



Level Crossing Strategy Council Yearly Report 2017-18



Front cover: Level crossing awareness and enforcement campaigns are central to the task of making level crossings safer and an important part of Towards Zero

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Glossary

Active Control	Lights, bells, boom gates regulate motorists Lights, bells, booms, and locking swing gates regulate pedestrians
ACRI	Australasian Centre for Rail Innovation
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 <i>Disability Discrimination Act 1992</i> (Commonwealth)
I&S	The Infrastructure and Services Division of TfNSW
Interconnected level crossing	A level crossing with active controls that are interconnected with a signalised road intersection to mitigate road vehicle queuing over the level crossing
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 TrainLink	The NSW Government agency [constituted as NSW Trains] that provides passenger train and coach services for regional NSW and outer-metropolitan Sydney
NLCSC	National Level Crossing Safety Committee
ONRSR¹	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
RSNL	The <i>Rail Safety National Law</i> (NSW)
Red man	A flashing warning sign of a 'red man' that warns pedestrians of oncoming trains
RIM	Rail infrastructure manager; a term defined in the RSNL that refers to, among other things, the person or organisation that has effective control and management of the rail infrastructure of a railway
Roads and Maritime or RMS	Roads and Maritime Services
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 2017 completing the transfer of NSW rail safety regulation to ONRSR

Executive Summary

1 Year in review: 2017-18

In 2017-18, Rail infrastructure managers (RIMs) and road managers invested in safer level crossings initiatives in NSW to the value of \$13.16 million of which \$6.00 million was allocated 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 RIMs and road managers spend on maintaining and upgrading level crossings on their networks.

Six major upgrades of level crossings were commissioned in 2017-18 through the LCIP: Lake Street, Ganmain⁸; Marrar North Road, Marrar; Gardiner Street, Griffith; McAdam Street (Rouchel Road), Aberdeen; Rosler Parade, Henty; and Baird Street, Culcairn.

Development work to the value of \$217,000 for upgrades in future years formed part of the 2017-18 LCIP, with concept and detailed design prepared for Burley Griffin Way - Yenda Road, Yoogali - Griffith project and preliminary designs works for Murrays Flat Road, Towrang; Mills Road, Towrang; and Wirrinya Road - Back Marsden Road, Wirrinya projects.

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 awareness and 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 Transport Infrastructure Plan provides LCIP funding of \$7.3 million a year to 2025-26. This translates to an allocation of \$29.2 million for the LCIP from 2015-16 to 2018-19, which allows for the planning and completion of future priority level crossing upgrades.

In June 2017 the LCSC endorsed the LCIP converting to a 3-year rolling program to the end of 2019-20. A 3-year program provides RIMs and local government with improved long-term planning and consultation capacity in the design and delivery of both LCIP and agency-funded level crossing upgrade projects. This also gives communities greater certainty in managing disruption while works are underway.

This report provides a consolidated overview of level crossing improvements delivered by RIMs and road managers in 2017-18 (including LCIP funded projects).

Appendix A: provides a summary of all projects funded under the LCIP in 2017-18.

Appendix B: sets out the expenditure on level crossing upgrades in NSW funded through the LCIP and by RIM and road managers from 2011-12 to 2017-18.

1.1 Agency level crossing initiatives

In addition to the LCIP, Australian Rail Track Corporation, John Holland Rail –TfNSW (Infrastructure and Services), Roads and Maritime, Sydney Trains and NSW TrainLink implemented their own programs for safer level crossings. Local government also has a role in assessing the safety risk at level crossings on local council roads.

Australian Rail Track Corporation

During 2017-18, ARTC planned and delivered level crossing safety initiatives to the value of \$1,677,697 (including \$324,000 contribution to LCIP projects) across various geographic regions over its NSW network. Initiatives included minor works covering:

- road surface renewals, improvements and associated works
- sighting distance improvements
- pedestrian level crossing renewals
- CCTV monitoring of level crossings

Details of ARTC level crossing safety initiatives are shown in table 8 on page 26.

Country Regional Network (JHR–I&S)

JHR and I&S continued to improve level crossing safety on the Country Regional Network with improvements totalling \$4.71 million (including \$1.38 million contribution to LCIP projects). These improvements included: concept and detailed design work to upgrade the level crossing at Samuel Street, Wellington, and rationalise the nearby level crossing at Charles Street; civil road surface upgrades; passive to active signalling upgrades; replacement of life-expired equipment; and the removal/replacement of signage on non-operational lines.

As the contracted RIM for the CRN, JHR has a statutory obligation to manage the risk at the level crossings on the network so far as is reasonably practicable. In pursuing this obligation, JHR has formed a Level Crossing Safety Sub-Committee with the task of ensuring level crossing safety is given the required level of governance and exposure within its business and provides the JHR business with the required level of risk management assurance. The Committee has a charter with objectives and nominated membership who meet regularly and abide by mandatory behaviours.

Details of CRN level crossing safety initiatives are shown in table 9 on page 27.

NSW TrainLink

NSW TrainLink 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.

NSW TrainLink participated in a range of initiatives in 2017-18 to support safer level crossings. These initiatives included:

- schools programs to educate students at 24 schools between Bulli and Kiama around safety at level crossings.

- community engagement events at Woonona (February 2018) and Manildra where NSW TrainLink engaged with members of the community and the Police to raise awareness of safety at level crossings. This also provided an opportunity to highlight rail infrastructure issues to relevant rail infrastructure managers.
- businesses close to level crossings on the South Coast line were approached to engage them in level crossing safety through the dissemination of safety information, flyers, and similar materials.
- TfNSW education campaigns where NSW TrainLink worked with TfNSW to develop short videos for social media about train drivers' experiences with level crossings. This activity is described under item 4.1 'Level crossing safety education' on page 20.

Sydney Trains

Sydney Trains undertook a program of level crossing improvements across the network during 2017-18. Improvements included the renewal of booms, bells and lights, and the implementation of level crossing data-loggers to monitor the correct functioning of the systems to further improve safety and reliability.

Sydney Trains also delivered design and development upgrade works for key safety initiatives to the value of \$113,000 at: Bourke Street, East Richmond and St James Road, Adamstown. Sydney Trains worked closely with Central Coast Council to progress designs to improve the road layout arrangements and signage at the level crossing at Rawson Road, Woy Woy for implementation in 2018. Additionally, enhanced road pavement markings and signage were implemented at the level crossing at Princes Highway, Unanderra.

