Transport for South Hampshire and Isle of Wight Evidence Base

Welborne, Fareham – Run 7 SRTM Modelling Analysis

Report for Fareham Borough Council

October 2013

mvaconsultancy

Document Control

Project Title:	Transport for South Hampshire Evidence Base
MVA Project Number:	C3A70033 (C39344)
Document Type:	Welborne, Fareham SRTM Report – Run 7
Directory & File Name:	J:\C39344_Transport_For_SOUTH_HAMPSHIRE_Model_Suite\MVA_Work\33northfarehamsda\FBC Scheme\Run 7\Report\New Community North Of Fareham SRTM Outputs RUN 7 20131024_V4a.Docx

Document Approval

Primary Author:	Claire Stephens
Other Author(s):	Chris Whitehead
Reviewer(s):	Chris Whitehead, Ian Burden
Formatted by:	CW/SW/IB

Distribution

Issue	Date	Distribution	Comments
1	04/10/13	FBC, HCC	Run 7 (SRTM Ref ACE)
2	09/10/13	FBC, HCC	Run 7 (SRTM Ref ACN) Minor amendments to Emissions, Sectored Demand and Network Statistics
3	11/10/13	FBC, HCC	Run 7 (SRTM Ref CAN) Report text floorspace updated
4	24/10/13	FBC, HCC	Minor text corrections to front cover

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1 Introduction

1.1 SRTM Background

1.1.1 MVA Consultancy was commissioned, as part of a wider team, to support Transport for South Hampshire (TfSH) with the development and application of a Sub-Regional Transport Model Suite (SRTM) for this nationally important area.

1.1.2 The SRTM has been developed to support a wide-ranging set of interventions across the TfSH sub-region, and is specifically required to be capable of:

- forecasting changes in travel demand, road traffic, public transport patronage and active mode use over time as a result of changing economic conditions, land-use policies and development, and transport improvement and interventions (schemes);
- testing the impacts of land-use and transport policies and strategies within a relatively short model run time; and
- testing the impacts of individual transport interventions in the increased detail necessary for preparing submissions for inclusion in funding programmes.

1.2 Welborne Development, North Fareham

1.2.1 The Welborne development is proposed on the land to the north of Fareham Town Centre and the M27. It is envisaged that Welborne will consist in the region of 6,500 dwellings and 112,000 square metres of employment land use.

1.2.2 The SRTM has been used to assess the impact of the development and to assist with the identification of the appropriate transport strategy for the development for a forecast year of 2036.

1.2.3 Use of the SRTM in a fully forecasting mode (whereby the amount of development taken up at Welborne is projected) was not required. Instead the Welborne development has been tested fully (100%) developed in order to identify the maximum transport impacts related to the development.

1.2.4 The land use build up continues to 2041 but the final transport model year in SRTM is 2036. The full 2041 development quantum has been run with the 2036 transport model to ensure the full quantum of development is replicated.

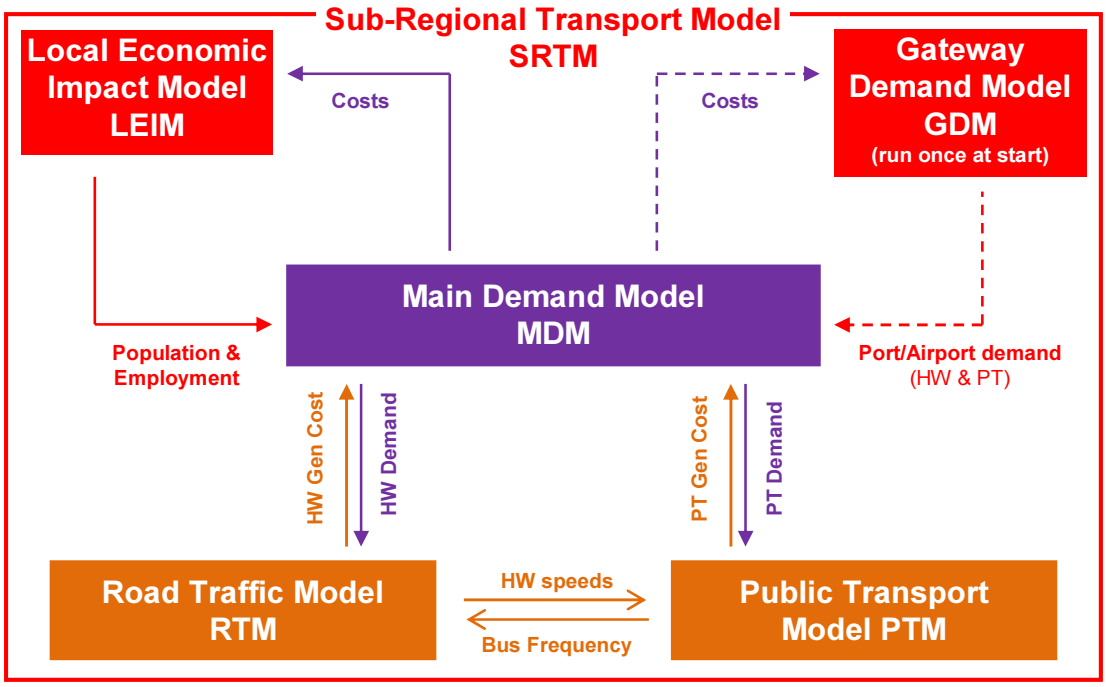
1.3 Sub Regional Transport Model Context and Scope

1.3.1 The SRTM is a suite of linked models comprising the following components as shown in Figure 1.1:

- the Main Demand Model (MDM) which predicts when (time of day), where (destination choice) and how (choice of mode) journeys are made;
- the Gateway Demand Model (GDM) which predicts demand for travel from ports and airports;

- the Road Traffic Model (RTM) which determines the routes taken by vehicles through the road network and journey times, accounting for congestion;
- the Public Transport Model (PTM) which determines routes and services chosen by public transport passengers; and
- a Local Economic Impact Model (LEIM) which uses inputs including transport costs to forecast the quantum and location of households, populations and jobs.

Figure 1.1 TfSH Sub-Regional Transport Model



1.3.2 The modelled area of the SRTM is divided into four regions, shown in Figure 1.2, which differ by zone aggregation and modelling detail. The Welborne site is within the Core Fully Modelled Area.

1.3.3 In accordance with guidance three weekday periods are modelled in the SRTM:

- AM peak: busiest hour between 0700 and 1000, (defined as 38.2% of the three hours for Highway and 40% for Public Transport);
- Inter peak: average of 1000 to 1600 (i.e. 16.7% of the six hours for both modes); and
- PM peak: busiest hour between 1600 and 1900, (defined as 35.8% of the three hours for Highway and 40% for Public Transport).

1.3.4 The SRTM has a base year of 2010, and forecast years of 2014, 2019, 2026, 2031 and 2036. In addition LEIM provides forecasts through to 2041. For the Welborne tests the model was projected forward up to 2036, but uses the 2041 full development quantum.

1.3.5 In early 2013 a re-validation exercise was undertaken on the SRTM with a prime objective to improve highway link flow validation on the strategic highway network including on the M27 in the vicinity to the proposed Welborne site. The re-validation work incorporated traffic data provided post original model development (2010) and advancements/ best practice in the coding of specific highway and junction arrangements. The results of the improved Base Year (2010) validation of SRTM on the strategic highway network in the vicinity to the Welborne site (M27 J9-12) is summarised in Appendix A.

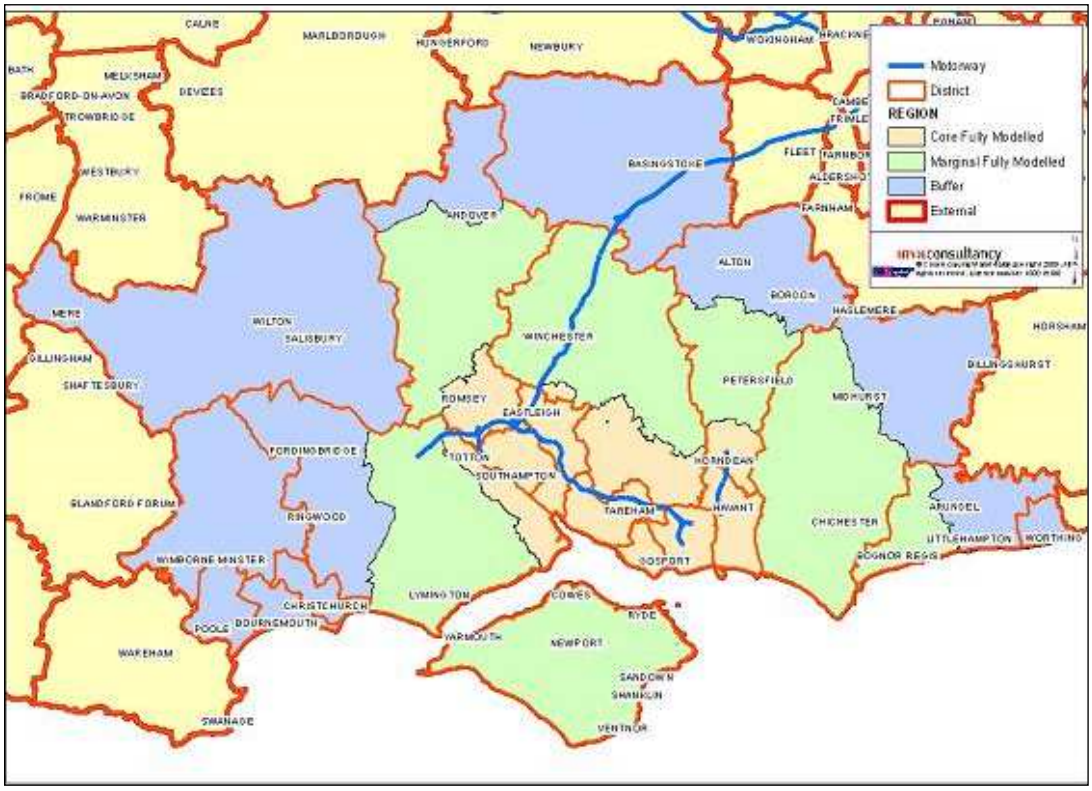


Figure 1.2 Study Area of the SRTM

2 Welborne Development Site Assumptions

2.1 Introduction

2.1.1 This chapter describes the planning assumptions for the Welborne site as used in the SRTM modeling and provided by FBC in September 2013.

2.2 Reference Case Committed Schemes and Developments

2.2.1 The SRTM model represents conditions up to the year 2036. Known developments and committed highway schemes are included within the models' reference case scenarios (2014, 2019, 2026, 2031 and 2036) to provide the most accurate representation of future year conditions. A list of the known developments and committed highway schemes included in the Reference Cases is provided as Appendix B.

2.3 Welborne Planning Assumptions

2.3.1 The current land use assumptions at the Welborne site as provided by FBC are summarised in Table 2.1. Table 2.2 summarises the highway and public transport proposals associated to the development area. Greater detail on the highway/ PT schemes is provided in Chapter 3. All planning assumptions relate to a design year of 2041 but are tested within the 2036 SRTM model (the most distant SRTM model year available).

Table 2-1 Welborne Land Use Assumptions

Model Run	Year	Residential (dwellings)	Employment (sqm)	Education (schools)
7	2036	6,500	112,000	4

Table 2-2 Welborne Highway/ Public Transport Assumptions

Model Run	Year	Highway/ PT	Measures
7	2036	Highway	• Roundabout from M27 J10 onto A32 • 4 Welborne site access on A32 (4 roundabouts). • New on/off slips on M27 west of J10 and dumbbells under bridge
		PT	• All existing A32 Bus services to divert in to Welborne • BRT from Welborne to Gosport • BRT from Welborne to Portsmouth via A27 • BRT from Welborne to Portsmouth via M27 J10 (Fast Track)

3 Modelling Welborne in the SRTM

3.1 Introduction

3.1.1 This chapter describes how the SRTM has been amended to represent Welborne.

3.2 Zoning

3.2.1 Travel in the model is aggregated into zones which therefore determine the spatial detail available. The definition of zones takes account of barriers (rivers, railways, motorways) as well as administrative and planning data boundaries (TfSH zones are aggregations of Census Output Areas in the fully modelled area and wards elsewhere). In addition zones accounted for land use types, access points onto the road network as well as respecting screenlines for trip matrix validation. For public transport catchment areas for rail stations and bus stops and fare boundaries were also considered and additional zones are included for the ports and airports.

3.2.2 In order to model the development at Welborne, five new zones (SRTM Zones 733 to 737) have been added to the network as shown in Figure 3.1. Four of the new zones cover the development to the west of the A32 and 1 new zone to the east. There is no direct access from the development to M27 J11.

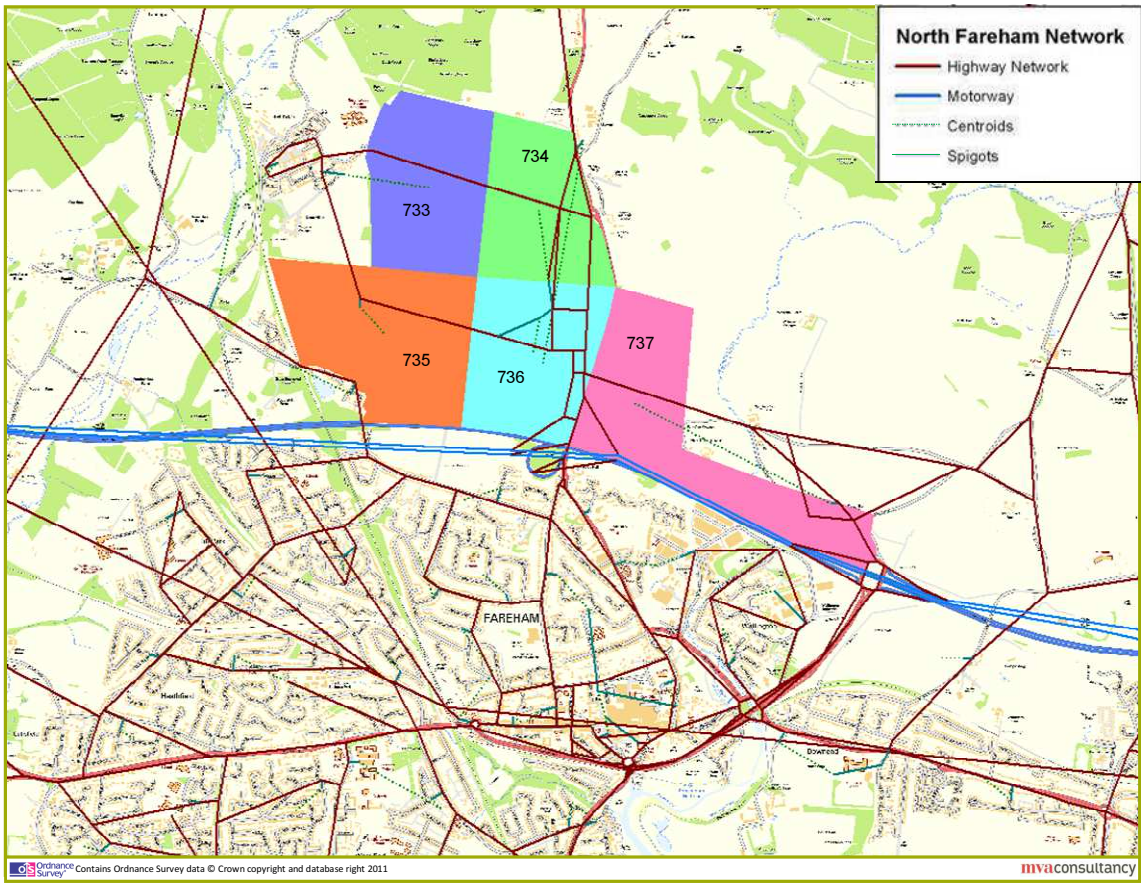


Figure 3.1 Welborne Zones and Highway Links

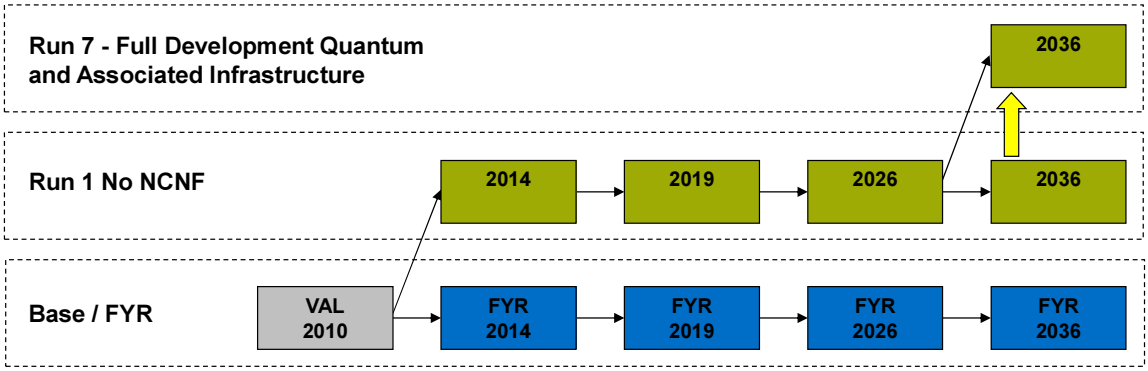
3.3 Scenarios

3.3.1 Figure 3.3 identifies the scenarios that have been modelled in order to assess the impact of Welborne.

3.3.1 The scenarios at the lowest level (Base / FYR) are the standard set of SRTM scenarios; 2010 base year validation and 2014, 2019, 2026 and 2036 Future Year Reference (FYR) Cases. In the FYR cases development is permissible at the Welborne site; the level of development is determined by the LEIM.

3.3.2 In the non-development model run (Run 1) development is not permitted at the Welborne site and highway infrastructure is unchanged from the Reference Case. This is to provide a set of scenarios against which to measure the impact of the development. Run 7 includes both the Welborne development quantum and the associated highway, PT and active mode infrastructure.

3.3.3 The solid yellow arrow shows the scenarios that were compared to establish the impact of the development.



Key

VAL : Validation
FYR : Future Year Reference

Figure 3.2 Scenarios Modelled to Assess the Impact of Welborne

3.4 Highway and Public Transport Network Changes

Highway

3.4.1 Changes have been made to the highway network that differs to those reported in Runs 5 and 6. The proposals still include upgrading M27 J10 to all movements but the western facing slips are located further west compared to Runs 5 and 6. There are 4 accesses from Welborne to the A32 via roundabouts. Three of the accesses are to the development west of A32 and one to the east of A32. The highway measures included in the individual scenarios are detailed in the drawings prepared by WSP in Appendix C.

Public Transport

3.4.2 In addition to the existing local bus services on A32 diverting in to Welborne, the main PT proposals relate to the interaction/ extension of proposed BRT routes to Welborne. The PT measures included in the individual scenarios are detailed in Table 3.1 and the proposed BRT routes and existing service diversions are shown on Figures 3.4 and 3.5. Each pair of lines in Figure 3.3 and Figure 3.4 represents an individual service (out and back).

Table 3-1 Welborne PT Schemes

Run	Scheme	Description
1	Committed Schemes	See Appendix B
	BRT from Fareham TC to Portsmouth	Fareham Bus Station to Portchester and Portsmouth via A27. Frequency of 3bph
7	BRT from Welborne to Gosport	Welborne to Gosport via Fareham Railway Station (not bus station). This is additional to Phase 1 BRT (committed scheme). (See Fig 3.6). Frequency of 4bph
	BRT from Welborne to Portsmouth via A27	Extension of the Run 1 route to the Welborne. (See Fig 3.4). Frequency of 3bph
	BRT from Welborne to Portsmouth via M27 (J10)	Welborne to Portsmouth via M27 J10 and M275. Fast track service. (See Fig 3.4). Frequency of 3bph
	Existing routes to access Welborne	All existing services on A32 to divert to Welborne (Fig 3.5). No change to existing frequencies.

