**TRANSPORT AND WORKS ACT 1992**

**TRANSPORT AND WORKS (INQUIRIES PROCEDURE) RULES 2004**

# THE NETWORK RAIL

# (CAMBRIDGE LEVEL CROSSING REDUCTION)

# ORDER

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## PROOF OF EVIDENCE

**-OF-**

**JOHN PREST**

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| Document Reference | NR31/1 |

## NTRODUCTION

1.1 My name is John Prest. I am a Route Level Crossing Manager (RLCM) within the Anglia Route by profession with 6 months' experience. Since joining the rail industry in 2001, I have been employed in numerous positions including that of a Level Crossing Manager (for 4 years), gaining promotion to my current role in March 2017. I have worked within the maintenance department for 16 years with varied responsibilities in that time. My current responsibility, so far as is relevant to this public inquiry, is the day to day management of six Level Crossing Managers (LCMs) on the West Anglia section of the Anglia Route.

1.2 The Anglia Route is split into 13 geographical areas, with each LCM having responsibility for risk assessment and asset inspections, liaison with local authorities, internal and external stakeholders along with a multitude of other duties relating to the management of level crossing operation and maintenance. The role of LCM was introduced in 2013 with an intensive 30 day training course covering risk management and assessment, ALCRM (the All Level Crossing Risk Model), interaction with level crossing users and stakeholders, and asset management and inspections. This was then followed by four weeks of mentorship from various relevant internal disciplines and a final competency assessment.

1.3 Previously, the activity of assessing level crossing risk was split between the Operational Risk Control Co-ordinator and the Mobile Operations Manager. This fragmented approach meant the operations risk control coordinators held responsibility for the risk assessments, had often never visited the crossings. The current LCM structure, allows for one individual to have responsibility for assessing risk and overseeing the maintenance of their specified crossings, and that all components of the risk assessment are conducted by the person who has personal knowledge of the operation, and particular features of the level crossing.

1.4 I supervise and am accountable for the activities carried out by the LCMs along the West Anglia section of the Anglia Route – which includes 100% of the crossings contained within the Order - and ensuring the risk at level crossings is kept as low as reasonably practicable.

## SCOPE OF EVIDENCE

2.1 In this proof of evidence, I explain how the LCMs conduct the risk assessment in respect of a crossing for which they are responsible, and their general maintenance responsibilities. I then set out, in respect of each crossing contained in the Draft Order, its particular characteristics or features, risk score, and any history of incidents.

## RISK ASSESSMENT

3.1 As Mark Brunnen explains in his Proof of Evidence NR 27/1, there are three aspects to a risk assessment which are carried out in respect of each level crossing; namely:

i. ALCRM;

ii. Qualitative Risk Assessment ("QRA"); and

iii. Narrative Risk Assessment ("NRA").

3.2 LCMs undertake all of the above risk assessment processes, which ultimately lead to an optioneering exercise, to consider how risk at an individual crossing can be

eliminated, mitigated or managed by the options submitted, and any recommendations which may be made to the Head of Maintenance and Head of Operations for the Anglia route as to which options are to be actioned.

3.3 I discuss each of those risk assessment processes below from a practical perspective – that is, the involvement of the LCMs conducting those assessments. I do not discuss how those risk assessment tools have been developed, or how they are regarded within the industry: that is dealt with in Mark Brunnen's Proof.

3.4 The LCM has to carry out a risk assessment once a year at the highest risk crossings, every two years at the medium risk crossings, and every three years at the lower risk crossings. See table below for more:

| Category | Criteria | Assessment Frequency (Years) |
|---|---|---|
| Red | • Individual risk is A<br>• Collective risk is 1<br>• Collective risk is 2<br>• Collision frequency (pedestrian + vehicle) is > 0.01 | 1.25 |
| Yellow | • Individual risk is B<br>• Individual risk is C<br>• Collective risk is 3<br>• Collision frequency (pedestrian + vehicle) is > 0.001<br>• Sighting time is less than warning time by > 4 seconds<br>**Note:** This does not take mitigations such as whistle boards and telephones into account | 2.25 |
| Double Yellow | Risk score is not M13 and no red or yellow criteria apply | 3.25 |
| Green | Risk score is M13 | Not assessed |

3.5 When there are either three reports of poor user behaviour within 12 months, one occasion requiring a train driver to apply an emergency brake, or an accidental fatality, a "triggered" risk assessment is undertaken within 6 weeks of the event.

3.6 There is also a requirement, to carry out a new risk assessment if there is a planned increase to the train timetable or a requirement to run longer trains. Additionally, any changes to the layout of the crossing or usage over the crossing would require a new assessment to be completed. Any of these may result in a change to the risk score and Fatality Weighted Injury (FWI).

**ALCRM**

3.7 To calculate the level of risk for each level crossing, ALCRM requires specific information about each level crossing asset to be inputted in order for the 'risk score' to be calculated.

3.8 LCMs are responsible for collecting and consolidating the following information to ALCRM and contacting any Authorised Users (AU) and stakeholders, inviting them to participate in the assessment.

3.9 Firstly, information on the crossing is gathered from existing records held by Network Rail; most importantly from historic risk assessments, and incident data (i.e. any 'near miss' or deliberate misuse incidents), and from stakeholder engagement (primarily, with users of the crossing).

3.10 Secondly, an important aspect of the information gathering exercise is the site visit completed by the LCM. The site visit will provide the following information for input into the ALCRM model:

i. The type of crossing surface or deck and its configuration. Different types of crossing surface have different non slip properties.

ii. The distance from the decision point* to the nearest rail and also the distance from the decision point to 2 meters beyond the furthest rail. These measurements are vitally important to calculating the traverse time and thus the required sighting distance. (*A decision point is the last point of safety, where an individual would stand and make an informed decision whether or not it is safe to cross, the CC03 - Stop Look Listen sign is usually positioned at this point).

iii. Whether the signs are positioned so that they are clearly visible to a crossing user as they approach the crossing.

iv. Sighting distances measured in all directions from both sides of the track. The distance measured from the decision point to where a train is first visible to a crossing user as it approaches the level crossing.

v. Are there any obstructions that make it difficult to see an approaching train.

vi. Any adjacent sources of light or noise which could affect the user's ability to see or hear an approaching train

vii. Whether a second train passes the crossings within 20 seconds of the first and if the second train would be visible to a crossing user.

viii. The orientation and layout of the crossing is used to assess sun glare risk, where either approaching trains and or warning equipment could be masked by bright or low sunshine.

ix. Is there anything that can be done to improve sighting.

x. Are there whistle boards providing additional warning at the crossing.

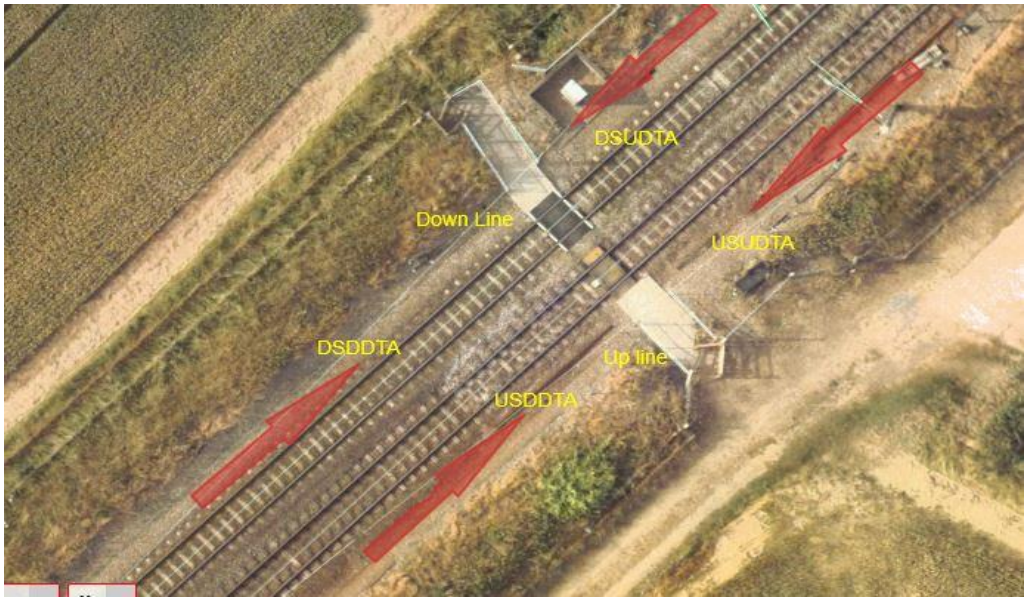
xi. If there are any new or planned developments in the area. New residential or retail/business developments can increase or even decrease the level of use over a crossing.

xii. Photographs are taken of all of the crossings approaches, road and railway signage plus crossing equipment and rail approaches. These will give a true and accurate representation of how the crossing looked on the day of the data collection.

3.11 Any other information considered relevant by the LCM

**MEASURING SIGHTLINES**

3.12 The picture below is a typical layout of a crossing to help explain the terminology used to assess sighting distances.




3.13 As set out in the Statement of Case, the time available to a user of the crossing to see an approaching train and to cross safely is dependent on the speed of the train and variation in train speeds.

3.14 The required sighting distance is calculated by multiplying the time taken to cross the railway safely by the line speed for the section of line at issue.

3.15 The first step is to calculate the required time to traverse the crossing safely. This is done by dividing traverse distance by the average walking pace (1.18 metres per second). The traverse distance is the distance measures from the decision point (see para 3.10(ii) above) to a point 2m from the line on the opposite side of the railway. E.g., the traverse time for a traverse distance of 9m would be calculated as 9 metres ÷ 1.18 metres per second = 7.57 seconds. This gives the average time a user would take to walk from one position of safety to another (i.e. from the 'decision point' to a point 2m from the track at the other side of the crossing)..

3.16 The traverse time is then multiplied by the maximum line speed (converted from miles per hour to metres per second) to give the required sighting distance. E.g. 7.57 seconds x 31.29 metres per second (70mph) = 236.86 metres

3.17 Variations to the above calculation are used when vulnerable persons are known to use the crossing, in which case an additional 50% is added to the traverse time, and where no crossing deck exists and user are required to walk on the ballast and step over rails, a walking speed of 0.914 metres per second is used, rather than 1.18 metres per second. Where steps are within the decision point or the crossing is skewed to the tracks the LCM can adjust the traverse time as they see fit.

3.18 The LCMs are provided with a calculator within an excel spread sheet to assist and remove the possibility of errors when calculating required sighting distances.

3.19 The LCM measures sighting distances in either direction from both sides of the tracks. Whilst standing at the decision point, a measurement is taken using a range finder to a fixed structure or feature where possible. If no structures or features exist, then the LCM will walk out with a measuring wheel to the distance where the CC03 - Stop Look Listen sign is lastly visible, or where it is known that a train is visible to. Where possible, the visibility of an approaching train is double checked with a range finder to an actual train, although this is not to be relied upon due to the speed or the approaching trains.

3.20 Weather conditions can affect visibility – especially if areas are known to be foggy / misty in the winter months. The LCM would include this information in their NRA. So even if the crossing has suitable sighting shown on the crossing by crossing section, this does not necessarily mean they have sufficient sighting throughout the year.

**USAGE**

3.21 As part of the risk assessment data the LCM will place a covert camera at the crossing for a minimum of 9 days. This provides the LCM with an understanding of when and by whom the crossing is used. The census also highlights potential vulnerable users.

3.22 The LCM assess the surrounding environment for potential seasonal variation to the sight lines caused by fog or vegetation growth, increased harvest usage, local attractions or tourist attractions. If the above were found, the LCM would undertake a second census at the appropriate time to record the increase/decrease in seasonal variations.

3.23 On vehicular crossings, the LCM would conduct an environmental check of up to a maximum of 700 metres in either direction and up to 20 metres either side of the railway. The following factors are used to asses any risks to a derailed train: proximity of buildings, bridges, tunnels, bodies of water, rail points/turnouts and structures. Any additional hazards would be highlighted by the LCM and added in to the NRA.

3.24 Anything else the LCM believed relevant would be noted on his data collection form and included on the NRA, which I refer to further below.

**RISK ASSESSMENT AND OPTIONEERING**

3.25 A defined set of observable crossing features, referred to at para 3.10 above, are recorded and then inputted into ALCRM to obtain a rating/score. A sample input form can be found at NR31/2, Tab 4 of my Appendices.

3.26 ALCRM will then provide its rating score, which is divided into two parts: collective risk and individual risk of fatality.

3.27 As explained by Mark Brunnen in his proof of evidence, collective risk is a measure of the total harm, or safety loss and is expressed in terms of FWI per year. This is reported in a simplified numeric form ranked from 1 to 13. 1 represents the highest risk. 13 represents nil risk, you would only usually see a 13 where the crossing is closed or it receives no usage.

3.28 The risk to the individual crossing user is presented as individual risk of fatality per year. It is expressed as a letter, ranked from A to M where A represents the highest risk, and M represents nil risk, you would only see a M where the crossing is closed or no usage is recorded or observed during an extended census.

3.29 However, as explained by Mark Brunnen in his Proof of Evidence, the risk assessment process, and decision making which follows the same, does not stop with the ALCRM score. It would be possible, for example, for two crossings within an LCM's area of responsibility to both score C4 (a high risk crossing) but one of those crossings might have features or characteristics which cause the LCM some concern, whereas the other does not. This would be identified on the NRA. A sample NRA can be found at NR31/2, Tab 5 of my Appendices.

3.30 The NRA is vitally important to the management of level crossings; it gives the LCM the opportunity to describe any concerns they have with each particular crossing under their control and also allows them to differentiate between similar types of crossing with a similar risk score. The LCM will use the NRA to support and justify their decision making and thought process. The NRA includes evidence collected on site during the data collection along with their local knowledge gained from visiting the crossing numerous times throughout the year, and the options considered to make the crossing safer.

3.31 Following completion of the risk assessments, the LCM will carry out an optioneering exercise, to consider options for eliminating, reducing, mitigating or managing the risk at an individual crossing.

3.32 Options which are considered by the LCM to eliminate the risk at a level crossing could be; closure by means of diversion, closure via an under or over bridge, and removing the rights to use the crossing. It should be noted that, installing new infrastructure is not always possible due to lack of funding and/or lack of physical room to install the new equipment or structures. However, this is not a matter which would be for the LCM to determine – questions of whether such infrastructure could be installed in practice would be for a specialist engineering team, and questions of funding put forward to sponsors to source funding, as explained in the Proof of Eliane Algaard NR28/1.

3.33 Options which would be considered by the LCM to reduce or mitigate the risk would usually focus on additional technologies or warnings which could be installed at the crossing. This would include for example, the installation of an active warning system, which would show a red light to instruct a user a train is approaching or a green light to instruct a user it is clear and safe to cross along with audible warnings.

3.34 Options which would be looked at by the LCM to manage the risk would be minor alterations to improve the crossing, such as delivering a gate to gate enhancement to ensure users cross the railway on the shortest safest possible route.

3.35 Other more limited options could be actioned by the LCMs themselves and this could for example include such things as arranging an education campaign at the crossing to educate the users how to use the crossing safely and in the most appropriate way, additional visits to carry out maintenance and other minor pieces of work to ensure the crossing remains to the current standard.

3.36 As I indicated above, the decision on whether any particular option should be taken forward (save the limited options I refer to in para 3.32) do not rest with the LCM. The LCM will make recommendations, based on the NRA and the optioneering process

which will then be discussed and decisions made at the level crossing optioneering meeting. This meeting would be attended by a selection of senior managers and level crossing subject matter experts, who would ultimately make a decision having regard not only to the crossing under discussion but the wider network in the Anglia region.

**MAINTENANCE**

4.1 The level crossing manager is responsible for carrying out a maintenance asset inspection. This activity is carried out at least once every 6 months at an unprotected footpath or user worked crossing. If the crossing has an automatic warning system installed, its inspection frequency is increased to at least every 7 weeks.

4.2 During this inspection the LCM carries out a visual tactile inspection on the crossing, if there is a minor defect the LCM can safely rectify, they will do it there and then. Anything they cannot complete will be reported to the relevant department with a priority code that is stipulated in the maintenance standard NR/L3/TRK/4041. A copy of that standard can be found at NR31/2 Tab 6 attached to my proof.

4.3 These inspections, and works which result from the LCM reporting an issue on site, are in addition to Maintenance Scheduled Tasks (MSTs) which are in place to maintain the sighting lines of each footpath and user worked crossing as specified in NR/L2/TRK/5201, a copy of that standard can be found at NR31/2 Tab 1. To comply we dictate one visit to cut vegetation and one to spray vegetation to stop the regrowth. This frequency can be adjusted where required. It is estimated to cost £3792 per crossing visit – this is because the team carrying out the duties need to comply with track safety requirements. This means there will be a requirement for a team of 3 to attend, this will consist of 1 person being there to solely look after the safety of the team and ensure they do not try beyond the limits of the safety zone. In general, the need for 2 visits, one to cut vegetation and one to spray to stop regrowth, would cost a minimum of £7584 per year per crossing.

4.4 It is also quite difficult and costly to maintain a smooth walking route from the decision point until a user is 2 metres clear of the running line. On a typical crossing it is estimated a team has to attend once a year. This would be completed at the same time as the vegetation team visit the crossing, if the maintenance is required at that time. As set out above, every time a team attend a crossing it costs £3792.

4.5 In addition, track standards dictate that every level crossing surface needs to be removed and replaced to allow inspection and maintenance of the track at set periods. This costs approximately £5000 on average each time the crossing is removed; each crossing is lifted at least once a year, however, this can be more often depending on the track quality.

4.6 I set out these figures to give an indication of the general maintenance costs associated with each level crossing on an annual basis, but these clearly do not take into account any costs which would be incurred in the event of an incident (for example, if there was a collision between a train and a motor vehicle / pedestrian) or a defect identified by an LCM on a site visit which he was not able to safely rectify himself.

**THE CROSSINGS CONTAINED WITHIN THE DRAFT ORDER**

5.1 I set out below the relevant risk scores, and particular characteristics, of each of the crossings contained within the Draft Order.

5.2 As set out in the Proofs of Evidence of Mark Brunnen and Eliane Algaard, Network Rail is not seeking to close the level crossings in the Draft Order and divert users to other crossing points because of specific safety concerns relating to each individual crossing. There is a general need to reduce the number of crossings to improve safety and efficiency. A number of the crossings are already closed, where specific safety concerns exist – albeit this is on a temporary basis. My evidence below is therefore concerned with the current assessment of risk relating to each crossing and any particular features which have been identified by the LCM responsible for the crossing, including any past incidents recorded on the crossing, and provided to assist the inquiry in understanding the position on the ground in relation to each of the crossings.

5.3 Incident history recorded below is taken from our records. The absence of any reported incidents of misuse or user error should not be taken to mean that there have been no such incidents. A significant number of the crossings below do not have monitoring systems installed, and, as they are passive crossings and unsupervised, the only real source of information from these crossing would be reports from drivers, unless incidents are reported by stakeholders in discussions with the LCMs.

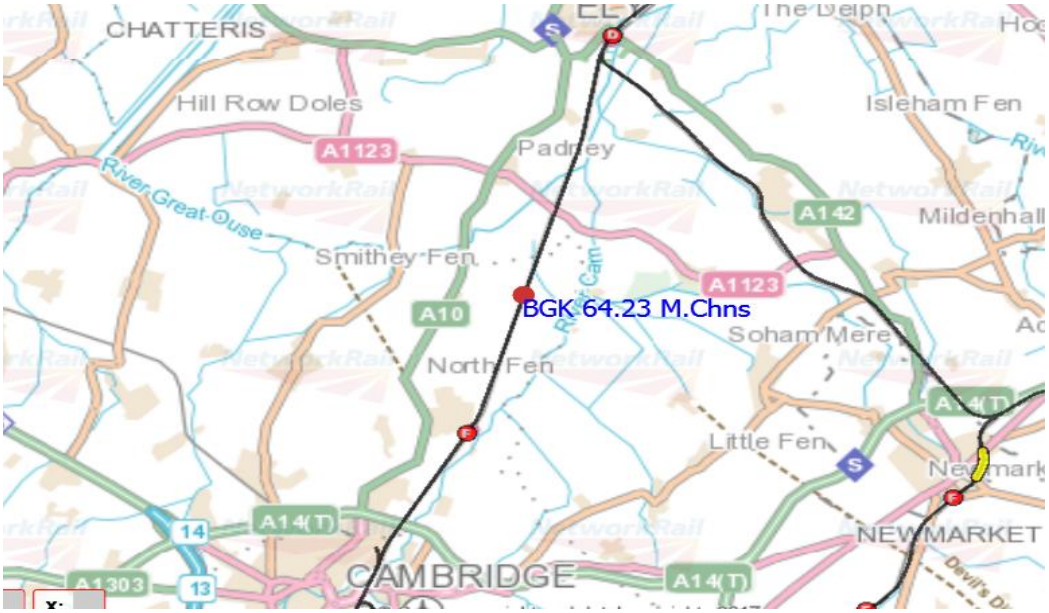
5.4 The LCMs for the purpose of optioneering refer to a derived cost sheet which has estimated costs for the options they are putting forward. These costs include measures for asset management and FWI reduction benefits and are used to help form the Cost Benefit Analysis (CBA). The estimated costs in the derived sheet tend to be on the conservative or lower side of what the actual option may in reality cost due to each option being a unique cost at every different crossing

## 6.0 C01 CHITTERING PUBLIC FOOTPATH LEVEL CROSSING

6.1 C01 Chittering footpath crossing has an ALCRM score of C10 with an FWI of 0.000003909. It is located in Waterbeach Parish on the BGK line (Bethnal Green to Kings Lynn) which has a line speed of 75mph on the up side and 90mph on the down side. It is between Waterbeach and Ely at 64 miles and 23 chains from Liverpool Street Station London.

6.2 There are 186 trains per day that run for 19 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

6.3 An aerial view of C01 Chittering Footpath crossing can be seen below.

6.4 The track on the left is the down line from London and the track on the right is the up line to London. Trains would normally run down from London on the left hand line that is from the bottom of the picture to the top. Trains would normally run up to London on the right hand side, which is from the top of the picture to the bottom.

6.5 C01 Chittering level crossing is a 'passive' crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

6.6 The last census was carried out starting on the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed no pedestrian or other use during that time. In the LCM's NRA of 20th July 2015 usage of a few times a year was allowed for.

6.7 Given the line speed of 75mph on the up side and 90mph on the down side in this area and the distance to traverse the crossing of 9.4 meters, this crossing requires sightlines of 266 metres on the up side and 319 metres on the down side in order to give the user enough time to cross before the train arrives.

6.8 The sightings recorded at last risk assessment which was completed on 20/07/2015 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 266m | 2,013m | Yes |
| Up side looking toward down direction train approach | 319m | 2,260m | Yes |
| Down side looking toward up direction train approach | 266m | 2,013m | Yes |
| Down side looking toward down direction train approach | 319m | 2,260m | Yes |

6.9 The photograph below is taken looking northward, from the up side (East) at a train approaching in the up direction (from the North). The trains usually approach on the closest set of lines (right hand side).

6.10 The photograph below is taken on the up side (east), looking south, the train usually approaches on the furthest (right hand side) set of lines.

6.11 The photograph below is taken on the down side (west) looking south; the train usually approaches on the closest line (right hand side) set of lines.

6.12 The photograph below is taken on the down side (west) looking north, the train usually approaches on the furthest line (right hand side) set of lines.

