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WEST BERKSHIRE COUNCIL - HOUSING ALLOCATION SITES, CALCOT VISSIM ASSIGNMENT

Traffic Assessment

20/10/2015

Quality Management

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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 VISSIM (version 5.40). 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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WEST Berkshire Council - Housing Allocation Sites, Calcot VISSIM assignment

Traffic Assessment

20/10/2015

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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 (HSA DPD). This document will help the Council to understand and mitigate where appropriate the traffic implications of the proposed sites.

1.1.4 This forms the second of two assessments. The first has been carried out using the West Berkshire Transport Model, covering Newbury, Thatcham, Woolhampton and Theale.

1.1.5 This second report has been produced to assess the effect of the generated HSA development traffic on the A4 corridor in the Calcot area. Micro-simulation modelling using VISSIM has been used as the basis to provide transportation advice on the impacts of the proposed HSA housing allocations in the west of Reading, around M4 Junction 12.

1.1.6 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 the conclusions to the assessment

2 VISSIM modelling

2.1 Introduction

2.1.1 A VISSIM micro-simulation model of the A4 corridor at Calcot was developed by WSP on behalf of WBC in 2008. The model was calibrated and validated to 2008 observed traffic data for both time periods and was subsequently used to assess various highway schemes and developer proposals. The results demonstrated that the 2008 AM peak and PM peak models are suitable for the purpose of testing highway schemes and forecast traffic levels on the local highway network.

2.1.2 Each peak period model represents the peak hour itself, during which the above traffic levels are loaded onto the network and the model outputs are analysed. This also includes a 15-minute 'warm-up' period, during which a small amount of traffic loaded in order to ensure the VISSIM network is populated by the start of the peak hour. The impacts of the proposed developments have been assessed for the AM peak and PM peak periods:

- 07:45-08:45 for the AM peak
- 17:15-18:15 for the PM peak

2.1.3 The model covers the A4 corridor from M4 Junction 12 in the west to the junction with Langley Hill in the east as shown in figure 2.1.

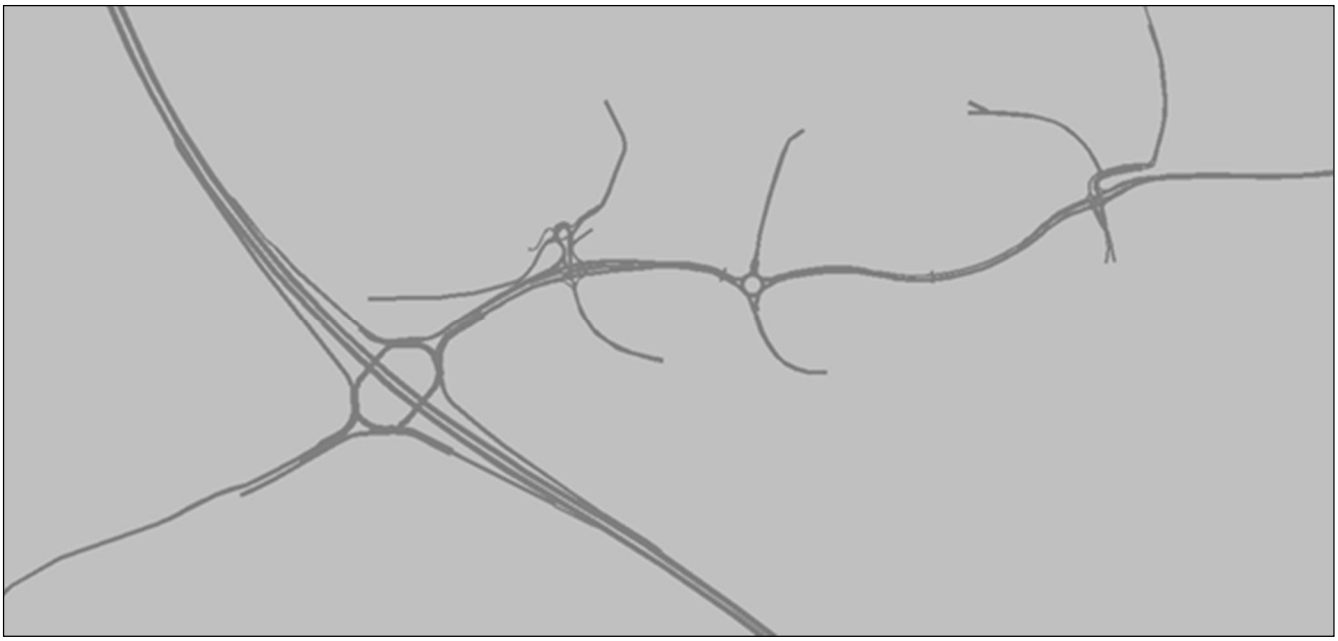

Figure 2.1: VISSIM model extent

2.2 Forecast traffic growth

2026 Reference Case

2.2.1 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. Traffic growth factors for cars are obtained from the NTEM version 6.2 datasets accessed through the TEMPRO version 6.2 program.

2.2.2 To calculate goods vehicle growth, the Regional Traffic Forecast model (RTF 13) is used, which is based on the National Transport Model and provides vehicle kilometres for each vehicle types for each regions and road types. The latest data is from 2013, and it contains historic and forecast data between 2003 and 2040.

2.2.3 The VISSIM model has a base year of 2008 therefore traffic growth between 2008 and 2013 has been calculated using the TEMPRO program for cars and RTF 13 tables for light and heavy good vehicles.. This allows the base year VISSIM model to have the same base year as the West Berkshire Traffic Model (WBTM) strategic model.

2.2.4 The methodology used to calculate forecast growth is that used in the WBTM. For the growth within the VISSIM model the WBTM has been used to calculate traffic growth between the base year of 2013 and the forecast year of 2026. Growth within the WBTM has been calculated using the TEMPRO program and RTF13 database and the methodology is described in the *'Traffic Assessment of West Berkshire HSA DPD Sites using WBM.pdf'* (March 2015) report.

2.2.5 This growth does not include the trips generated by the HSA developments and the committed development .

2.2.6 Traffic growth factors between 2008 and 2026 were calculated by combining traffic rates between 2008-2013 and 2013-2026. Table 2.1 shows traffic growth factors for both the AM peak and PM peak periods.

Table 2.1: Background traffic growth rates

AM		PM	
Lights	Heavies	Lights	Heavies
109%	111%	112%	110%

2.2.7 One committed development has been included within the 2026 Reference Case model (IKEA development - Application number: 11/00218/COMID). The calculated and applied figures consider the December 2014 application which includes for a 18% reduction in arrival and departure trips. The committed development trips which have been included within the 2026 forecast year VISSIM are summarised in table 2.2.

