LOCAL DEVELOPMENT PLAN

DO-MINIMUM AND MITIGATION TESTING REPORT

SYSTRA

HAYLING ISLAND MICROSIMULATION MODELLING

LOCAL DEVELOPMENT PLAN

IDENTIFICATION TABLE	
Client/Project owner	Havant Borough Council
Project	Hayling Island Microsimulation Modelling
Study	Local Development Plan
Type of document	Do-Minimum and Mitigation Testing Report
Date	21/12/2018
Reference number	GB01T17H90_MIT1
Number of pages	43

APPROVAL

Version	Name		Position	Date	Modifications
1	Author	David Treadgold	Assistant Consultant	07/12/2018	
	Checked by	Chris Shaw	Associate	07/12/2018	
	Approved by	Chris Shaw	Associate	07/12/2018	
2	Author	David Treadgold	Assistant Consultant	21/12/2018	Rerun Mitigation packages with improved signals at Langstone Area
	Checked by	Chris Shaw	Associate	21/12/2018	
	Approved by	Chris Shaw	Associate	21/12/2018	
3	Author	David Treadgold	Assistant Consultant	21/1/2019	Updated following final review
	Checked by	Chris Shaw	Associate	21/1/2019	
	Approved by	Chris Shaw	Associate	21/1/2019	

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1. INTRODUCTION

1.1 Background

SYSTRA was commissioned by Havant Borough Council (HBC) to develop a Paramics Discovery microsimulation model of Hayling Island in order to examine the impacts of HBC's Local Development Plan (LDP) proposals.

A Base model was developed for the study area, encompassing the A3023 through Hayling Island, West Lane, Sea Front and in Havant the A3023 Langstone Road/Park Road North and the interchange with the A27. Details of the model development, calibration, and validation were reported in *Hayling Island Model Development Report (SYSTRA Ref. GB01T17H90_MDR_5, September 2018).*

Two forecast scenarios were developed following the 2017 Base model development. These scenarios reflect HBC's 2036 committed development and background traffic growth (2036 Baseline), and then add development associated with the allocated LDP sites (2036 Do-Minimum).

A number of mitigation packages were outlined by HBC to support the LDP developments and models of each of these packages have been developed to reflect the impact of these changes in the 2036 Do-Minimum Scenario.

This Report details the development of the 2036 Do-Minimum and 2036 Mitigation Packages, future year forecasting, and development related traffic assignment.

2. FUTURE YEAR MODEL DEVELOPMENT

2.1 Methodology

The 2017 Hayling Island Base model was used to develop the 2036 Do-Minimum network. The 2036 network utilises the same zoning system, vehicle types, road hierarchy, and route choice parameters as set out in the *Hayling Island Model Development Report*. The model extents are shown in Figure 1.

The Base Model was developed to reflect a neutral, non-holiday weekday. This is standard practice in the transport planning industry for model network appraisal and development impact appraisal purposes. It is generally not considered necessary for a planning authority to model and appraise peaks in traffic volume which may occur during Bank Holiday weekends, the start and end of school term breaks or summer holiday activity because these peaks are deemed to be short lived and do not represent the normal state of the road network. The government Transport Analysis Guidance document *WebTAG* provides advice in *Unit M1.2: Data sources and surveys*. Under *Highway Surveys*, Section 3.3.6 advises traffic counts for modelling purposes should be collected "*during a 'neutral', or representative, month avoiding main and local holiday periods, local school holidays and half terms, and other abnormal traffic periods".*

The Future Year model development also reflects a neutral weekday.

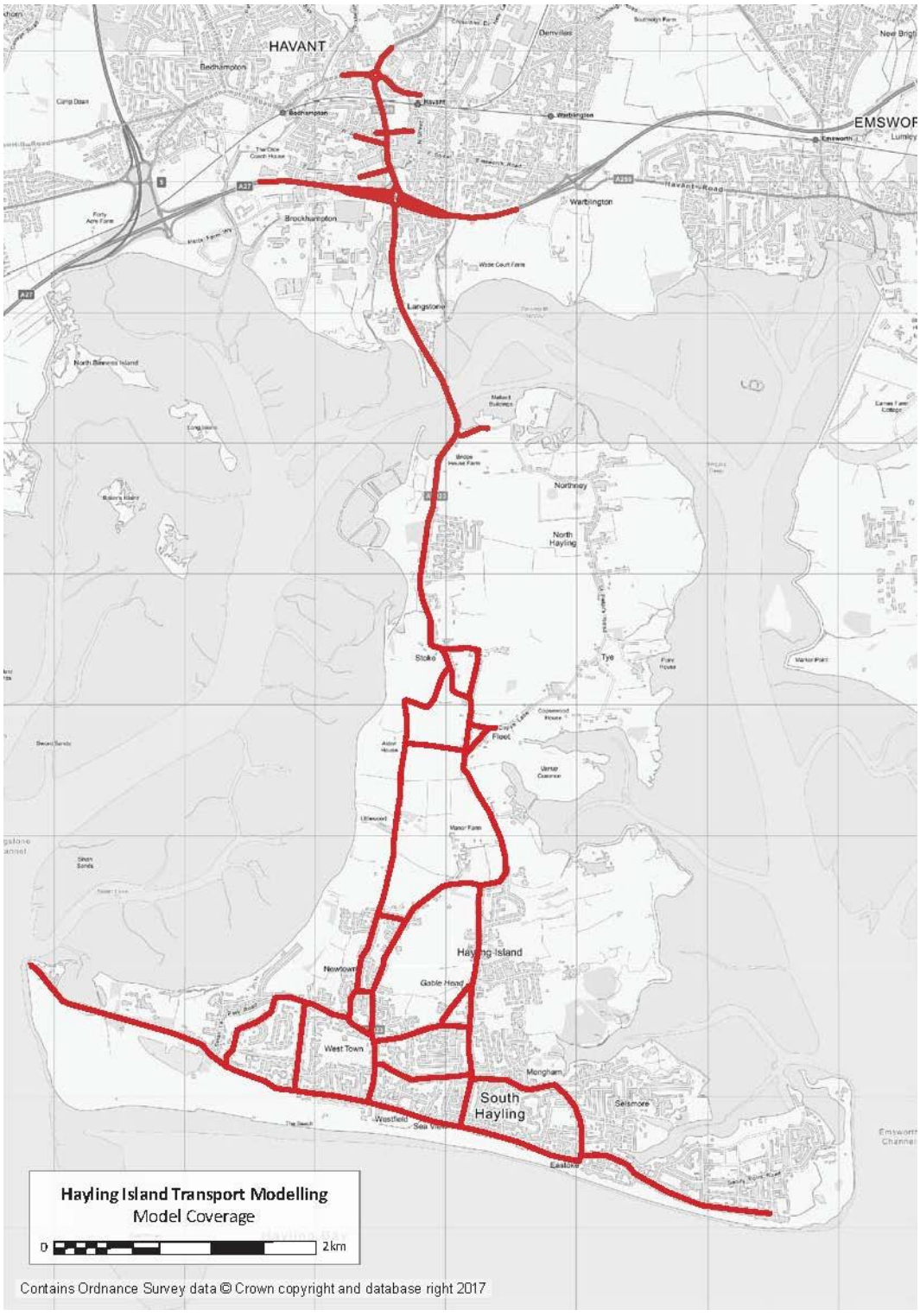

Figure 1. Hayling Island Model Coverage

The model periods are the same as those defined in the 2017 Base Model, which are:

- AM Period 07:00 – 10:00
- IP Period 10:00 - 16:00
- PM Period 16:00 – 19:00

The vehicle demand matrices are as follows:

- Matrix 1 Car
- Matrix 2 LGV
- Matrix 3 OGV

HBC advised that no planned infrastructure changes were to be added to form the 2036 Baseline or Do Minimum networks.

2.2 Network Development

Where possible, for each committed development and LDP site, a new zone was added to the network. Eight of the sites were not given their own zone but associated with existing zones and access points onto the network, namely Northney Road, Southwood Road, and Tournerbury Lane. New zones either required the addition of a new link road at the likely location of the proposed site access or were associated with an existing access point using a zone portal. All site access locations were confirmed with HBC.

For the LIDL access location, a right turn flare has been added for the eastbound direction on Manor Road, as per the Transport Assessment Revision issued by the developer (see Section 3.3.2).

3. 2036 DEMAND FORECASTING METHODOLOGY

The methodology for this study assumes that all growth within the model area is associated with development. For all island related traffic (island to island, island to mainland, and mainland to island) this will be in the form of trips added due to the island committed development and LDP sites. Uplift relating to development on the mainland will be derived using forecasts from the strategic model (discussed in Section 3.1).

3.1 Non-Development Related Traffic

The 2036 scenario is consistent with that reflected in the *Solent Transport's Sub-Regional Transport Model* (SRTM) and the Discovery model utilises the SRTM forecasts to derive growth in traffic between mainland zones. Adjustments to demands for future year forecasting were made to all vehicle types: Car, LGV, and HGV.

SYSTRA has developed the SRTM and provided 2036 cordon matrices for the study area around Hayling Island. By comparing the 2036 SRTM cordon to the Base year SRTM cordon (supplied during the Base model development), the overall percentage increase in volume of trips for mainland to mainland zones was determined for each vehicle type for each time period (AM, IP, and PM). This increase was applied to the 2017 Base matrices for all movements from mainland zone to mainland zone as set out in Table 1.

Period	Car	LGV	HGV
AM	14%	45%	18%
IP	35%	33%	21%
PM	16%	42%	10%

Table 1. 2036 Mainland Forecast Year Growth

3.2 Development Related Traffic

Three new matrix levels were created for the development trips, which are Car only:

- Matrix 4: Committed Development trips
- Matrix 5: LDP trips & Windfall trips
- Matrix 6: Rook Farm

HBC supplied various datasets outlining committed and proposed LDP sites within the study area. A final list of those sites to be included in the modelling work was agreed with HBC and is detailed in Table 2 and Table 1. The full list of committed development sites included multiple sites of only 1 or 2 dwellings (totalling 38 dwellings). These sites were excluded from the list on the basis that the number of trips they will generate will be negligible. An additional matrix level was created including only trips related to the Rook Farm development.

Committed Developments sites: Development Name	Type	Dwellings or Area	TRICs Index
117 Elm Grove	Retirement	33	as in TA
11 Bound Lane	Residential	8	2
36, 38 & 40 & 1 West Lane Station Road	Residential	18	2
3 Elm Grove	Residential	6	2
31 Elm Grove	Residential	3	2
Newtown House Hotel, Manor Road	Residential	3	2
19 - 23 & 29 - 31 Creek Road	Residential	3	2
151-153 Southwood Road	Residential	3	1
	Total Residential	**77**	
Lidl: Land South of Manor Road	Commercial	1,340m^2	as in TA

Table 2. Committed Development Sites

LDP sites: Development Name	Type	Dwellings or Area	TRICs Index
Land to rear 108-110 Elm Grove	Residential	15	1
Land at Fathoms Reach	Residential	55	1
Station Road (North of Sinah Lane / West of Furniss Way)	Residential	195	1
Land West of Tournerbury Golf Course	Residential	40	1
Northney Marina	Residential	40	1
41 Station Road	Residential	13	1
Manor Nurseries	Residential	15	1
Beachlands, Hayling Island Seafront	Residential	125	2
Eastoke Corner	Residential	20	2
The Nab Car Park Southwood Road	Residential	30	2
Windfall	Residential	144	1
Rook Farm	Residential	395	1
	Total Residential	**1087**	

Table 3. LDP Sites

Each development was assigned a trip rate based on the development type. The TRICS database was utilised to derive trip rates for three types:

1. Houses Privately Owned
2. Flats Privately Owned
3. Employment Office

As provided by HBC, the comments associated with each committed development site indicated which trip rate type to use. For the retirement apartments and Lidl, the trip rates used in their accompanying Transport Assessment (TA) documents were used. For the LDP sites, HBC indicated that all residential sites should be assigned Type 1 except the Seafront Regeneration sites, which should be Type 2. The Trip Rates used for this study are shown in Table 4.

