NSW GOVERNMENT

TOWARDS ZERO

Level Crossing Strategy Council Yearly Report 2016-17

August 2017

Front cover: Level crossing at **Cobbora Road**, Wellington in Central West NSW

Contents

Glossary

Active Control	Lights, bells, boom gates regulate motorists Lights, bells, booms, and locking swing gates regulate pedestrians
ALCAM	Australian Level Crossing Assessment Model
ARTC	Australian Rail Track Corporation
CRS	The Centre for Road Safety (a branch of the Freight, Strategy and Planning Division of TfNSW)
CRN	Country Regional Network (the part of the NSW rail network that is owned by TfNSW)
CSD	The Customer Services Division of TfNSW
DDA	The *Disability Discrimination Act 1992* (Commonwealth)
IPWEA	Institute of Public Works Engineering Australasia
JHR	John Holland Rail
LCCWG	Level Crossing Communication Working Group
LCIP	Level Crossing Improvement Program
LCSC	Level Crossing Strategy Council
LCWG	Level Crossing Working Group
LGNSW	Local Government NSW
NSW Trains	The NSW Government agency that provides passenger train and coach services for regional NSW and outer-metropolitan Sydney
NLCSC	National Level Crossing Safety Committee
ONRSR[1]	The Office of the National Rail Safety Regulator
Passive Control	STOP or GIVE way signs regulate motorists Signs warn pedestrians Pedestrian maze control and signage regulate pedestrians
Red Man	A flashing warning sign of a 'Red Man' warns pedestrians of oncoming trains
RIM	Rail infrastructure manager; a term defined in the *Rail Safety National Law* (NSW) that refers to, among other things, the person or organisation that has effective control and management of the rail infrastructure of a railway
RMS	Roads and Maritime Services
SDP	Service Delivery and Performance (a branch of the Infrastructure and Services Division of TfNSW)
Sydney Trains	The NSW Government agency that provides passenger train services for the Sydney suburban area and is the RIM for the greater Sydney metropolitan rail network
TfNSW	Transport for NSW (and the Department of Transport)

[1] Legislation to abolish the NSW Independent Transport Safety Regulator took effect on 31 March completing the transfer of NSW rail safety regulation to ONRSR

Executive Summary

1 Year in review: 2016-17

In 2016-17, Rail infrastructure managers (RIMs) and road managers invested a total of $29.21 million in level crossing safety initiatives in NSW, $7.28 million of which was provided through the NSW Level Crossing Improvement Program (LCIP). The LCIP is managed by Transport for NSW (TfNSW) and provides funding to accelerate improvements to level crossings at priority sites across NSW, raise community awareness of level crossing safety issues and promote new technology to improve level crossing safety. It is additional to the funds that rail infrastructure managers (RIMs) and road managers spend on maintaining and upgrading level crossings on their networks.

Eight LCIP-funded major upgrades of level crossings were commissioned in 2016-17: Cemetery Lane, Whittingham, Middle Folbrook Road, Nundah; Dudauman Street, Stockinbingal, Fry Street, Grafton, Yerong Street, The Rock, Summerland Way, Wiangaree, Cobbora Road, Wellington and Clergate Lane, Clergate (a 2-year project funded by the 2015-16 LCIP.

Development work for upgrades in future years formed a major part of the 2016-17 LCIP, with concept and detailed designs prepared for 2 projects: Lake Street, Ganmain and Marrar North Road, Marrar.

In addition to infrastructure works, the LCIP also funded other level crossing safety initiatives during the year; including:

- the level crossing safety education campaign, “Don’t rush to the other side”
- three level crossing police enforcement campaigns in regional NSW
- Australian Level Crossing Assessment Model (ALCAM) field assessments and road traffic data collection
- level crossing strategy and policy development.

The TfNSW Total Asset Management Plan provides funding of $7.3 million a year for the LCIP to 2025-26. This translates to an allocation of $29.2 million for the LCIP between 2014-15 and 2017-18. This allows for the planning and completion of future priority level crossing upgrades.

The LCSC endorsed the 2017-18 LCIP at its April 2017 meeting. At its June 2017 meeting the LCSC further endorsed extending the program to include the 2018-19 and 2019-20 financial years to convert it to a 3-year rolling program going forward. A 3-year program will provide RIMs and local councils with improved long-term planning and consultation capacity in the design and delivery of both LCIP and agency-funded level crossing upgrade projects. This will also give communities greater certainty in managing disruption while works are underway.

The following sections provide a consolidated overview of level crossing improvements delivered by RIMs and road managers in 2016-17 (including LCIP funded projects)

Appendix A: provides a summary of all projects funded under the LCIP in 2016-17

Appendix B: sets out the expenditure on level crossing upgrades in NSW funded through the LCIP and by RIMs and road managers from 2011-12 to 2016-17.

1.1 Agency level crossing initiatives

In addition to the LCIP, Australian Rail Track Corporation (ARTC), John Holland Rail (JHR) –Service Delivery and Performance (SDP), Roads and Maritime Services (RMS), Sydney Trains and NSW Trains implemented their own programs of level crossing safety improvements. Local government also has a role in assessing safety risk at level crossings on local council roads.

ARTC

During 2016-17, ARTC planned and delivered level crossing safety initiatives at 32 sites costing $3.03 million across its network in NSW. These works were undertaken in various NSW geographic regions spaning the west to the east coast and the south through to the north coast. Works included design packages, upgrading road and pedestrian surfaces, improving sighting distances, upgrading active crossing equipment and signage works.

JHR (CRN) - SDP

SDP and JHR (the contracted RIM for the Country Regional Network) undertook level crossing safety improvements on the CRN at a cost of $12.7 million. Works included: five passive to active level crossing upgrades; seven road surface improvements; two replacements of life-expired equipment; modification to signage on the CRN non-operational lines; and sighting distance improvements through vegetation clearing and excavation works.

RMS

During 2016-17, RMS delivered 5 level crossing safety initiatives across regional NSW costing $3.26 million. A $2.7 million major upgrade of the Golden Highway at Denman in the Hunter Region involved a major upgrade of the Denman level crossing and the Mangoola Road intersection to improve safety for motorists. RMS also undertook safety improvements costing $540,700 at four level crossings in West Wyalong. Works included road realignments and lane changes, level crossing signage upgrades, footpath resurfacing, relocation of flashing lights and replacement of boom gates.

Sydney Trains

During 2016-17, Sydney Trains delivered level crossing safety improvements of $2.942 million. Sydney Trains Capital Level Crossing Upgrade program continued with the $1.82 million upgrade of the level crossing at School Parade, Clifton. The work was completed in January 2017 and included road widening and resurfacing, along with the implementation of F-Type lights, booms and sirens. Other works for the remaining $1.122 million included conversion of bells to tri-tone sirens, renewal of motors, pedestrian lights and signage improvements. Additional sites were connected to the remote monitoring (Cerberus) system to enable early reporting of equipment failures.

NSW Trains

NSW Trains is a rolling stock operator and does not operate or maintain level crossings. It works constructively through the LCSC and other level crossing safety forums to deliver safer level crossings in NSW. This includes planning for the LCIP, and the cooperative approach to the allocation of resources.

In 2016-17, NSW Trains participated in local initiatives including the commencement of the new Regional Customer Support Centre in Wollongong, which enables the continuous monitoring of level crossings on the South Coast line via CCTV, particularly for pedestrian safety violations. NSW Trains will continue to examine the outcomes of this approach in 2017-18 to assess the extent of any similar behaviours at level crossings that are not monitored.

NSW Trains also extended its initiatives to build a closer relationship with the RIMs in its operating regions to develop shared approaches to level crossing safety improvements.

2 Level crossings in New South Wales

Under the *Rail Safety National Law (NSW)*, RIMs and road managers have an obligation to manage risks at level crossings. Safety regulatory oversight is provided by the Office of the National Rail Safety Regulator (ONRSR) for railway operations and rail infrastructure and the road/rail interface. Enforcement of the Road Rules 2014 is undertaken by the NSW Police Force.

2.1 Level Crossing Strategy Council

The Level Crossing Strategy Council (LCSC) is a NSW interagency forum that coordinates level crossing safety initiatives by RIMs and road managers and other key stakeholders. The LCSC is chaired by TfNSW and comprises senior executive representation from:

- TfNSW (Centre for Road Safety, Customer Services, Service Delivery and Performance)
- Australian Rail Track Corporation
- John Holland Rail
- Local Government NSW.
- NSW Police Force
- NSW Trains
- Roads and Maritime Services
- Sydney Trains

The Office of the National Rail Safety Regulator also attends the LCSC to provide a national perspective in discussions on rail safety related issues, and to offer independent comment/advice on level crossing safety strategy and policy. ONRSR does not have an endorsement or approval function in LCSC deliberations.

