

An aerial photograph of a residential neighborhood with a grid of streets and houses. A road runs horizontally across the middle, and a bridge structure is visible on the left side. The image is overlaid with a large, stylized red 'S' logo and a white circular graphic on the right side.

# S

## **Level Crossing Safety Impact Assessments**

*Bridget Feary*



# Level Crossing Safety

*All images are Near Misses at Level Crossings*



Pictures courtesy of Tracksafe and KiwiRail





# Level Crossing Safety - A Safe System Approach



- Humans make mistakes – but shouldn't be disproportionately punished for them
- Humans are vulnerable to injury – leading to a focus on harm minimisation
- A shared responsibility is required to address safety including rail operators, road controlling authorities and system users









## Level Crossing Risk Assessment Guidance (2018)



Final Guide for Industry Use (Version 2), October 2018

Developed for the NZ Transport Agency and KiwiRail  
by Stantec NZ and ViaStrada Ltd

### Appendix 7 Example Executive Summary

KiwiRail require the Executive Summary format to be consistent with the format used by the LCSIA Assessors, so have approved the following format. Request their format consistent with the topics covered by this layout permitted.

*If an LCSIA report is submitted without an Executive Summary, the report will not be reviewed until a suitable Executive Summary is provided.*

The LCSIA Assessor recommendations should be categorized as follows:

Where a 'Modified' SSSS has been applied in the assessment, this is clearly identified in the Executive Summary, so that KiwiRail LCSIA reports are primarily produced for KiwiRail, however, some of the technical terms in the Executive Summary are permitted.

#### A7.1 Example Executive Summary For

Springfield Council are planning to design a new shared corridor, which constitutes as a change in use of an existing Level Crossing Safety Impact Assessment (LCSIA) on the railway crossing. The Level Crossing Safety scores the risk of each crossing point at each assessment stage, the progression of the LCSIA for the level crossings aiming to achieve the two KiwiRail LCSIA Criteria.

#### Main Street Roadway LCSS:

Summary of the change in LCSS at Main Street level crossing

	Updated Existing	Change in Use	Proposed Design
LCSS	37 <sub>ms</sub>	39 <sub>ms</sub>	M
LCSS Risk Band	Medium	Medium	M
Criterion Met	-	None	Criteria 1 & 2

There were three recommendations made by the LCSIA to reduce the risk score and to attempt to achieve Criterion 1.

No.	Recommendation
1.	XXXX
2.	XXXX
3.	XXXX

#### Main Street Roadway Discussion:

The Updated Existing LCSS is Medium, and the Proposed Design achieve Score only achieves Criterion 2. Therefore, grade the Future Score.

A summary of the changes to the ALCAM risk band is presented in the following table.

Level Crossing Risk Assessment Guidance (2018) Version 2  
Summary of ALCAM changes at Main Street level crossings

	Updated Existing	Change in Use	Proposed Design
ALCAM Risk Band	High	High	Medium-High
ALCAM risk score change (%)	-	+33%	-23%
Fatal Return Period	400 years	178 years	563 years

The Updated Existing ALCAM risk band was High and remained High. The Proposed Design and Future Score reduced the ALCAM risk band crashes has increased by 23% and 21% respectively. The Return Period is likely than the Updated Existing.

There were no Red Flag issues raised at this road crossing for any of the following reasons:

Recommended Road Crossing Improvements:  
As the crossing has not met Criterion 1 for the Future Score, the level crossing from the railway line. The applicant to discuss if reasonably possible (SFARP) is a possibility, if so, then all Criteria should be met.

