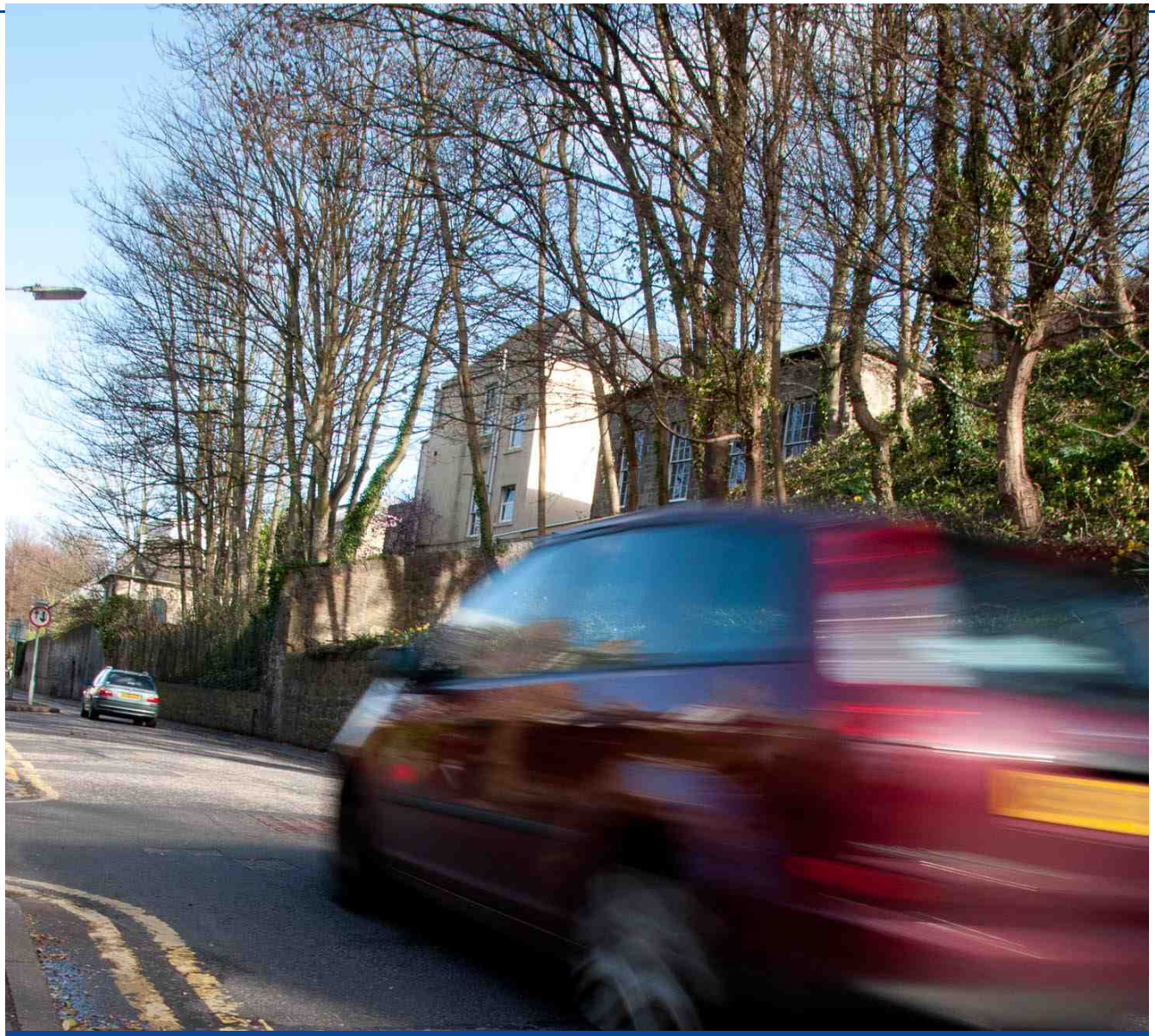

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WSP

TRAFFIC ASSESSMENT OF WEST BERKSHIRE HSA DPD SITES USING WBTM

West Berkshire Council

29/03/2015

Quality Management

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
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The transport modelling that has been carried out under the terms of our appointment and described in this report has been carried out using SATURN (version 11.2.05). Transport modelling software of this type provides predictions of transport flows on the basis of a number of assumptions. The assumptions made in developing the transport model have been identified within this report.

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TRAFFIC ASSESSMENT OF WEST BERKSHIRE HSA DPD SITES USING WBTM

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29/03/2015

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Table of Contents

1 Introduction

1.1.1 The 'West Berkshire Housing Site Allocations Development Plan Document – Preferred Options Consultation July 2014' sets out the preferred sites across West Berkshire for delivering the remaining homes needed to meet the 10,500 allocation for the District from 2006 – 2026.

1.1.2 West Berkshire Council (WBC) has asked for assistance with transport assessment work for the currently preferred sites in order to:

- be satisfied that they are deliverable
- be aware of the impact they will have on the transport network
- highlight the likely areas of facilitation and mitigation that will be required
- help inform final decisions regarding which sites are acceptable to go forward for allocation in the DPD

1.1.3 The main focus of this report is the impact on the existing highway network of the development sites outlined in the West Berkshire Housing Site Allocations Development Plan Document (Local Plan) (HSA DPD). This document will help the Council to understand and mitigate where appropriate the traffic implications of the proposed sites.

1.1.4 The methodology adopted in this study considers network stress when the HSA developments are included. The study is not intended to provide a detailed review of each development. As such it does not consider design issues, economic benefits, environmental impacts or safety issues. It must be stressed that we have not looked at any different combinations of developments within this study. Additional scenarios looking at different combinations of the four HSA developments in the Theale area have been assessed.

1.1.5 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required. Where appropriate these detailed assessments would accompany a planning application.

1.1.6 The study can be used to inform considerations of potential highway mitigation associated with the impacts of the developments. However, the analysis is not exhaustive and requirements should be reviewed on a case-by-case basis as part of the planning process.

1.1.7 This report sets out the inputs, methodology and results of the forecasting. The report is structured as follows:

- **Section 2** provides an overview of the base and forecast models
- **Section 3** provides details on the development of the model scenario which includes the HSA sites
- **Section 4** provides details on the network wide assessment impacts
- **Section 5** provides an assessment of the impact on the Newbury, Thatcham, Cold Ash and Woolhampton area
- **Section 6** provides an assessment of the impact on the Theale area (All sites)
- **Section 7** provides an assessment of the impact on the Theale area (Western sites)
- **Section 8** provides an assessment of the impact on the Theale area (Eastern sites)
- **Section 9** provides the conclusions to the assessment

2 Base and forecast modelling

2.1 2013 base year model

2.1.1 WSP were commissioned to update the West Berkshire Transport Model (WBTM) based on 2013 transport data for the following time periods:

- AM peak hour: 08:00-09:00
- Inter peak (average hour): 10:00-16:00
- PM peak hour: 17:00-18:00

2.1.2 The model development involved a comprehensive and extensive data collection exercise, including, manual and automatic traffic counts, automatic number plate recognition surveys and journey time surveys. To ensure compliance with modelling guidance the models have been developed in accordance with the Department for Transport (DfT) Web based Transport Analysis Guidance (WebTAG) on http://www.dft.gov.uk/webtag/. This provides detailed guidance on appraisal of transport projects and wider advice on scoping and carrying out transport studies.

2.1.3 The SATURN (Simulation and Assignment of Traffic in Urban Road Networks) Version 11.2.05 program was used as the highway modelling software package. The chosen modelling software package provides:

- WebTAG and DMRB compliance in terms of structure and convergence in SATURN
- Acceptability by local authorities, Department for Transport (DfT), Highways Agency (HA) and developers of model inputs and outputs
- Detailed WebTAG compliant convergence statistics that can be used later to estimate whether scheme benefits are robust

2.1.4 The model includes six user classes as follows:

- Car: Commuting
- Car: Employers Business
- Car: Other
- Light Goods Vehicle (LGV)
- Heavy Goods Vehicle (OGV1)
- Heavy Goods Vehicle (OGV2)

2.1.5 Appendix A includes a description of the user classes (Car, LGV, OGV1 and OGV2) as taken from the Design Manual for Roads and Bridges (DMRB) Volume 13. Public Service Vehicles (PSVs), i.e. buses, have not been included in the model as a distinct user class. Instead they have been represented on the network as fixed flows along a defined route with a peak hour frequency relevant to the respective peak hour modelled. Defining buses in this manner means their impact in terms of congestion and subsequently journey times around the model is captured and their routing realistic in terms of current bus provision when traffic surveys were undertaken.

2.1.6 The study area covers all key highway links and junctions extending from junction 14 of the M4 in the west to junction 12 in the east, north to junction 13 of the M4 and south to Kingsclere on the A339. This area covers the entire urban area of Newbury and Thatcham.

2.1.7 The transport model area is shown in figure 2.1. The transport model covers a sufficient area to accurately model the distribution and assignment of traffic in the areas surrounding Newbury and Thatcham as well as the town centres.

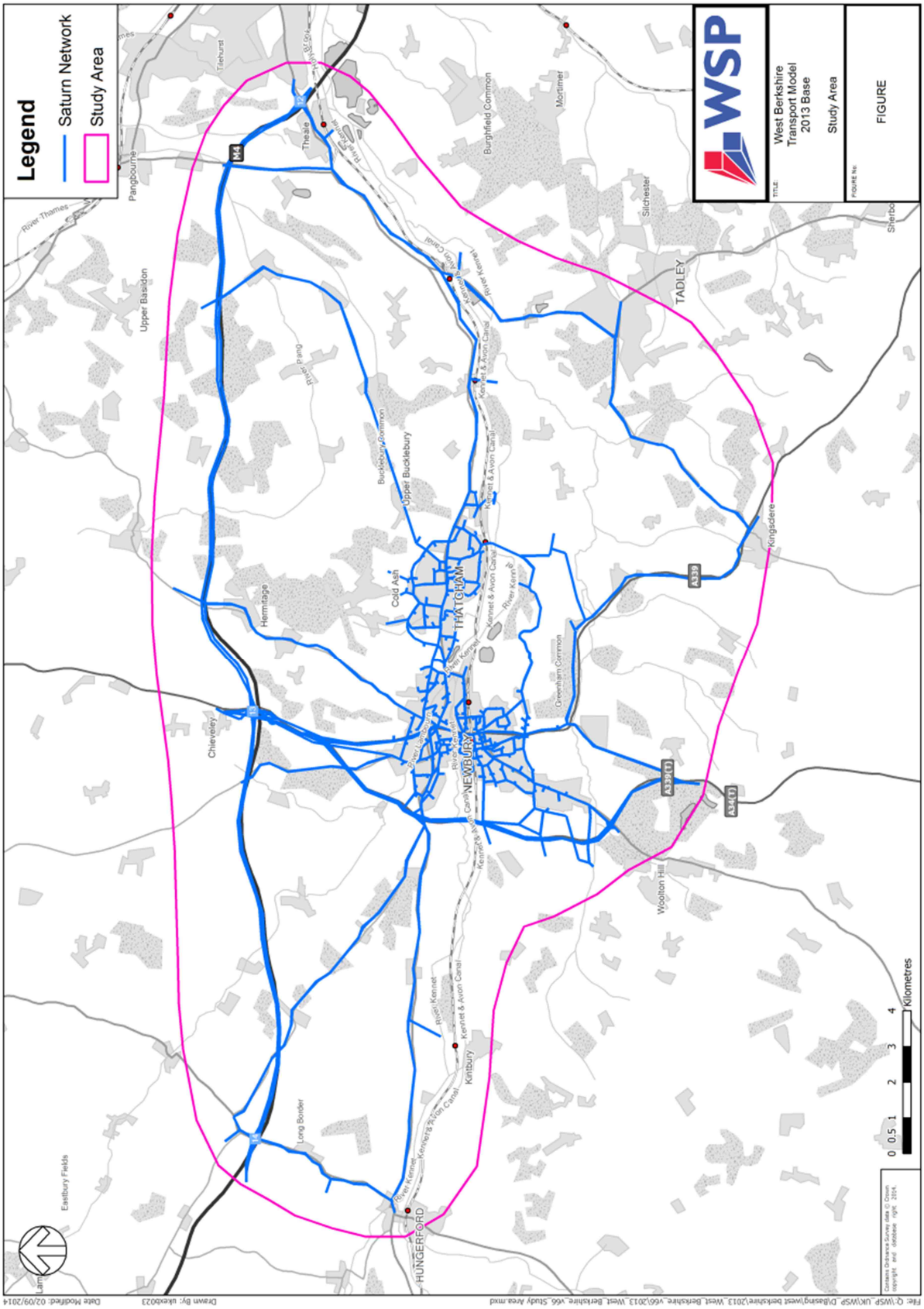

Figure 2.1: Transport model study area

2.1.8 The highway model calibration process was undertaken successfully and has produced a high standard and quality of results for all time periods. It has been shown that the prior trip matrices were improved by the use of matrix estimation techniques and that this process did not significantly alter the integrity of the prior trip matrices.

2.1.9 The calibration and validation levels achieved coupled with the quantity of traffic data included in the model for each time period meet the WebTAG criteria. It can be concluded that overall the WBTM is considered to be a robust tool and is suitable to be used for traffic forecasting, development and scheme appraisal, and hence is considered to be fit for purpose.

2.2 2019 and 2026 forecast year model

2.2.1 The WBTM base year is 2013 and the WBTM forecast years are 2019 and 2026 which are used to assess proposed developments and infrastructure. WebTAG Unit M4.3 stipulates that a "Core Scenario" should be defined which is based on the most "unbiased and realistic set of assumptions" that will form the central case for appraising a scheme. Alternative scenarios are also required which have different supply and/or demand assumptions from the core scenario. The differences in the alternative scenarios will reflect the uncertainties in assumptions made within the core scenario.

2.2.2 The Core Scenario has been defined as containing all developments and schemes deemed "near certain" and "more than likely." The low growth scenario only includes developments and schemes classified as "near certain", whilst the high growth scenario includes all the identified local developments and schemes.

2.2.3 In order to determine the core and alternative scenarios an uncertainty log was created following direct liaison with West Berkshire Council. Uncertainty was defined in terms of probability of a scheme or development going ahead as outlined in table 2.1.

Table 2.1: Uncertainty classifications

Probability	Description	Status
Near certain	The outcome will happen, or there is a high probability that it will happen	■ Intent announced by proponent to regulatory agencies ■ Approved development proposals ■ Projects under construction
More than likely	The outcome is likely to happen, but there is some uncertainty	■ Submission of planning or consent application imminent ■ Development application within the consent process ■ Politically and Corporately supported and being progressed with development partners
Reasonably foreseeable	The outcome may happen, but there is significant uncertainty	■ Identified within a development plan ■ Not directly associated with the transport strategy/scheme, but may occur if the transport strategy/scheme is implemented ■ Development conditional on the transport strategy/scheme proceeding ■ A committed policy goal, subject to tests (e.g. of deliverability) whose outcomes are subject to significant uncertainty
Hypothetical	There is considerable uncertainty whether the outcome will ever happen	■ Conjecture based on currently available information ■ Discussed on a conceptual basis ■ One of a number of possible inputs in an initial consultation process ■ A policy aspiration

2.2.4 In reviewing future developments, only those considered likely to have a significant local impact on the model study area were considered. Smaller developments are assumed to be accounted for in overall TEMPRO growth. The developments identified as having a notable impact within the study area and explicitly modelled within the forecast models are classified in table 2.2. West Berkshire Council was consulted directly in order to devise the list of committed developments included within the WBTM forecasts.

Table 2.2: Future developments

Area	ID	Development	Authority	Uncertainty
	Individual development sites			
Eastern Area	1	Ikea, Calcot	West Berks	**Near certain**
Newbury	2	Sandleford Park	West Berks	**More than likely**
Newbury	3	Kings Road Link Road	West Berks	**More than likely**
Newbury	4	Racecourse	West Berks	**Near certain**
Newbury	5	London Road Industrial Estate	West Berks	**More than likely**
Newbury	6	Market Street Redevelopment	West Berks	**More than likely**
	Infrastructure schemes			
	7	A4 Calcot capacity improvement scheme	West Berks	**Near certain**

2.2.5 Based on the information shown in table 2.2 it was decided that a single Core Scenario would be created for forecasting purposes.

2.2.6 Matrices are developed from a number of components and data sources, including:

- National Trip End Model (NTEM) dataset version 6.2 which provide growth factors for car and public transport trips
- information on significant developments (trip rates, trip distribution, trip internalisation) are included in the model explicitly
- Road Traffic Forecasts (RF13) which provide growth factors for LGV and HGV trips
- fuel and income adjustment factors applied to car trips

2.2.7 Figure 2.2 shows the process for the production of the forecast demand matrices.

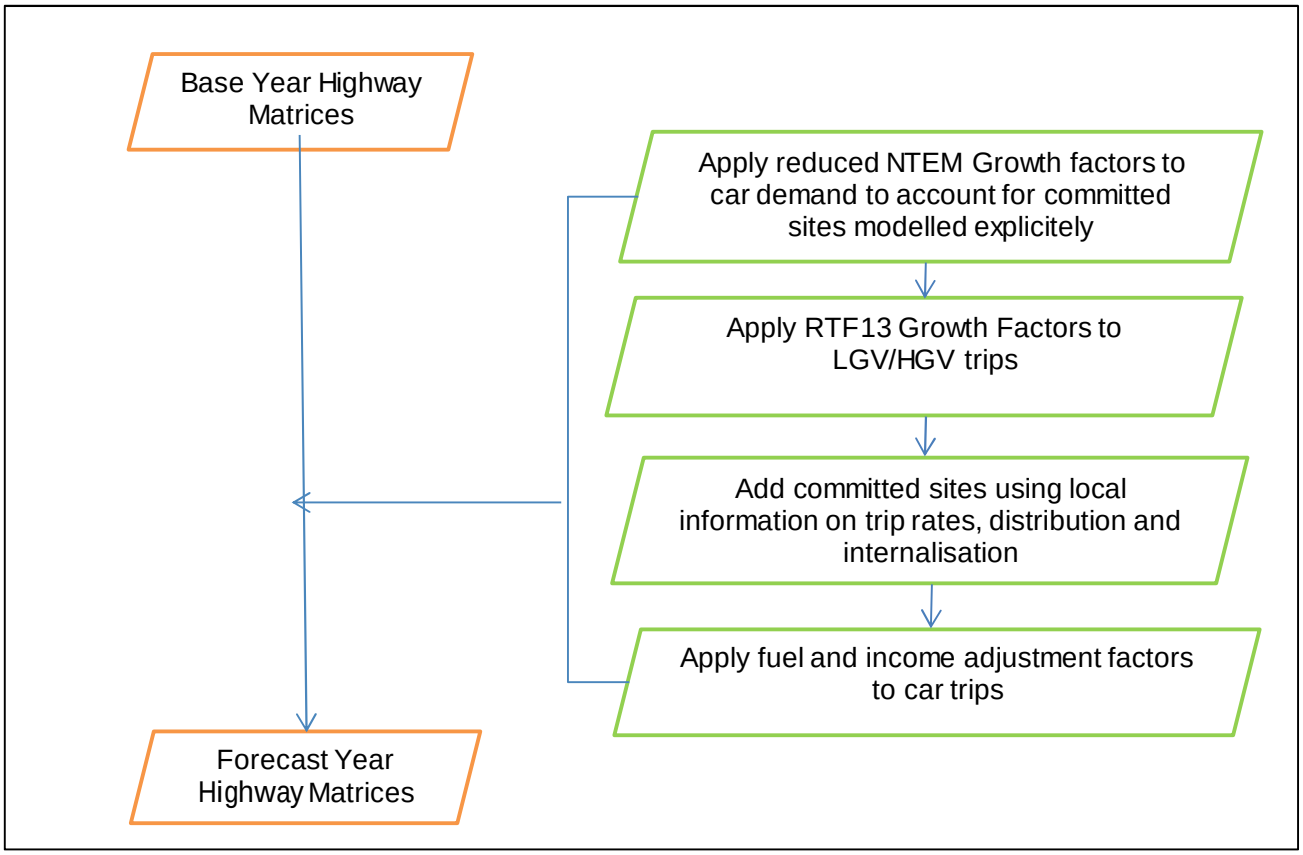

Figure 2.2: Forecast matrix development process

2.2.8 Table 2.3 shows the 2013 base year origin and destination trip matrix totals.

Table 2.3: 2013 base year matrix trip totals

User Class	AM peak hour (08:00-09:00)	Inter peak average hour (10:00-16:00)	PM peak hour (17:00-18:00)
Car	30,000	17,483	30,346
LGV	1,664	1,885	2,850
OGV1	1,932	2,070	2,574
OGV2	1,143	1,254	1,207
Total	**34,739**	**22,692**	**36,977**

2.2.9 The Trip End Model Presentation Program (TEMPRO) is a software tool that provides projections of growth over time for use in transport models, based on outputs from the National Trip End Model (NTEM) which is a nationally-consistent benchmark of growth. Following current guidance the forecast growth has remained consistent with forecasts obtained from the NTEM version 6.2 datasets accessed through the TEMPRO version 6.2 program.

2.2.10 The Core Scenario forecast growth was obtained directly from TEMPRO using the NTEM version 6.2 datasets. The Alternative Planning Assumptions facility within TEMPRO was used to remove the effect of explicitly modelled committed developments by adjusting the planning assumptions on which the forecasts were based. This involved removing totals associated with the explicitly modelled developments (shown in table 2.2) from the overall total with the resultant growth factors therefore representing background growth in traffic.

2.2.11 Employment density information contained within the 2nd Edition of the Homes and Communities Agency's *"Employment Densities Guide" (2010)* report (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/378203/employ-den.pdf) were applied to the developments in table 2.2 to give the total number of household and jobs forecast for Newbury and Thatcham for 2019 and 2026. Table 2.4 and table 2.5 show the adjusted TEMPRO household and jobs numbers forecasts for each district and each time period for the 2019 and 2026 forecast years.

Table 2.4: Adjusted TEMPRO household and jobs in 2019

Area	2013		2019		Alternative 2019	
	Households	Jobs	Households	Jobs	Households	Jobs
Eastern Area	11,199	7,025	11,682	7,454	11,682	7,320
Newbury	35,336	70,274	36,771	74,478	36,123	73,933

Table 2.5: Adjusted TEMPRO household and jobs in 2026

Area	2013		2026		Alternative 2026	
	Households	Jobs	Households	Jobs	Households	Jobs
Eastern Area	11,199	7,025	12,061	7,651	12,061	7,515
Newbury	35,336	70,274	37,895	76,350	36,686	75,773

2.2.12 Information obtained from TEMPRO provides forecast growth assumptions for car user classes. In accordance with current guidance (WebTAG Unit M4, November 2014) and to take into account uncertainties in fuel price, government policy and changes in income the forecast demand car matrices have been adjusted by fuel and income adjustment factors. The factors calculated and used in the forecasts are shown in table 2.6.

Table 2.6: Fuel and income adjustment factors

Year	Fuel	Income	Combined
2019	1.027	1.014	1.042
2026	1.065	1.032	1.099

2.2.13 The growth rate for the car user class is included within table 2.7. Growth factors for other user classes were obtained from the Regional Traffic Forecasts (2013) published by the DfT and are included within table 2.7. Growth rates for South East England were derived, and are applied equally across all time periods.