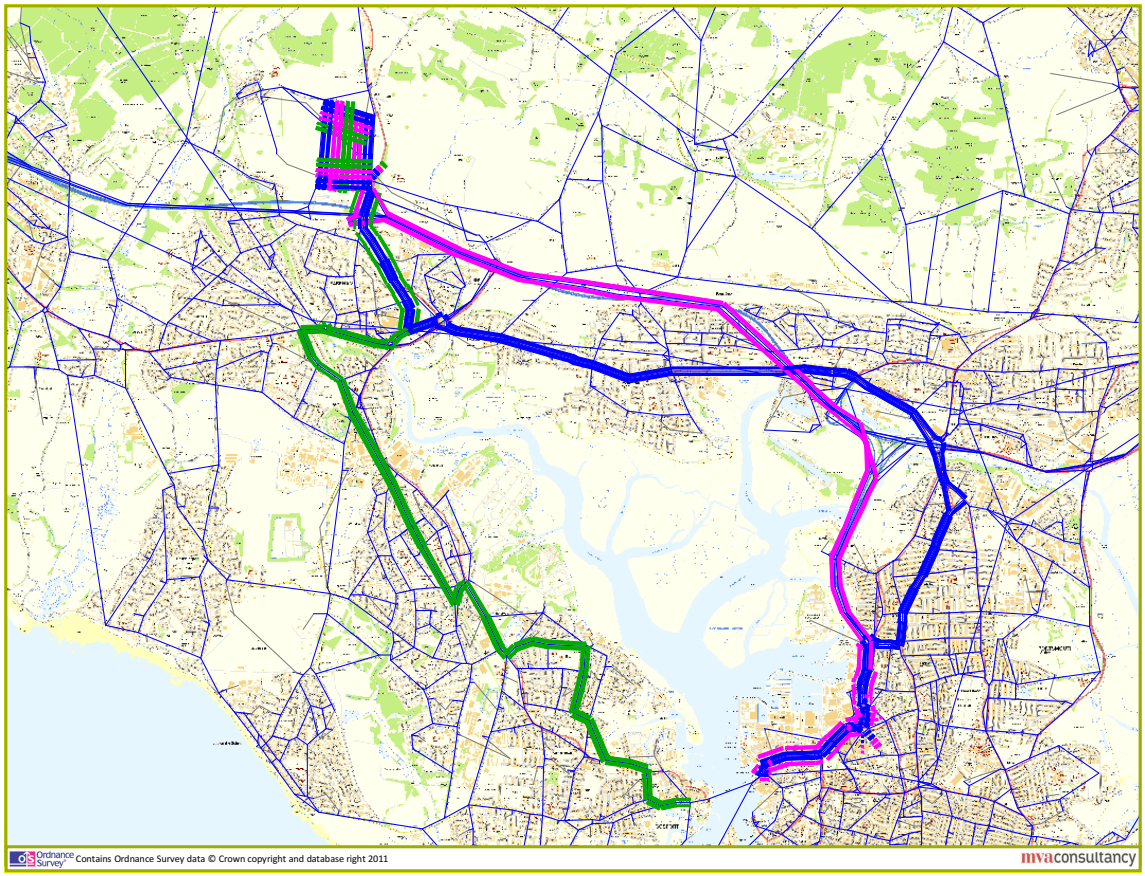


Figure 3.3 New BRT Routes servicing Welborne

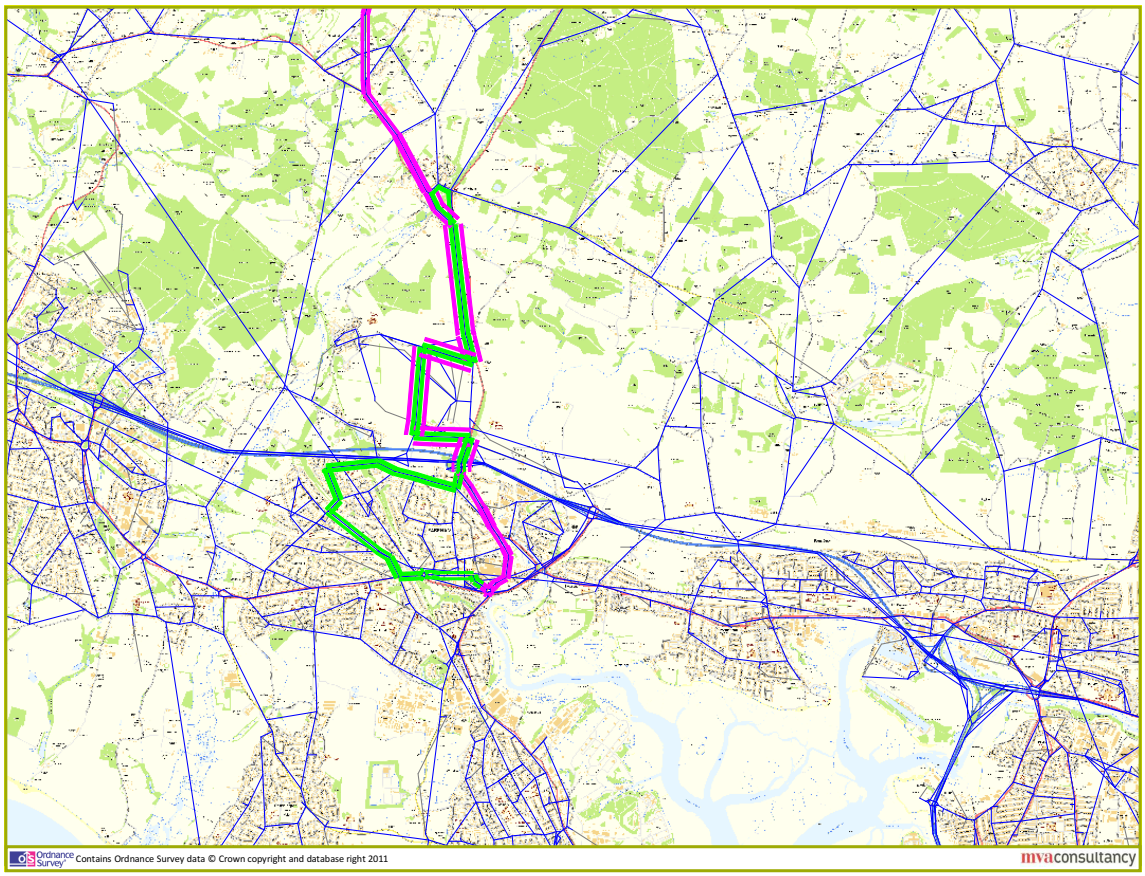


Figure 3.4 Existing A32 Bus Routes Diverted to Welborne

Active Modes

3.4.3 At the time of this study the active mode measures associated to Welborne were of a very indicative nature and scheme details were only provided as a brief text description. The Active Mode measures included in the individual scenarios are detailed in Table 3.2. The Active mode proposals are identical to Runs 5 and 6.

Table 3-2 Welborne Active Mode Schemes

Run	Scheme	Description
1	Committed Schemes	See Appendix B
7	Improved cycle and pedestrian links to Fareham Town Centre	Assumed 30s reduction in pedestrian/ cycle journey time
	Additional off site pedestrian and cycle links to Wickham	Assumed 30s reduction in pedestrian/ cycle journey time

4 Results – Main Demand Model and LEIM

4.1 Introduction

4.1.1 This section identifies the forecasts produced by the MDM and the LEIM for Welborne, including forecast jobs, trips, mode share and emissions.

4.2 Population, Dwellings, Jobs

4.2.1 Tables 4.1 to 4.3 show the LEIM forecasts for the population, number of dwellings and number of jobs within Welborne and the surrounding Districts compared to the without development scenario (Run 1).

4.2.2 The LEIM module of SRTM controls the level of overall development take-up within the model in accordance with TEMPRO employment and population targets for the sub-region which conforms with WebTAG. This is equivalent to allowing for background traffic growth within the modelling process.

4.2.3 The take up of permissible developments (both in terms of location and timeframe) is determined by LEIM based on the local conditions (the relative 'attractiveness' of the development).

4.2.4 In the 'without Welborne Development' (Run 1) scenario no development is permitted within the 5 development zones. The 'with Welborne Development' (Run 7) scenario fixes the development uptake at the 5 development zones to 100% by 2036 to ensure the full impact of the development trips can be quantified. The uptake of all other non-committed developments within the model is determined by LEIM.

4.2.5 Both scenarios remain controlled to TEMPRO employment and population targets. It therefore follows that if the Welborne development is fixed it would draw population/ employment from other areas when compared to the 'Without' scenario. This is why an increase in Welborne can result in a decrease in Portsmouth or other areas in the forecast years.

4.2.6 It should be stressed that the comparisons are based on two forecast year scenarios representing alternative trajectories of development for comparison purposes rather than representing a sudden change from the Welborne development opening.

4.2.7 The SRTM outputs for Welborne dwellings and jobs as summarised in Tables 4.2 and 4.3 is consistent with the FBC targets of 6,500 dwellings and confirms that the SRTM is replicating the desired level of development within the five Welborne development zones. The employment related floorspace was set to 112,000m^2, leading to the creation of 2,600 jobs.

Table 4.1 Forecast Change in Population

District	Run 1	Run 7	Difference (7 vs. 1)
East Hampshire (Core)	20,821	20,622	-199
Eastleigh	126,951	126,579	-372
Fareham (exc. Welborne)	108,611	105,925	-2,686
Gosport	86,424	85,636	-788
Havant	122,559	121,334	-1,225
New Forest (Core)	66,944	66,754	-190
Test Valley (Core)	44,779	44,731	-48
Winchester (Core)	69,448	68,671	-777
Portsmouth	252,720	249,256	-3,464
Southampton	265,696	264,725	-971
Welborne	0	15,050	15,050
Total	**1,164,953**	**1,169,284**	**4,331**

SRTM Ref: ACE v WC

Table 4.2 Forecast Change in Dwellings

District	Run 1	Run 7	Difference (7 vs. 1)
East Hampshire (Core)	9,064	8,975	-89
Eastleigh	56,648	56,529	-119
Fareham (exc. Welborne)	48,827	47,428	-1,399
Gosport	37,811	37,416	-395
Havant	54,027	53,489	-538
New Forest (Core)	29,331	29,275	-56
Test Valley (Core)	19,676	19,657	-19
Winchester (Core)	29,529	29,206	-323
Portsmouth	111,965	110,587	-1,378
Southampton	113,122	112,910	-212
Welborne	0	6,412	6,412
Total	**510,000**	**511,884**	**1,884**

SRTM Ref: ACE v WC

Table 4.3 Forecast Change in Jobs

District	Run 1	Run 7	Difference (7 vs. 1)
East Hampshire (Core)	3,711	3,676	-35
Eastleigh	57,495	57,408	-87
Fareham (exc. Welborne)	43,721	43,794	73
Gosport	23,103	22,967	-136
Havant	40,563	40,086	-477
New Forest (Core)	16,322	16,287	-35
Test Valley (Core)	17,919	17,910	-9
Winchester (Core)	21,273	21,151	-122
Portsmouth	106,359	104,938	-1,421
Southampton	116,038	115,367	-671
Welborne	0	2,600	2,600
Total	**446,504**	**446,184**	**-320**

SRTM Ref: ACE v WC

4.3 Total Person Trips to/from Welborne and Mode Split

4.3.1 Table 4.4 shows the forecast person trips to and from the development, by mode for Run 7. The total number of person trips to the development zones (including intra-zonal trips) is 1906 in the AM peak hour with a mode share of 64% Car, 17% PT and 18% Active. The equivalent AM peak hour total person trips from the development zones is 2907 with a mode share of 74% Car, 10% PT and 16% Active. The PM peak hour values person trips and mode share are broadly the reverse of the AM peak hour.

4.3.2 For a full 24hr period there are a total of 53,974 person trips to/from the development as a whole with a mode share of 72% car, 14% PT and 14% Active.

Table 4-4 Forecast Daily Person Trips to and from the Welborne (Run 7)

Split	Time Period	To Welborne			From Welborne		
		Car	PT	Active	Car	PT	Active
Absolute	AM Peak Hr	1204	341	361	2137	289	481
	AM (07:00-10:00)	3151	852	901	5594	722	1201
	PM Peak Hr	2281	283	355	1511	281	300
	PM (16:00-19:00)	6372	708	888	4222	703	749
	Daily Trips	20089	4103	3901	18684	3278	3919
%	AM Peak Hr	63%	18%	19%	74%	10%	17%
	AM (07:00-10:00)	64%	17%	18%	74%	10%	16%
	PM Peak Hr	78%	10%	12%	72%	13%	14%
	PM (16:00-19:00)	80%	9%	11%	74%	12%	13%
	Daily Trips	72%	15%	14%	72%	13%	15%

SRTM Ref: ACN

4.3.3 Figures 4.2 to 4.7 provide a breakdown of Sectored Demand by mode for Run 1 for the sectors identified in Figure 4.1. Figures 4.8 to 4.13 show this breakdown by mode for Run 7.

4.3.4 For car trips to/ from Welborne there is a reasonable spread across the sectors but with Portsmouth and the 'Near West' being the most attractive origins/ destinations.

4.3.5 Over half of all PT trips to/ from Welborne either originate or are destined for the broad Portsmouth area. Two of the three BRT services that access Welborne go to Portsmouth and these routes provide an attractive mode option to link the population and jobs between the City and Welborne.

4.3.6 The majority of Active mode trips that originate in, or are destined for Welborne, are intra-zonal within the development which is not unexpected. The number of active mode trips to/from Welborne reduces as distance increases and is again consistent with expected behaviour.

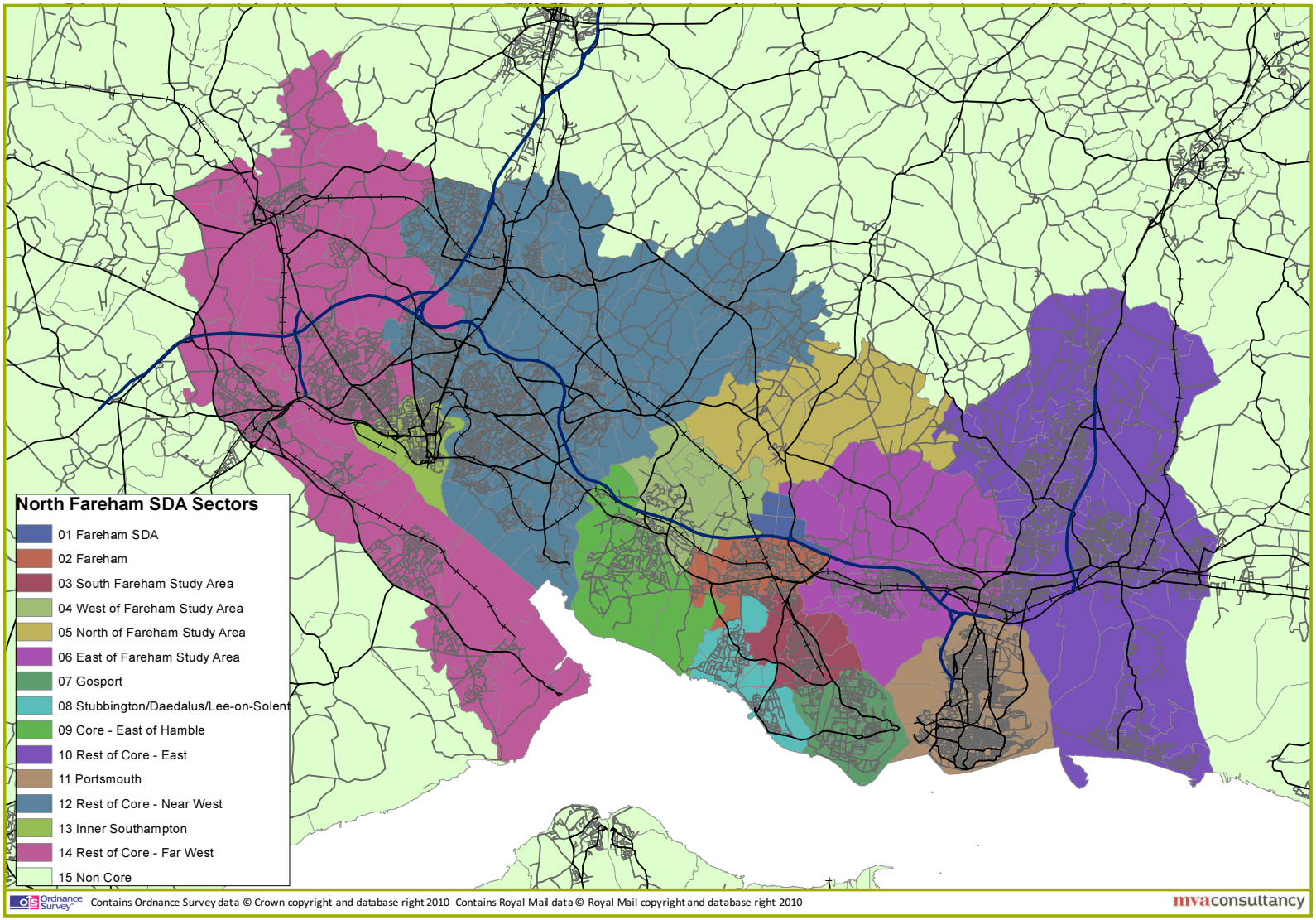


Figure 4.1 Sector Plan

AM Peak period- Car	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)
Fareham SDA											0	0	0	0		0	0
Fareham		2073	809	968	132	752	1042	738	582	822	696	849	87	273	874	10698	4087
Fareham Study Area - South		852	992	310	37	212	1874	685	128	255	260	187	19	61	477	6348	2425
Fareham Study Area - West		919	266	993	179	971	247	350	937	1435	1565	2007	270	330	1045	11513	4398
Fareham Study Area - North		178	42	219	48	197	36	48	77	358	218	678	112	188	267	2665	1018
Fareham Study Area - East		838	224	541	157	3456	204	294	161	5042	3648	1008	139	293	1962	17966	6863
Gosport		1563	2700	585	57	322	3908	1494	207	344	396	296	33	108	1050	13062	4990
Stubbington Area		1287	1305	495	52	288	1899	579	200	317	379	415	48	137	702	8102	3095
Core - East of Hamble		882	277	1978	134	467	263	296	1971	664	988	1639	228	334	2284	12406	4739
Rest of Core - East		1458	352	1261	304	6217	285	428	369	32337	7589	2776	437	1052	11602	66466	25390
Portsmouth	0	630	216	857	117	4129	217	570	243	7640	35346	1154	183	475	7081	58859	22484
Rest of Core - Near West	0	1195	293	2185	718	1645	223	477	1486	2555	1856	49530	8505	11272	14267	96206	36751
Inner Southampton	0	97	24	238	62	134	16	88	192	213	180	6474	4306	5443	4104	21572	8241
Rest of Core - Far West	0	414	97	500	125	489	68	59	212	725	665	9744	7106	25158	11846	57209	21854
Non Core		965	371	1020	189	2357	433	244	718	6592	6145	10594	5868	10206	82383	128084	48928
Total (07:00-10:00)	0	13351	7968	12149	2313	21637	10715	6348	7482	59298	59931	87351	27339	55331	139942	511155	
Total (08:00-09:00)	0	5100	3044	4641	884	8265	4093	2425	2858	22652	22894	33368	10444	21136	53458		195261

Figure 4.2 AM Highway Sectored Demand -Run 1 (Person Trips) (Ref: WC)

AM Peak period- PT	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)
Fareham SDA											0	0	0	0		0	0
Fareham		149	53	43	6	96	45	43	11	76	169	60	63	7	210	1030	412
Fareham Study Area - South		81	45	9	0	18	89	25	2	23	152	21	18	1	111	595	238
Fareham Study Area - West		43	3	46	1	20	3	8	2	49	69	49	77	12	190	573	229
Fareham Study Area - North		9	0	2	9	1	0	0	0	0	3	8	3	0	48	84	34
Fareham Study Area - East		43	10	11	1	293	16	15	2	329	586	32	61	15	208	1622	649
Gosport		133	126	10	0	34	223	92	3	58	470	30	47	2	261	1489	596
Stubbington Area		35	5	4	0	9	24	17	2	11	83	14	26	3	56	289	116
Core - East of Hamble		31	1	7	0	10	1	12	4	36	53	12	97	6	134	404	162
Rest of Core - East		40	23	21	1	448	27	18	8	2668	1217	33	83	27	979	5596	2238
Portsmouth	0	212	60	26	1	484	112	71	5	716	2835	123	140	42	1690	6518	2607
Rest of Core - Near West	0	112	4	48	10	45	11	22	22	56	173	2762	2014	670	2297	8245	3298
Inner Southampton	0	32	2	47	1	18	4	43	35	49	127	1144	1128	702	1365	4696	1878
Rest of Core - Far West	0	48	0	21	1	20	1	6	5	16	56	631	1381	1693	1123	4999	2000
Non Core		159	37	104	16	189	78	30	33	573	1461	1127	1569	611	5526	11512	4605
Total (07:00-10:00)	0	1126	369	398	48	1685	636	401	135	4660	7454	6045	6706	3791	14198	47652	
Total (08:00-09:00)	0	451	147	159	19	674	254	160	54	1864	2982	2418	2682	1516	5679		19061

Figure 4.3 AM PT Sectored Demand -Run 1 (Person Trips) (Ref: WC)

AM Peak period- Active	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)
Fareham SDA																	0
Fareham		3970	370	124	9	91	8	79	38	1	12	6		0	3	4711	1885
Fareham Study Area - South		579	3076	8	2	79	448	231	4	2	47	1		0	17	4496	1798
Fareham Study Area - West		280	20	1479	11	3	0	22	290	0	0	429	11	1	0	2547	1019
Fareham Study Area - North		37	2	22	477	48	0	0	1	2	0	28			2	618	247
Fareham Study Area - East		167	81	4	11	7119	26	6	0	719	633	1			3	8769	3508
Gosport		41	1102	5	1	80	7735	330	3	11	1961	0		0	90	11358	4543
Stubbington Area		166	429	6	0	5	302	1628	24	0	18	1		0	24	2605	1042
Core - East of Hamble		109	7	251	1	1	1	18	1637		0	106	5	9	6	2151	860
Rest of Core - East		5	4	0	8	1010	5	0		21470	574	1			221	23298	9319
Portsmouth		38	68	0	1	876	723	9	0	765	41643				100	44223	17689
Rest of Core - Near West		6	1	91	29	1	0	0	186	0		29516	2590	1172	329	33922	13569
Inner Southampton				5					6			3637	13960	1906	5	19519	7808
Rest of Core - Far West		1	0	2			0	0	53			1948	1159	20789	248	24202	9681
Non Core		6	36	1	3	2	92	32	16	222	133	211	2	197	267631	268584	107434
Total (07:00-10:00)		5404	5196	1997	553	9316	9341	2356	2258	23192	45023	35887	17727	24074	268679	451003	
Total (08:00-09:00)	0	2162	2079	799	221	3726	3736	942	903	9277	18009	14355	7091	9630	107472		180401

Figure 4.4 AM Active Mode Sectored Demand -Run 1 (Person Trips) (Ref: WC)

PM Peak period- Car	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)
Fareham SDA											0	0	0	0		0	0
Fareham		2033	999	1071	170	1389	1894	1397	992	1605	1097	1494	147	429	1110	15827	5666
Fareham Study Area - South		995	1010	320	50	377	3225	1539	312	418	408	407	47	120	492	9721	3480
Fareham Study Area - West		1331	373	1333	312	934	636	584	2294	1609	1438	3378	327	675	1281	16506	5909
Fareham Study Area - North		170	46	241	67	238	62	57	157	382	171	895	86	172	256	2999	1074
Fareham Study Area - East		937	250	955	259	4080	326	349	519	7908	6276	2284	245	622	2720	27731	9928
Gosport		1442	2354	367	53	401	5249	2619	353	428	457	476	59	149	923	15331	5488
Stubbington Area		1079	941	502	68	469	2202	857	426	579	774	724	122	121	514	9377	3357
Core - East of Hamble		1105	240	1263	117	335	366	377	2174	520	484	2304	233	373	984	10876	3894
Rest of Core - East		1411	407	1428	515	7335	505	446	737	38711	9472	3820	383	1011	9382	75564	27052
Portsmouth	0	1048	359	1315	299	5589	475	516	896	10778	45478	2551	327	791	8780	79202	28354
Rest of Core - Near West	0	1789	344	3326	797	1690	449	669	2441	3481	2107	60458	9223	13268	12343	112388	40235
Inner Southampton	0	167	35	366	178	236	46	62	226	509	302	10612	6376	9279	6517	34910	12498
Rest of Core - Far West	0	566	98	703	201	471	148	236	479	1125	766	14794	7795	31755	13880	73018	26141
Non Core		1439	512	1489	324	2728	1142	850	2011	13236	9056	14797	5520	12771	106533	172407	61722
Total (07:00-10:00)	0	15513	7968	14680	3410	26273	16725	10558	14017	81289	78287	118994	30891	71537	165714	655857	
Total (08:00-09:00)	0	5554	2852	5255	1221	9406	5988	3780	5018	29101	28027	42600	11059	25610	59326		234797