#### Main Street Pedestrian LCSS:

Summary of the change in LCSS at Main Street pedestrian level crossing

	Updated Existing	Change in Use	Proposed Design
Northern pedestrian crossing			
LCSS	42 <sub>ms</sub>	46 <sub>ms</sub>	28 <sub>ms</sub>
LCSS Risk Band	Medium High	Medium High	Medium Low
Criterion Met	-	None	Criteria 1 & 2
Southern pedestrian crossing			
LCSS	33 <sub>ms</sub>	35 <sub>ms</sub>	23 <sub>ms</sub>
LCSS Risk Band	Medium	Medium	Medium-L
Criterion Met	-	None	Criteria 1

There were five recommendations made by the LCSIA to reduce the LCSS to achieve Criterion 1, these were:

No.	Recommendation
4.	XXXXX
5.	XXXXX
6.	XXXXX
7.	XXXXX
8.	XXXXX



Level Crossing Risk Assessment Guidance (2018) Version 2  
Main Street Northern Pedestrian Discussion:

The Updated Existing LCSS is Medium-High, and the Change in Use LCSS increases further within the Medium-High band. The Proposed Design achieves Criterion 1 and Criterion 2, whilst the Future Score only achieves Criterion 2. Therefore, grade separation is required to achieve Criterion 1 for the Future Score. A summary of the changes to the ALCAM risk band is presented in the following table.

Summary of ALCAM changes at Main Street Northern pedestrian crossing

	Updated Existing	Change in Use	Proposed Design
ALCAM Risk Band	Medium-High	Medium-High	Medium
ALCAM risk score change (%)	-	+29%	-

The Updated Existing ALCAM risk band was Medium-High. The Proposed Design and Future Score achieved a reduction in the ALCAM risk band from Medium-High to Medium, with the ALCAM risk score reducing by 58%.

#### Main Street Southern Pedestrian Conclusion:

The Updated Existing LCSS is Medium, and the Change in Use LCSS increases further within the Medium band. The Proposed Design and Future Score achieve Criterion 1 for the Future Score. A summary of the changes to the ALCAM risk band is presented in the following table.

Summary of ALCAM changes at Main Street Southern pedestrian crossing

	Updated Existing	Change in Use	Proposed Design
ALCAM Risk Band	Medium	Medium	Medium
ALCAM risk score change (%)	-	+15%	-

The Updated Existing ALCAM risk band was Medium. The Proposed Design and Future Score achieved a reduction in the ALCAM risk band from Medium to Medium, with the ALCAM risk score reducing by 43% and 40% respectively.

#### Recommended Pedestrian Crossing Improvements:

As the northern crossing has not met Criterion 1 for the Future Score, the level crossing from the railway line. The applicant to discuss if reasonably possible (SFARP) is a possibility, if so, then all Criteria should be met.

#### Future User Volume Surveys:

The applicant is required to conduct additional surveys two years after the opening of the facility at the crossing. Subsequent surveys and reviews must be conducted.



### Recommended ALCAM updates in LXM:

- Road Crossing - ALCAM ID # 12345**
    - The traffic volume increased from 1,500 to 1,625.
    - Updated train volume from 85 passenger trains to 90 per day.
  - Northern Pedestrian Crossing - ALCAM ID # 12346**
    - Increased pedestrian volume from 100 to 104 AADT, with 110 in the peak hour.
    - Updated train volume from 85 passenger trains to 90 per day.
    - Increased proportion of school children from LOW to MEDIUM.
    - Flashing lights are not facing both approaches, so removed visual alarm from controls.
  - Southern Pedestrian Crossing - ALCAM ID # 12347**
    - Increased pedestrian volume from 100 to 104 AADT, with 47 in the peak hour.
    - Updated train volume from 85 passenger trains to 90 per day.
    - Flashing lights are not facing both approaches, so removed visual alarm from controls.
    - Deslected maintenance programme for vegetation, as vegetation is obstructing sight distance.
- Additionally, the LCSIA Assessor believes the following issues are incorrect in LXM:
- Road Crossing - ALCAM ID # 12345**
    - Review approach sight distances at crossing due to new building constructed in NE quadrant.
  - Northern Pedestrian Crossing - ALCAM ID # 12346**
    - Vegetation growing in the corridor needs to be maintained (down-track) or sight distance resurvey based on an unmaintained vegetation.
  - Southern Pedestrian Crossing - ALCAM ID # 12347**
    - View in the up-track left quadrant is obscured by a new fence line. Resurvey the sight distance.