6.13 As can been from the table above (6.8), C01 Chittering crossing does have sufficient sighting to meet industry standards in all directions. C01 Chittering crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

6.14 Following the NRA, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

i. Upgrade to Miniature Stop Lights (MSL) Overlay, this would cost in the region of £305,000 - this option has returned a 0.14 CBA score which means the cost of this option is disproportionate to the safety benefit received.

ii. Closure by building an overbridge would cost between an estimated £1.5m and £3m due to the crossings location and was not considered due to being disproportionate to the safety benefit received.

iii. Upgrading the crossing – replace decking, lights etc. Estimated cost of £10,000 returned a CBA of 2.47 which means the safety benefit is supporting the cost of this option

6.15 **Additional information:**

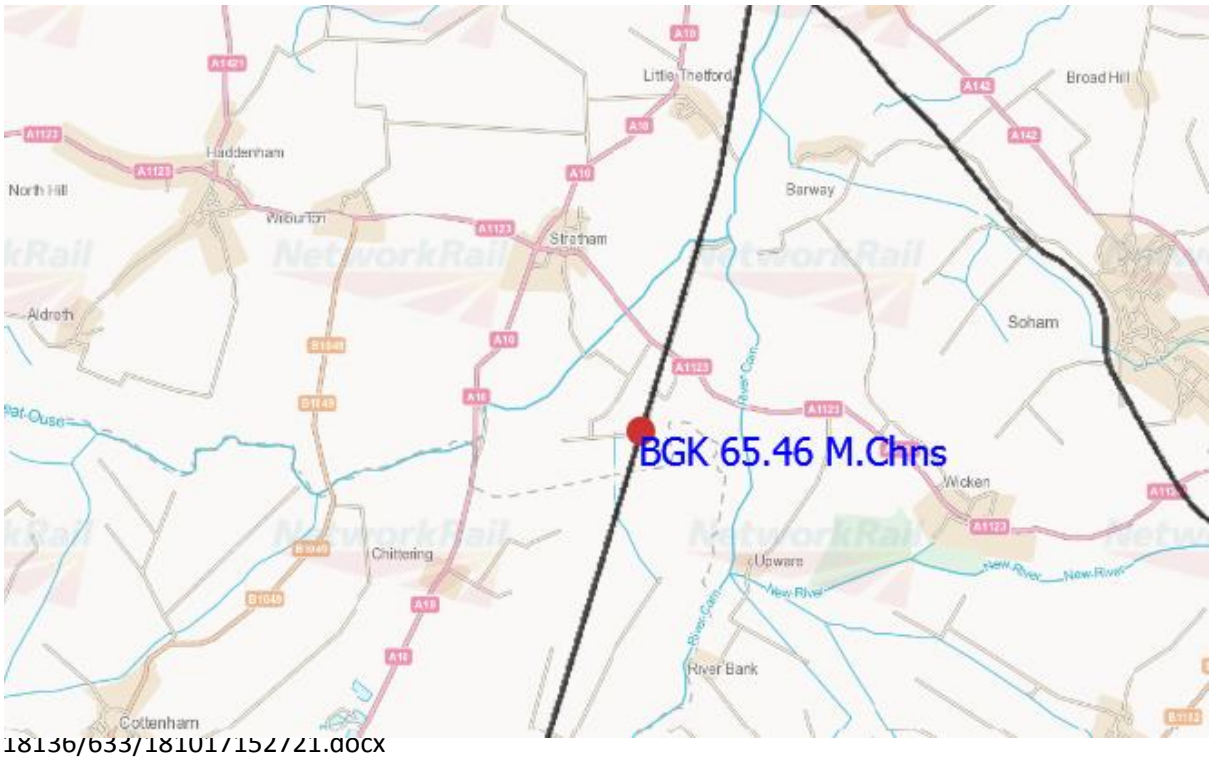
This level crossing is a Public footpath level crossing situated in-between farmland. The level crossing is on one of Anglia's main branches which means there is very high rail traffic. The FPS (footpath crossing with stiles) is located in private farmland but the FPS has public rights over the crossing. Recent visits to the crossing, by the local LCM has seen the approaches overgrown, indicating that the crossing is apparently hardly used.

## 7. C02 NAIRNS NO.117 PRIVATE USER WORKED LEVEL CROSSING

7.1 C02 Nairn's No.117 crossing has an ALCRM score of B2 with a FWI of 0.013725232; it is located in Stratham Parish on the BGK line (Bethnal Green to Kings Lynn) which has a line speed of 75mph. It is a private accommodation crossing. It is between Elsenham and Ely at 65 miles and 46 chains from Liverpool Street Station London.

7.2 There are 186 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

7.3 Aerial views of C02 Nairn's No.117 Level crossing can be seen below.



7.4 The track on the left is the down line from London and the track on the right is the up line to London. Trains would normally run down from London on the left hand line that is from the bottom of the picture to the top. Trains would normally run up to London on the right hand side, which is from the top of the picture to the bottom.

7.5 C02 Nairns No.117 level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains, it is not controlled, or equipped with lights, or any automatic audible warning systems. The crossing does have a telephone to the signallers at Cambridge Signal Box. The location and geography of the crossing means that it if there were no phone, a user would have to be reliant upon the `stop look and listen' signs to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

7.6 A census was carried out starting on the 16th August 2016 by the LCM and this census showed relatively little usage recorded over the census period. The AUs returned a questionnaire on crossing usage on the 14th December 2016 and this showed regular and varied daily usage by a variety of different vehicle types.

7.7 Given the line speed of 75 mph in this area and the distance to traverse the crossing of 9.9 meters, this crossing would require sightlines of 1,034 meters in order to give the user enough time to cross before the train arrives.

7.8 The sightings recorded at last risk assessment which was completed on 18/08/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 1,034m | 2,011m | Yes |
| Up side looking toward down direction train approach | 1,034m | 2,400m | Yes |
| Down side looking toward up direction train approach | 1,034m | 2,011m | Yes |
| Down side looking toward down direction train approach | 1,034m | 2,400m | Yes |

7.9 The photograph below is taken looking eastward, from the up side at a train approaching in the up direction. The trains usually approach on the closest set of lines (right hand side).

7.10 The photograph below is taken on the up side, looking west, the train usually approaches on the furthest (right hand side) set of lines.

7.11 The photograph below is taken on the down side looking west, the train usually approaches on the closest line (right hand side) set of lines.

7.12 The photograph below is taken on the down side looking east, the train usually approaches on the furthest line (right hand side) set of lines.

7.13 As you can see from the table above (7.8), C02 Nairns No.117 crossing location is on a straight piece of track which means that the crossing does have sufficient sighting to meet industry standards in all directions.

7.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

7.14.1 Closure via negotiations with AUs, this cost will vary depending on the AU - this option cannot be CBA scored until the cost has been agreed but it is likely to be a substantial sum.

7.14.2 Closure via installation of underpass would cost in the region of £1,300,000 – this option has returned a 0.22 CBA score which means the safety benefit is disproportionate to the cost but could still be considered here.

7.14.3 Installation of CCTV was optioned and now has been implemented reducing the risk at this crossing.

7.14.4 Upgrading the telephone system will be implemented in the near future to help with the safety benefits – this has now been done.

7.14.5 Upgrading to power operated gates – returned a CBA of 2.51 which is supportive of the potential safety benefit.

7.14.6 Upgrading to MSL – CBA of 0.19 - which means the cost of this option is disproportionate to the safety benefit received but could still be considered here.

7.15 **Other Relevant Information**

The sighting at this crossing is very good when weather conditions are favourable. The main issue as outlined below with this crossing has been poor behaviour by some users. This poor behaviour culminated in an incident on the 12th August 2016 when a vehicle was struck on the crossing. The AU has been visited many times over the current year prior to and after the incident, by the LCM emphasizing the critical use of the phones and handing out briefing and safety documents informing the users of the means to achieve correct behaviour when using this crossing. Crossing now has CCTV cameras as a permanent fixture at this location.

**13/04/2016**-LC Misuse - 1K82 18:12 Cambridge - Norwich; Land Rover had been stood at Nairn's level crossing entrance with both gates open.

**29/04/2016**-LC misuse- unspecified user of Nairn's Level Crossing near Waterbeach failed to call back after using the Level Crossing

**10/05/2016**-LC Misuse - Gates left open at Nairn's level crossing near Waterbeach

**20/07/2016**-LC Misuse - Farm worker failed to call back signaller once clear of Nairn's level crossing.

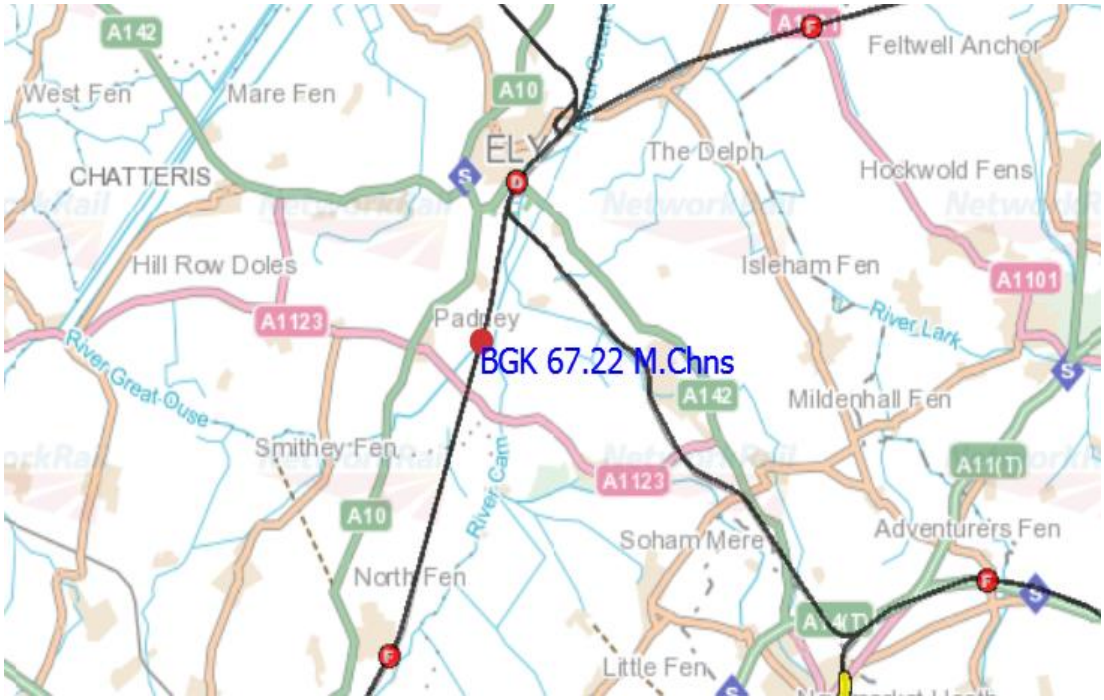
**12/08/2016**- Incident- 1T39 (GoVia 1354 King's Lynn – Kings Cross) struck Land Rover at Nairn's No 114 Level Crossing near Waterbeach. A member of the public (MOP) arrived at the crossing in a Land Rover. MOP used the crossing without the permission of the Signaller and was subsequently hit by a GTR service travelling between Kings Lynn and Kings Cross. The MOP failed to follow the procedure to use the User Worked Crossing correctly and has since been prosecuted

## 8. C03 WEST RIVER BRIDGE FOOTPATH CROSSING

8.1 C03 West River Bridge footpath crossing has an ALCRM score of C6 with a FWI score of 0.00023908. West River Bridge level crossing is traversed by a public footpath. The crossing is in the Parish of Thetford (Cambridgeshire) and is located approximately 1.8km east of the village of Stretham. West River Bridge footpath crossing is on the Bethnal Green and Kings Lynn line at 67 miles and 22 chains from Liverpool Street Station London. The maximum line speed is 75mph in both directions. The line is a dual track with trains operating in one direction on each line during normal operation.

8.2 There are 76 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

8.3 An aerial view of West River Bridge footpath crossing can be seen below.




8.4 The left side of this track is the down line from London and the right side of this track is the up line to London. Trains would normally run down from London that is from the bottom of the picture to the top. Trains would normally run up to London, which is from the top of the picture to the bottom.

8.5 C03 West River Bridge footpath crossing is a standard footpath crossing and is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

8.6 A full 9 day census was carried out starting on the 08/06/13 by Sky High Count On Us and this census showed no usage recorded. Also June 2015 – 9 Day Covert Camera Survey conducted by the LCM again showed no usage. It is reasonable however to believe that the crossing is used relatively infrequently by some pedestrians probably ramblers or local amenity users.

8.7 Given the line speed of 75 mph in this area and the distance to traverse the crossing of 9.2 meters this crossing would require sightlines of 260 meters for pedestrians in order to give the user enough time to cross before the train arrives.

8.8 The sightings recorded at last risk assessment which was completed on 14/12/2015 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 260m | 1,050m | Yes |
| Up side looking toward down direction train approach | 260m | 1,500m+ | Yes |
| Down side looking toward up direction train approach | 260m | 1,050m | Yes |
| Down side looking toward down direction train approach | 260m | 1,500m+ | Yes |

8.9 The photograph below is taken looking northward, from the up side (East) at a train approaching in the up direction (from the north). The trains usually approach on the closest set of lines (right hand side).

8.10 The photograph below is taken on the up side (east), looking south, the train usually approaches on the furthest (right hand side) set of lines

8.11 The photograph below is taken on the down side (west) looking south; the train usually approaches on the closest line (right hand side) set of lines.

8.12 The photograph below is taken on the down side (west) looking north, the train usually approaches on the furthest line (right hand side) set of lines

8.13 As can be seen from the table above (8.8), C03 West River Bridge footpath crossing does have sufficient sighting to meet industry standards in all directions, when weather conditions are not adverse.

8.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

**8.14.1 Closure by over-bridge:** estimated costs of £1,300,000 upwards. CBA of 0.01 meaning the cost of this option is disproportionate to the safety benefit received. Given its location it is more likely that a diversion/extinguishment of rights of way would be achievable and would be the preferred option given that it seems most people are using the underpass now

**8.14.2 Upgrade to MSL:** estimated cost of £305,000 with a CBA of 0.01 means the cost of this option is disproportionate to the safety benefit received. If we cannot achieve closure then the crossing should be upgraded to MWL in the longer term

**8.14.3 Stile to stile enhancement - upgrade to decking, re-profiles approaches, mark out decision point:** estimated cost of £6,000 – CBA of 0.23 means the cost of this option is disproportionate to the safety benefit received. This is the preferred short term option if we cannot achieve closure.

**8.15 Other Relevant Information:**

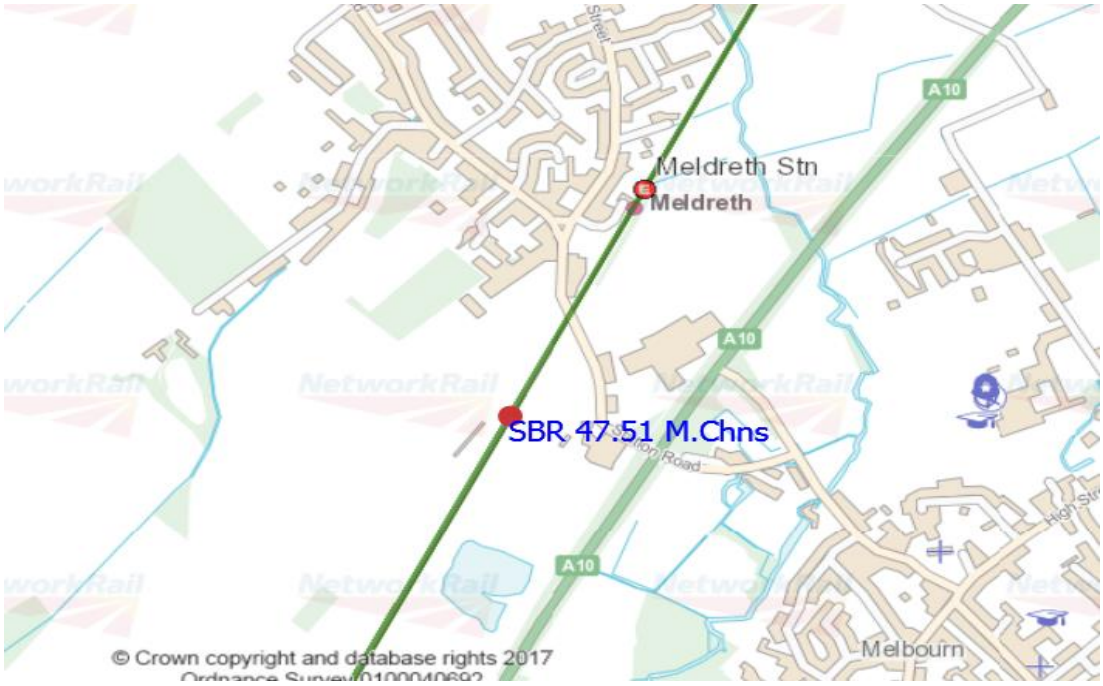
The pedestrian crossing is currently a Stop, Look & Listen crossing where pedestrians make their own judgement whether it is safe to cross. Level crossing signage is provided and the crossing does not appear to be frequently used with most people seemingly preferring to use the existing underbridge to continue their journey

## 9. C04 NO.20 PUBLIC FOOTPATH LEVEL CROSSING

9.1 C04 No.20 footpath crossing has an ALCRM score of C5 with an FWI of 0.000534386. It is located in Meldreth Parish on the SBR line (Shepreth to Royston line) which has a line speed of 90mph. It is between Royston and Meldreth at 47 miles and 51 chains from Liverpool Street Station London.

9.2 There are 166 trains per day that run for 21 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

9.3 Aerial views of C04 No.20 Footpath crossing can be seen below.

9.4 The track on the left is the down line from London and the track on the right is the up line to London. Trains would normally run down from London on the left hand line that is from the bottom of the picture to the top. Trains would normally run up to London on the right hand side, which is from the top of the picture to the bottom.

9.5 C04 NO.20 level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

9.6 The last 9 day census was carried out by the LCM in January 2017, and this census showed an average of 5 persons per day using the crossing.

9.7 Given the line speed of 90mph in this area and the distance to traverse the crossing of 9 meters, this crossing requires sightlines of 457 metres in order to give the user enough time to cross before the train arrives. This traverse distance has been increased by 50% to allow for vulnerable usage at this crossing.

9.8 The sightings recorded at last risk assessment which was completed on 16/02/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 457m | 3,000m | Yes |
| Up side looking toward down direction train approach | 457m | 2,700m | Yes |
| Down side looking toward up direction train approach | 457m | 3,000m | Yes |
| Down side looking toward down direction train approach | 457m | 2,700m | Yes |

9.9 The photograph below is taken looking northward, from the up side (east) at a train approaching in the up direction (from the north). The trains usually approach on the closest set of lines (right hand side).

9.10 The photograph below is taken on the up side (east), looking south, the train usually approaches on the furthest (right hand side) set of lines.

9.11 The photograph below is taken on the down side (west) looking south; the train usually approaches on the closest line (right hand side) set of lines.

9.12 The photograph below is taken on the down side (west) looking north, the train usually approaches on the furthest line (right hand side) set of lines.

9.13 As can been seen from the table above (9.8), C04 No.20 crossing does have sufficient sighting to meet industry standards in all directions. C04 No.20 crossing is

on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

9.14 Following the risk assessment, an Optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

9.14.1 Upgrade to MSL Overlay, this would cost in the region of £305,000 - this option has returned a 0.02 CBA score which means the cost of this option is disproportionate to the safety benefit received.

9.14.2 Closure by building an Over-Bridge would cost between an estimated £1.5m and £3m due to the crossings location and was not considered due to being disproportionate to the safety benefit received.

**9.15 Additional information**

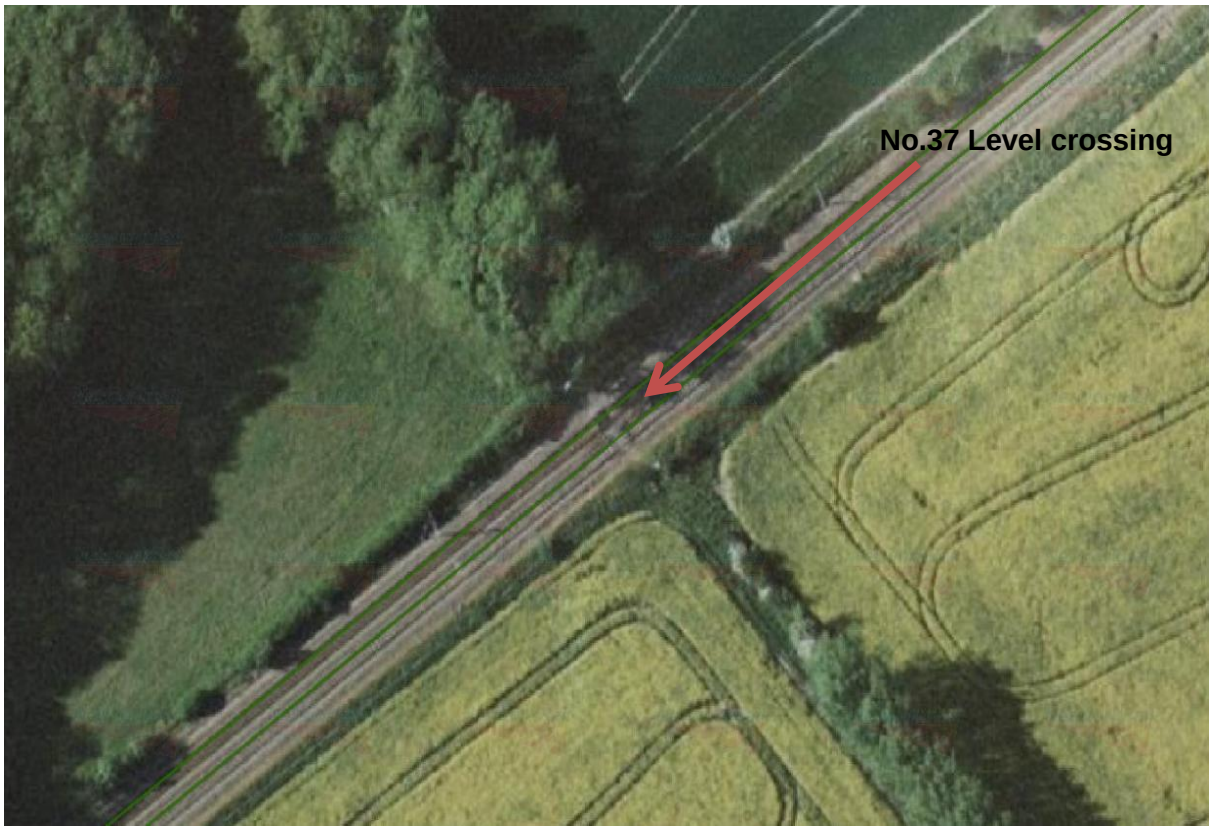
No Name no 20 FPS is a lightly used crossing being only used by pedestrians. It is situated in the middle of farmland and either side of the crossing at the end of the farmland are local businesses and an industrial estate. You have slight road traffic ambient noise coming from the A10 but nothing overpowering to impair hearing. The 9 day census on average says that only 5 people use the crossing a day and that could be the same jogger or dog walker coming back on themselves.

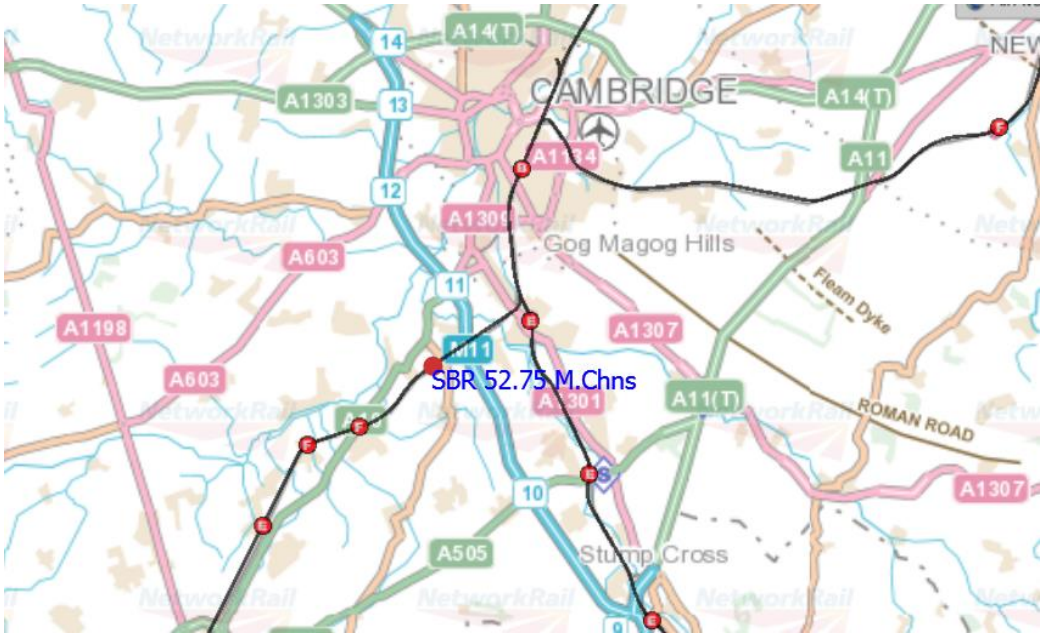
## 10. C07 NO.37 PUBLIC FOOTPATH LEVEL CROSSING

10.1 C07 No.37 footpath crossing has an ALCRM score of C6 with an FWI of 0.000289875. It is located in Harston Parish on the SBR line (Shepreth Branch Jn to Royston) which has a line speed of 80mph on the up side and 90mph on the down side. It is between Harston and Hauxton at 52 miles and 75 chains from Liverpool Street Station London.