Figure 4.5 PM Highway Sectored Demand -Run 1 (Person Trips) (Ref: WC)

PM Peak period- PT	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)
Fareham SDA											0	0	0	0		0	0
Fareham		162	90	49	16	75	156	43	38	46	208	103	42	19	114	1161	464
Fareham Study Area - South		56	49	4	1	14	149	13	2	19	133	4	3	0	41	488	195
Fareham Study Area - West		49	11	34	1	11	11	4	6	20	62	48	52	20	106	434	173
Fareham Study Area - North		8	0	1	4	1	0	0	0	1	1	7	2	0	18	44	18
Fareham Study Area - East		87	22	19	1	239	29	10	19	450	631	40	38	19	169	1773	709
Gosport		70	118	4	0	16	302	47	3	27	234	10	5	4	84	925	370
Stubbington Area		51	31	7	0	16	115	26	15	16	100	22	46	6	30	483	193
Core - East of Hamble		19	3	1	0	3	3	4	4	3	42	22	31	7	29	170	68
Rest of Core - East		50	24	28	3	346	50	11	12	2691	903	57	50	14	541	4781	1912
Portsmouth	0	204	220	88	3	602	554	126	91	1328	3515	140	98	45	1191	8207	3283
Rest of Core - Near West	0	56	21	37	4	28	30	12	16	35	130	2615	1106	533	1012	5637	2255
Inner Southampton	0	67	27	74	3	66	54	26	95	87	118	2082	1093	1439	1405	6636	2655
Rest of Core - Far West	0	8	2	13	0	12	3	3	10	12	30	638	817	1583	544	3673	1469
Non Core		154	105	145	38	202	204	45	96	833	1286	1944	1006	949	5177	12187	4875
Total (07:00-10:00)	0	1042	723	505	74	1632	1661	371	408	5568	7394	7732	4389	4639	10463	46600	
Total (08:00-09:00)	0	417	289	202	30	653	664	149	163	2227	2957	3093	1755	1856	4185		18640

Figure 4.6 PM PT Sectored Demand -Run 1 (Person Trips) (Ref: WC)

PM Peak period- Active	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)
Fareham SDA																	0
Fareham		3682	554	133	13	147	40	104	60	4	41	7		1	6	4794	1918
Fareham Study Area - South		460	2473	11	2	94	895	288	7	4	83	1		0	37	4356	1742
Fareham Study Area - West		153	9	1441	17	4	5	8	260	0	0	101	5	3	1	2007	803
Fareham Study Area - North		9	2	14	443	9	1	0	1	4	1	31			3	519	208
Fareham Study Area - East		115	95	3	14	7010	84	6	1	1090	1075	1			3	9497	3799
Gosport		14	568	0	0	39	7420	282	1	6	946	0		0	105	9383	3753
Stubbington Area		91	270	17	0	6	379	1473	20	0	12	0		0	31	2301	920
Core - East of Hamble		46	5	219	1	0	2	22	1262		0	170	7	15	13	1763	705
Rest of Core - East		1	2	0	2	805	12	0		18647	756	0			231	20456	8182
Portsmouth		16	60	0	0	849	1334	20	0	642	38089				149	41160	16464
Rest of Core - Near West		7	1	203	24	2	0	1	129	1		24715	2556	1134	202	28975	11590
Inner Southampton				7					5			2507	13072	1428	3	17023	6809
Rest of Core - Far West		0	0	1			0	0	5			1071	1752	20264	209	23304	9322
Non Core		4	23	1	3	3	110	30	8	225	125	291	5	263	262948	264041	105617
Total (07:00-10:00)		4600	4063	2050	521	8969	10282	2234	1761	20625	41129	28897	17398	23108	263942	429579	
Total (08:00-09:00)	0	1840	1625	820	208	3587	4113	894	704	8250	16451	11559	6959	9243	105577		171831

Figure 4.7 PM Active Mode Sectored Demand -Run 1 (Person Trips) (Ref: WC)

AM Peak period- Car	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)	% to SDA
Fareham SDA	326	544	135	758	95	467	72	153	172	607	674	1080	161	146	206	5594	2137	10%
Fareham	265	1900	768	951	112	689	1005	689	568	762	649	831	86	272	842	10389	3969	8%
Fareham Study Area - South	60	830	973	296	34	209	1852	667	127	252	253	179	19	60	470	6281	2399	2%
Fareham Study Area - West	400	972	264	937	193	921	242	340	890	1314	1401	1934	261	325	999	11394	4352	13%
Fareham Study Area - North	54	141	35	241	45	180	30	43	82	339	178	679	113	197	263	2621	1001	2%
Fareham Study Area - East	256	793	221	507	146	3349	196	284	155	4934	3567	961	133	286	1935	17725	6771	8%
Gosport	45	1515	2644	554	54	317	3890	1450	203	337	385	286	32	105	1039	12857	4911	1%
Stubbington Area	68	1238	1271	474	49	282	1888	567	197	310	368	401	46	135	696	7991	3052	2%
Core - East of Hamble	159	898	282	1909	139	456	261	293	1933	624	916	1600	223	330	2251	12276	4689	5%
Rest of Core - East	317	1403	359	1135	288	6112	273	422	344	31933	7508	2671	420	1027	11536	65747	25115	10%
Portsmouth	479	625	218	749	101	4021	188	552	221	7507	34758	1072	175	460	7013	58140	22209	15%
Rest of Core - Near West	513	1262	280	2082	715	1601	202	456	1467	2485	1728	49062	8447	11411	14272	95982	36665	16%
Inner Southampton	86	105	23	224	62	132	13	83	188	203	170	6400	4276	5488	4094	21548	8231	3%
Rest of Core - Far West	43	457	98	494	129	497	68	62	212	723	659	10160	7223	25789	12010	58623	22394	1%
Non Core	80	983	370	969	185	2316	437	242	705	6531	6080	10542	5851	10258	82511	128060	48919	3%
Total (07:00-10:00)	3151	13668	7940	12283	2345	21550	10617	6304	7466	58862	59296	87857	27465	56287	140137	515228		100%
Total (08:00-09:00)	1204	5221	3033	4692	896	8232	4056	2408	2852	22485	22651	33562	10492	21501	53532		196817	
% from SDA	6%	10%	2%	14%	2%	8%	1%	3%	3%	11%	12%	19%	3%	3%	4%	100%		

Figure 4.8 AM Highway Sectored Demand -Run 7 (Person Trips) (Ref: ACN)

AM Peak period- PT	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)	% to SDA
Fareham SDA	43	44	9	3	1	63	19	5	0	38	393	21	40	7	37	722	289	5%
Fareham	50	145	51	41	4	104	45	38	11	76	177	56	58	6	193	1057	423	6%
Fareham Study Area - South	20	86	43	9	0	20	87	22	2	22	154	21	17	1	107	612	245	2%
Fareham Study Area - West	5	43	3	43	1	21	4	8	2	48	73	48	76	12	190	577	231	1%
Fareham Study Area - North	4	6	0	2	8	1	0	0	0	0	7	7	3	0	47	87	35	1%
Fareham Study Area - East	64	47	10	11	1	306	17	13	2	316	606	30	56	15	200	1692	677	8%
Gosport	53	147	124	11	0	35	218	87	3	56	463	30	47	2	251	1527	611	6%
Stubbington Area	3	33	5	4	0	9	23	17	2	11	83	14	25	3	55	287	115	0%
Core - East of Hamble	1	30	1	7	0	10	1	13	4	36	52	12	95	6	132	399	159	0%
Rest of Core - East	48	45	24	20	1	439	26	17	8	2618	1183	33	81	27	967	5537	2215	6%
Portsmouth	446	270	63	25	2	490	106	67	5	676	2704	117	133	41	1587	6732	2693	52%
Rest of Core - Near West	30	107	4	47	10	45	11	21	22	55	172	2743	1997	676	2289	8228	3291	4%
Inner Southampton	48	30	2	46	1	18	2	42	35	48	125	1131	1113	709	1356	4704	1882	6%
Rest of Core - Far West	9	51	0	21	0	22	1	6	5	19	65	659	1423	1736	1154	5171	2069	1%
Non Core	29	156	38	102	16	190	76	29	32	573	1445	1121	1562	618	5525	11512	4605	3%
Total (07:00-10:00)	852	1238	376	391	46	1773	635	386	133	4593	7704	6041	6725	3861	14091	48845		100%
Total (08:00-09:00)	341	495	150	157	18	709	254	154	53	1837	3082	2416	2690	1544	5636		19538	
% from SDA	6%	6%	1%	0%	0%	9%	3%	1%	0%	5%	54%	3%	6%	1%	5%	100%		

Figure 4.9 AM PT Sectored Demand - Run 7 (Person Trips) (Ref: ACN)

AM Peak period- Active	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)	% to SDA
Fareham SDA	747	246	45	54	14	53	12	13	3	3	9	3			0	1201	481	83%
Fareham	87	3722	359	120	8	83	8	78	38	1	12	6		0	3	4525	1810	10%
Fareham Study Area - South	13	547	3054	8	1	77	442	228	4	2	47	1		0	17	4443	1777	1%
Fareham Study Area - West	22	282	20	1427	10	3	0	22	286	0	0	427	11	1	0	2511	1005	2%
Fareham Study Area - North	6	36	2	18	464	45	0	0	1	2	0	28			2	604	242	1%
Fareham Study Area - East	14	146	81	3	10	6996	25	5	0	709	618	1			3	8612	3445	2%
Gosport	5	35	1081	4	1	78	7641	322	2	11	1935	0		0	88	11203	4481	1%
Stubbington Area	3	162	428	6	0	5	298	1612	24	0	18	1		0	24	2582	1033	0%
Core - East of Hamble	1	108	6	245	1	1	1	17	1615		0	105	5	9	6	2121	848	0%
Rest of Core - East	0	4	4	0	7	998	5	0		21179	562	1			218	22979	9191	0%
Portsmouth	2	32	66	0	1	858	712	8	0	753	40944				99	43475	17390	0%
Rest of Core - Near West	2	5	1	90	28	1	0	0	185	0		29366	2584	1177	328	33769	13508	0%
Inner Southampton				5					6			3623	13905	1905	5	19448	7779	0%
Rest of Core - Far West		1	0	2			0	0	52			1986	1175	21724	250	25190	10076	0%
Non Core	0	6	35	1	3	2	93	32	15	221	132	211	2	197	267763	268714	107486	0%
Total (07:00-10:00)	901	5332	5183	1983	548	9200	9239	2339	2232	22881	44277	35759	17682	25013	268807	451378		100%
Total (08:00-09:00)	361	2133	2073	793	219	3680	3696	936	893	9152	17711	14304	7073	10005	107523		180551	
% from SDA	62%	20%	4%	4%	1%	4%	1%	1%	0%	0%	1%	0%	0%	0%	0%	100%		

Figure 4.10 AM Active Mode Sectored Demand - Run 7 (Person Trips) (Ref: ACN)

PM Peak period- Car	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)	% to SDA
Fareham SDA	466	352	77	536	82	397	57	101	205	432	642	651	92	39	93	4222	1511	7%
Fareham	602	1833	967	1062	139	1306	1824	1332	973	1524	1039	1505	148	446	1077	15778	5649	9%
Fareham Study Area - South	148	947	993	313	43	369	3155	1502	311	418	403	394	46	121	488	9653	3456	2%
Fareham Study Area - West	982	1304	352	1248	341	866	599	553	2184	1442	1261	3178	302	656	1206	16473	5897	15%
Fareham Study Area - North	115	144	42	256	62	219	58	53	160	359	152	887	87	179	250	3021	1082	2%
Fareham Study Area - East	545	854	246	892	231	3934	320	341	500	7747	6128	2211	240	629	2682	27501	9845	9%
Gosport	88	1392	2330	359	47	388	5211	2588	348	407	420	453	55	149	923	15157	5426	1%
Stubbington Area	188	1011	915	487	62	454	2144	833	418	567	748	700	117	124	511	9280	3322	3%
Core - East of Hamble	197	1066	236	1217	120	318	360	370	2136	487	447	2278	228	372	968	10799	3866	3%
Rest of Core - East	630	1297	402	1310	481	7120	498	437	697	38207	9332	3752	377	1017	9341	74897	26813	10%
Portsmouth	765	954	348	1175	237	5416	463	495	835	10656	44787	2410	318	793	8722	78372	28057	12%
Rest of Core - Near West	1124	1811	333	3226	797	1607	439	651	2395	3356	1985	59979	9157	13698	12291	112849	40400	18%
Inner Southampton	177	168	34	354	181	228	45	60	221	489	287	10542	6336	9422	6494	35037	12543	3%
Rest of Core - Far West	143	571	96	696	210	462	146	233	475	1097	742	15056	7887	32591	13962	74367	26623	2%
Non Core	203	1404	505	1444	317	2686	1133	843	1988	13147	8974	14818	5512	12947	106681	172601	61791	3%
Total (07:00-10:00)	6372	15109	7875	14576	3351	25768	16452	10391	13844	80335	77346	118814	30901	73181	165689	660005		100%
Total (08:00-09:00)	2281	5409	2819	5218	1200	9225	5890	3720	4956	28760	27690	42535	11063	26199	59317		236282	
% from SDA	11%	8%	2%	13%	2%	9%	1%	2%	5%	10%	15%	15%	2%	1%	2%	100%		

Figure 4.11 PM Highway Sectored Demand - Run 7 (Person Trips) (Ref: ACN)

PM Peak period- PT	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)	% to SDA
Fareham SDA	29	45	23	3	2	52	60	2	1	41	370	21	28	4	23	703	281	4%
Fareham	46	149	89	49	11	86	167	41	36	51	235	96	40	20	111	1227	491	7%
Fareham Study Area - South	9	53	47	4	1	15	145	12	2	20	139	4	3	0	43	496	198	1%
Fareham Study Area - West	3	46	11	31	1	11	12	4	5	19	61	47	50	19	106	426	171	0%
Fareham Study Area - North	1	5	0	1	4	1	0	0	0	1	2	7	1	0	18	43	17	0%
Fareham Study Area - East	60	92	23	21	1	238	31	10	19	437	630	39	36	21	170	1828	731	9%
Gosport	23	73	115	4	0	17	295	45	3	25	226	10	2	4	84	928	371	3%
Stubbington Area	6	47	28	7	0	14	109	26	16	15	95	22	45	6	29	465	186	1%
Core - East of Hamble	0	17	3	1	0	2	3	4	4	3	42	22	31	7	28	167	67	0%
Rest of Core - East	33	51	23	29	3	333	49	11	12	2639	853	57	50	17	541	4700	1880	5%
Portsmouth	393	223	223	91	6	606	548	125	89	1280	3350	139	96	54	1173	8396	3358	56%
Rest of Core - Near West	18	52	21	37	4	27	30	12	16	35	122	2599	1095	555	1008	5629	2251	3%
Inner Southampton	45	63	27	73	3	61	55	25	93	84	113	2066	1080	1474	1396	6656	2662	6%
Rest of Core - Far West	8	7	2	13	0	12	3	3	10	12	30	646	827	1624	550	3746	1498	1%
Non Core	33	143	103	146	39	195	198	45	95	823	1228	1940	1003	975	5178	12142	4857	5%
Total (07:00-10:00)	708	1065	737	509	75	1668	1703	364	402	5486	7496	7713	4387	4780	10458	47551		100%
Total (08:00-09:00)	283	426	295	204	30	667	681	146	161	2194	2998	3085	1755	1912	4183		19020	
% from SDA	4%	6%	3%	0%	0%	7%	8%	0%	0%	6%	53%	3%	4%	1%	3%	100%		

Figure 4.12 PM PT Sectored Demand - Run 7 (Person Trips) (Ref: ACN)

PM Peak period- Active	Fareham SDA	Fareham	Fareham Study Area - South	Fareham Study Area - West	Fareham Study Area - North	Fareham Study Area - East	Gosport	Stubbington Area	Core - East of Hamble	Rest of Core - East	Portsmouth	Rest of Core - Near West	Inner Southampton	Rest of Core - Far West	Non Core	Total (07:00-10:00)	Total (08:00-09:00)	% to SDA
Fareham SDA	559	106	15	32	5	16	5	4	1	1	2	2			0	749	300	63%
Fareham	172	3401	524	127	13	132	36	101	59	4	35	7		1	6	4615	1846	19%
Fareham Study Area - South	32	443	2444	11	2	92	873	285	7	4	81	1		0	37	4312	1725	4%
Fareham Study Area - West	43	145	8	1387	15	4	4	7	254	0	0	100	5	3	1	1977	791	5%
Fareham Study Area - North	11	8	2	13	428	8	1	0	1	4	1	30			3	510	204	1%
Fareham Study Area - East	38	105	93	3	13	6892	81	6	1	1074	1053	1			3	9363	3745	4%
Gosport	10	13	560	0	0	39	7307	279	1	6	929	0		0	106	9253	3701	1%
Stubbington Area	11	90	265	17	0	6	371	1456	20	0	12	0		0	31	2280	912	1%
Core - East of Hamble	2	46	5	216	1	0	2	22	1244		0	169	6	15	13	1741	696	0%
Rest of Core - East	2	1	2	0	2	794	11	0		18373	743	0			229	20157	8063	0%
Portsmouth	6	16	59	0	0	832	1308	20	0	629	37361				147	40381	16152	1%
Rest of Core - Near West	2	7	1	201	25	1	0	1	127	1		24589	2546	1162	201	28865	11546	0%
Inner Southampton				7					5			2500	13016	1441	3	16972	6789	0%
Rest of Core - Far West		0	0	1			0	0	5			1080	1755	20983	210	24034	9614	0%
Non Core	0	4	23	1	3	3	108	30	8	223	123	291	5	265	263121	264210	105684	0%
Total (07:00-10:00)	888	4385	4004	2015	509	8820	10108	2210	1734	20320	40342	28769	17334	23869	264113	429420		100%
Total (08:00-09:00)	355	1754	1602	806	203	3528	4043	884	694	8128	16137	11508	6934	9548	105645		171768	
% from SDA	75%	14%	2%	4%	1%	2%	1%	0%	0%	0%	0%	0%	0%	0%	0%	100%		

Figure 4.13 PM Active Mode Sectored Demand - Run 7 (Person Trips) (Ref: ACN)

4.4 Emissions

4.4.1 Tables 4.5 to 4.9 show the forecast emissions (NOx, PM10, HC, CO, Carbon) from the four modelled scenarios. Emission outputs are provided for the modelled region as a whole and for Fareham District. The change in emissions across the modelled area as a whole resulting from the development is minimal and within Fareham District range between 0.75 to 1.5% increases.

Table 4-5 NOx Forecast Emissions (Kg/12hr)

	Run 1	Run 7	7 vs. 1 (Abs)	7 vs. 1 (%)
Whole Model	5,620	5,620	-1	-0.01%
Fareham District	529	535	6	1.05%

SRTM Ref: ACN v WC

Table 4-6 PM10 Forecast Emissions (Kg/12hr)

	Run 1	Run 7	7 vs. 1 (Abs)	7 vs. 1 (%)
Whole Model	100	100	0	-0.03%
Fareham District	8	8	0	1.21%

SRTM Ref: ACN v WC

Table 4-7 HC Forecast Emissions (Kg/12hr)

	Run 1	Run 7	7 vs. 1 (Abs)	7 vs. 1 (%)
Whole Model	3,132	3,132	0	0.01%
Fareham District	339	344	5	1.54%

SRTM Ref: ACN v WC

Table 4-8 CO Forecast Emissions (Kg/12hr)

	Run 1	Run 7	7 vs. 1 (Abs)	7 vs. 1 (%)
Whole Model	36,431	36,403	-29	-0.08%
Fareham District	2,839	2,861	22	0.78%

SRTM Ref: ACN v WC

Table 4-9 Carbon Forecast Emissions (Kg/12hr)

	Run 1	Run 7	7 vs. 1 (Abs)	7 vs. 1 (%)
Whole Model	2,080,262	2,079,969	-292	-0.01%
Fareham District	194,936	197,244	2,308	1.18%

SRTM Ref: ACN v WC

5 Results - Road Traffic Model

5.1 Introduction

5.1.1 This chapter summarises the Road Traffic Model (RTM) outputs for the Welborne site, including forecast changes in flows and delays. The results include the following two scenarios:

- Run 1 – 2036 No Development at Welborne
- Run 7 – 2036 Full Welborne Development Quantum and 2036 Associated Infrastructure

5.2 Highway Network Performance

5.2.1 Tables 5.1 and 5.2 summarise key network statistics for the study area (as identified in Figure 5.1) as defined by FBC.

