

1 INTRODUCTION

1.1 INTRODUCTION

1.1.1 Velocity Transport Planning (VTP) has been appointed by Firethorn Trust (the Applicant) to provide highways and transport planning advice for an outline planning application relating to the development of up to 530 dwellings on land which forms part of the North West Bicester Eco Town development, located in Oxfordshire.

1.1.2 The Application Site falls within the administrative area of Cherwell District Council (CDC) and within the authority of Oxfordshire County Council (OCC) who are the local highway authority.

1.1.3 The Proposed Firethorn Development description for the outline planning application, planning reference: 21/01630/OUT, is as follows:

“Outline planning application for residential development (within Use Class C3), open space provision, access, drainage and all associated works and operations including but not limited to demolition, earthworks, and engineering operations, with the details of appearance, landscaping, layout and scale reserved for later determination.”

1.2 CONSULTATION RESPONSE

1.2.1 A response to the outline planning application was received from CDC on the 21st of September 2021, with the third page of the letter covering matters related to transport. It is noted that paragraph four of the transport comments refers to the potential need for a Grampian Condition to restrict the level of development prior to the implementation of the A4095 Strategic Highway Improvement scheme (Planning Ref 14/01968/F).

1.2.2 For completeness, the CDC comment is replicated below:

“There may be a need for a Grampian condition to restrict the level of development permissible until such time that the realigned A4095 is in place and opened to vehicular traffic.”

1.3 REPORT STRUCTURE

1.3.1 A comprehensive response to the wider CDC comments and in relation to the other consultation responses is set out within a separate Technical Note (TN) prepared by VTP to respond to the wider comments raised in relation to highways and transport matters.

1.3.2 The purpose of this TN is to address the CDC comments in relation to the need for a Grampian Condition and following this introduction, this TN is structured as follows:

- ⦿ Section 2 - Policy Context;
- ⦿ Section 3 - Overview of Current Position;
- ⦿ Section 4 - Proposed Methodology;
- ⦿ Section 5 - Junction Capacity Assessment; and
- ⦿ Section 6 - Conclusions.



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2 HISTORICAL ASSESSMENTS

2.1 OVERVIEW

2.1.1 The Proposed Development and Application Site forms part of the wider North West Bicester (NWB) Eco Town proposals. The NWB Eco Town is a zero-carbon sustainable development that will provide a new community of up to 6,000 homes, new employment opportunities, and attractive amenities on 390 hectares of land to the north west of Bicester Town Centre.

2.1.2 The overall Eco Town scheme is guided by the NWB Masterplan, which is detailed within CDC's NWB Supplementary Planning Document (adopted February 2016), which expands upon Policy Bicester 1 of the adopted CDC Local Plan 2011-2031.

2.1.3 To date, a number of the initial phases of the wider NWB Masterplan have been brought forward, as follows:

- ⊙ Exemplar Scheme, known as 'Elmsbrook', (Planning Ref 10/01780/hybrid) comprising a mixed-use scheme for 393 residential dwellings, commercial and education uses. It was granted planning consent on the 20th of July 2012 and is currently nearing completion, but still only partially occupied.
- ⊙ Application 1: Land North of the Railway Line, (Planning Ref 14/01384/OUT) comprising an outline application for up to 2,600 residential dwellings, commercial and education uses.
- ⊙ Application 2: Land South of Railway Line, (Planning Ref 14/01641/OUT) comprising an outline application for up to 900 residential dwellings, commercial and education uses.

2.1.4 Both of the outline planning applications for Application 1 and Application 2 have a resolution to grant, subject to the agreement of Section 106 contributions. It is key to note that the majority of the Application Site, i.e. all of the larger western parcel, was included within the assessment of the Application 1 proposals, which excluded the permitted Exemplar Scheme.

2.1 A4095 STRATEGIC HIGHWAY IMPROVEMENT SCHEME

2.1.1 The A4095 Strategic Highway Improvement scheme, (Planning Ref 14/01968/F) was granted planning permission by CDC on the 21st of August 2019 for the following:

"Construction of new road from Middleton Stoney Road roundabout to join Lord's Lane, east of Purslane Drive, to include the construction of a new crossing under the existing railway line north of the existing Avonbury Business Park, a bus only link east of the railway line, a new road around Hawkwell Farm to join Bucknell Road, retention of part of Old Howes Lane and Lord's Lane to provide access to and from existing residential areas and Bucknell Road to the south and associated infrastructure."

2.1.2 It is noted that the A4095 Strategic Highway Improvement scheme plays a key role in the operation of the highway network, particularly to the west of Bicester, and will require contributions from the developments within the wider NWB Masterplan and other Local Plan allocations.

2.1.3 It is acknowledged that the existing arrangement of the A4095 from its junction with the B4030 and Middleton Stoney Road in the south, to a point between the existing junction of Bicester Road with Bucknell Road and the existing junction of the B4100 and Banbury Road to the north, is not suitable to accommodate the predicted levels of traffic that would be generated by the delivery of the proposed development identified within the adopted CDC Local Plan.



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- 2.1.4 The A4095 Strategic Highway Improvement scheme has been developed to accommodate the additional levels of development traffic that are predicted to be generated by the proposed development identified within the adopted CDC Local Plan.
- 2.1.5 Whilst Phase 1 of the approved A4095 Strategic Highway Improvement scheme has been constructed, which relates to the new vehicular underpass and pedestrian crossing of the railway line, OCC are currently undertaking a Value Engineering assessment of the further Phases of the scheme. As such, a finalised cost and programme for delivery of the remaining Phases of the A4095 Strategic Highway Improvement scheme, is yet to be confirmed by OCC.
- 2.1.6 For completeness, the current Phasing Plan of the A4095 Strategic Highway Improvement scheme is included at **ATTACHMENT A** of this TN.
- 2.1.7 The A4095 Strategic Highway Improvement scheme was predicted to be completed by 2024, but as noted above, due to a Value Engineering assessment, the final cost and programme have not been confirmed by OCC, but it is assumed that 2026 might be a reasonable prospect for the implementation of the A4095 Strategic Highway Improvement scheme.
- 2.1.8 CDC and OCC have acknowledged that some development can be delivered prior to the implementation of the A4095 Strategic Highway Improvement scheme and the traffic associated with the occupation of a limited amount of development can be accommodated on the existing highway network without having a “severe” highways impact.
- 2.1.9 To limit the number of occupations, and therefore the traffic impact, which might be acceptable prior to the implementation of the A4095 Strategic Highway Improvement scheme, CDC have identified Grampian Conditions associated with a number of permitted developments within the area restricting the levels of traffic impact on the existing highway network prior to the implementation of the A4095 Strategic Highway Improvement scheme.

2.2 APPLICATION 1

- 2.2.1 In 2014, a mechanism to identify suitable trigger points for the provision of the A4095 Strategic Highway Improvement scheme was developed and agreed by landowners within the wider NWB Masterplan, OCC and CDC - with reference to the anticipated impact of Application 1 (14/01384/OUT) and other cumulative schemes within the local area.
- 2.2.2 This was summarised in a memorandum produced by Hyder Consulting dated the 12th of December 2014, which was circulated to, and agreed with, both CDC and OCC. For completeness, a copy of the memorandum is included at **ATTACHMENT B** of this TN.
- 2.2.3 The assessment undertaken by Hyder Consulting sought to determine the quantum of development that could come forward and be occupied on the wider NWB Masterplan prior to the delivery of the A4095 Strategic Highway Improvement scheme.
- 2.2.4 This was undertaken through a series of proportionate traffic flow tests to determine the operation of the critical junction along the existing route, which is identified as being the A4095 Howes Lane / Bucknell Road priority junction, which is a known constraint along the existing network, and which will be significantly relieved with the implementation of the A4095 Strategic Highway Improvement scheme.
- 2.2.5 The memorandum initially assessed the full development quantum of the Application 1 proposals within the wider NWB Masterplan that had been envisaged to come forward by the future year of 2024, which



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equated to a total 2,256 (including the Exemplar scheme) units. The assessment then sought to determine thresholds from the full allocation that could reasonably come forward prior to the implementation of the A4095 Strategic Highway Improvement scheme e.g. 40% of the estimated allocation by 2024 - 900 units, and circa 55% of the estimated allocation by 2024 - 1,200 units.