10.2 There are 168 trains per day that run for 21 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

10.3 Aerial views of C07 No.37 Footpath crossing can be seen below.






10.4 The track on the left is the down line from London and the track on the right is the up line to London. Trains would normally run down from London on the left hand line that is from the bottom of the picture to the top. Trains would normally run up to London on the right hand side, which is from the top of the picture to the bottom.

10.5 C07 NO.37 level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

10.6 The last census full 9 day was carried out by TRACSIS (a contractor of Network Rail) on 18th June 2016, and this census showed only a few pedestrians using the crossing during that time. In the LCM's NRA of 17th August 2017 usage of 4 times a day was recorded allowing for the current and previous survey results. No vulnerable usage was recorded at this crossing.

10.7 Given the line speed of 80mph on the up side and 90mph on the down side in this area and the distance to traverse the crossing of 9.1 meters, this crossing requires sightlines of 274 metres on the up side and 308 metres on the down side in order to give the user enough time to cross before the train arrives.

10.8 The Sightings recorded at last risk assessment which was completed on 17/08/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 280m | 1,188m | Yes |
| Up side looking toward down direction train approach | 315m | 548m | Yes |
| Down side looking toward up direction train approach | 280m | 1,188m | Yes |
| Down side looking toward down direction train approach | 315m | 548m | Yes |

10.9 The photograph below is taken looking northward, from the up side (east) at a train approaching in the up direction (from the north). The trains usually approach on the closest set of lines (right hand side).

10.10 The photograph below is taken on the up side (east), looking south, the train usually approaches on the furthest (right hand side) set of lines.

10.11 The photograph below is taken on the down side (west) looking south; the train usually approaches on the closest line (right hand side) set of lines.

10.12 The photograph below is taken on the down side (west) looking north, the train usually approaches on the furthest line (right hand side) set of lines.

10.13 As can been from the table above (10.8), C07 No.37 crossing does have sufficient sighting to meet industry standards in all directions. C07 No.37 crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

10.14 Following the risk assessment, an Optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

10.14.1 Closure by building an over-bridge would cost between £1.5m and £3m due to the crossings location and returned a CBA of 0.01 was not considered due to being disproportionate to the safety benefit received.

10.14.2 Upgrade to MSL – estimated cost of £305,000 – returned a CBA of 0.14 which means the cost is disproportionate to the safety benefit received but could still be considered at this crossing.

**10.15 Additional information**

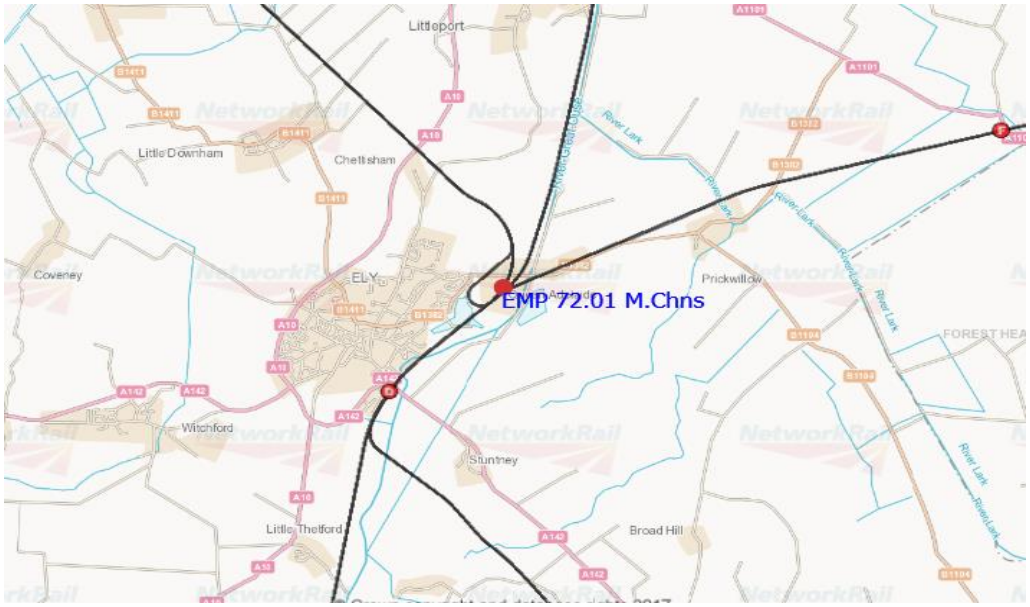
No Name No.37 FPW is a footpath in between farmland. Although this crossing is in a secluded area, it is lightly used by pedestrians. Looking at the estimated census information there is no usage by vulnerable users at this crossing due to the crossing surroundings. The 9 day census on average says that only 4 people use the crossing a day and that could possibly be the same jogger or dog walker coming back on themselves.

## 11. C08 Ely North Junction Public Footpath

11.1 C08 Ely North Junction FPS has an ALCRM score of C6 with an FWI of 0.000153397. It is located in Ely Parish on the EMP line (Ely-March- Peterborough) which has a line speed of 60mph on the up and down side. It is between March and Ely at 72 miles and 01 chains from Liverpool Street Station London.

11.2 There are 194 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

11.3 Aerial views of C08 Ely North Junction FPS can be seen below.



11.4 The track on the left side is the down line from London to Peterborough normally running from bottom to top and the track on the right side is the up line from Peterborough to London normally running from top to bottom.

11.5 C08 Ely North Junction FPS is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

11.6 The last census was carried out starting from the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed 10 pedestrian usages during that time. In the LCM's NRA of 01/12/2016 usage of 3 to 5 daily was allowed for given previous surveys at the crossing.

11.7 Given the line speed of 60mph on both up and down lines this and the distance to traverse the crossing of 9 metres, this crossing requires sightlines of 204 metres on the up side and 204 metres on the down side in order to give the user enough time to cross before the train arrives.

11.8 The Sightings recorded at last risk assessment which was completed on 01/12/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 204m | 280m | Yes |
| Up side looking toward down direction train approach | 204m | 290m | Yes |
| Down side looking toward up direction train approach | 204m | 240m | Yes |
| Down side looking toward down direction train approach | 204m | 210m | Yes |

11.9 The photograph below is taken looking southward, from the down side (west) at a train approaching in the down direction (from the south). The trains usually approach on the closest set of lines (right hand side).

11.10 The photograph below is taken on the down side (west), looking north, the train usually approaches on the furthest (right hand side) set of lines.

11.11 The photograph below is taken on the up side (east) looking south, the train usually approaches on the furthest line (right hand side) set of lines.

11.12 The photograph below is taken on the up side (east) looking north, the train usually approaches on the nearest line (right hand side) set of lines.

11.13 As can be seen from the table above (11.8), C08 Ely North Junction does have sufficient sighting to meet industry standards in all directions. C08 Ely North Junction FPS is on a curved section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is sufficient when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy, or if vegetation is not constantly managed on the curves.

11.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

11.14.1 Install a new rubber Pedi Strail decking system would cost in the region of £6,000 – this option has returned a 0.09 CBA score which means the cost of this option is disproportionate to the safety benefit received.

11.14.2 Blue lighting studs this would cost in the region of £2,000 - this option has returned a 0.18 CBA score which means the cost of this option is disproportionate to the safety benefit received.

11.14.3 Closure by over bridge, this would cost in the region of £1,300,000 to £2,000,000 - this option has returned a 0.15 CBA score which means the cost of this option is disproportionate to the safety benefit received.

11.14.4 Upgrade to MSL – estimated cost of £305,000 – CBA of 0.28 which means the cost of these options is disproportionate to the safety benefit received but would be a preferred option if closure was unsuccessful.

**11.15 Additional information**

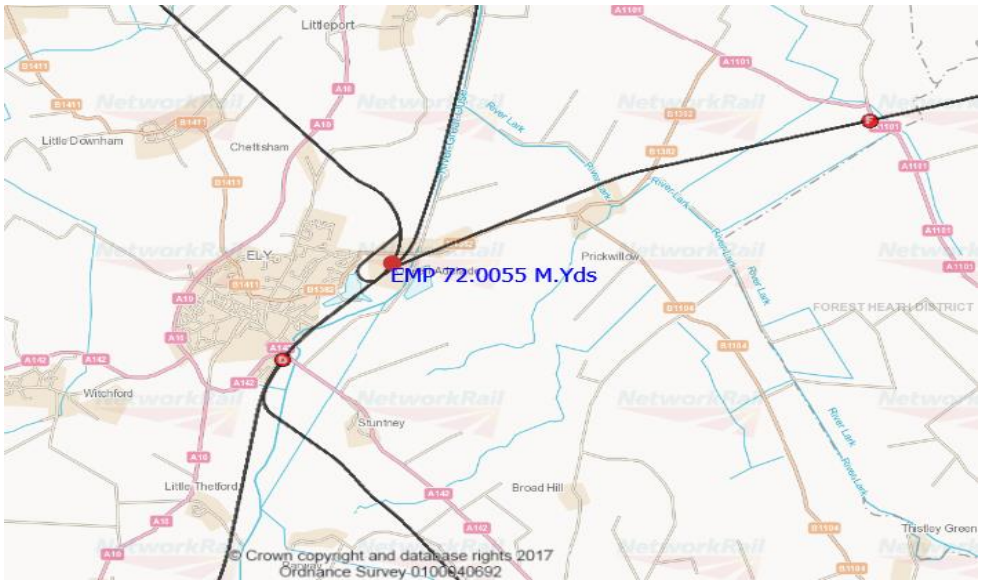
C08 Ely North Junction FPS. This level crossing is a Public footpath level crossing situated in-between grassland and a small woodland area. The level crossing is on one of Anglia's main branches which means there is very high rail traffic. The FPS on both up and down is located 5 to 6mtrs from the running rail and a grassed area is provided, which can be slippery. Vegetation management needs to be proactive to maintain minimum sighting

**12. C09 Second Drove Public Footpath**

12.1 C09 Second Drove FPS has an ALCRM score of C7 with an FWI of 0.000086925 It is located in Ely Parish on the EMP line (Ely-March- Peterborough) which has a line speed of 60mph on the up and down side. It is between March and Ely at 72 miles and 55 chains from Liverpool Street Station London.

12.2 There are 194 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

12.3 Aerial views of C09 Second Drove FPS can be seen below.




12.4 The track on the left hand side is the down line from London to Peterborough normally running from right to left and the track on the right hand side is the up line from Peterborough to London normally running from left to right.

12.5 C09 Second Drove FPS is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems- other than whistle boards (which I discuss further below). The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

12.6 The last census was carried out starting from the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed 5 pedestrian use during that time. In the LCM's NRA of 05/01/2016 usage of a few times a year was allowed for.

12.7 Given the line speed of 60mph on both up and down lines this and the distance to traverse the crossing of 9.3 meters, this crossing requires sightlines of 210 metres on the Up Side and 210 metres on the down side in order to give the user enough time to cross before the train arrives.

12.8 The Sightings recorded at last risk assessment which was completed on 05/01/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 210m | 271m | Yes |
| Up side looking toward down direction train approach | 210m | 784m | Yes |
| Down side looking toward up direction train approach | 210m | 249m | Yes |
| Down side looking toward down direction train approach | 210m | 784m | Yes |

12.9 The photograph below is taken looking southward, from the down side (west) at a train approaching in the down direction (from the south). The trains usually approach on the closest set of lines (right hand side).

12.10 The photograph below is taken on the down side (west), looking north, the train usually approaches on the furthest (right hand side) set of lines.

12.11 The photograph below is taken on the up side (east) looking south, the train usually approaches on the furthest line (right hand side) set of lines.

12.12 The photograph below is taken on the up side (east) looking north, the train usually approaches on the nearest line (right hand side) set of lines.

12.13 As can be seen from the table above (12.8), C09 Second Drove FPS does have sufficient sighting to meet industry standards in all directions but the crossing still has whistle boards installed as a mitigation measure. C09 Second Drove FPS is sighted to the centre of a curve section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is sufficient when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy. This crossing has whistle boards as a mitigation measure.

12.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

12.14.1 Closure via Non Equality Act Footbridge would cost in the region of £1,300,000 – this option has returned a 0.13 CBA score which means the cost of this option is disproportionate to the safety benefit received.

12.14.2 Tarmac from stiles to stiles would cost in the region of £10,000 – this option has returned a 0.94 CBA score which means the cost of this option is positive to the safety benefit received.

12.14.3 Covtec warning system - this would cost in the region of £25,000 - this option has returned a 0.24 CBA score which means the cost of this option is disproportionate to the safety benefit received.

12.14.4 MSL System, this would cost in the region of £305,000 – this option has returned a 0.01 CBA score which means the cost of this option is disproportionate to the safety benefit received.

**12.15 Additional information**

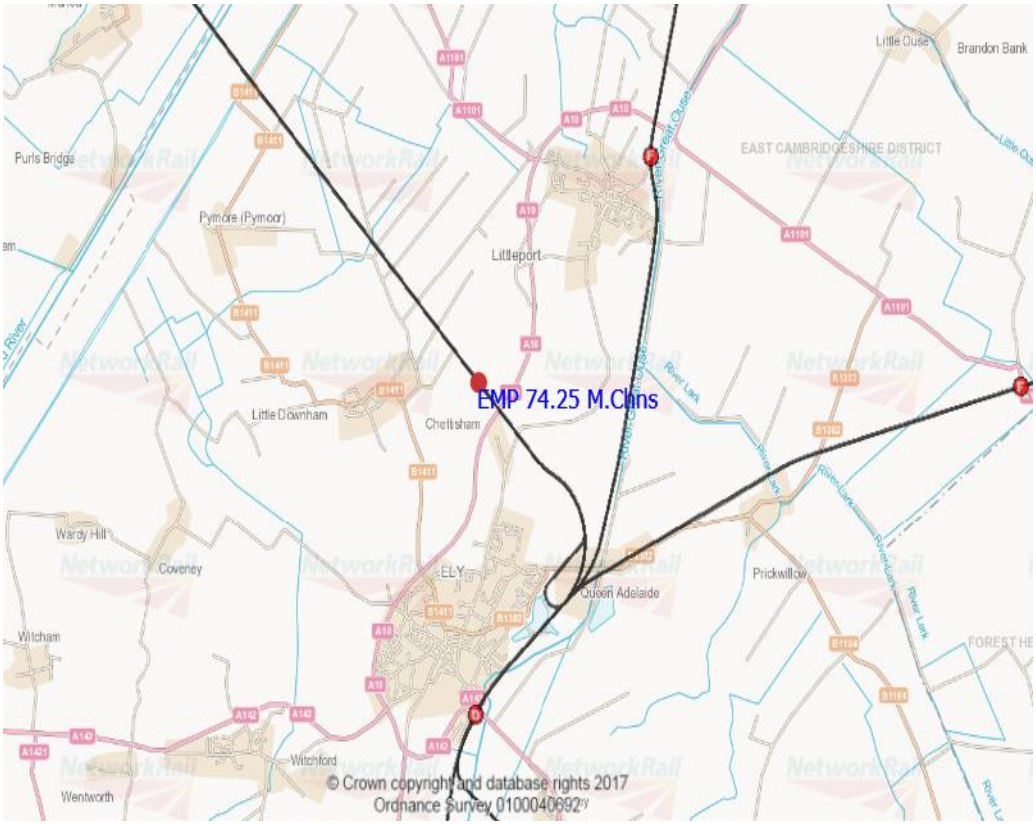
This level crossing is a Public footpath level crossing situated in-between a Byway (Clayway- Bishops way) and farmland. The level crossing is on one of Anglia's main branches which means there is very high rail traffic. The Stiles on both Up and Down are roughly 8metres from the running rail with a grass approach way and can be slippery in wet weather.

## 13. C10 COFFUE DROVE USER WORKED LEVEL CROSSING WITH TELEPHONES

13.1 C10 COFFUE DROVE user worked crossing with telephones has an ALCRM score of C9 with an FWI of 0.000007599. It is located in Downham Parish on the EMP line (Ely-March-Peterborough) which has a line speed of 75mph. It is between Ely and March at 74miles and 25chains from Liverpool Street Station London.

13.2 There are 194 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

13.3 Aerial views of C10 COFFUE DROVE user worked crossing with telephones can be seen below.




13.4 The track at the top of the picture is the up line from Peterborough to London running from left to right and the track on the bottom is the down line from London to Peterborough running from right to left.

13.5 C10 COFFUE DROVE user worked crossing with telephones is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line. There is a mitigation of telephones installed at this crossing so the user can phone the signaller to obtain permission to cross.

13.6 There has been no recorded use at this crossing in the latest NRAs and this has been confirmed by Signal Box Records.

13.7 Given the line speed of 75 mph in this area and the distance to traverse the crossing of 11.5 metres, this crossing would require sightlines of 1,093 metres in order to give the user enough time to cross before the train arrives.

13.8 The Sightings recorded at last risk assessment which was completed on 04/11/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 1,093m | 1,609m | Yes |
| Up side looking toward down direction train approach | 1,093m | 552m | No |
| Down side looking toward up direction train approach | 1,093m | 1,609m | Yes |
| Down side looking toward down direction train approach | 1,093m | 522m | No |

13.9 The photograph below is taken looking Eastward, from the down side (south) at a train approaching in the down direction (from the east). The trains usually approach on the closest set of lines (right hand side).

13.10 The photograph below is taken on the down side (south), looking west, the train usually approaches on the furthest right hand side (west) set of lines.

13.11 The photograph below is taken on the up side (north) looking east; the train usually approaches on the furthest line (right hand side) set of lines

13.12 The photograph below is taken on the up side (north) looking west, the train usually approaches on the nearest line (right hand side) set of lines.

13.13 As can be seen from the table above (13.8), C10 COFFUE DROVE user worked crossing with telephones does have some non-sufficient sighting aspects to meet industry standards and so Telephones installed are the mitigation.

13.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

13.14.1 Closure via underpass, this would cost in the region of £3,000,000 to £4,000,000 - this option has returned a 0.05 CBA score which means the cost of this option is disproportionate to the safety benefit received although this would be a preferred option.

13.14.2 Install an MCB-OD this would cost in the region of £2,400,000 – this option has returned a 0.35 CBA score which means the safety benefit is disproportionate to the safety benefit received.

13.14.3 Install an Ebigate/MSL system this would cost in the region of £150,000 to £305,000 – this option has returned a 0.25 CBA score which means the safety benefit is disproportionate to the safety benefit received although this would be a preferred option if closure could not be achieved.

13.14.4 Install a Power Operated Gate (POGO) system this would cost in the region of £29,000 – this option has returned a 0.20 CBA score which means the safety benefit is potentially supporting the costs of delivering.

**13.15 Additional information**

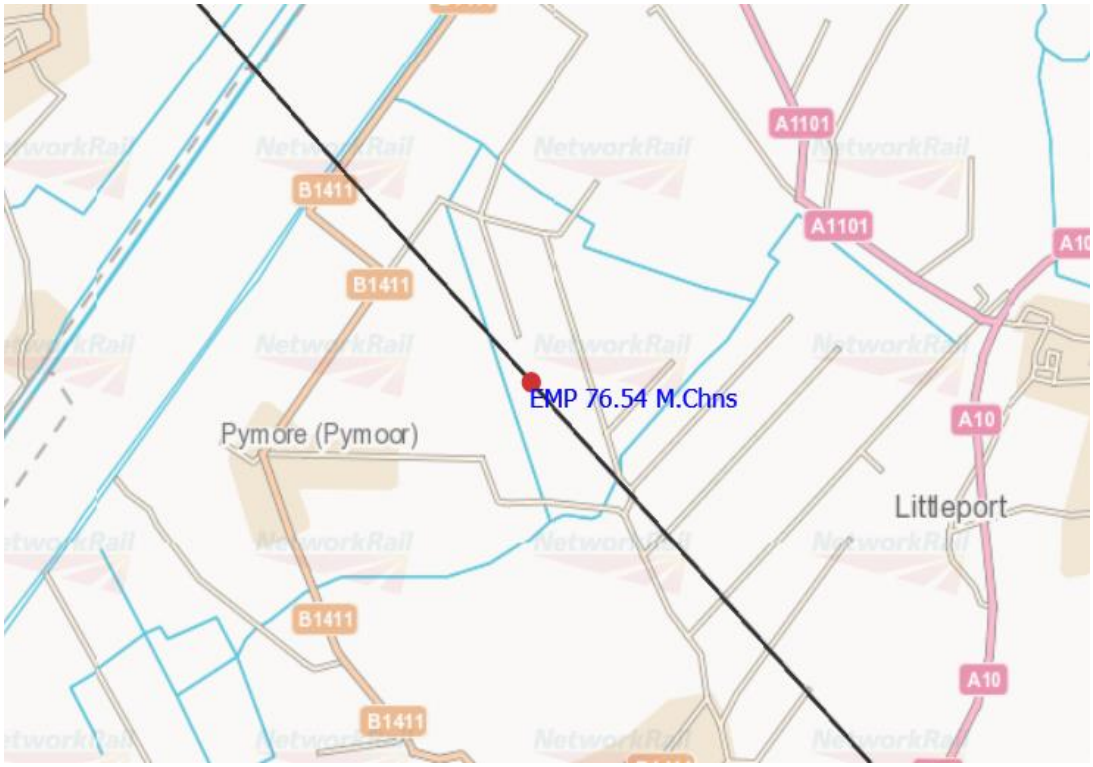
C10 COFFUE DROVE user worked crossing with telephones is sited between farmland and used to gain access to farmland on the up and down side of the crossing. It is a public Highway but not maintained to highway standards. The user is required to use the telephones at the crossing to determine if it is safe to cross.

## 14. C11 FURLONG DROVE FPG/Byway

14.1 C11 FURLONG DROVE FPG/Byway has an ALCRM score of C6 with an FWI of 0.000219907 It is located in Downham Parish on the EMP line which has a line speed of 75mph on the up and down side. It is between March and Ely at 76 miles and 54 chains from Liverpool Street Station London.

14.2 There are 194 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

14.3 An aerial view of C11 FURLONG DROVE FPG/Byway can be seen below.




14.4 The track at the bottom is the down line from London to Peterborough normally running from right to left and the track at the top is the up line from Peterborough to London normally running from left to right.

14.5 C11 FURLONG DROVE FPG/Byway is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

14.6 The last census was carried out starting from the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed 4 pedestrian users during that time. In the LCM's NRA of 25th April 2017 usage of once or twice daily was allowed for.

14.7 Given the line speed of 75mph on both up and down lines this and the distance to traverse the crossing of 12.9 meters, this crossing requires sightlines of 364 metres on the Up Side and 364 metres on the down side in order to give the user enough time to cross before the train arrives.

14.8 The Sightings recorded at last risk assessment which was completed on 25/04/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 364m | 1,500+m | Yes |
| Up side looking toward down direction train approach | 364m | 1,500+m | Yes |
| Down side looking toward up direction train approach | 364m | 1,500+m | Yes |
| Down side looking toward down direction train approach | 364m | 1,500+m | Yes |

14.9 The photograph below is taken looking eastward, from the down side (south) at a train approaching in the down direction (from the east). The trains usually approach on the closest set of lines (right hand side).

14.10 The photograph below is taken on the down side (south), looking west, the train usually approaches on the furthest (right hand side) set of lines.

14.11 The photograph below is taken on the up side (north) looking east, the train usually approaches on the furthest line (right hand side) set of lines.

14.12 The photograph below is taken on the up side (north) looking west, the train usually approaches on the nearest line (right hand side) set of lines.

14.13 As can be seen from the table above (14.8), C11 FURLONG DROVE FPG/Byway does have sufficient sighting to meet industry standards in all directions. C11 FURLONG DROVE FPG/Byway is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

14.14 Following the risk assessment, an Optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

14.14.1 Closure via Non Equality Act Footbridge would cost in the region of £1,500,000 – this option has returned a 0.01 CBA score which means the cost of this option is disproportionate to the safety benefit received.

14.14.2 Closure via Equality Act Footbridge would cost in the region of £1,500,000 upwards and this option has returned a 0.01 CBA score which means the cost of this option is disproportionate to the safety benefit received.

14.14.3 Strail Rubber Decking- this would cost in the region of £6,500 – this option has returned a 0.22 CBA score which means the cost of this option is disproportionate to the safety benefit received.

