

## Contents

Following the presentation of the Councils Response Mr Moore has replied with additional comment. The remaining points he makes are limited in their extent. LCC has prepared this written note having received the document on Monday afternoon.

Mr Moore appears to apply the calibration and validation techniques used at individual junction locations to an area-wide modelling exercise. In the former (junction modelling), all elements are known, including flow volumes, queue lengths and delays. There is little scope for variation and techniques are employed to ensure that exact observed relationships are developed by adjustment of individual junctions, sometimes by contradictory methods across different locations. In the latter, (assignment modelling) certain locations are chosen to calibrate (adjust) the model and others to validate (verify) the performance of the model. Across other locations the diligent construction of the model accounts for its acceptance given appropriate locations for both the calibration and validation. The variation of flows at locations other than calibration and validation sites is not commonly referenced as forecast error but rather the outcome of a necessary simplification whereby individual accesses and egresses are replaced by wide area zones and individual approach arrival profiles are represented by area wide peak-hour factors. This is an industry standard approach, adopted irrespective of the *“level of modelling”*.

### **1 Contrast Between Strategic and Junction Modelling**

Despite accepting that the work in the sensitivity test has achieved part of the objectives he suggests of meeting the various purposes Mr Moore maintains that a DfT acceptable model is not automatically suitable for all levels of modelling.

### **LCC Response**

The level of accuracy of the model is fit for purpose.

LCC have elsewhere identified the goodness of fit. Strategically the model is compliant. Locally, out of 14 calibration counts specified to improve traffic assignment in terms of flow comparison between the 2018 sensitivity model and the 2015 observed flows (Document Ref: LCC3/I.1) 93 % of flows are acceptable. It must be noted that these are calibration sites used in recognition that flow patterns can be more accurately reflected through the model sensitivity test.

We recognise that turn flow comparison is necessarily going to be at a lesser level of accuracy than for links. We recognise that given changes in land use, demographics, economic activity, work / leisure travel patterns and driver choice preferences then precise adherence to flow values will count for relatively little over the design horizon of the LEB.

We have previously stressed that it is important for a model to retain forecast capability and it is not helpful to limit every single flow to exactly replicate a single day count and lock down the degrees of freedom of the modelled response, as implicitly suggested by Mr Moore. It is this balance between accuracy and forecast response that has restrained us from introducing anything other than that considered necessary to achieve the appropriate traffic pattern in the vicinity.

We are concerned that Mr Moore introduces a concept of *“validation error”* when he seems to be describing forecast accuracy. As discussed in the Modelling documentation and previous

responses our base year is 2006. The 2018 do minimum figures are forecasts. Mr Moore must be discussing forecast error.

We agree that any model is subject to forecast error and there would equally be error in artificially constraining flow values beyond the more general adjustments already made to suit the needs of the project.

The inquiry can, as the DfT has previously, have confidence in the model and the indication it gives as a forecast tool.

## **2 The Sensitivity Test Model**

Mr Moore suggests criticism for using the core model but recognises that the sensitivity model is available and provides an alternative perspective based on flow evidence that differs from the original 2006 data.

### **LCC Response**

LCC was not seeking to personally criticise Mr Moore in this respect however it was seeking to ensure that the correct understanding was provided at the Inquiry. All key analysis is conducted for both datasets to ensure a robust approach.

## **3 Queuing at Greetwell Road Double Mini Roundabouts**

Mr Moore stands by the accuracy of his bespoke model for evaluation of the double roundabout

### **LCC Response**

Both LCC and Mr Moore suggest that the junction will fail. LCC has a potential layout for remedial action at this junction. LCC use a flat profile (based on evidence from total entry flow) and generate an RFC of 0.8 whereas Mr Moore obtains results of 0.92 using the same profile but revised geometrical measurements. In any event the junction performance is much improved to a condition not worse than the current performance.

On a point of detail Mr Moore has commented:

*“LCC’s analysis that the AM Peak is only 11% of daily traffic is for the city as a whole. A much larger proportion of traffic inbound to Lincoln on Greetwell Road – around 18% - occurs in the AM Peak hour. Additionally many journeys at this time of day are time critical and are constrained by a range of factors such as school start times, work times etc. Many people do not have the flexibility to start their journeys earlier or later”*

Mr Moore is correct if the analysis is limited to only west bound movements approaching the junction from Greetwell Road, which has approximately 18% of the total daily flow in the AM Peak hour.

However, this is not the only movement that uses this junction. Considering all of the approaches, the total daily flow into the junction is approximately 25000 and the AM Peak hourly flow is 2400, which is the equivalent of 9.5%. The position of LCC is that it is necessary to consider all movements, not only those moving from east to west and so the previously provided statement that *“90% of traffic movements through the day would find the routes which include the Greetwell Road/Outer Circle Road to be available for use without any or any excessive delay at most times”* remains valid and is correct.

#### **4      *Wragby Road/Outer Circle Road Traffic Signal Junction***

Mr Moore suggests this junction remains under capacity for all scenarios.

##### **LCC Response**

Mr Moore has updated some geometry but has not used Sensitivity Test flows. He does however concede that the promoted scheme has more reserve capacity. Mr Moore relies on capping flow and manual reassignment of traffic onto Ruskin Avenue to achieve an acceptable performance in Alternative 1. Manual reassignment is a technique whereby the flow is adjusted based on the discretion of the traffic analyst; the traffic model does not suggest that this is an appropriate model response. Without this Alternative 1 fails in terms of capacity in the PM peak as compared to assigned flows below capacity in the Promoted Scheme. Alternative 2 fails on a range of other aspects such as expense, land take and traffic flow patterns (See LCC response to Objectors Alternative Proposals - Alternative 2) and is therefore not worthy of further traffic consideration.

Mr Moore suggests modifying stage sequences, such as limited pedestrian capacity, or turn bans, to enhance junction performance. This suggests accepting a lower level of service for users of this junction, which should not be the premise of developing an improvement scheme.

Mr Moore is happy to critique model flows elsewhere but is seemingly reliant on these same flows to prove a tenuous argument for adequate junction performance which simply does not exist.

#### **5      *LEB Roundabouts***

Mr Moore checks the capacity of Wragby Road / LEB roundabout and finds that intercept values and lane usage are incorrect resulting in heavy queuing.

##### **LCC Response**

LCC inadvertently supplied the previous geometric layout to this junction. The correct geometric layout has a double lane merge on egress from the roundabout for LEB southbound traffic. This layout works and presents an RFC less than the critical 0.85 threshold.

The intercept values are less clear-cut. Positive intercept corrections suggest that the lane usage is relatively equal and that the junction would not require intercept adjustments. Without the correction the RFC increases to 1.1. It should be noted that this is for the PM peak hour, peaked profile in 2033. Given the suggestion that the layout may be sensitive to flow values on this arm there is scope for improvement of the flare length and lane capacity to mitigate the issue. The objectors alternative flow pattern would potentially require intercept adjustment and result in lower performance.