

A428 Black Cat to Caxton Gibbet improvements

TR010044

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9.38 Joint Position Statement with the Local Highway Authorities on
Junction Modelling

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improvements
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**9.38 Joint Position Statement with Local Highway Authorities on
Junction Modelling (Rev 2)**

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1 Introduction

- 1.1.1 This Joint Position Statement (the Statement) has been produced by National Highways (the Applicant) in response to concerns raised by Local Highway Authorities at the Issue Specific Hearing 2 (ISH2) held on 23 September 2021 **[EV-024 to EV-027]**. The concerns related to the methodology used by the Applicant in relation to junction modelling.
- 1.1.2 The following Interested Parties have prepared this Joint Statement:
- a. The Applicant.
 - b. Bedford Borough Council (BBC).
 - c. The Cambridgeshire Authorities.
 - d. Central Bedfordshire Council (CBC).
- 1.1.3 An initial draft of the Joint Position Statement was developed by the Applicant and then shared with the Local Highway Authorities on 1 October 2021 in order that their position on the matters set out could be confirmed. The Joint Position Statement which was submitted at Deadline 3 **[REP3-024]**, erroneously missed out certain sections from the local highway authorities responses; hence it is being resubmitted here with all contributions from all parties duly incorporated. The positions of the Applicant and the Local Highway are set out in **Table 1-1** of this document.

Table 1-1 Joint Position Statement between the Local Highway Authorities and the Applicant at Deadline 5 (16 November2021)

The Applicant	Bedford Borough Council	Cambridgeshire Authorities	Central Bedfordshire Council	Current Position
<p>Base models for the new 'Scheme' junctions were not developed because the Scheme will fundamentally change junction layouts in the future and therefore the operation of the existing junction (where it exists) will have no bearing upon the operation of the proposed new junction. In other locations, while base models could have been developed, this was not felt necessary or proportionate as the assignment and routeings of the traffic flows extracted from the Strategic Model indicated that for all these junctions the Scheme would reduce flows/ improve operation or that the junction would operate well within capacity with the Scheme in place.</p>	<p>Bedford Borough Council (BBC) has stated that the modelling is acceptable, and no issues have been raised in either the LIR [REP2-002] or Written Representations [REP1-045].</p>	<p>The base models were not developed and calibrated/validated for most of the junctions.</p>	<p>It is noted that a hybrid of model and observed flows were used to assess the operation of the Biggleswade North junction (A1/Hill Lane), and that the base model was not validated. In addition, junction surveys associated with recent planning applications show higher levels of queuing than modelled within the Transport Assessment Annex for this junction, which raises queries over the confidence that can be given to the modelling. Traffic surveys available on public file (as part of these planning applications) include queue lengths - it is considered they represent a suitable data source for model validation – the applicant has been provided with</p>	<p>The Applicant has agreed to undertake sensitivity tests for a selected group of junctions by changing the input parameters to reflect the base year counts and turning proportions in the forecast year demand inputs. In addition, some of the other modelling parameters highlighted by the Cambridgeshire Authorities and CBC will be amended to consider the potential impact of those changes on the model outputs and transport assessments of the Scheme. The detailed scope and methodology of the sensitivity tests are outlined in the Scope of Junction Model Sensitivity Test [REP3-029], submitted at Deadline 3.</p>

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The Applicant	Bedford Borough Council	Cambridgeshire Authorities	Central Bedfordshire Council	Current Position
			<p>links to the relevant data and CBC request that a validation exercise is undertaken. CBC would further request that a sensitivity test based upon observed turning movements to provide an updated base, with the addition of modelled growth for forecast assessment, is undertaken.</p> <p>Whilst reference is made to the reduction of flows or improved operation, this is not the case for junctions on the A1, where flows are predicted to increase following the opening of the scheme. In addition, the junctions in question are over capacity and subject to congestion and delay. As such accurate modelling of the junctions current and future operation is considered to be essential.</p>	

