Meldreth Road
Level Crossing Inquiry

Roger James
Meldreth Parish Council
11th April 2023

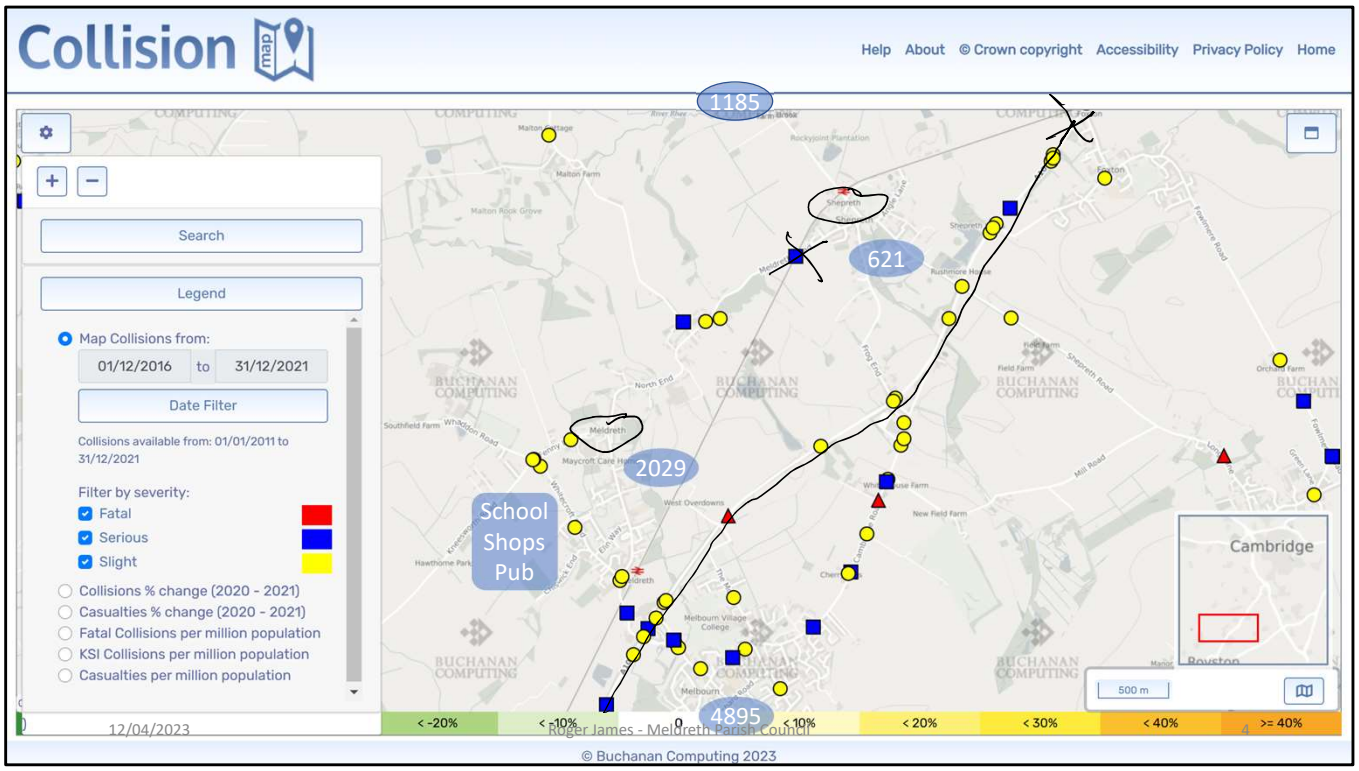
Broadly

- The gist of our objection is that the level crossing improvements are presented without reliable evidence on the effect on local traffic, in any event it is certainly not minor.
- The better evidence for delays comes from the recent experience with the station crossing – but will be worse due to the higher volume of traffic on this road (on the safer route into Cambridge)
- There is a basic technical criticism of the modelling work put forward, but there is much more available
- The judgement here for the inquiry is whether the proposed technical solution is fit for purpose and the inspector's 'view' on what extra level of delay is acceptable

Meldreth Parish Council – Statement of Case

- Our objection is that the data presented in this reply is inappropriate and inaccurate. It fails to make the case for the technical solution or to reassure residents that the changes will have a 'minor' impact on local residents and the commercial life of the area.
- The Scheme is presented as an Upgrade but it represents a significant Downgrade to the local residents and users of Meldreth Road.
- The problem of traffic delays are not amenable to definitive conclusions such as those presented in the report, it is a stochastic process and categorical reassurances cannot be given nor should averages be used.
- The 'real world data' on which the modelling was based is incomplete and unrepresentative
- When a similar 'improvement' was made to the adjacent Shepreth Station crossing traffic chaos ensued and delay times up to 20 minutes were regularly reported
- The Report Misses Vital Technical Details

- The proposed changes are not 'minor' and have led to considerable concerns from residents
- Upgrade
- Flaw of averages – reports are inconsistent and contradictory
- Real world data – significantly improved at the last minute but still tells a different story and still being used wrongly. Tarffic levels are underestimated from NR own data
- Real world evidence
- We are not experts but the alternatives are dismissed without clear evidence and no rational is provided



Real data on accidents – no near misses
Background to where people are and the journeys they wish to take and the real risks
5 year data – FWI data translates D2 predicts a major incident/death range 1 in 12.5m to 62.5m, this translates to 1 death equivalent in 50-250 years, on the roads the death rate (above) is 2 deaths in 5 years.
By reducing the railways hazard are we making the road hazard greater?

Meldreth & Shepreth – Local Traffic

- For Meldreth the route to Cambridge is a left turn onto the A10 after the crossing, or a dangerous right turn on detour
- For Shepreth access to the shops & school via the crossing avoids the busy A10
- The roads are far more dangerous than the rail and there are very more accidents. Traffic levels are estimated to be down by ~25% in 2021 survey (20% from 2013 and 5% growth)
- The train frequency is high (90th percentile), the use moderate (70th percentile) [NR Data]
- The train frequency is clustered with 4 fast/stopping services twice an hour

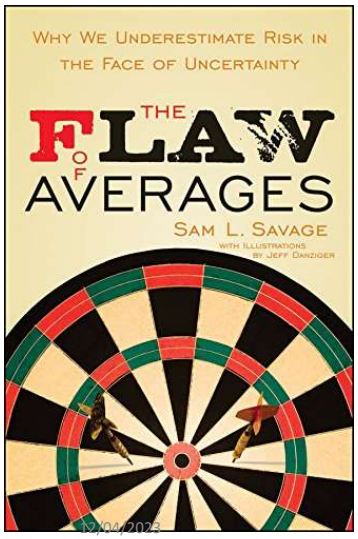
High train frequency and complexity – train clusters are the determining and pivotal aspect of the traffic situation

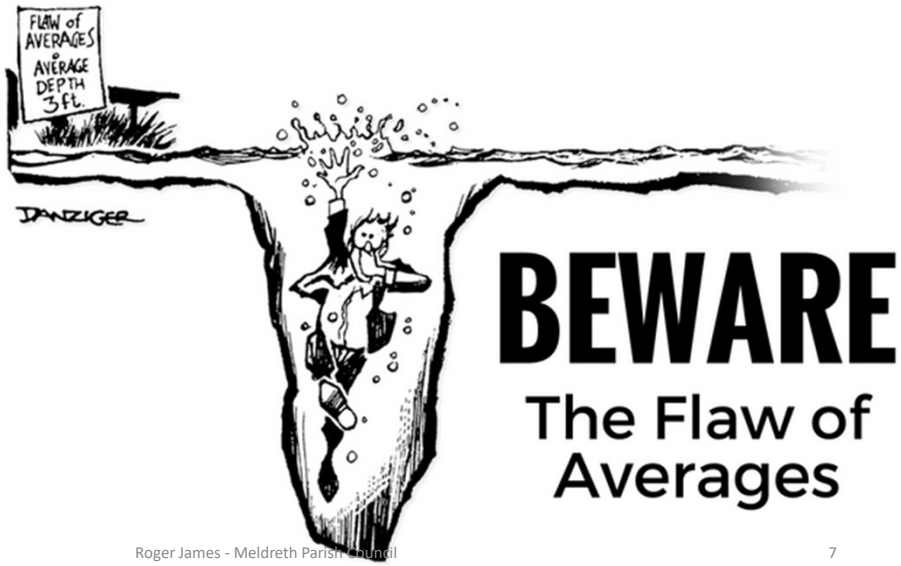
Averages or odds?

