

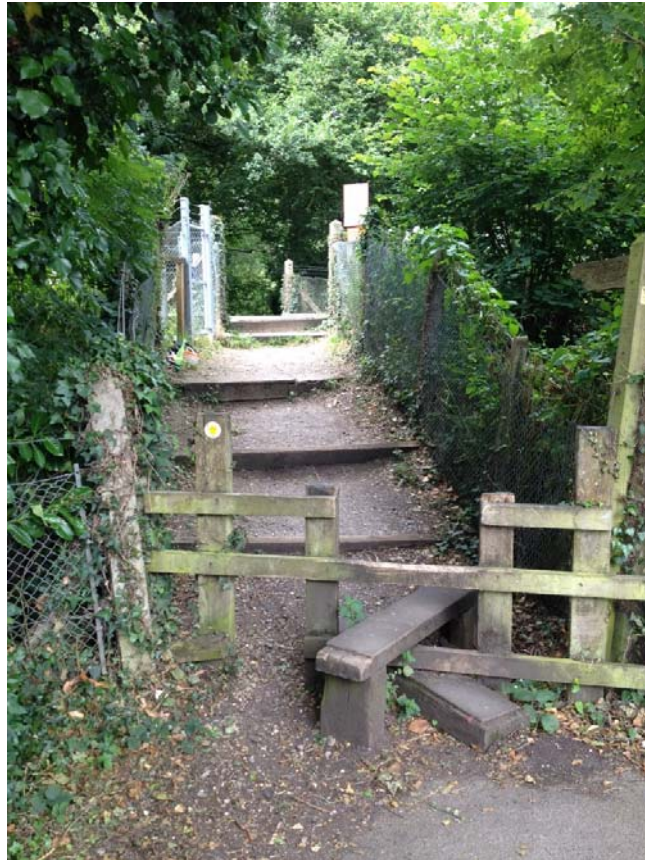
**NARRATIVE RISK ASSESSMENT – PASSIVE TEMPLATE FINAL v1.0**

**PASSIVE LEVEL CROSSING RISK ASSESSMENT**

**1. LEVEL CROSSING OVERVIEW AND ENVIRONMENT**

**1.1 LEVEL CROSSING OVERVIEW**

This is a risk assessment for Chandlers Ford level crossing.



This document provides the necessary supporting safety information to a decision making process for Chandlers Ford footpath crossing with stiles, leading to recommendations as to the most suitable level crossing option that reduces the risk to as low as reasonably practicable.

Crossing details	
<b>Name</b>	Chandlers Ford
<b>Type</b>	FPS
<b>Crossing status</b>	Public Footpath
<b>Overall crossing status</b>	Open
<b>Route name</b>	Wessex
<b>Engineers Line Reference</b>	ECR, 75m, 40ch
<b>OS grid reference</b>	SU431208
<b>Number of lines crossed</b>	1
<b>Line speed (mph)</b>	60
<b>Electrification</b>	None
<b>Signal box</b>	Eastleigh

Risk assessment details	
Name of assessor	Amanda Ingram
Post	Level Crossing Manger
Date completed	15/07/2014
Next due date	15/10/2016
Email address	amanda.ingram@networkrail.co.uk
Phone number	07515621610

ALCRM risk score	
Individual risk	C
Collective risk	4
FWI	0.003975302

## 1.2 INFORMATION SOURCES

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

Consulted	Attended site
Signaller and LOM	No
Local resident	No
Train operator	No

There has been concern voiced by local residents on site visits and train drivers have raised their concerns as part of the Level Crossing Driver forums held quarterly. It is felt that this crossing is used by vulnerable people which have been added into the risk score.

The reference sources used during the risk assessment included:

- Census; this is data gathered from installation of cameras to establish usage of this crossing.
- CCIL; this is a record of any incidents logged with the Control Centre
- GI Portal; this system is used to check on the environment for potential hazards
- SMIS; this is a data system that keeps logs of significant incidents at crossings it is used to reconcile against CCIL.