2.2.6 The key threshold used to derive whether the impact of the number of units was acceptable was not the typical junction modelling criteria of Ratio of Flow to Capacity (RFC) but was instead whether queuing at the critical priority junction blocked the nearby junctions downstream, including the A4095 / Shakespeare Drive traffic signal junction, and the A4095 / Bucknell Road roundabout junction.

2.2.7 The assessment for the full allocation of 2,256 units considerably impacted the nearby junctions and was not considered acceptable by OCC. The assessment also determined that 1,200 units was unacceptable and not deliverable prior to the implementation of the A4095 Strategic Highway Improvement scheme, with downstream queues as follows:

- ⦿ A4095 Howes Lane approach: a queue of 70 vehicles was identified in the PM Peak hour, which would block the A4095 / Shakespeare Drive traffic signal junction; and
- ⦿ Bucknell Road approach (turning right into the A4095): a queue of 14 vehicles was identified in the PM peak hour, which would block the A4095 / Bucknell Road roundabout junction.

2.2.8 However, the Hyder Consulting assessment concluded that a total of 900 units could be delivered on the NWB Masterplan on land to the north of the railway line as the respective queues on the A4095 Howes Lane (28 vehicles) and Bucknell Road (8 vehicles) did not queue back and obstruct any of the nearby junctions.

2.2.9 For completeness, an extract of the junction modelling tables from Table 3 of the Hyder Consulting memorandum are provided in **Figure 2-1**.

Figure 2-1: Hyder Consulting Memo (Table 3) - A4095 Howes Lane / Bucknell Road PICADY Results

Table 3: Bucknell Road/ A4095 Howes Lane PICADY Capacity Tests (J20)

Arm / Turning Movement	AM Peak (0800-0900)					
	Test 1 – Interim Year 2024		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes	
	RFC	Queue	RFC	Queue	RFC	Queue
Howes Lane - Right Turn	2.922	26	0.225	0	0.382	1
Howes Lane - Left Turn	3.005	212	0.768	3	0.844	5
Bucknell Road N (Right Turn to Howes Lane)	1.184	134	0.845	7	0.917	13
Arm / Turning Movement	PM Peak (1700-1800)					
	Test 1 – Interim Year 2024		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes	
	RFC	Queue	RFC	Queue	RFC	Queue
Howes Lane - Right Turn	6.983	51	0.886	4	1.068	8
Howes Lane - Left Turn	7.065	362	1.028	28	1.153	70
Bucknell Road N (Right Turn to Howes Lane)	1.17	127	0.863	8	0.929	14

2.2.10 It is noted that of the 900 units assessed, 393 units had already been effectively taken out of the capacity by the Exemplar scheme, leaving capacity for a further 507 units that could be occupied on with wider NWB Masterplan prior to the implementation of the A4095 Strategic Highway Improvement scheme.

2.1 ALBION LAND

2.1.1 Following agreement of the methodology set out within the Hyder Consulting memorandum from 2014 with OCC and CDC, an additional assessment was undertaken David Tucker Associates (DTA) in 2015 on behalf of the developers of the Albion Land scheme (Planning Ref 12/00455/HYBRID), which was granted planning



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permission by CDC on the 07th of August 2017.

- 2.1.2 This additional assessment by DTA identified that the existing A4095 Howes Lane / Bucknell Road priority junction could accommodate the traffic generated by an 'additional' 150 residential dwellings and commercial uses associated with the Albion Land development.
- 2.1.3 Whilst the Hyder Consulting memorandum identified that the implementation of the A4095 Strategic Highway Improvement scheme was required at a point between the occupation of 900 units and 1,200 units north of the railway, the assessment did not identify the precise 'tipping point' above which the A4095 Howes Lane / Bucknell Road priority junction would block the downstream junctions and require the implementation of the A4095 Strategic Highway Improvement scheme.
- 2.1.4 To establish what this 'tipping point' might be, DTA prepared a Technical Note dated the 17th of September 2015 to identify if there was scope for additional occupations to be agreed prior to the implantation of the A4095 Strategic Highway Improvement scheme. A copy of this TN is contained at **ATTACHMENT C**.
- 2.1.5 DTA consulted with Hyder Consulting to obtain the traffic data and traffic model from the 2014 memorandum assessment, to see whether the additional 150 residential units at the Albion Land scheme could be delivered prior to the implementation of the A4095 Strategic Highway Improvement scheme.
- 2.1.6 The work undertaken by DTA concluded that the additional 150 units could be accommodated on the existing highway network, bringing the cumulative total of occupations north of the railway line to 1,050 dwellings. The DTA TN identified that these additional 150 dwellings would still not result in a 'severe' impact at the A4095 Howes Lane / Bucknell Road priority junction, as the queues on Howes Lane and Bucknell Road did not queue back and block the nearby junctions.
- 2.1.7 For completeness, an extract from Table 1 of the DTA Technical Note is provided below in **Figure 2-2** to present the junction modelling results.



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Figure 2-2: DTA Technical Note (Table 1) - A4095 Howes Lane / Bucknell Road PICADY Results

Table 1: Bucknell Road/A4095 Howes Lane PICADY Capacity Tests – Hyder Flows

	AM Peak (8000-9000)							
	Test 1 – Interim Year 2024		Test 2 – NWB 900 Homes		Test 2a – NWB 1050 Homes		Test 3 – NWB 1200 Homes	
Arm/Turning Movement	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Howes Lane – Right Turn	2.922	26	0.225	0	0.29	0	0.382	1
Howes Lane – Left Turn	3.005	212	0.768	3	0.80	4	0.844	5
Bucknell Road N (Right Turn to Howes Lane)	1.184	134	0.845	7	0.88	9	0.917	13

	PM Peak (1700-1800)							
	Test 1 – Interim Year 2024		Test 2 – NWB 900 Homes		Test 2a – NWB 1050 Homes		Test 3 – NWB 1200 Homes	
Arm/Turning Movement	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Howes Lane – Right Turn	6.983	51	0.886	4	1.05	6	1.068	8
Howes Lane – Left Turn	7.065	362	1.028	28	1.09	48	1.153	70
Bucknell Road N (Right Turn to Howes Lane)	1.17	127	0.863	8	0.9	10	0.929	14

Source: Tests 1, 2 and 3 – Hyder Consulting. Test 2a – DTA utilising Hyder Consulting base data.

- 2.1.8 The DTA assessment concluded that the additional 150 units, or cumulative total of 1,050 units, would bring the queues up to 48 vehicles on Howes Lane and 10 vehicles on Bucknell Road, which would still not block the downstream junctions and was thus acceptable in transport terms, despite the RFCs exceeding 1.0 which is typically regarded as the maximum theoretical capacity of a junction.
- 2.1.9 In summary, the work undertaken by DTA did not challenge the Hyder Consulting conclusion that 1,200 units north of the railway line was unacceptable, it just acknowledged that there was scope to bring the unit threshold up to 1,050 units, which included the 150 units at the Albion Land scheme and the 393 units at Exemplar.
- 2.1.10 It is acknowledged that an additional sensitivity test was undertaken by DTA to account for commercial land not being delivered at the projected rates within the Local Plan monitoring reports. However, this sensitivity test only sought to identify the proportional impacts of the commercial uses at the Albion Land scheme within a separate assessment and did not seek to challenge the number of occupations of the residential units that would be deemed as acceptable north of the railway at the NWB Masterplan.
- 2.1.11 The Albion Land application was approved on 7th August 2017, with no Grampian condition placed by CDC to restrict the quantum of development that could come forward prior to the implementation of the A4095 Strategic Highway Improvement scheme. On that basis, it is considered that the work undertaken by DTA, and conclusions reached in support of the Albion Land application, was deemed to be acceptable to both CDC and OCC.



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3 PROPOSED METHODOLOGY

3.1 OVERVIEW

- 3.1.1 At present and based on the technical work undertaken to date that is discussed within Section 2 of this TN, it is considered that in excess of 1,050 units, but no more than 1,200 units, could theoretically be delivered at the NWB Masterplan prior to the implementation of the A4095 Strategic Highway Improvement scheme.
- 3.1.2 The purpose of this assessment is therefore to determine the precise ‘tipping point’, above which no further development can come forward at the NWB Masterplan prior to the implementation of the A4095 Strategic Highway Improvement scheme.
- 3.1.3 As per Section 2, it is considered that a portion of the traffic associated with the Proposed Development has already been considered at the A4095 Howes Lane / Bucknell Road junction, as part of the Hyder Consulting work for Application 1.

