Ahead	82.00%	5.1	10.4
	Eastern Circulatory Right Ahead	82.00%	4.5	8.6
	Eastern Circulatory Right	69.90%	3	9.1
	Southern Circulatory Ahead	5.80%	0	0
	Southern Circulatory Right Ahead	47.80%	0.5	0.5
	Southern Circulatory Right	31.50%	0.2	0.2
	Western Circulatory Ahead	61.50%	2.6	11.4
	Western Circulatory Right Ahead	60.90%	2.6	10.8

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2036 Baseline + Proposed Development	Western Circulatory Right	61.50%	3	11.7
	Stoneham Lane Ahead Left	81.40%	5.5	11.6
	Stoneham Lane Ahead	80.40%	6.4	9.6
	A335 (N) Left	25.60%	0.2	0.2
	A335 (N) Ahead	64.40%	3.7	8.6
	A335 (N) Ahead	64.40%	3.7	8.7
	M27 (E) Off slip Left	43.00%	0.4	0.4
	M27 (E) Off slip Ahead	87.30%	7.5	10.6
	A335 Stoneham Way (S) Ahead Left	85.80%	3	6.9
	A335 Stoneham Way (S) Ahead	92.30%	5.9	19.5
	M27 (W) Off slip Ahead Left	72.90%	4.1	8.5
	M27 (W) Off slip Ahead	56.10%	2.7	5.8
	M27 (W) Off slip Ahead	77.90%	4.6	8.9
	NW Circulatory Ahead	81.70%	4.9	12.9
	NW Circulatory Right Ahead	71.70%	3.6	12
	NW Circulatory Right	53.10%	1.4	6.3
	NE Circulatory Ahead	47.30%	2.1	9.6
	NE Circulatory Ahead Ahead2	75.20%	2.8	10.6
	NE Circulatory Ahead	33.90%	0.7	6.5
	Eastern Circulatory Ahead	84.30%	4.5	8.1
	Eastern Circulatory Right Ahead	85.60%	5.3	11.1
	Eastern Circulatory Right	76.50%	5	10.2
	Southern Circulatory Ahead	7.50%	0	0
	Southern Circulatory Right Ahead	50.80%	0.5	0.5
	Southern Circulatory Right	33.90%	0.3	0.8
	Western Circulatory Ahead	63.20%	3.5	14.3
	Western Circulatory Right Ahead	60.50%	2.9	9.6
	Western Circulatory Right	63.70%	3	11.3

Table 5-17: Forecast Results – J06 PM Model – M27 J5

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2028 Baseline	Stoneham Lane Ahead Left	79.30%	5.1	10.8
	Stoneham Lane Ahead	62.10%	4	5.8
	A335 (N) Left	32.00%	0.2	0.2
	A335 (N) Ahead	59.10%	3	6.6
	A335 (N) Ahead	57.10%	2.9	6.5
	M27 (E) Off slip Left	31.40%	0.2	0.2
	M27 (E) Off slip Ahead	47.10%	2.2	3.6
	A335 Stoneham Way (S) Ahead Left	62.00%	0.8	1.6
	A335 Stoneham Way (S) Ahead	94.20%	7	14.5
	M27 (W) Off slip Ahead Left	47.40%	2	4.4
	M27 (W) Off slip Ahead	46.30%	2	4.2
	M27 (W) Off slip Ahead	62.90%	3.1	6.4
	NW Circulatory Ahead	62.70%	2.2	7.1
	NW Circulatory Right Ahead	60.70%	2.4	9.1
	NW Circulatory Right	49.50%	1.3	3.5
	NE Circulatory Ahead	65.40%	2.1	11
	NE Circulatory Ahead Ahead2	58.70%	3.1	8.3
	NE Circulatory Ahead	25.00%	0.4	0.8
	Eastern Circulatory Ahead	87.30%	4.4	8
	Eastern Circulatory Right Ahead	90.50%	5.8	10.7
	Eastern Circulatory Right	60.00%	1.5	2.9
	Southern Circulatory Ahead	7.60%	0	0
	Southern Circulatory Right Ahead	32.70%	0.2	0.2
	Southern Circulatory Right	18.70%	0.1	0.1
	Western Circulatory Ahead	42.50%	2.1	6.5
	Western Circulatory Right Ahead	48.40%	2.3	8.2
	Western Circulatory Right	61.30%	2.7	10.9
2028 Baseline + Proposed Development	Stoneham Lane Ahead Left	81.20%	5.4	11.2
	Stoneham Lane Ahead	61.90%	3.9	5.8
	A335 (N) Left	37.00%	0.3	0.3
	A335 (N) Ahead	59.60%	3.2	7.5
	A335 (N) Ahead	59.40%	3.2	7.6
	M27 (E) Off slip Left	31.40%	0.2	0.2
	M27 (E) Off slip Ahead	50.20%	2.5	3.8

