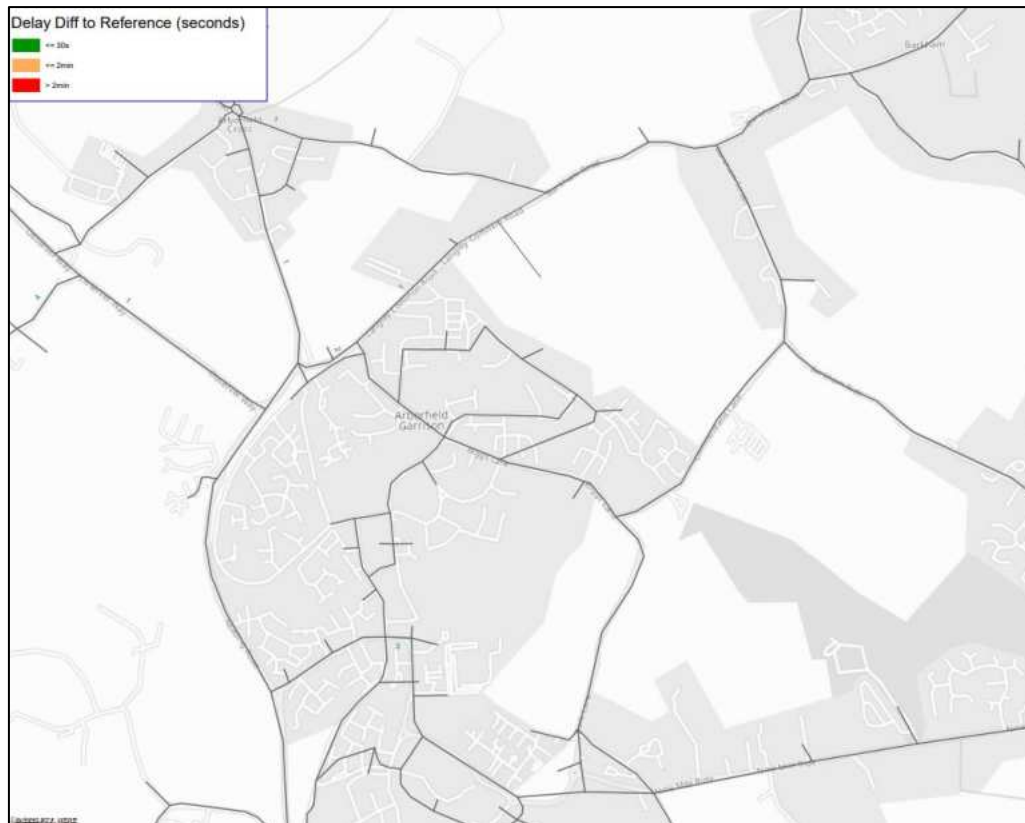


Figure 8.4 Evening peak hour change in delay



8.4.5 The modelled delay outputs demonstrate the development results in insignificant increases in delay along local roads. There is an increase in delay of 3seconds along Barkham Road between Barkham Lane and Bearwood Road in the morning peak hour, and no change in the PM peak hour. The change in delay along Langley Common Road between the site access and Biggs Lane increases by 2 seconds in the morning peak hour and 1 second in the evening peak hour.

8.4.6 The outputs of the Strategic Model demonstrate the development does not result in a 'severe' highways impact.

8.4.7 The full Strategic Model outputs are included as **Appendix F**.

8.5 Individual Junction Modelling

Site Access Junction

8.5.1 To determine whether the proposed site access has sufficient capacity to accommodate the development traffic, an operational assessment of the junction has been undertaken using Junctions 11 modelling software. In line with the modelling scenarios above, just the 2040 With Development scenario has been modelled.

8.5.2 The geometries of the proposed access roundabout (*ref: Drawing ITL11337-GA-01*) have been entered into a Junctions 11 model together with the trip generation for the site based on the adjusted traffic survey trip rates (**Table 6-2**) and 660 dwellings as well as elderly care. For the highways assessment work, the development trips have been distributed in accordance with that contained within the WSTM. However, for the purpose of this capacity assessment, an indicative 50/50 split of vehicles turning left and right from/to Langley Common Road has been used.