- National Lottery
  - Average winning is 56p in the pound
  - The odds of winning the national lottery jackpot in the UK are one in 45,057,474, according to Lottery.co.uk
  - [4 numbers - 1 in 2,180, 3 numbers – 1 in 97 etc]
- Level crossing
  - The odds of being delayed for more than 5 minutes in peak times, more than 10 minutes etc etc.

Stochastic properties – understood by probabilities and limits not averages, public behaviour and understanding of risk is related to the odds/probability

Flaw of Averages





Basic book when you teach this stuff!

Average is fine to calculate the volume of the water but useless if you want to cross the pond

Flaw of Averages 2

Villagers' frustration as Shepreth level crossing down for 17 minutes

7th December 2018

Traffic problems caused by the level crossing near Shepreth railway station. Picture: Rob Mungovan *(Image: Archant)*

By Bianca Wild
Chief reporter

Share Comments

Shepreth level crossing was recorded as being down for 17 minutes on Wednesday – much to the frustration of residents, and motorists travelling through the village.

And evidence why the flaw of Averages applies to this discussion

What the model attempts to show?

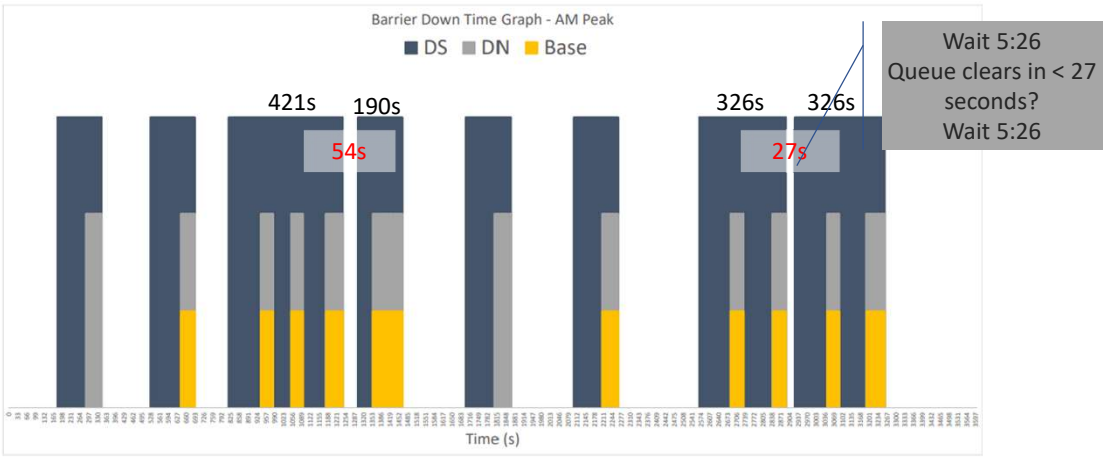


FIGURE 8.1: BARRIER DOWN TIMES – MELDRETH – AM

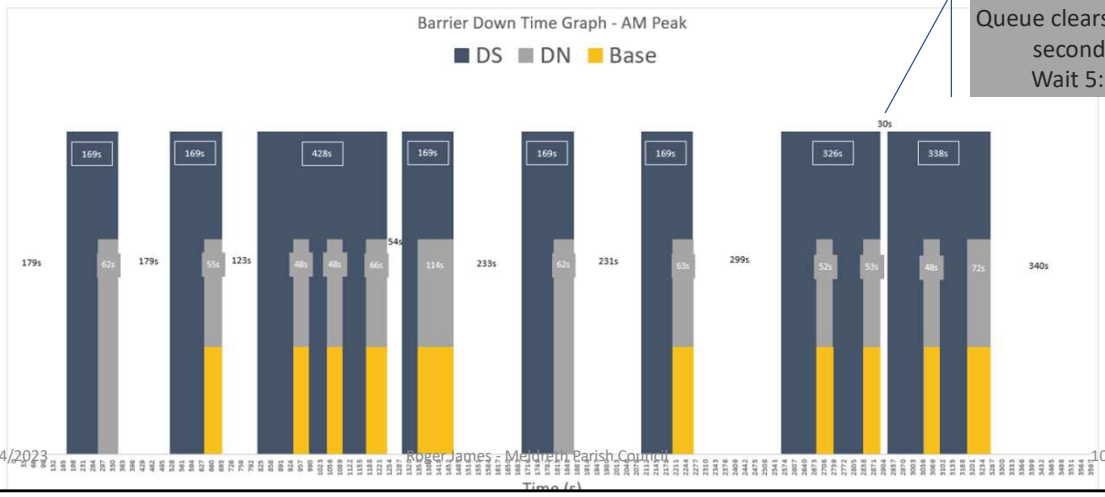
Key slide

- The old AHP system has significant gaps between trains – 1 closure per train
- The 'new' system has a much longer downtime per train but significantly 'bunches' the downtime so that the barriers remain closed between trains
- 4 'isolated' Trains per hour and 2 'clusters' of 4 trains – up & down and fast train followed by stopping train
- The width of the blue block – determined by the average barrier closure time (189 or 214 seconds)
- The gap between the blocks – determined by the ideal train timetable
- But – not all trains run exactly to time – the arrival within 5 minutes was down as 82% but now 95%

- THESE ARE AVERAGES USED AS MODEL INPUT, not measured distributions (actuals) which should be investigated as stochastic variable through the modelling

What the model attempts to show?

Modelled barrier down time (Meldreth)



30s gap – a bit of a giveaway – this should be a variable quantity depending on the precise performance of the trains, instead it assumes all trains appear at the exact same time!

No evidence that this is treated as a ‘stochastic variable’

The model is not using ‘real data’ of the variation in train arrivals

Perspective: trains or vehicles?

8 MELDRETH VISSIM MODEL

8.1 Traffic Data

8.1.1 The barrier down time of the Do-Nothing and Do-something scenario has been updated in line with Table 1.4 and Table 1.5.

8.1.2 Figure 8.1 and Figure 8.2 show the barrier down time across the peak period. A longer barrier down time in line with Table 1.6 is observed in the Do-Something. It was observed that this longer barrier down time allows multiple trains to pass through at once, whilst the shorter barrier down time only allows one train to pass through at a time.

- *The old system allowed traffic to flow between the arrival of trains when they arrive in a 'cluster' of arrivals.*
- *The do-something option stops traffic from the first train to the last in each cluster.*

The purpose of the modelling should be 'from the point of view on the effect of the community' – not the wear and tear on the barriers!
The model may be (partially right) but the results need to be understood and interpreted from the right perspective.