### 1.3 ENVIRONMENT



**Up side crossing approach**

**Down side crossing approach**

Chandlers Ford is a public footpath level crossing which is located on Sutherlands Way in the overgrown village of Chandlers Ford in the Borough of Eastleigh. A station can be seen from the level crossing at approximately 120 metres. The crossing covers a single bi-directional non-electrified track with no curvature.

The environment surrounding Chandlers Ford level crossing is between two housing estates with a small nature reserve for dog walkers and bird watchers on the downside. This is a heavily used crossing as a cut through to the local shops and for the use of the nature reserve.

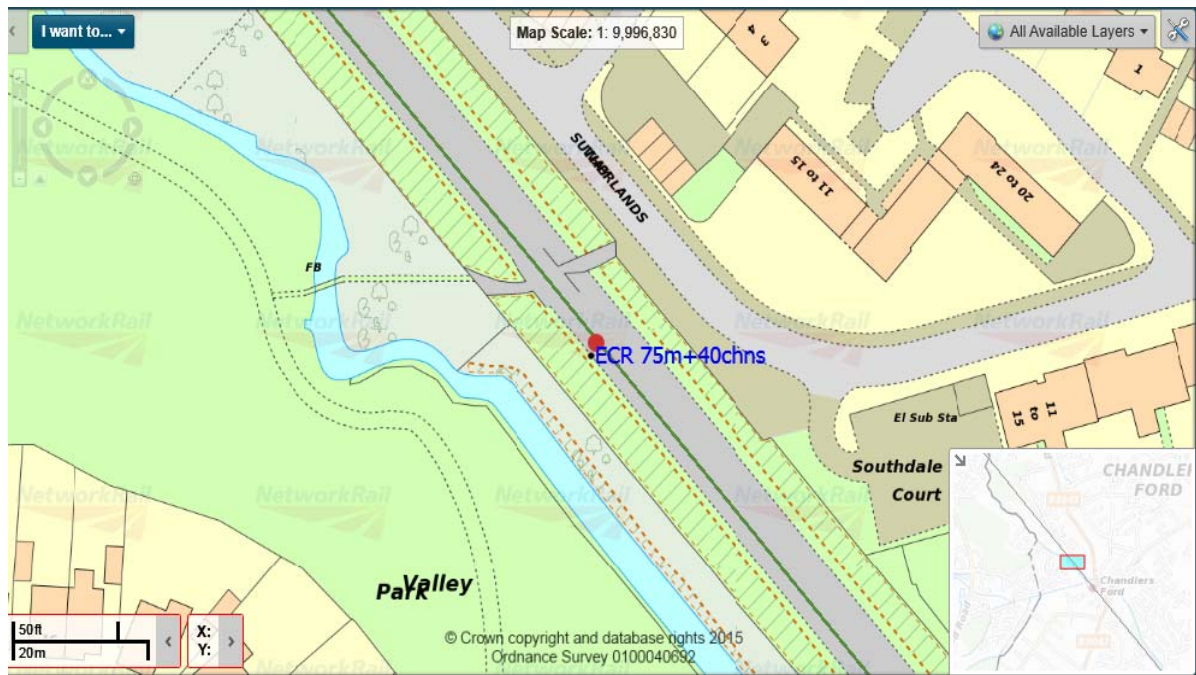
At Chandlers Ford level crossing the orientation of the road/path from the north is 80°; the orientation of the railway from the north to the up line in the up direction is 140°. Low horizon can result in sun glare; sun glare is not a known issue.

The approaches on both sides have two up two down stepped stiles with non-slip material applied which are in a good solid condition which lead onto steep large uneven steps made up of earth and timber which can prove slippery in adverse weather conditions. It is suggested that type 2 tarmac is installed to give a more level stepping area with less trip hazards. There is wing fencing on both sides which is in good condition. The crossing surface is timber decking with non-slip material, painted white edge lines and there are trespass guards in situ.

There are no planned or apparent developments near the crossing which may lead to a change or increase in use or risk.