TRICS Trip Rates								
	Private Houses		Private Flats		Office		Lidl (from TA)	
Period	Arr	Dep	Arr	Dep	Arr	Dep	Arr	Dep
07:00 - 08:00	0.080	0.320	0.029	0.091	0.711	0.055	0.435	0.087
08:00 - 09:00	0.124	0.362	0.058	0.169	1.828	0.102	1.383	0.878
09:00 - 10:00	0.167	0.175	0.070	0.140	1.086	0.297	2.897	2.041
10:00 - 11:00	0.141	0.169	0.123	0.144	0.328	0.367	4.763	4.324
11:00 - 12:00	0.146	0.154	0.115	0.103	0.219	0.258	4.763	4.478
12:00 - 13:00	0.164	0.166	0.156	0.144	0.281	0.461	4.346	4.456
13:00 - 14:00	0.170	0.161	0.160	0.169	0.477	0.336	3.929	4.258
14:00 - 15:00	0.139	0.169	0.148	0.148	0.242	0.328	5.334	5.070
15:00 - 16:00	0.250	0.176	0.115	0.111	0.234	0.430	4.675	4.982
16:00 - 17:00	0.272	0.160	0.144	0.099	0.117	0.758	4.170	4.456
17:00 - 18:00	0.351	0.161	0.169	0.078	0.156	1.734	4.851	5.224
18:00 - 19:00	0.206	0.154	0.140	0.053	0.062	0.508	3.512	3.863

Table 4. TRICS Hourly Trip Rates by Development Type

The hourly trip rate was used to generate overall vehicle trips by period. The resulting vehicle trips by development are detailed in Table 5 and Table 6.

Committed Developments: Development Name	Arr AM	Dep AM	Arr IP	Dep IP	Arr PM	Dep PM
117 Elm Grove	0	0	0	0	0	0
11 Bound Lane	5	6	16	16	6	6
36, 38 & 40 & 1 West Lane Station Road	1	3	7	7	4	2
3 Elm Grove	3	7	15	15	8	4
31 Elm Grove	1	2	5	5	3	1
Newtown House Hotel, Manor Road	0	1	2	2	1	1
19 - 23 & 29 - 31 Creek Road	0	1	2	2	1	1
151-153 Southwood Road	0	1	2	2	1	1
Total Residential	**12**	**22**	**49**	**50**	**25**	**15**
Lidl: Land South of Manor Road	63	40	373	369	168	181

Table 5. Vehicle Trips by Period, Committed Development Sites

LDP: Development Name	Arr AM	Dep AM	Arr IP	Dep IP	Arr PM	Dep PM
Land to rear 108-110 Elm Grove	6	13	15	15	12	7
Land at Fathoms Reach	20	47	56	55	46	26
Station Road (North of Sinah Lane)	72	167	197	194	162	93
Land West of Tournerbury Golf Course	15	34	40	40	33	19
Northney Marina	15	34	40	40	33	19
41 Station Road	5	11	13	13	11	6
Manor Nurseries	6	13	15	15	12	7
Beachlands, Hayling Island Seafront	20	50	102	102	57	29
Eastoke Corner	3	8	16	16	9	5
The Nab Car Park Southwood Road	5	12	25	25	14	7
Windfall	53	123	145	143	119	68
Rook Farm	147	339	399	393	327	188
Total Residential	**366**	**852**	**1064**	**1051**	**835**	**473**

Table 6. Vehicle Trips by Period, LDP Sites

3.3 Development Trip Distribution

3.3.1 Residential/Office Development

For each development, the distribution of trips to and from the development (i.e. the "Arrival" and "Departure" trips as shown in Table 5 and Table 6) was derived using Matrix 1 from the Base model (the existing Car matrix). The zones on the island were grouped into logical "regions" (e.g. south-east, south-west, etc) and the distribution of trips was derived by finding the proportion of trips from each region to each individual zone in the model, and the reverse. Each development site was associated with a region and its resulting distribution.

For example, the development at Eastoke Corner was associated with the south-east region and the Departure distribution was based on the proportion of all trips from the existing zones in the south-east to all zones in the model. The Arrival distribution was based on the proportion of trips from each individual zone in the model to the south-east.

3.3.2 Lidl Development

The Lidl Transport Assessment *Manor Road Discount Food Store, Hayling Island* (*RPS Ref. JE/AN/adf/sjs/JNY9067-01G, June 2017*) sets out that the store will generate various trip types, as follows:

- New Trips 16%
- Pass-by Trips 15%
- Transfer Trips 69%

A Transport Assessment Revision was issued by RPS in October 2017 (*RPS Ref: JNY9067-03*) which details the three trip types associated with the development. The application of trips for the Discovery model has included all trips associated with the three trip types in Matrix 4 (the committed development matrix), and also removes existing trips from Matrix 1 regarded as "Transfer" trips, as detailed below.

1. As defined by the TA, "New Trips" were new trips to the network and so have been added to Matrix 4 as island to store trips and reverse.

2. "Pass-by Trips" were considered as those trips which currently commute from the mainland to the island but will now stop at the store en route. These trips defined as "mainland to island" movements were removed from Matrix 1 and the same volume added as "mainland to Lidl" movements in Matrix 4 instead. Again, the same volume was added to Matrix 4 as "Lidl to island" trips.

3. "Transfer" trips were considered existing "island to mainland" trips for shopping, and the reverse, which now shop at Lidl instead and therefore do not leave the island. This volume of "Transfer Trips" was removed completely from Matrix 1 and included in Matrix 4.

For the Lidl trip distribution in the model, The Transport Assessment Revision states that for "New" trips and "Transfer" trips, the distribution split is 65% to the east of the access (12% to island "north" and 53% to island "east") and 35% to the west of the access. The zones on the island were divided into two groups: those whose trips would arrive/depart to the west or the east of the store access on Manor Road. The distribution to individual zones was derived by finding the proportion of trips from all island zones to each group and the reverse. The final split in the model is 61% to the east (7% to north, 54% to east) and 39% to the west.

3.4 Demand Release Profiles

Each development zone was assigned a demand release profile based on the hourly trip rates from TRICS for its associated development type. The 5min intervals within each modelled hour were split equally (i.e. a flat hourly profile was adopted for each hour within each time period).

3.5 Forecast Trip Totals

The resulting Car trip totals for the 2036 demand scenarios are shown in Table 7. The 2036 "matrix 1 adjusted" line refers to the change after the existing Lidl "Transfer" trips were removed.

Period	Demand Type	Car Trip Totals
AM	2036 (matrix 1)	30,535
	2036 (matrix 1 adjusted)	30,463
	Com Dev (matrix 4)	141
	LDP (matrix 5)	732
	Rook Farm (matrix 6)	485
	Total	31,337
IP	2036 (matrix 1)	70,904
	2036 (matrix 1 adjusted)	70,392
	Com Dev (matrix 4)	848
	LDP (matrix 5)	1,323
	Rook Farm (matrix 6)	792
	Total	72,563
PM	2036 (matrix 1)	36,509
	2036 (matrix 1 adjusted)	36,267
	Com Dev (matrix 4)	394
	LDP (matrix 5)	794
	Rook Farm (matrix 6)	515
	Total	37,455

Table 7. 2036 Do-Minimum Car Trip Totals

The final demand totals for the 2036 Baseline and 2036 Do Minimum scenarios by vehicle type (including non-development and development related traffic) are shown in Table 8. The 2017 Base demand totals are also shown for comparison.

Period	Vehicle Type		2017 Base	2036 Base	2036 Do Min
AM	Car		27,728	30,535	31,337
	LGV		3,691	4,874	4,874
	HGV		1,536	1,771	1,771
		Total	32,955	37,180	37,982
IP	Car		53,581	70,904	72,563
	LGV		7,167	8,757	8,757
	HGV		2,772	3,242	3,242
		Total	63,520	82,902	84,562
PM	Car		30,544	36,509	37,455
	LGV		3,832	5,014	5,014
	HGV		1,092	1,190	1,190
		Total	35,468	42,713	43,660

Table 8. Final 2036 Do-Minimum and Sensitivity Test Trip Totals by Vehicle Type

4. 2036 BASELINE VS 2036 DO MINIMUM

The new 2036 Baseline network was duplicated and used to represent the two different demand scenarios, 2036 Baseline and 2036 Do Minimum, and 10 runs for each time period were carried out and compared to see the impact of the extra LDP related demand on the network.

4.1 Link Flow Comparisons

Details of the link flow changes around the island and on the mainland for each time period are presented in Table 9, Table 10 and Table 11. A diagram showing the link flow locations (which in Discovery are essentially flows at a point) are shown in Figure 4.

Figure 2. Link Flow Locations

08:00 Peak Hour Location	Direction	Baseline	Do Minimum no Mitigation	Difference	Difference (%)
Park Rd North	NB	1052	1037	-16	-1%
Park Rd North	SB	1111	1112	1	0%
Park Rd South	NB	1466	1454	-12	-1%
Park Rd South	SB	766	717	-49	-6%
A27 EB off ramp	EB	1541	1516	-25	-2%
A27 EB on ramp	EB	429	422	-8	-2%
A27 WB off ramp	WB	434	433	-2	0%
A27 WB on ramp	WB	1097	1114	17	2%
A3023 Langstone Road	NB	1346	1429	83	6%
A3023 Langstone Road	SB	779	778	-1	0%
A3023 Langstone Bridge	NB	1339	1423	85	6%
A3023 Langstone Bridge	SB	727	720	-7	-1%
A3023 Havant Rd N of West Ln	NB	1194	1345	150	13%
A3023 Havant Rd N of West Ln	SB	649	652	4	1%
A3023 Havant Rd S of West Ln	NB	1049	1201	152	14%
A3023 Havant Rd S of West Ln	SB	562	581	19	3%
West Ln at Havant Rd A3023	NB	146	152	7	4%
West Ln at Havant Rd A3023	SB	83	70	-14	-17%
Mill Rythe Rbt Havant Rd	EB	1059	1170	111	10%
Mill Rythe Rbt Havant Rd	WB	629	655	26	4%
Mill Rythe Rbt Manor Rd	EB	339	327	-12	-3%
Mill Rythe Rbt Manor Rd	WB	228	246	19	8%
Mill Rythe Rbt Church Rd	NB	735	866	131	18%
Mill Rythe Rbt Church Rd	SB	418	428	10	2%
A3023 N of Newtown Ln	NB	303	325	22	7%
A3023 N of Newtown Ln	SB	227	265	38	17%
A3023 N of Sea Front	NB	159	186	27	17%
A3023 N of Sea Front	SB	150	175	25	17%
West Ln north of Newtown Ln	NB	155	219	64	41%
West Ln north of Newtown Ln	SB	118	113	-5	-4%
Station Rd W of West Ln	EB	206	273	68	33%
Station Rd W of West Ln	WB	180	212	33	18%
Staunton Ave	NB	51	60	9	17%
Staunton Ave	SB	39	45	5	14%
Ferry Rd	EB	43	44	1	3%
Ferry Rd	WB	52	58	6	11%
Sea Front E of A3023	EB	139	152	13	9%
Sea Front E of A3023	WB	140	159	19	13%
Sea Front W of A3023	EB	105	132	27	26%
Sea Front W of A3023	WB	127	147	20	16%
Sea Front W of Sea Grove Ave	EB	111	136	25	22%
Sea Front W of Sea Grove Ave	WB	128	151	23	18%
Sea Front E of Sea Grove Ave	EB	160	171	12	7%
Sea Front E of Sea Grove Ave	WB	339	376	37	11%
Sea Grove Ave N of Sea Front	NB	284	317	33	12%
Sea Grove Ave N of Sea Front	SB	120	128	8	6%
Southwood Rd	EB	175	184	9	5%
Southwood Rd	WB	324	344	20	6%
Selsmore E of Sea Grove Ave	EB	221	257	36	16%
Selsmore E of Sea Grove Ave	WB	375	430	54	14%
St Mary's Rd W of Elm Grove	NB	60	182	123	207%
St Mary's Rd W of Elm Grove	SB	51	88	37	74%
Elm Grove at Cherrywood Gdns	NB	629	691	62	10%
Elm Grove at Cherrywood Gdns	SB	383	413	30	8%

Table 9. Do-Min Link Flow Comparison AM Peak Hour (08:00 – 09:00)