Table 2.2: Considered committed development trips in the model

	AM		PM	
Site ID	Arrival	Departure	Arrival	Departure
IKEA	0	0	290	255
Total	0	0	290	255

Adjustment in background traffic

2.2.8 The initial 2026 Reference Case VISSIM model showed that the AM peak model performed well in terms of the level of traffic on the A4 and other roads. However the 2026 Reference Case PM peak model showed significant right turning traffic at the A4 Bath Rd / Dorking Way junction from A4 Bath EB which exceeded the capacity of the right turn in the VISSIM model. This caused continuous traffic build up in the area which considering the availability of parallel routes to the A4 eastbound deemed to be unrealistic. This is mainly due to the fact that the existing 2008 calibrated and built VISSIM models use static assignment, which does not allow much flexibility for route choices.

2.2.9 Figure 2.1 shows that the model network does not allow for route choice as the routes north and south of the A4 Bath Road are not connected.

2.2.10 A manual origin and destination survey was undertaken by WBC in November 2013 in the Calcot area and it was agreed with WBC that this survey should be used to adjust the 2026 Reference Case origin and destination AM peak and PM peak matrices. This survey showed that of the traffic which turns right from the A4 into Dorking Way, 30 per cent rejoins the A4 further east, having used Dorking Way/Charrington Road as a rat-run. This traffic re-joins the A4 Bath Road either at the A4 Bath Rd / Charrington Road roundabout or the A4 Bath Road / Langley Hill signalised junction.

2.2.11 The A4 widening scheme will reduce 'rat running' traffic, due to the capacity it adds to the A4. The effect of this will be more traffic on the A4, but fewer turning movement to/from Dorking Way and Charrington Road, which would further reduce conflicting movements at A4 Bath Rd / Dorking Way junction and A4 Bath Rd / Charrington Road roundabout.

2.2.12 It was agreed with WBC that a proportion of that traffic uses the Dorking Way/Charrington Road route as a rat run in favour of bypassing congestion on the A4 eastbound. It was not thought to be realistic that traffic would use local roads in favour of the A4 route.

2.2.13 Additionally it is assumed that part of the traffic from the A4 Bath Road eastbound wanting to access Charrington Road use Dorking Way instead thus avoiding the A4 Bath Road. As a result the 2026 Reference Case PM peak background traffic demand matrices were updated using the information from the 2014 origin and destination survey, and 30% of traffic from the east of the model was moved to access Charrington Road via the A4 Bath Road / Charrington Road junction rather than turn right at the A4 Bath Road / Dorking Way junction.

2.2.14 Further adjustments to the 2026 Reference Case were made to the AM peak and PM peak trip matrices as the right turn from Dorking Way northbound at the A4 Bath Road / Dorking Way junction is not available. Trips from this zone to eastern zones of the model now use the A4 Bath Road / Charrington Road roundabout to access the network.

2.3 Network updates

2026 Reference Case

2.3.1 The 2026 Reference Case scenario includes the following highway improvements:

- As-built improvement at A4 / Langley Hill junction
- As-built improvement at M4 J12
- IKEA proposed improvement at the A4 / Dorking Way junction
- A4 widening between A4 / Langley Hill junction and A4 / Charrington Rd roundabout

2.3.2 The drawings of the junctions are included in Appendix A. Signal timings as developed for the assessment of the A4 widening which were derived from LINSIG optimisation for both the A4 Bath Road / Dorking Way junction and the M4 Junction 12. Whilst the latter is controlled by MOVA and a dataset was extracted to enable average observed timings to be calculated, the internal clock was incorrect and so the dataset was meaningless.

2.3.3 An existing LINSIG model previously produced for the assessment of the new design was utilised to provide signal timings. The A4 / Langley Hill junction also operates under MOVA signal control and average timings were obtained from on-site observations during the peak hours on a mid-week day in January 2015.

2.3.4 While these signals were optimised for 2014 traffic, it was assumed that the 2026 Reference Case and the Assessment scenarios would operate well with these signals and in case of unacceptable queuing, mitigation measures can be undertaken to improve the operation of these traffic signal junctions.

2.3.5 The 2026 Assessment Option scenarios and 2026 Reference Case scenarios are identical regarding network improvements.

2026 Assessment Options

2.3.6 The same background- and committed development traffic were considered for the 2026 Assessment Option scenarios as for the 2026 Reference Case models. Additionally for background and committed development traffic, development traffic for the assessed housing allocations has been derived.

2.3.7 Table 2.3 shows which housing allocation sites were considered for the 2026 Assessment Options. The development traffic for site 1 to site 12 in table 2.3 has derived from the WBTM strategic SATURN model with the impacts reported on in the *Traffic Assessment of West Berkshire HSA DPD Sites using WBM.pdf*' (March 2015) report

2.3.8 The associated Transport Assessments (TA) for site 14 to site 16 shown in table 2.3 have been used to derive the development traffic for the 2026 Assessment Option VISSIM model. These three sites are not specifically included in the model, but the generated traffic from these sites to South Reading (16% of traffic generation) is considered in the model.

2.3.9 Traffic information for sites 13, 17 and 18 were used from 'Housing Allocations DPD Preferred Options - West Berkshire Council July 2014' (HA DPD)

Table 2.3: Housing Site Allocations

DPD site reference	Site	Description	Total Size Dwellings	Source
NEW012	1	Land north of Newbury College	23	WBTM
NEW042	2	Land at Bath Road, Speen	100	WBTM
NEW042	3	Land at Coley Farm, Stoney Lane	75	WBTM
NEW047D	4	Land to the north of Haysoms Drive and land adjoining Equine Way, SE Newbury	120	WBTM
NEW106	5	Land at Moor Lane Depot, Newbury	40	WBTM
THA025	6	Lower Way, Thatcham	87	WBTM
COL002	7	Land at Poplar Farm, Cold Ash	20	WBTM
WOOL006	8	Land to the north of the A4, Woolhampton	30	WBTM
THE003	9	North Lakeside, Theale	50	WBTM
THE009	10	Land between the A340 and The Green, Theale	125	WBTM
THE005	11	Land at Junction 12, Theale	50	WBTM
THE001	12	Former Sewage Works, Theale	88	WBTM
EUA007	13	Tunhams Farm (Pincents Lane)	285	HA DPD
EUA008/3	14	Stonehams Farm	44	TA
EUA031	15	Land east of Sulham Hill	29	TA
EUA033	16	Land east of Long Lane and south of Blackthorn Close	30	TA
EUA025	17	Land adjacent to M4 Jcn12	Up to 100	HA DPD
EUA026	18	Land adjacent to Bath Road and Dorking Way	24	HA DPD

3 Assessment results

3.1 2026 AM peak forecast scenarios

3.1.1 Table 3.1 shows the network performance indicators for the AM peak and show little difference between the 2026 Reference Case (RC) (without Housing Site Allocations) and the Assessment Option (HSA) (with Housing Site Allocations) in the AM peak period. The average delay time per vehicle increases from 47 seconds to 50 seconds which is a 6% increase. The average speed of the vehicles decrease by 3%.

