

Technical Note

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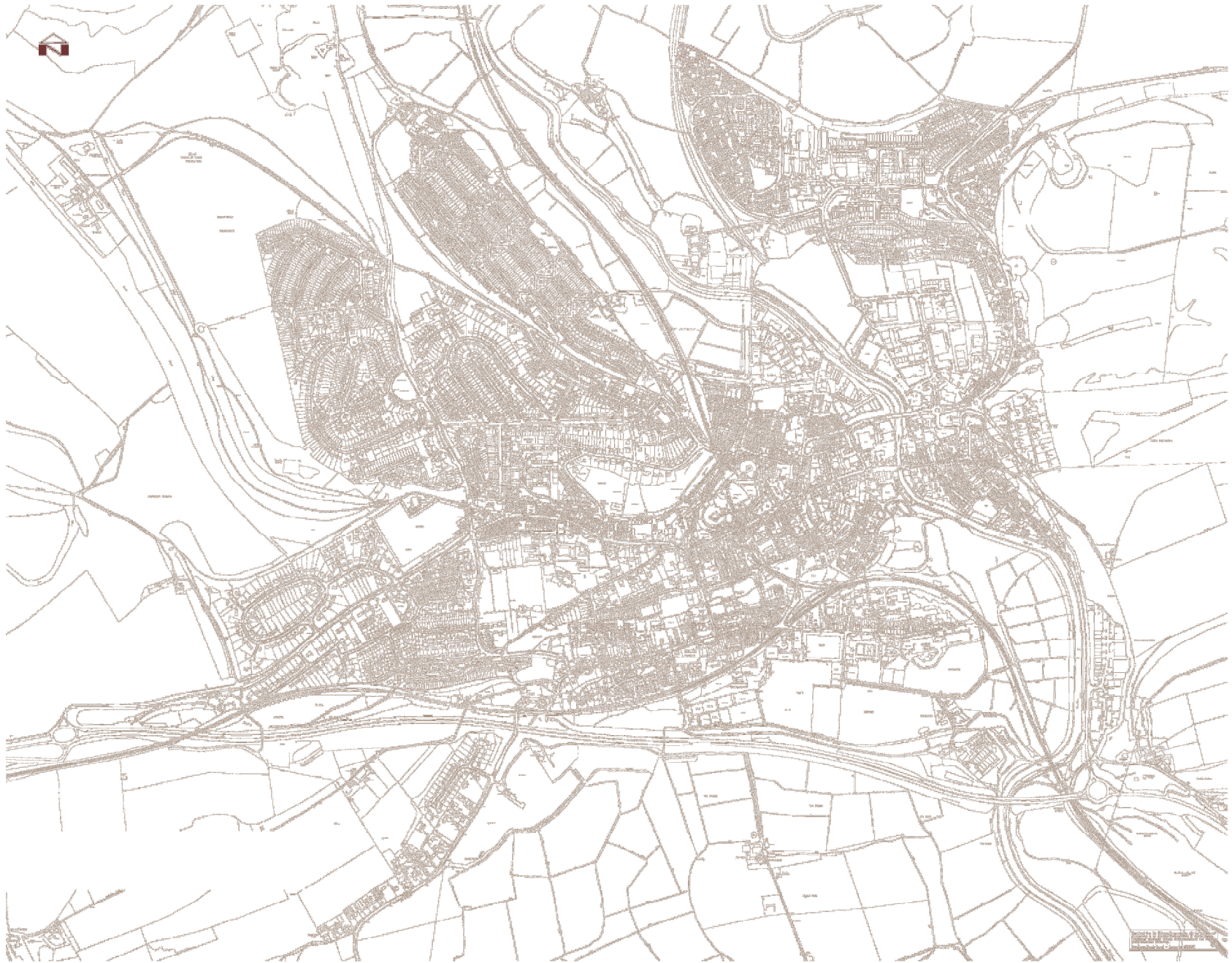
1.0 INTRODUCTION

Overview

- 1.1 Lewes District Council (LDC), in partnership with the South Downs National Park Authority, is currently preparing a Local Development Framework (LDF) Core Strategy, which will guide housing and employment development in Lewes District to 2030. TPI (part of Amey group) was commissioned to undertake a Transport Study for Lewes town, in order to determine the impacts that a number of development scenarios, identified by LDC, would have on the surrounding transport network over the period of the Core Strategy.
- 1.2 The development scenarios assessed in this Transport Study are focussed solely on the settlements of Lewes and Ringmer. No detailed account has been taken of potential development options in Newhaven and Peacehaven, which have been considered in a separate, local transport study.
- 1.3 Overall, the aim of the Lewes Town Transport Study is to give an objective view of the relative strengths and weaknesses of each development scenario, in terms of their future transport impacts. This should help to inform the Council's evaluation of possible options for future housing and employment growth in the period to 2030. The project specifically focuses on impact assessment during a typical weekday AM peak and PM peak hours, for a number of LDC spatial options in combination.
- 1.4 East Sussex County Council transportation officers worked with LDC to set the brief for the study.
- 1.5 A location plan showing the core area of the study is provided in **Figure 1.1**.

Background

- 1.6 A SATURN highway model has been used to undertake the Lewes Town Transport Study.. This is an updated version of the existing SATURN traffic model of Lewes. The model was originally developed for a 2005 base year. The highway model has since been updated and re-validated to a 2010 base year, for the Lewes Town Transport Study. The revisions are documented in the technical note 'SATURN Model Update', issued in May 2011 and mainly comprise the following:



— *SATURN Network Changes:*

- Cliffe High St closed to vehicular traffic;
- Inclusion of Beddingham roundabout (A27/ A26);
- Inclusion of Ham Lane/A26 junction;
- Inclusion of Ham Lane/B2192 junction, Ringmer;
- Layout changes at Southerham Roundabout (A27/A26);
- New model detail at A27/ A275;
- New model detail at Brighton Rd/ Nevil Rd signalised junction;
- New model detail at Mayhew Way/ Church Lane (Malling St); and
- New model detail at Orchard Rd/ A26 junction.

— *Inclusion of Land Use Development Changes in SATURN Trip Matrices:*

- Southdown House;
- Scout Hut;
- High Street Developments;
- Prince Edwards Road;
- Baxters Printing Works;
- Roche Site;
- Telephone Exchange;
- Avery Nursery;
- Merlins; and
- Ringmer Business Centre.

— *Amendments to the trip matrices, to resolve:*

- Shortage of A27 strategic traffic between east and west of the study area;
- Shortage of traffic entering the study area from A27 (W);
- Excessive traffic entering the study area from A27 (E); and
- Shortage of traffic starting/ending its journey at the South Malling Employment Zone.

— *Inclusion of additional traffic counts from 2005, 2009 and 2010, in matrix estimation.*

- 1.7 A reasonable base 2010 traffic flow validation was achieved for the AM and PM peak models, with respect to criteria specified in the Department for Transport (DfT) Design Manual for Roads and Bridges (DMRB) Volume 12, Section 2, Part 1 – Traffic Appraisal in Urban Areas. However journey time validation was less than satisfactory owing to large variability in the sample of observed times. Assigned route choice, convergence and stability in the models were better than acceptable thresholds.

Scope of the Appraisal

- 1.8 This note summarises the results of the model forecasting appraisal of the LDF development scenarios specified by LDC. Seven scenarios have been assessed at 2030, for a weekday AM peak hour (8am-9am) and PM peak hour (5pm-6pm). The forecast model includes two vehicle classes, namely Light Vehicles (Cars plus light goods vehicles) and Heavy Vehicles (heavy goods vehicles plus buses).
- 1.9 Comparisons have been drawn between the options, by using summary statistics from the transport model as indicators of scheme performance against certain criteria. The performance indicators for each option have been compared using a framework appraisal.
- 1.10 The forecast appraisal has been undertaken in line with guidance issued by Department for Transport (DfT) through WebTAG.

- 1.11 In the remainder of the note, Section 2 contains a discussion of the forecasting method and assumptions used in the SATURN model and also the appraisal method used to compare the LDF development scenarios. Section 3 contains a summary of the appraisal results. Section 4 draws conclusions from the appraisal.

2.0 FORECASTING AND APPRAISAL METHODOLOGY

Introduction

2.1 This section summarises the scope of the Lewes town traffic model forecasts and the method and assumptions used in the LDF impact appraisal.

Local Development Framework Development Scenarios

2.2 A number of housing/employment development scenarios have been identified for testing by LDC. These scenarios are set out in **Table 2.1**.

Table 2.1 LDF Development Scenarios

		LDF Scenario						
		Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Lewes	Old Malling Farm (Residential - 270 dwellings)	✓	✓	✓	✓	✓		
	North Street (Residential - 600 dwellings)	✓	✓	✓	✓		✓	
	North Street (Employment - 10000m2 B1a)	✓	✓	✓	✓		✓	
		Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7
Ringmer	Lewes Road (Residential - 154 dwellings)	✓	✓					✓
	Bishops Lane (Residential - 226 dwellings)	✓		✓				✓
	B2124/B2192 (Employment - 6000m2 B1c/B2)	✓	✓	✓	✓	✓	✓	✓

Source: Lewes District Council

2.3 The development scenarios in **Table 2.1** represent all permutations of development, split between the following locations:

- Lewes North Street (residential and employment);
- Lewes Old Malling Farm (residential only); and
- Ringmer (residential);
- Note – Ringmer employment allocation is common to all scenarios.

2.4 In summary, the scenarios represent the following:

- Scenario 1 – Maximum residential and employment across all locations;
- Scenario 2 – Maximum residential and employment in Lewes, with low residential in Ringmer;
- Scenario 3 – Maximum residential and employment in Lewes, with medium residential in Ringmer;
- Scenario 4 – Maximum residential and employment in Lewes, with no residential in Ringmer;
- Scenario 5 – Residential in Lewes Old Malling Farm, with no development in North Street and no residential in Ringmer;
- Scenario 6 – Residential and employment in Lewes North Street, with no development in Old Malling Farm and no residential in Ringmer; and

- Scenario 7 – No residential or employment in Lewes, with maximum residential in Ringmer.

Modelling Methodology

- 2.5 Travel demand forecasts were required at 2030, for AM and PM peak hours, in order to assess the likely impact of the housing and employment options upon the existing transport infrastructure.

Future Year Trip Matrices

- 2.6 Future year trip matrices were assembled for a Reference case situation and for the seven LDF development scenarios. The matrices were produced by applying separate forecasting techniques to different parts of the 2010 base matrix and by then combining the constituent parts. The main forecasting components to be considered were as follows:
- Growth of existing car trip origins and destinations, wholly within the model area of Lewes and Ringmer;
 - Growth of existing car trip origins or destinations at zones external to the study area;
 - Growth of existing car trip origins or destinations at Brighton and Hove zones;
 - Growth of existing car trip origins or destinations at Uckfield zones;
 - Growth of existing light goods vehicle element of (Car + LGV) trips between any origin and destination;
 - Growth of existing heavy goods vehicle element of (HGV + bus) trips between any origin and destination;
 - Occurrence of new site-specific trips associated with committed developments in Lewes and Ringmer zones;
 - Occurrence of new site-specific trips associated with LDF development scenarios in Lewes and Ringmer zones (only applicable to the LDF scenarios, not the reference case); and
 - Impact of changes in household income and fuel cost in future years.
- 2.7 Forecast trip matrices were developed identically for the reference case and the LDF development scenarios, except for component (viii) which was excluded from the reference case and which was different for each LDF development scenario.
- 2.8 Components (i)-(iv) and (ix) apply to the car element only of the light vehicle matrix. All of these calculations have been weighted according to the proportion of cars in the (Car + LGV) matrix.
- 2.9 For component (i), it was agreed that LDF development scenario traffic within Lewes and Ringmer would constitute the entirety of new car trip generations and attractions arising in 2030. Consequently, there would be no growth of car trip-ends wholly within Lewes or Ringmer in line with the TEMPRO database (i.e. the National Trip End Model). However, for component (ii), TEMPRO trip end growth would apply to car trips starting or ending at external zones, where no specific LDF development options have been considered.
- 2.10 Initially, it was intended to handle component (iii) using LDF trip data specific to Brighton and Hove. However, it was agreed that no reliable trip end values were available, so TEMPRO growth factors were applied here instead. Conversely, site-specific LDF trip ends were derived for component (iv) at Uckfield, using outputs from the Wealden DC transport model. A proportion of these Uckfield trips were distributed to and from the Lewes town model area on the basis of Census 2001 journey to work data.
- 2.11 LDF trip departures (origins) leaving Uckfield in the AM peak were split between model area and non-model area, according to Census trip movements from Uckfield. LDF trip arrivals (destinations) entering Uckfield in the AM peak were split between model area and non-model area, according to Census trip movements to Uckfield. The proportion of 'excluded' trips in the PM peak was estimated by transposing the AM peak departure and arrival

proportions, on the assumption that AM peak trip patterns will broadly reverse in the PM peak. **Table 2.2** shows the proportions of LDF trips at Uckfield that were included in and excluded from the study area.

Table 2.2 Proportion of Uckfield LDF Trips inside and outside the Study Area

	AM Peak		PM Peak	
	% Trips Included	% Trips Excluded	% Trips Included	% Trips Excluded
Uckfield Departures (Trip Origins)	13%	87%	11%	89%
Uckfield Arrivals (Trip Destinations)	11%	89%	13%	87%

Source: TPI

- 2.12 For components (ii) and (iii), TEMPRO factors were extracted from database version 5.4, using version 6.2 of the software, in line with current WebTAG advice from DfT. Factors were differentiated by local authority district corresponding with the relevant model zones. Where a trip passes between two different districts, an average TEMPRO origin/destination factor was derived.
- 2.13 It should be noted that WebTAG advice has recently been revised (19th July 2011), so that version 5.4 of the TEMPRO database has been superseded by version 6.2. This will have an impact upon the traffic volumes forecast in the Lewes town model at 2030 and is discussed later in the report.
- 2.14 Component (v) was accounted for by calculating the proportion of LGV trips within the base 2010 light vehicle matrix (Car + LGV) and then deriving a weighted LGV growth factor from the National Transport Model (NTM). Similarly, component (vi) was handled by extracting a weighted HGV factor from NTM to be applied to the heavy vehicle matrix (HGV + Bus).
- 2.15 Future committed developments in specified zones in Lewes and Ringmer were incorporated as component (vii). Trip generations and attractions, by time period and vehicle type, were calculated for each land use and site area, as discussed below and were distributed according similar zones in the existing model.
- 2.16 Site-specific trip generations and attractions were also calculated for the LDF development options in Lewes and Ringmer, for component (viii), in LDF scenarios 1-7. The derivation of trip rates by land use type and site area is discussed below. Distribution of the LDF trips was made on the basis of similar model zones. The proportion of Ringmer trips likely to travel on the SATURN network was predicted using Census 2001 journey to work data.
- 2.17 The final forecasting component (ix) was to account for changes in income and fuel cost. WebTAG advises that in a highway-only model, such as for Lewes town, where transfer of trips between travel modes is not allowed for, changes in the relative attractiveness of car travel should be allowed for using income and fuel cost adjustment factors to be applied to the matrix trip ends. Accordingly, income and fuel cost adjustment has been made to all car trips in the 2030 model.
- 2.18 Further details of the model forecasting parameters are given below.

TEMPRO Growth of Non-Internal Car Trips

- 2.19 Non-internal elements of the base year 2010 car matrices were projected to future year 2030 equivalents, by applying TEMPRO, average weekday, car-driver origin and destination trip end factors, by zone location. These factors were primarily calculated using the TEMPRO database version 5.4, as shown in **Table 2.3**.

Table 2.3 TEMPRO Growth factors (Model Version 6.2 with Database Version 5.4)

Model Zone	Area Description	Name	AM		PM	
			Origin	Destination	Origin	Destination
416	Region	SE	1.191	1.207	1.204	1.194
420	County	East Sussex	1.236	1.249	1.249	1.240
400/401	Authority	Brighton and Hove	1.302	1.265	1.266	1.285
403	Authority	Eastbourne	1.241	1.254	1.255	1.247
405	Authority	Hastings	1.250	1.253	1.255	1.253
410	21UF0	rural (Lewes)	1.148	1.222	1.212	1.163
411	21UF2	Burgess Hill(part of)	1.088	1.194	1.164	1.099
310-349	21UF5	Lewes	1.194	1.245	1.243	1.209
402	21UF6	Newhaven	1.166	1.226	1.218	1.176
407	21UG0	rural (Rother)	1.152	1.217	1.210	1.172
404	21UG1	Bexhill	1.245	1.251	1.260	1.261
405	21UG3	Hastings(part of)	1.165	1.226	1.225	1.189
408	21UG4	Battle	1.224	1.248	1.255	1.244
406	21UG5	Rye	1.245	1.252	1.260	1.260
409	21UH1	Eastbourne(part of)	1.254	1.259	1.267	1.267
414	21UH2	Crowborough	1.134	1.228	1.219	1.159
409	21UH3	Hailsham	1.220	1.252	1.255	1.238
412	21UH4	Uckfield	1.154	1.238	1.233	1.180
413	21UH5	Heathfield	1.174	1.245	1.243	1.200
415	21UH6	Wadhurst	1.149	1.234	1.225	1.173
419	29UB2	Tenterden	1.590	1.369	1.411	1.564
418	Authority	Tunbridge Wells	1.155	1.222	1.204	1.161
411	45UG1	Burgess Hill(main)	1.252	1.199	1.206	1.240
411	45UG2	Haywards Heath	1.234	1.203	1.205	1.225
417	45UG3	East Grinstead(main)	1.195	1.190	1.188	1.192

Source: TEMPRO V6.2 with V5.4 Database

2.20 As a later sensitivity test, the TEMPRO factors were revised using the TEMPRO database version 6.2 (released by DfT on 19.07.11), as shown in **Table 2.4**.