14.14.4 Straighten skewed decking, this would cost in the region of £8,500 – this option has returned a 0.17 CBA score which means the cost of this option is disproportionate to the safety benefit received.

14.14.5 Upgrade to MSL Overlay, this would cost in the region of £305,000 – this option has returned a 0.21 CBA score which means the cost of this option is disproportionate to the safety benefit received

### 14.15 Additional information

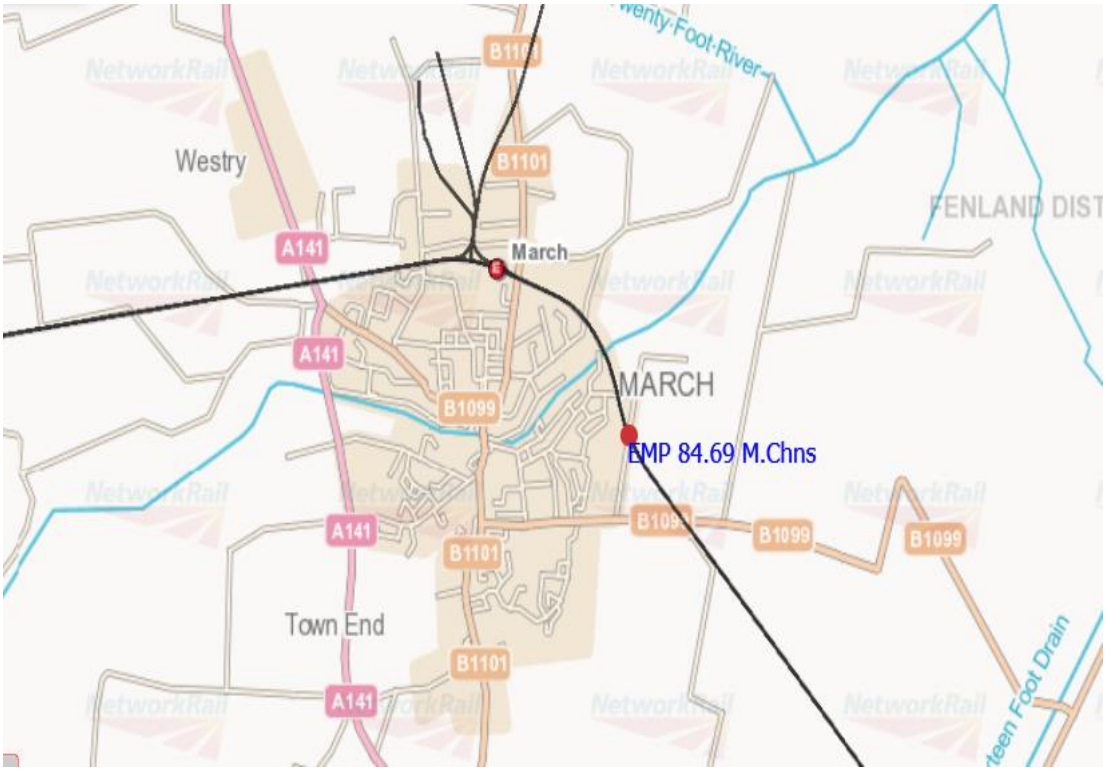
This level crossing is a Public footpath level crossing situated in-between farmland. The crossing is on one of Anglia's main branches which means there is very high rail traffic. The Footpath Gates on both Up and Down are 5 to 6mtrs from the running rail with a grass approach way.

## 15. C12 SILT DROVE USER WORK CROSSING WITH TELEPHONE

15.1 C12 SILT DROVE user worked crossing with telephones has an ALCRM score of A4 with an FWI of 0.003137229 It is located in March Parish on the EMP line (Ely-March-Peterborough) which has a line speed of 60 mph. It is between Ely and March at 84 miles and 69 chains from Liverpool Street Station London.

15.2 There are 194 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

15.3 An aerial view C12 SILT DROVE user worked crossing with telephones can be seen




15.4 The track to the right is the up line from Peterborough to London running from top to bottom and the track to the left is the down line from London to Peterborough running from bottom to top.

15.5 C12 SILT DROVE user worked crossing with telephones is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line. There is a mitigation of telephones at the crossings which means users can telephone the signaller to obtain permission to cross

15.6 Given the line speed of 60 mph in this area and the distance to traverse the crossing of 13.4 metres, this crossing would require sightlines of 437 metres in order to give the user of cars/vans/small lorries enough time to cross before the train arrives.

15.7 The Sightings recorded at last risk assessment which was completed on 10/08/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 437m | 225m | No |
| Up side looking toward down direction train approach | 437m | 320m | No |
| Down side looking toward up direction train approach | 437m | 555m | Yes |
| Down side looking toward down direction train approach | 437m | 370m | No |

15.8 The photograph below is taken looking eastward, from the down side (south) at a train approaching in the down direction (from the east). The trains usually approach on the closest set of lines (right hand side).

15.9 The photograph below is taken on the down side (south), looking west, the train usually approaches on the furthest right hand side (west) set of lines.

15.10 The photograph below is taken on the up side (north) looking east; the train usually approaches on the furthest line (right hand side) set of lines

15.11 The photograph below is taken on the up side (north) looking west, the train usually approaches on the nearest line (right hand side) set of lines.

15.12 As can be seen from the table above (15.7), C12 SILT DROVE user worked crossing with telephones does have some non-sufficient sighting aspects to meet industry standards and so telephones installed are the mitigation.

15.13 Following the risk assessment, an Optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

15.13.1 Closure via overbridge - this would cost in the region of £2,000,000 and this option has returned a 0.07 CBA score which means the cost of this option is disproportionate to the safety benefit received.

15.13.2 Install a Power Operated Gate (POGO) System this would cost in the region of £29,000 – this option has returned a 0.70 CBA score which means the safety benefit is potentially supporting the costs of delivering.

15.13.3 Install an Ebigate/MSL system this would cost in the region of £150,000 to £305,000 – this option has returned a 0.47 CBA score which means the cost of this option is disproportionate to the safety benefit received although the LCM would support this option.

15.13.4 Install Rubber Strail Decking this would cost in the region of £25,500 – this option has returned a 0.80 CBA score which means the safety benefit is potentially supporting the costs of delivering.

**15.14 Additional information**

C12 SILT DROVE user worked crossing with telephones is sited on the edge of March Town with some housing and a track/road with farmland on both sides. It is a

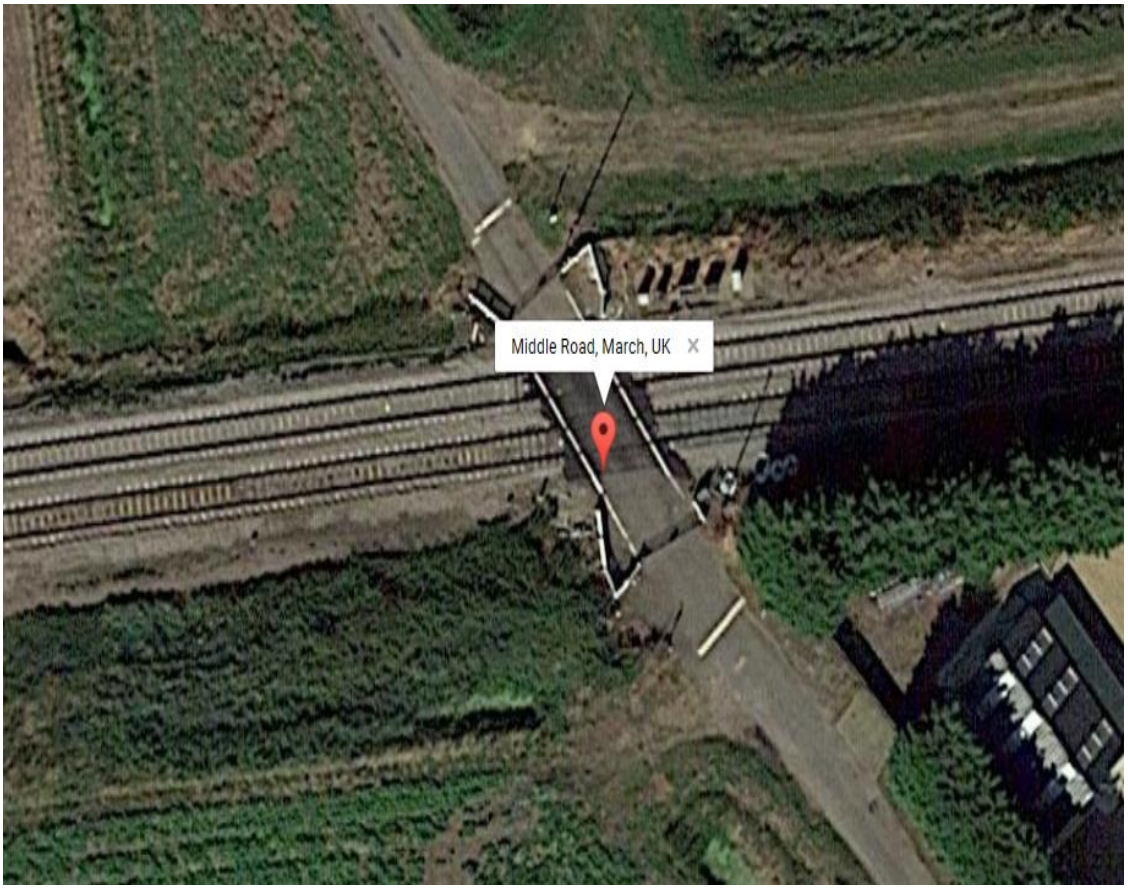
low grade public Highway. The user is required to use the telephones at the crossing to determine if it was safe to cross

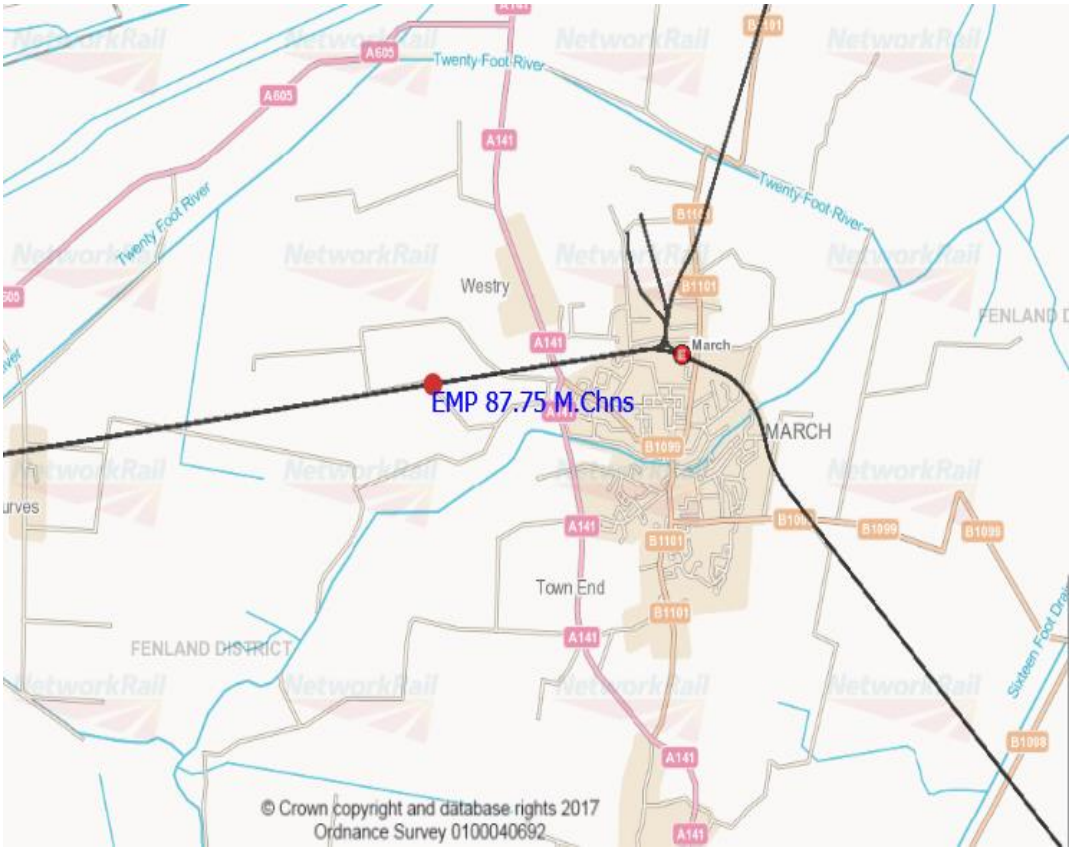
## 16. C13 MIDDLE DROVE USER WORK CROSSING WITH TELEPHONE & MWL

16.1 C13 MIDDLE DROVE USER WORK CROSSING WITH TELEPHONES & MWL has an ALCRM score of B4 with an FWI of 0.001698102 It is located in March Parish on the EMP line (Ely-March-Peterborough) which has a line speed of 75mph. It is between Peterborough and March at 87 miles and 75 chains from Liverpool Street Station London.

16.2 There are 186 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

16.3 An aerial view of C13 MIDDLE DROVE USER WORK CROSSING WITH TELEPHONES & MWL is below






16.4 The track at the top is the up line from Peterborough to London running from left to right and the track at the bottom is the down line from London to Peterborough running from right to left.

16.5 C13 MIDDLE DROVE USER WORK CROSSING WITH TELEPHONES & MWL is a protected crossing, meaning that there is a direct method of warning people who use the crossing of approaching trains, this is observing the Red and Green light system. There is also the back up of telephones to contact the signaller if required.

16.6 Given the line speed of 75 mph in this area and the distance to traverse the crossing of 12.8 metres, this crossing would require sightlines of 1,141 metres in order to give the user enough time to cross before the train arrives.

16.7 The Sightings recorded at last risk assessment which was completed on 15/02/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 1,141m | 590m | No |
| Up side looking toward down direction train approach | 1,141m | 100m | No |
| Down side looking toward up direction train approach | 1,141m | 590m | No |
| Down side looking toward down direction train approach | 1,141m | 30m | No |

16.8 The photograph below is taken looking eastward, from the down side (south) at a train approaching in the down direction (from the east). The trains usually approach on the closest set of lines (right hand side).

16.9 The photograph below is taken on the down side (south), looking west, the train usually approaches on the furthest right hand side (west) set of lines.

16.10 The photograph below is taken on the up side (north) looking east; the train usually approaches on the furthest line (right hand side) set of lines

16.11 The photograph below is taken on the up side (north) looking west, the train usually approaches on the nearest line (right hand side) set of lines.

16.12 As can be seen from the table above (16.7), C13 MIDDLE DROVE USER WORK CROSSING WITH TELEPHONES & MWL has insufficient sighting aspects in all directions to meet industry standards and so MWL and telephones are installed as the mitigation.

16.13 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

16.13.1 Install an MCB-OD (Manually Controlled Barriers With Obstacle Detection) Crossing System this would cost in the region of £2,400,000 – this option has returned a 0.04 CBA score which means the cost of this option is disproportionate to the safety benefit received.

16.13.2 Install Audible warning system this would cost in the region of £7,500– this option has returned a 6.60 CBA score which means the safety benefit is supporting the costs of delivering.

16.13.3 Install new fencing and white lining this would cost in the region of £2,000 – this option has returned a 32.51 CBA score which means the safety benefit is supporting the costs of delivering.

16.13.4 An option to close this crossing was not considered due to the cost of this option being considered disproportionate to the safety benefit received.

**16.14 Additional information**

C13 MIDDLE DROVE USER WORK CROSSING WITH TELEPHONES & MWL is sited on the edge of March Town with some housing and a tarmac road with farmland on both sides. It is a poor profile public Highway. The user is required to observe the Red/Green light system before crossing with a telephone installed for contacting the signaller if required

## 17. C14 EASTREA CROSS DROVE FPS

17.1 C14 EASTREA CROSS DROVE FPS has an ALCRM score of C6 with an FWI of 0.00011954. It is located in Whittlesey Parish on the EMP line (Ely-March-Peterborough) which has a line speed of 75mph on the up and down side. It is between Whittlesey and March at 93 miles and 05 chains from Liverpool Street Station London.

17.2 There are 171 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

17.3 An aerial view of C14 EASTREA CROSS DROVE FPS can be seen below.


17.4 The track at the bottom is the down line from London to Peterborough normally running from right to left and the track at the top is the up line from Peterborough to London normally running from left to right.

17.5 C14 EASTREA CROSS DROVE FPS is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

17.6 The last census was carried out starting from the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed 2 pedestrian use during that time. In the LCM's NRA of 21st Dec 2015 usage of weekly a year was allowed for.

17.7 Given the line speed of 75mph on both up and down lines this and the distance to traverse the crossing of 8.7 meters, this crossing requires sightlines of 246 metres on the up side and 246 metres on the down side in order to give the user enough time to cross before the train arrives.

17.8 The Sightings recorded at last risk assessment which was completed on 21/12/2015 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 246m | 1,500m+ | Yes |
| Up side looking toward down direction train approach | 246m | 1,100m | Yes |
| Down side looking toward up direction train approach | 246m | 1,500m+ | Yes |
| Down side looking toward down direction train approach | 246m | 1,100m | Yes |

17.9 The photograph below is taken looking eastward, from the down side (south) at a train approaching in the down direction (from the east). The trains usually approach on the closest set of lines (right hand side).

17.10 The photograph below is taken on the down side (south), looking west, the train usually approaches on the furthest (right hand side) set of lines.

17.11 The photograph below is taken on the up side (north) looking east, the train usually approaches on the furthest line (right hand side) set of lines.

17.12 The photograph below is taken on the up side (north) looking west, the train usually approaches on the nearest line (right hand side) set of lines.

17.13 As can been from the table above (17.8), C14 EASTREA CROSS DROVE FPS does have sufficient sighting to meet industry standards in all directions. C14 EASTREA CROSS DROVE FPS is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

17.14 Following the risk assessment, an Optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

17.14.1 Closure via Non Equality Act Footbridge/Overbridge would cost in the region of £1,500,000 to £2,000,000 – this option has returned a 0.01 CBA score which means the cost of this option is disproportionate to the safety benefit received.

17.14.2 New Strail Rubber Decking- this would cost in the region of £6,500 – this option has returned a 0.06 CBA score which means the cost of this option is disproportionate to the safety benefit received.

17.14.3 Upgrade to MSL Overlay, this would cost in the region of £305,000 – this option has returned a 0.21 CBA score which means the cost of this option is disproportionate to the safety benefit received.

### 17.15 Additional information

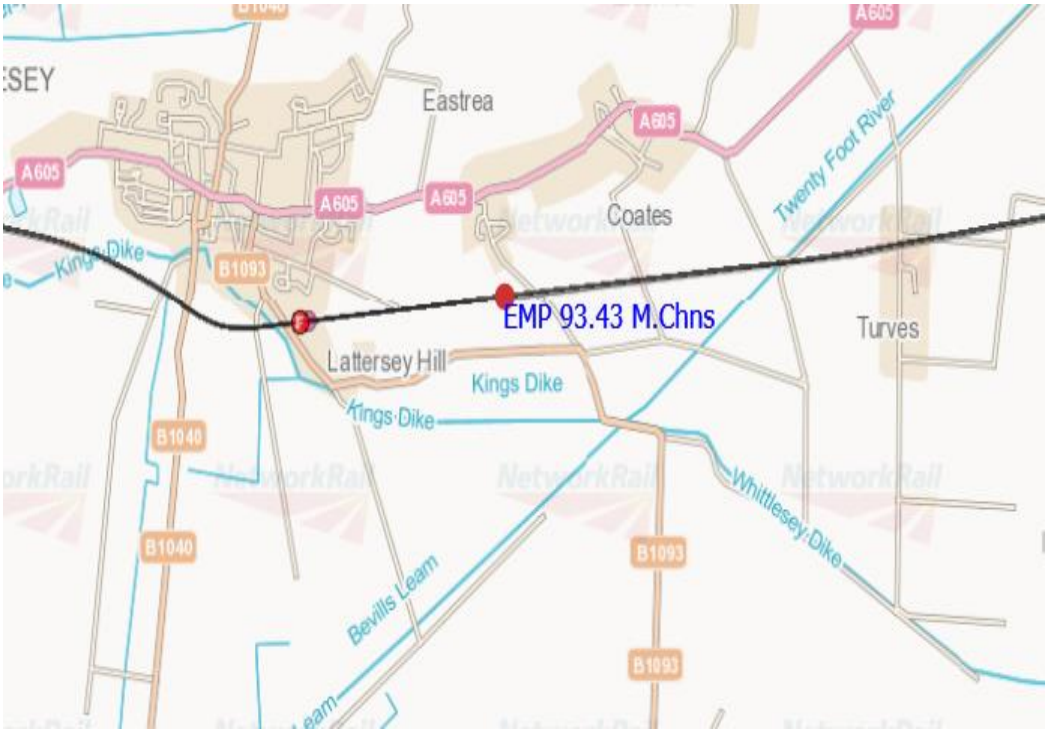
C14 EASTREA CROSS DROVE FPS. This level crossing is a Public footpath level crossing situated in-between farmland. The level crossing is on one of Anglia's main branches which means there is very high rail traffic. The FPS on both Up and Down is located 20mtrs from the running rail and a fenced approach is provided.

## 18. C15 BRICKYARD DROVE PUBLIC FOOTPATH LEVEL CROSSING

18.1 C15 Brickyard Drove footpath crossing has an ALCRM score of C6 with an FWI of 0000219907. It is located in Whittlesey Parish on the EMP line (Ely-March-Peterborough) which has a line speed of 75mph on the up and down side. It is between Whittlesey and March at 93 miles and 43 chains from Liverpool Street Station London.

18.2 There are 171 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

18.3 An aerial view of C15 Brickyard Drove footpath crossing can be seen below.




18.4 The track at the bottom is the down line from London to Peterborough normally running from right to left and the track at the top is the up line from Peterborough to London normally running from left to right.

18.5 C15 Brickyard Drove footpath crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

18.6 The last census was carried out starting from the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed 22 pedestrian usages during that time.

18.7 Given the line speed of 75mph on both up and down lines this and the distance to traverse the crossing of 9.6 meters, this crossing requires sightlines of 305 metres on the up side and 305 metres on the down side in order to give the user enough time to cross before the train arrives.

18.8 The Sightings recorded at last risk assessment which was completed on 31/05/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 305m | 1,500m | Yes |
| Up side looking toward down direction train approach | 305m | 1,314m | Yes |
| Down side looking toward up direction train approach | 305m | 1,500m | Yes |
| Down side looking toward down direction train approach | 305m | 1,314m | Yes |

18.9 The photograph below is taken looking eastward, from the down side (south) at a train approaching in the down direction (from the east). The trains usually approach on the closest set of lines (right hand side).

18.10 The photograph below is taken on the down side (south), looking west, the train usually approaches on the furthest (right hand side) set of lines.

18.11 The photograph below is taken on the up side (north) looking east, the train usually approaches on the furthest line (right hand side) set of lines.

18.12 The photograph below is taken on the up side (north) looking west, the train usually approaches on the nearest line (right hand side) set of lines.

18.13 As can been from the table above (18.8), C15 Brickyard Drove footpath does have sufficient sighting to meet industry standards in all directions. C15 Brickyard Drove footpath is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

18.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

18.14.1 Strail Rubber Decking- this would cost in the region of £6,500 - this option has returned a 0.05 CBA score which means the cost of this option is disproportionate to the safety benefit received.

18.14.2 Upgrade to tarmac approach ways , this would cost in the region of £5,000 - this option has returned a 0.01 CBA score which means the cost of this option is disproportionate to the safety benefit received.

18.14.3 Closure by building a Non Equality Act Over-Bridge would cost an estimated £1.1m this option has returned a 0.02 CBA score which means the cost of this option is disproportionate to the safety benefit received.

18.14.4 Upgrade to MSL Overlay, this would cost in the region of £305,000 – this option has returned a 0.18 CBA score which means the cost of this option is disproportionate to the safety benefit received.

