

**West Northamptonshire Development
Corporation**

DAVENTRY HOUSING APPEALS

**Rebuttal Proof of Evidence of
David Robert Bird BSc CEng MICE
on Highways Issues**

Volume 1 - Text
Document reference: WNDC/28

May 2009

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1 INTRODUCTION

- 1.1 This Rebuttal Proof responds to highway issues raised in the Proofs of Evidence of Ian Braddock of Aecom/Faber Maunsell (on behalf of the Highways Agency), Victoria Bennett of the Highways Agency, and Simon Bowers of Daventry District Council.

2 FLORE, WEEDON, UPPER-HEYFORD BYPASS

2.1 In this section I provide an update of WNDC’s position with regard to the Highways evidence submitted, and further developments since submission of WNDC Highways evidence.

Previous Highways Evidence

2.2 The evidence in my highways proof set out WNDC’s initial position with respect to the delivery of the FWUH bypass, and the level of development that could potentially be achieved prior to the delivery of the bypass.

2.3 I also included a potential junction improvement scheme for the A5-A45 (Weedon Crossroads) junction, which could potentially deliver extra capacity to allow development to proceed in this fashion. The scenarios as set out within paragraph 2.51 of my highways proof were tested for the proposed layout, and the numbers of deliverable dwellings for each scenario were identified. The results of this testing are summarised in **Table 2.1** below.

Table 2.1 - Deliverable Growth Prior to FWUH Bypass

Scenario	Number of Deliverable Dwellings			
	Danetree	Monksmoor	Church Fields	Total
A	-	1,000	-	1,000
C	-	1,000	1,400	2,400
D	955	955	955	2,865

2.4 In my Highways proof of evidence I concluded at paragraph 2.76 that:

“...based on preliminary analysis, if up to 2,400 units were developed on the Monksmoor and Church Fields sites prior to delivery of the bypass the Weedon Crossroads junction, with minor improvements, would operate no worse than in the existing situation.”

Updated WNDC Position

2.5 Further to the junction improvement layout provided within my highways evidence (drawing ref: 73073/B/3), I have undertaken an internal design

audit, along with a Stage 1 Road Safety Audit on this layout. The findings of these audits have identified some minor improvements to the junction layout, the amended scheme is shown in **Appendix A** (drawing ref: 73073/B/5). In addition, we identified an error in the traffic flow spreadsheet which has now been corrected. The correct flows have been used in the analysis within this rebuttal proof.

2.6 Amendments to the junction layout and modelling are summarised below:

- A5 arms - additional traffic island on the A5 arms which allowing the north-bound right-turn to be separately signalled. This would in turn allow two south-bound A5 lanes. A small amount of widening would be required to accommodate the south-bound exit merge.
- A5 northbound - near-side lane flare length for left turning traffic would be increased from approximately 1 PCU at present to 3 PCU.
- A5 westbound - strip widening to the west of the junction allowing two ahead lanes.
- A cycle time of 100 seconds has been used throughout the analysis to provide a consistent approach, and avoid the perception of increasing capacity by lengthening the cycle time.

All of the above improvements are deliverable within the highway boundary.

Road Safety Audit

2.7 In order to provide confidence in the deliverability of the proposed junction improvement an independent Stage 1 Road Safety Audit was commissioned. The RSA was carried out in accordance with the Design Manual for Roads and Bridges (DMRB) report HD 19/03 *Road Safety Audit* (Volume 5, Section 2, Part 2); the RSA report (Ref No. 109.097) is included in **Appendix B**.