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	A335 Stoneham Way (S) Ahead Left	64.20%	0.9	2.2
	A335 Stoneham Way (S) Ahead	99.80%	15.8	36.2
	M27 (W) Off slip Ahead Left	58.30%	2.6	5.4
	M27 (W) Off slip Ahead	57.90%	2.6	5.3
	M27 (W) Off slip Ahead	66.80%	3.3	6.6
	NW Circulatory Ahead	69.60%	2.5	8.3
	NW Circulatory Right Ahead	64.00%	2.5	9.8
	NW Circulatory Right	51.80%	1.4	4.1
	NE Circulatory Ahead	67.90%	2.4	11.7
	NE Circulatory Ahead Ahead2	64.50%	4.1	9.8
	NE Circulatory Ahead	26.90%	0.5	0.9
	Eastern Circulatory Ahead	90.50%	5.7	10
	Eastern Circulatory Right Ahead	97.00%	9.9	14.8
	Eastern Circulatory Right	73.00%	2.5	4.7
	Southern Circulatory Ahead	9.50%	0.1	0.1
	Southern Circulatory Right Ahead	36.90%	0.3	0.3
	Southern Circulatory Right	20.80%	0.1	0.1
	Western Circulatory Ahead	45.50%	2.1	7.1
	Western Circulatory Right Ahead	48.80%	2.2	8.6
	Western Circulatory Right	62.50%	2.7	11.2
2036 Baseline	Stoneham Lane Ahead Left	74.90%	4.6	10.4
	Stoneham Lane Ahead	62.10%	4	6
	A335 (N) Left	35.00%	0.3	0.3
	A335 (N) Ahead	54.10%	2.8	6.9
	A335 (N) Ahead	53.30%	2.8	6.9
	M27 (E) Off slip Left	33.00%	0.2	0.2
	M27 (E) Off slip Ahead	49.90%	2.4	3.8
	A335 Stoneham Way (S) Ahead Left	66.70%	1	2.4
	A335 Stoneham Way (S) Ahead	103.00%	27.3	92.2
	M27 (W) Off slip Ahead Left	55.30%	2.4	5
	M27 (W) Off slip Ahead	55.20%	2.4	5
	M27 (W) Off slip Ahead	70.10%	3.6	7.2
	NW Circulatory Ahead	70.40%	2.7	7.7
	NW Circulatory Right Ahead	65.70%	2.9	9.5
	NW Circulatory Right	55.20%	2	9.4
	NE Circulatory Ahead	71.70%	4.1	13.4