Table 3.1: Network Performance Indicators – AM peak

	AM Peak			
Parameter	RC	HSA	Diff	% Diff
Average delay time [s]	47	50	3	6%
Average speed [mph]	40	39	-1	-3%
Total travel time [h]	1046	1083	37	4%

3.1.2 Table 3.2 shows the journey time results for the AM peak. The journey time sections include delays along A4 in the model the approaches4 J12, and at the approaches of A4 Bath Rd / Langley Hill junction. Due to the additional traffic generated by the HSA developments journey times on the A4 Bath Road between the A4 Bath Road / Langley Hill junction and M4 Junction 12 do not change much in the eastbound direction, however it an increases in the westbound direction from 4 minutes 4 seconds to 4 minutes 24 seconds which is a 8.3% increase. This increment is mainly accumulated on the westbound approach to A4 / Dorking Way junction.

Table 3.2: Journey time results – AM peak

			AM Peak			
Route	From	To	Ref Case [mm:ss]	HSA [mm:ss]	Diff [mm:ss]	Diff [%]
A4 EB	M4 J12	Langley Hill Jcn	04:20	04:22	00:02	1.0%
A4 WB	Langley Hill jcn	M4 J12	04:04	04:24	00:20	8.3%

3.1.3 Table 3.3 shows the average queue lengths at key junctions and show little difference between the 2026 Reference Case and 2026 Assessment Option models for the AM peak period. The average queue lengths generally increase for the 2026 Assessment Option but in most cases the difference is minimal.

3.1.4 Passenger car units (pcu) 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.

3.1.5 The biggest queue increase is at A4 Bath Rd / Dorking Way, where queue length increases from 4 pcu (25metres) to 9 pcu (50 metres) on the westbound approach.

Table 3.3: Average queue lengths – AM peak

		Average queue length [m]		
Junction	Arm	Ref Case	HSA	Diff
A4 Bath Rd / Langley Hill	A4 (EB)	19	20	1
	A4 (WB)	14	14	0
	A4 RT (WB)	7	6	-1
	Old Bath Rd (SB)	99	110	11
	Pollards Way (NB)	15	15	0
	A4 LT (EB)	8	8	0
A4 Bath Rd / Charrington Rd	A4 (EB)	1	1	0
	Royal Avenue (SB)	1	1	0
	A4 (WB)	1	4	3
	Charrington Road (NB) LT	4	5	1
	Charrington Road (NB) RT	1	2	1
A4 Bath Rd / Dorking Way	A4 LT (EB)	2	2	0
	A4 Ah (EB)	11	11	0
	A4 RT (EB)	3	3	0
	Sainsbury LT (SB)	4	5	1
	Sainsbury Ah/RT (SB)	17	21	4
	A4 RT (WB)	16	18	2
	A4 Ah (WB)	25	50	25
M4 Junction 12	M4 (SB)	31	31	0
	A4 LT (EB)	1	2	1
	A4 Ah/RT (EB)	6	7	1
	M4 (NB)	19	19	0
	A4 (WB)	44	59	15

3.1.6 The 2026 forecast network is not congested in general, and the network can cope well with the increased traffic level. In general the westbound traffic is heavier in the HSA scenario option.

3.1.7 Figure 3.1 and figure 3.2 show vehicle speeds for a 5 minutes period, between 08:10 and 08:15 for the AM Reference Case and the HSA Scenario options.

