

## **Report to the Transport for South Hampshire Joint Committee**

**Date:** 26 January 2011

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**Subject:** Evidence Base – Data Sharing and Survey Results

### **Purpose of the Report**

This report provides a progress update on the TfSH Evidence Base Contract and summarises the results of the transport surveys undertaken as part of the data collection workstream of that contract, which incepted in March 2010.

### **Recommendations**

1. **That the contents of this report be noted.**
2. **That the *Report on Surveys* be published on the TfSH website.**

### **Introduction**

1. TfSH has undertaken a number of studies to seek to establish how strategic developments might be delivered in the sub-region. These have reached the limits of what is achievable given the lack of an ability to robustly model future scenarios and the effects of transport interventions on a TfSH area-wide basis. In order to understand the implications of growth and the interventions required to enable sustainable economic growth, a stronger evidence base and model is therefore required.
2. In consideration of this, and following approval by the Joint Committee in April 2009, Transport for South Hampshire has procured the services of a consortium led by MVA Consultancy for the development of a modelling suite, which comprises a suite of interlinked transport and land-use models.
3. The TfSH Evidence Base Contract is a major commission for TfSH, with monitoring and outputs provided for through a series of milestones, some of which are achieved through the publication of a report. The *Report on Surveys* represents the first of a series of such reports and this paper provides a summary of its contents. This report does not comment on the supporting data collected in 2008 and 2009.



5. The Local Economic Impact Model (LEIM) interacts with the Sub-Regional Transport Model (SRTM). Within the LEIM, forecasts of development, household and employment location are used to determine the demands for transport and the levels of accessibility calculated by the Sub-Regional Transport Model (SRTM) will, over time, influence the economy and land-uses in the LEIM. The Gateway demand model works in isolation as the drivers for sea port and airport demand are considered different from other transport demand drivers (e.g. the Cruise industry brings in passengers from a wider UK and an international market and employee shift patterns are different from normal commuting patterns).
6. The SRTM will be webTAG (*this is the Department for Transport's web-based Transport Analysis Guidance for appraising transport projects and proposals*) compliant, which means it will accord with rigorous Department for Transport requirements and so provide an objective and robust strategic transport planning tool covering the whole of the TfSH area at a fine level of detail. The wider area surrounding TfSH is also modelled. The importance of this modelling suite is heightened following the announcement of the intention to cancel the South East Plan.
7. The modelling suite will identify current and future transport and accessibility problems resulting from planned growth. To address the identified problems the SRTM will be used to test differing transport and land use scenarios and identify the impact of transport interventions across all modes. The modelling suite will therefore provide an objective analysis of the interventions that are required to unlock and enable development sites and mitigate the negative implications of development.
8. The TfSH Evidence Base contract has maximised every opportunity to utilise existing data sources to gain efficiencies. For example, data collected as part of the Portsmouth Western Corridor Model (PWCM) has been used. This data and earlier TfSH Evidence Base surveys in 2008 and 2009 have been collected through other projects and has therefore, been reported elsewhere. However, to provide the comprehensive inputs to develop the Evidence Base, it has been necessary to collect additional data. It should be noted that the data summarised within this report has been collected and analysed for the sole purpose of building the Evidence Base modelling suite and it is summarised here within this context. As such, the results, in general, confirm existing understandings and provide an up to date and comprehensive evidence base to support model development. However, this new pool of data will provide a number of benefits for other workstreams.
9. Whilst it is proposed to publish the *Report on Surveys* on the TfSH website, it only provides a summary of the 2010 data collection process and its results. The data is available for use by the three authorities of

TfSH to support other projects and TfSH expects to realise a revenue stream from the sale of this data to third parties. Indeed, the sale of part of the data to a transport consultancy company has already resulted in a £33,000 receipt.

10. The Evidence Base Contract incepted in March 2010 and the modelling suite is expected to be available for use in April 2011. The use of the model post March 2011 is the subject of the report supporting agenda item 9. Importantly, the development of the modelling suite is guided by an Evidence Base Steering Group, composed of officers of the three TfSH authorities, Department for Transport, Highways Agency, GOSE and Network Rail.