12:00 Peak Hour Location	Direction	Baseline	Do Minimum no Mitigation	Difference	Difference (%)
Park Rd North	NB	1207	1214	7	1%
Park Rd North	SB	1143	1151	9	1%
Park Rd South	NB	1237	1264	27	2%
Park Rd South	SB	1103	1130	27	2%
A27 EB off ramp	EB	1173	1187	14	1%
A27 EB on ramp	EB	489	497	7	1%
A27 WB off ramp	WB	422	427	5	1%
A27 WB on ramp	WB	923	945	22	2%
A3023 Langstone Road	NB	867	928	60	7%
A3023 Langstone Road	SB	922	969	47	5%
A3023 Langstone Bridge	NB	822	892	69	8%
A3023 Langstone Bridge	SB	837	895	57	7%
A3023 Havant Rd N of West Ln	NB	747	804	57	8%
A3023 Havant Rd N of West Ln	SB	744	798	54	7%
A3023 Havant Rd S of West Ln	NB	653	710	57	9%
A3023 Havant Rd S of West Ln	SB	646	691	45	7%
West Ln at Havant Rd A3023	NB	92	93	1	1%
West Ln at Havant Rd A3023	SB	99	109	9	9%
Mill Rythe Rbt Havant Rd	EB	689	749	60	9%
Mill Rythe Rbt Havant Rd	WB	706	753	47	7%
Mill Rythe Rbt Manor Rd	EB	287	314	27	9%
Mill Rythe Rbt Manor Rd	WB	291	304	12	4%
Mill Rythe Rbt Church Rd	NB	484	524	40	8%
Mill Rythe Rbt Church Rd	SB	500	542	43	9%
A3023 N of Newtown Ln	NB	271	296	25	9%
A3023 N of Newtown Ln	SB	265	279	14	5%
A3023 N of Sea Front	NB	191	215	24	13%
A3023 N of Sea Front	SB	189	223	33	18%
West Ln north of Newtown Ln	NB	113	121	8	7%
West Ln north of Newtown Ln	SB	117	130	13	11%
Station Rd W of West Ln	EB	178	212	34	19%
Station Rd W of West Ln	WB	218	248	30	14%
Staunton Ave	NB	51	59	8	15%
Staunton Ave	SB	50	54	5	9%
Ferry Rd	EB	81	85	4	5%
Ferry Rd	WB	91	99	8	9%
Sea Front E of A3023	EB	174	191	17	9%
Sea Front E of A3023	WB	172	192	20	12%
Sea Front W of A3023	EB	144	169	26	18%
Sea Front W of A3023	WB	150	173	23	15%
Sea Front W of Sea Grove Ave	EB	149	177	28	19%
Sea Front W of Sea Grove Ave	WB	152	176	24	16%
Sea Front E of Sea Grove Ave	EB	217	234	17	8%
Sea Front E of Sea Grove Ave	WB	268	296	28	10%
Sea Grove Ave N of Sea Front	NB	215	243	28	13%
Sea Grove Ave N of Sea Front	SB	167	180	13	8%
Southwood Rd	EB	278	299	21	7%
Southwood Rd	WB	270	289	19	7%
Selsmore E of Sea Grove Ave	EB	312	352	40	13%
Selsmore E of Sea Grove Ave	WB	314	348	33	11%
St Mary's Rd W of Elm Grove	NB	50	101	51	101%
St Mary's Rd W of Elm Grove	SB	50	108	58	115%
Elm Grove at Cherrywood Gdns	NB	435	474	39	9%
Elm Grove at Cherrywood Gdns	SB	510	547	37	7%

Table 10. Do-Min Link Flow Comparison IP Peak Hour (12:00 – 13:00)

17:00 Peak Hour Location	Direction	Baseline	Do Minimum no Mitigation	Difference	Difference (%)
Park Rd North	NB	1391	1388	-3	0%
Park Rd North	SB	1122	1146	24	2%
Park Rd South	NB	1106	1102	-4	0%
Park Rd South	SB	1229	1278	49	4%
A27 EB off ramp	EB	1424	1458	34	2%
A27 EB on ramp	EB	561	548	-13	-2%
A27 WB off ramp	WB	458	459	2	0%
A27 WB on ramp	WB	1134	1124	-10	-1%
A3023 Langstone Road	NB	714	724	9	1%
A3023 Langstone Road	SB	1313	1416	103	8%
A3023 Langstone Bridge	NB	713	752	39	5%
A3023 Langstone Bridge	SB	1264	1356	92	7%
A3023 Havant Rd N of West Ln	NB	609	655	46	8%
A3023 Havant Rd N of West Ln	SB	1071	1156	85	8%
A3023 Havant Rd S of West Ln	NB	537	579	42	8%
A3023 Havant Rd S of West Ln	SB	930	1005	76	8%
West Ln at Havant Rd A3023	NB	74	77	3	4%
West Ln at Havant Rd A3023	SB	139	150	11	8%
Mill Rythe Rbt Havant Rd	EB	583	633	50	9%
Mill Rythe Rbt Havant Rd	WB	992	1075	83	8%
Mill Rythe Rbt Manor Rd	EB	250	283	33	13%
Mill Rythe Rbt Manor Rd	WB	334	364	30	9%
Mill Rythe Rbt Church Rd	NB	417	458	42	10%
Mill Rythe Rbt Church Rd	SB	742	818	77	10%
A3023 N of Newtown Ln	NB	230	256	25	11%
A3023 N of Newtown Ln	SB	290	321	30	10%
A3023 N of Sea Front	NB	159	179	20	12%
A3023 N of Sea Front	SB	177	200	23	13%
West Ln north of Newtown Ln	NB	100	107	7	7%
West Ln north of Newtown Ln	SB	136	161	25	18%
Station Rd W of West Ln	EB	171	201	29	17%
Station Rd W of West Ln	WB	204	264	61	30%
Staunton Ave	NB	36	36	0	0%
Staunton Ave	SB	42	46	4	9%
Ferry Rd	EB	67	69	2	4%
Ferry Rd	WB	70	75	4	6%
Sea Front E of A3023	EB	150	162	12	8%
Sea Front E of A3023	WB	152	162	10	7%
Sea Front W of A3023	EB	145	163	19	13%
Sea Front W of A3023	WB	122	145	23	19%
Sea Front W of Sea Grove Ave	EB	148	164	16	11%
Sea Front W of Sea Grove Ave	WB	124	147	23	18%
Sea Front E of Sea Grove Ave	EB	290	306	16	5%
Sea Front E of Sea Grove Ave	WB	216	243	27	12%
Sea Grove Ave N of Sea Front	NB	173	192	19	11%
Sea Grove Ave N of Sea Front	SB	223	237	15	7%
Southwood Rd	EB	342	354	12	3%
Southwood Rd	WB	189	203	14	7%
Selsmore E of Sea Grove Ave	EB	406	460	55	13%
Selsmore E of Sea Grove Ave	WB	271	314	44	16%
St Mary's Rd W of Elm Grove	NB	56	105	49	87%
St Mary's Rd W of Elm Grove	SB	60	163	103	172%
Elm Grove at Cherrywood Gdns	NB	376	414	38	10%
Elm Grove at Cherrywood Gdns	SB	688	715	28	4%

Table 11. Do-Min Link Flow Comparison PM Peak Hour (17:00 – 18:00)

The tables show a general increase in traffic in the Do-Minimum model compared to the Baseline model due to the inclusion of the LDP traffic. More significant growth can be seen on roads immediately adjacent to the new LDP developments. Most notably St Marys Road which is the access point of Rook Farm accessing the network. Out with this exception, percentage increases at each location are around 10%.

4.2 Journey Time Comparisons

Six journey time routes were used to compare the operation between the 2036 Baseline and Do-Minimum models:

- Route 1: Beachlands Roundabout to Mill Rythe Roundabout via A3023 Manor Road, northbound and southbound
- Route 2: Sea Front/Sea Grove Avenue to Mill Rythe Roundabout via Church Road/Elm Grove, northbound and southbound
- Route 3: A3023 Woodbury Avenue to A3023/West Lane, northbound and southbound
- Route 4: Church Road Kings Road to A3023 West Lane
- Route 5: Manor Road Brights Lane to A3023 West Lane
- Route 6: West Lane Brights Lane to A3023 West Lane

The journey time routes are shown in Figure 3.

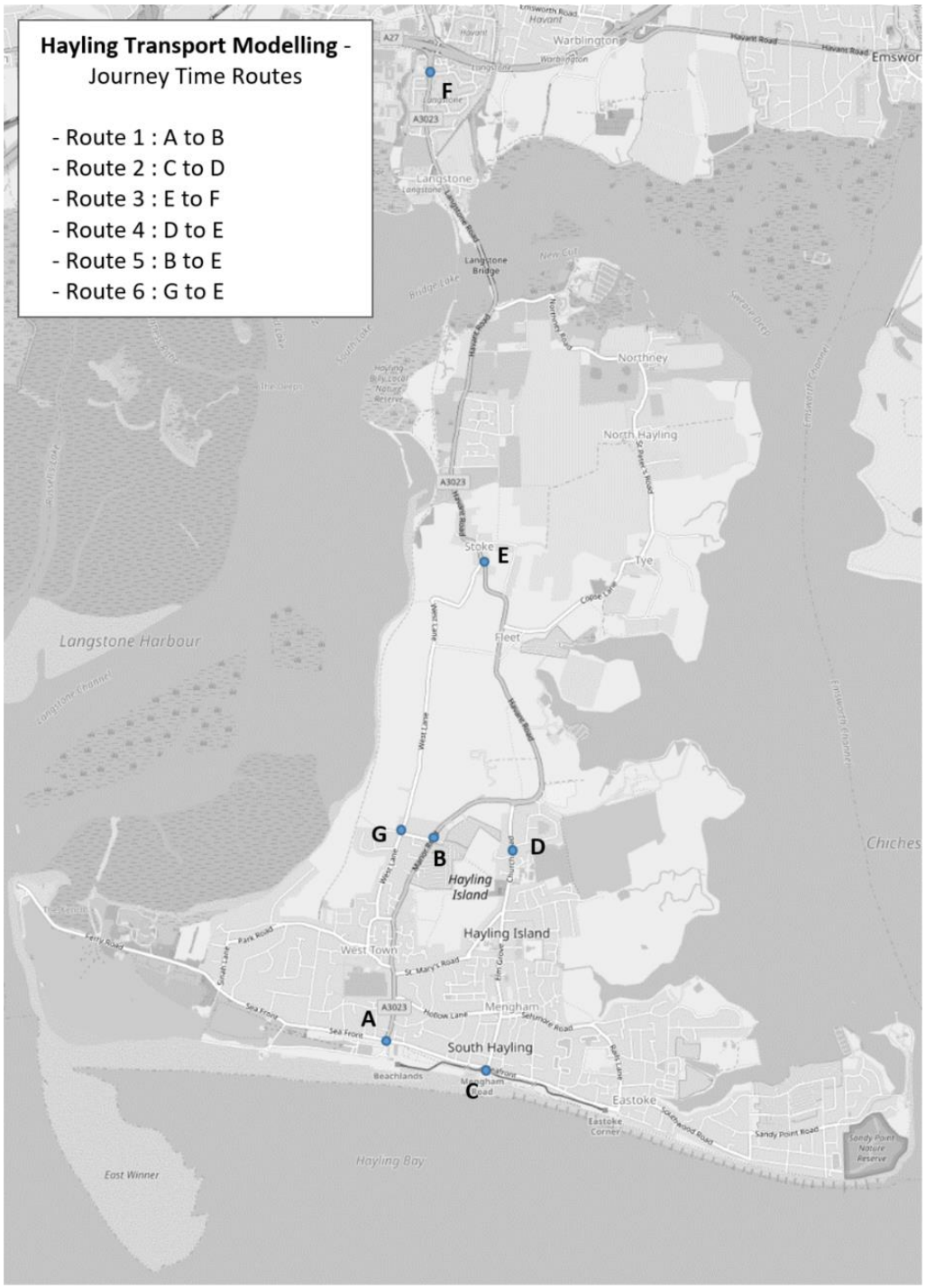

Figure 3. Journey Time Routes

Journey time results were collected and averaged over intervals of an hour for individual routes. The Journey times observed in the peak hours of each period are found in Table 12 to Table 14.

