PROTECTED LEVEL CROSSING RISK ASSESSMENT

Anglia Route

Level Crossing Narrative Risk Assessment

Waterbeach AHB Crossing

Planned 9th December 2021

1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT

1.1 LEVEL CROSSING OVERVIEW

This is a risk assessment for Waterbeach level crossing.

Crossing Details	
Name	Waterbeach
Type	AHB
Crossing status	Public Highway
Overall crossing status	Open
Route name	ANGLIA
Engineers Line Reference	BGK – 61m 01ch
OS grid reference	TL500649
Number of lines crossed	2
Line speed (mph)	75MPH
Electrification	No DC provided but OHLE present.
Signal box	Cambridge

Risk Assessment Details	
Name of assessor	Andrew Waling
Post	Level crossing manager.
Date completed	09-12-2021
Next due date	10-03-2023
Email address	andrew.waling@networkrail.co.uk
Phone number	07860500842

ALCRM Risk Score	
Risk per traverse risk	**D**
Collective risk	**2**
FWI	**0.042106949**

For Safety performance (Fatality weighted injuries (FWI), this crossing is ranked 2nd in Anglia route and 2nd nationally compared to other AHB.

This crossing has accumulated £115,284,14 in delay costs within the last 4 years.

1.2 INFORMATION SOURCES

Reason for Risk Assessment

Network Rail has a responsibility and legal duty under the Health and Safety at Work Act 1974 for the health, safety, and welfare of its employees and for protecting others against risk.

Network Rail also has a legal responsibility under the Management of Health and Safety at Work Regulations 1999. Section 3 focuses on the requirement for suitable and sufficient assessments of risk to health and safety of employees and others in connection with their undertaking.

The table below shows the stakeholder consultation that was undertaken as part of the risk assessment.

Consulted	Attended site
LOMS, MOMS and signallers	No
level crossing users.	No
Police (BTP/Home Office Force)	No
Local Resident	No

Stakeholder consultation and attendance notes:

All of the above were contacted with regards to this risk assessment and none attended the site meeting apart from local residents and dog walkers that were using the crossing on the day of the data collection.
The rest were either contacted via email or telephone after the site meeting.

The reference sources used during the risk assessment included:

- CCIL
- Census Counter
- Geo-RINM
- SMIS
- Other Data Sources: Google maps, Bing maps, hazard directory, sectional appendix.

1.3 ENVIRONMENT

Approach Photos

Upside crossing approach.

Downside crossing approach.

The level crossing is located on Clayhythe Rd. The road approach speed is estimated to be 30 to 40mph.

It is a Public Highway level crossing which is a principal access route for users travelling to a nearby station or ticket machine.

At Waterbeach level crossing the orientation of the road/path from the north is 140°; the orientation of the railway from the north to the up line in the up direction is 210°.

Sun Glare

LCG13 assessing sun glare at public road level crossings has been completed and records risk as Tolerable with detailed sun glare risk assessment not needed

Impact of low sun on the crossing

Below is the output from the Sun Calc application, which shows the lines of sunrise and sunset angles at two times of year (longest day June 21st & shortest day December 21st) when low sun would align with the rail approaches and might impact on the sighting.
The thin orange curve is the current sun trajectory, and the yellow area around is the variation of sun trajectories during the year. The closer a point is to the centre, the higher is the sun above the horizon.
The yellow line shows the direction of sunrise; the dark orange line the direction of sunset and the mid orange line the direction at a selected time of day (shown by the orange circle above the satellite image).

Longest Day 21st June.

Shortest Day 21st December.

There are planned or apparent developments near the crossing which may lead to a change or increase in use or risk.

Site Visit General Observations:

The approach to the upside is long and straight, whereas the downside is not. There are junctions on both sides of the crossing, on the downside approach there is both left and right turns into housing estates. On the upside approach there is a left-hand turn into the station car park and there are both left and right hand turns into depots very close to the crossing and there is field access.

Sun glare could be an issue during the winter months when the low sun is rising, this is mitigated by having all LED lights installed in the wig wag boards on both sides.

There is a proposed development on the east side of Waterbeach village (this is on the old Waterbeach barracks area) approx, half a mile away, this would increase the usage of the station and the crossing, but this could be mitigated with the station being moved to a different location, this is something that is being put forward and fully supported by Network Rail.

At the time of writing this risk assessment no confirmation of a new station has been confirmed but the Level Crossing Manager is in regular contact with Network Rail Town Planning and South Cambs District Council.