Table 2.4 TEMPRO Growth factors (Model Version 6.2 with Database Version 6.2)

Model Zone	Area Description	Name	Version 6.2				% Growth Change from V5.4			
			AM		PM		AM		PM	
			Origin	Destination	Origin	Destination	Origin	Destination	Origin	Destination
416	Region	SE	1.1356	1.1426	1.1499	1.1463	-5%	-5%	-4%	-4%
420	County	East Sussex	1.1416	1.1456	1.1523	1.1483	-8%	-8%	-8%	-7%
400/401	Authority	Brighton and Hove	1.0656	1.0939	1.0990	1.0828	-18%	-14%	-13%	-16%
403	Authority	Eastbourne	1.1517	1.1290	1.1440	1.1555	-7%	-10%	-9%	-7%
405	Authority	Hastings	1.1567	1.1158	1.1317	1.1563	-7%	-11%	-10%	-8%
410	21UF0	rural (Lewes)	1.1865	1.1458	1.1477	1.1684	3%	-6%	-5%	0%
411	21UF2	Burgess Hill(part of)	1.0734	1.1253	1.1263	1.0916	-1%	-6%	-3%	-1%
310-349	21UF5	Lewes	1.0987	1.1348	1.1380	1.1142	-8%	-9%	-8%	-8%
402	21UF6	Newhaven	1.1003	1.1306	1.1351	1.1150	-6%	-8%	-7%	-5%
407	21UG0	Rural (Rother)	1.5194	1.3163	1.3698	1.5118	32%	8%	13%	29%
404	21UG1	Bexhill	1.0740	1.1654	1.1644	1.1067	-14%	-7%	-8%	-12%
405	21UG3	Hastings(part of)	1.0920	1.1753	1.1791	1.1274	-6%	-4%	-4%	-5%

Model Zone	Area Description	Name	Version 6.2				% Growth Change from V5.4			
			AM		PM		AM		PM	
			Origin	Destination	Origin	Destination	Origin	Destination	Origin	Destination
408	21UG4	Battle	1.0765	1.1696	1.1707	1.1116	-12%	-6%	-7%	-11%
406	21UG5	Rye	1.1319	1.1822	1.1910	1.1620	-9%	-6%	-5%	-8%
409	21UH1	Eastbourne(part of)	1.0599	1.1621	1.1605	1.0953	-15%	-8%	-8%	-14%
414	21UH2	Crowborough	1.1582	1.1936	1.2064	1.1862	2%	-3%	-1%	2%
409	21UH3	Hailsham	1.1382	1.1730	1.1811	1.1616	-7%	-6%	-6%	-6%
412	21UH4	Uckfield	1.1204	1.1686	1.1745	1.1469	-3%	-6%	-5%	-3%
413	21UH5	Heathfield	1.0931	1.1473	1.1544	1.1251	-7%	-8%	-7%	-6%
415	21UH6	Wadhurst	1.1436	1.1744	1.1834	1.1676	0%	-5%	-3%	0%
419	29UB2	Tenterden	1.0715	1.1454	1.1457	1.0999	-33%	-16%	-19%	-30%
418	Authority	Tunbridge Wells	1.0947	1.1304	1.1361	1.1136	-5%	-8%	-6%	-4%
411	45UG1	Burgess Hill(main)	1.1125	1.1395	1.1471	1.1317	-11%	-5%	-5%	-9%
411	45UG2	Haywards Heath	1.0282	1.1102	1.0952	1.0413	-17%	-8%	-9%	-15%
417	45UG3	East Grinstead(main)	1.0812	1.1291	1.1334	1.1029	-10%	-5%	-5%	-7%

Source: TEMPRO V6.2 with V6.2 Database

- 2.21 It can be seen from Table 2.4 that, on average across East Sussex and in Lewes, projected TEMPRO growth from 2010 to 2030 is about 8% less with the version 6.2 database than with version 5.4.

National Transport Model (NTM) Growth of Light and Heavy Goods Vehicle Trips

- 2.22 The light and heavy goods vehicle component of the base year matrix was projected to future years in line with NTM growth rates. A summary of the growth factors, calculated from NTM Revision 1.1 (May 2010), is shown in **Table 2.5**.

Table 2.5 NTM Growth factors

Forecast Period	LGV		HGV	
	AM	PM	AM	PM
2010 – 2030	1.673	1.230	1.673	1.236

Source: NTM Rev 1.1, May2010

Committed Development Trips

- 2.23 Trip predictions were produced for a number of land use sites within the traffic model area, where developments are committed, as identified by LDC officers. The committed development trips were added into the 2010 matrices after the application of TEMPRO income and fuel cost factors.
- 2.24 The sites at which committed development is expected, their corresponding planning status and their model zone allocations, are shown in **Table 2.6**.

Table 2.6 Committed Land Use Developments

Site Location	Development Size		Zone	Land Use Type
	Completions (net) since 1 April 2005	Committed (net)		
Southdown House, 44 St Annes Crescent, BN7 1SD	12 dwellings	0	329	Residential
Scout Hut, St John Street, BN7 2QD	6 dwellings	0	323	Residential
34 - 35 High Street, BN7 2LU	8 dwellings	0	319	Residential
82 Prince Edwards Road, BN7 1BH	14 dwellings	0	345	Residential
Baxters Printing Works	54 dwellings	0	319	Residential
24 High Street, BN7 2LU	8 dwellings	0	319	Residential
Former Roche site, Bell Lane BN7 1JU	14 dwellings	0	325	Residential
Land to the South and West of Former Clayhill Nurseries	24 dwellings	0	321	Residential
78 - 79 High Street, BN7 1XF	7 dwellings	0	316	Residential
Land adjacent to the telephone exchange	85 dwellings	0	347	Residential
Avery Nursery, Uckfield Road BN8 5RU	1200 sqm GFA	0	347	B2
Merlins, Uckfield Road, BN8 5RU	6221 sqm GFA	0	347	B2
Ringmer Business Centre, Chamberlaines Lane, Ringmer, East Sussex BN8 5NF	1828 sqm GFA	0	347	B1c, B1a, B2, B8
Upper Stoneham Farm, Upper Stoneham	-2363 sqm GFA	0	347	Sui generis
Land to the South and West of Former Clayhill Nurseries	0	41 dwellings	321	Residential
At Lewes House Site	0	59 dwellings	319	Residential
53 Cliffe High Street, BN7 2AN	0	7 dwellings	313	Residential
Lewes Police Station, West Street, BN7 2NY	0	14 dwellings	323	Residential
Caburn Field, BN8 5QW (nearest postcode)	0	40 dwellings	347	Residential
Land to the South and West of Former Clayhill Nurseries, Malling Street BN7 2BQ (Phase 1)	0	2480 sqm GFA	321	B1
Aldi, Brooks Road, BN7 2BY	0	1475 sqm GFA	321	A1
Land east of Malling Industrial Estate, Brooks Road, BN7 2BY	0	7040 sqm GFA	321	B1a, B1c, B2, B8
Tesco, Brooks Road, BN7 2BY	0	1135 sqm GFA	321	A1

Source: Lewes District Council

LDF Development Trips

2.25 Trip movements were also predicted for the LDF development options in scenarios 1-7. Land uses and development sizes, specified by LDC, were as shown in **Table 2.7**. The LDF development trips were added into the 2010 matrices after the application of TEMPRO income and fuel cost factors.

Table 2.7 LDF Land Use Development Options

Site Location		Development Size	Zone	Land Use Type
Lewes	Old Malling Farm	270 dwellings	334	Residential
	North Street	600 dwellings	322	Residential
	North Street	10,000 sqm GFA	322	B1a
Ringmer	Lewes Road	8 dwellings	347	Residential
	Bishops Lane	14 dwellings	347	Residential
	B2124/B2192 Junction	6,000 sqm GFA	347	B1c/B2

Source: Lewes District Council

Land Use Development Trip Rates

2.26 Lewes town has a population of approximately 16,000 and has limited public transport provision. Trip rates for Lewes and Ringmer were initially derived from the TRICS database, according to site characteristics. However, it was subsequently agreed that the trip rates should be made consistent with those used in the adjacent Newhaven Transport Study. Consequently, trip rates for both committed developments and LDF development

options in the Lewes model were allocated, by time period and vehicle type, as shown in **Table 2.8**.

Table 2.8 Land Use Trip Rates for Lewes and Ringmer Committed and LDF Sites

Trip Rate Units	Development Type		Peak	Ave. Trip Rate Cars/LGV		Ave. Trip Rate OGV	
				Arrive	Depart	Arrive	Depart
Trips Per Dwelling	Residential	C3	AM	0.157	0.403	0.000	0.000
			PM	0.403	0.241	0.000	0.000
Trips per 100sqm GFA	Employment	A1	AM	4.370	3.195	0.040	0.052
			PM	6.668	6.881	0.016	0.023
		B1	AM	2.063	0.271	0.025	0.016
			PM	0.282	1.739	0.005	0.010
B1, B2 & B8	AM	1.036	0.207	0.029	0.032		
	PM	0.174	0.897	0.041	0.005		
B2	AM	0.952	0.314	0.040	0.048		
	PM	0.176	0.814	0.006	0.027		

Source: East Sussex CC / Mott MacDonald

2.27 Distribution of development trips amongst origin and destination zones in the model matrices has been determined according to the existing distribution in similar land use zones in the transport model.

2.28 LDF trip departures (origins) leaving Ringmer in the AM peak were split between model area and non-model area, according to Census trip movements from Ringmer. LDF trip arrivals (destinations) entering Ringmer in the AM peak were split between model area and non-model area, according to Census trip movements to Ringmer. The proportion of 'excluded' trips in the PM peak was estimated by transposing the AM peak departure and arrival proportions, on the assumption that AM peak trip patterns will broadly reverse in the PM peak. **Table 2.9** shows the proportions of LDF trips at Ringmer that were included in and excluded from the study area.

Table 2.9 Proportion of Ringmer LDF Trips inside and outside the Study Area

	AM Peak		PM Peak	
	% Trips Included	% Trips Excluded	% Trips Included	% Trips Excluded
Ringmer Departures (Trip Origins)	60%	40%	40%	60%
Ringmer Arrivals (Trip Destinations)	40%	60%	60%	40%

Source: TPI

2.29 A separate development-only trip matrix was created for each site, time period and vehicle type at 2030, for the committed and the LDF development options.

2.30 **Table 2.10** shows a breakdown of site-specific trip volumes predicted for each LDF development option, for AM and PM peak periods.

Table 2.10 Land Use Trip Totals for LDF Sites

Matrix Trip Component	Incl. / Excl. in Model?	AM Peak Trips (PCU) – Rounded			PM Peak Trips (PCU) – Rounded		
		Car & LGV	HGV	All Vehicles	Car & LGV	HGV	All Vehicles
Lewes – Old Malling Farm (Res.)	Included	152	0	152	166	0	166
Lewes North Street (Res. & Empl.)	Included	570	7	570	580	2	580
Ringmer (Empl.)	Included	32	3	35	28	1	29
	Excluded	42	3	45	37	1	38
Ringmer (Max. Res.)	Included	116	0	116	128	0	128
	Excluded	97	0	97	116	0	116
Ringmer (Med. Res.)	Included	69	0	69	77	0	77
	Excluded	58	0	58	69	0	69
Ringmer (Min. Res.)	Included	47	0	47	52	0	52
	Excluded	39	0	39	47	0	47

Source: TPI

2.31 In both AM and PM peaks, the greatest vehicle trip volumes would be produced by the North Street (Lewes) development and would constitute about two thirds of the LDF sites in the largest scenario (1). The remaining one third of trips would be contributed in equal parts by Old Malling Farm (Lewes) and Ringmer.

2.32 **Table 2.11** indicates the total site-specific land use trips in each forecast scenario, for reference case and LDF.

Table 2.11 Land Use Trip Totals for Reference Case and LDF Scenarios

Matrix Trip Component	AM Peak Trips (PCU) – Rounded			AM Peak Trips (PCU) – Rounded		
	Car & LGV	HGV	All Vehicles	Car & LGV	HGV	All Vehicles
Committed Sites (Ref Case)	638	17	655	619	10	629
LDF Scenario 1 Sites	869	10	879	903	3	906
LDF Scenario 2 Sites	801	10	811	826	3	830
LDF Scenario 3 Sites	823	10	832	851	3	854
LDF Scenario 4 Sites	754	10	764	774	3	778
LDF Scenario 5 Sites	184	10	194	194	3	197
LDF Scenario 6 Sites	602	10	612	608	3	611
LDF Scenario 7 Sites	148	10	158	156	3	159

Source: TPI

2.33 It can be seen from Table 2.11 that Scenario 1 has the largest vehicle trip volume arising from site-specific developments, in both AM and PM peaks.

Income and Fuel Cost Adjustment to Growth in Car Trips

2.34 All parts of the base year 2010 car trip matrices have also been adjusted to represent the impact of income growth and fuel cost change, because the Lewes model is a highway-only model with a fixed trip matrix (i.e. no variable demand forecasting). Appropriate factors representing fuel cost and Income effects were applied in line with WebTAG unit 3.15.2 (Section 5.4). These factors are shown in **Table 2.12** below.

Table 2.12 Income and Fuel Cost Forecast adjustment Factors

Year	Income Adjustment Factor	Fuel Adjustment Factor	Year	Income Adjustment Factor	Fuel Adjustment Factor
1991	1.000	1.000	2017	1.077	1.024
1992	0.999	1.001	2018	1.080	1.026
1993	1.002	0.992	2019	1.083	1.028
1994	1.008	0.982	2020	1.087	1.029
1995	1.012	0.970	2021	1.090	1.031
1996	1.015	0.957	2022	1.093	1.031
1997	1.019	0.948	2023	1.097	1.032
1998	1.023	0.942	2024	1.100	1.032
1999	1.025	0.940	2025	1.104	1.032
2000	1.029	0.928	2026	1.107	1.032
2001	1.032	0.924	2027	1.111	1.032
2002	1.034	0.930	2028	1.115	1.032
2003	1.037	0.945	2029	1.118	1.032
2004	1.040	0.954	Forecast Year 2030	1.122	1.032
2005	1.042	0.953	2031	1.126	1.032
2006	1.045	0.946	2032	1.130	1.032
2007	1.048	0.943	2033	1.134	1.032
2008	1.051	0.950	2034	1.138	1.032
2009	1.054	0.971	2035	1.142	1.032
Base Year 2010	1.056	0.993	2036	1.146	1.032
2011	1.059	1.009	2037	1.150	1.032
2012	1.062	1.017	2038	1.155	1.032
2013	1.065	1.018	2039	1.159	1.032
2014	1.068	1.020	2040	1.164	1.032
2015	1.071	1.021	2041	1.168	1.032
2016	1.074	1.023			

Source: WebTAG - Unit 3.15.2

2.35 Using the adjustment factors in Table 2.12 gives an overall trip end growth, for income change of (x1.0625) and, for fuel cost change, of (x1.0393). The combined income and fuel factor is (x1.1043).

Forecast Matrix Trip Totals and Sensitivity Tests

2.36 Individual components of the forecast trip matrices have been combined for the reference case and LDF scenarios, respectively, as Test 1. Various sensitivity test adjustments to the resulting matrices (Tests 2-5) were subsequently requested by East Sussex County Council (ESCC), namely:

- Test 2 – Replace Uckfield zone LDF site-specific trips with TEMPRO (database 5.4) factored trips;
- Test 3 – Reduce Lewes DC LDF development options in scenarios 1-7, by 10% to reflect ‘smarter choices’ initiatives;
- Test 4 – Combine Uckfield TEMPRO-factored trips and Lewes DC 10%-reduced LDF trips; and

- Test 5 – Adjust all TEMPRO-factored zones (including Uckfield) to match new TEMPRO (database 6.2) as approved by DfT on 19.07.11.

2.37 Matrix trip totals from the demand Tests 1-5 are shown in **Table 2.13**.

Table 2.13 Lewes Model Matrix Trip Totals

Trip Matrix Scenario	Demand Scenario Description	Weekday Peak Time Period	Base Year 2010 Trip Matrix	2030 Matrix Trip Totals (Light + Heavy Vehicle PCU), with SATURN Network Configuration & Demand Adjustment				
				Test 1 No matrix Adjustment	Test 2 Uckfield LDF Replaced by TEMPRO	Test 3 Lewes DC LDF Reduced by 10% (Smarter Choices)	Test 4 Uckfield LDF Replaced by TEMPRO & Lewes DC LDF Reduced by 10% (Smarter Choices)	Test 5 TEMPRO Growth Changed from Database 5.4 to 6.2; including Uckfield LDF replaced by TEMPRO
Reference Case	Background growth & committed development	AM	11465	15635	15468	15635	15468	14783
		PM	9805	13191	13021	13191	13021	12433
Scenario 1	North St empl & res. Old Mallng Fm res. Ringmer empl. & max. res.	AM	11465	16514	16348	16426	16260	15662
		PM	9805	14097	13928	14007	13837	13340
Scenario 2	North St empl & res. Old Mallng Fm res. Ringmer empl. & med. res.	AM	11465	16445	16279	16364	16198	15594
		PM	9805	14021	13851	13938	13768	13263
Scenario 3	North St empl & res. Old Mallng Fm res. Ringmer empl. & min. res.	AM	11465	16467	16301	16384	16218	15615
		PM	9805	14045	13875	13960	13790	13288
Scenario 4	North St empl & res. Old Mallng Fm res. Ringmer empl.	AM	11465	16398	16232	16322	16156	15547
		PM	9805	13969	13799	13891	13721	13211
Scenario 5	Old Mallng Fm res. Ringmer empl.	AM	11465	15819	15652	15800	15634	14967
		PM	9805	13385	13215	13365	13196	12627
Scenario 6	North St empl & res. Ringmer empl.	AM	11465	16237	16071	16177	16010	15385
		PM	9805	13799	13630	13738	13569	13042
Scenario 7	Ringmer empl. & max. res.	AM	11465	15783	15616	15768	15601	14931
		PM	9805	13347	13178	13332	13162	12590

Source: TPI

2.38 Considering the reference case situation in Table 2.13, (i.e. without any Lewes DC LDF development options), the overall matrix trip totals were found to change by the amounts shown in **Table 2.14**, for the respective tests.

Table 2.14 Lewes Reference Case Trip Matrix Growth from 2010 to 2030

Reference Case Trip Matrix Test	Time Period	
	AM Peak	PM Peak
Tests 1 & 3 (TEMPRO 5.4 with Uckfield LDF)	+36%	+35%
Tests 2 & 4 (TEMPRO 5.4 without Uckfield LDF)	+35%	+33%
Test 5 (TEMPRO 6.2 without Uckfield LDF)	+29%	+27%

Source: TPI

2.39 Table 2.14 shows that removal of Uckfield LDF trips and their replacement with TEMPRO (V5.4) growth would result in a small, 1%-2%, reduction in overall growth compared with the baseline reference case, from 2010 to 2030. Substitution of TEMPRO (V5.4) growth rates by (V6.2) growth rates (again with no LDF development in Uckfield) would cause a larger 7%-8% reduction in overall growth compared with the baseline reference case to 2030.

2.40 Comparing the Test 5 matrix trip totals (TEMPRO V6.2) with those from Test 1 (TEMPRO V5.4), in Table 2.13, shows that, across all scenarios and time periods, traffic volumes would fall by about 5.5% with the revised database.

3.0 APPRAISAL RESULTS

Introduction

- 3.1 The core of the study brief was to assess the relative impacts upon the highway network of the seven LDF development scenarios, as specified by LDC, in Test 1. This test assumed the following:
- i) No TEMPRO growth of internal trips;
 - ii) TEMPRO V5.4 growth of trips to and from external zones;
 - iii) TEMPRO V5.4 growth of trips at Brighton and Hove zones;
 - iv) Site-specific LDF trips at Uckfield zones;
 - v) NTM growth of LGV and HGV trips at all zones;
 - vi) Site-specific trips at committed developments in Lewes and Ringmer;
 - vii) Site-specific trips at LDF development options in Lewes and Ringmer zones (not in the reference case); and
 - viii) Car trip growth from income and fuel cost change.
- 3.2 Results from all of the Test 1 assignments are provided in this section. In addition, outputs from selected further tests, as agreed with ESCC, have been included. However, these are not comprehensive, owing to the limitations of study timeframe and budget.

Model Convergence and Stability

- 3.3 Checks were made to ensure that each forecast SATURN model assignment reached satisfactory levels of convergence and stability.
- 3.4 Flow stability was assessed by monitoring the SATURN 'P' parameter, or the proportion of assigned link flows that were within 5% of the volume recorded during the preceding model iteration. In each of the AM peak, Inter peak and PM peak forecast models a high 'P' value was achieved on the final SATURN iteration.
- 3.5 Cost minimisation and optimum trip routing were checked by monitoring 'Delta', the percentage difference between the travel costs on the assigned routes and on the minimum cost routes.
- 3.6 The convergence and stability tests showed that, in all of the forecast assignments, the Lewes model is reliable to the standards required by DMRB criteria in both time periods.