Geo-RINM View



Satellite View



## 2. LEVEL CROSSING USAGE

### 2.1 RAIL

The train service over Chandlers Ford level crossing consists of passenger and freight trains. There are 40 trains per day. The highest permissible line speed of trains is 60mph. Trains are timetabled to run for 18 hours per day.

There are no whistle boards in place for this footpath as sighting is sufficient but train drivers will blow the train horns if they see people at the crossing to warn them of their approach.

### 2.2 USER CENSUS DATA

A 24 hour census was carried out on 23/07/2014 by Amanda Ingram. The census applies to 100% of the year.

The census taken on the day is as follows:

<b>Pedestrians</b>	122
<b>Pedal cyclists</b>	11
<b>Horses / riders</b>	0
<b>Animals on the hoof</b>	0

Available information indicates that the crossing does not have a high proportion of vulnerable users. Vulnerable people are witnessed using this crossing but it is not considered to be higher than usual.

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

Information gathered indicates that Chandlers Ford level crossing has a high number of users during the night or at dusk.

Census data captured shows that this crossing is used at night/dusk by joggers, cyclists and dog walkers.

Cameras were installed on site 15th - 23rd July 2014. It should be noted that this is within school holidays and less children are using this crossing at this time of year, usually there are more using the crossing to and from School.

Installation of cameras at this crossing show it is heavily used by cyclists who have to carry their bikes across here, it is a crossing which is used at night and shows people crossing the trespass guards to walk up and down the track.



### 2.3 USER CENSUS RESULTS

ALCRM calculates usage of the crossing to be 0 road vehicles and 133 pedestrians and cyclists per day.

## 3. RISK OF USE

### 3.1 SIGHTING AND TRAVERSE

At Chandlers Ford level crossing, the decision point and traverse lengths are calculated as:

	Decision point (m)	Traverse length (m)	Measured from
Up side	2.2	5.7	Edge of top step
Down side	2.4	5.9	Edge of top step

Timber decking is provided over the level crossing. The decking is considered to be wide enough for all users of the crossing. It is fitted with a non-slip surface.

The traverse times are calculated as:

	Traverse time (s)
Pedestrians	7.19

The current census has identified a high proportion of vulnerable users which were captured on camera and witnessed many times on site as children, elderly and cyclists carrying bikes. The pedestrian traverse time has been increased by 50% to account their traverse.

Sighting was measured by the following means:

- Using a Range Finder

Sighting, measured in metres, at Chandlers Ford level crossing is recorded as:

All distances are recorded in metres	Minimum sighting distance required	Measured sighting distance	Sighting distance measured to	Is sighting compliant?	If deficient, is sighting distance mitigated?	Notes on deficient sighting time mitigations
Up side looking toward up direction train approach	193	792	Mileage post	Yes	N/A	N/A
Up side looking toward down direction train approach	193	404	Vegetation beyond overbridge	Yes	N/A	N/A
Down side looking toward up direction train approach	200	295	Station bridge	Yes	N/A	N/A
Down side looking toward down direction train approach	200	328	Vegetation before overbridge	Yes	N/A	N/A



Sighting restrictions are recorded as follows:

	Up Direction	Down Direction
Nothing; vanishing point	<b>YES</b>	<b>YES</b>
Track curvature	NO	NO
Permanent structure (building/wall etc)	NO	NO
Signage or crossing equipment	NO	NO
Vegetation	NO	NO
Bad weather on the day of visit	NO	NO
Other	NO	NO

There are no known obstructions that could make it difficult for users to see approaching trains. There are no known issues with foliage, fog or other issues that might impair visibility of the crossing, crossing equipment or approaching trains.

There are no whistle boards and the minimum sighting distances are easily achieved. Installation of whistle boards would be met with hostility by local residents.

There is straight track here with good sighting.

### **3.2 CROSSING APPROACHES**

The signs at Chandlers Ford are located in a position so that they are clearly visible on the direct route a user would take over the level crossing. The visibility of the signs is reduced at night or at dusk.

The approaches to the crossing within the boundary fence are considered to be steep, slippery or present a tripping hazard to users.