### 2010 Data collection

11. Table 1 lists the surveys that have been conducted as part of the TfSH Evidence Base contract.

**Table 1 Surveys Conducted as part of the TfSH Evidence Base Contract**

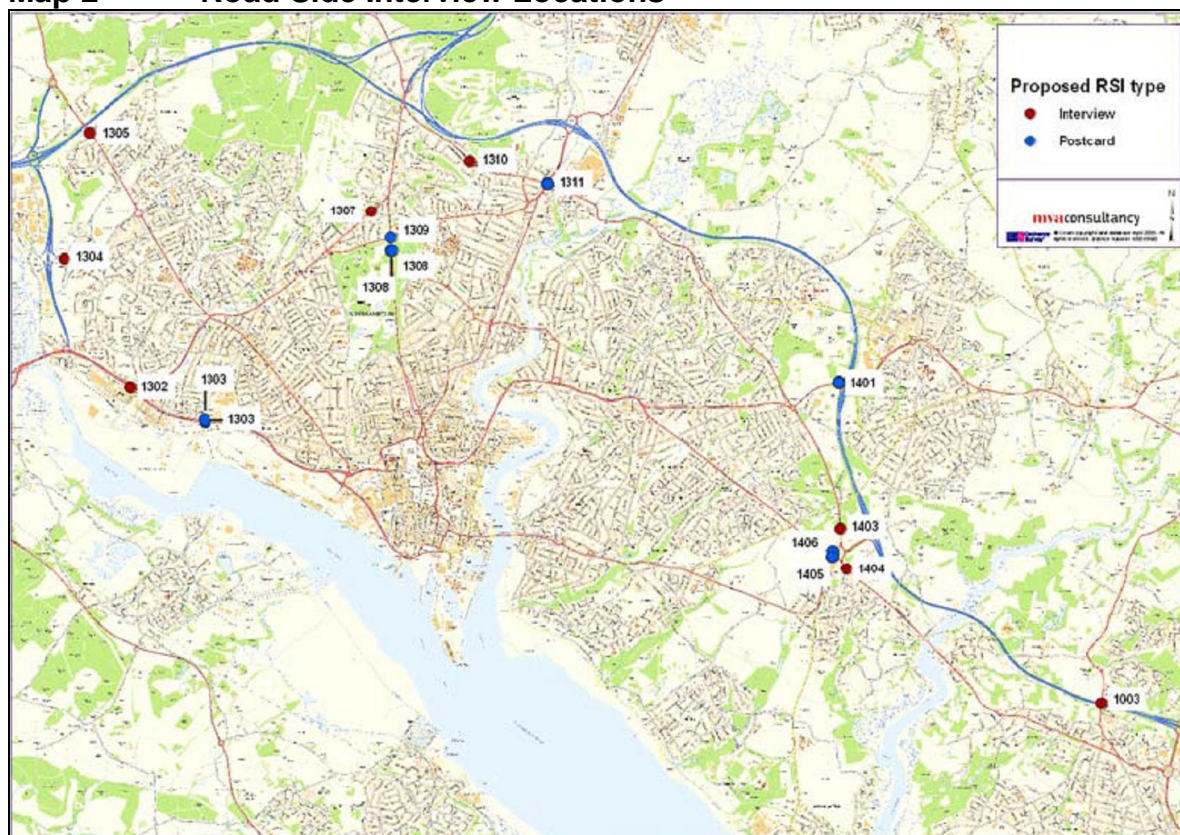
1. Road Side Interviews (RSIs)	6. Rail Passenger Survey
2. Manual and Automatic Traffic Counts	7. Bus Passenger Survey
3. Road Network Journey Time Survey	8. Bus Passenger Cordon Counts
4. Junction Saturation Flow Survey	9. Port and Airport Passenger, Employee, and Goods Vehicle Surveys and Counts
5. Automatic Number Plate Recognition (ANPR)	

12. The results of the surveys listed in table 1 are summarised, in turn, in the remainder of this report.

### Road Side Interviews (RSIs)

13. The objective of the Road Side Interviews (RSI) surveys, which took place in June 2010, was to collect origin and destination data for existing road travellers. The objective of the exercise is about *why* people are travelling as well as *where* they are travelling. The site locations were designed to complement the programme of 99 sites surveyed in 2008-09, by picking up traffic joining or leaving the motorways and providing additional detail for the Southampton area. In total the 2010 RSI programme resulted in 17 survey sites and these are shown on Map 2, below. Depending on safety issues at each location, the surveys were carried out by either interview or postcard distribution.

**Map 2 Road Side Interview Locations**



14. To allow for adjustment for day to day variation not picked up by the RSI surveys, manual traffic counts were undertaken on the day of the surveys, along with automatic traffic counts for a two week period around the survey day.
15. The overall sample of interviews relative to net traffic flow was 13.2%, where the AM peak sample rate was 14.8%, Inter Peak (IP) was 13.3% and the PM peak was 11.8%. The sample rate is sufficient for the data to be statistically representative.
16. Table 2 shows the survey method, the number of responses and the survey rate relative to traffic flow by site.

