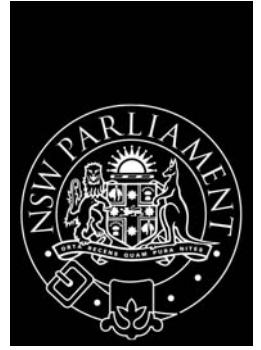


PARLIAMENT OF NEW SOUTH WALES



STAYSAFE Committee
REPORT ON THE SAFETY OF RAILWAY LEVEL CROSSINGS
— WHERE ROADS AND RAILWAY LINES MEET AT
SUBSTANTIALLY THE SAME LEVEL

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Table of Contents

Membership & Staff.....	v
Terms of Reference.....	vii
Chairman’s Foreword	ix
List of Recommendations	xiii
CHAPTER ONE – INTRODUCTION	1
Update and chronology regarding the STAYSAFE Committee’s inquiry into the safety of railway level crossings.....	2
Background on Australian railways	3
Other actions to address the safety of railway level crossings.....	7
CHAPTER TWO - RAILWAY LEVEL CROSSINGS IN NEW SOUTH WALES.....	11
The history of railway level crossings in New South Wales.....	11
Types of railway level crossings.....	13
Types of protection at railway level crossings.....	14
Technology for active protection at railway level crossings.....	16
Closure of railway level crossings.....	18
Prioritisation of upgrading of railway level crossings	21
Maintenance and safety at railway level crossings	23
Funding.....	25
CHAPTER THREE - INCIDENTS AND CRASHES AT RAILWAY LEVEL CROSSINGS.....	27
New South Wales data and relevant information	27
Crashes at railway level crossings in New South Wales	27
Fatalities from railway level crossing crashes in New South Wales	29
Rail risks	32
National data regarding railway level crossing crashes	33
Other data and research about railway level crossing crashes and incidents.....	35
CHAPTER FOUR - ADMINISTRATION MATTERS RELATING TO RAILWAY LEVEL CROSSINGS .	39
Recent history of railway level crossing administration.....	39
The management of matters associated with railway level crossings.....	43
Funding of railway level crossing improvements	48
Inventory of railway level crossings in New South Wales	55
Risk assessment and prioritisation of railway level crossings	59
Rail corridor management	61
Investigation of level crossing incidents	66
Contingency planning for level crossing crashes involving passenger trains or trains carrying hazardous materials.....	68
Heritage and tourist railway operations	70
Other private railways in New South Wales.....	71

CHAPTER FIVE - ROAD ENVIRONMENT MATTERS ASSOCIATED WITH RAILWAY LEVEL CROSSINGS	73
Standards for signs, signals and road markings at railway level crossings.....	73
Technologies used for signs, signals and road markings at railway level crossings....	76
New technologies and innovative approaches for signs, signals and road markings at railway level crossings.....	80
Frangible roadside and railway infrastructure at railway level crossings.....	85
Median barriers.....	87
Sighting distances at railway level crossings	87
General advisory signage regarding railway level crossings.....	90
Departmental and private crossings	90
Land use planning and development issues and railway level crossings	91
CHAPTER SIX - MATTERS RELATING TO TRAIN CREWS	93
Safety concerns at railway level crossings in metropolitan areas.....	94
Safety concerns with railway level crossings in regional and rural areas	95
Reporting of incidents	95
Impact of incidents and crashes on train crews.....	100
CHAPTER SEVEN - MATTERS RELATING TO LOCOMOTIVES AND ROLLING STOCK.....	103
Slowing train speeds	103
Train conspicuity	108
Improvements in locomotive passive safety.....	110
Risk assessment for level crossing crashes involving passenger trains or trains carrying hazardous materials	111
CHAPTER EIGHT - MATTERS ASSOCIATED WITH MOTOR VEHICLES AT RAILWAY LEVEL CROSSINGS	113
CHAPTER NINE - MATTERS ASSOCIATED WITH DRIVERS AND OTHER ROAD USERS AT RAILWAY LEVEL CROSSINGS	117
Behaviour of motorists at railway level crossings.....	117
Education and awareness of motorists and pedestrians	122
Advertising and education relating to seasonal rail operations.....	123
Education and awareness actions to also address "culture of blame"	128
Enforcement issues associated with railway level crossings	132
The question of "fail safe" signals	136
Criminal offences regarding motorists using of railway level crossings	137
Civil liabilities regarding railway level crossing crashes and incidents	138
Pedestrians, cyclists and other non-motorised transport user behaviour at railway level crossings	139
Trespass across railway lines	140
Suicides at railway level crossings	142
Operation Lifesaver	144

CHAPTER TEN - MATTERS RELATING TO THE RAILWAY ENVIRONMENT AT LEVEL CROSSINGS	149
Vandalism.....	149
Other offences associated with railway level crossings	151
CHAPTER ELEVEN - CONCLUDING COMMENTS	155
One family's story	155
The bigger picture—the review of responses to inquiry findings and recommendations	161
APPENDIX A	165
APPENDIX B	175
REFERENCES	205
WITNESSES WHO TESTIFIED BEFORE THE STAYSAFE COMMITTEE ON THE SAFETY OF RAILWAY LEVEL CROSSINGS	211
SUBMISSIONS RECEIVED BY THE STAYSAFE COMMITTEE ON THE SAFETY OF RAILWAY LEVEL CROSSINGS	213
RELEVANT EXTRACTS FROM THE MINUTES OF THE STAYSAFE COMMITTEE REGARDING THE SAFETY OF RAILWAY LEVEL CROSSINGS	217

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Terms of Reference

The STAYSAFE Committee investigated this matter under the joint resolution of the Legislative Assembly and the Legislative Council that:

(1) As an ongoing task, the Committee is to -

...

- (b) review and report on counter measures aimed at reducing deaths, injuries, and the social and economic costs to the community arising from road accidents.

The STAYSAFE Committee received a Ministerial reference requesting the inquiry from the Hon. Carl Scully MP, Minister for Roads, and adopted the following terms of reference:

That the Committee conduct an inquiry into the safety of railway level crossings in New South Wales, with the terms of reference to provide for a review of:

- the status of railway level crossings in New South Wales;
- factors contributing to crashes at railway level crossings;
- countermeasures which may increase the safety of railway level crossings;
- motorist behaviour and education regarding the use of railway level crossings;
- and any other related matters.

Chairman's Foreword

This is the final report of an inquiry into the safety of railway level crossings—where roads and railway lines meet at substantially the same level.

The inquiry arose from a Ministerial Reference provided by the Hon. Carl Scully MP, Minister for Roads and Minister for Transport, following several fatal crashes at railway level crossings in southern New South Wales in early 2001.

Railway infrastructure in New South Wales has developed over a period of 150 years. Over that period, many changes have occurred in traffic type, speed and numbers of both rail and road traffic, but much of the original infrastructure remains, including infrastructure associated with the intersection of railway lines with roads and other access routes (i.e., level crossings). Railways are thus a mix of 21st, 20th, and 19th century technologies and thinking where the very modern often co-exists with the highly traditional.

There is a streak of conservatism in the railway industry. This conservatism is particularly so when it comes to safety matters.

Currently, there are more than 3,800 level crossings in New South Wales. In the early development of railways, level crossings in high risk locations were protected by swing gates operated by gatekeepers or railway station staff. More recently, many level crossings have been replaced by grade-separated road bridges or underpasses, and many of the remaining level crossings in high risk locations are demarcated by signage, road markings, flashing lights, bells, and also boom gates. These level crossings are defined as having 'active protection'.

The majority of level crossings, however, are demarcated by signage and road markings only. These level crossings are defined as having 'passive protection'.

Level crossings occur across a variety of road access types (highways, other public roads, private roads, and access for rail agencies), road user categories (motor vehicles, pedestrians, agricultural machinery, and other work vehicles such as plant machinery), and rail use types (main lines, secondary main lines, branch lines, heavy haulage lines, and restricted lines subject to seasonal use or tourism activities).

The public risk associated with crossing railway tracks comprises:

- vehicular (motor vehicles, bicycles, horse-drawn vehicles)
- pedestrian (including persons using wheelchairs)
- trespass and suicide (or unauthorised entry onto railway property)

Fatalities and injuries to pedestrians or vehicle occupants due to crashes involving trains at level crossings in New South Wales are not high, compared to the overall road toll. But while road trauma associated with level crossings is low, there is an extremely serious risk of a catastrophic outcome from a level crossing crash if there is a major train derailment involving overturning or impacts with passenger carriages, or the spillage of hazardous freight.

Chairman's Foreword

As at October 2004, 60 primary submissions have been received, with 30 supplementary submissions making further comment. Submissions have been received from New South Wales government agencies (through the Level Crossing Strategy Council), interstate rail agencies, rail operators, rail unions, railway staff, and the general public.

There have been few submissions received from local councils, despite the majority of level crossings in New South Wales being on roads under the administrative responsibility of local councils.

The STAYSAFE Committee has held three days of public hearings into the safety of railway level crossings, and has conducted inspections throughout regional New South Wales and interstate. Concurrently, there have been a number of coronial inquiries into fatal crashes in New South Wales, and also significant research activity into level crossing safety nationally. As well, in Melbourne in February 2002 there were three major meetings: Operation Lifesaver – community advocacy to improve the safety of level crossings; a workshop to discuss the safety of passive level crossings; and the 7th International Symposium on the Safety of Highway-Rail Grade Crossings. These coronial, research, and information-sharing processes have assisted the STAYSAFE Committee in its inquiry.

In this report, the STAYSAFE Committee presents its findings in a series of chapters which address the status of railway level crossings in New South Wales, the factors contributing to crashes at railway level crossings, the countermeasures which may increase the safety of railway level crossings, and examine motorist behaviour and education regarding the use of railway level crossings. The report is organised as follows:

- Chapter 1, reviewing the rail network in New South Wales
- Chapter 2, on railway level crossings in New South Wales
- Chapter 3, examines incidents and crashes at railway level crossings
- Chapter 4 examines matters relating to the administration of railway level crossings (i.e., the bureaucratic structures within government agencies, methods used to document railway level crossings, assess the safety of level crossings, and develop appropriate interventions to reduce hazards)
- Chapter 5 examines the road environment on the approaches and entry to railway level crossings
- Chapter 6 examines matters associated with train crews
- Chapter 7 examines matters relating to locomotives and rolling stock (i.e., rail vehicles)
- Chapter 8 examines issues associated with road vehicles at railway level crossings
- Chapter 9 examines issues associated with drivers and other road users (pedestrians, wheelchair occupants, etc.) at railway level crossings
- Chapter 10 examines matters relating to the rail environment and infrastructure at railway level crossings
- Chapter 11 notes the human tragedies that occur at railway level crossings, and reviews the possible future development of the New South Wales rail network.

The recommendations in this report affect the operations of the Rail Infrastructure Corporation and the Roads and Traffic Authority primarily. Many recommendations also include reference to local councils, other government agencies (within the Transport portfolio and outside), and railway operators.

The findings of this report have a general import for the New South Wales community, and for government agencies involved in the safe operation of the railway network specifically.

Some of the findings of the STAYSAFE inquiry include:

- The diversity of road access, road use and rail use categories associated with railway level crossings, and the number of railway level crossings State-wide, indicates that there is no one solution that can be implemented to increase safety. A flexible range of strategies must be developed and implemented to deal effectively with level crossing safety
- There is a need for a comprehensive inventory of the number and types of railway level crossings in New South Wales, including public, private, and departmental crossings, including adoption of a nationally consistent standard reference system
- The restructuring of the Level Crossing Strategy Council, with representatives from rail, road, local councils and police, should ensure a more coordinated and whole-of-Government approach to the administration of safety at level crossings
- The need to develop a risk identification model, based on risk/consequence analysis, that provides an objective priority ranking for upgrades and which should eliminate any potential for an ad hoc and inconsistent approach and enable a statewide perspective to be developed
- There is a need to ensure a comprehensive policy and standards framework for improving safety at level crossings, and, as part of this, a policy and procedures document that outlines Government objectives in respect of level crossings, the responsibilities of the relevant parties, the role of the Level Crossing Strategy Council, and key processes (e.g., closure or upgrade of level crossings)
- There is a need for a greater emphasis on educating road users and the community about the risks at level crossings, and the need for safety awareness, through coordinated and strategically targeted campaigns
- There is a need to examine the way that enforcement can play an educative/deterrent role and to work with police in pursuing this as a strategy
- There is a need to consider instituting a closed corridor policy on high speed lines, which could involve the closure of crossings, grade separations, possible provision of alternative access and the upgrading of passive crossings to active protection
- There is a need to consider the use of alternative technologies with a view to providing simpler, more cost effective means of protection.
- The doubling of funding for the Level Crossing Improvements Program through to 2006/07 will enable a greater number of projects to be undertaken, including the upgrade of level crossings from passive protection to active, the installation of advanced warning lights, and LED lighting replacing existing level crossing warning lights to improve visibility.

Chairman's Foreword

The STAYSAFE inquiry arose as a consequence of fatal level crossing crashes in southern New South Wales in early 2001. It is worthwhile to consider the remarks of the Deputy State Coroner, Mr Carl Milovanovich, in his findings into the deaths of five young men at the Bells Road, Gerogery level crossing:

“It is a sad reality that we will never know what happened precisely. We can make informed guesses, but that is all they are. The real tragedy in this matter is not whether the driver made an error of judgment but that in this day and age when we all strive to reap the benefits of new technology such as computers, advances in medicine, trains that travel at 160 km/h and even faster, we still have a 19th century approach to level crossings on the basis that they are traversed by horse and cart... Certainly it could not be said to be acceptable that a major road traverses a railway line on which a train can travel at 160 km/h without at least some effective barrier that may eliminate serious accidents due to human error. Other than suicide, no person would drive a vehicle in front of a train unless it is a human error; that error can be the more likely if the configuration of the road, the lights, etc., plus weather and other conditions play a part.”

The New South Wales Government has announced that the level crossing at Bells Road, Gerogery is to be replaced by a road bridge providing grade separation between the Main Southern rail line and the Olympic Way.

Acknowledgements

I am grateful for the contributions of my colleagues on the STAYSAFE Committee, and note, in particular, the concerns of Mr Daryl Maguire MP, Opposition Whip and Member for Wagga Wagga, who brought his concerns to STAYSAFE following several deaths at railway level crossings in the Wagga Wagga area. The STAYSAFE Committee is at its best when it works in a collegiate and bipartisan way, and this inquiry has demonstrated this to the full.

Much of the initial work for this inquiry was undertaken by the STAYSAFE Committee of the previous Parliament, under the Chairmanship of the Hon. Grant McBride MP, now Minister for Gaming and Racing. I thank Grant for his work, and acknowledge the contributions of the other members of the STAYSAFE Committee of the 52nd Parliament who have left the Committee: Hon. John Jobling MLC (retired), Mr Russell Smith MP (retired), the Hon. David Campbell MP (Minister for Regional Development, Minister for the Illawarra, and Minister for Small Business), Mr Kevin Green MP, Mr Andrew Stoner MP, and Mr Thomas George MP.

The STAYSAFE Committee is grateful for the assistance of its secretariat, in particular, Mr Ian Faulks, Committee Manager, who prepared this report for the Committee. Mr Faulks is assisted by his very capable staff: Mr Jim Jefferis, Project Officer, and Ms Millie Yeoh and Ms Ashika Cyril, Assistant Committee Officers.

List of Recommendations

Matters relating to the administration of railway level crossings

RECOMMENDATION 1:

Ministry of Transport be the lead agency for matters associated with railway level crossings, that is, intersections where a road and railway meet at the same level.

RECOMMENDATION 2:

The Director General, Ministry of Transport continue to chair the Level Crossing Strategy Council.

RECOMMENDATION 3:

Where a grade separation (bridge or underpass) is under consideration to replace a railway level crossing the Roads and Traffic Authority should take the role of lead agency, although the Level Crossing Strategy Council should continue to make recommendations on which level crossings are of such a risk magnitude as to warrant this level of action.

RECOMMENDATION 4:

Matters associated with railway level crossings in New South Wales be:

- (a) co-ordinated and directed through a high level council comprising the relevant Minister(s) and chief executives of the roads and transport portfolios, to be known as the Level Crossing Strategy Council;
- (b) managed through a railway level crossings manager employed by the Rail Infrastructure Corporation;
- (c) administered in terms of budget and works programs by the Rail Infrastructure Corporation; and with responsibilities regarding roads in the immediate vicinity of railway level crossings to be negotiated and co-ordinated by the railway level crossings manager in consultation with the Rail Infrastructure Corporation, the Roads and Traffic Authority and local councils

RECOMMENDATION 5:

The government agencies and other organisations to form the Level Crossing Strategy Council should include:

- the Ministry of Transport
- the Rail Infrastructure Corporation
- the Roads and Traffic Authority
- New South Wales Police
- the Local Government and Shires Associations of New South Wales
- the Independent Transport Safety and Reliability Regulator
- the Australasian Railways Association
- the Australian Rail Track Corporation

RECOMMENDATION 6:

All incidents at railway level crossings—‘near miss’ or potential crashes, collisions, trespass and suicide—be recorded in a central register and maintained by the Rail Infrastructure Corporation and Level Crossing Manager .

RECOMMENDATION 7:

That the railway level crossings incidents register be presented regularly to the Level Crossing Strategy Council for review and response to recorded incidents.

RECOMMENDATION 8:

That all investigations of railway level crossings crashes and other incidents be conducted by the Independent Transport Safety and Reliability Regulator, in conjunction with the Rail Infrastructure Corporation, Ministry of Transport, Roads and Traffic Authority, New South Wales Police, Local Government and Shire Associations, and the Australasian Railways Association, with the resulting reports to be furnished to the Level Crossing Strategy Council through the Level Crossing Manager.

RECOMMENDATION 9:

The Level Crossing Strategy Council publish an annual report of its activities.

RECOMMENDATION 10:

The Minister for Transport and Minister for Roads review the recurrent funding formula for the upgrading of railway level crossings, with specific regard to:

- (a) the adequacy of the recurrent funding to achieve the necessary and desirable improvements in public rail safety and road safety within a reasonable timeframe and in a manner that promotes the development of rail transport in New South Wales;
- (b) the capacity of local councils to contribute to the recurrent funding formula; and
- (c) whether the recurrent funding formula allows the effective and efficient planning of upgrading works associated with railway level crossings.

RECOMMENDATION 11:

The Level Crossing Strategy Council should:

- (a) develop a longer term plan for improvements in the safety of railway level crossings;
- (b) ensure that its member agencies and organisations reflect this strategic focus within their own planning processes and documentation.

RECOMMENDATION 12:

In the event that a local Council is unable to meet the one-third cost contribution for the upgrading of a railway level crossing, the previous practice for the Roads and Traffic Authority to defer the upgrading work from the annual Level Crossing Improvements Program and re-prioritise funds elsewhere in the program should be discontinued.