**18.15 Additional information**

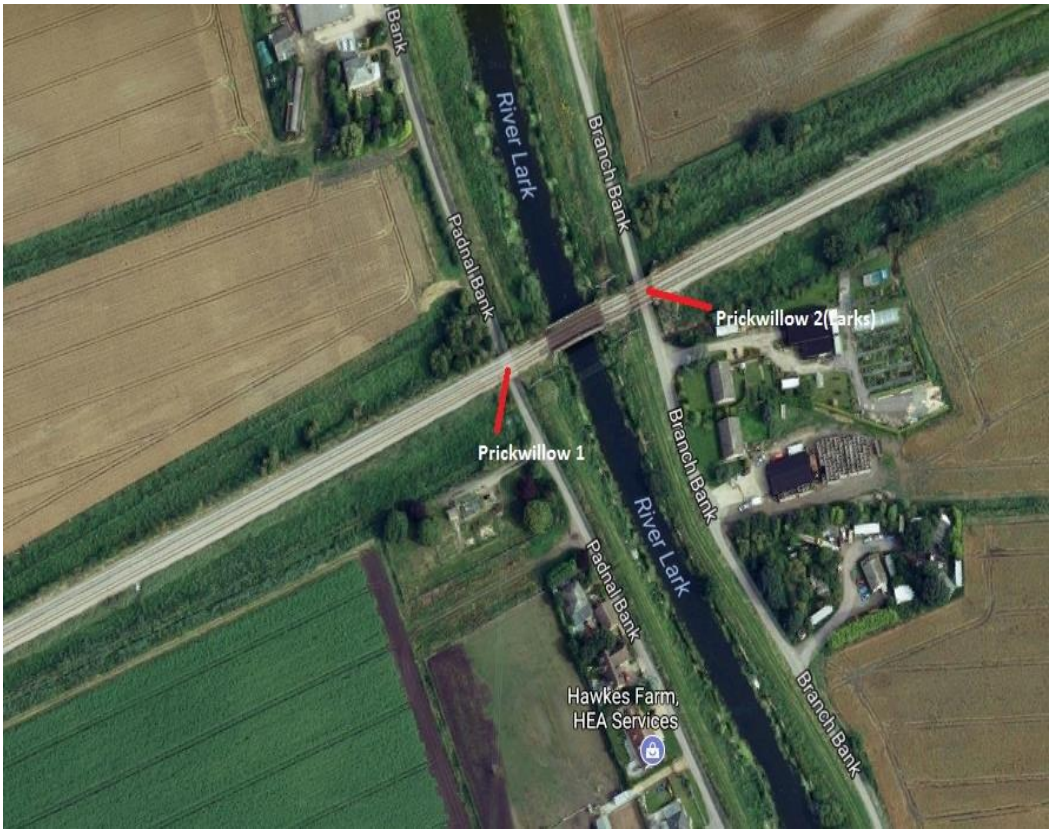
Brickyard drove level crossing is a FPS. This level crossing is a Public footpath level crossing situated in-between farmland and a cycle route. The level crossing is on one of Anglia's main branches which means there is very high rail traffic. The FPS is located besides cycle route 63.

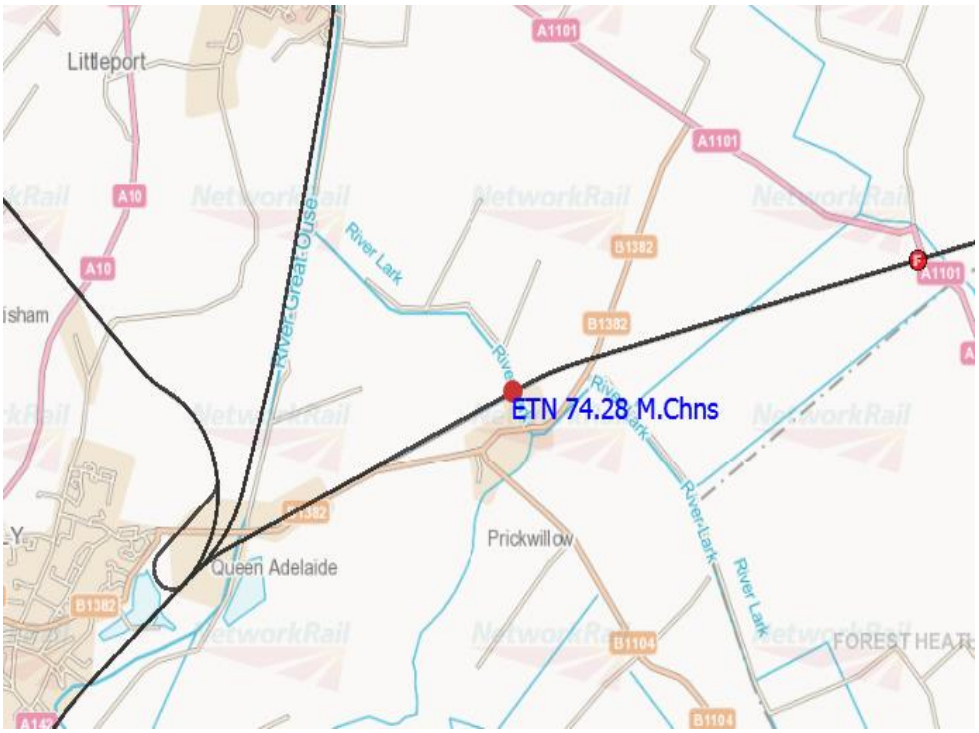
## 19. C16 PRICKWILLOW 1 PUBLIC FOOTPATH LEVEL CROSSING

19.1 C16 Prickwillow 1 footpath crossing has an ALCRM score of M13 with an FWI of 0.00 as crossing was temporarily closed on 15th April 2014 for safety reasons. Prior to closure the crossing had an ALCRM score of C10 with a FWI of 0.00000126. It is located in Ely Parish on the ETN line (Ely to Norwich) which has a line speed of 75mph on the up side and down side. It is between Ely and Shippea Hill at 74 miles and 28 chains from Liverpool Street Station London.

19.2 There are 65 trains per day that run for 17.5 hours per day over this level crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

19.3 An aerial view of C16 Prickwillow 1 footpath crossing can be seen below.






19.4 The track on the bottom of the first aerial picture is the up line from Norwich to Ely, and the track on the top of the first picture is the down line from Ely to Norwich. Trains would normally run to Ely on the bottom line that is from right to left of the picture. Trains would normally run to Norwich on the top line, that is from left to right of the picture.

19.5 C16 Prickwillow 1 level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems- other than whistle boards (which I discuss further below). The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

19.6 The last census was carried out over nine days from Saturday 18th June 2016 to Sunday 19th June 2016 and Tuesday 21st June 2016 to Monday 27th June 2016 by Mott McDonald, as crossing was closed this recorded zero usage. The last census conducted while crossing was open was an estimated survey conducted on 17th September 2013 and recorded a few pedestrians a year using the crossing.

19.7 Given the line speed of 75mph on both the up side and down side and that the distance to traverse the crossing of 9 meters, this crossing requires sightlines of 254 metres on the up side and the down side in order to give the user enough time to cross before the train arrives.

19.8 The Sightings recorded at last risk assessment which was completed on 04/12/2015 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 254m | 10m | No |
| Up side looking toward down direction train approach | 254m | 1,500m | Yes |
| Down side looking toward up direction train approach | 254m | 10m | No |
| Down side looking toward down direction train approach | 254m | 1,500m | Yes |

19.9 The photograph below is taken from the up side (South) at a train approaching in the up direction (from the East). The trains usually approach on the closest set of lines (right hand side).

19.10 The photograph below is taken on the up side (South), at a train approaching in the down direction (from the West). The train usually approaches on the furthest (left hand side) set of lines.


19.11 The photograph below is taken on the down side (North) at a train approaching in the up direction (from the East). The train usually approaches on the furthest (left hand side) set of lines.

19.12 The photograph below is taken on the down side (North) at a train approaching in the down direction (from the West). The train usually approaches on the closest (right hand side) set of lines.

19.13 As can been seen from the table above (19.8), C16 Prickwillow 1 level crossing does not have sufficient sighting to meet industry standards for up side looking toward up direction train approaching and down side looking toward up direction train approaching, sighting in these directions is heavily restricted by railway underbridge 1579a and is limited to 10 metres.C16 Prickwillow 1 level crossing has whistle boards installed as a mitigation measure for insufficient sighting.

**19.14. Additional information**

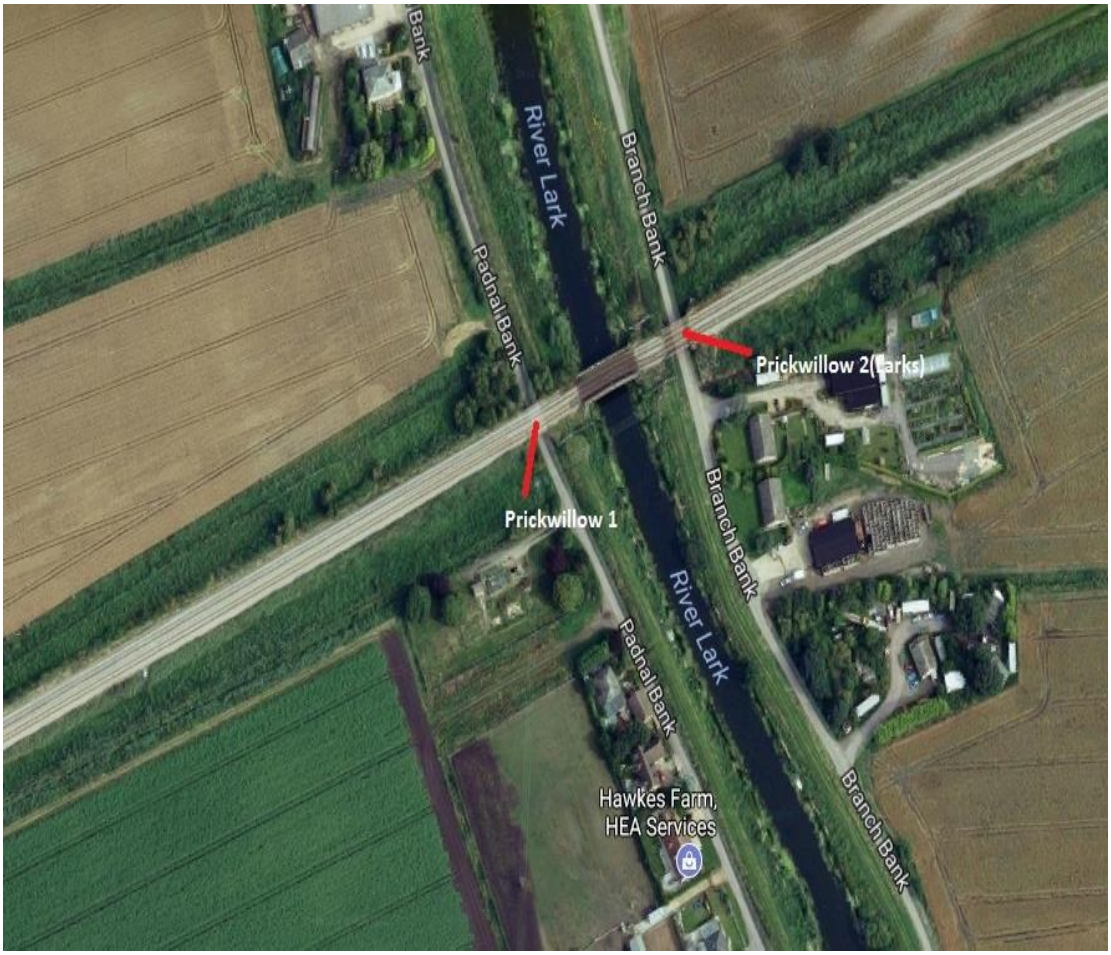
Crossing was temporarily closed on 15th April 2014 and has remained closed due to safety concerns given that sighting is heavily restricted by railway underbridge 1579a and is limited to 10 metres in two directions. The concern was that given the very limited sighting there was potential that a user could step out directly into the path of an oncoming train. The crossing is located on a river bank with another railway crossing ( Prickwillow 2 Larks) on adjacent river bank, this lead to additional concerns that users may be tempted to use railway underbridge 1579a that has limited clearance walkways to cross the river. Although C16 Prickwillow 1 level crossing is currently closed dog walkers and ramblers do still walk along the river bank and on reaching the crossing walk down a steep slope then under underbridge 1579, they then climb up the bank on far side of the crossing to continue their walk along the river bank, provision of steps on river back would eliminate risk of pedestrians climbing up and down steep slippery river banks.

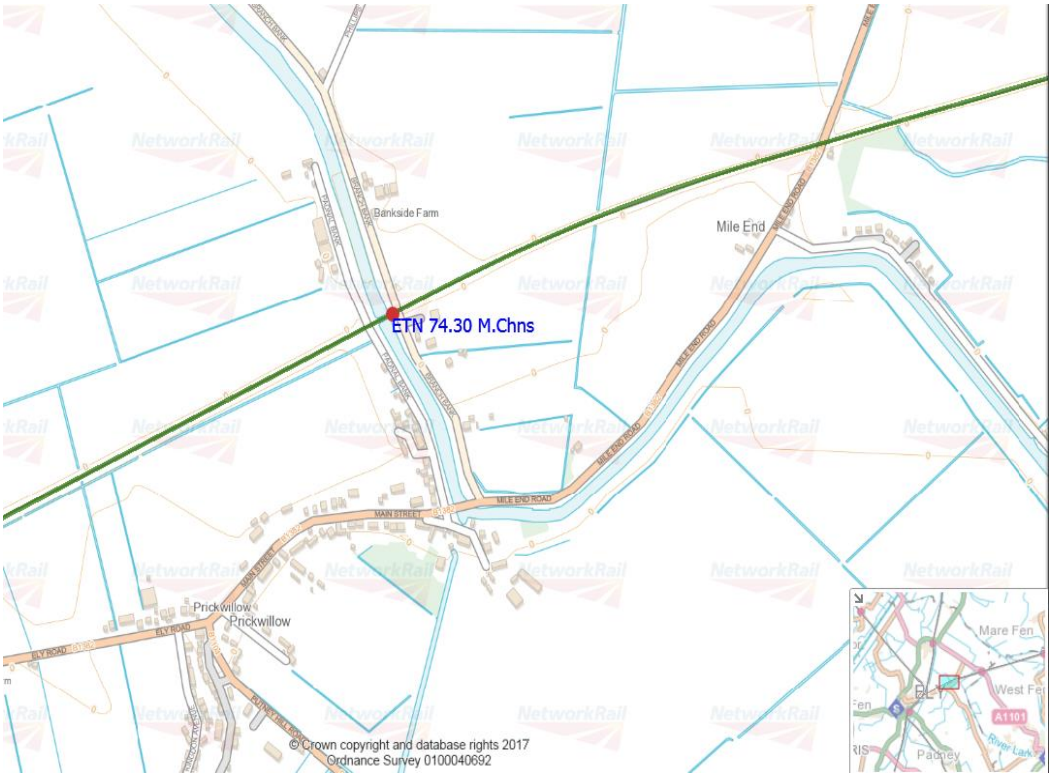
## 20. C17 PRICKWILLOW 2 PUBLIC FOOTPATH LEVEL CROSSING

20.1` C17 Prickwillow 2 (Larks Bridge) footpath crossing has an ALCRM score of M13 with an FWI of 0.00 as crossing was temporarily closed on 15th April 2014 for safety reasons. Prior to closure the crossing had an ALCRM score of C10 with a FWI of 0.00000126. It is located in Ely Parish on the ETN line (Ely to Norwich) which has a line speed of 75mph on the up side and down side. It is between Ely and Shippea Hill at 74 miles and 30 chains from Liverpool Street Station London.

20.2 There are 65 trains per day that run for 17.5 hours per day over this level crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

20.3 An aerial view of C17 Prickwillow 2 (Larks Bridge) footpath crossing can be seen below.






20.4 The track on the bottom of the first picture is the up line from Norwich and the track on the top of the first picture is the down line to Ely. Trains would normally run up to Ely on the bottom line that is from right to left of the picture. Trains would normally run down to Norwich on the top line, that is from left to right of the picture.

20.5 C17 Prickwillow 2 (Larks Bridge) level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems - other than whistle boards (which I discuss further below). The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

20.6 The last census was carried out over nine days from Saturday 18th June 2016 to Sunday 19th June 2016 and Tuesday 21st June 2016 to Monday 27th June 2016 by Mott McDonald, as crossing was closed this recorded zero usage. The last census conducted while crossing was open was an estimated survey conducted on 17th September 2013 and recorded a few pedestrians a year using the crossing.

20.7 Given the line speed of 75mph on both the up side and down side and that the distance to traverse the crossing of 9.5meters, this crossing requires sightlines of 268 metres on the up side and the down side in order to give the user enough time to cross before the train arrives.

20.8 The Sightings recorded at last risk assessment which was completed on 04/12/2015 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 268m | 696m | Yes |
| Up side looking toward down direction train approach | 268m | 9m | No |
| Down side looking toward up direction train approach | 268m | 5m | No |
| Down side looking toward down direction train approach | 268m | 10m | No |

20.9 The photograph below is taken from the up side (South) at a train approaching in the up direction (from the East). The trains usually approach on the closest set of lines (right hand side).

20.10 The photograph below is taken on the up side (South), at a train approaching in the down direction (from the West). The train usually approaches on the furthest (left hand side) set of lines.


20.11 The photograph below is taken on the down side (North) at a train approaching in the Up direction (from the East). The train usually approaches on the furthest (left hand side) set of lines.

20.12 The photograph below is taken on the down side (North) at a train approaching in the down direction (from the West). The train usually approaches on the closest (right hand side) set of lines.

20.13 As can been seen from the table above (20.8), C17 Prickwillow 2(Larks Bridge) level crossing does not have sufficient sighting to meet industry standards for up side looking toward down direction train approaching, down side looking toward up direction train approaching and down side looking toward down direction train approaching, sighting in these directions is heavily restricted by railway underbridges. C17 Prickwillow 2 (Larks Bridge) level crossing has whistle boards installed as a mitigation measure for insufficient sighting.

**20.14 Additional information**

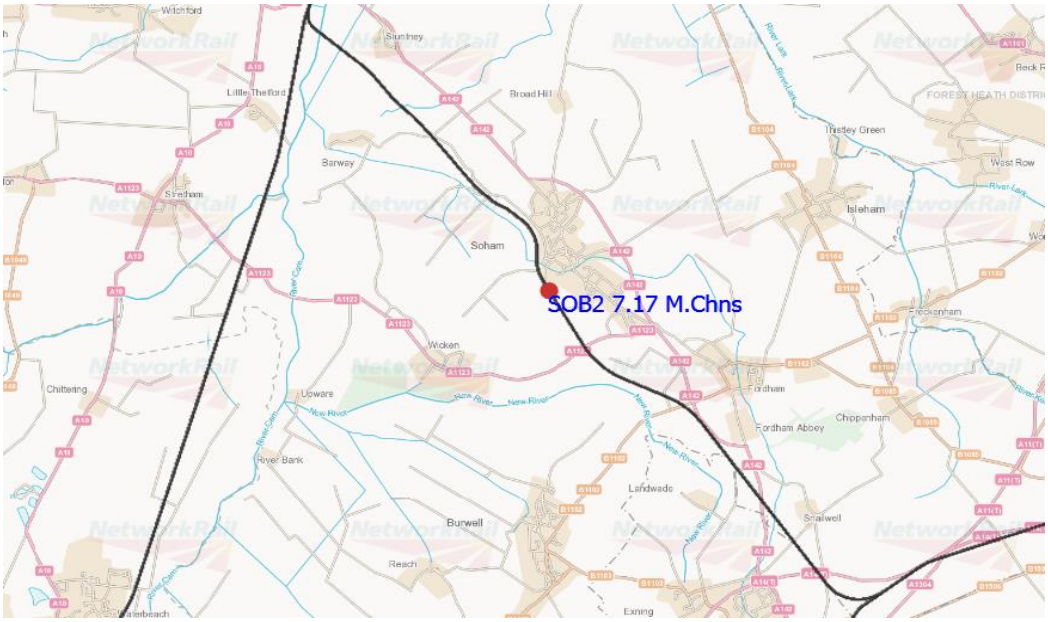
C17 Prickwillow 2 (Larks Bridge) crossing was temporarily closed on 15th April 2014 and has remained closed due to safety concerns given that sighting is heavily restricted by railway underbridges. The concern was that given the very limited sighting there was potential that a user could step out directly into the path of an oncoming train. The crossing is located on a river bank with another railway crossing (Prickwillow 1) on adjacent river bank, this lead to additional concerns that users may be tempted to use railway underbridge 1579a that has limited clearance walkways to cross the river. Although C17 Prickwillow 2 (Larks Bridge) level crossing is currently closed dog walkers and ramblers do still walk along the river bank and on reaching the crossing walk down a steep slope then under underbridge 1579A, they then climb up the bank on far side of the crossing to continue their walk along the river bank, provision of steps on river back would eliminate risk of pedestrians climbing up and down steep slippery river banks.

## 21. C20 LEONARDS PUBLIC FOOTPATH LEVEL CROSSING

21.1 C20 Leonards footpath crossing has an ALCRM score of D5 with an FWI of 0.00058136. It is located in Soham Parish on the SOB2 line (Ely Dock Junction to Chippenham Junction) which has a line speed of 75mph on the up side and on the down side. It is between Soham and Chippenham Junction at 7 miles and 17 chains from Chippenham Junction near Newmarket.

21.2 There are 83 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

21.3 Aerial views of C20 Leonards Footpath crossing can be seen below.



21.4 The track on the left on the first picture is the down line to Ely and the track on the right is the up line to Chippenham Junction. Trains would normally run down to Ely on the left hand line that is from the bottom of the picture to the top. Trains would normally run up to Chippenham Junction on the right hand side, which is from the top of the picture to the bottom.

21.5 C20 Leonards level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

21.6 The last census was carried out starting on the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed 20 pedestrian or other use during that time.

21.7 Given the line speed of 75mph on the up side and on the down side in this area and the distance to traverse the crossing of 10.4 meters, this crossing requires sightlines of 294 metres on the up side and down side in order to give the user enough time to cross before the train arrives.

21.8 The Sightings recorded at last risk assessment which was completed on 09/03/2015 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 294m | 410m | Yes |
| Up side looking toward down direction train approach | 294m | 1,427m | Yes |
| Down side looking toward up direction train approach | 294m | 410m | Yes |
| Down side looking toward down direction train approach | 294m | 1,427m | Yes |

21.9 The photograph below is taken looking northward, from the up side (East) at a train approaching in the up direction (from the North). The trains usually approach on the closest set of lines (right hand side).

21.10 The photograph below is taken on the up side (east), looking south, the train usually approaches on the furthest (right hand side) set of lines.

21.11 The photograph below is taken on the down side (west) looking south; the train usually approaches on the closest line (right hand side) set of lines.

21.12 The photograph below is taken on the down side (west) looking north, the train usually approaches on the furthest line (right hand side) set of lines.

21.13 As can been from the table above (21.8), C20 Leonards crossing does have sufficient sighting to meet industry standards in all directions. C20 Leonards crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

21.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

21.14.1 Upgrade to MSL Overlay, this would cost in the region of £305,000 - this option has returned a 0.11 CBA score which means the cost of this option is disproportionate to the safety benefit received.

21.14.2 Closure by building an overbridge this would cost in the region of £1,500,000 – this option has returned a 0.0 CBA score which means the cost of this option is disproportionate to the safety benefit received, and given this crossings location is unlikely to be considered.

**21.15 Additional information**

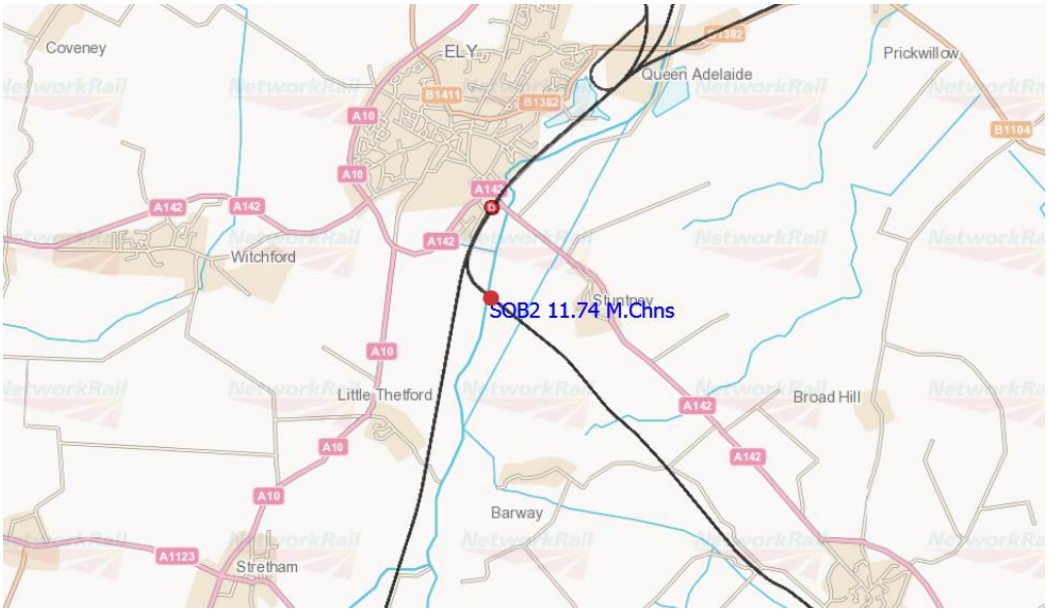
This crossing is possibly used as a round walking route from the town back to the town via Mill Drove AHB.

