TECHNICAL NOTE

105957 TFSH137 – SOUTHAMPTON CAZ

CAZ DEMAND MODEL ASSESSMENT – CITYWIDE CLASS B CHARGING

IDENTIFICATION TABLE	
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1. OVERVIEW

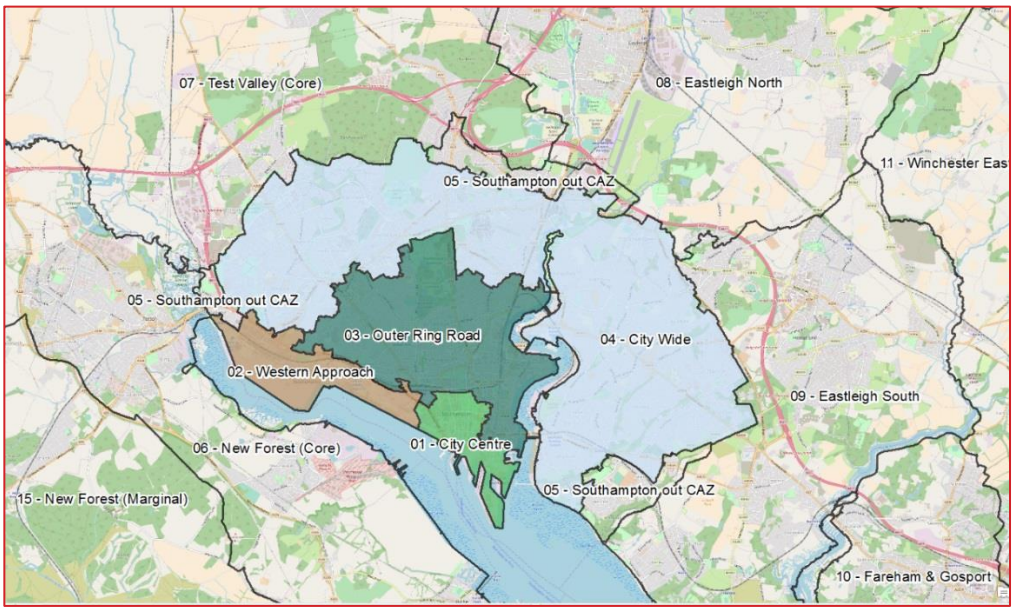
1.1.1 SYSTRA have been commissioned to conduct analysis of proposed Clean Air Zone (CAZ) charging schemes within Southampton using the Solent Transport Sub Regional Transport Model.

1.1.2 The CAZ charging scheme applies to all non-compliant vehicles (determined by specific Euro standards classifications) which travel within a defined enclosed area. The charge is incurred once per day per vehicle.

1.1.3 In September 2017 SYSTRA presented analysis of 10 'sifting options' runs to explore the impact of various charging area schemes in highway (AM peak hour) assignment tests. These used 2019 fixed demand and no application of the Solent Transport demand model. This meant that the reassignment impacts of the charging regime were considered but not secondary mode shift or redistribution impacts.

1.1.4 Based on this initial exploratory analysis, SYSTRA were asked to proceed with testing the preferred scenario 1, citywide charging of class B (HGVs only), within the full demand model. This charging area can be seen in the shaded area of Figure 1, which shows how zone-to-zone demand is grouped in to sectors for later analysis (the specific road links defining the charging boundary are provided in Figure 2).

Figure 1. Sector system used in results analysis, showing charging area in Southampton (sectors 1-4)



1.1.5 The sifting option analysis explored only the effect of compliance shift (travellers replacing non-compliant vehicles) and re-routing within the AM peak hour. The full demand model run incorporates the inter-peak (10am- 4pm), PM period (4pm-7pm) and off peak (7pm-7am) time periods as well as potential for travellers to alter their behaviour in response to experience of the network. Behavioural response within the model includes changing modes (to/ from public transport or active modes), changing the time of day in which they travel or by changing destination.

1.1.6 Goods vehicle demand is not incorporated within the demand model. So when examining HGV charging, the only demand model effect is by travellers in response to the change in HGV behaviour (which are, where possible, re-routing to avoid the toll).

2. ASSUMED CHARGING STRUCTURE

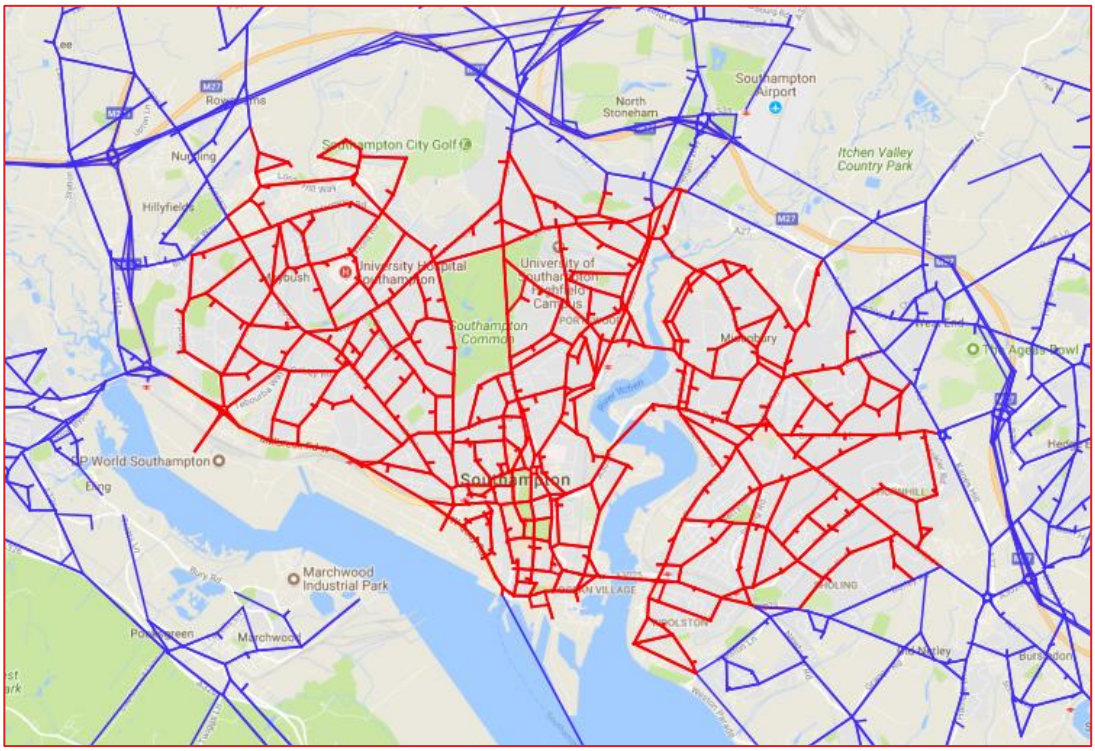
2.1.1 In the examined test, only non-compliant goods vehicles incur any charges from travelling within the city-wide CAZ area. As in the sifting option analysis tests, non-compliant heavy goods vehicular demand is split in to those beginning or ending their trips **inside** the CAZ area (so are forced to pay the charge) and those who are potentially passing through, so start and end their trip **outside** the CAZ area (and may reroute to avoid the charge).