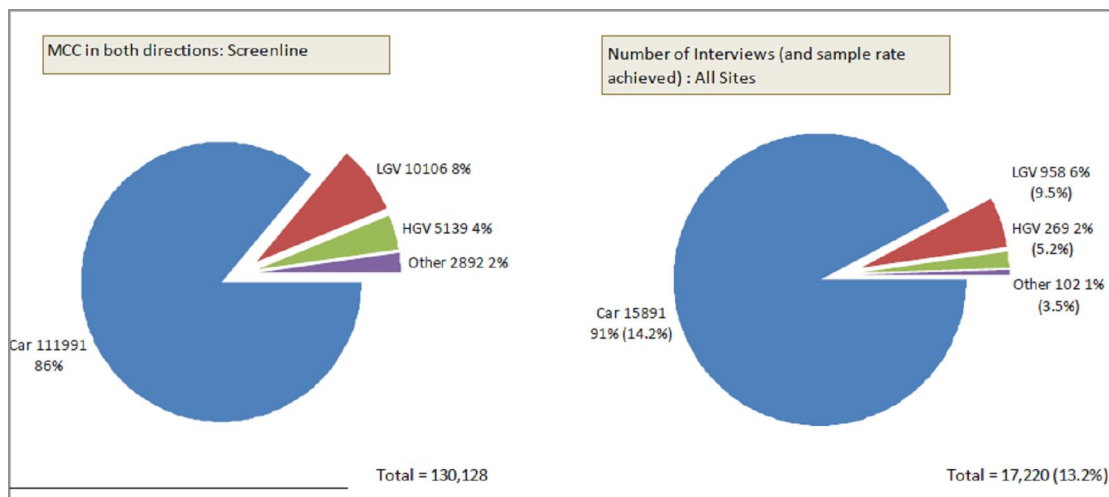
**Table 2 RSI Survey Sample**

Site No.	Site	Interview	Returned Postcard	Total Interviews	Vehicle Count	Sample
1003	Botley Rd	1079	-	1079	4317	25%
1302	Redbridge Rd	972	-	972	10804	9%
1303	Millbrook Rd	-	1689	1689	19353	9%
1303-5	Regents Pk Rd	-	353	353	1798	20%
1304	Brownhill Way	1072	-	1072	7904	14%
1305	Romsey Rd	1208	-	1208	4161	29%
1307	Winchester Rd	1116	-	1116	9466	12%

1308-1	The Avenue	-	418	418	8365	5%
1308-2	Highfield Av	-	623	623	3161	20%
1309	Burgess Rd	-	378	378	1437	26%
1310	Bassett Gr Rd	1068	-	1068	5327	20%
1311	Stoneham Way	-	920	920	13037	7%
1401	Charles Watts Way	-	1274	1274	10002	13%
1403	West End Rd	1299	-	1299	4837	27%
1404	Providence Hill	1207	-	1207	4416	28%
1405	Hamble Ln	-	1461	1461	11950	12%
1406	Bursledon Rd	-	1083	1083	9793	11%
<b>Total</b>		<b>9021</b>	<b>8199</b>	<b>17220</b>	<b>130128</b>	<b>13%</b>

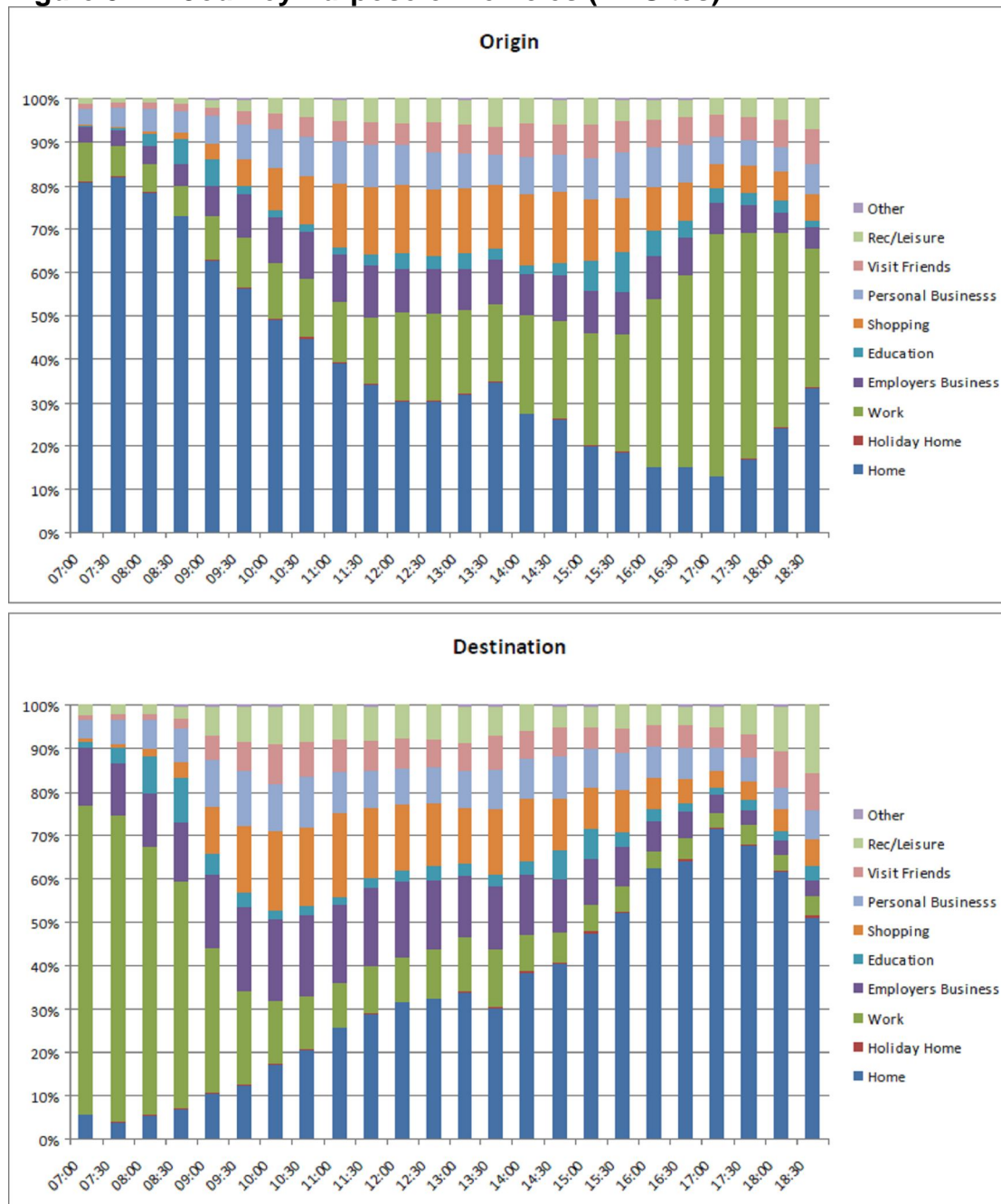
17. Figure 2 compares the vehicle types from the manual traffic count data and from the RSI data in aggregate. The comparison shows that a broadly comparable set of interviews have been captured relative to observed flows by vehicle type.