Table 2.7: Growth factors

User Class		2019			2026		
		AM peak	Inter peak	PM peak	AM peak	Inter peak	PM peak
Car	No Fuel and Income factors	4.17%	5.35%	5.11%	7.53%	11.03%	9.50%
	With Fuel and Income factors	8.53%	9.76%	9.51%	18.15%	21.99%	20.32%
LGV		14.54%			35.7%		
OGV1		-1.71%			3.47%		
OGV2		7.26%			23.10%		

2.2.14 The application of the fuel and income adjustment factors shown in table 2.6 affect the numbers of trips in the origin and destination matrix meaning more cars on the road network in the future as a direct result of changes to both income and fuel prices.

2.2.15 The 2013 origin and destination trip shown in table 2.3 have been factored using the information contained within table 2.6 and table 2.7 to produce the 2019 and 2026 background growth trip totals shown in table 2.8, table 2.9 and table 2.10 for the AM peak, Inter peak and PM peak respectively.

Table 2.8 AM peak – 2019 and 2026 background growth trip totals

AM peak hour (08:00-09:00)									
User Class	**2013**	**2019: No Fuel and Income factors**		**2019: incl Fuel and Income factors**		**2026: No Fuel and Income factors**		**2026: incl Fuel and Income factors**	
Car	30,000	31,250	4.17%	32,559	8.53%	32,260	7.53%	35,444	18.15%
LGV	1,664	1,906	14.54%	1,906	14.54%	2,257	35.7%	2,257	35.7%
OGV1	1,932	1,899	-1.71%	1,899	-1.71%	1,999	3.47%	1,999	3.47%
OGV2	1,143	1,226	7.26%	1,226	7.26%	1,407	23.10%	1,407	23.10%
Total	**34,739**	**36,281**	**4.4%**	**37,590**	**8.21%**	**37,923**	**9.2%**	**41,107**	**18.33%**

Table 2.9: Inter peak – 2019 and 2026 background growth trip totals

Inter peak average hour (10:00-16:00)									
User Class	**2013**	**2019: No Fuel and Income factors**		**2019: incl Fuel and Income factors**		**2026: No Fuel and Income factors**		**2026: incl Fuel and Income factors**	
Car	17,483	18,418	5.35%	19,189	9.76%	19,412	11.03%	21,327	21.99%
LGV	1,885	2,159	14.54%	2,159	14.54%	2,558	35.7%	2,558	35.7%
OGV1	2,070	2,035	-1.71%	2,035	-1.71%	2,142	3.47%	2,142	3.47%
OGV2	1,254	1,344	7.26%	1,344	7.26%	1,543	23.10%	1,543	23.10%
Total	**22,692**	**23,956**	**5.5%**	**24,727**	**8.97%**	**25,654**	**13.1%**	**27,570**	**21.50%**

Table 2.10: PM peak – 2019 and 2026 background growth trip totals

PM peak hour (17:00-18:00)									
User Class	**2013**	**2019: No Fuel and Income factors**		**2019: incl Fuel and Income factors**		**2026: No Fuel and Income factors**		**2026: incl Fuel and Income factors**	
Car	30,346	31,897	5.11%	33,232	9.51%	33,230	9.50%	36,511	20.32%
LGV	2,850	3,264	14.54%	3,264	14.54%	3,866	35.7%	3,866	35.7%
OGV1	2,574	2,530	-1.71%	2,530	-1.71%	2,663	3.47%	2,663	3.47%
OGV2	1,207	1,295	7.26%	1,295	7.26%	1,486	23.10%	1,486	23.10%
Total	**36,977**	**38,986**	**5.4%**	**40,321**	**9.04%**	**41,246**	**11.5%**	**44,526**	**20.41%**

2.2.16 The information contained in table 2.8, table 2.9 and table 2.10 shows the overall increase in the trip total from the 2013 base year to the 2019 and 2026 forecast year with the:

- AM peak increasing from 2013 to 2019 by 8.21% and from 2013 to 2026 by 18.33%
- Inter peak increasing from 2013 to 2019 by 8.97% and from 2013 to 2026 by 21.50%
- PM peak increasing from 2013 to 2019 by 9.04% and from 2013 to 2026 by 20.41%

2.2.17 There has been a further stage in the process for producing the 2019 and 2026 forecast matrices as within Newbury there are committed developments where there are existing land uses which generate trips. These are listed in table 2.2 and have been removed from the forecast 2019 and 2026 trip matrices to give the trip totals shown in table 2.11.

Table 2.11: 2019 and 2026 forecast matrices with trips removed

User Class	AM peak		Inter peak		PM peak	
	2019	2026	2019	2026	2019	2026
Car	32,014	34,715	18,869	20,963	32,655	35,638
LGV	1,874	2,210	2,128	2,505	3,201	3,774
OGV1	1,806	1,901	1,943	2,045	2,429	2,557
OGV2	1,222	1,402	1,344	1,542	1,284	1,474
Total	**36,916**	**40,228**	**24,283**	**27,055**	**39,570**	**43,442**

2.2.18 The committed development trips (from developments listed in table 2.2) are shown in table 2.12 for the AM peak, Inter peak and PM peak.

Table 2.12: 2019 and 2026 committed development trip totals

User Class	AM peak		Inter peak		PM peak	
	2019	2026	2019	2026	2019	2026
Car	925	2,024	1,791	2,475	1,703	2,798
LGV	59	111	155	186	171	237
OGV1	20	20	8	9	8	8
OGV2	11	14	13	18	10	12
Total	**1,015**	**2,170**	**1,967**	**2,689**	**1,893**	**3,055**

2.2.19 The committed development trip totals shown in table 2.12 are added to the 2019 and 2026 forecast background trip totals shown in table 2.11. Table 2.13 shows the total background plus committed trip matrix totals for 2019 and 2026

Table 2.13: Core scenario matrix total comparison

User Class	AM peak		Inter peak		PM peak	
	2019	2026	2019	2026	2019	2026
Car	32,939	36,739	20,660	23,438	34,358	38,436
LGV	1,933	2,321	2,283	2,691	3,372	4,011
OGV1	1,826	1,921	1,951	2,054	2,437	2,565
OGV2	1,233	1,416	1,357	1,560	1,294	1,486
Total	**37,931**	**42,398**	**26,250**	**29,744**	**41,463**	**46,497**

2.2.20 Table 2.14 compares the matrix totals between the 2013 base year model, 2019 forecast year model and 2026 forecast year model for each peak period.

Table 2.14: Core scenario matrix total comparison

	2013 base year matrix total	2019		2026	
		Matrix total	% increase 2019 vs BY	Matrix total	% increase 2026 vs BY
AM peak hour (08:00-09:00)	34,738	37,931	9.19%	42,396	22.05%
Inter peak average hour (10:00-16:00)	22,692	26,250	15.68%	29,744	31.08%
PM peak hour (17:00-18:00)	36,977	41,463	12.13%	46,497	25.75%

2.2.21 The resultant all vehicle highway growth between 2013 and 2019 is 9.19% in the AM peak, 15.68% in the inter peak and 12.13% in the PM peak. The growth between 2013 and 2026 is 22.05% in the AM peak, 31.08% in the inter peak and 25.75% in the PM peak.

2.2.22 It is unlikely that all of this growth will occur in reality, due to network constraints, highway schemes and other transport interventions that encourage modal shift away from the car to more sustainable modes. The forecast demand matrices have been produced using current Department for Transport WebTAG guidance and represent a worst case scenario.

3 Model scenario development

3.1 Introduction

3.1.1 This section presents the assessment of HSA sites undertaken by comparing Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) models. The assessment reported in this document focuses on changes in traffic flows and junction performance between the two scenarios.

3.1.2 The HSA modelling work has been based on the latest version of the 2026 AM peak and PM peak hour forecast traffic models. The HSA assessment has not been carried out for the Inter peak.

3.1.3 To assess the HSA development two scenarios were considered:

- **Scenario 1**: without the HSA development but including the committed developments contained in table 2.2
- **Scenario 2**: Scenario 1 plus all HSA development[1] (sites 1 to 12)

3.1.4 Additional scenarios have been assessed for combinations of the four HSA sites in Theale which are:

- **Scenario 3**: Scenario 1 plus HSA development (Sites 1 to 10)
- **Scenario 4**: Scenario 1 plus HSA development (Sites 1 to 8, 11 and 12)

3.1.5 The HSA residential sites considered in this assessment are listed in table 3.1 and shown graphically figure 3.1. It is assumed that the HSA residential sites will be implemented in full by 2026.

Table 3.1: Residential HSA Sites

DPD site reference	ID	Description	Total Size, dwellings
	Sites used in Scenarios 2 to 4		
NEW012	1	Land north of Newbury College	23
NEW042	2	Land at Bath Road, Speen	100
NEW042	3	Land at Coley Farm, Stoney Lane	75
NEW047D	4	Land to the north of Haysoms Drive and land adjoining Equine Way, SE Newbury	120
NEW106	5	Land at Moor Lane Depot, Newbury	40
THA025	6	Lower Way, Thatcham	87
COL002	7	Land at Poplar Farm, Cold Ash	20
WOOL006	8	Land to the north of the A4, Woolhampton	30
THE003	9	North Lakeside, Theale	50
THE009	10	Land between the A340 and The Green, Theale	125
THE005	11	Land at Junction 12, Theale	50
THE001	12	Former Sewage Works, Theale	88
Total			**808**

[1] Sites as set out in the Housing site Allocations Development Plan Document Preferred Options Consultation (July 2014)

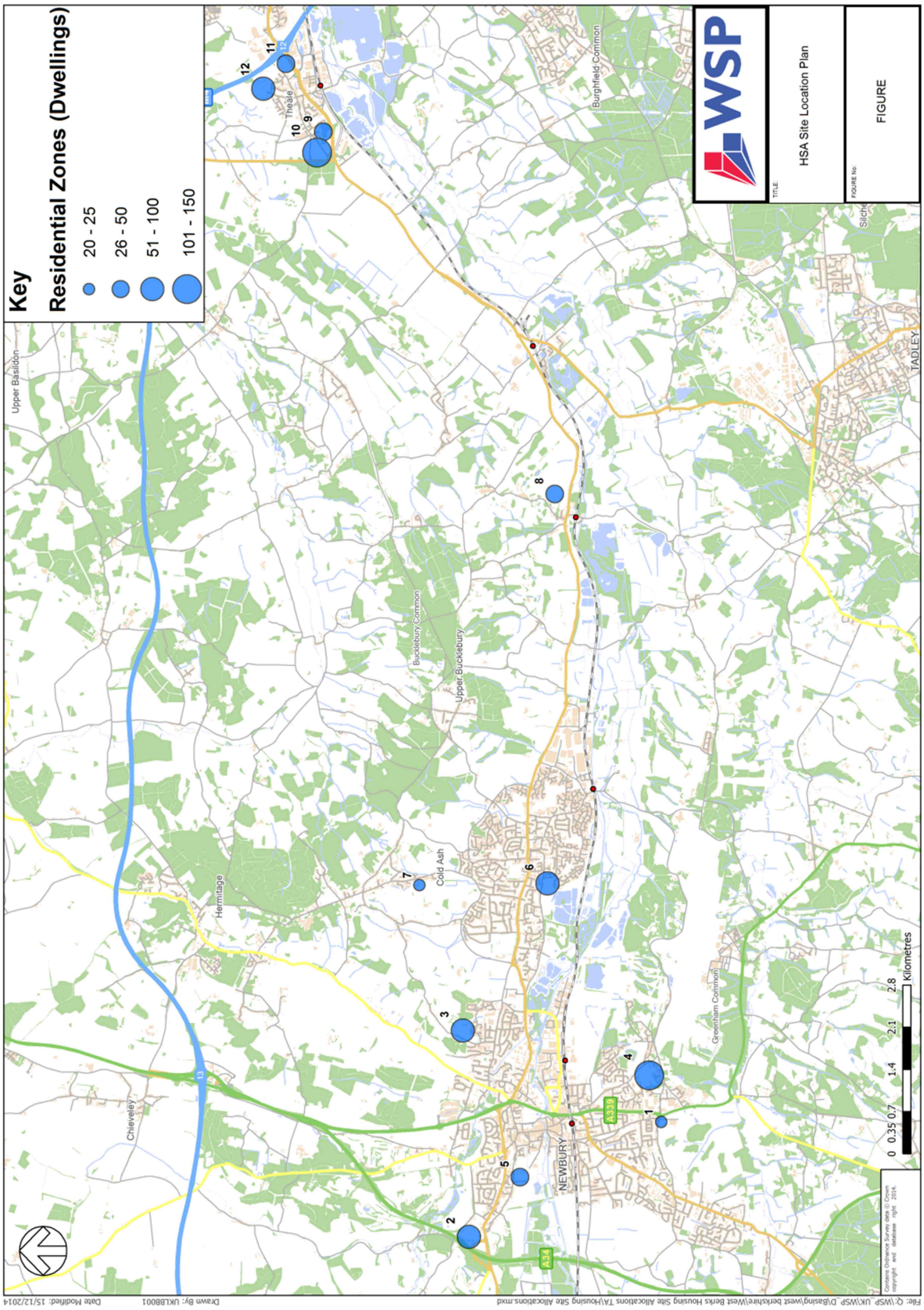

Figure 3.1 Location of HSA Sites

3.1.6 The trip rates were produced by interrogating the TRICS database with development type C3 (residential) used for the assessment of the HSA developments as shown in table 3.2.

Table 3.2: AM Peak and PM Peak hour trip rates

		Trip Rate, vehicle / dwellings[2]		
		Arrival	Departure	Total
AM peak hour (08:00-09:00)	Car	0.13	0.40	0.53
	HGV	0.00	0.00	0.01
PM peak hour (17:00-18:00)	Car	0.33	0.20	0.53
	HGV	0.00	0.00	0.01

3.1.7 The trip rates have been applied to the number of dwellings; the resultant trip generation is reproduced in table 3.3.

Table 3.3: 2026 modelled AM peak and PM peak hour trip generation (vehicles)

ID	2026 forecast year							
	AM peak				PM peak			
	Arrival		Departure		Arrival		Departure	
	Car/LGV	HGV	Car/LGV	HGV	Car/LGV	HGV	Car/LGV	HGV
1	3	0	9	0	8	0	5	0
2	13	1	40	1	33	1	20	1
3	10	1	30	0	25	0	15	0
4	15	1	48	1	40	1	24	0
5	5	0	16	0	13	0	8	0
6	12	1	35	0	29	1	18	0
7	3	0	8	0	7	0	4	0
8	4	0	12	0	10	0	6	0
9	7	1	20	0	17	0	10	0
10	16	1	49	1	42	1	26	1
11	7	1	20	0	17	0	10	0
12	12	1	35	1	29	0	18	0
Total	**107**	**8**	**322**	**4**	**270**	**4**	**164**	**2**
	441				**440**			

3.1.8 It is predicted that the HSA sites are likely to result in an additional 441 vehicle trips in the AM peak and 440 vehicle trips in the PM peak hours loaded onto the district's transport network. The total trip numbers for the base year and the 2026 Scenario 1 forecast year are shown in table 3.4, together with the number of trips generated by the HSA sites, and the final 2026 Scenario 2 trip numbers.

[2] Totals may not add up due to rounding of trip rates

Table 3.4: Modelled AM peak and PM peak hour trip numbers[3]

	Scenario 1		Scenario 2 HSA sites		Scenario 2 - total		Scenario 2 % change	
	AM	PM	AM	PM	AM	PM	AM	PM
Car/LGV	39,060	42,446	429	434	39,489	42,880	1%	1%
HGV	3,337	4,050	12	6	3,349	4,056	0.03%	0.01%
Total	42,397	46,496	441	440	42,838	46,936	1%	0.9%

3.1.9 Table 3.4 shows that all the preferred options housing sites increase trips across the network by approximately 1%. This small increase does not represent a significant impact on the highway network given that Scenario 2 is a worst case scenario and is therefore not a cause for concern in terms of increased congestion.

3.1.10 However, even though it is unlikely that all of the traffic growth summarised in Table 2.14 will occur in reality, due to network constraints, highway schemes and other transport interventions, any increase in traffic growth needs to be planned for in terms of future highway schemes and transport interventions to encourage modal shift.

[3] Totals may not add up due to rounding of trip rates

4 Network wide assessment impacts

4.1.1 The following sections present information network wide results for the modelled scenarios identified in paragraph 3.1.3 for the AM peak and PM peak. The highway network has been examined using key network indicators summarised below:

- Network wide statistics
- Actual flow
- Junction Volume over Capacity
- Link Volume over Capacity

4.1.2 The transport model information in the following sections is presented as the impact of traffic flows in terms of passenger car units (pcu). These are frequently used in traffic assessment work and are based on the principal of translating all vehicles into one common traffic currency. A pcu equivalent is essentially the impact that a mode of transport has on traffic variables (such as headway, speed, density) compared to a single car. This is achieved by apportioning different pcu values to different types of traffic.

4.1.3 Standard factors to convert each vehicle type into pcu have been taken from Table A7 in WebTAG Unit A5.4 “Marginal External Costs” (January 2014). These are:

- Cars: 1.0
- LGV: 1.0
- OGV1: 1.9
- OGV2: 2.9

4.1.4 Appendix A includes a description of the user classes as taken from the Design Manual for Roads and Bridges (DMRB) Volume 13.

4.2 2026: network wide statistics

4.2.1 The network wide model statistics for the 2026 modelled scenario are detailed below to establish how network performance is affected for each of the modelled scenarios. This is assessed through the travel time, total delay, distance travelled, queuing and fuel consumption. These give an indication of overall network performance, taking into account the aggregate impact of small changes in driver behaviour as a result of a particular development or scheme.

4.2.2 The 2026 network statistics are detailed in table 4.1 for the AM peak and table 4.2 for the PM peak.

Table 4.1: AM peak network statistics: Scenario 2 (with HSA Development) vs Scenario 1

	Scenario 1	Scenario 2	Absolute Difference (S2 v S1)	% (S2 v S1)
Over-Capacity Queues (PCU-Hrs)	1,182	1,304	122	10.3%
Total Travel Time (PCU-Hrs)	12,451	12,771	320	2.6%
Travel Distance (PCU-kms)	643,895	650,129	6,234	1.0%
Overall Average Speed (kph)	52	51	-1	-1.9%
Total Trips Loaded (PCU)	42,197	42,637	440	1.0%
Journey Time/Vehicle	17.70	17.97	0.27	1.5%

Table 4.2: PM peak network statistics: Scenario 2 (with HSA Development) vs Scenario 1

	Scenario 1	Scenario 2	Absolute Difference (S2 v S1)	% (S2 v S1)
Over-Capacity Queues (PCU-Hrs)	2,174	2,328	154	7.08%
Total Travel Time (PCU-Hrs)	14,331	14,628	297	2.07%
Travel Distance (PCU-kms)	699,759	705,645	5,886	0.84%
Overall Average Speed (kph)	49	48	-1	-2.04%
Total Trips Loaded (PCU)	46,283	46,738	455	0.98%
Journey Time/Vehicle	18.58	18.78	0.20	1.08%

4.2.3 The over-capacity queue relates to the time spent in queues at a junction where the traffic flow exceeds the capacity of the junction. The results show that with the increased number of trips on the network in all peak hours the over-capacity queues, total travel time and travel distance increases with a corresponding decrease in the overall average speed across the modelled network. In all peaks the journey time per vehicle increases due to the additional trips on the network and the increase in the total travel time. The information contained in table 4.1 and table 4.2 shows only slight increases which are not considered to be significant.

5 Newbury, Thatcham, Cold Ash and Woolhampton – Site 1 to Site 8

5.1 AM peak (08:00-09:00)

2026 traffic flows

5.1.1 Figure 5.1 show the impact of HSA sites on flow levels by presenting the absolute difference in directional flow on key links between the Scenario 1 and Scenario 2 for the AM peak. The difference in flows is shown in passenger car units (pcu) and any difference less than 10 pcu is not shown in order to highlight the larger differences only and not overcrowd the figures. The red bands represent an increase in traffic in Scenario 2 (with HSA sites) when compared to Scenario 1 (without HSA sites) whilst the blue bands indicate a decrease in traffic.

5.1.2 The additional trips due to the HSA developments are spread across the district's transport network rather than concentrated at one location which echoes the dispersed nature of the HSA site locations.

5.1.3 The increase in the directional flow on the majority of the roads is not predicted to exceed 50 pcu. The highest increases are on the M4. The addition of the HSA development sites switches traffic from the B3421 Hambridge Road onto alternative routes.

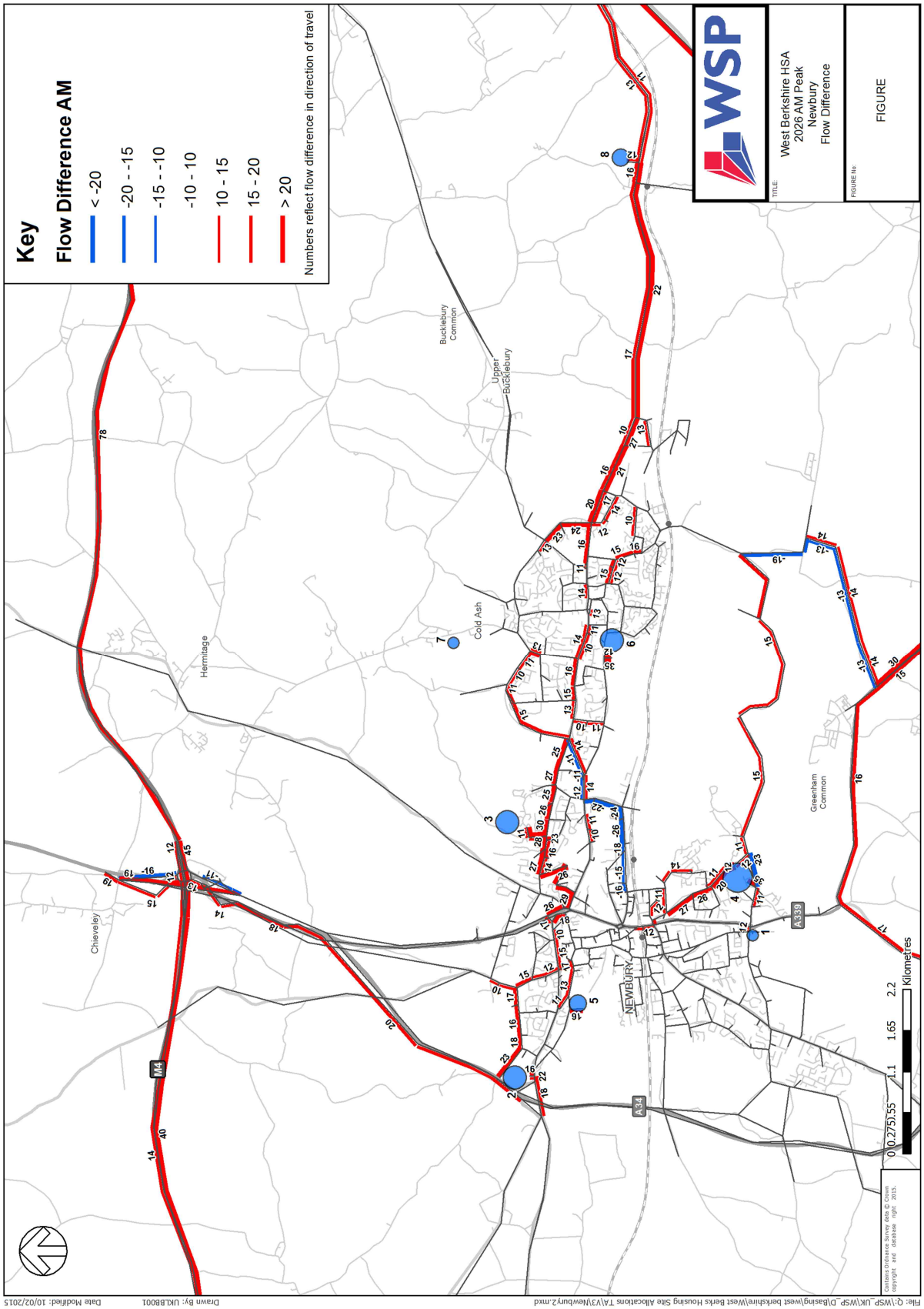

Figure 5.1 2026 traffic flow difference between Scenario 2 and Scenario 1 – AM peak

Junction performance

5.1.4 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

5.1.5 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken. Figure 5.2 shows an example of VoC information for each turning movement at a roundabout.