2.1.2 Figure 2 shows the modelled network structure in the links (in red) on which CAZ tolls are applied for the city wide class B test. Within Saturn, the highway modelling software, the charge is implemented at the cordon boundary only, so vehicles passing through this experience the deterrence.

2.1.3 In the modelled scenario, non-compliant heavy goods vehicles which begin or end their trips inside the CAZ area (so are forced to pay the charge) do not consider the charge in their route choice. This avoids discouraging trips which may pass out of the enclosure then back in. However, these vehicles are included as non-compliant charged vehicles in provided network statistics and revenue calculations.

2.1.4 HGVs are assumed to be charged £100 for one day of travel within the CAZ area. This has been implemented as a £50 charge for each trip within the highway assignment model, so assuming that HGVs make two trips per day.

Figure 2. Highway network structure in Southampton, showing HGV banned links and those on which tolls are applied



3. COMPLIANCE SHIFT IMPACTS

3.1.1 The assumed compliance split for all vehicular demand, following JAQU guidance, is provided in Table 1. The national fleet split is generally assumed, except where drivers would respond to the CAZ charging scheme (note that in this test only HGV demand responds). In this case the compliance rate increases to account for drivers replacing their non-compliant vehicle with a compliant vehicle.

Table 1. Compliance split assumptions used

	% OF COMPLIANT VEHICLES	
VEHICLE TYPE	NATIONAL FLEET MIX IN 2020	REACTING TO CLEAN AIR ZONE
Cars	73.81	90.65 *(not included)*
Vans	70.13	89.19 *(not included)*
HGVs	85.14	97.41

3.1.2 HGV demand that is classified as 'reacting to the clean air zone' is identified by analysis of routing in the Do Minimum situation. A 'cordon' is set up within the Saturn assignment software at the proposed CAZ boundaries and trips passing through are identified and flagged where at least 5% of the total OD movement demand passes through.

3.1.3 The resulting assigned hour goods vehicle matrix totals are provided in Table 2 for the 'Do minimum' (without any CAZ scheme) and 'Compliance shift'(with CAZ charging) scenarios. This shows how demand is split in to classifications which are treated differently:

- **Outside – Outside:** demand does not interact with the CAZ area in the Do Minimum scenario. Remains at national split of compliant/ non-compliant despite the introduction of the CAZ scheme. Non-compliant vehicles would be charged within the highway assignment model if attempting to enter the CAZ area.
- **Through:** Demand passes through the CAZ area in the Do Minimum scenario. In the 'compliance shift' demand matrix, a proportion of the non-compliant demand moves to the new 'compliant shift' compliant userclass which is not charged. The 'compliant shift' userclass is anticipated to have a different vehicle composition than the original 'compliant' userclass, as these are vehicles which have upgraded most recently in response to the CAZ scheme.
- **To/ from CAZ:** As described in 2.1.2, these trips are not charged within the assignment model as they would pay the charge with no choice and continue making their trips post-implementation. A portion of the non-compliant demand in this category moves in to the 'compliant shift' compliant userclass.

3.1.4 The resulting sector-to-sector (using the definitions shown in Figure 1, focussing on Southampton, and Figure 4 showing the wider model area) proportions of demand which is 'compliant shifted' in the AM assigned hour (i.e. affected movements) is given in Figure 3. This includes all demand to and from the four Southampton sectors and plausible sector to sector movements across the CAZ area, such as to/ from the 'Southampton out sector' (being the areas within Southampton district which are not included in the CAZ area) and the to/ from the Isle of Wight.

3.1.5 The 2.1% of the total matrix shifted indicates that 1/6 of all model HGV demand is impacted by the citywide class B CAZ scheme.

3.1.6 For reporting purposes, car traffic and bus traffic is assumed to be universally national split levels of compliance.

Table 2. Vehicle movement and compliance shift proportions

	AM Assigned Hour	User Class	Do Minimum Demand	%	Compliance Shift Demand	%	Difference Demand	%
Outside - Outside	Compliant	9	13,940	85.1%	13,940	85.1%	0	0.0%
Outside - Outside	Non-Compliant	7	2,433	14.9%	2,433	14.9%	0	0.0%
Through	Compliant	9	174	85.1%	174	85.1%	0	0.0%
Through	'Compliant shift'	10		0.0%	25	12.3%	25	-
Through	Non-Compliant	11	30	14.9%	5	2.6%	-25	-82.6%
To/From CAZ	Compliant	9	2,659	85.1%	2,659	85.1%	0	0.0%
To/From CAZ	'Compliant shift'	10		0.0%	383	12.3%	383	-
To/From CAZ	Non-Compliant	8	464	14.9%	81	2.6%	-383	-82.6%
	IP Assigned Hour	**User Class**	**Demand**	**%**	**Demand**	**%**	**Demand**	**%**
Outside - Outside	Compliant	9	11,381	85.1%	11,381	85.1%	0	0.0%
Outside - Outside	Non-Compliant	7	1,986	14.9%	1,986	14.9%	0	0.0%
Through	Compliant	9	119	85.1%	119	85.1%	0	0.0%
Through	'Compliant shift'	10		0.0%	17	12.3%	17	-
Through	Non-Compliant	11	21	14.9%	4	2.6%	-17	-82.6%
To/From CAZ	Compliant	9	2,176	85.1%	2,176	85.1%	0	0.0%
To/From CAZ	'Compliant shift'	10		0.0%	314	12.3%	314	-
To/From CAZ	Non-Compliant	8	380	14.9%	66	2.6%	-314	-82.6%
	PM Assigned Hour	**User Class**	**Demand**	**%**	**Demand**	**%**	**Demand**	**%**
Outside - Outside	Compliant	9	8,930	85.1%	8,930	85.1%	0	0.0%
Outside - Outside	Non-Compliant	7	1,559	14.9%	1,559	14.9%	0	0.0%
Through	Compliant	9	56	85.1%	56	85.1%	0	0.0%
Through	'Compliant shift'	10		0.0%	8	12.3%	8	-
Through	Non-Compliant	11	10	14.9%	2	2.6%	-8	-82.6%
To/From CAZ	Compliant	9	2,137	85.1%	2,137	85.1%	0	0.0%
To/From CAZ	'Compliant shift'	10		0.0%	308	12.3%	308	-
To/From CAZ	Non-Compliant	8	373	14.9%	65	2.6%	-308	-82.6%

3.1.7 It is noted, as was observed in the sifting run analysis, that for the city wide tests the number of 'through' trips is relatively low. This is primarily due to the close proximity of the M27 and M271 motorways to the CAZ boundary (providing an alternative to through-routes) and the further relative tendency for HGVs in the model to favour direct, shortest path routings on motorways caused by their relatively high Pence Per Kilometre value.