What the simulation tells us!

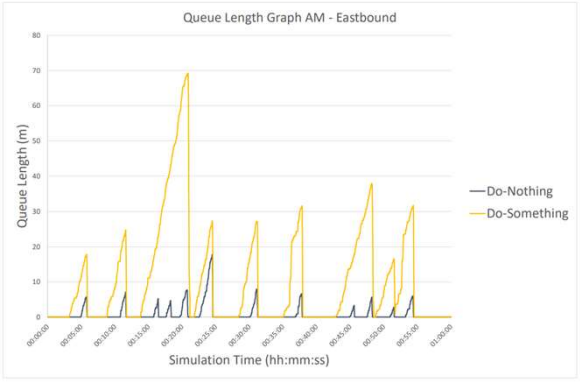
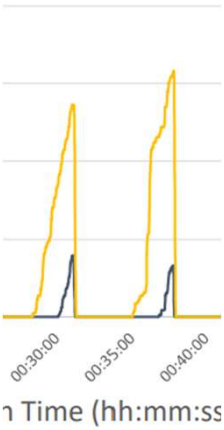


FIGURE 8.4: QUEUES – EASTBOUND - AM PEAK – MELDRETH

The do nothing in black shows the current automatic barrier system and shows the ‘gaps between peaks’ during which the queues disperse.
The slope shows the arrival of vehicles that need to queue

Explanation: Random arrivals & Random Clearing



- Simple case – if the train arrival is evenly distributed through the hour the queues have time to clear

The ‘single train’ are not unduly problematic, but the interesting performance is when the train arrivals are close to each other (ie the clusters)

Explanation: Train Clusters Backup Queues

- The 4 trains arrive before the queues have had the opportunity to clear. The vehicles accumulate and the wait times increase exponentially
- On the current timetable 8 out of 12 trains traverse the crossing in 2 blocks of 4 in 12 minute periods.
- On the line the recent timetable performance arrival data was 85% within 5 minutes.

Vissim - Detail

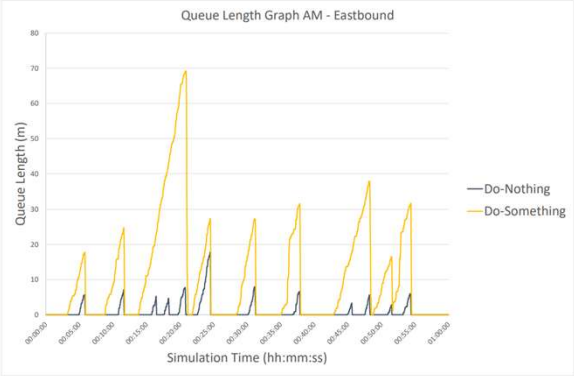


FIGURE 8.4: QUEUES – EASTBOUND - AM PEAK – MELDRETH

- Clustering is clear (2 * 12 min periods in the hour)
- Little tolerance for the barriers not to be closed for whole extent of both clusters
- The queue emptying is vertical – traffic light grand prix?

Vissim uses the previous train patterns are input for a model which models the arrival of vehicles at random through the hour. When the barriers are closed we see the queue build up as expected. [if you have the right levels for the traffic patterns – the data used is 25% off]

When the barriers lift the queue disappears – this is not realistic!

So

- What about the actual pattern arrival of the trains
- What about the time taken for the queue to dissipate (problems of A10, influence of road blockages eg Shepreth Station)

Perspective – Shepreth Observed Data

5.12 The Modelling Group has undertaken a review of the barrier downtime at the Shepreth Crossing over a period of 6 months. The review took place between 1 September 2022 and 28 February 2023 and the results (as set out in the table below) clearly set out that the upgraded barrier was down for a period of more than 10 minutes only in 91 instances (out of a total 20,730 instances), which represents 0.44% of the overall downtime and confirms that the significant delays mentioned in Mr James' Statement of Case do not in fact occur on a regular basis.

- 0.44%?
- 20%
- 100%

- *The barrier down time is not a measure of the wait time in the 'clusters'*
- *The model [each day, every day] input has 8 barrier lifts in peak am – 5 for 1 train, 2 for 2 trains and 1 for 3 [= 12 trains per hour] from which:-*
  - *1 barrier lift = 3 minutes (5/8th percentile)*
  - *2 barrier lifts = 5 minutes (7/8th percentile)*
  - *etc*
- *If we had data on the gap size ('fixed' in the model at 54 seconds and 30 seconds) we could identify the extended delays.*

- Shepreth observed data (only available last month) is a much better place to start
- The experience of the villagers is determined by the barrier down time and the time to clear the queue. If the queueu does not clear the individual 'experiences' two barrier closings
- Again the data is presented with the wrong perspective and falls for the flaw of averages!
- The data does not show the important gap between barrier lifts – which is why the queues extend and which drives the wait time

Back of the envelope calculation

- Barrier down time ‘per train’ is 2:49 (169) or 3:34 (214)?
- Cluster of 1 train – average time in queue is then 1:47, max is 3:34
- Cluster of 2 trains, gap sufficient to clear queue, [2 trains 7:08, gap, 7:08] – average time in queue is then 3:34 (214), max 7:08
- Cluster of 3 trains [10:42, gap, 1 train 3:34] – av 4:26, max is 10:42
- Cluster of 4 trains 14:16, gap – av 7:08, max 14:16

- Key question: How often do trains appear in clusters?
- Second question: What is the arrival pattern of the vehicles?

Your don’t need a simulation model to start making sense of this, a simple back of the envelope calculation makes the point and disproves many of the ‘absolute’ predictions in the evidence

The Engineering Solution

- Rethink the technical solution – AHB+ perhaps?
- Break-up the cluster of trains – more evenly spaced through the hour?
- It seems ironic that …..
  - The safety vulnerabilities are assessed as down to human error not technical error?
  - The ‘do something’ option replaces a technical oversight to safety by a human one – slower, more error prone?

I am no expert on the technical solutions being offered.

From the available evidence the alternatives, and alternatives with a lower impact on the community, have not been properly investigated or fairly discounted.

Issues

- Flaw of Averages
- Modelling Purpose (GIGO)
- Representation of arrival of trains in a ‘cluster’
- Road users perspective
- Shepreth Data does not reflect traffic delays but barrier movements
- Queue clearing times are not zero

I imagine when we come to questions that these themes will re-occur so it is worth summarizing then now

- Flaw of averages – the issue of a stochastic process
- Modelling purposes – [Garbage In Garbage Out] the modelling may be accurate but is reported with inappropriate perspectives and assumptions
- Train clusters – the important gaps determine the performance of the system and are a property of the train arrivals not the vehicles. Trains are stochastic
- Road users perspective – which is the objective of the study and the modelling, (already provided examples)
- Shepreth data is barrier down times are not queue times
- Queue clearing times – are not instantaneous as the model (but not in other models presented)

Technical Analysis

Roger James

Technical Issues

- Length of queues
- Poor Previous Estimates
- Busy Crossing
- Strawman Options
- Whatever happened to AHB+
- No evidence of train 'clusters'
- Barrier Downtimes – 169 or 214s?
- Queue length - Traffic lights Grand Prix?
- Validation - Failed
- Stochastically - Maximums don't exist!
- Plain and Simply Wrong & Contradicting
- Flawless Modelling?
- Who is in charge?
- No guarantees
- Ignoring the available data
- Community Concerns
- Partial Solution
- Safety Options

The list of detailed evidence where the assumptions and use of the model is problematic.