Sydney Trains provided critical support to the Centre for Road Safety and Roads and Maritime on a key national initiative to review and test the operation of all NSW level crossings interconnected with traffic signals.

Details of Sydney Trains level crossing safety initiatives are shown in table 10 on page 27.

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. The NSW Police Force enforces the *Road Rules 2014*.

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, Infrastructure and Services)
- Australian Rail Track Corporation
- John Holland Rail
- Local Government NSW
- NSW Police Force
- NSW TrainLink
- Roads and Maritime
- 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), 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 2017-18.

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
- upgrading level crossings controlled by passive signage (e.g. give way or stop sign) to boom gates and flashing lights
- minor works at passively controlled level crossings.

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 RIM and road managers and other relevant stakeholders.

2.3 National Level Crossing Safety Committee

The National Level Crossing Safety Committee (NLCSC) is an initiative of the Australasian rail industry. It operates as an inter-agency forum to coordinate national efforts for safer level crossings and reports to the Transport and Infrastructure Senior Officials Committee (TISOC). Its focus is 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 strategic objectives of the NLCSC are to:

- reduce the likelihood of crashes and near misses at railway crossings
- improve coordination between road and RIM, 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.

2.4 Interconnected level crossings

The Centre for Road Safety continued to support the work of the NLCSC in 2017-18, particularly in implementing the Action Plan for the National Railway Level Crossing Safety

Strategy. This included a key project initiated by the Centre for Road Safety to test existing level crossings in NSW interconnected with traffic signals at adjacent road intersections. The project aims to raise road/rail awareness of the dependencies of interconnected level crossing operations, maintenance requirements, and the testing of the 13 interconnected level crossings in NSW.

Testing of the 13 sites was completed by 30 June by Roads and Maritime with the relevant RIMs (i.e. Sydney Trains, JHR and ARTC). A final report based on the project findings is to be provided to the NLCSC in October 2018 to raise awareness to other jurisdictions.

Figure 1: Roads and Maritime and RIMs joint testing of the interconnected level crossings at Orange (L) and Parkes (R)



2.5 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, Roads and Maritime, 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.

2.6 Level crossing incident data

Of the 1,358 public road level crossings in NSW, 406 have active traffic controls; 159 have flashing lights and bells and 247 have flashing lights, bells and boom gates. The majority of other crossings are controlled by “give-way” or “stop” signs.

Overall, the number of crashes between a train and a road vehicle has decreased over the past 29 years in NSW. Figure 2 through to figure 5 show the number of collisions and fatalities at level crossings from 1989-90 to 2017-18.

There was one fatality at a level crossing in NSW in 2017-18, resulting from a collision between a train and a person at a crossing with active control equipment. There were ten collisions between a train and road vehicle during the year, four at crossings with active controls, and six at crossings with passive controls.

While overall the number of crashes between a train and a road vehicle has decreased over the past 29 years in NSW, the past year has seen a slight increase compared with recent years.

Figure 2: Train Colliding with Road Vehicle at Level Crossing, 1989-90 to 2017-18 in NSW²

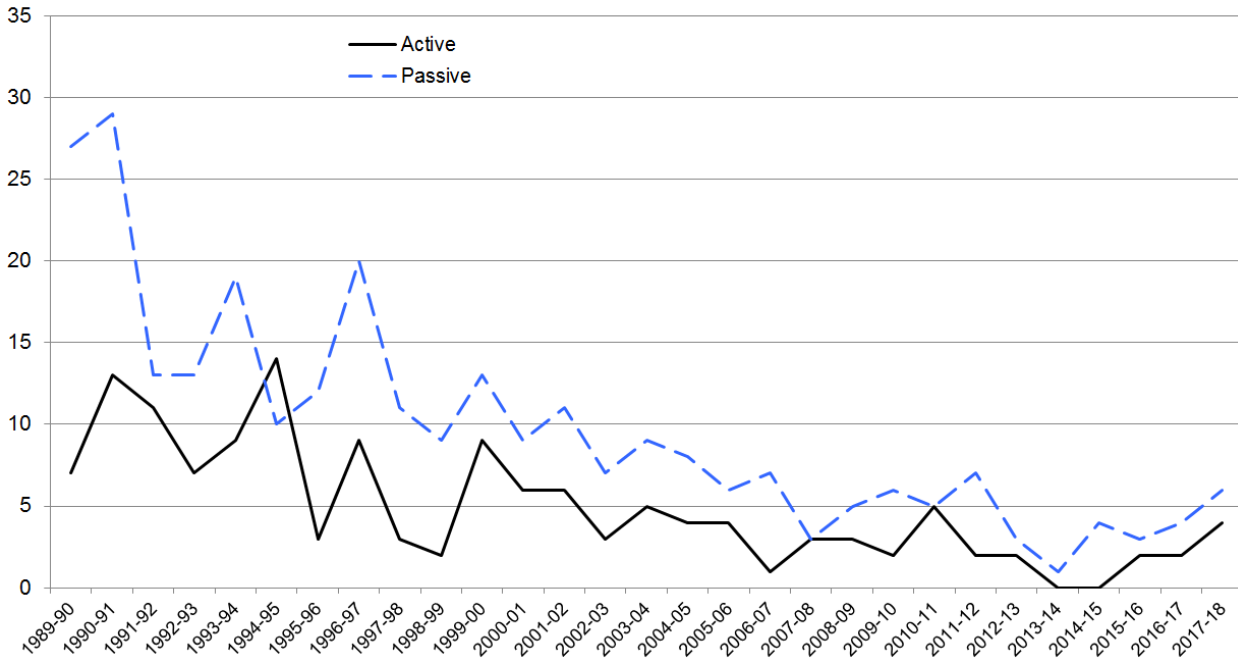
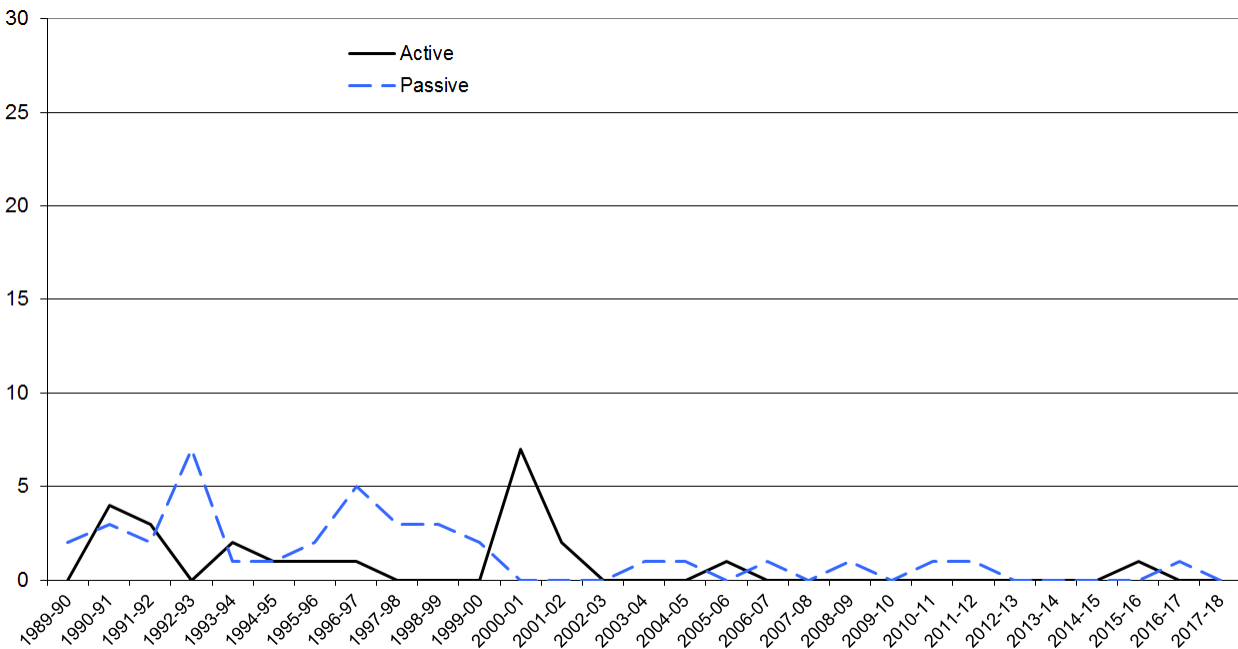