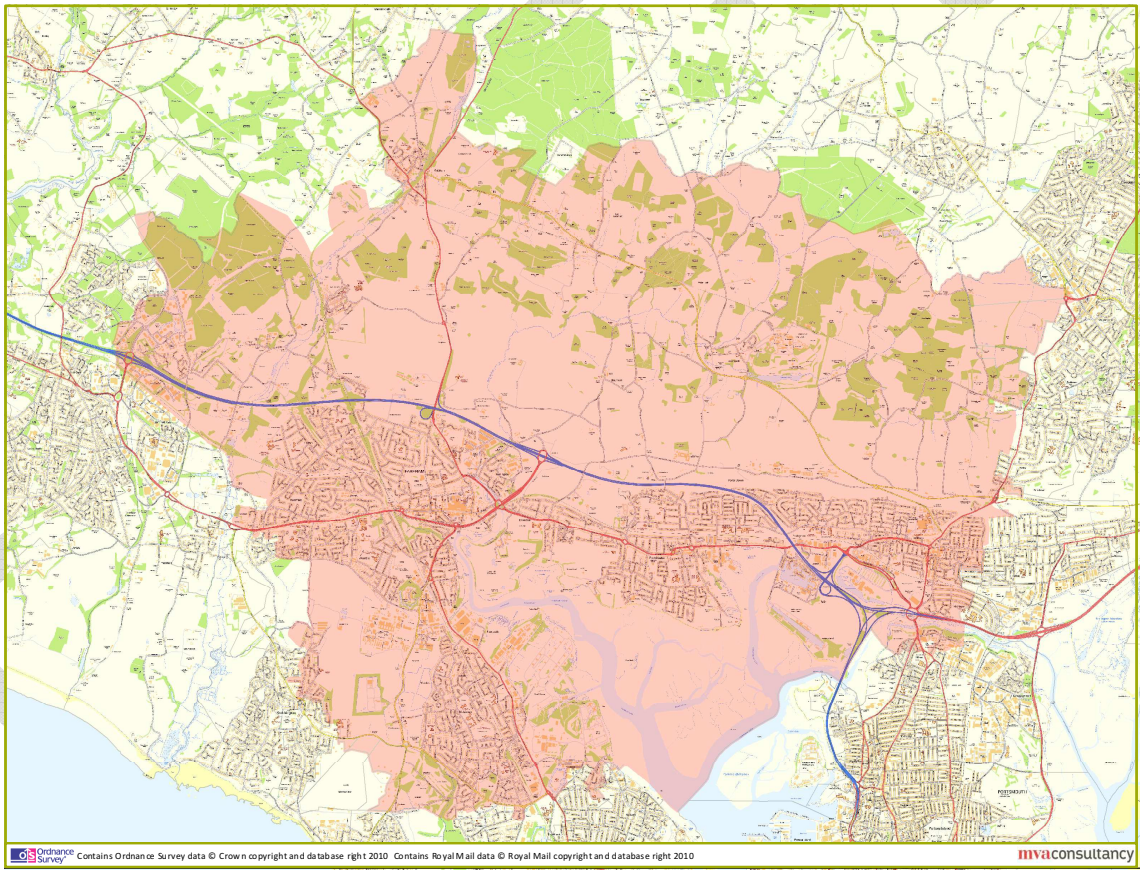


Figure 5.1 'Study Area'

5.2.2 Table 5.1 and 5.2 also summarise the journey times for the following routes (the routes are defined in Figure 5.2):

- Route 1 – N-S Wickham to Junction of A32/ Rowner Road (via A27);
- Route 2 – E-W Quay Street to M27 J9 (via A27); and
- Route 3 – E-W M27 J9 to M27 J12.

5.2.3 For Run 7, vehicle kilometres and vehicle hours have remained similar when compared to Run 1.

5.2.4 For the journey times on the three identified routes the most significant change in both AM and PM peak periods is on Route 1 (A32); in the AM peak the southbound journey increases by 5.5% and in the PM peak the northbound journey increases by 7.2%. This route incorporates the section of A32 adjacent to Welborne and it is expected that this increase is related to the highway activity associated to the development and the increased number of junctions on A32 that service the development.

Table 5-1 AM Period (07:00-10:00) Study Area Network Statistics

Parameter			Run 1	Run 7	7 vs 1 (Abs)	7 vs 1 (%)
Vehicle Hr			101651	101667	15.9	0.0%
Vehicle Km			5300424	5302913	2489	0.0%
Average Speed (kph)			52.1	52.2	0.1	0.2%
Journey Time (mins)	Route 1	S/B	19.9	21.0	1.1	5.5%
		N/B	23.3	24.3	1.0	4.1%
	Route 2	E/B	13.6	13.5	-0.1	-0.7%
		W/B	13.7	13.3	-0.4	-2.6%
	Route 3	E/B	11.3	11.6	0.3	2.4%
		W/B	8.5	8.6	0.1	0.8%

SRTM Ref: ACN v WC

Table 5-2 PM Period (16:00-19:00) Study Area Network Statistics

Parameter			Run 1	Run 7	7 vs 1 (Abs)	7 vs 1 (%)
Vehicle Hr			96675	96623	-51.8	-0.1%
Vehicle Km			5031252	5030731	-521.5	0.0%
Average Speed (kph)			52	52.1	0.1	0.2%
Journey Time (mins)	Route 1	S/B	22.7	22.7	0.0	-0.1%
		N/B	21.2	22.7	1.5	7.2%
	Route 2	E/B	12.5	12.6	0.1	0.8%
		W/B	12.1	12.1	0.0	-0.3%
	Route 3	E/B	9.6	9.8	0.2	2.2%
		W/B	9.2	8.9	-0.3	-2.8%

SRTM Ref: ACN v WC

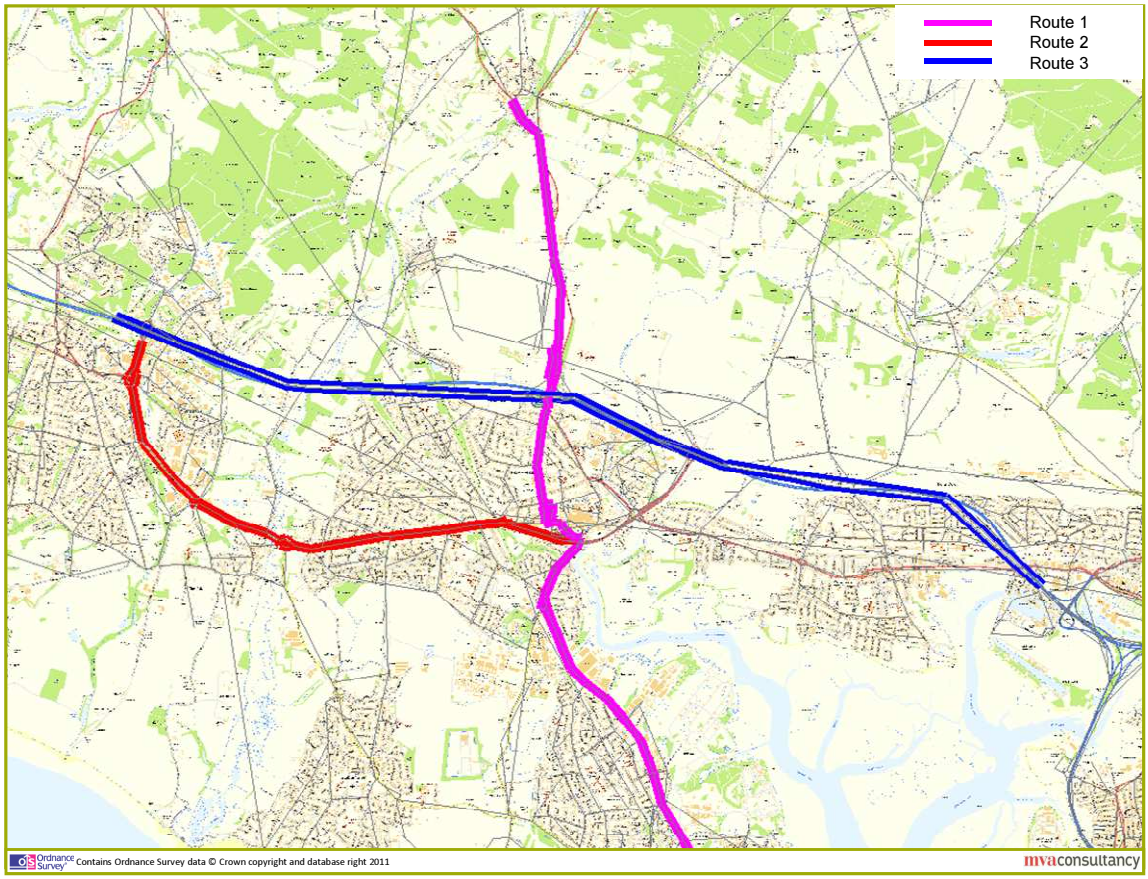


Figure 5.2 Journey Time Routes

5.3 Highway Link Flows, Delays and Capacity Hotspots

5.3.1 The output plots included as Figures 5.3 to 5.20 summarise the performance of the highway network at the development site and Fareham Town Centre. Where appropriate the Figures include an inset that provides a zoomed in view of the network in the immediate vicinity to Welborne. For clarity on the output plots, only data that exceeds the thresholds identified in Sections 5.3.2 to 5.3.11 below is included in the figures.

Total Highway Flows

5.3.2 Figures 5.3 and 5.4 identify the total link traffic flows (PCUs) for Run 1 and Run 7 respectively in the AM peak hour. The corresponding PM data is included in Figures 5.12 and 5.13.

Development Only Flows

5.3.3 Figures 5.5 and 5.14 identify Welborne development only traffic (in PCUs) for the AM and PM peak hours respectively. These plots isolate the distribution of development trips on the highway network. For clarity only development flows in excess of 50 PCUs are displayed on the plots.

Change in Traffic Flow

5.3.4 Figures 5.6 and 5.15 identify the change in traffic flow in the AM and PM peak hours respectively peak between the 'with' (Run 7) and 'without' (Run 1) development scenarios.

Figures 5.7 and 5.14 focus on M27 J9 in the AM and PM peaks respectively and Figures 5.8 and 5.16 focus on M27 J11.

5.3.5 In addition to new traffic directly associated with the developments these plots highlight any re-routing of traffic that may result from localised congestion or redistribution of existing trips to the new facilities (e.g. homes, shops, schools etc.). These plots identify where the net change to traffic flow is most pronounced.

5.3.6 For the flow difference plots, the absolute difference in PCUs is identified adjacent to the appropriate link. Blue lines identify a reduction compared to the non-development scenario and pink/red lines an increase. In addition, the scale of the change is represented graphically with the coloured lines of varying bandwidth. Only flow differences of 50 PCUs or greater and are displayed in the plots.

5.3.7 For the flow difference plots the most immediate observation is the net reduction in trips between junctions 10 and 11 of M27. This is due to the provision of the new west facing slips at J10 that remove the need for traffic joining/ exiting at J10 to perform a u-turn via J11 if originating or departing west of J10. In the AM peak there is a noticeable net increase in southbound trips on the A32 in to Fareham itself, a pattern that is reversed in the PM peak.

Highway Delays

5.3.8 Figures 5.9 and 5.18 identify the change in link delay in the AM and PM peak hours respectively between the 'with' (Run 7) and 'without' (Run 1) development scenarios. The absolute difference in delay in seconds is identified adjacent to the appropriate link. Blue lines identify a reduction compared to the non-development scenario and pink/red lines an increase. In addition, the scale of the change is represented graphically with the coloured lines of varying bandwidth. All delay differences in excess of 1s are displayed in the plots.

Capacity Hotspots

5.3.9 Figures 5.10 and 5.19 identify the capacity hotspots for the AM and PM peak hours for the 'without' development (Run 1) scenario. Figures 5.11 and 5.20 identify the corresponding capacity hotspots for the AM and PM peak hours for the 'with' development (Run 7) scenario. The hotspots are defined in terms of the link Volume to Capacity ratio (V/C). For the V/C plots the performance of the link is identified through the colour of the link as follows:

- > 80% - Pink
- > 100% - Red

5.3.10 If the V/C is near, or in excess of 90%, then the junction will be subject to queuing and delays; a value of 90% is taken as the practical value for design purposes. A value of >100% means that the junction is over capacity and signification queues and delay could occur.

5.3.11 In terms of delay and the performance of the actual Welborne infrastructure the junction of the main E-W link with A32 is just over capacity in the AM peak. The junction of the E-W with the main N-S link within the development is approaching capacity in the AM peak. There are no forecast capacity problems with the Welborne site infrastructure in the PM peak. The development site junctions have been built as part of the Run 7 network and may require additional localised junction modelling to obtain satisfactory operation.

5.3.12 For the existing network infrastructure Table 5.3 below summarises those junctions in the broad Fareham area that are forecast to operate with a V/C in excess of 90% in 2036. In the table ✓ identifies a junction with V/C greater than 90% but less than 100% and ✓✓ identifies a junction with V/C in excess of 100%. Nine junctions are identified as experiencing capacity problems in 2036 in the broad vicinity to the site, however, eight of these junctions were forecast to experience similar scale or worse problems without the Welborne development. The one exception is M27 J10 westbound offslip that was not forecast to experience capacity problems without Welborne but is now forecast to be over capacity with the development.

5.3.13 The length of M27 between junctions 11 and 12 is predicted to be at capacity in both the with and without development scenarios.

Table 5.3 Capacity Hotspots (Run 1 and Run 7) excluding development infrastructure

Junction	Capacity Hotspots (V/C > 90%)	
	Without Welborne	With Welborne
M27 J10 exit slip		✓✓
Kiln Road / North Hill	✓✓	✓✓
Quay Street roundabout (A27/ A32)	✓✓	✓✓
Station Roundabout	✓✓	✓
A32 Lower Quay Road	✓✓	✓✓
M27 J11	✓✓	✓
A27/ Gudge Heath Lane	✓	✓
A32/ Newgate Lane	✓	✓
A27/ Downend Road	✓✓	✓✓

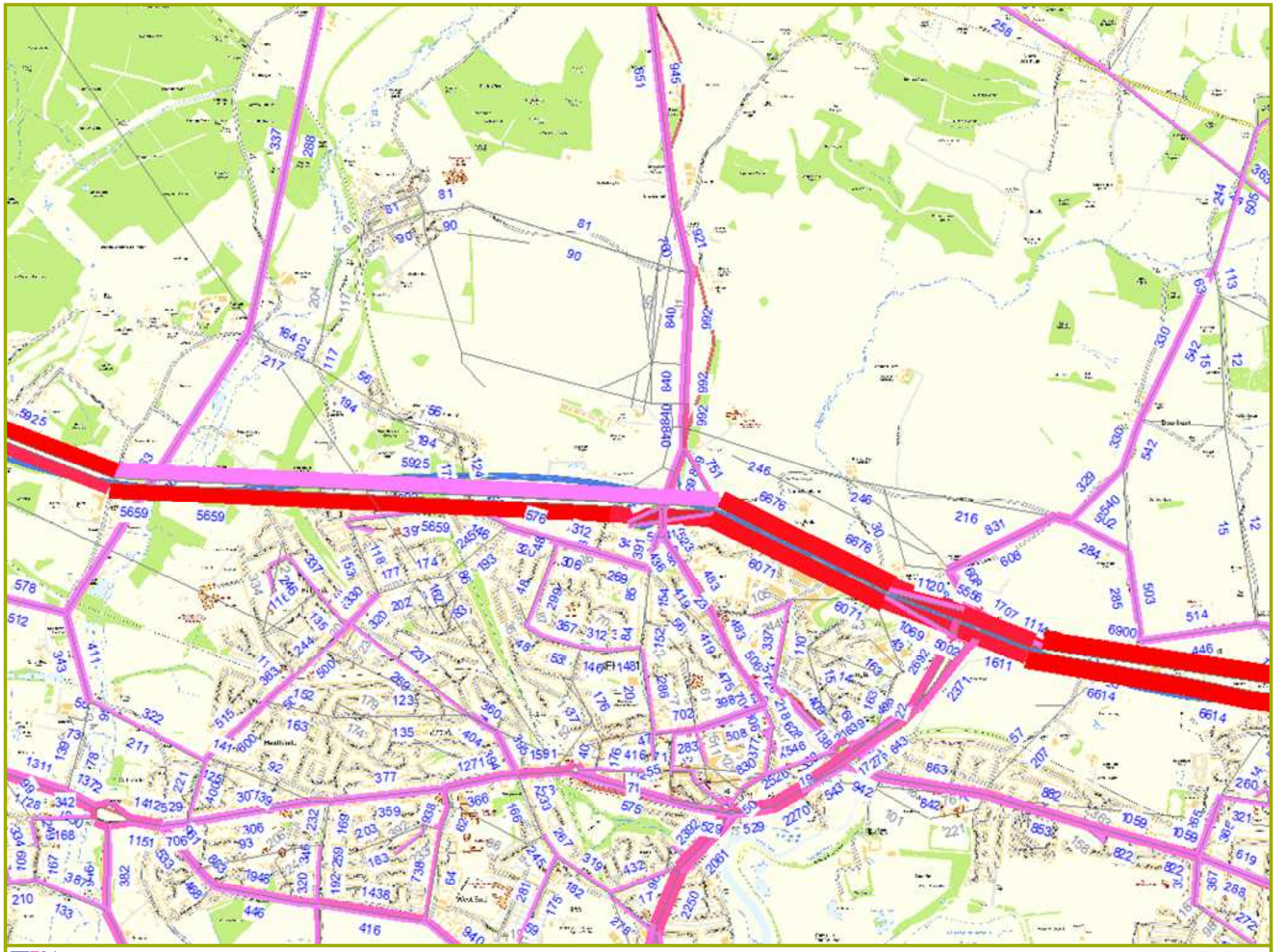


Figure 5.3 - AM Peak Total Flow (Run 1) (Ref: WC)

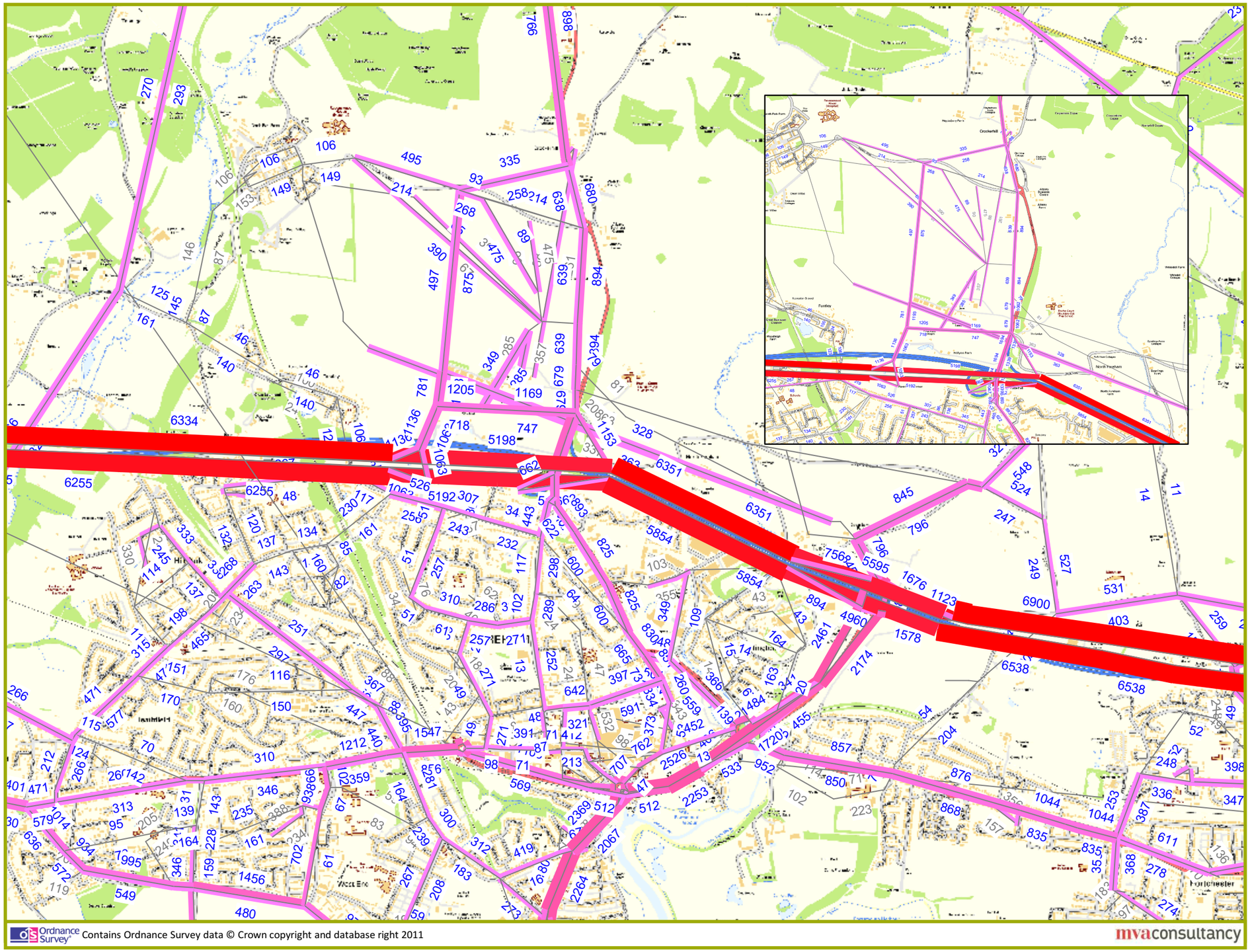


Figure 5.4 - AM Peak Total Flows (Run 7) (Ref: ACE)