## 22. C21 NEWMARKET BRIDGE PUBLIC FOOTPATH LEVEL CROSSING

22.1 C21 Newmarket Bridge footpath crossing has an ALCRM score of C10 with an FWI of 0.00000117204. It is located in Ely Parish on the SOB2 line (Ely Dock Junction to Chippenham Junction) which has a line speed of 60 mph in both Up and down directions on a single line. It is between Ely and Soham at 11 miles and 74 chains from Chippenham Junction near Newmarket.

22.2 There are 83 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

22.3 Aerial views of C21 Newmarket Bridge Footpath crossing can be seen below.



22.4 There is a single line at this location and trains are signalled to run in either direction at any time. From the bottom to the top of the picture is the down direction towards Ely and the top to the bottom of the picture is the up direction towards Chippenham Junction.

22.5 C21 Newmarket Bridge level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

22.6 The last census was carried out starting on the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed an average of 17 pedestrian or other usages during that time.

22.7 Given the line speed of 60 mph in both up and down directions on a single line in this area and the distance to traverse the crossing of 6.9 meters, this crossing requires sightlines of 156 metres on the up side and down side in order to give the user enough time to cross before the train arrives.

22.8 The Sightings recorded at last risk assessment which was completed on 29/09/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 156m | 243m | Yes |
| Up side looking toward down direction train approach | 156m | 1,266m | Yes |
| Down side looking toward up direction train approach | 156m | 238m | Yes |
| Down side looking toward down direction train approach | 156m | 1,266m | Yes |

22.9 The photograph below is taken looking north-westward, from the up side (north) at a train approaching in the up direction (from the Northwest).

22.10 The photograph below is taken on the up side (north), looking southeast.

22.11 The photograph below is taken on the down side (south) looking southeast.

22.12 The photograph below is taken on the down side (south) looking northwest.

22.13 As can been from the table above (22.8), C21 Newmarket Bridge crossing does have sufficient sighting to meet industry standards in all directions. C21 Newmarket

Bridge crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

22.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

22.14.1 Upgrade to MSL Overlay, this would cost in the region of £305,000 - this option has returned a 0.0 CBA score which means the cost of this option is disproportionate to the safety benefit received.

22.14.2 Closure by building an overbridge would cost between an estimated £1.5m and £3m due to the crossings location and was not considered due to being disproportionate to the safety benefit received.

22.14.3 Pedestrian walkway define/re-tarmac would cost in the region of £1,000– this option has returned a 2.01 CBA which means the safety benefit is supporting the costs of a tarmac walking route across the crossing.

**22.15 Additional information**

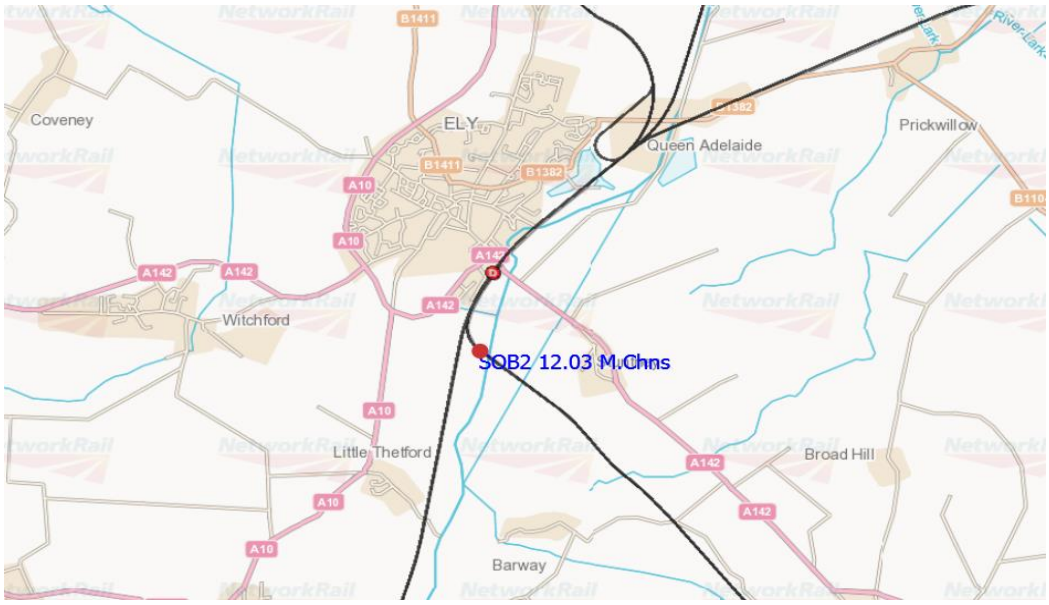
When the national cycle way was built there was an underpass made under the rail bridge so cyclists would not need to use the crossing.

## 23. C22 WELLS ENGINE PUBLIC FOOTPATH LEVEL CROSSING

23.1 C22 Wells Engine footpath crossing has an ALCRM score of C4 with an FWI of 0.00110168. It is located in Ely Parish on the SOB2 line (Ely Dock Junction to Chippenham Junction) which has a line speed of 40 mph in both up and down directions on a single line. It is between Ely and Soham at 12 miles and 03 chains from Chippenham Junction, near Newmarket.

23.2 There are 83 trains per day that run for 24 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

23.3 An aerial view of C22 Wells Engine Footpath crossing can be seen below.



23.4 There is a single line at this location and trains are signalled to run in either direction at any time. From the bottom to the top of the picture is the down direction towards Ely and the top to the bottom of the picture is the up direction towards Chippenham Junction.

23.5 C22 Wells Engine level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

23.6 The last census was carried out starting on the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed an average of 8 pedestrian or other use per day during that time. In the LCM's NRA of 13th September 2017 the same usage was used

23.7 Given the line speed of 40mph in both up and down directions on a single line in this area and the distance to traverse the crossing of 7.0 meters, this crossing requires sightlines of 106 metres on the up side and down side in order to give the user enough time to cross before the train arrives.

23.8 The Sightings recorded at last risk assessment which was completed on 13/09/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 106m | 611m | Yes |
| Up side looking toward down direction train approach | 106m | 1,427m | Yes |
| Down side looking toward up direction train approach | 106m | 611m | Yes |
| Down side looking toward down direction train approach | 106m | 1,427m | Yes |

23.9 The photograph below is taken looking north-westward, from the up side (north) at a train approaching in the up direction (from the Northwest).

23.10 The photograph below is taken on the up side (north), looking southeast.

23.11 The photograph below is taken on the down side (south) looking southeast

23.12 The photograph below is taken on the down side (south) looking northwest.

23.13 As can been from the table above (23.8), C22 Wells Engine crossing does have sufficient sighting to meet industry standards in all directions. C22 Wells Engine crossing is at the end of a long straight section of the railway and a long sweeping curve with minimal vegetation as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

23.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

23.14.1 Upgrade to MSL Overlay, this would cost in the region of £305,000 - this option has returned a 0.0 CBA score which means the cost of this option is disproportionate to the safety benefit received.

23.14.2 Closure by building an over bridge this would cost in the region of £1,300,000 upwards - this option has returned a 0.07 CBA score which means the cost of this option is disproportionate to the safety benefit received.

23.14.3 Upgrade to Type 1 path from gates to decking, this would cost in the region of £5,000 - this option has returned a 0.36 CBA score which means the cost of this option is disproportionate to the safety benefit received.

23.14.4 Move and renew pedestrian fencing and gates down side, this would cost in the region of £2,000 – this option has returned a 0.38 CBA score which means the cost of this option is disproportionate to the safety benefit received.

**23.15 Additional information**

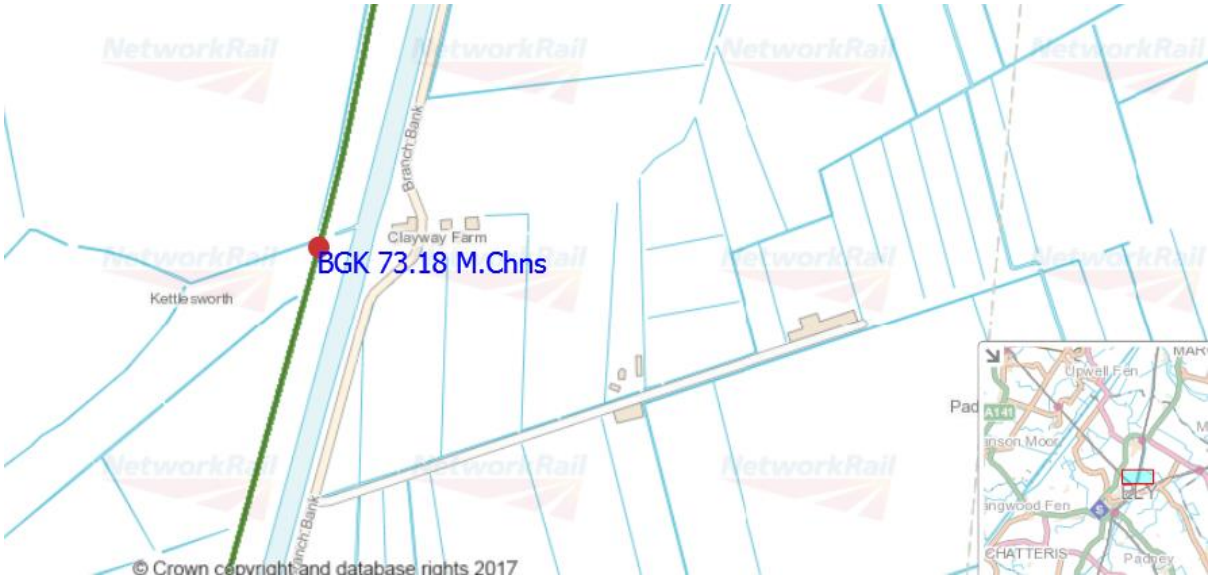
By installing a type 1 path, move and renew pedestrian fencing and gates down side would improve the crossing cosmetically the safety benefit received would be disproportionate to the cost, therefore the diversion under the river bridge would be the better option.

## 24. C24 CROSS KEYS FOOTPATH CROSSING

24.1 C24 Cross keys footpath crossing has an ALCRM score of D7 with a FWI score of 0.000078036. Cross Keys level crossing is traversed by a public footpath. The crossing is in the Parish of Ely (Cambridgeshire) and is located approximately 3.9km northeast of the village of Ely. C24 Cross keys footpath crossing is on the BGK line (Bethnal Green and Kings Lynn) at 73 miles and 18 Chains from London Liverpool Street. The maximum line speed is 80mph in both directions. The line is a dual track with trains operating in one direction on each line during normal operation.

24.2 There are 76 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

24.3 Aerial views of Cross keys footpath crossing can be seen below.




24.4 The left side of this track is the down line from London and the right side of this track is the up line to London. Trains would normally run from London that is from the bottom of the picture to the top. Trains would normally run to London, which is from the top of the picture to the bottom.

24.5 C24 Cross keys footpath crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

24.6 A census was carried out starting on the 18/06/16 by TRACSIS and this census showed relatively average to low usage recorded, with the crossing effectively being used by pedestrians.

24.7 Given the line speed of 80 mph in this area and the distance to traverse the crossing of 10.9 metres on the up side, and 10.1 metres on the down side this crossing would require sightlines of 374 meters for pedestrians in order to give the user enough time to cross before the train arrives.

24.8 The Sightings recorded at last risk assessment which was completed on 25/09/2014 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 374m | 1,500m | Yes |
| Up side looking toward down direction train approach | 374m | 1,500m | Yes |
| Down side looking toward up direction train approach | 374m | 460m | Yes |
| Down side looking toward down direction train approach | 374m | 1,500m | Yes |

24.9 The photograph below is taken looking northward, from the up side (East) at a train approaching in the up direction (from the North). The trains usually approach on the closest set of lines (right hand side)

24.10 The photograph below is taken on the up side (east), looking south, the train usually approaches on the furthest (right hand side) set of lines

24.11 The photograph below is taken on the down side (west) looking south; the train usually approaches on the closest line (right hand side) set of lines

24.12 The photograph below is taken on the down side (west) looking north, the train usually approaches on the furthest line (right hand side) set of lines

24.13 As can be seen from the table above (24.8), C24 Cross keys footpath crossing does have sufficient sighting to meet industry standards in all directions. C24 Cross Keys crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

24.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

24.14.1 Closure by over bridge: estimated cost of £1,500,000 - CBA of 0.03. Which means the safety benefit is disproportionate to the benefit achieved. Given location it is more likely that a diversion/extinguishment of rights of way would be achievable.

24.14.2 Upgrade to MSL: estimated cost of £305,000 with a CBA of 0.00 which means the safety benefit of a bridge is disproportionate to the benefit achieved. If we cannot achieve closure then the crossing should be upgraded to MWL in the longer term.

24.14.3 Stile to stile enhancement - upgrade to decking, re-profiles approaches, mark out decision point: estimated cost of £25,000 with a CBA of 0.00 which means the safety benefit of a bridge is disproportionate to the benefit achieved. Preferred short term option if we cannot achieve closure.

**24.15 Other Relevant Information:**

The pedestrian crossing is currently a Stop, Look & Listen crossing where pedestrians make their own judgement whether it is safe to cross. Level crossing signage is provided. Access to the level crossing is via stiles with a grassed path

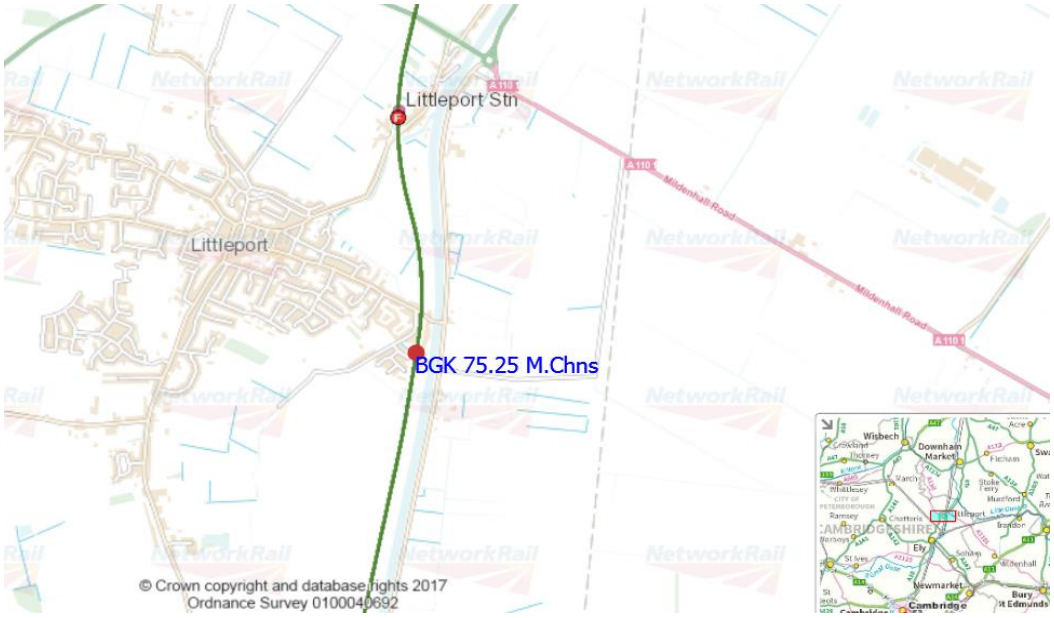
through fields on both sides of the railway with links to Footpath Ely 15 on the east side of the railway. The crossing is on ballast with no decking provided.

## 25. C25 CLAYWAY FOOTPATH CROSSING

25.1 C25 Clayway footpath crossing has an ALCRM score of C5 with a FWI score of 0.000896867. Clayway footpath crossing is in the county of Cambridgeshire located in Littleport parish and has a postcode of CB6 1NT. This is a footpath crossing with a stile. C25 Clayway footpath crossing is located between Littleport Station and Ely North station at 75 miles 25 chains from Kings Lynn Station and has a line speed of 80 mph.

25.2 There are 76 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

25.3 Aerial views of C25 Clayway footpath crossing can be seen below




25.4 The left side of this track is the down line from London and the right side of this track is the up line to London. Trains would normally run down from London that is from the bottom of the picture to the top. Trains would normally run up to London, which is from the top of the picture to the bottom.

25.5 C25 Clayway footpath crossing is a passive footpath crossing with a stile which means that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems- other than whistle boards (which I discuss further below). The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

25.6 A 9 day census was carried out starting on the 06/06/16 by Mott MacDonald and this census showed on the busiest day 26 pedestrians using the crossing.

25.7 Given the line speed of 80 mph in this area and the distance to traverse the crossing of 9 meters, this crossing would require sightlines of 407 meters for pedestrians in order to give the user enough time to cross before the train arrives.

25.8 The Sightings recorded at last NRA which was completed on 08/02/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 407m | 326m | No |
| Up side looking toward down direction train approach | 407m | 608m | Yes |
| Down side looking toward up direction train approach | 407m | 266m | No |
| Down side looking toward down direction train approach | 407m | 420m | Yes |

25.9 The photograph below is taken looking northward, from the up side (East) at a train approaching in the up direction (from the North). The trains usually approach on the closest set of lines (right hand side)

25.10 The photograph below is taken on the up side (east), looking south, the train usually approaches on the furthest (right hand side) set of lines


25.11 The photograph below is taken on the down side (west) looking south; the train usually approaches on the closest line (right hand side) set of lines

25.12 The photograph below is taken on the down side (west) looking north, the train usually approaches on the furthest line (right hand side) set of lines

25.13 As can be seen from the table above (25.8), C25 Clayway FPS does not have sufficient sighting to meet industry standards in all directions but the crossing has whistle boards installed as a mitigation measure. C25 Clayway FPS is sighted to the centre of a curve section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is insufficient when weather conditions are favourable. Sighting distances can also be severely reduced when the weather is poor e.g. raining or foggy.

25.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

25.14.1 Upgrade to MSL Overlay, this would cost in the region of £305,000 - this option has returned a 0.21 CBA score which means the cost of this option is disproportionate to the safety benefit received

25.14.2 Closure by building an over bridge would cost between an estimated £1.5m and £3m due to the crossings location and was not considered due to being disproportionate to the safety benefit received.

**25.15 Other Relevant Information:**

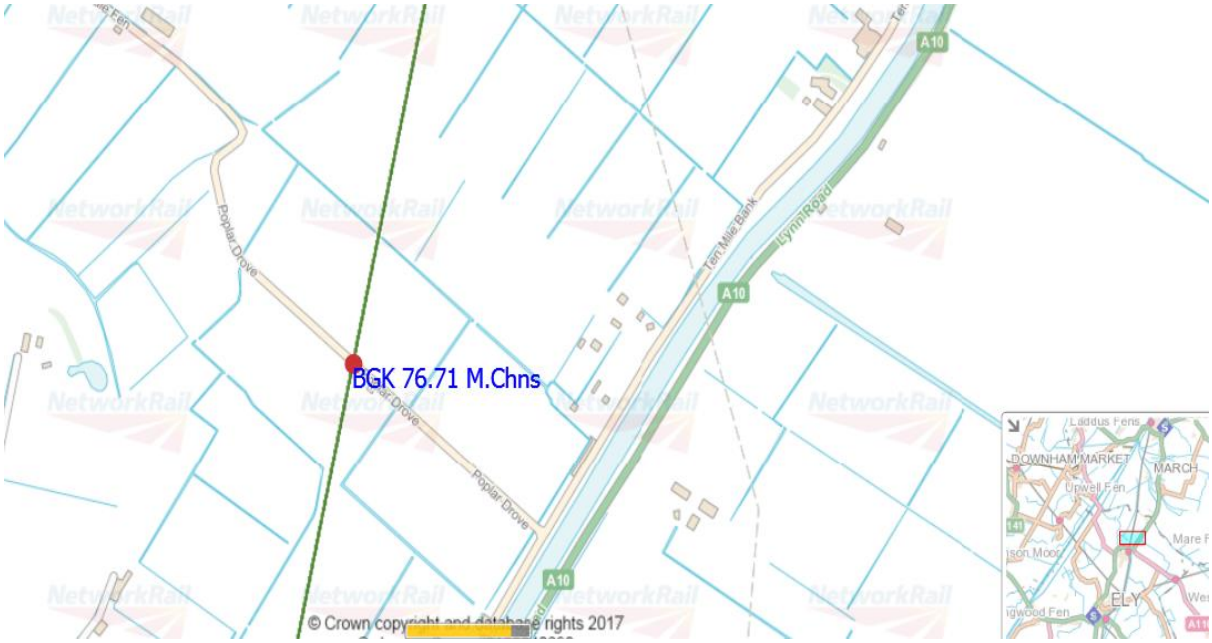
Sandhill is a Public Road Automatic Half Barrier level crossing which is located to the north of the Clayway level crossing and offers an alternative on-road route to the users of Clayway level crossing.

## 26. C26 POPULAR DROVE PRIVATE USER WORKED LEVEL CROSSING

26.1 C26 Popular drove has an ALCRM score of B3 with an FWI of 0.009479336, the crossing is in the Parish of Littleport (Cambridgeshire). Poplar Drove level crossing is a private user worked crossing (although there is a belief by the Local Authority that it is a Public Road) with a telephone located approximately 2.2km north of the village of Littleport. The crossing is on the Bethnal Green and King's Lynn Line (BGK line and the maximum line speed is 90 mph in both directions. The line is a single track with trains operating in both directions during normal operation. C26 Popular drove is located between Downham Mkt Station and Littleport Station at 76 miles 71 chains From Kings Lynn Station.

26.2 There are 76 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

26.3 Aerial views of C26 Popular drove can be seen below.




26.4 The left side of this single track is the down line from London and the right side of this single track is the up line to London. Trains would normally run down from London that is from the bottom of the picture to the top. Trains would normally run up to London, which is from the top of the picture to the bottom.

26.5 Popular Drove is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line. The crossing is a user worked crossing with telephones as mitigation, on a private road. A telephone is provided for users at the user-worked vehicle crossing along with vehicle gates and level crossing signage.

26.6 A census was carried out starting on the 25th November 2016 by Tracsis and this census showed relatively low to average usage recorded (average of 2 vehicles per day and an average of 1 pedestrian) with the crossing effectively being mostly used by various different user types ranging from pedestrians to cars and farm traffic on occasions.

26.7 Given the line speed of 90 mph in this area and the distance to traverse the crossing of 6.8 meters on the up side and 7.1 meters on the down side, this crossing would require sightlines of 1,118 meters in order to give the user enough time to cross before the train arrives.

26.8 The Sightings recorded at last risk assessment which was completed on 08/03/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 1,118m | 502m | No |
| Up side looking toward down direction train approach | 1,118m | 804m | No |
| Down side looking toward up direction train approach | 1,118m | 502m | No |
| Down side looking toward down direction train approach | 1,118m | 844m | No |

26.9 The photograph below is taken looking northward, from the up side (East) at a train approaching in the up direction (from the North).

26.10 The photograph below is taken on the up side (east), looking south, the train usually approaches in the down direction

26.11 The photograph below is taken on the down side (west) looking south; the train usually approaches in the Down direction

26.12 The photograph below is taken on the down side (west) looking south; the train usually approaches in the Up direction

26.13 As can been from the table above (26.8), C26 Poplar Drove crossing does not have sufficient sighting to meet industry standards in all directions. Whilst C26 Poplar Drove crossing is located on a long straight section of the railway as shown in the photographs above, there are numerous sighting restrictions which limit the sightlines e.g. OHL. This means the sighting for a user to see an approaching train is limited and will be severely reduced when the weather is poor e.g. raining or foggy.

26.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were

26.14.1 Upgrade to MSL Overlay, this would cost in the region of £305,000 - this option has returned a 0.14 CBA score which means the cost of this option is disproportionate to the safety benefit received.