Figure 3. HGV movement compliance shift proportions

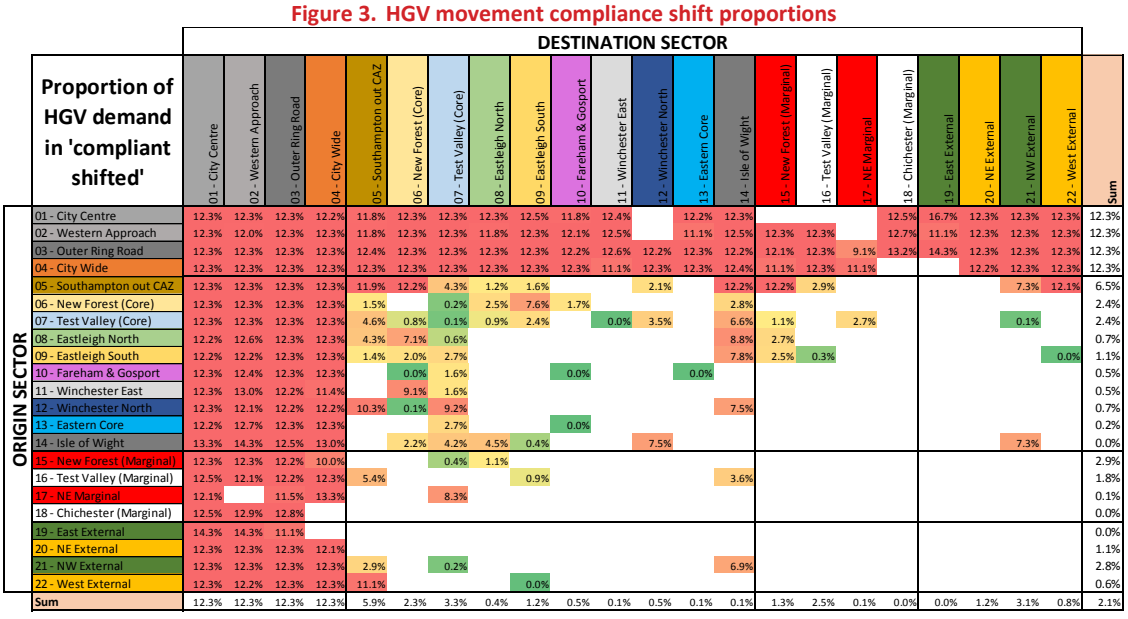
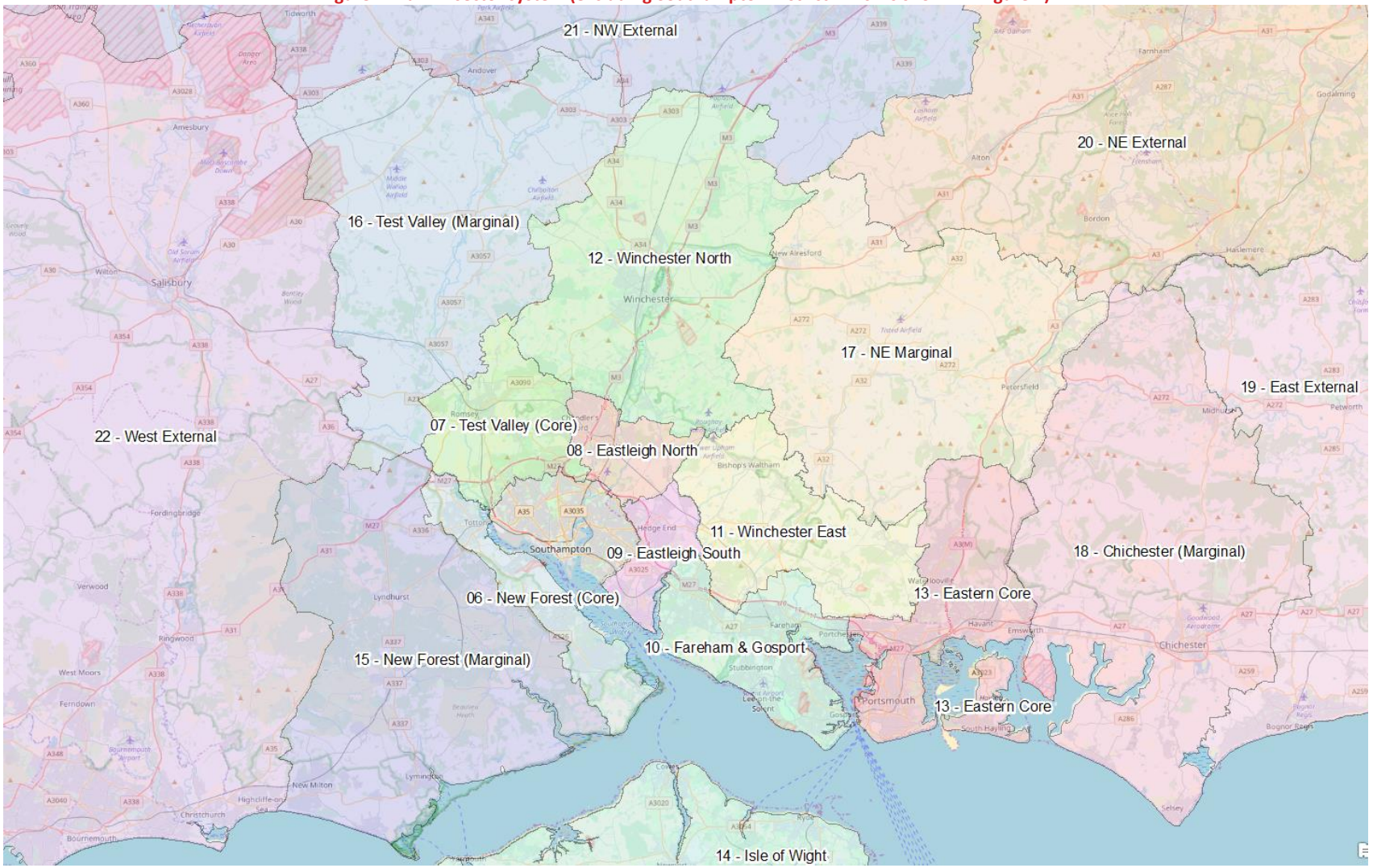


Figure 4. Full 22 sector system (excluding Southampton District which is shown in Figure 1)



4. DEMAND MODEL MATRIX IMPACTS

4.1.1 Figure 5 and Figure 6 show the change in highway demand between the Do Minimum and Do Something tests, and Figure 7 and Figure 8 show the change in public transport demand between tests. There is only an insignificant change in active mode demand.

4.1.2 Generally, demand will increase if conditions improve between scenarios and decrease if conditions worsen. However model 'noise' can occur where slight variations between the conditions in each completed highway assignment drive what is usually small demand changes in locations which are not reasonably considered affected by the scheme.

4.1.3 Public transport travel conditions are generally linked to those in the highway network because bus speeds are derived from highway travel speeds. If an area becomes harder to access by both public transport and car then destination shift can occur as an area becomes less attractive.

4.1.4 Generally, the demand model response is small but does show an overall increase in car trips (+39 12hr total to/from/within Southampton) and a decrease in PT trips (-14 12hr to/from/within Southampton) as might be expected by discouraging HGV trips through the city. As shown, a specific variation in conditions across Southampton leads to differing demand response. For example, movements between the'03 – Outer Ring Road' and '04 - City wide' sector grow by a total of +84 12hr car trips and decrease by -15 12hr PT trips.

4.1.5 Further, the demand model result suggests that the CAZ scheme improves access to the outer ring road sector in general but not to the city centre. By observing the difference plots, it is seen that the majority of discouraged HGV routing is through the the'03 – Outer Ring Road' and '04 - City wide' sectors and less through the city centre. HGVs are generally discouraged from through-routing via the city centre due to the high toll charge on the Itchen Bridge.