The Applicant	Bedford Borough Council	Cambridgeshire Authorities	Central Bedfordshire Council	Current Position
<p>The Applicant relied on the forecast flows taken directly from the strategic model as inputs for the forecast year junction models for the following reasons:</p> <ul style="list-style-type: none"> For the new 'Scheme' junctions the layout changes fundamentally. This means that existing turning flows cannot inform future junction operation because the turning proportions and routings change significantly between the base and forecast years. For the junctions on the wider network, the strategic model flows indicated that the Scheme would reduce flows/improve operation, or that the junction(s) would operate well within capacity. Hence, 		<p>The 2025/2040 DM/DS forecast flows were taken directly from the strategic models, which are not calibrated to individual turning flows, and the method followed did not take account of surveyed turning flows. Hence the Cambridgeshire Councils do not have adequate confidence on the operation of the junctions for the forecast years.</p>	<p>The junctions of concern within CBC are not new 'Scheme' junctions and therefore existing baseline operation can be assessed.</p> <p>The junctions of concern in the CBC area (those on the A1 within CBC and at M1 J13) are also expected to experience increases in flow as a result of the proposed scheme and are predicted to operate over capacity.</p> <p>In addition, the operation of the local road approaches to these junctions are considered to be sensitive to increases in flow on the A1 Strategic Route, and as such the schemes impact upon individual turning movements is considered to be both relevant and important for CBC to have a full understanding of</p>	<p>The Applicant has agreed to undertake sensitivity tests for a selected group of junctions by changing the input parameters to reflect the base year counts and turning proportions in the forecast year demand inputs. In addition, some of the other modelling parameters highlighted by the Cambridgeshire Authorities and CBC will be amended to consider the potential impact of those changes on the model outputs and transport assessments of the Scheme. The detailed scope and methodology of the sensitivity tests are outlined in the Scope of Junction Model Sensitivity Test [REP3-029], submitted at Deadline 3.</p>

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The Applicant	Bedford Borough Council	Cambridgeshire Authorities	Central Bedfordshire Council	Current Position
<p>adopting forecast turning flows from the strategic models to assess the junctions is a reasonable approach. This enables consideration of the Scheme impact on the overall junctions rather than on individual approach arms or turning movements, which is appropriate given the scale and nature of the Scheme.</p>			<p>potential scheme impacts.</p>	
			<p>As detailed in the Written Statement, CBC continue to have concern over the significant differences between the strategic model and VISSIM model when assessing the highway network around Sandy, including the A1/ A603 junction, due in part to the sensitivity of this junction to additional traffic, the potential for the displacement of traffic</p>	<p>The Applicant has provided CBC with the VISSIM models used to assess the operation of the highway network around Sandy and the A1/ A603 junction, in order to provide CBC with greater comfort with regards to the findings of the VISSIM modelling work. These models are currently being reviewed</p>

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			<p>through the centre of Sandy (as predicted within the Strategic Modelling) and the resultant implications in terms of congestion and air quality.</p>	<p>by CBC and their consultants, however the review has not been concluded at the time of this position statement.</p>
		<p>The Cambridgeshire Authorities are also interested in the Applicant's approach to 'Monitor and Manage' and support and agree with the principles and the final 3 paragraphs of the CBC position covering this matter and consider that it also applies to the Cambridgeshire highway network.</p>	<p>Whilst the modelling work undertaken for the scheme and summarised in the Transport Assessment Annex (application document ref. APP 243), identifies increases in traffic through the junctions on the A1 and the A421 south of the scheme, no direct mitigation is being proposed.</p> <p>These junctions are modelled as operating over capacity and with a 'significant change in flow patterns' at the Sandy A1/A603 roundabout (para.3.18.11 of the Transport Assessment Annex – APP 243), favouring A1 movements over local road</p>	<p>For the SRN junctions where the local highway network arms are predicting to have longer queues due to reassignment of local traffic NH proposes to obtain regular feedback through monitoring of the traffic flow characteristics by the local highway authorities and if found necessary consideration will be given to the potential need for interventions.</p>