Figure 3: Fatalities: Train Colliding with Road Vehicles at Level Crossing, 1989-90 to 2017-18 in NSW



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 2

Figure 4: Train Colliding with Person at Level Crossing, 1989-90 to 2017-18 in NSW

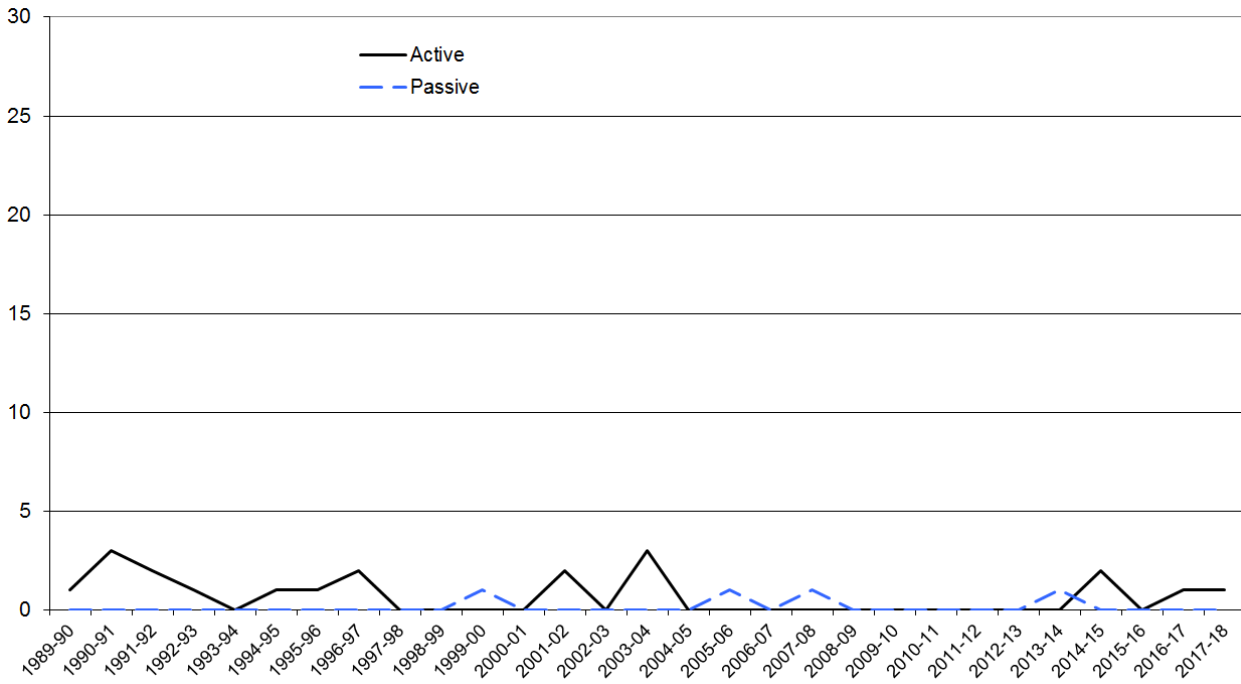
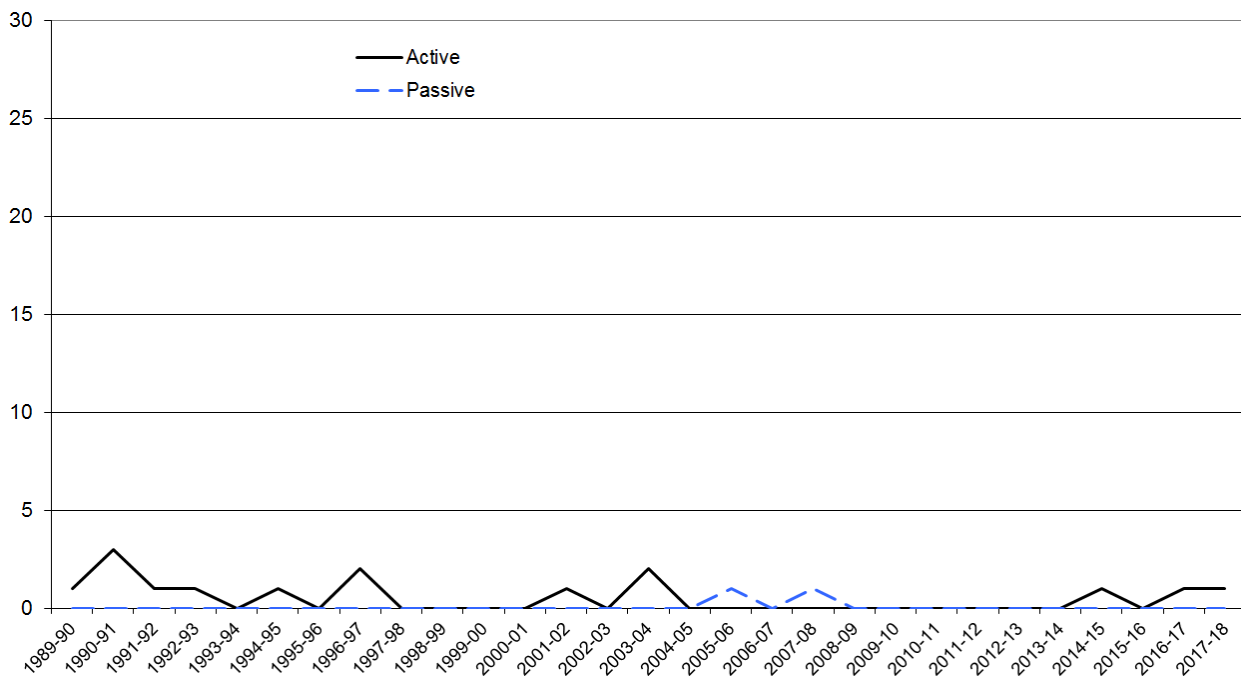