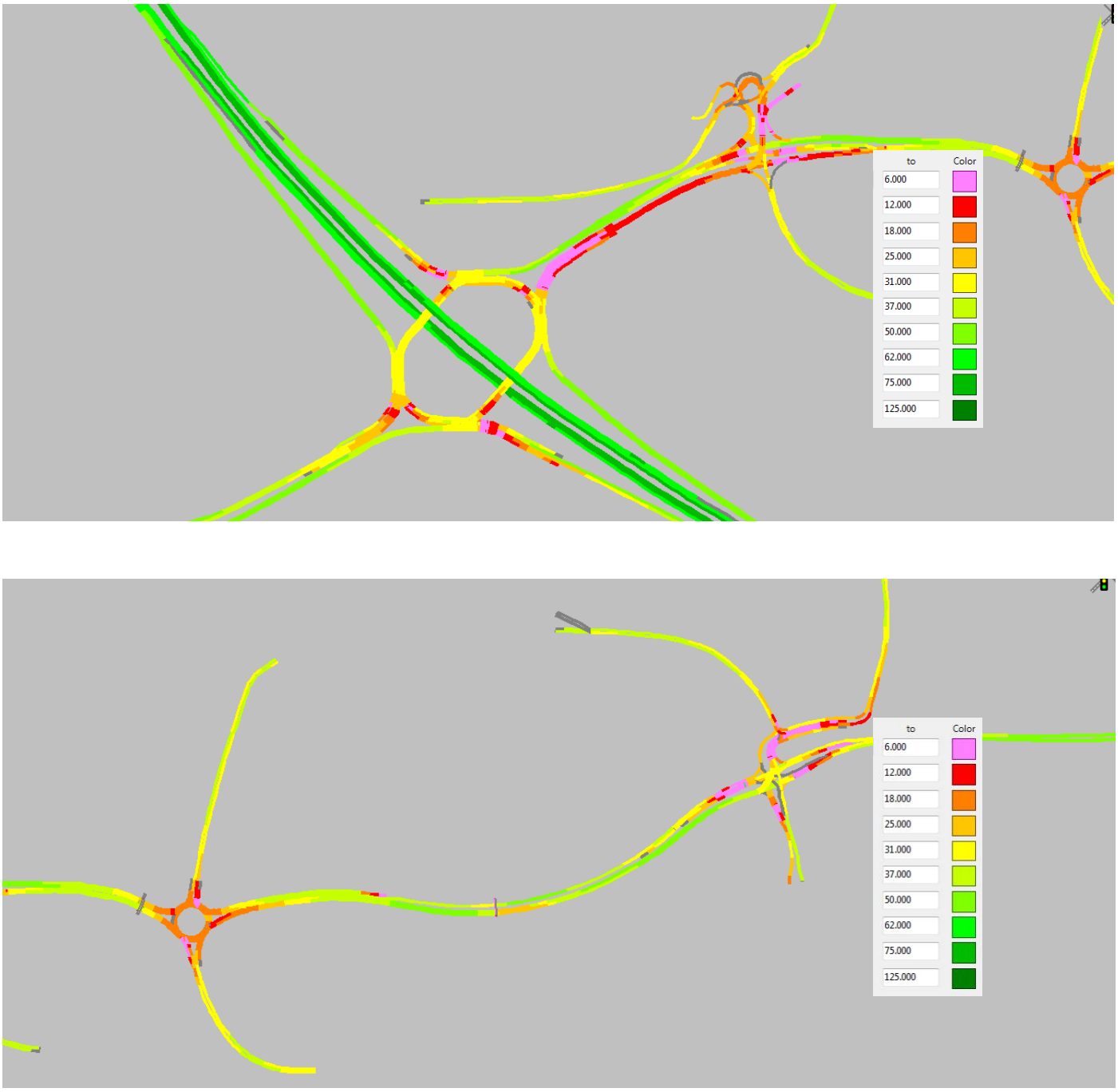

Figure 3.1: 2026 Reference Case - Average speed (08:10-08:15)

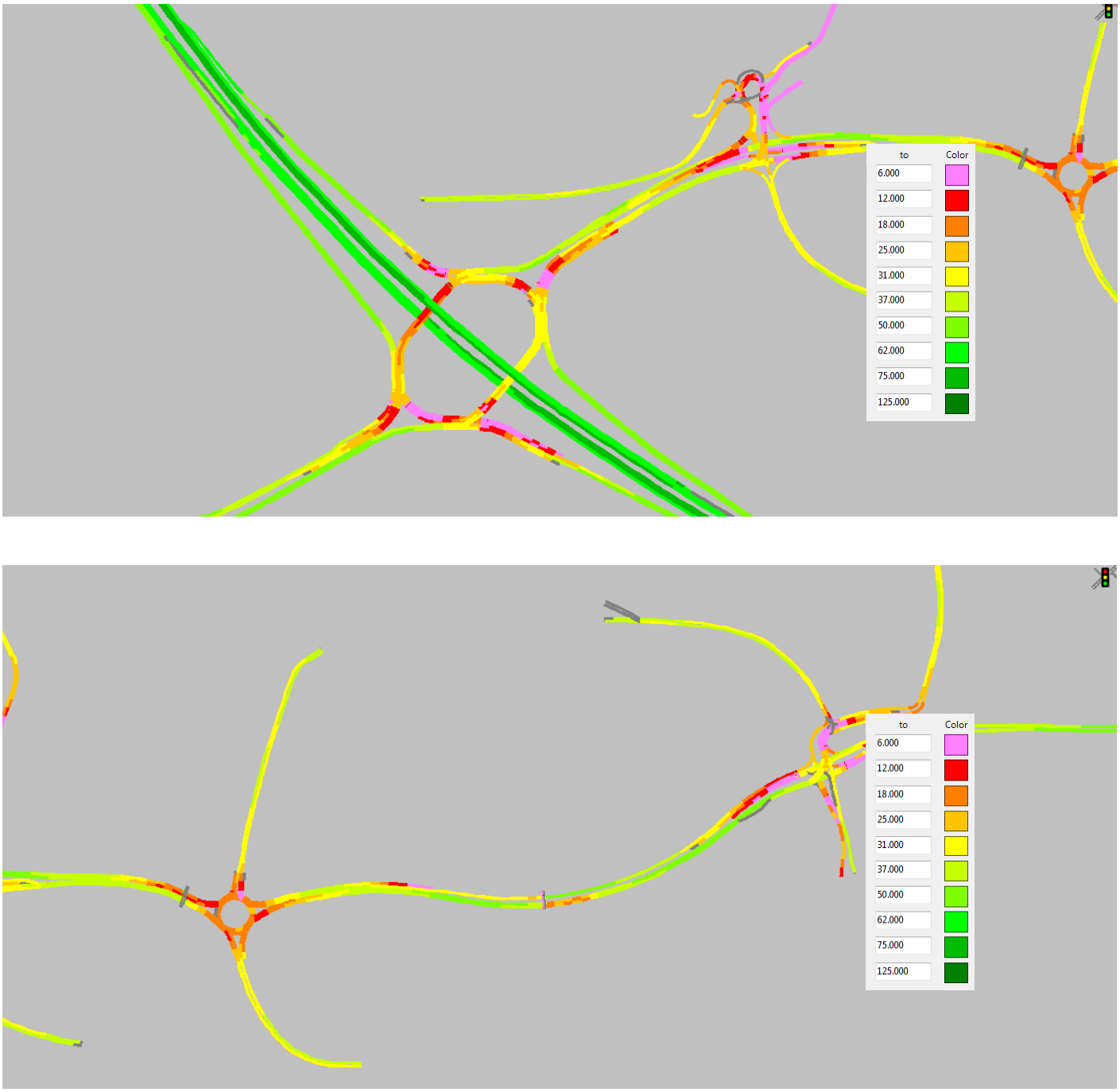

Figure 3.2: 2026 Assessment Option - Average speed (08:10-08:15)

3.2 2026 PM peak forecast scenarios

3.2.1 Table 3.4 shows the network performance indicators for the AM peak and show greater differences between the 2026 Reference Case (RC) and the Assessment Option (HA) in the PM peak period. The average delay time per vehicle increases from 54 seconds to 61seconds which is a 14% increase.

3.2.2 The increased delays reduce the average speed in the network which is changes from 39mph to 37mph which is a 3% reduction.

Table 3.4: Network Performance indicators - PM peak

	PM Peak			
Parameter	RC	HSA	Diff	% Diff
Average delay time [s]	54	61	7	14%
Average speed [mph]	39	37	-1	-3%
Total travel time [h]	1136	1194	58	5%

3.2.3 Table 3.5 shows the journey time results for the PM peak. Due to the additional traffic generated by the HSA developments journey times on the A4 Bath Road between the A4 Bath Road / Langley Hill junction and M4 Junction 12 do not increase significantly.

Table 3.5: Journey time results - PM peak

			PM Peak			
Route	From	To	Ref Case [mm:ss]	HSA [mm:ss]	Diff [mm:ss]	Diff [%]
A4 EB	M4 J12	Langley Hill Jcn	04:57	05:09	00:11	3.8%
A4 WB	Langley Hill jcn	M4 J12	03:44	03:46	00:03	1.1%

3.2.4 Table 3.6 shows the average queue lengths at key junctions and show little difference at A4 Bath Rd / Langley Hill and A4 Bath Rd / Charrington Rd junctions between the 2026 Reference Case and 2026 Assessment Option models for the PM peak period. Queue lengths increases at A4 Bath Rd / Dorking Way junction by 2 pcu on the southbound and on the westbound approach.