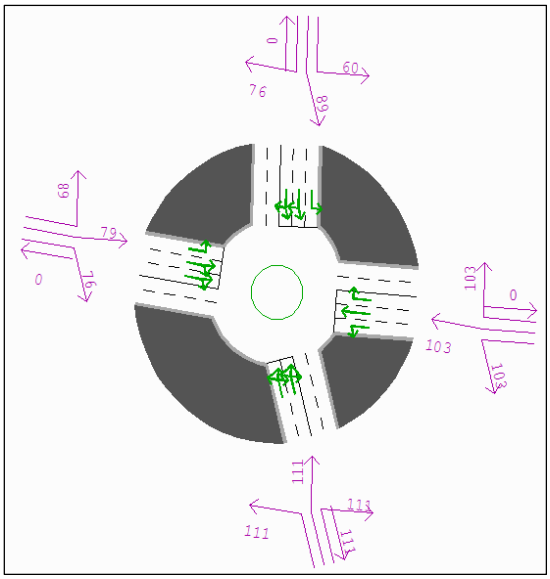

Figure 5.2 Example of VoC on individual turns

5.1.6 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

5.1.7 Figure 5.3 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

5.1.8 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. Overall, the absolute changes in VoC statistics between the two scenarios are not extensive.

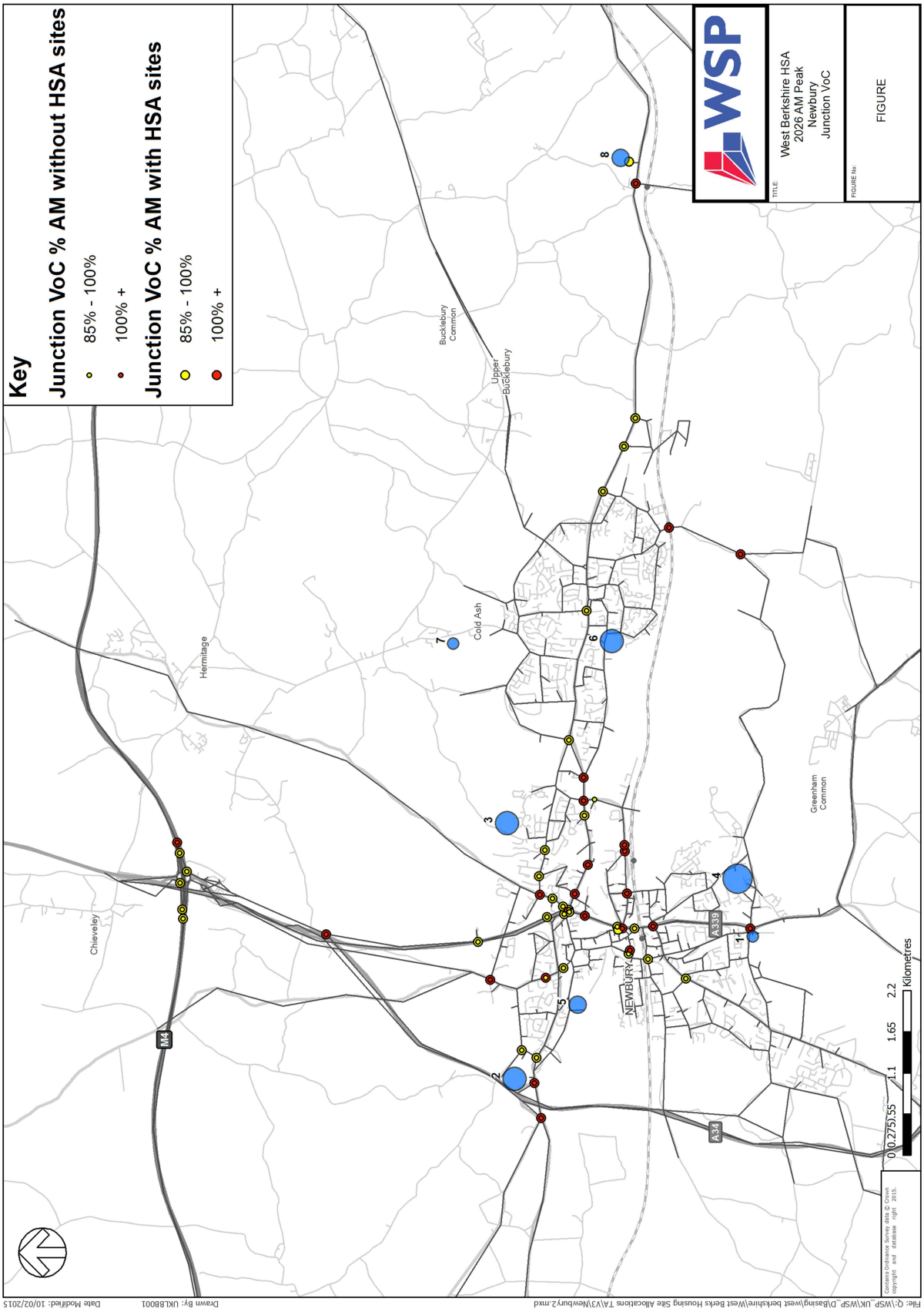

Figure 5.3 2026 junction VoC difference between Scenario 2 and Scenario 1 – AM peak

Link performance

5.1.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

5.1.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

5.1.11 Figure 5.4 and figure 5.5 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 in the Newbury area. Those links that are predicted to operate under 85% capacity are excluded from the assessment. There are minor increases in the link VoC on the A339 through Newbury and on the A4 Bath Road between the A4 Bath Road/Piper Way junction and the A4 Bath Road/A340 junction when the development is included. These are only small increases and are already over-capacity without the HSA developments.

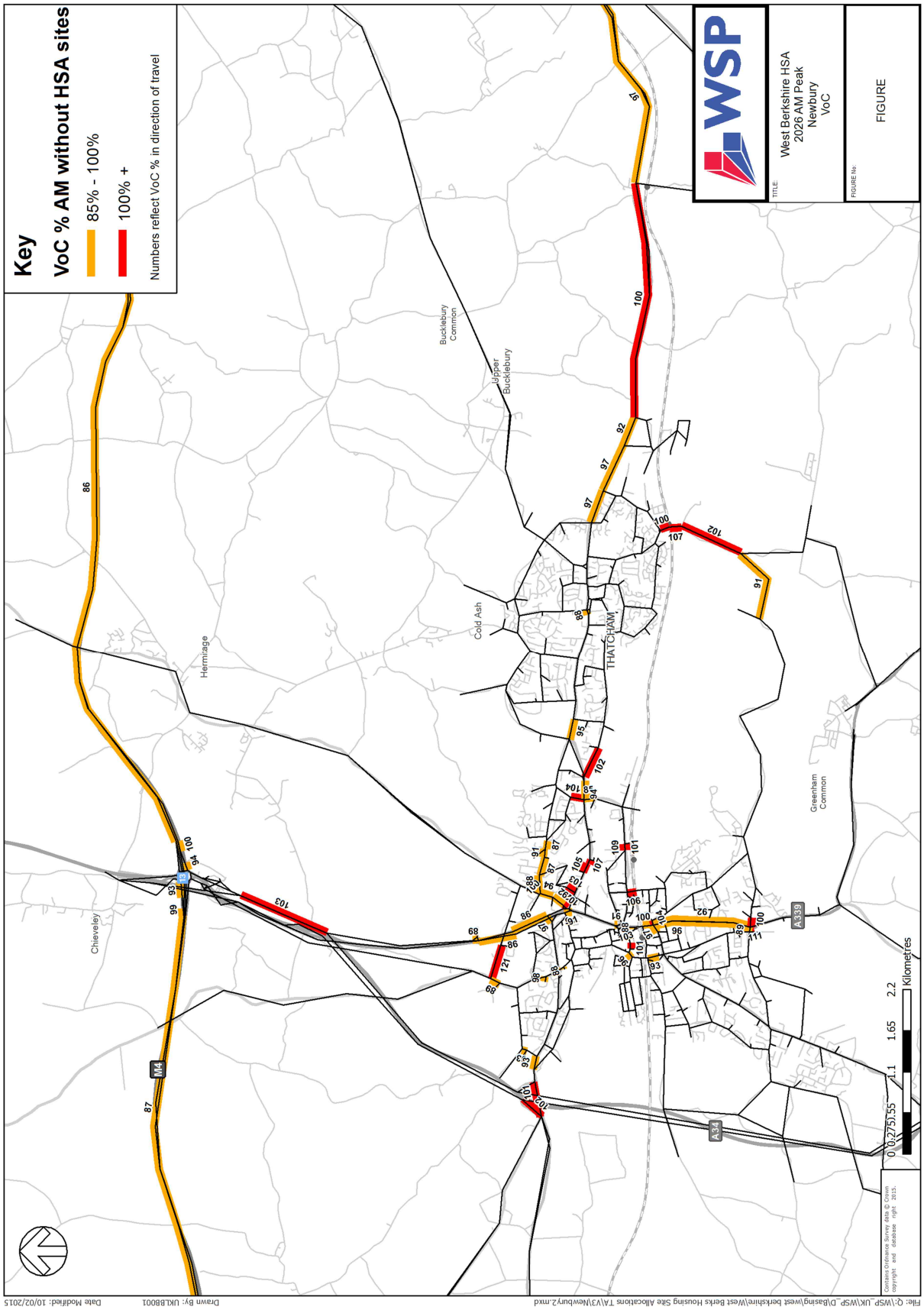

Figure 5.4 2026 link VoC for Scenario 1 – AM peak

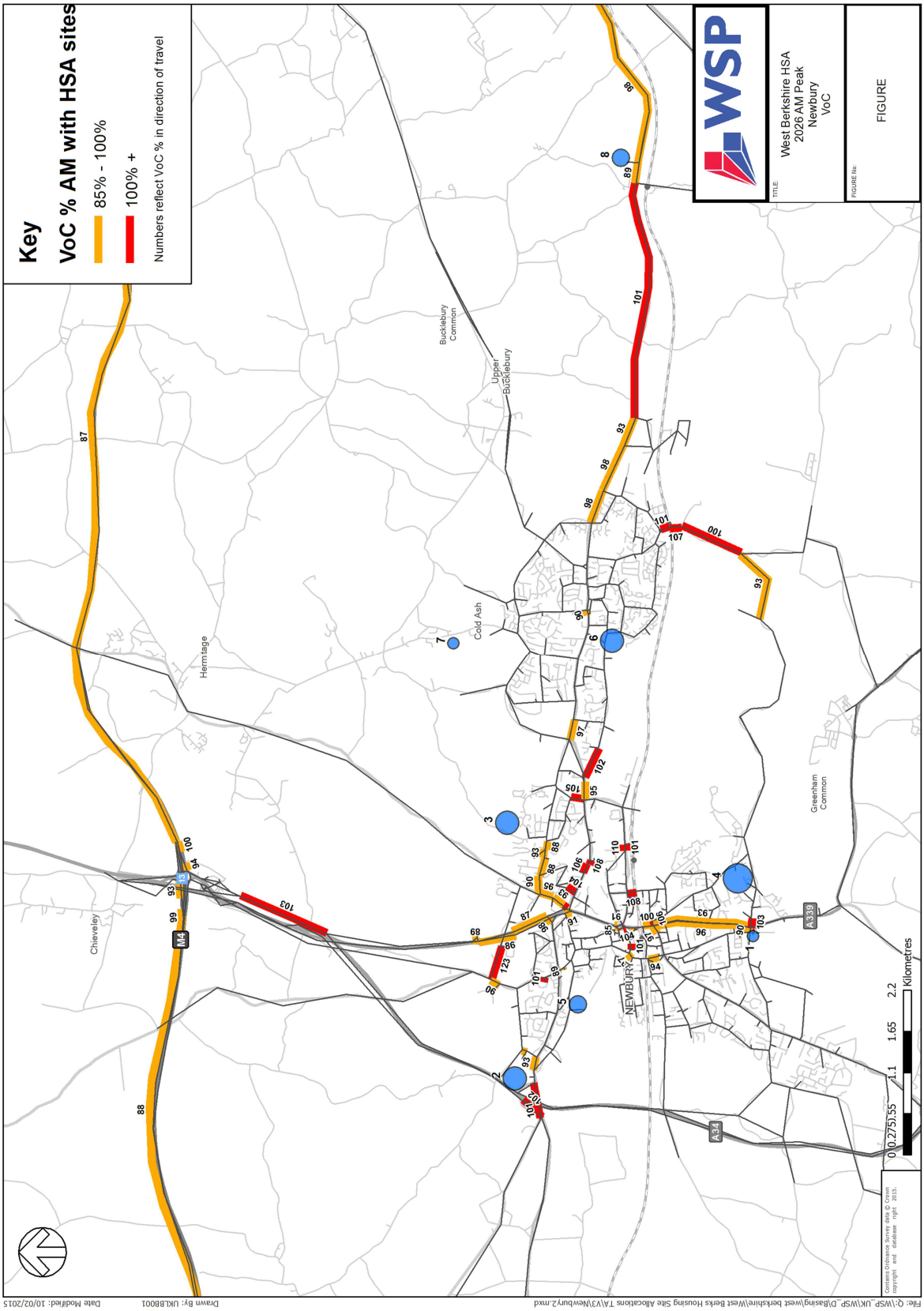

Figure 5.5 2026 link VoC for Scenario 2 – AM peak

5.2 PM peak (17:00-18:00)

2026 traffic flows

5.2.1 Figure 5.6 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 2 for the PM peak. The difference in flows is shown in passenger car units (pcu). The red bands represent an increase in traffic in Scenario 2 (with HSA sites) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

5.2.2 The additional trips due to the HSA are spread across the district's transport network rather than concentrated at one location which echoes the dispersed nature of the HSA site locations.

5.2.3 The increase in the directional flow on the majority of the roads is not predicted to exceed 60 pcu. There is a decrease on the A339 in the southbound direction due to traffic switching onto alternative routes such as the A34.

5.2.4 There is a localised switch of traffic from the B4494 Oxford Road approach to the A4 Bath Road/B4494 junction onto Castle Grove. This is due to reduction in the delay at the Dolman Road/A4 Bath Road junction. It must be stressed that this is a traffic modelling exercise and is unlikely to occur in reality given the nature of Castle Grove and the flows are relatively low in any case.

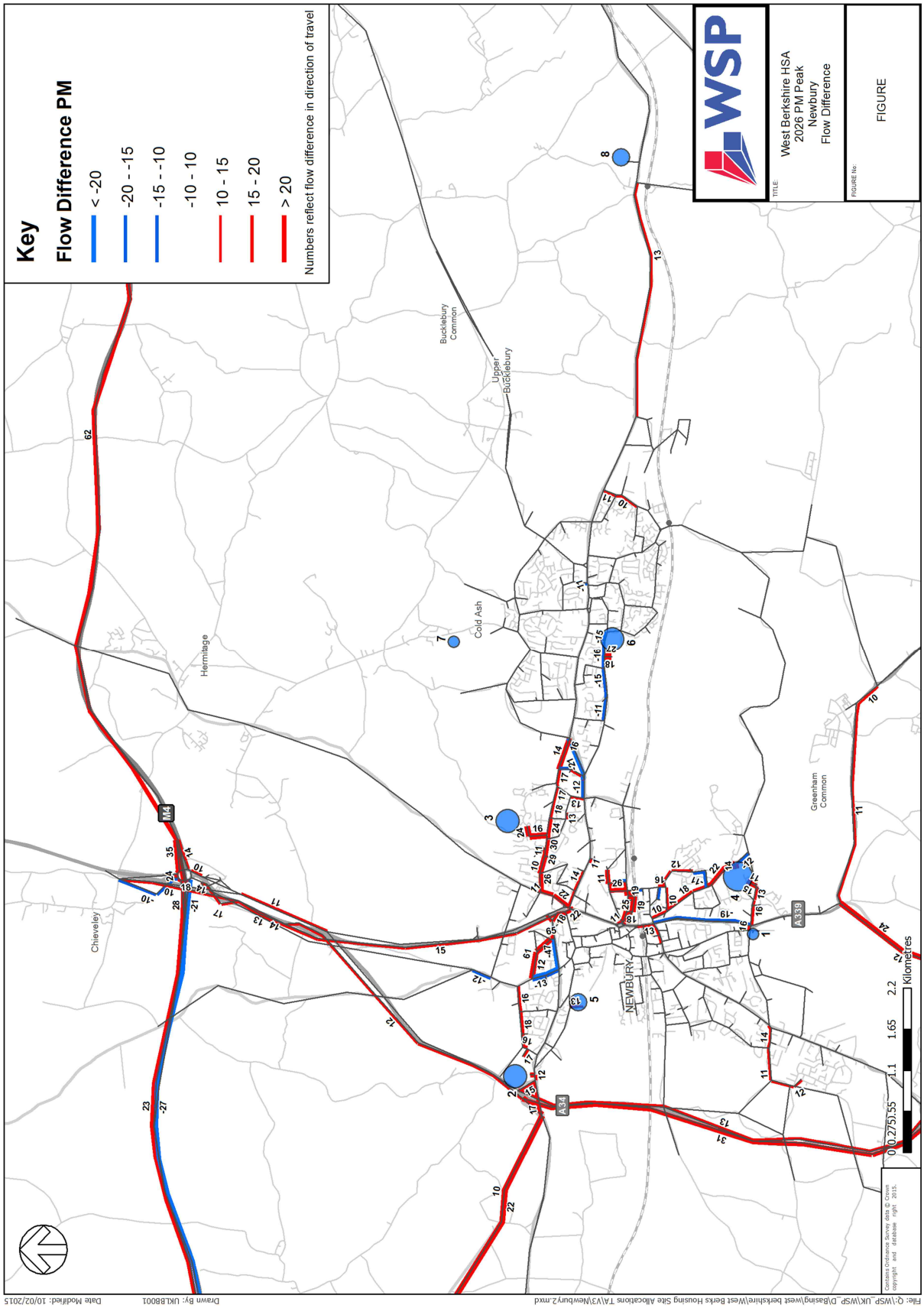

Figure 5.6 2026 traffic flow difference between Scenario 2 and Scenario 1 – PM peak

Junction performance

5.2.5 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

5.2.6 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken.

5.2.7 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

5.2.8 Figure 5.7 illustrates the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

5.2.9 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. The most noticeable changes in junction performance are predicted to be in areas with the highest flow differences as described in the 2026 traffic flows section.

5.2.10 Overall, the absolute changes in VoC statistics between the two scenarios are not extensive. Within the centre of Newbury there are no significant changes in the VoC values with those junction turning movements showing a VoC greater than 85% still showing VoC values greater than 85%.

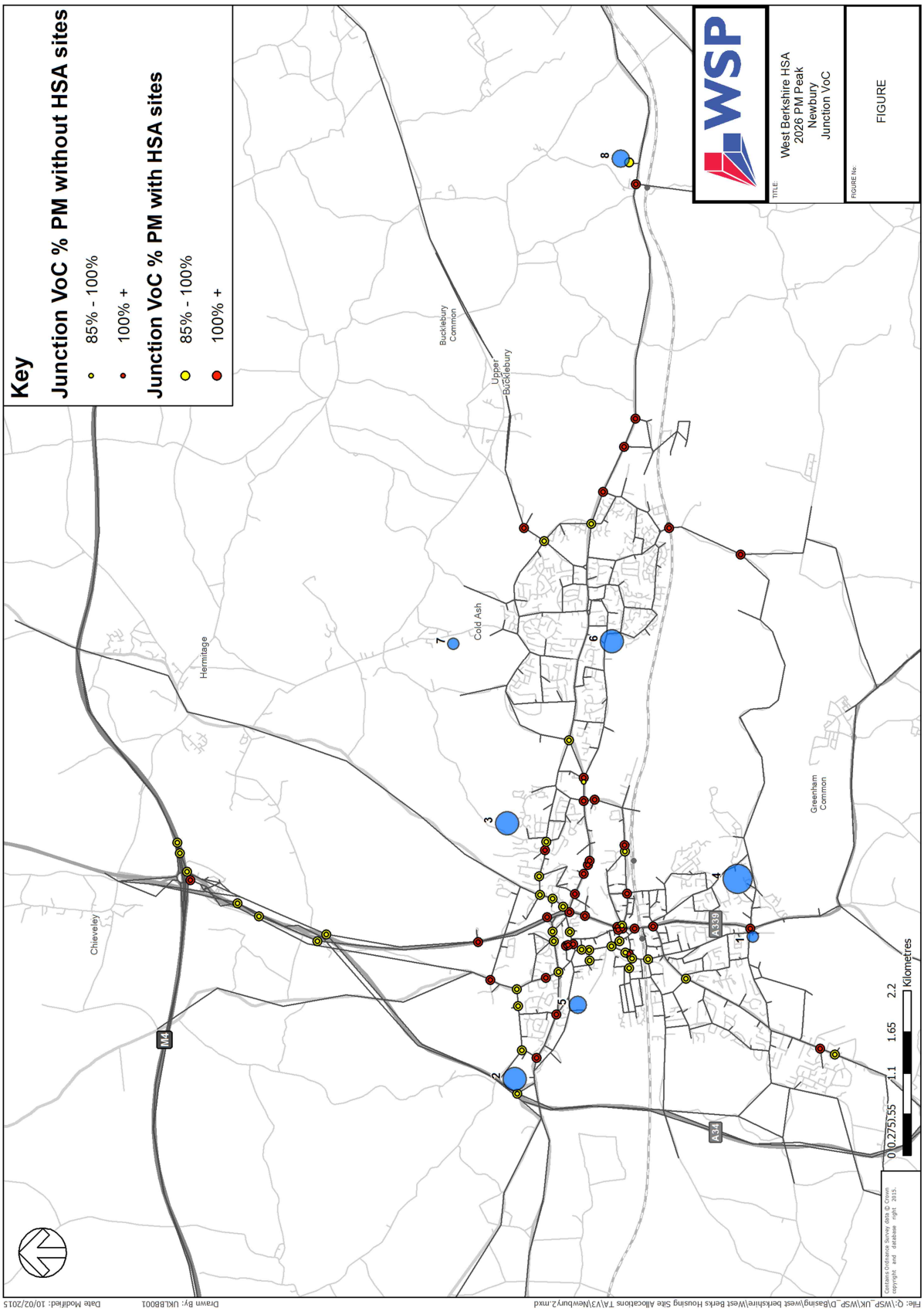

Figure 5.7 2026 junction VoC difference between Scenario 2 and Scenario 1 – PM peak

Link performance

5.2.11 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

5.2.12 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

5.2.13 Figure 5.8 and figure 5.9 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 in the Newbury area for the PM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment.

5.2.14 There are increases in the link VoC on the A339 through Newbury and on the A4 Bath Road between the A4 Bath Road/Piper Way junction and the A4 Bath Road/A340 junction when the development is included. These are only small increases and are already over-capacity without the HSA developments.