Prepared for any follow-up

Length of queues

It is also noted that the extent of the queue as shown in figure 8.8 of the modelling report appears inaccurate scale and the queue should be shown longer.

Figure 8 view to Shepreth with car queue back 70m. Note cars parking in distance on the left. This will cause issues when traffic is released

Ref:obj-11_r_faires_1002

This is the problem that exacerbated the Station Crossing, where the queue of cars blocked entrances/exit so cars turning right further obstructed the flow

Poor Previous Estimates

NetworkRail

Cambridge Area Interlocking Renewals

GRIP Stage 4 – Barrier Down Time Study

Appendix A- Shepreth LX

Project Name: CAIR	Business Unit: IP
Project Manager: [redacted]	OP/PMCS number: 133838
Client: Anglia Route	

Rounding up to the nearest minute – Shepreth LX is currently closed for up to 8 minutes during the busiest hour of the day.

A5.3 Calculations for Proposed Arrangements – 10 trains

Up EMU Non-Stop	124s	x	4	496s
Up EMU Stopping	240s	x	1	240s
Up Class 4 Freight	150s	x	1	150s
Down EMU Non-Stop	148s	x	3	444s
Down EMU Stopping	214s	x	1	214s
Total				1,544s

Rounding up to the nearest minute – Shepreth LX will be closed for up to 26 minutes during the busiest hour of the day.

Ref: 113_NORTH_END-6148724 - barrier down times

This was data from the Shepreth plan published in 2016 – no VISSIM but a meltdown for the residents with lasting impact

Busy Crossing

OFFICIAL

NetworkRail

PROTECTED LEVEL CROSSING RISK ASSESSMENT

NetworkRail

Anglia Route

Level Crossing Narrative Risk Assessment

Meldreth Road AHB

Planned 9th May 2022

Meldreth Road AHB sees a regular daily usage by both vehicles and pedestrians, this pattern is continuous throughout the year.

- the usage of the crossing is moderate for road vehicles (29% of crossings have higher levels of use)
- the use by pedestrian and cyclists is moderate (36% of crossings have higher levels of use)
- the train frequency is high compared to other AHB crossings (only 10% of crossings have a higher level of use).

As stated above, trains are occasionally known to pass each other, if the train frequencies increase then the chance of a second train coming will increase.
Due to the timetable at this crossing another train passing at the same time is a very high likely hood. This section of line has a standard timetable pattern from Shepreth Branch JN to Royston. These services mostly two forms of formations which consist of four and eight car units. As for the freight side there's a small number on this section of line measuring 400mtrs long but doesn't take into account any extra which are planned outside the trust system on a daily basis.

Nov 5, 2021, SMIS4314599 Meldreth Road AHB At 09:47 hours the driver of 2C21 09:27 Cambridge. London King's Cross, reported a near miss at Meldreth Road AHB level crossing, between Meldreth and Shepreth with a member of the public. The person ran onto the crossing, the driver sounded the horn and the person stepped back clear. The driver did not apply the emergency brake stating that there was no time due to the proximity, the driver was fit to continue.

Ref: app49_-_meldreth_road_ahb_crossing_-_narrative_risk_assessment

TOC

NRs own assessment of the crossing – not the top 10% of train traffic which was not modelled in the traffic study. Note also the safety report caused by impatience at the junction

Strawman Options

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at Meldreth Road AHB crossing include:

Option	Term	Risk per Traverse	Collective Risk	FWI	FWI Difference	Cost	Benefit Cost Ratio	BCR with GDF	Status	Comments
Safety campaign	Short Term	D	2	.01770566	-.000165306	£500	N/A		Accept/ongoing .	This would be carried out by the Level Crossing Manager on his regular inspections to the site and will be supported by the BTP.
Close via diversion and overbridge .	Long Term	M	13	0	-.017870966	£50,000,000	0.02	0.05	RECOMMENDED Reject.	The diversion route could link up to the existing A10 road
Install ANPR cameras	Traffic Change Option	D	2	.016217906	-.00165306	£136,000	0.12	0.3	Reject.	Preferred option if MCBOD/CCTV does not proceed - passes CBA and whilst poor behaviour is not prevalent here would be an effective behaviour modifier
Standing Red man	Traffic Change Option	D	2	.017540354	-.000330612	£25,000	0.62	1.55	Reject.	Dog Walkers and other crossing users would get a warning at head height
Close via over bridge	Long Term	M	13	0	-.017870966	£10,000,000	0.12	0.3	Reject.	A bridge would need to cater for use by pedestrians with push chairs etc. and possibly for horses and accommodate maximum height overheads, which would mean that the cost is relatively high.
Upgrade to MCB-OD/CCTV	Long Term	H	4	.001084697	-.016786269	£3,500,000	0.17	0.425	Accept.	Natural Upgrade to MCB-OD could be considered here - would need to consider crossing redesign

NOTES

Network Rail always evaluates the need for short and long-term risk control solutions. An example of level crossing risk management might be a short-term risk control of a temporary speed restriction, with the long-term solution being closure of the level crossing and its replacement with a bridge.

Ref: app49_2023_meldreth_road_ahb_crossing_-_narrative_risk_assessment

nb = .0177 – 1 in 58 years

TOC

This table is incomplete and inconsistent and appears to be just a strawman for a foregone conclusion.

For example

AHP+ is not included

The recommendations are not ranked or chosen on cost benefit

The reduction in FWI for MCB-OD is not consistent with the graph shown elsewhere (60% reduction not 90% as per here)

The numerator for risk FWI is 1 death or equivalent per 58 years but this adopts the worse value at the top of the range which extends to approx. 200 years (the local roads are much worse – 2 deaths in the last 8 years)

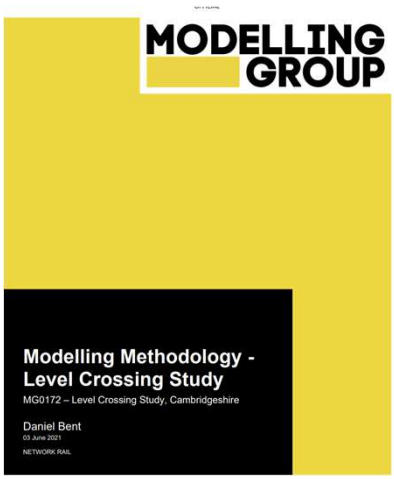
Whatever happened to AHB+

Upgrade to MCB-OD/CCTV - It is not clear if an MCB-OD is feasible in this location due to proximity to the MERLIN radio telescope and it may not be possible to get a licence. It is understood that Meldreth Road lies just inside the 6.5km contour and that even if the scanner is directed away from the MERLIN radio telescope, there is theoretical potential for interference within 6.5km. Possible barrier down times would need to be considered if this type of option were to be taken forward. It may again as per Shepreth Station Crossing; be a better option to consider converting to MCB-CCTV or putting forward for AHB+ trial site possibly. At the last optioneering meeting held on the 12/02/20 this was accepted subject to feasibility. At the optioneering meeting held on the 05th of May 2021, this option was rejected due to the upgrading of current crossing to a CCTV crossing. **At the optioneering meeting held on the 20th of July 2022, this option was accepted as it is due to be completed late 2024.**

Ref: app49_-_meldreth_road_ahb_crossing_-_narrative_risk_assessment

This is not presented – it could be the best of both world with an automated train detection significantly reducing the barrier down times. No description is given apart from the cost being around the same of the MCB-OD. The adoption of AHB+ would be much better for the community

No evidence of train ‘clusters’



2.1 Introduction

2.1.1 This section details the indicative VISSIM model extents for each of the 7 level crossings to be assessed, which are proposed to be upgraded by Network Rail.