Table 3.6: Average queue lengths - PM peak

		Average queue length [m]		
Junction	Arm	Ref Case	HSA	Diff
A4 Bath Rd / Langley Hill	A4 (EB)	20	20	0
	A4 (WB)	14	14	0
	A4 RT (WB)	6	6	0
	Old Bath Rd (SB)	30	31	1
	Pollards Way (NB)	57	59	2
	A4 LT (EB)	18	17	-1
A4 Bath Rd / Charrington Rd	A4 (EB)	12	14	2
	Royal Avenue (SB)	1	1	0
	A4 (WB)	3	3	0
	Charrington Road (NB) LT	0	1	1
	Charrington Road (NB) RT	1	1	0
A4 Bath Rd / Dorking Way	A4 LT (EB)	2	4	2
	A4 Ah (EB)	20	21	1
	A4 RT (EB)	15	22	7
	Sainsbury LT (SB)	67	77	10
	Sainsbury Ah/RT (SB)	73	81	8
	A4 RT (WB)	21	33	12
	A4 Ah (WB)	12	12	0
M4 Junction 12	M4 (SB)	6	7	1
	A4 LT (EB)	2	2	0
	A4 Ah/RT (EB)	11	11	0
	M4 (NB)	16	26	10
	A4 (WB)	15	15	0

3.2.5 Figure 3.3 and figure 3.4 shows average vehicle speeds for 5 minute period between 17:40-17:45.

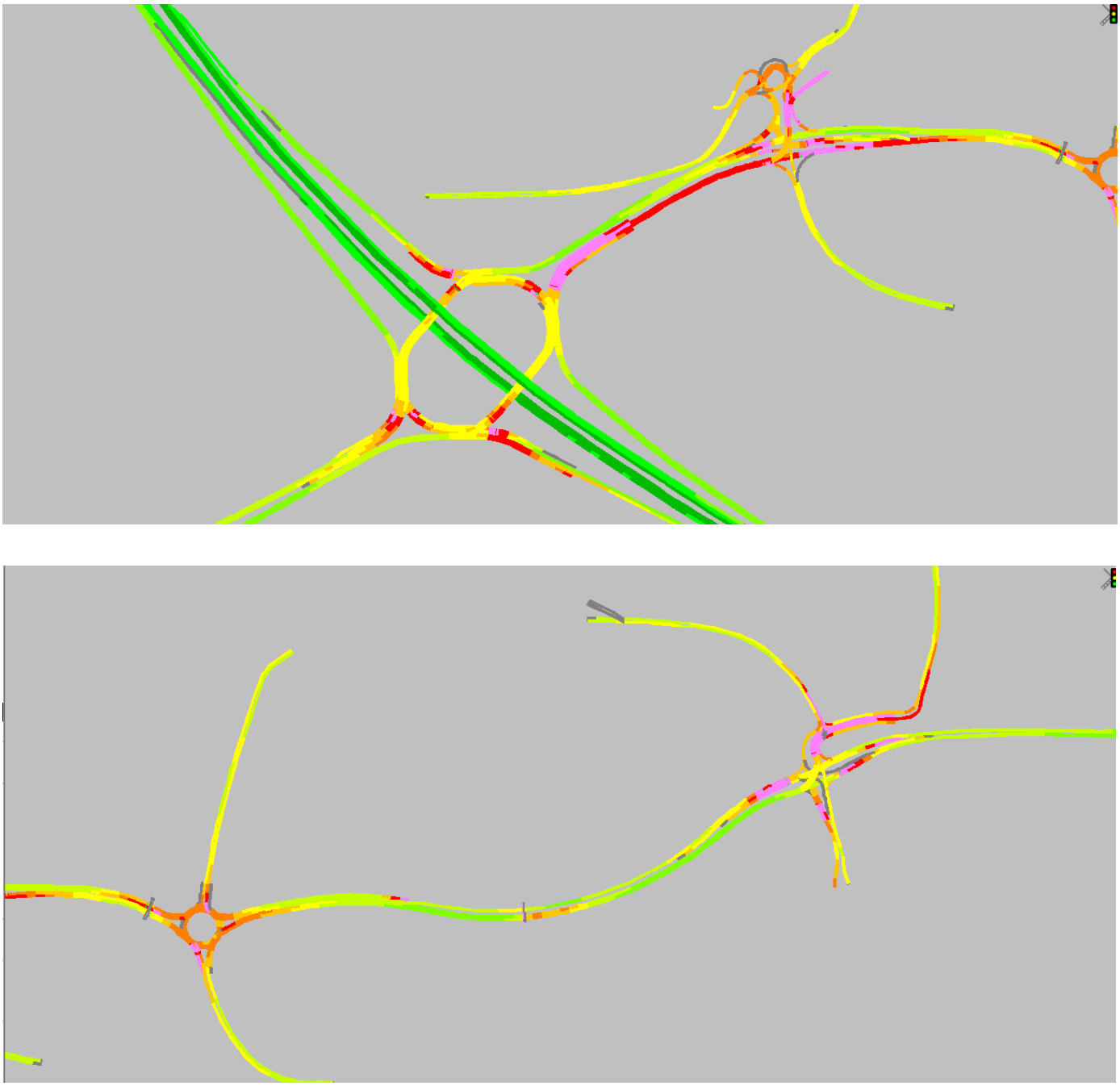

Figure 3.3: 2026 Reference Case - Average speed (17:40-17:45)

