

Technical Note 3 – Early-Stage Forecast Modelling Results – Background Growth Only & Initial Local Plan ‘Scenario’

8th May 2014

This technical note considers forecast-year vehicle flow outputs taken from the Epping spreadsheet model and their use with junction modelling packages to determine future-year junction performance in the Epping Forest district. Specific focus is placed on appraising junction capacities in 2026 and 2036 with a) only TEMPRO-based background growth and b) with the inclusion of a Local Development Plan (LDP) quota referred to as ‘Scenario One’. A table of the development sites included in the Scenario One quota can be found in the appendices. In total this comprises (just under) 10,500 dwellings and 25.7 hectares of employment sites. The methodology for calculating background growth and development trip generation can be found in Technical Note 2 (January 2014).

The junctions assessed match those identified prior to the base-year modelling as documented in Technical Note 1 (October 2013). A location map is included as item 3 in the appendices of this technical note.

This note has been produced as an interim document to inform Epping Forest District Council (EFDC) and Essex County Council (ECC) of continued study progress, and to assist EFDC in their selection of further LDP scenarios for testing. It is envisaged that the contents of this note, will form part of a final report to be produced at the conclusion of the study.

Modelling results

Results of the junction capacity modelling are presented in tables for each assessed junction in turn, and represent conditions modelled at the busiest quarter-hour period of the peak hours. Ratio of Flow to Capacity (RFC) values for roundabouts and Degree of Saturation (DoS) values for signalised junctions are used to present a comparison of outputs from the following tests:

- a) 2013 base,
- b) 2026 background growth only,
- c) 2036 background growth only,
- d) 2026 with background growth and Scenario One LDP trips (50% of total allocation) - referred to in the output tables as ‘S1’

Clarification on the use of capacity ratios/values in this study can be found in the appendices of this technical note.

It should be acknowledged that, as flow outputs have been taken from a fixed assignment spreadsheet model, junction capacity results should be deemed ‘worse case’. In reality, it

might be expected that vehicles will attempt to avoid the worst incidences of congestion by changing route, mode of travel or time of travel.

Instead, the results from this modelling exercise should be used to identify anticipated pinch-points on the road network, and prioritise focus on the most congested junctions relative to the others being assessed.

The findings of this forecast year assessment of junctions – with and without LDP traffic, should help to inform the selection of LDP sites for the District’s low, medium and high growth scenarios. Indeed, a targeted selection of sites will form a key component of measures to mitigate future congestion at key junctions in the district.

The following tables document the RFC and DoS ratios at each of the assessed junctions from the various development tests undertaken. The Junctions 8 (ARCADY) and LINSIG models developed for the base year junction appraisals have been reviewed prior to their use with future year testing. Subsequent improvements in the accuracy of the junction models has resulted in base year values differing slightly from those documented in Technical Note 1. Overall patterns of congestion remain the same, however.

Queue lengths have not been stated in this technical note due to the unreliability of such outputs where junctions are modelled as significantly over capacity.

Junction 1 – Wake Arms Roundabout, Epping Forest

Junction 1 (Wake Arms PH) - Epping					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
B1393 Epping Road	0.59	0.67	0.73	1.06	0.73	0.81	0.88	0.91
B172	0.89	1.01	1.11	1.31	0.96	1.09	1.21	1.22
A121 Golding's Hill	1.33	1.53	1.66	1.83	1.02	1.16	1.25	1.36
A104 Epping New Road	0.94	1.05	1.13	1.04	1.14	1.27	1.37	1.71
A121 Woodridden Hill	0.86	0.97	1.05	1.19	1.21	1.34	1.45	1.57

The A121 Golding’s Hill, A104 Epping New Road and A121 Woodridden Hill arms of the roundabout are already under pressure in the base case. The B172 arm might be expected to be pushed over capacity by 2026, whilst it is likely that the B1393 Epping Road will exceed capacity with the inclusion of LDP development. Given the high RFC values on a number of approach arms, it is reasonable to suggest that significant capacity improvements will be required to address existing and future congestion at the junction.

Junction 2 – Talbot PH Roundabout, North Weald

Junction 2 (Talbot PH) - North Weald					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
B181 Weald Bridge Road	0.19	0.22	0.25	0.29	0.18	0.22	0.25	0.30
A414 High Road	0.81	0.90	0.98	1.09	0.53	0.59	0.65	0.80
B181 High Road	0.43	0.50	0.56	0.66	0.47	0.53	0.60	0.79
A414	0.45	0.50	0.55	0.61	0.70	0.79	0.88	0.98

It is possible that the A414 High Road arm of the Talbot Roundabout may exceed capacity in the AM peak. However, this is likely to be dependent on the size and location of proposed LDP sites nearby.