2.1.2 The model extents identified have been based on an assessment of the 5 and 10-minute journey time isochrones from each of the level crossings. It is anticipated that the change in barrier downtime will increase to approximately 3-4 minutes per train. This value has been observed on similar MCB-OD level crossings.

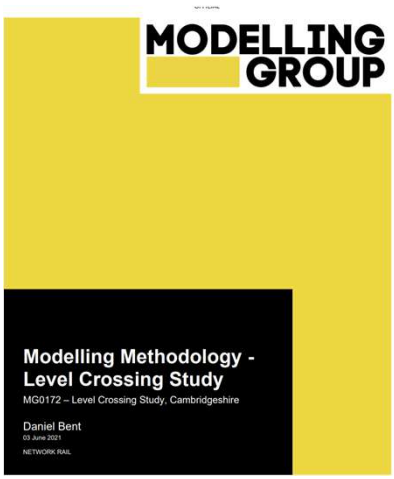
Level Crossing Operation

4.2.9 The level crossing operation and in particular the barrier downtime, will be modelled based on the train timetable operation and current observed operation durations. Bespoke logic will be developed to model the operation of the barriers to ensure a realistic operation at each site.

Ref: Reference document - Level Crossing Study - Modelling Methodology

Modelling assumption – no account taken of the variation in train arrivals and its effect on the gap ‘modelled based on the train timetable operation’.
Flawed from the start

Barrier Downtimes – 169 or 214s?



5.3 Proposed Barrier Down Times

5.3.1 To inform the proposed barrier down times for the upgraded level crossings, Network Rail has provided Modelling Group with the following data:

- A set of absolute minimum barrier closure times for each crossing, with the exception of Meldreth where the times are proposed to be in line with the Shepreth crossing.

Modelling Methodology - Level Crossing Study MG0172 - Level Crossing Study, Cambridgeshire

No.	Level Crossing	Min Barrier Down Time (s)	Min Barrier Down Time + Hinxton Difference (s)	Min Barrier Down Time + Hinxton Difference (mm:ss)
6	Dullingham	113	194	03:14
7	Meldreth		214*	03:24

169?

TABLE 5.1: CALCULATED BARRIER DOWN TIMES FOR UPGRADED LEVEL CROSSINGS

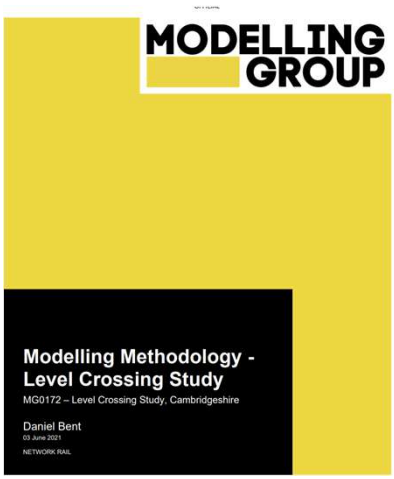
**For the Meldreth level crossing, as no other data is available, the barrier down time has been based on the average time from all of the other level crossings.*

5.4 Outputs & Reporting

Ref: Reference document - Level Crossing Study - Modelling Methodology

This is a major and significant inconsistency. In the methodology study it proposes 214 seconds (3:34 – not wrong in the table) whereas by the time it appears in the performance report this has become 169 seconds (2:49). A significant difference made with no explanation –[explained verbally as the difference between the mean and the median?] – but no sensitivity analysis on the likely variation in this factor [especially when it under manual control]

Queue length - Traffic lights Grand Prix?



5.4.2 A detailed impact assessment will be provided for each mode of transport at the crossing and all relevant junctions assessed as part of this study.

5.4.3 An example of the anticipated queue length reporting is shown in **Figure 5.2**.

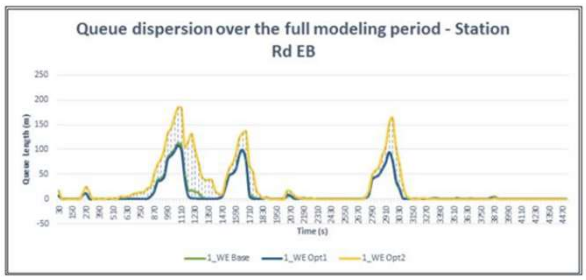
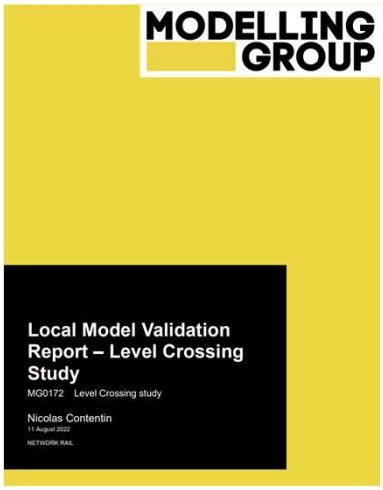


FIGURE 5.2: EXAMPLE QUEUE LENGTH DISPERSION GRAPH

Ref: Reference document - Level Crossing Study - Modelling Methodology

This is another major issue. In the graph from other studies the queues disperse gradually (the downward slope is not vertical). This is an absolutely critical assumption missed in the model yet seemingly it can be modelled elsewhere.

Validation - Failed



8.6 Model Validation – Queue Lengths

8.6.1 The queue lengths in the model have also been compared with the observed data as shown in Table 8.7 and Table 8.8.

Max Queue Length (Vehicle) AM Peak						
	WB			EB		
Call #	Surveyed	Modelled	Diff.	Surveyed	Modelled	Diff.
1	1	0	-1	1	1	0
2	1	0	-1	2	0	-2
3	0	0	0	1	1	0
4	1	0	-1	0	0	0
5	2	1	-1	3	1	-2
6	2	0	-2	2	0	-2
7	1	0	-1	2	2	0
8	1	0	-1	1	0	-1
9	3	1	-2	0	4	4
10	0	0	0	1	0	-1
Avg	1	0	-1	1	1	0

TABLE 8.7: QUEUE LENGTHS – AM PEAK – MELDRETH

Ref: Reference document - Level Crossing Study - Local Model Validation Report

TOC

Anyone with experience of using models uses validation to test the suitability of models to represent the problem in question. That the error pattern (column labelled diff) is always in one direction is of major concern, indicating the model is fundamentally unrepresentative). If the model is an accurate representation of reality then the errors would be distributed around the mean (approx. equal numbers of +ve variance and –ve variance).

The surveyed queues are not being predicted by the model, yet the whole case is built around the behaviour of the queues.

Stochastically - Maximums don't exist!

TRANSPORT AND WORKS ACT 1992

TRANSPORT AND WORKS (INQUIRIES PROCEDURE) RULES 2004

THE NETWORK RAIL (CAMBRIDGE RE-SIGNALLING) ORDER

PROOF OF EVIDENCE – TRAFFIC MODELLING

STATEMENT OF NICOLAS CONTENTIN

15 March 2023

1. INTRODUCTION

1.1 My name is Nicolas Contentin. I am a Director of Modelling Group, appointed on behalf c Network Rail in partnership with Tracsis Traffic Data Ltd, to analyse the traffic and congestio implications of upgrading 7 level crossings, as part of the Cambridge Re-Signalling Project.

1.2 I have over 20 years' experience working on a wide range of projects in the public and privat sectors. These projects include modelling schemes for town centre regeneration, publi transport improvement, providing modelling support for residential and commercial schemes as well as for the energy sector.