08:00 - 09:00

Journey Times (mm:ss) Description	Route #	Baseline	Do Minimum no Mitigation	Difference	Difference (%)
Beechlands Rbt - Brights Lane	Route 1 NB	01:38	01:38	00:00	0%
Brights Lane - Beechlands Rbt	Route 1 SB	01:42	01:46	00:04	4%
Sea Front - St Mary's Road	Route 2 NB	02:05	02:07	00:02	2%
St Mary's Road - Sea Front	Route 2 SB	02:17	02:20	00:03	2%
West Lane/A3023 - Tech Park	Route 3 NB	06:06	07:45	01:39	27%
Tech Park - West Lane/A3023	Route 3 SB	04:40	05:14	00:34	12%
Church Road - West Lane/A3023	Route 4 NB	03:47	04:09	00:22	10%
West Lane/A3023 Church Road	Route 4 SB	03:33	03:41	00:08	4%
Manor Road - West Lane/A3023	Route 5 NB	04:41	07:25	02:44	58%
West Lane/A3023 - Manor Road	Route 5 SB	03:48	03:56	00:08	4%
West Lane Northbound	Route 6 NB	02:51	03:36	00:45	26%
West Lane Southbound	Route 6 SB	02:43	03:02	00:19	12%

Table 12. Journey Times in AM Peak Hour (08:00-09:00)

12:00 - 13:00

Journey Times (mm:ss) Description	Route #	Baseline	Do Minimum no Mitigation	Difference	Difference (%)
Beechlands Rbt - Brights Lane	Route 1 NB	01:40	01:40	00:00	0%
Brights Lane - Beechlands Rbt	Route 1 SB	01:50	01:50	00:00	0%
Sea Front - St Mary's Road	Route 2 NB	02:02	02:02	00:00	0%
St Mary's Road - Sea Front	Route 2 SB	02:12	02:14	00:02	2%
West Lane/A3023 - Tech Park	Route 3 NB	04:46	04:49	00:03	1%
Tech Park - West Lane/A3023	Route 3 SB	04:35	04:42	00:07	3%
Church Road - West Lane/A3023	Route 4 NB	03:35	03:37	00:02	1%
West Lane/A3023 Church Road	Route 4 SB	03:35	03:36	00:01	0%
Manor Road - West Lane/A3023	Route 5 NB	03:53	03:55	00:02	1%
West Lane/A3023 - Manor Road	Route 5 SB	03:53	03:53	00:00	0%
West Lane Northbound	Route 6 NB	02:37	02:38	00:01	1%
West Lane Southbound	Route 6 SB	02:34	02:35	00:01	1%

Table 13. Journey Times in IP Peak Hour (12:00-13:00)

17:00 - 18:00

Journey Times (mm:ss) Description	Route #	Baseline	Do Minimum no Mitigation	Difference (mm:ss)	Difference (%)
Beechlands Rbt - Brights Lane	Route 1 NB	01:39	01:40	00:01	1%
Brights Lane - Beechlands Rbt	Route 1 SB	01:50	01:50	00:00	0%
Sea Front - St Mary's Road	Route 2 NB	02:02	02:03	00:01	1%
St Mary's Road - Sea Front	Route 2 SB	02:13	02:14	00:01	1%
West Lane/A3023 - Tech Park	Route 3 NB	04:42	06:27	01:45	37%
Tech Park - West Lane/A3023	Route 3 SB	05:16	07:33	02:17	43%
Church Road - West Lane/A3023	Route 4 NB	03:37	03:39	00:02	1%
West Lane/A3023 Church Road	Route 4 SB	03:36	03:37	00:01	0%
Manor Road - West Lane/A3023	Route 5 NB	03:53	03:56	00:03	1%
West Lane/A3023 - Manor Road	Route 5 SB	03:51	03:51	00:00	0%
West Lane Northbound	Route 6 NB	02:35	02:36	00:01	1%
West Lane Southbound	Route 6 SB	02:33	02:34	00:01	1%

Table 14. Journey Times in PM Peak Hour (17:00-1800)

From the tables it can be seen that with the inclusion of the LDP traffic in the Do Minimum journey times have changed most notably along three routes: Tech Park-West Lane Northbound and Southbound, Manor Road – West Lane Northbound, and along West Lane Northbound. The former is a result of a higher volume of traffic on the island travelling to and from Havant and the impact that has on journey time. Aside from this main route off the island the two latter routes are associated with minor arms at junctions that have increased opposing flows at Mill Rythe and A3023/West Lane, resulting in a notable increase in journey time.

To generate a picture of the impact more generally, strategic routes have been aggregated from these routes to define the 3 main routes to and from the island in Table 15 to Table 17.

The aggregated strategic routes define three main routes north/south from South Hayling:

- Strategic Route 1 : Sea Front/Sea Grove Avenue to Mill Rythe to Stoke to Langstone
- Strategic Route 2 : Beachlands Roundabout to Mill Rythe to Stoke to Langstone
- Strategic Route 3 : West Lane/Brights Lane to Stoke to Langstone.

08:00 - 09:00

Journey Times (mm:ss) Description	Baseline	Do Minimum no Mitigation	Difference (mm:ss)	Difference (%)
Strategic Route 1 NB	11:58	14:01	02:03	17%
Strategic Route 1 SB	10:30	11:15	00:45	7%
Strategic Route 2 NB	12:25	16:48	04:23	35%
Strategic Route 2 SB	10:10	10:56	00:46	8%
Strategic Route 3 NB	08:57	11:21	02:24	27%
Strategic Route 3 SB	07:23	08:16	00:53	12%

Table 15. Journey Time Comparison for Strategic Routes in AM Peak Hour (08:00-09:00)

12:00 - 13:00

Journey Times (mm:ss) Description	Baseline	Do Minimum no Mitigation	Difference (mm:ss)	Difference (%)
Strategic Route 1 NB	10:23	10:28	00:05	1%
Strategic Route 1 SB	10:22	10:32	00:10	2%
Strategic Route 2 NB	10:19	10:24	00:05	1%
Strategic Route 2 SB	10:18	10:25	00:07	1%
Strategic Route 3 NB	07:23	07:27	00:04	1%
Strategic Route 3 SB	07:09	07:17	00:08	2%

Table 16. Journey Time Comparison for Strategic Routes in IP Peak Hour (12:00-13:00)

17:00 - 18:00

Journey Times (mm:ss) Description	Baseline	Do Minimum no Mitigation	Difference (mm:ss)	Difference (%)
Strategic Route 1 NB	10:21	12:09	01:48	17%
Strategic Route 1 SB	11:05	13:24	02:19	21%
Strategic Route 2 NB	10:14	12:03	01:49	18%
Strategic Route 2 SB	10:57	13:14	02:17	21%
Strategic Route 3 NB	07:17	09:03	01:46	24%
Strategic Route 3 SB	07:49	10:07	02:18	29%

Table 17. Journey Time Comparison for Strategic Routes in PM Peak Hour (17:00-18:00)

4.3 Queue Length Comparisons

The tables below show the maximum queue lengths in metres at selected junctions throughout the study area within each time period.

AM Period

Movement	Base	Do Minimum	Difference	Difference (%)
B2199 Petersfield Road at Park Road North Roundabout	177	177	0	0%
Elmleigh Road at Park Road North Roundabout	67	78	10	16%
Park Road North at Park Road North Roundabout	62	67	5	8%
New Road at Park Road North Roundabout	159	158	-1	0%
B2149 Park Road (North) at Park Road North/Elm Lane	135	241	106	78%
Elm Lane at Park Road North/Elm Lane	219	218	-1	0%
B2149 Park Road (South) at Park Road North/Elm Lane	167	168	1	1%
Park Way at Park Road North/Elm Lane	140	136	-4	-3%
B2149 Park Road South (North) at Park Road South/ Solent Road	147	329	183	125%
B2149 Park Road South (South) at Park Road South/ Solent Road	180	181	1	0%
Solent at Park Road South/ Solent Road	152	207	55	37%
B2149 Park Road South at Havant Bypass	180	221	41	22%
A27 Havant Bypass (East) at Havant Bypass	90	144	54	59%
A3023 Langstone Road at Havant Bypass	126	132	6	5%
A27 Havant Bypass (West) at Havant Bypass	194	335	141	73%
Sea Grove Avenue (North) at Sea Grove Avenue/Selsmore Road	-	8	-	-
Selsmore Road at Sea Grove Avenue/Selsmore Road	57	63	6	10%
Sea Grove Avenue (South) at Sea Grove Avenue/Selsmore Road	3	4	2	75%
Newton Ln at Manor Road/Newton Lane	9	16	7	78%
north at Manor Road/Newton Lane	14	21	7	52%
south at Manor Road/Newton Lane	20	24	5	23%
beachlands west at Beechlands Roundabout	7	7	0	0%
beachlands south at Beechlands Roundabout	3	6	3	103%
beachlands east at Beechlands Roundabout	7	7	-1	-9%
beachlands north at Beechlands Roundabout	2	4	2	96%
north at Manor Road/St Mary's Road	4	7	2	55%
south at Manor Road/St Mary's Road	4	3	-1	-24%
St Marys at Manor Road/St Mary's Road	4	9	5	115%
north at Manor Road/Station Road	52	73	21	40%
Station at Manor Road/Station Road	17	27	11	64%
south at Manor Road/Station Road	-	-	-	-
Tournerbury at Church Road/St Mary's Road	3	7	4	115%
north at Church Road/St Mary's Road	2	22	20	1044%
St Marys at Church Road/St Mary's Road	12	32	20	160%
south at Church Road/St Mary's Road	2	2	1	26%
Cherrywood at Elm Grove/Cherrywood Gardens	15	18	3	19%
north at Elm Grove/Cherrywood Gardens	33	39	6	18%
south at Elm Grove/Cherrywood Gardens	65	91	25	38%
north at Northney Junction	91	97	6	6%
Northney Rd at Northney Junction	33	157	124	378%
south at A3023/West Lane	31	138	107	344%
north at A3023/West Lane	115	280	165	143%
West Ln at A3023/West Lane	53	68	15	28%
tech park at Tech Park/Woodbury Road	30	36	6	18%
north at Tech Park/Woodbury Road	103	104	1	1%
south at Tech Park/Woodbury Road	10	68	57	554%
south at A3023/ Yew Tree Road	135	176	42	31%
north at A3023/ Yew Tree Road	-	-	-	-
Yew Tree at A3023/ Yew Tree Road	5	6	1	19%
Copse Ln at A3023/Copse Lane	7	15	8	109%
south at A3023/Copse Lane	34	77	43	128%
north at A3023/Copse Lane	16	32	15	95%
Church Rd at Mill Rythe Roundabout	70	113	44	63%
Manor Rd at Mill Rythe Roundabout	143	296	153	107%
Havant Rd at Mill Rythe Roundabout	37	40	3	9%

Table 18. Queue Length Comparisons in AM Peak Hour (08:00-09:00)

IP Period

Movement	Base	Do Minimum	Difference	Difference (%)
B2199 Petersfield Road at Park Road North Roundabout	176	175	-1	-1%
Elmleigh Road at Park Road North Roundabout	188	189	1	1%
Park Road North at Park Road North Roundabout	87	87	0	0%
New Road at Park Road North Roundabout	125	141	16	13%
B2149 Park Road (North) at Park Road North/Elm Lane	190	192	2	1%
Elm Lane at Park Road North/Elm Lane	216	216	0	0%
B2149 Park Road (South) at Park Road North/Elm Lane	181	165	-16	-9%
Park Way at Park Road North/Elm Lane	143	144	1	1%
B2149 Park Road South (North) at Park Road South/ Solent Road	118	117	-1	-1%
B2149 Park Road South (South) at Park Road South/ Solent Road	151	148	-3	-2%
Solent at Park Road South/ Solent Road	209	210	1	0%
B2149 Park Road South at Havant Bypass	120	121	1	1%
A27 Havant Bypass (East) at Havant Bypass	87	75	-12	-13%
A3023 Langstone Road at Havant Bypass	116	122	6	5%
A27 Havant Bypass (West) at Havant Bypass	147	140	-7	-5%
Sea Grove Avenue (North) at Sea Grove Avenue/Selsmore Road	8	5	-3	-37%
Selsmore Road at Sea Grove Avenue/Selsmore Road	52	50	-2	-4%
Sea Grove Avenue (South) at Sea Grove Avenue/Selsmore Road	5	8	3	67%
Newton Ln at Manor Road/Newton Lane	9	15	6	68%
north at Manor Road/Newton Lane	35	43	8	23%
south at Manor Road/Newton Lane	19	27	8	39%
beachlands west at Beechlands Roundabout	16	14	-2	-13%
beachlands south at Beechlands Roundabout	6	8	2	29%
beachlands east at Beechlands Roundabout	4	7	3	59%
beachlands north at Beechlands Roundabout	4	4	0	2%
north at Manor Road/St Mary's Road	6	6	0	-7%
south at Manor Road/St Mary's Road	4	5	0	5%
St Marys at Manor Road/St Mary's Road	7	12	4	58%
north at Manor Road/Station Road	105	95	-10	-10%
Station at Manor Road/Station Road	24	32	8	34%
south at Manor Road/Station Road	-	-	-	-
Tournerbury at Church Road/St Mary's Road	8	10	2	26%
north at Church Road/St Mary's Road	18	28	10	56%
St Marys at Church Road/St Mary's Road	13	22	9	67%
south at Church Road/St Mary's Road	2	4	1	67%
Cherrywood at Elm Grove/Cherrywood Gardens	11	14	4	33%
north at Elm Grove/Cherrywood Gardens	55	66	11	19%
south at Elm Grove/Cherrywood Gardens	61	81	20	33%
north at Northney Junction	118	120	2	2%
Northney Rd at Northney Junction	34	39	4	12%
south at A3023/West Lane	7	7	0	-3%
north at A3023/West Lane	132	119	-13	-10%
West Ln at A3023/West Lane	26	29	2	9%
tech park at Tech Park/Woodbury Road	41	38	-4	-9%
north at Tech Park/Woodbury Road	29	31	2	8%
south at Tech Park/Woodbury Road	6	7	1	19%
south at A3023/ Yew Tree Road	103	96	-6	-6%
north at A3023/ Yew Tree Road	-	3	-	-
Yew Tree at A3023/ Yew Tree Road	9	12	3	33%
Copse Ln at A3023/Copse Lane	9	11	2	20%
south at A3023/Copse Lane	34	43	9	28%
north at A3023/Copse Lane	47	63	16	34%
Church Rd at Mill Rythe Roundabout	45	46	1	2%
Manor Rd at Mill Rythe Roundabout	89	111	22	24%
Havant Rd at Mill Rythe Roundabout	59	80	21	35%