2. LEVEL CROSSING USAGE

2.1 RAIL

The train service over Waterbeach level crossing consists of Passenger and Freight trains. There are 188 trains per day. The highest permissible line speed of trains is 75 mph. Trains are timetabled to run for 19 hours per day.

Assessor's notes:

As stated, above trains are timetabled to run for 19 hours per day, but lines are open 24 hours a day and may receive additional freight, passenger or engineering trains which often vary in length, these are non-time tabled trains which do run from time to time and are mainly for engineering, rail head treatment and track recording purposes.

2.2 USER CENSUS DATA

A 24-hour census was carried out on 06-06-2018 by TRACSIS. The census applies to 100% of the year.

The census taken on the day is as follows:

Cars / car-based vans / quad bikes	4,785
Large vans / small lorries / large 4x4s	593
Buses / coaches	10
HGVs	62
Tractors / large farm vehicles	8
Pedal / motor cyclists	345
Pedestrians	595
Horse riders	0
Animal herders	0

Assessor's general census notes:

The census is a weekday average from a 9-day census by TRACSIS for a Network Rail project. Dated 06/06/2018.

Available information indicates that the crossing has a high proportion of vulnerable users.

Vulnerable user observations:

Location next to a station means the elderly, pushchair users; children, dog walkers and cyclists could all use the crossing to access the station. Taking the above into account with vulnerable users being witnessed using Waterbeach AHB crossing a 50% extra on the traverse time has been added to this risk assessment.

Available information indicates that the crossing does not have a high number of irregular users.

Irregular user observations:

No known irregular users as its mostly local people and regular commuters but this cannot be discounted.

2.3 USER CENSUS RESULTS

ALCRM calculates the usage of the crossing to be 5,458 road vehicles and 940 pedestrians and cyclists per day.

Notes on daily, annual, seasonal usage:

As stated above in this risk assessment, the crossing has a high daily usage of both vehicles and pedestrian's usage and this pattern does not seem to change through the year as it is a continuous regular flow of local through traffic and daily commuters. The Level Crossing can become busy should the main Cambridge to Ely A10 road be closed as this road will be used as a diversion route, should this happen a MOM will be deployed to watch over the crossing until the diversion has finished.

3. RISK OF USE

3.1 CROSSING APPROACHES

The road approach speed for vehicles on the upside of the crossing is 30 to 40mph and the approach speed on the downside of the crossing is 30 to 40mph.

Both approach roads to Waterbeach level crossing are assessed as being long and straight. There are prominent features on the approach to the level crossing that could distract drivers.

Site visit observations:

On the approach to Waterbeach AHB crossing there are 4x RLT signals and these are visible on the approach to the crossing form both directions as follows: Upside nearside approach = 237 Upside offside approach = 102 Downside nearside approach = 140 Downside offside approach = 80 The approach to the upside is long and straight, whereas the downside is not. There are junctions on both sides of the crossing, on the downside approach there is both left and right turns into housing estates. On the upside approach there is a left-hand turn into the station car park and there are both left and right hand turns into depots very close to the crossing and there is field access.

The road surface, including gradient if present, is unlikely to impact on the ability of a vehicle to stop behind the stop line.

There are known issues with ice, mud, loose material or flood water. In addition, there are known issues with foliage or fog.

Assessor's notes:

Foliage can obscure signs if not regularly cut back, this is usually undertaken by Cambridgeshire highways department or the Level Crossing Manager on his regular visits to the crossing. Fog and bad weather at certain times in the year can impede the visibility of the crossing but this has been mitigated by the installation of LED lights in the wig wags. The road is on a regular route for gritting during the winter months and the responsibility of applying.

At the estimated road speed, the visibility of level crossing signage and equipment on the upside is adequate - the visibility should be sufficient for a vehicle to be able to react in time if the crossing is activated

At the estimated road speed, the visibility of level crossing signage and equipment on the downside is adequate - the visibility should be sufficient for a vehicle to be able to react in time if the crossing is activated

Assessor's general crossing approach notes:

The approach to the upside is long and straight, whereas the downside is not. There are junctions on both sides of the crossing, on the downside approach there is both left and right turns into housing estates. On the upside approach there is a left-hand turn into the station car park and there are both left and right hand turns into depots very close to the crossing and there is field access.

3.2 AT THE CROSSING – GROUNDING RISK

The visual evaluation of the vertical profile of the road indicates that it does create a risk of vehicles grounding on the crossing.

Risk of grounding signs have been provided at the crossing.