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	NE Circulatory Ahead Ahead2	67.50%	1.6	5.9
	NE Circulatory Ahead	30.50%	1.9	6.7
	Eastern Circulatory Ahead	89.40%	5.3	8.9
	Eastern Circulatory Right Ahead	97.60%	10.9	16.1
	Eastern Circulatory Right	71.20%	2.2	4.5
	Southern Circulatory Ahead	8.00%	0	0
	Southern Circulatory Right Ahead	36.60%	0.3	0.3
	Southern Circulatory Right	20.00%	0.1	0.1
	Western Circulatory Ahead	44.30%	1.7	7.4
	Western Circulatory Right Ahead	49.70%	1.9	8.2
	Western Circulatory Right	61.80%	2.6	10.4
2036 Baseline + Proposed Development	Stoneham Lane Ahead Left	76.30%	4.8	10.7
	Stoneham Lane Ahead	62.00%	4	6
	A335 (N) Left	39.90%	0.3	0.3
	A335 (N) Ahead	62.80%	3.5	8.3
	A335 (N) Ahead	62.50%	3.5	8.4
	M27 (E) Off slip Left	33.00%	0.2	0.2
	M27 (E) Off slip Ahead	107.00%	40	40
	A335 Stoneham Way (S) Ahead Left	69.30%	1.1	3
	A335 Stoneham Way (S) Ahead	107.20%	45	93.5
	M27 (W) Off slip Ahead Left	52.90%	2.5	5.5
	M27 (W) Off slip Ahead	52.70%	2.5	5.4
	M27 (W) Off slip Ahead	59.10%	2.9	6.4
	NW Circulatory Ahead	72.00%	2.7	7.1
	NW Circulatory Right Ahead	68.60%	3.2	10.6
	NW Circulatory Right	57.20%	2.4	9.7
	NE Circulatory Ahead	67.20%	3.5	12.3
	NE Circulatory Ahead Ahead2	72.50%	1.9	9.2
	NE Circulatory Ahead	27.40%	1.8	6.7
	Eastern Circulatory Ahead	49.90%	0.8	1.4
	Eastern Circulatory Right Ahead	50.70%	1.3	7.6
	Eastern Circulatory Right	40.00%	0.6	1.5
	Southern Circulatory Ahead	11.00%	0.1	0.1
	Southern Circulatory Right Ahead	38.30%	0.3	0.3
	Southern Circulatory Right	21.10%	0.1	0.1
	Western Circulatory Ahead	48.60%	2.3	7.8

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	Western Circulatory Right Ahead	49.70%	2.3	7.2
	Western Circulatory Right	67.50%	3.5	12.6

- 5.21 The modelling results indicate that the junction generally operates within acceptable capacity limits, in the 2025 and 2028 Baseline AM peak scenarios with most arms/ lanes staying below 90% DoS.
- 5.22 However, certain key movements experience increasing pressure over time. In the AM peak, DoS values exceed 80% by the 2036 Baseline on the A335 Stoneham Way arm and Eastern Circulatory section. In the 2036 Baseline + Proposed Development AM peak scenario, the M27 E off-slip ahead arm, and A335 Stoneham Way S arms and the Eastern Circulatory all operate above 80% DoS, but the junction still operates within its theoretical capacity.
- 5.23 In the PM peak, the DoS levels are generally higher than in the AM peak. In the 2028 Baseline PM peak the DoS is forecast to exceed 90% on A335 Stoneham Way ahead arm and Eastern Circulatory, which then increase further in the 2028 Baseline + Proposed Development PM peak scenario, with the A335 Stoneham Way ahead arm close to theoretical capacity (99.8% DoS).
- 5.24 In the 2036 Baseline PM peak, the A335 Stoneham Way ahead arm is forecast to be at 103% DoS, and the Eastern Circulatory is forecast to be at 97.6% DoS, and therefore the junction will be operating above theoretical capacity even before Proposed Development trips are added. Therefore, the theoretical capacity is also forecast to be exceeded in the 2036 Baseline + Proposed Development scenario on the M27 E off-slip and the A335 Stoneham Way arm (107% DoS).

J07 – Stoneham Way / Wide Lane / Wessex Lane and Wide Lane / Mansbridge Road

- 5.25 The junction capacity results for this junction are shown in the tables below.