RECOMMENDATION 13:

The Level Crossing Strategy Council actively promote the development and implementation of a nationally consistent standard reference for railway level crossings that provides a unique reference number or descriptor, is communicable, visible and easily understood by the public, by rail and road authorities, and by police and emergency services.

RECOMMENDATION 14:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority and other agencies, develop and maintain an inventory of all intersections between railways and roads, including all intersections where a road, road-related area, pedestrian access route or other access route meets a railway at substantially the same level (e.g., actively signalled road level crossings, passively signed road level crossings, accommodation crossings, maintenance crossings, pedestrian crossings, etc.).

RECOMMENDATION 15:

The Rail Infrastructure Corporation ensure that there is public internet access to the inventory of all intersections between railways and roads, including intersections where a road and railway meet at substantially the same level.

RECOMMENDATION 16:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other agencies, develop and implement a regular and ongoing program of audit for all railway level crossings in New South Wales, including at least annual inspections of road markings, signs and advance warning signals on roads approaching railway level crossings.

RECOMMENDATION 17:

The Rail Infrastructure Corporation, in consultation with other rail agencies interstate, continue to develop and maintain a risk assessment and prioritisation program for railway level crossings.

RECOMMENDATION 18:

The Rail Infrastructure Corporation, in consultation with other rail agencies interstate, ensure that the development of a risk assessment and prioritisation program for railway level crossings is organised to readily identify issues associated with high speed passenger services, and high speed rail operations generally.

RECOMMENDATION 19:

The Ministry of Transport, in consultation with in the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, rail operators, and other agencies develop and implement rail corridor management strategies for New South Wales railway lines.

RECOMMENDATION 20:

The Ministry of Transport, in consultation with in the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, rail operators, and other agencies adopt a closed corridor strategy for high speed railway lines in New South Wales.

RECOMMENDATION 21:

The maximum speed of trains within the New South Wales rail network should not exceed 120 km/h unless the rail corridor is a closed corridor.

RECOMMENDATION 22:

The general policy to be adopted by rail and road agencies is that the at-grade intersection of roads and railway tracks through provision of a railway level crossing is to be avoided wherever possible.

RECOMMENDATION 23:

The Ministry of Transport, in consultation with the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other agencies, actively seek the closure or relocation of railway level crossings across the New South Wales rail network.

RECOMMENDATION 24:

The relevant legislation be amended to:

- (a) allow the Director-General of the Ministry of Transport to order the closure or relocation of intersections where a road and railway meet at substantially the same level;
- (b) specify the mechanism and grounds for appeal of a decision by the Director-General of the Ministry of Transport to close or relocate an intersection where a road and railway meet at substantially the same level;
- (c) provide for the Roads and Traffic Authority and the local council to be a party to any appeal of a decision by the Director-General of the Ministry of Transport to close or relocate an intersection where a road and railway meet at substantially the same level.

RECOMMENDATION 25:

The Minister for Emergency Services, in consultation with the Level Crossing Strategy Council, should review the State Disaster Plan and other statewide emergency plans to ensure adequate and effective contingency planning for serious incident scenarios such as a crash at a railway level crossing involving a fast passenger train or a freight train carrying dangerous goods (hazardous materials) on metropolitan, regional and rural railway lines within New South Wales.

RECOMMENDATION 26:

The Ministry of Transport commission or conduct research to estimate:

- (a) the probabilities for the likely occurrence of railway level crossing crashes; and
- (b) the projected human costs, capital costs, and economic costs likely to be associated with such crashes.

RECOMMENDATION 27:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, ensure that issues associated with railway level crossings on heritage and tourist railways are identified, considered, and addressed in general policies and programs to improve the safety of operation of railway level crossings.

Matters relating to the road environment at railway level crossings

RECOMMENDATION 28:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, ensure that issues associated with railway level crossings on private railways are identified, considered, and addressed in general policies and programs to improve the safety of operation of railway level crossings.

RECOMMENDATION 29:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other Transport NSW agencies, seek and participate in the review of Australian Standard AS1742 - Part 7 relating to railway level crossings, including, but not limited to a range of technical issues associated with signals technology, signage, markings, etc.

RECOMMENDATION 30:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, seek to adopt Australian technologies and to adopt best practice principles for the management of railway level crossings.

RECOMMENDATION 31:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, and other agencies, encourage the development and implementation of new technologies to improve the safety of railway level crossings.

RECOMMENDATION 32:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other agencies, ensure that there are opportunities for the assessment of innovative approaches to addressing the problems associated with railway level crossings.

RECOMMENDATION 33:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority and local councils, develop a program for the installation of gateway treatments and other perceptual countermeasures to provide better cues to motorists on roads approaching railway level crossings, including but not limited to road markings, signage, roadside infrastructure, the road pavement design and construction (e.g., road width, road surface treatment, rumble strips, etc.), and traffic signals (e.g, approach flashing lights).

RECOMMENDATION 34:

The Roads and Traffic Authority and the Rail Infrastructure Corporation, with local councils (where appropriate), provide for the integration of rail signals with any traffic signals on roads approaching railway level crossings.

RECOMMENDATION 35:

The Rail Infrastructure Corporation and the Roads and Traffic Authority develop and trial a new railway level crossing signal system based on the existing road traffic signals where:

- (a) a system of green-amber-red lights is displayed to road traffic approaching a railway level crossing so that drivers see:
 - (i) a green light when no train is present or approaching,
 - (ii) an amber light indicating the approach of a train, and
 - (iii) a red light (or double red lights) to indicate the imminent approach and transit of a train;
- (b) the use of flashing green-amber-red lights is compared with a steady green-amber-red lights display; and
- (c) the railway level crossing signal system uses modern technologies (e.g., LED displays, detection of train speeds, microwave technology, GPS technology, etc.)

RECOMMENDATION 36:

The Roads and Traffic Authority and the Rail Infrastructure Corporation assess the feasibility of installing train-activated rumble strips at passive railway level crossings.

RECOMMENDATION 37:

The Rail Infrastructure Corporation ensure that the roadside and railway infrastructure that is installed at railway level crossings minimises the likelihood of serious injury in the event of collisions between a train and a vehicle or person through:

- (a) the design and construction of frangible (breakaway) road side and rail infrastructure; and
- (b) the removal and replacement of non-frangible roadside and railway infrastructure at railway level crossings.

RECOMMENDATION 38:

The Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation and local councils, develop guidelines for the installation of median barriers at railway level crossings.

RECOMMENDATION 39:

The Roads and Traffic Authority, in consultation with local councils and the Railway Infrastructure Corporation, develop a consistent policy regarding the use of approach warning signage, signals and road markings prior to the immediate approaches and entry into a railway level crossing.

RECOMMENDATION 40:

The Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation, ensure that the angles of intersection between the road and the railway line are such to allow the drivers approaching and entering the railway level crossing to view the railway line—in both directions—for the presence of a train.

RECOMMENDATION 41:

The Independent Transport Safety and Reliability Regulator, in consultation with the Rail Infrastructure Corporation, Australian Rail Track Corporation and the operators of private rail lines, ensure that structures such as signal boxes within the rail reserve do not impede the view of the railway line of a driver approaching or stopped at the entry to a railway level crossing.

RECOMMENDATION 42:

The Roads and Traffic Authority, in consultation with local councils and the Railway Infrastructure Corporation, consider developing a general advisory sign for use on major roads where railway level crossings occur, or on roads intersecting with high use railway lines.

RECOMMENDATION 43:

The Rail Infrastructure Corporation, in consultation with local councils, the Roads and Traffic Authority and the Environment Protection Authority ensure that there is a program to removal obstructive roadside and railway vegetation within the sight triangles associated with railway level crossings.

RECOMMENDATION 44:

The Rail Infrastructure Corporation, in consultation with rail operators, review the safety of departmental crossings associated with vehicular and pedestrian access onto or across railway tracks.

RECOMMENDATION 45:

The Rail Infrastructure Corporation and the Roads and Traffic Authority, ensure that local councils, when considering land use planning and development issues, take account of issues associated with railway level crossings, and that such considerations are documented by local council traffic committees.

Matters relating to train crews

RECOMMENDATION 46:

The Independent Transport Safety and Reliability Regulator, in consultation with the Rail Infrastructure Corporation, Australasian Railways Association and the Ministry of Transport, ensure the development and implementation of an independent and confidential reporting system to assist in the identification of problems associated with the operation of the New South Wales rail network, and railway level crossings specifically.

RECOMMENDATION 47:

The Rail Infrastructure Corporation, in consultation with the WorkCover Authority, New South Wales Health, rail unions, rail operators, other Transport NSW agencies, New South Wales Police, and other relevant agencies and organisations, review the support provided for train crews and other personnel involved in attending level crossing crashes to:

- (a) identify best practice principles; and
- (b) develop and implement improved programs to support train crews and other personnel involved in attending level crossing crashes.

Matters relating to locomotives and rolling stock

RECOMMENDATION 48:

The maximum speed for trains within the New South Wales rail network should be 120 km/h unless there is a closed corridor for train operations.

RECOMMENDATION 49:

The Ministry of Transport, in consultation with rail operators, rail unions, the WorkCover Authority, and other relevant agencies and organisations, identify and review the efficacy of measures to improve the conspicuity of trains, with specific attention to issues associated with trains travelling across level crossings, including but not limited to:

- locomotive ditch lights,
- locomotive strobe lights,
- general locomotive lighting,
- the use of locomotive highlights
- the use of retroreflective marking on locomotives, goods wagons and passenger carriages.

RECOMMENDATION 50:

The Rail Infrastructure Corporation investigate and review crashes involving trains and motor vehicles, and trains and pedestrians, to identify:

- the characteristics of the point of impact between the train and motor vehicle or pedestrian;
- the potential for the use of energy absorbing structures at common points of impact locations between trains and motor vehicles or pedestrians.

RECOMMENDATION 51:

The Ministry of Transport, in collaboration with the Emergency Services, Police, Health, Environment, and Roads portfolios, should commission or conduct risk assessments for serious incident scenarios such as a crash at a railway level crossing involving a fast passenger train or a freight train carrying dangerous goods (hazardous materials) on metropolitan, regional and rural railway lines within New South Wales.

Matters relating to motor vehicles at railway level crossings

RECOMMENDATION 52:

The Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation and other relevant agencies and organisations, identify and review the possible mechanisms and contribution of driver distraction as a contributor to level crossing crashes, including but not limited to placement and complexity of road side signage and signals, in-vehicle devices and instrumentation, and the vehicle environments (soundproofing, air conditioning, etc.)

RECOMMENDATION 53:

The Roads and Traffic Authority support the development of a capability within in-vehicle navigation systems to alert drivers to the presence of a potentially hazardous situation such as a railway level crossing.

Matters relating to drivers and other road users at railway level crossings**RECOMMENDATION 54:**

The Rail Infrastructure Corporation, in consultation with local councils, and the Roads and Traffic Authority review the current approaches to the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour where a road, road-related area, pedestrian access route or other access route meets a railway at substantially the same level, with particular regard to the effectiveness of public advertising, driver education materials, and road signage.

RECOMMENDATION 55:

The Roads and Traffic Authority, in consultation with local councils and the Rail Infrastructure Corporation, ensure that the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour at level crossings addresses issues associated with the "culture of blame" where the train and train driver are seen as responsible for a crash or near miss incident.

RECOMMENDATION 56:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, conduct research into the knowledge, behaviour and beliefs of motorists and pedestrians about railway level crossings.

RECOMMENDATION 57:

The Roads and Traffic Authority, in consultation with New South Wales Police and the Rail Infrastructure Corporation, review the means currently and potentially available to enforce traffic law regarding motorists transiting a railway level crossing, including but not limited to red light camera technologies and locomotive-mounted video cameras.

RECOMMENDATION 58:

The Roads and Traffic Authority and the Rail Infrastructure Corporation examine the use of flashing amber to indicate signal fault or malfunction and "fail safe" operation for motorists approaching an actively protected railway level crossing.

RECOMMENDATION 59:

The Attorney General's Department, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, review the current criminal law regarding motorists and pedestrians using railway level crossings and determine if the current offences are sufficient to deter unsafe and inappropriate behaviour and if further specific offences are required.

RECOMMENDATION 60:

The Attorney General's Department, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, review the current civil law regarding motorists and pedestrians using railway level crossings and determine if the current tort liabilities are sufficient to deter unsafe and inappropriate behaviour.

RECOMMENDATION 61:

The Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other Transport NSW agencies, review the safety of pedestrian facilities associated with crossing railway tracks, including pedestrian-only level crossings as well as level crossings used by motor vehicles.

RECOMMENDATION 62:

The Level Crossing Strategy Council consult with the Victorian Railway Pedestrian Crossing Upgrades Committee regarding the safety of pedestrians, cyclists, and people using wheelchairs, who use railway level crossings at roads or as stand-alone pedestrian crossing points.

RECOMMENDATION 63:

The Rail Infrastructure Corporation, in consultation with the New South Wales Police Service and other Transport NSW agencies, review the incidence of trespass across railway lines and develop, where possible, effective means for the prevention of trespass and intervention with trespassers on railway property.

RECOMMENDATION 64:

The Rail Infrastructure Corporation, in consultation with the New South Wales Police Service, ensure that where unauthorised, short-cut sites are identified that allow pedestrian movement across operating railway lines, action is taken to close these crossing points permanently.

RECOMMENDATION 65:

The Rail Infrastructure Corporation, in consultation with employee organisations and New South Wales Health, review the incidence of suicide at railway level crossings and develop, where possible, effective means for the prevention of suicides and intervention with persons exhibiting suicidal tendencies.

RECOMMENDATION 66:

The Ministry of Transport, Roads and Traffic Authority and local councils review the Operation Lifesaver program in Canada and the United States of America for possible use, when adapted to Australian conditions and culture, in New South Wales.

RECOMMENDATION 67:

The Australasian Railways Association, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, hold a workshop and seminar on road user behaviour at railway level crossings.

Matters relating to the railway environment at level crossings

RECOMMENDATION 68:

The Rail Infrastructure Corporation, in consultation with New South Wales Police, the Roads and Traffic Authority, and local councils:

- (a) Develop policies and strategies to combat vandalism associated with railway level crossings; and
- (b) Review the adequacy of current legislation to effectively deal with vandalism and criminal damage of railway and road infrastructure

Concluding comments

RECOMMENDATION 69:

The Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other agencies, be subject to a further review in 2006 by the STAYSAFE Committee regarding the response to the findings and recommendations of the inquiry into the safety of railway level crossings in New South Wales.

CHAPTER ONE – INTRODUCTION

- 1.1 The intersection of railway tracks and roads at substantially the same grade or level—that is, railway level crossings—are one of the most difficult traffic situations to manage within both the New South Wales road transport system and the New South Wales rail system.
- 1.2 This report outlines the history of, and administrative processes involved in, level crossings and level crossing safety in New South Wales. Using available data and information, it provides an overview of the number and type of level crossings in New South Wales and the different types of protection in use. It looks at reported fatalities and injuries at level crossings in New South Wales and relevant data and research from other jurisdictions. Additionally, it highlights recent initiatives to improve level crossing safety, as well as future directions and priorities to ensure ongoing improvements.
- 1.3 There are over 3,800 railway level crossings in New South Wales. The number of fatalities and serious injuries that arise from crashes at railway level crossings each year is not high, relative to the number of fatalities and injuries resulting from road crashes generally. However, railway level crossing incidents are an issue of strong community concern, and the consequences of a major incident—to rail passengers and crew, freight operations, the rail network overall, and to road users—are recognised as significant. Level crossing incidents are generally thought of in terms of the consequences for road users. The risks to rail are not as predominant due to the low frequency of injuries and fatalities to train passengers and crews. However, on average there is at least one derailment of a train (locomotive or rolling stock) every year in New South Wales arising from a railway level crossing crash. The consequences of a major train derailment or similar event from a collision at a level crossing are potentially extremely serious.
- 1.4 Roles and responsibilities for ensuring safety at railway level crossings are shared by a number of agencies, with strategic coordination and oversight occurring through the Level Crossing Strategy Council. There is a range of strategies in place to improve level crossing safety, including the Level Crossing Improvements Program. During the course of the inquiry, over the period 2001-2004, the New South Wales Government announced and legislated for a number of initiatives to ensure further improvements to safety at railway level crossings, including major restructuring of the transport portfolio and rail agencies. These initiatives, which included major restructuring of responsibilities within rail and transport agencies, also had significant effect on executive managers within the Transport portfolio (e.g., three individuals have been appointed to the position of Director General of Transport during the course of the inquiry).

Update and chronology regarding the STAYSAFE Committee's inquiry into the safety of railway level crossings

- 1.5 The STAYSAFE inquiry commenced in April 2001, following receipt of a reference from the Minister for Roads and Minister for Transport, the Hon. Carl Scully MP.
- 1.6 The terms of reference provided for a review of:
 - the status of railway level crossings in New South Wales
 - factors contributing to crashes at railway level crossings
 - countermeasures which may increase the safety of railway level crossings
 - motorist behaviour and education regarding the use of railway level crossings
 - and any other related matters
- 1.7 After public hearings, private briefings, and visits of inspection, STAYSAFE agreed to 40 recommendations to be forwarded to the then Minister for Roads and Minister for Transport, the Hon. Carl Scully MP. The recommendations were forwarded to the Minister in January 2003. A list of the recommendations is included as Attachment A to this report.
- 1.8 The STAYSAFE inquiry lapsed on the prorogation of Parliament in February 2003.
- 1.9 After the reforming of the STAYSAFE Committee in mid-2003, the Committee resolved to recommence the inquiry into the safety of railway level crossings under the previous terms of reference agreed in April 2001.
- 1.10 During 2003 the New South Wales transport portfolio underwent significant restructuring, and a new Minister, the Hon. Michael Costa MLC, was appointed. Transport NSW was abolished and its functions were transferred to existing rail entities such as the Rail Infrastructure Corporation, the Ministry of Transport (after 1 July 2003), and the Independent Transport Safety and Reliability Regulator (after 1 January 2004).
- 1.11 In October 2003, the STAYSAFE Committee sought the response of Government to the 40 recommendations regarding the safety of railway level crossings.
- 1.12 Ministers advised that the Government's response would be co-ordinated through the Level Crossing Strategy Council—comprising the Ministry of Transport, the Rail Infrastructure Corporation, the Roads and Traffic Authority, New South Wales Police, the Local Government & Shires Association, and RailCorp, under the chairmanship of the Director General of Transport.
- 1.13 A submission outlining the Government's response to the STAYSAFE's 40 recommendations for reform was received from Mr John Lee, then Director General, Ministry of Transport, in April 2004.
- 1.14 Government representatives testified on the response to the 40 recommendations and related matters affecting the safety of railway level crossings at a public hearing on 17 May 2004.

- 1.15 Since that hearing, STAYSAFE has deliberated upon its final recommendations and is now reporting to Parliament.