Junction 3 – B194 Crooked Mile / Abbeyview Roundabout, Waltham Abbey

Junction 3 (Crooked Mile) - Waltham Abbey					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
B194 Crooked Mile	0.52	0.58	0.64	0.66	0.44	0.49	0.55	0.53
Parklands	0.48	0.55	0.61	0.62	0.39	0.45	0.50	0.48
Crooked Mile	0.32	0.37	0.40	0.39	0.46	0.52	0.57	0.53
Car park	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03
B194 Abbeyview	0.23	0.26	0.28	0.28	0.53	0.60	0.67	0.69

The B194 Crooked Mile / Abbeyview Roundabout should operate within capacity in 2026 and 2036, and accommodate 2026 levels of development traffic as selected for Scenario One.

Junction 4 – B194 Highbridge Street / Abbeyview Roundabout, Waltham Abbey

Junction 4 (Highbridge St) - Waltham Abbey					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
B194 Abbeyview	0.34	0.38	0.41	0.46	0.27	0.30	0.33	0.33
Highbridge Street	0.33	0.38	0.42	0.40	0.25	0.29	0.31	0.30
B194 Highbridge Street	0.46	0.51	0.55	0.54	0.85	0.95	1.03	1.06
Powdermill Lane	0.05	0.05	0.06	0.06	0.15	0.18	0.20	0.18

The B194 Highbridge Street / Abbeyview Roundabout in Waltham Abbey should largely operate within capacity in 2026 and 2036. However, greater levels of congestion may be experienced on the B194 Highbridge Street (western) approach arm in the PM peak by 2036, or by 2026 with the inclusion of development traffic.

Junction 5 – A112 Sewardstone Road / Dowding Way Roundabout, Waltham Abbey

Junction 5 (Sewardstone Rd) - Waltham Abbey					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
Sewardstone Road	0.36	0.41	0.45	0.44	0.36	0.42	0.47	0.46
A121 Dowding Way	0.52	0.59	0.66	0.71	0.37	0.42	0.47	0.47
A112 Sewardstone Road	0.42	0.47	0.52	0.51	0.65	0.73	0.81	0.81
A121 Meridian Way	0.34	0.38	0.42	0.42	0.46	0.53	0.60	0.65

The A112 Sewardstone Road / Dowding Way Roundabout should operate within capacity in 2026 and 2036, and accommodate 2026 levels of development traffic as selected for Scenario One.

Junction 6 – A112 Sewardstone Road / Sun Street Signalised Junction, Waltham Abbey

Junction 6 (Sun St) - Waltham Abbey					Signalised Junction			
Arm	AM PEAK (DoS)				PM PEAK (DoS)			
	Base	2026	2036	S1	Base	2026	2036	S1
A121 Crooked Mile	62	68	88	63	81	81	82	85
Monkswood Avenue	76	89	83	97	59	58	68	74
Sun Street - <i>Left/Ahead</i>	35	41	39	44	29	40	45	40
Sun Street - <i>Right</i>	71	81	78	90	88	123	138	132
Sewardstone Road NB - <i>Left/Ahead</i>	71	78	75	82	66	71	70	62
Sewardstone Road NB - <i>Right/Ahead</i>	54	58	65	53	65	65	60	62
Sewardstone Road SB - <i>Left/Ahead</i>	59	61	67	68	82	81	83	81
Sewardstone Road SB - <i>Ahead</i>	31	34	40	33	42	45	48	46
Farm Hill Road	116	140	152	152	107	124	134	122
Sewardstone Road NB	69	73	76	77	105	115	127	132

At the northern end of the signalised junction along Sewardstone Road, the Sun Street approach arm is likely to exceed capacity in the PM peak by 2026, with no room spare to accommodate potential development traffic. With modelled signal optimisation to minimise overall delay, the remaining approach arms are likely to remain within capacity by 2036 or with the addition of development traffic in 2026.

At the southern end of the junction, modelling suggests the Farm Hill Road approach arm operates over capacity in both peak periods under existing traffic conditions, whilst the southern approach along Sewardstone Road exceeds capacity in the base year PM peak. Conditions are likely to worsen along these links by 2036 and/or through the addition of development traffic.