Table 5-18: Forecast Results – J07 AM Model – Stoneham Way / Wide Lane / Wessex Lane and Wide Lane / Mansbridge Road

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2028 Baseline	Stoneham Way / Wessex Lane			
	Stoneham Way NB Ahead Left	50.8	2.7	12.4
	Stoneham Way NB Ahead	48.3	2.6	12
	Stoneham Way NB Right	77.3	4.9	9.5
	Wide Lane Left	45.8	0.4	0.5
	Bassett Green Road Left	47.2	2.6	6
	Stoneham Way SB Ahead	79.9	6	25.2
	Stoneham Way SB Right Ahead	72.4	5	8.3
	Wide Lane Right Ahead Left	29.7	1.4	2.4

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	Wide Lane Ahead	32.5	0.5	10.3
	The Fleming Arms Right Ahead Left	0	0	0
	Wessex Lane Right	61.3	1.9	3.2
	Wide Lane Ahead Left Right	65.9	4.9	13.5
	Mansbridge Roundabout			
	Wide Lane Right Left	21.5	0.1	0.1
	Mansbridge Road Right Left	42	0.4	0.4
	Mansbridge Road	16.3	0.1	0.1
	Wide Lane Right Left	20.4	0.1	0.1
2028 Baseline + Proposed Development	Stoneham Way / Wessex Lane			
	Stoneham Way NB Ahead Left	52.1	2.9	12.9
	Stoneham Way NB Ahead	49.7	2.8	12.6
	Stoneham Way NB Right	80.6	5.6	10.9
	Wide Lane Left	48.2	0.5	0.5
	Bassett Green Road Left	44	2.5	5.8
	Stoneham Way SB Ahead	78.1	5.8	23.9
	Stoneham Way SB Right Ahead	70.9	5.1	8.3
	Wide Lane Right Ahead Left	32.7	1.4	2.6
	Wide Lane Ahead	32.9	0.5	10.8
	The Fleming Arms Right Ahead Left	0	0	0
	Wessex Lane Right	62.1	2	3.3
	Wide Lane Ahead Left Right	70.1	5.4	14.3
	Mansbridge Roundabout			
	Wide Lane Right Left	22.4	0.1	0.1
	Mansbridge Road Right Left	46.9	0.4	0.4
	Mansbridge Road	16.5	0.1	0.1
	Wide Lane Right Left	26.3	0.2	0.2
2036 Baseline	Stoneham Way / Wessex Lane			
	Stoneham Way NB Ahead Left	54	3	13.8
	Stoneham Way NB Ahead	51.7	2.9	13.3

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	Stoneham Way NB Right	83.1	5.9	11.2
	Wide Lane Left	50.7	0.5	0.5
	Bassett Green Road Left	47.9	2.7	6.3
	Stoneham Way SB Ahead	81.1	6.4	26.2
	Stoneham Way SB Right Ahead	75.8	5.7	9
	Wide Lane Right Ahead Left	32.8	1.6	2.8
	Wide Lane Ahead	35.6	0.6	12.2
	The Fleming Arms Right Ahead Left	0	0	0
	Wessex Lane Right	64.5	2.1	3.5
	Wide Lane Ahead Left Right	73	5.9	15.4
	Mansbridge Roundabout			
	Wide Lane Right Left	26.5	0.2	0.2
	Mansbridge Road Right Left	48.1	0.5	0.5
	Mansbridge Road	19.3	0.1	0.1
	Wide Lane Right Left	23.9	0.2	0.2
2036 Baseline + Proposed Development	Stoneham Way / Wessex Lane			
	Stoneham Way NB Ahead Left	55.4	3.2	14.4
	Stoneham Way NB Ahead	53.1	3.2	13.9
	Stoneham Way NB Right	86.1	6.9	12.8
	Wide Lane Left	53.2	0.6	0.6
	Bassett Green Road Left	44.7	2.6	6.1
	Stoneham Way SB Ahead	85.3	7.8	29.2
	Stoneham Way SB Right Ahead	72.9	5.4	8.5
	Wide Lane Right Ahead Left	35.8	1.7	3
	Wide Lane Ahead	36	0.7	12.6
	The Fleming Arms Right Ahead Left	0	0	0
	Wessex Lane Right	65.3	2.1	3.6
	Wide Lane Ahead Left Right	77.2	6.5	16.3
	Wide Lane Right Left	27.4	0.2	0.2
	Mansbridge Roundabout			