Assessor's notes:

The crossing sits on slight humped profile but has passed the SIN 109 inspection. There are no signs of grounding on the crossing itself but there are Risk of Grounding signs on both road approaches.

3.3 AT THE CROSSING – BLOCKING BACK

The road layout at or close to the crossing does result in identified incidents of traffic queuing over the crossing. Blocking back risk is known to occur Occasionally (less than 25% of activations).

No incidents of blocking back have been recorded.

There are identified issues with the road layout, parked cars or other features that could stop traffic. In addition, the road is a known diversionary route.

Assessor's notes:

There are junctions on both sides of the crossing, on the downside approach there is both left and right turns into housing estates. On the upside approach there is a left-hand turn into the station car park and there are both left and right hand turns into depots very close to the crossing and also there is field access. Previous accident on the A10 meant that the traffic was diverted through Waterbeach and over the crossing, whilst this happened a MOM was deployed to the crossing

3.4 AT THE CROSSING – ANOTHER TRAIN COMING RISK

Trains are known to occasionally pass each other at this crossing.

Assessor's another train coming notes:

Trains are occasionally known to pass each other at this crossing. If train frequency increases so will the potential of trains passing. The risk is a user may cross after one train has passed without realising another train is coming in the other direction – this is mitigated by spoken Another Train Coming warnings

3.5 INCIDENT HISTORY

A level crossing safety event has been known to occur at Waterbeach level crossing in the last twelve months.

Assessor's incident history notes:

Aug 28, 2021 Waterbeach At 08:34 hours the driver of 1T13 07:44 Kings Lynn/London King's Cross reported a near miss at Waterbeach AHB station level crossing with a teenage girl. The person traversed the crossing in front of the train as it was approaching the station. The person then boarded the rear coach. The driver was fit to continue. Driver also confirmed that emergency brakes were not applied. Cambridge MOM checked all signage and all clear and in place. Operation of crossing working correctly.
Aug 1, 2021 Waterbeach Cambridge SSM reported a crossing misuse at Waterbeach with a male between 25-30 years old crossing from the down to the up road in front of 1K74, the male walked between the barriers. The driver did not have time to apply the emergency brake and had not classed it as a near miss and was happy to continue. Cambridge MOM examined the crossing, and everything was working correctly.

Red light violations / barrier weaving

The chance of a vehicle user deliberately misusing the crossing is estimated as Significantly lower than average.

Measures have been taken to mitigate deliberate misuse.

Assessor's incorrect use notes:

LED wig wags, CCTV and the installation of RLSE at Waterbeach AHB have been installed to mitigate against deliberate misuse, also the BTP do regular visits to the crossing with the Level Crossing Manager normally during both the morning and evening peak times to understand how people use the crossing and if they are doing so in a safe and correct manner.

3.6 THE CROSSING – STRIKE IN TIMES

Strike in times

	Designed strike in time	Does the observed strike in time conform to the designed strike in time?	Is the observed barrier down time excessive?
Up line	29s	Yes	No
Down line	29s	Yes	No

Assessor's notes and observations on strike in times:

The above strike in times seem adequate for this type of crossing, the average time for a non-stopping train to arrive at the crossing once the barrier sequence has started is between 28s-29s and for a stopping train the average time is 41s, these have been timed on site by the Level Crossing Manager.

4. ALCRM CALCULATED RISK

Waterbeach level crossing ALCRM results.

Key risk drivers: ALCRM calculates that the following key risk drivers influence the risk at this crossing:

- Distracted / forced by dog (loss of control), Road traffic accident, Second train coming
- Does not observe lights/barriers, Slips, trips, falls or snagged on crossing
- Unaware of crossing, slow moving / short warning, train unexpected
- Blocking back, Late braking, Incorrect use (e.g. non-adherence with level crossing road traffic light signals)
- Stuck or grounded on crossing, Fails to observe level crossing, Parked on level crossing
- Stranded / failed on crossing, Turns onto the railway, Poor crossing visibility
- Failure to detect approaching train, lights / barriers or obstacle detection equipment fails to operate
- signaller or other workforce, train driver

The calculated safety risk for this crossing is:	**Risk per Traverse (Letter)**	**Collective Risk (Number)**
	D	**2**
	Risk per Traverse (FWI)	**Collective Risk (FWI)**
Cars / car-based vans / quad bikes	0.000000006	0.011200071
Large vans / small lorries / large 4x4s		0.001388013
Buses / Coaches	0.000000001	0.000004887
HGVs		0.000030302
Tractors / large farm vehicles		0.00000391
Pedal / motor cyclists	0.000000082	0.010311313
Pedestrians		0.017783279
Horse Riders		0
Animal Herders		0
Vehicles user in pedestrian mode		0
Train Passengers	0.000000001	0.000073936
Train Staff	0.000000006	0.000389886
Derailment Risk		0.000921351
Weighted Average (Users)	**0.000000017**	
Total Risk		**0.042106949**
	Average Consequence	0.630800818
	Collision Frequency	0.066751577