Background on Australian railways

- 1.16 At the turn of the 21st century, the Australian rail industry is characterized by reform, privatisation and contracting-out. The changes taking place within the industry are expected to increase the demand for railroad equipment and services: the market for railroad equipment is conservatively valued at \$300 million currently.
- 1.17 The Australian Bureau of Statistics Year Book Australia 2002 provides general summary information on rail transport activity. The Australian rail industry is very diverse, comprising rail operators (freight, passenger, tourist and heritage), manufacturers, suppliers, consultants, track access corporations, maintenance and construction contractors, logistics providers and a wide range of other companies covering all sectors of the industry. Australia's railways are undergoing significant change as a result of the Commonwealth, State and Territory governments' policy to increase competition. Consequently, there has been an increase in private rail activity, with a decline in government ownership and management of railways.
- 1.18 In New South Wales, the Rail Infrastructure Corporation (RIC) manages rail infrastructure including maintenance and operator access to the network outside of the Sydney metropolitan area.
- 1.19 RailCorp provides passenger rail transport throughout New South Wales via its CityRail and CountryLink services and is responsible for the safe operation, crewing and maintenance of passenger trains and stations, operating urban, commuter and country rail passenger services, and interstate passenger trains to Melbourne and Brisbane (Cityrail and Countrylink). It also owns and maintains the metropolitan rail network and provides access to freight operators in the metropolitan area.
- 1.20 RailCorp—the Rail Corporation New South Wales formed on 1 January 2004—is a new state-owned corporation that has as its main focus the provision of a safe, clean, secure and reliable passenger rail network throughout New South Wales. RailCorp merged the State Rail Authority of NSW (StateRail) and the metropolitan functions of the Rail Infrastructure Corporation. The transformation of the Rail Infrastructure Corporation and StateRail into RailCorp is aimed at delivering single point accountability across the railways in order to deliver safe, clean, secure and reliable services. The move to a new rail entity is part of a wide-ranging reform of the transport sector, commenced by the New South Wales Government in early 2003.
- 1.21 FreightCorp, previously the State government-owned major rail freight operator which also operated in South Australia and between Sydney and Melbourne, was recently sold to the National Rail Consortium. A number of other private operators also operate rail services.
- 1.22 The Australian Rail Track Corporation (ARTC) recently took over the management of the interstate railway lines within the New South Wales rail network.

Introduction

- 1.23 As part of the restructuring of the transport portfolio following the general State election in early 2003, an Independent Transport Safety and Reliability Regulator (ITSRR) was established on a recommendation arising from the inquiry into the Glenbrook rail crash (McInerney, 2001). The functions of this body are the co-ordination of safety regulation, which is implemented through a process of co-regulation where the railway operators work with the regulator to arrive at a regulatory model. This model differs from more prescriptive approaches in other transport modalities (e.g., aviation, where the Civil Aviation Safety Authority (CASA) sets the regulations and operators have to work to them). STAYSAFE notes that while co-regulation is proposed as best practice, the implications of this model in areas such as safety management systems is under scrutiny currently in the inquiry into the Waterfall rail crash (see, e.g., McInerney, 2004). The Independent Transport Safety and Reliability Regulator reports to the Minister and the Parliament through an advisory board. In terms of investigation and report on crashes, there is a separate part of the Independent Transport Safety and Reliability Regulator—the Office of Transport Safety Investigations (OTSI)—which is the investigative arm of the regulator. It conducts its work separately and the reports become available publicly.
- 1.24 Most of the remaining functions of the Department of Transport have been absorbed into a new Ministry of Transport, but STAYSAFE notes that planning has been transferred over to the new Department of Infrastructure, Planning and Natural Resources. The restructure of the transport portfolio reflects a strong view of the need to increase the focus on safety and reliability in heavy rail. Prior to the restructure, the Director-General of Transport was also the Co-ordinator General of Rail. The Office of the Coordinator General of Rail was abolished.
- 1.25 In New South Wales, the Level Crossing Strategy Council is the lead body for co-ordination of matters associated with railway level crossings. The Director General of the Ministry of Transport chairs the Level Crossing Strategy Council, and it has representation from a number of agencies as well as community organisations: the Rail Infrastructure Corporation, the Roads and Traffic Authority, RailCorp, New South Wales Police, the Independent Transport Safety and Reliability Regulator, the Local Government and Shires Association, the Australian Rail Track Corporation. The Department of Infrastructure, Planning and Natural Resources has observer status concerning the long-term planning for rail transport in New South Wales.
- 1.26 Across the other Australian States and Territories, a number of rail reforms and developments have also occurred.
- 1.27 During the 1990's significant rail reform policies were implemented with the aim to open up the rail industry (in particular, freight rail) to competition. The key developments in this area have included:
- The elimination of an inefficient gauge transfer in Adelaide, South Australia in 1995, and the establishment of a single gauge line for all of Australia. Now, freight no longer needs to be transferred at State borders, and the subsequent reduced costs and travel time have made freight haulage more appealing to potential new entrants.

- The establishment of a two-part tariff access pricing mechanism for rail track, so that rail operators (private and public) are now charged the same price for track access if they are carrying the same traffic in the same corridor on the same sized train (“competitive neutrality”).
- The sale of Australian National to a number of operators (as described above).
- The formation of a new national organization to control and manage access to the interstate rail network (Australian Rail Track Corporation).
- The corporatisation and later sale of National Rail, a national freight business owned by the Federal government and the State governments of Victoria and New South Wales, which carries general and bulk freight across the national interstate railway network. National Rail is Australia's largest rail based carrier of interstate freight, operating over 350 train services a week access a national network of over 6000 kilometres, and is fully exposed to competition from private operators for access to track. National Rail was sold in a combined sale with FreightCorp (the New South Wales based rail freight operator) to the National Rail Consortium (jointly owned by Toll Holdings and Lang Corporation (Patricks), two publicly listed Australian transport companies).

1.28 The early 1990s saw the total market for rail equipment grow by more than 30 percent. This was primarily due to the investment in rolling stock made by National Rail and refurbishment of rolling stock undertaken by various State authorities. The mid-1990s also saw a significant increase in demand for railroad equipment as rail authorities became corporatised and invested heavily in upgrading their fleets. The strong demand for rail equipment from State authorities is expected to continue, particularly following the recent announcement of the Auslink program for land transport development in Australia.

1.29 The Australasian Railway Association has reported that in the year to 30 June 2003, railways in Australia transported:

- 586 million passengers on urban rail routes
- 8.92 million passengers on non-urban rail routes
- 544.6 million tonnes of freight

This is equivalent to 11.2 billion passenger kilometres and 158.1 billion tonne kilometres (Australasian Railway Association, 2004). This report is the first comprehensive survey of the performance of the Australian railway industry.

1.30 Road funding continues to feature prominently in both State and Federal Government budgets. Australia's road transport industry is relatively efficient and approaches world best practice. The majority of interstate goods transport is by road. Traditionally, Australian rail transport has lagged behind world best practice. However, there has been major investment in new railways, including the new Alice Springs-Darwin railway line linking Adelaide and Darwin, as well as planning for a new railway line linking Melbourne to Darwin via inland New South Wales and Queensland. These major projects are indicative of the potential for rail transport to continue to compete more effectively with road transport.

Introduction

- 1.31 A major report to the Federal Government by the Australian Rail Track Corporation during 2001 recommended immediate investment of \$507 million in the interstate rail network. This is part of a detailed independent 'audit' of the network carried out at the government's request. According to the Australian Rail Track Corporation, the benefits to the Australian community from this investment would be \$1.5 billion in lower freight costs, and reduced greenhouse gas emissions, noise and road accidents. It would transfer two million tonnes of freight per annum from road to rail. The Australian Rail Track Corporation says the performance of rail between Melbourne and Perth shows what can be done. In that corridor, rail now carries 77% of all east-west freight – the result of track upgrading, more effective management of train movements, investment in new rolling stock and aggressive marketing by rail operators.
- 1.32 The Australian Rail Track Corporation report proposed that a major part of the proposed investment would focus on north-south freight movement, with an upgrade of the Melbourne-Sydney-Brisbane corridor, while an additional injection of funds would provide the impetus for a 'Sydney Freight Priority Project', involving works to upgrade signalling and track, lift speeds into loops, ease curves, upgrade track quality, lengthen passing loops, remove height restrictions for double-stacked containers west of Parkes, and improve system management. The Australian Rail Track Corporation investment program would complement investment in the "Inland Route" proposed by the Australian Transport and Energy Corridor (ATEC) – according to the Australian Rail Track Corporation, investment on the current Melbourne-Sydney-Brisbane route should be undertaken regardless of any future investment in the "Inland Route". At this stage, there is no firm commitment to funding this proposed investment, as there are important issues still to be resolved between the Commonwealth and New South Wales.
- 1.33 The Australian Rail Track Corporation's 'audit' also said the management of interstate rail corridors must be simplified. Freight train timetables must respond to users' needs for quick transit of freight. This means that management of the flow of trains must be better coordinated, by putting one organisation in charge across the interstate network. This has been done on the Australian Rail Track Corporation's track, and the benefits have been large.
- 1.34 The Federal Parliament's Standing Committee on Transport and Regional Services released a report in May 2001 calling for direct Commonwealth intervention to advance reform in the interstate rail network. The committee argued that the result would be better outcomes for the community (less congested roads, cleaner air and more dispersed employment opportunities) and better outcomes for business (quick and reliable deliveries at cheaper freight rates). The committee recommended:
- declaration of the existing standard gauge rail network from Brisbane to Perth as a 'National Track',
 - establishment of a 'National Rail Network Manager' to ensure a consistent access regime, establishment of a 'National Rail Transport Commission' to ensure coherent planning, and
 - funding of a significant rail infrastructure re-development program to overcome chronic deficiencies in rail infrastructure.

Other actions to address the safety of railway level crossings

- 1.35 At the same time as STAYSAFE conducted its inquiry into the safety of railway level crossings, there were a number of initiatives elsewhere in Australia to examine level crossing crashes.
- 1.36 The most important was the development by the Australian Transport Council of a National Railway Level Crossing Strategy in late 2003.
- 1.37 The National Railway Level Crossing Strategy is summarised in the following paragraphs. The strategy noted that while fatalities at railway level crossings are only a very small proportion of the deaths that occur on roads each year, of all the types of road crashes which occur those between a motor vehicle and a train are amongst the most severe. Although statistical data is approximate due to the lack of or poor quality of available information, it appears that there are about 100 crashes between a road vehicle and a train in Australia each year, and about 8% of these result in deaths. Many crashes occur while pedestrians, cyclists, people with disabilities, people in wheelchairs, people using motorised mobility aids, children in prams, etc., are crossing railways on public streets, and about 22 of these more vulnerable road users die each year as a result.
- 1.38 Due to the degree of severity and relative infrequency, railway level crossing crashes can be highly emotive and are generally widely reported in the media.
- 1.39 Railway level crossing crashes are one of the most serious safety issues faced by the rail system in Australia. This is largely beyond the control of rail organisations, yet rail organisations bear much of the costs. Railway level crossing crashes are amongst the most costly economically and are estimated to be \$180,000 per crash in urban areas and \$430,000 in rural areas. These figures exclude the costs to the rail track owner for track and train repair and for the train operator, which can often amount to several million dollars for a single crash.
- 1.40 Although rail is a relatively safe mode of transport, when crashes do occur they attract a lot of publicity because people's expectations are high (as they are for the air transport industry) and they potentially jeopardise the lives of a large number of people. The rail industry believes that the public perceive that 'others', such as road and rail authorities, should provide solutions to make things safer rather than individuals taking personal responsibility for their own actions.
- 1.41 Railway level crossing safety has recently been included in the National Road Safety Action Plan for the first time, but it is not included in most State or local government road safety strategies. New South Wales did develop a specific strategy to address the safety of railway level crossings for the 1995-2000 period (KPMG Management Consulting, 1994).
- 1.42 This strategy specifically addresses the complex road and pedestrian rail interface in response to industry and community concerns. It covers issues that are normally excluded from road safety strategies, and involves stakeholders who have little contact with road safety issues except in this context.

Introduction

- 1.43 Safety at railway level crossings is only one part of a wider picture of transport safety within the whole transport system. Other related strategies cover road safety as a whole (such as the National Road Safety Strategy), other specific issues (such as heavy vehicle safety) or particular areas (such as individual States, regions or Local Governments).
- 1.44 The scope of the National Railway Level Crossing Safety Strategy covers:
- crossings in metropolitan, rural and remote areas;
 - crossings for all road users including pedestrians, vehicles and people with disabilities;
 - all types of crossing control including active, passive and grade separation;
 - all types of railway including passenger, freight, tourist, mining, heritage, and sugarcane;
 - government and private railways;
 - public, private and occupational crossings;
 - any possible safety treatments and countermeasures which could result in safety improvements.
- 1.45 Unlike this STAYSAFE report, crashes at non-crossing locations, trespassing, suicides, and crashes in station precincts and in freight terminals are not included in the National Railway Level Crossing Safety Strategy. In contrast, STAYSAFE has adopted a ‘person under train’ conceptualisation that sees a continuum of incidents extending from unintentional or mistaken entry into a railway level crossing, through intentional non-compliance by drivers or pedestrians with the legal requirements to transit railway level crossings, to trespass across railway tracks, risk-taking and ‘hoon’ actions on railway tracks, and suicidal behaviour involving railway operations.
- 1.46 Governments, the rail industry and others have been applying a variety of countermeasures for many years to improve railway level crossing safety. These actions are substantial and have resulted in a continuing decrease in crossing crashes and severity. However, the National Railway Level Crossing Safety Strategy is designed to encourage new and additional actions.
- 1.47 The specific strategies to improve railway level crossing safety can be summarised in shown in the table on the following page.
- 1.48 STAYSAFE notes a number of other significant actions undertaken recently, including the following reports and investigations—this listing is not definitive (see also, e.g., Travelsafe, 1997). There is also an extensive series of papers and reports over the past three decades in Australia, including, for example, Cairney (1991), and a series of papers and reports by Wigglesworth (e.g., 1976, 1978a, 1978b, 1990).
- 1.49 The Australian Transport Safety Bureau commissioned Covance (2001) to undertake a literature survey, referencing material published overseas as well as in Australia. The literature survey focused on published material that explores measures that can be implemented to help prevent railway level crossing crashes or to improve safety at railway level crossings.

1.50 The Western Australian Government Railways Commission conducted a study of locomotive lighting arrangements (Cairney, Cornwall & Mabbott, 2002), following a fatal railway level crossing crash at Yarramony in July 2000. The Australian Transport Safety Bureau also released a report on the conspicuity of trains at passive railway level crossings (Cairney, 2003). The House of Representatives Standing Committee on Transport and Regional Services (2004) subsequently conducted an inquiry to review train illumination measures that might improve train visibility and reduce level crossing accidents.

Strategic Response

Issue	Strategy
Train Conspicuity	Ensure that road users can see either an approaching train (locomotive or carriages), or a train that is already on the railway level crossing.
Car and Truck Driver Responses	Ensure that drivers identify railway level crossing sites, and respond appropriately.
Pedestrian Responses	Ensure that pedestrians identify railway level crossing sites, and respond appropriately. Ensure that people with disabilities are provided with appropriate information by way of site design and other initiatives.
Site Assessment, Prioritisation and Treatment	Ensure that railway level crossing sites, including pedestrian crossings separate to road crossings, are designed and constructed to an appropriate standard. Develop appropriate Australian design standards for railway level crossing protection equipment including the operation and timing of flashing lights, boom barriers, pedestrian signals and gates, and active advance warning signs. Develop uniform criteria for the establishment of the level of protection for road vehicle and pedestrian crossings. Ensure that designs are appropriate for people with disabilities and other vulnerable road users. Close level crossings where appropriate. Investigate low cost treatments including active warning signs, beacons, strobe lights and other alerting devices at railway level crossings.
Stakeholder Education and Information	Develop awareness and understanding through participation amongst the public, engineers, the police and others to improve responses, engineering and enforcement (may be similar to U.S. 'Operation Lifesaver').
Data Collection	Enable effective national data comparisons.
Funding	Seek additional funds for railway level crossing safety. Allocate funds for railway level crossing treatments within the context of broader transport infrastructure priorities.
Rail Industry Involvement	Industry involvement in engineering, education and enforcement programs. Ensure appropriate train standards and operation.
Legislation, Regulation and Enforcement	Ensure that laws and penalties are clear, understood, appropriate and enforced.
Coordination	Develop consistency in information, assessments, standards and practices between States. Implementation of the Strategy should be well managed, co-ordinated, monitored and reviewed.

(From: 2003 National Railway Level Crossing Safety Strategy)

Introduction

- 1.51 Austroads released a major review of measures to reduce collisions at passive railway level crossings in Australia (Cairney, Gunatillake & Wigglesworth, 2002).
- 1.52 The Australian Transport Safety Bureau (2003) released an investigation report into a collision between the passenger train 5AL8 and vehicles at the Salisbury Interchange level crossing, Salisbury, South Australia, 24 October 2002.
- 1.53 The Cooperative Research Centre for Railway Engineering and Technologies is undertaking a major study into level crossing risk management, with a focus on developing a community intervention program for level crossing safety.
- 1.54 The Centre for Accident Research and Road Safety—Queensland, based at the Queensland University of Technology, is conducting a Delphi research project into motorist behaviour at railway level crossings currently.
- 1.55 There were also a number of other studies, papers and reports released over the past 4-5 years (e.g., Dennis, 1999; Ford & Matthews, 2002; Wigglesworth, 2001)

CHAPTER TWO - RAILWAY LEVEL CROSSINGS IN NEW SOUTH WALES

- 2.1 Railway level crossings are defined in the Australian Road Rules by Part 10—Level crossings, Rule 120 ‘What is a level crossing?’, as:

A level crossing is an area where a road and a railway meet at substantially the same level, whether or not there is a level crossing sign on the road at all or any of the entrances to the area ...

- 2.2 The New South Wales Level Crossing Strategy Council reported that there were at least 3805 railway level crossings in New South Wales in 2001. This number does not include railway level crossings on the broad gauge network (this network comprises freight lines in the southern part of New South Wales originating from Victoria, which are the responsibility of the Victorian government). Exact numbers of railway level crossings on these lines are not known. Vic Track has supplied data indicating 87 broad gauge railway level crossings on public roads but is not able to provide data on private and pedestrian railway level crossings on the broad gauge network.
- 2.3 The Level Crossing Strategy Council has identified the need to develop a comprehensive database on all railway level crossings in New South Wales and will include identification of broad gauge crossings in this exercise. This issue will be addressed in detail in a later chapter on administrative matters associated with railway level crossings.