Performance of Key Junctions

- 3.7 There are a number of key junctions where effective operation is critical to the movement of traffic between the main land uses within the study area. These junctions are as follows:
- A27/ A277 Ashcombe Roundabout;
 - A275/ A277 Prison Crossroads;
 - A275/ Prince Edwards Rd;
 - A275/ A2029 Offham Rd;
 - A2029/ Prince Edwards Rd;
 - A2029/ The Avenue;
 - A277/ Irelands Lane;
 - B2193/ Bell Lane;
 - A277/ New Rd;
 - Priory St/ Southover High St;
 - Station Rd/ Priory St;
 - A277 High St/ Fisher St;
 - A277/ Market St;

- Station Rd/ Landsdown Place;
- Eastgate St/ High St;
- Little East St/ Phoenix Causeway/ Eastgate St;
- Phoenix Causeway/ A26 Malling St/ Cuilfail Tunnel;
- Phoenix Causeway/ Brooks Lane;
- A26 Malling Down/ Church Lane;
- A26 Malling Down/ B2192 Ringmer Rd;
- A27/ A26 Southerham Roundabout; and
- Earwig Corner scheme improvement.

3.8 The locations of these junctions and their positions on the network are shown in **Figure 3.1**.

3.9 Modelled ratios of flow to capacity (RFC) have been extracted from SATURN for all key junctions in the Test 1 assignments. These are summarised by model scenario and time period (AM/PM) in the spreadsheets contained in **Appendix A**. The RFC are given by turning movement and are colour-coded by severity, as follows:

- Red – RFC in excess of 100%;
- Amber – RFC between 85% and 100%; and
- Green – RFC below 85%.

3.10 **Figures 3.2 and 3.3** show the maximum turn RFC at the key junction locations on the existing network, at base year 2010, in the AM and PM peaks respectively. **Figures 3.4 and 3.5** show the equivalent AM and PM peak junction RFC, in the reference case at 2030. Comparable RFC values for LDF scenarios 1-7, in the AM and PM peaks, are shown in **Figures 3.6 – 3.19**.

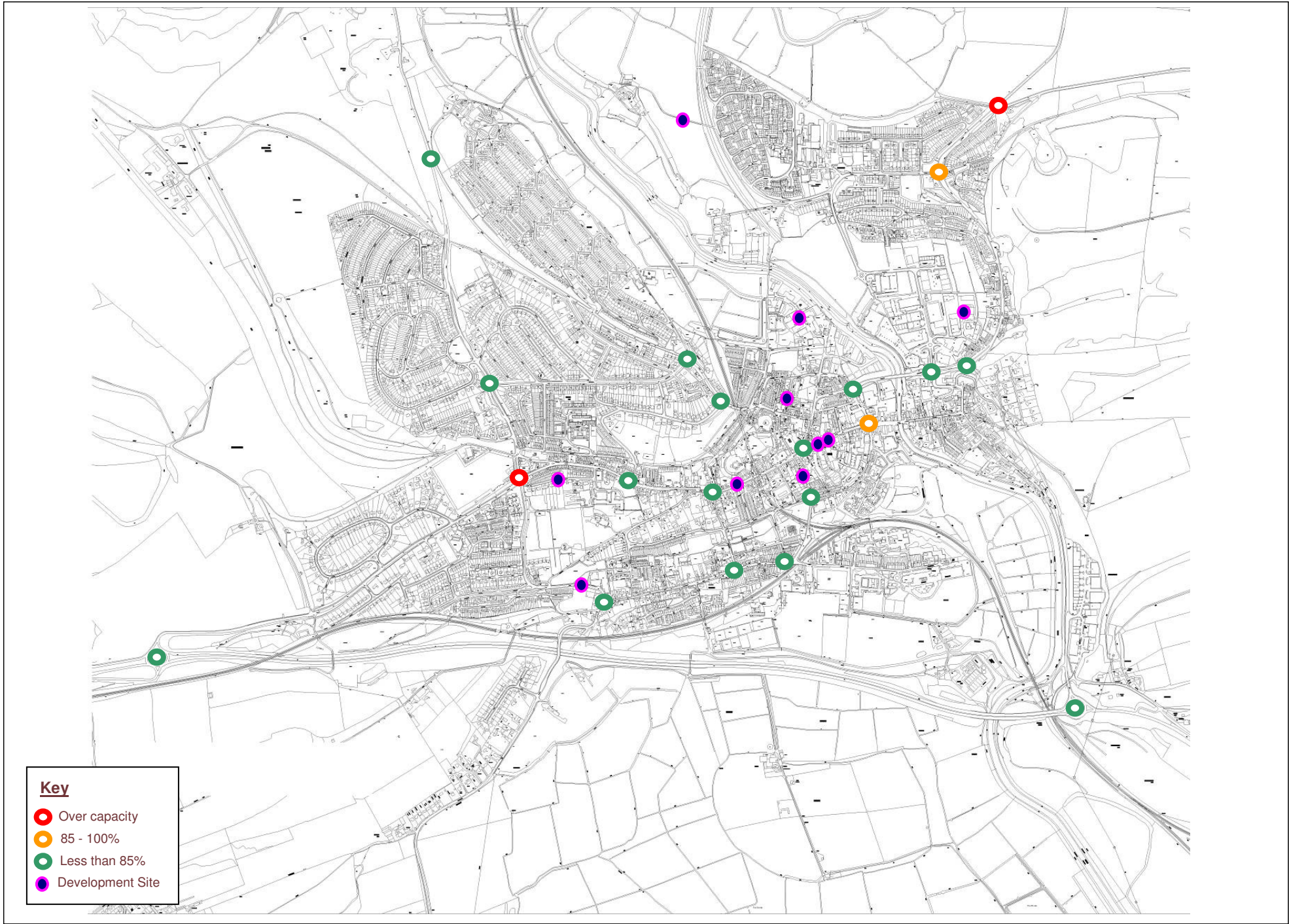
3.11 There are three critical junctions at which the highest turn RFC will exceed 100% and at which there will be significant traffic delays at 2030, in the AM and PM peaks, in all LDF scenarios and in the reference case (without any LDF development options). These junctions are as follows:

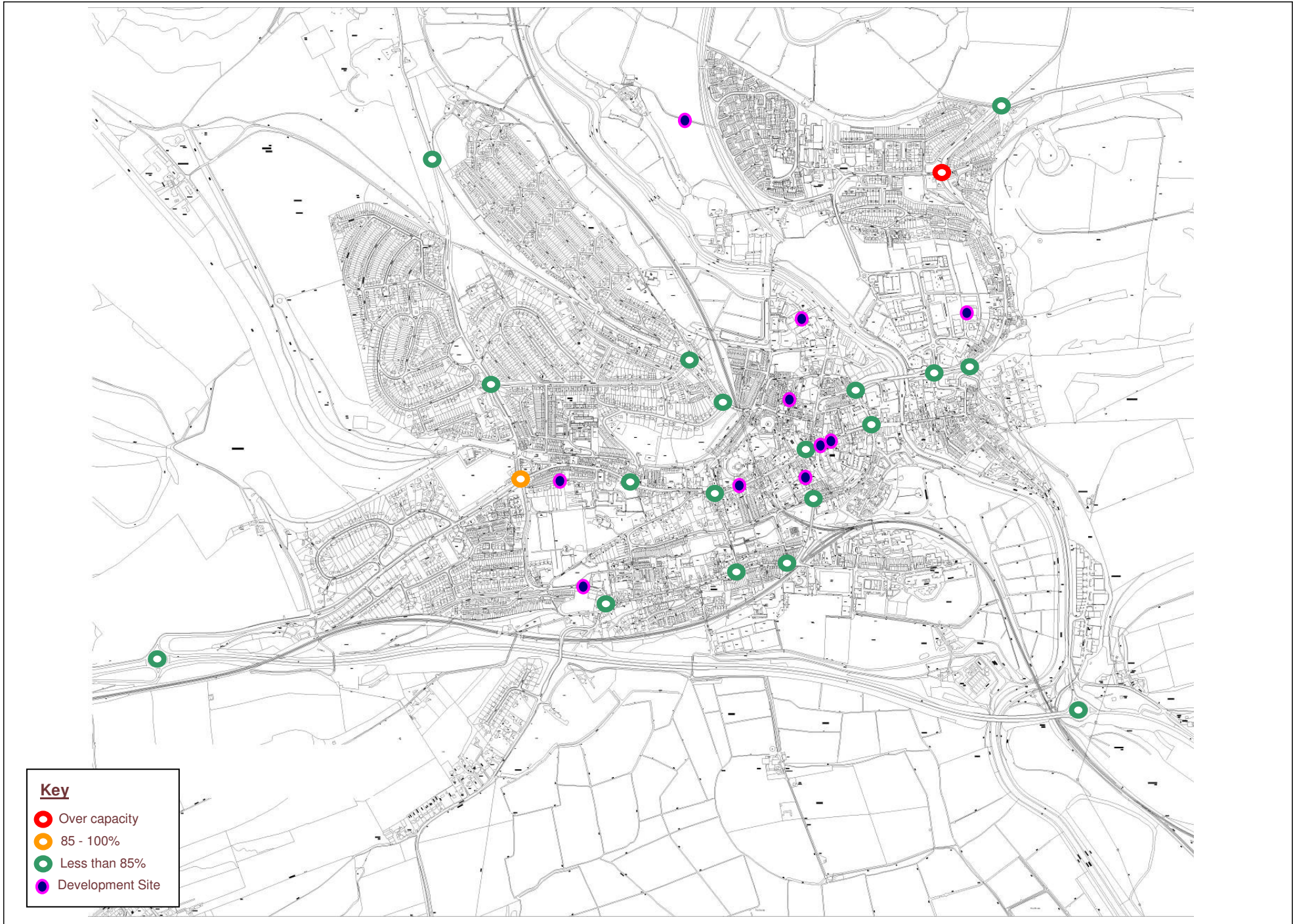
- A26 / B2192 Earwig Corner major/minor junction;
- A26 / Church Street major/minor junction; and
- A26 / Phoenix Causeway roundabout.

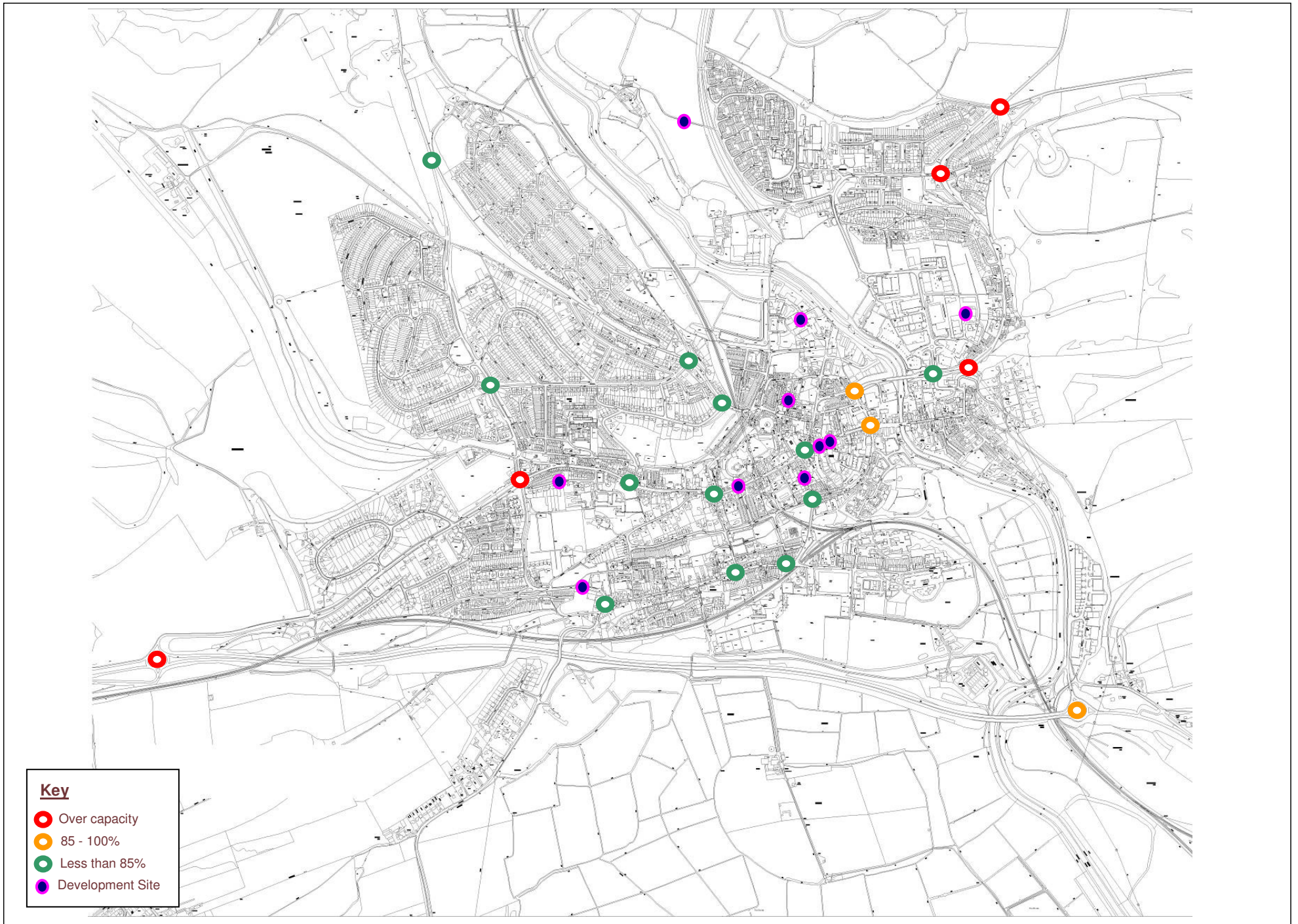
3.12 It is evident that each of these junctions will require capacity improvement by 2030 in the reference case, even if no development proceeds. Improvement will certainly be needed to enable any of the Lewes / Ringmer LDF development options to be implemented successfully.

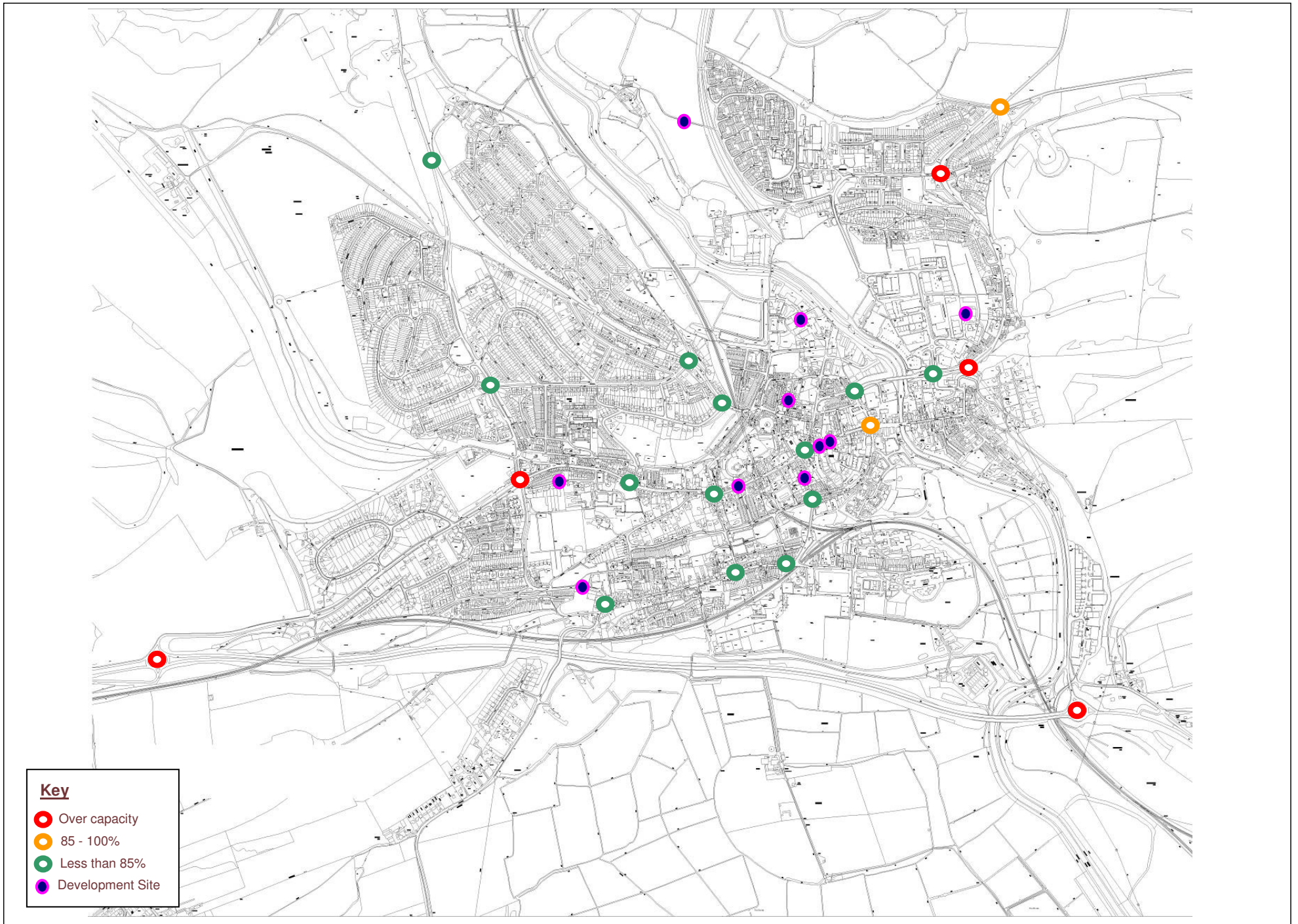
3.13 There is also likely to be congestion at A27/A26 Southerham and A27/A277 Ashcombe roundabouts, in some forecast scenarios. However, the model outputs for these junctions are not entirely reliable and tend to misrepresent traffic delays, for the following reasons:

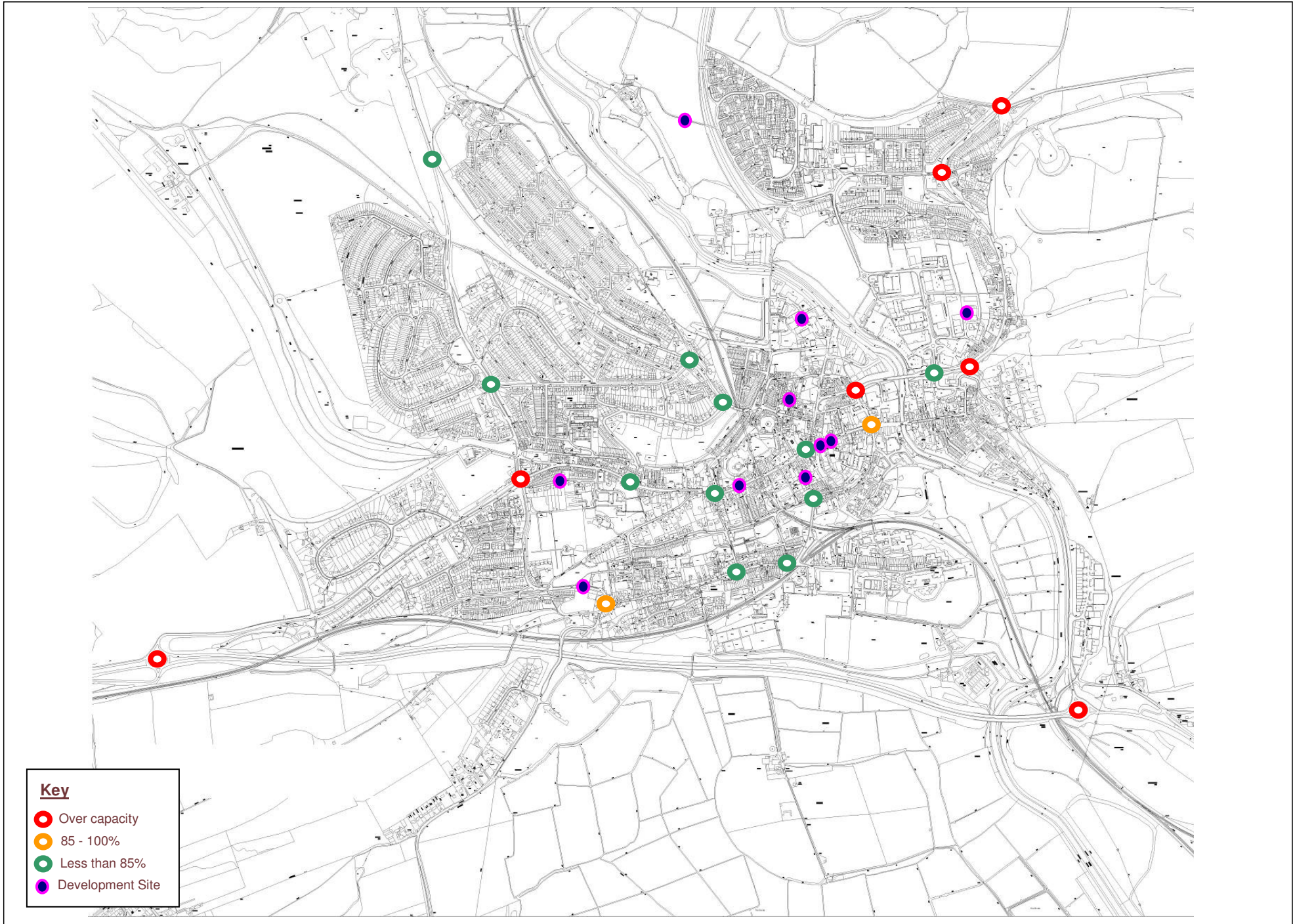
- The ESCC trip origin to destination (O-D) data that were used to build the SATURN model did not include movements on the A27 east and west of Lewes, so although these trips have been carefully synthesised, they are not entirely accurate;
- External zones to the east of Lewes are connected to several outer links in the model, so as delays on the A27 eastbound from Southerham increase, then modelled traffic will tend to switch routes to avoid congestion, thereby preventing heavy delays at Southerham, even when the bottleneck is correctly modelled; and
- As the SATURN model represents average conditions during an AM and PM hour, it cannot accurately show the peak queue interaction between the Southerham and 'Snail' (A26/Cuilfail Tunnel) roundabouts.