Guided by the *Strategic Plan for NSW Level Crossings 2010–2020*, the LCSC develops policy, reviews incident and safety trends, monitors new technologies, and oversees the development and delivery of the annual capital works program, and education and awareness campaigns.

The LCSC is supported by the Level Crossing Working Group (LCWG) and the Level Crossing Communication Working Group (LCCWG), which comprise officer-level representatives from member agencies. TfNSW provides secretariat support and assistance to the LCSC, LCWG and LCCWG, coordinates the implementation of the LCIP, and manages the application of the ALCAM in NSW.

2.2 Level Crossing Improvement Program

The LCIP was established in 2000 to fund a range of level crossing safety initiatives in NSW. Funding under the LCIP is supplementary to the existing capital and maintenance programs of RIMs and road managers to improve and maintain safety at the level crossings on their networks.

Key elements of the LCIP are: to accelerate engineering upgrades and safety improvements at priority level crossings, education campaigns and police enforcement campaigns in regional NSW, and data collection to ensure accurate information is available on the status of NSW public level crossings.

The projects funded under LCIP each year are developed by TfNSW (Centre for Road Safety), with the assistance of the LCWG, and endorsed by the LCSC. The LCWG monitors program delivery and promotes collaboration and consultation between delivery agencies. In April 2017, the LCSC endorsed an approach to establish the LCIP as a 3-year program to commence from the 2017/18 financial year.

A methodology is in place to determine the level crossings eligible for funding under the LCIP and the priorities for improvements. This methodology, commonly known as the LCIP (Infrastructure Works) Eligibility Criteria, was revised in 2013 to ensure available funding is applied effectively to level crossing safety improvements. The 2013 methodology applies to the development of the LCIP from 2014-15 to 2016-17.

In the first instance, the methodology distributes the LCIP funding across the following three categories:

- upgrading level crossings controlled by flashing lights to boom gates and flashing lights (approximately 33.5 per cent of upgrade funding)
- upgrading level crossings controlled by passive signage (e.g. give way or stop sign) to boom gates and flashing lights (approximately 53 per cent of upgrade funding)
- minor works at passively controlled level crossings (approximately 13.5 per cent of upgrade funding).

A prioritisation process is then used to identify the crossings to be upgraded within the first two categories. This process first uses an ALCAM ranking to generate a shortlist of sites. The shortlist is then refined through consultations with relevant stakeholders to nominate sites required for major upgrades. Consultations involve a review of level crossing incident data for NSW, and consideration of local knowledge from RIMs and road managers and other relevant stakeholders.

2.3 National Level Crossing Safety Committee

The National Level Crossing Safety Committee (NLCSC) was re-established in 2014 as an initiative of the Australasian rail industry. It is an inter-agency forum to coordinate efforts to improve safety at level crossings. Its terms of reference outline its strategic objectives which are to:

- reduce the likelihood of crashes and near misses at railway crossings
- improve coordination between road and RIMs, governments and other member organisations through maximising knowledge-sharing, skills and practice
- develop and recommend initiatives to align and coordinate safety mitigation strategies developed by member organisations where it is agreed a national perspective provides safety benefits.

The NLCSC is chaired by the Director-General of the Queensland Department of Transport and Main Roads, and includes representatives from Australasian jurisdictions, government and private rail operators, RIMs, rail industry associations, regulators, and the Australia New Zealand Police Advisory Agency. Its secretariat support function is provided by the TrackSAFE Foundation.

In April 2016, the Transport and Infrastructure Senior Officials Committee (TISOC) endorsed an approach for the NLCSC to function as an annual workshop with a focus on maximising knowledge-sharing and best practice, and on strategic opportunities such as greater national consistency in data collection/use and technology trials and take up. The NLCSC is to continue to report its progress to TISOC.

The Centre for Road Safety participated in a two-week international level crossing study tour to the United States and the United Kingdom in April 2017, which was facilitated by the TrackSAFE Foundation as an outcome of the work of the NLCSC. Government and industry participants from various Australasian jurisdictions visited American and British rail and road agencies and level crossing safety experts. This provided a rare networking opportunity to directly engage with Australian and international rail researchers, and industry and government representatives about world's best practice in current and emerging level crossing technologies.

Key take-outs included the application of quadrant boom gates and queuing prevention technology in the US and the UK. This will lead to further work in 2017-18 to examine the potential use of this technology in NSW for safer level crossings.

2.4 Level crossing closures

The only means of completely eliminating risk at a level crossing is to close the crossing. The closure of public and private level crossings is pursued, where appropriate, by LCSC member RIMs and road managers.

Thorough inspection and detailed assessment of crossings, including alternative means of access, is considered before closure. Consultation with the relevant local council, adjacent landowners, the community, RMS, emergency services and other rail and road users is also conducted prior to recommending closure. The *Transport Administration Act 1988* (section 99B) provides that level crossings can only be closed with the approval of the Minister for Transport and Infrastructure. The TfNSW Level Crossing Closures Policy provides more information on level crossing closures.

Since 2002, a total of 164 level crossings have been gazetted for closure, most of which were on private property.

2.5 Level crossing incident data

Of the 1,361 public road level crossings in NSW, 405 have active traffic controls; 161 have flashing lights and bells and 244 have flashing lights, bells and boom gates. The majority of other crossings are controlled by "give-way" or "stop" signs.

Two fatalities were recorded at level crossings in NSW in 2016-17, one resulted from a collision between a train and a pedestrian, and one resulted from a collision between a train and a road vehicle. There were six crashes between a train and road vehicle during the year, four at crossings with passive controls, and two at crossings with active controls. Overall, the number of crashes between a train and a road vehicle has decreased over the past 28 years in NSW. Figure 1 through to figure 4 show the number of collisions and fatalities at level crossings from 1989-90 to 2016-17.

Figure 1: Train Colliding with Road Vehicle at Level Crossing, 1989-90 to 2016-17 in NSW[2]