26.14.2 Closure by building an over bridge would cost between an estimated £1.5m and £3m due to the crossings location and was not considered due to being disproportionate to the safety benefit received.

26.14.3 Upgrading the crossing – replace decking, lights etc. Estimated cost of £5,000 returned a CBA of 2.47 which means the safety benefit is supporting the cost of this option.

**26.15 Other Relevant Information**

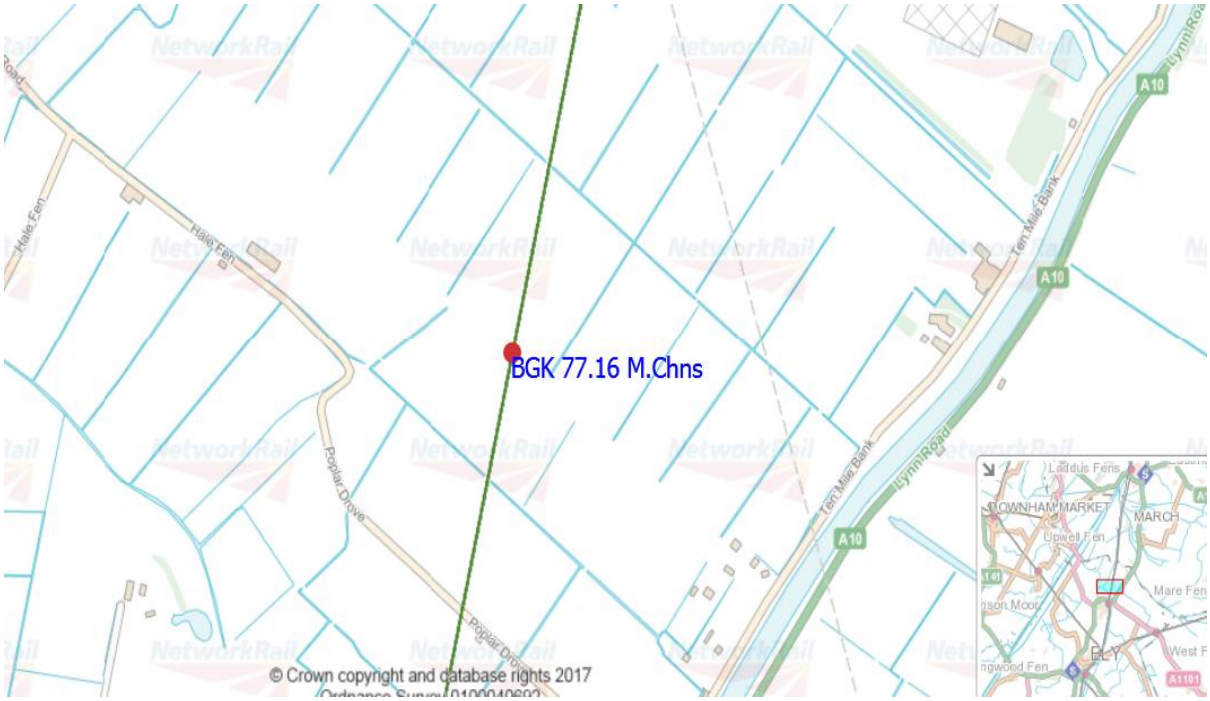
This crossing required constant vegetation management in both directions to maintain maximum sighting available and this is still insufficient to what is required, the location of the crossing on a slight curve/straight with OHL structures and signage on the crossing can affect available sighting and were highlighted by the LCM. Popular drove crossing is usually accessed from the both sides of the level crossing. There are houses and farms either side of this crossing and a variety of usages (e.g. Quad Bikes) occur due to the uncertain status of the road.

## 27. C27 WILLOW ROAD PUBLIC USER WORK CROSSING

27.1 C27 Willow road crossing is located between Downham Market Station and Littleport Station at 77 miles 16 chains From London Liverpool Street Station. C27 Willow road user work crossing has an ALCRM score of A3 with an FWI of 0.006166488. Willow Road level crossing is a byway user worked crossing (without telephones). The crossing is in the Parish of Littleport (Cambridgeshire) and is located approximately 2.7km north of the village of Littleport. The crossing is on the BGK line and the maximum line speed is 90 mph in both directions. The line is a single track with trains operating in both directions during normal operation.

27.2 There are 76 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

27.3 Aerial views of C27 Willow road crossing can be seen below.




27.4 The left side of this single track is the down line from London and the right side of this single track is the up line to London. Trains would normally run down from London that is from the bottom of the picture to the top. Trains would normally run up to London, which is from the top of the picture to the bottom.

27.5 Willow road is a user worked crossing which is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

27.6 A census was carried out starting on the 30th November 2016 by the LCM and this census showed relatively average usage (crossing used on average a few times a day) recorded over a ten year period, with the crossing effectively being mostly used by various different user groups ranging from pedestrians to some farm traffic. It is acknowledged by the LCM that there are occasions when harvesting will affect usage at this crossing.

27.7 Given the line speed of 90 mph in this area and the distance to traverse the crossing of 6.6 meters, this crossing would require sightlines of 1,096 meters for vehicles and 224 meters for pedestrians in order to give the user enough time to cross before the train arrives.

27.8 The Sightings recorded at last risk assessment which was completed on 30/11/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 1,096m (@3m) 224m (@2m) | 1,474m (@2m & 3m) | Yes |
| Up side looking toward down direction train approach | 1,096m (@3m) 224m (@2m) | 1,347m (@2m & 3m) | Yes |
| Down side looking toward up direction train approach | 1,096m (@3m) 224m (@2m) | 1,474m (@2m & 3m) | Yes |
| Down side looking toward down direction train approach | 1,096m (@3m) 224m (@2m) | 1,347m (@2m & 3m) | Yes |

27.9 The photograph below is taken looking eastward, from the up side at a train approaching in the up direction.

27.10 The photograph below is taken looking Westward, from the up side at a train approaching in the down direction

27.11 The photograph below is taken on the down side looking west, which is an approaching train on the Up Direction.

27.12 The photograph below is taken on the down side looking east which is an approaching train on the Down Direction.

27.13 As can been from the table above (27.8), C27 Willow Row crossing does have sufficient sighting to meet industry standards in all directions. C27 Willow Row crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy

27.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

27.14.1 Upgrade to MSL: Upgrade to MSL Overlay, this would cost in the region of £305,000 - this option has returned a 0.51 CBA score which means the cost of this option is slightly disproportionate to the safety benefit received. If crossing remains open this would be the preferred option of the level crossing manager given this is a public right of way.

27.14.2 Add Power Operated Gates (POGO): This would cost in the region of £20,000 - this option has returned a 1.37 CBA score which means the cost of this option is supported by the safety benefit. If crossing remains open and Network Rail upgrade to a UWCT crossing adding this enhancement makes sense also.

27.14.3 Closure by over bridge: This would cost in between the region of £1,500,000 - this option has returned a 0.12 CBA score which means the cost of this option is disproportionate to the safety benefit received .

27.14.4 Re profile and move gates: This would cost in the region of £15,000 - this option has returned a 0.30 CBA score which means the cost of this option is disproportionate to the safety benefit received. If crossing remains open then we should actively consider this to remove/mitigate risk of grounding and improve decision point demarcation.

### 27.15 Other Relevant Information

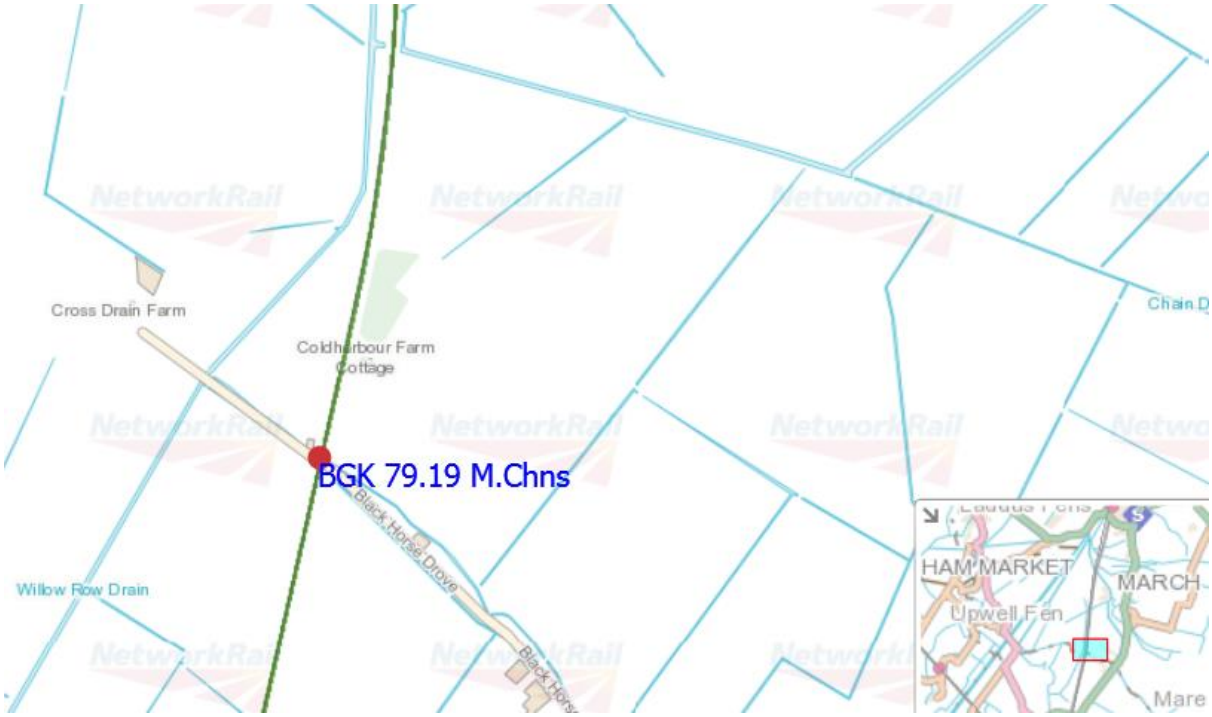
This crossing required constant vegetation management in both directions to maintain maximum possible sighting. Willow road crossing is usually accessed from the both sides of the level crossing. There are farms either side of this crossing. Littleport Bypass Public road Automatic Half Barrier crossing is located to the south of the level crossing and provides a possible alternative route for motorised users of Willow Road level crossing.

## 28. C28 BLACK HORSE DROVE PRIVATE USER WORKED LEVEL CROSSING

28.1 C28 Black horse drove is located between Downham Mkt Station and Littleport Station at 79 miles 19 chains from Kings Lynn Station. C28 Black horse drove has an ALCRM score of B4 with an FWI of 0.003652998. The crossing is in the Parish of Littleport (Cambridgeshire) and is located approximately 5.9km north of the village of Littleport. The crossing is on the BGK line and the maximum line speed is 90 mph in both directions. The line is a single track with trains operating in both directions during normal operation.

28.2 There are 76 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

28.3 Aerial views of C28 Black Horse Drove can be seen below.




28.4 The left side of this single track is the down line from London and the right side of this single track is the up line to London. Trains would normally run down from London that is from the bottom of the picture to the top. Trains would normally run up to London, which is from the top of the picture to the bottom.

28.5 Black Horse Drove is a protected user worked crossing with miniature warning lights on a public road, meaning that there is a direct method of warning people who use the crossing of approaching trains and this method is by miniature warning lights showing either a green or red aspect. It also has automatic audible warning systems which sound an alarm when the red aspect is shown. There are phones each side of the crossing which enable users to contact the local signal box if in vehicles.

28.6 A census was carried out in June 2016 by Mott MacDonald and this showed frequent usage by both vehicles of different varieties and pedestrians at the footpath associated with the crossing – 148 vehicles and 105 pedestrians over a 9 day period.

28.7 Given the line speed of 90 mph in this area and the distance to traverse the crossing of 6.6 meters, this crossing would require sightlines of 1,096 meters in order to give the user enough time to cross before the train arrives.

28.8 The Sightings recorded at last risk assessment which was completed on 13/07/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 1,096m | 450m | No |
| Up side looking toward down direction train approach | 1,096m | 1,500m | Yes |
| Down side looking toward up direction train approach | 1,096m | 400m | No |
| Down side looking toward down direction train approach | 1,096m | 1,500m | Yes |

28.9 The photograph below is taken looking eastward, from the up side at a train approaching in the up direction.

28.10 The photograph below is taken looking westward, from the up side, which is an approaching train in the down direction.

28.11 The photograph below is taken looking westward, from the down side, which is an approaching train in the up direction.

28.12 The photograph below is taken looking westward, from the down side, which is an approaching train in the down direction.

28.13 As can be seen from the table above (28.8), C28 BLACK HORSE DROVE CROSSING WITH TELEPHONES & MWL has insufficient sighting aspects in all directions to meet industry standards and so MWL and telephones are installed as the mitigation.

28.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

28.14.1 Upgrade to Manually Controlled Barrier/Obstacle Detection Crossing – estimated cost of £1,500,000 – CBA of 0.00 which means the cost of this option is disproportionate to the safety benefit received.

28.14.2 Closure By Bridge – estimated costs of £2,000,000– CBA of 0.00, which means the cost of this option is disproportionate to the safety benefit received

**28.15 Other Relevant Information**

This crossing requires constant vegetation management in the up direction to maintain even limited sighting, the location of the crossing on a curve with OHL (overhead line) structures and signage on the up side of the crossing severely affects available sighting and were highlighted by the LCM. Black Horse Drove

crossing is usually accessed from the both sides of the level crossing. There are houses and farms either side of this crossing.

## 29. C29 CASSELLS PUBLIC FOOTPATH LEVEL CROSSING

29.1 C29 Cassells footpath crossing has an ALCRM score of D8 with an FWI of 0.0000255064. It is located in Brinkley Parish on the CCH line (Coldham Lane Junction to Haughley Junction) which has a line speed of 60mph in both up and down directions on a single line. It is between Cambridge and Newmarket at 8 miles and 05 chains from Coldham Lane Junction, Cambridge.

29.2 There are 34 trains per day that run for 17 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

29.3 Aerial views of C29 Cassells Footpath crossing can be seen below.

29.4 There is a single line at this location and trains are signalled to run in either direction at any time. From the bottom to the top of the picture is the up direction towards Cambridge and the top to the bottom of the picture is the down direction towards Newmarket.

29.5 C29 Cassells level crossing is a passive crossing, meaning that there is no direct method of warning people who use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that it is therefore necessarily reliant upon users to `stop look and listen' to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

29.6 The last census was carried out starting on the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed 1 pedestrian or other use during that time.

29.7 Given the line speed of 60mph in both up and down directions on a single line in this area and the distance to traverse the crossing of 5.4 meters, this crossing requires sightlines of 122 metres in on the up side and down side in order to give the user enough time to cross before the train arrives.

29.8 The sightings recorded at last risk assessment which was completed on 15/10/2014 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Upside looking toward up direction train approach | 122m | 318m | Yes |
| Up side looking toward down direction train approach | 122m | 384m | Yes |
| Down side looking toward up direction train approach | 122m | 247m | Yes |
| Down side looking toward down direction train approach | 122m | 384m | Yes |

29.9 The photograph below is taken looking eastward, from the up side (south) at a train approaching in the up direction (from the east).

29.10 The photograph below is taken on the up side (south), looking west.

29.11 The photograph below is taken on the down side (North) looking west.

29.12 The photograph below is taken on the down side (North) looking east.

29.13 As can been from the table above (29.8), C29 Cassells crossing does have sufficient sighting to meet industry standards in all directions. C29 Cassells crossing is on a long sweeping bend section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is sufficient when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

29.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

29.14.1 Upgrade to MSL Overlay, this would cost in the region of £305,000 - this option has returned a 0.21 CBA score which means the cost of this option is disproportionate to the safety benefit received.

29.14.2 Closure by building an over bridge would cost between an estimated £1.5m and £3m due to the crossings location and was not considered due to being disproportionate to the safety benefit received.

**29.15 Additional information**

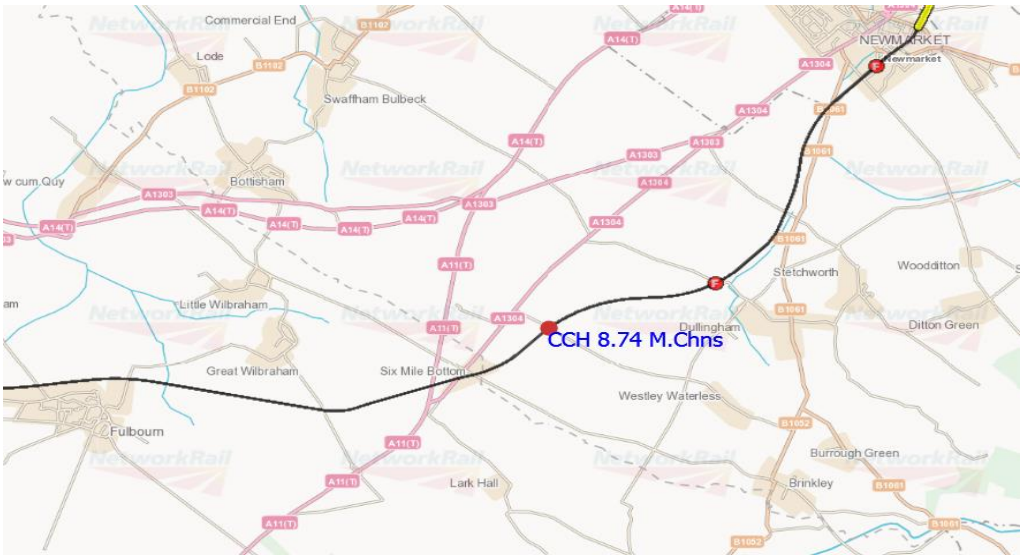
This crossing has regular vegetation management to maintain the sighting as the crossing is on a long sweeping curve, if this vegetation was not done then the sighting would reduce significantly

## 30. C30 WESTLEY ROAD PUBLIC USER WORKED LEVEL CROSSING

30.1 C30 Westley Road user worked crossing has an ALCRM score of C6 with an FWI of 0.000031997. It is located in Westley Waterless Parish on the CCH line (Coldham Lane Junction to Haughley Junction) which has a line speed of 60mph in both Up and down directions on a single line. It is between Cambridge and Newmarket at 8 miles and 64 chains from Coldham Lane Junction, Cambridge.

30.2 There are 34 trains per day that run for 17 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

30.3 An aerial view of C30 Westley Road Footpath crossing can be seen below.



30.4 There is a single line at this location and trains are signalled to run in either direction at any time. From the bottom to the top of the picture is the up direction towards Cambridge and the top to the bottom of the picture is the down direction towards Newmarket.

30.5 C30 Westley Road level crossing is a protected crossing, meaning that there is a direct method of warning people who use the crossing of approaching trains. This is achieved by MSL or telephones. The location and geography of the crossing means that it is therefore necessarily reliant upon users to adhere to the lights to check for approaching trains.

30.6 The last census was carried out starting on the 18th June 2016 until the 26th June 2016 by Mott McDonald, this census showed 6 vehicles of various types per day during that time. In the LCM's NRA of 21th July 2017, a census from 2013 was used and the usage was similar to the Mott McDonald census that was not available at the time of the data collection.

30.7 Given the line speed of 60mph in both up and down directions on a single line in this area and the distance to traverse the crossing of 6.8 meters, this crossing requires sightlines of 737metres on the up side and on the down side in order to give the user enough time to cross before the train arrives.

30.8 The sightings recorded at last risk assessment which was completed on 21/07/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 737m | 172m | No |
| Up side looking toward down direction train approach | 737m | 300m | No |
| Down side looking toward up direction train approach | 737m | 243m | No |
| Down side looking toward down direction train approach | 737m | 560m | No |

30.9 The photograph below is taken looking eastward, from the up side (south) at a train approaching in the up direction (from the east).

30.10 The photograph below is taken on the up side (south), looking west.

30.11 The photograph below is taken on the down side (north) looking east.

30.12 The photograph below is taken on the down side (north) looking west.

30.13 As can been from the table above (30.8), C30 Westley Road crossing does not have sufficient sighting to meet industry standards in all directions. C30 Westley Road crossing is on a reverse curved section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very poor even when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

30.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

30.14.1 Redesign crossing- this would cost in the region of £1,000 - this option has returned a 0.12 CBA score which means the cost of this option is disproportionate to the safety benefit received.

30.14.2 Upgrade to Manually Controlled Barrier-Obstacle Detection crossing, this would cost in the region of £2,400,000 - this option has returned a 0.01 CBA score which means the cost of this option is disproportionate to the safety benefit received.

30.14.3 Closure by building an over bridge this would cost in the region of £2,000,000 - this option has returned a 0.08 CBA score which means the cost of this option is disproportionate to the safety benefit received.

30.14.4 Install Yodels- this would cost in the region of £7,000 – this option has returned a 0.02 CBA score which means the cost of this option is disproportionate to the safety benefit received.

**30.15 Additional information**

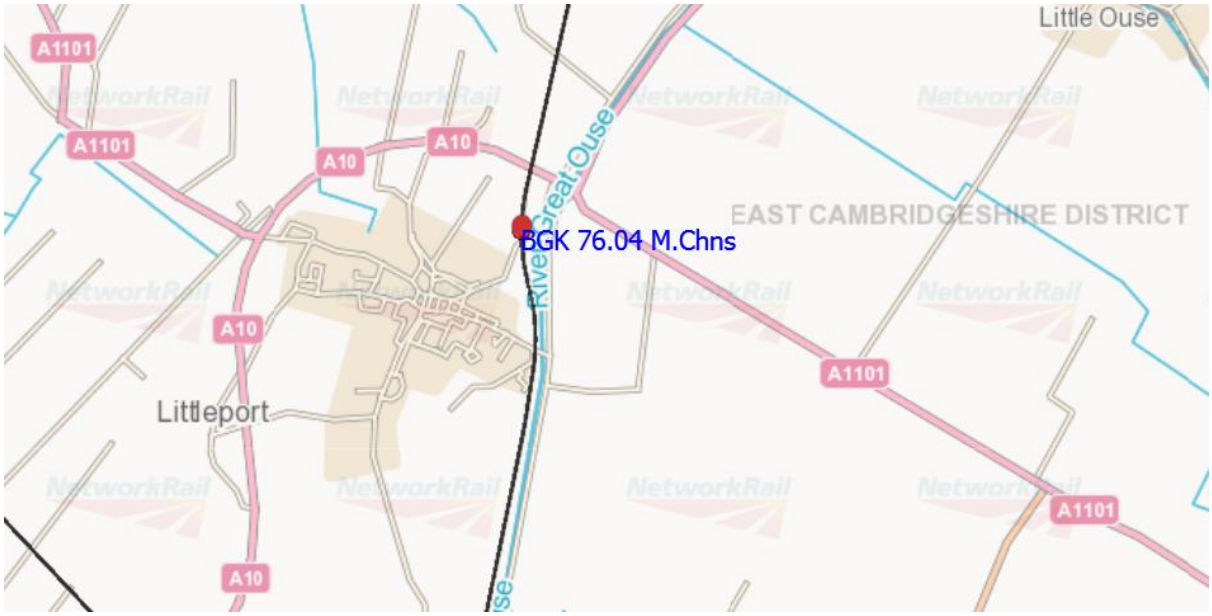
The options for Westley Road UWCM are also for the footpath element of the crossing. The issue with the sighting is due to an embankment and the vegetation on the embankment, major earthworks would be required to remove this issue. This option has not been considered as the cost of this option is disproportionate to the safety benefit received.

## 31. C31 LITTLEPORT STATION BARROW CROSSING

31.1 C31 Littleport station barrow crossing is located at Littleport Station at 76 miles 04 chains From London Liverpool Street Station. The crossing is on the Bethnal Green and King's Lynn Line (BGK) line. C31 Littleport station barrow crossing has an ALCRM score of D4 with a FWI 0.00215396. Littleport station barrow crossing is in the county of Cambridgshire. It's located in Littleport parish and has a postcode of CB6 1JL. This is a station passenger crossing with miniature warning lights.

31.2 There are 76 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

31.3 Aerial views of C31 Littleport station barrow crossing can be seen below.




31.4 The left side of this track is the down line from London and the right side of this track is the up line to London. Trains would normally run down from London that is from the bottom of the picture to the top. Trains would normally run up to London, which is from the top of the picture to the bottom.

31.5 C31 Littleport station barrow crossing is a protected crossing which has miniature warning lights and an audible warning system, which means a red aspect is shown to indicate there is a train approaching and a siren is activated to warn users, with an audible warning of another train coming if this event occurs.