Table 19. Queue Length Comparison in IP Peak Hour (12:00-13:00)

PM Period

Movement	Base	Do Minimum	Difference	Difference (%)
B2199 Petersfield Road at Park Road North Roundabout	151	171	20	13%
Elmleigh Road at Park Road North Roundabout	187	187	0	0%
Park Road North at Park Road North Roundabout	172	192	20	11%
New Road at Park Road North Roundabout	154	140	-13	-9%
B2149 Park Road (North) at Park Road North/Elm Lane	138	143	5	4%
Elm Lane at Park Road North/Elm Lane	214	211	-3	-1%
B2149 Park Road (South) at Park Road North/Elm Lane	206	202	-4	-2%
Park Way at Park Road North/Elm Lane	144	144	0	0%
B2149 Park Road South (North) at Park Road South/ Solent Road	96	106	11	11%
B2149 Park Road South (South) at Park Road South/ Solent Road	98	94	-4	-4%
Solent at Park Road South/ Solent Road	209	208	-1	0%
B2149 Park Road South at Havant Bypass	145	157	11	8%
A27 Havant Bypass (East) at Havant Bypass	125	175	51	41%
A3023 Langstone Road at Havant Bypass	121	131	10	8%
A27 Havant Bypass (West) at Havant Bypass	88	127	39	44%
Sea Grove Avenue (North) at Sea Grove Avenue/Selsmore Road	5	5	0	-1%
Selsmore Road at Sea Grove Avenue/Selsmore Road	33	42	8	25%
Sea Grove Avenue (South) at Sea Grove Avenue/Selsmore Road	6	9	3	48%
Newton Ln at Manor Road/Newton Lane	5	10	5	98%
north at Manor Road/Newton Lane	40	41	1	3%
south at Manor Road/Newton Lane	8	8	-1	-6%
beachlands west at Beechlands Roundabout	7	9	2	25%
beachlands south at Beechlands Roundabout	4	4	0	-1%
beachlands east at Beechlands Roundabout	4	6	1	29%
beachlands north at Beechlands Roundabout	4	2	-2	-45%
north at Manor Road/St Mary's Road	-	3	-	-
south at Manor Road/St Mary's Road	2	2	0	-4%
St Marys at Manor Road/St Mary's Road	5	7	2	32%
north at Manor Road/Station Road	74	70	-3	-5%
Station at Manor Road/Station Road	13	24	10	78%
south at Manor Road/Station Road	-	-	-	-
Tournerbury at Church Road/St Mary's Road	10	15	5	47%
north at Church Road/St Mary's Road	30	22	-8	-26%
St Marys at Church Road/St Mary's Road	10	17	7	69%
south at Church Road/St Mary's Road	3	4	2	59%
Cherrywood at Elm Grove/Cherrywood Gardens	10	12	2	15%
north at Elm Grove/Cherrywood Gardens	73	76	3	4%
south at Elm Grove/Cherrywood Gardens	62	52	-10	-16%
north at Northney Junction	134	185	51	38%
Northney Rd at Northney Junction	35	67	33	95%
south at A3023/West Lane	4	3	-2	-38%
north at A3023/West Lane	106	117	11	10%
West Ln at A3023/West Lane	13	11	-1	-9%
tech park at Tech Park/Woodbury Road	96	96	-1	-1%
north at Tech Park/Woodbury Road	50	74	24	48%
south at Tech Park/Woodbury Road	11	32	21	181%
south at A3023/ Yew Tree Road	78	91	13	16%
north at A3023/ Yew Tree Road	11	9	-3	-22%
Yew Tree at A3023/ Yew Tree Road	7	13	6	83%
Copse Ln at A3023/Copse Lane	9	11	2	16%
south at A3023/Copse Lane	33	50	18	54%
north at A3023/Copse Lane	61	70	9	15%
Church Rd at Mill Rythe Roundabout	39	42	3	8%
Manor Rd at Mill Rythe Roundabout	53	60	7	14%
Havant Rd at Mill Rythe Roundabout	79	86	7	9%

Table 20. Queue Length Comparison in PM Peak Hour (17:00-18:00)

The Queue length comparisons broadly reflect the journey time comparisons. For the majority of junctions the queueing is much the same in the Do Minimum Scenario as it is in the Baseline scenario. Notable exceptions to this include: Mill Rythe Roundabout where the Manor Road arm is negatively impacted by the increase of demand and no greater share of time in the junction; Northney Road where increased traffic northbound makes access to the A3023 from Northney Road more difficult; and some impact on the Havant Bypass where increased demand on the junction impacts the off slip and Park Road South.

4.4 Summary

With the addition of the LDP Traffic on top of the traffic associated with committed development it is clear to see that the road network as it currently exists is put under further strain, increasing journey times on all routes to and from the island in the AM and PM Peaks. Without adjustment this increase in demand also affects already suffering arms of traffic, specifically the Manor Road arm of the Mill Rythe Roundabout. In the Interpeak period with reduced traffic compared to the AM and PM the inclusion of development traffic does not impact travel in the area but this is expected at these times of the day.

5. MITIGATION PACKAGE MODELS

HBC defined three LDP mitigation packages for testing with the objectives of improving mainline journey times and alleviating queueing on side arm traffic. Models of each mitigation package were coded from the 2036 Do Minimum model. These are as follows:

- 2036 Do Minimum Scenario with Package 1 – 2036 Do Min model with Package 1
- 2036 Do Minimum Scenario with Package 2 – 2036 Do Min with Packages 1 and 2
- 2036 Do Minimum Scenario with Package 3 – 2036 Do Min with all 3 Packages

5.1 Package 1 Changes

The changes incorporated in package 1 include dedicated bus laybys and right turn lanes as well as the conversion of two junctions, A3023/Woodbury Avenue/Tech Park priority junction and Mill Rythe Roundabout, to signalised junctions. The section of 2 lane road at the A3023/Woodbury Avenue/Tech Park junction southbound is extended down to opposite the Langbrook Close Junction.

The Woodbury Avenue signal plan also includes restricting right turning traffic from Woodbury Avenue and so the proposal is to send this right turning traffic to Southbrook Avenue. To accommodate this new signals are to be put in at the A3023/Southbrook Avenue junction to let out the right turning traffic on this busy section of Road.

Bus laybys were introduced at the following locations: across from the Ship Inn, A3023/New Cut, A3023/Mill Close, A3023/Castlemans Lane, at the Maypole Pub, A3023/Gilber Mead and adjacent to St Patricks Church on Manor Road. Right turn filters were put in at the following locations: the Ship Inn, A3023/New Cut, A3023/Avenue Road, A3023/Victoria Road, and Manor Road/Newton Lane.

Finally signal performance has been improved at the Havant Bypass Roundabout.

5.2 Package 2 Changes

Package 2 incorporates the changes outlined in Package 1 with the inclusion of additional elements. Further to the Bus laybys outlined in package 1, an additional layby is introduced at Northney Junction. A mini roundabout at A3023/Copse Lane and the signalisation of the Northney Junction are also introduced in this package.

Finally this package incorporates a new signalised junction connecting West Lane with the A3023 between the existing junction and A3023/Copse Lane. The existing road connecting the A3023 to West Lane will be a local access junction to serve the properties at the north end of West Lane and will connect with the new road as a priority junction with the existing link giving way to the new link.

5.3 Package 3 Changes

Package 3 incorporates the changes in the previous two packages and introduces a bypass road connecting Manor Road at The Oven Campsite to the existing West Lane Road north of the residential properties and continues onto the new link connecting West Lane and the A3023 from Package 2.

This new bypass will connect to Manor Road at a new 3 arm roundabout with an additional left turn filter on the northbound arm from Manor Road. The existing West Lane south of the new bypass will join the bypass as a priority junction with a right turn filter for the southbound traffic turning onto West Lane.

This new bypass will replace the existing stretch of the A3023 along Havant Road as the strategic route north/south and the signposting and signals at the north end will encourage all northbound traffic to use this new route, with the local traffic along Havant Road continuing north along Havant Road and joining the main route north at the new signals after Castlemans Lane.

6. 2036 DO MINIMUM VS MITIGATION SCENARIOS

Ten model runs for each time period of the mitigation models and Do Minimum were carried out and the results averaged. The following sections show a comparison of traffic conditions between the each of these models.

6.1 Link Flow Comparisons

Details of the link flow changes around the island and on the mainland for each time period are presented in Table 21, Table 22, and Table 23. A diagram showing the link flow locations (which in Discovery are essentially flows at a point) are shown in Figure 4. The colour coding is explained in the following key:

	>5% Decrease from Do Minimum
	No Significant Change
	>5% Increase from Do Minimum

Figure 4. Link Flow Locations

08:00 Peak Hour Location	Direction	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Park Rd North	NB	1037	1064	1060	1065
Park Rd North	SB	1112	1107	1111	1110
Park Rd South	NB	1454	1485	1472	1489
Park Rd South	SB	717	768	772	772
A27 EB off ramp	EB	1516	1568	1558	1569
A27 EB on ramp	EB	422	437	434	440
A27 WB off ramp	WB	433	438	432	443
A27 WB on ramp	WB	1114	1117	1108	1128
A3023 Langstone Road	NB	1429	1413	1398	1418
A3023 Langstone Road	SB	778	830	829	830
A3023 Langstone Bridge	NB	1423	1404	1386	1405
A3023 Langstone Bridge	SB	720	771	776	779
A3023 Havant Rd N of West Ln	NB	1345	1350	1324	1343
A3023 Havant Rd N of West Ln	SB	652	681	685	704
A3023 Havant Rd S of West Ln	NB	1201	1191	1175	112
A3023 Havant Rd S of West Ln	SB	581	583	583	125
West Ln at Havant Rd A3023	NB	152	165	162	1250
West Ln at Havant Rd A3023	SB	70	96	96	578
Mill Rythe Rbt Havant Rd	EB	1170	1167	1171	130
Mill Rythe Rbt Havant Rd	WB	655	617	616	166
Mill Rythe Rbt Manor Rd	EB	327	412	412	183
Mill Rythe Rbt Manor Rd	WB	246	232	229	435
Mill Rythe Rbt Church Rd	NB	866	807	808	519
Mill Rythe Rbt Church Rd	SB	428	434	434	307
A3023 N of Newtown Ln	NB	325	389	393	796
A3023 N of Newtown Ln	SB	265	236	236	393
A3023 N of Sea Front	NB	186	200	207	355
A3023 N of Sea Front	SB	175	171	178	229
West Ln north of Newtown Ln	NB	219	199	199	70
West Ln north of Newtown Ln	SB	113	146	143	98
Station Rd W of West Ln	EB	273	275	281	263
Station Rd W of West Ln	WB	212	219	221	216
Staunton Ave	NB	60	56	57	46
Staunton Ave	SB	45	49	46	43
Ferry Rd	EB	44	44	44	45
Ferry Rd	WB	58	60	60	59
Sea Front E of A3023	EB	152	150	154	168
Sea Front E of A3023	WB	159	154	157	153
Sea Front W of A3023	EB	132	129	130	181
Sea Front W of A3023	WB	147	160	159	295
Sea Front W of Sea Grove Ave	EB	136	130	133	176
Sea Front W of Sea Grove Ave	WB	151	160	159	283
Sea Front E of Sea Grove Ave	EB	171	173	178	186
Sea Front E of Sea Grove Ave	WB	376	370	377	373
Sea Grove Ave N of Sea Front	NB	317	295	304	189
Sea Grove Ave N of Sea Front	SB	128	129	130	107
Southwood Rd	EB	184	188	185	190
Southwood Rd	WB	344	344	341	343
Selsmore E of Sea Grove Ave	EB	257	259	251	249
Selsmore E of Sea Grove Ave	WB	430	435	426	431
St Mary's Rd W of Elm Grove	NB	182	182	180	164
St Mary's Rd W of Elm Grove	SB	88	86	90	86
Elm Grove at Cherrywood Gdns	NB	691	637	635	371
Elm Grove at Cherrywood Gdns	SB	413	413	405	298