5. OPTION ASSESSMENT AND CONCLUSIONS

5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at Waterbeach crossing include:

Option	Term	Risk per Traverse	Collective Risk	FWI	FWI Difference	Cost	Benefit Cost Ratio	Status	Comments
Close via diversion and overbridge	Long Term	M	13	0	-.042106949	£50,000,000	0.05	RECOMMENDED REJECT.	A bridge would have to be of maximum height which would mean that the cost is relatively high. A diversion route could link up to the existing busy and congested main Cambridge to Ely A10 road.
Safety campaign.	Short Term	D	2	.046225509	.00411856	£500	N/A	ACCEPT.	This can be undertaken by the Level crossing manager on his regular inspection and can be supported by the BTP.
Upgrade to MCB-OD	Long Term	H	4	.002514793	-.039592156	£3,500,000	0.36	ACCEPT.	Natural Upgrade to MCB-OD could be considered here – would need to consider crossing redesign.

NOTES

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

5.2 CONCLUSIONS

Assessor's notes:

Waterbeach AHB is a half barrier level crossing with 4 RTL's located next to Waterbeach railway station in the village of Waterbeach 6 miles north of the city of Cambridge.

The crossing is located between the Ely station and Cambridge North station with direct services into both London Liverpool Street and London Kings Cross stations, the maximum permissible line speed is 75MPH and the line is open 24 hours a day 365 days a year including bank holidays (UK) only.

The crossing is controlled by Cambridge panel 'A' signal box and this is manned at all times.

The crossing is located on the on Clayhithe Road which is a Public Highway, and the road approach speed is estimated to be 31-40mph.

The level crossing is located at a station which means all types of users use the crossing including vulnerable users, these are classed as people who are elderly, adults with push chairs, unaccompanied children and people who are in wheelchairs, also being in-between a staggered platform makes it an even more vulnerable crossing during peak times especially.

Because of the location of the level crossing, sun glare can be an issue during the winter months when the low sun is rising, this is mitigated by having all LED lights installed in the wig wag boards on both sides.

Due to Waterbeach AHB crossing being a highly used crossing any option would be highly needed to reduce the risk at the level crossing, other mitigations are already in place and these are flashing pedestrian signs, LED wigwags, yellow box on crossing, CCTV (downloadable), audible alarms that stay on until barriers raise, spoken warning of another train coming and red-light safety enhancement cameras, (RLSE)

At present there is a planning application to re-locate the station near to the proposed development of the old Waterbeach barracks of possibly 6500 new homes and all ancillary infrastructure, i.e., schools, shops, businesses, etc, there is a Network Rail project team already working with the developers and regular conversations are undertaken by themselves and the Level Crossing Manager.

Options to be considered:

Closure via diversion and overbridge - This option would close a total of 3 crossings and divert traffic from the village and would be a better option than an overbridge in situ of the level crossing, when the main A10 Ely to Cambridge to road is closed this option should be considered as a separate project involving the developers of Waterbeach barracks. The CBA shows a cost of £50,000,000 (which is only an approx. cost) but still does not give a positive one. See plan in the additional photos. At the optioneering meeting held on the 18-11-20, this option was rejected until further developments on the Waterbeach new town. **At the optioneering meeting held on the 02.02.22 this option was rejected as it would require 3rd party funding.**

Upgrade to MCB-OD- Reduces the risk at the level crossing quite considerably and looking at the CBA score, I feel that this would make it a good option to proceed with in the near future. Waterbeach should be looked at as one of the highest risk level crossing due to its already high misuse amount and the calculated increased risk due to the Waterbeach development an upgrade to reduce the risk at this crossing will be definitely needed, a deliberate misuse occurred when a road vehicle was parked on the level crossing after the crossing was activated (attempted suicide), MCB-OD would have prevented this. At the Optioneering meeting on 18-11-20, this was accepted in CP6 planned for December 2023. **At the optioneering meeting held on the 02.02.22 this was accepted and will be delivered by the Cambridge C3R project.**

Safety campaign- This is an ongoing option, the Level Crossing Manager in collaboration with the British Transport Police who regularly do patrols during the peak usage times.