There are adjacent sources of light or noise that could affect a users' ability to see or hear approaching trains.

There was a redundant metal post embedded into the earth on the down side that has been removed giving better visibility of crossing signs. The road on the up side can be noisy at peak times with vehicles and regular passing buses.

### **3.3 AT THE CROSSING – ANOTHER TRAIN COMING RISK**

The likelihood of a second train approaching does not exist at this crossing as it is a single track line

### 3.4 MISUSE

Misuse has been known to occur at Chandlers Ford level crossing in the last twelve months.

Event Date	Event Time	Primary Component	Short Description	Level Crossing Name/Identity	Location Code
24/08/2014	18:49	Level Crossing/LC equipment - misuse/near misses	Trespass - 2 males reported trespassing at Chandlers Ford Xing - hiding in bushes	Chandlers Ford	ECR00160
14/04/2014	15:04:00	Level Crossing/LC equipment - misuse/near misses	Trespass - 1F17 1230 Cardiff C - Portsmouth Hbr reported 4 youths standing on Chandlers Ford Foot crossing	Chandlers Ford	ECR00160
12/03/2014	19:20:00	Level Crossing/LC equipment - misuse/near misses	LC Near Miss - 2S59 1907 Romsey - Salisbury reported near miss with male and young child at Chandlers Ford Foot Crossing. BTP Reference: 519.	Chandlers Ford	ECR00160

People coming from the crossing and station to walk up and down the track as a short cut and youths trespassing is a frequent occurrence.







#### 4. ALCRM CALCULATED RISK

ALCRM provides an estimate of both the individual and collective risks at a level crossing.

The individual and collective risk is expressed in Fatalities and Weighted Injuries (FWI). The following values help to explain this:

- **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

#### INDIVIDUAL RISK

This is the annualised probability of fatality to a 'regular user'. *NOTE: A regular user is taken as a person making a daily return trip over the crossing; assumed 500 traverses per year.*

Individual risk:

- Applies only to crossing users. It is not used for train staff and passengers
- Does not increase with the number of users.
- Is presented as a simplified ranking:
  - Allocates individual risk into rankings 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 comparison of individual risk to average users across any crossings on the network

Individual Risk Ranking	Upper Value (Probability)	Lower Value (Probability)	Upper Value (FWI)	Lower Value (FW)
A	1 in 1	Greater than 1 in 1,000	1	0.001000000
B	1 in 1,000	1 in 5,000	0.001000000	0.000200000
C	1 in 5,000	1 in 25,000	0.000200000	0.000040000
D	1 in 25,000	1 in 125,000	0.000040000	0.000008000
E	1 in 125,000	1 in 250,000	0.000008000	0.000004000
F	1 in 250,000	1 in 500,000	0.000004000	0.000002000
G	1 in 500,000	1 in 1,000,000	0.000002000	0.000001000
H	1 in 1,000,000	1 in 2,000,000	0.000001000	0.000000500
I	1 in 2,000,000	1 in 4,000,000	0.000000500	0.000000250
J	1 in 4,000,000	1 in 10,000,000	0.000000250	0.000000100
K	1 in 10,000,000	1 in 20,000,000	0.000000100	0.000000050
L	Less than 1 in 20,000,000	Greater than 0	0.000000050	Greater than 0
M	0	0	0	0

## COLLECTIVE RISK

This is the total 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:
  - Allocates collective risk into rankings 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 easily compare collective risk between any two crossings on the network

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

**Chandlers Ford level crossing ALCRM results**

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

- User misuses
- Large number users

<b>Safety risk</b>				
Compared to other crossings the safety risk for this crossing is	Individual risk		Collective risk	
	<b>C</b>		<b>4</b>	
	Individual risk (fraction)	Individual risk (numeric)		
Car	0	0	0	
Van / small lorries	0	0	0	
HGV	0	0	0	
Bus	0	0	0	
Tractor / farm vehicle	0	0	0	
Cyclist / Motor cyclist	1 in 24570	0.0000407	0.000326817	
Pedestrian	1 in 24570	0.0000407	0.0036247	
				<b>Derailment contribution</b>
Passengers			0	0
Staff			0.000023784	0
<b>Total</b>			0.003975302	0
<b>Collision frequencies</b>	<b>Train / user</b>	<b>User equipment</b>	<b>Other</b>	
Vehicle	0	0	0	
Pedestrian	0.004756879	0.001166126	0.003194269	
<b>Collision risk</b>	<b>Train / user</b>	<b>User equipment</b>	<b>Other</b>	
Vehicle	0	0	0	
Pedestrian	0.003862585	0.000018658	0.000070274	