3.2 METHODOLOGY

- 3.2.1 As the Proposed Development has already been partially considered within the Hyder Consulting work undertaken in 2014 in support of Application 1 and within the subsequent Albion Land assessments, it is proposed to pro-rata the results of the PICADY modelling undertaken by Hyder Consulting and DTA to ensure a consistent assessment and approach.
- 3.2.2 It is acknowledged that traffic data from the Bicester Transport Model (BTM) was utilised in support of the Firethorn planning application and the associated traffic modelling for the Proposed Development within the supporting Transport Assessment. However, whilst the traffic data from the BTM does include a future interim year of 2026, which it is noted is likely to be a more accurate date as to when the A4095 Strategic Highway Improvement scheme might be in place, the BTM interim year of 2026 includes the provision of the A4095 Strategic Highway Improvement scheme as it was expected to be implemented by 2024. On that basis, it would not be appropriate to utilise the BTM data, as it would not be in accordance with the previous technical work undertaken by Hyder Consulting and DTA and would not follow the same methodology.
- 3.2.3 It is considered that given the planning consents - the methodology and results of the assessment for both the 1,050 units and 1,200 units associated with the NWB Masterplan north of the railway line have already been reviewed and deemed as acceptable by OCC and CDC, with 1,050 units being acceptable and the implementation of the A4095 Strategic Highway Improvement scheme being required at a point prior to the occupation of 1,200 units.
- 3.2.4 Therefore, the proposed methodology set out within this TN does not seek to challenge what was previously agreed, but seeks to determine the precise ‘tipping point’ above the previously agreed 1,050 occupations at which the traffic impact on the existing A4095 Howes Lane / Bucknell Road priority junction would reach a point where it became “severe”, i.e. at which point the traffic queues would block the nearby junctions.

3.3 SEVERITY THRESHOLDS

- 3.3.1 In order to determine the trigger points that cause the junction to fail, and the traffic impact associated with the NWB Masterplan to become “severe”, the key thresholds determined by OCC relate to queuing back and blocking of the A4095 / Shakespeare Drive Signal junction.
- 3.3.2 It is acknowledged that queues could impact the A4095 / Bucknell Road roundabout, with the Albion Land



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assessment regarded as acceptable with a 10 vehicle queue on Bucknell Road, which may partially queue into the roundabout.

3.3.3 However, given the nature of roundabouts, it is likely that these queues would form ‘sliver queues’ and still allow traffic to move slowly through the junction. It is considered that queues at this junction would therefore not present as much of a safety concern as any queues at the A4095 / Shakespeare Drive Signal junction, as drivers would simply just wait to give way.

3.3.4 From a review of the geometry along the A4095 Howes Lane, it is considered that the key tipping point is reached when the queue exceeds 390m or is the equivalent to a queue of 65 vehicles - which would cause vehicles to block back and queue through the A4095 / Shakespeare Drive Signal junction.

3.4 REFERENCE SCENARIOS

3.4.1 The difference between the PICADY modelling results for the 1,050 and 1,200 NWB allocations presented in **Figure 2-2** have been proportionally allocated to determine the uplift in both RFC and Queues associated with the additional units at the NWB Masterplan to the north of the railway line.

3.4.2 For completeness, the following reference scenarios have been utilised for the A4095 Howes Lane / Bucknell Road junction:

- ⊙ Test 2 - 900 units at NWB, within the Hyder Consulting memorandum dated the 12th of December 2014;
- ⊙ Test 2A - 1,050 units at NWB, within the DTA TN dated the 17th of September 2015; and
- ⊙ Test 3 - 1,200 units at NWB, within the Hyder Consulting memorandum dated the 12th of December 2014.

3.4.3 The proportional percentage increases are calculated based on the difference between 1,050 units at NWB and 1,200 for robustness, as the impacts on the RFCs and queues will increase in direct portion to the number of units and traffic being generated.

3.4.4 The proportionate increases in both RFC and vehicle queue (Q) per unit is presented in **Table 3-1** for the AM peak and **Table 3-2** for the PM peak.

Table 3-1: Proportionate Increase in RFC and Queue per Unit - AM Peak

ARM	2 NWB: 900 UNITS SOURCE: HYDER		2A NWB: 1,050 UNITS SOURCE: DTA		3 NWB: 1,200 UNITS SOURCE: HYDER		APPROXIMATE INCREASE PER UNIT (%)	
	RFC	Q	RFC	Q	RFC	Q	RFC	Q
Howes Lane (Right Turn)	0.225	0	0.29	0	0.382	1	0.21%	-
Howes Lane (Left Turn)	0.768	3	0.8	4	0.844	5	0.04%	0.17%
Bucknell Road N (Right Turn)	0.845	7	0.88	9	0.917	13	0.03%	0.30%



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Table 3-2: Proportionate Increase in RFC and Queue per Unit - PM Peak

ARM	2 NWB: 900 UNITS SOURCE: HYDER		2A NWB: 1,050 UNITS SOURCE: DTA		3 NWB: 1,200 UNITS SOURCE: HYDER		APPROXIMATE INCREASE PER UNIT (%)	
	RFC	Q	RFC	Q	RFC	Q	RFC	Q
Howes Lane (Right Turn)	0.886	4	1.05	6	1.068	8	0.01%	0.22%
Howes Lane (Left Turn)	1.028	28	1.09	48	1.153	70	0.04%	0.31%
Bucknell Road N (Right Turn)	0.863	8	0.9	10	0.929	14	0.02%	0.27%

3.5 PROPOSED ASSESSMENT SCENARIOS

3.5.1 A sensitivity test has then been employed using the methodology outlined above to determine the precise number of units that can be accommodated in the interim without causing the vehicle queues to block the A4095 / Shakespeare Drive signal junction e.g. where queueing on the A4095 Howes Lane exceeds 65 vehicles.

3.5.2 Using the proportional increases discussed in the above tables, the following theoretical development quantum at NWB has been assessed:

- ⊙ Scenario 2B: 1,100 homes at NWB;
- ⊙ Scenario 2C: 1,150 homes at NWB; and
- ⊙ Scenario 2D: 1,165 homes at NWB.

3.6 ASSESSMENT

3.6.1 The results of the revised theoretical junction capacity assessments for the AM peak is provided in **Table 3-3** and in **Table 3-4** for the PM peak.

Table 3-3: NW Bicester Theoretical Scenario Assessments - AM Peak

ARM	2A NWB: 1,050 SOURCE: DTA		2B NWB: 1,100 VTP ASSESSMENT		2C NWB: 1,150 VTP ASSESSMENT		2D NWB: 1,165 VTP ASSESSMENT		3 NWB: 1,200 SOURCE: HYDER	
	RFC	Q	RFC	Q	RFC	Q	RFC	Q	Q	RFC
Howes Lane (Right Turn)	0.290	0	0.031	1	0.351	1	0.361	1	0.382	1
Howes Lane (Left Turn)	0.800	4	0.815	4	0.829	5	0.834	5	0.844	5
Bucknell Road (Right Turn)	0.880	9	0.892	10	0.905	12	0.908	12	0.917	13



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Table 3-4: NW Bicester Theoretical Scenario Assessments - PM Peak

ARM	2A NWB: 1,050 SOURCE: DTA		2B NWB: 1,100 VTP ASSESSMENT		2C NWB: 1,150 VTP ASSESSMENT		2D NWB: 1,165 VTP ASSESSMENT		3 NWB: 1,200 SOURCE: HYDER	
	RFC	Q	RFC	Q	RFC	Q	RFC	Q	RFC	Q
Howes Lane (Right Turn)	1.050	6	1.056	7	1.062	7	1.064	8	1.068	8
Howes Lane (Left Turn)	1.090	48	1.111	55	1.132	63	1.138	65	1.153	70
Bucknell Road (Right Turn)	0.900	10	0.910	11	0.919	13	0.922	13	0.929	14

- 3.6.2 The revised sensitivity assessment suggests that the precise ‘tipping point’ for development quantum at NWB is 1,165 units, with the queues in the PM peak meeting the 65 vehicle queue threshold that would cause vehicles to queue back and block the A4095 / Shakespeare Drive signal junction.
- 3.6.3 To ensure robustness within the assessment, it could therefore be assumed that the development quantum at NWB north of the railway could increase to 1,150 units, which will add an additional margin for error at the junction, though 1,165 would be the maximum development quantum possible.
- 3.6.4 Once the threshold of 1,165 units has been reached, there is no further capacity within the existing A4095 Howes Lane / Bucknell Road priority junction without the need to implement the A4095 Strategic Highway Improvement scheme.