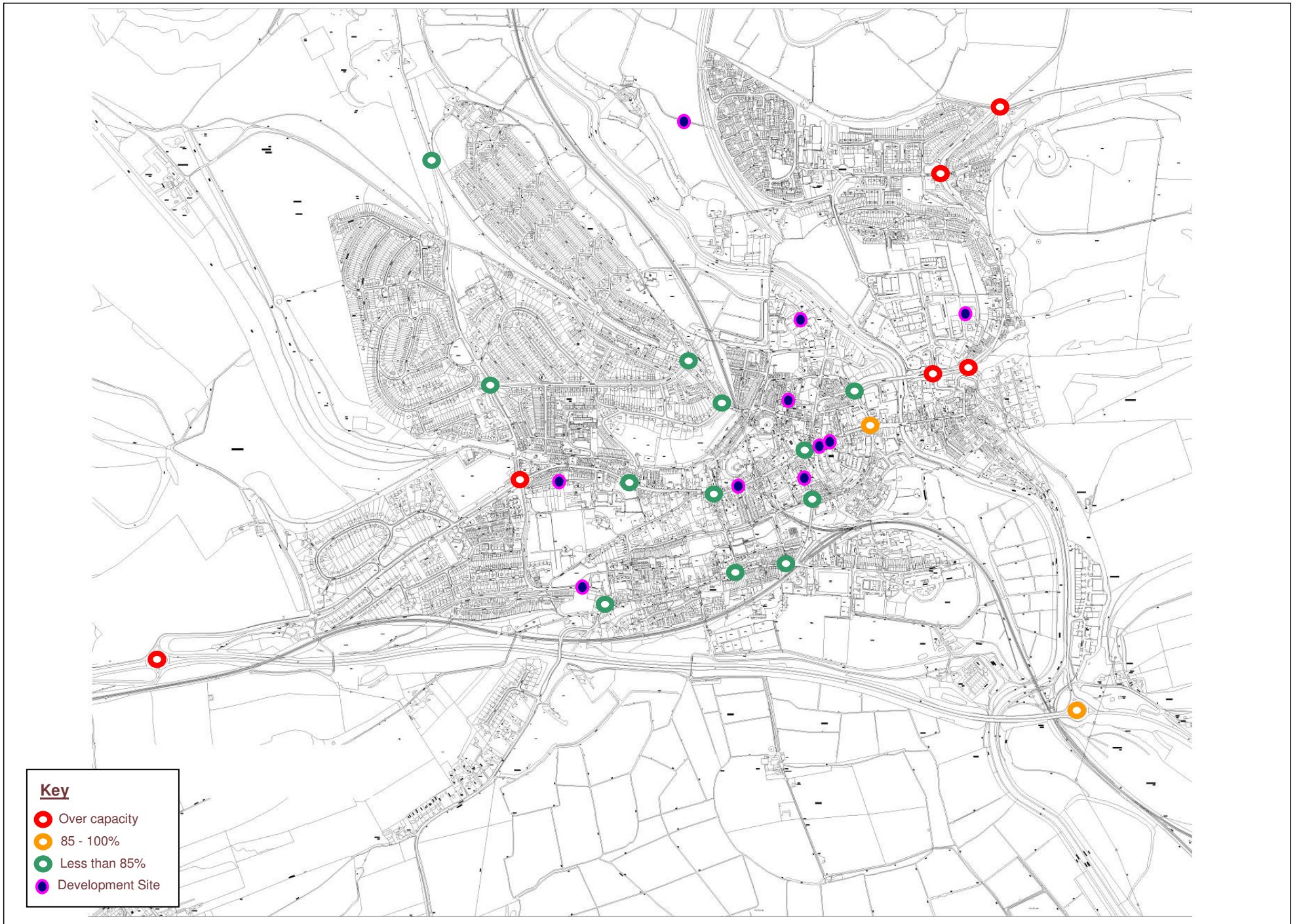


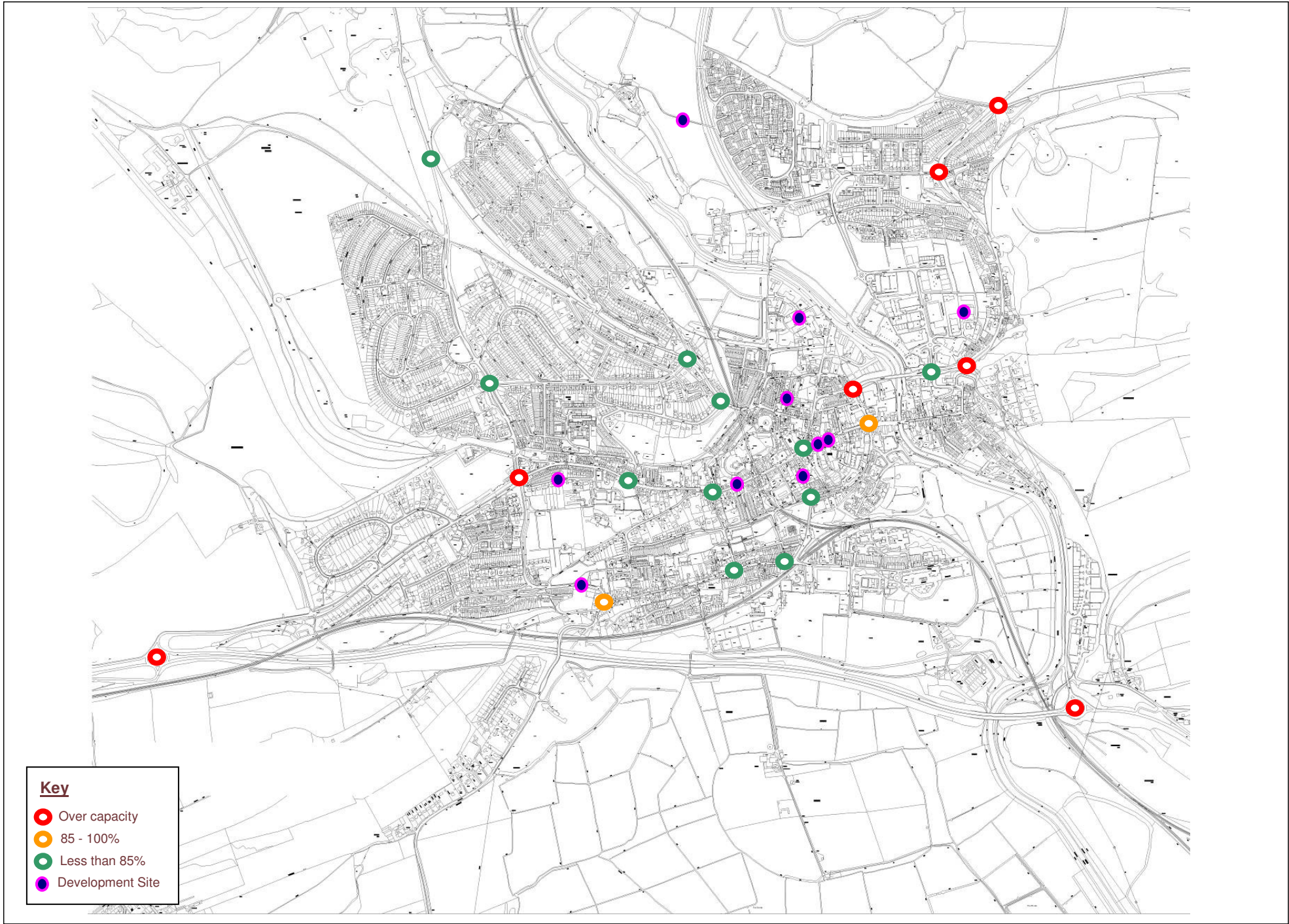


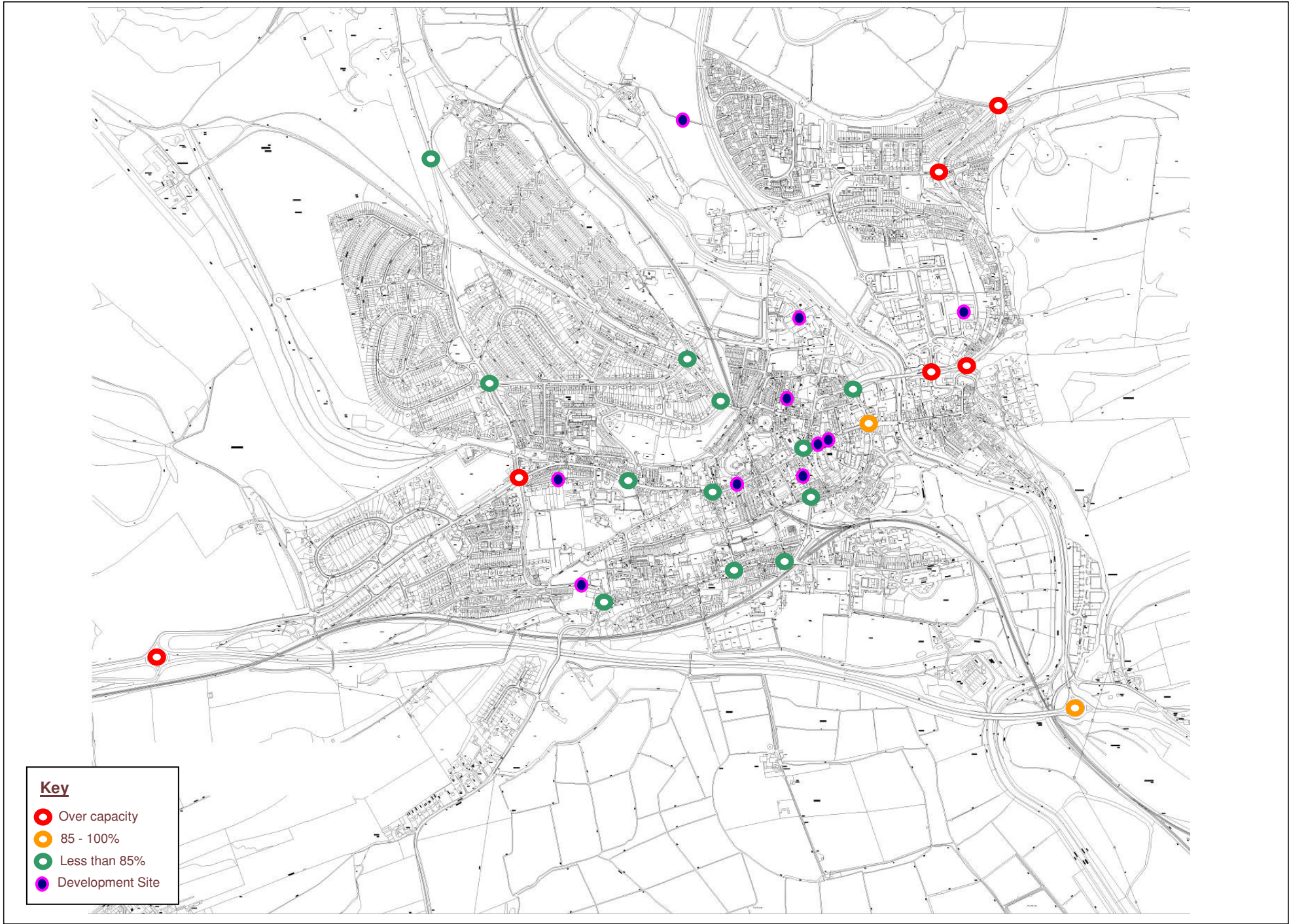


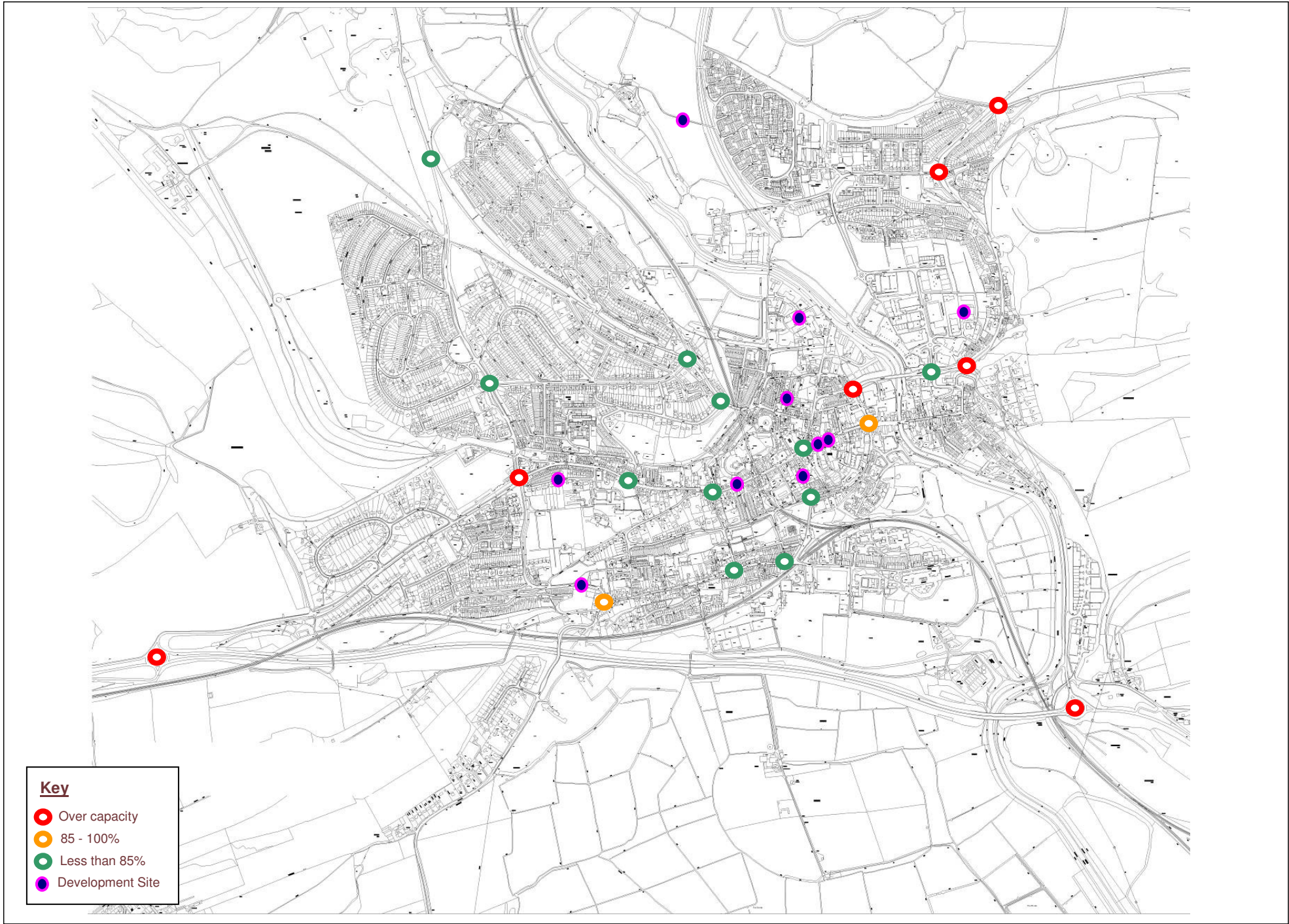


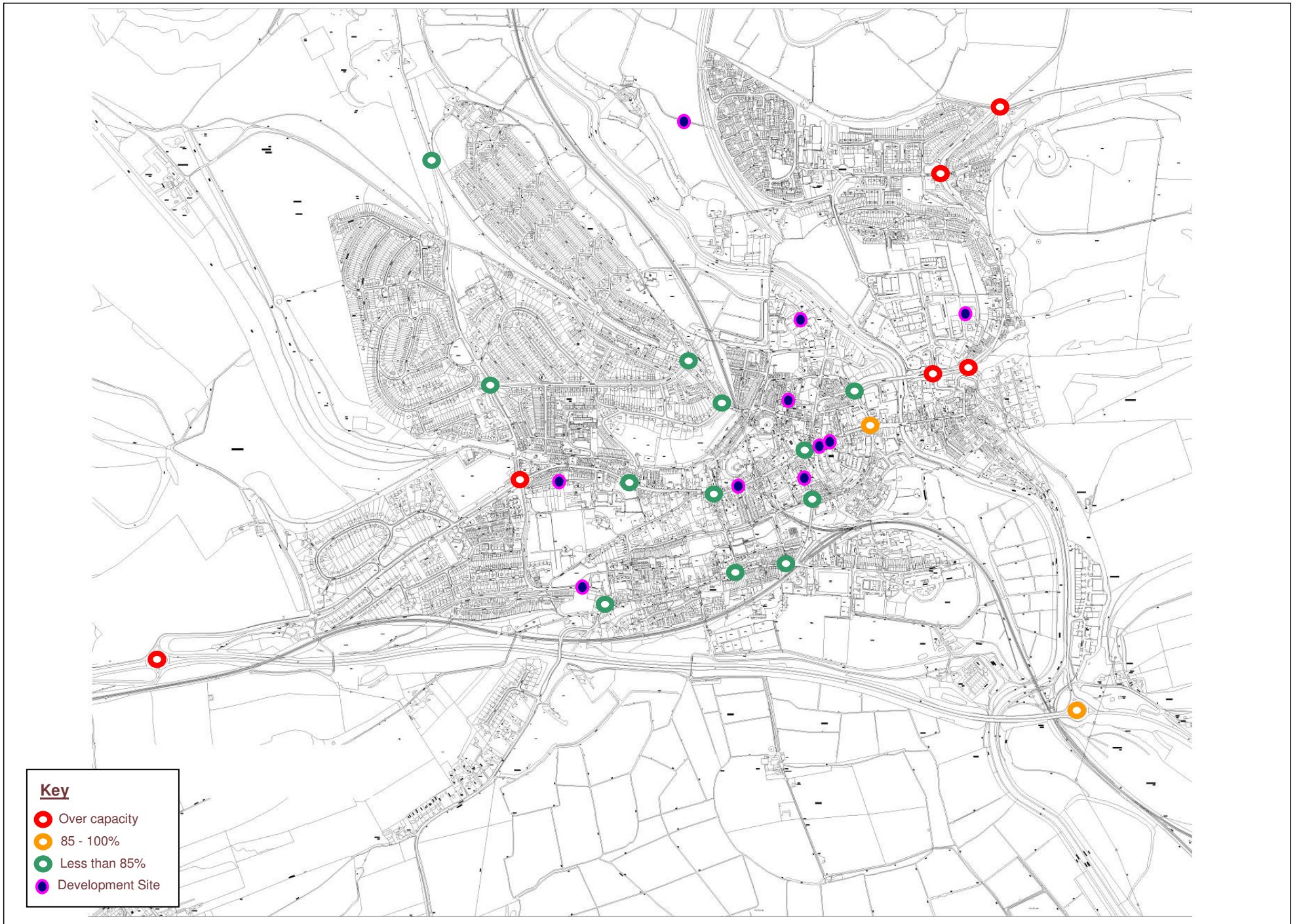


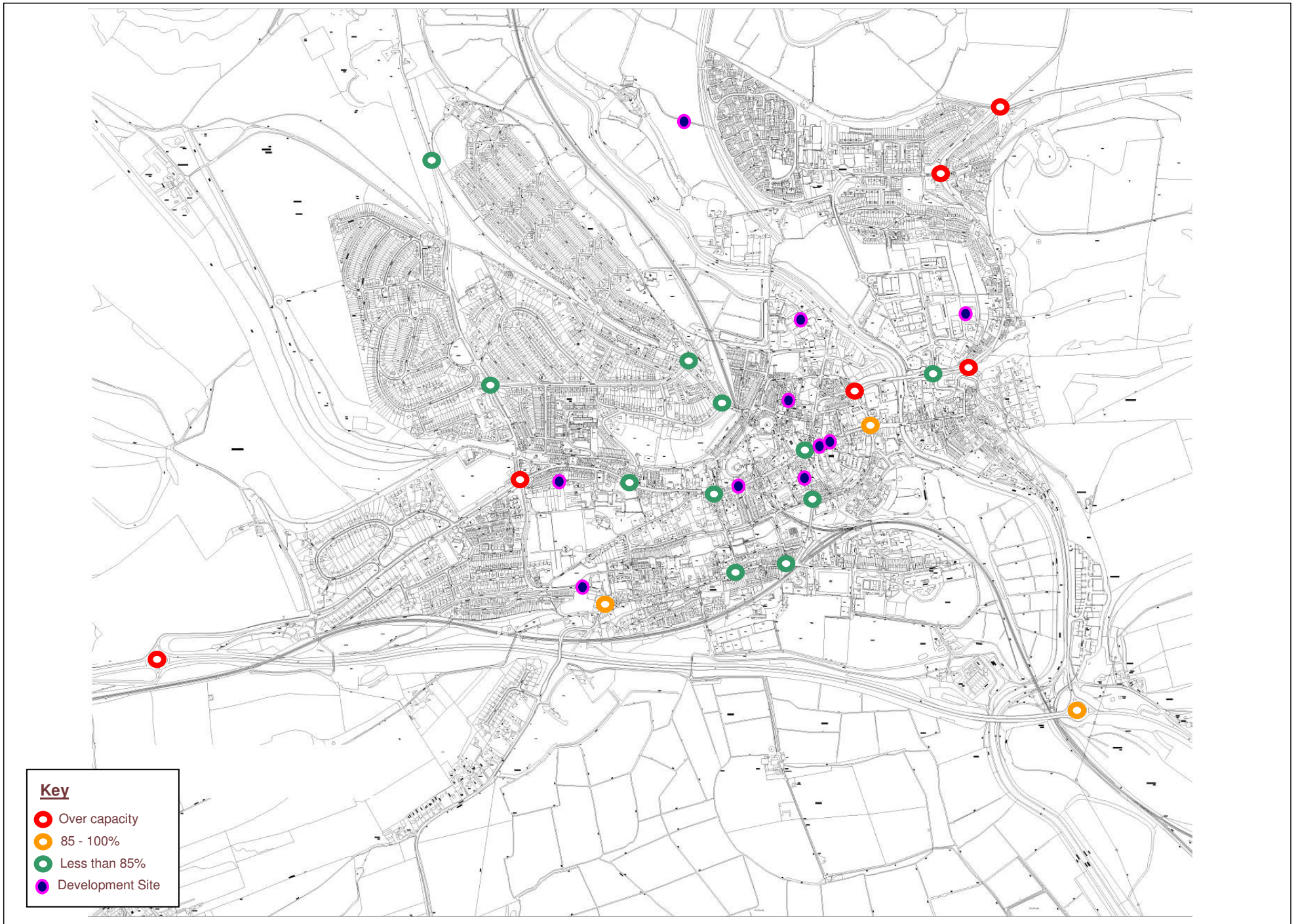


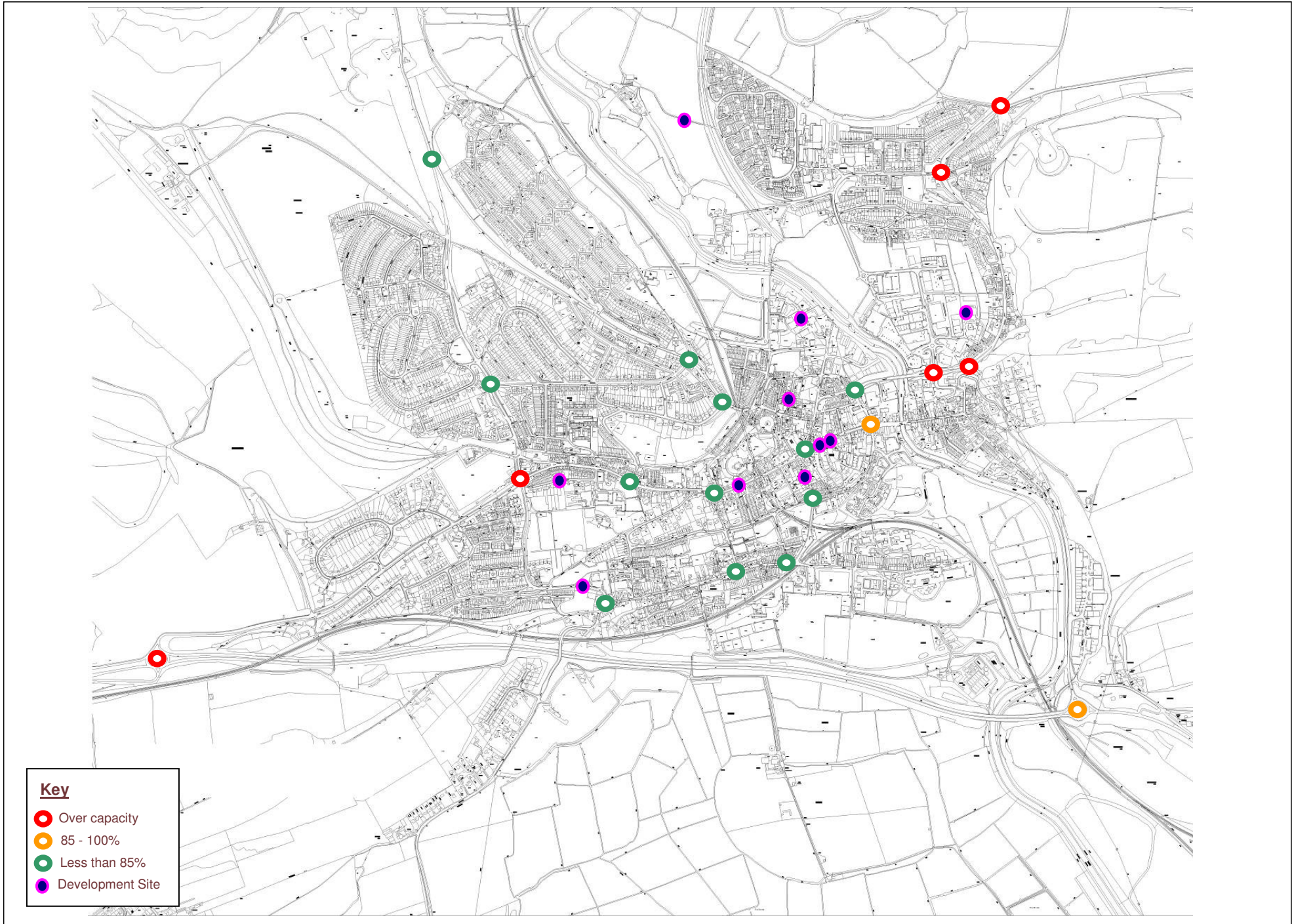


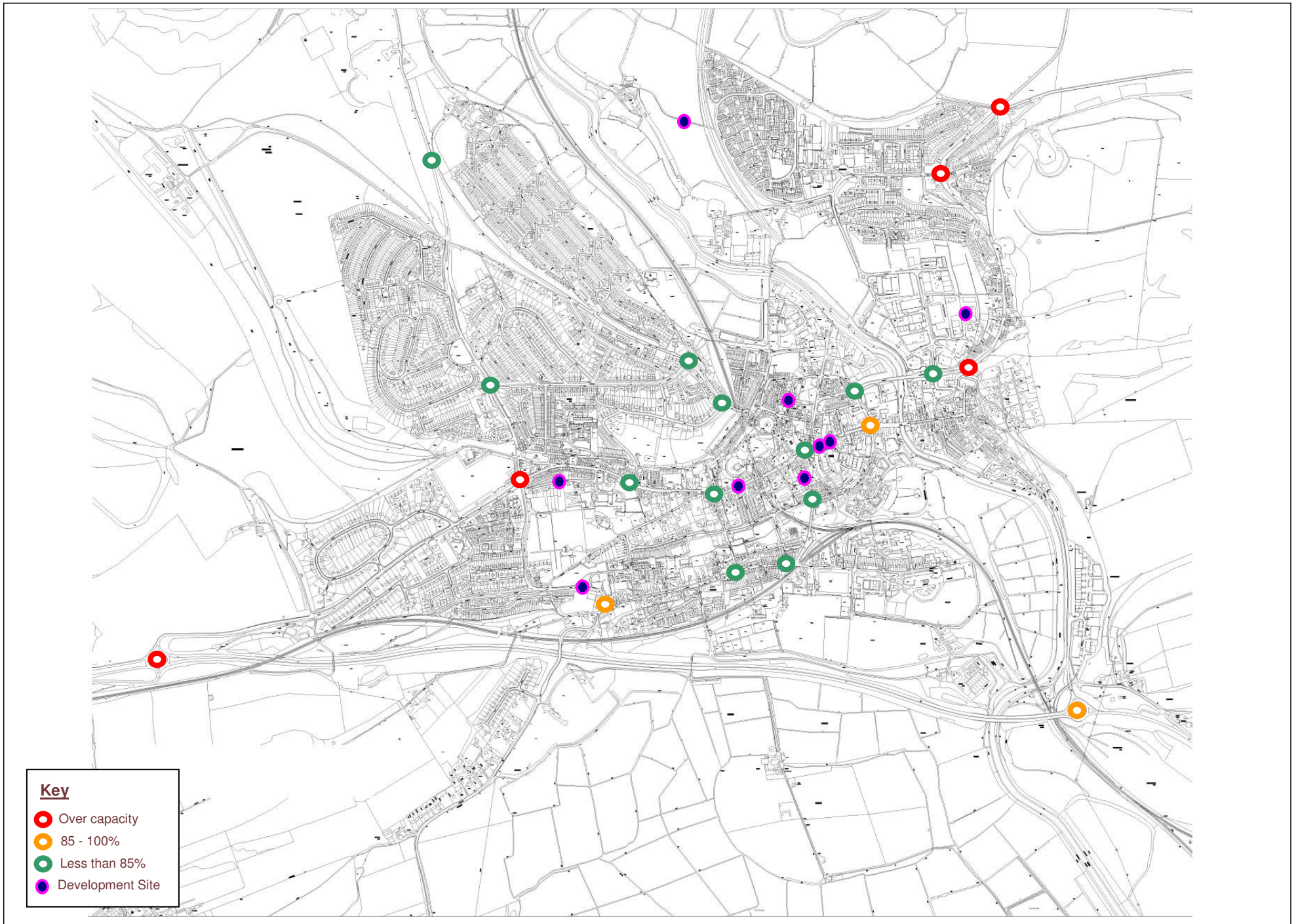


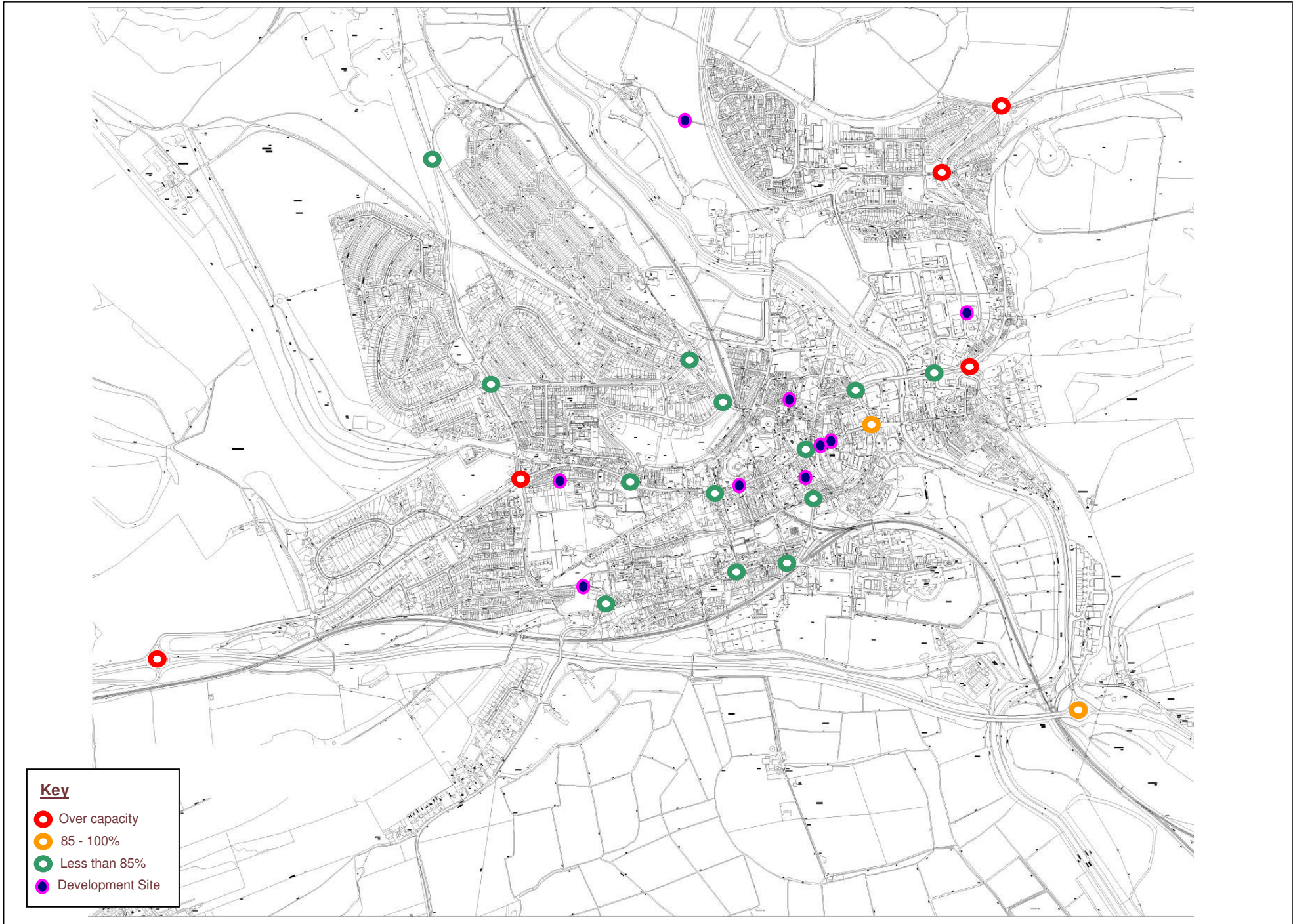


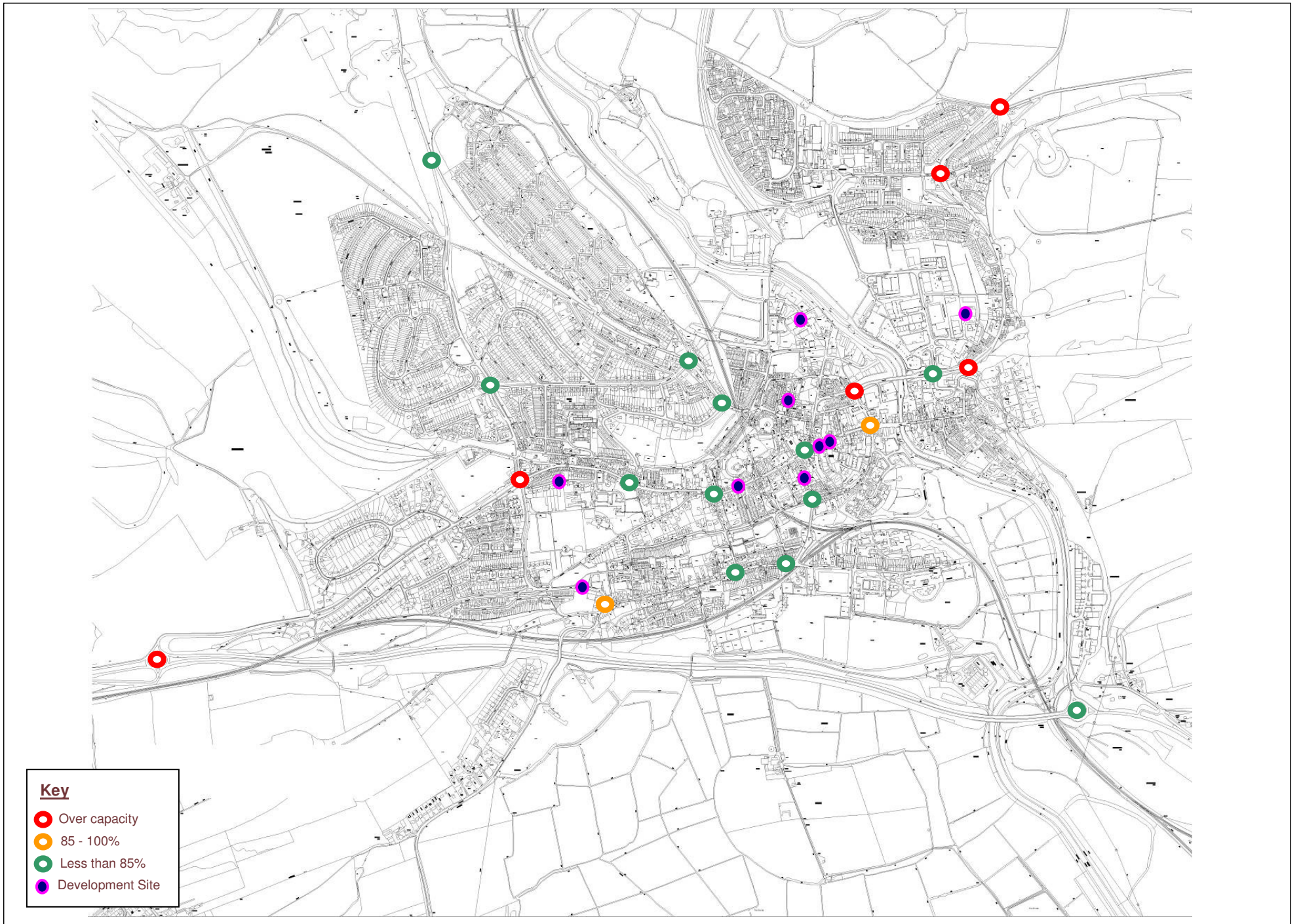


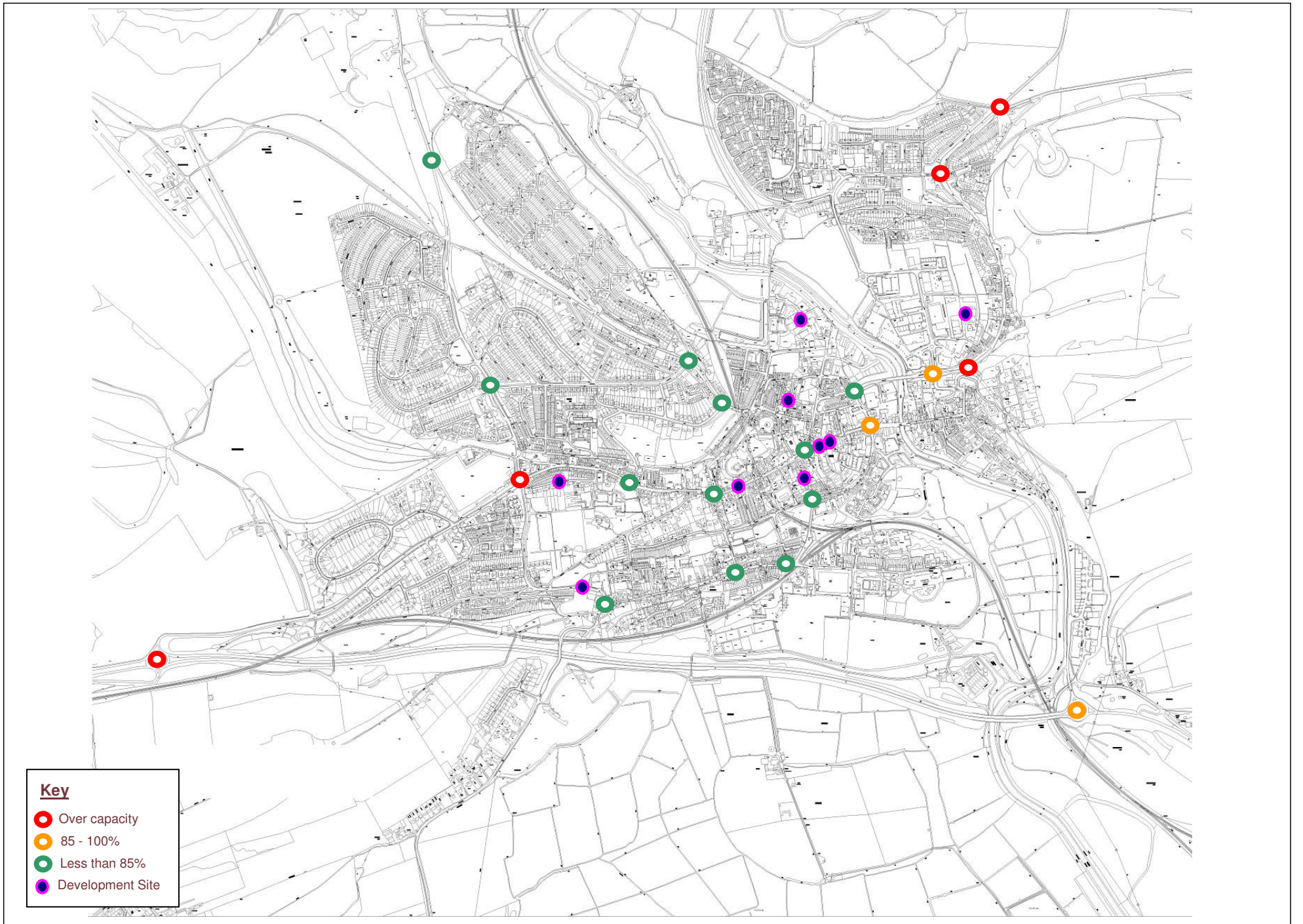


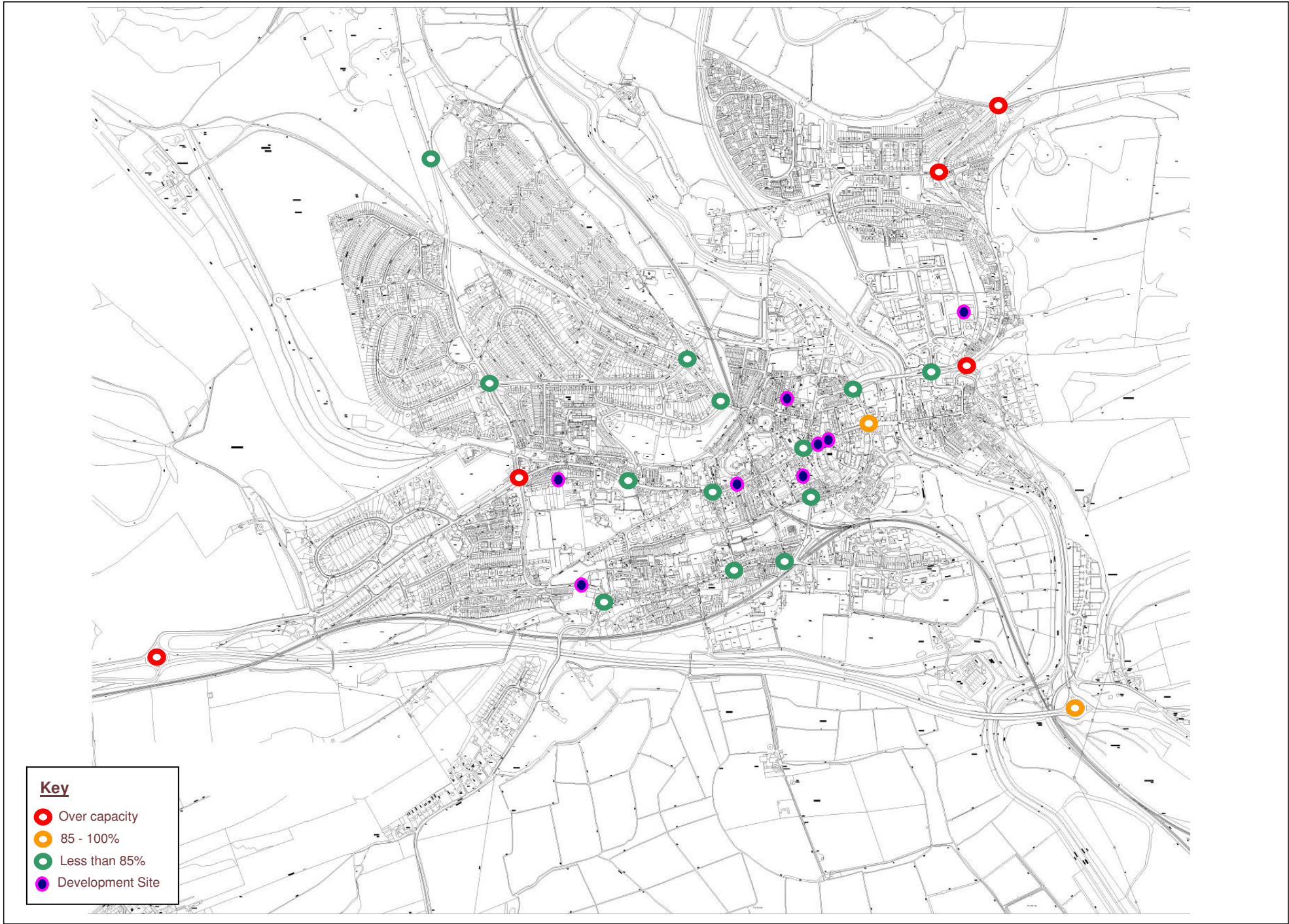


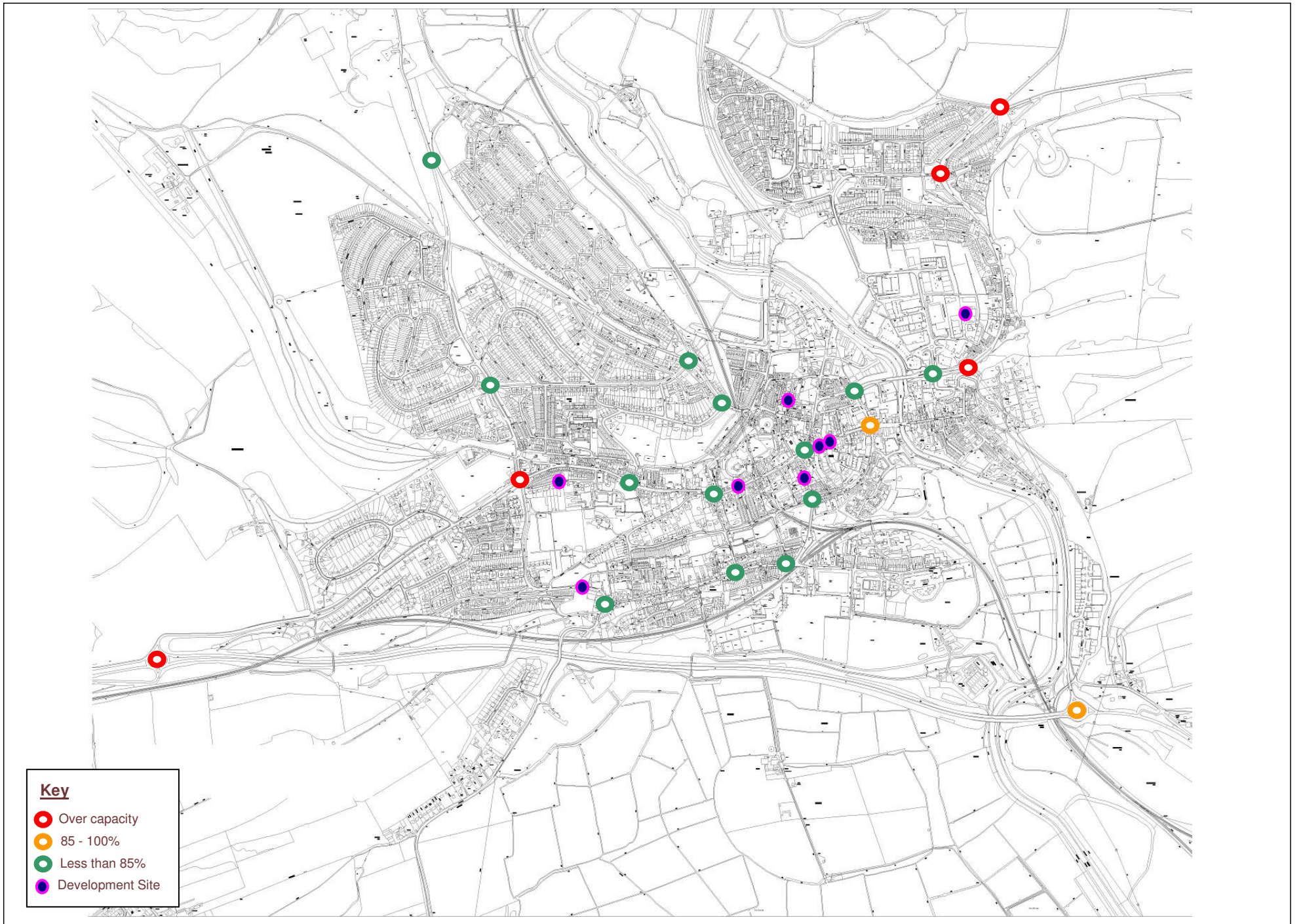












- 3.14 Whilst there are some current issues during the PM peak at A27/A26 Southerham roundabout, it cannot be determined with certainty, from the model, whether or not the LDF scenarios would result in impacts that would require mitigation at A27 Southerham or Ashcombe junctions.
- 3.15 The SATURN model indicates that there would be congestion issues at A277 / A275 Prison Crossroads signals, in the forecast reference case and LDF scenarios. However, it is not considered that the capacity limitations, here, should automatically act as a constraint on any of the tested LDF scenario sites. Prison Crossroads is about 1.5km to the west of the centre of Lewes and even further from the LDF scenario sites, for which A26, via Cuilfail Tunnel, is the more natural means of access to the strategic road network, for longer distance traffic generated by those sites.

Wider Network Performance

- 3.16 Summary statistics that indicate the overall performance of the highway network in each of the forecast scenarios, with Test 1, have been extracted from SATURN. The selected performance indicators, weighted by the number of assigned trips, are as follows:
- Total travel time;
 - Total travel distance;
 - Total queuing delay;
 - Total length of over-capacity queues;
 - Average vehicle speed; and
 - Total fuel consumption.