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	Mansbridge Road Right Left	52.4	0.5	0.5
	Mansbridge Road	19.5	0.1	0.1
	Wide Lane Right Left	30.1	0.2	0.2

Table 5-19: Forecast Results – J07 PM Model – Stoneham Way / Wide Lane / Wessex Lane and Wide Lane / Mansbridge Road

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
2028 Baseline	Stoneham Way / Wessex Lane			
	Stoneham Way NB Ahead Left	50.8	2.7	12.4
	Stoneham Way NB Ahead	48.3	2.6	12
	Stoneham Way NB Right	77.3	4.9	9.5
	Wide Lane Left	45.8	0.4	0.5
	Bassett Green Road Left	47.2	2.6	6
	Stoneham Way SB Ahead	79.9	6	25.2
	Stoneham Way SB Right Ahead	72.4	5	8.3
	Wide Lane Right Ahead Left	29.7	1.4	2.4
	Wide Lane Ahead	32.5	0.5	10.3
	The Fleming Arms Right Ahead Left	0	0	0
	Wessex Lane Right	61.3	1.9	3.2
	Wide Lane Ahead Left Right	65.9	4.9	13.5
	Mansbridge Roundabout			
	Wide Lane Right Left	21.5	0.1	0.1
	Mansbridge Road Right Left	42	0.4	0.4
	Mansbridge Road	16.3	0.1	0.1
	Wide Lane Right Left	20.4	0.1	0.1
2028 Baseline + Proposed Development	Stoneham Way / Wessex Lane			
	Stoneham Way NB Ahead Left	52.1	2.9	12.9
	Stoneham Way NB Ahead	49.7	2.8	12.6
	Stoneham Way NB Right	80.6	5.6	10.9
	Wide Lane Left	48.2	0.5	0.5

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	Bassett Green Road Left	44	2.5	5.8
	Stoneham Way SB Ahead	78.1	5.8	23.9
	Stoneham Way SB Right Ahead	70.9	5.1	8.3
	Wide Lane Right Ahead Left	32.7	1.4	2.6
	Wide Lane Ahead	32.9	0.5	10.8
	The Fleming Arms Right Ahead Left	0	0	0
	Wessex Lane Right	62.1	2	3.3
	Wide Lane Ahead Left Right	70.1	5.4	14.3
	Mansbridge Roundabout			
	Wide Lane Right Left	22.4	0.1	0.1
	Mansbridge Road Right Left	46.9	0.4	0.4
	Mansbridge Road	16.5	0.1	0.1
	Wide Lane Right Left	26.3	0.2	0.2
2036 Baseline	Stoneham Way / Wessex Lane			
	Stoneham Way NB Ahead Left	54	3	13.8
	Stoneham Way NB Ahead	51.7	2.9	13.3
	Stoneham Way NB Right	83.1	5.9	11.2
	Wide Lane Left	50.7	0.5	0.5
	Bassett Green Road Left	47.9	2.7	6.3
	Stoneham Way SB Ahead	81.1	6.4	26.2
	Stoneham Way SB Right Ahead	75.8	5.7	9
	Wide Lane Right Ahead Left	32.8	1.6	2.8
	Wide Lane Ahead	35.6	0.6	12.2
	The Fleming Arms Right Ahead Left	0	0	0
	Wessex Lane Right	64.5	2.1	3.5
	Wide Lane Ahead Left Right	73	5.9	15.4
	Mansbridge Roundabout			
	Wide Lane Right Left	26.5	0.2	0.2
	Mansbridge Road Right Left	48.1	0.5	0.5
	Mansbridge Road	19.3	0.1	0.1