Figure 5: Fatalities: Train Colliding with Person at Level Crossing, 1989-90 to 2017-18 in NSW



Level Crossing Improvement Program 2017-18

3 Infrastructure works

3.1 Major works completed

During 2017-18 six 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 2017-18

Location	Electorate	Network
Lake Street, Ganmain	Murrumbidgee	JHR
Marrar North Road, Marrar	Murrumbidgee	JHR
Gardiner Street, Griffith	Murrumbidgee	JHR
McAdam Street (Rouchel Road), Aberdeen	Upper Hunter	ARTC
Rosler Parade, Henty	Albury	ARTC
Baird Street, Culcairn	Albury	ARTC

3.1.1 Lake Street, Ganmain

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 16 January 2018 at a total value of \$1.27 million including an LCIP contribution of \$990,000, of which \$835,000 to be funded from the 2018-19 LCIP⁸.

Figure 6: Lake Street, Ganmain



Lake Street, Ganmain (Before)



Lake Street, Ganmain (After)

3.1.2 Marrar North Road, Marrar

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 30 January 2018 at a total cost of \$1.74 million including an LCIP contribution of \$1.40 million.

Figure 7: Marrar North Road, Marrar



Marrar North Road, Marrar (Before)



Marrar North Road, Marrar (After)

3.1.3 Gardiner Street, Griffith

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 16 June 2018 at a total cost of \$1.45 million including an LCIP contribution of \$688,000.

Figure 8: Gardiner Street, Griffith



Gardiner Street, Griffith (Before)



Gardiner Street, Griffith (After)

3.1.4 McAdam Street (Rouchel Road), Aberdeen

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 road works, new road and rail signage, line marking and a level crossing equipment building. The upgrade was commissioned on 12 April 2018 at a total cost of \$688,000 fully funded by LCIP.

Figure 9: McAdam Street (Rouchel Road), Aberdeen



McAdam Street (Rouchel Road), Aberdeen (Before)



McAdam Street (Rouchel Road), Aberdeen (After)

3.1.5 Rosler Parade, Henty

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 27 June 2018 at a total cost of \$850,000 including an LCIP contribution of \$688,000.

Figure 10: Rosler Parade, Henty



Rosler Parade, Henty (Before)



Rosler Parade, Henty (After)

3.1.6 Baird Street, Culcairn

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 road works, new road and rail signage and line marking. The upgrade was commissioned on 25 June 2018 at a total cost of \$850,000 including an LCIP contribution of \$688,000.

Figure 11: Baird Street, Culcairn



Baird Street, Culcairn (Before)



Baird Street, Culcairn (After)

3.2 Development work undertaken

Development work for upgrades in future years is a key element of the LCIP. In 2017-18 the LCIP provided \$217,000 for the concept and design work, and early procurement of signalling equipment at the level crossings shown in table 2 below.

Table 2: LCIP Concept and Detailed Designs Completed in 2017-18

Location	Electorate	Network	Cost
Murrays Flat Road, Towrang	Goulburn	ARTC	\$11,000
Mills Road, Towrang	Goulburn	ARTC	\$11,000
Burley Griffin Way - Yenda Road, Yoogali - Griffith	Murrumbidgee	CRN	\$184,000
Wirrinya Road - Back Marsden Road, Wirrinya	Dubbo	ARTC	\$11,000
Total (4)			\$217,000

3.3 Minor works

In 2017-18, the LCIP funded minor construction works of \$339,000 at 12 level crossings in regional NSW as shown in table 3 on page 17 below. These works comprise:

- 7 locations in the Northern Rivers
- 1 location on the Mid-North Coast
- 2 locations in the Southern Highlands
- 2 location in the Southern Tablelands
- 1 location in the Riverina

Minor works funding during 2017-18 also included investigation and installation of warning signposting at 50 short stacking locations that had been identified through ALCAM and consultations with Roads and Maritime (see item 3.3.2 on page 17 below).