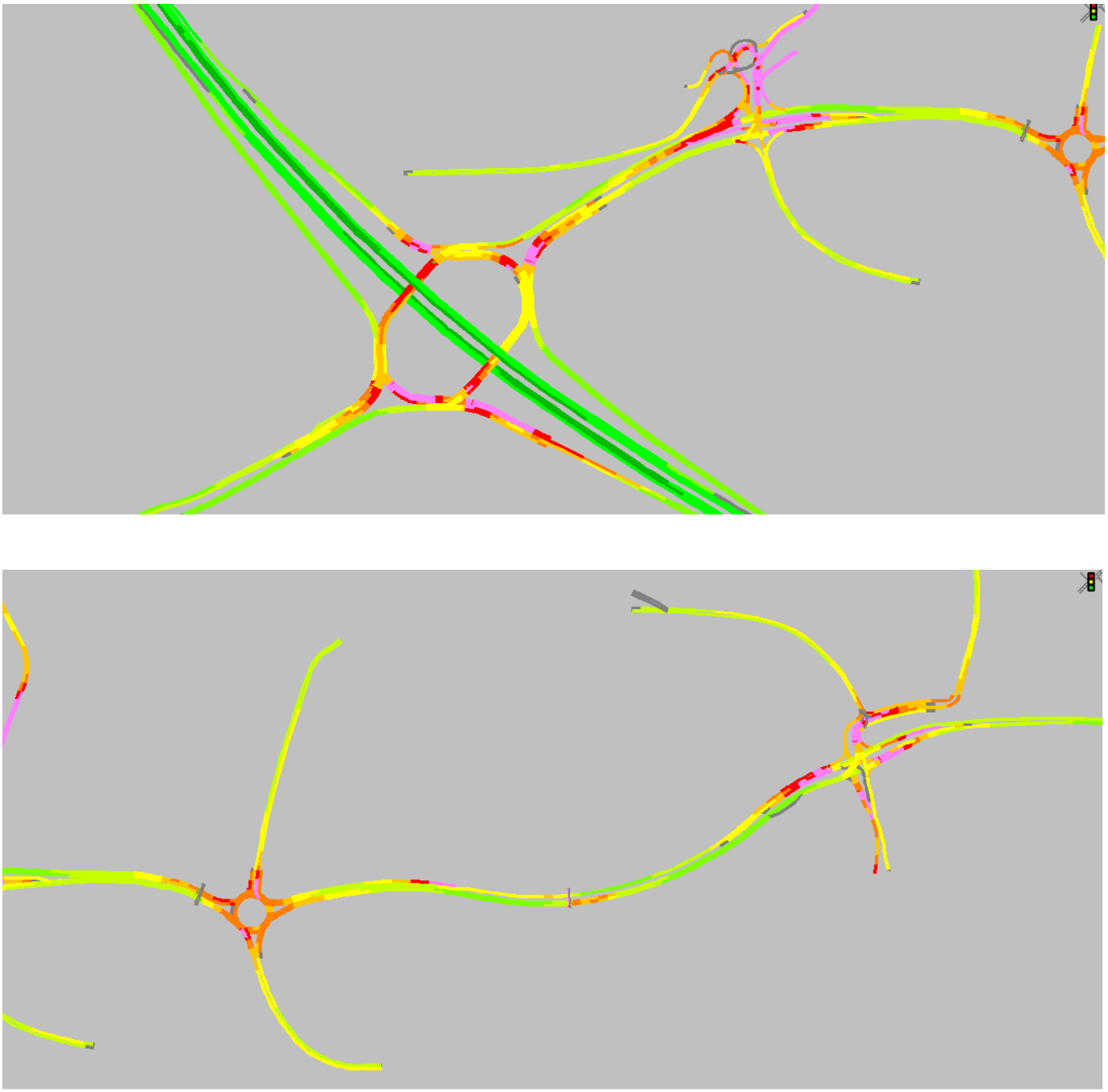

Figure 3.4: 2026 Assessment Option - Average speed (17:40-17:45)

4 Conclusions

4.1.1 The HSA development sites that have been assessed represent a worst case scenario for modelling, as all sites are considered at their maximum size and fully developed state.

4.1.2 Queuing and delays appear in both the 2026 Reference Case and 2026 Assessment Option models, and would appear to be created by general increase in traffic rather than as a direct result of the addition of the development traffic.

4.1.3 The VISSIM model results show that the proposed HSA development has only a marginal effect in the 2026 forecast year AM peak period where the queue length, delays and journey times increase only slightly due to the addition of the HSA development traffic.

4.1.4 In the PM peak period queue lengths are generally very similar in both the 2026 Reference Case and the 2026 Assessment Option. However there is concern in the vicinity of Pincents Lane and the vicinity of the Sainsbury superstore. Table 3.6 shows some of the biggest increases in traffic queues in this location during the PM peak. This location is characterised by much activity including access to Pincents Lane, Sainsbury's, McDonald's, a filling station and a bus interchange.

4.1.5 Overall the HSA developments have a marginal impact on the operation of the A4 Bath Road corridor in the Calcot area.