# LCSIA - Level Crossing Safety Impact Assessment



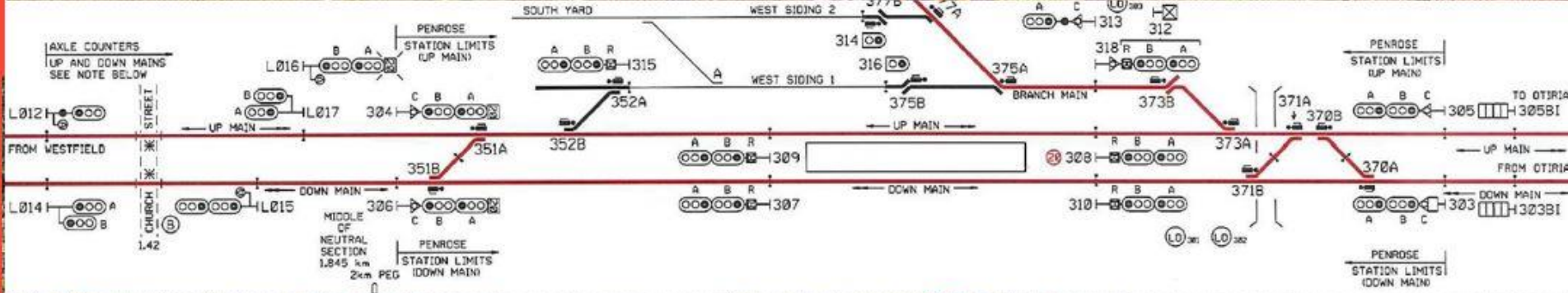
# LCSIA Process



Figure 7: Level crossing safety score risk bands

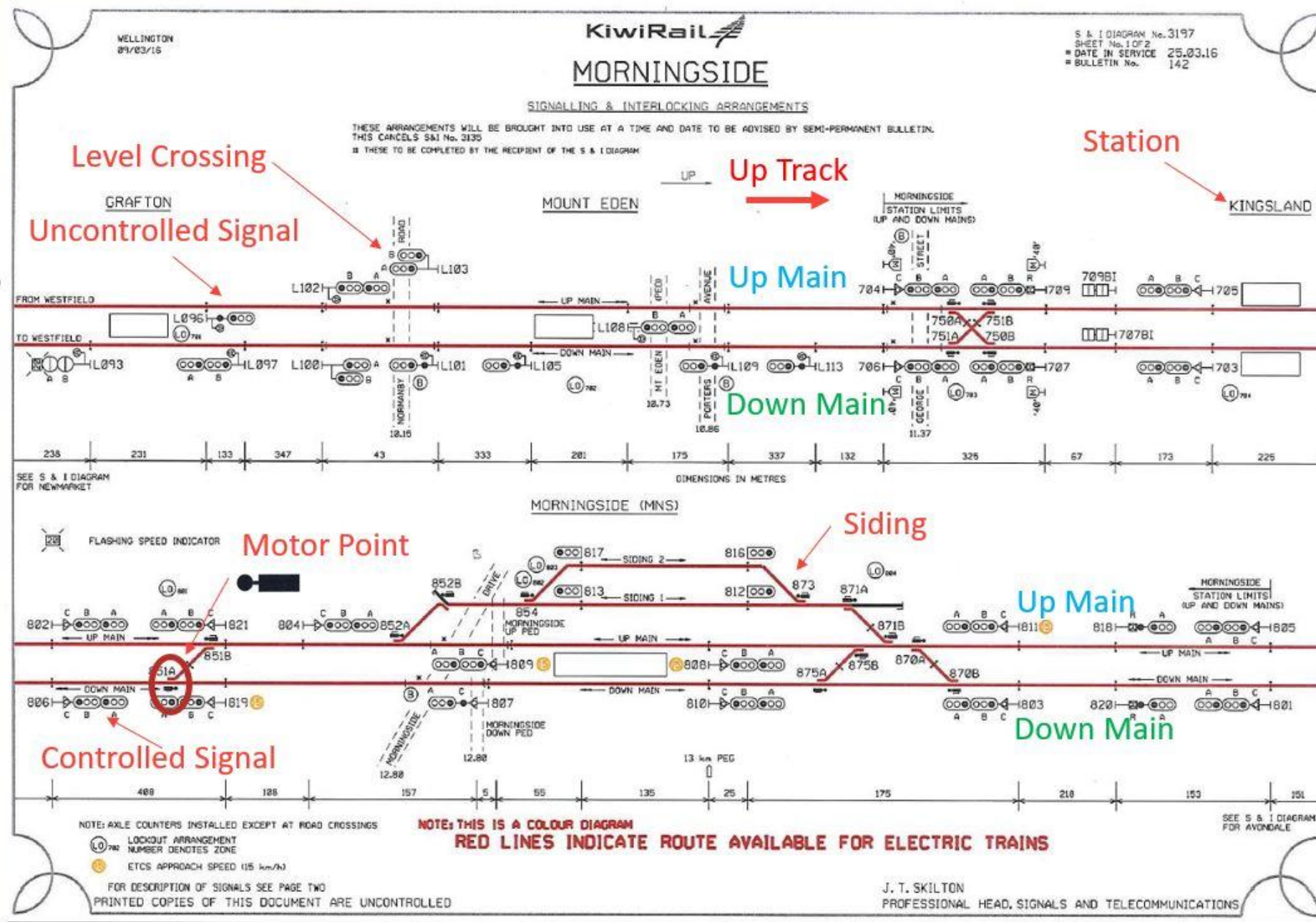


# Signalling and Interlocking





# Signalling and Interlocking





# Projects

Level Crossing Safety  
Impact Assessments



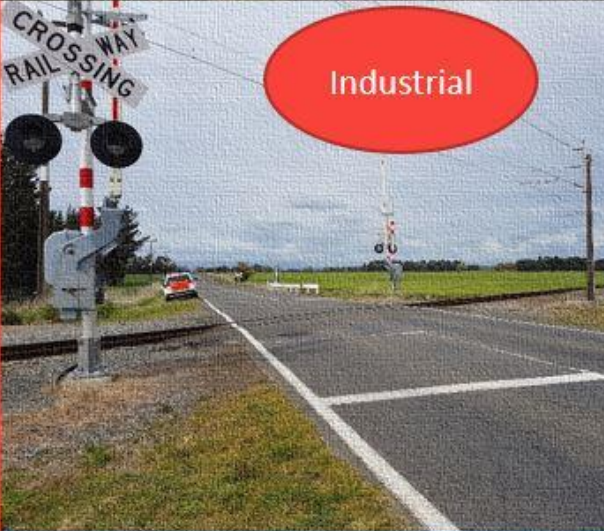
Commercial