- 3.17 In **Table 3.1** there is a summary of network performance statistics for each development scenario in the AM peak, with the Test 1 matrix assumptions. **Table 3.2** shows likewise for the PM peak. The performance comparison is made between each development scenario and the equivalent 2030 reference case.
- 3.18 The outcome from the analysis of wider network statistics is logical, whereby highway performance is poorer in scenarios with more LDF development options and better in scenarios with fewer LDF development options. In both AM and PM peak periods, performance is poorest in Scenario 1, in which there is greatest development in Lewes (at Old Malling Farm and North Street) and in Ringmer. Conversely, there is least network 'stress' in Scenario 5, which contains Old Malling Farm and Ringmer employment options only.
- 3.19 The gradation of network performance from least to most network 'stress' is consistent in both AM and PM peaks, as follows:
- Reference Case;
 - LDF Scenario 5;
 - LDF Scenario 7;
 - LDF Scenario 6;
 - LDF Scenario 4;
 - LDF Scenario 2;
 - LDF Scenario 3;
 - LDF Scenario 1.

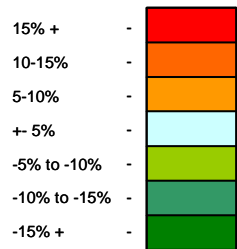
Corridor Journey Time Statistics

- 3.20 Changes in journey time, along key highway corridors, have also been assessed for the specified LDF scenarios, in Test1. **Table 3.3** compares travel times in the AM peak for each scenario with those in the equivalent 2030 reference case. **Table 3.4** shows likewise for the PM peak period.

Lewes District Local Development Framework Transport Assessment - Network Summary Statistics (AM Peak 0800-0900)

Criteria	2010 Base Year	2030 Ref Case	Scenario 1	S1 Diff from Ref Case	Scenario 2	S2 Diff from Ref Case	Scenario 3	S3 Diff from Ref Case	Scenario 4	S4 Diff from Ref Case	Scenario 5	S5 Diff from Ref Case	Scenario 6	S6 Diff from Ref Case	Scenario 7	S7 Diff from Ref Case
Total time (pcu hrs per hr)	1719.0	4295.0	5061.0	17.83%	4930.0	14.78%	4984.0	16.04%	4862.0	13.20%	4415.0	2.79%	4768.0	11.01%	4499.0	4.75%
Total distance (pcu kms per hr)	72490.0	102500.0	106500.0	3.90%	105900.0	3.32%	106000.0	3.41%	105600.0	3.02%	104100.0	1.56%	104800.0	2.24%	103900.0	1.37%