Appendices

Appendix A

As built drawings

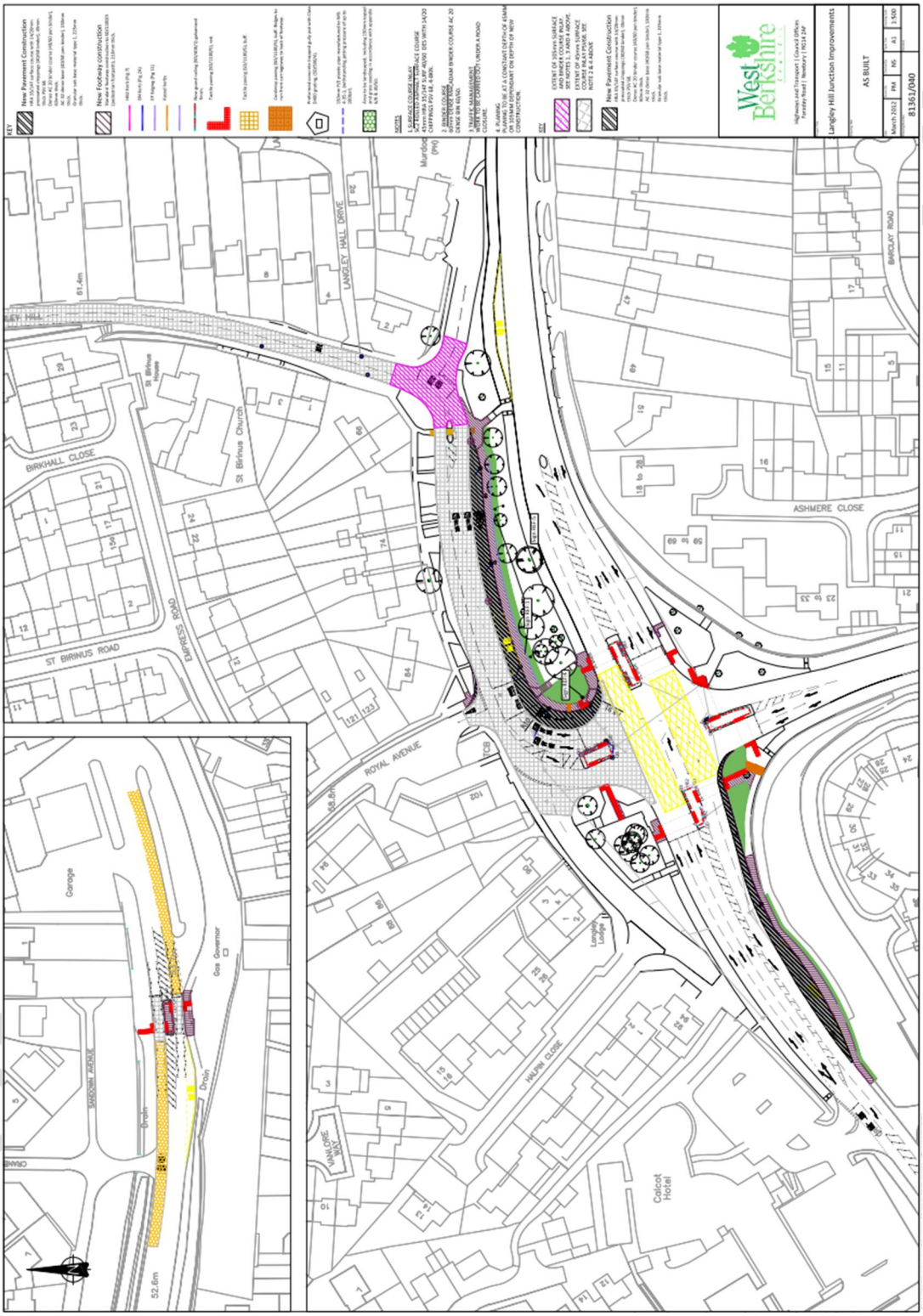

Figure A.1: Langley Hill junction improvements

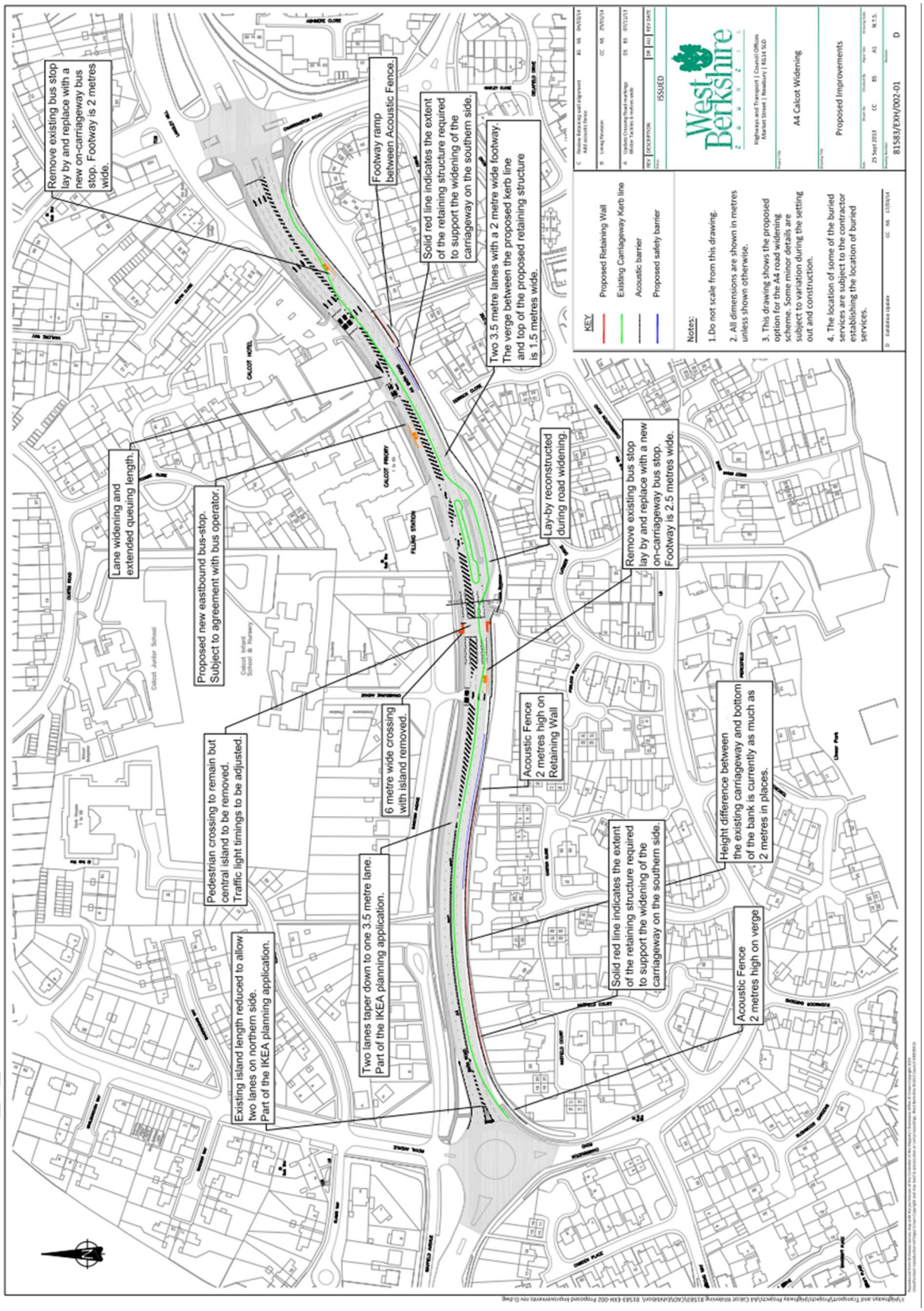

Figure A.2: A4 Calcot Widening