3.3.1 Minor construction works

Table 3: ARTC Minor works

ARTC Minor works		
Street	Location	Scope
Banyabba Railway Station Road	Banyabba	Install new RX2 assemblies and delineators. Upgrade all signage to AS1742.7
Poley House Road	Braunstone	Remove dip in road caused by increased heavy vehicle usage and reinstate bitumen to interface with approach roads. Renew line marking and upgrade signage to AS1742.7
Breadalbane Road	Breadalbane	Remove dip in road caused by increased heavy vehicle usage and reinstate bitumen to interface with approach roads. Remove non-frangible material, install delineators, bitumen approaches, renew line marking, upgrade all signage to AS1742.7
West Street	Casino	Remove non-frangible material from the rail corridor and reinstate fences/gates to boundary; Renew line marking; Install flexible guideposts and upgrade all signage to AS1742.7
Baraimal Lane	Fairy Hill	Traffic hazard due to poor condition of bitumen approaches and hump. Improve road approaches, renew bitumen, install flexible guideposts and line marking, remove non-frangible material, upgrade all signage to AS1742.7
Sladen Street	Henty	Remove non-frangible material from the rail corridor, relocate fencing away from boom arm, widen bitumen, renew line marking and tactiles, upgrade all signage to AS1742.7
Studders Lane	Kyogle	Replace Colourbond fence enclosure around active signalling equipment obstructing sighting of passive level crossing controls. Replace with a see-through wire mesh fence to enable sighting. Upgrade signage to AS1742.7.
East Lanitza Road	Lanitza	Remove trees to improve sighting, Install new RX2 assemblies. Upgrade all signage to AS1742.7
Oolong Road	Oolong	Replace road base in 6 foot between rubber Strail panels with bitumen. Renew line marking where required.
Myrtle Creek Road	Rappville	Repair damaged crossing fencing. Renew asphalt on approach roads
Fountaindale Road	Robertson	Renew surface and remove dip on road approach. Reinstate road surface and renew line marking. Renew signage to AS1742.7
Macquarie Street	Taree	Remove and hump and reinstate road approach surface. Upgrade signage to AS1742.7
Murrimba Road	Wingello	Renew line marking and install flexible guideposts. Upgrade all signage to AS1742.7
Total	\$339,000	12

3.3.2 Roads and Maritime Short stacking program

In 2017-18 Roads and Maritime continued a project to investigate level crossings across regional NSW that are at risk of 'short stacking' (queuing over the level crossing). The short stacking locations were identified through ALCAM and in consultations with Roads and Maritime 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.

The LCIP contributed funding of \$446,000 to Roads and Maritime for the financial year to fund short stacking investigations and install warning signage to warn road users not to queue across these level crossings.

Roads and Maritime conducted preliminary works to scope and improve fifty six level crossing short stacking locations. Improvements such as signage upgrades and other mitigation strategies were completed at fifty sites.

Table 4: Roads and Maritime Minor works

Roads and Maritime Minor works		
Street	Location	Region
Maitland Street (Jones Road)	Condobolin	Central West
May Street	Condobolin	Central West
Public Road / Condobolin Bulk Head	Condobolin	Central West
Peak Hill Road / Crowley Road	Kadungle	Central West
Oakey Forest Road	Marrangaroo (Lithgow)	Central West
Lone Pine Avenue	Orange	Central West
Robert Street (Duri Road)	South Tamworth	Central West
Segenhoe Road (Halcolm Road)	Aberdeen	Hunter
Public Road	Denman	Hunter
off Muscle Creek Road	Grasstree	Hunter
Charles Street	Neath	Hunter
Owen Street	Thirlmere	Macarthur
Oaks Street	Thirlmere	Macarthur
Dunwoodie Street	Kendall	Mid North Coast
Foreshore Road	Port Kembla	Mid North Coast
Couche Crescent/ Koolewong Road	Koolewong	New England
Top Box Road	Garah	North West
Merah North	Public Road "Purl Wea"	North West
Public Road "Dally"	Merah North	North West
Old Pilliga Road	Wee Waa	North West
West Parade / East Parade	Buxton	Orana

Roads and Maritime Minor works		
Street	Location	Region
GPS Road (Off B64)	Weethalle	Orana
Erigolia Road	Binya	Riverina
Baird Street	Culcairn	Riverina
Benanbra Road	Culcairn	Riverina
Odewahns Rd	Culcairn	Riverina
Blumer Avenue	Griffith	Riverina
Ebert Street	Griffith	Riverina
Hamilton Road	Griffith	Riverina
Pavese Road	Griffith	Riverina
Ross Road	Griffith	Riverina
Sladen Street	Henty	Riverina
Rosler Parade (Yankee Crossing Road)	Henty	Riverina
The Springs Road/ Rankins Springs Road	Hillston	Riverina
Canal Street	Leeton	Riverina
Shaw Street	Moama	Riverina
Old North Road Blandford	Old North Road	Riverina
Yerong Street	The Rock	Riverina
Old Trunk Road (Burkes Creek Road)	The Rock	Riverina
Yerong Street	The Rock	Riverina
Nelson Road	Warburn	Riverina
Clarke Lane / Canal Road	Widgelli	Riverina
McDonough Road	Yenda	Riverina
Neuhaus Lane	Yerong Creek	Riverina
Burley Griffin Way - Yenda Road	Yoogali / Griffith	Riverina
Clarke Road	Yoogali / Griffith	Riverina
Burradoo Road	Burradoo	Southern Highlands
Murrimba Road	Wingelo	Southern Highlands
Coolalie Road (formerly Jerrawa Road)	Jerrawa	Southern Tablelands
Broadway Road	Jerrawa	Southern Tablelands

4 Education and awareness

4.1 Level crossing safety education campaigns

Don't rush to the other side



The 'Don't rush to the other side' level crossing safety education campaign provides a timely reminder to drivers that level crossings should not be approached with complacency. The campaign continued throughout 2017-18 and 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, cinema, outdoor billboards and petrol pumps, radio, digital and social media.

New social media content was developed in 2017 featuring two train drivers from NSW TrainLink being interviewed about their personal experiences around level crossings and the need for motorists to be aware and always obey the signs and signals. This content continued to receive a positive response achieving strong engagement rates of more than five per cent. The majority of comments on the posts also endorsed the key messages promoted in the videos. Extended versions of the content were included in the Field Days event videos.

There were three periods of paid advertising in 2017-18: November 2017, to coincide with harvest season when more trains are operating and more vehicles are on the road, February 2018 and May/June 2018 during the traditional peaks in level crossing collisions.

TfNSW ran four 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, Senior Sergeant 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 2017-18 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 on page 21.