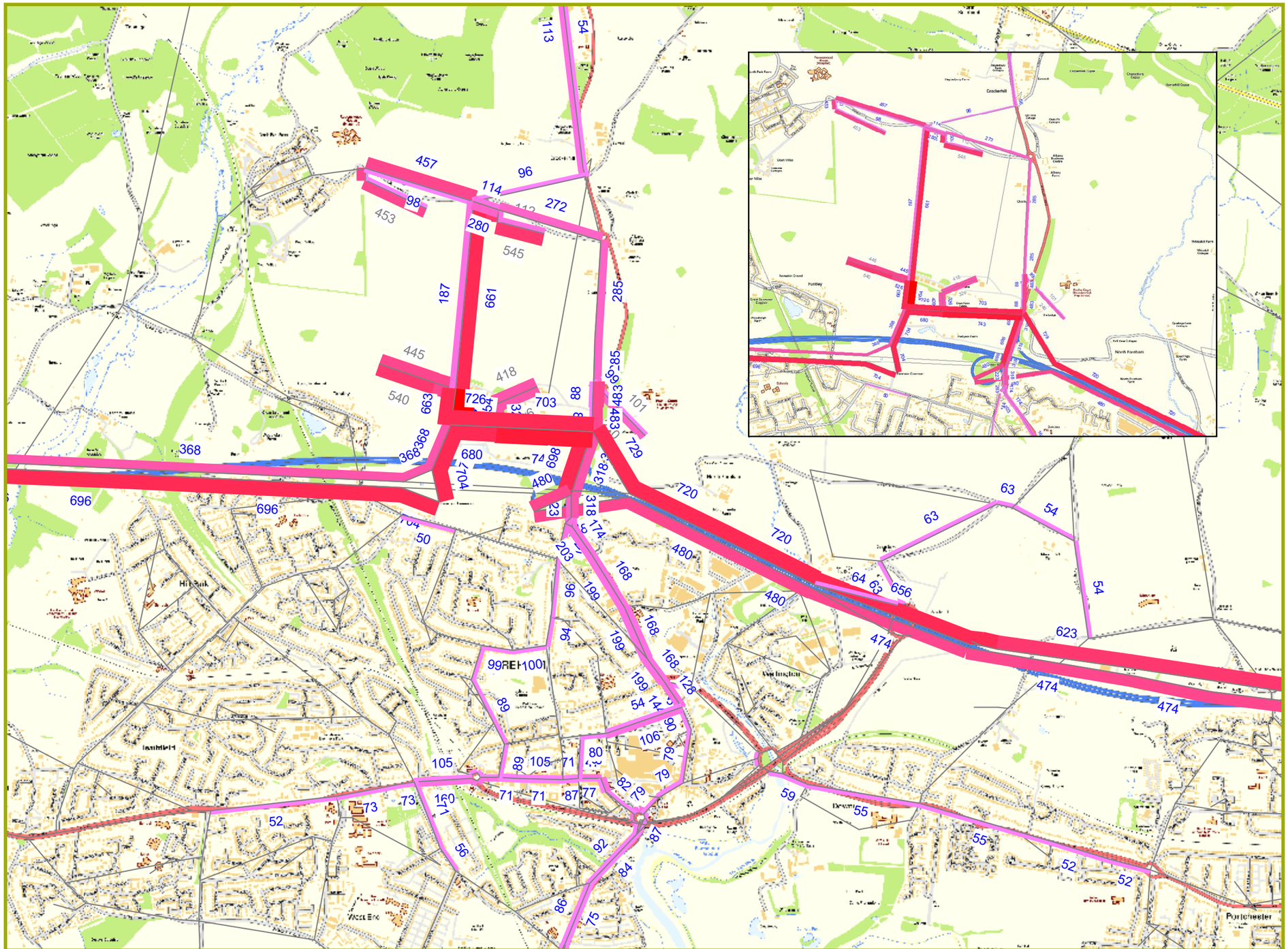


Figure 5.5 - AM Peak Welborne Only Flows (Run 7) (Ref: ACE)

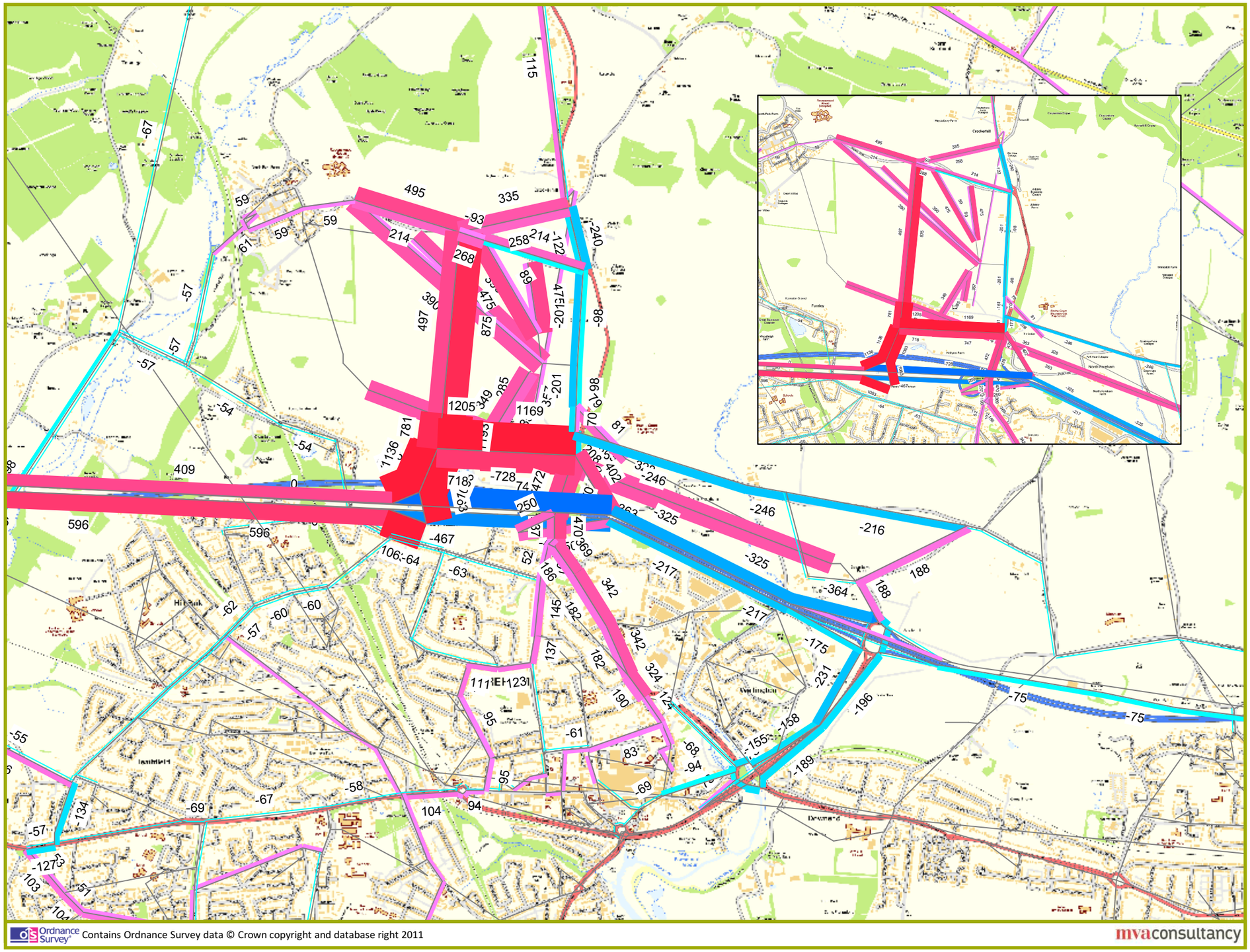


Figure 5.6 - AM Peak Flow Difference (Run 7 v Run 1) (Ref: ACE v WC)

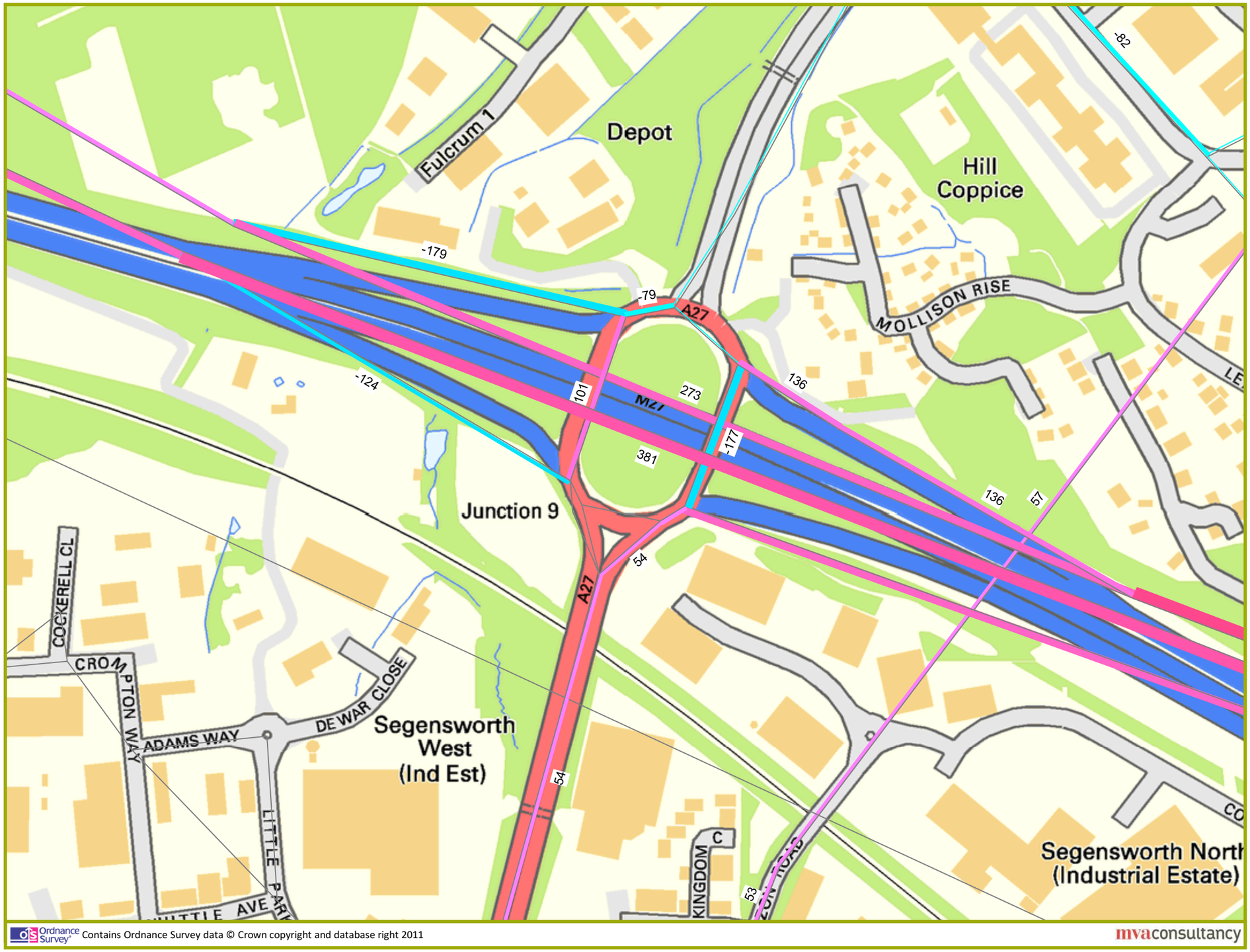


Figure 5.7 - AM Peak Flow Difference (Run 7 v Run 1) – M27 J9 (Ref: ACE v WC)

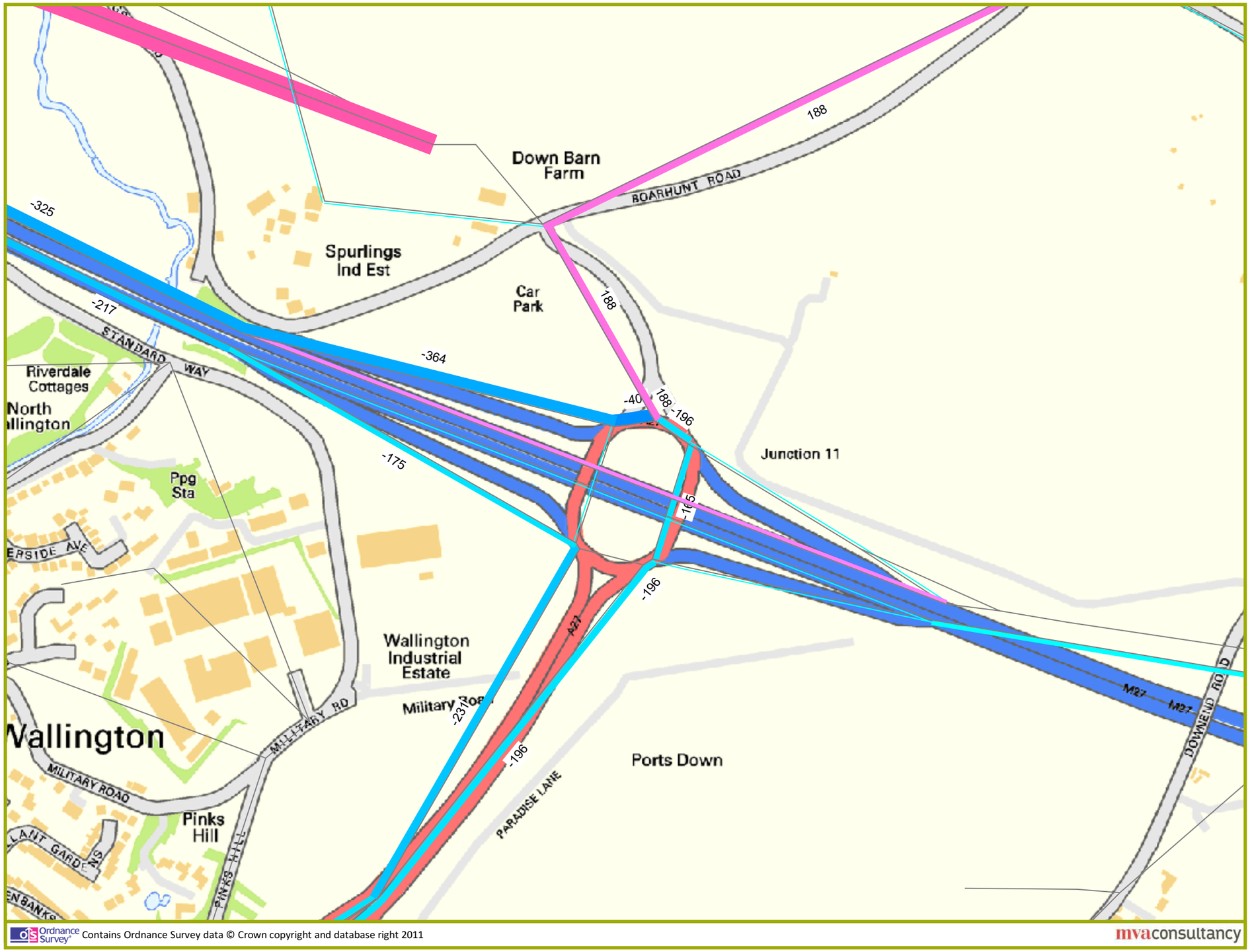


Figure 5.8 - AM Peak Flow Difference (Run 7 v Run 1) – M27 J11 (Ref: ACE v WC)

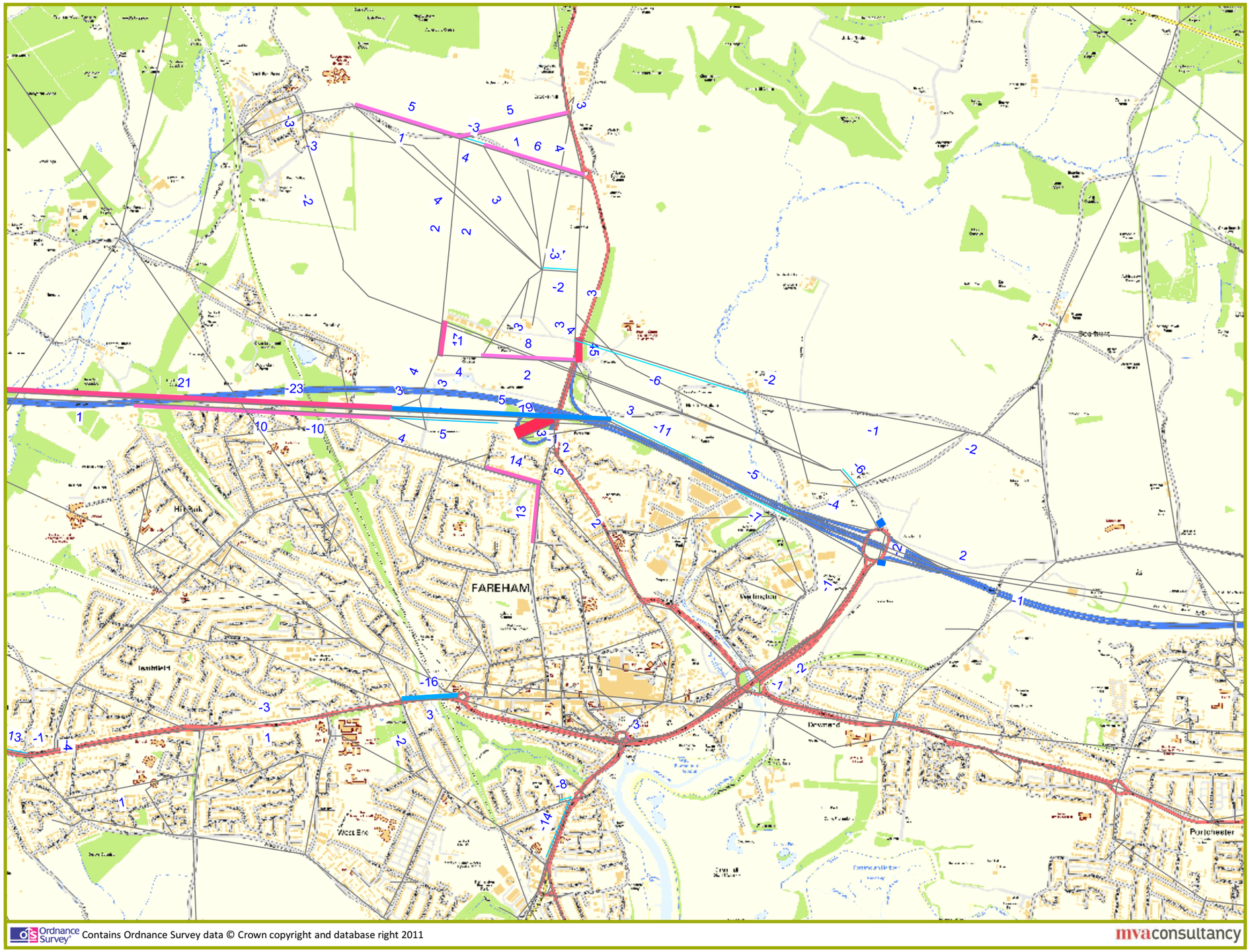


Figure 5.9 - AM Peak Delay Difference (Run 7 v Run 1) (Ref: ACE v WC)

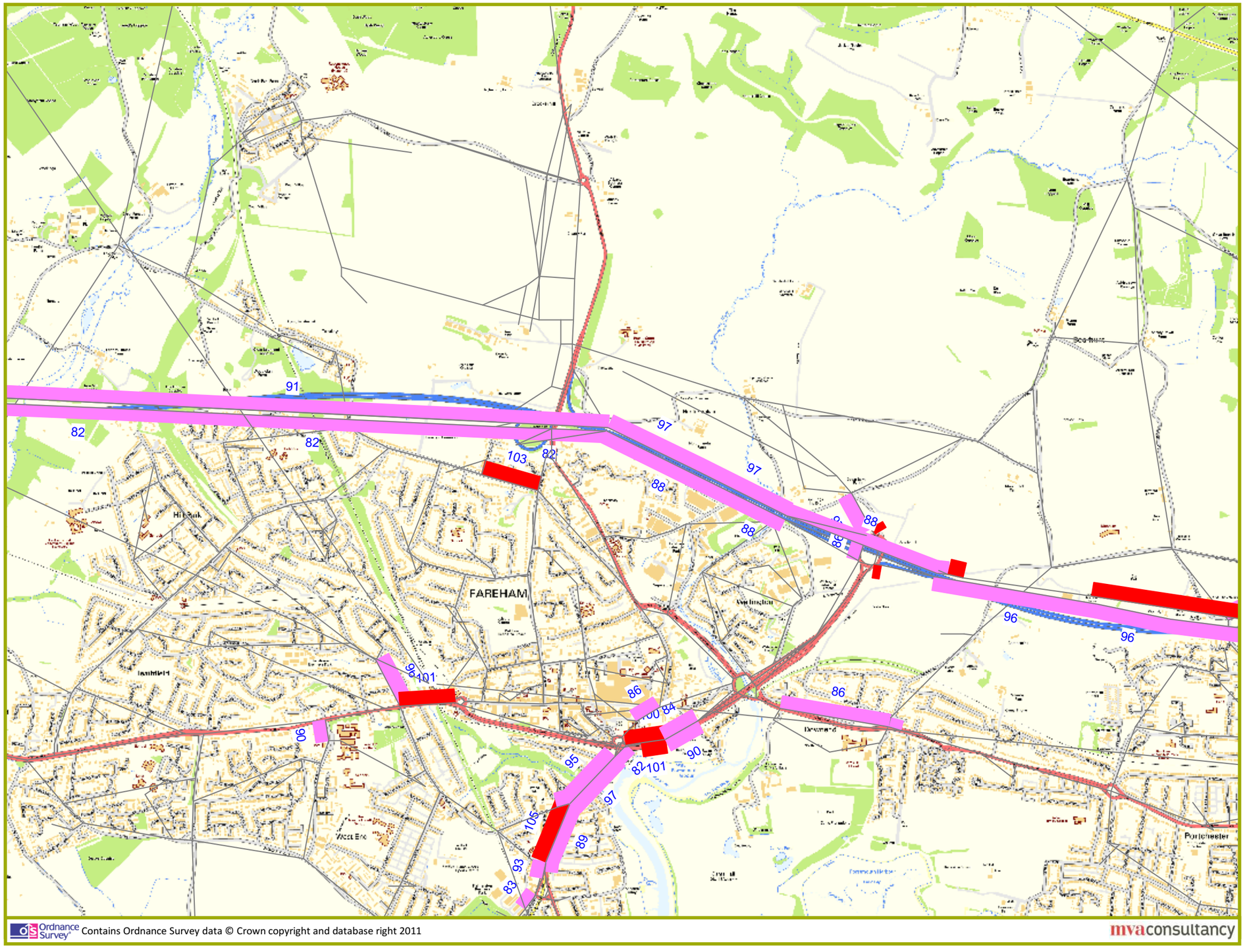


Figure 5.10 - AM Peak Volume against Capacity (V/C) (Run 1) (Ref: WC)