The history of railway level crossings in New South Wales

- 2.4 As noted, rail infrastructure in New South Wales developed over a period of 150 years. The early construction standards were for slow-moving trains carrying light loads. Where a railway line cut access to a road or property then the rail authority was, and still is, legally obliged to provide and maintain access. In the early days, railway level crossings were cheap to provide and, with slow train speeds, did not represent significant risk. Since then, changes have occurred in type, density, and speed of rail traffic, and the type, density and speeds of road traffic, while much of the original infrastructure remains in place.
- 2.5 Early level crossings in high risk road locations were protected by swing gates, operated by a gatekeeper or railway station staff. Swing gates were also used at private level crossings accessing farm properties, etc.. While the track and roadside infrastructure associated with swing gates has disappeared, remnants such as gatekeepers cottages can still be seen within the rail system (although they are usually now in private ownership), and some swing gates remain for private railway level crossings. Signal boxes were later established which allowed mechanical operation of gates at public railway level crossings. Later, electrically or pneumatically operated booms replaced swing gates at public railway level crossings.

Railway level crossings in New South Wales

- 2.6 The introduction of early automatic installations generally used equipment purchased from the United States. This included ‘magnetic flagmen’ or wig wag signals where a red light on a suspended arm swung back and forth on train approach, and rotating arm-type signals where two contra-rotating arms spun on the top of a post, moving across a red light to give a flashing effect. In both cases a gong sounded in time with the operation of the arms. These installations operated from track circuits.
- 2.7 In the 1960s, the Association of American Railroads (AAR) standard was adopted by the Australian and New Zealand Railway Commissioners. This required the installation of alternating flashing lights below a “Railway Crossing” crossboard sign, generally known as ‘Type F’ protection. Today, this standard is embodied in Australian Standard 1742.7 which specifies traffic control devices to be used to control and warn traffic at and in advance of railway level crossings, and some of the circumstances under which particular controls should be used.
- 2.8 The Association of American Railroads standard required a warning time before the arrival of the train at the level crossing of between 20 and 30 seconds, with the design requirement generally being 25 seconds. With changing circumstances, such as increased train speeds and the introduction of ‘B double’ road vehicles, warning times have had to be extended in some instances. (It is important that warning times are sufficient but not excessive as this can lead to road users choosing to ignore them.) With a much greater variety of train speeds now in operation (e.g., wheat trains at 50 km/h, the XPT passenger trains at 160 km/h), it can often be difficult to find the right balance. In the past, installations that detect train speed and then activate equipment at the time required have been used. However this can introduce additional risks (such as if the train passes over the relevant circuits at a lower speed and then accelerates quickly) and is therefore not a favoured approach.
- 2.9 Grade predictor technology which provides a constant warning time (i.e., not linked to the speed of a train) has been developed and is used in the United States. While this was initially perceived to present too high a risk of failure for use locally, problems have been resolved and grade predictor crossings are now being installed at some locations in New South Wales. This type of equipment is not suitable for all situations.
- 2.10 Early boom gate crossings descended across both sides of the railway for the full width of the road, on occasion trapping vehicles. There are few full boom gate crossings remaining in New South Wales, with most now being half booms. Booms are standard on multiple track crossings where there is the risk of one train obscuring another and a motor vehicle driver proceeding after the first train has cleared the crossing, not realising the presence of a second. Booms can also be provided on single track level crossings although the Australian Standard AS1742.7 does not prescribe this level of protection, unless other circumstances warrant it.

Types of railway level crossings

- 2.11 In New South Wales, railway level crossings can generally be categorised into three groups:
- public level crossings;
 - private level crossings; and
 - pedestrian level crossings.
- 2.12 Public level crossings are those that are located on main or local roads (where a local council or the Roads and Traffic Authority is the road authority) and provide road access across new or existing rail lines.
- 2.13 Private railway level crossings are located on local or private roads and allow access to private properties or between parts of private properties.
- 2.14 Pedestrian railway level crossings are those specifically designed to allow pedestrians to cross the rail lines. Pedestrian railway level crossings may be located off the end of station platforms, or on pedestrian routes where the risk to public safety or the cost of installation does not warrant provision of an underpass or bridge. Pedestrian railway level crossings may be in association with a road crossing. STAYSAFE noted, during site inspections, a school pedestrian railway level crossing in Tamworth which was controlled by a school crossing supervisor (funded by the Rail Infrastructure Corporation) as a scheduled passenger train service transited the railway level crossing at the time of afternoon school travel
- 2.15 For administrative purposes, all types of railway level crossings in New South Wales are classed as being either 'accommodation' level crossings or 'licensed' level crossings. Accommodation crossings are those built to maintain (or accommodate) existing public or private access at the time of construction of the rail line. Licensed crossings are those that have been installed after a rail line has been constructed and require a licence agreement between the track owner and the entity requesting usage, for example, a private individual, company, or the Roads and Traffic Authority. Again, they can be public railway level crossings or those built to permit access to private property.
- 2.16 The maintenance of accommodation railway level crossings is generally carried out by the Rail Infrastructure Corporation while for licensed crossings, the licensee is responsible for the cost of construction and maintenance.

Railway level crossings in New South Wales

2.17 The following tables provide an overview of the types of railway level crossings in New South Wales.

Table 1: Level crossings on all New South Wales railway lines

	Unrecorded	Pedestrian	Private	Departmental	Public	Total
Number of crossings	61	115	1960	26	1643	3805

Note: the Rail Infrastructure Corporation is currently in the process of auditing available records to determine whether the “unrecorded” crossings are public or private. Those crossings listed in the departmental category are level crossings owned and maintained by rail authorities.

Table 2: Accommodation and licensed level crossings on all New South Wales railway lines

Accommodation	Licensed	Others
733	236	2836

Note: The ‘Others’ category includes public crossings and Rail Authority crossings for which the legal status had not yet been recorded on the Rail Infrastructure Corporation’s central database.

Types of protection at railway level crossings

2.18 In New South Wales, the degree of railway level crossing protection provided falls into one of three categories: passive, active or grade separation.

2.19 Passive protection at railway level crossings involves the use of signs and devices, none of which are activated during the approach or passage of a train and which rely on the road user detecting the approach or presence of a train by direct observation, for example, a Stop or Give-Way sign. Passive protection is usually found on roads where the risk of collision is deemed low.

2.20 Active protection at railway level crossings involves the use of signs, flashing lights, bells and boom gates or barriers, or a combination of these where the device is activated prior to and during the passage of a train through a crossing. Active protection is usually found on crossings where there is a high volume of road, rail, and pedestrian traffic, or where sighting distance requirements cannot be met.

2.21 The following tables provide an overview of the different types of protection applying to the different types of railway level crossings in New South Wales.

Table 3: Public Railway Level Crossing Protection

Protection Type	Crossing Type				
	Accommodation	Licensed	Departmental	Public roads	Total
Closed/removed	22	1	8	510	82
Gates	31	6	1	33	71
Give way sign	98	19		388	505
Lights/bells	33	13		114	160
Lights/bells/booms	19	8		42	69
Line closed	1			32	33
Manual gates				14	14
Not recorded	24	6	1	305	336
Stop sign	101	22	2	248	373
Total	329	75	12	1227	1643

Note: Data provided by the Rail Infrastructure Corporation. The *Public Roads* category consists of those level crossings where it is unclear whether they are accommodation or licensed crossings. According to the Rail Infrastructure Corporation, regional databases hold this information and the development of a corporate database (underway) will enable ready identification of the information.

Table 4: Private Railway Level Crossing Protection

Protection Type	Total
Closed	201
Give Way sign	165
Lights/bells	3
Lights/bells/booms	3
Line closed	21
Manual gates	419
Not recorded	953
Stop sign	192
Total	1960

2.22 Grade separation can be used instead of active protection where the risk to public safety at the railway level crossing is deemed extremely high and where the benefits of separation are seen to justify the cost of installation. In this instance, the railway level crossing is removed and underpasses or bridges are built to replace the railway-road interface.

2.23 The level of protection allocated to railway level crossings is ideally determined according to the degree of risk that is perceived to be present at a particular crossing. Risk factors can include:

- accident history;
- the volumes of rail/pedestrian/road traffic using a level crossing;
- the amount of visibility (sighting distance) available to motor vehicle drivers approaching a level crossing to sight an oncoming train; and
- the environmental conditions in and around the level crossing.

2.24 Risk assessment is discussed in more detail in later sections.

Technology for active protection at railway level crossings

- 2.25 Typical active protection for railway level crossings consists of a number of light standards with red lights that flash alternately on train approach. One standard is fitted with a bell that rings on train approach. Wider roads and multiple track installations have two bells.
- 2.26 The railway level crossing is activated by track circuits, which are engineered to be the correct length to give the appropriate warning for the speed of the approaching trains.
- 2.27 The railway level crossing uses vital signalling relays to control operation and directional functions. These relays are designed to fail safe, but critical functions are duplicated. Circuitry is double wired to ensure reliability and the operating circuitry is separate for each of the lamp standards. A high quality battery charger is provided to charge nickel cadmium (Ni-Cad) cells, which are designed to operate the railway level crossing in the event of a power failure.
- 2.28 Over the years, active protection installations have been progressively upgraded to improve reliability and minimise the possibility of any single item causing a wrong side (unsafe) failure of the railway level crossing.
- 2.29 Some of the improvements to railway level crossing operation include:
- Directional circuitry to only operate when the train has reached the railway level crossing;
 - Improved battery arrangements, including replacement of lead acid types with nickel-cadmium types;
 - Improved arrangements for power supply indications of battery problems to detect potential battery problems;
 - Improved arrangements for proving of directional relay operation;
 - Provision of railway level crossing monitoring equipment that logs operation for ease of fault finding and for the remote reporting of defects;
 - Upgrading of lamps and reflectors, including the recent installation of LED style lights;
 - Provision of electronic lamp flashers;
 - Use of pedestrian mazes, boom gates, and now power operated swing gates; and
 - Use of tone generators, rather than bells, to focus the audible alarm for railway level crossing users and reduce environmental noise.
- 2.30 Where railway level crossings are provided within signalled areas, the signalling and the railway level crossings are interconnected, so that trains may be held at red signals close to the railway level crossing without operation of signals to road users at the railway level crossing. Upon clearance of the signal, the railway level crossing operation still provides the necessary warning time before the train occupies it. In such arrangements, the level crossing operation is automatic, and the signaller has no direct control over the equipment.

- 2.31 Where road intersections close by could result in queuing across the railway level crossing, an indication of train approach can be linked to the Roads and Traffic Authority's traffic light arrangements. This involves the approaching train initiating an arrangement where traffic lights leading onto the railway level crossing turn to red while those lights that would permit traffic transiting the railway level crossing to clear it turn to green. There are a number of locations in New South Wales where such technology is in use.
- 2.32 Current railway level crossing designs include the provision of advance warning lights—flashing yellow lights on the road approach to the railway level crossing—for advanced and additional warning to motorists in areas of poor visibility or increased risk.
- 2.33 While current railway level crossing active protection systems are relatively sophisticated, it is recognised that there are some limitations:
- 2.34 Long vehicles - while railway level crossing operating times are adjusted to allow for long vehicles, it is difficult to control where long vehicles (e.g., trucks operating in a B Double configuration) are permitted to cross. Queuing issues can exacerbate these problems, and it does not appear to be possible to completely prevent long vehicles from using railway level crossings for which they are not authorised.
- 2.35 Warning times – the consistency of warning times is important to prevent vehicles becoming impatient for trains which may be slow on approach. Because of the large difference between train speeds and the increase in railway level crossing warning times to accommodate long vehicles such as trucks operating in a B Double configuration, it is becoming more difficult to minimise the variance in times. Grade crossing prediction equipment may assist in this regard, but will require further testing and then upgrading of existing installations. This technology is not suitable for use in electrified areas.
- 2.36 Fail safe signalling – railway level crossing equipment is designed to what are termed 'fail safe signalling principles', which means that signals will activate if a failure occurs. This is intended to prevent use of the railway level crossing. However, this does not control for driver behaviour and situations where, on realising that the signal has failed, the driver or pedestrian chooses to proceed over the railway level crossing.
- 2.37 Costs - Because of the necessity to provide a highly reliable and fail safe design, costs of installing active protection at railway level crossings are high. In many cases, integrating the railway level crossing into the existing signalling arrangements requires substantial resignalling (redesign and reinstallation of signals) that would not have been needed otherwise.
- 2.38 High train speeds – railway level crossing safety risks to road and rail users increase with increased train speeds, and some single line level crossings are being fitted with booms where high-speed passenger services operate.

Railway level crossings in New South Wales

2.39 Active protection in remote areas - consideration needs to be given to failure response times when active protection is installed at railway level crossings in remote areas. A failure of the signaling system or power supply may cause the crossing to continuously operate. In situations where boom gates are installed, this will make it impossible for road traffic to use the railway level crossing and may introduce additional hazards. Active protection is often provided at railway level crossings in remote areas when sighting is inadequate. These railway level crossings are particularly hazardous during such a failure as train operators may not be aware of the failure and may not slow the train.

Closure of railway level crossings

2.40 The Transport Administration Act 1988 s.99B allows a rail infrastructure owner (the owner of the railway level crossing and the track) to close railway level crossings with the approval of the Minister. The Act requires that the Rail Infrastructure Corporation notify the Minister of any such proposal, cause a notice of the proposed closure to be published in the Gazette, and notify the Roads and Traffic Authority and the council of the area concerned of the proposed closure (s.99B (2)&(3)).

s.99B Closure of level-crossings, bridges and other structures

- (1) A rail infrastructure owner may, with the approval of the Minister, close any level-crossing, bridge or other structure for crossing or passing over or under any railway track if both the level-crossing, bridge or other structure and the railway track are owned by the Corporation.
- (2) A rail infrastructure owner must notify the Minister of any proposal by it to close a level-crossing, bridge or other structure for crossing or passing over or under a railway track.
- (3) A rail infrastructure owner must, before closing any such level-crossing, bridge or other structure:
 - (a) cause a notice of the proposed closure to be published in the Gazette, and
 - (b) notify the Roads and Traffic Authority and the council of the area concerned of the proposed closure.
- (4) On the closure of any such level-crossing, bridge or other structure, all rights, easements and privileges in relation to that level-crossing, bridge or other structure are extinguished.

2.41 The Public Works Act 1912 s.91 states that:

s.91 Accommodation works

The Constructing Authority shall make and at all times maintain the following works (hereinafter called 'accommodation works') for the accommodation of the owners and occupiers of lands adjoining any public work, that is to say:

- (a) such and so many convenient gates, bridges, arches, culverts, and passages over, under or by the sides of or leading to or from the public work as are necessary for the purpose of making good any interruptions caused by the public work to the use of the land

- through, in, or upon which such public work is made or constructed; and such work shall be made forthwith after such public work or part of it passing over such lands has been laid out or formed or during the formation thereof,
- (b) sufficient posts, rails, hedges, ditches, mounds, or other fences for separating the land, taken for or for the use of the public work, from the adjoining lands not taken and protecting such lands from trespass, or the cattle of the owners or occupiers thereof from straying thereout, in consequence of such public work; together with all necessary gates made to open towards such adjoining lands and not towards the public work. All necessary stiles, and such posts, rails, and other fences shall be made forthwith after the taking of any such lands, if the owners thereof so require, and such other works as soon as conveniently may be,
 - (c) all necessary arches, tunnels, culverts, drains, or other passages either over or under, or by the sides of the public work, of such dimensions as will be sufficient, at all times, to convey the water as clearly from the lands lying near or affected by such public work as before the making of the public work or as nearly so as may be; and such works shall be made from time to time as the public work proceeds.

Provided that the Constructing Authority shall not be required to make such accommodation works in such a manner as would prevent or obstruct the working or using of the public work; nor to make any accommodation works with respect to which the owners and occupiers of the lands have agreed to receive and have been paid compensation instead of the making them.

- 2.42 Historically, this has been taken to mean that the consent of the landowner occupying the lands, or any others who have had the right to exercise a right-of-way, and the relevant local council is required in respect of closure of accommodation railway level crossings. According to the Rail Infrastructure Corporation, obtaining this consent has at times been problematic. As such, it is estimated that there are 253 railway level crossings in New South Wales that have been removed by regional Rail Infrastructure Corporation staff because of disuse and safety concerns, but that are yet to be officially closed, pending consent of the landowner and council.
- 2.43 More recently, the Rail Safety Act 2002 ss.51-52 has given the Director-General of the Department of Transport the authority to direct an accredited person (the owner of railway infrastructure or operator of a railway) to close any railway level crossing, bridge or other structure for crossing over or under a railway if the Director General considers it necessary for safety reasons. The accredited person, on being served such a direction, must circulate a notice of the proposed closure in a local newspaper and must notify the Roads and Traffic Authority and the local council of the proposed closure:

51 Improvement notices

- (1) An authorised officer may give an improvement notice to an accredited person or other person if the officer is of the opinion that:
 - (a) the person is contravening any provision of this Act or the regulations or, in the case of an accredited person, any condition or restriction attached to the person's accreditation, or
 - (b) the person has contravened any such provision or condition or restriction in circumstances that make it likely that the contravention will continue or be repeated, or

Railway level crossings in New South Wales

- (c) in the case of an accredited person, that any railway operations for which the person is accredited are carried out in contravention of any applicable safety interface agreements, or
 - (d) it is necessary to do so to ensure the safety of members of the public or other persons.
- (2) An improvement notice may require the person, within the period specified in the notice, to do any one or both of the following:
- (a) to remedy the contravention or the matters occasioning it,
 - (b) to undertake remedial safety work.
- (3) The period within which a person is required by an improvement notice to remedy a contravention or the matters occasioning the contravention or to undertake remedial safety work must be at least 7 days after the notice is given.
- (4) However, an authorised officer may specify a period that is less than 7 days after the improvement notice is given if satisfied that it is reasonably practicable for the person to comply with the requirements imposed by the notice by the end of that period.
- (5) An improvement notice must:
- (a) state that the authorised officer is of the opinion referred to in subsection (1), and
 - (b) state the reasons for that opinion, and
 - (c) if in the authorised officer's opinion there is a contravention of a provision of this Act the regulations or a condition or restriction attached to an accreditation, specify the provision, condition or restriction, and
 - (d) include information about obtaining a review of the notice under this Division.

52 Closure of level-crossings or other structures

- (1) Without limiting section 51 (1), an improvement notice may direct an accredited person to close any level-crossing, bridge or other structure for crossing over or passing over or under a railway.
- (2) An accredited person given a direction must, before closing the level-crossing, bridge or other structure:
 - (a) cause a notice of the proposed closure to be published in a local newspaper circulating in the area in which the level-crossing, bridge or other structure is situated, and
 - (b) notify the Roads and Traffic Authority and the council of the area concerned of the proposed closure.
- (3) On the closure of the level-crossing, bridge or other structure, all rights, easements and privileges in relation to that crossing, bridge or other structure are extinguished.

2.44 Until this issue came under scrutiny as part of the STAYSAFE inquiry, this power has been used infrequently.

2.45 STAYSAFE queried the Level Crossing Strategy Council as to whether there are there better mechanisms or practices for review and closure of private railway level crossings in other Australian jurisdictions and overseas. STAYSAFE was particularly

interested in whether there was a need for statutory or regulatory amendment to facilitate the closure of disused private railway level crossings.