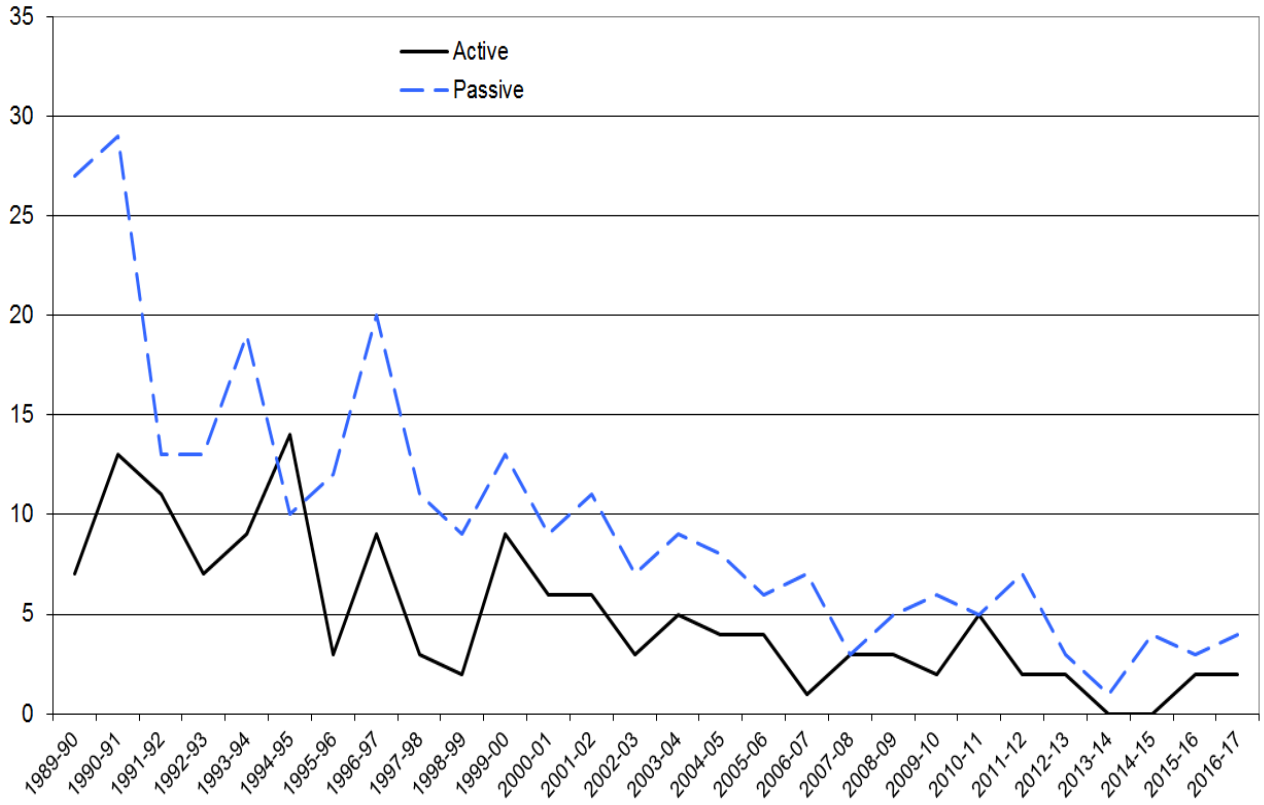
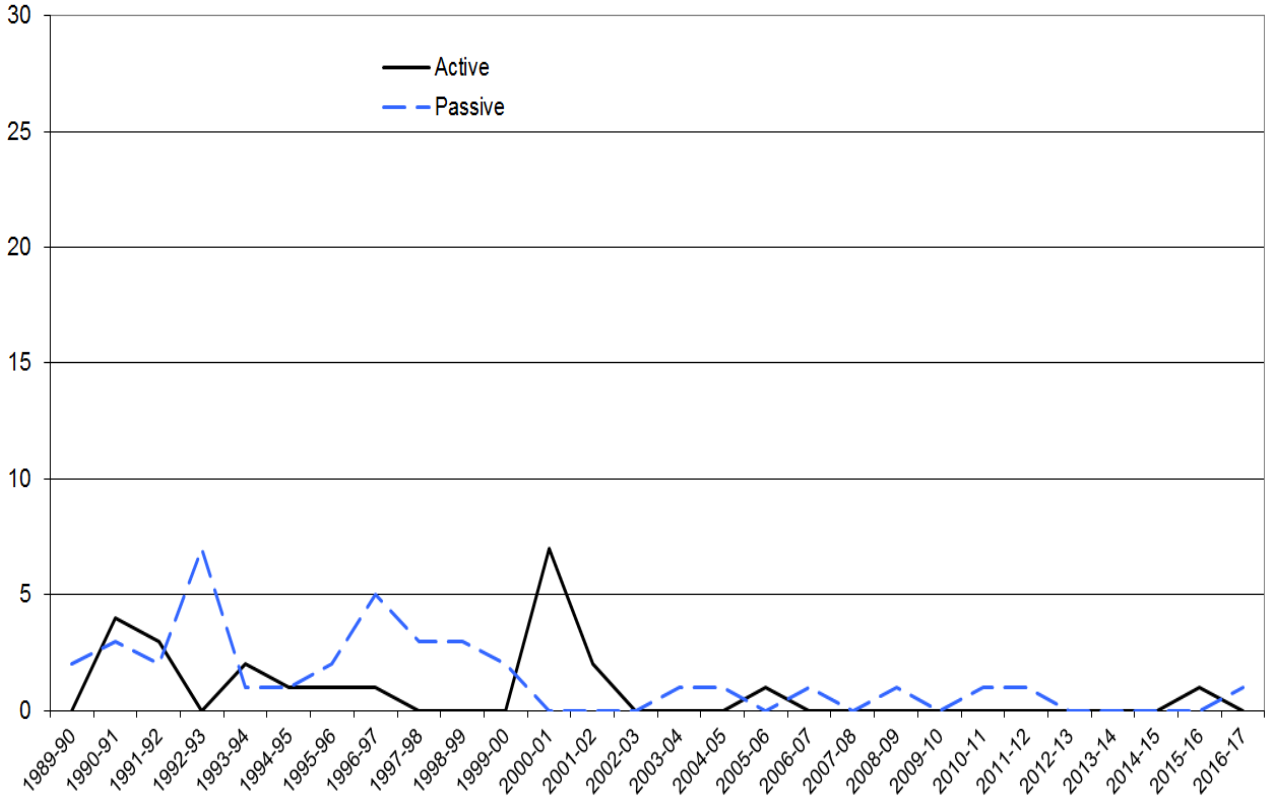


Figure 2: Fatalities: Train Colliding with Road Vehicles at Level Crossing, 1989-90 to 2016-17 in NSW



[2] There was also a collision between a train and a road vehicle at an uncontrolled level crossing in 2015-16, which is not included in the results shown in figure 1

Figure 3: Train Colliding with Person at Level Crossing, 1989-90 to 2016-17 in NSW

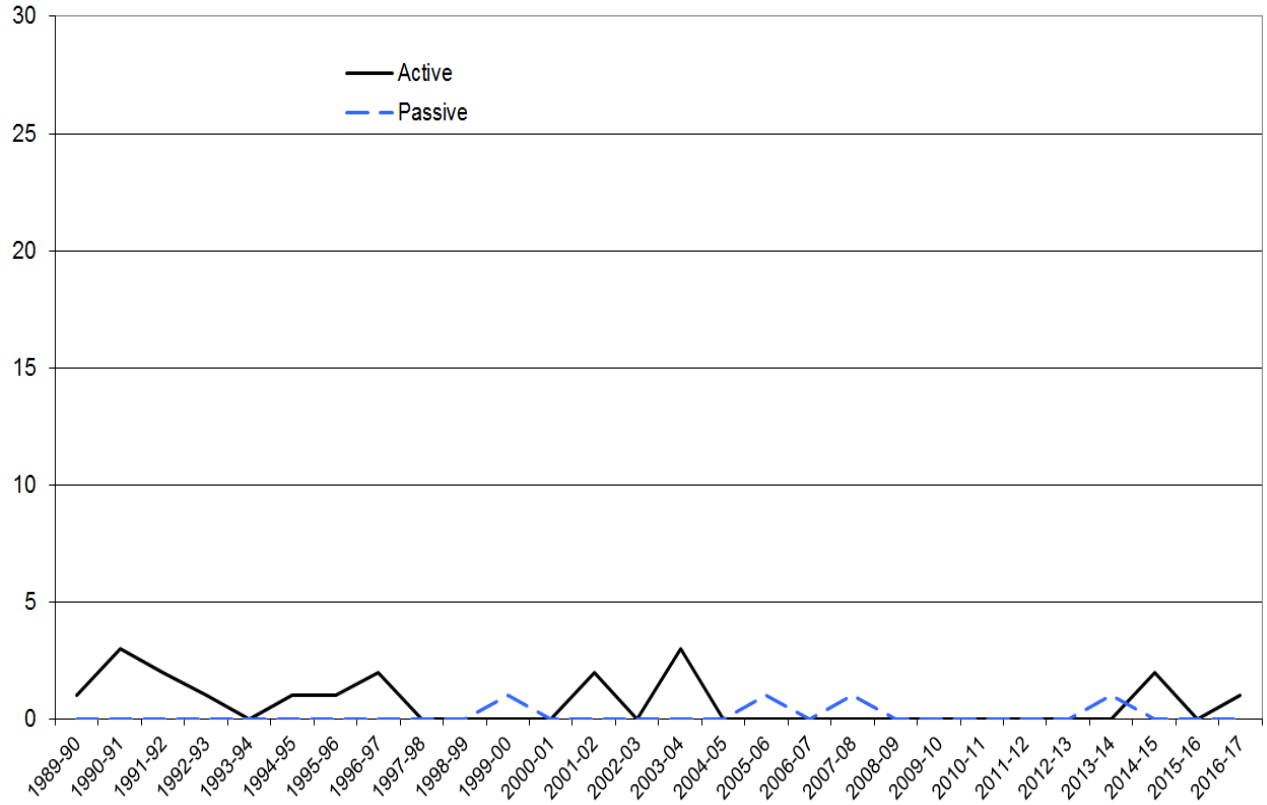
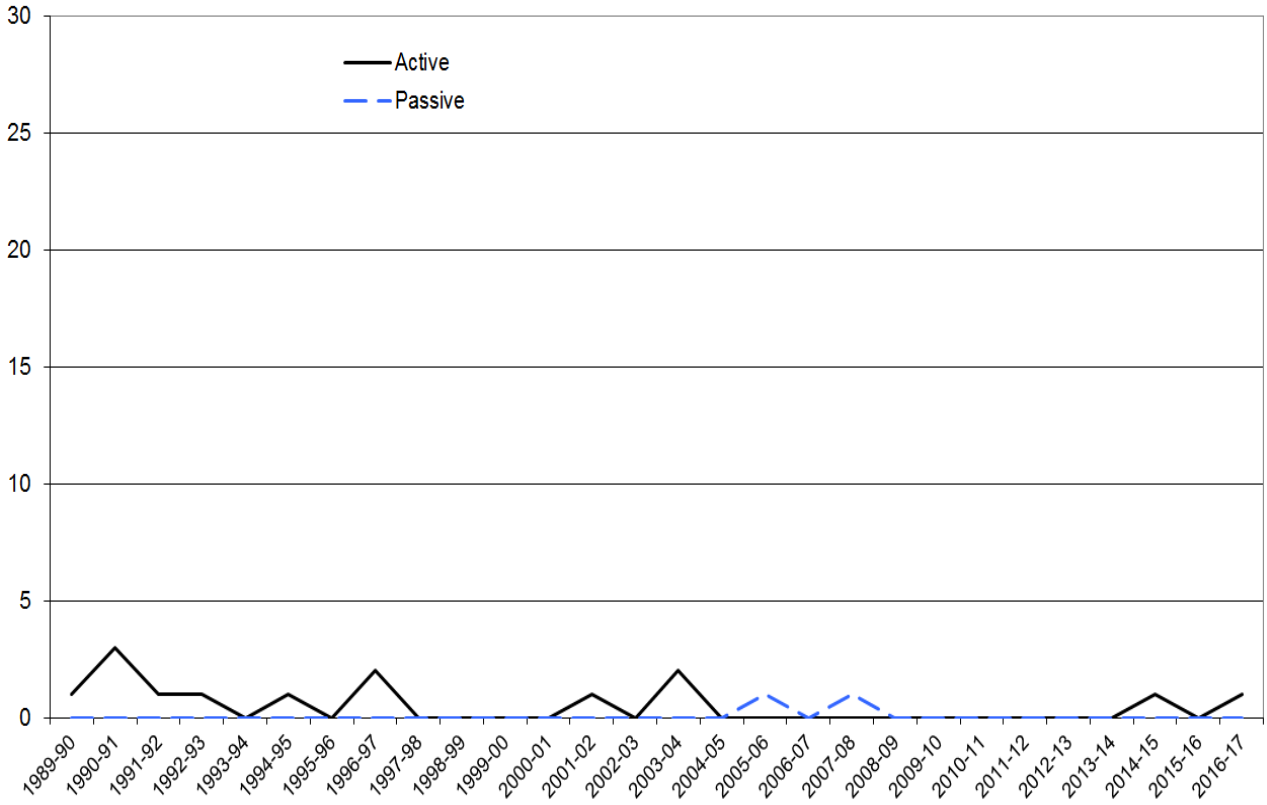