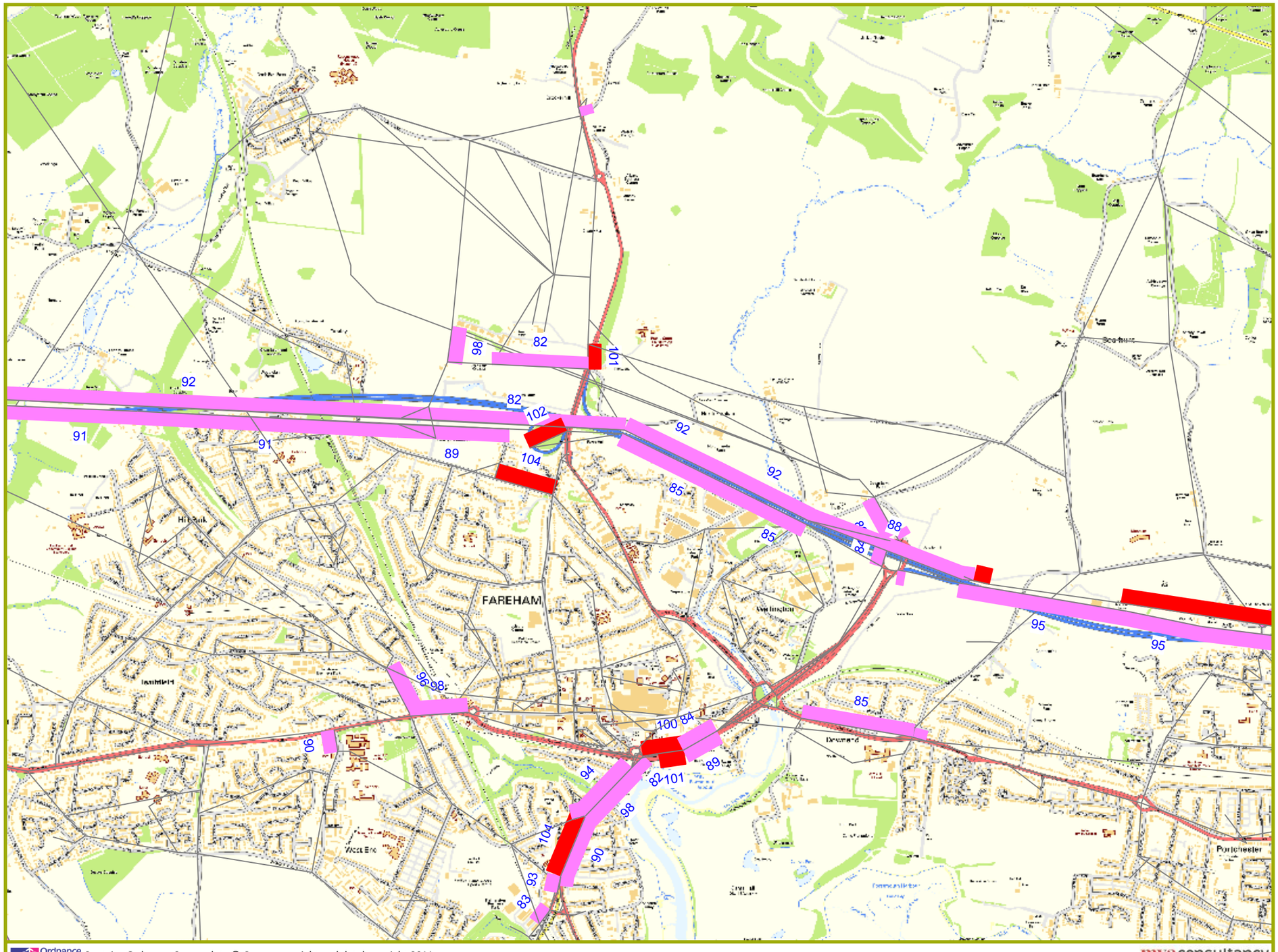


Figure 5.11 - AM Peak Volume against Capacity (V/C) (Run 7) (Ref: ACE)

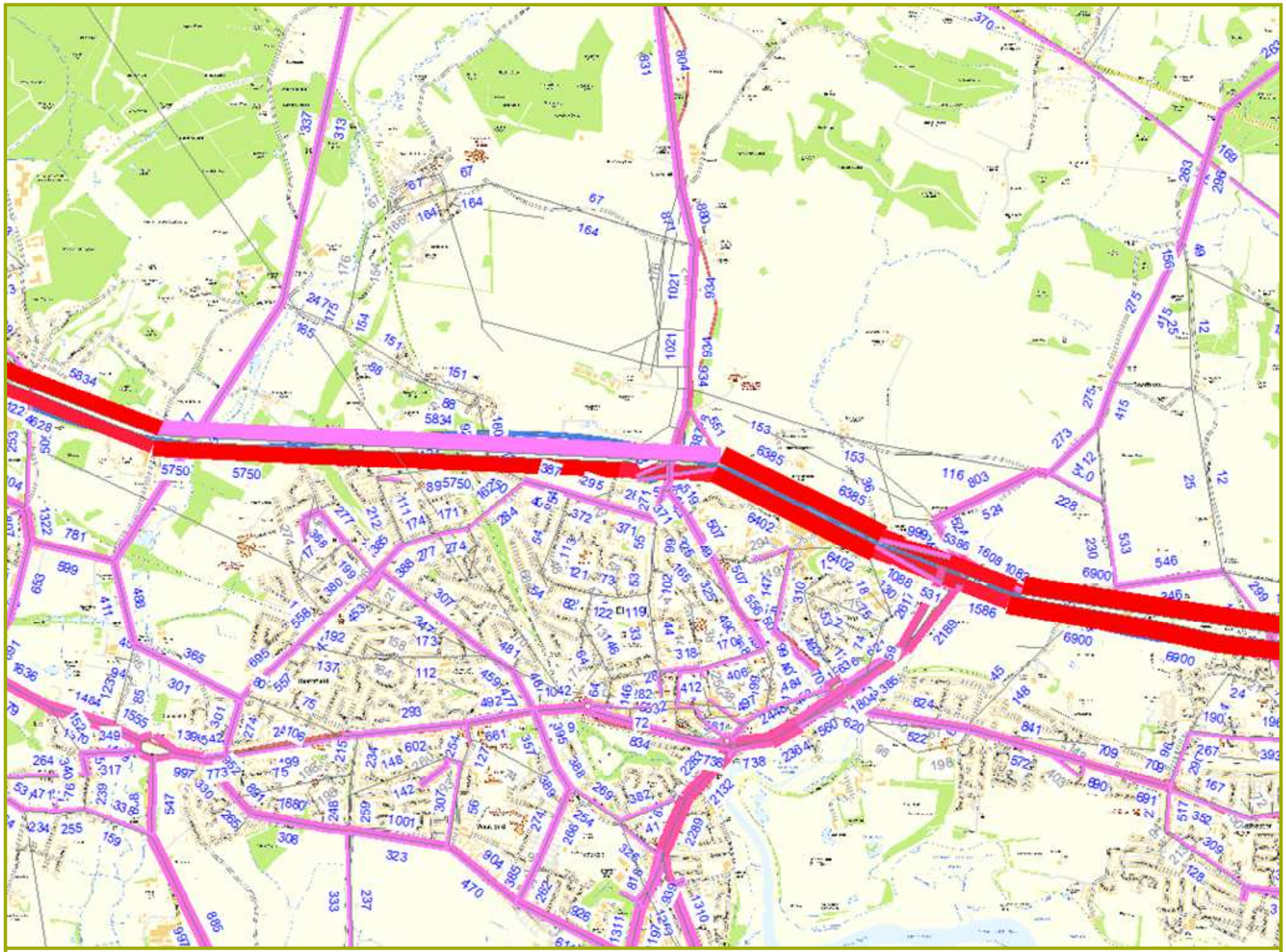


Figure 5.12 - PM Peak Total Flows (Run 1) (Ref: WC)

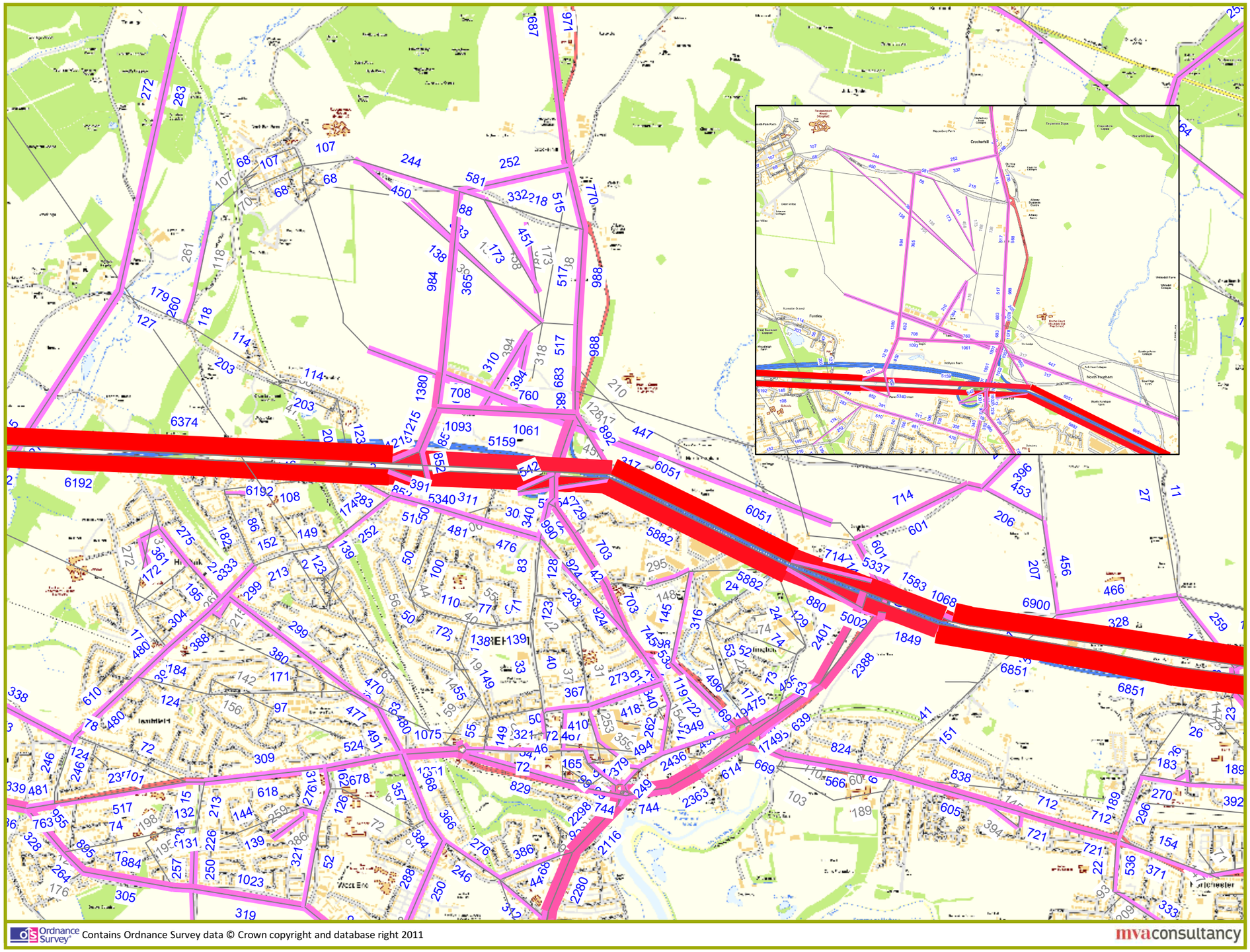


Figure 5.13 - PM Peak Total Flows (Run 7) (Ref: ACE)

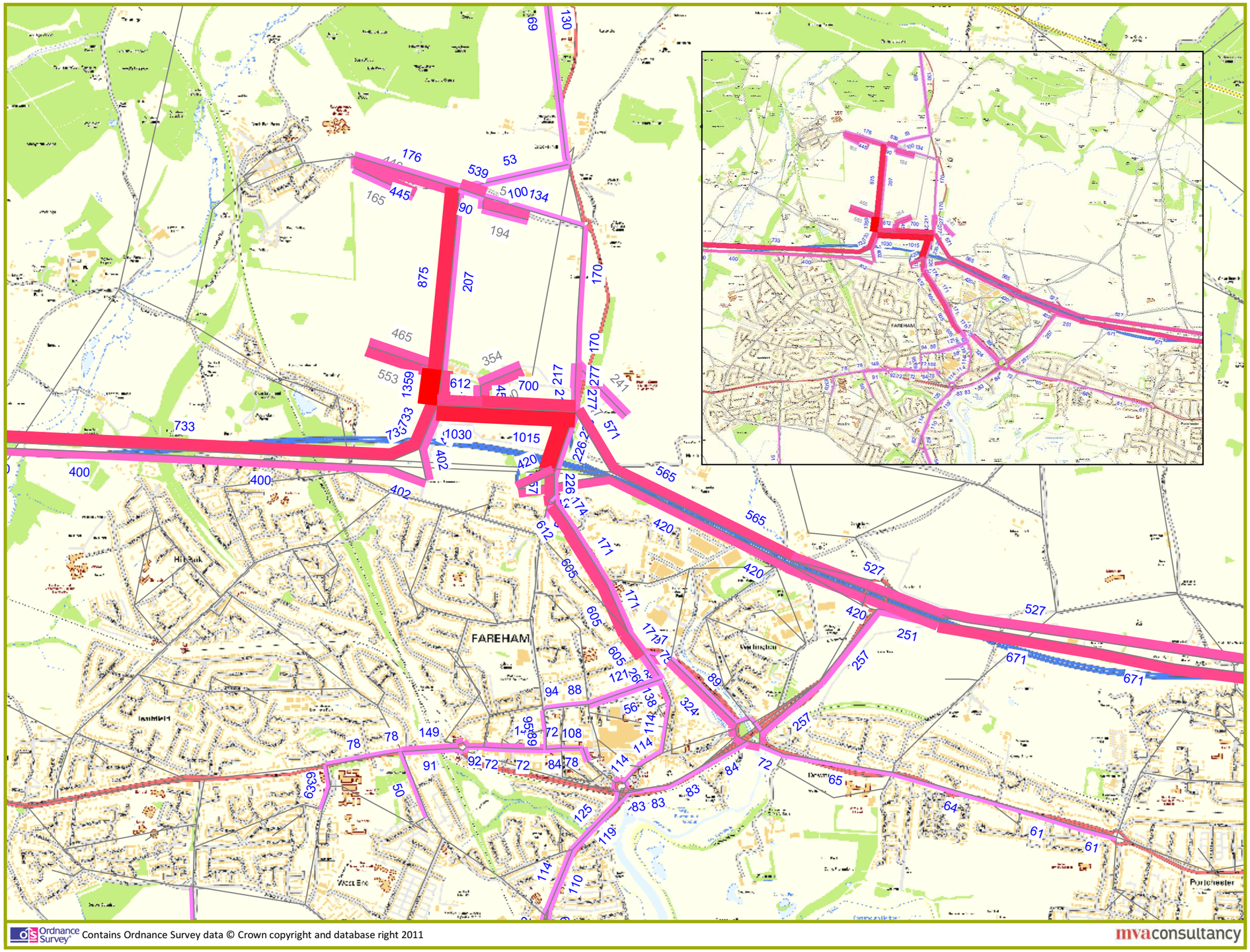


Figure 5.14 - PM Peak Welborne Only Flows (Run 7) (Ref: ACE)

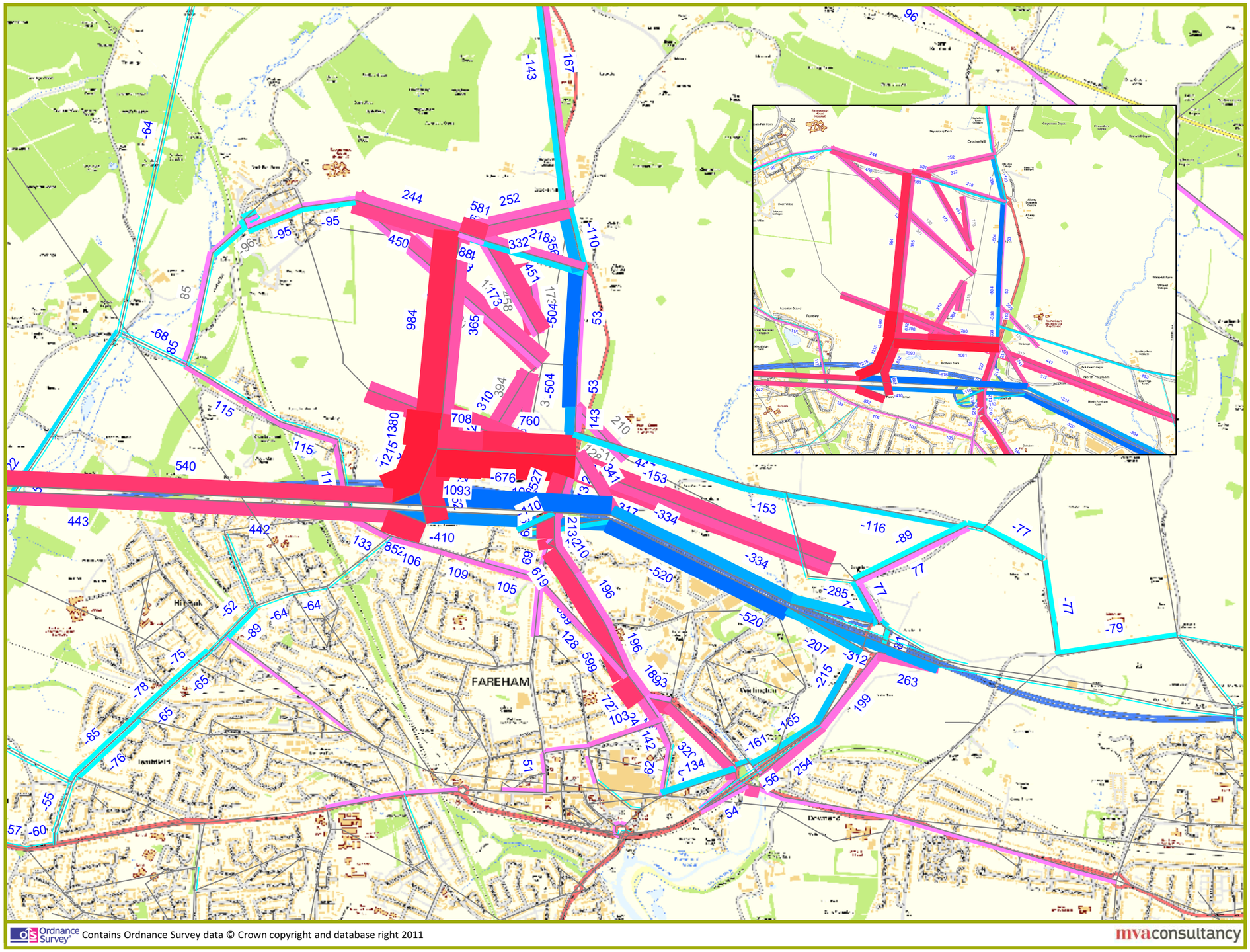


Figure 5.15 - PM Peak Flow Difference (Run 7 v Run 1) (Ref: ACE v WC)

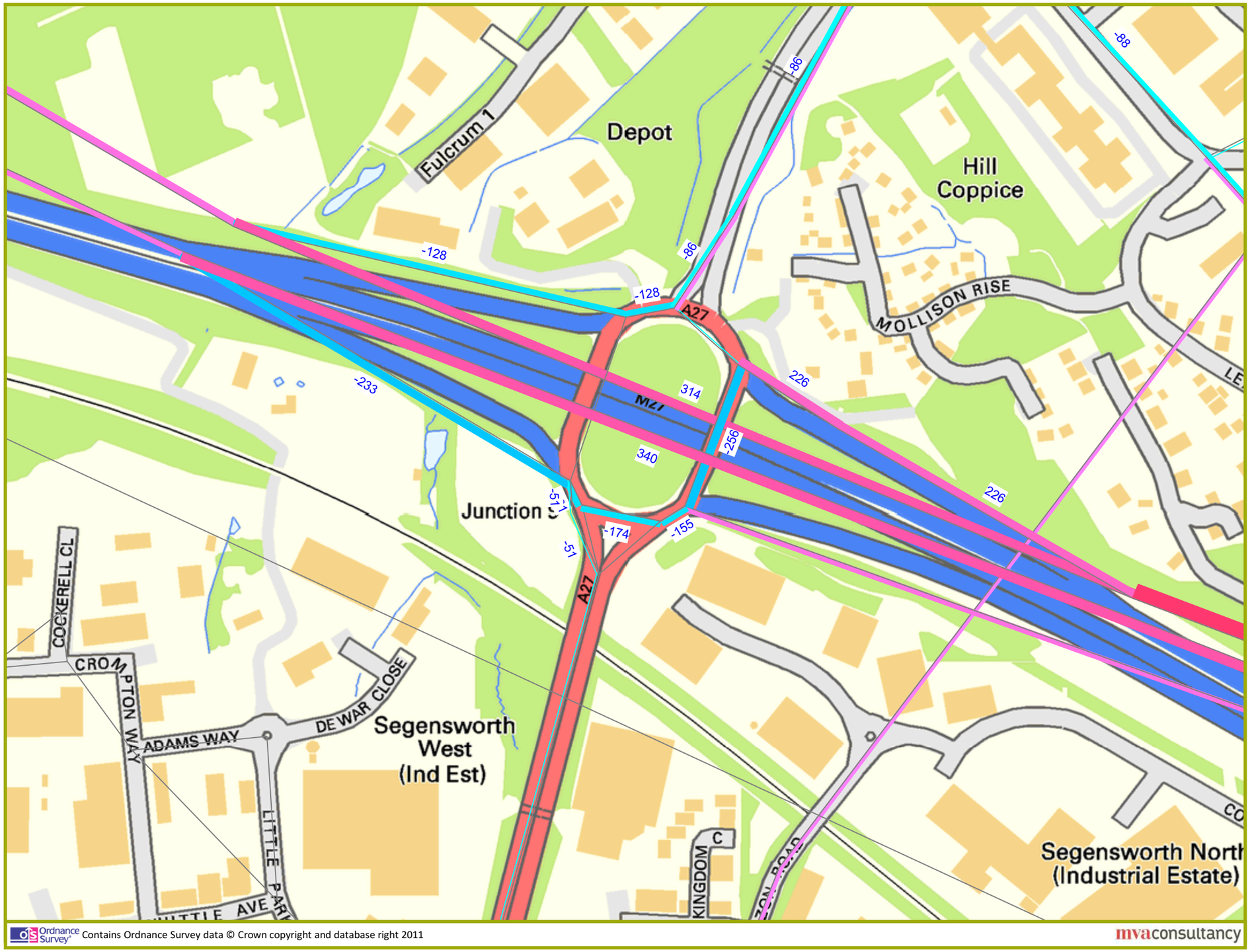


Figure 5.16 - PM Peak Flow Difference (Run 7 v Run 1) – M27 J9 (Ref: ACE v WC)