Junction 7 – Honey Lane / Broomstick Hall Road Roundabout, Waltham Abbey

Junction 7 (Honey Ln) - Waltham Abbey					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
Broomstick Hall Road	0.32	0.36	0.40	0.55	0.32	0.37	0.41	0.51
Honey Lane	0.92	1.03	1.12	1.18	0.85	0.95	1.04	1.29
Farm Hill Road	0.46	0.51	0.55	0.54	0.74	0.83	0.90	0.93

There is the potential for the Honey Lane approach arm to exceed capacity in the AM peak in 2026 and in the PM peak in 2036. The addition of development traffic will further add to congestion on the approach arm in both peak periods.

Junction 8 – B1393 Thornwood Road Signalised Junction, Epping

Junction 8 (Thornwood Road) - Epping					Signalised junction			
Arm	AM PEAK (DoS)				PM PEAK (DoS)			
	Base	2026	2036	S1	Base	2026	2036	S1
B1393 Thornwood Road - Left/Ahead	90	98	108	131	111	111	111	115
B181 The Plain - Left/Ahead	77	85	90	98	101	112	121	115
B1393 Palmers Hill - Right/Ahead	89	98	105	103	119	138	156	192

The Thornwood Road signalised junction in Epping is already operating over capacity in the PM peak. Background traffic and/or development traffic growth will likely cause extensive congestion across all arms by 2026. Existing conditions in the morning peak are not as severe, although the addition of development traffic might be expected to push the junction over capacity by 2026.

Junction 9a – B1393 High Street / Station Road Roundabout, Epping

Junction 9a (Station Rd) - Epping					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
B1393 High Street RAB Link	0.80	0.88	0.95	1.12	0.92	1.03	1.12	1.17
Station Road	0.77	0.89	1.00	1.11	0.69	0.79	0.87	0.91
B1393 High Street	0.92	1.03	1.12	1.17	0.87	0.97	1.07	1.26

Both B1393 High Street approach arms might be expected to exceed capacity across the peak hours by 2026. The addition of development traffic and/or additional background growth to 2036 will likely lead to significant congestion on the High Street approach arms. The Station

Road approach is also likely to experience congestion in the morning peak in 2026 with development traffic or in 2036 with background flows.

Junction 9b – B1393 High Street / St. John's Road Roundabout, Epping

Junction 9b (St. John's Rd) - Epping					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
St. John's Road	0.37	0.71	0.97	1.05	0.82	1.09	1.18	1.31
B1393 High Street	0.69	0.94	1.10	1.35	0.93	1.13	1.23	1.34
B1393 High Street RAB Link	0.89	0.98	1.06	1.13	0.72	0.80	0.86	1.05

Whilst conditions might be expected to be worse in the PM peak, all approach arms are likely to exceed capacity in 2026 with development traffic. The B1393 High Street northern approach and St. John's Road approach arms also fall over capacity in the PM peak from just background flows in 2026. The addition of LDP development associated with Scenario One, would appear to result in significant congestion at the junction.

Junction 10 – B1393 Epping Road / Theydon Road Signalised Junction, Epping

Junction 10 (Theydon Road) - Epping					Signalised junction			
Arm	AM PEAK (DoS)				PM PEAK (DoS)			
	Base	2026	2036	S1	Base	2026	2036	S1
B1393 Epping Road (East) - Left/Ahead	82	85	80	133	65	72	75	138
Theydon Road	92	126	357	377	84	93	114	401
B1393 Epping Road (West) - Right/Ahead	87	99	114	122	75	92	99	112

Optimising modelled signal timings to minimise total delay through the junction enables traffic flows along the B1393 to be accommodated in 2026. In doing so however, it has not been possible to prevent the Theydon Road approach arm from operating significantly over capacity in the 2026 AM peak. Given the Degree of Saturation (DoS) calculated in 2036 or with the addition of development traffic in 2026, it is envisaged that capacity improvements would likely be required at the junction to accommodate traffic flows along Theydon Road.

Junction 11 – B1393 High Road / Bury Lane Roundabout, Epping

Junction 11 (Bury Ln) - Epping					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
B182 Bury Lane	0.68	0.80	0.92	1.07	0.43	0.51	0.58	0.59
B1393 High Road (East)	1.02	1.16	1.27	1.52	1.00	1.12	1.23	1.30
B1393 High Road (West)	0.82	0.90	0.97	0.99	0.86	0.95	1.03	1.26

With delays modelled on the B1393 eastern approach to the roundabout in both peak periods in the base model, background traffic growth is shown to leave the junction arm operating significantly over capacity in 2026. Further LDP development traffic might be expected to result in heavy delays on the eastern approach to the junction whilst also pushing the other approach arms over capacity.