Table 5: Campaign effectiveness – advertising diagnostics and outcomes

Light Vehicle Drivers

- Campaign recognition remains consistent at 58%
- There is strong message take-out:
 - dangerous behaviour at level crossings can lead to negative consequences (77%)
 - I should always look and obey the road signs and signals when approaching a level crossing (76%)
- Believability continues to be high at 74%
- 80% of light vehicle drivers who have seen the campaign claimed they had never sped up to make it through a level crossing before the boom gates closed in the past 12 months (versus 71% of drivers who haven't seen the campaign)
- 90% 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)
- 86% of light vehicle drivers claimed they had never driven through a level crossing without stopping when there is a Stop sign in the past 12 months (versus 78% of drivers who haven't seen the campaign)
- 92% of light vehicle drivers believe it is extremely important to always obey the signs and signals at level crossings (versus 86% of drivers who haven't seen the campaign)³

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:

- AgQuip Field Days, Gunnedah – August 2017
- Henty Machinery Field Days, Henty – September 2017
- Australian National Field Days, Borenore – October 2017

Figure 12: 2017 AgQuip Field Days, Gunnedah



Figure 13: 2017 Henty Machinery Field Days, Henty



Harvest season

The annual grain harvest involves a large number of oversize, heavy farming machinery being transported along some of the major transport routes in western NSW and the movement of grain to and from grain receival sites, which often operate 24 hours a day in peak periods. Harvest coincides with school holiday periods in October and December-January, and times when a large number of 'grey nomads' are travelling south.

The mix of farm machinery, grain trucks and other traffic along major freight/ travel routes is a significant concern for regional communities. The threat of bad weather, rapidly ripening crops and machinery and contractor costs give farmers a tight window for harvest to get the best business returns. Anecdotal information shows many fatigued drivers are

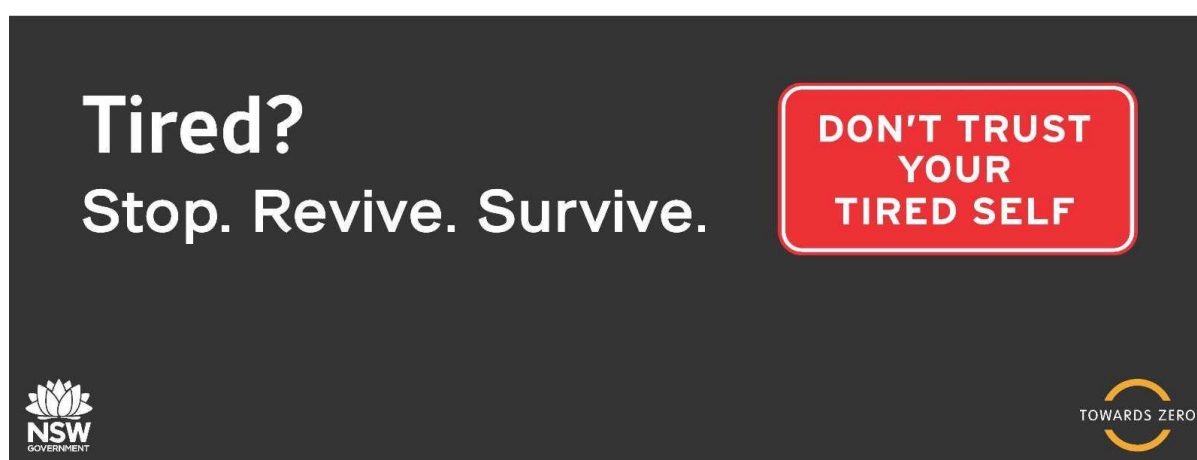
³ Level crossings campaign evaluation, Ipsos, 2017-18

on the road after completing long workdays operating machinery, performing other on-farm activities, and then driving grain to silos.

Roads and Maritime Western Region continues to undertake 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. The region covers most of the Queensland and South Australian border areas and incorporates a vast array of agricultural areas with crops including cotton, wheat, barley and sorghum.

Harvest is now a key area of focus for level crossing safety education and awareness in NSW. Roads and Maritime Western Region continued to support grain receival sites during the financial year with campaign material for harvest season focussed mainly on driver fatigue. A key initiative was to install permanent signage (as shown in figure 14 below) at the highest flow receival sites (GrainCorp and GrainFlow).

Figure 14: Permanent level crossing safety message at grain receival sites



4.2 Level crossing awareness and enforcement campaigns

NSW Police enforces the *Road Rules 2014* including level crossing offences. The impact of level crossing awareness and enforcement campaigns in delivering increased road policing around level crossings is reflected in the increase in legal actions for level crossing offences (driving) since the first campaign in February 2011.

Four joint TfNSW – NSW Police level crossing awareness and enforcement campaigns were conducted during 2017-18 as shown in table 6 below.

Table 6: Level crossing awareness and enforcement campaigns in 2017-18

Location	Electorate	Region	Period
Mumbil and Stuart Town	Orange	Orana	September 2017
Curlewis, Nea and Gunnedah	Tamworth	North West	November / December 2017
Manildra	Orange	Central West	April 2018
Narromine, Narwonah and Trangie	Dubbo Barwon	Orana	May / June 2018
Total (3)			

A key area of focus for police in 2017-18 was 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.

Figure 15: Left: media event at Gunnedah on 29 November 2017. Pictured right: Level crossing awareness and enforcement campaigns are central to the task of making level crossings safer and an important part of Towards Zero



Legal actions for level crossing offences (driving) have been trending upwards since 2010 due to a heightened awareness of level crossing safety brought about through the campaign. As shown in table 7 below, 527 penalty notices were issued to motorists for traffic offences at level crossings in 2017-18.

Table 7: NSW Police Level Crossing Legal Actions between 2010-11 and 2017-18

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
2017-18	527

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 2017-18, TfNSW led a project on behalf of the National ALCAM Committee to initiate a pilot training course for ALCAM data collection at level crossings. The course aims to identify the adjustments to the training and assessment materials needed to develop a formal ALCAM data collection training course. The pilot training course is to be delivered by the TfNSW Transport Training Centre at Petersham from 17 to 20 July 2018. The pilot training course will comprise both classroom training and practical training on-site at a level crossing on a disused railway line in the Sydney metropolitan area.

The committee provided ongoing support and maintenance enhancements to the online Level Crossing Management System (LXM) database to ensure it operates correctly, and users are given adequate and timely technical support.

5.2 NSW ALCAM data collection

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

In 2017-18, the LCIP funded ALCAM field assessments at 203 road and pedestrian level crossings on the ARTC network.

TfNSW engaged Spinal Cord Injury Australia (SCIA) to enter the survey data collected from field assessments into the ALCAM LXM database. SCIA is a not-for-profit organisation working for people with spinal cord injury.