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4 CONCLUSIONS

4.1 OVERVIEW

4.1.1 Velocity Transport Planning (VTP) has been appointed by Firethorn Trust (the Applicant) to provide highways and transport planning advice for an outline planning application relating to the development of up to 530 dwellings on land which forms part of the North West Bicester Eco Town development, located in Oxfordshire.

4.1.2 In their response dated the 21st of September 2021, Cherwell District Council (CDC) noted that there may be a need for a Grampian Condition to restrict the quantum of development that could come forward at the application site prior to the implementation of the A4095 Strategic Highway Improvement scheme as the existing A4095 Howes Lane / Bucknell Road priority junction can only accommodate a limited amount of additional traffic until the impacts are considered to be “severe”.

4.1.3 An historic assessment by Hyder Consulting in 2014 concluded that the upper thresholds of development that could come forward prior to the implementation of the A4095 Strategic Highway Improvement scheme would be 900 units at the North West Bicester (NWB) Masterplan north of the railway line, which was agreed with both Oxfordshire County Council (OCC) and CDC. The Hyder Consulting assessment concluded that 1,200 units at the NWB Masterplan could not be accommodated and would require the implementation of the A4095 Strategic Highway Improvement scheme to mitigate the impact of this additional traffic.

4.1.4 A subsequent assessment was undertaken by David Tucker Associates (DTA) that updated the findings of the Hyder Consulting assessment, utilising the same methodology, to conclude a threshold of 1,050 units (including 150 units at the Albion Land scheme) would be acceptable prior to delivery of the A4095 Strategic Highway Improvement scheme, with 1,200 units still not being deemed as acceptable without triggering the need for mitigation.

4.1.5 In summary, of the units considered within the NWB Masterplan on land to the north of the railway line that have previously been assessed and deemed as acceptable on the A4095 Howes Lane / Bucknell Road junction, the number of units by scheme is broken down as follows:

- ⦿ 393 units associated with the Exemplar Scheme
- ⦿ 150 units associated with the Albion Land application
- ⦿ **Total: 543 units at NWB**

4.1.6 Based on the previously agreed threshold of 1,050 units at NWB Masterplan, this left a spare capacity for 507 units on the NWB Masterplan land to the north of the railway line prior to the implementation of the A4095 Strategic Highway Improvement scheme.

4.2 ASSESSMENT CONTEXT AND FINDINGS

4.2.1 Based on the findings of the updated assessment undertaken within this Technical Note, it is suggested that the overall development quantum that could be accommodated at the NWB Masterplan on land to the north of the railway line prior to the implementation of the A4095 Strategic Highway Improvement scheme, is in fact between 1,150 and 1,165 units, which would supersede the indicative threshold of 900 units previously concluded by Hyder Consulting in support of Application 1, and the 1,050 units concluded by DTA in support of Albion Land proposals.



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4.2.2 This conclusion also accords with the findings of the previous assessment for Application 1 undertaken by Hyder Consulting, which suggested an upper threshold of 1,200 units at the NWB Masterplan would not be acceptable without the implementation of the A4095 Strategic Highway Improvement scheme.

4.3 CONCLUSIONS

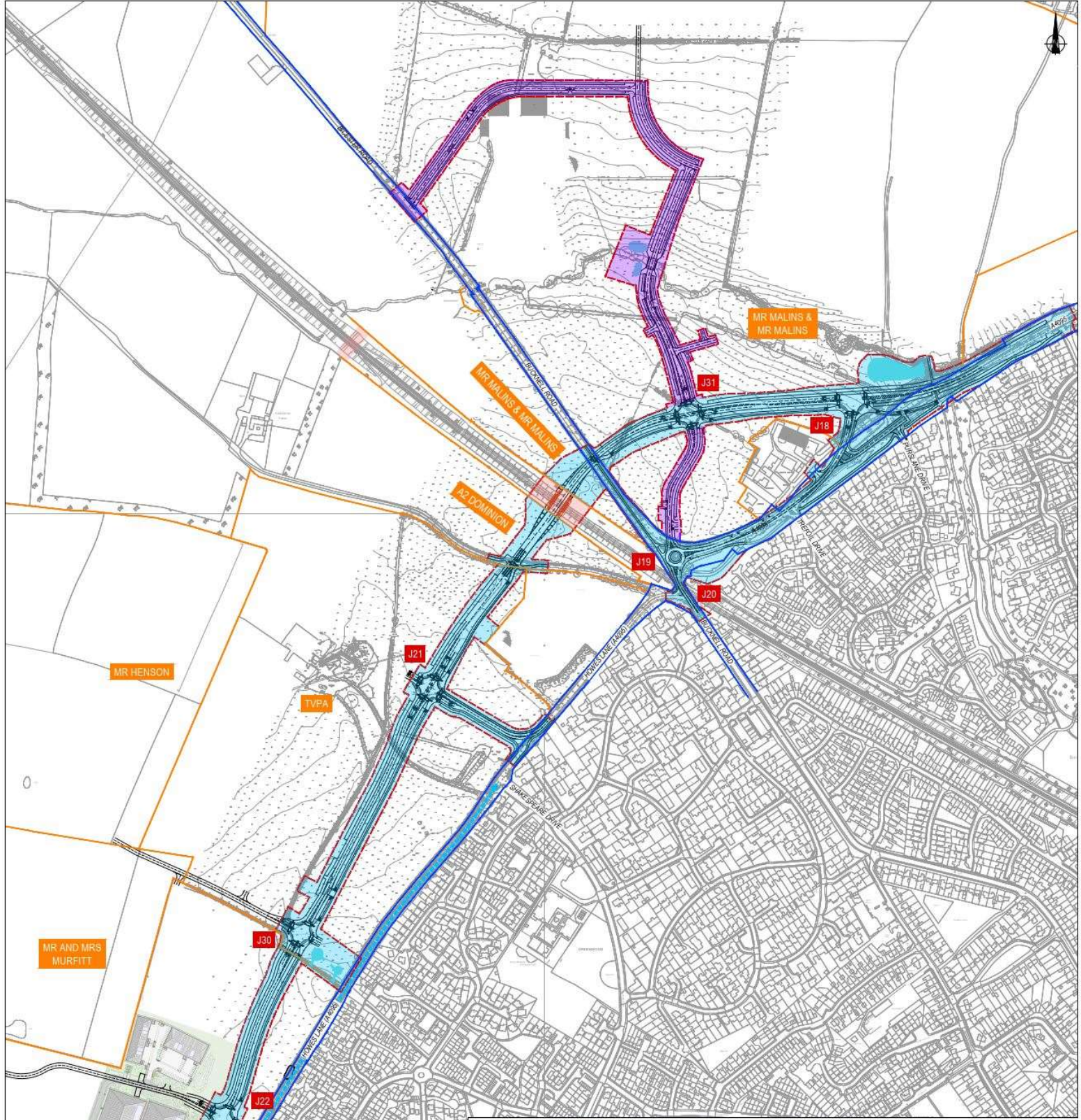
4.3.1 In light of the above, it is considered there is spare capacity for approximately 607 units at the NWB Masterplan land to the north of the railway line (1,150 less 543) that could be delivered prior to the implementation of the A4095 Strategic Highway Improvement scheme, which accounts for the units already allocated to Exemplar (393) and Albion Land (150).

4.3.2 On this basis, it is considered there would be no requirement for a Grampian Condition on the Proposed Development of 530 units. This TN has demonstrated that the traffic impact of the Firethorn development can be suitably accommodated at the existing A4095 Howes Lane / Bucknell Road junction without resulting in a “severe” highways impact on the local network.