Junction 12 – Four Wantz Roundabout, Ongar

Junction 12 (Four Wantz Roundabout) - Ongar					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
B184 Fyfield Road	0.67	0.78	0.87	1.09	0.57	0.67	0.77	1.05
A414 Chelmsford Road	0.86	0.98	1.09	1.21	0.52	0.60	0.66	0.71
B184 High Street	0.71	0.82	0.89	1.03	0.75	0.85	0.95	1.11
A414 Epping Road	0.54	0.61	0.67	0.96	0.76	0.87	0.98	1.18

The Four Wantz Roundabout north of Ongar is modelled to remain within capacity by 2026. By 2036, the A414 Chelmsford Road arm might be expected to surpass its capacity in the AM peak, whilst the B184 High Street and A414 Epping Roads could well reach capacity in the PM peak. The inclusion of LDP development traffic might be expected to create heavy delays on the A414 Chelmsford Road eastern approach in the AM peak, and on the opposite western approach in the PM peak. Both B184 approaches are likely to be over capacity in both peak periods.

The spreadsheet and junction modelling implies that it is unlikely that a large development off the B184 Fyfield Road could be accommodated without capacity improvements to the junction.

Junction 13 – A113 Coopers Hill / Brentwood Road Roundabout, Marden Ash / Ongar

Junction 13 (Coopers Hill) - Marden Ash (Ongar)					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
A113 Coopers Hill	0.96	1.07	1.15	1.46	0.73	0.82	0.89	1.22
A128 Brentwood Road	0.66	0.73	0.79	1.11	0.53	0.60	0.66	0.79
A113 Stanford Rivers Road	0.37	0.42	0.46	0.60	0.77	0.88	0.97	1.24
St. James Avenue	0.04	0.06	0.07	0.09	0.09	0.16	0.23	0.70

Modelling suggests that the A113 Coopers Hill approach to the roundabout (from Ongar town centre) may slip over capacity in the 2026 AM peak. Should a large volume of proposed development in Ongar be realised (a proportion of which is included in Scenario One), capacity improvements will likely be needed at the roundabout in order to prevent heavy congestion on a number of approach arms in both peak periods.

Junction 19 – B172 Coppice Road / Piercing Hill Signalised Junction, Theydon Bois

Junction 19 (Piercing Hill) - Theydon Bois					Priority junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
Piercing Hill	0.76	0.92	1.08	0.99	0.80	0.96	1.11	1.02
B172 Coppice Road (East) R-T	0.32	0.35	0.39	0.37	0.40	0.46	0.50	0.49
The Green	0.89	1.06	1.24	1.14	0.66	0.78	0.90	0.85
B172 Coppice Road (West) R-T	0.05	0.06	0.07	0.06	0.06	0.07	0.08	0.08

Outputs from the junction modelling suggests that The Green approach arm may exceed capacity in the 2026 AM peak, whilst Piercing Hill will likely experience growing levels of congestion in both peak periods by 2036. With development traffic in 2026, conditions along The Green might be expected to worsen in the AM peak, whilst Piercing Hill may well be pushed marginally over capacity in the PM peak. Given the distribution of development trips across the spreadsheet model, the location and scale of nearby LDP sites in Theydon Bois and south Epping should have an impact on the volume of traffic expected to use the junction in the future.

Junction 21 – M25 J26 Northern Roundabout, Waltham Abbey

Junction 21 (M25 J26 Northern RAB) - Waltham Abbey					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
Old Shire Lane	0.17	0.15	0.21	0.21	0.13	0.15	0.17	0.17
Honey Lane RAB Link	0.38	0.56	0.43	0.46	0.52	0.56	0.61	0.66
M25 Off Slip	0.24	0.44	0.29	0.28	0.40	0.44	0.49	0.50
Honey Lane	0.33	0.23	0.41	0.49	0.20	0.23	0.26	0.35

It is likely that all arms of the M25 Junction 26 northern roundabout will operate within capacity in 2036 or in 2026 with LDP development.

Junction 22 – M25 J26 Southern Roundabout, Waltham Abbey

Junction 22 (M25 J26 Southern RAB) - Waltham Abbey					Roundabout junction			
Arm	AM PEAK (RFC)				PM PEAK (RFC)			
	Base	2026	2036	S1	Base	2026	2036	S1
M25 Off Slip	0.34	0.39	0.43	0.47	0.26	0.29	0.33	0.36
A121 Honey Lane	0.97	1.09	1.20	1.45	0.75	0.84	0.92	1.05
A121 Dowding Way	0.38	0.43	0.46	0.50	0.49	0.56	0.63	0.79
Honey Lane RAB Link	0.46	0.51	0.55	0.65	0.48	0.52	0.57	0.60

The M25 Junction 26 southern roundabout is shown in the model to accommodate most traffic movements - except for the A121 Honey Lane / Woodridden Hill approach. This is observed to be close to capacity in the AM peak base modelling, and is shown to worsen substantially in 2026 with the addition of substantial volumes of development traffic for onward access to the M25.