## 5. OPTION ASSESSMENT AND CONCLUSIONS

### 5.1 OPTIONS EVALUATED

The options evaluated to mitigate the risks at Chandlers Ford crossing include:

Option	Term <sup>1</sup>	ALCRM risk score	ALCRM FWI	Safety Benefit	Cost	Benefit Cost Ratio	Status	Comments
Closure with installation of Footbridge	Long Term	M13	0.0	3.98E-3	525,000	0.75	Complete	A footbridge would be the safest option to progress with including a cycle rail to provide ease of use
Installation of MSLS	Long Term	D4	4.77E-3	7.96E-4	300,000	0.33	Complete	There is no benefit cost ratio to proceed with this option
Closure with diversion	Long Term	M13	0.0	3.98E-3	N/A	N/A	Complete	Diversion not possible as over existing footbridge approximately 1 mile from crossing, Hampshire County Council in agreement.
Upgrade steps	Short Term	C4	3.98E-3	3.98E-3	5,000	0.00	Complete	Type 2 tarmac installation on steps – funding to be sourced as not deemed unsuitable for use as in line with surrounding walkways to the crossing
Awareness Days	Short Term	C4	3.98E-3	3.98E-3	1,000	0.00	Complete	Level crossing awareness day – use to highlight dangers of misuse at this crossing and educate on correct use, this to include leaflet drop in local area and local school education

## NOTES

Network Rail always evaluates the need for short<sup>1</sup> 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.

<sup>1</sup> Includes interim

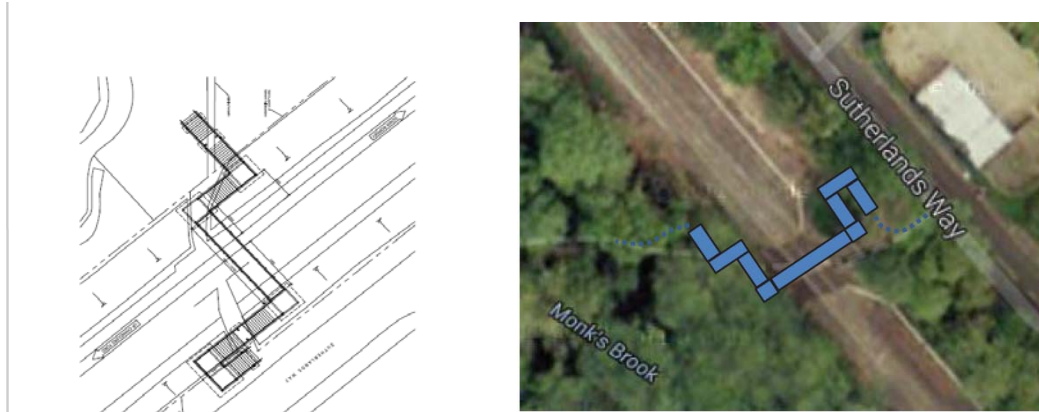
CBA gives an indication of overall business benefit. It is used to support, not override, structured expert judgement when deciding which option(s) to progress. CBA might not be needed in all cases, e.g. standard maintenance tasks or low cost solutions (less than £5k).

The following CBA criteria are used as a support to decision making:

- a. benefit to cost ratio is  $\geq 1$ : positive safety and business benefit established;
- b. benefit to cost ratio is between 0.99 and 0.5: reasonable safety and business benefit established where costs are not grossly disproportionate against the safety benefit; and
- c. benefit to cost ratio is between 0.49 and 0.0: weak safety and business benefit established.