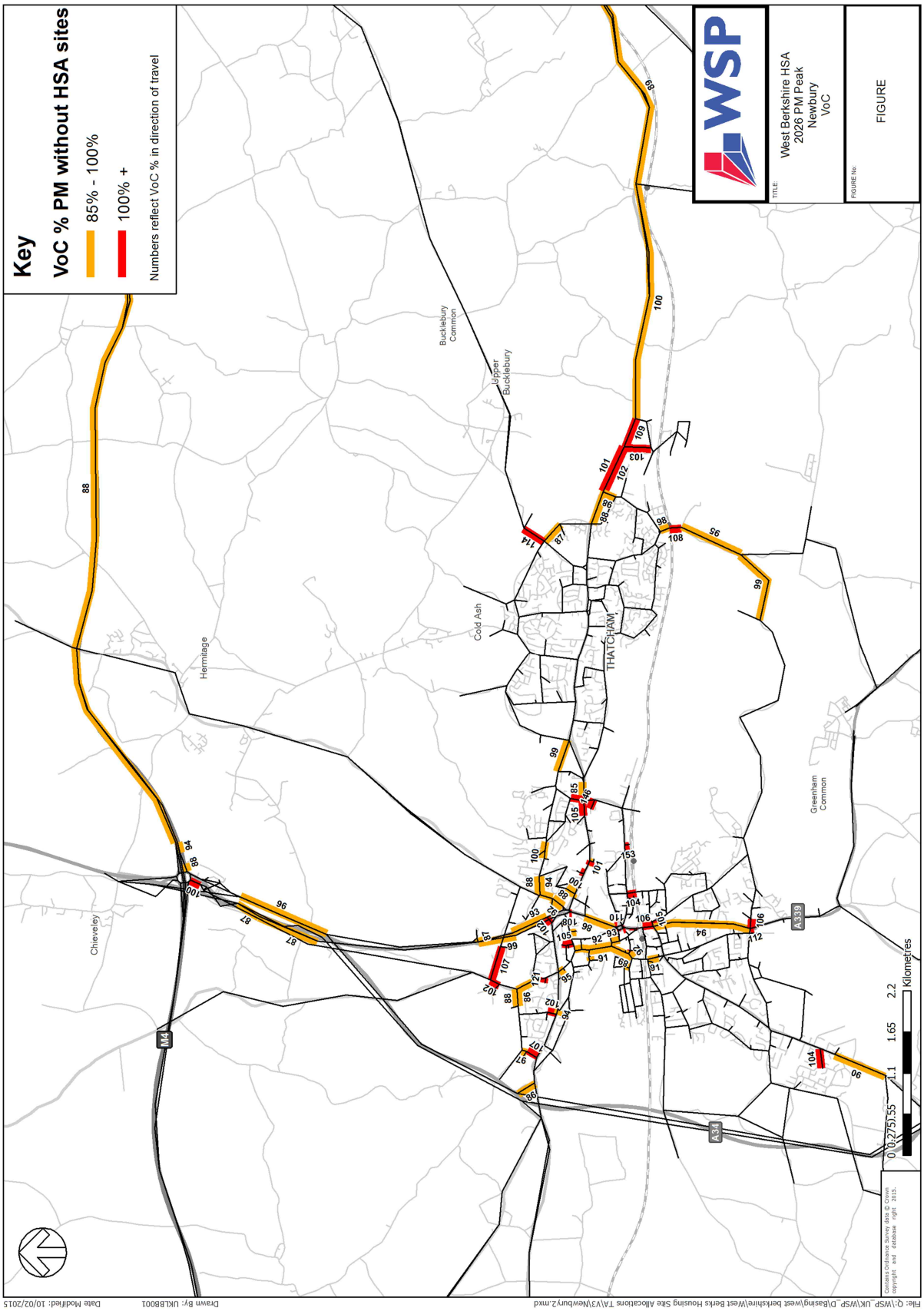

Figure 5.8 2026 link VoC for Scenario 1 – PM peak

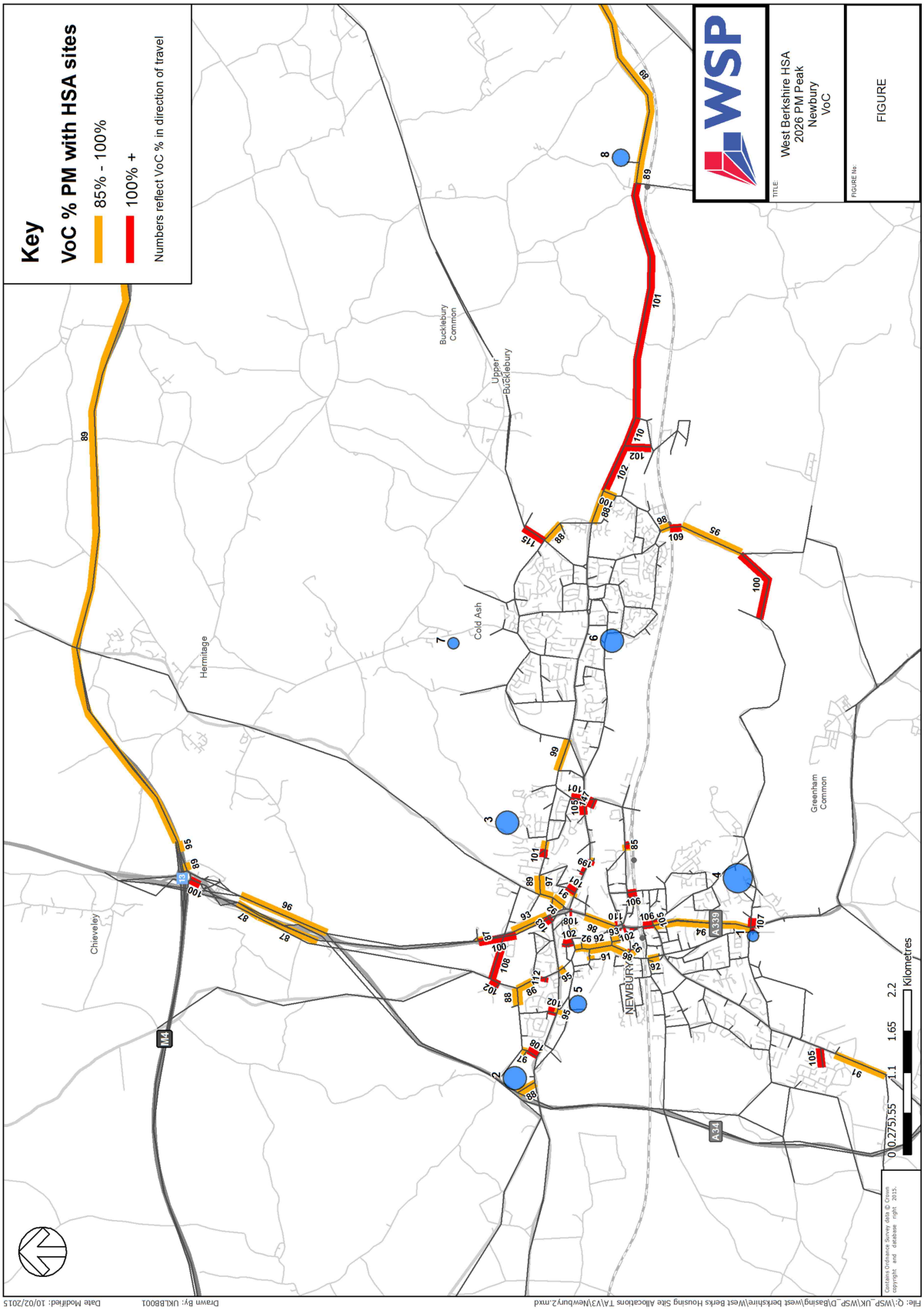

Figure 5.9 2026 link VoC for Scenario 2 – PM peak

6 Theale – Site 9 to Site 12 (All sites)

6.1 AM peak (08:00-09:00)

2026 traffic flows

6.1.1 Figure 6.1 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 2 for the AM peak. The difference in flows is shown in passenger car units (pcu) and any difference less than 10 pcu is not shown. The red bands represent an increase in traffic in Scenario 2 (with HSA sites) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

6.1.2 The additional trips due to the HSA are based on the worst case scenario as all four HSA developments in the Theale area have been included.

6.1.3 The highest flow increase in the district occurs in the Theale area as shown on figure 6.1 where due to the concentration of the four HSA developments increases of up to 80 pcu are seen on the approach to the M4 Junction 12.

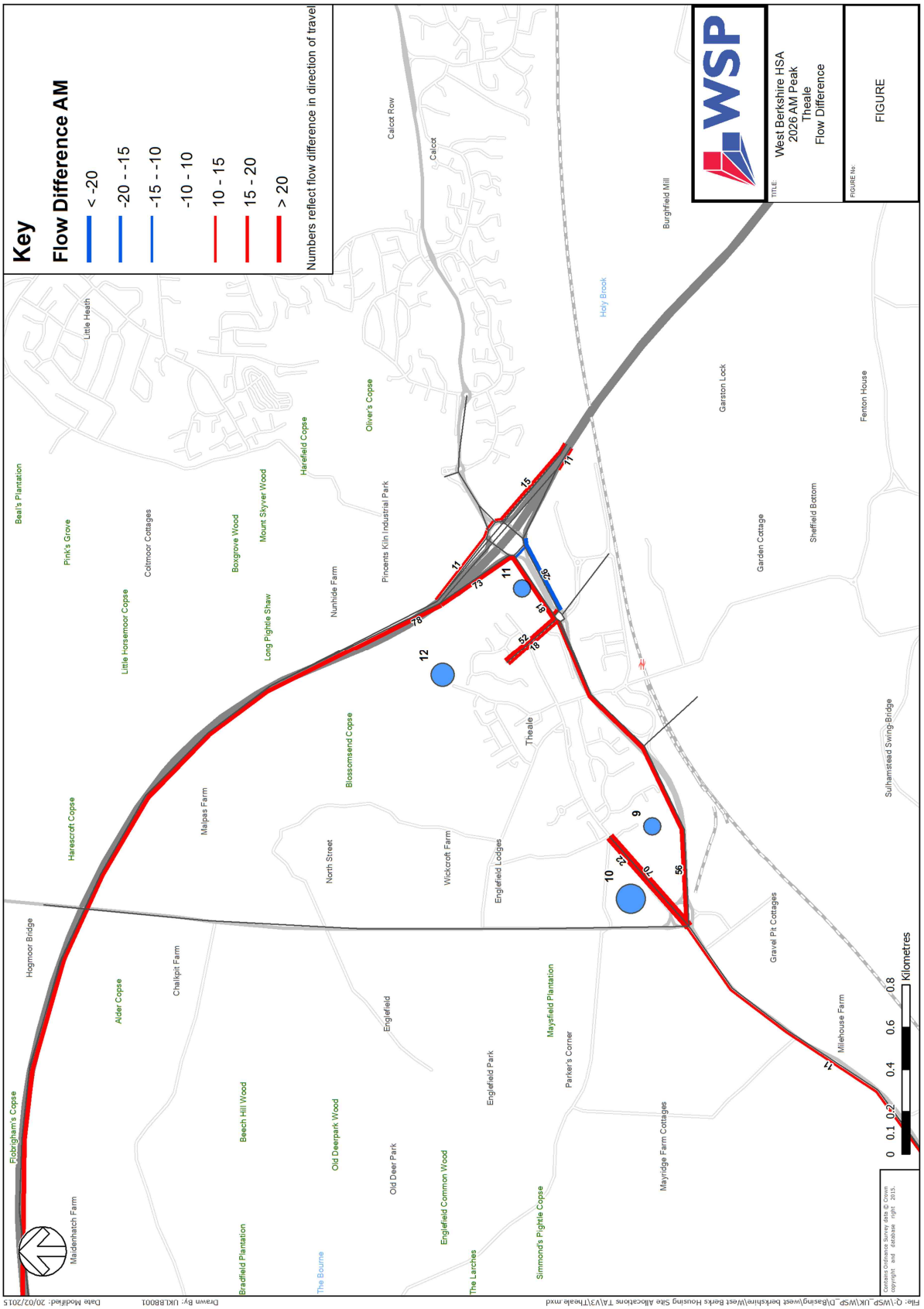

Figure 6.1 2026 traffic flow difference between Scenario 2 and Scenario 1 – AM peak

Junction performance

6.1.4 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

6.1.5 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken.

6.1.6 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

6.1.7 Figure 6.2 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

6.1.8 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios.

6.1.9 Overall, the absolute changes in VoC statistics between the two scenarios are not extensive. There is blocking back on the circulatory arm of the M4 Junction 12 which accounts for the increase in the VoC shown on figure 6.2 however adjustments to the signal timings at the junction could be made which would potentially remove this. The Theale area shows an increase in the VoC from 82% to 86% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout as shown on figure 6.2.

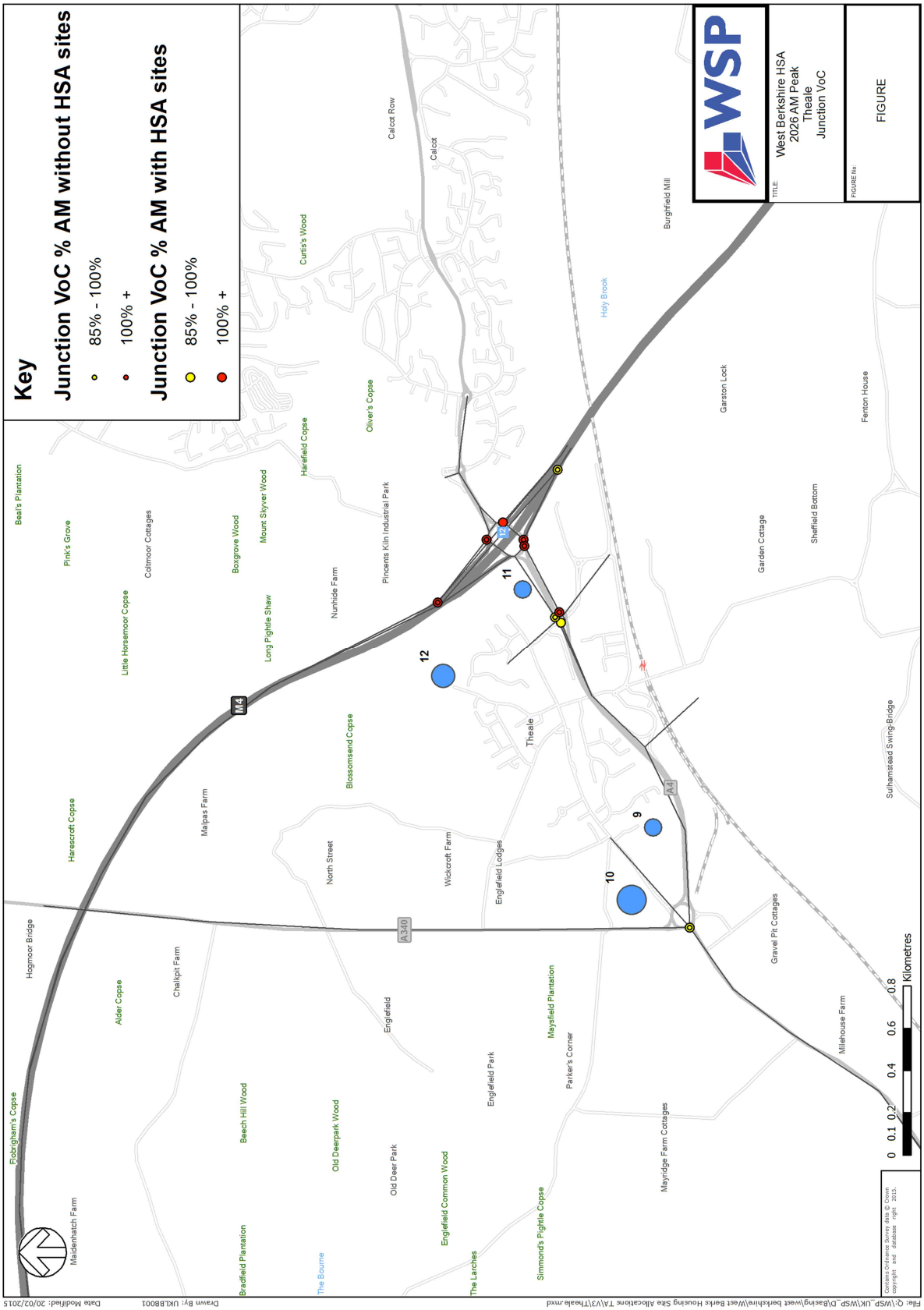

Figure 6.2 2026 junction VoC difference between Scenario 2 and Scenario 1 – AM peak

Link performance

6.1.10 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

6.1.11 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

6.1.12 Figure 6.3 and figure 6.4 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 in the Theale area for the AM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment. These are minor increases and the links that are shown to be over-capacity are already over-capacity without the HSA developments.

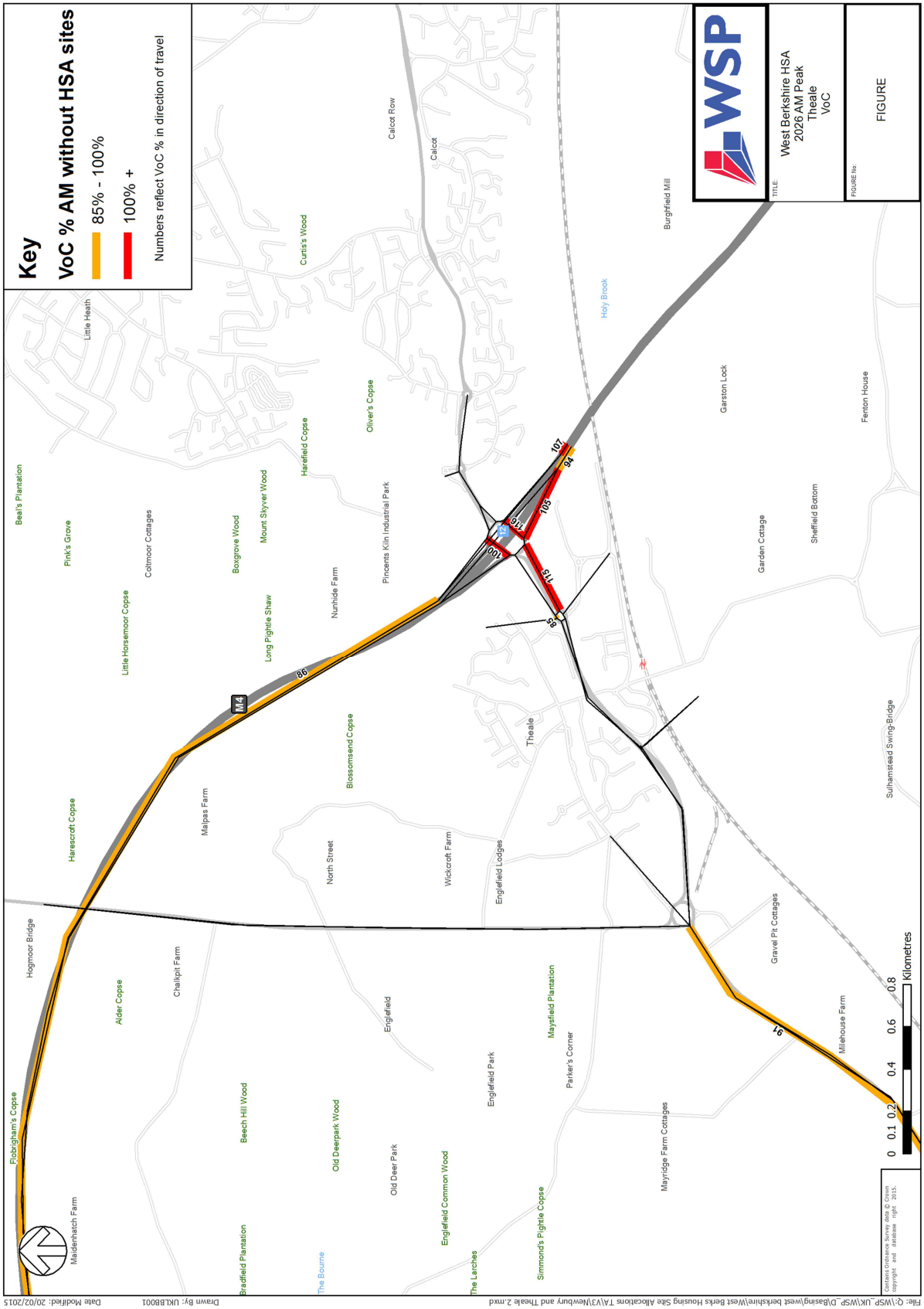

Figure 6.3 2026 link VoC for Scenario 1 – AM peak

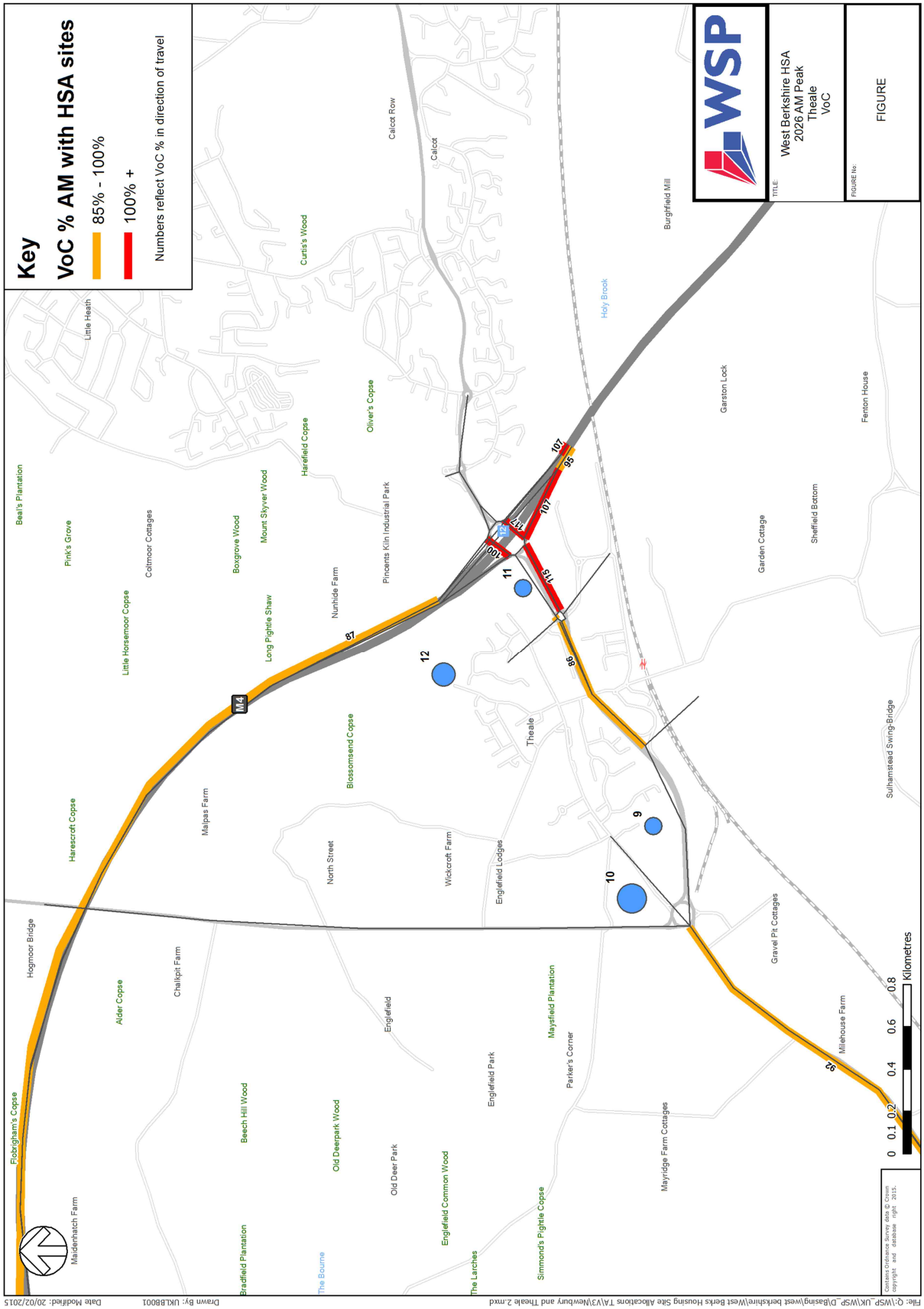

Figure 6.4 2026 link VoC for Scenario 2 – AM peak

6.2 PM peak (17:00-18:00)

2026 traffic flows

6.2.1 Figure 6.5 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 2 for the PM peak. The difference in flows is shown in passenger car units (pcu). The red bands represent an increase in traffic in Scenario 2 (with HSA sites) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

6.2.2 The increase in the directional flow on the majority of the roads is not predicted to exceed 60 pcu. Due to the concentration of four HSA development sites in a relatively small area Theale is likely to see the biggest increase in flow as shown on figure 6.5.