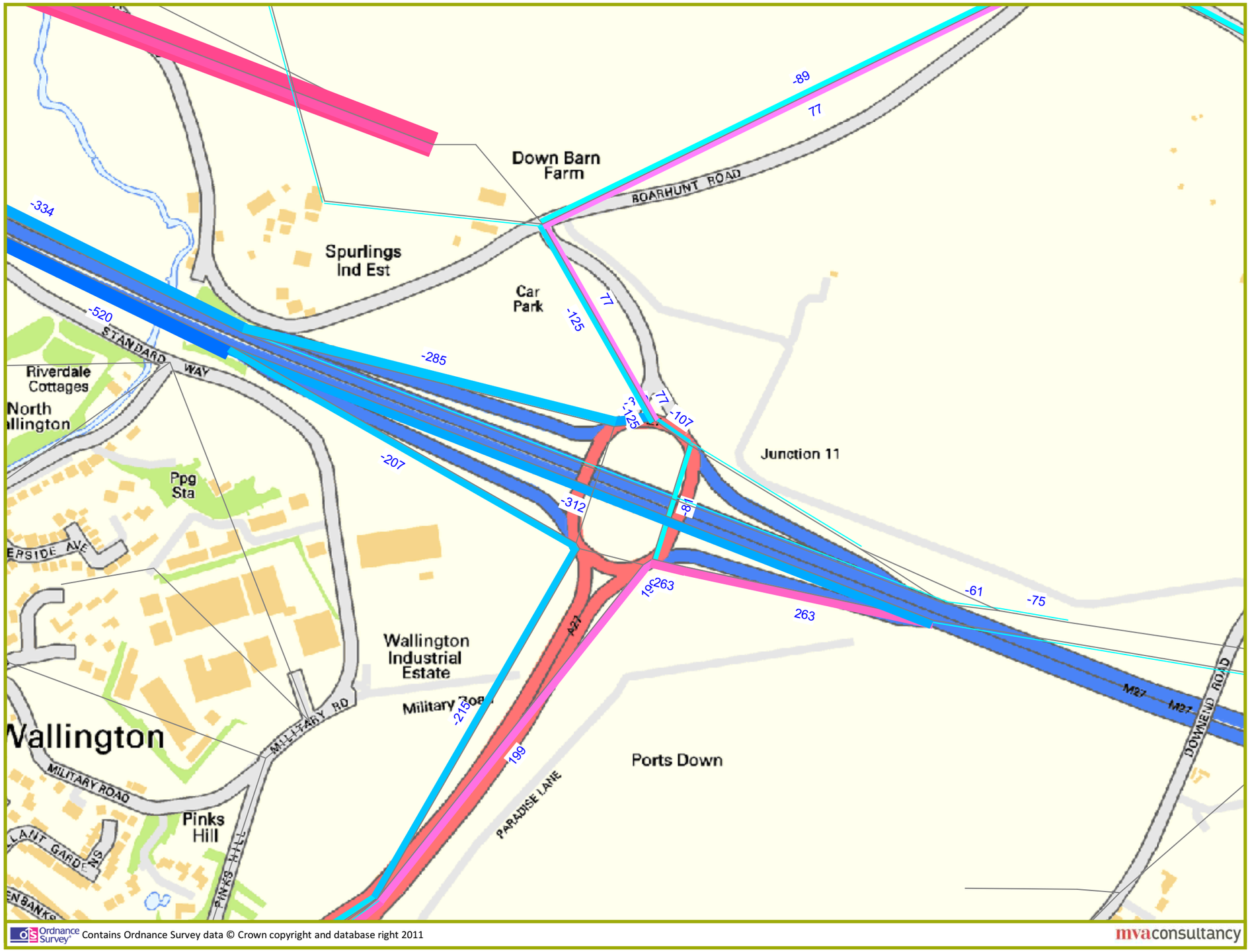


Figure 5.17 - PM Peak Flow Difference (Run 7 v Run 1) – M27 J11 (Ref: ACE v WC)

Figure 5.18 - PM Peak Delay Difference (Run 7 v Run 1) (Ref: ACE v WC)

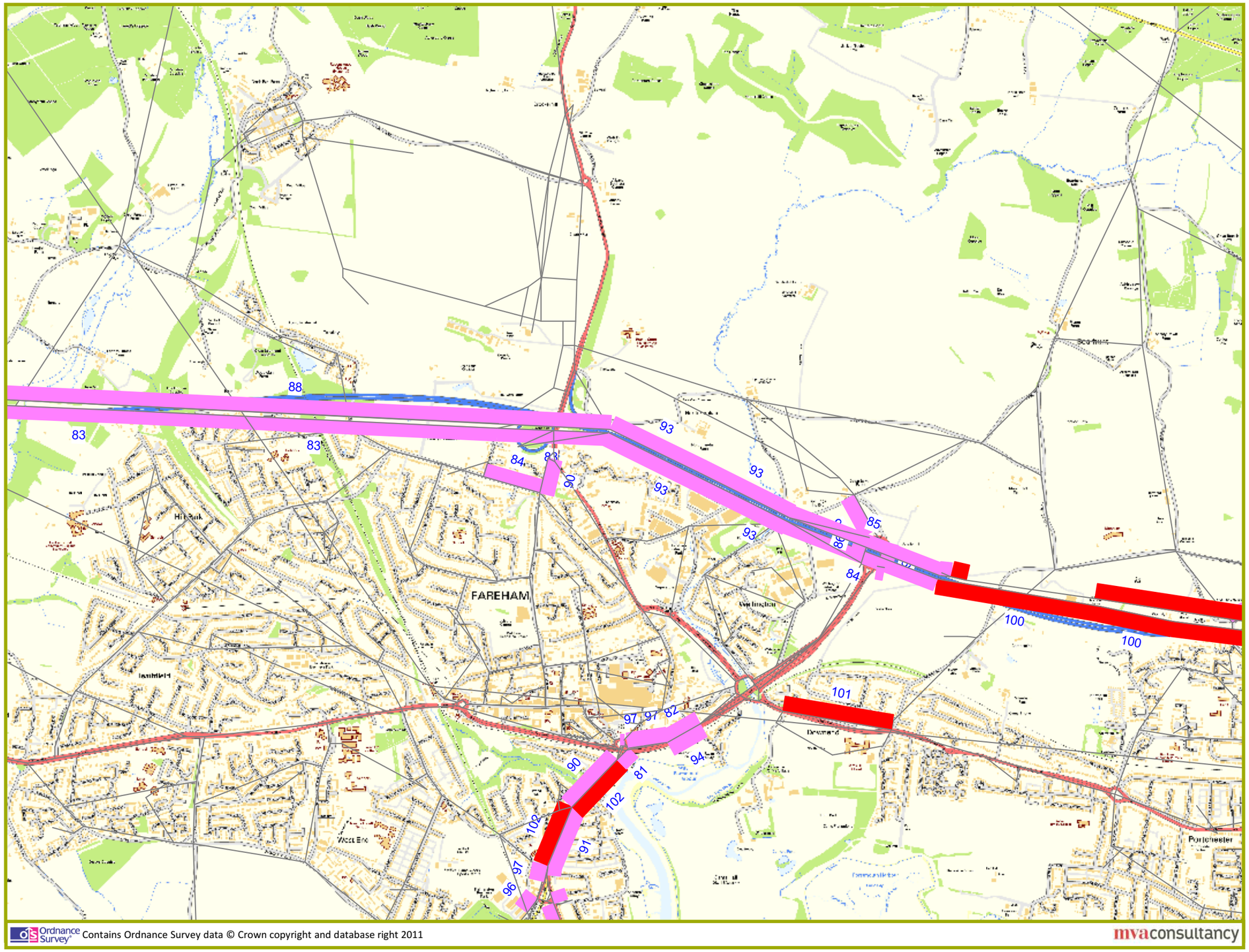


Figure 5.19 - PM Peak Volume against Capacity (V/C) (Run 1) (Ref: WC)

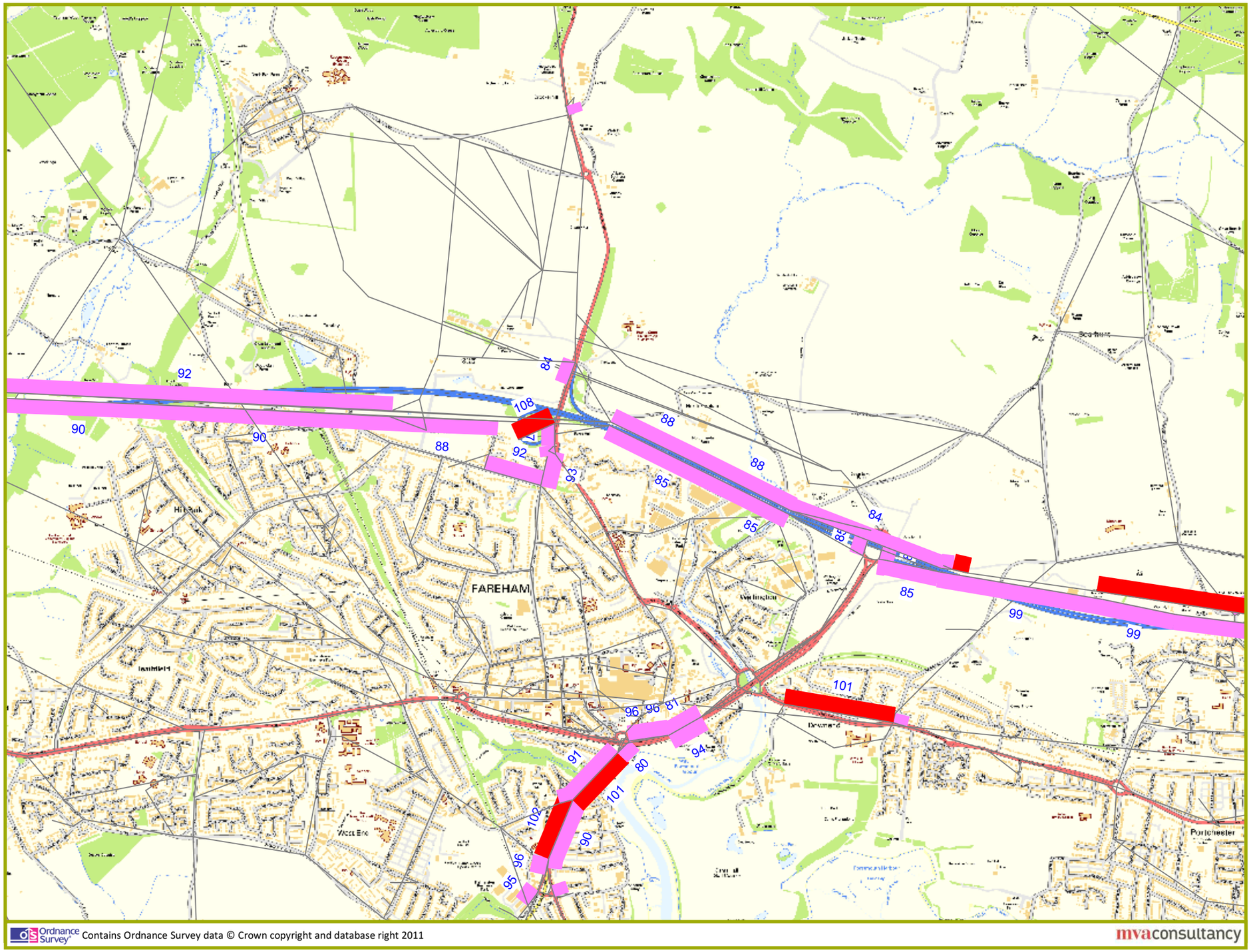


Figure 5.20 - PM Peak Volume against Capacity (V/C) (Run 7) (Ref: ACE)

6 Results – Public Transport Model

6.1 Introduction

6.1.1 This chapter provides forecasts for the change in passenger numbers using Public Transport resulting from Welborne.

6.2 Results

6.2.1 Figures 6.1 and 6.6 identify the forecast boardings, alightings and loadings (passengers per hour) for the AM peak on the three BRT services that access Welborne in Run 7.

6.2.2 Figures 6.7 and 6.8 identify the passenger number changes (between Runs 1 and 7) for the AM and PM peak hours (0800-0900 & 1700-1800) respectively on the new services linking to Welborne.

6.2.3 Both the boarding plots and the passenger number change plots highlight the high volume of PT trips associated to Welborne that either originate or are destined for the wider Portsmouth area. The sectored demand in summarised in Section 4.3 of this Report identified that over 50% of Welborne PT trips coming from or going to Portsmouth.

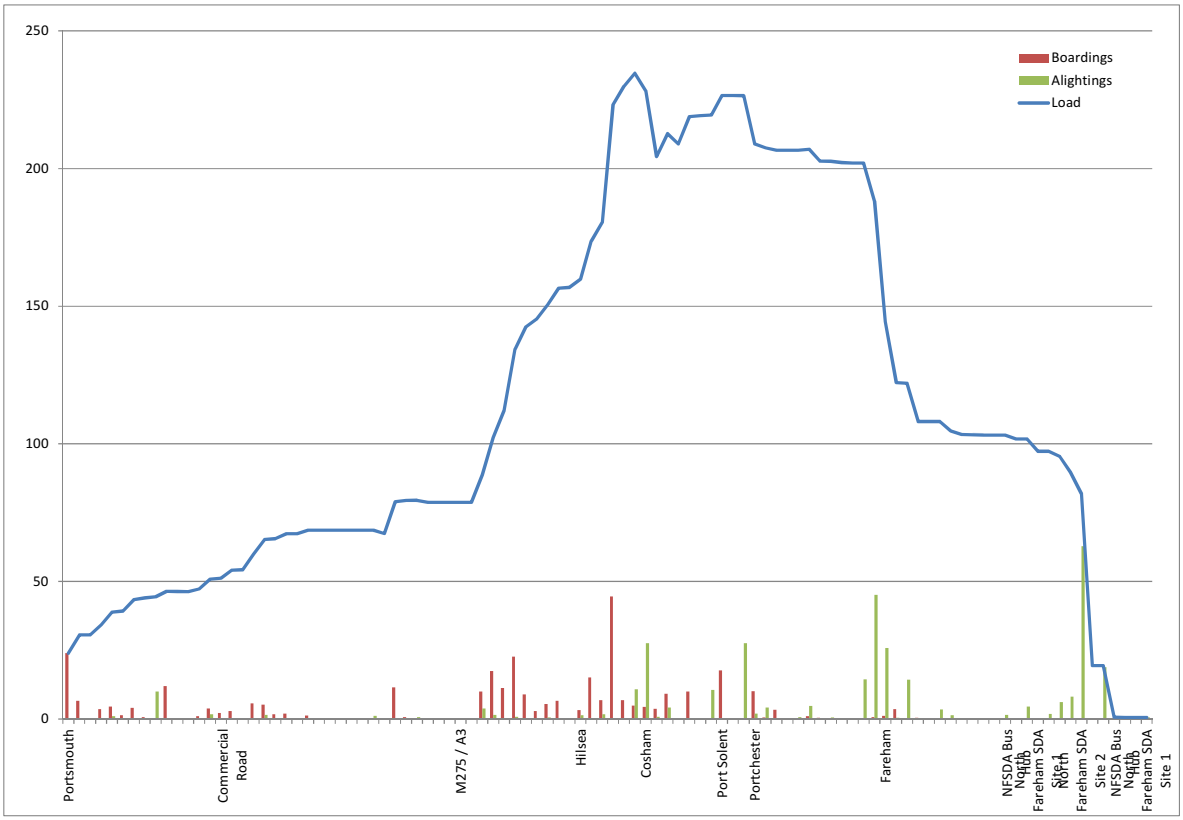


Figure 6.1 - AM Loadings for BRT Route Portsmouth to Welborne via A27 (Run 7) (Ref: ACE)

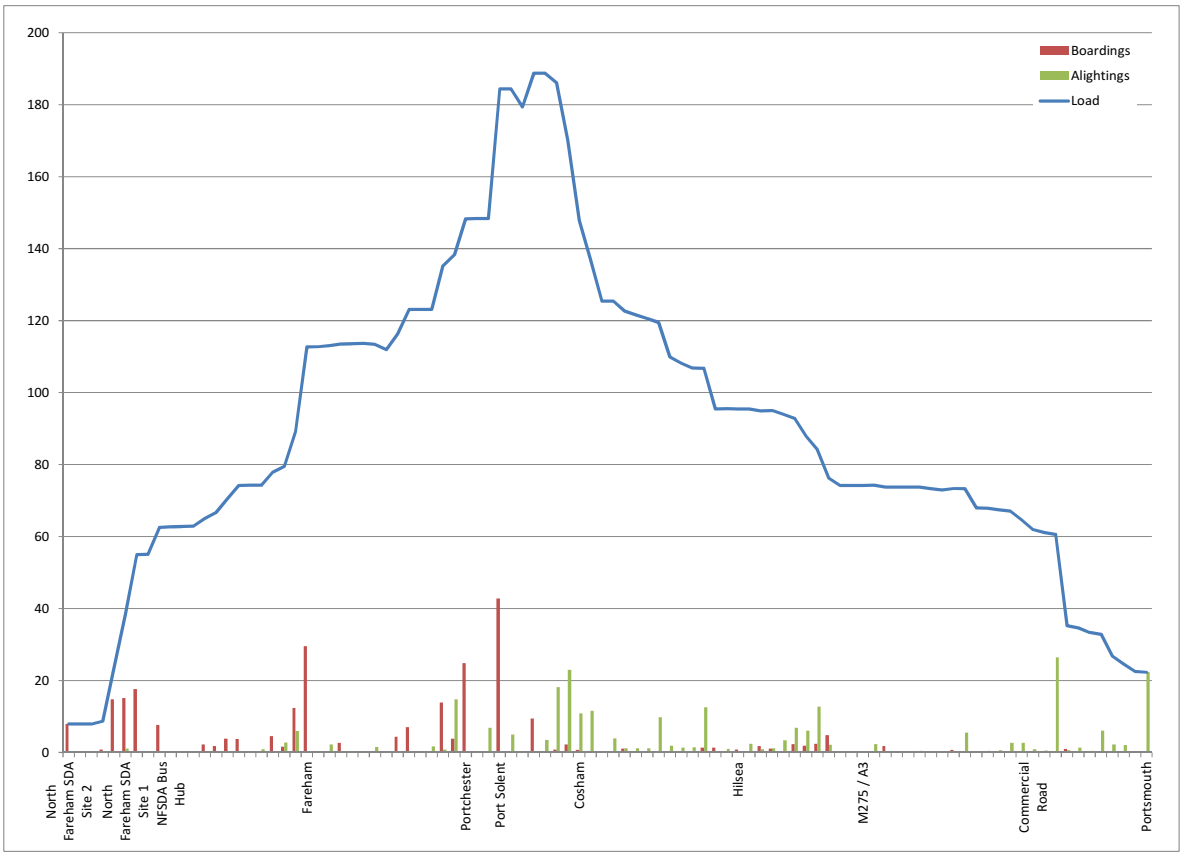


Figure 6.2 - AM Loadings for BRT Route Welborne to Portsmouth via A27 (Run 7) (Ref: ACE)

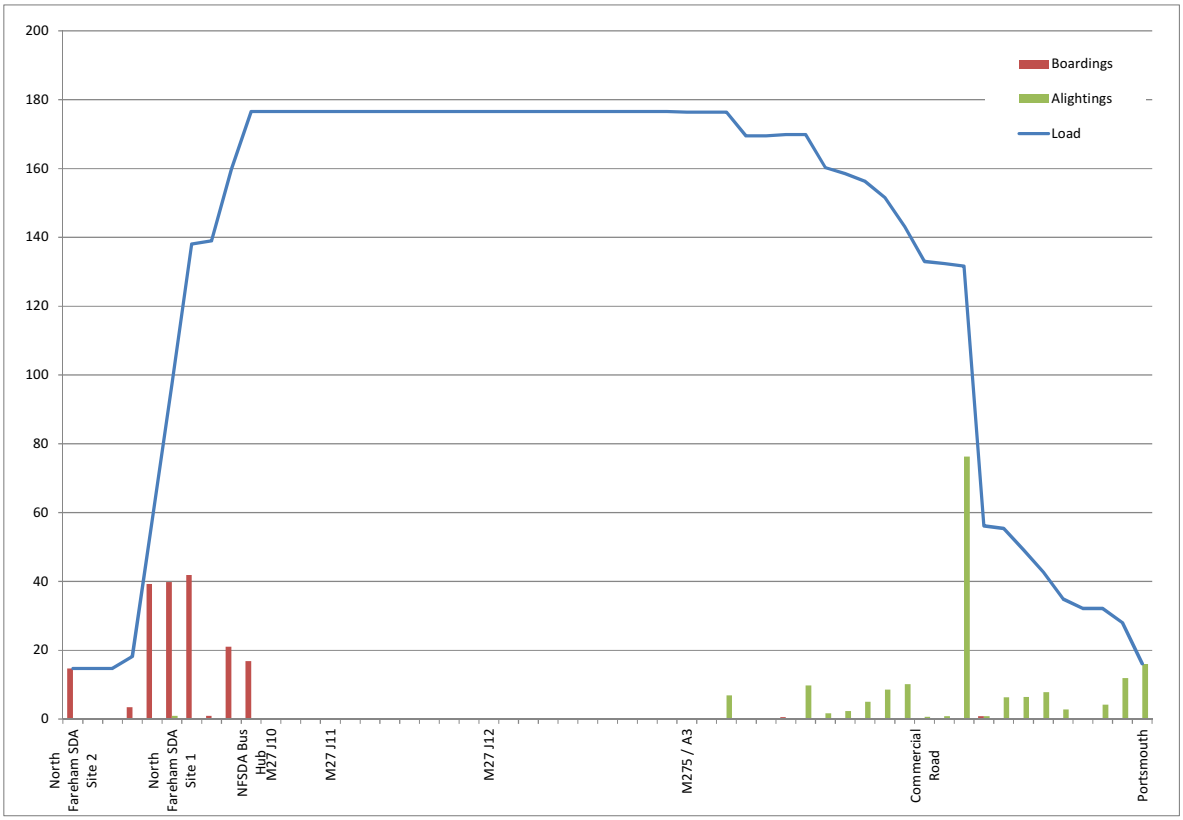


Figure 6.3 - AM Loadings for BRT Route Welborne to Portsmouth via M27 (Run 7) (Ref: ACE)