2.8 The items raised within the RSA report have been investigated, and a Designer's Response is provided at **Appendix C**. The Items set out within Section 2 of the RSA Report do not require any alterations to the

junction design at this stage, therefore the existing layout, as shown in drawing 73073/B/5, has not been amended. The RSA did however highlight the requirement for a number of areas to be examined further at detailed design stage, as follows:

- A1.3 - Physical dimensions/hatching at the splitter island on A5 north.
- A2.1 - Speed control measures/speed limit changes on A5 junction approaches.
- A2.2 - Additional signage to southbound merge.
- A3.1 - Alternative arrangement to A5 south/Bridge Street junction.
- A3.2 - Negotiation with Globe Hotel regarding access from A5 north, alterations to A45 access.
- A3.3 - Review requirement for give-way markings on A5 north and A45 arms.
- A4.2 - Footway dimensions in proximity of existing bus stop on north side of A45 west.
- A5.1 – Assess adequacy of junction illumination.

Junction Capacity Testing

2.9 The results of the 2009 Base AM peak Hour modelling for the Existing layout and Proposed layout (as shown in **Appendix A**) are shown in **Table 2.2** below.

Table 2.2 – A5-A45 Junction 2009 Base AM Capacity Assessment

Arm	Link	Existing Layout		Proposed Layout	
		DoS (%)	Queue Length (PCU)	DoS (%)	Queue Length (PCU)
A5 North	Ahead	86.4	10.6	63.6	8.0
	Left	21.4	2.4	33.0	2.2
	Right	*	*	8.1	0.4
A45 East	Right	22.4	1.6	38.8	1.8
	Left, Ahead	94.3	25.8	71.5	17.2
A5 South	Right	71.5	5.8	71.6	5.8
	Left, Ahead	73.3	12.3	63.7	11.1
A45 West	Right	90.6	10.0	69.1	7.1
	Left, Ahead	86.3	19.0	75.1	16.1
Cycle Time		100 seconds		100 seconds	
PRC		-4.8%		19.8%	

* Right turn movement is included within Ahead link for the existing layout

2.10 The results in Table 2.2 demonstrate that the Practical Reserve Capacity (PRC) for the existing layout of the junction is estimated to be -4.8%, whilst for the proposed layout of the junction, it is predicted to be 19.8%, therefore the proposed layout achieves an improvement in junction PRC for the 2009 Base AM peak scenario of circa 25%.

2.11 In order to identify the results with the appeal developments in place I have again considered Scenarios C and D, as set out within my submitted Highways proof, as follows:

- Scenario C - Full development of Monksmoor (1,000 units) + 35% of Church Fields (1,400 units).
- Scenario D - Even distribution of development on all 3 sites (955 units per site).

I have not included any background traffic growth for the purpose of this exercise. The results of the Scenario C and D tests are summarised in

Table 2.3.

Table 2.3 – A5-A45 Junction 2009 Scenario C and D Capacity Assessments

Arm	Link	Scenario C		Scenario D	
		DoS (%)	Queue Length (PCU)	DoS (%)	Queue Length (PCU)
A5 North	Ahead	64.2	9.4	62.7	9.1
	Left	76.0	7.3	78.5	7.6
	Right	8.9	0.6	8.5	0.5
A45 East	Right	63.5	3.7	74.9	4.4
	Left, Ahead	76.0	18.6	78.6	19.6
A5 South	Right	77.1	6.2	83.0	6.8
	Left, Ahead	79.1	15.9	87.3	18.9
A45 West	Right	74.0	7.9	74.5	8.7
	Left, Ahead	84.6	19.5	91.1	24.4
Cycle Time		100 seconds		100 seconds	
PRC		6.4%		-1.2%	

2.12 The results in Table 2.3 demonstrate that the PRC predicted for both Scenario C and D result in an improvement when compared to the existing layout with no development.

2.13 I therefore conclude that the Weedon Crossroads junction, with the identified improvements, could accommodate up to 2,400 units at the Monksmoor and Church Fields sites while the junction would operate no worse than in the existing situation, in fact the capacity situation would be improved.

2.14 This figure complements the assessment undertaken by NCC/Arup, which suggests that the link capacity of the A45 should limit development to a maximum of 2,250 dwellings prior to the delivery of the FWUH bypass.