4.1.6 The highway differences also suggest an improvement in access to areas East of Southampton such as the sectors Eastleigh South, Fareham and Gosport and Winchester East. This could be related to a general decrease in motorway traffic as car trips are attracted in to routes through the centre of Southampton due to the reduction in HGV traffic here.

Figure 5. 12hr change in highway movements as a result of the CAZ scheme

HY DS - DM (12hr demand) Red = increase, blue = decrease		01 - City Centre	02 - Western Approach	03 - Outer Ring Road	04 - City Wide	05 - Southampton out CAZ	06 - New Forest (Core)	07 - Test Valley (Core)	08 - Eastleigh North	09 - Eastleigh South	10 - Fareham & Gosport	11 - Winchester East	12 - Winchester North	13 - Eastern Core	14 - Isle of Wight	15 - New Forest (Marginal)	16 - Test Valley (Marginal)	17 - NE Marginal	18 - Chichester (Marginal)	19 - East External	20 - NE External	21 - NW External	22 - West External	Sum
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	-31
01 - City Centre	1	-12	0	13	10	0	2	-1	0	4	-3	1	-1	0	-	0	0	0	0	0	0	0	0	-12
02 - Western Approach	2	0	-	0	1	0	1	0	0	0	0	0	0	0	-	0	0	0	-	-	-	0	0	1
03 - Outer Ring Road	3	16	0	9	33	0	6	0	1	1	0	1	1	2	-	1	0	0	0	0	0	0	0	37
04 - City Wide	4	9	1	51	30	1	6	4	7	5	8	1	2	2	0	1	0	0	0	0	1	1	1	8
05 - Southampton out CAZ	5	1	0	0	2	0	0	0	0	2	1	0	0	0	-	0	-	0	0	0	0	0	0	2
06 - New Forest (Core)	6	1	1	7	5	0	10	0	0	1	0	0	0	1	-	3	0	0	0	0	0	0	2	2
07 - Test Valley (Core)	7	1	0	1	2	0	1	5	2	0	0	0	0	0	-	0	0	-	0	0	-	0	0	11
08 - Eastleigh North	8	1	0	2	2	1	0	2	9	4	2	3	2	1	-	0	0	-	0	-	-	0	1	10
09 - Eastleigh South	9	3	0	2	2	1	1	1	1	12	3	2	0	0	-	0	0	0	0	0	0	0	0	11
10 - Fareham & Gosport	10	4	0	2	11	2	0	0	1	9	22	4	0	1	-	0	0	0	0	0	0	0	0	4
11 - Winchester East	11	0	0	1	0	0	0	0	1	1	3	1	0	1	-	0	0	0	-	0	0	0	0	8
12 - Winchester North	12	1	0	0	1	0	0	1	1	1	0	1	2	0	-	0	0	0	0	-	-	0	1	2
13 - Eastern Core	13	1	0	5	1	0	0	0	0	1	5	3	0	45	0	0	0	0	5	0	0	0	0	38
14 - Isle of Wight	14	0	-	-	-	-	0	-	-	-	-	-	-	-	2	-	-	-	-	0	0	0	0	2
15 - New Forest (Marginal)	15	0	0	1	1	0	3	0	0	0	0	0	0	0	-	0	0	0	-	0	0	-	0	0
16 - Test Valley (Marginal)	16	0	0	0	1	0	1	0	0	0	0	0	0	0	-	0	-	-	-	-	-	-	-	2
17 - NE Marginal	17	0	0	0	0	-	0	0	0	0	0	0	0	0	-	-	-	0	-	-	0	0	0	0
18 - Chichester (Marginal)	18	0	-	0	0	-	0	-	-	0	0	0	0	3	-	-	0	0	0	-	0	-	0	2
19 - East External	19	0	-	0	0	-	-	-	-	0	0	0	-	1	-	0	-	-	0	0	0	-	0	0
20 - NE External	20	0	0	0	0	0	0	-	0	1	0	0	0	0	0	0	-	0	0	0	0	1	0	1
21 - NW External	21	0	0	0	0	0	0	0	0	2	1	0	0	1	0	-	0	0	0	0	1	10	0	14
22 - West External	22	1	0	0	1	0	1	0	0	1	1	0	1	0	-	0	0	0	0	0	0	0	1	1
Sum		24	2	68	1	3	2	14	1	8	19	15	7	47	2	1	1	0	4	0	1	10	1	8