- 2.46 The Level Crossing Strategy Council replied that although mechanisms in other states or overseas are not known, reports from the United States generally indicate a lengthy process. The current powers available to the Minister of Transport and the Director General by the Transport Administration Act and the Rail Safety Act appear to be appropriate and workable. However, the closure of railway level crossings (public or private) will in time be subjected to court challenge; difficulties may arise given that private railway level crossings are essentially a “right of way”. STAYSAFE notes that on 8 October 1998, the Rail Infrastructure Corporation closed a private level crossing at Hexham following approval from the Director General under Section 63 after a number of safety related incidents involving the crossing user.
- 2.47 To overcome the problems identified by the Rail Infrastructure Corporation in officially closing some railway level crossings, in 2001 the then Director General of Transport requested that the Rail Infrastructure Corporation to compile a list of railway level crossings that have been removed but which have yet to be officially closed.
- 2.48 Railway level crossings can also be closed or safety enhancements made using powers under the Roads Act 1993. This legislation enables the Minister or the Roads and Traffic Authority to close roads and take other action for the purpose of regulating traffic on a public road, following publication of the proposal and the receipt of submissions. (Roads Act 1993 Sections 33-38, and 116-119). Recently, these powers have been used to deal with safety issues at the Pine Road railway level crossing at Fairfield, which is located 50 metres from a T-intersection. This railway level crossing was identified as posing a significant safety risk—it has been the subject of a high number of incidents over the preceding two years, resulting in damage to the boom gates—with poor traffic flows and instances of queuing across the railway level crossing identified as problems. With the Minister’s approval, it has been agreed to alter traffic flow over the railway level crossing by preventing right hand turns into and out of Pine Road.

Prioritisation of upgrading of railway level crossings

- 2.49 Available Rail Infrastructure Corporation data indicates that, of the 1643 public railway level crossings in New South Wales, 229 have active protection, 878 are fitted with passive protection and 85 are protected by gates, with the rest having been closed or removed, or information on their protection status is not yet centrally available.
- 2.50 The Roads and Traffic Authority and the Rail Infrastructure Corporation have used somewhat different models for assessing risk at railway level crossings in New South Wales.
- 2.51 The Roads and Traffic Authority model is based on a statistical relationship between motor vehicle/train crashes at railway level crossings and the risk exposure based on

Railway level crossings in New South Wales

the product of daily road vehicles and weekly trains. An economic analysis provides a mechanism to prioritise upgrades.

- 2.52 The Rail Infrastructure Corporation model considers risk exposure based on road vehicle and train volumes, predicting the probability of a road vehicle and train being at the railway level crossing at the same time. It incorporates an assessment of different types of railway level crossing controls and the risk/risk reduction relating to each. Priorities are obtained by considering risk reduction through an iterative evaluation of upgrade options versus cost. Options for reducing safety risks may be:
- the removal of visual obstructions
 - road realignment
 - education of road users
 - removal of the railway level crossing
 - provision of alternative access
 - rail realignment
 - train speed reduction
 - upgrade of the protection mechanism
 - use of alternative routes
 - enforcement of compliance with traffic law relating to railway level crossings
- 2.53 It was indicated at the commencement of STAYSAFE's inquiry into the safety of railway level crossings that neither model can be fully used, primarily because of a lack of available data. In practice, the Rail Infrastructure Corporation and Roads and Traffic Authority rely on qualitative information and assessment by their regional staff. Each organisation then brings a list of priorities to the Level Crossing Strategy Council. Following discussion and consideration of other relevant factors (such as accident history, community concern, high risk factors such as train speed, etc.), a set of priorities to form the basis of the forthcoming works program is agreed.
- 2.54 The Level Crossing Strategy Council advised STAYSAFE at the commencement of the inquiry into the safety of railway level crossings that it had begun work on the development of a risk identification model that can be used consistently by all relevant parties to determine degree of risk at railway level crossings and priorities for improvement. It is hoped that the model under consideration (developed by Queensland Transport, see McClurg, 2000) will, with some modifications, combine the best elements of existing models, in particular the Rail Infrastructure Corporation's, and enable a more robust assessment process. This is discussed in more detail later.
- 2.55 Once priority is allocated through the Level Crossing Strategy Council, responsibility for the actual upgrading works at railway level crossings is shared between the Rail Infrastructure Corporation, the Roads and Traffic Authority, and, to some degree, local Councils, with oversight from the Ministry of Transport and Level Crossing Strategy Council. The program's funding is geared towards the upgrading of railway level crossings from passive protection to active protection, although other works of a more minor nature such as sighting distance enhancement, road approach works and

advance warning improvements are also funded from the Program. The upgrading of a railway level crossing from passive to active protection costs, on average, between \$200-300,000 per railway level crossing, depending on the existing configuration.

- 2.56 The Roads and Traffic Authority's Regional Managers are responsible for overseeing the works and ensuring they are completed as required. This involves engaging the Rail Infrastructure Corporation for design and construction aspects, undertaken by the Rail Infrastructure Corporation regional staff. A site conference involving all relevant parties is held to agree to and sign off on a construction drawing, following which work can commence. The Roads and Traffic Authority, as part of its responsibility for the New South Wales road network, must endorse the works as they affect traffic conditions.
- 2.57 Every local Council has a Traffic Committee comprising representatives of local government, Police, Roads and Traffic Authority and the local State Member of Parliament. Traffic Committees deal with all traffic control matters relating to local roads, including railway level crossings. Concerns raised by Traffic Committees about specific railway level crossings are generally forwarded to the regional Roads and Traffic Authority offices or the Local Government and Shires Associations (as a representative on the Level Crossing Strategy Council) for consideration and action. Consultation with Councils is not required for Roads and Traffic Authority-controlled major roads.

Maintenance and safety at railway level crossings

- 2.58 As the track owner, the Rail Infrastructure Corporation is responsible for ensuring that the condition of the track and related infrastructure is such that it does not present risks to the safe operation of trains. In this role, the Rail Infrastructure Corporation undertakes an annual inspection of the safety condition of all railway level crossings. Remedial work is then carried out, if required. It was indicated at the commencement of STAYSAFE's inquiry into the safety of railway level crossings that while the Rail Infrastructure Corporation's regional offices had databases which held this information, there was no central database of the findings and issues identified from these annual inspections. The Rail Infrastructure Corporation indicated that a corporate database is being established, which will eventually provide a central source of information on railway level crossing safety conditions.
- 2.59 The Rail Infrastructure Corporation Regional Maintenance Managers are also responsible for ensuring that all active railway level crossings are inspected daily, to ensure that they are in proper working order.
- 2.60 In addition to its annual inspections, in late 2000 the Rail Infrastructure Corporation commenced a program of railway level crossing safety audits. It is intended that all public railway level crossings will be inspected as part of a rolling program of audits. The scope of these audits includes assessing equipment condition, road condition, road signage, light focus, guardrails, railway level crossing telephones, and fencing. Maintenance visit records are also inspected to ensure that maintenance is being performed in accordance with standards, including ensuring that all relevant tests have been taken and recorded.

Railway level crossings in New South Wales

- 2.61 After an initial audit of 194 railway level crossings were audited, the Rail Infrastructure Corporation advised STAYSAFE that some of the issues that had been identified were the condition of signs, the placement of signs, and the condition of road markings.
- 2.62 The information generated by audits of railway level crossings is provided to the Rail Infrastructure Corporation's Asset Managers and to the Roads and Traffic Authority, where appropriate, for action. A program of follow-up audits has also been introduced.
- 2.63 The Roads and Traffic Authority or the local council, depending on the road type, is responsible for erecting and maintaining approach warning signs, pavement markings and road surface on the approaches to railway level crossings. Both Roads and Traffic Authority regional staff and representatives from local councils do this in accordance with their respective maintenance programs.
- 2.64 Through its accreditation of operators and owners, as well as compliance inspections and audits, the Independent Transport Safety and Reliability Regulator is responsible for regulating the safety of the New South Wales rail network, which includes railway level crossings. Australian Standard AS 1742 – Part 7 prescribes the minimum requirement which agencies must meet in respect of designing, maintaining and operating railway level crossings. It specifies devices necessary to warn and control road and pedestrian traffic at railway level crossings and the way these devices are to be used to achieve the level of traffic control for the safety of rail traffic and road users. The standard is applicable to public and private railway level crossings and is used in the assessment of railway level crossing safety.
- 2.65 The Roads and Traffic Authority and the Rail Infrastructure Corporation have additional standards and guidelines that supplement AS1742 – Part 7. For example, the Rail Infrastructure Corporation has specific standards concerning design and installation, configuration, construction specifications, equipment specifications and maintenance, as well as Safe Working Rules that apply to train operations over railway level crossings. Where appropriate, they are consistent with Roads and Traffic Authority standards. A number of policy documents are still in draft format.
- 2.66 Standards and guidelines are technical in nature and require a high degree of knowledge for effective application. There is also no one document that pulls together all requirements in respect of railway level crossings. Another problem is that a 1984 SRA standard is used by the Rail Infrastructure Corporation to assess 'old' railway level crossings while those more recently constructed are expected to comply with a 1990 standard. To begin to address this problem, the Level Crossing Strategy Council has recently endorsed a process whereby the Rail Infrastructure Corporation will produce a draft standards manual that combines all of its existing operational standards, for approval by the Independent Transport Safety and Reliability Regulator.

Funding

- 2.67 At the commencement of STAYSAFE's inquiry into the safety of railway level crossings, the Roads and Traffic Authority administered the allocated funds for the Level Crossing Improvements Program. Since it took over this role in 1989, the budget for upgrading railway level crossings has remained constant at \$2 million per annum.
- 2.68 On State and regional road railway level crossings, the Roads and Traffic Authority funds all improvements. On local roads, the Roads and Traffic Authority is responsible for two-thirds of the cost of upgrading works, while the local Council contributes one-third of the cost. In the event that the local Council is unable to meet the one-third cost, the practice has been that the Roads and Traffic Authority may have to defer the upgrading work from the annual Level Crossing Improvements Program and reprioritise funds elsewhere in the program.
- 2.69 In the period 1991/1992 to 1999/2000, the Roads and Traffic Authority expended \$41.23 million on railway level crossing upgrades, including four grade separations. This is a substantial injection of funds above the \$2 million annual allocation, primarily because of the grade separations.
- 2.70 As the Rail Infrastructure Corporation is a track owner, it has legal obligations to ensure that the track is safe for rail users and road users alike. While it is involved in determining the priorities for upgrade, undertaking the required works, and ensuring that railway level crossings are operational and adequately maintained on a day-to-day basis, it has not historically contributed funds to the upgrade program. For 2001/02 and the following two years, the Rail Infrastructure Corporation matched the funding provided by the Roads and Traffic Authority to the Level Crossing Upgrade Program, doubling the amount of money available each year to \$4 million.
- 2.71 For 2000/2001, the Rail Infrastructure Corporation spent approximately \$8 million on railway level crossings through major periodic routine maintenance, repair of railway level crossings and upgrades. With regard to the latter, a total of \$1.9 million was spent on Level Crossing Strategy Council projects, including installation of boom gates at Gerogery.

CHAPTER THREE - INCIDENTS AND CRASHES AT RAILWAY LEVEL CROSSINGS

- 3.1 Available data in relation to incidents at railway level crossings is not extensive. Similarly, research into railway level crossing incidents and contributing factors is somewhat limited, although other states and overseas research provides some useful information.

New South Wales data and relevant information

- 3.2 When accidents occur in the immediate vicinity of railway level crossings, they are deemed to be railway level crossing crashes. In general terms, these are classified as pedestrian crashes, road crashes or road/rail crashes. Both the Roads and Traffic Authority and the Rail Infrastructure Corporation collect data in relation to them.
- 3.3 There are some qualifications with regard to the data presented here. The Roads and Traffic Authority only collects data for railway level crossing crashes that occur on public roads, whereas the Rail Infrastructure Corporation's database also includes those that occur at private railway level crossings. Therefore the Rail Infrastructure Corporation's record of total number of collisions and fatalities at railway level crossings in New South Wales is higher, and more comprehensive, than the Roads and Traffic Authority's. However, in respect of those collisions that occur at public railway level crossings, the Roads and Traffic Authority's data is likely to be more accurate as it is drawn from police reports. The Rail Infrastructure Corporation reports are compiled by the site manager at the time of the crash and therefore do not include follow-up information. For this reason, Roads and Traffic Authority data is provided as well as the Rail Infrastructure Corporation data, even though Roads and Traffic Authority data is only dealing with a subset of railway level crossing crashes.

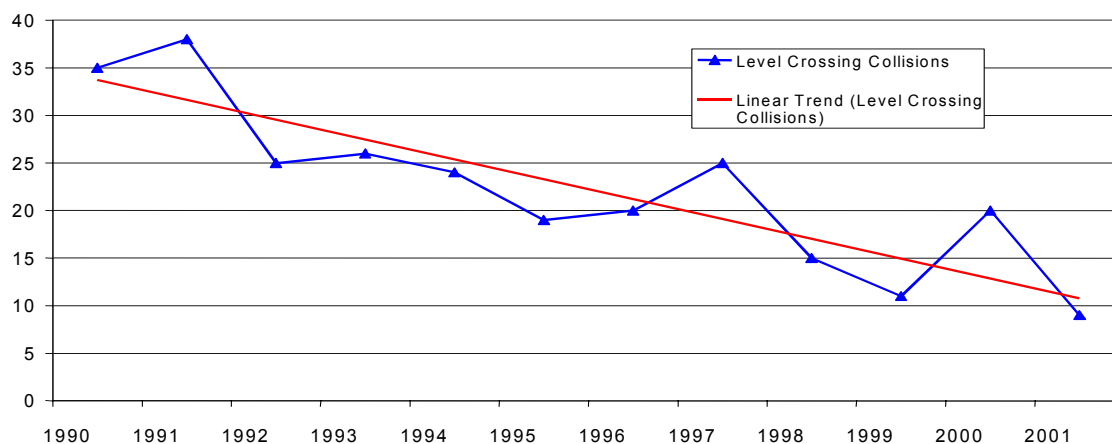
Crashes at railway level crossings in New South Wales

- 3.4.1 The Rail Infrastructure Corporation's rail incident database records that, since 1990, there have been 267 collisions at railway level crossings, both public and private, in New South Wales (Table 5).

Table 5: Number of Railway Level Crossing Crashes

Year	Number of crashes
1990	35
1991	38
1992	25
1993	26
1994	24
1995	19
1996	20
1997	25
1998	15
1999	11
2000	20
2001	9
Total (1990-2001)	267

3.5 This indicates that between 1990-2001 there has been a reduction in the annual number of railway level crossing crashes, although with some peaks within this period, as Figure 1 shows:

**FIGURE 1: Total number of railway level crossing crashes per year, 1990-2001.**

- 3.5 Roads and Traffic Authority data for public railway level crossing incidents involving trains and road vehicles at public railway level crossings provides a comparison with total road accidents for the same period (Table 6)

Table 6: Road/train crashes as a proportion of total road crashes by year

Year	Number of road/ train impacted crashes	Total road-related crashes (including train)	Level crossing crashes as a % of total crashes
1991	23	53,762	0.043%
1992	19	50,505	0.038%
1993	21	50,718	0.041%
1994	10	50,846	0.020%
1995	13	52,120	0.025%
1996	16	52,383	0.030%
1997	22	50,120	0.044%
1998	13	52,575	0.025%
1999	10	52,833	0.019%
2000	15	52,914	0.028%
TOTAL	162	518,809	0.031%

Note: Data provided by Roads and Traffic Authority

- 3.7 For the period 1991 –2000, Roads and Traffic Authority data indicates that the total number of railway level crossing accidents in New South Wales represented 0.031% of the total number of reported road accidents.

Fatalities from railway level crossing crashes in New South Wales

- 3.8 The Rail Infrastructure Corporation data indicates a total of 50 fatalities occurring at public and private railway level crossings between 1990-2001. All of these have involved road vehicle drivers or passengers, as Table 7 below illustrates:

Table 7: Fatalities in railway level crossing collisions

Year	Total number of crashes	Public deaths (car drivers and passengers)	Train Passenger Deaths	Employee Deaths	Trespasser Deaths	Total deaths
1990	35	2	0	0	0	2
1991	38	10	0	0	0	10
1992	25	7	0	0	0	7
1993	26	5	0	0	0	5
1994	24	1	0	0	0	1
1995	19	1	0	0	0	1
1996	20	6	0	0	0	6
1997	25	6	0	0	0	6
1998	15	2	0	0	0	2
1999	11	2	0	0	0	2
2000	20	2	0	0	0	2
2001	9	6	0	0	0	6
Total	267	50	0	0	0	50

3.10 STAYSAFE notes that Table 10 presents data for fatalities occurring at public and private railway level crossings. A number of deaths occurred at crossing points away from public and private railway level crossings, and are not included.

3.11 The following graphs, based on the Rail Infrastructure Corporation data, depict the trends in total number of collisions and fatalities at railway level crossings (Figure 2) and the average number of fatalities per crash (Figure 3) since 1990.