**Figure 2 Comparison of manual traffic count data with Interviews (All sites)**



18. Figure 3 shows the journey purpose for vehicles captured across all sites covering the survey day period. This identifies that, as expected, the majority of journeys in the 07:00 – 09:00 period are home to work journeys. This process is reversed in the 16:00 – 18:00 period.

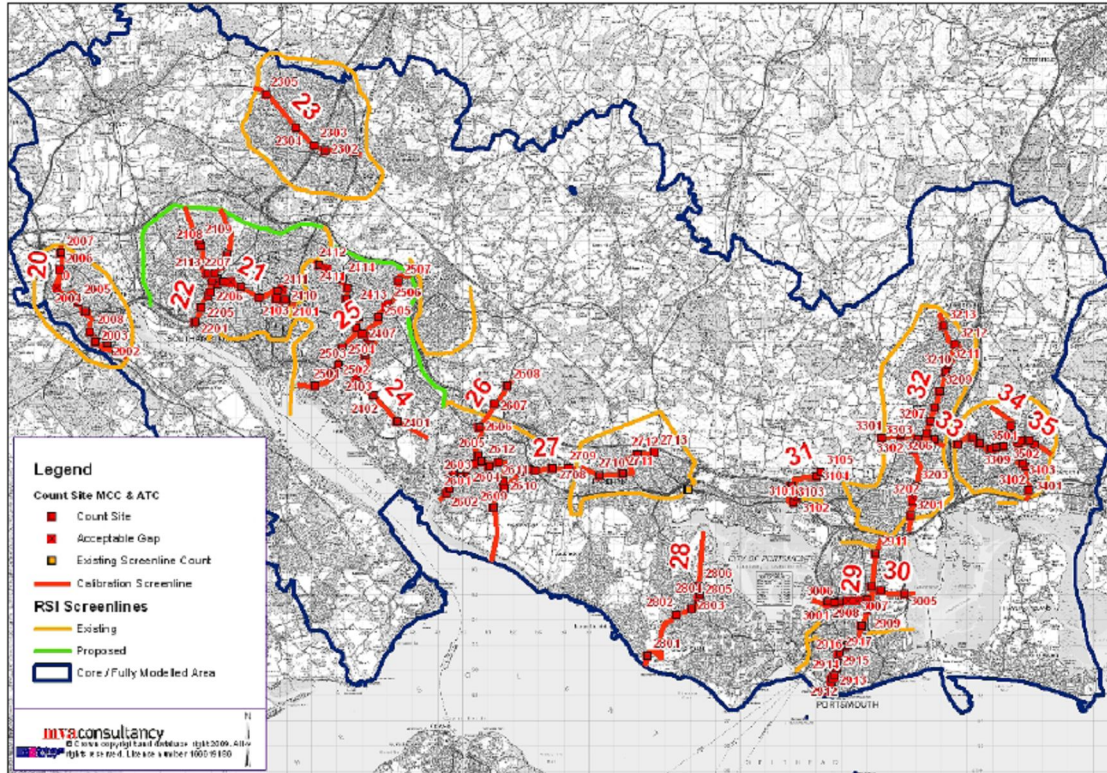
**Figure 3 Journey Purpose of Vehicles (All Sites)**



**Screenline Counts**

19. Flow and traffic composition data for use in calibration and validation (the process of fine tuning the model to ensure it reliably and robustly represents actual traffic movements) of the road traffic model was collected using manual and automated traffic counts. The locations of the screenlines and the count sites is shown in map 3.

**Map 3 Location of screenlines and count sites**



20. The 12 hour daily flows collected from screenline surveys show that the largest flows are (in descending order):

Screenline	Direction	Automatic Vehicle Count
21	WB	63346
24	WB	62642
24	EB	62166
21	EB	61643
29	WB	58849
29	EB	57338
27	SB	56391
27	NB	52265
32	EB	51543
32	WB	50026

21. The data shows that west bound movements at screenlines 21 and 24, which captured traffic entering Southampton, show the highest flows in the TfSH area. Eastbound movements (or vehicles exiting Southampton) at the same screenlines represent the third and fourth largest vehicle flows. Similarly, flows in Portsmouth are high.

### Journey Time Surveys

22. Journey time surveys were carried out to provide data for the validation of the journey times obtained from the Department for Transport

commissioned TrafficMaster journey time dataset, which is collected from in-vehicle GPS devices. Twelve routes (shown in map 4) were surveyed for a minimum of 10 times in each time period (AM peak, Inter peak, and PM Peak). For the Portsmouth City area, journey time data from the PWCM was used.