Figure 6. 12hr % change in highway movements as a result of the CAZ scheme

HY DS - DM (12hr demand) Red = increase, blue = decrease		01 - City Centre	02 - Western Approach	03 - Outer Ring Road	04 - City Wide	05 - Southampton out CAZ	06 - New Forest (Core)	07 - Test Valley (Core)	08 - Eastleigh North	09 - Eastleigh South	10 - Fareham & Gosport	11 - Winchester East	12 - Winchester North	13 - Eastern Core	14 - Isle of Wight	15 - New Forest (Marginal)	16 - Test Valley (Marginal)	17 - NE Marginal	18 - Chichester (Marginal)	19 - East External	20 - NE External	21 - NW External	22 - West External	Sum
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	0
01 - City Centre	1	-0.15%	-0.02%	-0.13%	0.16%	-0.08%	0.05%	-0.04%	-0.01%	0.28%	-0.39%	0.33%	-0.10%	0.04%	0.00%	0.08%	-0.10%	0.01%	0.09%	0.06%	0.00%	0.00%	-0.01%	-0.03%
02 - Western Approach	2	-0.05%	0.00%	0.02%	0.03%	-0.02%	0.13%	-0.04%	-0.09%	-0.04%	-0.09%	0.00%	-0.03%	-0.10%	0.00%	0.13%	-0.04%	-0.21%	0.00%	0.00%	0.00%	-0.02%	-0.02%	0.01%
03 - Outer Ring Road	3	-0.19%	0.02%	0.03%	0.15%	-0.02%	0.15%	-0.01%	0.02%	0.04%	-0.01%	0.09%	-0.03%	0.20%	0.00%	0.11%	-0.02%	0.04%	0.09%	0.08%	0.01%	0.01%	0.01%	0.04%
04 - City Wide	4	0.16%	0.06%	0.22%	-0.04%	-0.01%	0.11%	-0.04%	-0.12%	-0.02%	-0.16%	0.05%	-0.06%	-0.06%	0.13%	0.05%	-0.02%	-0.06%	0.00%	-0.03%	-0.05%	-0.04%	-0.03%	0.00%
05 - Southampton out CAZ	5	-0.22%	0.04%	0.00%	0.03%	0.01%	0.04%	-0.04%	-0.05%	0.09%	-0.16%	0.11%	-0.02%	0.00%	0.00%	0.12%	0.00%	0.09%	0.19%	-0.06%	-0.01%	0.01%	0.01%	0.01%
06 - New Forest (Core)	6	0.04%	0.21%	0.18%	0.10%	0.09%	-0.02%	0.01%	-0.01%	0.06%	0.02%	0.06%	0.00%	-0.05%	0.00%	-0.03%	-0.01%	-0.06%	0.00%	-0.03%	0.00%	0.00%	-0.04%	0.00%
07 - Test Valley (Core)	7	-0.06%	-0.01%	0.02%	-0.02%	-0.04%	-0.01%	-0.03%	-0.02%	0.01%	0.02%	0.02%	-0.01%	-0.04%	0.00%	0.01%	-0.02%	0.00%	-0.13%	-0.04%	0.00%	0.02%	-0.01%	-0.02%
08 - Eastleigh North	8	-0.04%	-0.07%	0.05%	-0.04%	-0.08%	-0.03%	-0.02%	0.02%	0.06%	0.07%	0.08%	-0.02%	-0.02%	0.00%	0.02%	0.02%	0.00%	-0.04%	0.00%	-0.04%	-0.03%	0.04%	0.01%
09 - Eastleigh South	9	0.24%	-0.05%	0.06%	-0.01%	0.04%	-0.03%	-0.04%	0.02%	-0.05%	-0.04%	0.04%	-0.02%	0.00%	0.00%	0.01%	0.01%	-0.02%	-0.06%	-0.10%	-0.02%	0.00%	-0.02%	-0.01%
10 - Fareham & Gosport	10	-0.54%	-0.06%	0.10%	-0.18%	-0.28%	-0.02%	0.02%	0.02%	-0.12%	0.01%	0.03%	0.00%	0.00%	0.00%	0.03%	0.04%	-0.02%	-0.01%	-0.01%	-0.02%	-0.01%	0.02%	0.00%
11 - Winchester East	11	0.02%	-0.05%	0.09%	0.00%	0.00%	-0.03%	0.00%	0.04%	0.02%	0.03%	-0.01%	0.01%	0.01%	0.00%	0.01%	0.04%	-0.01%	0.00%	0.07%	-0.01%	-0.03%	0.06%	0.01%
12 - Winchester North	12	-0.13%	-0.06%	-0.01%	-0.03%	-0.04%	-0.02%	-0.01%	-0.01%	0.04%	0.01%	0.05%	-0.01%	-0.01%	0.00%	-0.01%	0.00%	-0.01%	0.04%	0.00%	0.00%	0.00%	0.03%	0.00%
13 - Eastern Core	13	-0.17%	-0.05%	0.27%	-0.03%	-0.02%	-0.01%	-0.02%	-0.02%	0.02%	0.02%	0.02%	0.01%	-0.01%	0.07%	0.00%	0.02%	0.00%	-0.03%	0.00%	0.01%	0.00%	0.01%	-0.01%
14 - Isle of Wight	14	-0.09%	0.00%	0.00%	0.00%	0.00%	0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.05%	-0.01%	-0.02%	-0.04%	0.00%
15 - New Forest (Marginal)	15	0.04%	0.22%	0.15%	0.06%	0.31%	-0.03%	0.03%	0.00%	0.04%	0.03%	0.03%	-0.02%	0.00%	0.00%	-0.02%	-0.16%	-0.01%	0.00%	-0.03%	0.00%	0.00%	-0.02%	0.00%
16 - Test Valley (Marginal)	16	-0.24%	-0.05%	-0.04%	-0.04%	-0.05%	-0.04%	-0.03%	-0.01%	-0.01%	0.00%	0.03%	0.00%	-0.05%	0.00%	-0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%
17 - NE Marginal	17	0.05%	-0.14%	0.23%	-0.01%	0.00%	-0.03%	-0.02%	0.01%	0.02%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.00%
18 - Chichester (Marginal)	18	0.08%	0.00%	0.18%	0.00%	0.00%	-0.01%	0.00%	-0.01%	0.02%	0.01%	0.03%	0.00%	-0.02%	0.00%	0.00%	0.61%	-0.02%	0.02%	0.01%	0.02%	0.00%	0.02%	-0.01%
19 - East External	19	-0.17%	0.00%	0.06%	-0.01%	0.00%	0.00%	0.00%	0.00%	0.06%	-0.01%	0.05%	0.00%	-0.02%	0.00%	-0.07%	0.00%	0.00%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%
20 - NE External	20	-0.11%	-0.02%	0.00%	-0.03%	-0.01%	-0.05%	0.00%	0.01%	0.06%	0.00%	0.01%	0.00%	0.00%	-0.06%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	0.02%	0.00%	0.00%
21 - NW External	21	-0.05%	-0.02%	0.01%	0.00%	0.02%	-0.02%	0.00%	0.03%	0.13%	0.02%	0.06%	0.00%	0.02%	0.04%	0.00%	0.01%	0.00%	-0.01%	0.01%	0.03%	0.16%	0.00%	0.03%
22 - West External	22	-0.07%	-0.01%	0.00%	-0.02%	-0.03%	-0.03%	-0.01%	0.02%	0.05%	0.06%	0.05%	0.01%	0.00%	0.00%	-0.01%	-0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Sum		-0.07%	0.03%	0.08%	0.00%	-0.02%	0.00%	-0.02%	0.00%	-0.01%	0.01%	0.03%	-0.01%	-0.01%	0.00%	0.00%	-0.01%	0.00%	-0.02%	0.00%	0.00%	0.03%	0.00%	0.00%

Figure 7. 12hr change in public transport movements as a result of the CAZ scheme

PT DS - DM (12hr demand) Red = increase, blue = decrease		01 - City Centre	02 - Western Approach	03 - Outer Ring Road	04 - City Wide	05 - Southampton out CAZ	06 - New Forest (Core)	07 - Test Valley (Core)	08 - Eastleigh North	09 - Eastleigh South	10 - Fareham & Gosport	11 - Winchester East	12 - Winchester North	13 - Eastern Core	14 - Isle of Wight	15 - New Forest (Marginal)	16 - Test Valley (Marginal)	17 - NE Marginal	18 - Chichester (Marginal)	19 - East External	20 - NE External	21 - NW External	22 - West External	Sum
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	26
01 - City Centre	1	-1	1	3	-2	0	0	0	0	-2	1	-	0	0	-	0	0	0	0	0	0	0	0	0
02 - Western Approach	2	0	0	1	-0	0	0	0	0	-	0	-	0	-	-	-	-	-	-	-	-	0	-	0
03 - Outer Ring Road	3	3	1	1	-6	0	2	0	0	-1	1	0	0	0	-0	0	0	0	0	0	0	1	1	2
04 - City Wide	4	-7	0	-10	1	0	0	0	1	1	1	0	1	0	-	0	-	-	0	0	0	1	0	-15
05 - Southampton out CAZ	5	0	0	0	0	-	0	-	-	0	-	0	-	-	0	-	-	-	-	-	-	0	-	0
06 - New Forest (Core)	6	-0	0	3	0	0	0	0	0	0	0	0	-0	0	0	-0	-	-	-	-	0	0	-0	2
07 - Test Valley (Core)	7	-0	-	-	0	-0	0	1	-0	0	-0	-	-	-	0	-0	-0	-	-	-0	0	0	-0	-0
08 - Eastleigh North	8	-0	0	-	-	0	0	-0	1	0	0	0	-0	0	-0	-	-	-	-	-0	0	0	0	0
09 - Eastleigh South	9	-2	0	-2	1	-	-	0	-0	0	-0	-	0	-0	0	-	-	-	0	-	0	0	-	-3
10 - Fareham & Gosport	10	1	-	1	1	0	-0	-	0	0	-1	0	-0	-0	0	-	-	-	0	0	0	1	0	2
11 - Winchester East	11	0	-	0	0	-	-	-	0	0	0	0	0	-0	0	-	-	0	0	0	0	0	0	1
12 - Winchester North	12	1	0	0	-1	0	-0	-	0	-0	-0	0	-1	-0	-0	-0	-	-	0	-0	2	1	0	-4
13 - Eastern Core	13	0	-	0	0	-	-	0	-0	-0	-	0	-0	-23	-1	-	-	0	-0	-0	1	27	-0	1
14 - Isle of Wight	14	-	-	0	-	-	-	-0	-0	-	0	0	-0	-1	-3	-0	-	0	-0	-0	0	6	-0	1
15 - New Forest (Marginal)	15	0	-	0	0	-	-0	-	-	-	-	-	-	-	0	-0	-	-	-	-0	0	0	0	0
16 - Test Valley (Marginal)	16	-	-	0	-	-	-	-	0	-	-	-	-	-	-	-0	-	-	-	-	-	-	-	0
17 - NE Marginal	17	0	0	0	-	-	-	-	-	0	-	0	-	-0	-	-	-	0	-	-	-	-	-	0
18 - Chichester (Marginal)	18	0	-	0	-	-	-	-	-	-	0	0	-	0	0	-	-	-	-	-	0	-	-	0
19 - East External	19	0	-	0	0	-	-0	-	-0	-	0	0	-0	-0	0	-0	-	-	-	-	-	-	0	0
20 - NE External	20	-0	0	0	-0	-	-0	-0	0	0	0	0	-2	-1	-0	0	-	0	-	0	-	2	0	1
21 - NW External	21	-1	0	-2	-1	-0	1	-0	1	-0	-2	-0	-2	32	5	-1	-	-0	-0	-	1	-	-1	26
22 - West External	22	0	-	1	-0	0	-0	-0	-	-0	0	-	-0	-0	-0	-0	-0	-	-	-	-	-0	-0	0
Sum		-7	1	-2	7	-0	2	0	-1	-2	0	1	-7	7	0	-0	-0	-0	-0	-0	2	30	0	13