## 5.2 CONCLUSIONS

**A footbridge is the long term recommended option.** This is the only way to remove an unacceptable level of risk from the crossing without removing the right of way to amenities for local residents between Chandlers Ford and Valley Park. The design of the bridge should also include some type of cycle rail so that the many cyclists who use this crossing can still take their bikes across with ease.



**Education and awareness days are short term recommended options.** Discussions have taken place with the local Community Safety Manager to promote safety at this crossing with local schools being approached, with a plan being worked up. The next ILCAD is to be held at this site, with a focus being on Pedestrians and Cyclists after which leaflet drops can be carried out in the area.

**Type 2 Tarmac applied to steps is a short term recommended option.** There is no BCR or safety benefit therefore funding would need to be sourced as the steps here are not deemed unsuitable for use by the maintenance team. They are in keeping with the surrounding walkways approaching the crossing on the downside, for this to move forward the highways side would need to be upgraded at the same time.

## 6 APPROVALS

Prepared By: Amanda Ingram	Signature: 
	Job Title: Level Crossing Manager
Date: 15/07/2014	
Approved By: (RLCM)	Signature:
	Job Title:
Date:	
Approved By:	Signature:
	Job Title:
Date:	

## ANNEX A – 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
<b>Road vehicle and train collision risk</b>	<p>Examples at the crossing include:</p> <ul style="list-style-type: none"> <li>insufficient sighting and / or train warning for all vehicle types; known to be exacerbated by the driving position, e.g. tractor</li> <li>level crossing equipment and signage is not conspicuous or optimally positioned</li> <li>instructions for safe use might be misunderstood e.g. signage clutter detracts from key messages, conflicting information given</li> <li>high volume of unfamiliar users, e.g. irregular visitors, migrant workers</li> <li>known user complacency leading to high levels of indiscipline, e.g. failure to use telephone, gates left open</li> <li>type of vehicle unsuitable for crossing; <ul style="list-style-type: none"> <li>large, low, slow making access or egress difficult and / or vehicle is too heavy for crossing surface</li> <li>risk of grounding and / or the severity of the gradient adversely affects ability to traverse</li> </ul> </li> <li>poor decking panel alignment / position on skewed crossing</li> <li>where telephones are provided, users experience a long waiting time due to: <ul style="list-style-type: none"> <li>long signal section (Signaller unaware of exact train location)</li> <li>high train frequency</li> </ul> </li> <li>insufficient or excessive strike in times at MSL crossings</li> <li>high chance of a second train coming</li> <li>high line speed and / or high frequency of trains</li> <li>unsuitable crossing type for location, train service, line speed and vehicle types</li> </ul>	<p>Controls can include:</p> <ul style="list-style-type: none"> <li>optimising the position of equipment and / or signs</li> <li>removing redundant and / conflicting signs</li> <li>engaging with signalling engineers to optimise strike in times</li> <li>upgrading of asset to a higher form of protection</li> <li>downgrading of crossing by removing vehicle access rights</li> <li>optimising sighting lines and / or providing enhanced user based warning system, e.g. MSL</li> <li>re-profiling of crossing surface</li> <li>engaging with stakeholders / authorised users to reinforce safe crossing protocol, legal responsibilities and promote collaborative working</li> <li>widening access gates and / or improving the crossing surface construction material</li> <li>realigning or installing additional decking panels to accommodate all vehicle types</li> <li>implementing train speed restriction or providing crossing attendant</li> </ul>
<b>Pedestrian and train collision risk</b>	<p>Examples include:</p> <ul style="list-style-type: none"> <li>insufficient sighting and / or train warning</li> <li>ineffective whistle boards; warning inaudible, insufficient warning</li> </ul>	<p>Controls can include:</p> <ul style="list-style-type: none"> <li>optimising the position of equipment and / or signs</li> <li>removing redundant and / conflicting signs</li> </ul>