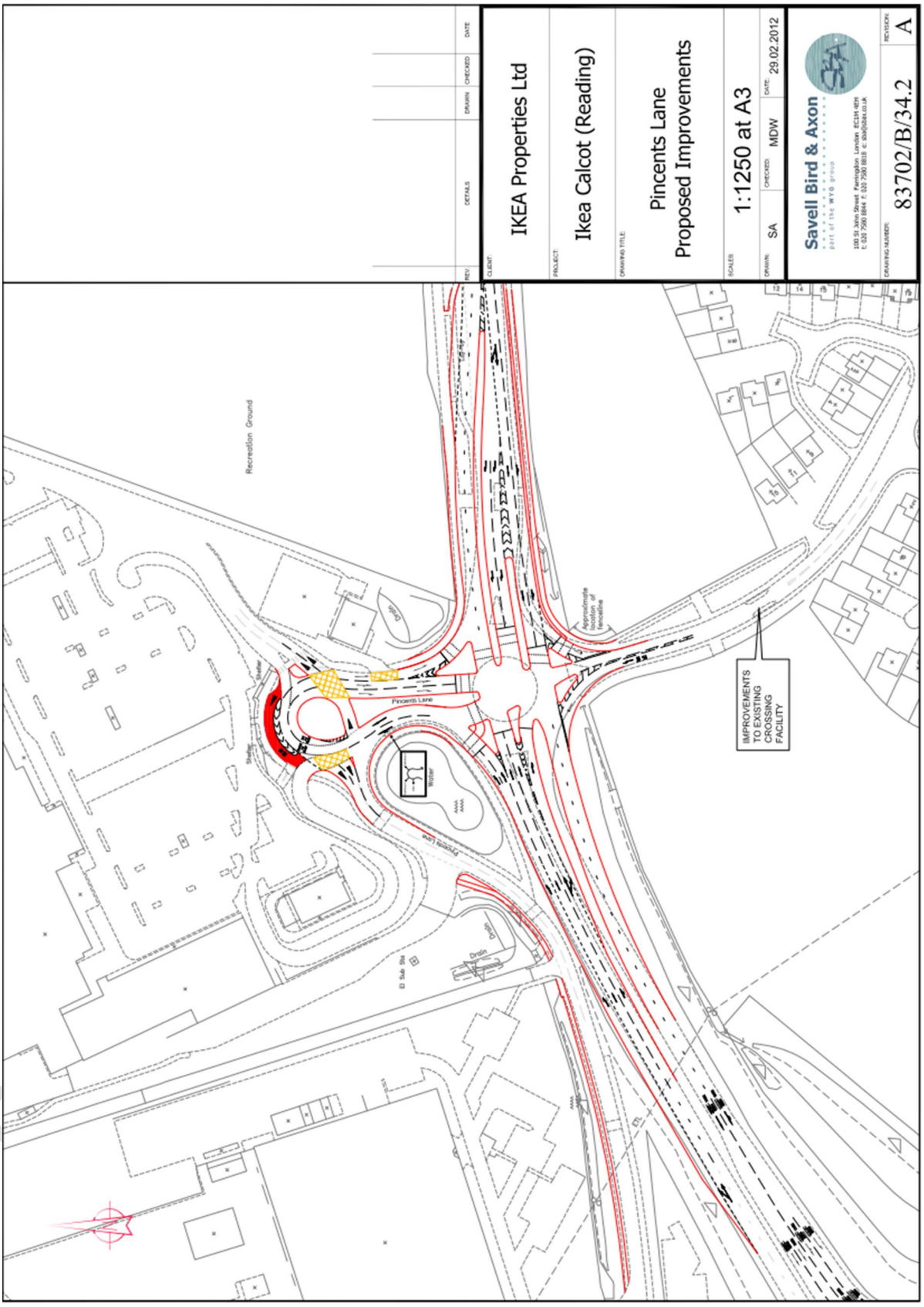

Figure A.3: Pincents Lane Proposed Improvements

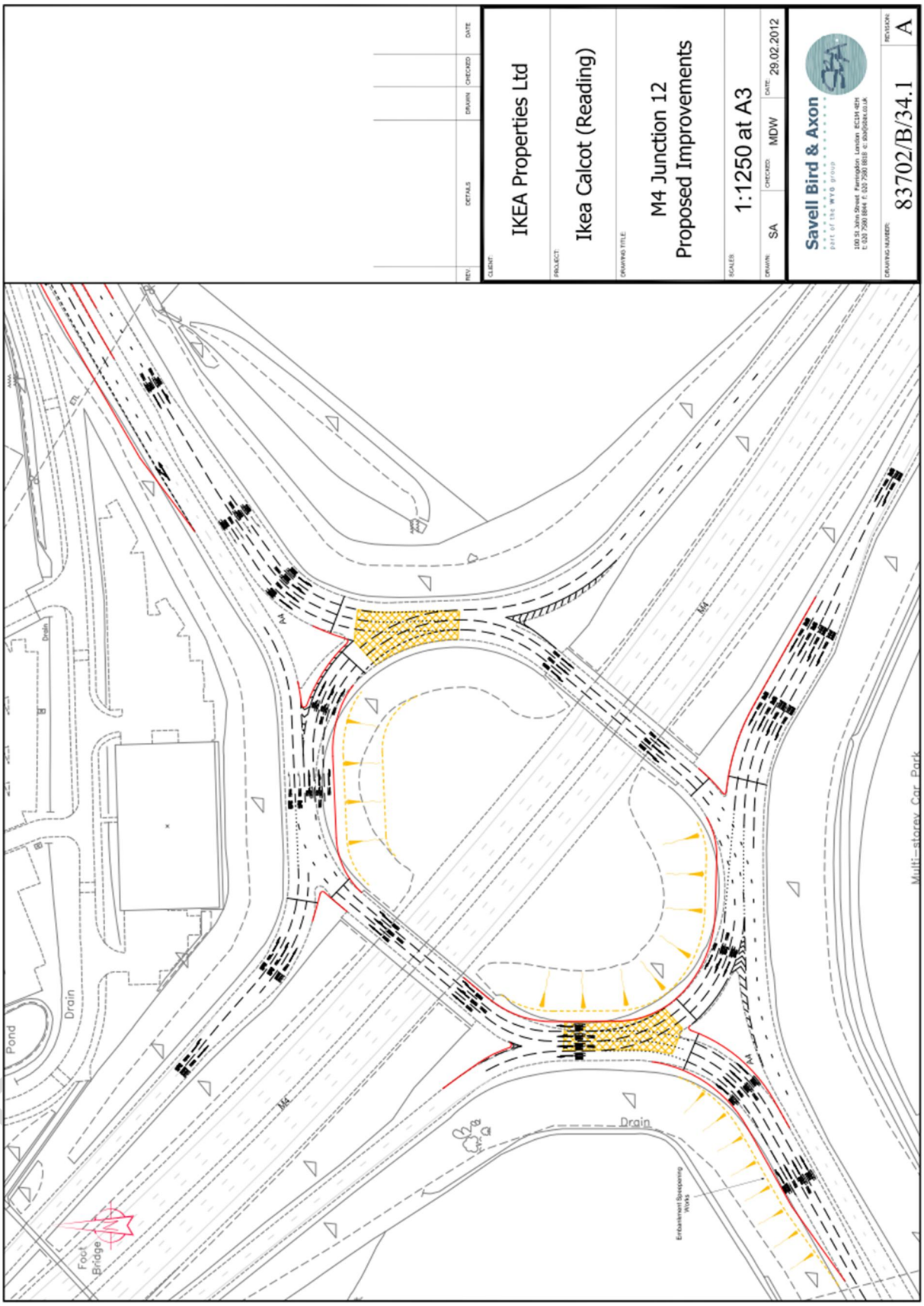

Figure A.4: M4 Junction 12 Proposed Improvements

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