**Map 4 Journey Time Survey Routes**



23. A summary of the journey time durations recorded through the survey is provided in Appendix A. The greatest degree of variation between the maximum and minimum journey times recorded in the AM peak occurred on Route 10, with a difference of 25 minutes between the longest and shortest times recorded for the northbound journey, where the average journey time was 31 minutes.
24. Additionally, the following routes also encountered a reasonably large degree of variation in the journey times recorded for particular periods:
  - Route 1 - Eastbound (IP)
  - Route 5 - Southbound (PM)
  - Route 6 - Southbound (AM)
  - Route 7 - Southbound (AM)
  - Route 8 - Northbound (IP)
  - Route 11 - Northbound (PM)

The inter-peak (IP) period represented the most consistent period for journey times across the majority of the routes assessed.

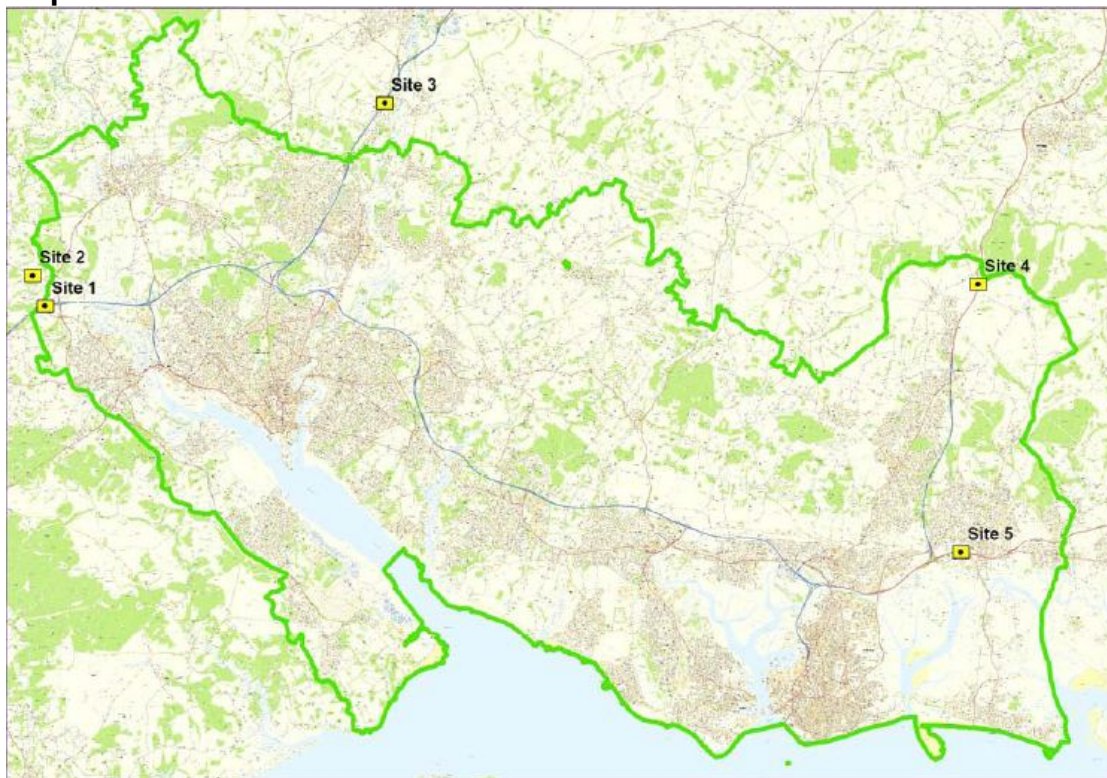
## Junction Saturation Flow Surveys

25. The saturation flow rate is the maximum number of vehicles from a lane group that can pass through a junction in a defined time period. A number of factors can impact the flow, for example, if the approach has very narrow lanes, traffic will naturally produce longer gaps between vehicles, which will reduce the saturation flow rate.
26. Observations of traffic movements at ten stop line locations at traffic signal junctions were carried out by video recording. The data was used to estimate saturation flow rates for straight ahead movements. These will be compared with the standard rates used in the development of the highway assignment model in order to validate the rates used in the model.

## Automatic Number Plate Recognition (ANPR) Survey

27. An Automatic Number Plate Recognition (ANPR) survey was undertaken to estimate the traffic movements passing through the study area via the motorways, as these would not be intercepted in the RSI programme. Five sites (shown on map 5) extending from the end of the M27 to the west, to the A3(M) and A27 to the east, and the M3 north of the study area, were used. A camera was focussed on each lane, and data on registration number and vehicle type was collected in both directions between 06:30 and 19:30, on Tuesday 6th July 2010.