8.5.3 The model outputs are included as **Appendix G**, with the results summarised in **Table 8.1**.

Table 8.1 Proposed Site Access Junction – 2040 With Development

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
Langley Common Road (E)	0.54	1	6	0.36	<1	5
Proposed Site Access	0.34	<1	6	0.11	0	3
Langley Common Road (W)	0.50	1	5	0.64	2	7
Proposed Service Road	0.00	0	0	0.00	0	0

Source: Junctions 11

8.5.4 **Table 8.1** shows the proposed site access junction is likely to have a maximum RFC value of 0.64 in the evening peak hour on one arm and minimal queueing will occur on all arms. This demonstrates that the site access will have plenty of capacity to accommodate the development traffic in a future year of 2040.

B3349 / Biggs Lane Roundabout:

8.5.5 The B3349 / Biggs Lane Roundabout is a roundabout that connects traffic from Barkham to Arborfield Green, as well as indirectly to the A327. Its location can be seen in **Figure 8.5**. This priority roundabout was modelled within Junctions 11 to investigate the impact the development would have, in accordance with the scenarios set out previously. The results are shown in **Table 8.2**. The traffic flows from the respective strategic model results have been used.

Figure 8.5 B3349 / Biggs Lane Roundabout Location

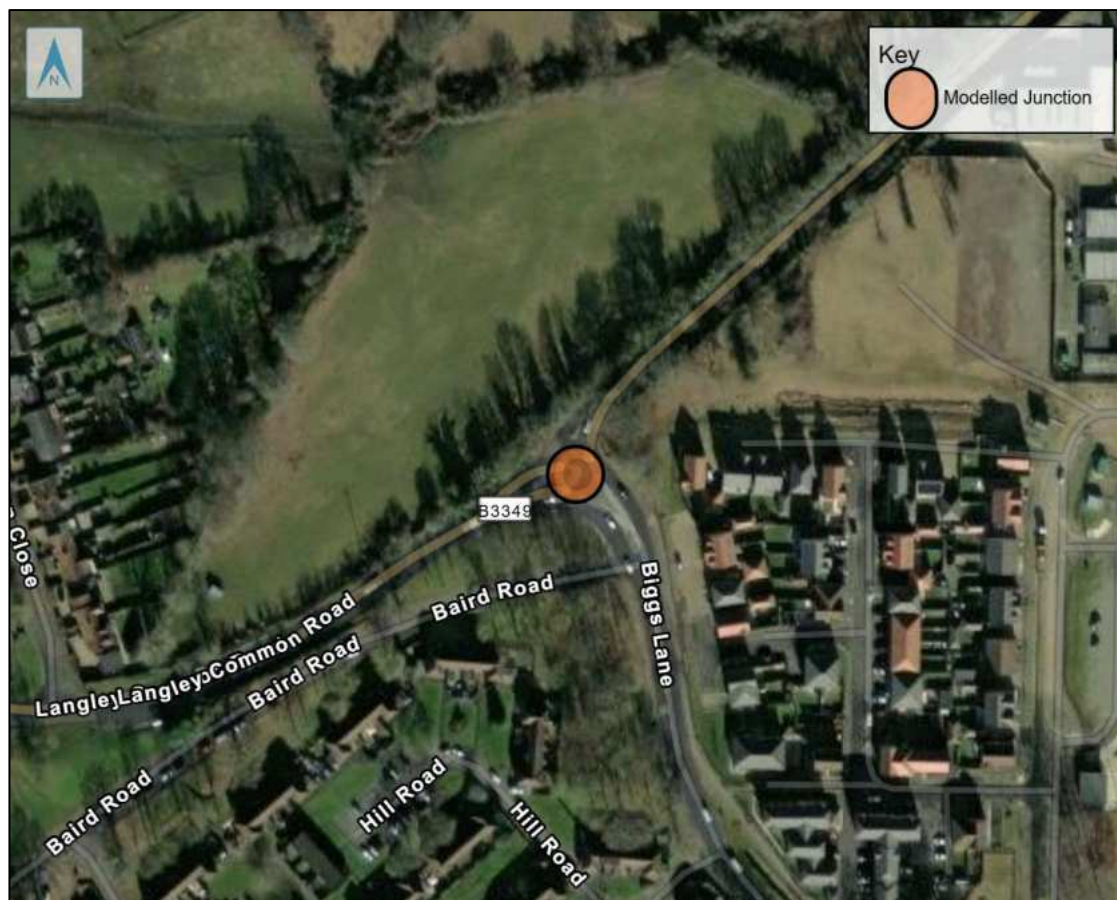


Table 8.2 B3349 / Biggs Lane Roundabout Junction Results

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2040 – Do Minimum						
Biggs Lane	0.37	<1	4	0.19	<1	3
B3349 Langleys Common Road (W)	0.53	1	6	0.55	1	5
B3349 Langleys Common Road (E)	0.47	<1	7	0.49	1	7
2040 – Do Something without Development						
Biggs Lane	0.44	<1	5	0.24	<1	4
B3349 Langleys Common Road (W)	0.63	2	7	0.63	2	7

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
B3349 Langley Common Road (E)	0.60	2	9	0.64	2	10
2040 – Do Something with Development						
Biggs Lane	0.44	<1	5	0.27	<1	4
B3349 Langley Common Road (W)	0.64	2	7	0.68	2	8
B3349 Langley Common Road (E)	0.74	3	13	0.69	2	11

8.5.6 The results indicate that the B3349 / Biggs Lane roundabout is likely to have a maximum RFC value of 0.74 in the morning peak hour on one arm and minimal queueing will occur on all arms. This demonstrates that the roundabout will have spare capacity to accommodate development traffic in a future year of 2040.