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 that provides professional, independent applied research, strategic and economic analysis and innovative solutions for the Australasian rail industry and the broader transport sector.

Since 2014, ACRI has completed 22 projects with outcomes including:

- delivery of a good practice overview of condition monitoring in rail operations
- influencing an Australian 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 memorandums of understanding and co-operation with Australian and overseas rail and logistics bodies enable joint projects and sharing information with participants about current and past research. ACRI agreements include 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. This 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 reports, articles and research outcomes and 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 in progress and development include:

- Evaluating retro-reflective screens to aid conspicuity of tabletop carriages at passive level crossings
- Identifying and lab testing improved stimuli for road user attention at level crossings
- Identification of Solutions to Rail Flange Gap Issues at Pedestrian Level Crossings
- Investigating the use of train horns at rail level crossings
- Evaluating level crossing visual warning devices for pedestrians using eye-tracking
- Evaluating safety measures and behaviours at level crossings along maintained but non-operational rail corridors
- Reviewing current international practice in prevention of trespass and self-harm incidents on urban rail systems

Safety initiatives

7 Agency safer level crossings initiatives

7.1 ARTC level crossing safety initiatives

During 2017-18 ARTC undertook level crossing safety initiatives to the value of \$1,677,697 across its network in NSW as shown in table 8 below.

Table 8: ARTC level crossing safety initiatives in 2017-18

Line section	Cost	Sites	Project Scope
Yass – Demondrille	\$107,854	1	Level crossing surface upgrade and associated works
Cootamundra – Junee	\$100,349	1	Level crossing surface improvements and associated works
Stratford Junction to Kundabung	\$116,000	5	Level crossing surface and signage improvements
Telarah to Stratford Junction	\$40,000	1	Level crossing surface improvements and associated works
Kundabung to Lawrence Road	\$106,000	4	Level crossing sighting distance, road surface improvements and associated works
Lawrence Road to The Border	\$158,000	6	Level crossing sighting distance, road surface improvements and associated works
Cootamundra - Parkes	\$266,500	2	Level crossing surface improvements and associated works
Ivanhoe to Parkes	\$49,000	1	Level crossing surface improvements and associated works
Merrygoen - Gulgong	\$199,994	9	Level crossing road surface renewals and sighting distance improvements
Merrygoen to Gap	\$231,000	8	Level crossing road surface renewals and sighting distance improvements
Murulla to Willow Tree	\$288,000	2	Pedestrian and road level crossing renewals
Various	\$15,000	2	CCTV monitoring of level crossings
Sub total	\$1,677,697	42	
ARTC contribution to LCIP projects			
Project	Contribution	Sites	
Rosler Parade, Henty	\$162,000	1	
Baird Street, Culcairn	\$162,000	1	
Sub total	\$324,000	2	
Total	\$5,357,091		

7.2 CRN level crossing safety initiatives

JHR and I&S continued to improve level crossing safety on the CRN with improvements of \$3.33 million set out in table 9 on page 27. These improvements included civil road surface upgrades, passive to active signalling upgrades, replacement of life-expired equipment, the removal/replacement of signage on non-operational lines to reflect actual conditions to standard, and other minor works.

Table 9: CRN level crossing safety initiatives in 2017-18

Location	Cost	Project Scope
Nyngan Junction to Cobar - Moonagee Street, Nyngan	\$937,000	Level crossing upgrade (signals) - axle counter upgrade
Nyngan Junction to Cobar - Mitchell Street, Nyngan	\$929,000	Level crossing upgrade (signals) - axle counter upgrade
Tarana to Orange - Orton Park, Bathurst	\$640,000	Level crossing upgrade (signals) - replacement of life expired components (active type f)
Bowenfels to Wallerawang - Main Street, Wallerawang	\$375,000	Level crossing upgrade (signals) - installation of axle counter train detection
Tarana to Orange, Mid-Western Highway, Blayney	\$406,000	Signalling system modification - replacement of boom mechanisms
Samuel and Charles Streets, Wellington	\$45,000	Level crossing upgrade – detailed designs
Sub total	\$3,332,000	
JHR and I&S contribution to LCIP projects		
Project	Contribution	
Marrar North Road, Marrar	\$337,000	
Lake Street, Ganmain	\$277,000	
Gardiner Street, Griffith	\$762,000	
Sub total	\$1,376,000	
Total	\$4,708,000	

7.3 Sydney Trains level crossing safety initiatives

Sydney Trains continued to improve the safety of the level crossings on its network during 2017-18 with key infrastructure improvement initiatives shown in table 10 below.

Table 10: Sydney Trains level crossing safety initiatives in 2017-18

Location	Cost	Project Scope
Bourke Street, East Richmond	\$57,000	Upgrade of the existing pedestrian swing gate crossing and the installation of a new country-side swing gate pedestrian crossing
St James Road, Adamstown	\$56,000	Assess the feasibility of converting the level crossing to an automatic mode and the installation of an interface with the traffic signals at the intersection
Total	\$113,000	

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.

Progress

The number of outstanding interface agreements across Australia is slowly improving. In 2017-18, ONRSR has engaged further with the Australian Local Government Association (ALGA), as it continues to support state-based local government authorities progressing the outstanding agreements.

As at 30 June 2018, 88 (48%) interface agreements across NSW remained outstanding. The majority of these are tripartite agreements, which involve a local council, Roads and Maritime and a RIM.

During 2017-18, ONRSR and RIMs actively engaged with local governments and local government associations to progress outstanding agreements. The subsequent resolution of issues with Central NSW Councils (Centroc) has resulted in the progression of completed agreements across NSW.

Table 11 below shows a breakdown of interface agreements required in NSW and the number outstanding as at 30 June 2018.