ATTACHMENT 1

A4095 STRATEGIC HIGHWAY IMPROVEMENT PHASING PLAN



SITE PLAN
 (APPROXIMATE SCALE 1:10,000)

KEY:

- PLANNING APPLICATION BOUNDARY
- LAND OWNERSHIP BOUNDARIES
- HIGHWAY BOUNDARY
- PHASE 1 - NEW RAIL UNDERPASS
- PHASE 2 - NEW STRATEGIC LINK ROAD
- PHASE 2B - CONVERSION OF EXISTING HOVES LANE (TO BE AGREED)
- PHASE 3 - PROPOSED NORTHERN LINK ROAD AND TWO-WAY BUS ONLY LINK

Rev	Description	Date	Drawn	Checked	Appr'd

Drawing Issue Status: **FOR INFORMATION**

**A4095 NORTH WEST BICESTER
 PROPOSED LINKE ROAD DESIGN
 PERMANENT REPLACEMENT SCHEME
 SCHEME PHASING PLAN**

Client: **Balfour Beatty** **Stantec**

Project No:	48135/5501/SK018	Revision:	J1	Date:	19/03/2024
Scale:	1:2000	Author:	JH	Drawn:	PH
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Balfour Beatty | Stantec
 48135/5501/SK018

ATTACHMENT 2

HYDER CONSULTING MEMORANDUM (DECEMBER 2014)

MEMORANDUM

Date 12 December 2014
Reference UA005241 NW Bicester Development
From Janice Hughes
To Jacqui Cox - OCC
Michael Deadman - OCC
Jenny Barker - CDC
Copies Gerry Walker – A2 Dominion
Steve Hornblow – A2 Dominion
Steve Jury – A2 Dominion
Iain Painting – Barton Wilmore
Gary Young - Farrell's
Philip Harker – Hyder Consulting
Subject **NW Bicester - Transport Infrastructure Phasing**

1.1 Introduction

This memorandum sets out suggested phasing of transport infrastructure for NW Bicester. Trigger points in terms of occupation of homes are proposed for the delivery of key elements of access infrastructure and off-site mitigation.

The infrastructure elements are discussed in relation to the overall NW Bicester development as well as how this relates to the Application 1 and 2 developments submitted by A2 Dominion.

The infrastructure discussed in this memorandum is as follows:

- A4095 NW Strategic Link Road (the realignment of Howes Lane and Lords Lane);
- Signalisation of the Exemplar Southern Access junction;
- Capacity improvements to the A4095/ B4100 Banbury Road roundabout junction;
- Traffic calming measures in Bucknell Village;
- Walking and Cycling improvements in Shakespeare Drive; and
- Traffic reduction/ safety improvements at the B4100/ Caversfield junction.

It should be noted that this memorandum does not discuss town centre measures or eastern perimeter road improvements as information is awaited on the OCC proposals.

1.2 A4095 NW Strategic Link Road

The A4095 Strategic Link Road is proposed in order to address the constraints of the existing route to accommodate future planned growth including most notably the Howes Lane/ Bucknell Road junction as well as the poor standard of the Howes Lane road alignment.

In order to inform the phasing of this key element of transport infrastructure, traffic modelling results for a Local Development Plan Interim Year of 2024 have been obtained from White Young Green. The modelling scenario was developed on behalf of Oxfordshire County Council to inform the Local Development Plan

Modifications. The Interim Year 2024 scenario includes 1,863 homes in NW Bicester plus the Exemplar Development (total of 2,256) but does not include the A4095 NW Bicester Strategic Link Road, in order to enable an assessment to be undertaken of the point at which the scheme is required for planned growth.

The level of development included in the Interim Year is set out in Table 1 below. As noted above the figure of 1863 dwellings for NW Bicester is in addition to the consented Exemplar development, thus the scenario includes 2256 dwellings across the development (1863+393).

Table 1: Housing and Employment Figures: 2024 Trajectory

Plan Period Total Supply 2011–2024	Housing (Dwellings)	Employment (Hectares)
North West Bicester (Bicester 1)	1863*	10
Graven Hill (Bicester 2)	1400	26
South West Bicester Phase 1	1462	
South West Bicester Phase 2 (Bicester 3)	726	
South East Bicester (Bicester 12)	1100	
Gavray Drive (Bicester 13)	300	
Talisman Road (approved site)	125	
Bicester Business Park (Bicester 4)		29.5
Bicester Gateway (Bicester 10)		18
Land at NE Bicester (Bicester 11)		15
SE Bicester (Bicester 12)		28.8
Total	6976	127.3

*Note: 393 Exemplar already included in the model

Source: WYG December 2014

In order to test other levels of NW Bicester development without the A4095 NW Strategic Link Road, traffic growth between the Base Year 2012 and Interim Year 2024 has been reduced down by a factor based on the number of NW Bicester homes and subtracted from the 2024 turning movements. This means growth at other developments and background traffic growth (such as increase in through movements on the A4095) has also been reduced alongside that for NW Bicester.

The growth in traffic at each junction with 900 or 1200 NW Bicester homes has been assessed. Thus for example 900 homes is a 60.11% reduction on the 2,256 homes included in the Interim Year 2024 scenario. The selection of 900 homes was used as a starting point as this represents a minimal 500 homes post Exemplar across the development. The 1,200 homes scenario represents an incremental step from 900 homes.

The following three junctions have been modelled using Arcady and Picady programs:

- Bucknell Road/ A4095 Lords Lane (Ref Junction 19);
- Bucknell Road/ A4095 Howes Lane (Ref Junction 20);
- A4095 Howes Lane/ B4030/ Vendee Drive/ Middleton Stoney Road (Ref Junction 23).

Each junction has been the subject of three tests:

- Test 1 - Interim Year 2024 (NW Bicester 2,256 homes);
- Test 2 - NW Bicester 900 homes;
- Test 3 - NW Bicester 1200 homes.

Bucknell Road/ A4095 Lords Lane (Ref Junction 19)

Table 2 shows the results for the three tests at the Bucknell Road/ A4095 Lords Lane roundabout junction. It can be seen that the junction operates largely within capacity even with the Interim Year 2024 test of 2,256 NW Bicester homes and all the other planned growth shown in Table 1. Bucknell Road south is slightly over capacity in the PM peak hour with an RFC of 0.879 (0.85 is the theoretical capacity) and a queue of 7 vehicles. This infers that the capacity of this junction does not trigger the need for an improvement until the occupation of 2,256 NW Bicester homes.

Table 2: Bucknell Road/ A4095 Lords Lane ARCADY Capacity Tests (J19)

		AM Peak (0800-0900)					
		Test 1 – Interim Year 2024 NWB 2256 Homes		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes	
Arm	Name	RFC	Queue	RFC	Queue	RFC	Queue
Arm A	A4095 Lords Lane	0.508	1	0.376	1	0.319	1
Arm B	A4095 Bucknell Road (south)	0.724	3	0.56	1	0.457	1
Arm C	Bucknell Road (north)	0.299	0	0.175	0	0.177	0
		PM Peak (1700-1800)					
		Test 1 – Interim Year 2024 NWB 2256 Homes		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes	
Arm	Name	RFC	Queue	RFC	Queue	RFC	Queue
Arm A	A4095 Lords Lane	0.524	1	0.324	1	0.358	1
Arm B	A4095 Bucknell Road (south)	0.879	7	0.732	3	0.525	1
Arm C	Bucknell Road (north)	0.251	0	0.173	0	0.134	0

Bucknell Road/ A4095 Howes Lane (Ref Junction 20)

Table 3 shows the results for the three tests at the Bucknell Road/ A4095 Howes Lane priority junction. The modelling has used as a basis the recently implemented improvement scheme as part of the Exemplar development (provided by Infrastruct CS Ltd on 9th December 2014).

It can be seen that the junction operates significantly over capacity in the Interim Year 2024 test of 2,256 NW Bicester homes and all the other planned growth, as expected for this junction. With regard to the other tests of 900 and 1200 homes, both tests show the junction operating over capacity. It should be noted however that the Exemplar development was originally consented with the proposed junction showing an RFC over capacity of 0.941 and queue of 11 vehicles in the PM peak hour. In comparison, the test with 900 NW Bicester homes (i.e. a further 500 to the Exemplar) gives a maximum queue of 28 vehicles on the left turn from Howes Lane in the PM peak. This would not block back to the adjacent Shakespeare Drive junction.

The test with the 1200 homes (i.e. a further 800 to the Exemplar) gives a maximum queue of 70 vehicles on the same arm in the PM peak and is over capacity on the other movements.