Background Traffic Growth Test

2.15 In my highways evidence I demonstrated that the FWUH bypass could be delivered as early as 2016. Therefore, in order to quantify the capacity conditions at the Weedon Crossroads junction in 2016, I have undertaken further tests including background traffic growth. These tests have been

based on the observed 2007 traffic flows collected by the Highways Agency.

2.16 I have used the Tempro-corrected NRTF background traffic growth factors provided within the Faber Maunsell technical note dated 7th April 2009, which states in Appendix B that for growth during the period 2007 to 2016, a conversion factor of 1.165, or an increase of 16.5% should be applied.

2.17 The capacity of the junction in 2016 has been tested for the existing layout without development, along with the proposed layout for Scenario C. The results of these tests are summarised in Table 2.4.

Table 2.4 – A5-A45 Junction 2016 Scenario C Capacity Assessments

Arm	Link	2016 Existing Layout – No Development		2016 Proposed Layout with Scenario C	
		DoS (%)	Queue Length (PCU)	DoS (%)	Queue Length (PCU)
A5 North	Ahead	105.4	26.3	83.2	12.8
	Left	25.3	2.6	84.0	7.9
	Right	*	*	18.4	1.1
A45 East	Right	44.1	2.3	81.8	5.3
	Left, Ahead	106.9	61.3	93.6	29.8
A5 South	Right	118.0	31.7	89.0	10.3
	Left, Ahead	93.0	21.4	93.2	24.7
A45 West	Right	142.2	44.8	84.0	9.1
	Left, Ahead	81.1	17.6	89.8	21.8
Cycle Time		100 seconds		100 seconds	
PRC		-58.00%		-4.0%	

* Right turn movement is included within Ahead link for the existing layout

2.18 The results set out in Table 2.4 demonstrate that the existing layout of the junction would result in a PRC of -58.0% in 2016 with background traffic growth and no development. For comparison, the results forecast that the proposed junction improvement with the full Monksmoor development and 1,400 dwellings at Church Fields would achieve a PRC of -4.0% which would not only achieve a nil-detriment junction capacity impact, but

is a material improvement on the PRC provided by the existing junction layout.

Junction Improvement Costs

2.19 A preliminary cost estimate for the proposed junction improvement shown in drawing ref: 73073/B/5 has been prepared, and is included in **Appendix D**. The estimated cost of construction of this scheme is £609,510, however this does not include the following:

- Fees or charges levied by the County Council or Local Authority;
- The cost of any Safety Audits that may be required;
- Commuted sums for maintenance (Traffic Signals);
- Costs associated with diversion/protection of existing statutory authority services;
- Requirement for night or out of hours working;
- Costs associated with Traffic Regulation orders; or
- Contingencies or optimism bias.

Phased Approach

2.20 The results demonstrated by the modelling exercise contained within my submitted Highways proof, and the update to these contained above, identify that circa 2,400 dwellings could be delivered on the Monksmoor and Church Fields sites whilst achieving at least a 'nil-detriment' impact in junction capacity terms at the Weedon crossroads junction.

2.21 I have identified that sufficient capacity can be provided to serve up to 2,400 dwellings prior to completion of the FWUH bypass. Therefore I consider it appropriate to examine the delivery of this level of development across the Monksmoor and Church Fields sites, and how the Secretary of State could be in a position to allocate permissions at this Inquiry.

2.22 The modelling-derived figure of 2,400 assumes the full delivery of the Monksmoor site; therefore I consider it appropriate to allow planning permission for this site at the Inquiry.