Figure 8. 12hr % change in public transport movements as a result of the CAZ scheme

PT DS - DM (12hr demand) Red = increase, blue = decrease		01 - City Centre	02 - Western Approach	03 - Outer Ring Road	04 - City Wide	05 - Southampton out CAZ	06 - New Forest (Core)	07 - Test Valley (Core)	08 - Eastleigh North	09 - Eastleigh South	10 - Fareham & Gosport	11 - Winchester East	12 - Winchester North	13 - Eastern Core	14 - Isle of Wight	15 - New Forest (Marginal)	16 - Test Valley (Marginal)	17 - NE Marginal	18 - Chichester (Marginal)	19 - East External	20 - NE External	21 - NW External	22 - West External	Sum
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	0
01 - City Centre	1	-0.14%	1.65%	0.25%	-0.10%	-0.07%	-0.04%	-0.05%	-0.05%	-0.35%	0.12%	0.00%	0.01%	0.12%	0.00%	0.08%	0.18%	0.19%	0.09%	0.11%	-0.02%	-0.15%	0.11%	0.00%
02 - Western Approach	2	0.06%	0.09%	0.67%	-0.26%	-1.97%	0.22%	0.18%	-0.63%	0.00%	0.72%	0.00%	-0.61%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.74%	0.00%	0.07%
03 - Outer Ring Road	3	0.19%	0.41%	0.03%	-0.12%	0.06%	0.26%	-0.03%	0.01%	-0.17%	0.17%	0.04%	-0.04%	0.02%	-0.05%	0.09%	0.12%	0.09%	0.16%	0.10%	0.01%	-0.19%	0.14%	0.01%
04 - City Wide	4	-0.29%	-0.23%	-0.21%	0.02%	0.00%	0.03%	-0.08%	-0.08%	0.12%	0.19%	0.23%	-0.14%	0.11%	0.00%	0.01%	0.00%	0.00%	0.29%	0.19%	-0.03%	-0.27%	0.02%	-0.08%
05 - Southampton out CAZ	5	0.01%	-1.32%	0.07%	0.02%	0.00%	0.21%	0.00%	-0.05%	0.00%	0.07%	0.00%	-0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.27%	0.00%	0.01%
06 - New Forest (Core)	6	-0.05%	-0.68%	0.31%	0.05%	0.29%	0.01%	0.27%	0.05%	0.20%	0.08%	1.15%	-0.02%	-0.02%	0.36%	-0.05%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.51%	-0.04%	0.04%
07 - Test Valley (Core)	7	-0.09%	0.00%	-0.04%	-0.02%	-0.20%	0.28%	0.14%	-0.03%	-0.44%	-0.12%	0.00%	0.00%	-0.03%	0.00%	-0.05%	-0.11%	0.00%	0.00%	-0.22%	-0.03%	-0.45%	-0.05%	0.00%
08 - Eastleigh North	8	-0.04%	0.16%	0.00%	-0.06%	-0.05%	0.05%	-0.02%	0.02%	0.05%	0.13%	0.23%	0.00%	0.01%	-0.03%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.01%	-0.21%	0.08%	0.00%
09 - Eastleigh South	9	-0.52%	0.57%	-0.30%	0.11%	0.00%	-0.14%	-0.67%	0.05%	-0.06%	0.00%	0.08%	-0.12%	0.02%	0.11%	0.00%	0.00%	0.00%	0.22%	0.00%	0.14%	-0.34%	0.00%	-0.08%
10 - Fareham & Gosport	10	0.17%	0.00%	0.19%	0.23%	0.18%	-0.02%	0.00%	0.13%	0.02%	-0.01%	0.07%	-0.01%	-0.01%	-0.03%	0.00%	0.00%	0.00%	0.03%	0.01%	0.03%	-0.21%	0.06%	0.01%
11 - Winchester East	11	0.12%	0.00%	0.13%	0.17%	0.00%	0.00%	0.00%	0.23%	0.02%	0.05%	0.05%	0.02%	-0.01%	-0.10%	0.00%	0.00%	1.16%	0.52%	0.21%	0.19%	-0.45%	0.26%	0.06%
12 - Winchester North	12	0.27%	0.90%	-0.03%	-0.12%	-0.20%	-0.06%	0.00%	0.01%	-0.10%	-0.01%	0.02%	-0.12%	-0.05%	-0.08%	-0.02%	0.00%	0.00%	-0.27%	-0.11%	-0.07%	-0.16%	0.01%	-0.05%
13 - Eastern Core	13	0.17%	0.00%	0.02%	0.06%	0.00%	-0.02%	-0.03%	-0.01%	0.00%	0.00%	-0.01%	-0.05%	-0.06%	-0.07%	0.00%	0.00%	-0.03%	-0.03%	-0.04%	-0.05%	5.46%	-0.02%	0.00%
14 - Isle of Wight	14	0.00%	0.00%	0.05%	0.00%	0.00%	0.00%	-0.21%	-0.06%	0.00%	-0.04%	0.10%	-0.18%	-0.07%	-0.01%	-0.03%	0.00%	-0.17%	-0.10%	-0.09%	-0.08%	2.96%	-0.04%	0.01%
15 - New Forest (Marginal)	15	0.00%	0.00%	0.08%	0.07%	0.00%	-0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.02%	-0.29%	0.01%	0.00%
16 - Test Valley (Marginal)	16	0.00%	0.00%	0.12%	0.00%	0.00%	0.00%	-0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-2.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
17 - NE Marginal	17	0.17%	8.22%	0.09%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%	0.00%	0.94%	0.00%	-0.03%	0.00%	0.00%	0.00%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%
18 - Chichester (Marginal)	18	0.11%	0.00%	0.28%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.53%	0.00%	0.01%	0.06%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.00%	0.00%	0.01%
19 - East External	19	0.12%	0.00%	0.11%	0.30%	0.00%	-0.19%	0.00%	-0.03%	0.00%	-0.01%	0.18%	-0.08%	-0.03%	-0.05%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.06%	-0.01%
20 - NE External	20	-0.01%	-0.19%	0.01%	-0.03%	0.00%	-0.05%	-0.01%	0.00%	0.13%	0.02%	0.18%	-0.10%	-0.05%	-0.06%	0.00%	0.00%	0.04%	0.00%	0.08%	0.00%	13.57%	0.03%	-0.01%
21 - NW External	21	-0.63%	-1.53%	-0.64%	-0.55%	-0.83%	-0.86%	-0.56%	-0.48%	-0.56%	-0.61%	-0.65%	-0.32%	6.35%	2.77%	-0.49%	0.00%	-0.54%	0.00%	0.00%	5.04%	0.00%	-0.68%	0.85%
22 - West External	22	0.09%	0.00%	0.17%	-0.01%	0.06%	-0.02%	-0.02%	0.00%	-0.07%	0.06%	0.00%	0.04%	-0.02%	-0.07%	-0.02%	-0.05%	0.00%	0.00%	-0.07%	0.00%	-0.17%	-0.03%	0.01%
Sum		-0.08%	0.14%	-0.01%	-0.04%	-0.02%	0.03%	0.00%	-0.01%	-0.05%	0.00%	0.05%	-0.09%	0.01%	0.00%	-0.01%	-0.01%	0.00%	-0.01%	-0.02%	-0.01%	0.96%	0.01%	0.01%