Both tests of 900 and 1200 homes show the junction over capacity, but with the 900 homes capacity issues are not significantly worsened compared to the situation consented for the Exemplar.

Table 3: Bucknell Road/ A4095 Howes Lane PICADY Capacity Tests (J20)

Arm / Turning Movement	AM Peak (0800-0900)					
	Test 1 – Interim Year 2024		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes	
	RFC	Queue	RFC	Queue	RFC	Queue
Howes Lane - Right Turn	2.922	26	0.225	0	0.382	1
Howes Lane - Left Turn	3.005	212	0.768	3	0.844	5
Bucknell Road N (Right Turn to Howes Lane)	1.184	134	0.845	7	0.917	13
Arm / Turning Movement	PM Peak (1700-1800)					
	Test 1 – Interim Year 2024		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes	
	RFC	Queue	RFC	Queue	RFC	Queue
Howes Lane - Right Turn	6.983	51	0.886	4	1.068	8
Howes Lane - Left Turn	7.065	362	1.028	28	1.153	70
Bucknell Road N (Right Turn to Howes Lane)	1.17	127	0.863	8	0.929	14

A4095 Howes Lane/ Middleton Stoney Road/ Vendee Drive (Ref Junction 23)

Table 4 shows the results for the three tests at the A4095 Howes Lane/ Middleton Stoney Road/ Vendee Drive roundabout junction. It can be seen that the junction operates within capacity in both the 900 and 1200 homes scenarios. In the Interim Year 2024 test of 2,256 NW Bicester homes and all other planned growth the roundabout is over capacity in the PM peak with an RFC of 1.061 and queue of 51 vehicles. It can be inferred that the capacity of this junction does not trigger the need for an improvement until beyond the occupation of 1,200 homes but before the 2,256 NW Bicester homes.

The improvements at this junction are the remodelling of the roundabout with the new alignment of Howes Lane. Given the fact that the employment uses are concentrated close to this junction (whilst the traffic growth has been proportioned across the whole development) it would seem appropriate to use the lower development level (occupation of 1,200 homes) as a trigger for the Link Road in relation to this junction.

Table 4: A4095 Howes Lane/ Middleton Stoney Road/ Vendee Drive ARCADY Capacity Tests (J23)

Arm	Name	AM Peak (0800-0900)					
		Test 1 – Interim Year 2024 NWB 2256 Homes		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes	
		RFC	Queue	RFC	Queue	RFC	Queue
Arm A	B4030 (Northwest)	0.52	1	0.351	1	0.386	1
Arm B	A4095 Howes Lane	0.43	1	0.282	0	0.313	1
Arm C	Middleton Stoney Rd	0.533	1	0.385	1	0.415	1
Arm D	B4030 Vendee Drive left turn	0.119	0	0.059	0	0.072	0
Arm E	B4030 Vendee Drive ahead right	0.835	5	0.674	2	0.71	2
Arm	Name	PM Peak (1700-1800)					
		Test 1 – Interim Year 2024 NWB 2256 Homes		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes	
		RFC	Queue	RFC	Queue	RFC	Queue
Arm A	B4030 (Northwest)	0.493	1	0.333	1	0.367	1
Arm B	A4095 Howes Lane	0.456	1	0.316	1	0.346	1
Arm C	Middleton Stoney Rd	0.491	1	0.38	1	0.403	1
Arm D	B4030 Vendee Drive left turn	0.218	0	0.086	0	0.115	0
Arm E	B4030 Vendee Drive ahead right	1.061	51	0.712	2	0.788	4

Conclusions

The junction modelling of the three key junctions on the Howes Lane/ Lords Lane corridor leads to the following conclusions:

- The A4095 Lords Lane/ Bucknell Road junction operates within capacity until the Interim Year 2024 level of development (2256 NW Bicester homes);

- The A4095 Howes Lane/ Bucknell Road junction is over capacity with 900 NW Bicester homes but this is not significantly worse than was consented for the Exemplar development;
- The junction modelling results together with the proximity to the employment uses indicate that the A4095 Howes Lane/ Middleton Stoney Road/ Vendee Drive junction with the realigned Howes Lane will require improvement beyond occupation of 1200 NW Bicester homes.

On the basis of the analysis it is requested that OCC allow 900 homes to be occupied prior to the construction of the railway underpass section of the Link Road (from Shakespeare Drive to Lords Lane) in order to facilitate the phasing of the NW Bicester infrastructure and in recognition that the Link Road, whilst being funded by the NW Bicester development, will address existing issues and accommodate overall planned growth.

It is suggested that the section of the Link Road from Shakespeare Drive to the A4095 Howes Lane/ Middleton Stoney Road/ Vendee Drive junction is not required for junction capacity reasons until the occupation of 1200 homes.

1.3 Exemplar Southern Access Junction

The recently constructed Southern Access to the Exemplar site was tested as part of the Application 1 Transport Assessment with the full NW Bicester development of 6,000 homes in 2031 and is anticipated to be operating over capacity, as shown in Table 5. The queuing is experienced on the development access arm as traffic growth on Banbury Road increases.

Table 5: Exemplar Site Southern Access with Full Development 2031 PICADY model results (J15)

	AM		PM	
	RFC	Queue	RFC	Queue
B4100 South	-	-	-	-
Southern Access	0.698	2	2.683	71.84
B4100 North	0.016	0	0.639	1.65

Detailed testing of the priority junction layout has indicated it could accommodate 75% of the full 6,000 homes development traffic before requiring an upgrade to a signalised junction layout (i.e. 4,500 homes). However, the actual point in time that it is required will depend in particular on the rate of build out of the land north of the railway. It is suggested that the junction could be upgraded prior to Phase 4 of NW Bicester. The Exemplar and Phases 1 to 3 (up to 2031) comprises an estimated 3,793 units of which approximately 1,800 would be on land north of the railway, which is 69% of the Application 1 development. The development of 1,800 homes from Application 1, as it this development that leads to the need for the improvement, is therefore suggested as the most appropriate trigger for the improvement. This could be subject to monitoring of traffic delay at the junction and implemented prior to 2031 if required.

A signalised junction is proposed and a preliminary layout and LinSig modelling results are provided separately to this Memorandum.

1.4 A4095/ B4100 Banbury Road Roundabout

The junction modelling of the full NW Bicester development undertaken for the Masterplan and Application 1 and 2 has identified that the A4095 Lords Lane/ B4100 Banbury Road junction is forecast to be over capacity in the future year of 2031. Further tests have been undertaken using the Interim Year 2024 scenario (with NW Bicester 2256 homes but not the Link Road) for the Interim Year and 900 and 1200 homes in order to determine a point at which the improvements are likely to be required. There is an agreed scheme for minor modifications to the junction as part of the Exemplar, but the modelling discussed in this section has incorporated minor geometric amendments to optimise use of available lane width.

The results of the modelling for the three tests are shown in Table 8. It can be seen that in the Interim Year 2024 with 2256 homes, the Banbury Road north and Lords Lane approaches are over capacity with RFCs of 1.135 and 1.002 and queues of 64 vehicles and 26 vehicles respectively. Whilst the junction is over capacity in the 900 homes and 1200 homes tests, this is only in the PM peak hour for traffic going straight ahead or right from Lords Lane with a maximum queue of 13 vehicles. A further test with growth equivalent to 1500 NW Bicester homes (and other planned growth in proportion) has therefore been undertaken. This test 4 shows a maximum queue of 20 vehicles. A queue of this length would not extend back to the proximate junction to the west (Germander Way/ Development access) and can therefore be accommodated safely within the approach to the roundabout.

On the basis of the assessment it is considered that 1,500 NW Bicester homes would be an appropriate trigger for capacity improvements of the A4095/ B4100 Banbury Road roundabout junction. Preliminary solutions for improving capacity are provided separately to this Memorandum.