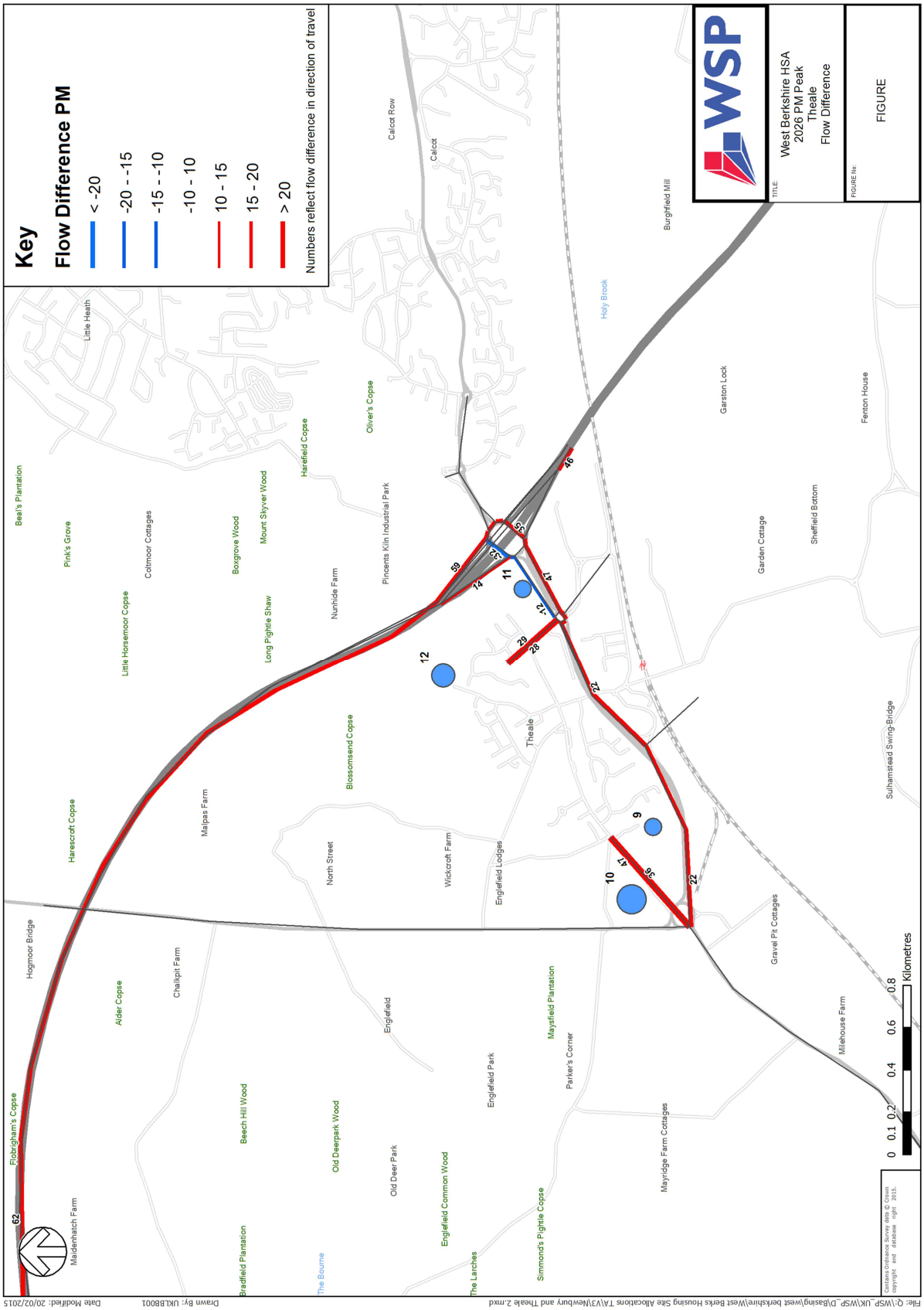

Figure 6.5 2026 traffic flow difference between Scenario 2 and Scenario 1 – PM peak

Junction performance

6.2.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

6.2.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken.

6.2.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

6.2.6 Figure 6.6 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

6.2.7 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. The most noticeable changes in junction performance are predicted to be in areas with the highest flow differences as described in the 2026 traffic flows section.

6.2.8 Overall, the absolute changes in VoC statistics between the two scenarios are not extensive. The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout.

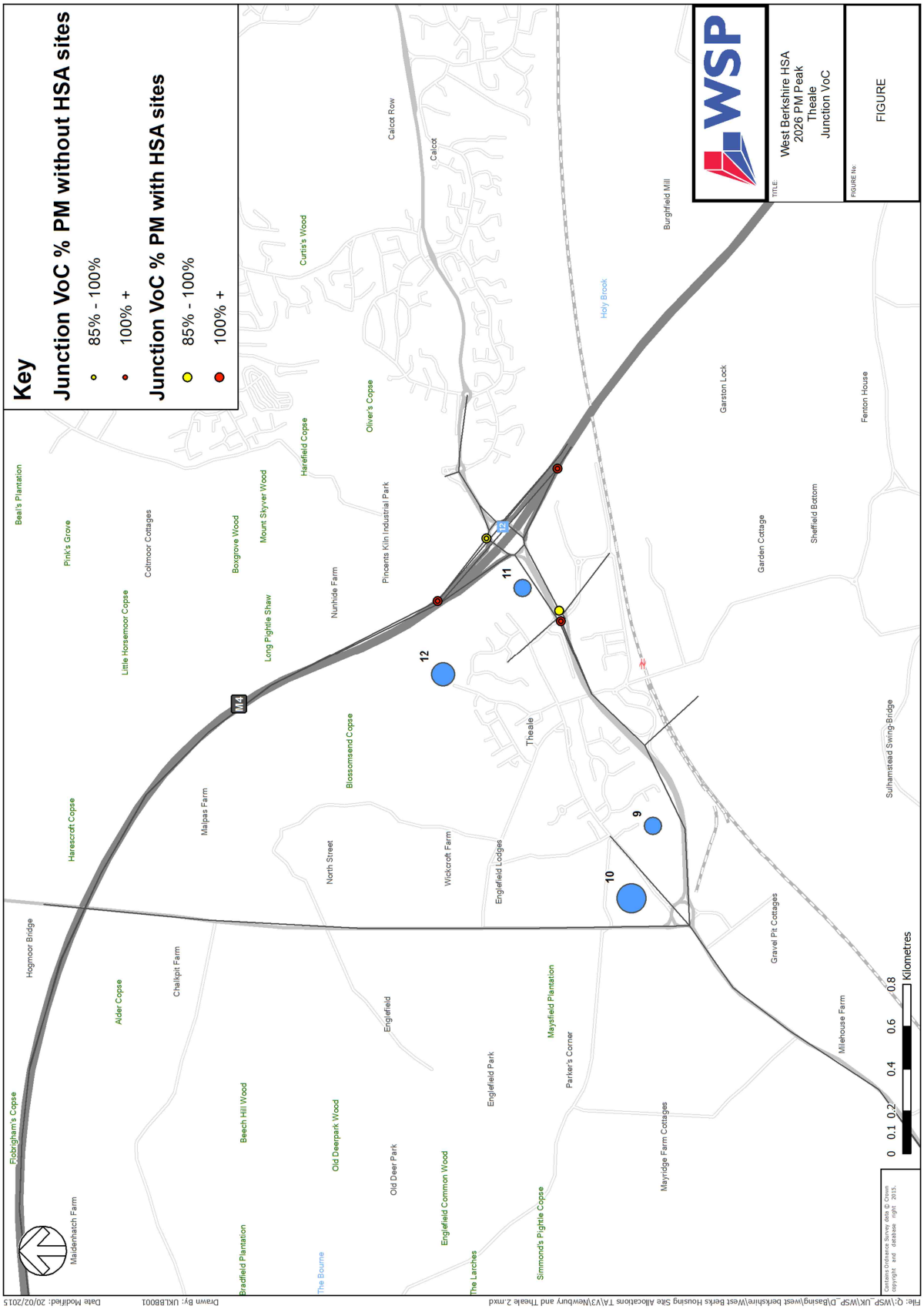

Figure 6.6 2026 junction VoC difference between Scenario 2 and Scenario 1 – PM peak

Link performance

6.2.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

6.2.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

6.2.11 Figure 6.7 and figure 6.8 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 2 in the Theale area for the PM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment.

6.2.12 The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout. There is an increase in the VoC from 121% to 126% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout. This is due to increased right-turning traffic into Hoad Way to access HSA site 11 and site 12.

6.2.13 These are minor increases and the links that are shown to be over-capacity are already over-capacity without the HSA developments.

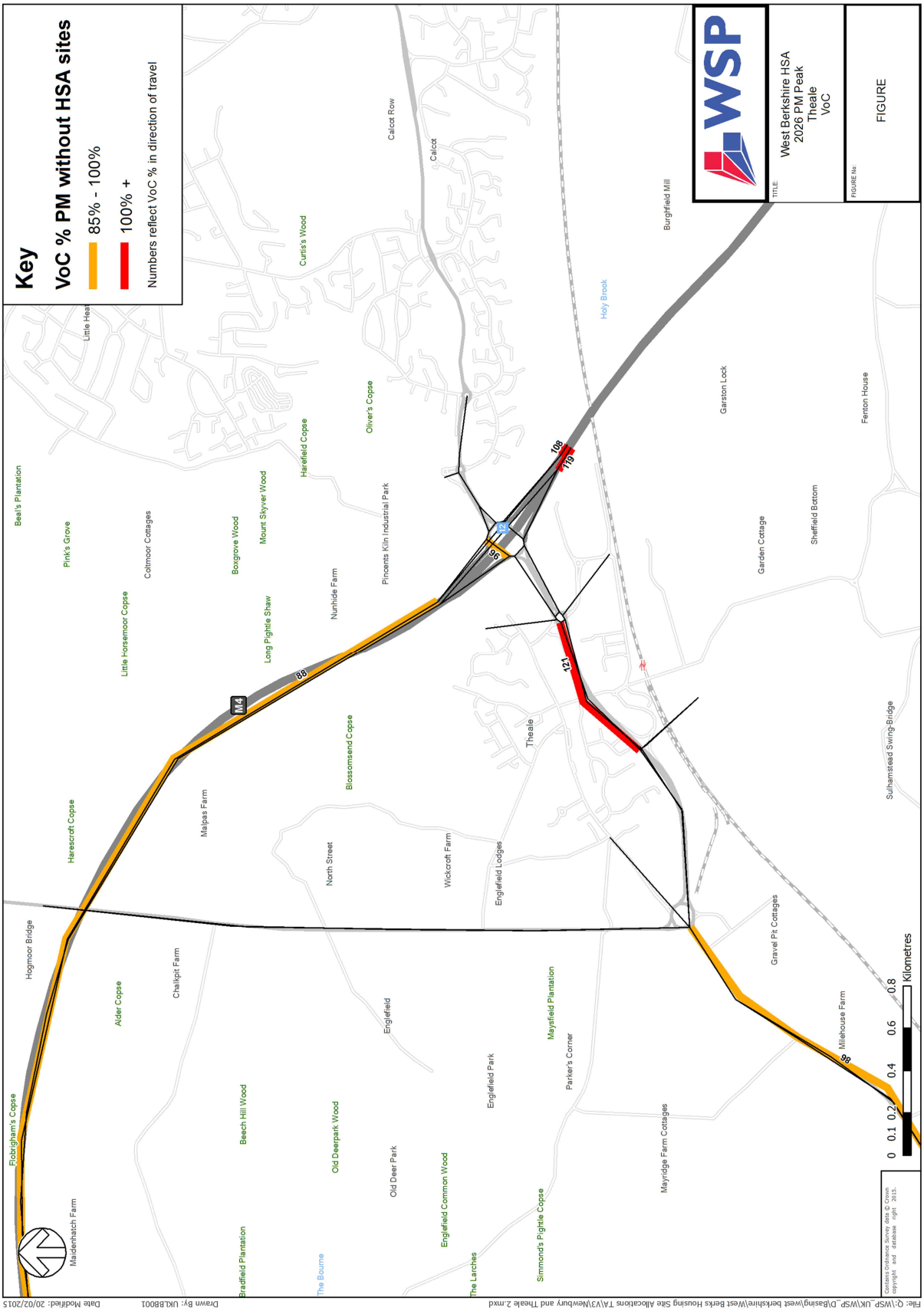

Figure 6.7 2026 link VoC for Scenario 1 – PM peak

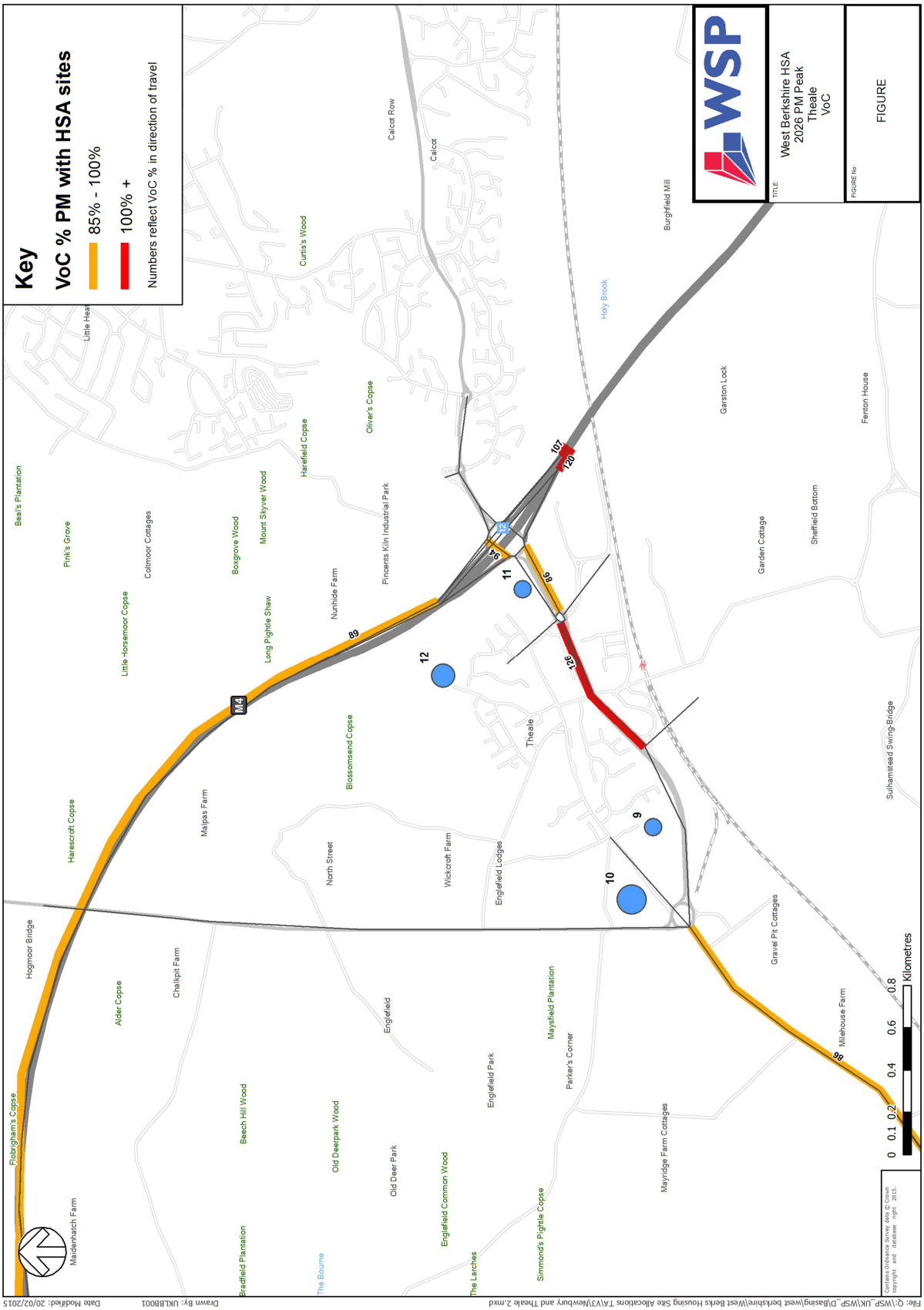

Figure 6.8 2026 link VoC for Scenario 2 – PM peak

7 Scenario 3: Theale – Site 9 and Site 10 (Western sites)

7.1 AM peak (08:00-09:00)

2026 traffic flows

7.1.1 Figure 7.1 show the impact of HSA site 9 and site 10 on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 3 for the AM peak. The difference in flows is shown in passenger car units (pcu) and any difference less than 10 pcu is not shown. The red bands represent an increase in traffic in Scenario 3 (with HSA site 9 and site 10) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

7.1.2 There are flow increases of up to 70 pcu with the addition of HSA site 9 and site 10 which are accessed from The Green at the A340 /A4 Bath Road roundabout. There are increases in flow of up to 60 pcu on the eastbound approach to the M4 Junction.

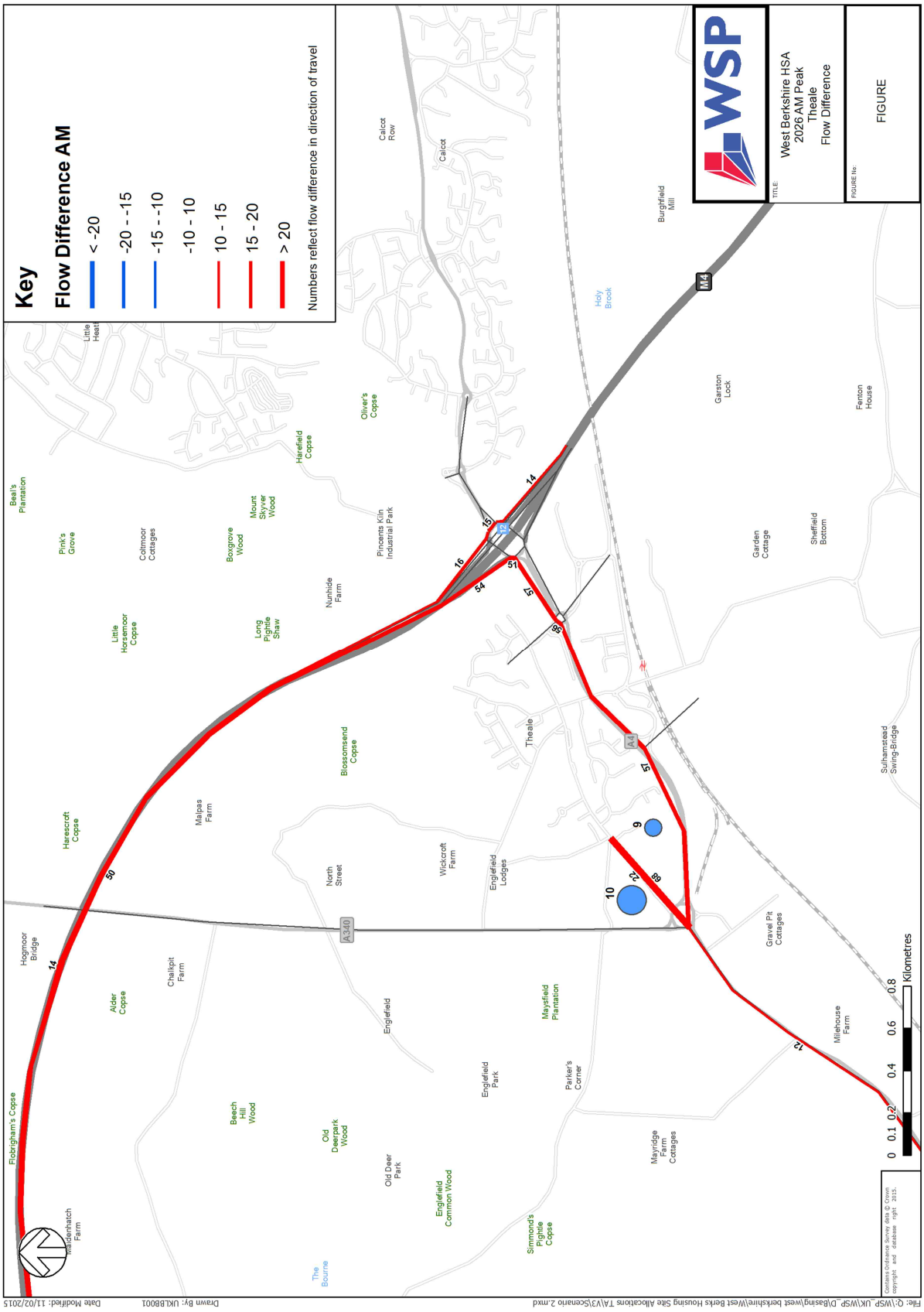

Figure 7.1 2026 traffic flow difference between Scenario 3 and Scenario 1 – AM peak

Junction performance

7.1.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

7.1.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 2 (with HSA sites) undertaken.

7.1.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

7.1.6 Figure 7.2 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 3 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

7.1.7 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios.

7.1.8 Overall, the absolute changes in VoC statistics between the two scenarios are not extensive. There is blocking back on the circulatory arm of the M4 Junction 12 which accounts for the increase in the VoC shown on figure 6.2 however adjustments to the signal timings at the junction could be made which would potentially remove this. The Theale area shows an increase in the VoC from 82% to 85% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout as shown on figure 7.2.