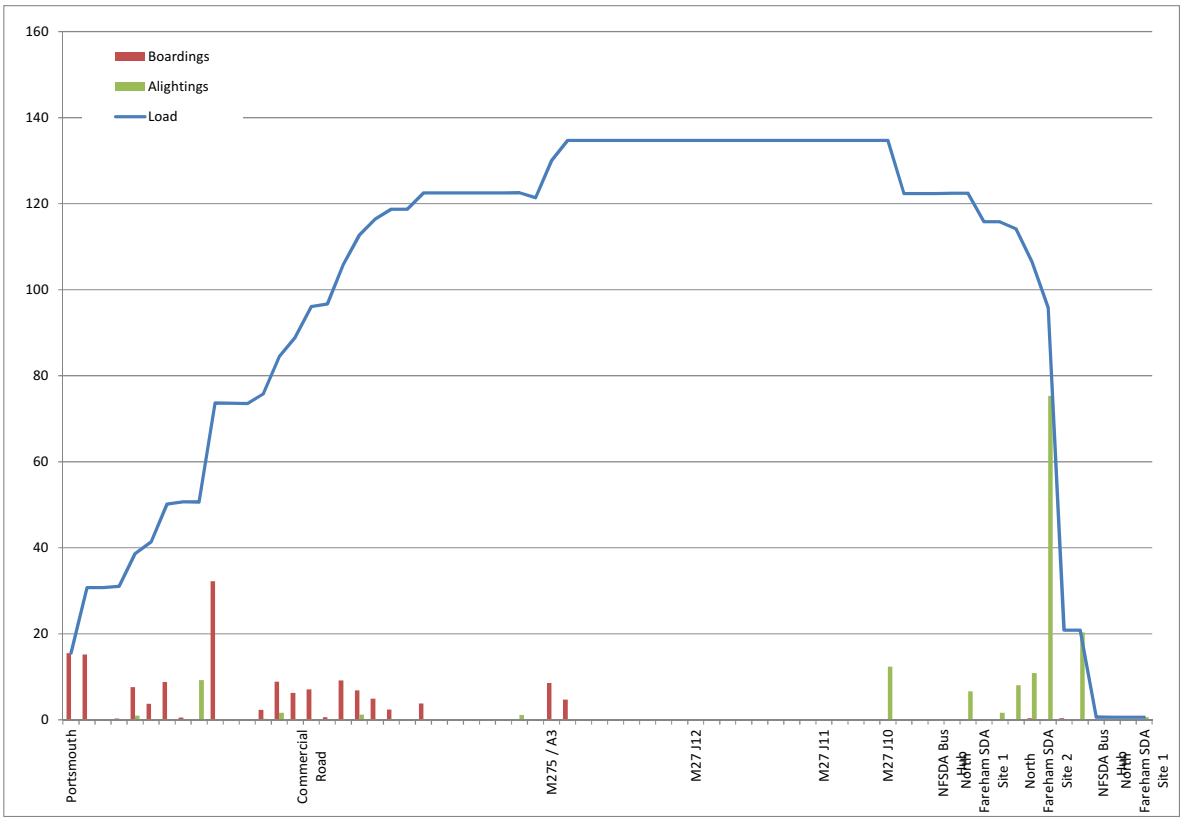


Figure 6.4 - AM Loadings for BRT Route Portsmouth to Welborne via M27 (Run 7) (Ref: ACE)

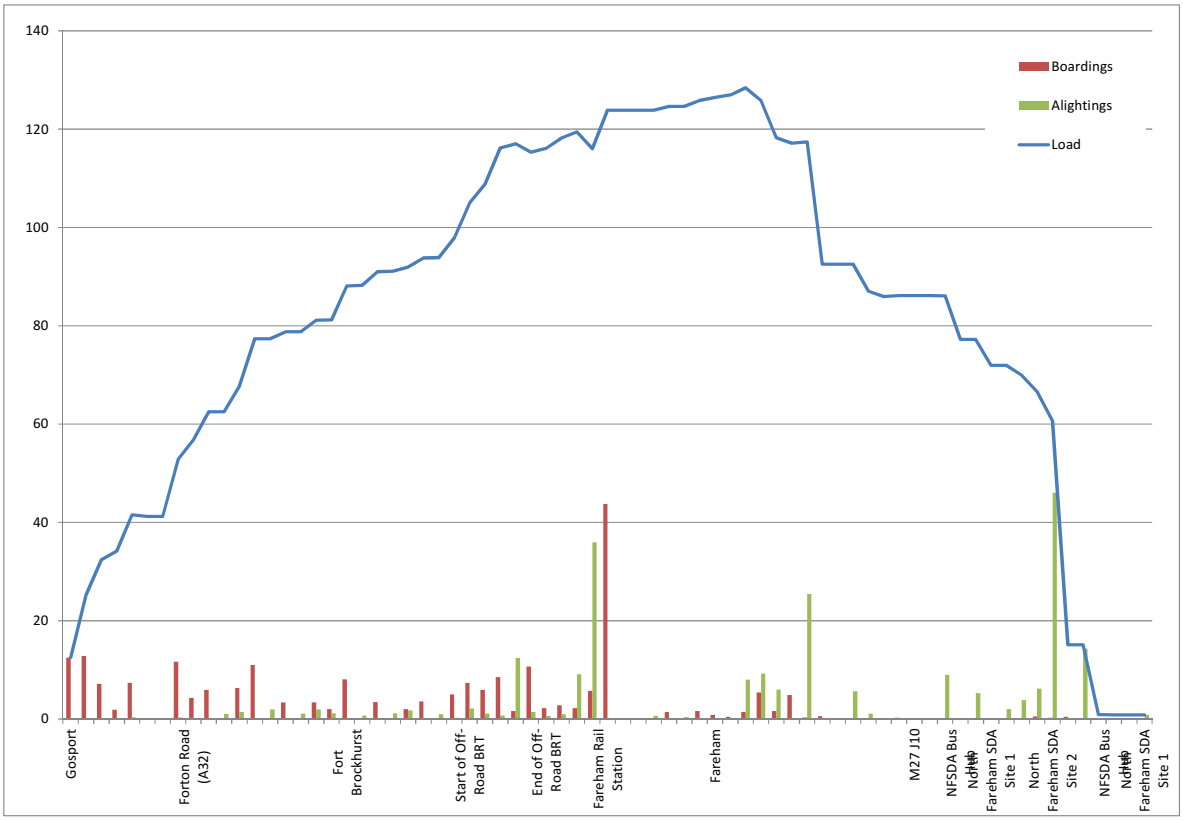


Figure 6.5 - AM Loadings for BRT Route Gosport to Welborne (Run 7) (Ref: ACE)

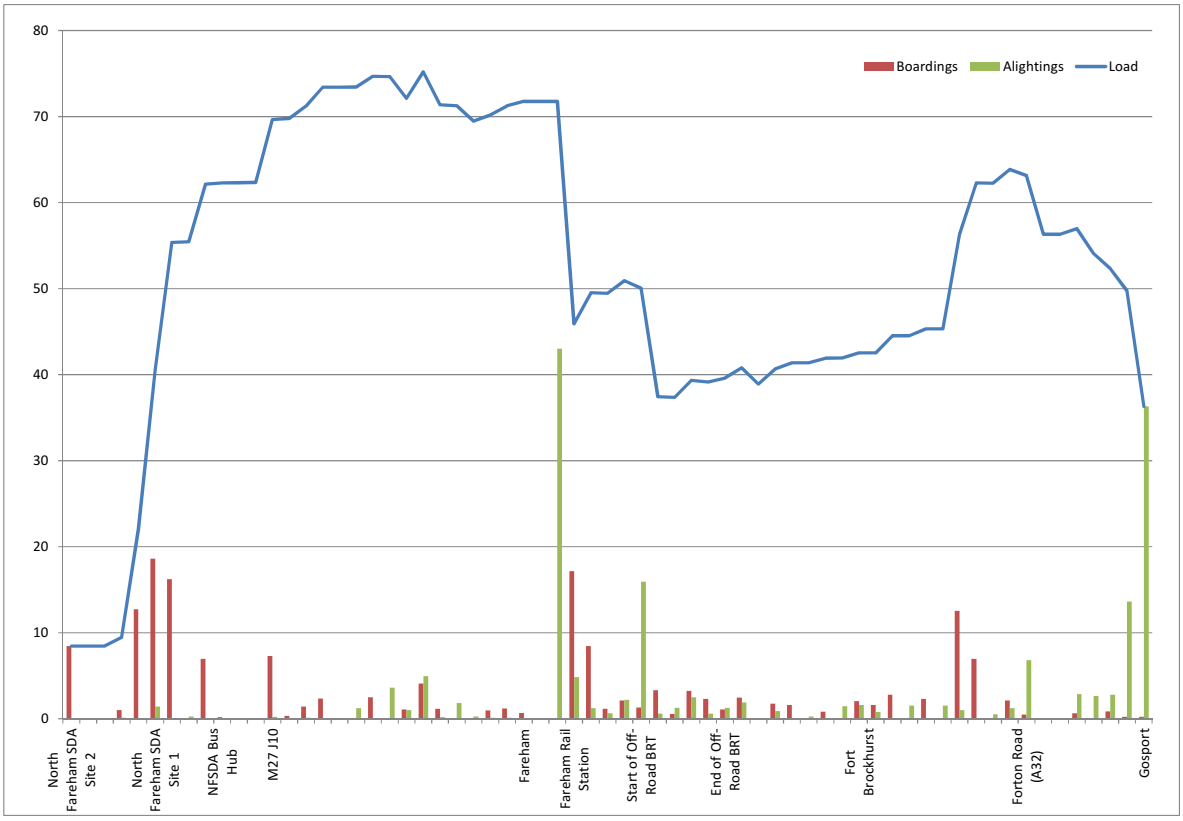


Figure 6.6 - AM Loadings for BRT Route Welborne to Gosport (Run 7) (Ref: ACE)

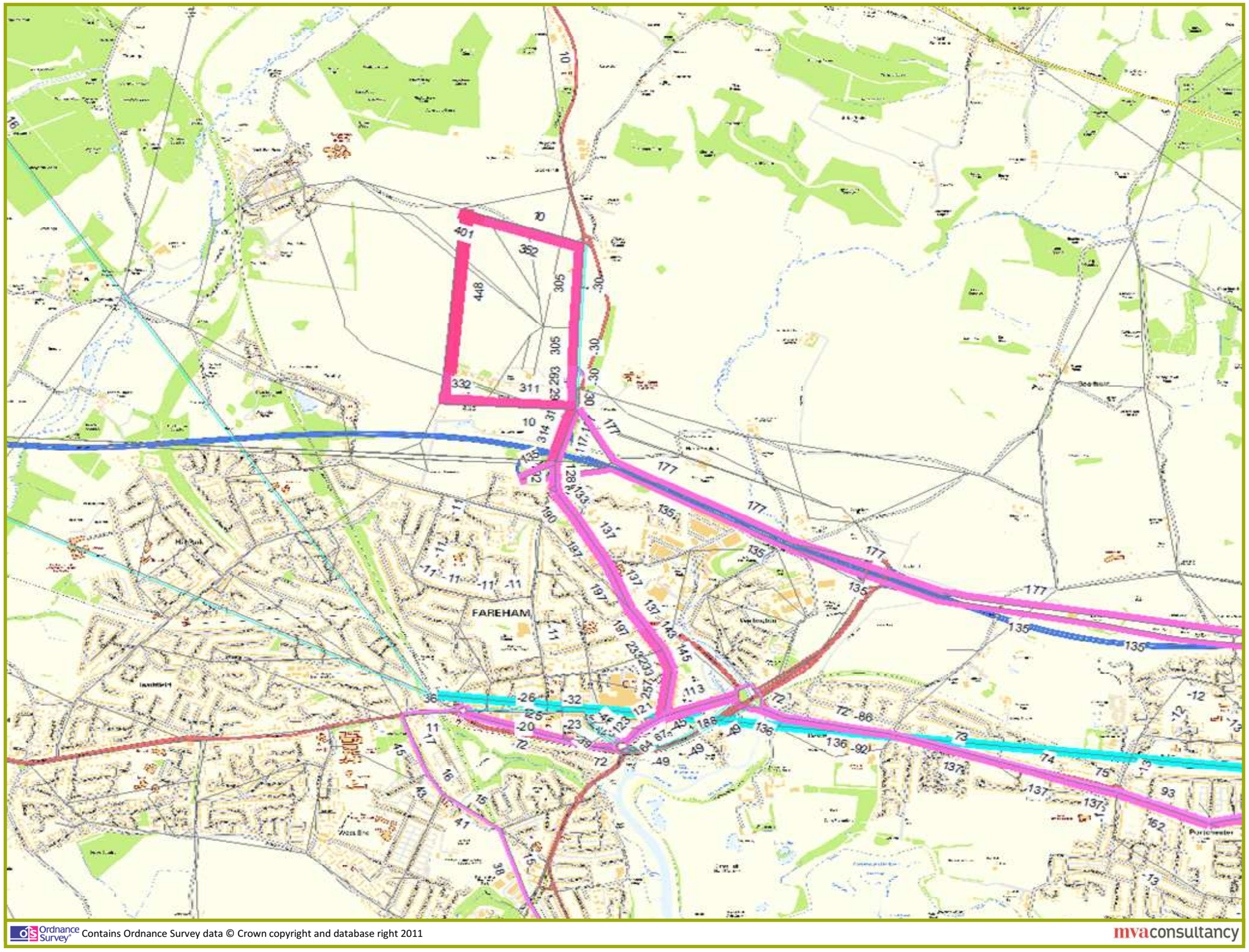


Figure 6.7 - AM Peak Change in Passenger Numbers (Run 7 v Run 1) (Ref: ACE v WC)

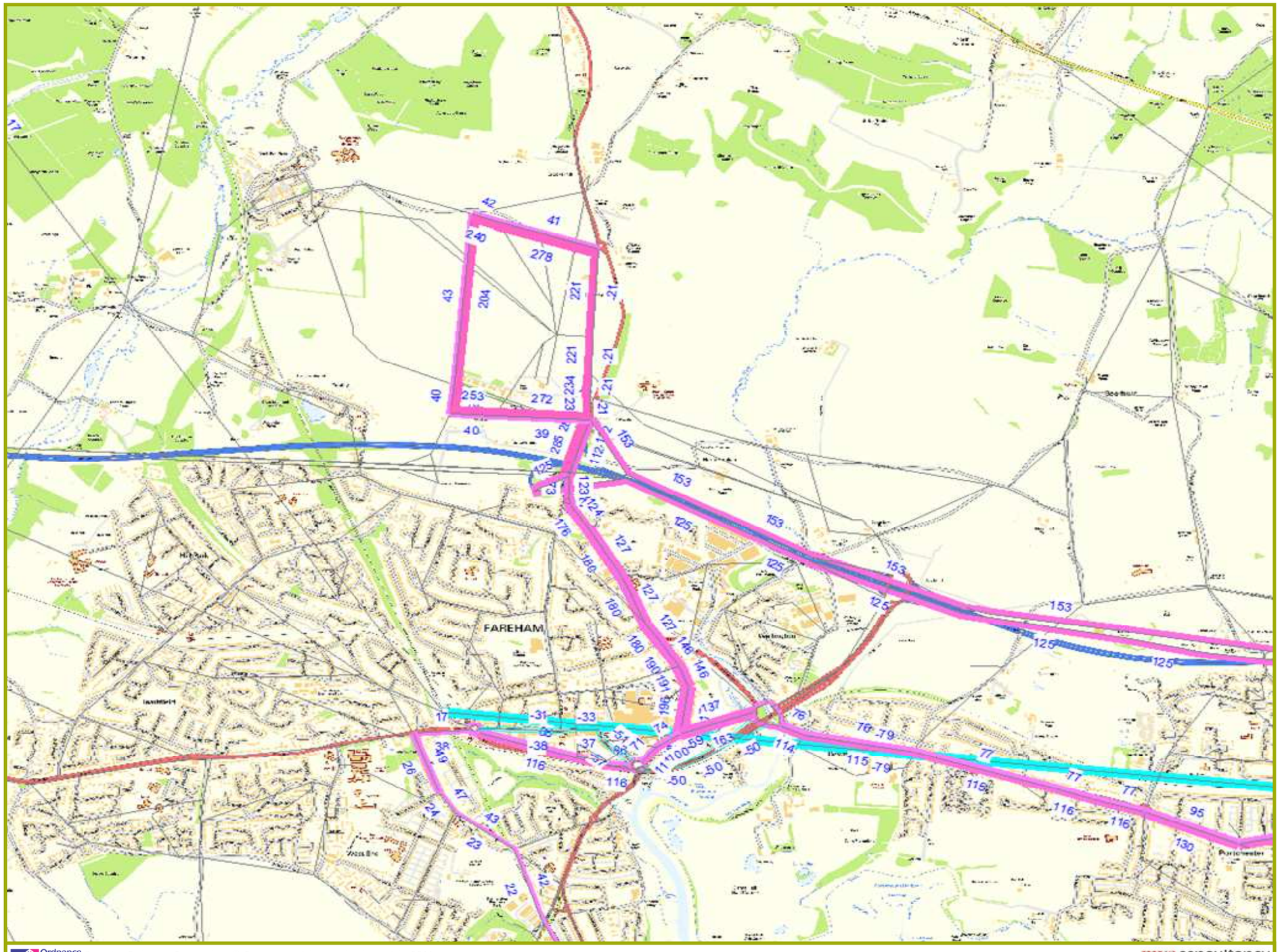


Figure 6.8 - PM Peak Change in Passenger Numbers (Run 6 v Run 1) (Ref: ACE v WC)

7 Summary

7.1 Summary

7.1.1 This Report summarises the impact of 6500 dwelling and 112,000 square metres of employment floorspace forming the New Community North of Fareham. The associated highway infrastructure provides new west facing slips at M27 J10 making this junction all-movement.

7.1.2 Welborne has good PT links. In addition to existing local services on A32 there are three BRT routes with direct access to the development. The BRT routes provide high quality PT provision to/ from Portsmouth, Fareham and Gosport.

7.1.3 Overall the development related highway infrastructure performs relatively well during the PM peak. However, in the AM peak the roundabouts linking the E-W route within the site to A32 in the east and the internal N-S route in the west are forecast to be at capacity and require further investigation/ more detailed local modelling (e.g. ARCADY).

7.1.4 Away from the development itself a number of junctions are forecast to perform near to or at capacity but all of these junctions were forecast to operate at a similar level without Welborne. The one exception is the off-slip for the westbound movement at M27 J10 that has gone from experiencing no capacity problems without the development to being over capacity with the development.

7.1.5 The new west facing slips at M27 J10 reduce the pressure on the motorway section between junctions 10 and 11 by removing the need for u-turns to be performed at J11 to access J10 from the west. However, the section between J11 and J12 is at capacity in both the with and without development scenarios.

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For more information visit www.mvaconsultancy.com

Abu Dhabi
AS Business Centre, Suite 201, Al Ain Road, Umm al Nar, P.O. Box 129865, Abu Dhabi, UAE
T: +971 2 510 2402 F: +971 2 510 2403

Birmingham
Second Floor, 37a Waterloo Street
Birmingham B2 5TJ United Kingdom
T: +44 (0)121 233 7680 F: +44 (0)121 233 7681

Dublin
First Floor, 12/13 Exchange Place
Custom House Docks, IFSC, Dublin 1, Ireland
T: +353 (0)1 542 6000 F: +353 (0)1 542 6001

Edinburgh
Second Floor, Prospect House, 5 Thistle Street,
Edinburgh EH2 1DF United Kingdom
T: +44 (0)131 220 6966 F: +44 (0)131 220 6087

Glasgow
Seventh Floor, 78 St Vincent Street
Glasgow G2 5UB United Kingdom
T: +44 (0)141 225 4400 F: +44 (0)141 225 4401

London
Seventh Floor, 15 Old Bailey
London..EC4M 7EF T United Kingdom
T: +44 (0)20 7529 6500 F: +44 (0)20 7529 6556

Lyon
11, rue de la République, 69001 Lyon, France
T: +33 (0)4 72 10 29 29 F: +33 (0)4 72 10 29 28

Manchester
25th Floor, City Tower, Piccadilly Plaza
Manchester M1 4BT United Kingdom
T: +44 (0)161 236 0282 F: +44 (0)161 236 0095

Marseille
76, rue de la République, 13002 Marseille, France
T: +33 (0)4 91 37 35 15 F: +33 (0)4 91 91 90 14

Paris
12-14, rue Jules César, 75012 Paris, France
T: +33 (0)1 53 17 36 00 F: +33 (0)1 53 17 36 01

Woking
Dukes Court, Duke Street, Woking
Surrey GU21 5BH United Kingdom
T: +44 (0)1483 728051 F: +44 (0)1483 755207

Email: info@mvaconsultancy.com

Offices also in
Bangkok, Beijing, Hong Kong, Shenzhen and Singapore

mvaconsultancy