2. INVOLVEMENT WITH THE PROJECT AND STRUCTURE OF THIS STATEMENT

2.1 I was appointed by Network Rail on the 7th of May 2021 and my involvement with the Projec consisted of assessing the traffic impacts of the proposed level crossing upgrades on the loca communities and the wider transport network.

2.2 The Project is described in detail in Ms Heria's evidence. My evidence covers traffic modellin matters in relation to the Project and addresses the matters raised at 3(b) of the Secretary c State's Statement of Matters dated 9 March 2023 (**Statement of Matters**): *"the impacts of th changes on crossing users including motorised vehicles, pedestrians, cyclists and other non motorised users."*

Level Crossing	Increase in Level Crossing Use (Trains)	Traffic Flow (Veh.) – AM Peak	Traffic Flow (Veh.) – PM Peak	Ped Flow (Veh.) – AM Peak	Ped Flow (Veh.) – PM Peak	Max Queue Length Increase (m)	Max Journey Time Increase (s)	Max Average Delay (s)
Milton Fen	+1	16	14	221	10	6	46	31
Waterbeach	+2	605	480	43	26	525	53	21
Dimmocks Cote	+4	403	369	0	0	244	116	103
Croxton	+2	522	481	0	0	80	20	18
Six Mile Bottom	+1	1109	1060	3	0	322	12	13
Dullingham	+1	53	40	4	0	-2	-18	-17
Meldreth	+2	110	114	4	0	52	65	27

4. TRAFFIC MODELLING AT EACH LEVEL CROSSING

Milton Fen Level Crossing

Ref: APP-W7-1 - Proof of Evidence of Nicolas Contentin

TOC

Flaws of averages! eg Max journey time increase – 65 seconds – no you just cannot say this for a stochastic process unless the railway runs like clockwork!

Plain and Simply Wrong & Contradicting

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5.5 Mr James questions the traffic modelling undertaken by the Modelling Group and suggests that it does not incorporate a realistic understanding of the train traffic patterns and provides definitive conclusions and categorical reassurances in reliance on averages, without acknowledging that the problem of traffic delays is a stochastic process.

5.6 This statement is not correct. The Meldreth level crossing model was not built using average values. It is based on a data collection exercise undertaken at the level crossing, which includes vehicle, pedestrian and cyclist counts every 15 minutes, as well as train counts. In accordance with the industry standard practice, any data so collected were then uploaded to the modelling software and averages of the generated results were relied upon for the reporting purposes.

5.7 Accordingly, notwithstanding Mr James' comments, the model undertaken includes all scenarios, which could in reality arise at the level crossing (including clustering of trains as a result of interaction between Meldreth and Shepreth level crossings).

5.8 To account for any stochastic processes, the Modelling Group used the VISSIM software, which allows for the daily randomness of vehicles and traffic conditions to be incorporated into the model. This is achieved via a random number generator used by VISSIM, which allows to simulate stochastic variations of vehicle arrivals in the network.

5.12 The Modelling Group has undertaken a review of the barrier downtime at the Shepreth Crossing over a period of 6 months. The review took place between 1 September 2022 and 28 February 2023 and the results (as set out in the table below) clearly set out that the upgraded barrier was down for a period of more than 10 minutes only in 91 instances (out of a total 20,730 instances), which represents 0.44% of the overall downtime and confirms that the significant delays mentioned in Mr James' Statement of Case do not in fact occur on a regular basis.

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	AM Peak			
Time	# Occurance	% occurance	Cum %	#
1-2min	29	2.57%	2.57%	
2-3min	537	47.61%	50.18%	
3-4min	283	25.09%	75.27%	
4-5min	156	13.83%	89.10%	

5.16 The 65 seconds quoted in paragraph 5.14 is not a maximum value but an average value over a period of an hour. The model is clear that a maximum delay can be of up to 428s.

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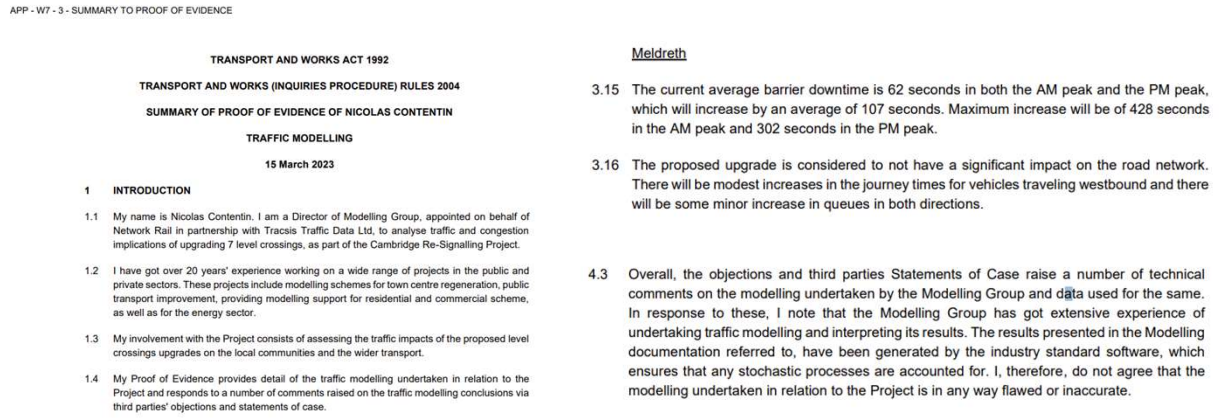
6.2 The modelling results show that the impacts of the upgrades on Milton Fen, Croxton, Dullingham and Meldreth level crossings are minimal, with queue increase below 100m and average delays per vehicle below 60s. Although, it should be noted that these values are an average over a period of an hour and some vehicles will experience longer delays.

Ref: APP-W7-1 - Proof of Evidence of Nicolas Contentin

This is the response to my criticisms which is plainly wrong and contradicts itself.

For example
"Realistic understanding of the train traffic patterns" – no it just lifts the schedule from the timetable, not the actual pattern of trains
"includes all scenarios which could in reality arise" – no it cannot explain the data in the table under 5.13 which has a closure time of > 30 minutes
"maximum delay up to 428s (7:08)" – with measure data having 1.5% of measurements above 7 minutes barrier closure (which itself is less than traffic delay)
"0.44%" – discussed in the main presentation

Flawless Modelling?



APP - W7 - 3 - SUMMARY TO PROOF OF EVIDENCE

TRANSPORT AND WORKS ACT 1992

TRANSPORT AND WORKS (INQUIRIES PROCEDURE) RULES 2004

SUMMARY OF PROOF OF EVIDENCE OF NICOLAS CONTENTIN

TRAFFIC MODELLING

15 March 2023

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1.2 I have got over 20 years' experience working on a wide range of projects in the public and private sectors. These projects include modelling schemes for town centre regeneration, public transport improvement, providing modelling support for residential and commercial scheme, as well as for the energy sector.

1.3 My involvement with the Project consists of assessing the traffic impacts of the proposed level crossings upgrades on the local communities and the wider transport.

1.4 My Proof of Evidence provides detail of the traffic modelling undertaken in relation to the Project and responds to a number of comments raised on the traffic modelling conclusions via third parties' objections and statements of case.

Meldreth

3.15 The current average barrier downtime is 62 seconds in both the AM peak and the PM peak, which will increase by an average of 107 seconds. Maximum increase will be of 428 seconds in the AM peak and 302 seconds in the PM peak.

