Commentary on Summary of Bar Charts for Meldreth and Waterbeach Level Crossings (002)

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The latest set of graphics for Meldreth Road strengthen the case for the inadequacy of the modelling used to represent the likely delays experienced by residents. The substantive deficiencies of the modelling approach were revealed in the discussion with Nicholas Contentin and myself on Tuesday April 18th.

It is clear that the Shepreth Observed Data used in the bar chart is not in accord with the barrier downtime at the Shepreth Crossing (5.13 in APP-W7-1 - Proof of Evidence of Nicolas Contentin). Namely:-

- The new modelling data 'suggests' an hourly 7m 2s barrier down time from Shepreth LX – Observed Data which is 1/8th (**12.5%**) of the barrier closing yet data in 5.13 of the proof of evidence records only **0.5%** of closings exceed 7 minutes. Similarly the data for downtime in excess of 5 minutes predicts 2/8th (**25%**) of closings in excess of 5 minutes and the data in 5.13 only records **10.9%**.

With such a wide disparity between the predictions from the model and the observed behaviour the conclusion is that the model is woefully inappropriate, remembering the point made on Tuesday that the complexity at Meldreth Road lies with the complication of the train arrival / barrier down cycles and not with the road network. An approach which relies on a single average to represent the complexity of multiple speed trains and multiple trains per barrier cycle is just plain wrong!

The choice of median as opposed to average is convenient only in the sense that it fudges the modelling. The reason that means do not equal medians is always due to a 'long tailed distribution' where a few 'high values' have a greater impact than many low values, clearly true of the Shepreth data. Equally using a median is wrong for a multi-modal distribution (one in which there is > 1 peak). We established on Tuesday that the barrier down time is different for a single train and for multiple over-lapping trains.

The proposal to change the level crossing on Meldreth Road Shepreth has raised a substantial number of objections from local residents in Shepreth and Meldreth. The concerns were primarily around the likelihood and impact of delays especially following their experience of the upgrade to the adjacent Shepreth Station which generated significant crossing delays.

At the inquiry the focus of Cambridge Highways was on the effect of the changes on the wider transport network viz: *".. to analyse traffic and congestion implications of upgrading 7 level crossings to MCB-OD2 / MCB-CCTV type operation, with a view to understanding the impacts the upgrades will have on the local communities and the wider transport network*" [App39_-_traffic_modelling' 1.1.1]. For the local communities, mentioned here, a different view is required to understand "*the impacts of the changes on crossing users including motorised vehicles, pedestrians, cyclists and other non-motorised users*."[Secretary of State's Statement of Matters dated 9 March 2023]. For the residents averages fail to properly reflect the situation they experience.

The bar chart utilises observed data from Shepreth yet the Proof of Evidence table [5.13] also purports to be observed data of barrier down times. Noting first that a barrier down time does not reflect the community wait time as it misses the queue clearance time and, as we learnt on Tuesday, any blocking back.

On Tuesday I also commented upon the lack of correspondence of the observed Shepreth data, if trustworthy, [5.13] with the model, viz:

- The distribution of barrier down times is not a single distribution but a concatenation of multiple distributions – of a single train passing per barrier cycle, of 2 trains passing etc. Statistically you cannot treat multiple distributions as one in modelling. The tell-tale sign from the data is the number of recorded barrier cycles compared with the number of trains – in the data the am peak shows 1128 barrier cycles but for 180 days and 12 trains per hour an estimated 2160 trains pass. Holidays, strikes and the weekend timetable would reduce the number of trains but a significant number of multi-train crossings per barrier cycle is clearly evident.
- The Shepreth data also allows an estimate to be made of the aggregate down time for the barriers. For Shepreth the model predicts 56% of the peak hour down and 54% at Meldreth, using the Shepreth data and multiplying the average downtime of each range (e.g. 1.5 minutes for the 1-2 minute box) by the number of barrier cycles in this range (29) suggests 43.5 minutes total downtime between 1-2 mins, continuing this process across all the time intervals gives an aggregate of 3086 minutes downtime in the 180 am peak hours. This is 21 minutes in each hour or 35% (model prediction 56%).

The modelling report narrative used words such as insignificant or modest without there being a standard, consistent or agreed definition of the terms used [such as minor: > 1 minute, significant: > 3, major: >3 etc]. There was no evidence provided for any balance point nor any standard objective criteria or terms used to characterise the go/no-go decision.

A cynic of the whole process might be inclined to take the literal interpretation of the summary provided by the Level Crossing Group to the modelling:-

"*10.7 Again, considering the Proof of Evidence supplied by my colleague Nicholas Contentin at Modelling Group and notwithstanding the details contained in his proof, I am of the opinion that whatever the outcome of the traffic modelling undertaken, the overall safety benefit of upgrading all of the crossings within this project outweighs those issues or concerns*"

At the start of the process the local representatives stated in a meeting with Network Rail that we understood the safety case and to start the discussion on trade-offs we required an accurate and realistic prediction of the impact on local residents. My conclusion here is that no such prediction has been provided with the evidence presented so far.