**Map 5** Location of ANPR sites

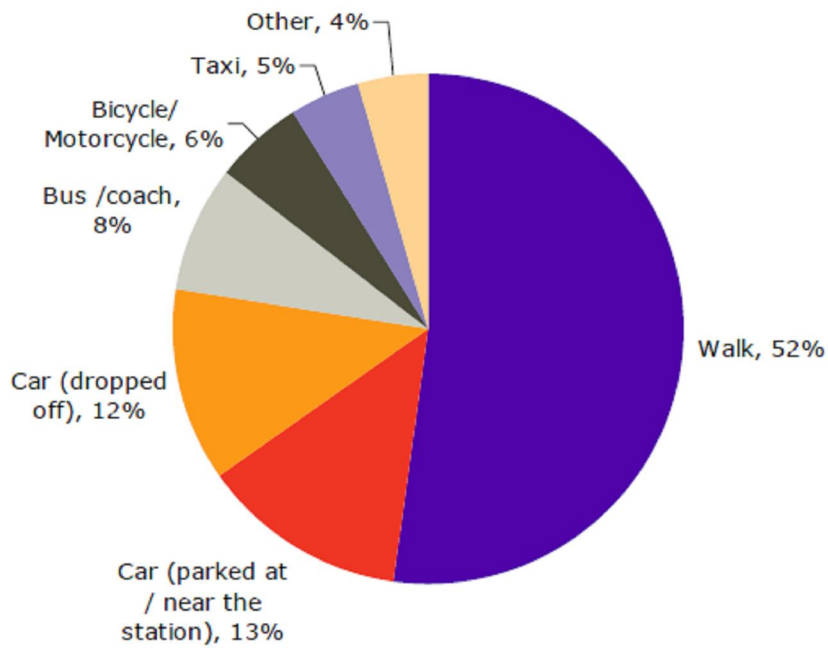


28. The data recorded 39,148 through trips of a total 195,783 movements (20%), with the largest flows of through movements recorded from site 3 M3(SB) to site 1 M27(WB) and in the reverse direction from site 1 M27(EB) to site 3 M3(NB) corridors.
29. 38,244 (20%) of the total recorded trips can be classified as daily commutes into the TfSH area and back again, whilst almost the same number of trips are daily commutes out of the TfSH area (38,333) and back again. In addition, 23% of trips were recorded as in only, whilst 17% were recorded as out only (likely to be accounted for in part by the return leg falling outside of the observed period).

### **Rail Passenger Surveys**

30. Rail passenger surveys and counts were undertaken to produce an ultimate origin and destination matrix of all rail movements within the study area to be used in the Public Transport Model. Data was also collected about journey purposes and car availability as this is required for the Main Demand Model.
31. Self-completion postal questionnaires, based on the National Rail Travel Survey (NRTS) were distributed to rail passengers entering stations across the study area. In order to expand the questionnaire responses, entry and exit counts were also undertaken at the stations at selected times of the day.
32. All stations were included in the passenger counts between 07:00 – 11:00, with busier stations surveyed across the full day (07:00 – 19:00).
33. Rail passengers accessing stations were asked to list all the modes used to travel to their first rail station for the journey they were making. As more than one mode may have been used, the resultant sum adds up to greater than 100%. This is shown in figure 4.

**Figure 4 Access Mode To Rail Station (All Stations)**



34. Whilst the overall picture shows that the vast majority of people access rail stations on foot (52%), this pattern varies between stations and, in particular, station location type. The overall picture shown in figure 4 is broken down by station in table 3. Please note that respondents were asked to give all modes used to access stations so percentages may sum to over 100%.

**Table 3 Access Mode to Study Area Stations**

	Sample Size	Walk	Car (parked at/near station)	Car (dropped off)	Bus /coach	Bicycle/Motorcycle	Taxi	Air / Sea
ASHURST RAIL	11	35%	53%	9%	0%	3%	8%	0%
BEDHAMPTON RAIL	15	94%	6%	0%	0%	0%	0%	0%
BITTERNE RAIL	10	89%	3%	7%	0%	0%	0%	0%
BOTLEY RAIL	21	49%	18%	33%	0%	0%	0%	0%
BROCKENHURST RAIL	213	54%	25%	15%	1%	4%	2%	0%
BURSLLEDON RAIL	1	100%	0%	0%	0%	0%	0%	0%
CHANDLERS FORD RAIL	35	77%	12%	5%	0%	8%	0%	0%
COSHAM RAIL	180	62%	12%	12%	14%	4%	5%	0%
EASTLEIGH RAIL	359	67%	7%	9%	4%	9%	6%	0%
FAREHAM RAIL	158	56%	13%	17%	3%	6%	6%	0%
FRATTON PORTSMOUTH RAIL	247	70%	3%	8%	1%	12%	6%	0%
HAMBLE RAIL	8	40%	0%	36%	0%	24%	0%	0%
HAVANT RAIL	364	44%	24%	18%	6%	8%	2%	0%
HEDGE END RAIL	93	32%	36%	28%	0%	5%	0%	0%
HILSEA PORTSMOUTH RAIL	28	51%	0%	35%	1%	12%	0%	0%
LYMINGTON PIER RAIL	10	87%	6%	0%	34%	0%	0%	15%
LYMINGTON TOWN RAIL	31	77%	8%	5%	15%	9%	0%	0%
MICHELDEVER RAIL	47	20%	63%	14%	0%	4%	0%	0%
MILLBROOK (HAMPSHIRE) RAIL	8	100%	0%	0%	23%	0%	0%	0%
NETLEY RAIL	30	78%	8%	14%	0%	0%	0%	0%
PORTCHESTER RAIL	109	78%	7%	13%	2%	3%	1%	0%
PORTSMOUTH & SOUTHSEA RAIL	229	75%	0%	3%	12%	5%	9%	0%
PORTSMOUTH HARBOUR RAIL	163	41%	15%	15%	10%	3%	8%	33%
REDBRIDGE RAIL	2	50%	0%	0%	0%	50%	0%	0%
ROMSEY RAIL	71	70%	6%	22%	0%	3%	0%	0%
SHAWFORD RAIL	40	46%	26%	26%	0%	13%	0%	0%
SHOLING RAIL	15	82%	3%	0%	0%	16%	0%	0%
SOUTHAMPTON AIRPORT RAIL	265	13%	40%	22%	9%	2%	6%	13%
SOUTHAMPTON CENTRAL RAIL	597	54%	8%	11%	19%	6%	7%	6%
ST DENYS RAIL	72	97%	1%	2%	1%	0%	0%	0%
SWANWICK RAIL	152	55%	16%	7%	4%	14%	5%	0%
SWAYTHLING RAIL	34	64%	13%	23%	0%	0%	0%	0%
TOTTON RAIL	68	58%	17%	14%	7%	11%	1%	0%
WINCHESTER RAIL	703	63%	14%	14%	8%	5%	5%	5%
WOOLSTON RAIL	28	89%	0%	0%	6%	6%	0%	0%