Scenario	Lane	DoS (%)	Total Delay (PCU/Hr)	Mean Max Queue
	Wide Lane Right Left	23.9	0.2	0.2
2036 Baseline + Proposed Development	Stoneham Way / Wessex Lane			
	Stoneham Way NB Ahead Left	55.4	3.2	14.4
	Stoneham Way NB Ahead	53.1	3.2	13.9
	Stoneham Way NB Right	86.1	6.9	12.8
	Wide Lane Left	53.2	0.6	0.6
	Bassett Green Road Left	44.7	2.6	6.1
	Stoneham Way SB Ahead	85.3	7.8	29.2
	Stoneham Way SB Right Ahead	72.9	5.4	8.5
	Wide Lane Right Ahead Left	35.8	1.7	3
	Wide Lane Ahead	36	0.7	12.6
	The Fleming Arms Right Ahead Left	0	0	0
	Wessex Lane Right	65.3	2.1	3.6
	Wide Lane Ahead Left Right	77.2	6.5	16.3
	Wide Lane Right Left	27.4	0.2	0.2
	Mansbridge Roundabout			
	Mansbridge Road Right Left	52.4	0.5	0.5
	Mansbridge Road	19.5	0.1	0.1
	Wide Lane Right Left	30.1	0.2	0.2

- 5.26 The modelling results show that across all scenarios and time periods, the junction operates within acceptable capacity limits, with all lanes remaining below 90% DoS. During the 2036 Baseline PM peak scenario the Stoneham Way northbound right turn lane and Stoneham Way southbound ahead lanes operate at 83% and 81% RFC respectively, with RFC's increasing marginally to 86% on the Stoneham Way northbound right turn lane and 85% on the Stoneham Way southbound lane during the 20236 Baseline + Proposed Development PM peak scenario.

6 Conclusion and Recommendations

6.1 The transport modelling analysis for the Navigator Quarter study area has demonstrated the effectiveness of the Junctions 9 and LinSig models in providing a robust representation of current and future traffic conditions. The base models were validated to an acceptable level of accuracy, confirming their suitability for assessing forecast scenarios.

6.2 Key findings from the base model analysis include:

- **Validation Results:** The base models generally aligned well with observed traffic conditions, with minimal discrepancies. While a few minor validation issues were identified they do not undermine the reliability of the overall models.
- **Operational Challenges:** The analysis highlighted significant existing operational issues at some junctions with the A335 / Wide Lane consistently operating above practical capacity during peak periods. Queueing effects at Southampton Airport Parkway contributes to this congestion issue.

6.3 Key findings from the forecast model analysis including junction arms operating at/ above capacity are identified in **Table 6-1** below. This table excludes mitigation measures.

Table 6-1: Summary of junctions operating at/ above capacity.

Junction	Lane	Junctions and arms operating at/ above capacity			
		FB 2028	Proposed 2028	FB 2036	Proposed 2036
J01 - Wide Lane / South Street	Southampton Rd	N	N	N	N
	Wide Lane	Y	Y	Y	Y
	South Street	N	N	Y	Y
J02 - Wide Lane / Southampton Airport Parkway	Wide Lane N	N	N	N	N
	SAP	N	N	N	N
	Wide Lane S	N	N	Y	Y
J03 - A335 / Wide Lane Roundabout	1/1 - Wide Lane (NE)	N	N	N	N
	1/2 - Wide Lane (NE)	Y	Y	Y	Y
	2/1 - Wide Lane (S)	Y	Y	Y	Y
	2/2 - Wide Lane (S)	N	N	N	N
	3/1 - A335 (NW)	Y	Y	Y	Y
	3/2 - A335 (NW)	N	Y	Y	Y
J04 - Spitfire Roundabout	Wide Lane N	N	N	N	Y
	Mitchell Way	N	N	N	N
	George Curl Way	N	N	N	N
	Wide Lane W	N	N	N	N
	Wide Lane N	N	Y	Y	Y