B3349 / Eversley Road Roundabout:

8.5.7 The B3349 / Eversley Road Roundabout is a roundabout that connects traffic from Arborfield Cross to Arborfield Green, and resultantly to Barkham also, as well as indirectly to the A327. Its location can be seen below in **Figure 8.6**. This priority roundabout was modelled within Junctions 11 to investigate the impact the development would have, in accordance with the scenarios set out previously. The results are shown in **Table 8.3**. The traffic flows from the respective strategic model results have been used.

Figure 8.6 B3349 / Eversley Road Roundabout Location



Table 8.3 B3349 / Eversley Road Roundabout Junction Results

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2040 – Do Minimum						
Eversley Road (N)	0.41	<1	6	0.38	<1	6
B3349 Langleys Common Road	0.63	2	8	0.50	1	6
Baird Road	0.08	<1	6	0.01	0	5
Eversley Road (W)	0.55	1	5	0.52	1	4
2040 – Do Something without Development						
Eversley Road (N)	0.50	1	7	0.46	<1	7
B3349 Langleys Common Road	0.81	4	15	0.67	2	9
Baird Road	0.15	<1	8	0.02	0	6

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
Eversley Road (W)	0.61	2	6	0.59	1	5
2040 – Do Something with Development						
Eversley Road (N)	0.50	1	7	0.50	1	7
B3349 Langley Common Road	0.83	5	17	0.68	2	9
Baird Road	0.22	<1	10	0.02	0	6
Eversley Road (W)	0.61	2	6	0.63	2	5

- 8.5.8 The results indicate that the B3349 / Eversley Road priority roundabout is likely to have a maximum RFC value of 0.83 in the morning peak hour on one arm with a queue of up to 17 vehicles, but with minimal queueing on all other arms. This demonstrates that the roundabout will have plenty of capacity to accommodate development traffic in a future year of 2040.

A321 / Observer Way / Eversley Road Roundabout

- 8.5.9 The A321 / Observer Way / Eversley Road Roundabout is a priority roundabout that connects traffic from Arborfield Green, Barkham and Wokingham to the strategic road network, especially taking traffic northbound through Arborfield and Shinfield. Its location can be seen below in **Figure 8.7**. This priority roundabout was modelled within Junctions 11 to investigate the impact the development would have, in accordance to the scenarios set out previously. The results are shown in **Table 8.3**. The traffic flows from the respective strategic model results have been used.