Queuing delay (pcu hrs per hr)	157.0	309.8	359.3	15.99%	347.4	12.14%	357.2	15.30%	341.5	10.23%	326.1	5.26%	331.8	7.10%	318.3	2.74%
Over capacity queues (pcu hrs per hr)	333.0	2240.0	2869.0	28.08%	2760.0	23.21%	2802.0	25.00%	2706.0	20.80%	2319.0	3.53%	2638.0	17.77%	2413.0	7.72%
Av. speed (kph)	42.0	23.9	21.0	-11.90%	21.5	-9.97%	21.3	-10.89%	21.7	-9.05%	23.6	-1.26%	22.0	-7.92%	23.1	-3.27%
Total fuel consumption (ltrs per hr)	6093.0	11350.0	12600.0	11.01%	12390.0	9.16%	12480.0	9.96%	12270.0	8.11%	11630.0	2.47%	12070.0	6.34%	11690.0	3.00%
Total trips (pcu)	11465	15635	16514	5.53%	16445	5.10%	16467	5.24%	16398	4.81%	15819	1.16%	16237	3.79%	15783	0.93%

Key:



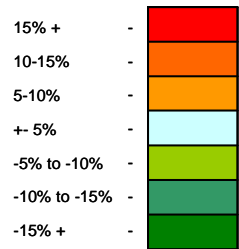
Note: Opposite for Avg Speed

Table 3.1

Lewes District Local Development Framework Transport Assessment - Network Summary Statistics (PM Peak 1700-1800)

Criteria	2010 Base Year	2030 Ref Case	Scenario 1	S1 Diff from Ref Case	Scenario 2	S2 Diff from Ref Case	Scenario 3	S3 Diff from Ref Case	Scenario 4	S4 Diff from Ref Case	Scenario 5	S5 Diff from Ref Case	Scenario 6	S6 Diff from Ref Case	Scenario 7	S7 Diff from Ref Case
Total time (pcu hrs per hr)	1086.0	2556.0	3103.0	21.40%	2992.0	17.06%	3036.0	18.78%	2925.0	14.44%	2640.0	3.29%	2836.0	10.95%	2736.0	7.04%
Total distance (pcu kms per hr)	57630.0	79740.0	83900.0	5.22%	83220.0	4.36%	83400.0	4.59%	82720.0	3.74%	80750.0	1.27%	82040.0	2.88%	81520.0	2.23%
Queuing delay (pcu hrs per hr)	117.0	249.3	294.8	18.26%	292.2	17.21%	291.1	16.77%	290.1	16.37%	263.7	5.78%	282.9	13.48%	266.3	6.82%
Over capacity queues (pcu hrs per hr)	138.0	958.7	1378.0	43.74%	1283.0	33.83%	1324.0	38.10%	1225.0	27.78%	1001.0	4.41%	1160.0	21.00%	1088.0	13.49%
Av. speed (kph)	53.0	31.2	27.0	-13.33%	27.8	-10.87%	27.5	-11.96%	28.3	-9.36%	30.6	-1.96%	28.9	-7.28%	29.8	-4.49%
Total fuel consumption (ltrs per hr)	4511.0	7817.0	8902.0	13.88%	8727.0	11.64%	8787.0	12.41%	8612.0	10.17%	7986.0	2.16%	8451.0	8.11%	8217.0	5.12%
Total trips (pcu)	9805	13191	14097	6.79%	14021	6.22%	14045	6.40%	13969	5.83%	13385	1.45%	13799	4.56%	13347	1.17%