Figure 4: Fatalities: Train Colliding with Person at Level Crossing, 1989-90 to 2016-17 in NSW



2.6 Heavy Vehicles Harvest Fatigue Project

Harvest season

The RMS Western Region undertakes an annual behavioural road safety campaign focussed on farmers, truck drivers, grain receival site staff, rail companies and the general travelling public during the grain harvest season (harvest). The region is bounded by most of the Queensland and South Australian borders and incorporates a vast array of agricultural areas with crops including cotton, wheat, barley and sorghum.

Leading up to, during and after harvest, a large contingent of oversize heavy farming machinery is transported along some of the region's major transport routes. This also involves the movement of grain to and from grain receival sites (silos), which often operate 24 hours a day for peak periods during harvest.

The threat of bad weather, the pressure of rapidly ripening crops and the cost of machinery and contractors, means farmers have a tight window for harvesting to get the best possible returns for their businesses. Anecdotal information shows many fatigued drivers are on the road after completing long workdays operating machinery, performing other on-farm activities, and then driving grain to silos.

Harvest coincides with major school holiday periods (October and December-January) and times when a large contingent of 'grey nomads' are travelling south. The mix of farming machinery, grain trucks and other traffic along major freight/ travel routes is a significant concern for communities in the region.

Level crossing safety has featured in the campaign material since 2014. Feedback from rail infrastructure managers indicates harvest sees a jump in level crossing near misses as it coincides with more trucks and more trains on the network. Harvest is now a key area of focus for level crossing safety education and awareness in NSW.

2016-17 Highlights

Key highlights of the partnership between RMS and TfNSW on harvest for 2016-17 include:

- partner organisations engaged and encouraged to participate in the project now include GrainCorp and GrainFlow
- GrainCorp and the LCIP contribute funding and in-kind support
- 16 portable variable message signs were put in place for 8 weeks in 8 towns in the region: Moree, Bellata, Coonamble, Gilgandra, Trangie, Parkes, Condobolin and Forbes
- a Harvest Fatigue fact sheet was developed and sent to partners for wider distribution to growers and staff
- presentation material was created for partners to use when briefing landholder groups and inducting teams
- partners were given driver fatigue text for sms messaging to their grower contacts
- information was prepared to enable the media to highlight the danger of fatigue during harvest

- peak rural groups such as the Country Women's Association, Local Land Services, Landcare, the Rural Women's Network and farmers' groups, were engaged to help promote key road safety messages to farmers
- local road safety officers were engaged to support and promote road safety through their networks
- the Test Your Tired Self website was further promoted and encouraged to be used through promotional material such as, for example, reusable coffee cups and notebooks
- the variable message sign component was also deployed at key sites in the RMS South West Region, which extends from the South Australian border to the Monaro.

Level Crossing Improvement Program 2016-17

3 Infrastructure works

3.1 Major works completed

During 2016-17 eight major construction projects were commissioned across the NSW rail network under the LCIP. These are shown in table 1 and described in more detail below.

Table 1: LCIP Major Construction Works Completed in 2016-17

Street	Location	Network
Cemetery Lane	Whittingham	ARTC
Middle Folbrook Road	Nundah	ARTC
Dudauman Street	Stockinbingal	ARTC
Fry Street	Grafton	ARTC
Yerong Street	The Rock	ARTC
Summerland Way	Wiangaree	ARTC
Cobbora Road	Wellington (accelerated project)	CRN JHR
Clergate Lane	Clergate	CRN JHR

3.1.1 Cemetery Lane, Whittingham

This passive level crossing was upgraded from stop signs to new high intensity LED flashing lights, bells and retro-reflective boom gates. The upgrade also included resurfacing of the road close to and across the crossing with new road and rail signage. The upgrade was commissioned on 24 November 2016 at a total cost of $783,000.

Figure 5: Cemetery Lane, Whittingham

Cemetery Lane, Whittingham (Before)

Cemetery Lane, Whittingham (After)

3.1.2 Middle Folbrook Road, Nundah

This passive level crossing was upgraded from stop signs to new high intensity LED flashing lights, bells and retro-reflective boom gates. The upgrade also included resurfacing of the road close to and across the crossing with new road and rail signage. The upgrade was commissioned on 24 November 2016, at a total cost of $758,000.

Figure 6: Middle Folbrook Road, Nundah

Middle Folbrook Road, Nundah (Before)

Middle Folbrook Road, Nundah (After)

3.1.3 Dudauman Street, Stockinbingal

This passive level crossing was upgraded from stop signs to new high intensity LED flashing lights, bells and retro-reflective boom gates. The upgrade also included new road and rail signage. The upgrade was commissioned on 21 March 2017 at a total cost of $975,000.

Figure 7: Dudauman Street, Stockinbingal

Dudauman Street, Stockinbingal (Before)

Dudauman Street, Stockinbingal (After)

3.1.4 Fry Street, Grafton

This passive level crossing was upgraded from stop signs to new high intensity LED flashing lights, bells and retro-reflective boom gates. The upgrade also included road works, new road and rail signage and line marking. The upgrade was commissioned on 12 March 2017 at a total cost of $774,000.

Figure 8: Fry Street, Grafton

Fry Street, Grafton (Before)

Fry Street, Grafton (After)

3.1.5 Yerong Street, The Rock

This active level crossing was upgraded from flashing lights and bells to new high intensity LED flashing lights, bells and retro-reflective boom gates. The upgrade also included major road works, new road and rail signage and line marking. The upgrade was commissioned on 30 June 2017 at a total cost of $977,000.

Figure 9: Yerong Street, The Rock

Yerong Street, The Rock (Before)

Yerong Street, The Rock (After)

3.1.6 Summerland Way, Wiangaree

This active level crossing was upgraded from flashing lights and bells to new high intensity LED flashing lights, bells and retro-reflective boom gates. The upgrade also included a new level crossing equipment building, audible warning devices, new emergency switches, a test switch and manual operation switch. The upgrade was commissioned on 12 June 2017 at a total cost of $676,000.

Figure 10: Summerland Way, Wiangaree

Summerland Way, Wiangaree (Before)

Summerland Way, Wiangaree (After)

3.1.7 Cobbora Road, Wellington

This active level crossing was upgraded from flashing lights and bells to new high intensity LED flashing lights, bells and retro-reflective boom gates. The upgrade was commissioned on 6 June 2017 at a total cost of $434,000 JHR (accelerated project).

Figure 11: Cobbora Road, Wellington

Cobbora Road, Wellington (Before)

Cobbora Road, Wellington (After)

3.1.8 Clergate Lane, Clergate

The level crossing at Clergate Lane was approved by the LCSC for upgrade in the 2015-16 financial year. On the 29 October 2015 it was agreed to complete the construction over two financial years due to the limited track possession windows over the financial

year. This passive level crossing was upgraded from stop signs to new high intensity LED flashing lights, bells and retro reflective boom gates. The upgrade also included major road and drainage works.