	Hazard	Control
	<p>time provided, known high usage between 23:00 and 07:00</p> <ul style="list-style-type: none"> <li>• high chance of a second train coming</li> <li>• high line speed and / or high frequency of trains</li> <li>• level crossing equipment and signage is not conspicuous or optimally positioned</li> <li>• 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</li> <li>• instructions for safe use might be misunderstood e.g. signage clutter detracts from key messages, conflicting information given</li> <li>• surface condition or lack of decking contribute to slip trip risk</li> <li>• known high level of use during darkness</li> <li>• increased likelihood of misuse, e.g. crossing is at station</li> <li>• free wicket gates might result in user error</li> <li>• high volume of unfamiliar users, e.g. irregular visitors / ramblers, equestrians</li> <li>• complacency leading to high levels of indiscipline, e.g. users are known to rely on knowledge of timetable</li> <li>• high level of use by vulnerable people</li> <li>• where telephones are provided i.e. bridleways, users experience a long waiting time due to: <ul style="list-style-type: none"> <li>- long signal section (Signaller unaware of exact train location)</li> <li>- high train frequency</li> </ul> </li> <li>• insufficient or excessive strike in times at MSL crossings</li> <li>• unsuitable crossing type for location, train service, line speed and user groups</li> <li>• high usage by cyclists</li> <li>• degree of skew over crossing increases traverse time and users' exposure to trains</li> <li>• crossing layout encourages users not to cross at the designed decision point; egress route unclear especially during darkness</li> </ul>	<ul style="list-style-type: none"> <li>• upgrading of asset to a higher form of protection</li> <li>• optimising sighting lines, e.g. de-vegetation programme, repositioning of equipment or removal of redundant railway assets</li> <li>• implementing train speed restriction or providing crossing attendant</li> <li>• providing enhanced user based warning system, e.g. MSL</li> <li>• engaging with stakeholders / authorised users to reinforce safe crossing protocol, legal responsibilities and promote collaborative working</li> <li>• installing guide fencing and / or handrails to encourage users to look for approaching trains, read signage or cross at the designed decision point</li> <li>• re-design of crossing approach so that users arrive at the crossing as close to a 90° angle as possible</li> <li>• installing lighting sources</li> <li>• engaging with signalling engineers to optimise strike in times</li> <li>• providing decking or improving crossing surface, e.g. holdfast, strail, non-slip surface</li> <li>• providing cyclist dismount signs and / or chicanes</li> <li>• straightening of crossing deck</li> </ul>

	Hazard	Control
	schools, local amenities or other attractions are known to contribute towards user error	
<b>Pedestrian and road vehicle collision risk</b>	<p>Examples include:</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• the position of pedestrian gate forces / encourages pedestrian users to traverse diagonally across the roadway</li> <li>• road / footpath inadequately separated; footpath not clearly defined</li> <li>• condition of footpath surface increases the likelihood of users slipping / tripping into the path of vehicles</li> </ul>	<p>Controls can include:</p> <ul style="list-style-type: none"> <li>• providing separate pedestrian gates</li> <li>• clearly defining the footpath; renew markings</li> <li>• positioning pedestrian gates on the same side of the crossing</li> <li>• improving footpath crossing surface so it is devoid of potholes, excessive flangeway gaps and is evenly laid</li> <li>• improving crossing surface, e.g. holdfast, strail, non-slip surface</li> </ul>
<b>Personal injury</b>	<p>Examples include:</p> <ul style="list-style-type: none"> <li>• skewed crossing with large flangeway gaps results in cyclist, mobility scooter, pushchair or wheelchair user being unseated</li> <li>• condition of footpath surface increases the likelihood of users slipping / tripping</li> <li>• degraded gate mechanism or level crossing equipment</li> <li>• barrier mechanism unguarded / inadequately protected</li> </ul>	<p>Controls can include:</p> <ul style="list-style-type: none"> <li>• improving fence lines</li> <li>• reducing flangeway gaps and straightening where possible</li> <li>• providing decking or improving crossing surface, e.g. holdfast, strail, non-slip surface</li> <li>• straighten / realign gate posts</li> <li>• fully guarding barrier mechanisms</li> </ul>