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The Applicant	Bedford Borough Council	Cambridgeshire Authorities	Central Bedfordshire Council	Current Position
			<p>movements, and a similar pattern at the A1/A6001 Biggleswade North junction, with increases in mainline traffic offset by reductions inside road traffic.</p> <p>The outcome of the modelling work, as reported in the Transport Assessment Annex – document ref APP 243, para 3.22.5 is to propose that the following junctions are covered by a monitor and manage approach:</p> <ul style="list-style-type: none"> • M1 J13 • Sandy A1/A603 • Biggleswade North • Biggleswade South <p>Whilst clarification on the Monitor and Manage process has been requested, no further detail has been provided on how this would operate, including the timing, frequency and</p>	

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The Applicant	Bedford Borough Council	Cambridgeshire Authorities	Central Bedfordshire Council	Current Position
			<p>methodology for any monitoring process, (including for example pre-commencement surveys to provide a baseline against which to monitor), governance and involvement of CBC, trigger points for intervention, or funding or delivery if mitigation is required.</p> <p>As key junctions within the CBC authority area, it is considered that a lack of clarity on Monitor and Manage would impact upon CBCs ability to discharge their Network Management Duties. As detailed within CBCs written statement, the authority is seeking a greater degree of certainty on this matter, to be secured through the DCO process.</p>	
		<p>Following on from Issue Specific Hearing 2 on 23rd September, and the publication of the Hearing</p>		<p>The Applicant has attached the proposed</p>

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The Applicant	Bedford Borough Council	Cambridgeshire Authorities	Central Bedfordshire Council	Current Position
		<p>Action List on 27th September, Cambridgeshire County Council contacted the Applicant several times on this matter. At a meeting on 1st October the Applicant noted that a position statement would be issued on the same day for the Council to review, and the Council noted that a meeting to discuss, or earlier visibility of the position statement (as with the Biodiversity position statement) would have been beneficial.</p> <p>In the absence of engagement during last week the Council had prepared a proposed methodology, as requested by the Examining Authority. This is attached as an Appendix to this Position Statement.</p>		<p>methodology at Appendix A.</p>

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The Applicant	Bedford Borough Council	Cambridgeshire Authorities	Central Bedfordshire Council	Current Position
		<p>The Councils are not convinced that sensitivity testing is the correct answer because it would be an iteration of the same base modelling.</p>		<p>The sensitivity tests will adopt the base survey flows to determine the turning proportions for the forecast years flows as recommended by CCC in their Approach-2 of sensitivity test methodology (set out in Appendix A)</p>
		<p>The Councils note that the 'Scoping Brief for the Sensitivity Tests' being submitted at Deadline 3 has not been discussed with the Local Authorities and look forward to reviewing it.</p>		<p>The Applicant submitted the Scope of Junction Model Sensitivity Test [REP3-029] at Deadline 3.</p>

2 Joint Position Statement

- 2.1.1 The statement below is based upon the information and positions summarised within **Table 1-1** of this document.
- 2.1.2 In summary, while the applicant considers that the methodology adopted for modelling the Scheme and wider area junctions are robust, the Applicant has agreed to undertake sensitivity tests for a selected group of junctions in order to provide the Cambridgeshire Authorities and CBC with greater confidence in the modelling results.
- 2.1.3 A Scoping Brief for the Sensitivity Tests was submitted at Deadline 3 [**REP3-029**]. The outputs from the sensitivity tests are set out in Junction Model Sensitivity Test Outputs [**TR010044/EXAM/9.68**] which has been submitted at Deadline 5. This will form the basis of further discussions with the Local Highway Authorities.

Appendix A – CCC Preferred Method for Deriving Junction Model Flows

A428 Black Cat to Caxton Gibbet – CCC Preferred Method for Deriving Junction Model Flows

Prepared by: Cambridgeshire County Council

Date: 27 September 2021

Introduction

CCC officers have concerns about the traffic flows that have been used in the detailed operational junction modelling that has been used to underpin the proposed A428 Black Cat to Caxton Gibbet highway scheme.

These concerns have been raised with National Highways (NH) on a number of occasions via the joint Issues Log, in meetings, in the Public Inquiry Written Representations and Local Impact Report as well as at the recent Issue Specific Hearing that covered Highway matters.