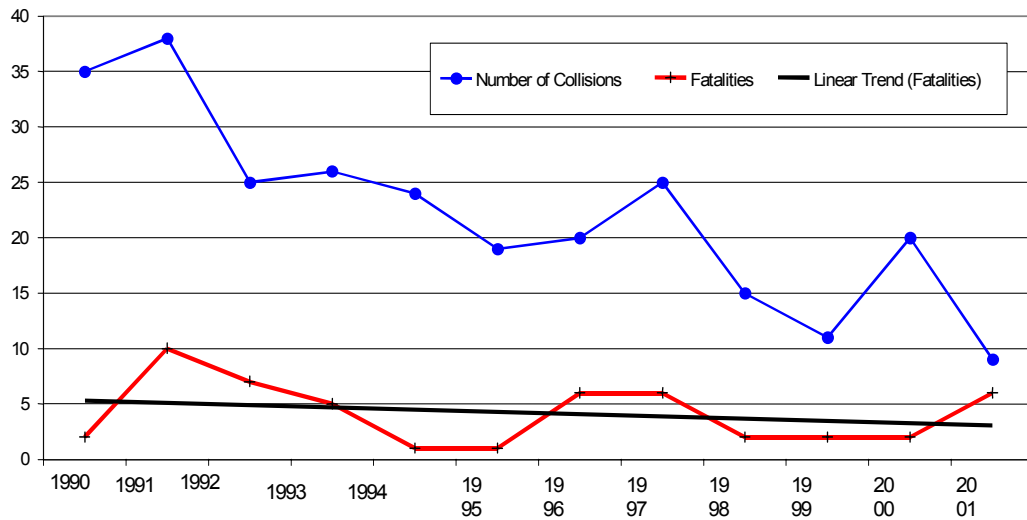


FIGURE 2: Fatalities and crashes at railway level crossings, 1990-2001

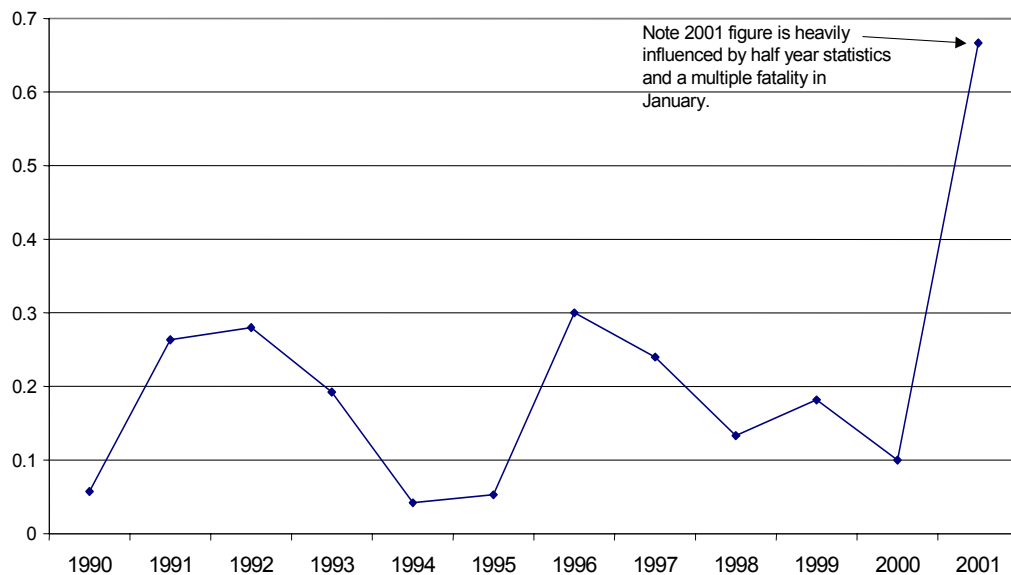


FIGURE 3: Average number of fatalities per crash, 1990-2001

3.12 The Rail Infrastructure Corporation also requires its regional staff to record information on “near misses” or potential collisions at railway level crossings. Table 8 highlights the large number of potential collisions that have occurred since 1990 and the observed cause. The category *RMV careless* refers to those incidents where there is no apparent cause other than driver carelessness. This category, and that of ‘Equipment fault’ are the two most commonly recorded ‘causes’ of potential collisions.

Incidents and crashes at railway level crossings

3.13 STAYSAFE also noted research released by the Roads and Traffic Authority showing that 76 per cent of railway level crossing accidents over a four-year period involved men living within 100 kilometres of the accident site. The study found that of 78 railway level crossing crashes between 1996 and 2000:

- 59 drivers were male (76 per cent)
- 59 drivers were local (76 per cent)
- 17 were aged 40 to 49 years old (21 per cent)
- 14 were aged 20 to 29 years old (17 per cent)

Table 8: Potential Collisions and Causes since 1990

Potential Collision	Cause	Incidents	Fatalities
	Circuit wiring defect	37	0
	Equipment fault	836	0
	Level crossing condition	39	0
	Outside agent	1	0
	Power failure	208	0
	Relay defective	47	0
	RMV careless	576	1*
	Track fails to detect train	22	0
	Vandalism	301	0
Total Potential Collisions		2067	1
Potential Derailment	Level crossing condition	10	0

* This person collided with a railway level crossing warning light pole and died in the accident. There was also an injury to the passenger

Rail risks

3.14 Based on analysis of the Rail Infrastructure Corporation data collated since 1990, it is estimated that about 19% of railway level crossing collisions have resulted in the death of road users. While there have been no rail passenger or crew fatalities, there have been railway level crossing crashes up to 17 rail passengers have been injured. A number of serious accidents, identified below, have occurred which highlight the risk to rail, as well as road users.

3.15 In 1996, a freight train collided with a herd of cattle being driven across the tracks at Kicatoo. This killed many of the stock and derailed three locomotives, one of which

fell onto its side, narrowly avoiding a wheat silo. The rolling stock came to rest 50 metres up the track, crew were injured and a number of rail vehicles were destroyed.

- 3.16 Another serious accident involving a freight train occurred at a railway level crossing at Condobolin in 1992, killing two people in a semitrailer, derailling the train and resulting in three locomotives being damaged, one of which was destroyed. There was a spill of freight which included cyanide pellets and nitropril, as well as fuel from the ruptured fuel tank. The Main West line was closed for six weeks while recovery and remediation took place.
- 3.17 In 1995, an XPT train travelling at 160 km/h collided with a car at a railway level crossing at The Rock, south of Wagga Wagga, killing the driver of the car and travelling 2 km in a derailed condition before stopping. There are railway level crossings in country towns where the XPT travels at 160 km/h and freight trains up to 1500 metres long travel up to 115 km/h, where the only protection is Stop signs.
- 3.18 These incidents highlight the serious risks for rail passengers and crew and the potential for multiple fatalities that can be associated with railway level crossing incidents.

National data regarding railway level crossing crashes

- 3.19 In 2002 the Australian Transport Safety Bureau released a study of fatal crashes at railway level crossings. This publication presents the findings of a study of 87 fatal crashes at railway level crossings that were among those that occurred in the period 1988–1998 and involved a train and a road vehicle (a ‘road vehicle’ can be either a motor vehicle or a non-motor road vehicle, such as a bicycle). The study focussed on crash details recorded in Australian Transport Safety Bureau’s ‘Fatality Crash Database’, a national database holding records of crashes on public roads resulting in at least one fatality. The database currently covers the years 1988, 1990, 1992, 1994, 1996, 1997 and 1998 (only part year to date, as some of the relevant coroners’ reports have not yet been received). The 87 cases in the study sample are the fatal crashes at railway level crossings that occurred in these years (Australian Transport Safety Bureau, 2002)
- 3.20 In any given year covered by the Australian Transport Safety Bureau database, railway level crossing crashes constituted no more than one per cent of fatal road crashes. The actual annual figures range from half a percentage point to one per cent, averaging out to 0.7 of a percentage point. The number of fatalities per 100 fatal railway level crossing crashes was slightly higher than the number of fatalities per 100 other fatal road crashes. There were 120 fatalities per 100 fatal railway level crossing crashes compared with 113 fatalities per 100 other fatal road crashes.
- 3.21 Of the 87 railway level crossing crashes involving fatalities examined:
- The point of impact was more often the front of the train rather than the side of the train. In 66 per cent of the 87 cases the point of impact was the front of the train. In 16 per cent the point of impact was the side of the train. In the remaining 18 per cent the point of impact was unknown.

Incidents and crashes at railway level crossings

- Eighty three per cent occurred in daylight (excluding dawn and dusk) and 63 per cent on a weekday (as opposed to a weekend) during the day. Fourteen per cent occurred at night, two per cent at dawn and one per cent at dusk. Fifteen per cent occurred on a weekend day, 13 per cent on a weeknight, and nine per cent on a weekend night. Eighty five per cent occurred in fine weather, 84 per cent on a dry road, and the road was straight in 89 per cent of cases and level in 77 per cent of cases.
- Sixty seven per cent occurred in a rural area or urban centre away from a capital city. Sixty seven per cent occurred in locations other than a capital city, 18 per cent in a capital city, and the location of 15 per cent of cases was unknown. Ten per cent occurred at railway level crossings with boom gates, 41 per cent occurred where the warning system in place was some other type of 'active' warning system (other than boom gates) and 44 per cent occurred where the warning system was 'passive'. 'Active' warning systems employ devices such as flashing light signals, gates or barriers, or a combination of these. 'Passive' systems employ signs, road humps or other non-electric devices.
- Unintended road user error was more common in railway level crossing crashes than in other fatal road crashes. Forty six per cent of railway level crossing crashes appeared to be due to unintended road user error compared with 22 per cent of other fatal road crashes. That is, in these railway level crossing crashes the road user did not see the train, or did not observe or was unable to heed the warning system, or for some other reason was unable to avoid the train. It is not the intention to say that in these cases the road user was 'at fault'; the Australian Transport Safety Bureau recognises the importance of the 'human factors' approach to transport safety. In some cases the safety defences in place at the railway level crossing might not have adequately protected the road user from a collision with the train.
- The influence of alcohol or drugs was less common in railway level crossing crashes than in other fatal road crashes.
- The influence of excessive speed was less common in railway level crossing crashes than in other fatal road crashes.
- Of the 89 road vehicles involved in railway level crossing crashes (in two of the 87 cases, two road vehicles were involved in each crash) sixty nine per cent were either a car, 4WD, van or utility, 15 per cent were heavy trucks, and nine per cent were motorcycles, a pattern similar to that for other fatal road crashes. Three per cent were bicycles, two per cent buses and another two per cent were some other type of road vehicle. 'Heavy truck' means a truck with a gross vehicle mass of over 4.5 tonnes and one that was either a rigid or an articulated truck. Seventy six per cent of the drivers were male. Males represent 80 per cent of drivers in other fatal road crashes.
- Twenty six per cent of the drivers were in the 60+ age group while only ten per cent of drivers in other fatal road crashes were in this age group. The over-representation of older drivers was observed for both male and female drivers. Twenty four per cent of the male drivers were in the 60+ age group compared with 10 per cent of the male drivers in other fatal road crashes. Thirty three per cent of the female drivers were in the 60+ age group compared with 12 per cent of the female drivers in other fatal road crashes.

- 3.22 The study has provided a description of some of the circumstances that appear to be prevalent in fatal crashes at railway level crossings but in no way claims to be a definitive study of the nature and causes of level crossing crashes. The sample size was too small to enable in-depth analysis. This was especially so once cross-classifications were undertaken and also given the incidence of ‘unknown’ and ‘not applicable’ codes for some data items. Moreover, the data elements in Australian Transport Safety Bureau’s Fatality Crash Database are used to describe fatal road crashes in general and not railway level crossing crashes in particular. Hence, variables of particular relevance to railway level crossing crashes are not necessarily included (for example, volume of road vehicle traffic and volume of train traffic are not included).
- 3.23 The Bureau of Transport and Regional Economics (2003) released an examination of rail accident costs in Australia, reporting that the total cost of railway level crossing crashes in Australia was estimated to be \$32 million in 1999. As well, there are also significant social costs associated with deaths and serious injuries associated with railway level crossing crashes (House of Representatives Standing Committee on Transport and Regional Services, 2004).

Other data and research about railway level crossing crashes and incidents

- 3.24 As noted earlier, the Australian Transport Safety Bureau commissioned Covance (2001) to undertake a literature survey, referencing material published overseas as well as in Australia. The literature survey focused on published material that explores measures that can be implemented to help prevent railway level crossing crashes or to improve safety at railway level crossings. The searches concentrated on level crossing accidents involving motor vehicles; accidents involving pedestrians were excluded. Due to the large number of studies on level crossing accidents, the searches were limited to English language studies from the last ten years (i.e., 1990-2001). This still resulted in large numbers of publications being found in each search. Not every publication found was included, due to resource constraints: for example, a search on “level crossing” and “accidents” in ROAD (a database relating to vehicle design and safety, road safety, and vehicle testing) located 490 articles. The article abstracts were reviewed and the articles that matched the primary focus of the search were included. Articles without abstracts were excluded, except for cases where the title was thought to reflect a focus on measures that can be implemented to help prevent level crossing accidents or to improve safety at level crossings. An attempt was made to locate other literature, such as government publications and academic research conducted by specialised centres. A search of the web and appropriate transport related sites was conducted. Due to the vast nature of the web, it was impossible to provide an exhaustive bibliography of the available research. However, examples of the available literature are provided in the report. The report contains the full reference and abstract of each article found which was considered relevant, grouped by country of origin (Australia, United States, Europe, Japan, New Zealand), sorted in reverse publication year order (i.e., most recent first), and sorted alphabetically within each publication year.

Incidents and crashes at railway level crossings

- 3.25 A Queensland study into the characteristics of railway level crossing incidents found that the fatality rate for railway level crossing incidents was 12.2 times higher than for road users involved in intersection accidents, while the 'social cost' for railway level crossing incidents was on average 3 and a half times greater than for intersection crashes. The rate of hospitalisation was also much higher. Major crash characteristics were identified as straight level roads, daylight hours, during the working week, in 60km/h speed zones and involving road users aged between 25 and 59 (Queensland Transport, 1996). The study also found a higher proportional involvement of crossings fitted with boom gates in railway level crossing fatalities.
- 3.26 A study in Illinois spanning 1988-1999 examined 805 railway level crossings fitted with boom gates, finding 651 reports of crashes over the 12 year period involving 295 level crossings. Just under two-thirds of the railway level crossings were recorded as having no crashes, while one-fifth recorded one crash, one-tenth two crashes, and the remainder were associated with three or more crashes (Metaxatos, Sriraj, Sööt & DiJohn, 2002). Interestingly, this study identified two railway level crossings that displayed very divergent characteristics, both with 17 crashes occurring during the study period—a similar pattern of two railway level crossings displaying very divergent characteristics was observed by the Travelsafe Committee (1997) in an examination of railway level crossing crashes in the Brisbane suburban area for the period 1991-1997.
- 3.27 A report by the Economic and Social Commission for Asia and the Pacific (2000) reviewed the scale and severity of railway level crossing crashes in selected countries of the Asia Pacific region (India, Iran, Russia, Vietnam, Bangladesh, Phillipines and Thailand), and contrasted these findings with the experience of developed countries such as the United Kingdom, Japan, the United States, Canada, and a number of European countries. Australia was not included in the study.
- 3.28 Fatality data collated by the Australian Transport Safety Bureau records 96 fatalities as the result of 80 collisions at railway level crossings throughout Australia, over a six-year period.¹ Further analysis indicates that 41 (51.25%) of these collisions occurred at crossings with active protection, 36 (40%) occurred at crossings with passive protection, and the remainder either occurred at crossings with no signs or where the level of protection was unknown.
- 3.29 Statistics from the United States of America indicate that while 35% of railroad crossings had active warning devices, 50% of all crossing fatalities occurred at these locations.² In similar fashion, the Economic and Social Commission for Asia and the Pacific (2000) report noted that the majority of railway level crashes on the Japanese rail network occurred at crossings fitted with automatic barrier systems.
- 3.30 A study by the United States Transportation Safety Board, involving in-depth analysis of 60 passive railway level crossing incident case studies, found that:
- most (78%) of the railway level crossing accidents examined occurred during

¹ 1988, 1990, 1992, 1994, 1996, and 1997.

² United States General Accounting Office Testimony before Subcommittee on Railroads, Committee on Transportation and Infrastructure, House of Representatives, March 1996

daylight hours

- more than half the vehicle drivers and passengers were fatally injured
- impairment because of alcohol or drugs was not a common factor for drivers
- in the majority of cases, the train had a headlight on at the time of the accident and had sounded its horn
- motor vehicle driver error was cited as the primary cause in 82% of cases while for the remaining 18%, the probable cause was determined to be related to roadway and track conditions
- the most commonly cited factors related to driver error were 'disregard for stop sign', 'failure to look' and 'distraction' (National Transportation Safety Board, 1998).

3.31 STAYSAFE has found that research or analysis that has been undertaken into driver behaviour and road users characteristics that might play a role in railway level crossing incidents is not readily available (see, e.g., Wigglesworth, 1976, for an early Australian study). However, a considerable amount has been undertaken in terms of road crashes generally that might have some applicability to railway level crossing incidents. For example, data analysis and research by the Australian Transport Safety Bureau shows that males across all age groups have a higher level of risk of being involved in a road crash resulting in serious injury or fatality. Older drivers tend to be involved in crashes with the following characteristics: multi-vehicle; occurring during daylight hours on weekdays; occurring at intersections and other complex traffic situations like roundabouts; while travelling at lower speeds; and involving failure to give way, improper turns, disregarding traffic signals or angle collisions. In contrast, younger drivers are more likely to be involved in crashes where there is: loss of control, for example high speed, skidding, rollover crashes; alcohol use; and nighttime driving (Elliott, Elliott & Lysaght, 1995).

3.32 Another area of research that may have some relevance to railway level crossings concerns the use of enforcement as a means of reducing the occurrence of risky behaviour. A study into the long-term effectiveness of random breath testing (RBT) has shown that in New South Wales the impact was instantaneous, substantial and permanent (as measured by reduction in fatal and serious accidents) and that significant increases in enforcement and publicity were required for the change to be sustained. Results achieved in New South Wales were attributed to careful choice of sites for stationary testing, the presence of signs proclaiming that random breath testing was in operation, and publicity and awareness campaigns to alert the driving public to random breath testing (Henstridge, Homel & Mackay, 1997).

3.33 While there are significant differences between the problems of drink driving and accidents at railway level crossings, this study highlights that enforcement and the threat of enforcement can be powerful deterrents to risky behaviour and can effectively bring about desired change. It also shows the impact that education and community awareness campaigns can have.

CHAPTER FOUR - ADMINISTRATION MATTERS RELATING TO RAILWAY LEVEL CROSSINGS

- 4.1 As discussed in the earlier chapters, in terms of safety concerns on the New South Wales rail network and road system, injuries and fatalities caused by railway level crossing collisions are not a predominant risk due to their low rate of occurrence. (For example, fatalities caused by trespassing or suicide are a much more frequent occurrence and therefore represent a far greater rail safety risk). By necessity, this influences the allocation of resources and priority to railway level crossings by the Rail Infrastructure Corporation and Roads and Traffic Authority.
- 4.2 The high risk potential that railway level crossing incidents can represent to rail passengers and crew, freight operations, the network as a whole and to road users is recognised. The Rail Infrastructure Corporation rates railway level crossing accidents in its top 10 network risks. It is also recognised that a systematic, coordinated and considered approach to improving railway level crossing safety is needed, to maximise available resources and prevent tragic occurrences.