Junction	Lane	Junctions and arms operating at/ above capacity			
		FB 2028	Proposed 2028	FB 2036	Proposed 2036
J05 - Wide Lane / Mountpark	Mountpark	N	N	N	N
	Wide Lane S	N	N	N	N
J06 – M27 J5	Stoneham Lane Ahead Left	N	N	N	N
	Stoneham Lane Ahead	N	N	N	N
	A335 (N) Left	N	N	N	N
	A335 (N) Ahead	N	N	N	N
	A335 (N) Ahead	N	N	N	N
	M27 (E) Off slip Left	N	N	N	N
	M27 (E) Off slip Ahead	N	N	N	Y
	A335 Stoneham Way (S) Ahead Left	N	N	N	N
	A335 Stoneham Way (S) Ahead	Y	Y	Y	Y
	M27 (W) Off slip Ahead Left	N	N	N	N
	M27 (W) Off slip Ahead	N	N	N	N
	M27 (W) Off slip Ahead	N	N	N	N
	NW Circulatory Ahead	N	N	N	N
	NW Circulatory Right Ahead	N	N	N	N
	NW Circulatory Right	N	N	N	N
	NE Circulatory Ahead	N	N	N	N
	NE Circulatory Ahead Ahead2	N	N	N	N
	NE Circulatory Ahead	N	N	N	N
	Eastern Circulatory Ahead	N	Y	N	N
	Eastern Circulatory Right Ahead	Y	Y	Y	N
	Eastern Circulatory Right	N	N	N	N
	Southern Circulatory Ahead	N	N	N	N
J07 – Stoneham Way / Wide Lane / Wessex Lane and Wide Lane / Mansbridge Road	Stoneham Way NB Ahead Left	N	N	N	N
	Stoneham Way NB Ahead	N	N	N	N
	Stoneham Way NB Right	N	N	N	N
	Wide Lane Left	N	N	N	N

Junction	Lane	Junctions and arms operating at/ above capacity			
		FB 2028	Proposed 2028	FB 2036	Proposed 2036
	Bassett Green Road Left	N	N	N	N
	Stoneham Way SB Ahead	N	N	N	N
	Stoneham Way SB Right Ahead	N	N	N	N
	Wide Lane Right Ahead Left	N	N	N	N
	Wide Lane Ahead	N	N	N	N
	The Fleming Arms Right Ahead Left	N	N	N	N
	Wessex Lane Right	N	N	N	N
	Wide Lane Ahead Left Right	N	N	N	N
	Wide Lane Right Left	N	N	N	N
	Mansbridge Road Right Left	N	N	N	N
	Mansbridge Road	N	N	N	N
	Wide Lane Right Left	N	N	N	N

6.4 Considering the table above and results detailed in Chapter 5, mitigation options were developed for J03 – A335 / Wide Lane and J04 – Spitfire Roundabout, as these junctions perform significantly worse as a result of the additional development trips. This is summarised below:

- The mitigation option to increase capacity through additional left-turn bypasses was tested as part of this assessment for **J03 – A335 / Wide Lane** and was shown to reduce the RFC in the 2036 proposed scenario to an acceptable level.
- The mitigation option to improve lane discipline was tested as part of this assessment for **J04 – Spitfire Roundabout** and was shown to reduce the RFC in the 2036 proposed scenario to an acceptable level.

6.5 Whilst J05 – Wide Lane / Mountpark does exceed theoretical capacity in 2028 Baseline + Proposed Development scenario, it only slightly exceeds the 2028 Baseline Scenario, where it is close to practical capacity and therefore, it is not considered a priority for mitigation. At all other junctions, performance issues occur in the Future Baseline scenarios indicating that background growth is the main driver of poor junction performance, not the Proposed Development.