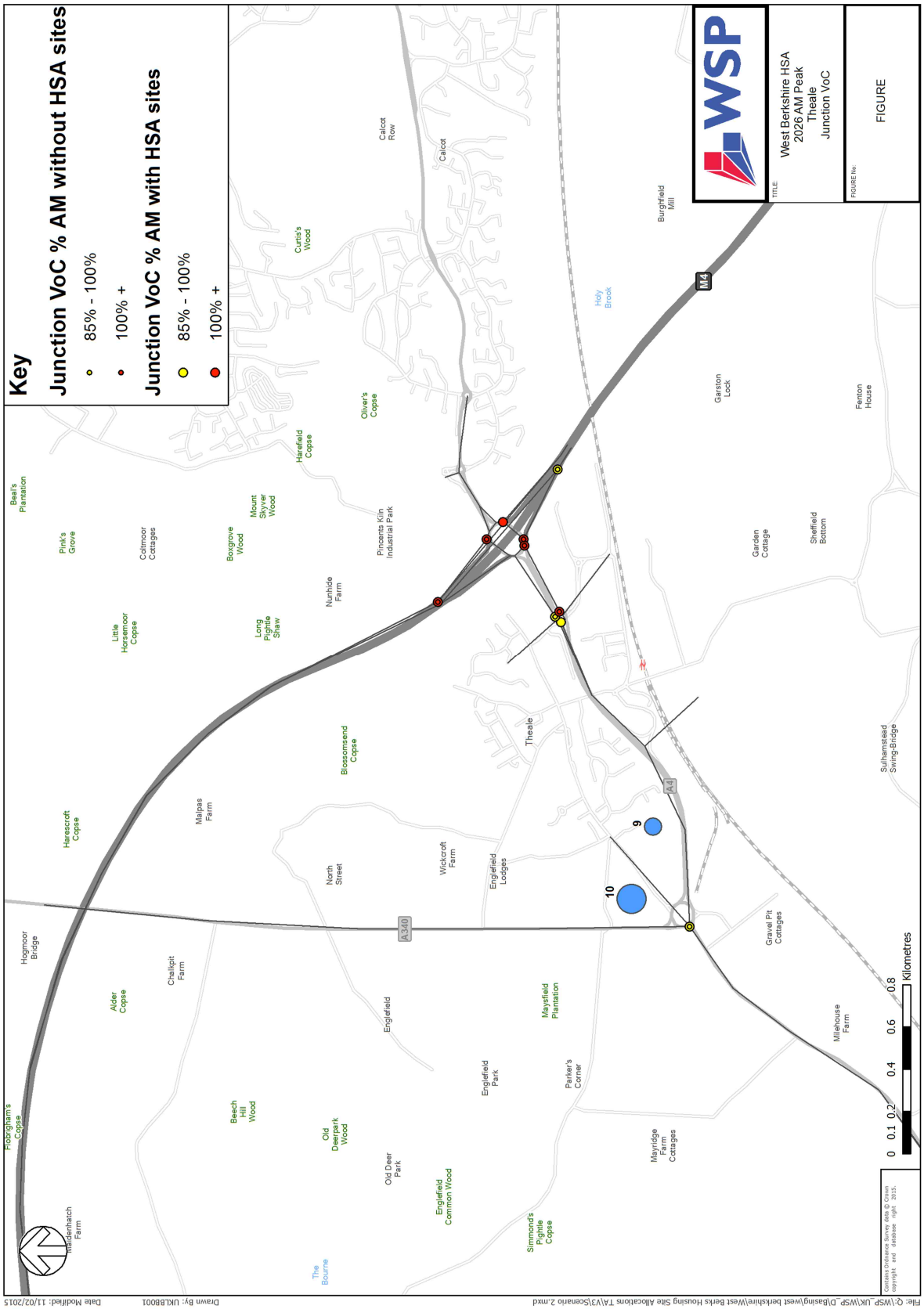

Figure 7.2 2026 junction VoC difference between Scenario 3 and Scenario 1 – AM peak

Link performance

7.1.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

7.1.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 3 (with HSA site 9 and site 10). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

7.1.11 Figure 7.3 and figure 7.4 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 3 in the Theale area for the AM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment. These are minor increases and the links that are shown to be over-capacity are already over-capacity without the HSA developments.

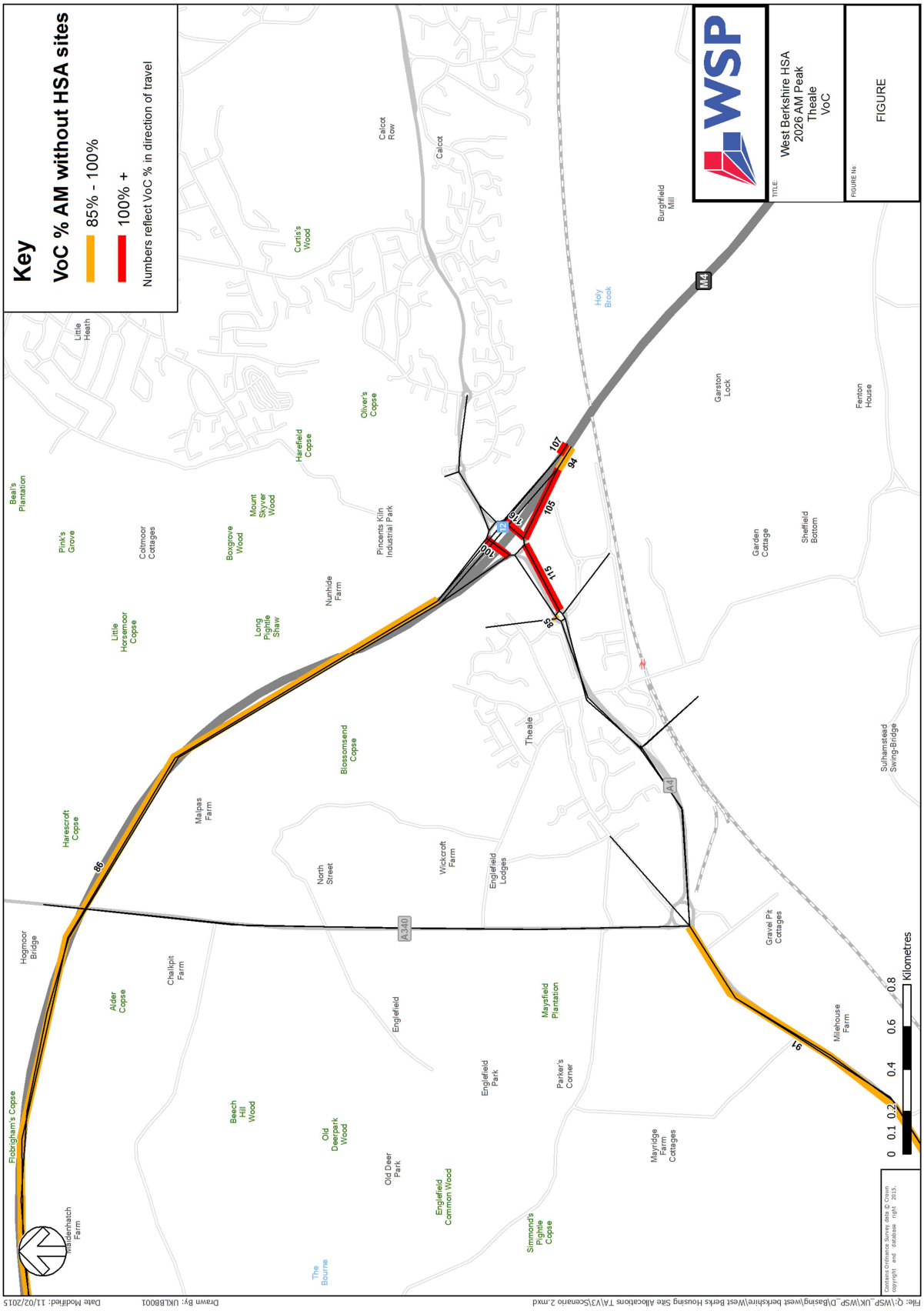

Figure 7.3 2026 link VoC for Scenario 1 – AM peak

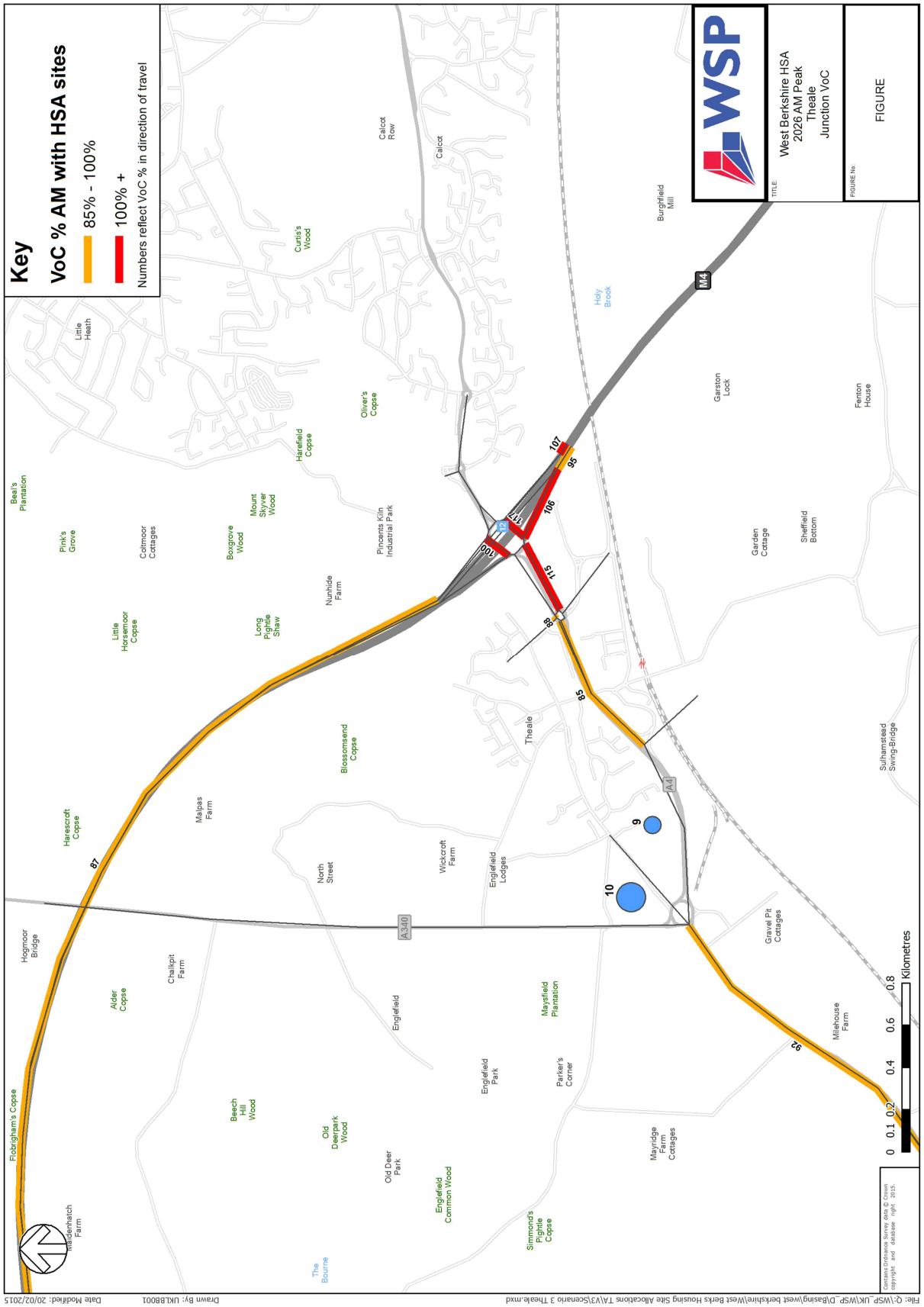

Figure 7.4 2026 link VoC for Scenario 3 – AM peak

7.2 PM peak (17:00-18:00)

2026 traffic flows

7.2.1 Figure 7.5 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 3 for the PM peak. The difference in flows is shown in passenger car units (pcu). The red bands represent an increase in traffic in Scenario 3 (with HSA site 9 and site 10) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

7.2.2 There are flow increases of up to 40 pcu with the addition of HSA site 9 and site 10 which are accessed from The Green at the A340 /A4 Bath Road roundabout. There are increases in flow of up to 35 pcu on the eastbound approach to the M4 Junction.

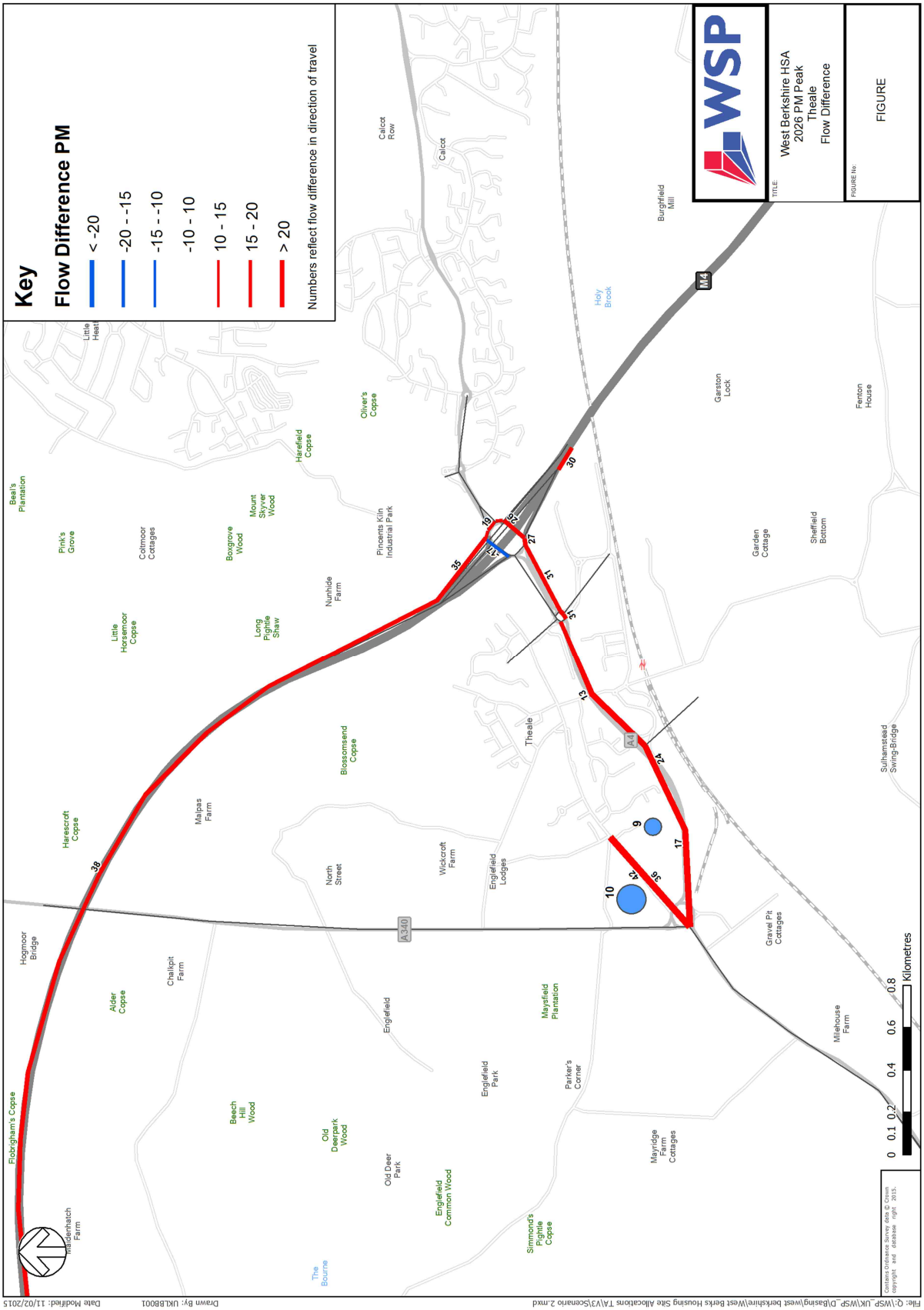

Figure 7.5 2026 traffic flow difference between Scenario 3 and Scenario 1 – PM peak

Junction performance

7.2.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

7.2.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 3 (with HSA site 9 and site 10) undertaken.

7.2.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

7.2.6 Figure 7.6 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 3 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

7.2.7 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. The most noticeable changes in junction performance are predicted to be in areas with the highest flow differences as described in the 2026 traffic flows section.

7.2.8 Overall, the absolute changes in VoC statistics between the Scenario 1 and Scenario 3 are not extensive. The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout.

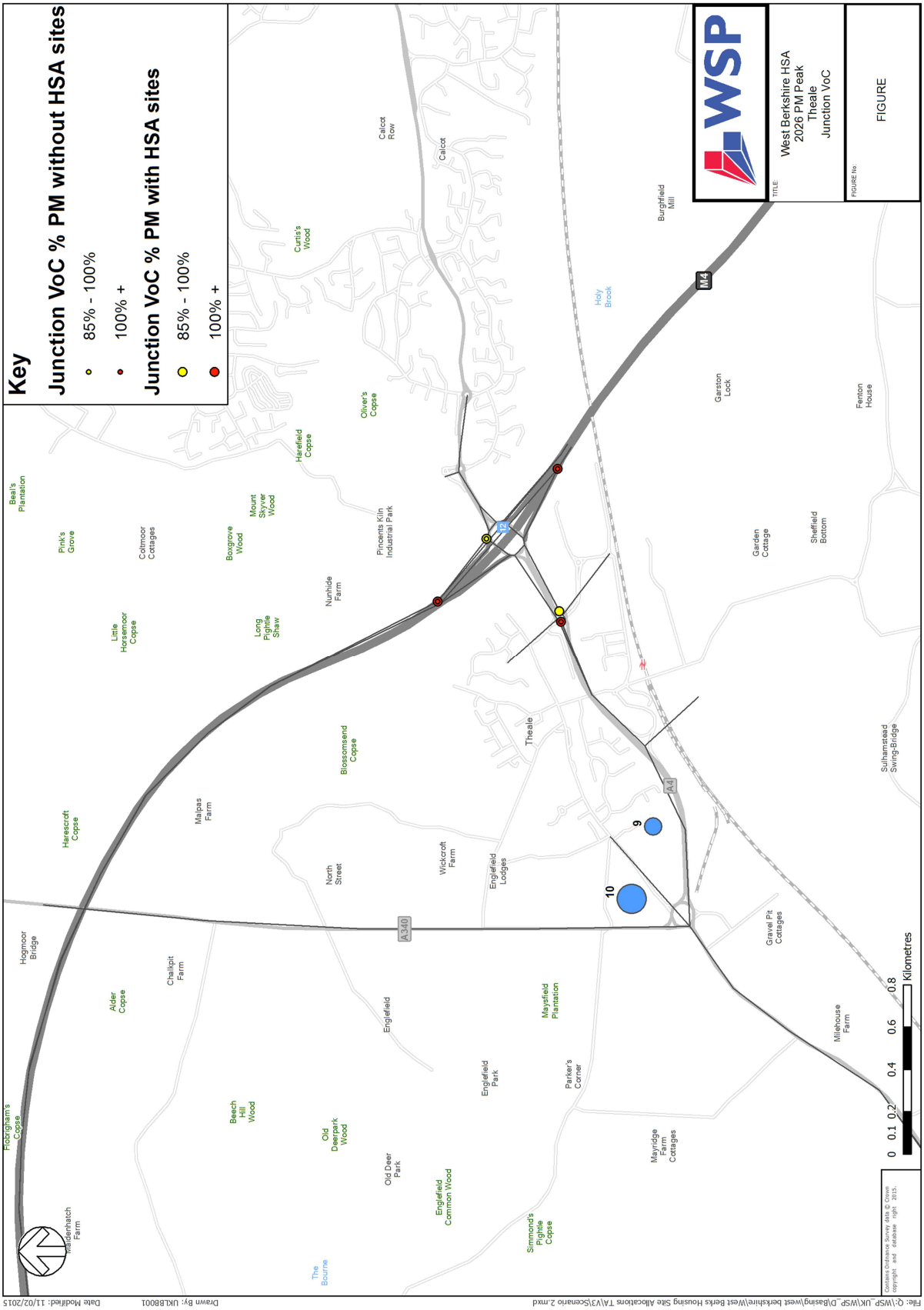

Figure 7.6 2026 junction VoC difference between Scenario 3 and Scenario 1 – PM peak

Link performance

7.2.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

7.2.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 3 (with HSA site 9 and site 10). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

7.2.11 Figure 7.7 and figure 7.8 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 3 in the Theale area for the PM peak.. Those links that are predicted to operate under 85% capacity are excluded from the assessment.

7.2.12 The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout. There is an increase in the VoC from 121% to 123% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout.