- 2.23 The remaining 1,400 dwellings could potentially be delivered at the Church Fields site; however as the appeal site totals some 4,000, it is necessary to consider the phasing of this development along with the viability of providing a reduced quantum of development.
- 2.24 Discussions with Croudace have identified that the initial phase of the Church Fields development would comprise circa 1,125 dwellings. This level of development would constitute the south-eastern sector of the site, comprising the local centre.
- 2.25 The quantum of development provided by Monksmoor and Phase 1 of Church Fields would total 2,125 dwellings, thus fitting within the threshold figure of 2,400 identified within my evidence.
- 2.26 This approach is set out further within the Supplementary Planning Evidence of Eric Owens (Ref: WNDC/30).
- 2.27 I would add that WNDC are in discussions with NCC to assist in ensuring that the FWUH bypass is delivered as early as possible in order to facilitate the delivery of growth in Daventry.

3 HIGHWAYS AGENCY EVIDENCE

3.1 In this section I will consider the highways evidence of the Highways Agency as submitted by Ian Braddock and Victoria Bennett. I provide discussion of the points I consider to be relevant, along with a summary of my conclusions at the end.

Ian Braddock Evidence

3.2 Paragraph 6.6 of Ian Braddock's evidence discusses the potential for improvement schemes at the Weedon Crossroads junction, and concludes that

"...there is no scope for improving the junction within the highway boundary and that capacity improvement would require land outside the highway boundary in order to deliver a more substantive scheme".

3.3 Discussions with the HA have identified that they have investigated a range of solutions for the capacity issues at the Weedon Crossroads junction. These cover interim solutions that would allow some development traffic through the junction, but also in terms of full large-scale improvements that would allow the realisation of full RSS growth within Daventry. The HA have confirmed that none of the interim schemes assessed were viable from a junction capacity perspective.

3.4 The HA examined two large scale junction improvements at the junction, in the form of the 'large signalised junction option' and the 'roundabout in the field', as acknowledged at paragraphs 6.8 and 6.9 of Ian Braddock's evidence, however both of these schemes were dismissed due to high costs and concerns over deliverability, Furthermore, neither of the improvements provided sufficient capacity for of all of the appeal sites to come forward.

3.5 As discussed within my submitted Highways evidence, I have identified a junction improvement scheme that will allow the delivery of circa 2,400 dwellings at the Monksmoor and Church Fields sites whilst maintaining a 'nil-detriment' impact.

3.6 The requirement of the HA is to demonstrate a 'nil-detriment' highways solution, as stated at paragraph 4.17 of Ian Braddock's evidence. The assessment of nil-detriment is not dependent upon the assessment year or quantity of growth added. In whichever year assessment takes place, nil-detriment is nil-detriment.

3.7 To summarise, I consider that there is a short-term improvement option that is deliverable within the existing highway boundary, which will allow the junction to accommodate background traffic growth and some development in lieu of the wider mitigation in the form of the Flore-Weedon-Upper Heyford Bypass (FWUH). Furthermore I have provided this improvement with supporting LINSIG model and input parameters to all parties at this inquiry with the aim of satisfying all parties that this is deliverable, and where possible reach agreement prior to giving evidence at the Inquiry on 25th June 2009.

3.8 At paragraph 6.8 Ian Braddock suggests that the exit link capacity of the A45 in the vicinity of the Weedon Crossroads junction, should a junction improvement scheme be realised, is limited to 3,000 dwellings. This assessment was based on the implementation of the 'large signalised junction' or the 'roundabout in the field' schemes. However, this demonstrates that whilst it is not possible to deliver all three appeal sites within the link capacity threshold, there is spare capacity to allow the provision of development up to a maximum of 3,000 dwellings.

3.9 Finally, Ian Braddock's evidence states at paragraph 8.10 that:

"Application of normally adopted DfT policy would indicate that improvements to the A5/A45 junction would be required before any development could proceed. In the case of the three appeal sites however, the HA have confirmed that a quantum of development would be acceptable with no improvement provided there was certainty in the delivery of a long term solution (a Flore-Weedon bypass)."

This acknowledges the position of the HA, in that they are prepared to take some 'pain' at the junction prior to the delivery of the bypass. It does not however prescribe the 'level of pain' which it would consider acceptable.