Table 21. Do-Min Link Flow Comparison AM Peak Hour (08:00 – 09:00)

12:00 Peak Hour Location	Direction	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Park Rd North	NB	1037	1064	1060	1065
Park Rd North	SB	1112	1107	1111	1110
Park Rd South	NB	1454	1485	1472	1489
Park Rd South	SB	717	768	772	772
A27 EB off ramp	EB	1516	1568	1558	1569
A27 EB on ramp	EB	422	437	434	440
A27 WB off ramp	WB	433	438	432	443
A27 WB on ramp	WB	1114	1117	1108	1128
A3023 Langstone Road	NB	1429	1413	1398	1418
A3023 Langstone Road	SB	778	830	829	830
A3023 Langstone Bridge	NB	1423	1404	1386	1405
A3023 Langstone Bridge	SB	720	771	776	779
A3023 Havant Rd N of West Ln	NB	1345	1350	1324	1343
A3023 Havant Rd N of West Ln	SB	652	681	685	704
A3023 Havant Rd S of West Ln	NB	1201	1191	1175	112
A3023 Havant Rd S of West Ln	SB	581	583	583	125
West Ln at Havant Rd A3023	NB	152	165	162	1250
West Ln at Havant Rd A3023	SB	70	96	96	578
Mill Rythe Rbt Havant Rd	EB	1170	1167	1171	130
Mill Rythe Rbt Havant Rd	WB	655	617	616	166
Mill Rythe Rbt Manor Rd	EB	327	412	412	183
Mill Rythe Rbt Manor Rd	WB	246	232	229	435
Mill Rythe Rbt Church Rd	NB	866	807	808	519
Mill Rythe Rbt Church Rd	SB	428	434	434	307
A3023 N of Newtown Ln	NB	325	389	393	796
A3023 N of Newtown Ln	SB	265	236	236	393
A3023 N of Sea Front	NB	186	200	207	355
A3023 N of Sea Front	SB	175	171	178	229
West Ln north of Newtown Ln	NB	219	199	199	70
West Ln north of Newtown Ln	SB	113	146	143	98
Station Rd W of West Ln	EB	273	275	281	263
Station Rd W of West Ln	WB	212	219	221	216
Staunton Ave	NB	60	56	57	46
Staunton Ave	SB	45	49	46	43
Ferry Rd	EB	44	44	44	45
Ferry Rd	WB	58	60	60	59
Sea Front E of A3023	EB	152	150	154	168
Sea Front E of A3023	WB	159	154	157	153
Sea Front W of A3023	EB	132	129	130	181
Sea Front W of A3023	WB	147	160	159	295
Sea Front W of Sea Grove Ave	EB	136	130	133	176
Sea Front W of Sea Grove Ave	WB	151	160	159	283
Sea Front E of Sea Grove Ave	EB	171	173	178	186
Sea Front E of Sea Grove Ave	WB	376	370	377	373
Sea Grove Ave N of Sea Front	NB	317	295	304	189
Sea Grove Ave N of Sea Front	SB	128	129	130	107
Southwood Rd	EB	184	188	185	190
Southwood Rd	WB	344	344	341	343
Selsmore E of Sea Grove Ave	EB	257	259	251	249
Selsmore E of Sea Grove Ave	WB	430	435	426	431
St Mary's Rd W of Elm Grove	NB	182	182	180	164
St Mary's Rd W of Elm Grove	SB	88	86	90	86
Elm Grove at Cherrywood Gdns	NB	691	637	635	371
Elm Grove at Cherrywood Gdns	SB	413	413	405	298

Table 22. Do-Min Link Flow Comparison IP Peak Hour (12:00 – 13:00)

17:00 Peak Hour Location	Direction	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Park Rd North	NB	1037	1064	1060	1065
Park Rd North	SB	1112	1107	1111	1110
Park Rd South	NB	1454	1485	1472	1489
Park Rd South	SB	717	768	772	772
A27 EB off ramp	EB	1516	1568	1558	1569
A27 EB on ramp	EB	422	437	434	440
A27 WB off ramp	WB	433	438	432	443
A27 WB on ramp	WB	1114	1117	1108	1128
A3023 Langstone Road	NB	1429	1413	1398	1418
A3023 Langstone Road	SB	778	830	829	830
A3023 Langstone Bridge	NB	1423	1404	1386	1405
A3023 Langstone Bridge	SB	720	771	776	779
A3023 Havant Rd N of West Ln	NB	1345	1350	1324	1343
A3023 Havant Rd N of West Ln	SB	652	681	685	704
A3023 Havant Rd S of West Ln	NB	1201	1191	1175	112
A3023 Havant Rd S of West Ln	SB	581	583	583	125
West Ln at Havant Rd A3023	NB	152	165	162	1250
West Ln at Havant Rd A3023	SB	70	96	96	578
Mill Rythe Rbt Havant Rd	EB	1170	1167	1171	130
Mill Rythe Rbt Havant Rd	WB	655	617	616	166
Mill Rythe Rbt Manor Rd	EB	327	412	412	183
Mill Rythe Rbt Manor Rd	WB	246	232	229	435
Mill Rythe Rbt Church Rd	NB	866	807	808	519
Mill Rythe Rbt Church Rd	SB	428	434	434	307
A3023 N of Newtown Ln	NB	325	389	393	796
A3023 N of Newtown Ln	SB	265	236	236	393
A3023 N of Sea Front	NB	186	200	207	355
A3023 N of Sea Front	SB	175	171	178	229
West Ln north of Newtown Ln	NB	219	199	199	70
West Ln north of Newtown Ln	SB	113	146	143	98
Station Rd W of West Ln	EB	273	275	281	263
Station Rd W of West Ln	WB	212	219	221	216
Staunton Ave	NB	60	56	57	46
Staunton Ave	SB	45	49	46	43
Ferry Rd	EB	44	44	44	45
Ferry Rd	WB	58	60	60	59
Sea Front E of A3023	EB	152	150	154	168
Sea Front E of A3023	WB	159	154	157	153
Sea Front W of A3023	EB	132	129	130	181
Sea Front W of A3023	WB	147	160	159	295
Sea Front W of Sea Grove Ave	EB	136	130	133	176
Sea Front W of Sea Grove Ave	WB	151	160	159	283
Sea Front E of Sea Grove Ave	EB	171	173	178	186
Sea Front E of Sea Grove Ave	WB	376	370	377	373
Sea Grove Ave N of Sea Front	NB	317	295	304	189
Sea Grove Ave N of Sea Front	SB	128	129	130	107
Southwood Rd	EB	184	188	185	190
Southwood Rd	WB	344	344	341	343
Selsmore E of Sea Grove Ave	EB	257	259	251	249
Selsmore E of Sea Grove Ave	WB	430	435	426	431
St Mary's Rd W of Elm Grove	NB	182	182	180	164
St Mary's Rd W of Elm Grove	SB	88	86	90	86
Elm Grove at Cherrywood Gdns	NB	691	637	635	371
Elm Grove at Cherrywood Gdns	SB	413	413	405	298

Table 23. Do-Min Link Flow Comparison PM Peak Hour (17:00 – 18:00)

The link count comparison show that the Do Minimum with Package 1 and Do Minimum Package 2 models have broadly consistent link flows with the Do Minimum in all periods. While the mitigation measures in Package 1 and 2 improve the operation of the network generally they do not have a significant impact on the link flows.

The bypass introduced in package 3 changes the strategic north and southbound routes on and off the island. With this in place, Package 3 can be seen to generate significant increases on the West Lane junctions and significant decreases along the old section of A3023 being replaced by the bypass. Similarly there is a redistribution of traffic around South Hayling as the strategic routes on and off the island are changed and traffic may choose their new route early on. The results are similar across all 3 periods.

6.2 Journey Time Comparisons

Six journey time routes were used to compare the operation between the Do Minimum and Mitigation models:

- Route 1: Beachlands Roundabout to Mill Rythe Roundabout via A3023 Manor Road, northbound and southbound
- Route 2: Sea Front/Sea Grove Avenue to Mill Rythe Roundabout via Church Road/Elm Grove, northbound and southbound
- Route 3: A3023 Woodbury Avenue to A3023/West Lane, northbound and southbound
- Route 4: Church Road Kings Road to A3023 West Lane
- Route 5: Manor Road Brights Lane to A3023 West Lane
- Route 6: West Lane Brights Lane to A3023 West Lane

The journey time routes are shown in Figure 5. For Table 24 to Table 26 the colour coding is explained in the following key:

	> 30s under Journey Time
	No Significant Change
	> 30s over Journey Time

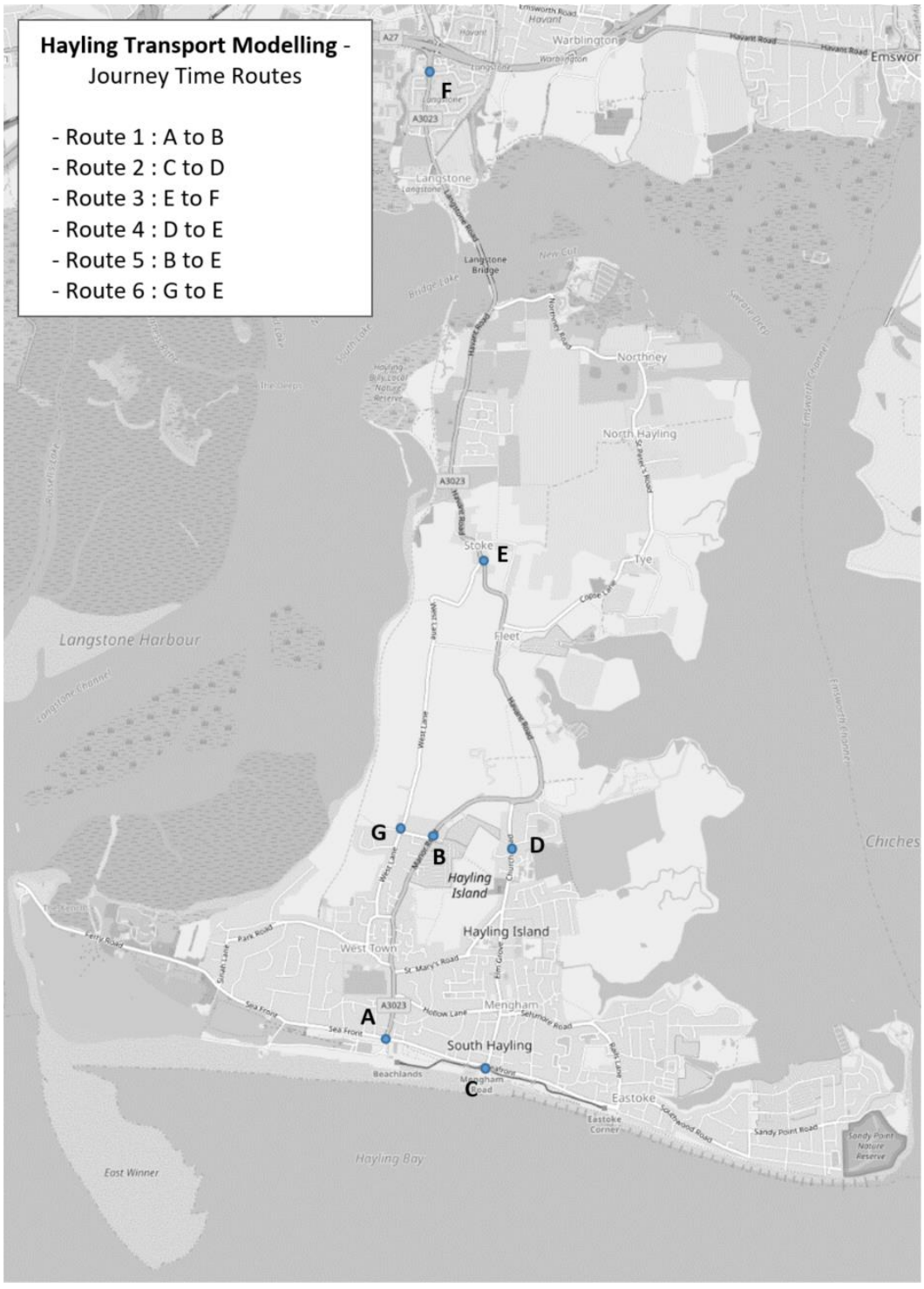

Figure 5. Journey Time Routes

Journey time results were collected and averaged over intervals of an hour for individual routes. The Journey times observed in the peak hours of each interval are found in Table 24 to Table 26 below.