The upgrade was commissioned on 29 June 2017 at a total cost of $1.797 million, which includes a contribution of $688,000 from the LCIP for civil preparation works and signage design in the 2015-16 financial year.

Figure 12: Clergate Lane, Clergate

Clergate Lane, Clergate (Before)

Clergate Lane, Clergate (After)

3.2 Development work undertaken

Development work for upgrades in future years is a key element of the LCIP. The concept and design work, and early procurement of signalling equipment undertaken during 2016-17 is shown in table 2 below.

Table 2: LCIP Concept and Detailed Designs Completed in 2016-17

Street	Location	Network	Cost
Lake Street	Ganmain	CRN JHR	$155,000
Marrar North Road	Marrar	CRN JHR	$196,000

3.3 Minor works

In 2016-17, the LCIP funded minor construction works at 36 level crossings (see table 3 below) in regional NSW including:

- 15 locations in the Northern Rivers
- 7 locations on the Mid-North Coast
- 6 locations in New England
- 4 locations in the North West
- 2 locations in the Hunter
- 1 location in the Southern Tablelands
- 1 location in the Riverina

Minor works funding during 2016-17 also included:

- 6 speed zone reviews as shown in table 4
- investigation and installation of warning signposting at 20 short stacking locations that had been identified through ALCAM and consultations with RMS

3.3.1 Minor construction works

Table 3: Minor works

Street	Location	Scope
ARTC Minor works		
Bango Road	Bango	Sighting improvements including cutting works
Taylors Road	Culcairn	Sighting improvement and signage
Border Spiral Road	Border Loop	Improve sighting in A1 and A4 to mouth of tunnel and install signage
Ampdale	Camira Creek	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install flexible guideposts; Upgrade signage
AWJ Moore and Co	Bulliac	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies and flexible guideposts Relocate crossing 50m north to improve sighting distance in A2
Hilldale Road	Hilldale	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies, gates and flexible guideposts Upgrade and level road approaches to improve safety and remove vegetation to improve sighting distance
Public Road	Nooroo	Install new RX2 assemblies, gates and flexible guideposts Upgrade and level road approaches to improve safety and remove vegetation to improve sighting distance
Macquarie Street	Taree	Remove and reinstate humping bitumen safety hazard to pedestrians and scooters
Public Road	Kerewong (Wauchope South)	Install new RX2 assemblies, gates and flexible guideposts Upgrade humped crossing by installing steel panel Upgrade and level road approaches to improve safety and remove vegetation to improve sighting distance
Cochrane Street	Kempsey	Remove non-frangible material from the rail corridor and reinstate gate Install new RX2 assemblies and flexible guideposts Upgrade and level road approaches to improve safety
Old Ferry Road	Raleigh	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies and flexible guideposts Upgrade and level road approaches to improve safety

Street	Location	Scope
Towells Road	Glenreagh	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies and flexible guideposts Upgrade and level road approaches to improve safety Remove large trees in A4 and vegetation in all quadrants to improve sighting distance
Brennans Road	Kungala	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies and flexible guideposts Upgrade and level road approaches to improve safety Remove large trees on up side and vegetation in all quadrants to improve sighting distance
Maloneys (off Poley House Road)	Braunstone	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies and flexible guideposts Upgrade and level road approaches to improve safety Remove vegetation in all quadrants to improve sighting distance
Baraimal Lane	Fairy Hill	Level road approaches to remove hump, resurface and install bitumen - requires road closure
Dilkoon Road	Dilkoon	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies and flexible guideposts Realign road approaches to improve angle for quadrants A1 and A3 to improve safety Cut back bank in quadrant A3 to improve sighting distance
Howlett Road	Johns River	Remove small trees to improve sighting distance
West Street	Casino	Renew pedestrian maze fencing both sides
Mt Marsh Road	Whiporie	Remove small trees to improve sighting distance
Leeville Station Road	Leeville	Remove small trees to improve sighting distance
Cedargetters Road	Loadstone	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Remove 10 trees in quadrant A2 to improve sighting distance
Coombell Road	Coombell	Remove small trees in quadrants A2 and A3 to improve sighting distance
Whian Whian Road (off Myrtle Creek Road)	Rappville	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies and flexible guideposts Remove trees and cut back bank in quadrant A1 to improve sighting distance
Andrew Street	Kyogle	Cut back bank in quadrant A4 to improve sighting distance - survey required
Boat Harbour Road	Kundabung	Remove small trees to improve sighting distance
Clearfield Road	Clearfield	Remove non-frangible material from the rail corridor and re-instate fences/gates to boundary Install new RX2 assemblies and flexible guideposts Remove trees in quadrant A1 to improve sighting distance

Street	Location	Scope
JHR/SDP (CRN) Minor works		
Markham Street	Armidale	Replace crossing signs to suit Australian Standards
Estate Road	Mount Falcon	Replace crossing signs to suit Australian Standards
Denison Street	West Tamworth	Replace crossing signs to suit Australian Standard
Darling Street	Tamworth	Replace crossing signs to suit Australian Standards
Hall Street	Tamworth	Replace crossing signs to suit Australian Standards
Walcha Road	Uralla	Replace crossing signs to suit Australian Standards
Brisbane Street	Tamworth	Replace non-frangible RX5 crossings stands including signage
Currabubula	Main Street	Replace non-frangible RX5 crossings stands including signage
Carnarvon Highway	Moppin	Replace non-frangible RX5 crossings stands including signage
Newell Highway	Narrabri West	Replace non-frangible RX5 crossings stands including signage
Total	**36**	

3.3.2 RMS Speed zone reviews

RMS conducted 6 speed zone reviews at the locations shown in table 4.

Table 4: RMS speed zone reviews funded by the LCIP

Street	Location	Network
Marsden Road	Wirrinya	**ARTC**
Turanville Road	Togar	**ARTC**
Newell Highway	Tichborne	**ARTC**
Bentley Road	Kyogle	**ARTC**
Newell Highway	Welcome	**ARTC**
Mongogarie Road	Leeville	**ARTC**
Total	6	

3.3.3 RMS Short stacking program

In 2016-17 RMS commenced a project to investigate short stacking locations identified through ALCAM and in consultations with RMS regions.

Short stacking occurs where the distance between the closest rail of the level crossing and a downstream intersection or other constriction is not long enough to accommodate the design vehicle plus a safety factor of 5 metres stopped at the intersection without fouling the tracks.

A similar scenario involves a left or right turn from a continuing road (e.g. a highway) onto the short space before a level crossing. Here, the long vehicle may need to stop before traversing the level crossing, leaving the rear of the vehicle remaining partially on the highway. This presents a risk to other vehicles travelling in either direction.

TfNSW approved an RMS submission to fund short stacking investigations and install warning signposting as a first step to addressing this issue. TfNSW allocated $100,000 from the LCIP to commence this work in 2016-17, with a further $400,000 allocated to complete the work in 2017-18.

4 Awareness and enforcement campaigns

4.1 Level crossing awareness and education campaign

The ‘Don’t rush to the other side’ level crossing safety education campaign, which provides a timely reminder to drivers that level crossings should not be approached with complacency, continued to run throughout 2016-17 on behalf of the LCSC.

The campaign focussed on light vehicle drivers who live within 10 kilometres of a level crossing in regional NSW. The paid advertising campaign was fully integrated and ran across television, outdoor billboards and petrol pumps, radio, digital and social media.

New social media content was developed in 2017 featuring two train drivers from NSW Trains being interviewed about their personal experiences around level crossings and the need for motorists to be aware and always obey the signs and signals. The first video was published on the NSW Road Safety Facebook page on 2 May with the second video released on 1 June to align with International Level Crossing Awareness Day.

The content had a positive response, with almost 270,000 video views and an engagement rate of 2.68 per cent. The majority of comments on the posts also endorsed the key messages promoted in the videos. Extended versions of the content will be included in future Field Days event videos.

In 2016-17, there were three periods of paid advertising: November 2016, to coincide with harvest season when more trains are operating and more vehicles are on the road, and February 2017 and May/June 2017 during the traditional peaks in level crossing collisions.

TfNSW ran three localised radio campaigns and letterbox drops to inform residents of upcoming local Police enforcement operations at level crossings, and remind them of the penalties for disobeying the road rules (see section 4.2). To complement this, Acting Inspector Mick Timms, NSW Police Traffic Highway Patrol Command, was interviewed by local radio stations in these areas to discuss the risks associated with level crossings.

Campaign tracking research carried out during 2016-17 activity by an independent

research agency showed the campaign continues to perform well for light vehicle drivers. Summary of the results are set out in table 5 and table 6.