Junction 24 – B194 Highbridge Street / Meridian Way Signalised Junction, Waltham Abbey

Junction 24 (Meridian Way) - Waltham Abbey					Signalised junction			
Arm	AM PEAK (DoS)				PM PEAK (DoS)			
	Base	2026	2036	S1	Base	2026	2036	S1
Beaulieu Drive	22	24	25	47	34	34	39	60
B194 Highbridge Street (East)	111	129	145	160	89	99	113	110
Meridian Way	95	98	101	111	61	67	71	86
B194 Highbridge Street (West)	98	96	96	90	89	96	103	114

The B194 Highbridge Street / Meridian Way signalised junction in Waltham Abbey is already observed and modelled to be operating over capacity in the AM peak along the B194 Highbridge Street eastern approach. The addition of future traffic flows is likely to result in significant congestion problems along the link, irrespective of signal optimisation.

At the same time, Meridian Way is shown in the modelled AM peak to exceed capacity with development traffic in 2026 and with background traffic in 2036, whilst similar conditions are experienced in the PM peak along the B194 Highbridge Street western approach.

Summary & Conclusions

The following table summarises the capacity performances of the assessed junctions in the Epping Forest district under the various forecast-year tests conducted.

Ref	Junction	Location	Test			
			2013	2026	2036	S1
JC01	B1393 Epping Rd / B172 / A121 / A104 Epping New Rd (Wake Arms) (5-arm)	Epping				
JC02	A414 High Rd / B181 High Rd (Talbot PH), North Weald (4-arm)	N Weald				
JC03	B194 Abbeyview / Crooked Mile / Parklands, Waltham Abbey (5-arm)	W Abbey				
JC04	B194 Abbeyview / B194 Highbridge St, Waltham Abbey (5-arm)	W Abbey				
JC05	A112 Sewardstone Rd / A121 Meridian Way / Dowding Way, Waltham Abbey (4-arm)	W Abbey				
JC06	Sun St / Sewardstone Rd / Monkswood Ave / Farm Hill Rd, Waltham Abbey (5-arm extended)	W Abbey				
JC07	Farm Hill Rd / Honey Ln / Broomstick Hall Rd, Waltham Abbey (3-arm)	W Abbey				
JC08	B1393 Thornwood Rd / B181 Epping Rd, Epping (3-arm)	Epping				
JC09a	B1393 High St / Station Rd, Epping (3-arm)	Epping				
JC09b	B1393 High St / St. John's Rd Rd, Epping (3-arm)	Epping				
JC10	B1393 High Rd / Theydon Rd, Epping (3-arm)	Epping				
JC11	B182 Bury Ln / B1393 High Rd, Epping (3-arm)	Epping				
JC12	A414 Chelmsford Rd / B184 High St / Fyfield Rd, Ongar (4-arm)	Ongar				
JC13	A128 Brentwood Rd / A113 Coopers Hill, Marden Ash (4-arm)	Ongar				
JC19	Piercing Hill / B172 Coppice Row, Theydon Bois (4-arm)	Epping				
JC21	M25 J28 / A121 north roundabout, Waltham Abbey	W Abbey				
JC22	M25 J28 / A121 south roundabout, Waltham Abbey	W Abbey				
JC24	A121 Station Rd / B194 Highbridge St / A121 Meridian Way, Waltham Abbey	Loughton				

	Two or more arms over capacity, or one arm significantly over capacity
	One arm over capacity

Over Capacity Junctions in 2013

A number of junctions are observed to be over capacity under current traffic conditions and are shown to worsen considerably by 2026 through background growth alone. These are as follows:

- Junction 1 – Wake Arms Roundabout, Epping Forest
- Junction 6 – A112 Sewardstone Road (junction with Farm Hill Road), Waltham Abbey
- Junction 8 – B1393 Thornwood Road Signalised Junction, Epping
- Junction 24 – B194 Highbridge Street / Meridian Way Signalised Junction, Waltham Abbey

In addition, the following junctions approach arm operates marginally over capacity under existing conditions:

- Junction 11 - B1393 High Road (East) approach to the junction with the B182 Bury Lane in Epping

Over Capacity Junctions in 2026 with background growth

Other junctions are observed to operate largely within capacity under current traffic conditions, but are modelled to exceed capacity by 2026 with background growth. These are as follows:

- Junction 9a – B1393 High Street / Station Road Roundabout, Epping
- Junction 9b – B1393 High Street / St. John’s Road Roundabout, Epping
- Junction 10 – B1393 Epping Road / Theydon Road Signalised Junction, Epping

In addition, the following junction approach arms are all shown to fall over capacity by 2026:

- Junction 7 - Honey Lane approach to the junction with Broomstick Hall Road, Waltham Abbey
- Junction 13 - A113 Coopers Hill approach to the junction with the A128 Brentwood Road, Marden Ash
- Junction 19 - The Green approach to the junction with the B172 Coppice Road, Theydon Bois

In most instances, development traffic added to 2026 background flows places greater modelled capacity pressures on the appraised junctions when compared with 2036 background traffic flows.

Over Capacity Junctions in 2026 with background growth & development traffic

The following surveyed junctions are modelled to operate significantly over capacity with the introduction of LDP development traffic in 2026 associated with Scenario One:

- Junction 7 – Honey Lane / Broomstick Hall Rd, Waltham Abbey
- Junction 11 – B1393 High Road / Bury Lane Roundabout, Epping
- Junction 12 – Four Wantz Roundabout, Ongar
- Junction 13 – A113 Coopers Hill / Brentwood Road Roundabout, Marden Ash / Ongar
- Junction 19 – Piercing Hill Priority Junction, Theydon Bois
- Junction 22 – M25 J28 southern roundabout, Waltham Abbey

In addition, the following junction approach arms are shown to exceed capacity in 2026 with development traffic included:

- Junction 2 - A414 High Road arm of the Talbot Roundabout, North Weald
- Junction 4 - B194 Highbridge Street arm of the junction with B194 Abbeyview, Waltham Abbey

For this set of junctions and individual approach arms, it is possible that future congestion can be mitigated through considered selection of LDP development sites, or through capacity improvements directly funded from developer contributions.

With few exceptions, the growth in traffic flow at junctions attributed to development traffic in 2026, exceeds the predicted growth in background traffic over ten years from 2026-2036. For this reason, the 2036 capacity tests without development are shown to have generally lower RFC/DoS values than those from the Scenario One tests in 2026.

It should be noted that the allocation of development traffic modelled for Scenario One in 2026 is half of the total amount proposed for 2036 – i.e. 5,750 dwellings and 12.85 hectares of employment. This level of development nevertheless appears sufficient to leave 15 of the 18 assessed junctions with approach arms operating over capacity.

Appendices

1) Junction Capacity Descriptions & Application

RFC = Ratio of Flow to Capacity

The ratio of flow to capacity provides a measure of the utilised capacity of a junction approach arm. Arms exceeding a ratio of 0.85 (i.e. 85% capacity utilised) are considered to be approaching capacity and characteristically have light-to-moderate levels of queued traffic flow. Arms exceeding a ratio of 1.00 (i.e. 100% capacity utilised) are considered to be over capacity and are characterised as having heavy volumes of queued traffic.

ARCADY results that exceed RFCs of 1.00 generate queue lengths that are subject to exponential growth. However, the instability of flows through over-capacity approach arms, results in an inherent difficulty in calibrating modelled outputs to observed conditions. For this reason, queue lengths attributed to over capacity approach arms should be seen as indicative rather than representative.

The capacity assessment tables at the end of this technical note use a colour-coding system to assist in appraisal:

- Arms with an RFC of less than 0.85 are coloured green
- Arms with an RFC between 0.85 and 0.99 are coloured amber
- Arms with an RFC of 1.00 or more are coloured red

DOS = Degree of Saturation

The degree of saturation is an output from LINSIG which provides a measure of the utilised capacity of a signalised junction approach lane. It is directly comparable to the RFC outputs obtained from ARCADY assessments (see above).

The colour-coding system used to categorise DOS in the model results tables is as follows:

- Lanes with a DOS of less than 85% are coloured green
- Lanes with a DOS between 85% and 99% are coloured amber
- Lanes with a DOS of 100% or more are coloured red

2) Full Table of Proposed LDP Developments – Scenario One selections highlighted –