Figure 8.7 A327 / Observer Way / Eversley Road Roundabout Location

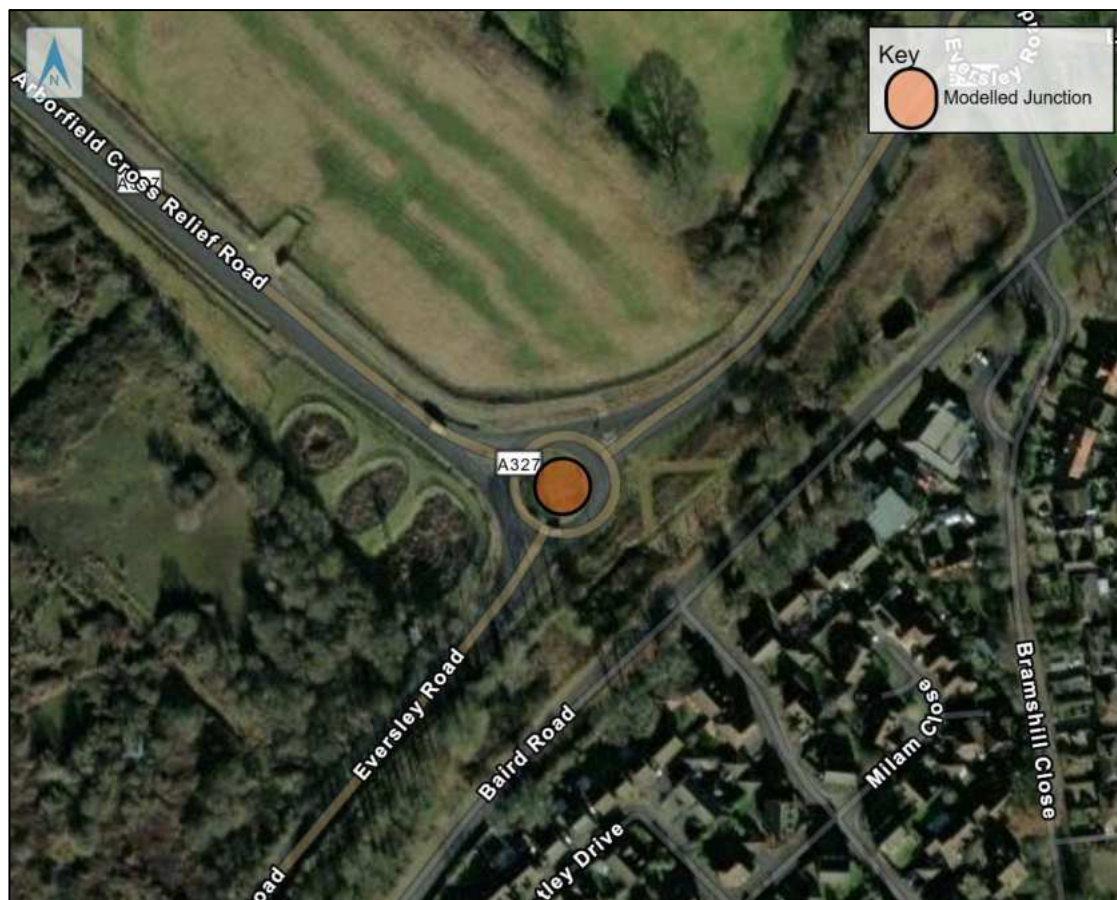


Table 8.4 A327 / Observer Way / Eversley Road Roundabout Junction Results

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2040 – Do Minimum						
A327 Observer Way	0.83	0.49	1	5	0.63	2
Eversley Road (E)	0.64	0.63	2	6	0.55	1
A327 Eversley Road (S)	0.82	0.89	7	28	0.73	3
2040 – Do Something without Development						
A327 Observer Way	0.57	1	6	0.72	3	9
Eversley Road (E)	0.74	3	9	0.65	2	7
A327 Eversley Road (S)	1.12	72	201	0.93	10	37
2040 – Do Something with Development						

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
A327 Observer Way	0.56	1	6	0.75	3	10
Eversley Road (E)	0.77	3	10	0.66	2	8
A327 Eversley Road (S)	1.15	82	231	0.96	14	49

8.5.10 The results indicate that the A327 / Eversley Road / Observer Way priority roundabout is likely to have a maximum RFC value of 0.77 and 0.75 across both morning and evening peaks on the northern and eastern arms. The A327 Eversley Road (S) is anticipated to run over capacity with an RFC of up to 1.12 in the morning peak without considering the development. However, it is to be noted that the development makes minimal addition to this issue, increasing the RFC to 1.15. This demonstrates that the development itself will have minimal additional impact to the roundabout, and that capacity issues are caused by background traffic growth.