Added options: -

Close via footbridge - At the optioneering meeting held on the 02.02.22 this option was added and accepted, this would be a GRP footbridge with a cost of £800,000, this would require a feasibility study to be undertake to as-certain it suitability for this location.

Past options already implemented:

Full Spoken Another Train Coming Audible Warning
Flashing Pedestrian Signs
Red Light Safety Enforcement Cameras
CCTV (downloadable)
LED wig wags

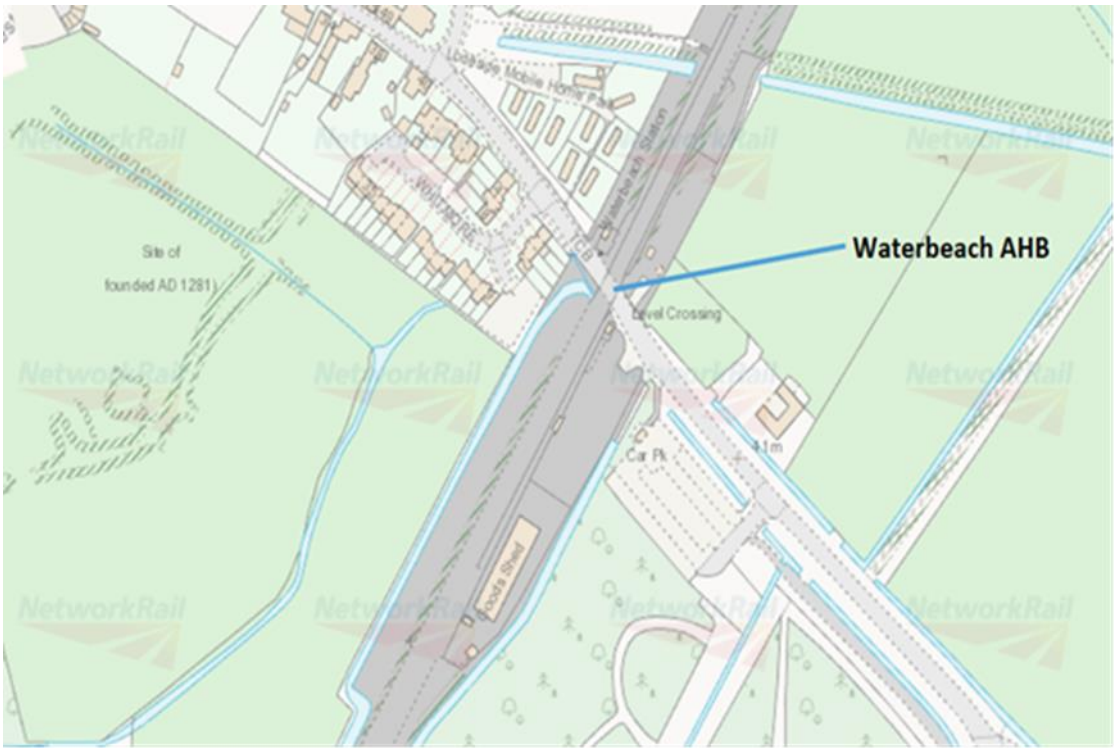
ANNEX A – ADDITIONAL PHOTOGRAPHS

Additional Photographs

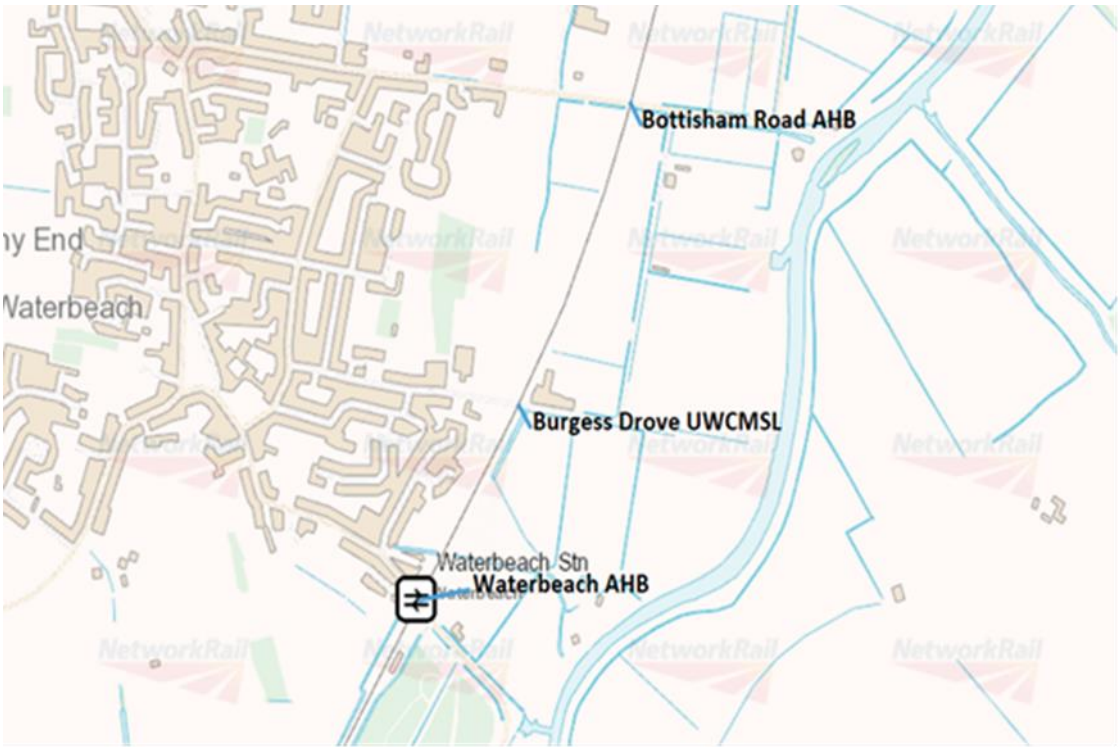
Upside across crossing.

Downside across crossing.

Location of crossing.

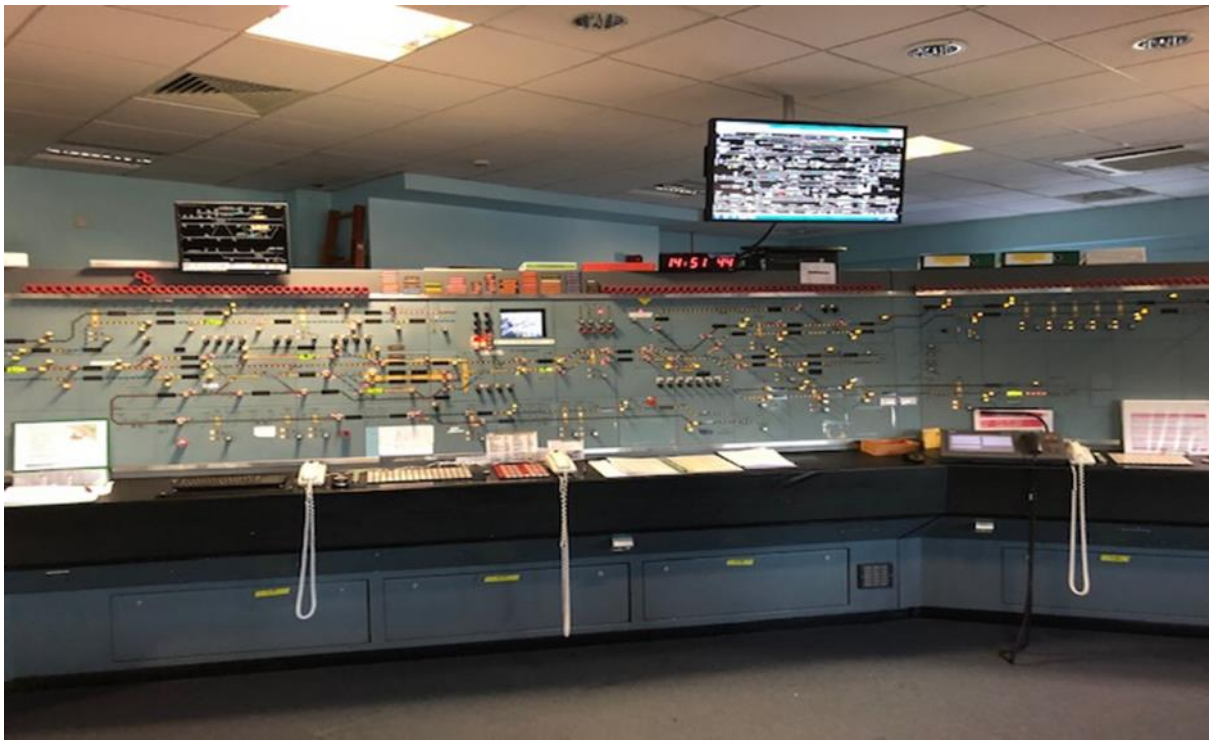


Surrounding area of the crossing.