Site/App Ref	Site Name & Location	Settlement:	Easting	Northing	JTW zone to represent site	Model Sector	Site Size (Ha):	Total 2013-2036 Site Yield	Additional Land Use	Floorspace (GFA) m ²
BKH - 1	Powell Road	Buckhurst Hill	541466	194645	35	D10	1.2	40		-
BKH - 2	Station Way	Buckhurst Hill	541524	192952	35	D10	0.17	12		-
CHG - 1	Hainault Road (Small)	Chigwell	543877	193153	32	D9	0.4	10		-
CHG - B	Vicarage Lane	Chigwell	544269	193845	33	D9	1.8	54		-
CHG - D	Hainault Road (Large)	Chigwell	544140	193149	32	D9	14.8	355		-
EPP - 1	St. John's Road	Epping	545862	202114	4	E4	1.47	35	Employment - Office	1,200
EPP - 2	Nicholl Road	Epping	545895	201804	3	E3	0.04	12		-
EPP - 3	Centre Drive	Epping	546119	201679	3	E3	0.2	6		-
EPP - 4	Bower Terrace	Epping	546132	201306	10	E10	2	55		-
EPP - A	Stonards Hill (S)	Epping	546535	202104	9	E9	14.5	300		-
EPP - B	Stonards Hill (N)	Epping	546807	202362	7	E7	7.8	230		-
EPP - C	Thornwood Road	Epping	546381	203035	6	E6	12	350		-
EPP - D	B181 Lindsey Street / B182 Bury Lane	Epping	545224	202813	5	E5	53	750		-
EPP - E	Theydon Place / Madells	Epping	545722	201543	12	E12	2	60		-
EPP - F	Ivy Chimneys Road	Epping	545668	200786	12	E12	17	350		-
EPP - G	Brook Road	Epping	546166	200611	11	E11	26	250		-
EPP - H	Bower Hill	Epping	546572	201452	10	E10	23	350		-
HAR - A	B181 Epping Road / B1133 Water Lane	Harlow	542327	208310	67	D19	36	900		-
HAR - B	B181 Epping Road / Parsloe Road	Harlow	543000	207157	67	D19	59	1100		-
HAR - C	Rye Hill Road	Harlow	545802	207348	70	D21	33	987		-
HAR - D	A414 North of M11 J7	Harlow	547543	207777	70	D21	4	0	Employment - Office	16,000
HAR - E	B183 Sheering Road	Harlow	549325	212222	72	D22	140	4850		-
LOU - 1	Clay's Lane	Loughton	543497	197918	46	D13	2.59	78		-
LOU - 10	Oakwood Hill	Loughton	543646	195778	38	D11	0.55	0	Employment - Industrial Estate	2,200
LOU - 11	Albion Hill	Loughton	541227	195108	36	D10	0.29	10		-
LOU - 2	Langston Road (North)	Loughton	545060	196847	40	D11	9.06	0	Employment - Industrial Estate	30,200
LOU - 3	Langston Road / Oakwood Hill	Loughton	544264	196006	39	D11	33.51	0	Employment - Industrial Estate	20,000
LOU - 4	Langston Road (NE)	Loughton	544921	196508	40	D11	6.24	0	Employment - Industrial Estate	32,000
LOU - 5	Langston Road (East)	Loughton	544801	196244	39	D11	3.87	0	Employment - Industrial Estate	7,700
LOU - 6	Vere Road	Loughton	544189	196409	39	D11	0.97	41		-
LOU - 7	Chigwell Lane / The Broadway	Loughton	544092	196318	39	D11	0.24	19	Retail - Shopping Centre / Local Shops	1,500
LOU - 8	Chigwell Lane	Loughton	544140	196224	39	D11	0.52	41	Retail - Food superstore	3,800
LOU - 9	Torrington Drive	Loughton	544324	196307	39	D11	1.28	80	Retail - Shopping Centre / Local Shops	1,000
LSH - A	Station Road / Sheering Lower Road	Lower Sheering	549056	215200	73	D22	0	14		-
LSH - B	Sawbridgeworth Road / Back Lane	Lower Sheering	549056	215200	73	D22	22	630		-
NAZ - 1	Hoe Lane	Nazeing	540039	206387	68	D19	13.5	400		-
NAZ - A	Peck's Hill / Palmers Grove	Nazeing	539578	206605	64	D18	23	690		-
NAZ - B	Hyde Mead	Nazeing	539362	205761	63	D17	12	293	Employment - Industrial Estate	9,800
NWA - A	North Weald Airfield A	North Weald Airfield	548269	204518	17	D4	14	0		-
NWA - B	North Weald Airfield B	North Weald Airfield	549041	204108	17	D4	3	0		-
NWA - C	North Weald Airfield C	North Weald Airfield	548447	203919	17	D4	23	0	Employment - Warehousing	82,000