NH approach to the junction modelling means that CCC consider the current junction assessments to be unreliable, which has a direct impact on assessment of required mitigation for the scheme, highway design for new junctions and may lead to changes with the scheme design itself. CCC are also keen not to adopt more assets than necessary due to the ongoing maintenance burden. For these reasons getting the junction modelling as reliable as possible is a key requirement for CCC.

In an attempt to move this forward this technical note outlines two options for NH to consider that CCC would find acceptable. CCC note that NH stated their intention to carry out sensitivity testing during the Issue Specific Hearing. Without knowing the nature or coverage of this sensitivity testing CCC are unable to confirm that it would meet their requirements, so request NH proceed using one of the two options outlined in this note.

National Highways Methodology

In deriving turning movements for use in the local junction models, NH have adopted one of three approaches depending on their assessment of which of the following categories the junction should fall in to:

1. Junctions which do not exist in the base year, or where there are fundamental changes in layout – '**scheme junctions**'.
Demand for these junctions was taken directly from the strategic model in future years, with no base year model developed.
2. Junctions which do exist in the base year and are not significantly changed by the Scheme, but where no base models were developed: referred to as '**existing junctions with no calibrated/ validated base models**'.
Demand for these junctions was taken directly from the strategic model in future years
3. Junctions which do exist in the base year and are not significantly changed by the Scheme, but where observed data was available and base models were developed: referred to as '**existing junctions with calibrated/ validated base models**'.
Demand for these models was taken in some cases from observed counts in the base year and in others it was taken directly from the strategic model.
Demand was taken directly from the strategic model in future years.

CCC fundamentally disagree with use of unmodified strategic model flows in the local junction models. This is primarily because the strategic model is not validated to turning movements at individual junctions, as evidenced by CCC comparison of modelled and observed flows at a number of junctions.

NH have undertaken a comparison of the available observed count data and the base year strategic model and have concluded that the strategic model flows are sufficiently close to the observed data. The table below shows an example of the comparison undertaken by NH.

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total
A1198 Ermine Street (North)	0	416	227	0	642	0	422	172	38	632	0	-6	55	-38	10
A428 (East)	271	0	1	892	1164	430	1	99	812	1342	-159	-1	-98	80	-178
A1198 (South)	280	29	0	61	369	211	274	0	106	591	69	-245	0	-45	-222
A428 Cambridge Road (West)	0	1075	21	0	1096	6	914	113	0	1033	-6	161	-92	0	63
Total	551	1520	249	952	3273	647	1611	384	956	3598	-96	-91	-135	-4	-325 (-9%)

Source: A428_MCTC_Analysis_SATURN Flows_Scheme Vissim Junctions

NH have reviewed this and concluded that the model flows are representative of the observed traffic data and it is acknowledged that the flows on each arm of the junction in the strategic model would appear to be reasonably comparable with the observed data meaning that the link flow validation is acceptable at this location. However, the important measure for deciding if the use of flows from the strategic model in the assessment of individual junction models is appropriate should be based on the representation of the turning proportions in the model.

The table below was prepared by CCC using the data above to compare the turn proportions at this junction in the base year model.

From/To	SATURN Flows (2015)					Survey Flows (2016)					Difference (SATURN - Survey)				
	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total	A1198 Ermine Street (North)	A428 (East)	A1198 (South)	A428 Cambridge Road (West)	Total
A1198 Ermine Street (North)	0.0%	64.7%	35.3%	0.0%	100%	0.0%	66.8%	27.2%	6.0%	100%	0%	-2%	8%	-6%	0%
A428 (East)	23.3%	0.0%	0.1%	76.6%	100%	32.0%	0.1%	7.4%	60.5%	100%	-9%	0%	-7%	16%	0%
A1198 (South)	75.8%	7.8%	0.0%	16.4%	100%	35.7%	46.4%	0.0%	17.9%	100%	40%	-39%	0%	-1%	0%
A428 Cambridge Road (West)	0.0%	98.1%	1.9%	0.0%	100%	0.6%	88.5%	10.9%	0.0%	100%	-1%	10%	-9%	0%	0%
Total	16.8%	46.4%	7.6%	29.1%	100%	18.0%	44.8%	10.7%	26.6%	100%	31%	-31%	-8%	9%	0%

From this it is possible to see that the turning proportions vary significantly. For example, the strategic model indicates that 75.8% of traffic on the A1198 (south) continues on the A1198 (north) when in the count only 35.7% of traffic makes this movement. From this it is possible to confirm that the turning proportions at the junctions examined do not compare well, from which CCC conclude that all of the junction models should be based on observed turning counts in the base year.