Ariel view of the crossing.

Cambridge panel 'A' signal box.



ANNEX B – HAZARD IDENTIFICATION AND RISK CONTROLS

The table below is intended for use by risk assessors when identifying hazards and risk control solutions. It is not an exhaustive list or presented in a hierarchical order.

	Hazard	Control
Road vehicle and train collision risk	Examples at the crossing include: • insufficient sighting and / or train warning for all vehicle types; known to be exacerbated by the driving position, e.g. tractor • level crossing equipment and signage is not conspicuous or optimally positioned • instructions for safe use might be misunderstood e.g. signage clutter detracts from key messages, conflicting information given • high volume of unfamiliar users, e.g. irregular visitors, migrant workers • known user complacency leading to high levels of indiscipline, e.g. failure to use telephone, gates left open • type of vehicle unsuitable for crossing; - large, low, slow making access or egress difficult and / or vehicle is too heavy for crossing surface - risk of grounding and / or the severity of the gradient adversely affects ability to traverse • poor decking panel alignment / position on skewed crossing • where telephones are provided, users experience a long waiting time due to:	Controls can include: • optimising the position of equipment and / or signs • removing redundant and / conflicting signs • engaging with signalling engineers to optimise strike in times • upgrading of asset to a higher form of protection • downgrading of crossing by removing vehicle access rights • optimising sighting lines and / or providing enhanced user-based warning system, e.g. MSL • re-profiling of crossing surface • engaging with stakeholders / authorised users to reinforce safe crossing protocol, legal responsibilities and promote collaborative working • widening access gates and / or improving the crossing surface construction material • realigning or installing additional decking panels to accommodate all vehicle types • implementing train speed restriction or providing crossing attendant

	Hazard	Control
	- long signal section (Signaller unaware of exact train location) - high train frequency • insufficient or excessive strike in times at MSL crossings • high chance of a second train coming • high line speed and / or high frequency of trains • unsuitable crossing type for location, train service, line speed and vehicle types	
Pedestrian and train collision risk	Examples include: • insufficient sighting and / or train warning • ineffective whistle boards; warning inaudible, insufficient warning time provided, known high usage between 23:00 and 07:00 • high chance of a second train coming • high line speed and / or high frequency of trains • level crossing equipment and signage is not conspicuous or optimally positioned • location and position of level crossing gates mean that users have their backs to approaching trains when they access the level crossing, i.e. users are initially unsighted to trains approaching from their side of the crossing • instructions for safe use might be misunderstood e.g. signage clutter detracts from key messages, conflicting information given • surface condition or lack of decking contribute to slip trip risk	Controls can include: • optimising the position of equipment and / or signs • removing redundant and / conflicting signs • upgrading of asset to a higher form of protection • optimising sighting lines, e.g. de-vegetation programme, repositioning of equipment or removal of redundant railway assets • implementing train speed restriction or providing crossing attendant • providing enhanced user-based warning system, e.g. MSL • engaging with stakeholders / authorised users to reinforce safe crossing protocol, legal responsibilities and promote collaborative working • installing guide fencing and / or handrails to encourage users to look for approaching trains, read signage or cross at the designed decision point

	Hazard	Control

	• known high level of use during darkness
	• increased likelihood of misuse, e.g. crossing is at station
	• free wicket gates might result in user error
	• high volume of unfamiliar users, e.g. irregular visitors / ramblers, equestrians
	• complacency leading to high levels of indiscipline, e.g. users are known to rely on knowledge of timetable
	• high level of use by vulnerable people
	• where telephones are provided i.e. bridleways, users experience a long waiting time due to:
	  - long signal section (Signaller unaware of exact train location)
	  - high train frequency
	• insufficient or excessive strike in times at MSL crossings
	• unsuitable crossing type for location, train service, line speed and user groups
	• high usage by cyclists
	• degree of skew over crossing increases traverse time and users' exposure to trains
	• crossing layout encourages users not to cross at the designed decision point; egress route unclear especially during darkness
	schools, local amenities or other attractions are known to contribute towards user error
		• re-design of crossing approach so that users arrive at the crossing as close to a 90° angle as possible
		• installing lighting sources
		• engaging with signalling engineers to optimise strike in times
		• providing decking or improving crossing surface, e.g. holdfast, strail, non-slip surface
		• providing cyclist dismount signs and / or chicanes
		• straightening of crossing deck