3.16 The proposed upgrade is considered to not have a significant impact on the road network. There will be modest increases in the journey times for vehicles traveling westbound and there will be some minor increase in queues in both directions.

4.3 Overall, the objections and third parties Statements of Case raise a number of technical comments on the modelling undertaken by the Modelling Group and data used for the same. In response to these, I note that the Modelling Group has got extensive experience of undertaking traffic modelling and interpreting its results. The results presented in the Modelling documentation referred to, have been generated by the industry standard software, which ensures that any stochastic processes are accounted for. I, therefore, do not agree that the modelling undertaken in relation to the Project is in any way flawed or inaccurate.

Ref: APP-W7-3 - Summary to Proof of Evidence of Nicolas Contentin

TOC

Flaws of averages again …..
"average barrier downtime increase is 107 seconds" – what happened to the 214 seconds?
"maximum increase of 428 seconds (490 = 8:10)" – what about 4 trains in a cluster?, How does this relate to vehicle delays from queue clearance?
"considered not to have a significant impact on the road network" – I think their assumption is that anything less than a 10 minute delay is insignificant
"any way flawed or inaccurate" – honestly?

Who is in charge?

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NetworkRail

Network Rail
One Stratford Place
Montfichet Road
London
E20 1EJ

03 March 2023

Dear Charlotte,

22/05204/FUL - Meldreth Road Level Crossing
Third Party Objector Response

This briefing note sets out the responses to third party objections that have been uploaded to the South Cambridgeshire Planning Register (dated 29th January 2023) in relation to the above referenced planning application by a third party objector.

A summary of the objections and Network Rail's (NR) responses are provided below:

"I'm writing to object to the works at Meldreth Road level crossing for the following reasons –

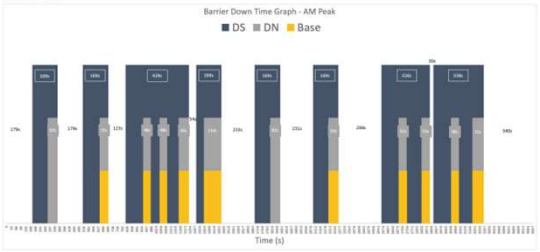
1 - The works are still subject to an enquiry by the department of transport and any decision on this should wait for that.

NR Response: On the 5th August 2022, Network Rail submitted a Transport and

"Road closure time is an important parameter that impacts level crossing risk as well as utility. This is because a high road closure time can cause aggravation and frustration for users which can lead to increased misuse. Sotera has used a fairly simple model to estimate the potential impact of any upgrade to an MCB-type fall barrier crossing (MCB-OD or MCB-CCTV). For Meldreth Road, this suggests that the busiest hour road closure time would increase from about 18% currently as an AHB level crossing to about 71% as shown in Figure 36."

As detailed within Caneparo's Transport Assessment (see Appendix G - Figure 8.1 and 8.2 as embedded below) the estimated downtime at Meldreth is 169s for a single train passing (see annotated graph below). There may be instances where the level crossing will remain down to allow 2 or more trains to pass which will increase barrier downtime from time to time – which we note is outside of our control as this is determined through scheduling proposed by operators.

AM Peak



Ref: NETWORK_RAIL_RESPONSE_TO_THIRD_PARTY_COMMENTS-6153861

TOC

"***which we note is outside our control as this is determined through scheduling proposed by operators***" – the 'clustering' and therefore traffic delays can be modified by timetable changes (so trains are spread more through the hour) but the suggestion here is for a system to be introduced which will not protect the community from a gridlock caused by the operators

No guarantees

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NR Response: On the 5th August 2022, Network Rail submitted a Transport and

- How are emergency services going to decide which way to go to an emergency if there may or may not be a long delay at the crossing.?

NR Response: The emergency services will be made aware of the impact of the increased barrier down time and they will review their routing plans accordingly. In addition, in the case of a fault, we are able to place the crossing under local control and dispatch a mobile operations manager to site who can safely guide emergency vehicles over the crossing if necessary.

5 - The original design and this planning application does not review the rail infrastructure and how it could be optimised or improved to reduce the total down time at this crossing. I would assume that the time for a crossing to be down must be a function of where the signal positions are and if they can be changed to reduce impact. Network rail are imposing the cheapest and easiest solution when there is discussion in their report that an AHB+ would have a similar down time to the existing.

NR Response: This planning application only deals with updating and improving the Meldreth Road Level Crossing to bring this crossing in line with current Network Rail level crossing safety standards and guidance. Overall improvements to efficiency and optimisation of railway operations is subject to operator timetables and other governmental regulations and controls.

Therefore without accurate site specific highways and train modelling scrutinised for the actual in-situ impact the application must be refused.

NR Response: The VISSIM modelling utilised by the Modelling Group to estimate and inform the Transport Assessment is underpinned by a robust methodology to estimate barrier down-times and highways impacts. The outputs of this assessment have determined that highways impacts would not be significant.

Further we note that in future, barrier down-times will be subject to changes in scheduling as determined by operators and will be controlled by the relevant Network Rail Level Crossing Orders, which is a process outside of planning control.

Ref: NETWORK_RAIL_RESPONSE_TO_THIRD_PARTY_COMMENTS-6153861

TOC

"***in future barrier down times will be subject to changes in scheduling as determined by operators .. Outside of planning control***" – so what can be guaranteed and can the community have a solution which protects us from this?

Ignoring the available data

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NetworkRail

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NR Response: On the 5th August 2022, Network Rail submitted a Transport and

1.2 In addition the above third party objection, a second response has been shared with our project team via email from case officer, Charlotte Burton (dated 22nd February 2023). A summary of the objections and Network Rail's responses are provided below:

I wanted to pick up one point of the highways teams about the other crossing Network Rail used to calculate the increase in down time.

The highways team commented that they assume the crossing is similar, however that hasn't been confirmed by Network Rail.

It is not only about train numbers being equivalent but train speed and position of the signals, there is no commentary on that.

I've recently been sent the attached following an FOI response, which is the original study for Shepreth Station crossing, whereby they calculated the time for the installed level crossing based on the actual location of the signals. The position of the signals, which the report accepts, are poorly placed for Shepreth Station, as the upstream signal is the wrong side of Meldreth station so stopping trains trigger the level crossing south of Meldreth station then slow down, stop then speed up. The consequence is the time for the crossing to be down is longer than a crossing where the trains are running at full line speed between the signal and level crossing.

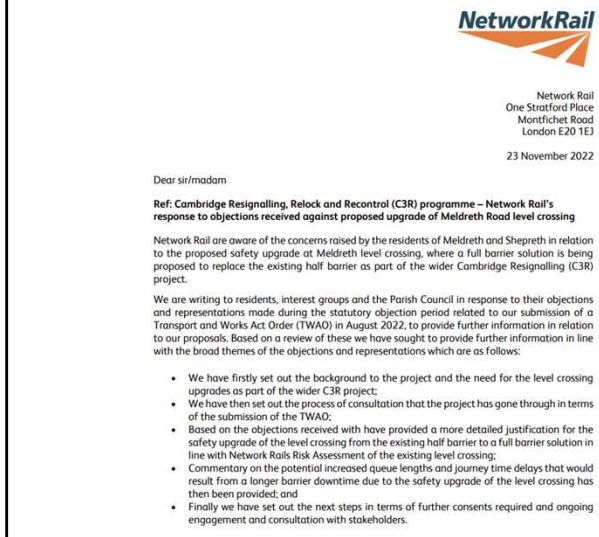
When the Modelling Group initially undertook their baseline study there was no available observed down-time data for the Meldreth level crossing so the Modelling Group they decided to apply the average barrier down time from all other level crossing (as explained in the Modelling Group methodology).