Recent history of railway level crossing administration

- 4.3 The establishment of inter-departmental committee of relevant stakeholders has been the typical mechanism for examining the available means to improve safety at railway level crossings in New South Wales.
- 4.4 An Inter-Departmental Level Crossing Committee was established in 1960 to make recommendations to the Minister for Transport on the improvement of safety at railway level crossings across New South Wales. The State Rail Authority was responsible for the servicing of, and administration of funding for, the Inter-Departmental Level Crossing Committee. Members of the committee were the State Rail Authority, Department of Main Roads and, in later years, the Department of Local Governments and Land, New South Wales Police Department, Roads and Traffic Authority and the Treasury.
- 4.5 Organisational changes within the State Rail Authority and the Roads and Traffic Authority, together with Government concerns over the apparent difficulties in the administration and management of the railway level crossings improvements program, led the Ministry of Transport in 1989 to conduct a review of the administrative arrangements for the funding of the program. This resulted in the following changes:
- Transfer to the Roads and Traffic Authority of full administrative and delivery responsibility for the improvements program
 - The downgrading of the Inter-Departmental Level Crossing Committee to a consultative group, with representation by the State Rail Authority, Roads and Traffic Authority and the Department of Transport only, and renamed the Level Crossing Strategy Council

Administration matters relating to railway level crossings

- The establishment of a single railway level crossings fund with a single allocation from the Consolidated Fund, supplemented, where appropriate, by contributions from local councils.
- 4.6 In 1993, as part of a general Government reform process into rail safety, the Rail Safety Act was introduced with the aim of promoting the safe construction, operation and maintenance of railways. As part of this, the task of enforcing rail safety in New South Wales went to the newly created Directorate of Rail Safety.
- 4.7 The Rail Safety Act 1993 requires that owners and operators of railways be accredited, and that the Director General of the Department ensure that safety compliance inspections are undertaken, notifiable occurrences are reported and inquiries into incidents undertaken. Specifically, sections 62 and 63 of the Act give the Director General the power to direct the installation of protective devices (including bells, lighting and boom gates) and the closure of any railway level crossing if considered necessary for safety reasons.
- 4.8 A major crash in 1994 refocused attention on railway level crossings. The crash at Vineyard (on the Richmond Line) resulted in a Tangara urban passenger train derailing after it collided with a car during the train's transit through a railway level crossing. Four people were injured and \$5 million worth of damage was done to the train. While there were no fatalities, concerns were raised as the injury count could have been much higher had the train been carrying a full load of passengers. (Due to university holidays, the train, which serviced a local education facility, had a very small number of passengers.)
- 4.9 The then Minister for Transport and Roads, the Hon. Bruce Baird MP, determined that the different objectives of the Roads and Traffic Authority and State Rail Authority in prioritising the upgrading of railway level crossings was hindering the outcomes of the Level Crossing Strategy Council
- 4.10 The Minister directed that the responsibility for the administration of the Level Crossing Strategy Council should be transferred to the Department of Transport, so that an independent perspective could be brought to the matter. This was in keeping with the charter of the Department of Transport's newly created Directorate of Rail Safety to promote the safety of rail operations in New South Wales.
- 4.11 The Roads and Traffic Authority, however, continued to be responsible for the funding and delivery of the Level Crossing Improvements Program.
- 4.12 In 1996, the disaggregation of the New South Wales railway industry resulted in the responsibility for maintenance of railway level crossings passing from the State Rail Authority to the new track owner, Rail Access Corporation. Consequently, the Rail Access Corporation replaced the State Rail Authority as a member of the Level Crossing Strategy Council.
- 4.13 In January 2001, five young men from Wagga Wagga were killed when an XPT passenger train and their car collided at the Bells Road, Gerogery railway level crossing. Just days earlier, a truck driver, also from Wagga Wagga, was killed when his

truck collided with an XPT at a level crossing at Bomen, just outside Wagga Wagga. These fatal crashes aroused considerable concern in Wagga Wagga and more generally across regional New South Wales about the safety risks at level crossings. These crashes also occurred in the 2000-2001 summer holiday period at a time when there was significant community, governmental, and media concern that the New South Wales road toll was also unexpectedly high and that efforts to reduce road trauma were stalled or failing.

- 4.14 In March 2001, the Minister for Transport, the Hon. Carl Scully MP, announced that the New South Wales government would double spending on railway level crossing upgrades to \$12 million over the next three years to accelerate and extend safety improvement works. At the same time, the Minister requested that the then Director General of the Department of Transport should assume the chair of the Level Crossing Strategy Council to ensure a strong focus and oversight role. This was meant to provide for the Level Crossing Strategy Council to have a more prominent role in the Level Crossing Improvements Program, that is, for the Council to become more “hands on”, particularly with respect to decision-making and project management.
- 4.15 While the Level Crossing Strategy Council oversaw the Level Crossing Improvements Program, the day to day administration and program delivery of railway level crossings in New South Wales fell to the Roads and Traffic Authority and the Rail Infrastructure Corporation, with safety regulation at that time provided by the Department of Transport’s Transport Safety Bureau. Following the deaths at railway level crossings in 2001, the then Department of Transport, via the Level Crossing Strategy Council, took on a project management role to assist the Roads and Traffic Authority and the Rail Infrastructure Corporation to ensure that the Level Crossing Improvements Program was delivered in an efficient, effective manner.
- 4.16 The Roads and Traffic Authority continued to administer the funding arrangements for upgrading New South Wales’s railway level crossings through the Level Crossing Improvements Program. The Rail Infrastructure Corporation, as the owner of the majority of the track, approved any new works, insofar as they affected train operations, and ensured that they were carried out. For non-Rail Infrastructure Corporation owned track (private and broad-gauge network), the Roads and Traffic Authority negotiated with the respective track owner on funding and implementation of railway level crossing upgrades. Additionally, the Rail Infrastructure Corporation undertook work to improve safety at railway level crossings that was not funded through the Level Crossing Improvements Program. This included upgrading private railway level crossings, improving boom gates, ensuring adequate sighting distances, etc..
- 4.17 Following the general State election in March 2003, a further major restructure within the Transport portfolio was announced. On 8 April 2003 the new Minister for Transport Services, the Hon. Michael Costa MLC, announced that Transport NSW would be restructured by:
- replacing nine divisions with a Ministry of Transport comprising four branches focussed on providing policy advice to the Minister and operational from 1 July 2003.

Administration matters relating to railway level crossings

- transferring Transport NSW's Master Planning and Infrastructure division to the Department of Infrastructure, Planning and Natural Resources.
 - the creation of the Transport Safety and Reliability Regulator independent of the Department of Transport answering directly to the Minister.
 - separating the roles of Director-General of Transport NSW and Co-ordinator General of Rail.
- 4.18 With effect from 1 July 2003, the name of the former Department of Transport (which had previously been renamed Transport Co-ordination Authority) was changed to the Ministry of Transport.
- 4.19 From August 2003, the Rail Infrastructure Corporation undertook administrative and operational responsibility for railway level crossings in New South Wales, in association with the Roads and Traffic Authority.
- 4.20 The new Transport Safety and Reliability Regulator became fully operational on 1 January 2004—until that time, the current Rail Safety Regulator remained responsible for transport safety.
- 4.23 The restructure aimed to separate policy from operations and was designed to allow the Co-ordinator General of Rail to focus on the daily running of the rail network.
- 4.24 Within New South Wales, the establishment of priorities for the upgrading of railway level crossings through the Level Crossing Improvements Program remains the responsibility of the Level Crossing Strategy Council, chaired by the Director General of the Ministry of Transport and consisting of representatives from the Ministry of Transport, the Roads and Traffic Authority, the Rail Infrastructure Corporation, and the Local Government and Shires Association. The Level Crossing Strategy Council approves the allocation of priority for railway level crossing upgrades and improvements, monitors delivery of the Level Crossing Improvements Program, and ensures consultation between all agencies involved in the works. More recently, it has taken on the role of approving and monitoring the works program to ensure effective delivery.
- 4.25 The Level Crossing Strategy Council is not involved in allocating funds for the grade separation of railway level crossings (replacing them with either an underpass or overbridge). Until the recent restructure, this function was funded and undertaken separately by the Roads and Traffic Authority.
- 4.26 After reviewing the history of administrative changes affecting the management of railway level crossings in New South Wales, STAYSAFE was very concerned with the recurring pattern of action and inaction, and of repeated bureaucratic change, that has marked the administration of railway level crossings over the past decade or more, and called for clarification of the respective roles of the various government agencies involved in its initial recommendations.

The management of matters associated with railway level crossings

4.27 STAYSAFE confirms its recommendation that the Ministry of Transport should be the lead agency for matters associated with railway level crossings.

RECOMMENDATION 1:

Ministry of Transport be the lead agency for matters associated with railway level crossings, that is, intersections where a road and railway meet at the same level.

4.28 STAYSAFE notes that Minister's request that the Director General, Ministry of Transport chair the Level Crossing Strategy Council and the more proactive and intensive role that the Council is now taking, highlight the desire to achieve real improvements to railway level crossing safety and to ensure coordinated and focused effort to this end.

4.29 STAYSAFE does have concern that the current activity and focus on railway level crossing safety should not diminish over time — it is not unfair to conclude, from a review of the recent history of administrative actions regarding railway level crossings in New South Wales that there is a cyclical pattern in activity in response to incidents and crashes that have occurred within the rail network. Similar patterns of interest and activity can be seen in other States.

4.30 STAYSAFE notes the comments of Mr John Lee, then Director-General, Ministry of Transport, regarding the question of which agency should be the lead agency for railway level crossing matters in New South Wales:

Mr LEE: With the new ministerial structure established in March 2004 by the re-elected Carr Government there was a change in emphasis, and Transport New South Wales, as it then stood, was modified to form the Ministry of Transport, which is focused on providing policy advice. Rather than being a deliverer of services as Transport New South Wales was, it shifted to being an adviser to the Minister and central government. But it is fair to say that I have retained the position as chair of the Level Crossing Strategy Council because I had discussions with Vince Graham when he took up the role with RailCorp, and with Paul Forward, about the necessity to have, if you like, an independent umpire to ensure that the focus of the Council was not lost. So I think that recommendation could be slightly modified to confirm the new arrangements that are in place, but I do take a very active role with the Council.

Mr GIBSON MP (CHAIRMAN): If there is a problem with a level crossing and one body is waiting for another body to make a decision on the matter, who has the final say?

Mr LEE: Thankfully, we have not come to that hypothetical situation. I would think that in a practical situation the matter would be raised at the Council, there would be a discussion, and there would be an outcome. I do not foresee that there would be any ambiguity in that regard.

Administration matters relating to railway level crossings

Mr GIBSON MP (CHAIRMAN): One immediately comes to mind: that Council should have carried out certain work and it was not carried out, but that Council was not ordered to carry out the work. Where does the organisation fit in there?

Mr LEE: Ultimately, the Council makes recommendations and puts forward the forward program. As I said, we have not had the situation where there has been disagreement, albeit between the Roads and Traffic Authority and RailCorp. But if matters are raised in which there would appear to be a difference of opinion, I would ultimately work through those matters with the stakeholders who are concerned about it. (Minutes of evidence of the STAYSAFE Committee, Monday 17 May 2004, Page 26)

4.31 STAYSAFE recommends that the Director General, Ministry of Transport, should continue to chair the Level Crossing Strategy Council.

RECOMMENDATION 2:

The Director General, Ministry of Transport continue to chair the Level Crossing Strategy Council.

4.32 STAYSAFE notes that where a grade separation (bridge or underpass) is being considered to replace a railway level crossing the Roads and Traffic Authority should take the role of lead agency, although the Level Crossing Strategy Council should continue to make recommendations on which railway level crossings are of such a risk magnitude as to warrant this level of action. Grade separations are resource intensive exercises, requiring major reconstruction of road and rail infrastructure costing millions of dollars.

RECOMMENDATION 3:

Where a grade separation (bridge or underpass) is under consideration to replace a railway level crossing the Roads and Traffic Authority should take the role of lead agency, although the Level Crossing Strategy Council should continue to make recommendations on which level crossings are of such a risk magnitude as to warrant this level of action.

4.33 Overall, STAYSAFE is of the view that matters associated with railway level crossings in New South Wales should continue to be co-ordinated and directed through a high level council comprising the relevant Minister(s) and chief executives of the roads and transport portfolios, and to be known as the Level Crossing Strategy Council. Matters associated with railway level crossings in New South Wales should be managed through a railway level crossings manager employed by the Rail Infrastructure Corporation. The Rail Infrastructure Corporation should continue to administer the general budget and works programs for railway level crossings in New South Wales, excluding grade separations. In practice, however, STAYSAFE agrees that responsibilities regarding roads in the immediate vicinity of railway level crossings should be negotiated and co-ordinated by the railway level crossings manager in consultation with the Rail Infrastructure Corporation, the Roads and Traffic Authority and local councils.

- 4.34 The number of agencies involved, different priorities, limited resources and lack of a robust prioritisation model have tended to create problems with ensuring that improvement work required is undertaken in a coordinated and timely fashion. The Level Crossing Strategy Council has adopted a project management approach, involving establishment of a working group to develop an annual works program, reporting against the annual program, and monitoring progress through Level Crossing Strategy Council meetings. The Ministry of Transport has recently reported:

“Level Crossing Improvement Strategies

The role of the Level Crossing Strategy Council (LCSC) has been given more focus. There is now a strategic program in place to ensure effective action is taken to improve the safety of level crossings through NSW.” (New South Wales Ministry of Transport, 2003, p.21)

- 4.35 STAYSAFE believes that the Level Crossing Strategy Council should continue to have a major, ‘hands-on’ role in project management, to avoid underspending, and to ensure that projects are completed on time.

RECOMMENDATION 4:

Matters associated with railway level crossings in New South Wales be:

- (a) co-ordinated and directed through a high level council comprising the relevant Minister(s) and chief executives of the roads and transport portfolios, to be known as the Level Crossing Strategy Council;
- (b) managed through a railway level crossings manager employed by the Rail Infrastructure Corporation;
- (c) administered in terms of budget and works programs by the Rail Infrastructure Corporation; and with responsibilities regarding roads in the immediate vicinity of railway level crossings to be negotiated and co-ordinated by the railway level crossings manager in consultation with the Rail Infrastructure Corporation, the Roads and Traffic Authority and local councils

- 4.36 STAYSAFE notes that the government agencies and other organisations to form the Level Crossing Strategy Council should include the Ministry of Transport, the Rail Infrastructure Corporation, the Roads and Traffic Authority, New South Wales Police, the Local Government and Shires Associations of New South Wales, and the Independent Transport Safety and Reliability Regulator. In addition, the Australasian Railway Association (representing train operators) and the Australian Rail Track Corporation (for the interstate rail network in New South Wales), should also be represented.

RECOMMENDATION 5:

The government agencies and other organisations to form the Level Crossing Strategy Council should include:

- the Ministry of Transport
- the Rail Infrastructure Corporation
- the Roads and Traffic Authority
- New South Wales Police
- the Local Government and Shires Associations of New South Wales
- the Independent Transport Safety and Reliability Regulator
- the Australasian Railways Association
- the Australian Rail Track Corporation

4.37 STAYSAFE emphasises the major role that the Level Crossing Strategy Council must play in developing safe railway level crossings in New South Wales. There needs to be a number of administrative actions taken to ensure that the cycle of action and inaction in response to major fatal crashes at railway level crossings does not recur. These administrative actions should include the Level Crossing Strategy Council taking note of:

- reports of near miss incidents, collisions, trespass and suicide associated with railway level crossings;
- all investigation reports involving crashes at railway level crossings.

The Rail Infrastructure Corporation's Level Crossing Manager should have the responsibility to obtain and report on these matters.

4.38 STAYSAFE asked if the Ministry of Transport or any rail or transport agency in the Transport portfolio had established a register of coroner's reports and recommendations relating to deaths at railway level crossings in New South Wales? The Level Crossing Strategy Council advised that there had not been any action to establish a register of coroners reports and recommendations relating to deaths at railway level crossings in New South Wales, and that recent searches also indicated some difficulty in easily accessing such reports.

4.39 STAYSAFE notes that the Ministry of Transport recently reported:

"National Incident Data and Analysis

For a number of years there has been ongoing debate among the various states and the Commonwealth regarding the establishment and operation of a national incident database and analysis of this information. The principal stumbling block has been the development of acceptable definitions for particular types of incidents so that there was consistent reporting of incidents throughout Australia.

All states have recently agreed to a series of definitions as a starting point for the collection, collation and analysis of data. This will enable the commencement of the comparative analysis of incident frequency across Australia." (New South Wales Ministry of Transport, 2003, p.20)

4.40 STAYSAFE also recommends that all investigations of railway level crossings crashes and other incidents be conducted by the Independent Transport Safety and Reliability Regulator, in conjunction with the Rail Infrastructure Corporation, Ministry of Transport, Roads and Traffic Authority, New South Wales Police, Local Government and Shire Associations, and the Australasian Railways Association, with the resulting reports to be furnished to the Level Crossing Strategy Council through the Level Crossing Manager. STAYSAFE notes that the Ministry of Transport has developed a memorandum of understanding with the Australian Transport Safety Bureau covering the circumstances in which the Australian Transport Safety Bureau will investigate railway crashes and incidents. His arrangement should minimise duplication of effort between the Commonwealth and New South Wales, and facilitate the sharing of information. STAYSAFE hopes that the investigations of railway level crossings crashes and other incidents at railway level crossings will benefit from this arrangement.

RECOMMENDATION 6:

All incidents at railway level crossings—‘near miss’ or potential crashes, collisions, trespass and suicide—be recorded in a central register and maintained by the Rail Infrastructure Corporation and Level Crossing Manager .

RECOMMENDATION 7:

That the railway level crossings incidents register be presented regularly to the Level Crossing Strategy Council for review and response to recorded incidents.

RECOMMENDATION 8:

That all investigations of railway level crossings crashes and other incidents be conducted by the Independent Transport Safety and Reliability Regulator, in conjunction with the Rail Infrastructure Corporation, Ministry of Transport, Roads and Traffic Authority, New South Wales Police, Local Government and Shire Associations, and the Australasian Railways Association, with the resulting reports to be furnished to the Level Crossing Strategy Council through the Level Crossing Manager.

4.41 As noted earlier, the Level Crossing Strategy Council has adopted a project management approach, involving an annual works program with reporting against the works program and monitoring of progress through Level Crossing Strategy Council meetings. The Rail Safety Act 2002 section 62 requires the Director General of Transport to prepare an annual rail industry safety report (see New South Wales Ministry of Transport, 2003, for the first annual report). The report provides an overview of rail operations, but also includes a summary of bus and marine safety issues. The entry for railway level crossing safety is quite limited:

“Level Crossing Improvement Strategies

The role of the Level Crossing Strategy Council (LCSC) has been given more focus. There is now a strategic program in place to ensure effective action is taken to improve the safety of level crossings through NSW. Key strategies include closure of crossings and appropriate prioritization of improvement works.

Administration matters relating to railway level crossings

Expenditure on level crossing safety improvements in 2002/03 is forecast to total \$5.5 million. The total number of sites numbered 133 and included 13 level crossing closures, achieving more site improvements than originally planned. The types of treatment ranged from advanced warning lights, upgrading of existing warning lights using LED (light emitting diode) technology, and other improvements to signage, road approaches and sighting distances.

Level crossing safety awareness advertising was conducted in from late November 2002 for 5 weeks using radio, newspapers and billboards, primarily targeting local rural communities. Advertising proposed in 2003/04 is also to include the Hunter Region.

The LCSC has approved a \$5 million 2003/04 level crossing safety improvement program.” (New South Wales Ministry of Transport, 2003, p.21)

4.42 The Ministry of Transport notes that:

“It is anticipated that future reports will include a greater level of analysis of the rail industry as a whole.” (New South Wales Ministry of Transport, 2003, p.3)

4.43 STAYSAFE recommends that the Level Crossing Strategy Council compile and publish an annual report of its activities.

RECOMMENDATION 9:

The Level Crossing Strategy Council publish an annual report of its activities.