Table 8: A4095/ B4100 Banbury Road ARCADY Capacity Tests (J14)

AM Peak (0800-0900)									
Arm	Name	Test 1 – Interim Year 2024 NWB 2256 Homes		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes		Test 4 – NWB 1500 Homes	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Arm A	B4100	0.668	2	0.551	1	0.576	1	0.601	2
Arm B	A4095 (east)	0.588	1	0.496	1	0.515	1	0.535	1
Arm C	Banbury Road	0.357	1	0.363	1	0.362	1	0.36	1
Arm D	A4095 (west) left lane	0.19	0	0.143	0	0.154	0	0.164	0
Arm E	A4095 (west) ahead right lane	0.85	5	0.735	3	0.761	3	0.786	4
PM Peak (1700-1800)									
Arm	Name	Test 1 – Interim Year 2024 NWB 2256 Homes		Test 2 – NWB 900 Homes		Test 3 – NWB 1200 Homes		Test 4 – NWB 1500 Homes	
		RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Arm A	B4100	0.533	1	0.458	1	0.477	1	0.495	1
Arm B	A4095 (east)	0.845	5	0.666	2	0.704	2	0.743	3
Arm C	Banbury Road	1.135	64	0.582	1	0.679	2	0.787	4
Arm D	A4095 (west) left lane	0.314	1	0.213	0	0.236	0	0.261	0
Arm E	A4095 (west) ahead right lane	1.039	41	0.908	9	0.943	13	0.981	20

1.5 Bucknell Village Traffic Calming

The link flow analysis demonstrates that whilst base year traffic flows are low, there is anticipated to be an increase in traffic on links to and from Bucknell in both the Reference Case and with the full NW Bicester development in 2031.

The diversion of Bucknell Road as part of the Development proposal reduces traffic on the link and will also help to reduce accident issues south of the village. In order to further minimise impacts in the village it is proposed to introduce traffic calming measures. Indicative proposals are put forward separately. The measures suggested include for the implementation of a 20mph zone for the village with associated traffic calming measures and signing.

It should be noted that there are local concerns about the existing traffic issues and any measures will address existing problems as well as mitigate the impact of the NW Bicester development and other planned growth in Bicester. Thus the responsibility for the funding of measures will require further discussion.

With regards to timing of improvements in relation to NW Bicester, the fact that the impacts of additional traffic may be experienced during construction phases indicates that measures should be put in place at an early stage of the further proposed development, such as prior to first occupation of future phases of NW Bicester. These measures are a result of the overall development rather than of a single application/ element of the development.

1.6 Shakespeare Drive Walking and Cycling Improvements

The Bicester Saturn Model scenario used for the assessment of the full NW Bicester development incorporates traffic calming measures to the Shakespeare Drive area including a one way section between the Shakespeare Drive and old Howes Lane and 20mph on Shakespeare Drive, Blenheim Drive and West Street, to see in principle what benefits traffic calming would bring. The modelling showed that the traffic calming would have benefits and there is a need for measures to discourage traffic movements through the area as increases could impact on pedestrian severance and amenity. Indicative proposals for Shakespeare Drive have been developed and are provided separately, involving a 3 metres wide shared cycleway/footway, build outs to reduce traffic speed and pedestrian crossing points.

The need for the improvements is closely related to the traffic impacts of land south of the railway as well as provision of walking and cycling connections for this area, as there will be a connection from Shakespeare Drive to the Link Road and the primary road into the development. However, the route is unlikely to become attractive to access the development until the Link Road is in place as well as when the Application 2 development and other developments in the vicinity are underway. It is therefore suggested that the measures should be implemented in accordance with the same timeframe as the Link Road (i.e. beyond 900 NW Bicester total homes).

1.7 B4100/ Caversfield junction safety improvements

The assessment of impacts of traffic from the NW Bicester development has identified safety and capacity issues at the junction of the B4100 and unnamed road junction for Caversfield as well as an anticipated increase in traffic on routes in the village. As such, indicative proposals have been developed for the junction with the B4100 to improve safety and discourage traffic from using the unnamed road into Caversfield, and as a short cut to Skimmingdish Lane. Two options are provided separately – minor signing and white lining measures to improve visibility and reduce overtaking or a left in and left out only junction. This latter suggestion would remove the right turn in and out of the unnamed road and thus improve safety, as well as reduce the traffic using the route.

There are acknowledged to be existing accident issues on the B4100 and the speed limit is to be reduced to 40mph as part of the Exemplar development, which will bring some benefit. It is suggested that the further improvement is made within the early phases of development of NW Bicester, to prevent safety issues arising and minimise the impact on Caversfield. A trigger of occupation of 900 homes of the overall NW Bicester development is put forward as a suggested timescale.

1.8 Summary

The discussion above has indicated trigger points for the various elements of transport infrastructure in relation to the NW Bicester development. These are summarised in Table 9 below.

Table 9: Summary of Suggested Phasing of Transport Infrastructure

Priority in Timescale	Transport Infrastructure	Suggested Trigger	Comment
1	Bucknell Village Traffic Calming	Prior to first occupation (during construction phase)	Related to all NW Bicester development as well as existing issues and overall planned growth
2	A4095 NW Strategic Link Road: Shakespeare Drive to Lords Lane	900 homes	Related to all NW Bicester development and overall planned growth
2	Shakespeare Drive Walking and Cycling Improvements	900 homes (in parallel with the Link Road)	Related to all NW Bicester development to the south of the railway.
2	B4100/ Caversfield junction safety improvements	900 homes	Related to all NW Bicester development to the north of the railway as well as existing issues and overall planned growth
3	A4095 NW Strategic Link Road: Western section from Middleton Stoney Road to Shakespeare Drive	1200 homes	Related to all NW Bicester development and overall planned growth
4	A4095/ B4100 Banbury Road roundabout capacity improvements	1500 homes	Related to all NW Bicester development and overall planned growth
5	Exemplar Southern Access Junction	1800 homes of Application 1 (3793 homes of overall NW Bicester development)	Related specifically to Application 1. Improvements may be most appropriately undertaken in combination with the A4095/ B4100 Banbury Road roundabout however.

ATTACHMENT 3

DAVID TUCKER ASSOCIATES TECHNICAL NOTE (SEPTEMBER 2017)

Introduction

1. As landowners forming part of the Bicester 1 Local Plan Allocation (NWB), Albion Land (AL) have a collaboration agreement in place with A2Dominion (A2D).
2. This firstly provides a mechanism by which part of the NWB link road is delivered on land under the control of AL; and secondly the mechanism by which AL makes proportionate financial contribution towards the comprehensive transport infrastructure/services package agreed between A2D and Oxfordshire County Council (OCC) is secured. This contribution is worked out in terms of the respective housing content on the Albion Land site (150) as a proportion of the full NWB allocation (6,000). The NWB Link Road is a fundamental element of the transport package.
3. For the infrastructure funding contribution to be secured from AL, the above relies upon the AL proposals to the south of the rail line coming forward early to secure the necessary funding. A2D are supportive of AL aspirations in this regard and have confirmed that they would not seek to construct any part of their proposals on land to the south of the railway line in advance of the rail crossing.
4. Nonetheless until AL secure unfettered development consent on their proposals, the consequential unavailability of the land necessary to form the western end of the Link Road and the funding contribution will present a significant obstacle to the delivery of the wider NWB allocation.
5. The securing of the Link Road rail crossing (tunnel) also currently presents an obstacle to the comprehensive delivery of NWB. In 2014, a mechanism to identify trigger points for highway infrastructure implementation, including the Link Road rail crossing was developed and agreed between A2D and their consultants Hyder Consulting, OCC and Cherwell District Council (CDC). This was summarised in a Memo dated 12/12/14 prepared by Hyder Consulting (attached as **Appendix A**). The traffic flow appraisal technique employed, gave rise to a NWB development threshold of no more than 900 dwellings together with a proportionate level of the other land uses across NWB prior to the implementation of the Link Road rail crossing. The threshold of 900 was derived following a series of proportionate traffic flow reduction tests to establish the

performance levels at the Bucknell Road/Howes Lane junction with varying development quantum. This is the main junction for which relief is provided by the Link Road rail crossing.

6. The residential element of this threshold figure will be delivered to the north of the rail line by A2D, including the Exemplar site (393) and 507 further dwellings.
7. The Memo defines the appraisal technique employed, whereby development quantum levels were tested as a proportion of the NWB development which had been envisaged for an interim year of 2024, within the Local Plan period to 2031. In terms of residential development, the 2024 trajectory had been for 1863 dwellings in addition to the already consented Exemplar site (393 dwellings), i.e. 2256 dwellings in total. The threshold of 900 dwellings therefore equated to 40% of the 2024 trajectory.