Ref: NETWORK_RAIL_RESPONSE_TO_THIRD_PARTY_COMMENTS-6153861

TOC

"***so decided to apply the average barrier down time etc***" – why did they not collect the data earlier and at a site which is classified in the top 10% of train movements are we average?

Community Concerns



Network Rail
One Stratford Place
Montfichet Road
London E20 1EJ

23 November 2022

Dear sir/madam

Ref: Cambridge Resignalling, Relock and Recontrol (C3R) programme – Network Rail's response to objections received against proposed upgrade of Meldreth Road level crossing

Network Rail are aware of the concerns raised by the residents of Meldreth and Shepreth in relation to the proposed safety upgrade at Meldreth level crossing, where a full barrier solution is being proposed to replace the existing half barrier as part of the wider Cambridge Resignalling (C3R) project.

We are writing to residents, interest groups and the Parish Council in response to their objections and representations made during the statutory objection period related to our submission of a Transport and Works Act Order (TWAO) in August 2022, to provide further information in relation to our proposals. Based on a review of these we have sought to provide further information in line with the broad themes of the objections and representations which are as follows:

- We have firstly set out the background to the project and the need for the level crossing upgrades as part of the wider C3R project;
- We have then set out the process of consultation that the project has gone through in terms of the submission of the TWAO;
- Based on the objections received with have provided a more detailed justification for the safety upgrade of the level crossing from the existing half barrier to a full barrier solution in line with Network Rails Risk Assessment of the existing level crossing;
- Commentary on the potential increased queue lengths and journey time delays that would result from a longer barrier downtime due to the safety upgrade of the level crossing has then been provided; and
- Finally we have set out the next steps in terms of further consents required and ongoing engagement and consultation with stakeholders.

In total the March 2021 Public Consultation received 244 contacts. The responses are summarised as follows:

- 215 no. responses were provided to the online survey;
- Responses from 29 no. individual stakeholders (5 no. stakeholders provided responses to both the online survey and via e-mail) including a variety of organisations, local stakeholder groups and the public were submitted to the project email address (CambridgeC3R@networkrail.co.uk); and
- During the consultation period, the project received 1 no. telephone call.

From the responses received, 11 % 'did not support' and 22 % 'strongly did not support' specifically the proposed level crossing safety upgrades as part of the project. Within these responses 11 % of the 'did not support' and 45 % of the 'strongly did not support' responses related specifically to the proposed Meldreth Level Crossing safety upgrade.

As part of this 'Objection Period' the DfT received 28 objections and five representations. Twenty-four of the objections from the public related to the proposed Meldreth level crossing safety upgrade. In summary the broad themes within these 24 objections were:

- Lack of justification for the safety upgrade of the level crossing from the existing half barrier to a full barrier solution;
- Concerns in relation to the increased queue lengths and journey time delays that would result from a longer barrier downtime due to the safety upgrade of the level crossing.

Ref:obj-11_r_faires_1002

We have seen a big community concern over the proposals and the delays with the impact on community life

Partial Solution

NetworkRail

Network Rail
One Stratford Place
Montfichet Road
London E20 1EJ

23 November 2022

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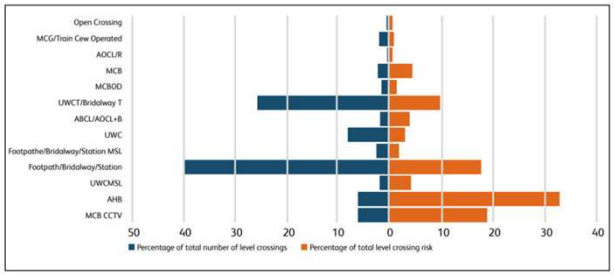
The overall ALCRM for the entire network identifies (see below) that while AHB crossings of this type account for just 6% of the total estate, they hold 32% of total modelled risk and 75% of our level crossings require the user to make the decision on whether it is safe to cross. AHB type crossings are therefore higher risk crossings compared to other types or full closures.



As part of this update a nine-day, 24-hour traffic census by continuous recording was carried out at the crossing between 18th and 26th June 2022. This is an update to the previous census carried out in April 2013, which served as the previous basis of the risk assessment.

During the nine-day census, a total of 70 incidents of RTL running were identified with incidents recorded on every day of the census. RTL running is categorised as a vehicle passing the lights after initiation with sufficient warning on approach.

Ref: obj-11_r_faires_1002

In the bar chart the AHB+ option is not presented. It is of not that the proposed solution (MCB) only mitigates the risk by around 40% of the AHB. This is not reflected in the strawman table or the figures. How close is AHB+ which elsewhere is stated at the same cost to MCB and may offer a significant and guaranteed relief to the community.

The observation of 'running the red light' is bound to be worsened by the longer delays and the ANPR option may be a better bet and significantly 'close the gap' with the risk from AHB.

Safety Options

NetworkRail

Network Rail
One Stratford Place
Montfichet Road
London E20 1EJ

23 November 2022

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Options Considered	Summary Outcome
Maintain existing AHB Crossing	Renewal of a crossing with an ALCRM score of D2 as an AHB would be contrary to Network Rail's strategy of upgrading high risk AHB crossings when renewal is required.
Closure of the crossing	The crossing is on the main road between Meldreth and Shepreth. There is an alternative route along the busy and congested A10 and may involve a detour of up to 8km. Given the usage of the crossing (1,500 vehicles, 100 pedestrians and cyclists per day) this is not a viable closure option.
Closure + pedestrian bridge	Main use is road vehicles so would not enable closure as above.
Closure + road bridge or underpass	A road bridge or underpass at this location is not likely to be feasible without purchasing significant land and existing houses as exist in three corners of the level crossing currently and any potential route for an off-line bridge has been eliminated by recent house building on Collins Close.
Closure with Bypass	Diverting the road to Barrington Road and crossing the railway at Shepreth station was considered. It would need about 800m of new undesignated road. There would also need for an additional ramped footbridge at Meldreth Road. This was estimated as having a potential cost of £4.5m consisting of construction and land costs
Renew as an Automatic Barrier Level Crossing, Locally-monitored	Not a viable option due to the restriction in line speed that would be necessitated.
Renew as an automatic full barrier (AHB+)	Meldreth Road level crossing has a very high benefit to cost ratio for Controlled Barrier Level Crossing with Obstacle Detection (MCB-OD) rather than AHB+ as the costs of a MCB-OD or AHB+ are similar (there are no additional signals for the MCB-OD) and there is a higher safety benefit for the MCB-OD type. Other considerations are road closure time and the proximity of Meldreth Road to Shepreth Station CCTV level crossing. Having different modes of operation for two crossings in close proximity

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	introduces additional hazards in the event of a signalling failure. This reinforces the case to upgrade Meldreth Road as an MCB-OD type crossing.
Upgrade to an Manually-Controlled Barrier Level Crossing with CCTV	Both options are considered feasible. They would however share the protecting signals with Shepreth (on Shepreth station platform) which would increase the road closure time. The other signal is about 200 metres from the crossing. Future 'busiest hour' road closure time of Shepreth station and Meldreth road may not be sustainable.
Controlled Barrier Level Crossing with Obstacle Detection	

Ref:obj-11_r_faires_1002

12/07/2023

Roger James - Meldreth Parish Council

35

TOC

Given that the only reported incidents on the crossing are slaloming the half barrier and running the red an AHB+ option would address this without a massive deterioration in wait times. A better consideration is required.