Key:



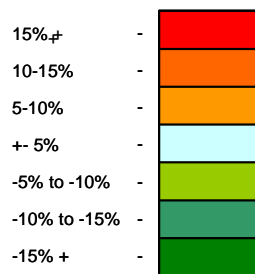
Note: Opposite for Avg Speed

Table 3.2

Lewes District Local Development Framework Transport Assessment - Corridor Journey Time Statistics (AM Peak 0800-0900)

Corridor	Direction	2030 Ref Case	Scenario 1 Travel Time (mins)	S1 Diff from Ref Case	Scenario 2 Travel Time (mins)	S2 Diff from Ref Case	Scenario 3 Travel Time (mins)	S3 Diff from Ref Case	Scenario 4 Travel Time (mins)	S4 Diff from Ref Case	Scenario 5 Travel Time (mins)	S5 Diff from Ref Case	Scenario 6 Travel Time (mins)	S6 Diff from Ref Case	Scenario 7 Travel Time (mins)	S7 Diff from Ref Case
A275	Northbound	29.93	31.76	6.11%	31.85	6.41%	32.34	8.05%	31.76	6.11%	30.28	1.17%	31.66	5.78%	30.84	3.04%
A275	Southbound	7.75	8.27	6.71%	8.00	3.23%	8.37	8.00%	8.05	3.87%	7.77	0.26%	8.62	11.23%	7.51	-3.10%
A27	Eastbound	7.11	7.61	7.03%	7.40	4.08%	7.57	6.47%	7.23	1.69%	7.05	-0.84%	7.09	-0.28%	7.19	1.13%
A27	Westbound	8.29	9.16	10.49%	8.99	8.44%	9.04	9.05%	8.89	7.24%	8.39	1.21%	8.86	6.88%	8.54	3.02%
A26	Northbound	35.40	37.46	5.82%	37.20	5.08%	37.23	5.17%	37.11	4.83%	35.74	0.96%	36.65	3.53%	35.77	1.05%
A26	Southbound	14.76	16.01	8.47%	15.72	6.50%	16.20	9.76%	16.01	8.47%	15.39	4.27%	15.16	2.71%	14.78	0.14%
A2029	Eastbound	4.86	4.76	-2.06%	5.03	3.50%	4.90	0.82%	5.13	5.56%	4.92	1.23%	4.87	0.21%	4.84	-0.41%
A2029	Westbound	6.63	7.18	8.30%	7.14	7.69%	6.94	4.68%	7.00	5.58%	6.54	-1.36%	6.92	4.37%	6.55	-1.21%
A277	Eastbound	2.86	2.90	1.40%	2.90	1.40%	2.90	1.40%	2.90	1.40%	2.88	0.70%	2.90	1.40%	2.87	0.35%
A277	Westbound	2.23	2.22	-0.45%	2.23	0.00%	2.22	-0.45%	2.23	0.00%	2.23	0.00%	2.22	-0.45%	2.23	0.00%

Key:



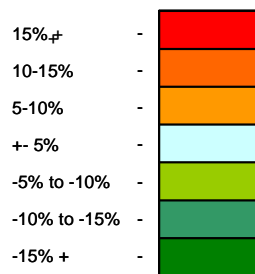
Note: Opposite for Avg Speed

Table 3.3

Lewes District Local Development Framework Transport Assessment - Corridor Journey Time Statistics (AM Peak 0800-0900)

Corridor	Direction	2030 Ref Case	Scenario 1 Travel Time (mins)	S1 Diff from Ref Case	Scenario 2 Travel Time (mins)	S2 Diff from Ref Case	Scenario 3 Travel Time (mins)	S3 Diff from Ref Case	Scenario 4 Travel Time (mins)	S4 Diff from Ref Case	Scenario 5 Travel Time (mins)	S5 Diff from Ref Case	Scenario 6 Travel Time (mins)	S6 Diff from Ref Case	Scenario 7 Travel Time (mins)	S7 Diff from Ref Case
A275	Northbound	10.97	11.49	4.74%	11.37	3.65%	11.52	5.01%	11.24	2.46%	11.08	1.00%	11.16	1.73%	11.24	2.46%
A275	Southbound	7.28	7.24	-0.55%	7.57	3.98%	7.51	3.16%	7.24	-0.55%	7.02	-3.57%	7.54	3.57%	7.42	1.92%
A27	Eastbound	9.57	10.29	7.52%	10.09	5.43%	10.13	5.85%	9.96	4.08%	9.80	2.40%	9.60	0.31%	9.87	3.13%
A27	Westbound	5.09	5.09	0.00%	5.09	0.00%	5.09	0.00%	5.09	0.00%	5.09	0.00%	5.09	0.00%	5.09	0.00%
A26	Northbound	25.30	29.79	17.75%	29.07	14.90%	29.31	15.85%	28.21	11.50%	25.49	0.75%	28.28	11.78%	27.12	7.19%
A26	Southbound	19.51	20.68	6.00%	20.40	4.56%	20.67	5.95%	20.31	4.10%	19.45	-0.31%	19.53	0.10%	20.29	4.00%
A2029	Eastbound	3.88	7.13	83.76%	6.45	66.24%	6.47	66.75%	6.22	60.31%	3.91	0.77%	5.69	46.65%	3.90	0.52%
A2029	Westbound	6.41	6.53	1.87%	6.52	1.72%	6.52	1.72%	6.51	1.56%	6.42	0.16%	6.52	1.72%	6.41	0.00%
A277	Eastbound	2.82	2.94	4.26%	2.91	3.19%	2.92	3.55%	2.90	2.84%	2.82	0.00%	2.90	2.84%	2.82	0.00%
A277	Westbound	2.32	2.34	0.86%	2.33	0.43%	2.34	0.86%	2.34	0.86%	2.32	0.00%	2.34	0.86%	2.32	0.00%

Key:



Note: Opposite for Avg Speed

Table 3.4

3.21 As with wider network performance, the corridor journey time results are logical. Travel times increase in almost every scenario, on each route, when compared with the reference case. The amount of travel time increase is consistent with the number of LDF development options and vehicle trips in each scenario. The gradation of journey time increases, from least to most change, is consistent in the AM and PM peaks, as follows:

- Reference Case;
- LDF Scenario 5;
- LDF Scenario 7;
- LDF Scenario 6;
- LDF Scenario 4;
- LDF Scenario 2;
- LDF Scenario 3;
- LDF Scenario 1.

3.22 A summary of the pcu trip totals is shown is available at **Appendix A** for all forecast matrices (including the further tests done to account for LDF changes).

Results from Further Model Tests

3.23 After discussions with ESCC, a limited number of further assignments were performed in the SATURN model, so as to assess the effects of trip matrix adjustments, as represented by Tests 2 – 5, referred to in section 2.34. Primarily, each test was performed on the worst-case LDF scenario (1).

3.24 In addition, an analysis was made of potential junction improvements at A26/B2192 'Earwig Corner', to determine if the predicted future congestion here could be resolved. Two layouts were modelled: a conventional roundabout with 2-lane entries on all approaches, a 30m flare from A26 north and south and a 20m flare from B2192; and a 3-stage signalised junction with separate right turn arrow phase from A26 south to B2192.

3.25 Results from the Earwig Corner scheme modelling, with the Test 1 trip volumes in the reference case and scenario 1, are included in Appendix A. It was found that the Earwig roundabout layout would perform reasonably satisfactorily in both peak periods to 2030. The greatest 'stress' would arise in Scenario 1 with a maximum RFC of 103% in the AM peak. This is considerably better than in any instance with the existing junction and would also allow some attraction of traffic away from the A26 / Ham Lane junction.

3.26 The signalised junction arrangement would not perform satisfactorily, without significant extra land-take, owing to the amount of capacity reduction ('lost time') during the signal cycle.

3.27 A summary of network performance (junction RFC) and trip volume, under the various SATURN sensitivity tests that have been undertaken, is contained in **Table 3.5** and **Table 3.6**.

3.28 Table 3.5 refers to model outputs with the existing highway network. It mainly shows the junction RFC predicted at key locations, under the reference case and under each LDF scenario (1-7), for AM and PM peaks, with the original Test 1 matrix assumptions. It also shows the junction RFC at A26/B2192 Earwig Corner, with the Test 2 – 4 assumptions and the performance of critical junctions, in the reference case only, with Test 5.

3.29 Table 3.6 shows similar results to Table 3.5, but with the proposed roundabout junction at Earwig Corner.

3.30 More detailed analysis of Earwig Corner, with the existing junction, the proposed roundabout and the rejected traffic signal configurations, is shown in **Tables 3.7 and 3.8** for

AM and PM peaks, respectively. The tables indicate the RFC for each turning movement, the amount of vehicle delay and the volume of trips, under each model scenario.

(CO03022406) Lewes Town Transport Study: Summary of SATURN Model Assignments with Base Highway Network

SATURN Network Configuration & Demand Adjustment															
Trip Matrix Scenario	Demand Scenario Description	Weekday Peak Time Period	Baseline 2030 Matrix Trip Total (PCU)	Test 1: Base Do-Nothing Network; No matrix Adjustment			Test 2: Base Do-Nothing Network; Matrix with Uckfield LDF Replaced by TEMPRO			Test 3: Base Do-Nothing Network; Matrix with Lewes DC LDF Reduced by 10% (Smarter Choices)			Test 4: Base Do-Nothing Network; Matrix with Uckfield LDF Replaced by TEMPRO & Lewes DC LDF Reduced by 10% (Smarter Choices)		
				Tested in SATURN?	Matrix Trip Total (PCU)	Test Outcome	Tested in SATURN?	Matrix Trip Total (PCU)	Test Outcome	Tested in SATURN?	Matrix Trip Total (PCU)	Test Outcome	Tested in SATURN?	Matrix Trip Total (PCU)	Test Outcome
Reference Case	Background growth & committed development	AM	15635	Yes	15635	A26/B2192 Earwig over-capacity 179% A26/Church Lane over-capacity 107% A26/Phoenix C wy over-capacity 168% A277/A275 Prison C roads over-capacity 143%	Yes	15468	A26/B2192 Earwig over-capacity 146%	N/A	15635	N/A	N/A	15468	N/A
		PM	13191	Yes	13191	A26/B2192 Earwig within capacity 100% A26/Church Lane over-capacity 122% A26/Phoenix C wy over-capacity 108% A277/A275 Prison C roads over-capacity 115%	Yes	13021	A26/B2192 Earwig within capacity 93%	N/A	13191	N/A	N/A	13021	N/A
Scenario 1	North St empl & res. Old Malling Fm res. Ringmer empl. & max. res.	AM	16514	Yes	16514	A26/B2192 Earwig over-capacity 196% A26/Church Lane over-capacity 109% A26/Phoenix C wy over-capacity 175% A277/A275 Prison C roads over-capacity 143% Phoenix C way/Eastgate St over-capacity 101%	Yes	16348	A26/B2192 Earwig over-capacity 164%	Yes	16426	A26/B2192 Earwig over-capacity 188%	Yes	16260	A26/B2192 Earwig over-capacity 162% A26/Church Lane over-capacity 106% A26/Phoenix C wy over-capacity 170% A277/A275 Prison C roads over-capacity 144% Phoenix C way/Eastgate St over-capacity 100%
		PM	14097	Yes	14097	A26/B2192 Earwig over-capacity 109% A26/Church Lane over-capacity 133% A26/Phoenix C wy over-capacity 114% A277/A275 Prison C roads over-capacity 117% Phoenix C way/Brooks La over-capacity 103%	Yes	13928	A26/B2192 Earwig over-capacity 105%	Yes	14007	A26/B2192 Earwig over-capacity 109%	Yes	13837	A26/B2192 Earwig over-capacity 102% A26/Church Lane over-capacity 130% A26/Phoenix C wy over-capacity 111% A277/A275 Prison C roads over-capacity 115% Phoenix C way/Brooks La over-capacity 100%
Scenario 2	North St empl & res. Old Malling Fm res. Ringmer empl. & med. res.	AM	16445	Yes	16445	A26/B2192 Earwig over-capacity 195% A26/Church Lane over-capacity 109% A26/Phoenix C wy over-capacity 174% A277/A275 Prison C roads over-capacity 143% Phoenix C way/Eastgate St over-capacity 101%	Yes	16279	A26/B2192 Earwig over-capacity 155%	Yes	16364	A26/B2192 Earwig over-capacity 187%	No	16198	
		PM	14021	Yes	14021	A26/B2192 Earwig over-capacity 105% A26/Church Lane over-capacity 130% A26/Phoenix C wy over-capacity 113% A277/A275 Prison C roads over-capacity 116% Phoenix C way/Brooks La over-capacity 102%	Yes	13851	A26/B2192 Earwig over-capacity 104%	Yes	13938	A26/B2192 Earwig over-capacity 108%	No	13768	
Scenario 3	North St empl & res. Old Malling Fm res. Ringmer empl. & min. res.	AM	16467	Yes	16467	A26/B2192 Earwig over-capacity 194% A26/Church Lane over-capacity 110% A26/Phoenix C wy over-capacity 174% A277/A275 Prison C roads over-capacity 144% Phoenix C way/Eastgate St over-capacity 101%	Yes	16301	A26/B2192 Earwig over-capacity 156%	Yes	16384	A26/B2192 Earwig over-capacity 193%	No	16218	
		PM	14045	Yes	14045	A26/B2192 Earwig over-capacity 106% A26/Church Lane over-capacity 131% A26/Phoenix C wy over-capacity 114% A277/A275 Prison C roads over-capacity 117% Phoenix C way/Brooks La over-capacity 102%	Yes	13875	A26/B2192 Earwig over-capacity 105%	Yes	13960	A26/B2192 Earwig over-capacity 106%	No	13790	
Scenario 4	North St empl & res. Old Malling Fm res. Ringmer empl.	AM	16398	Yes	16398	A26/B2192 Earwig over-capacity 196% A26/Church Lane over-capacity 110% A26/Phoenix C wy over-capacity 173% A277/A275 Prison C roads over-capacity 144% Phoenix C way/Eastgate St over-capacity 100%	Yes	16232	A26/B2192 Earwig over-capacity 157%	Yes	16322	A26/B2192 Earwig over-capacity 190%	No	16156	
		PM	13969	Yes	13969	A26/B2192 Earwig over-capacity 104% A26/Church Lane over-capacity 130% A26/Phoenix C wy over-capacity 112% A277/A275 Prison C roads over-capacity 116% Phoenix C way/Brooks La over-capacity 102%	Yes	13799	A26/B2192 Earwig over-capacity 101%	Yes	13891	A26/B2192 Earwig over-capacity 102%	No	13721	
Scenario 5	Old Malling Fm res. Ringmer empl.	AM	15819	Yes	15819	A26/B2192 Earwig over-capacity 174% A26/Church Lane over-capacity 108% A26/Phoenix C wy over-capacity 169% A277/A275 Prison C roads over-capacity 143% Phoenix C way/Eastgate St within capacity 87%	Yes	15652	A26/B2192 Earwig over-capacity 150%	Yes	15800	A26/B2192 Earwig over-capacity 170%	No	15634	
		PM	13385	Yes	13385	A26/B2192 Earwig over-capacity 115% A26/Church Lane over-capacity 122% A26/Phoenix C wy over-capacity 109% A277/A275 Prison C roads over-capacity 115% Phoenix C way/Brooks La within capacity 83%	Yes	13215	A26/B2192 Earwig within capacity 96%	Yes	13365	A26/B2192 Earwig over-capacity 110%	No	13196	
Scenario 6	North St empl & res. Ringmer empl.	AM	16237	Yes	16237	A26/B2192 Earwig over-capacity 201% A26/Church Lane over-capacity 107% A26/Phoenix C wy over-capacity 172% A277/A275 Prison C roads over-capacity 144% Phoenix C way/Eastgate St over-capacity 101%	Yes	16071	A26/B2192 Earwig over-capacity 171%	Yes	16177	A26/B2192 Earwig over-capacity 193%	No	16010	
		PM	13799	Yes	13799	A26/B2192 Earwig over-capacity 105% A26/Church Lane over-capacity 131% A26/Phoenix C wy over-capacity 111% A277/A275 Prison C roads over-capacity 116% Phoenix C way/Brooks La within capacity 96%	Yes	13630	A26/B2192 Earwig within capacity 96%	Yes	13738	A26/B2192 Earwig over-capacity 105%	No	13569	
Scenario 7	Ringmer empl. & max. res.	AM	15783	Yes	15783	A26/B2192 Earwig over-capacity 178% A26/Church Lane over-capacity 108% A26/Phoenix C wy over-capacity 169% A277/A275 Prison C roads over-capacity 143% Phoenix C way/Eastgate St within capacity 84%	Yes	15616	A26/B2192 Earwig over-capacity 153%	Yes	15768	A26/B2192 Earwig over-capacity 174%	No	15601	
		PM	13347	Yes	13347	A26/B2192 Earwig over-capacity 106% A26/Church Lane over-capacity 127% A26/Phoenix C wy over-capacity 110% A277/A275 Prison C roads over-capacity 116% Phoenix C way/Brooks La within capacity 83%	Yes	13178	A26/B2192 Earwig over-capacity 101%	Yes	13332	A26/B2192 Earwig over-capacity 105%	No	13162	

Table 3.5

(CO03022406) Lewes Town Transport Study: Summary of SATURN Model Assignments with Scheme Highway Network