Table 5: Campaign Effectiveness - Advertising Diagnostics

Light Vehicle Drivers
• 47% Recognition • 82% Main Message • 74% Believability • 49% Social Relevance

Table 6: Campaign Effectiveness - Behavioural and Attitudinal

Light Vehicle Drivers
• 79% of light vehicle drivers who have seen the campaign believe it is very dangerous to speed up to make it through a level crossing before the boom gates close (versus 74% of drivers who haven't seen the campaign). • 88% of light vehicle drivers claimed they had never driven around the boom gate to get through a level crossing in the past 12 months (versus 79% of drivers who haven't seen the campaign). • 92% of light vehicle drivers claimed they will never drive through a level crossing without stopping when there is a Stop sign (versus 84% of drivers who haven't seen the campaign).

To help to continue to raise the profile of level crossings and generate talkability, TfNSW again participated in a number of public relations road-show events featuring the 'Pearly Gates' campaign message and a crashed car that had been involved at a level crossing incident.

The events included:

- Rail Safety Week – August 2016
- AgQuip Field Days (Gunnedah) – August 2016
- Henty Machinery Field Days (Henty) – September 2016
- Australian National Field Days (Borenore) – October 2016

Figure 13: 2016 AqQuip Field Days (Gunnedah)

Figure 14: 2016 Australian National Field Days (Borenore)

While the ‘Don’t rush to the other side’ campaign continued throughout 2016-17 for light vehicle drivers, research results indicate the need for new tailored communications to be developed for heavy vehicle drivers to positively shift attitudes and reduce unsafe behaviours at level crossings.

The production of a pilot campaign was undertaken at the end of 2016-17. This focussed on heavy vehicle drivers through key heavy vehicle publications (such as *Big Rigs*) and was amplified through radio and social media to engage with the audience and address specific heavy vehicle driver issues around level crossings. Engagement results from this test campaign will be used to inform the development of a heavy vehicle driver communication strategy in 2017-18.

4.2 Level crossing Police enforcement campaign

The joint TfNSW / NSW Police Force Level Crossing Awareness and Enforcement Campaign continued during 2016-17 with three campaigns: Taree and Melinga; Tamworth, Willow Tree and Werris Creek; and Bungendore, Tarago and Lake Bathurst.

NSW Police is responsible for the enforcement of the *Road Rules 2014* including level crossing offences. Legal actions (table 7 below) for level crossing offences (driving) have now been trending upwards since 2010 due to a heightened awareness of level crossing safety brought about through the campaign.

In 2016-17, 422 penalty notices were issued to motorists for traffic offences at level crossings.

Table 7: NSW Police Level Crossing Legal Actions between 2010-11 and 2016-17

Financial Year	Legal Actions
2010-11	219
2011-12	281
2012-13	306
2013-14	371
2014-15	488
2015-16	414
2016-17	422

Figure 15: Media Event at Bungendore on 19 May 2017. Pictured left Kings Highway level crossing and Acting Inspector Mick Timms, Traffic and Highway Patrol Command, speaking to the media

4.3 Level crossing awareness and enforcement campaign strategy

At its April 2017 meeting the LCSC endorsed a level crossing awareness and enforcement campaign strategy to commence from 1 July 2017 going forward. The strategy sets out the agreed approach to develop, plan and deliver level crossing awareness and enforcement campaigns in regional NSW.

A key area of focus for police enforcement activity for the strategy is the speed of vehicles on the approaches to active level crossings, particularly those with curved road approaches. This reflects the importance of addressing the potential for high-consequence level crossing crashes where speed is a contributing factor.

Campaigns will continue to focus on motorists disobeying level crossing controls at nearby crossings.

5 ALCAM development and data collection

ALCAM is used to assess potential risks at level crossings and to assist in the prioritisation of safety improvements at level crossings according to their comparative safety risks. ALCAM is currently applied across Australia and in New Zealand, and is overseen by the National ALCAM Committee.

5.1 National ALCAM Committee

The National ALCAM Committee comprises representatives of all Australian states and territories, and New Zealand. The committee's role is to manage the development of ALCAM and to ensure consistency in its application. TfNSW represents NSW on the committee.

During 2016-17, the committee made significant progress on developing ALCAM training and assessment materials. The majority of the development work has been completed and the remaining work is scheduled to be finalised in early 2017-18.

The committee also commenced an investigation of possible training resources as well as potential internal and external providers in the market place interested in undertaking the ALCAM site data collection training. This project, led by TfNSW, aims to increase the number of ALCAM data collection providers in the market, which would in turn increase market competition and improve value for money.

Throughout the year, there was ongoing support and maintenance/enhancements of the online Level Crossing Management System database by the committee to ensure the system operates in a satisfactory condition and users are given adequate technical support in a timely manner.

5.2 NSW ALCAM data collection

Details on traffic controls, level crossing characteristics and other related risks are currently collected on all public level crossings on a cyclical basis over a five-year period in NSW. These details are loaded into the ALCAM database to update the characteristics and risk profiles for level crossings in NSW.

In 2016-17, the LCIP funded two streams of data collection projects in NSW. These included ALCAM field assessments at 212 road and pedestrian level crossings on the ARTC network and road traffic data collection (including type, volume and speed of vehicles traversing a level crossing) at 315 level crossings in NSW.

6 New technology and research

6.1 Australasian Centre for Rail Innovation

ACRI approach

The Australasian Centre for Rail Innovation (ACRI) is a not-for-profit organisation established to provide professional, independent applied research, strategic and economic analysis and innovative solutions for the Australasian rail industry and the broader transport sector. These activities support and ensure continued improvement in productivity and sustainability to underpin the competitive position of the industry.

In its first three years, ACRI has completed 19 major projects with outcomes including:

- delivery of a good practice overview of condition monitoring in rail operations
- influencing a Standards Australia standard to improve safety around level crossings
- successfully trialling various new technologies to improve safety and efficiency in rail
- conducting a unique Health and Safety Survey for the New Zealand Rail sector

ACRI's program of seeking memorandums of understanding and co-operation with Australian and overseas rail and logistics bodies allow it to undertake joint projects and share information with participants about current and past research. ACRI now has agreements with bodies such as the UK Rail Safety Standard Board, the US Federal Railroad Administration, Transport for Canada, the Australian Logistics Council, the Rail Industry Safety Standards Board of Australia, the International Union of Railways, and the Italian rail body *Italcertifer SpA*.

ACRI has reinvigorated the ACRI/National Interest Services Rail Knowledge Bank. The knowledge bank is an information-rich website covering every aspect of rail and related transport in Australia and New Zealand with additional material and links on international rail. It provides ease of access to tens of thousands of reports, articles and research outcomes. This is of considerable value to industry, suppliers, customers and researchers, and limits the potential for duplication of effort.

ACRI Level Crossing Work Program

The safety of motorists, pedestrians, rail workers and operators is the principal area of focus in the ACRI level crossing work program. With up to 40 deaths a year at level crossings across Australia, ACRI's work to improve safety in all aspects of level crossing operation has the potential to make an important contribution to Towards Zero.

Research projects consist of:

- Level crossing sighting distances
- Impact of waiting times on risk and standardisation of waiting times
- Passive crossings and table-top carriages
- Evaluation of a level crossing enforcement system
- Better stimulus around level crossing control
- Low cost level crossing risk and legal evaluation
- Affordable level crossings

- Baseline of near-miss incident level crossing reporting video
- Rail flange gaps
- Active “expect trains” sign trials
- Train horn investigation
- Pedestrian LED visual warning devices
- Sighting distances at private level crossings
- Current international practice in prevention of trespass / self-harm incidents on urban rail systems

6.2 Interconnected level crossings

The April 2017 international level crossing study tour (see section 2.3 on page 9), included a briefing from the US Department of Transportation, which dealt with a range of issues including interconnected level crossings. These are level crossings where the level crossing controls are interconnected with the traffic signals at adjacent road intersections.

The briefing dealt with a bulletin from the US Federal Railroad Administration (FRA) to States entitled: *Verify Traffic Lights Connected to Railroad Crossings Function Correctly*, which strongly recommend that state and local transportation officials, together with railroad officials, visit crossings in their region and monitor and test level crossing signals and adjacent traffic signals to ensure they are synced and operating properly.

In May 2017, TfNSW facilitated a technical workshop with RIMs, RMS and the TfNSW Asset Standards Authority to review the operation of NSW level crossings interconnected with traffic signals, and to ensure both road and rail control systems are operating correctly. This work will continue during 2017-18.

Safety initiatives

7 LCSC agency level crossing safety initiatives

7.1 ARTC level crossing initiatives

During 2016-17 ARTC undertook level crossing safety improvements of $3.03 million across its network in NSW, as shown in table 8, for road and pedestrian crossings.