31.6 A camera census was carried out starting on the 13/11/2014 by the LCM and this census showed relatively high usage recorded (over 100 persons per day), with regular commuter usage during that period and also other pedestrian usage.

31.7 Given the line speed of 60 mph in this area and the distance to traverse the crossing of 9 metres, this crossing would require sightlines of 322 metres for pedestrians in order to give the user enough time to cross before the train arrives.

31.8 The Sightings recorded at last risk assessment which was completed on 24/05/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Up side looking toward up direction train approach | 322m | 174m | No |
| Up side looking toward down direction train approach | 322m | 482m | Yes |
| Down side looking toward up direction train approach | 322m | 174m | No |
| Down side looking toward down direction train approach | 322m | 482m | Yes |

31.9 The photograph below is taken looking eastward, from the up side at a train approaching in the up direction.

31.10 The photograph below is taken on the up side, looking west at a train approaching from the down direction.

31.11 The photograph below is taken on the down side looking west, which is an approaching train traveling in the up direction.

31.12 The photograph below is taken on the down side looking east, at a train approaching from the down direction.

31.13 As can be seen from the table above (31.8), C31 Littleport station barrow crossing does not have sufficient sighting to meet industry standards in all directions.

31.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

31.14.1 Closure by over bridge / underpass : estimated cost of £1,500,000 to £3,000,000 with a CBA of 0.07, which means the cost is disproportionate to the safety benefit. If crossing can be closed by any of these means then this would be the preferred option overall.

**31.15 Other Relevant Information**

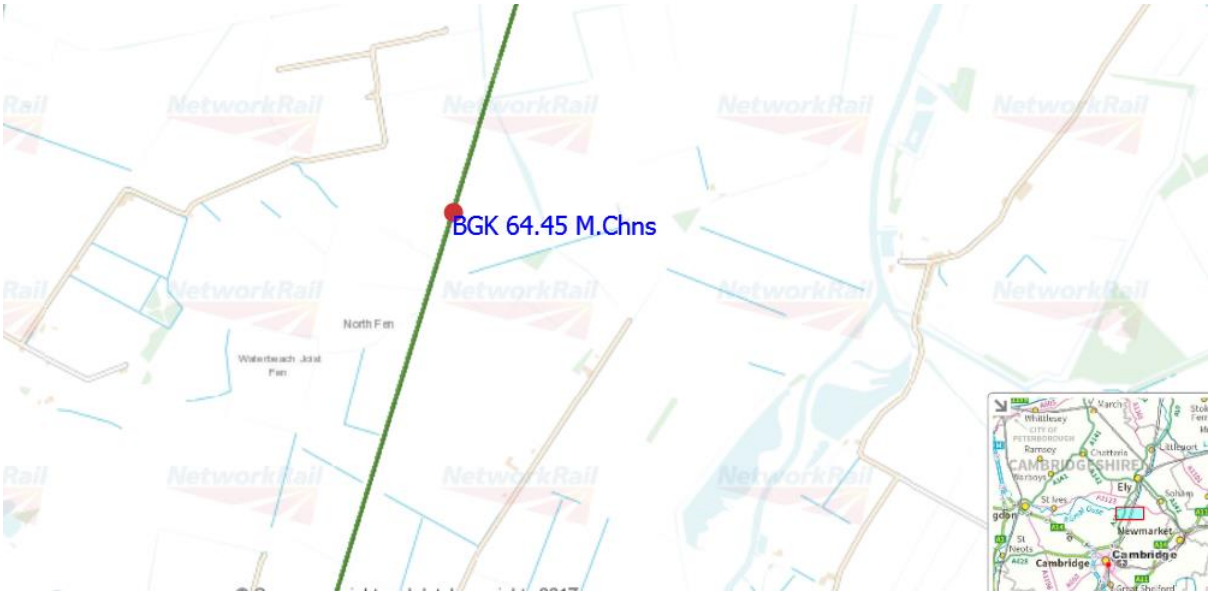
The environment surrounding Littleport Station Barrow Crossing SMWL level crossing consists of Station Premises only. It is a domestic level crossing which is located on Littleport Station Internal crossing. The level crossing is at the station located at the bottom of both platforms. At Littleport Station Barrow Crossing SMWL level crossing the orientation of the road/path from the north is 220°; the orientation of the railway from the north to the up line in the up direction is 190°. Low horizon can result in sun glare; sun glare is not necessarily a major risk factor but on occasions can affect visibility of both the MWL Lights and the railway itself.

## 32. C33 Jack O'Tells PRIVATE USER WORKED LEVEL CROSSING

32.1 C33 Jack O'Tells crossing has an ALCRM score of A4 with an FWI of 0.002768635. It is located in Waterbeach Parish on the BGK line (Bethnal Green to Kings Lynn) which has a line speed of 75mph on the up side and 90mph on the down side. It is between Elsenham and Ely at 64 miles and 45 chains from London Liverpool Street Station London.

32.2 There are 186 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

32.3 Aerial views of C33 Jack O'Tells Level crossing can be seen below




32.4 The track on the left is the down line from London and the track on the right is the up line to London. Trains would normally run down from London on the left hand line that is from the bottom of the picture to the top. Trains would normally run up to London on the right hand side, which is from the top of the picture to the bottom.

32.5 C33 Jack O'Tell level crossing is a passive crossing, meaning that there is no direct method of warning for people that use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that there are no phones, a user would have to be reliant upon the `stop look and listen' signs to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

32.6 A census was carried out starting on the 04th May 2016 by the LCM and this census recorded 2 vehicles and 12 pedestrians used the crossing. A questionnaire completed by the authorized user in December 2016 stated daily usage comprised 3 pedestrian traverses and 11 vehicles

32.7 Given the line speed of 75 mph on the up side and 90 mph on the down side in this area and the distance to traverse the crossing of 9.6 meters, this crossing would require sightlines of 1,023 meters on the up line and 1,228 metres on the down line in order to give the user enough time to cross before the train arrives.

32.8 The Sightings recorded at last risk assessment which was completed on 25/07/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Upside looking toward up direction train approach | 1,023m | 2,800m | Yes |
| Upside looking toward down direction train approach | 1,228m | 2,700m | Yes |
| Down side looking toward up direction train approach | 1,023m | 2,800m | Yes |
| Down side looking toward down direction train approach | 1,228m | 2,700m | Yes |

32.9 The photograph below is taken looking eastward, from the up side at a train approaching in the up direction. The trains usually approach on the closest set of lines (right hand side).

32.10 The photograph below is taken on the up side, looking west, the train usually approaches on the furthest (right hand side) set of lines.

32.11 The photograph below is taken on the down side looking west, the train usually approaches on the closest line (right hand side) set of lines.

32.12 The photograph below is taken on the down side looking east, the train usually approaches on the furthest line (right hand side) set of lines.

32.13 As you can see from the table above (32.8), C33 Jack O'Tells crossing does have sufficient sighting to meet industry standards in all directions. C33 Jack O' Tells crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

32.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. The options considered were:

32.14.1 Upgrading to MSL – estimated cost of £305,000 with a CBA of 0.30 - which means the safety benefit is disproportionate to the safety benefit received although the LCM considers this a suitable upgrade to be made at this level crossing.

32.14.2 Closure via installation of over bridge would cost in the region of £1,300,000 upwards – this option has returned a 0.05 CBA score which means the safety benefit is disproportionate of the supporting costs although either of these would be the LCM's preferred solution.

32.14.3 Upgrade to User Worked Crossing-Telephone **–** not considered as an option here due to impact on signaller's workload if crossing upgraded to this (see below).

### 32.15 Other Relevant Information

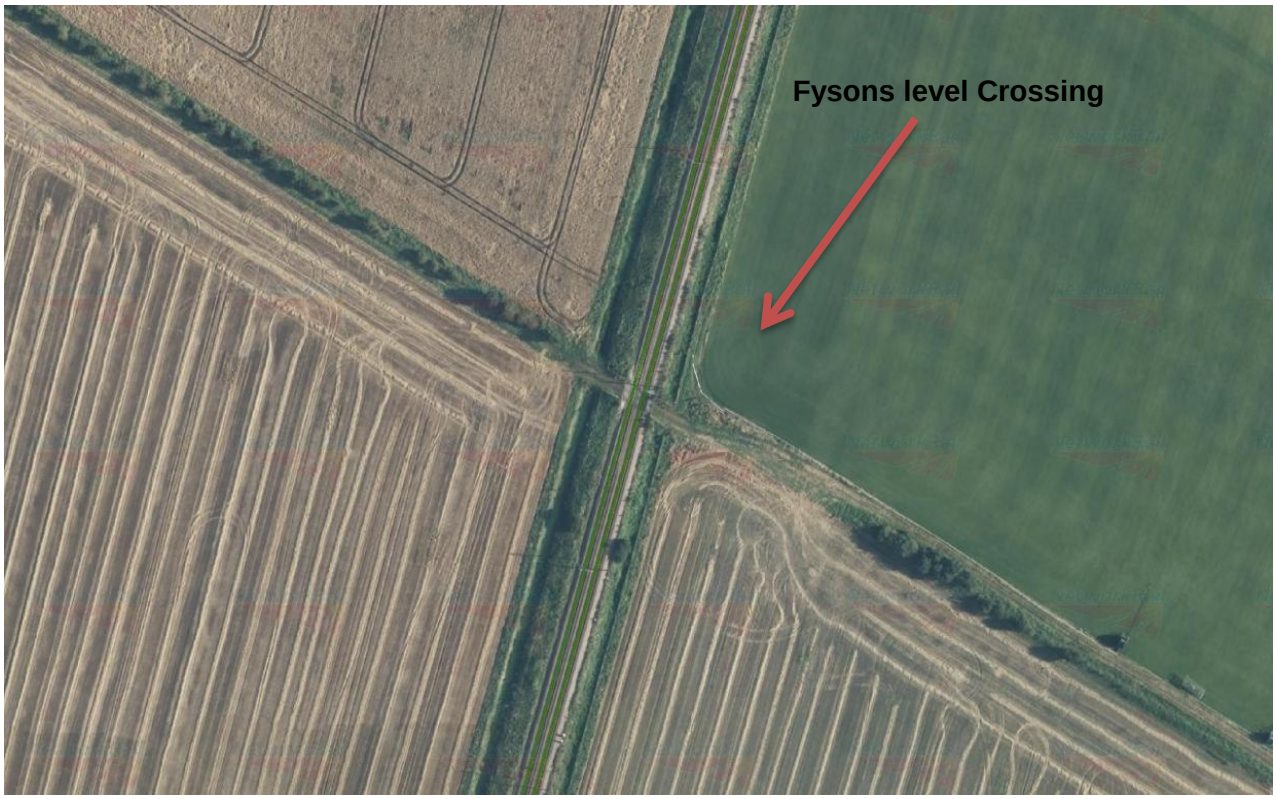
The sighting at this crossing is normally very good. Jack O'Tells UWC is an accommodation level crossing as it provides access from field to field. There are no stations visible at the level crossing. This level crossing is situated between farmland and the access road is difficult when wet. Only the AU and his/her personnel use this crossing on a daily basis as noted by the census data. Due to the harvest period at this level crossing in the previous year the call volumes to the signal box got to a very high level which means the signaller's workload was impacted on severely and more so since there is no formal telephone at this crossing and it is difficult for signallers to be sure of where users are calling from in this instance.

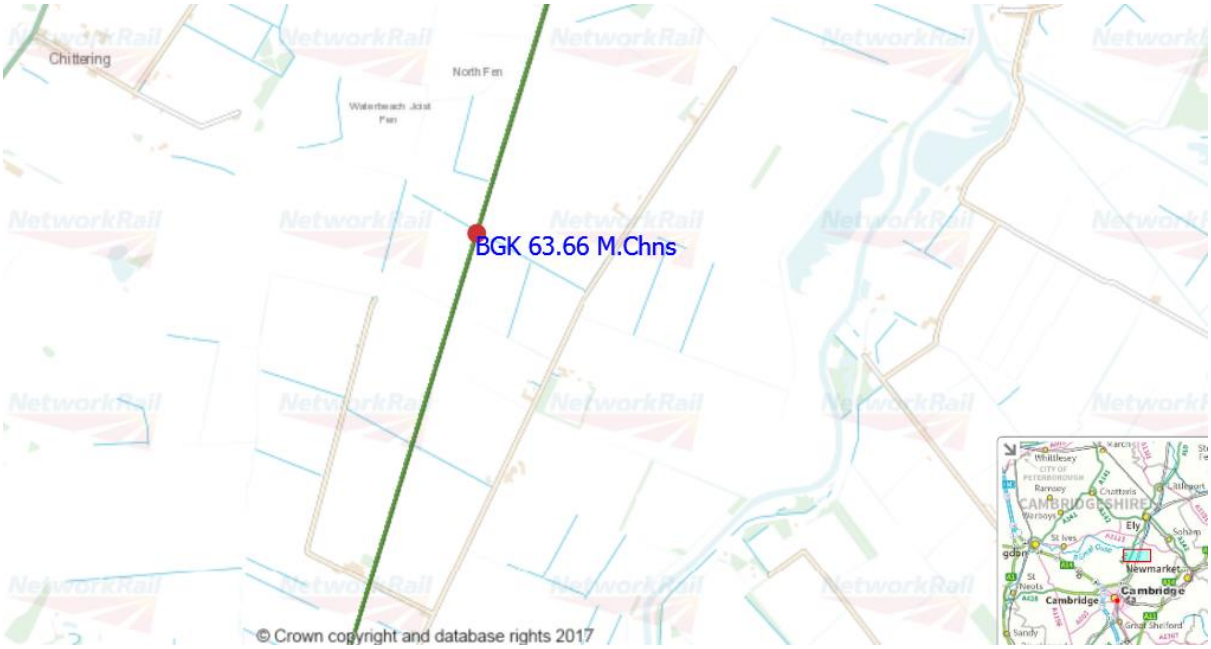
## 33. C34 Fysons PRIVATE USER WORKED LEVEL CROSSING

33.1 C34 Fysons crossing has an ALCRM score of A2 with an FWI of 0.024409858. It is located in Waterbeach Parish on the BGK line which has a line speed of 75mph on the up line and 90mph on the down line. It is between Elsenham and Ely at 63 miles and 66 chains from Liverpool Street Station London.

33.12 There are 186 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

33.3 Aerial views of C34 Fysons Level crossing can be seen below.






33.4 The track on the left is the down line from London and the track on the right is the up line to London. Trains would normally run down from London on the left hand line that is from the bottom of the picture to the top. Trains would normally run up to London on the right hand side, which is from the top of the picture to the bottom.

33.5 C34 Fysons level crossing is a passive crossing, meaning that there is no direct method of warning for people that use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that there are no phones, a user would have to be reliant upon the `stop look and listen' method to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

33.6 A census questionnaire completed by the AU in December 2016 stated daily usage at the crossing comprised 2 pedestrian traverses and 9 vehicles per day.

33.7 Given the line speed of 75 mph on the up side and 90 mph on the down side in this area and the distance to traverse the crossing of 9.6 meters, this crossing would require sightlines of 1,027 meters on the up road and 1,232 meters on the down road in order to give the user enough time to cross before the train arrives.

33.8 The Sightings recorded at last risk assessment which was completed on 02/08/2016 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Upside looking toward up direction train approach | 1,027m | 2,976m | Yes |
| Upside looking toward down direction train approach | 1,232m | 2,413m | Yes |
| Down side looking toward up direction train approach | 1,027m | 2,976m | Yes |
| Down side looking toward down direction train approach | 1,232m | 2,413m | Yes |

33.9 The photograph below is taken looking eastward, from the up side at a train approaching in the up direction. The trains usually approach on the closest set of lines (right hand side).

33.10 The photograph below is taken on the up side, looking west, the train usually approaches on the furthest (right hand side) set of lines.

33.11 The photograph below is taken on the down side looking west, the train usually approaches on the closest line (right hand side) set of lines.

33.12 The photograph below is taken on the down side looking east, the train usually approaches on the furthest line (right hand side) set of lines.

33.13 As you can see from the table above (33.8), C34 Fysons level crossing does have sufficient sighting to meet industry standards in all directions. C34 Fysons crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

33.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

33.14.1 Upgrading to POGO (Power Operated Gates), estimated cost of £25,000 – CBA of 1.12 - which means the cost of this option is potentially supporting the safety benefit received.

33.14.2 Closure via over bridge – estimated cost up to £2,500,000 – this option returned a CBA of 0.01 which means the safety benefit will be disproportionate from the supporting costs.

33.14.3 Upgrade to User Worked Crossing-Telephone – not considered as an option here due to impact on signaller's workload if crossing upgraded to this (see below).

33.14.4 Upgrading to MSL – estimated cost of £305,000 with a CBA of 0.34 - which means the cost benefit is disproportionate to the safety benefit received although the LCM considers this a potential suitable upgrade to be made at this level crossing.

### 33.15 Other Relevant Information

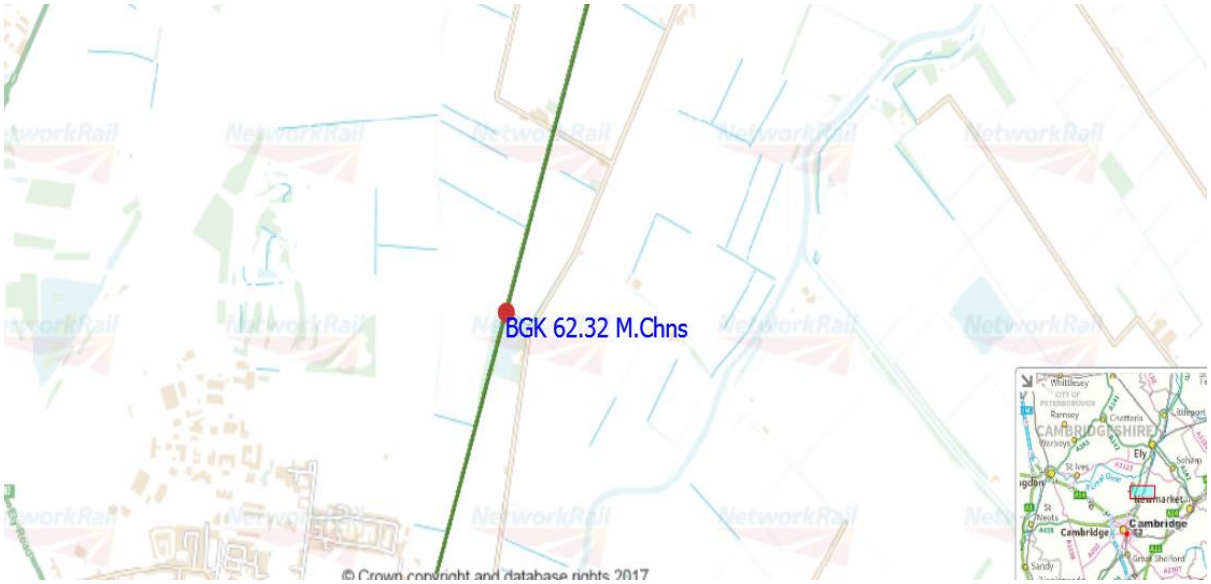
The sighting at this crossing is usually very good. Fysons level crossing is a UWC. This level crossing is an occupation level crossing situated in-between farmland. The level crossing is on one of Anglia's main branches which means there is very high rail traffic. The UWC is located in private farmland so the public will not be using the crossing. Only the authorised user and his/her personnel use this crossing on a daily basis. The approach layout has changed at Fysons which makes it even more difficult for the public to gain access if they so wished. Due to the harvest period at this and other crossings nearby, the call volumes to the signal box got to a very high level which means the signallers workload was impacted on severely and more so since there is no formal telephone at this crossing and it is difficult for signallers to be sure of where users are calling from in this instance.

## 34. C35 Ballast Pit PRIVATE USER WORKED LEVEL CROSSING

34.1 C35 Ballast Pit crossing has an ALCRM score of A6 with an FWI of 0.000278672. It is located in Waterbeach Parish on the BGK line (Bethnal Green to Kings Lynn) which has a line speed of 75mph. It is between Elsenham and Ely at 62 miles 32 chains from Liverpool Street Station London.

34.2 There are 186 trains per day that run for 20 hours per day over this level crossing. Additionally, there are empty stock trains that pass over the crossing. There can also be various on-track machinery and plant that pass over the crossing at any point.

34.3 Aerial views of C35 Ballast pit Level crossing can be seen below.

34.4 The track on the left is the down line from London and the track on the right is the up line to London. Trains would normally run down from London on the left hand line that is from the bottom of the picture to the top. Trains would normally run up to London on the right hand side, which is from the top of the picture to the bottom.

34.5 C35 Ballast pit level crossing is a passive crossing, meaning that there is no direct method of warning for people that use the crossing of approaching trains. It is not controlled, or equipped with lights, or any automatic audible warning systems. The location and geography of the crossing means that there are no phones, a user would have to be reliant upon the `stop look and listen' method to check for approaching trains, ensuring they have sufficient time to cross to protect their personal safety whilst traversing the line.

34.6 Census questionnaires completed by the AUs in December 2016 stated pedestrian traverses 10 times per month, twice monthly traverses with a tractor, and ten times yearly vehicular usage.

34.7 Given the line speed of 75 mph in this area and the distance to traverse the crossing of 9.6 metres, this crossing would require sightlines of 1,023 metres in order to give the user enough time to cross before the train arrives.

34.8 The Sightings recorded at last risk assessment which was completed on 10/05/2017 were as follows:

| All distances are recorded in metres | Minimum sighting distance required | Measured sighting distance | Is sighting compliant? |
|---|---|---|---|
| Upside looking toward up direction train approach | 1,023m | 1,892m | Yes |
| Upside looking toward down direction train approach | 1,023m | 1,236m | Yes |
| Down side looking toward up direction train approach | 1,023m | 1,892m | Yes |
| Down side looking toward down direction train approach | 1,023m | 1,236m | Yes |

34.9 The photograph below is taken looking eastward, from the up side at a train approaching in the up direction. The trains usually approach on the closest set of lines (right hand side).

34.10 The photograph below is taken on the up side, looking west, the train usually approaches on the furthest (right hand side) set of lines.

34.11 The photograph below is taken on the down side looking west, the train usually approaches on the closest line (right hand side) set of lines.

34.12 The photograph below is taken on the down side looking east, the train usually approaches on the furthest line (right hand side) set of lines.

34.13 As you can see from the table above (34.8), C35 Ballast Pit level crossing does have sufficient sighting to meet industry standards in all directions. C35 Ballast Pit crossing is on a long straight section of the railway as shown in the photographs above. This means the sighting for a user to see an approaching train is very good

when weather conditions are favourable. Sighting distances however, will be severely reduced when the weather is poor e.g. raining or foggy.

34.14 Following the risk assessment, an optioneering exercise was carried out to consider options for eliminating, reducing, mitigating or managing risk at this crossing. These options considered were:

34.14.1 Upgrading to MSLs – estimated cost of £305,000 with a CBA of 0.01 - which means the cost of this option is disproportionate to the safety benefit received – the LCM would support this option at the crossing however.

34.14.2 Closure via over bridge – estimated costs of £2,500,000 returning a CBA score of 0.01. Which means the safety benefit will be disproportionate from the safety benefit received. The LCM would support this however as a preferred option at this crossing.

34.14.3 Upgrade to User Worked Crossing -Telephone – not considered as an option here due to impact on signaller's workload if crossing upgraded to this (see below)

**34.15 Other Relevant Information**

The sighting at this crossing is normally good. Ballast pit UWC is an accommodation level crossing which provides access from field to field. There are no stations visible at the level crossing. This level crossing is situated between farmland and the access road to get to this level crossing is difficult when wet. Only the authorised user uses this crossing on a weekly basis. Looking at Ballast pit the farm side of the crossing is padlocked privately by the AU so no one else can access his/her land. Due to the harvest period at this and other level crossings nearby in the previous year the call volumes to the signal box got to a very high level which means the signallers workload was impacted on severely and more so since there is no formal telephone at this crossing and it is difficult for signallers to be sure of where users are calling from in this instance

**WITNESS STATEMENT**

I hereby declare as follows:

(i) This proof of evidence includes all facts which I regard as being relevant to the opinions that I have expressed and that the Inquiry's attention has been drawn to any matter which would affect the validity of that opinion.
(ii) I believe the facts that I have stated in this proof of evidence are true and that the opinions expressed are correct.
(iii) I understand my duty to the Inquiry to help it with matters within my expertise and I have complied with that duty.