5. FLOW DIFFERENCES

5.1.1 The **CAZ Flow Differences 2019.pptx** file contains flow difference plots based on the comparison between Do Minimum, Compliance Shift and Do Something (with charging) scenarios. : CUBE difference plots from the runs for each time period and user class categories (see Table 2 for a description of the user classes). Differences are shown for both the whole Soton area as well as the centre of Southampton by the following groups:

- **Cars:** User class 1 and 2 – all compliant and non-compliant cars
- **Light Goods Vehicles:** User class 3 to 6 – all compliant and non-compliant LGVs
- **Heavy Goods Vehicles Compliant:** User class 9 and 10 – all compliant HGVs
- **Heavy Goods Vehicles Non-Compliant:** User class 7, 8 & 11 – non-compliant HGVs

5.1.2 The following paragraphs provide a commentary for the difference plots**.**

AM assigned (peak) hour flows

5.1.3 *Compliance Shift vs Do Minimum:* As expected, there is no difference in car or LGV traffic flows. The only visible differences are due to the compliance shift impact of non-compliant HGVs becoming compliant. These trips are primarily leaving Southampton north on the A33 The Avenue, west along Redbridge Road and east along the A3024.

5.1.4 *Do Something vs Compliance Shift:* As anticipated, non-compliant HGVs re-route away from travelling through the centre of Southampton in favour of the M27 motorway. The primary Southampton route which is reduced is along the A3024, across Northam Bridge and to the Western approach road. It appears that the change in HGV flow across Northam Bridge triggers a more severe car re-routing response, which is likely due to local roads being heavily congested and particularly sensitive to change.

IP assigned (averag6e) hour flows

5.1.5 *Compliance Shift vs Do Minimum:* Same as the AM flows, where car and LGV is unchanged and non-compliant HGVs become compliant.

5.1.6 *Do Something vs Compliance Shift*: The inter-peak sees extremely low volumes of through movements, potentially because the motorway is generally less congested and a more attractive route is available in the Do Minimum situation. The most significant change in HGV flow is near to the M3 motorway, close to the boundary, where non-compliant HGVs make a small diversion when accessing a zone outside of the CAZ area.

PM assigned (peak) hour flows

5.1.7 *Compliance Shift vs Do Minimum:* Same as the AM flows, where car and LGV is unchanged and non-compliant HGVs become compliant.

5.1.8 *Do Something vs Compliance Shift*: In a pattern closely resembling the AM period, HGVs re-route away from a path following the A3024 towards the western approach. Cars generally move to travel through these areas, and it appears that some small local area changes are triggered near the docks area.

6. NETWORK STATISTICS

6.1.1 The **RTM_Standard_Outputs_12hrOutputs.xlsx** file contains network statistics split by user class. (note that HGV results are presented in pcus, where 1 HGV vehicle = 2 pcus):

- Total trips in model
- Area based pcu hours, pcu kms and average speed split in to sectors
- Total flow in the model by road type
- Total flow across CAZ boundaries
- Motorway flows
- Total flows through AQMA locations
- Summary revenue calculations

6.1.2 The following charts provide a number of network wide, aggregated statistics for comparison purposes. For each test, three values are provided, split by vehicle type:

- **Do Minimum (DM)** – where compliance/ non-compliance split is entirely the national average across the whole model. No CAZ charges are applied.
- **Compliance shift (CS)** – includes demand which 'reacts to the clean air zone' with some exchanging their vehicle for one which is compliant. Highway flows are identical to the DM situation, since no charges apply and only demand composition changes.
- **Do Something (DS)** – includes CAZ charging schemes, demand model and re-routing responses.

6.1.3 Table 3 provides a 12hr overview of traffic volumes (in vehicle hours) within the CAZ area. In total, the CAZ accounts for a 75.8% reduction in non-compliant HGVs within the area.

Table 3. Vehicle movement and compliance shift proportions

	12HR (7AM - 7PM) VEHICLE HOURS IN CAZ AREA (SECTORS 1-4)		
	Do Minimum (abs)	Compliance Shift (Diff vs. DM)	Do Something (Diff vs. CS)
Compliant cars	33549	0 (+0.0%)	+139 (+0.4%)
Compliant LGVs	3246	0 (+0.0%)	-1 (-0.0%)
Compliant HGVs	3218	+456 (+14.2%)	-9 (-0.3%)
Non-Compliant Cars	11906	0 (+0.0%)	+50 (+0.4%)
Non-Compliant LGVs	1372	0 (+0.0%)	0 (+0.0%)
Non-Compliant HGVs	562	-456 (+81.1%)	-13 (-2.3%)

6.1.4 Table 4 shows the overall 12hr network % differences statistics for the DM, CS and DS tests aggregated to the sectors shown in shown in Figure 1 and Figure 4.

6.1.5 This table also suggests that the overall impact on car traffic is small, with the Do Something test exhibiting small flow increases in Southampton and decreases in neighbouring sectors.

6.1.6 Further, Table 4 also shows that the majority of the compliance change impact is due to the Compliance Shift rather than re-routing impact of charging.