35. Access to Millbrook and Bursledon stations is shown as being 100% on foot. Bedhampton (94%), Bitterne (89%), Woolston (89%) and St. Denys (97%) also have high levels of access by walking. This information will be useful for targeting measures to encourage more people to access stations by walking or cycling, perhaps through station travel plans. Stations with high levels of access by car are those in more rural areas (Ashurst – 62%; Micheldever – 77%) or those built close to road links and with large parking facilities (Southampton Parkway – 62%; Hedge End – 64%).
36. The rail passenger surveys also identified journey purpose. In the morning peak, the main journey purpose was travel to work (52%), whilst the evening peak was dominated by the work to home commute (50%). The inter-peak period was dominated by ‘other’ trips (e.g. retail, leisure, and visiting family and friends).

## **Bus passenger surveys**

37. The aim of the bus passenger surveys was to capture key bus movements to and from areas of major bus based activity within the study area. These were designed to intercept a large proportion of bus passengers in order to capture origin and destination information and the characteristics of bus users in terms of distances walked to and from stops, journey purposes etc. The bus stop locations selected for survey sites were based around town centres.
38. Overall, the proportion of adults boarding buses who completed questionnaires was 16% in the morning peak (0700-1000hrs), 14% in the inter-peak (1000-1600hrs) and 12% in the evening peak (1600-1900hrs). The proportion is fairly consistent across the surveyed locations, and for most locations is between 10% and 20%. Survey rates were generally lower in the evening peak.
39. The results show that in the morning peak 35% of trips are from home to work. In the inter-peak, nearly 87% of all trips are for “other” purposes (e.g. leisure and retail). In the evening peak, the proportion of commuting trips is similar to the morning peak, reflecting the return leg of many of these trips. However, the proportion of “other” trips remains high (39%). The proportion of “other” trips is roughly the same as in the morning peak, although a higher proportion of these are home-based. It should be noted that the proportion of education trips is very low in all periods (2% or less). This is likely to be due to a number of reasons:
- Low response rate from school children;
  - The existence of separate school bus services not captured by the survey;
  - The survey was conducted in July, outside of university term time.

## **Bus Passenger Cordon Counts**

40. The aim of the bus passenger cordon survey was to identify the loadings and average occupancy of buses for each site, bus type and time period. To achieve this, the numbers of passengers on each bus were counted through on-board counts as well as being estimated by ‘observers’ located at the roadside.
41. Counts were undertaken at locations across Portsmouth and Southampton. Unsurprisingly, the survey sites at Mile End Road and Kingston Road in Portsmouth, both show high volumes of passengers entering and leaving Portsmouth as these are the two busiest routes between the city centre and Hilsea to the north. Southampton’s busiest sites are at Shirley Road and The Avenue.

## Port and Airport Surveys

42. The objective of these surveys was to capture data on movements to and from Portsmouth Port, Southampton Port, Southampton Airport and various local ferry ports within the study area. These included a wide variety of movements, including car and foot passengers, freight, port employees and port business. Movements were captured through a series of interviews, adapted to the needs of each port/airport, and also utilised manual classified counts and automatic traffic counts at the entrance to the ports.
43. For the Port of Southampton it is worth noting that, in recognition of the variability of cruise ship activity, a specific survey date was chosen. On the day of the survey one cruise ship was in port with a capacity of 2000 passengers. With an average of 0.74 cruise ships for the period represented by the model and with the average capacity being 2,300, the survey day can be classed as typical. Table 4 summarises the main results of the surveys.