7.2.13 These are only small increases and are already over-capacity without the HSA developments.

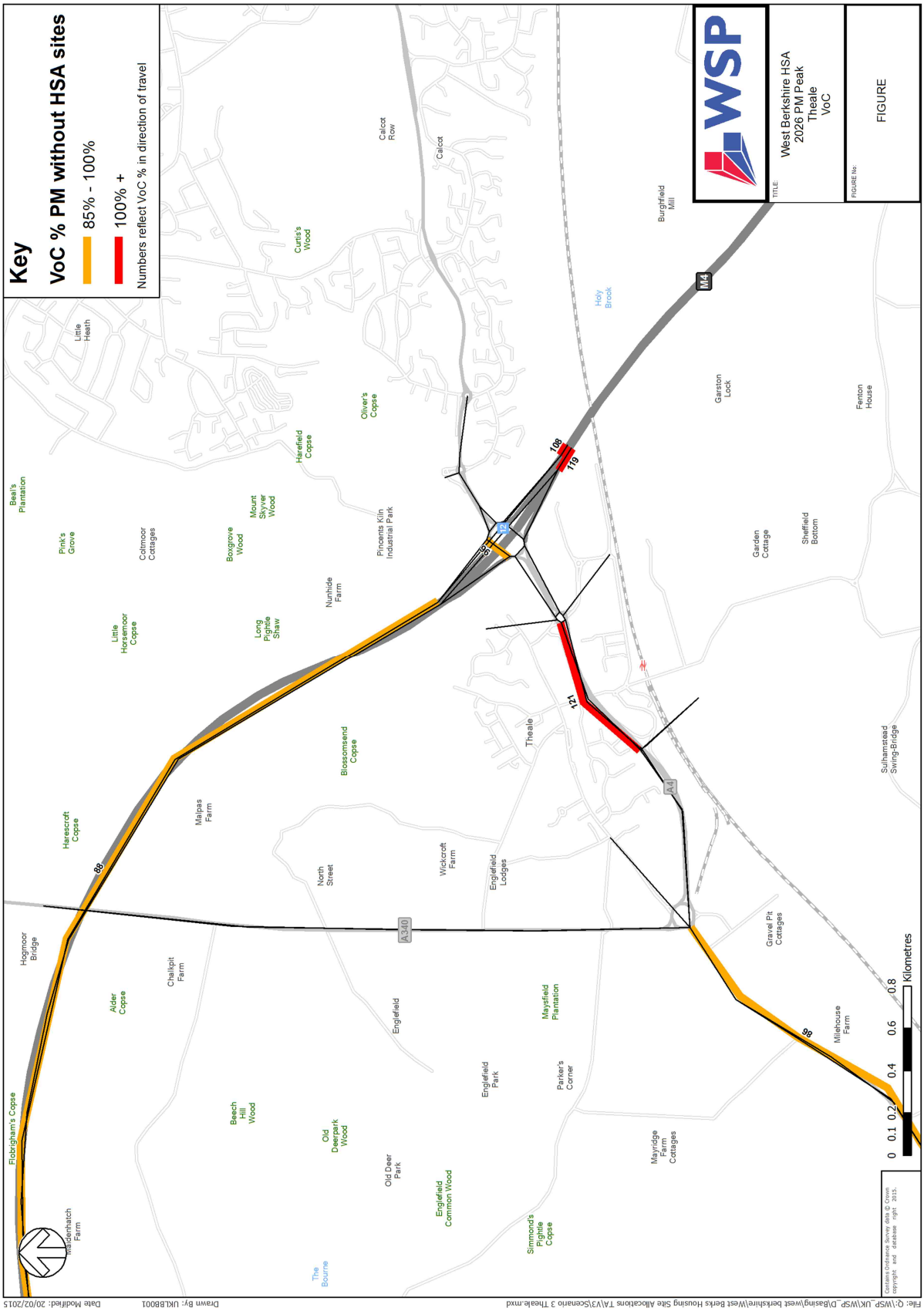

Figure 7.7 2026 link VoC for Scenario 1 – PM peak

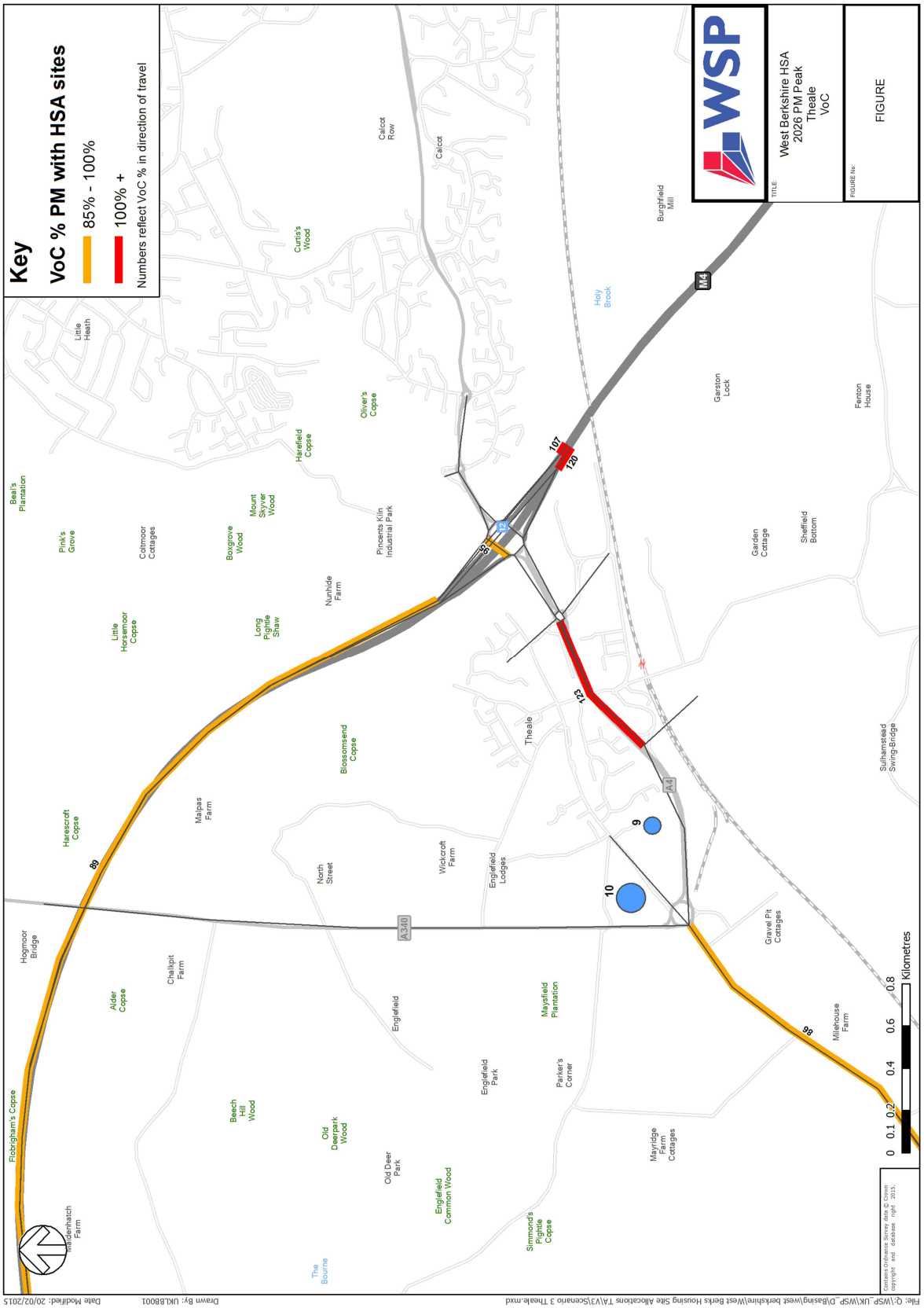

Figure 7.8 2026 link VoC for Scenario 3 – PM peak

8 Scenario 4: Theale – Site 11 and Site 12 (Eastern sites)

8.1 AM peak (08:00-09:00)

2026 traffic flows

8.1.1 Figure 8.1 show the impact of HSA site 11 and site 12 on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 4 for the AM peak. The difference in flows is shown in passenger car units (pcu) and any difference less than 10 pcu is not shown. The red bands represent an increase in traffic in Scenario 4 (with HSA site 11 and site 12) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

8.1.2 There are flow increases of up to 50 pcu with the addition of HSA site 11 and site 12 which are accessed from Hoad Way at the A4 Bath Raod/Arlington Business Park roundabout. There are increases in flow of up to 40 pcu on the eastbound approach to the M4 Junction.

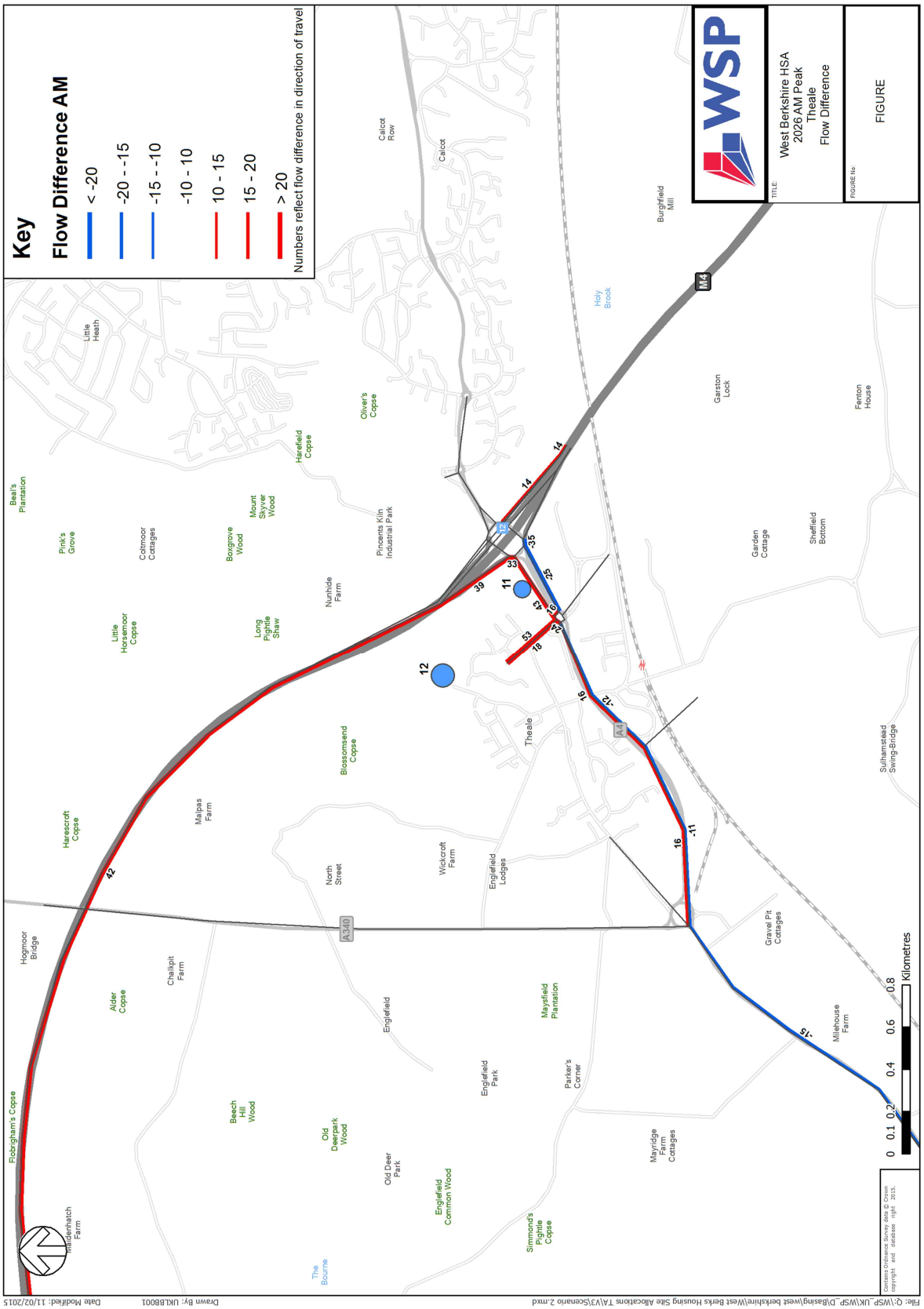

Figure 8.1 2026 traffic flow difference between Scenario 4 and Scenario 1 – AM peak

Junction performance

8.1.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and a further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

8.1.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 4 (with HSA site 11 and site 12) undertaken.

8.1.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

8.1.6 Figure 8.2 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 4 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

8.1.7 The effect of adding additional trips associated with HSA sites on the overall junction performance shows that those junctions where the VoC is over 85% without the HSA developments remain in the same category in both scenarios.

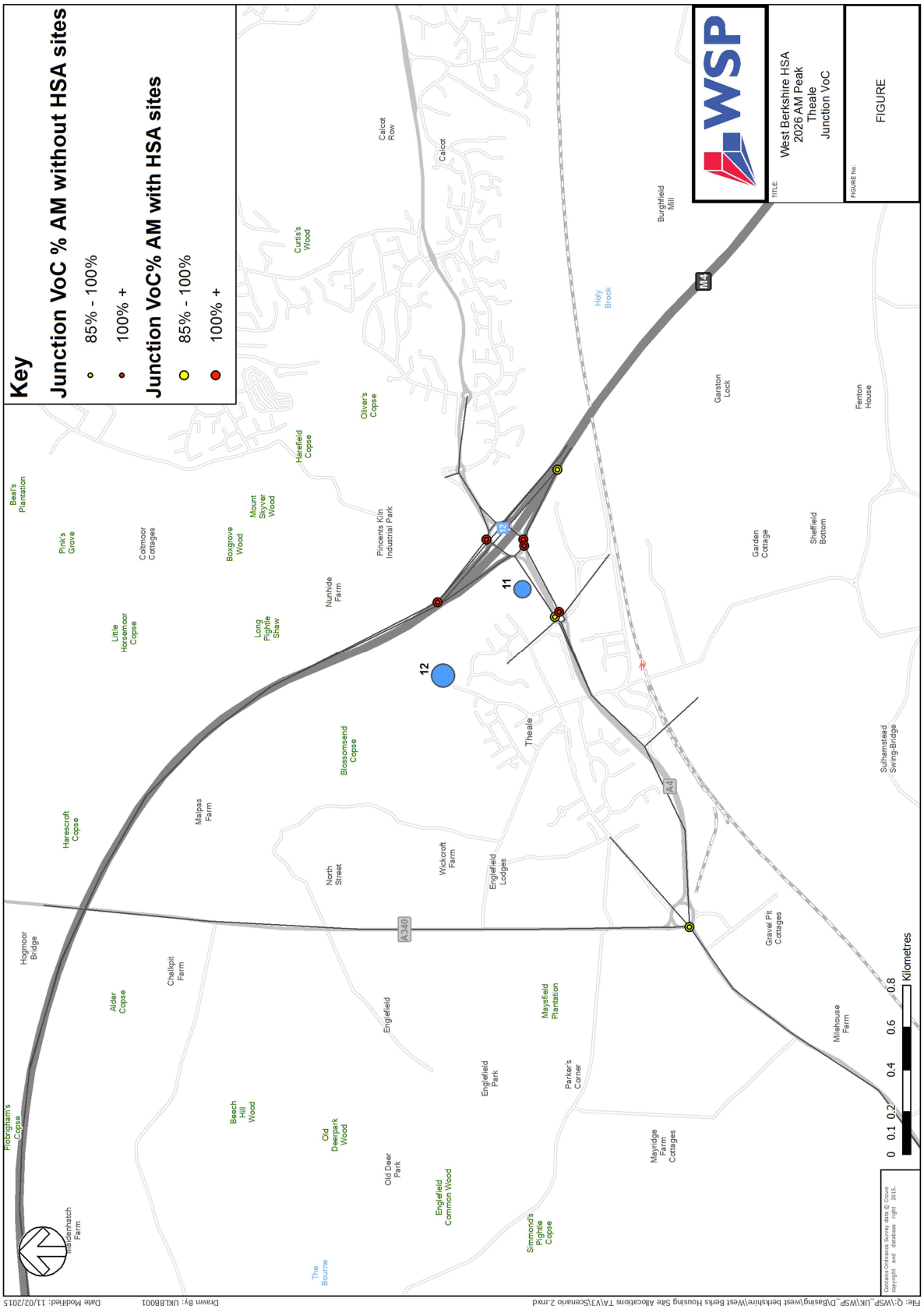

Figure 8.2 2026 junction VoC difference between Scenario 4 and Scenario 1 – AM peak

Link performance

8.1.8 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

8.1.9 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 4 (with HSA site 11 and site 12). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

8.1.10 Figure 8.3 and figure 8.4 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 4 in the Theale area for the AM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment. These are minor increases and the links that are shown to be over-capacity are already over-capacity without the HSA developments.

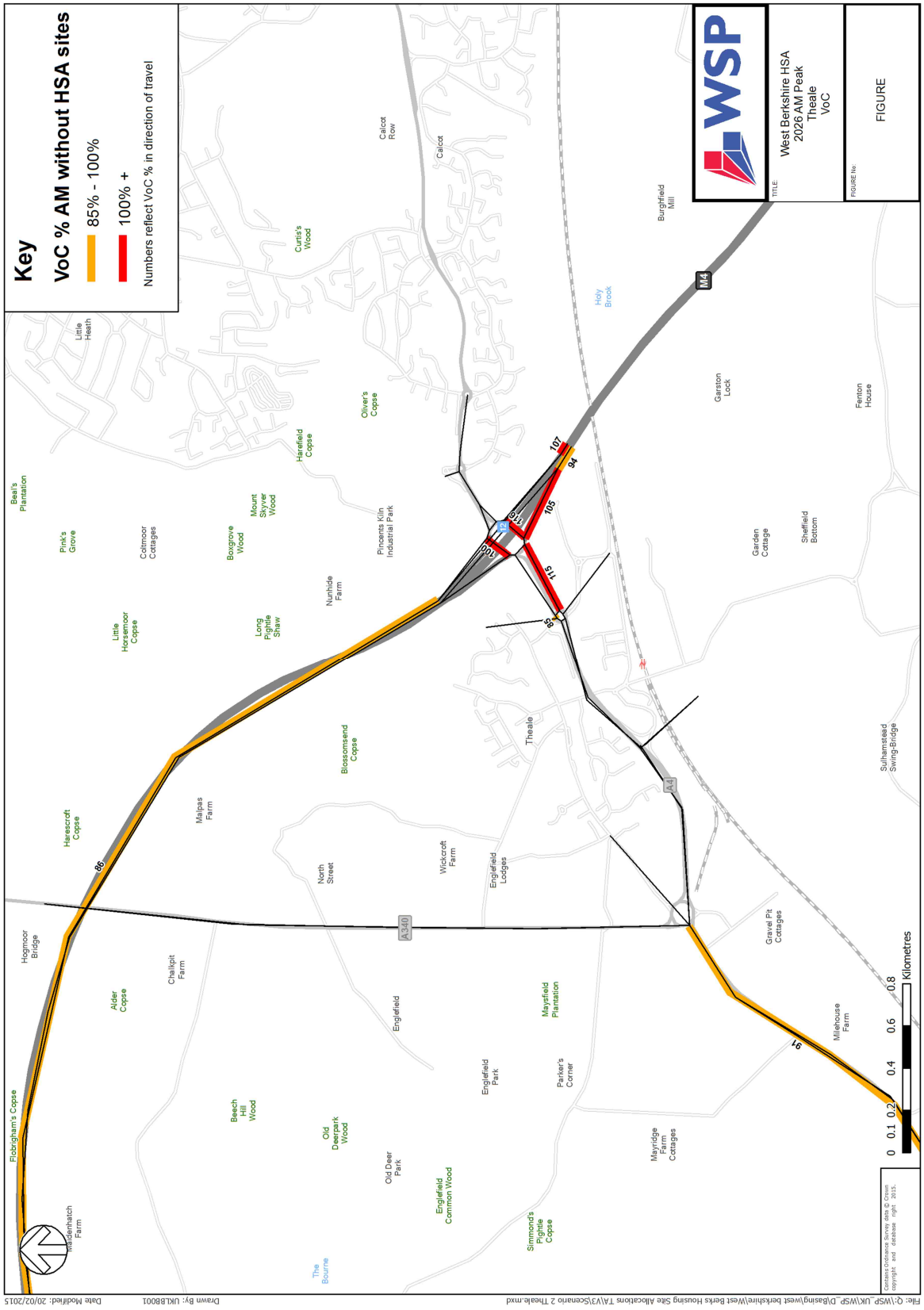

Figure 8.3 2026 link VoC for Scenario 1 – AM peak

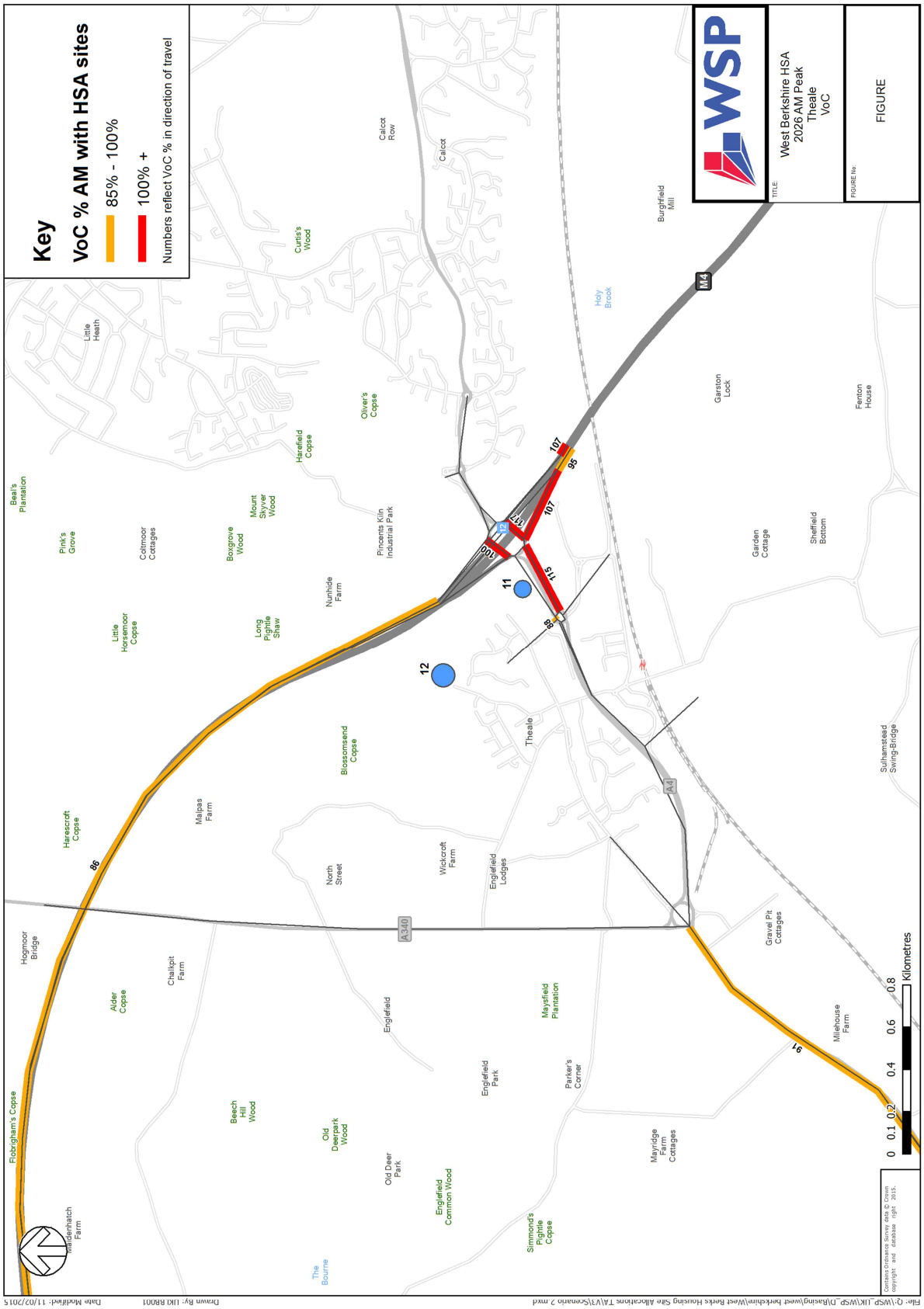

Figure 8.4 2026 link VoC for Scenario 4 – AM peak

8.2 PM peak (17:00-18:00)

2026 traffic flows

8.2.1 Figure 8.5 show the impact of HSA sites on flow levels by presenting the absolute difference in flows on key links between the Scenario 1 and Scenario 4 for the PM peak. The difference in flows is shown in passenger car units (pcu). The red bands represent an increase in traffic in Scenario 3 (with HSA site 11 and site 12) when compared to Scenario 1 whilst the blue bands indicate a decrease in traffic.

8.2.2 There are flow increases of up to 30 pcu with the addition of HSA site 11 and site 12 which are accessed from Hoad Way at the A4 Bath Road/Arlington Business Park roundabout. The largest increase in flow is 36 pcu on the eastbound approach to the M4 Junction.