Table 11: Outstanding interface agreements in NSW as at 30 June 2018

Summary of interface agreement implementation	
Agreements required in NSW	182
Agreements outstanding in NSW	88 (48%)
Road manager	Number outstanding
Roads and Maritime & local councils (including tripartite agreements)	82
Local councils (Centroc members)	6

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 2017-18

Year	Program / Agency	Expenditure (\$ millions)	Total (\$ millions)
2003-04	CRIA	2.00	5.00
	LCIP	3.00	
2004-05	LCIP	5.00	5.00
2005-06	RailCorp	1.30	7.30
	LCIP	6.00	
2006-07	RailCorp	2.40	11.33
	ARTC	1.65	
	CRIA	0.28	
	LCIP	7.00	
2007-08	RailCorp	2.65	18.49
	ARTC	6.90	
	CRIA	1.94	
	LCIP	7.00	
2008-09	RailCorp	2.81	18.03
	ARTC	2.47	
	CRIA	4.53	
	RTA	2.94	
	LCIP	5.28	
2009-10	RailCorp	3.27	59.77
	ARTC ⁴	42.77	
	CRIA	3.87	
	RTA	3.30	
	LCIP	6.57	
2010-11	RailCorp	3.60	15.94
	ARTC	1.65	
	CRIA	3.37	
	LCIP ⁵	7.33	
2011-12	RailCorp	3.20	42.69
	ARTC	29.21	
	CRIA	2.88	
	LCIP ⁶	7.40	

⁴ One-off funding for the Boom Gates for Rail Crossings Program was provided as part of the Commonwealth Government's Nation Building Program.

⁵ Includes \$2 million funding provided from the former RTA.

⁶ Includes \$2.5 million provided by RailCorp and \$4.8 million provided by RMS

Year	Program / Agency	Expenditure (\$ millions)	Total (\$ millions)
2012-13	RailCorp	1.90	24.65
	ARTC	12.90	
	CRN	1.04	
	RMS	1.30	
	LCIP ⁷	7.51	
2013-14	Sydney Trains	1.80	20.85
	ARTC	8.17	
	CRN	2.82	
	RMS	0.46	
	LCIP ⁶	7.60	
2014-15	Sydney Trains	2.78	19.62
	ARTC	5.36	
	CRN	1.16	
	RMS	3.05	
	LCIP ⁶	7.27	
2015-16	Sydney Trains	1.96	16.70
	ARTC	3.88	
	CRN	3.79	
	RMS	0.00	
	LCIP	7.07	
2016-17	Sydney Trains	2.94	29.21
	ARTC	3.03	
	CRN	12.70	
	RMS	3.26	
	LCIP	7.28	
2017-18	Sydney Trains	0.11	13.16
	ARTC	2.00	
	CRN	4.71	
	LCIP	6.34	

⁷ Includes \$2.5 million provided by RailCorp and \$5.0 million provided by RMS

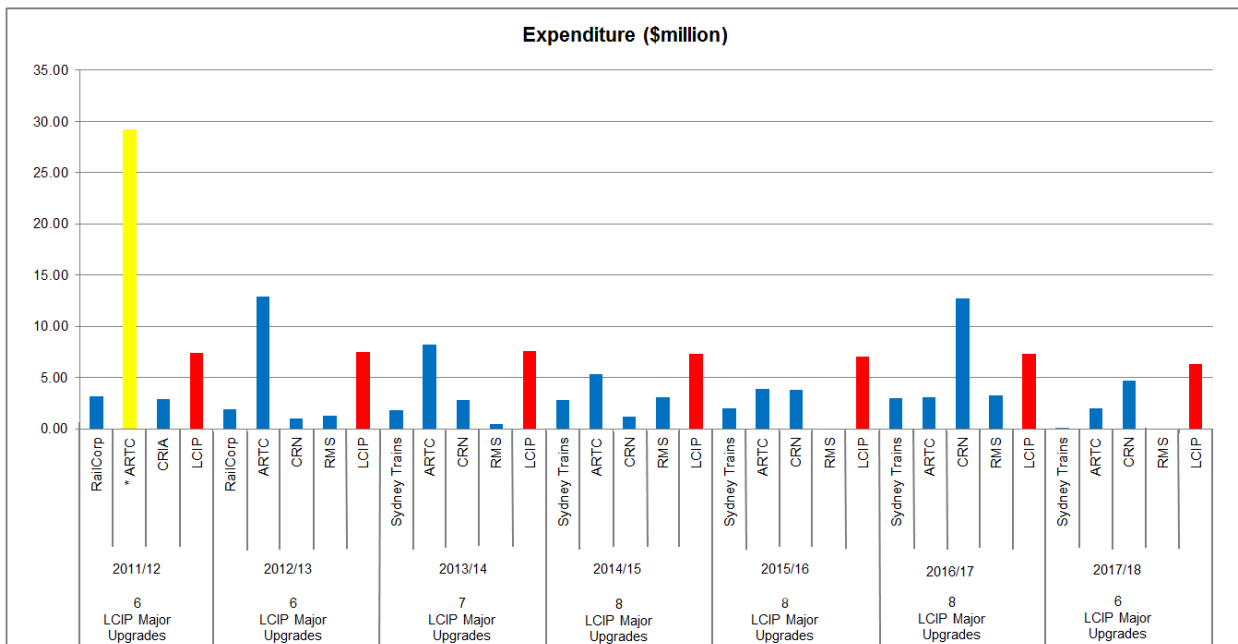
Appendix A: Total LCIP 2017-18 work completed

Table 13: Total LCIP 2017-18 work completed

Location	Electorate	Value
Construction Projects		
Lake Street, Ganmain ⁸	Murrumbidgee	
Marrar North Road, Marrar	Murrumbidgee	\$1,204,000
Gardiner Street, Griffith	Murrumbidgee	\$688,000
McAdam Street (Rouchel Road), Aberdeen	Upper Hunter	\$688,000
Rosler Parade, Henty	Albury	\$688,000
Baird Street, Culcairn	Albury	\$688,000
	Total	\$3,956,000
Concept and Detailed Design		
Murrays Flat Road, Towrang	Goulburn	\$11,000
Mills Road, Towrang	Goulburn	\$11,000
Burley Griffin Way - Yenda Road, Yoogali - Griffith	Murrumbidgee	\$184,000
Wirrinya Road - Back Marsden Road, Wirrinya	Burrinjuck	\$11,000
	Total	\$217,000
Minor works		
ARTC Minor works		339,000
Roads and Maritime Short stacking program		\$446,000
	Total	\$785,000
Other Level Crossing Initiatives		
Level Crossing Education and Enforcement Campaigns		\$996,000
ALCAM Data Collection and development		\$295,000
Level Crossing Policy and Strategy Development		\$91,000
	Total	\$1,382,000
	Grand Total	\$6,340,000

⁸ Work completed in 2017-18 to be funded from the 2018-19 LCIP

Appendix B: Expenditure on level crossing upgrades in NSW funded through the LCIP and by RIMs and road managers 2011-12 to 2017-18



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.

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