CCC would like to see base year models developed for all of the junction models produced by NH. This is because all of the junctions assessed currently exist in some form, for which base models could be built to calibrate demand. Demand for totally new movements in future years could be taken directly from the strategic model, which would be an acceptable use for these flows.

Furthermore, direct use of strategic model flows in future year scenarios is not agreed because of the discrepancies between modelled and observed flows in the

base year. CCC maintain that future year flows should be produced by using strategic model flows to modify observed base year counts.

While CCC would like to see base year models produced in each case, we have set out two options below for discussion.

Option 1

Base year models should be built for all junctions so that base year demand and junction operation can be calibrated to existing conditions.

In the case of VISSIM models this would include calibrating observed demand to ensure that base year queues are representative of observed conditions. CCC are not suggesting collecting new queue length data but simply using information that already exists, for example, historic WebTRIS or Trafficmaster data.

Future year demand should be estimated using strategic modelled turning flows that have been converted to vehicles and adjusted to convert peak period to peak hour flows. Differences between base and forecast year can be calculated and applied to observed base year turning flows to produce respective forecast year demands per scenario. These should then be used in the junction models. The process is outlined in Appendix A using a Do Minimum scenario as an example but the method applies equally to Do Something scenarios.

Option 2

Despite CCC repeatedly asking for validated base year models for all of the junctions assessed, NH have to date resisted this saying that the approach taken is appropriate and proportionate. Therefore, in an attempt to move this forward CCC propose the following compromise position.

CCC note the base year models that NH have already built and will not request NH build any additional ones.

However, for those junctions that have a base year observed count, CCC request that NH assume that the count data would have been used instead of base year flows from the strategic model had a base year model been produced.

CCC then request that the future year matrices should be built using the methodology set out in Option 1 above (see Appendix A), that is, using strategic modelled turning flows that have been converted to vehicles and adjusted to convert peak period to peak hour flows. Calculate differences between base and forecast year and apply those to observed base year turning flows to produce respective forecast year demands per scenario. These should then be used in the future year junction models.

Summary

CCC consider Option 1 to be the preferred option as this follows industry standard best practice. However, CCC put forward Option 2 as an alternative that would be acceptable as it would provide a much better estimate of future year junction performance than the method used by NH to date. CCC request that the methodology going forward be discussed and agreed BEFORE the work is

undertaken so that the risk of further disagreement is minimised. The junctions affected are summarised in Appendix B.

Additional Junctions models requested by CCC

CCC note they have asked NH to assess additional junctions on Great North Road and Cambridge Road in St Neots as the strategic modelling undertaken by NH indicates that both these roads see a significant increase in traffic as a direct result of the scheme. CCC need to be confident that the adjacent junctions on these roads can accommodate the suggested increase in trips (circa 200 PCU/hour in the AM and PM Peak periods). These junctions are listed in Appendix C and their assessments should be carried out using Option 1 above.

Summary and Conclusions

CCC are concerned about the use of unmodified strategic model flows in local junction model assessments supporting the proposed A428 Black Cat to Caxton Gibbet scheme.

These concerns arise because of the poor comparison between modelled and observed turning flows in the base year at a number of the junctions assessed, undermining confidence in the ability of the strategic model to model turning movements accurately. Since turning movements are at the heart of any junction assessment this is a major concern.

Two options for producing more accurate future year flows for use in the junction assessments are suggested above, which would provide a sounder basis to determine mitigation measures for the proposed scheme.

Appendix A – Method for producing forecast year matrices – Do Minimum (DM) scenario used for illustrative purposes