	Hazard	Control
Pedestrian and road vehicle collision risk	Examples include: • a single gate is provided for pedestrian and vehicle users where there is a high likelihood that both user groups will traverse at the same time • the position of pedestrian gate forces / encourages pedestrian users to traverse diagonally across the roadway • road / footpath inadequately separated; footpath not clearly defined • condition of footpath surface increases the likelihood of users slipping / tripping into the path of vehicles	Controls can include: • providing separate pedestrian gates • clearly defining the footpath; renew markings • positioning pedestrian gates on the same side of the crossing • improving footpath crossing surface so it is devoid of potholes, excessive flangeway gaps and is evenly laid • improving crossing surface, e.g. holdfast, strail, non-slip surface
Personal injury	Examples include: • skewed crossing with large flangeway gaps results in cyclist, mobility scooter, pushchair or wheelchair user being unseated • condition of footpath surface increases the likelihood of users slipping / tripping • degraded gate mechanism or level crossing equipment • barrier mechanism unguarded / inadequately protected	Controls can include: • improving fence lines • reducing flangeway gaps and straightening where possible • providing decking or improving crossing surface, e.g. holdfast, strail, non-slip surface • straighten / realign gate posts • fully guarding barrier mechanisms

ANNEX C – ALCRM RISK SCORE EXPLANATION

ALCRM calculates the level of risk to individual users (per traverse) and the combined risks for all users, train staff and passengers at level crossings. It provides a consistent and robust quantitative methodology that is supplemented by the local knowledge and professional judgement of risk assessors.

Risk is expressed in fatalities and weighted injuries (FWI). The following values help to explain what this means:

- 1 = 1 fatality per year or 10 major injuries or 200 minor RIDDOR events or 1000 minor non-RIDDOR events
- 0.1 = 20 minor RIDDOR events or 100 minor non-RIDDOR events
- 0.005 = 5 minor non-RIDDOR events

RISK PER TRAVERSE

This is the level of calculated risk to an individual crossing user. It applies to a single traverse of the level crossing or each time the crossing is used by an individual.

Risk per traverse:

- Can be calculated for crossing users, train staff and passengers. Ranking is based on the risk to users only.
- Does not increase with the number of users.
- Is presented as a simplified ranking A to M. A is highest, L is lowest, and M is 'zero risk' e.g. temporary closed, dormant or crossings on mothballed lines.
- Allows risks to individuals on a per traverse basis to be assessed even if usage and Collective Risk is low.
- Can help in the prioritisation of risk mitigation and investment in safety.

Risk Per Traverse Ranking	Probability		FWI/traverse	
	Upper	Lower	Upper	Lower
A	1 in 1	1 in 500000	1	0.000002
B	1 in 500000	1 in 2500000	0.000002	0.0000004
C	1 in 2500000	1 in 12500000	0.0000004	0.00000008
D	1 in 12500000	1 in 62500000	0.00000008	0.000000016
E	1 in 62500000	1 in 125000000	0.000000016	0.000000008
F	1 in 125000000	1 in 250000000	0.000000008	0.000000004
G	1 in 250000000	1 in 500000000	0.000000004	0.000000002
H	1 in 500000000	1 in 1000000000	0.000000002	0.000000001
I	1 in 1000000000	1 in 2000000000	0.000000001	0.0000000005
J	1 in 2000000000	1 in 5000000000	0.0000000005	0.0000000002
K	1 in 5000000000	1 in 10000000000	0.0000000002	0.0000000001
L	1 in 10000000000	Greater than 0	0.0000000001	Greater than 0
M	0	0	0	0

COLLECTIVE RISK

This is the total calculated risk for the crossing and includes the risk to users (pedestrian and vehicle), train staff and passengers.

Collective risk:

- Is presented as a simplified ranking 1 to 13. 1 is highest, 12 is lowest, and 13 is 'zero risk' e.g. temporary closed, dormant or crossings on mothballed lines.
- Can help in the prioritisation of risk mitigation and investment in safety.

Collective Risk Ranking	Upper Value (FWI)	Lower Value (FW)
1	Theoretically infinite	Greater than 5.00E-02
2	0.050000000	0.010000000
3	0.010000000	0.005000000
4	0.005000000	0.001000000
5	0.001000000	0.000500000
6	0.000500000	0.000100000
7	0.000100000	0.000050000
8	0.000050000	0.000010000
9	0.000010000	0.000005000
10	0.000005000	0.000001000
11	0.000001000	0.000000500
12	0.0000005	0
13	0.00E+00	0.00E+00