B3349 Barkham Road / Barkham Street Roundabout

8.5.11 The B3349 Barkham Road / Barkham Street mini-roundabout connects traffic from Barkham directly southbound towards Hogwood Industrial Estate and Finchampstead. Its location can be seen below in **Figure 8.8**. This mini-roundabout was modelled within Junctions 11 to investigate the impact the development would have, in accordance to the scenarios set out previously. The results are shown in **Table 8.4**. The traffic flows from the respective strategic model results have been used.

Figure 8.8 B3349 Barkham Road / Barkham Street mini-roundabout Location

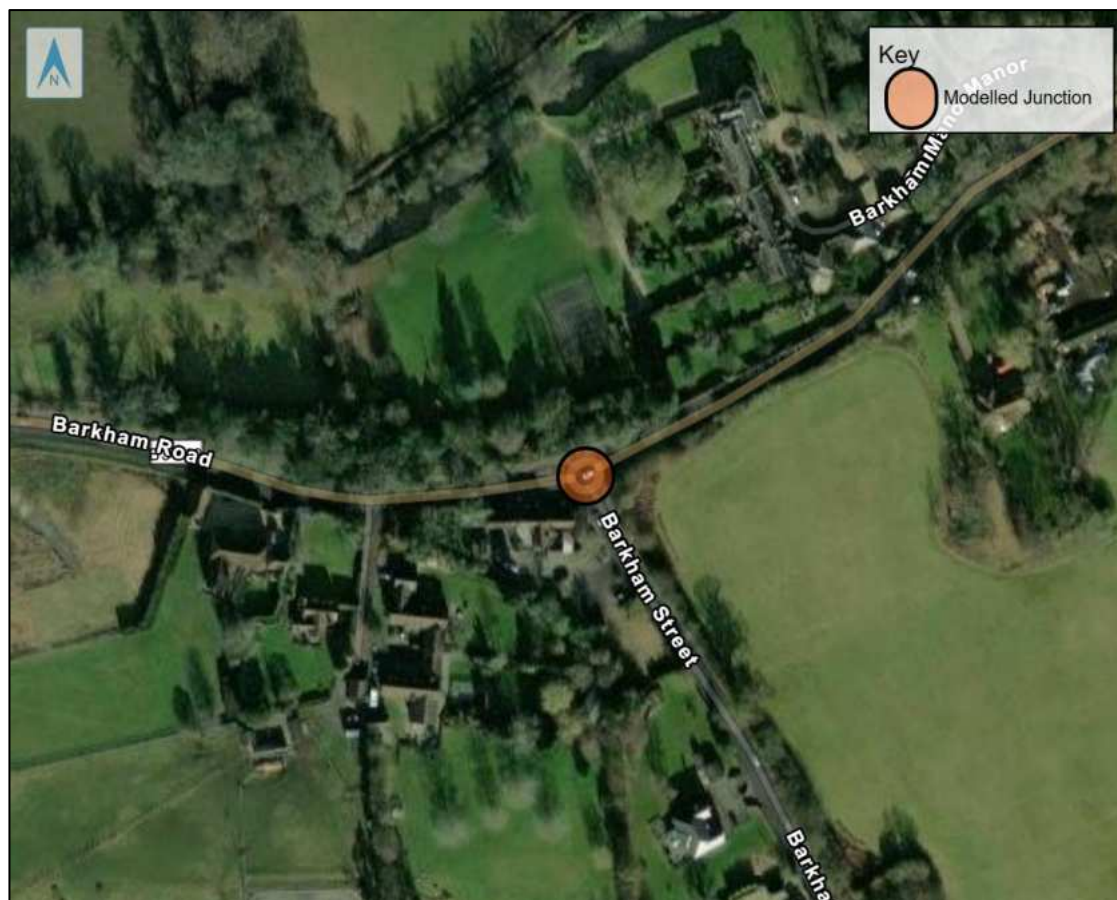


Table 8.5 B3349 Barkham Road / Barkham Street mini-roundabout Junction Results

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2040 – Do Minimum						
Barkham Street	0.83	5	29	0.54	1	13
B3349 Barkham Road (W)	0.78	3	19	0.80	4	21
B3349 Barkham Road (E)	0.82	4	21	0.66	2	11
2040 – Do Something without Development						
Barkham Street	0.95	11	65	0.70	2	22
B3349 Barkham Road (W)	0.86	6	29	0.87	6	32
B3349 Barkham Road (E)	0.93	10	45	0.77	3	16
2040 – Do Something with Development						