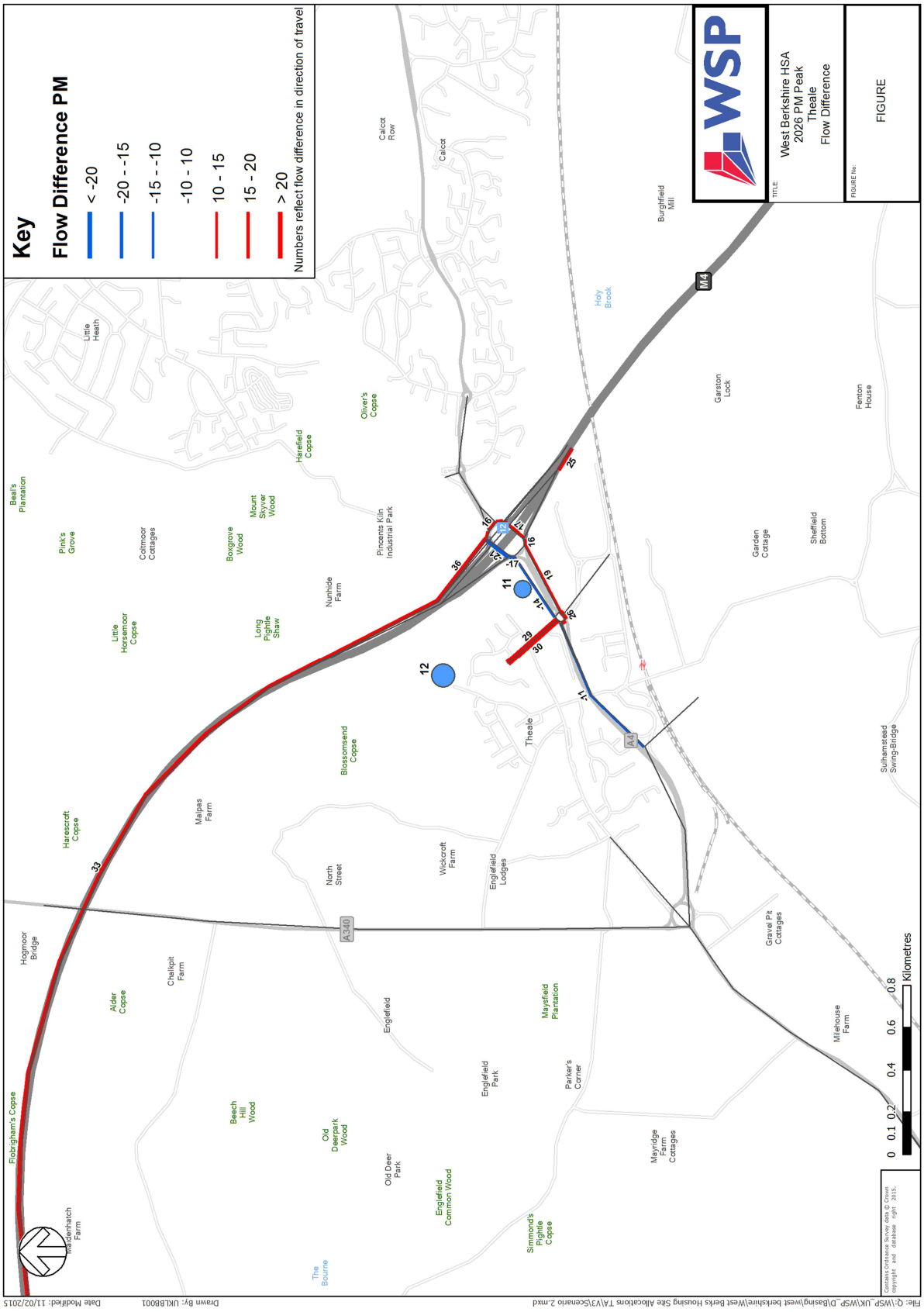

Figure 8.5 2026 traffic flow difference between Scenario 4 and Scenario 1 – PM peak

Junction performance

8.2.3 The junction performance assessment highlights junctions that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single junction. It should be noted that the junction operation assessment undertaken as part of this study intends to provide a high level assessment and further junction assessment using more localised modelling and specialised software (LinSig, Arcady, Picady) may be required.

8.2.4 To present the junction performance assessment results, the worst performing junction turning movements in terms of the Volume over Capacity (VoC) statistics were selected for every single junction and compared between Scenario 1 (without HSA sites) and Scenario 4 (with HSA site 11 and site 12) undertaken.

8.2.5 In general a VoC value of 85% and below indicates that a junction operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a junction operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the junction operates above capacity, resulting in queues and delays.

8.2.6 Figure 8.6 illustrate the junctions which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 4 respectively. Junctions that are predicted to operate under 85% capacity are excluded from the assessment.

8.2.7 The effect of adding additional trips associated with HSA sites on the overall junction performance is minimal with the majority of junctions remaining in the same category in both scenarios. The most noticeable changes in junction performance are predicted to be in areas with the highest flow differences as described in the 2026 traffic flows section.

8.2.8 Overall, the absolute changes in VoC statistics between Scenario 1 and Scenario 4 are not extensive. The Theale area shows an increase in the VoC from 84% to 85% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout.

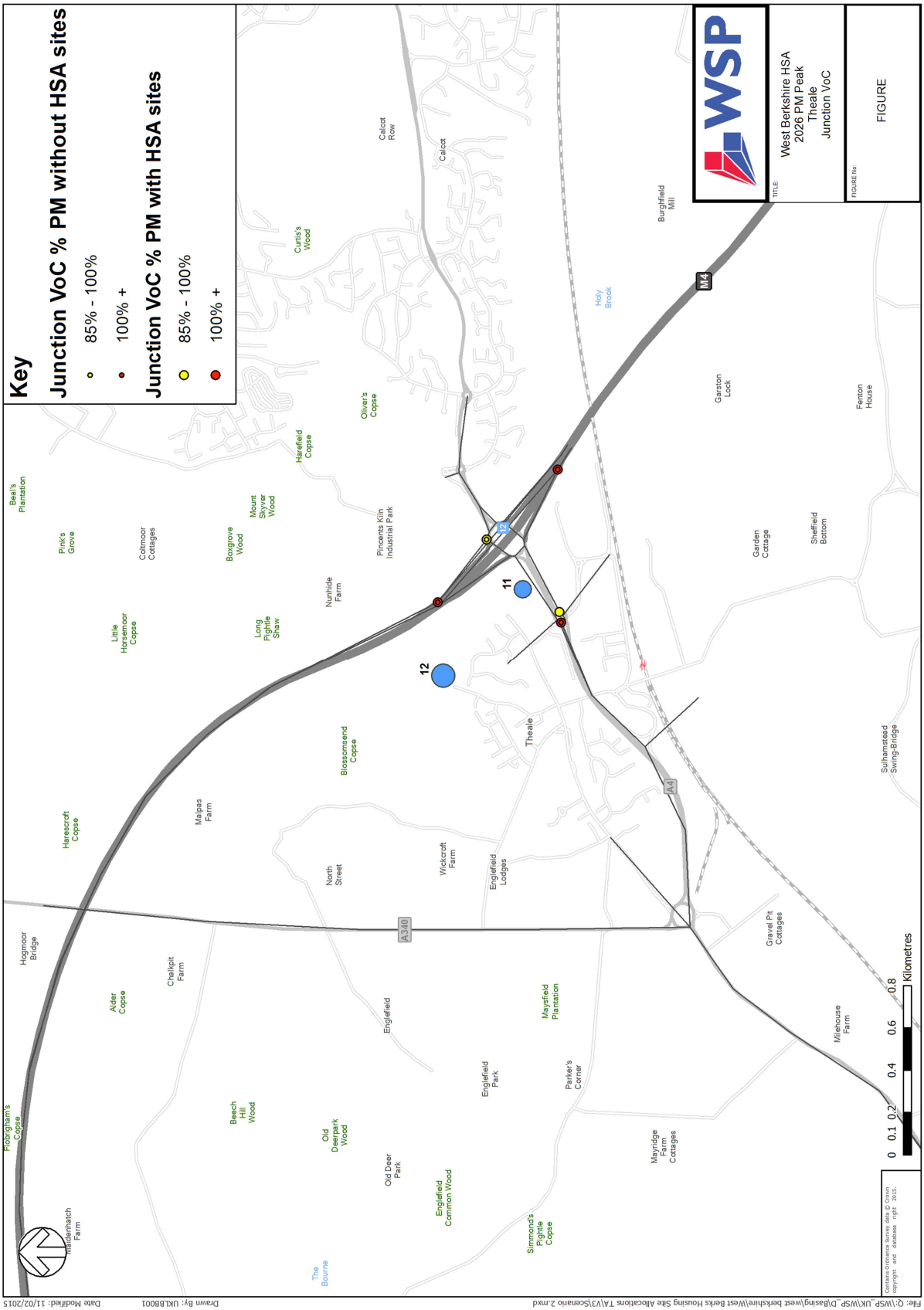

Figure 8.6 2026 junction VoC difference between Scenario 4 and Scenario 1 – PM peak

Link performance

8.2.9 The link performance assessment highlights those links that are predicted to operate above 85% capacity. It should be noted that this assessment is based on a strategic model, which has not been validated at every single link.

8.2.10 To present the junction performance assessment results, the worst performing links of the Volume over Capacity (VoC) statistics were selected and compared between Scenario 1 (without HSA sites) and Scenario 4 (with HSA site 11 and site 12). In general a VoC value of 85% and below indicates that a link operates within capacity and with spare capacity. A VoC value of between 85% and 100% means that a link operates within, but approaching, capacity with signs of queuing and delays whereas a VoC value of 100% and above indicates that the link operates above capacity, resulting in queues and delays.

8.2.11 Figure 8.7 and figure 8.8 illustrate the links which are forecast to operate at 85% capacity or above in Scenario 1 and Scenario 4 in the Theale area for the PM peak. Those links that are predicted to operate under 85% capacity are excluded from the assessment.

8.2.12 The Theale area shows an increase in the VoC from 84% to 86% on the A4 Bath Road westbound approach to the A4 Bath Road/Arlington Business Park roundabout. There is an increase in the VoC from 121% to 125% on the A4 Bath Road eastbound approach to the A4 Bath Road/Arlington Business Park roundabout.

8.2.13 These are only small increases and are already over-capacity without the HSA developments.

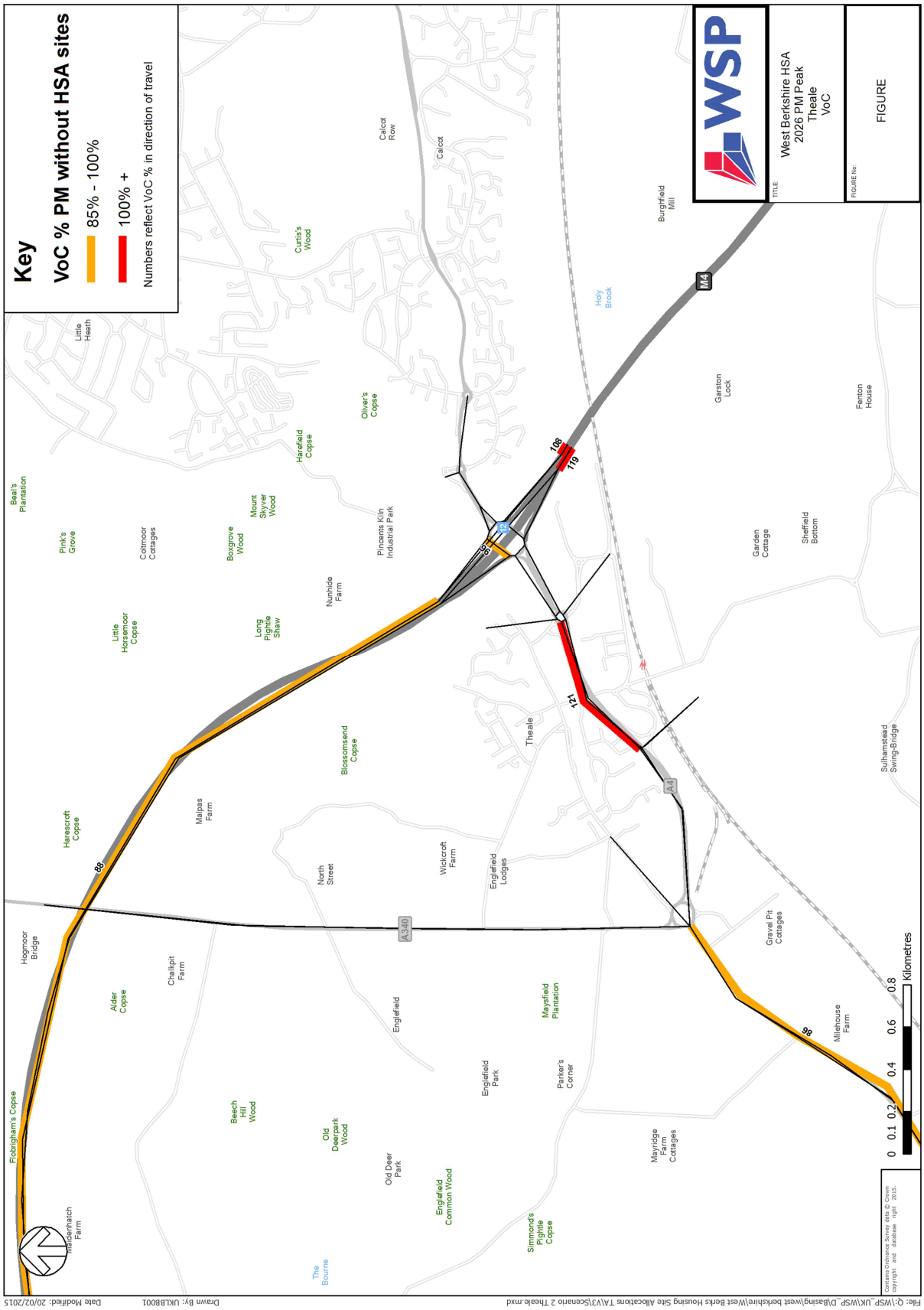

Figure 8.7 2026 link VoC for Scenario 1 – PM peak

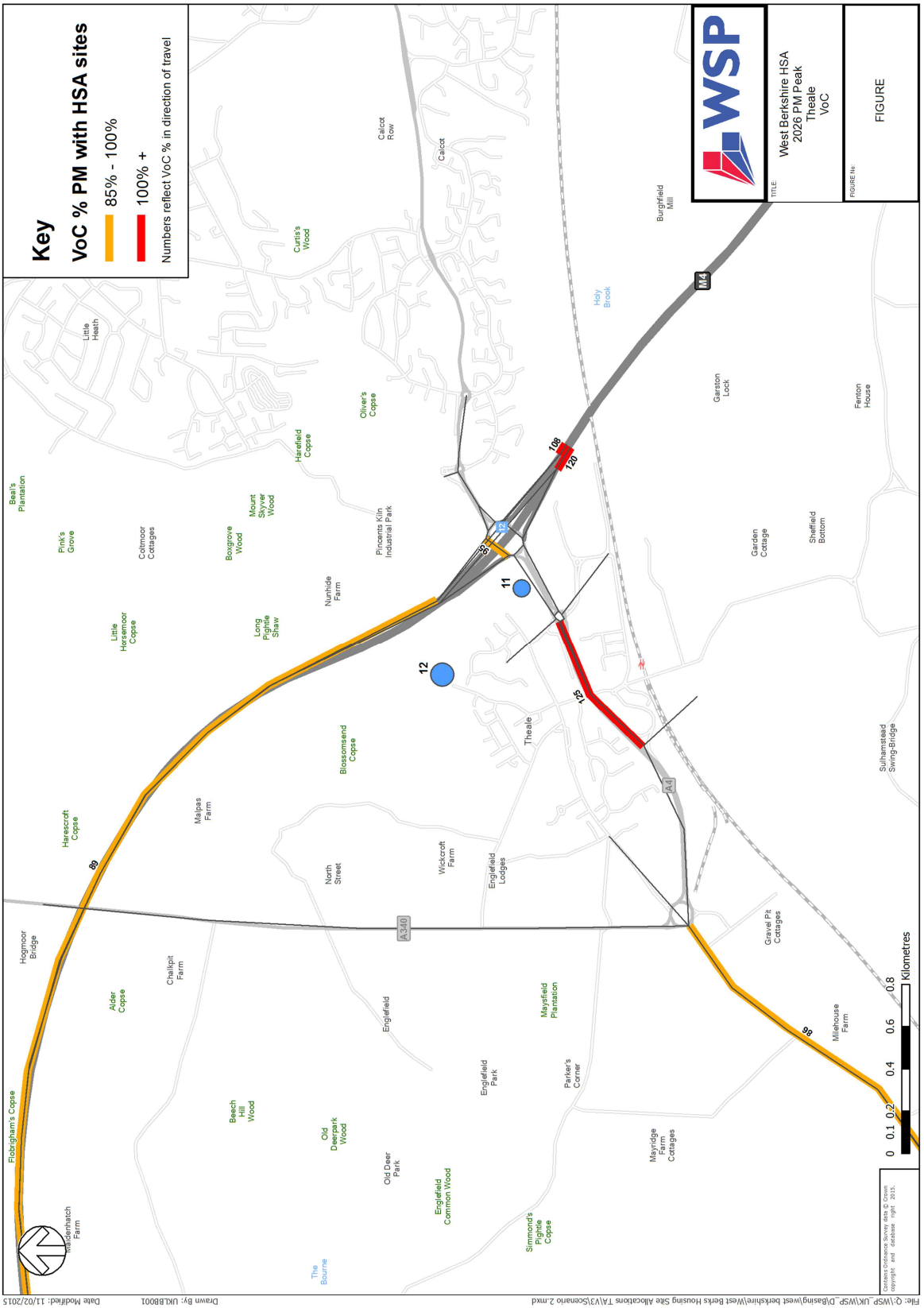

Figure 8.8 2026 link VoC for Scenario 4 – PM peak

9 Conclusions

9.1.1 The main focus of this report is the impact on the existing highway network of the development sites outlined in the West Berkshire Housing Site Allocations Development Plan Document (Local Plan) (HSA DPD).

9.1.2 The assessment has been undertaken using the latest available 2026 AM peak and PM peak forecasts of the West Berkshire Transport Model (WBTM). The methodology adopted in this study considers network stress when the HSA developments are included. The study is not intended to provide a detailed review of each development. As such it does not consider design issues, economic benefits, environmental impacts or safety issues.

9.1.3 The assessment has been undertaken by comparing traffic flows and Volume over Capacity statistics for the following scenarios:

- **Scenario 1**: without the HSA development
- **Scenario 2**: with the HSA development (Site 1 to 12)
- **Scenario 3:** with the HSA development (Site 1 to 10)
- **Scenario 4**: with the HSA development (Site 1 to 8, site 11 and site 12)

9.1.4 It is predicted that the HSA sites are likely to result in an additional 440 pcu trips loaded onto the district's transport network in the AM peak and PM peak hours. This is an increase of about 1% and is not considered to be a significant increase in the trip numbers predicted to be on the network. The additional trips are spread across the district's transport network rather than concentrated at one location which echoes the dispersed nature of the HSA site locations.

9.1.5 The increase in the directional flow on the majority of roads is not predicted to exceed 50 pcu apart from in the vicinity of M4 Junction 12 where the flow increases are predicted to by up to 80 pcu's due to the concentration of Theale sites (site 9 to site 12)

9.1.6 The increased traffic flows associated with the developments listed above are most likely to result in a slight worsening of the junction performance, and an increase in congestion along some roads near the HSA sites. It should however be noted that the assessment is based on a strategic model, which has not been validated at every single link and junction and further assessment using a more localised model and specialised software (LinSig, Arcady, Picady) may be required. Where appropriate these detailed assessments would accompany a planning application.

9.1.7 The effect of adding additional trips associated with HSA sites on overall junction performance and network congestion is minimal with the majority of junctions and links remaining in the same VoC percentage category in both scenarios.

9.1.8 The study can be used to inform considerations of potential highway mitigation associated with the impacts of the developments. However, the analysis is not exhaustive and requirements should be reviewed on a case-by-case basis as part of the planning process.

Appendices

Appendix A
Description of user classes

8. VEHICLE CATEGORIES

Definition of Categories

8.1 The various components of traffic have different characteristics in terms of operating costs, growth and occupancy. Figure 8/1 illustrates the most common categories into which the traffic is split in COBA. These are defined as:

Cars	**(CARS)** including taxis, estate cars, 'people carriers' and other passenger vehicles (for example, minibuses and camper vans) with a gross vehicle weight of less than 3.5 tonnes, normally ones which can accommodate not more than 15 seats. Three-wheeled cars, motor invalid carriages, Land Rovers, Range Rovers and Jeeps and smaller ambulances are included. Cars towing caravans or trailers are counted as one vehicle unless included as a separate class (see User Specified Category below);
Light Goods Vehicles	**(LGV)** Includes all goods vehicles up to 3.5 tonnes gross vehicle weight (goods vehicles over 3.5 tonnes have sideguards fitted between axles), including those towing a trailer or caravan. This includes all car delivery vans and those of the next larger carrying capacity such as transit vans. Included here are small pickup vans, three-wheeled goods vehicles, milk floats and pedestrian controlled motor vehicles. Most of this group are delivery vans of one type or another;
Other Goods Vehicles	**(OGV 1)** Includes all rigid vehicles over 3.5 tonnes gross vehicle weight with two or three axles Includes larger ambulances, tractors (without trailers), road rollers for tarmac pressing, box vans and similar large vans. A two or three axle motor tractive unit without a trailer is also included; **(OGV 2)** Includes all rigid vehicles with four or more axles and all articulated vehicles. Also included in this class are OGV1 goods vehicles towing a caravan or trailer;
Buses and Coaches	**(PSV)** Includes all public service vehicles and works buses with a gross vehicle weight of 3.5 tonnes or more, usually vehicles with more than 16 seats;
User Specified	There is a facility within the program for the user to input an additional vehicle category, however its use will be a rare occurrence. It can only be used if the appropriate values of time, occupancy, vehicle operating costs and vehicle proportions by flow group are available for the input category. An example of its use could be to test the sensitivity of a high proportion of cars with trailers in the traffic mix.

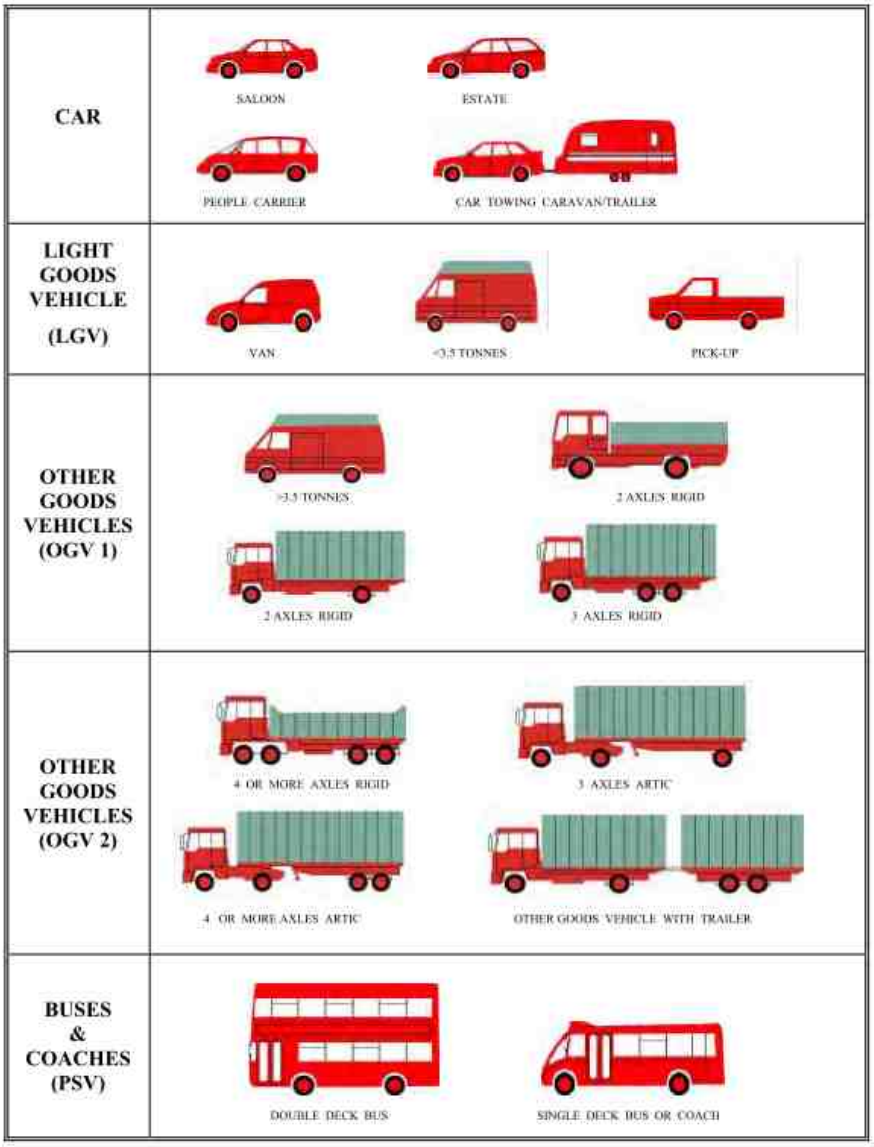

Figure 8/1: COBA Vehicle Categories

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