Epping Forest Local Plan Highway Impact Assessment



Site/App Ref	Site Name & Location	Settlement:	Easting	Northing	JTW zone to represent site	Model Sector	Site Size (Ha):	Total 2013-2036 Site Yield	Additional Land Use	Floorspace (GFA) m ²
NWA - D	North Weald Airfield D	North Weald Airfield	549441	204233	17	D4	24	1107		-
NWB - 1	B181 Epping Road (North)	North Weald Bassett	548957	203881	17	D4	8	0		-
NWB - 2	B181 Epping Road (South)	North Weald Bassett	549002	203764	17	D4	0	0		-
NWB - 3	Station Road	North Weald Bassett	549635	203826	18	D4	0	0		-
NWB - A	Vicarage Lane West	North Weald Bassett	549971	205090	16	D3	35	1050		-
NWB - B	Vicarage Lane East	North Weald Bassett	550438	205106	16	D3	4	103		-
NWB - 4	Land SW of Blakes Golf Club	North Weald Bassett	550566	203967	18	D4	4	0		-
ONG - 1	High Street	Ongar	555190	202873	22	O22	1	5		-
ONG - A	B184 Fyfield Road (NE Ongar)	Ongar	555627	204340	21	O21	26.6	635	Employment - Office	21,300
ONG - D	A128 Brentwood Road / Stondon Road	Ongar	555521	201900	23	O23	54.2	1344	Employment - Industrial Estate	45,000
ONG - E	Stanford Rivers Road	Ongar	554852	201933	24	O24	17.6	432	Employment - Industrial Estate	14,000
ONG - F	A414 Epping Road (West Ongar)	Ongar	554779	203325	25	O25	84.2	2015	Employment - Industrial Estate	67,000
ONG - G	B184 Fyfield Road (NW Ongar)	Ongar	555194	204504	21	O21	20.7	504	Employment - Office	17,000
ROY - A	B181 High Street / Harlow Road	Roydon	540995	210040	66	D20	9	289		-
ROY - B	B181 Epping Road (South Roydon)	Roydon	540885	209353	66	D20	0	5		-
ROY - C	B181 Epping Road (NW Roydon)	Roydon	540550	209905	65	D19	25	750		-
SHE - A	B183 The Street (West Sheering)	Sheering	550237	213880	74	D22	3	71		-
SHE - B	B183 The Street (North Sheering)	Sheering	550730	214191	74	D22	14	420		-
SHE - C	B183 The Street (South Sheering)	Sheering	550587	213710	74	D22	6	183		-
THB - A	Forest Drive	Theydon Bois	545564	199738	80	D29	6.6	198		-
THB - B	B172 Coppice Row	Theydon Bois	544362	199289	47	D14	2.3	68		-
THB - C	B172 Abridge Road	Theydon Bois	545592	198864	80	D29	36	1000		-
THO - 1	B1393 High Road / Weald Hall Lane	Thornwood	547154	204635	15	D2	0.97	20		-
THO - 2	Woodside	Thornwood	547405	204337	15	D2	0.4	5		-
THO - A	Weald Hall Lane (NE Thornwood)	Thornwood	547393	204846	15	D2	8.8	231	Employment - Industrial Estate	11,400
THO - B	Woodside / Duck Lane	Thornwood	547390	204434	15	D2	0.6	19		-
THO - C	B1393 High Road (NW Thornwood)	Thornwood	546976	204723	15	D2	4.18	125		-
WAL - 3	Mason Close	Waltham Abbey	539510	200380	53	W53	0	10		-
WAL - 4	Broomstick Hall Road	Waltham Abbey	539364	200819	53	W53	7	220		-
WAL - A	Honey Lane / M25	Waltham Abbey	540126	199863	50	W50	12.96	0	Employment - Industrial Estate	20,000
WAL - B	Old Shire Lane / Upshire Road	Waltham Abbey	540507	200112	51	W51	19	500		-
WAL - C	Honey Lane / Woodgreen Road	Waltham Abbey	540840	200565	51	W51	45	950	Employment - Industrial Estate	54,500
WAL - E	Paternoster Hill / Pick Hill	Waltham Abbey	539911	201278	52	W52	10	384		-
WAL - F	Parklands	Waltham Abbey	538995	201287	61	W61	42	600		-
WAL - G	Dowding Way	Waltham Abbey	539138	199593	55	W55	26	0	Employment - Warehousing	104,000
WAL - 1	Highbridge Street / Quaker Lane	Waltham Abbey	538167	200547	59	W59	14	15	Employment - Office	7,000
WAL - 2	Powdermill Way	Waltham Abbey	537744	200988	60	W60	11	200		-

3) Location Map of Assessed Junctions, LDP Sites and Committed Developments in Epping Forest District