08:00 - 09:00

Journey Times (mm:ss) Description	Route #	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Beechlands Rbt - Brights Lane	Route 1 NB	01:38	01:38	01:38	01:40
Brights Lane - Beechlands Rbt	Route 1 SB	01:46	01:42	01:42	01:48
Sea Front - St Mary's Road	Route 2 NB	02:07	02:06	02:06	02:04
St Mary's Road - Sea Front	Route 2 SB	02:20	02:19	02:19	02:14
West Lane/A3023 - Tech Park	Route 3 NB	07:45	08:48	09:14	09:01
Tech Park - West Lane/A3023	Route 3 SB	05:14	05:07	04:55	04:59
Church Road - West Lane/A3023	Route 4 NB	04:09	04:29	04:56	04:28
West Lane/A3023 Church Road	Route 4 SB	03:41	04:35	04:41	04:09
Manor Road - West Lane/A3023	Route 5 NB	07:25	04:58	05:21	03:14
West Lane/A3023 - Manor Road	Route 5 SB	03:56	04:34	04:38	02:47
West Lane Northbound	Route 6 NB	03:36	03:13	03:28	03:53
West Lane Southbound	Route 6 SB	03:02	02:51	03:00	02:24

Table 24. Journey Times in AM Peak Hour (08:00-09:00)

12:00 - 13:00

Journey Times (mm:ss) Description	Route #	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Beechlands Rbt - Brights Lane	Route 1 NB	01:40	01:39	01:41	01:41
Brights Lane - Beechlands Rbt	Route 1 SB	01:50	01:44	01:44	01:48
Sea Front - St Mary's Road	Route 2 NB	02:02	02:02	02:03	02:01
St Mary's Road - Sea Front	Route 2 SB	02:14	02:15	02:16	02:11
West Lane/A3023 - Tech Park	Route 3 NB	04:49	04:33	04:38	04:37
Tech Park - West Lane/A3023	Route 3 SB	04:42	04:41	04:48	04:47
Church Road - West Lane/A3023	Route 4 NB	03:37	03:59	04:04	03:50
West Lane/A3023 Church Road	Route 4 SB	03:36	04:05	04:06	03:52
Manor Road - West Lane/A3023	Route 5 NB	03:55	04:07	04:09	02:37
West Lane/A3023 - Manor Road	Route 5 SB	03:53	04:14	04:14	02:39
West Lane Northbound	Route 6 NB	02:38	02:37	03:04	02:39
West Lane Southbound	Route 6 SB	02:35	02:35	02:43	02:24

Table 25. Journey Times in IP Peak Hour (12:00-13:00)

17:00 - 18:00

Journey Times (mm:ss) Description	Route #	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Beechlands Rbt - Brights Lane	Route 1 NB	01:40	01:41	01:40	01:41
Brights Lane - Beechlands Rbt	Route 1 SB	01:50	01:44	01:43	01:48
Sea Front - St Mary's Road	Route 2 NB	02:03	02:03	02:03	02:03
St Mary's Road - Sea Front	Route 2 SB	02:14	02:16	02:17	02:13
West Lane/A3023 - Tech Park	Route 3 NB	06:27	04:32	04:39	04:35
Tech Park - West Lane/A3023	Route 3 SB	07:33	06:08	06:14	06:17
Church Road - West Lane/A3023	Route 4 NB	03:39	04:23	04:33	04:05
West Lane/A3023 Church Road	Route 4 SB	03:37	04:18	04:22	03:54
Manor Road - West Lane/A3023	Route 5 NB	03:56	04:06	04:08	02:35
West Lane/A3023 - Manor Road	Route 5 SB	03:51	04:28	04:28	02:41
West Lane Northbound	Route 6 NB	02:36	02:36	03:04	02:37
West Lane Southbound	Route 6 SB	02:34	02:35	02:43	02:25

Table 26. Journey Times in PM Peak Hour (17:00-1800)

From the tables it can be seen that among the mitigation scenarios the journey times for route 1 and 2 show broadly consistent results. This is to be expected as the majority of interventions implemented are further north of these routes.

Route 3 shows increased journey time in packages 1,2 and 3 compared to the Do Minimum scenario. This is due to the signals introduced at Woodbury Avenue and Southbrook Avenue. Route 3 covers the only north to south route for the island and is a busy section of road. The signals introduced to let in side arm traffic add delay to the main flow of traffic which were previously unopposed. It should be noted that although not covered by these journey time routes, the signals at these locations provide significant benefits for traffic on the side arms at Woodbury Avenue and Southbrook Road, allowing these vehicles to exit on to the main carriageway.

The Route 4 journey times in the models including the mitigation packages show increases when compared to the Do Minimum scenario. This is a result of the signalisation of Mill Rythe Roundabout. The northbound and southbound traffic on this route were main avenues of traffic, and before the signalisation were largely unimpeded. With the signals being introduced these two routes are disrupted to allow for traffic to and from Manor Road.

The signalisation of Mill Rythe Roundabout also has an effect on Manor Road, the traffic on this arm is delayed at the roundabout in the Do Minimum but the signalisation of the junction allows the vehicles pass through the junction with reduced delay. This is shown with reduction in journey times on Route 5 Northbound. In mitigation package 3, Route 5 northbound uses the new bypass and avoids the Mill Rythe roundabout altogether.

The same can be said for the southbound movement along this route for each time period. Because the movement from Manor Road to Church Road is not a prominent one, the southbound traffic from the Havant Road arm is on the whole unimpeded with the existing roundabout in place. With the signals this movement is forced to wait and so the journey time will be longer for this movement in each of the intervals. This can also be seen in the Route 5 southbound results for package 3 which show a decrease in journey time as vehicles use the bypass to avoid this junction.

Route 6 Journey times in each of the mitigation scenarios are broadly the same as what is seen in the Do Min scenario with the exception of Package 2. In package 2 the north end of the route is signalised but it is a minor arm and so has a relatively short green time. The signalisation allows more people to get out but on the whole people will wait the length of a cycle of the signals before moving into the new road so this accounts for the slight increase in journey times. In converse the package 3 is also signalised but with a majority of the green time assigned to the West Lane arm the majority of vehicles will not need to wait at this junction and so queueing is reduced compared to package 2.

Among all the routes you can see that there is an increase in Journey time between Packages 1 and 2. This can be explained by the signalisation of Northney Junction just south of the bridge. Signals have been introduced at this location to reduce queueing on the minor arm, Northney Road. Subsequently the main flow along the A3023 is interrupted whereas before the main flow was unimpeded.

Strategic Routes have been aggregated from these routes to define the 3 main routes to and from the island in Table 27 to Table 29. The colour coding here is the same as with Table 24 to Table 26.

The aggregated strategic routes define three main routes north from South Hayling:

- Strategic Route 1 : Sea Front/Sea Grove Avenue to Mill Rythe to Stoke to Langstone
- Strategic Route 2 : Beachlands Roundabout to Mill Rythe to Stoke to Langstone
- Strategic Route 3 : West Lane/Brights Lane to Stoke to Langstone.

08:00 - 09:00

Journey Times (mm:ss) Description	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Strategic Route 1 NB	14:01	15:23	16:16	15:33
Strategic Route 1 SB	11:15	12:01	11:55	11:22
Strategic Route 2 NB	16:48	15:24	16:13	13:55
Strategic Route 2 SB	10:56	11:23	11:15	09:34
Strategic Route 3 NB	11:21	12:01	12:42	12:54
Strategic Route 3 SB	08:16	07:58	07:55	07:23

Table 27. Journey Time Comparison for Strategic Routes in AM Peak Hour (08:00-09:00)

12:00 - 13:00

Journey Times (mm:ss) Description	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Strategic Route 1 NB	10:28	10:34	10:45	10:28
Strategic Route 1 SB	10:32	11:01	11:10	10:50
Strategic Route 2 NB	10:24	10:19	10:28	08:55
Strategic Route 2 SB	10:25	10:39	10:46	09:14
Strategic Route 3 NB	07:27	07:10	07:42	07:16
Strategic Route 3 SB	07:17	07:16	07:31	07:11

Table 28. Journey Time Comparison for Strategic Routes in IP Peak Hour (12:00-13:00)

17:00 - 18:00

Journey Times (mm:ss) Description	Do Minimum no Mitigation	Do Minimum Package 1	Do Minimum Package 2	Do Minimum Package 3
Strategic Route 1 NB	12:09	10:58	11:15	10:43
Strategic Route 1 SB	13:24	12:42	12:53	12:24
Strategic Route 2 NB	12:03	10:19	10:27	08:51
Strategic Route 2 SB	13:14	12:20	12:25	10:46
Strategic Route 3 NB	09:03	07:08	07:43	07:12
Strategic Route 3 SB	10:07	08:43	08:57	08:42

Table 29. Journey Time Comparison for Strategic Routes in PM Peak Hour (17:00-18:00)

6.3 Queue Length Comparisons

The tables below show the maximum queue lengths in metres at selected junctions throughout the study area. The colour coding is explained in the following key:

	>5% and >15m Decrease from Do Minimum
	No Significant Change
	>5% and >15m Increase from Do Minimum

AM Period

Movement	Do Minimum	Package 1	Package 2	Package 3
B2199 Petersfield Road at Park Road North Roundabout	177	177	177	178
Elmleigh Road at Park Road North Roundabout	78	62	58	66
Park Road North at Park Road North Roundabout	67	61	65	66
New Road at Park Road North Roundabout	158	159	158	159
B2149 Park Road (North) at Park Road North/Elm Lane	241	135	133	129
Elm Lane at Park Road North/Elm Lane	218	217	217	216
B2149 Park Road (South) at Park Road North/Elm Lane	168	172	175	170
Park Way at Park Road North/Elm Lane	136	141	138	135
B2149 Park Road South (North) at Park Road South/ Solent R	329	117	117	118
B2149 Park Road South (South) at Park Road South/ Solent R	181	178	170	181
Solent at Park Road South/ Solent Road	207	149	150	130
B2149 Park Road South at Havant Bypass	221	110	114	117
A27 Havant Bypass (East) at Havant Bypass	144	77	97	80
A3023 Langstone Road at Havant Bypass	132	105	103	103
A27 Havant Bypass (West) at Havant Bypass	335	89	142	87
Sea Grove Avenue (North) at Sea Grove Avenue/Selsmore Ro	8	-	-	-
Selsmore Road at Sea Grove Avenue/Selsmore Road	63	62	73	50
Sea Grove Avenue (South) at Sea Grove Avenue/Selsmore Ro	4	3	4	4
Newton Ln at Manor Road/Newton Lane	16	14	9	30
north at Manor Road/Newton Lane	21	5	3	7
south at Manor Road/Newton Lane	24	56	63	96
beachlands west at Beechlands Roundabout	7	8	6	12
beachlands south at Beechlands Roundabout	6	6	5	10
beachlands east at Beechlands Roundabout	7	7	5	19
beachlands north at Beechlands Roundabout	4	3	3	4
north at Manor Road/St Mary's Road	7	-	-	14
south at Manor Road/St Mary's Road	3	5	5	4
St Marys at Manor Road/St Mary's Road	9	11	8	24
north at Manor Road/Station Road	73	35	40	112
Station at Manor Road/Station Road	27	26	20	42
south at Manor Road/Station Road	-	-	-	8
Tournerbury at Church Road/St Mary's Road	7	9	9	10
north at Church Road/St Mary's Road	22	7	17	2
St Marys at Church Road/St Mary's Road	32	30	31	21
south at Church Road/St Mary's Road	2	3	1	3
Cherrywood at Elm Grove/Cherrywood Gardens	18	12	15	6
north at Elm Grove/Cherrywood Gardens	39	27	26	16
south at Elm Grove/Cherrywood Gardens	91	83	74	50
north at Northney Junction	97	105	114	140
south at Northney Junction	246	304	70	302
Northney Rd at Northney Junction	157	172	67	66
south at A3023/West Lane	138	165	224	137
north at A3023/West Lane	280	264	35	8
West Ln at A3023/West Lane	68	64	-	-
tech park at Tech Park/Woodbury Road	36	32	35	29
north at Tech Park/Woodbury Road	104	78	87	84
south at Tech Park/Woodbury Road	68	2	22	6
south at A3023/ Yew Tree Road	176	87	125	6
north at A3023/ Yew Tree Road	-	-	-	-
Yew Tree at A3023/ Yew Tree Road	6	7	6	-
Copse Ln at A3023/Copse Lane	15	9	5	5
south at A3023/Copse Lane	77	40	127	6
north at A3023/Copse Lane	32	6	7	12
Church Rd at Mill Rythe Roundabout	113	241	257	156
Manor Rd at Mill Rythe Roundabout	296	185	195	84
Havant Rd at Mill Rythe Roundabout	40	170	165	89