3.10 The junction improvement I have identified, however, can accommodate some short-term development at this junction whilst maintaining at least a 'nil-detriment' impact in junction capacity terms. Therefore, provided the HA are content with the details of the scheme, this would provide a better situation than the HA appear to be contemplating according to Figure 3.1 of the Faber Maunsell technical note dated 7 April 2009.

3.11 In terms of the certainty in delivery of the bypass, this is covered within Victoria Bennett's evidence which I discuss in the following sub-section.

Victoria Bennett Evidence

3.12 The A5-A45 junction is identified within paragraph 8.15 of Victoria Bennett's evidence as being a junction requiring major mitigation works.

3.13 Paragraph 9.3 also states that: "*The signal control at the junction is already optimised by MOVA and the boundary of the highway is very tightly drawn, such that there is no scope within the boundary of the highway to modify the junction layout. A number of options have been considered but dismissed as ineffective.*"

3.14 As stated at paragraphs 2.3 to 2.5 of this rebuttal proof, I believe there to be an interim improvement capable of delivering circa 2,400 dwellings at the Monksmoor and Church Fields sites, which is deliverable within the highway boundary, and achieves a 'nil-detriment' impact.

3.15 At paragraph 12.2 Victoria Bennett acknowledges that the HA are prepared to adopt the exceptional position of allowing some development to come forward in advance of the delivery of the FWUH bypass. Paragraph 12.4 acknowledges the need for a threshold limiting this level of development, and suggests that this could potentially be the link capacity of the A45. However the proof stops short of actually suggesting a threshold, stating that the HA needs to understand the mitigation package proposed and the timing of its delivery before the level of acceptable development can be determined.

3.16 Paragraph 4.18 of Victoria Bennett's proof suggests that the final version of the Daventry Infrastructure Study (DIS) was submitted in December

2008; however the final version was approved by WNDC in March 2009, albeit this version had few variations to that submitted in January 2009.

- 3.17 It should be noted that the intention of DIS was not to conclude the numbers and locations of housing across Daventry, merely to identify key infrastructure issues, such as highway mitigation measures. One key conclusion of the DIS was that further modelling work was required before further judgements on the level and location of residential development could be finalised.

Summary

- 3.18 The HA acknowledges that a certain level of development can proceed prior to the delivery of the FWUH bypass, however a specific threshold or level is not prescribed within their evidence.
- 3.19 In my Highways proof I demonstrated that the level of development set out as 2,400 between Monksmoor and Church Fields sites could be accommodated with a nil-detriment impact in junction capacity terms at the Weedon Crossroads junction.
- 3.20 In this rebuttal proof I have demonstrated that with the inclusion of background traffic growth, in terms of junction capacity, there would be an improvement in capacity issues in the short to medium term.
- 3.21 Notwithstanding this, if permission were granted for Monksmoor and Phase 1 of Church Fields, this would not remove the requirement for both sites to contribute to the FWUH bypass scheme as the traffic generated by both sites would add to the need for provision of a large-scale mitigation measure.

4 DAVENTRY DISTRICT COUNCIL EVIDENCE

4.1 In this section I will consider the highways evidence of Daventry District Council as submitted by Simon Bowers. I provide discussion of the points I consider to be relevant, along with a summary of my conclusions at the end.

Simon Bowers Evidence

4.2 Paragraph 3.3 states that the link capacity of the A45 thorough Flore and Weedon is limited to the delivery of 850 dwellings. This figure has been misinterpreted from a table within Appendix H of the NCC Arup Final Technical Note, 11th February 2009 (NCC2) which suggest the limit of Monksmoor development prior to the requirement for the FWUH bypass is 850 dwellings, however this is solely due to the housing trajectory build out rate for this appeal site.