**Table 4 Main Results of the Port and Airport Surveys**

	<b>Port of Portsmouth</b>	<b>Port of Southampton</b>	<b>Southampton Airport</b>
<b>Destination purpose</b>	Holiday (31.4%)	Work (31.1%)	Holiday (35.7%)
	Recreation / Leisure (30.8%)	Employers business (27.9%)	Employers business (24.6%)
<b>Mode of travel to port (vehicle trips)</b>	Car / LGV (54.2%)	Car / LGV (48.5%)	Car / LGV (77.5%)
	HGV 4+ Axle (16.3%)	HGV 4+ Axle (24.4%)	Taxi (15.5%)

## Conclusion

44. This report shows that a considerable amount of data has been collected as part of the Evidence Base Contract. This data is a necessary input to build a robust modelling suite to provide the cross-border strategic planning tool for the TfSH area, and will also provide a rich data source to assist in the development of (and provide efficiencies for) other workstreams. The data collection exercise, in the main, went according to programme and without incident.

Section 100 D - Local Government Act 1972 - background papers

**The following documents disclose facts or matters on which this report, or an important part of it, is based and has been relied upon to a material extent in the preparation of this report.**

NB the list excludes:

1. Published works.
2. Documents which disclose exempt or confidential information as defined in the Act.

TITLE

LOCATION

*To be completed*

## Appendix A Summary of Journey Time Durations

Route - Direction of Travel	AM (0700-1000)			IP (1000-1600)			PM (1600-1900)		
	Minimum	Maximum	Average	Minimum	Maximum	Average	Minimum	Maximum	Average
Route 1 - Eastbound	00:19:29	00:30:48	00:23:42	00:18:53	00:56:24	00:31:18	00:18:44	00:29:36	00:24:24
Route 1 - Westbound	00:22:39	00:39:56	00:29:04	00:21:08	00:30:22	00:26:01	00:26:10	00:36:42	00:30:43
Route 2 - Eastbound	00:16:26	00:21:42	00:18:11	00:18:16	00:26:33	00:21:33	00:19:12	00:31:43	00:26:57
Route 2 - Westbound	00:15:31	00:30:12	00:24:42	00:21:40	00:25:27	00:23:25	00:22:41	00:32:53	00:28:29
Route 3 - Northbound	00:17:46	00:24:12	00:20:50	00:17:39	00:24:01	00:20:16	00:16:13	00:32:24	00:23:16
Route 3 - Southbound	00:16:52	00:24:31	00:19:34	00:17:31	00:22:14	00:19:46	00:16:41	00:25:22	00:20:46
Route 4 - Northbound	00:09:09	00:16:48	00:12:24	00:09:05	00:14:21	00:10:42	00:10:26	00:17:13	00:14:10
Route 4 - Southbound	00:07:59	00:20:45	00:13:45	00:08:54	00:12:17	00:10:29	00:11:28	00:18:41	00:14:38
Route 5 - Northbound	00:17:38	00:27:06	00:20:36	00:16:06	00:20:46	00:17:52	00:15:34	00:21:10	00:18:18
Route 5 - Southbound	00:18:01	00:23:40	00:20:17	00:16:49	00:23:54	00:20:01	00:16:28	00:34:53	00:23:23
Route 6 - Northbound	00:13:36	00:24:00	00:17:17	00:12:50	00:16:47	00:14:42	00:13:52	00:18:56	00:16:16
Route 6 - Southbound	00:13:08	00:29:51	00:17:06	00:12:45	00:17:43	00:15:09	00:14:04	00:23:53	00:17:52
Route 7 - Northbound	00:13:24	00:22:04	00:18:01	00:17:44	00:21:38	00:19:50	00:12:33	00:24:11	00:19:35
Route 7 - Southbound	00:14:04	00:29:36	00:20:16	00:17:04	00:20:51	00:19:15	00:15:35	00:22:19	00:19:07
Route 8 - Northbound	00:15:14	00:28:19	00:19:43	00:15:15	00:41:53	00:18:43	00:15:55	00:30:46	00:19:57
Route 8 - Southbound	00:13:11	00:20:27	00:17:01	00:14:27	00:18:41	00:16:20	00:15:48	00:28:32	00:21:15
Route 9 - Northbound	00:18:11	00:29:27	00:24:18	00:16:58	00:25:34	00:19:14	00:16:54	00:22:07	00:19:16
Route 9 - Southbound	00:16:01	00:23:56	00:18:33	00:16:08	00:21:51	00:17:52	00:17:18	00:21:59	00:19:46
Route 10 - Northbound	00:20:48	00:45:47	00:31:45	00:19:50	00:24:10	00:21:32	00:20:17	00:26:20	00:23:09
Route 10 - Southbound	00:16:24	00:23:46	00:20:30	00:19:39	00:21:22	00:20:25	00:24:51	00:42:19	00:32:24
Route 11 - Northbound	00:15:04	00:25:56	00:18:36	00:15:25	00:23:48	00:17:52	00:14:41	00:32:13	00:21:01
Route 11 - Southbound	00:11:38	00:23:00	00:18:10	00:15:42	00:19:53	00:18:08	00:16:05	00:24:22	00:19:08
Route 12 - Northbound	00:14:46	00:18:50	00:16:50	00:13:43	00:17:53	00:15:09	00:14:46	00:19:06	00:16:46
Route 12 - Southbound	00:12:41	00:16:10	00:14:36	00:13:16	00:17:43	00:15:44	00:13:07	00:15:59	00:14:20

Difference between minimum and maximum journey time in excess of 60-99% from the average

Difference between minimum and maximum journey time in excess of 100% from the average