Table 30. Queue Length Comparisons in AM Peak Hour (08:00-09:00)

IP Period

Movement	Do Minimum	Package 1	Package 2	Package 3
B2199 Petersfield Road at Park Road North Roundabout	175	175	175	175
Elmleigh Road at Park Road North Roundabout	189	188	188	188
Park Road North at Park Road North Roundabout	87	82	89	90
New Road at Park Road North Roundabout	141	142	133	133
B2149 Park Road (North) at Park Road North/Elm Lane	192	200	208	203
Elm Lane at Park Road North/Elm Lane	216	217	216	216
B2149 Park Road (South) at Park Road North/Elm Lane	165	170	170	175
Park Way at Park Road North/Elm Lane	144	144	143	143
B2149 Park Road South (North) at Park Road South/ Solent R	117	118	118	118
B2149 Park Road South (South) at Park Road South/ Solent R	148	141	152	151
Solent at Park Road South/ Solent Road	210	210	210	211
B2149 Park Road South at Havant Bypass	121	122	126	117
A27 Havant Bypass (East) at Havant Bypass	75	78	75	74
A3023 Langstone Road at Havant Bypass	122	166	158	170
A27 Havant Bypass (West) at Havant Bypass	140	127	122	138
Sea Grove Avenue (North) at Sea Grove Avenue/Selsmore Rc	5	5	6	6
Selsmore Road at Sea Grove Avenue/Selsmore Road	50	53	48	42
Sea Grove Avenue (South) at Sea Grove Avenue/Selsmore Ro	8	8	8	8
Newton Ln at Manor Road/Newton Lane	15	11	12	22
north at Manor Road/Newton Lane	43	4	5	10
south at Manor Road/Newton Lane	27	49	64	81
beachlands west at Beechlands Roundabout	14	18	14	16
beachlands south at Beechlands Roundabout	8	10	9	11
beachlands east at Beechlands Roundabout	7	7	9	17
beachlands north at Beechlands Roundabout	4	5	7	9
north at Manor Road/St Mary's Road	6	3	6	10
south at Manor Road/St Mary's Road	5	6	6	7
St Marys at Manor Road/St Mary's Road	12	13	14	27
north at Manor Road/Station Road	95	91	86	137
Station at Manor Road/Station Road	32	40	37	45
south at Manor Road/Station Road	-	-	5	5
Tournerbury at Church Road/St Mary's Road	10	10	9	8
north at Church Road/St Mary's Road	28	7	13	6
St Marys at Church Road/St Mary's Road	22	21	26	15
south at Church Road/St Mary's Road	4	3	5	3
Cherrywood at Elm Grove/Cherrywood Gardens	14	19	12	11
north at Elm Grove/Cherrywood Gardens	66	64	67	36
south at Elm Grove/Cherrywood Gardens	81	65	66	50
north at Northney Junction	120	125	165	173
south at Northney Junction	124	93	-	125
Northney Rd at Northney Junction	39	32	68	68
south at A3023/West Lane	7	7	5	9
north at A3023/West Lane	119	94	8	21
West Ln at A3023/West Lane	29	18	-	-
tech park at Tech Park/Woodbury Road	38	57	52	51
north at Tech Park/Woodbury Road	31	30	28	29
south at Tech Park/Woodbury Road	7	14	27	38
south at A3023/ Yew Tree Road	96	66	67	4
north at A3023/ Yew Tree Road	3	-	-	-
Yew Tree at A3023/ Yew Tree Road	12	11	8	3
Copse Ln at A3023/Copse Lane	11	11	9	6
south at A3023/Copse Lane	43	39	13	3
north at A3023/Copse Lane	63	5	5	14
Church Rd at Mill Rythe Roundabout	46	168	173	112
Manor Rd at Mill Rythe Roundabout	111	137	150	83
Havant Rd at Mill Rythe Roundabout	80	169	156	100

Table 31. Queue Length Comparison in IP Peak Hour (12:00-13:00)

PM Period

Movement	Do Minimum	Package 1	Package 2	Package 3
B2199 Petersfield Road at Park Road North Roundabout	171	149	145	156
Elmleigh Road at Park Road North Roundabout	187	187	187	187
Park Road North at Park Road North Roundabout	192	166	174	191
New Road at Park Road North Roundabout	140	144	147	151
B2149 Park Road (North) at Park Road North/Elm Lane	143	142	141	140
Elm Lane at Park Road North/Elm Lane	211	215	209	210
B2149 Park Road (South) at Park Road North/Elm Lane	202	197	198	204
Park Way at Park Road North/Elm Lane	144	145	145	144
B2149 Park Road South (North) at Park Road South/ Solent R	106	94	94	90
B2149 Park Road South (South) at Park Road South/ Solent R	94	93	94	92
Solent at Park Road South/ Solent Road	208	208	209	208
B2149 Park Road South at Havant Bypass	157	158	144	157
A27 Havant Bypass (East) at Havant Bypass	175	127	136	140
A3023 Langstone Road at Havant Bypass	131	159	162	148
A27 Havant Bypass (West) at Havant Bypass	127	96	95	97
Sea Grove Avenue (North) at Sea Grove Avenue/Selsmore Rc	5	5	13	5
Selsmore Road at Sea Grove Avenue/Selsmore Road	42	39	35	31
Sea Grove Avenue (South) at Sea Grove Avenue/Selsmore Ro	9	6	9	8
Newton Ln at Manor Road/Newton Lane	10	10	13	18
north at Manor Road/Newton Lane	41	3	3	8
south at Manor Road/Newton Lane	8	38	40	56
beachlands west at Beechlands Roundabout	9	6	6	12
beachlands south at Beechlands Roundabout	4	6	9	8
beachlands east at Beechlands Roundabout	6	9	7	16
beachlands north at Beechlands Roundabout	2	5	3	6
north at Manor Road/St Mary's Road	3	2	-	6
south at Manor Road/St Mary's Road	2	2	6	5
St Marys at Manor Road/St Mary's Road	7	14	9	20
north at Manor Road/Station Road	70	63	55	130
Station at Manor Road/Station Road	24	24	25	33
south at Manor Road/Station Road	-	-	-	-
Tournerbury at Church Road/St Mary's Road	15	10	13	9
north at Church Road/St Mary's Road	22	7	17	4
St Marys at Church Road/St Mary's Road	17	19	21	16
south at Church Road/St Mary's Road	4	4	5	4
Cherrywood at Elm Grove/Cherrywood Gardens	12	9	13	6
north at Elm Grove/Cherrywood Gardens	76	67	60	37
south at Elm Grove/Cherrywood Gardens	52	61	67	53
north at Northney Junction	185	141	243	227
south at Northney Junction	94	80	-	108
Northney Rd at Northney Junction	67	51	60	63
south at A3023/West Lane	3	7	3	3
north at A3023/West Lane	117	109	25	25
West Ln at A3023/West Lane	11	11	-	-
tech park at Tech Park/Woodbury Road	96	106	106	106
north at Tech Park/Woodbury Road	74	39	46	43
south at Tech Park/Woodbury Road	32	11	31	27
south at A3023/ Yew Tree Road	91	77	84	6
north at A3023/ Yew Tree Road	9	-	2	-
Yew Tree at A3023/ Yew Tree Road	13	13	10	3
Copse Ln at A3023/Copse Lane	11	8	10	6
south at A3023/Copse Lane	50	44	11	3
north at A3023/Copse Lane	70	10	6	19
Church Rd at Mill Rythe Roundabout	42	173	171	109
Manor Rd at Mill Rythe Roundabout	60	121	106	86
Havant Rd at Mill Rythe Roundabout	86	164	180	110

Table 32. Queue Length Comparison in PM Peak Hour (17:00-18:00)

The Queue length comparisons broadly reflect the journey time comparisons. For a majority of junctions the queueing is much the same in each of the mitigation packages as it is in the 2036 Do Minimum scenario. Notable exceptions to this include: Mill Rythe Roundabout where the introduction of signals increases queueing on Church Road and Havant Road and reduces queueing on Manor Road and on Northney Road where the inclusions of signals in package 2 reduces queueing on this approach to the A3023.

6.4 Impact on Havant Bypass Roundabout

With the Mitigation scenarios tested there was concerns regarding the impact they may have on the roundabout at the Havant bypass grade separated interchange. Table 33, Table 34, and Table 35 outline the queueing observed in each of the scenarios.

AM Period

Movement	Base	Do Minimum	Package 1	Package 2	Package 3
B2149 Park Road South at Havant Bypass	180	221	110	114	117
A27 Havant Bypass (East) at Havant Bypass	90	144	77	97	80
A3023 Langstone Road at Havant Bypass	126	132	105	103	103
A27 Havant Bypass (West) at Havant Bypass	194	335	89	142	87

Table 33. Queueing Comparison at Havant Bypass in AM Period

IP Period

Movement	Base	Do Minimum	Package 1	Package 2	Package 3
B2149 Park Road South at Havant Bypass	120	121	122	126	117
A27 Havant Bypass (East) at Havant Bypass	87	75	78	75	74
A3023 Langstone Road at Havant Bypass	116	122	166	158	170
A27 Havant Bypass (West) at Havant Bypass	147	140	127	122	138

Table 34. Queueing Comparison at Havant Bypass in IP Period

PM Period

Movement	Base	Do Minimum	Package 1	Package 2	Package 3
B2149 Park Road South at Havant Bypass	145	157	158	144	157
A27 Havant Bypass (East) at Havant Bypass	125	175	127	136	140
A3023 Langstone Road at Havant Bypass	121	131	159	162	148
A27 Havant Bypass (West) at Havant Bypass	88	127	96	95	97

Table 35. Queueing Comparison at Havant Bypass in PM Period

From the tables the queue lengths at the bypass have reduced significantly. This is due to signal improvements to the Havant bypass roundabout introduced in Package 1. It can be seen that the signalisation of the junctions in the Langstone area seem to have no adverse effect on the performance of the bypass junction.

7. RESULTS SUMMARY

The Do Minimum model shows a general increase in journey times and queue lengths when compared to the 2036 Baseline model due to the addition of the LDP related trips.

The package 1 model sees the A3023 journey times increase for the northbound movement most notably in the AM. This is due to the inclusion of signals at Woodbury Avenue and Southbrook Road. The conversion of Mill Rythe Roundabout to a signalised junction increases journey times and queues on Church Road and Havant Road and reduces journey times and queues for Manor Road. Otherwise the operation of the Package 1 model is similar to the Do Minimum model.

The package 2 model shows similar results to package 1 except in the locations in the immediate vicinity of the package 2 measures. The signalisation of the junction at A3023/Northney Road in package 2 reduces queueing on the Northney Road arm of the junction. This however comes at the cost of an extended journey time off and on the island as previously unopposed traffic now have to give way periodically to minor arm traffic. The signals at West Lane/ A3023 do not have a significant impact on the journey times through this section.

Over and above the differences in packages 1 and 2, the main impact of package 3 comes from the inclusion of the Stoke bypass. This reduces both northbound and southbound journey times between West Lane, Manor Road and Church Road and the existing junction West Lane/ A3023 as vehicles are now using the bypass instead of Havant Road.

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