Table 4. Area based data to show the difference between Compliance Shift and Do Minimum

		Compliance shift vs Do Min Difference %							Do Something vs Compliance shift Difference %							Do Something vs Do Min Difference %						
		12hr				12hr			12hr				12hr			12hr				12hr		
		Car NC	Car C	LGV NC	LGV C	HGV NC	HGV C		Car NC	Car C	LGV NC	LGV C	HGV NC	HGV C		Car NC	Car C	LGV NC	LGV C	HGV NC	HGV C	
RTM	Units	AM Hr	AM Hr	UC 3 + 4 Hr	UC 5 + 6 Hr	UC7+8+11	UC9+10	Total Hr	AM Hr	AM Hr	UC 3 + 4 Hr	UC 5 + 6 Hr	UC7+8+11	UC9+10	Total Hr	AM Hr	AM Hr	UC 3 + 4 Hr	UC 5 + 6 Hr	UC7+8+11	UC9+10	Total Hr
Area Based Data																						
Total	pcu hrs	0.0%	0.0%	0.0%	0.0%	-13.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-13.1%	2.3%	0.0%
01 - City Centre	pcu hrs	0.0%	0.0%	0.0%	0.0%	-81.3%	14.2%	0.0%	-0.7%	-0.7%	-0.7%	-0.7%	-11.5%	-0.7%	-1.0%	-0.7%	-0.7%	-0.7%	-0.7%	-83.5%	13.4%	-1.0%
02 - Western Approach	pcu hrs	0.0%	0.0%	0.0%	0.0%	-81.0%	14.1%	0.0%	0.1%	0.1%	0.0%	0.0%	-11.7%	-0.5%	-0.8%	0.1%	0.1%	0.0%	0.0%	-83.2%	13.6%	-0.8%
03 - Outer Ring Road	pcu hrs	0.0%	0.0%	0.0%	0.0%	-81.3%	14.2%	0.0%	1.5%	1.5%	0.4%	0.4%	-8.8%	0.3%	0.1%	1.5%	1.5%	0.4%	0.4%	-82.9%	14.5%	0.1%
04 - City Wide	pcu hrs	0.0%	0.0%	0.0%	0.0%	-81.1%	14.2%	0.0%	0.1%	0.1%	0.0%	0.0%	-13.7%	-0.4%	-0.7%	0.1%	0.1%	0.0%	0.0%	-83.7%	13.7%	-0.7%
05 - Southampton out CAZ	pcu hrs	0.0%	0.0%	0.0%	0.0%	-41.3%	7.2%	0.0%	-0.3%	-0.3%	0.0%	0.0%	-0.6%	-0.3%	-0.3%	-0.3%	-0.3%	0.0%	0.0%	-41.6%	6.9%	-0.3%
06 - New Forest (Core)	pcu hrs	0.0%	0.0%	0.0%	0.0%	-17.0%	3.0%	0.0%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.1%	0.1%	-16.9%	3.1%	0.1%
07 - Test Valley (Core)	pcu hrs	0.0%	0.0%	0.0%	0.0%	-13.2%	2.3%	0.0%	-0.1%	-0.1%	0.0%	0.0%	0.7%	0.2%	0.2%	-0.1%	-0.1%	0.0%	0.0%	-12.5%	2.4%	0.2%
08 - Eastleigh North	pcu hrs	0.0%	0.0%	0.0%	0.0%	-8.6%	1.5%	0.0%	0.0%	0.0%	-0.1%	-0.1%	0.3%	0.1%	0.1%	0.0%	0.0%	-0.1%	-0.1%	-8.3%	1.6%	0.1%
09 - Eastleigh South	pcu hrs	0.0%	0.0%	0.0%	0.0%	-10.8%	1.9%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	0.2%	0.0%	0.1%	-0.1%	-0.1%	-0.1%	-0.1%	-10.6%	1.9%	0.1%
10 - Fareham & Gosport	pcu hrs	0.0%	0.0%	0.0%	0.0%	-4.3%	0.7%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-0.3%	-0.1%	-0.2%	-0.1%	-0.1%	-0.1%	-0.1%	-4.5%	0.6%	-0.2%
11 - Winchester East	pcu hrs	0.0%	0.0%	0.0%	0.0%	-3.6%	0.6%	0.0%	0.1%	0.1%	0.2%	0.1%	0.3%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	-3.2%	0.6%	0.0%
12 - Winchester North	pcu hrs	0.0%	0.0%	0.0%	0.0%	-12.0%	2.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-12.0%	2.1%	0.0%
13 - Eastern Core	pcu hrs	0.0%	0.0%	0.0%	0.0%	-1.7%	0.3%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	0.0%	0.0%	-0.1%	-0.1%	-0.1%	-0.1%	-1.7%	0.3%	0.0%
14 - Isle of Wight	pcu hrs	0.0%	0.0%	0.0%	0.0%	-3.8%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-3.8%	0.7%	0.0%
15 - New Forest (Marginal)	pcu hrs	0.0%	0.0%	0.0%	0.0%	-8.0%	1.4%	0.0%	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.1%	-7.9%	1.5%	0.1%
16 - Test Valley (Marginal)	pcu hrs	0.0%	0.0%	0.0%	0.0%	-14.4%	2.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-14.4%	2.5%	0.0%
17 - NE Marginal	pcu hrs	0.0%	0.0%	0.0%	0.0%	-3.4%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-3.5%	0.6%	0.0%
18 - Chichester (Marginal)	pcu hrs	0.0%	0.0%	0.0%	0.0%	-1.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-1.0%	0.2%	0.0%
19 - East External	pcu hrs	0.0%	0.0%	0.0%	0.0%	-0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.7%	0.1%	0.0%
20 - NE External	pcu hrs	0.0%	0.0%	0.0%	0.0%	-14.7%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-14.7%	2.6%	0.0%
21 - NW External	pcu hrs	0.0%	0.0%	0.0%	0.0%	-21.1%	3.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-21.1%	3.7%	0.0%
22 - West External	pcu hrs	0.0%	0.0%	0.0%	0.0%	-5.9%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-5.9%	1.0%	0.0%

7. CONCLUDING REMARKS

7.1.1 This note has described the Solent Transport demand model implementation of the citywide CAZ 'class B' charging structure, following its identification as a preferred option during sifting run analysis.

7.1.2 Generally, as was seen in the sifting run analysis, the citywide B charging structure has relatively low impact on the overall transport system and experience of other network users. This is evidenced by the small overall change in traffic flows and low demand model impact in either mode shift or distribution change.

7.1.3 This behaviour occurs because, while the citywide B structure does prompt 'compliance shift', improving the overall HGV fleet composition, it does not dissuade a significant number of through trips because there are not high volumes to dissuade.

7.1.4 It is likely that Southampton sees relatively low numbers of HGV through trips because of its proximity to encircling motorways providing a convenient and more direct path around the city.

7.1.5 Whilst very small in magnitude the trends seen do reflect the nature of the changes being imposed in the area localised to Southampton, namely:

- Slight increases in uncharged vehicle types in the CAZ area;
- Slight increases in charged vehicle types on the M27; and
- Consequent slight reduction in uncharged cars on M27.

APPROVAL					
Version	**Name**		**Position**	**Date**	**Modifications**
1	Author	Maria Chan James Snowdon	Analyst Senior Consultant	14/12/2017	
	Checked by	James Snowdon	Senior Consultant	18/12/2017	
	Approved by	Ian Burden	Director	18/12/2017	
2	Author			DD/MM/YY	
	Checked by			DD/MM/YY	
	Approved by			DD/MM/YY	