Employment Land

8. 40% of the employment on NWB is inherent within the traffic appraisal which established the agreed threshold. Given that the NWB employment trajectory in 2024 was 10 hectares, the acceptability of the traffic impact from 4 hectares of employment on NWB is already definitively established.
9. Within the A2D application documents, the land being promoted by AL is referred to as Zone 2 of NWB. The employment land use mix assumed by A2D for Zone 2 differs from the content of the AL planning application. Consequently the calculations implicit within the 2014 Memo, give rise to a 70-80% over-estimate of AL site generated peak period traffic levels. The junction appraisals set out within the Memo therefore overstate the resulting queues and delays.
10. In a similar vein, the background traffic levels within the threshold appraisals had been based upon assumed delivery of wider Bicester local plan housing and employment allocations trajectory. Traffic from the forecast level of development at these allocations is therefore included within the junction appraisals.

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11. The total employment trajectory set out in the Memo was for 127.3 hectares to be delivered over a 13 year period between 2011 and 2024. Proportionally this equates to approximately 10 hectares per year. Between 2011 and 2015, none of these sites have delivered any employment use. If the original profile of 10 hectares per year going forward is assumed, then by 2024 there would be a shortfall of 40 hectares, representing approximately 30% of the trajectory to 2024 with a consequential overstating of traffic levels in the agreed development threshold appraisal tests. The consequence of this is that the Bucknell Road/Howes Lane junction appraisal from which the threshold was derived, now represents a pessimistic outcome. It is therefore an entirely appropriate and consistent application of the methodology that the entirety of the NWB employment allocation can be delivered before the Road Link rail crossing. This employment is focussed on the AL site, and the approach is consistent with para 2 above, whereby A2D are supportive of AL development coming forward early.
 12. Traffic from the entire AL employment land can therefore be added to the network without further worsening the forecasted impact on the Bucknell Road/Howes Lane junction as set out in the December 2014 Memo.

Housing

13. Hyder Consulting have provided AL with traffic forecast output to reflect the inclusion of an additional 150 dwellings utilising the same methodology employed in the December 2014 Memo.

Appraisal based on agreed methodology

14. These flows have then been subject to appraisal using PICADY, with Hyder Consulting input parameters. **Table 1** in part replicates the AM and PM peak results of the tests included in the 2014 Memo (namely Test 1, 2 and 3). It also includes DTA test results (Test 2a) utilising the Hyder traffic flows and junction parameters for a threshold of 1050 dwellings (900 + 150).

Table 1: Bucknell Road/A4095 Howes Lane PICADY Capacity Tests – Hyder Flows

	AM Peak (8000-9000)							
	Test 1 – Interim Year 2024		Test 2 – NWB 900 Homes		Test 2a – NWB 1050 Homes		Test 3 – NWB 1200 Homes	
Arm/Turning Movement	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Howes Lane – Right Turn	2.922	26	0.225	0	0.29	0	0.382	1
Howes Lane – Left Turn	3.005	212	0.768	3	0.80	4	0.844	5
Bucknell Road N (Right Turn to Howes Lane)	1.184	134	0.845	7	0.88	9	0.917	13

	PM Peak (1700-1800)							
	Test 1 – Interim Year 2024		Test 2 – NWB 900 Homes		Test 2a – NWB 1050 Homes		Test 3 – NWB 1200 Homes	
Arm/Turning Movement	RFC	Queue	RFC	Queue	RFC	Queue	RFC	Queue
Howes Lane – Right Turn	6.983	51	0.886	4	1.05	6	1.068	8
Howes Lane – Left Turn	7.065	362	1.028	28	1.09	48	1.153	70
Bucknell Road N (Right Turn to Howes Lane)	1.17	127	0.863	8	0.9	10	0.929	14

Source: Tests 1, 2 and 3 – Hyder Consulting. Test 2a – DTA utilising Hyder Consulting base data.

15. Test 2 which was the means by which the previously agreed 900 dwelling threshold was derived gave rise to a queue of 28 vehicles on Howes Lane and 8 vehicles on Bucknell Road in the PM peak. Neither queue would block the downstream junctions on the respective links (Shakespeare Drive traffic signals and A4095 mini-roundabout respectively). This was deemed acceptable by the authorities.
16. Test 3 (appraising 1200 dwellings) gave rise to queues of 70 vehicles and 14 vehicles on Howes Lane and Bucknell Road respectively in the PM peak. Both queues would block the downstream junctions. This operational level was considered unacceptable by the authorities.
17. Test 2a with the AL dwellings included gives rise to queues of 48 vehicles and 10 vehicles respectively. As with Test 2, neither queue would block the respective downstream junctions on Howes Lane or Bucknell Road.

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18. This consequential level of congestion is not severe in NPPF terms. Allied to this, the context of land being released to deliver the western part of the NWB link road by the delivery of residential and employment land on the AL site demonstrates the wider benefit that will ensue.

Alternative appraisal methodology

19. In order to ensure robust consideration of the implications of the additional AL dwellings, an alternative appraisal approach has also been prepared. This reflects the proximity of the AL site and the fact that traffic from these 150 dwellings to the south of the railway line will as a natural consequence of site traffic distribution will not tend to use the Bucknell Road/Howes Lane junction.
20. Building upon the Hyder Consulting 900 dwelling appraisal traffic flows as forming the permitted base (i.e. Test 2), an alternative method of appraisal of AL site traffic is presented at **Table 2**. Forecast site traffic from the AL Transport Assessment Report has then been added to the Test 2 junction turning flows. The results of the appraisal whereby traffic from 150 dwellings is added are provided in Test 2b in **Table 2** below.
21. Finally, notwithstanding the justification provided above that the AL employment should be allowed to come forward before the Link Road rail crossing, a further test to re-enforce this view is provided with the addition of the AL TAR residential site traffic and traffic from the balance of the employment land (over and above the 4 hectares already allowed for in Test 2). Again these results are provided at **Table 2** as Test 2c.

Table 2: Bucknell Road/A4095 Howes Lane PICADY Capacity Tests – Hyder Base + DTA Site Traffic

	AM Peak (8000-9000)			
	Test 2b – NWB 1050 Homes		Test 2c – NWB 1050 Homes and Balance of Employment	
Arm/Turning Movement	RFC	Queue	RFC	Queue
Howes Lane – Right Turn	0.25	0	0.25	0
Howes Lane – Left Turn	0.80	4	0.78	4
Bucknell Road N (Right Turn to Howes Lane)	0.86	8	0.88	9

	PM Peak (1700-1800)			
	Test 2b – NWB 1050 Homes		Test 2c – NWB 1050 Homes and Balance of Employment	
Arm/Turning Movement	RFC	Queue	RFC	Queue
Howes Lane – Right Turn	1.02	4	1.05	5
Howes Lane – Left Turn	1.05	35	1.09	49
Bucknell Road N (Right Turn to Howes Lane)	0.89	10	0.90	10

Source: Traffic levels sourced from Test 2 (Hyder Consulting) except for Site traffic – DTA estimates (AL TAR).

22. The Test 2b results with the AL residential traffic forecasts generally mimic the outcome of the Test 2 results (Table 1). Using his approach, the operational criteria deemed previously acceptable to the authorities would facilitate 1050 dwellings (ie 150 dwellings on AL).

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23. Similarly, the Test 2c results generally reflect the Test 2a results. In other words, using this approach the operational criteria deemed acceptable by DTA at paragraphs 16-17, facilitates 1050 dwellings and the full quantum of AL employment land.

Conclusion

24. In conclusion:
- a. AL have a collaboration agreement with A2D providing a key part of the Link Road and financial contribution to transport infrastructure/services.
 - b. The traffic implications from 4ha of employment land on NWB are already accepted within the previously agreed 900 dwelling threshold prior to implementation of the Link Road rail crossing.
 - c. Using the same methodology the traffic implications of 1050 dwellings are demonstrated not to be severe in NPPF terms.
 - d. The lack of Local Plan employment allocation sites coming forward between 2011 and 2015 contributes towards the conclusion that the full AL employment content.
 - e. This conclusion is further strengthened by the limited traffic impact which the AL employment has on the Bucknell Road/Howes Lane junction. Beyond the first 4 ha of employment land, AL are prepared to enter into a Routing Agreement to preclude HGVs from accessing the site via Bucknell Road prior to the Link Road rail crossing.
 - f. Traffic from the AL site in accordance with the current application has been demonstrated to be acceptable on the highway network in advance of the Link Road rail crossing.



APPENDIX A