Table 8: ARTC level crossing safety improvements in 2016-17

Location	Cost	Sites	Project Scope
Anvill Hill to Sandy Hollow Junction - Denman	$250,000	1	Replace rubber panels
Bengalla Junction to Anvill Hill - Roxburgh	$140,000	1	Renew bitumen road surface
Cootamundra to Junee – multiple locations	$203,234	5	Renew bitumen road surface, upgrade boom motors and LEDs, upgraded to rubber panels
Dartbrook Junction to Murulla - Aberdeen	$475,088	1	Lights and bells relocated to prevent collisions
Goobang Junction to Troy Junction - multiple locations	$115,000	2	Upgraded to steel panels, upgrade to rubber panels
Junee - The Rock, Bomen	$87,416	1	Boom motor upgrade
Kundabung to Lawrence Road - multiple locations	$126,678	3	Upgrade to GCP 4000, Sighting distance improvement
Lawrence Road to The Border, Mount Lion	$13,197	1	Sighting distance improvement
Merrygoen to Gap - multiple locations	$75,000	2	Sighting distance improvement
Merrygoen to Gulgong - multiple locations	$50,000	2	Sighting distance improvement
Moss Vale Junction to Unanderra - Moss Vale	$158,363	1	Upgrade pedestrian level crossing to rubber panels
Stratford Junction to Kundabung - multiple locations	$506,320	6	Replaced rubber panel, boom motor upgrade, upgrade to rubber panels, replaced RX-5 assemblies
Troy Junction to Merrygoen - multiple locations	$37,000	2	Sighting distance improvement
Willow Tree to Werris Creek - multiple locations	$497,875	2	Boom motor upgrade, upgrade to rubber panels
Woodville Junction to Islington Junction - Islington Junction	$211,150	1	Renew bitumen road surface
Yass to Demondrille - Cunningar	$87,416	1	Boom motor upgrade
Total	**$3,033,737**	**32**	

7.2 JHR (CRN) and SDP level crossing initiatives

SDP and JHR continued to improve level crossing safety on the CRN with civil road surface upgrades, passive to active signalling upgrades, replacement of life-expired equipment, signage removal/replacement on non-operational lines to reflect actual conditions to standard, and other minor works.

These improvements are set out in table 9 below.

Table 9: SDP and JHR level crossing safety improvements in 2016-17

Location	Cost	Sites	Project Scope
Dandaloo Road, Albert Lloyds Road, Bathurst Nyngan Road, Tullamore Trundle Road, Bogan Gate Oakley Forest Road, Marrangaroo Mulla Road, Nyngan Showground Road, Barellan	$5,360,000	7	Level crossing upgrade – civil – concrete road surface at level crossing
Quambone Road, Gulargambone Wombiana Lane, Blayney Kitchener Street, Temora Mirrool Street, Ardlethan Dane Lane, Bloomfield	$6,423,000	5	Level crossing upgrade – passive to active
Crossing Street, Griffith Banks Street, Molong	$638,000	2	New active pedestrian maze Level crossing refurbishment – replacement of life-expired equipment
CRN non-operational lines	$226,000	435	Modification of level crossing signage on the CRN non-operational lines
Charles Street and Samuel Street, Wellington	$20,000	2	Rationalisation of level crossings in Wellington, where consultations with the community are underway to close the level crossing at Charles Street, and upgrade the level crossing at Samuel Street to boom gates and flashing lights). These works are to continue over the next three years
Kentucky Road, Kentucky Scotts Lane / Jones Road, Warrigundi	$33,000	2	Vegetation clearing and excavation works to improve sighting distance at level crossings
Total	**$12,700,000**	**453**	

7.3 Sydney Trains level crossing initiatives

7.3.1 School Parade, Clifton

Sydney Trains Capital Level Crossing Upgrade program continued with the upgrade of the level crossing at School Parade, Clifton. The work was completed in January 2017 at a cost of $1.82 million, and included road widening and resurfacing, along with the implementation of F-Type lights, booms and sirens.

Figure 16: School Parade, Clifton

School Parade, Clifton (Before)

School Parade, Clifton (After)

7.3.2 Minor safety improvements

In 2016-17 Sydney Trains funded minor safety improvements totalling $1.122 million at the pedestrian and road level crossing locations shown in table 10 below.

Table 10: Sydney Trains minor safety improvements in 2016-17

Name and Location	Scope of Works
10 sites, Illawarra Line	Upgrade of level crossing bells to tri-tone sirens
Racecourse Road, Clarendon	Replacement of boom motors
6 sites, Western Line	Renewal of equipment including motors, lights and signage
Sir Henry's Parade, Faulconbridge	Installation of Cerberus Level crossing monitor

7.4 RMS level crossing initiatives

7.4.1 Golden Highway, Denman

RMS worked with ARTC (under a contract to RMS) to upgrade the Denman level crossing and Mangoola Road intersection on the Golden Highway, Denman to improve safety for motorists. This active level crossing was upgraded from flashing lights and bells to new high intensity LED flashing lights, bells and retro-reflective boom gates. Other work involved road widening to improve turning movements at Mangoola Road. Additional activated electrical warning signals were installed for both directions of the Golden Highway traffic for when trains approach the crossing.

The upgrade was completed on 21 June 2017 at a total cost of $2.7 million, including the contracted works carried out by ARTC at a cost of $1.66 million.

Figure 17: Golden Highway, Denman

Golden Highway, Denman (Before)


Golden Highway, Denman (After)

7.4.2 Boltes Lane, West Wyalong

This passive level crossing was decommissioned and completely removed including all approach roads. As part of reducing the number of junctions on the West Wyalong Heavy Vehicle Alternative Route to improve safety, Boltes Lane (north) was closed and removed, including the level crossing. The upgrade was commissioned on 30 June 2017 at a total cost of $26,000.

7.4.3 Church Street, West Wyalong

This passive level crossing has had a signage upgrade. Adjacent upgrades to the West Wyalong Heavy Vehicle Alternative route provided a turning lane for vehicles turning right into Church Street. The improvement works involved upgrading the level crossing signage to confederate boards. The upgrade was commissioned on 30 June 2017 at a total cost of $1,000.

7.4.4 Showground Road, West Wyalong

This active level crossing was upgraded from a 9-metre wide crossing to a 20-metre wide crossing. The upgrade was part of a road realignment to remove a sharp and narrow z-shape that was not suitable for higher productivity vehicles such as B-triples or road trains. The new alignment involved acquisition of adjacent property to allow road realignment and a 70 degree skewed crossing of the rail. Existing flashing lights were relocated to suit the

new alignment with an additional signal installed. Boom gates were replaced with longer boom gates to suit the widened travel lanes. The upgrade was commissioned on 30 June 2017 at a total cost of $494,000.

Figure 18: Boltes Lane, West Wyalong

8 Interface agreements

Context

The *Rail Safety National Law* (NSW) (RSNL) requires RIMs and road managers to identify and assess risks to safety at level crossings and to enter into interface agreements to manage those risks. RIMs and road managers are working to meet these obligations and are currently negotiating interface agreements for the level crossings on their networks. Interface agreements has been a long-standing requirement since the introduction of the Model Law in 2006, and continued through the RSNL.

ONRSR

The number of outstanding interface agreements across Australia remains very high and progress in this area has been slow. ONRSR met with the Australian Local Government Association in December 2016, which agreed to support state-based local government authorities to progress the outstanding agreements.

As at 30 June 2017, 141 interface agreements across the three major RIMs in NSW (Sydney Trains, JHR and ARTC) remained outstanding. Of these, 55 involve a local council, RMS and a RIM. The remaining outstanding agreements involve only the local council and a RIM. There are 15 agreements that involve RMS and a RIM only, all of which have been completed.

ONRSR has been assisting, where possible, LGNSW and Centroc (Central NSW Councils, the organisation representing councils in Central West NSW) to progress these agreements with councils and RIMs. ONRSR also liaised with the Institute of Public Works Engineering Australasia (IPWEA), which has been assisting local councils in this process.

Centroc raised an issue in relation to responsibilities for maintenance, which delayed the negotiation of interface agreements between member councils and the relevant RIM. ONRSR wrote to Centroc with a view to progressing the finalisation of these agreements, and negotiations with RIMs recommenced.

Table 11 below shows a breakdown of interface agreements required in NSW and the number outstanding as 30 June 2017.

Table 11: Outstanding interface agreements in NSW as at 30 June 2017

Summary of interface agreement implementation	
Agreements required in NSW	198
Agreements outstanding in NSW	141 (71%)
Road manager	**Number outstanding**
RMS & local councils	55
Local councils (not Centroc members)	66
Local councils (Centroc members)	20

RMS

In 2016-17 RMS liaised with ONRSR, LGNSW, ARTC, JHR and Sydney Trains to promote the progression of interface agreements. RMS conducted preliminary works to scope and improve level crossing short stacking locations. Proposed improvements such as signage upgrades and other mitigation strategies are being scoped.