Safety  
Audit



Port



Industrial



Landfill



Movie  
Set



Shunting  
Yard



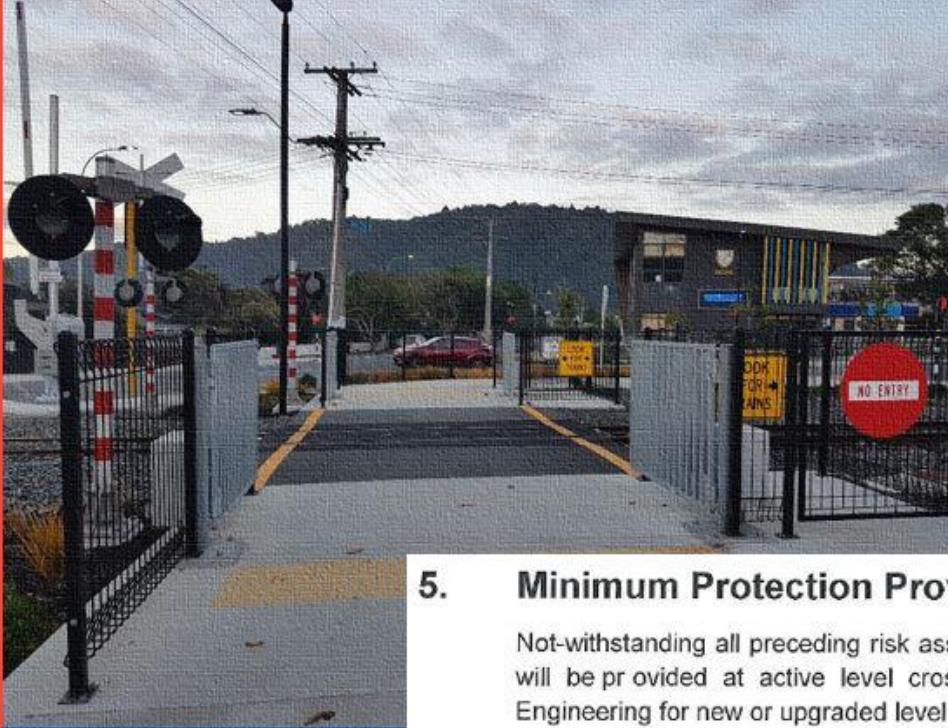
Safety  
Audit



Port



# Rail Crossing Infrastructure for Pedestrians and Cyclists



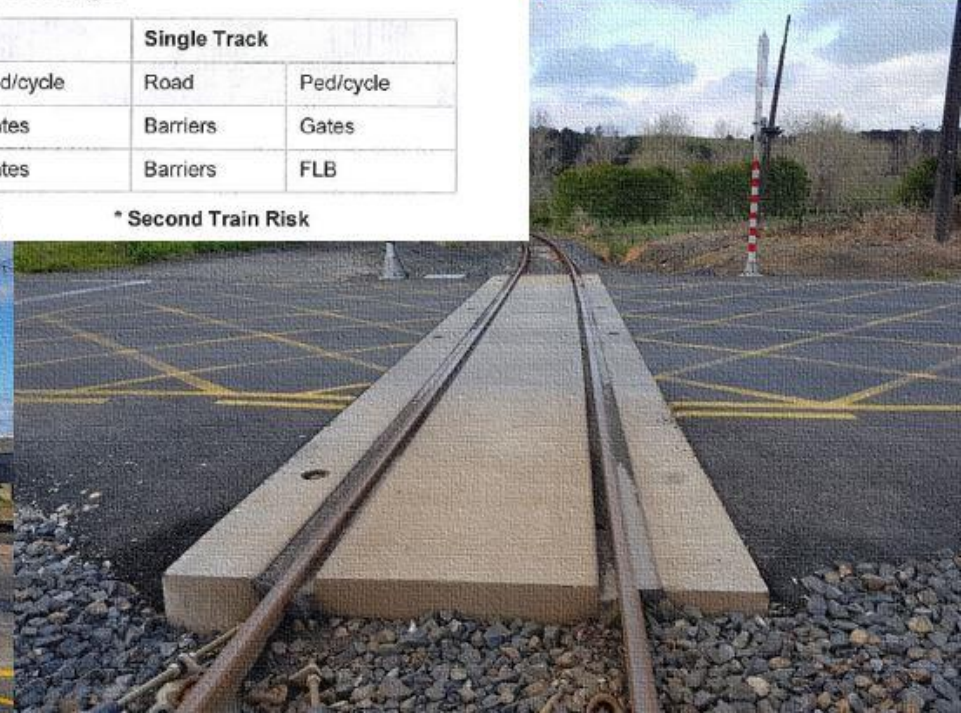
## 5. Minimum Protection Provided

Notwithstanding all preceding risk assessments the following minimum protections will be provided at active level crossings by Signals and Telecommunications Engineering for new or upgraded level crossings.

Railway Type	Multi Track*		Single Track	
	Road	Ped/cycle	Road	Ped/cycle
Metro	Barriers	Gates	Barriers	Gates
Non-metro	Barriers	Gates	Barriers	FLB

FLB = Flashing Lights and Bells

\* Second Train Risk





# Questions?

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