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
Barkham Street	1.00	18	100	0.77	3	29
B3349 Barkham Road (W)	0.94	11	52	0.89	7	36
B3349 Barkham Road (E)	0.96	14	61	0.81	4	20

8.5.12 The results indicate that the mini-roundabout is likely to have a maximum RFC value of 0.96 and 0.94 across both morning and evening peaks on the east and west arms respectively, with moderate queueing of up to 18 vehicles expected on Barham Street. The development does result in an increase in RFC at Barkham Street from 0.95 in the future year without development, to 1.00 when the development is added. This increase is not a 'severe' impact.

B3349 Barkham Road / Bearwood Road

8.5.13 The B3349 Barkham Road / Bearwood Road mini-roundabout connects traffic from Barkham directly northbound towards Sindlesham. Its location can be seen below in **Figure 8.9**. This priority roundabout was modelled within Junctions 11 to investigate the impact the development would have, across the scenarios set out previously. The results are shown in **Table 8.6**. The traffic flows from the respective strategic model results have been used.

Figure 8.9 B3349 Barkham Road / Bearwood Road mini-roundabout Location



Table 8.6 B3349 Barkham Road / Bearwood Road mini-roundabout Junction Results

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
2040 – Do Minimum						
Bearwood Road	1.17	64	286	1.05	29	143
B3349 Barkham Road (E)	0.71	2	13	0.72	3	14
B3349 Barkham Road (W)	0.83	5	16	0.66	2	9
2040 – Do Something without Development						
Bearwood Road	1.42	152	789	1.17	63	289
B3349 Barkham Road (E)	0.79	4	18	0.81	4	20
B3349 Barkham Road (W)	0.89	7	25	0.69	2	10
2040 – Do Something with Development						

	Morning Peak Hour (0800-0900)			Evening Peak Hour (1700-1800)		
	RFC	Queue (veh)	Delay (s)	RFC	Queue (veh)	Delay (s)
Bearwood Road	1.48	184	957	1.23	80	390
B3349 Barkham Road (E)	0.79	4	18	0.82	4	21
B3349 Barkham Road (W)	0.94	13	38	0.69	2	10

8.5.14 The junction operates over capacity in both the future reference case and future Local Plan scenarios with Bearwood Road exceeding absolute capacity (1.00 RFC) in both peak hours. Barkham Road West also exceeds theoretical capacity (0.85 RFC) in the future Local Plan scenario morning peak hour. The peak hour development flows through this junction equate to 23 vehicles in the morning peak hour and 27 in the PM peak hour. This is a very modest increase in junction throughput which the model results demonstrate to slightly reduce performance.

8.5.15 Whilst the development itself does not result in the need for mitigation at this location, from pre-application engagement with WBC it is understood that improvements are being reviewed to address existing capacity issues. However, existing highway constraints, land availability and presence of driveways limit the scope. To assist with this, the opportunities for improvements at this location have been reviewed, which WBC may consider as part of any future interventions.

Potential Improvement

8.5.16 The existing design of the junction has been maximised to the furthest extent possible within the constrained highway land available. Both the Barkham Road arms have two entry lanes whilst the Bearwood Road arm has a single arm, vehicles entering the roundabout from here are restricted by relatively constant arrivals along the Barkham Road corridor.

8.5.17 The modelling results demonstrate that queuing along Bearwood Road increases in the future year assessment as opportunities to enter the junction reduce further as mainline flows increase.

8.5.18 It is suggested that a queue responsive signal head be implemented on the Barkham Road eastbound approach to the roundabout. This would respond to queueing on the Bearwood Road arm via loops installed approximately 50m from the roundabout entry. When queueing extends beyond 50m, the signal on Barkham Road East will be triggered, stopping all vehicles conflicting with Bearwood Road at the roundabout and essentially permitting unrestricted priority flow.