SATURN Network Configuration & Demand Adjustment																		
Trip Matrix Scenario	Demand Scenario Description	Weekday Peak Time Period	Test 1: Base Do-Nothing Network; No matrix Adjustment				Test2: Base Do-Nothing Network; Matrix with Uckfield LDF Replaced by TEMPRO				Test 3: Base Do-Nothing Network; Matrix with Lewes DC LDF Reduced by 10% (Smarter Choices)				Test 4: Base Do-Nothing Network; Matrix with Uckfield LDF Replaced by TEMPRO & Lewes DC LDF Reduced by 10% (Smarter Choices)			
			Baseline 2030 Matrix Trip Total (PCU)	Tested in SATURN?	Matrix Trip Total (PCU)	Test Outcome	Tested in SATURN?	Matrix Trip Total (PCU)	Test Outcome	Tested in SATURN?	Matrix Trip Total (PCU)	Test Outcome	Tested in SATURN?	Matrix Trip Total (PCU)	Test Outcome			
Reference Case	Background growth & committed development	AM	15635	Yes	15635	A26/B2192 Earwig over-capacity 103% A26/Church Lane over-capacity 132% A26/Phoenix C'wy over-capacity 165% A277/A275 Prison C'roads over-capacity 143%	Yes	15468	A26/B2192 Earwig over-capacity 102%	N/A	15635	N/A	N/A	15468	N/A			
		PM	13191	Yes	13191	A26/B2192 Earwig within capacity 83% A26/Church Lane over-capacity 102% A26/Phoenix C'wy over-capacity 109% A277/A275 Prison C'roads over-capacity 115%	Yes	13021	A26/B2192 Earwig within capacity 80%	N/A	13191	N/A	N/A	13021	N/A			
Scenario 1	North St empl & res. Old Malling Fm res. Ringmer empl. & max. res.	AM	16514	Yes	16514	A26/B2192 Earwig over-capacity 103% A26/Church Lane over-capacity 121% A26/Phoenix C'wy over-capacity 170% A277/A275 Prison C'roads over-capacity 144% Phoenix C'way/Eastgate St over-capacity 101%	Yes	16348	A26/B2192 Earwig over-capacity 101%	Yes	16426	A26/B2192 Earwig over-capacity 101%	Yes	16260	A26/B2192 Earwig within capacity 98% A26/Church Lane over-capacity 135% A26/Phoenix C'wy over-capacity 165% A277/A275 Prison C'roads over-capacity 108% Phoenix C'way/Eastgate St within capacity 89%			
		PM	14097	Yes	14097	A26/B2192 Earwig within capacity 86% A26/Church Lane over-capacity 116% A26/Phoenix C'wy over-capacity 114% A277/A275 Prison C'roads over-capacity 118% Phoenix C'way/Brooks La within capacity 95%	Yes	13928	A26/B2192 Earwig within capacity 87%	Yes	14007	A26/B2192 Earwig within capacity 86%	Yes	13837	A26/B2192 Earwig within capacity 86% A26/Church Lane over-capacity 108% A26/Phoenix C'wy over-capacity 113% A277/A275 Prison C'roads over-capacity 116% Phoenix C'way/Brooks La within capacity 90%			
Scenario 2	North St empl & res. Old Malling Fm res. Ringmer empl. & med. res.	AM	16445	No	16445		Yes	16279	A26/B2192 Earwig within capacity 99%	Yes	16364	A26/B2192 Earwig over-capacity 100%	No	16198				
		PM	14021	No	14021		Yes	13851	A26/B2192 Earwig within capacity 86%	Yes	13938	A26/B2192 Earwig within capacity 86%	No	13768				
Scenario 3	North St empl & res. Old Malling Fm res. Ringmer empl. & min. res.	AM	16467	No	16467		Yes	16301	A26/B2192 Earwig over-capacity 100%	Yes	16384	A26/B2192 Earwig over-capacity 102%	No	16218				
		PM	14045	No	14045		Yes	13875	A26/B2192 Earwig within capacity 86%	Yes	13960	A26/B2192 Earwig within capacity 86%	No	13790				
Scenario 4	North St empl & res. Old Malling Fm res. Ringmer empl.	AM	16398	No	16398		Yes	16232	A26/B2192 Earwig over-capacity 102%	Yes	16322	A26/B2192 Earwig over-capacity 105%	No	16156				
		PM	13969	No	13969		Yes	13799	A26/B2192 Earwig within capacity 85%	Yes	13891	A26/B2192 Earwig within capacity 86%	No	13721				
Scenario 5	Old Malling Fm res. Ringmer empl.	AM	15819	No	15819		Yes	15652	A26/B2192 Earwig over-capacity 103%	Yes	15800	A26/B2192 Earwig over-capacity 103%	No	15634				
		PM	13385	No	13385		Yes	13215	A26/B2192 Earwig within capacity 80%	Yes	13365	A26/B2192 Earwig within capacity 82%	No	13196				
Scenario 6	North St empl & res. Ringmer empl.	AM	16237	No	16237		Yes	16071	A26/B2192 Earwig over-capacity 101%	Yes	16177	A26/B2192 Earwig over-capacity 103%	No	16010				
		PM	13799	No	13799		Yes	13630	A26/B2192 Earwig within capacity 86%	Yes	13738	A26/B2192 Earwig within capacity 86%	No	13569				
Scenario 7	Ringmer empl. & max. res.	AM	15783	No	15783		Yes	15616	A26/B2192 Earwig over-capacity 102%	Yes	15768	A26/B2192 Earwig over-capacity 102%	No	15601				
		PM	13347	No	13347		Yes	13178	A26/B2192 Earwig within capacity 83%	Yes	13332	A26/B2192 Earwig within capacity 86%	No	13162				

Table 3.6

Lewes Town Transport Study: Analysis of A26 / B2192 Earwig Corner Junction Performance With and Without Roundabout Improvement - AM Peak

			Uckfield in and Smarter Choices reduction														Uckfield taken out and replaced with TEMPRO (No Smarter Choices reduction)														test8					
			L30ADNRC	L30ADNS1	L30ADNS2	L30ADNS3	L30ADNS4	L30ADNS5	L30ADNS6	L30ADNS7	L30ANTRC	L30AN1S1	L30AN1S2	L30AN1S3	L30AN1S4	L30AN1S5	L30AN1S6	L30AN1S7	L30ADNRC	L30ADNS1	L30ADNS2	L30ADNS3	L30ADNS4	L30ADNS5	L30ADNS6	L30ADNS7	L30ANTRC	L30AN1S1	L30AN1S2	L30AN1S3	L30AN1S4	L30AN1S5	L30AN1S6	L30AN1S7	L30AN1S8	
			RFC (%)																																	
264901308	264191306	A26 South to A26 North	35	45	43	44	38	45	42	45	42	44	45	44	42	45	44	45	43	43	42	41	41	43	37	43	42	42	42	42	41	43	42	43	42	
264901307	264191304	A26 South to B2192	89	101	99	100	91	100	99	100	41	46	45	45	41	45	43	45	94	99	99	100	101	99	88	99	42	45	44	44	42	44	43	45	44	
308901307	308306304	A26 North to B2192	110	6	6	6	6	6	6	6	4	48	54	47	51	18	44	17	111	6	6	6	6	6	6	6	10	16	17	17	16	10	16	9	17	
308901264	308306191	A26 North to A26 South	110	72	72	72	72	72	72	72	56	97	98	97	98	89	97	89	111	71	71	71	71	70	71	70	80	90	90	90	89	80	89	80	90	
307901264	304191264	B2192 to A26 South	100	100	100	100	100	101	100	93	101	100	102	105	103	103	102	100	100	100	100	100	100	100	100	100	102	101	99	100	102	103	101	102	98	
307901308	304306308	B2192 to A26 North	2	3	3	3	3	4	3	3	19	101	100	102	105	103	103	102	2	4	4	4	4	3	3	3	102	101	74	96	102	103	101	102	59	
307304191		B2192 towards A26 junction	122	188	187	193	190	170	193	174								146	164	155	156	157	150	171	153											
Average RFC @ Junction			81	74	73	74	71	71	74	71	43	73	74	73	74	67	72	67	87	69	68	68	69	67	68	68	63	66	61	65	65	64	65	63	58	
			Delay (secs)																																	
264901308	264191306	A26 South to A26 North	35	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5	0	0	0	0	0	0	0	0	5	5	5	5	5	5	5	5	5	
264901307	264191304	A26 South to B2192	89	105	93	93	60	91	93	91	7	7	7	7	7	7	7	7	45	89	90	91	114	87	52	88	7	7	7	7	7	7	7	7		
308901307	308306304	A26 North to B2192	110	0	0	0	0	0	0	0	6	16	17	15	16	9	14	9	197	0	0	0	0	0	0	0	8	10	10	10	9	8	9	8	10	
308901264	308306191	A26 North to A26 South	110	0	0	0	0	0	0	0	8	18	19	17	18	11	16	11	197	0	0	0	0	0	0	0	10	12	12	12	11	10	11	10	12	
307901264	304191264	B2192 to A26 South	100	105	111	105	105	102	118	102	15	72	58	85	135	99	112	81	76	101	101	101	101	99	102	99	84	61	40	43	81	86	54	67	36	
307901308	304306308	B2192 to A26 North	2	64	60	63	52	61	59	61	17	74	60	87	137	101	114	83	25	56	54	54	54	54	47	54	86	63	42	45	83	88	56	69	38	
307304191		B2192 towards A26 junction	122	1579	1559	1666	1613	1268	1677	1330								836	1156	997	1012	1032	900	1285	952											
Average Delay @ Junction			81	265	260	275	262	217	278	226	10	32	27	36	53	39	45	33	90	41	41	41	45	40	33	40	33	26	19	20	33	34	24	28	18	
			Demand Flow																																	
264901308	264191306	A26 South to A26 North	902	1221	1194	1214	1177	1196	1180	1210	697	736	751	737	752	744	751	747	899	1161	1131	1127	1119	1139	1129	1153	700	692	702	702	712	702	702	699	709	
264901307	264191304	A26 South to B2192	477	330	333	329	340	335	334	339	677	775	747	766	738	744	727	749	513	344	345	350	349	348	344	352	707	779	756	760	737	743	731	755	762	
308901307	308306304	A26 North to B2192	79	43	43	42	41	41	41	44	23	36	34	36	37	33	36	33	102	41	40	40	39	40	40	42	31	29	29	29	30	31	30	28	30	
308901264	308306191	A26 North to A26 South	1505	1840	1804	1816	1785	1731	1796	1772	790	1407	1429	1401	1426	1232	1410	1245	1587	1805	1769	1778	1763	1693	1767	1732	1109	1281	1292	1291	1279	1095	1275	1102	1302	
307901264	304191264	B2192 to A26 South	285	366	361	369	367	330	357	346	1041	872	819	858	800	854	815	902	321	372	353	363	352	330	359	348	894	954	905	918	889	915	889	975	924	
307901308	304306308	B2192 to A26 North	4	5	5	4	5	5	5	4	19	31	26	29	19	21	22	23	5	5	5	5	4	4	4	15	34	23	26	19	18	18	23	28		
307304191		B2192 towards A26 junction	246	315.9	322.6	321.2	331.8	276.5	311.1	283								257	332.1	329.7	342.6	325.1	279.6	312.1	288.7											

Key

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Lewes Town Transport Study: Analysis of A26 / B2192 Earwig Corner Junction Performance With and Without Roundabout Improvement - PM Peak

			Uckfield in and Smarter Choices reduction														Uckfield taken out and replaced with TEMPRO (No Smarter Choices reduction)														test8				
			L30P DNS1	L30P DNS2	L30P DNS3	L30P DNS4	L30P DNS5	L30P DNS6	L30P DNS7	L30P RC	L30P N1S1	L30P N1S2	L30P N1S3	L30P N1S4	L30P N1S5	L30P N1S6	L30P N1S7	L30P DNS1	L30P DNS2	L30P DNS3	L30P DNS4	L30P DNS5	L30P DNS6	L30P DNS7	L30P RC	L30P N1S1	L30P N1S2	L30P N1S3	L30P N1S4	L30P N1S5	L30P N1S6	L30P N1S7	L30A N1S8		
RFC (%)																																			
264901308	264191306	A26 South to A26 North	31	47	47	47	47	43	47	46	71	83	83	83	83	78	84	82	33	46	46	46	34	34	36	33	75	82	81	82	81	75	83	77	82
264901307	264191304	A26 South to B2192	75	96	97	96	96	96	97	97	78	86	86	86	86	82	86	86	79	97	99	98	92	79	78	87	80	87	86	86	85	80	86	83	86
308901307	308306304	A26 North to B2192	0	103	103	103	102	1	100	101	1	2	2	2	1	1	1	2	0	101	101	1	1	0	0	1	1	2	1	1	1	1	1	2	2
308901264	308306191	A26 North to A26 South	34	103	103	103	102	56	100	101	61	75	75	75	74	73	73	75	38	101	101	60	45	39	41	41	64	73	72	72	71	66	70	71	73
307901264	304191264	B2192 to A26 South	78	100	100	100	100	100	100	100	41	62	60	61	59	58	59	60	93	100	100	100	100	96	96	100	51	61	59	60	57	55	57	58	60
307901308	304306308	B2192 to A26 North	1	1	0	2	1	0	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1
	307304191	B2192 towards A26 junction	24	109	108	106	102	110	105	105									27	105	104	105	101	27	26	101									
Average RFC @ Junction			35	80	80	79	78	58	79	79	42	52	51	51	51	49	51	51	39	79	79	59	53	39	40	52	45	51	50	50	49	46	50	49	51
Delay (secs)																																			
264901308	264191306	A26 South to A26 North	31	0	0	0	0	0	0	0	5	6	6	6	6	5	6	6	0	0	0	0	0	0	0	0	5	6	6	6	6	5	6	6	6
264901307	264191304	A26 South to B2192	75	58	60	57	57	47	59	61	7	8	8	8	8	7	8	8	13	61	68	64	25	13	13	18	7	8	8	8	8	7	8	8	8
308901307	308306304	A26 North to B2192	0	62	61	49	29	0	8	17	8	10	10	10	10	9	9	10	0	10	12	0	0	0	0	0	9	10	10	10	9	9	9	10	10
308901264	308306191	A26 North to A26 South	34	62	61	49	29	0	8	17	10	12	12	12	12	11	11	12	0	10	12	0	0	0	0	0	11	12	12	12	11	11	11	12	12
307901264	304191264	B2192 to A26 South	78	76	76	76	76	69	76	76	6	8	8	8	8	8	8	8	26	76	76	76	53	34	36	49	7	7	7	7	7	7	7	7	7
307901308	304306308	B2192 to A26 North	1	35	34	35	35	25	34	34	8	10	10	10	10	10	10	10	12	34	34	34	15	12	13	13	9	9	9	9	9	9	9	9	9
	307304191	B2192 towards A26 junction	24	168	147	102	40	177	87	95									32	73	90	10	0	0	10										
Average Delay @ Junction			35	66	63	53	38	45	39	43	8	9	9	9	9	9	9	9	7	40	39	38	15	8	9	13	8	9	9	9	8	8	8	9	9
Demand Flow																																			
264901308	264191306	A26 South to A26 North	792	1431	1427	1407	1375	1190	1375	1325	697	957	952	950	950	856	968	868	876	1382	1373	1357	985	905	1032	910	777	870	872	886	871	777	902	772	870
264901307	264191304	A26 South to B2192	913	617	618	605	592	647	594	577	1034	1208	1177	1191	1146	1106	1129	1168	879	601	612	596	924	850	878	930	1039	1244	1191	1198	1160	1066	1133	1180	1233
308901307	308306304	A26 North to B2192	5	10	15	11	11	9	9	9	4	5	4	4	4	4	4	5	5	13	13	9	5	5	5	5	4	4	4	4	4	4	4	5	5
308901264	308306191	A26 North to A26 South	665	1228	1228	1220	1207	1097	1193	1199	659	814	821	814	824	811	816	800	754	1194	1195	1186	882	772	805	815	709	766	766	770	770	725	759	745	765
307901264	304191264	B2192 to A26 South	557	210	208	203	198	300	202	199	508	697	675	689	658	652	658	680	584	202	202	203	498	584	564	563	615	704	682	691	665	653	666	678	703
307901308	304306308	B2192 to A26 North	4	1	0	3	1	0	1	0	4	5	5	5	4	4	4	5	3	1	1	0	3	4	4	4	4	5	4	4	4	4	4	4	5
	307304191	B2192 towards A26 junction	473	164.9	163.2	160.2	153.1	249.3	156.6	162.6										157.4	153.4	155.1	441	531.2	506.3	510.2									

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4.0 CONCLUSIONS

- 4.1 The updated Lewes SATURN traffic model has been used, successfully, to predict the likely performance of the local road network, in the AM and PM peaks at 2030, under various LDF scenarios for Lewes and Ringmer and under a reference case with no LDF allocation.
- 4.2 Primarily, the model has been run with an agreed set of forecasting assumptions ('Test 1').
- 4.3 Outcomes from the performance appraisal are logical, in so far as they show that the network will operate less well and with greater 'stress' in those LDF scenarios that have more land use allocations and higher total trip volumes. The LDF outcome with the poorest performance will be Scenario 1, whilst the outcome with the best performance will be Scenario 5.
- 4.4 The ranking of scenarios in worsening order of junction RFC and corridor travel time will be as follows:
- Reference Case;
 - LDF Scenario 5;
 - LDF Scenario 7;
 - LDF Scenario 6;
 - LDF Scenario 4;
 - LDF Scenario 2;
 - LDF Scenario 3;
 - LDF Scenario 1.
- 4.5 There are several critical junctions at which flows will exceed capacity, in the reference case and in all LDF Scenarios 1-7, at 2030 AM and PM peaks, as follows
- A26 / B2192 Earwig Corner major/minor junction;
 - A26 / Church Street major/minor junction; and
 - A26 / Phoenix Causeway roundabout.
- 4.6 These junctions will require some form of improvement to accommodate background growth of traffic demand in the reference case, with only committed development and also to enable any of the Lewes / Ringmer LDF development options to be implemented.
- 4.7 Some further junctions will experience flows in excess of capacity under certain scenarios, as follows:
- Phoenix Causeway / Eastgate Street major/minor junction – This junction will require some form of improvement in the AM peak, in all scenarios containing the Lewes North Street development option (i.e. not 5 or 7); and
 - Phoenix Causeway / Brooks Lane roundabout – This junction will require some form of improvement in the PM peak, in all scenarios containing the Lewes Old Malling Farm development option (i.e. not 6 or 7).
- 4.8 Testing of highway mitigation schemes to resolve the above junction problems has not been requested as part of the study.
- 4.9 Predicted congestion issues at A277/A275 Prison Crossroads, in the forecast reference case and LDF scenarios, should not act as a constraint on development of the tested LDF scenario sites, because of the distance of Prison Crossroads from those sites and the availability of A26, via Cuilfail Tunnel, as the more natural route for strategic traffic between A27 and those sites. It cannot be determined with certainty, from the model, whether or not the LDF scenarios would result in impacts that would require mitigation, at either A27 Southerham or Ashcombe junctions.

- 4.10 Agreed adjustments have been made to the Test 1 forecasting assumptions, in order to assess the sensitivity of the model results. These adjustments have comprised the following:
- Test 2 – Replace Uckfield zone LDF site-specific trips with TEMPRO factored trips;
 - Test 3 – Reduce internal LDF development options in scenarios 1-7 by 10%, to reflect 'smarter choices';
 - Test 4 – Combine Uckfield TEMPRO-factored trips and 10%-reduced LDF trips; and
 - Test 5 – Adjust all TEMPRO-factored zones (including Uckfield) to match new TEMPRO (database 6.2).
- 4.11 Congestion problems will arise at the existing A26/B2192 Earwig Corner priority junction, in all forecast situations. Traffic delays, here, will also occur even with the following demand adjustments:
- With Test 2 – in all AM and PM scenarios, except for the PM reference case and PM scenarios 5 and 6, which exclude Ringmer residential development;
 - With Test 3 – in all AM and PM scenarios;
 - With Test 4 – in the maximum LDF Scenario 1; and
 - With Test 5 – in the reference case, AM peak only.
- 4.12 The need for junction improvement at Earwig Corner, with the Ringmer LDF development option in place, will arise regardless of whether or not the Uckfield LDF development also proceeds. Furthermore, the need for the improvement with Ringmer LDF development option will not be removed by Smarter Choices initiatives (10% reduction in vehicle trips).
- 4.13 Problems at Earwig Corner could be largely resolved by introducing a new roundabout design with 2-lane entries from all arms. A signal arrangement would not perform satisfactorily without significant land-take.
- 4.14 With the proposed roundabout design and the maximum demand situation (LDF Scenario 1, in Test 1), the highest RFC at the roundabout would be as follows:
- 103% in the AM peak, without demand interventions.
- 4.15 The maximum RFC at the Earwig roundabout would fall to 98% in the AM peak with Scenario 1, if there was no Uckfield LDF development and if Smarter Choices were implemented (i.e. Test 4). The maximum RFC would be even lower under Test 5 assumptions, with new TEMPRO V6.2 growth rates.
- 4.16 Forecasts from the Lewes SATURN model are considered to be sufficiently robust for the study purpose. However, there are some limitations, which would require further actions in order to produce detailed results, namely:
- New trip O-D survey data to produce an improved base model validation;
 - New classified traffic count data for base validation; and
 - Extension of the SATURN network outside Lewes, especially to the east, to enable accurate representation of route choice for longer-distance trips.