Sydney Trains

In 2016-17 Sydney Trains worked with road managers to facilitate the development of interface agreements. Sydney Trains is continuing negotiations with Hawkesbury City Council, which is the road manager for the one remaining interface agreement covering level crossings on the council's road network.

ARTC

In 2016-17 ARTC entered into 2 interface agreements with road managers bringing the total in place to 16. ARTC also signed 23 outstanding interface agreements, which were then forwarded to RMS for RMS to sign and liaise with councils at a regional level in an effort to encourage signoff.

ARTC is still working with Sydney Trains on an interface agreement covering passenger access at stations, and for structures managed by Sydney Trains that pass over or under the ARTC rail corridor.

JHR

JHR is obliged to enter into interface agreements with 60 public road managers on the CRN. Thirty-two interface agreements are now in place. Following feedback from road managers and ONRSR, JHR will re-issue all interface agreements removing the requirement for road managers to enter into additional JHR safety management plans for every interface. JHR has actively consulted with the remaining public road managers who have yet to agree to interface agreements with a view to having all 60 interface agreements in place by December 2017.

JHR is also obliged to enter into interface agreements with about 500 private road managers. JHR will verify the total number as part of a property access agreement activity in 2017-18. Of the 500, 8 interface agreements are now in place while most private road managers are seeking further documentation to assist with legal clarification on accessing their properties.

Funding

9 Funding for level crossings in NSW

Table 12 provides a summary of the total expenditure on level crossing safety improvements in NSW since 2003-04.

Table 12: Funding for Level crossing safety improvements in NSW from 2003-04 to 2016-17

Year	Program / Agency	Expenditure ($ millions)	Total ($ millions)
2003-04	CRIA LCIP	2.00 3.00	5.00
2004-05	LCIP	5.00	5.00
2005-06	RailCorp LCIP	1.30 6.00	7.30
2006-07	RailCorp ARTC CRIA LCIP	2.40 1.65 0.28 7.00	11.33
2007-08	RailCorp ARTC CRIA LCIP	2.65 6.90 1.94 7.00	18.49
2008-09	RailCorp ARTC CRIA RTA LCIP	2.81 2.47 4.53 2.94 5.28	18.03
2009-10	RailCorp ARTC[3] CRIA RTA LCIP	3.27 42.77 3.87 3.30 6.57	59.77
2010-11	RailCorp ARTC CRIA LCIP[4]	3.60 1.65 3.37 7.33	15.94
2011-12	RailCorp ARTC CRIA LCIP[5]	3.20 29.21 2.88 7.40	42.69

[3] One-off funding for the Boom Gates for Rail Crossings Program was provided as part of the Commonwealth Government's Nation Building Program.
[4] Includes $2 million funding provided from the former RTA.
[5] Includes $2.5 million provided by RailCorp and $4.8 million provided by RMS

Year	Program / Agency	Expenditure ($ millions)	Total ($ millions)
2012-13	RailCorp ARTC SDP RMS LCIP[6]	1.90 12.90 1.04 1.30 7.51	24.65
2013-14	Sydney Trains ARTC SDP RMS LCIP[5]	1.80 8.17 2.82 0.46 7.60	20.85
2014-15	Sydney Trains ARTC SDP RMS LCIP[5]	2.78 5.36 1.16 3.05 7.27	19.62
2015-16	Sydney Trains ARTC SDP RMS LCIP	1.96 3.88 3.79 0.00 7.07	16.70
2016-17	Sydney Trains ARTC SDP RMS LCIP	2.94 3.03 12.70 3.26 7.28	29.21

[6] Includes $2.5 million provided by RailCorp and $5.0 million provided by RMS

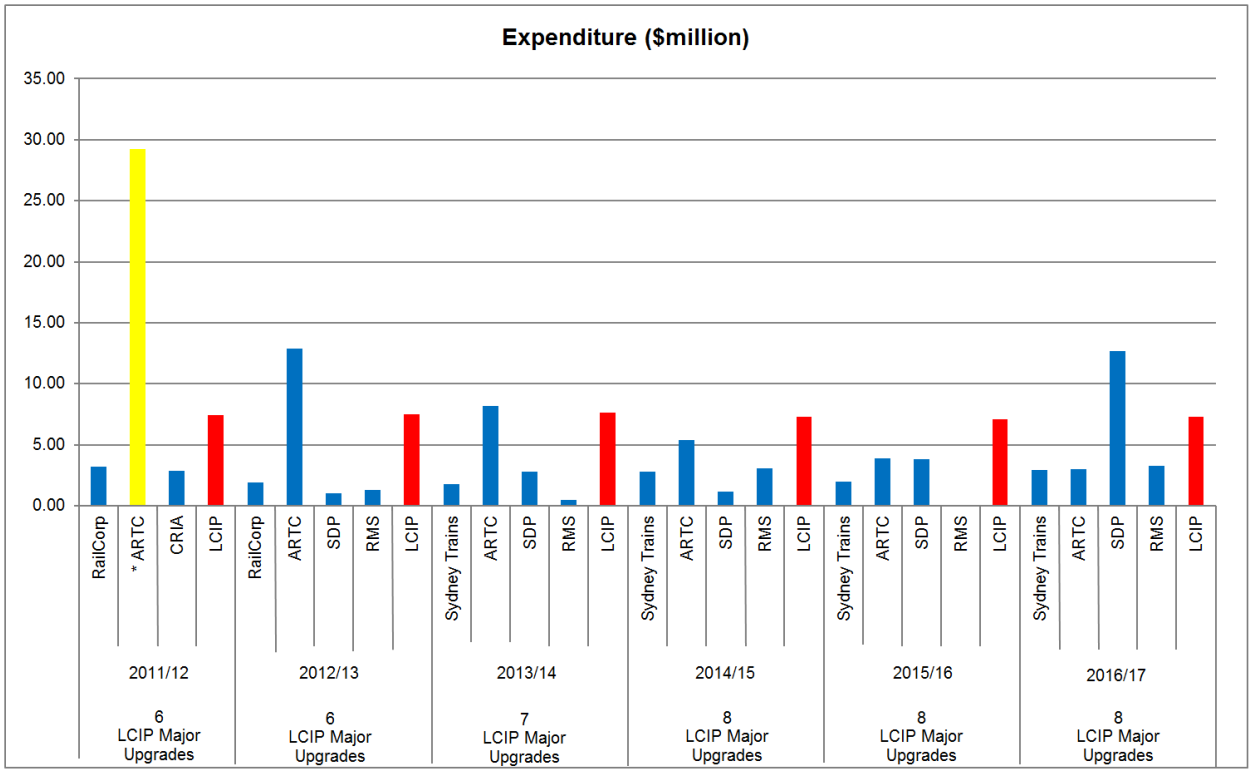
Appendix A: Total LCIP 2016-17 expenditure

Table 13: Appendix A Total LCIP 2016-17 Expenditure

Street	Location	Cost
Construction Projects		
Cemetery Lane	Whittingham	$703,000
Middle Folbrook Road	Nundah	$668,000
Dudauman Street	Stockinbingal	$851,000
Fry Street	Grafton	$686,000
Yerong Street	The Rock	$937,000
Summerland Way	Wiangaree	$676,000
Cobbora Road	Wellington	$434,000
	Total	**$4,955,000**
Concept and Detailed Design		
Lake Street[7]	Ganmain	$155,000
Marrar North Road[7]	Marrar	$196,000
	Total	**$351,000**
Minor works		
ARTC Minor works		$389,000
JHR/SDP Minor works		91,000
RMS Speed zone reviews		$15,000
RMS Short stacking program		$58,000
	Total	**$553,000**
Other Level Crossing Initiatives		
Level Crossing Awareness and Enforcement Campaign		$899,000
ALCAM Data Collection		$404,000
Level Crossing Policy and Strategy Development		$121,000
	Total	**$1,424,000**
	Grand Total	**$7,283,000**

[7] This amount includes the cost of concept and detailed design work, and early procurement of signalling equipment.

Appendix B: Expenditure on level crossing upgrades in NSW funded through the LCIP and by RIMs and road managers 2011-12 to 2016-17



Note: * – During 2011-12, ARTC undertook works in excess of $29 million to enhance or eliminate level crossings across its network in NSW. This included $23 million spent on two major grade separation projects as part of the Maitland to Minimbah Third Track and other safety improvements within the network.

Transport for NSW, Centre for Road Safety
T 02 8265 7149 F 02 8202 3809
E roadsafety@transport.nsw.gov.au
W roadsafety.transport.nsw.gov.au
Level 4 18 Lee Street Chippendale NSW 2008 | PO Box K659 Haymarket 1240

NSW GOVERNMENT

TOWARDS ZERO