4.3 The A45 Corridor Analysis Trigger Points Table from the NCC Arup report provides a range of values representing the maximum level of development that can be delivered within the existing link capacity on the approaches to the Weedon Crossroads junction. These figures are based on the housing trajectories agreed at the Housing RTS, and summarise at what point a single and dual carriageway bypass will be required for all seven modelled scenarios. This table is reproduced at Table 4.1 below.

Table 5.1 - A45 Corridor Analysis Trigger Points

Improvement Requirement					
Option	Development	Bypass Single		Bypass Dual	
		Year	Dwellings	Year	Dwellings
Ref Case	None	2021	-	-	-
1	Dane, C/F & Monks	2015	2250	2020	6150
2	Dane & Monks	2015	1400	2022	4750
3	C/F & Monks	2017	1970	-	-
4	Dane & C/F	2015	1900	2020	5200
5	Monksmoor	2019	850	-	-
6	Church Fields	2018	1675	-	-
7	Danetree	2016	1425	2022	3750

- 4.4 The figure of 850 dwellings quoted within Mr Bowers evidence is the lowest of the thresholds shown within Table 4.1, which suggests that a single carriageway bypass would be required in 2019 once 850 dwellings are built on the Monksmoor site (Scenario 5). The threshold for Scenario 5 is limited by the housing trajectory assumptions, i.e. slow build out rate at Monksmoor, and background traffic growth assumptions. (The point regarding background traffic growth is demonstrated by the requirement for a single carriageway bypass in 2021 with no development (see Ref Case in Table 4.1)).
- 4.5 In reality much more housing could be provided if development takes place on more than one site. This is demonstrated by Scenario 1, which suggests that a single carriageway bypass is required after the construction of 2,250 dwellings. This clearly demonstrates that link capacity on the A5-A45 is not restrained to 850 dwellings.
- 4.6 Clarification of this point is provided within Graham Reeve's proof of evidence, which at paragraphs 10.13 and 10.14 states that:
- "NCC is prepared to accept some short-term increase in traffic flows along the A45 only on the basis of a privately funded single carriageway scheme for the WFUH By-pass being a condition of any planning permission. This should be achieved with a Grampian condition*
- The level of development should be limited to 2,250 units before the WFUH is implemented..."*
- 4.7 I understand this to mean that the link capacity of the A45 junction approaches limit the maximum threshold for development under any Scenario to the delivery of 2,250 dwellings prior to the implementation of the FWUH bypass.

5 SUMMARY AND CONCLUSIONS

- 5.1 In this evidence I have considered the highways evidence submitted on the 22 April 2009. I summarise my conclusions in the paragraphs below.
- 5.2 The HA have taken the exceptional stance in which they are prepared to allow some development prior to the delivery of the FWUH bypass, however they have stopped short of defining this threshold. Furthermore, despite undertaking capacity assessments for a range of junction improvements schemes, the HA concluded that there is no viable interim improvement scheme from a capacity perspective.
- 5.3 Notwithstanding the evidence provided by the other parties at this Inquiry, I have identified a junction improvement that will allow the delivery of up to 2,400 dwellings prior to the delivery of the FWUH bypass. This junction improvement achieves:
- i. improved operating conditions in Scenario C compared with the existing situation (ignoring background traffic growth (Tables 2.2 and 2.3));
 - ii. improved conditions in 2016 with Scenario C compared with the no-development scenario in 2016 (Table 2.4). This is much better than the nil detriment test;
 - iii. in 2016 with Scenario C the improved junction operates virtually the same as the existing situation (2009) (Table 2.4 compared with Table 2.2).
- 5.4 I would reiterate, however, that while the development sites would be expected to fund the implementation of the junction improvement, this does not remove the obligation of the Monksmoor and Church Fields sites to contribute to the strategic mitigation measures, i.e. the FWUH bypass.
- 5.5 If the proposed junction improvement was not considered appropriate, my interpretation of NCC and the HA's positions is that circa 1,600 dwellings could be delivered with the existing junction layout, i.e. this level of pain associated with development would be acceptable.