4.44 STAYSAFE notes that the Level Crossing Strategy Council has commenced publication of annual reports of its activities (see, e.g., Transport NSW, 2002). The [Level Crossing Strategy Council's yearly report for 2002/03](#) is included as [Attachment B](#).

Funding of railway level crossing improvements

4.45 A major issue identified by STAYSAFE concerning the administration of railway level crossings relates to the need to ensure an appropriate level of funding, the effective use of funds to improve railway level crossing safety, and the development of a long term program for improving railway level crossing safety.

4.46 The responsibility for infrastructure provision at railway level crossings is as follows:

- The Rail Authority is responsible for displaying and maintaining the appropriate signs, flashing lights, boom gates, bells and associated equipment at level crossings.
- The Rail Authority is responsible for maintaining the roadway located between the outer extremities of the sleepers supporting the rails.
- The Rail Authority, in consultation with the Road Authority, is responsible for determining the form of at-grade control implemented at each level crossing.
- The Road Authority (Roads and Traffic Authority or local council, depending on the status of the road) is responsible for displaying and maintaining the appropriate signs and markings on the approach to level crossings.

- The local council is responsible for the provision of street lighting where necessary.
- 4.47 The Roads and Traffic Authority provides annual allocations for the improvement of railway level crossings. At-grade improvements are considered separately from proposals involving grade separation such as overbridges. This is to avoid relatively low cost but worthwhile level crossing improvements being subordinated to relatively high cost grade separation projects.
- 4.48 On state and regional roads, railway level crossing improvements are funded by the Roads and Traffic Authority. On local roads, the Roads and Traffic Authority is responsible for 2/3 of the cost of the improvement while the local council pays 1/3 of the cost. The Roads and Traffic Authority contribution for the latter case applies to two lane facilities only.
- 4.49 The cost of warning signs in advance of railway level crossings is the responsibility of the Road Authority, either the Roads and Traffic Authority or the local council.
- 4.50 The prioritisation model used by the Rail Authority and the Roads and Traffic Authority is very complex, but the type of controls applied to a particular railway level crossing site is determined by: Road/rail traffic; Sight distance; Road/rail alignment; Roadside activity; Accident history; Road width; and Number of railway tracks. The road/rail traffic factor is the product of the daily vehicular traffic and the weekly train traffic.
- 4.51 In March 2001, the Minister for Transport announced an additional \$6 million funding over three years. The Level Crossings Strategy Council was tasked to coordinate this additional expenditure through the Level Crossings Improvements Program. For example, the 2001-2002 Level Crossings Improvement Program approved by the Level Crossings Strategy Council involves upgrading protection at the following sites through New South Wales:

1	Bomen	Dampier St
2	Bribbaree	Young Rd
3	Byron Bay	Bayshore Drive
4	Byron Bay	Old Bangalow Rd
5	Dubbo	Bunninyong Rd
6	Dubbo	Eulomogo Rd
7	Kandos	Angus Ave
8	Marinna	Public Road
9	Moppin	State Hwy 28 (Carnarvon Highway)
10	Robertson	Fountaindale St
11	Robertson	Hoddle St
12	Robertson	Meryla St
13	The Rock	Burkes Ck Rd (Old Trunk Rd)
14	Upper Burringbar	Upper Burringbar Rd East
15	Upper Burringbar	Upper Burringbar Rd West
16	Wagga	Fernleigh Rd
17	Willbriggie	Kidman Way (Darlington Point Rd)

Administration matters relating to railway level crossings

- 4.52 Member agencies to the Level Crossings Strategy Council compiled the list based on subjective assessment by field officers. It is an internal working document listed alphabetically with two levels of priority according to whether the work is planned for next financial year or later.
- 4.53 It has no public status and is only used to permit forward planning until the prioritised program is available. A Risk Identification Model (see later section for a detailed discussion) will assess all of these sites, but the final prioritised output may not include any or all of these sites. The Level Crossings Strategy Council will only endorse a final prioritised program for the remaining two years once the outputs of the Risk Identification Model are available.
- 4.54 Some of the \$6 million budget will also be used to purchase equipment from overseas to ensure timely delivery for later year programs. In addition, some funds will go into necessary advance design work for upcoming sites.

2002-03

1	Albury	Perryman's Lane	Main South	629.443
2	Culcairn	Benambra Road	Main South	606.160
3	Culcairn	Odewahns Road	Main South	601.325
4	Culcairn	Taylor's Road	Main South	598.937
5	Grafton	Fry Street	North Coast Main	700.407
6	Henty	Public Road	Main South	579.075
7	Kundabung	Smiths Creek Wharf Road	North Coast Main	485.137
8	Kungala	Kungala Road	North Coast Main	664.669
9	Kyogle	Andersons Road	North Coast Main	829.939
10	Marulan	Aglime Road	Main South	193.900
11	Mullion Creek	Mullion Ck Road	Main West	339.520
12	Raleigh	Yellow Rock Road	North Coast Main	586.908
13	Spring Hill	Lucknow / Beazley Road	Main West	309.577
14	Spring Hill	Orange Road	Main West	308.370
15	Table Top	Ettamogah Road	Main South	637.435
16	Uranquinty	Bonaccord Road	Main South	541.680
17	Urunga	Snapper Beach Road	North Coast Main	576.100
18	Yerong Creek	Eulensteins Lane	Main South	571.750

2003-04

1	Albury	Dalinger Road	Main South	640.935
2	Albury	Fallon Street	Main South	643.295
3	Albury	North Street	Main South	644.145
4	Albury	Thurgoona Road	Main South	639.375
5	Ballimore	Ballimore Road	Dubbo - Merrygoen	495.557
6	Braunstone	Poley House Road	North Coast Main	682.520
7	Brewongle	Brewongle Road	Main West	225.006
8	Camira Ck	Old Tenterfield Road	North Coast Main	757.156

Administration matters relating to railway level crossings

9	Dubbo	Purvis Lane	Dubbo - Coonamble	465.764
10	Dubbo	Troy Sale Yards	Dubbo - Merrygoen	467.454
11	Dubbo	Yarrendale Road	Dubbo - Merrygoen	468.720
12	Harefield	Trunk Road (Main Road)	Main South	496.945
13	Koolkhan	Southampton Ferry	North Coast Main	704.326
14	Kundabung	River Road	North Coast Main	486.827
15	Leeton	Popular Street	Junee - Griffith	610.603
16	Leeville	Leeville	North Coast Main	793.889
17	Macksville	Brown's Crossing Road	North Coast Main	538.525
18	Nevertire	Mitchell Highway	Nevertire - Warren	564.337
19	Parkville	Mareeba Road	Main North	321.549
20	Reefton	Wylong Road	Temora - Lake Cargelligo	517.996
21	Wauchope	Kings Creek Road	North Coast Main	451.450
22	-	Ivanhoe Road	Orange - Broken Hill	987.696
23	-	Old Grafton-Casino Road	North Coast Main	731.130
24	-	Ringwood Road	Orange - Broken Hill	517.869
25	-	Whiporie	North Coast Main	750.900

- 4.55 The doubling of funding for the railway level crossings improvement program has enabled a greater number of projects to be undertaken, including the upgrade of level crossings from passive protection to active, the installation of advanced warning lights, and the installation of LED lighting to replace existing level crossing warning lights to improve visibility. Consideration of strategies that are not technology-based will also be undertaken as part of the improvements program, with a view to identifying innovative, cost effective solutions.
- 4.56 It remains that there are hundreds of railway level crossings on public roads alone that have been identified as being in need of some infrastructure modification to reduce inappropriate risk to rail and road movements. Even though there has been an increase in funding through to 2006/2007, the upgrading of just these railway level crossings is likely to take well over a decade to realise even if the current level of funding is extended.
- 4.57 As well, there are a number of longer term issues that are not addressed in current funding, including: specific funding to address pedestrian level crossing safety issues; costs associated with the closure of railway level crossings; costs associated with grade separations to replace existing railway level crossings; costs associated with the implementation of a closed corridor policy for high speed railway lines; expenditure associated with the development and introduction of new technologies associated with railway level crossings (including an inventory of railway level crossings, identification of priorities for upgrades), etc..

RECOMMENDATION 10:

The Minister for Transport and Minister for Roads review the recurrent funding formula for the upgrading of railway level crossings, with specific regard to:

- (a) the adequacy of the recurrent funding to achieve the necessary and desirable improvements in public rail safety and road safety within a reasonable timeframe and in a manner that promotes the development of rail transport in New South Wales;
- (b) the capacity of local councils to contribute to the recurrent funding formula; and
- (c) whether the recurrent funding formula allows the effective and efficient planning of upgrading works associated with railway level crossings.

4.58 STAYSAFE further recommends that the Level Crossing Strategy Council should develop a longer term plan for improvements in the safety of railway level crossings, and ensure that its member agencies and organisations reflect this strategic focus within their own planning processes and documentation. STAYSAFE was impressed, for example, with planning documentation used in other jurisdictions which integrated railway level crossing planning with other relevant transportation planning processes, for example, the Federal Railroad Administration's five-year strategic plan for railroad research, development and demonstrations (Federal Railroad Administration, 2002).

RECOMMENDATION 11:

The Level Crossing Strategy Council should:

- (c) develop a longer term plan for improvements in the safety of railway level crossings;
- (d) ensure that its member agencies and organisations reflect this strategic focus within their own planning processes and documentation.

4.59 While local government shares the same concerns as the State Government in improving safety at level crossings, however, in some instances local council contributions towards upgrading works have been delayed due to budgetary constraints.

4.60 STAYSAFE notes that on occasions, projects involving local roads that have been identified as requiring an upgrade have been dropped from the Level Crossing Improvements Program or delayed until a local council contribution is available. This issue was discussed at the public hearing of 30 October 2001:

MR McBRIDE MP (CHAIRMAN): Earlier I referred to the funding in relation to council. I am looking at ... the funding ratio. [It is stated]:

In the event that the local Council is unable to meet the one-third cost, the practice has been that the RTA may have to defer the upgrading work from the annual Level Crossing Improvements Program and reprioritise funds elsewhere in the program.

I shall elaborate on that. The point that was made to us is that councils have great difficulty—given that these are non-urban councils and especially western councils—in terms of developing a program of forward commitment to these crossings, given the size of the chunk it takes out of their uncommitted funds. The point was made to us that because they cannot fund their component it falls off the list even though, from a safety point of view, it would have been given a higher priority.

Mr DEEGAN: Again, because we are now developing a rolling program, we will work with local councils on those issues. The history of the arrangements has not always been as neat tidy as one would like and we are working to improve that dramatically. We are working with those groups to move forward. Previously there have been debates about when there are competing priorities but potentially at the same level; if one council is in a position to assist then you do make judgments. We are revisiting that on a regular basis....

Mr FORD: The Roads and Traffic Authority makes funds available to local government for a variety of purposes, including road safety projects, what we call block grants on local roads which perform a regional road function, in some instances on road maintenance on those roads, in other instances on road development projects, on traffic projects on local roads, etc.. Where councils have difficulty in raising a one-third contribution to what we would call a minor work it can use other funds available to the council from the Roads and Traffic Authority for that purpose. I am suggesting that there is some scope for negotiation with various councils in how the funds are allocated.

MR McBRIDE MP (CHAIRMAN): They might disagree with you. An area that was identified was co-operation between the Roads and Traffic Authority and the Rail Infrastructure Corporation. I cite the incident, with which you may not be familiar, at Gunnedah where two options were being considered. One option involved a cost to the Roads and Traffic Authority, and the other option involved a cost to the Rail Infrastructure Corporation. One was a level crossing further up the road, and one was to go under the rail bridge. It was associated with a new coal loader. I take the look on your face to mean that you are familiar with it. What we found there was that it was basically just a funding war between the Roads and Traffic Authority and the Rail Infrastructure Corporation as to the option. The consideration was not the best outcome from a safety point of view or anything else, or even from a rail management point of view because the option in terms of the rail costing, as we saw it, was that they had to have a single man walk down the track for a kilometre and change the points or whatever it was—I cannot remember all the exact details.

One option was very inefficient from the rail point of view but it was efficient from the Roads and Traffic Authority point of view because all the costs were on the rail side of the ledger. The Roads and Traffic Authority option was to lower the pavement under the bridge but they told us that that goes underwater at least once every five years so we could not take that option. Yet it was pointed out by the locals that there were two further crossings down the road that the trust could take in the event that there was flooding in the causeway. Do you have any comments on how we resolve these issues?

Administration matters relating to railway level crossings

Mr DEEGAN: Not just giving a political response, the level of co-operation between the two organisations is at an all-time high and we expect that to improve. There have been differences, as you would in any organisation with different priority levels. To have the same Minister, which I think is one of the features of the system, and that he has appointed the head of his department to chair this group is a very clear message from him about ensuring that the two work hand-in-hand. At officer level, the degree of co-operation and support is terrific to watch. They all have the same issues and concerns, and they are working closely together. If there are differences about discussing those priorities, and that is a healthy debate, which I think is a reasonable thing for professional people, then the strategy council, which encompasses all those players, sits down and sorts it out. Also, adopting a project management role so that we can pull all that together and get the best from some very experienced people. (Minutes of evidence of the STAYSAFE Committee, Monday 30 October 2001, pages 14-15)

- 4.61 The Level Crossing Strategy Council initially advised that ongoing consultation with local councils will continue to ensure that they are aware of the importance of the program and are able to work with the Roads and Traffic Authority to improve level crossing safety on local roads.
- 4.62 STAYSAFE notes that the Level Crossing Strategy Council is currently determining an appropriate funding strategy, and assessing likely budget requirements and an achievable delivery program.
- 4.63 STAYSAFE further notes that projects involving local roads that have been identified as requiring an upgrade have been dropped from the Level Crossing Improvements Program or delayed until a local council contribution is available. STAYSAFE accepts that there is a responsibility for local government to assist the improvement of railway level crossing safety by contributing to works involving local roads, but the reality is that local roads expenditure management in local councils is not structured to allow for the level of contribution that even one major level crossing upgrade might require.
- 4.64 It is imperative that an alternative funding model is developed and implemented that allows more flexibility for local councils to meet their obligations regarding the upgrade of railway level crossings where indicated. This could include the establishment of some form of 'funding bank' to allow for local councils to spread the cost of their contribution to a railway level crossing upgrade across several financial years.
- 4.65 STAYSAFE specifically recommends that, in the event that a local Council is unable to meet the one-third cost contribution for the upgrading of a railway level crossing, the previous practice for the Roads and Traffic Authority to defer the upgrading work from the annual Level Crossing Improvements Program and re-prioritise funds elsewhere in the program should be discontinued. In STAYSAFE's view, the inability for a local council to provide a contribution to the upgrading should not be a reason for a priority work to not proceed.

RECOMMENDATION 12:

In the event that a local Council is unable to meet the one-third cost contribution for the upgrading of a railway level crossing, the previous practice for the Roads and Traffic Authority to defer the upgrading work from the annual Level Crossing Improvements Program and re-prioritise funds elsewhere in the program should be discontinued.

Inventory of railway level crossings in New South Wales

- 4.66 STAYSAFE was surprised to find at the commencement of the inquiry that there was no accepted inventory of railway level crossings in New South Wales. Indeed, as noted in earlier chapters, it remains unclear as to the exact number of railway level crossings across railway lines in New South Wales.
- 4.67 Problems identifying railway level crossings occur for reasons such as:
- the local community, the local council, or road and rail authorities identify road names differently
 - locations are generally identified by rail authorities using a railway line description and kilometrage from Sydney or a “locality” name
 - railway level crossings on rail corridors that are not managed by the Rail Infrastructure Corporation (e.g., on private railway lines, or on broad gauge system railways such as that managed through Victorian rail authorities) do not appear in the New South Wales railway databases
 - the public do not have a “ready reference” when reporting railway level crossing faults/incidents to authorities
- 4.68 The original Rail Infrastructure Corporation database did not always have accurate road descriptions, which sometimes created confusion when discussing the location of a railway level crossing with the Roads and Traffic Authority or local councils.
- 4.69 The Rail Infrastructure Corporation database now includes accurate road descriptions for most railway level crossing locations and rail distances (kilometrage) from Sydney. Additionally, the Rail Infrastructure Corporation is able to provide global positioning system (GPS) coordinates for most level crossings. Once all level crossing locations have road descriptions the database will be compatible to both organisations. The Rail Infrastructure Corporation also provides a location plaque at active crossings indicating the locality, kilometrage, a unique identity number and an emergency contact phone number. A nationally consistent standard reference for railway level crossings that provides a unique reference number or descriptor, is communicable, visible and easily understood by the public, by rail and road authorities, and by police and emergency services. This would be of major benefit in the administration and maintenance of level crossings and any emergency response to incident locations.

RECOMMENDATION 13:

The Level Crossing Strategy Council actively promote the development and implementation of a nationally consistent standard reference for railway level crossings that provides a unique reference number or descriptor, is communicable, visible and easily understood by the public, by rail and road authorities, and by police and emergency services.

Administration matters relating to railway level crossings

- 4.70 The Level Crossing Strategy Council has accepted that current data on level crossings in New South Wales is inconsistent, with different organisations recording different information and using different terminology, and with no readily accessible records appearing to exist for some level crossings. A major objective of the Level Crossing Strategy Council has been the development of a centralised, comprehensive database that accurately records relevant information on all level crossings in New South Wales.
- 4.71 STAYSAFE recommends that the Rail Infrastructure Corporation develop and maintain an inventory of all intersections between railways and roads, including all intersections where a road, road-related area, pedestrian access route or other access route meets a railway at substantially the same level (e.g., actively signalled road level crossings, passively signed road level crossings, accommodation crossings, maintenance crossings, pedestrian crossings, etc.).
- 4.72 The Level Crossing Strategy Council has indicated that it is working to achieve this database, but that the process will take some time:

Mr LEE: The inventory database was the subject of major criticism. A number of listings were the same crossing expressed with the same sort of suburb and put in the database three or four times. Other crossings were omitted altogether. There has been a consolidation of those 1,600 sites. They have all been entered into the inventory. We are 99.9 per cent sure all those sites are exact but with more than all 3,800 sites, about half being private and half being public, it is a multimillion-dollar exercise to visit every single site and give an inventory for every site.

But our work has been focused on the public roads. Most of the 100 sites have been validated by site inspections. When we talk about the top 100 sites under the LCAM model, obviously with those 69 factors they are probably those that have a higher risk than other sites. Even within that top 100 we also recognise that some of the sites in community terms are low risk in comparison with other parts of the roadway but we understand that they have high consequences. With a train of anything between 200 and 350 tonnes the consequences are severe compared with a vehicle hitting a tree on the side of the road ..." (Minutes of evidence of the STAYSAFE Committee, 17 May 2004, p.10)

RECOMMENDATION 14:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority and other agencies, develop and maintain an inventory of all intersections between railways and roads, including all intersections where a road, road-related area, pedestrian access route or other access route meets a railway at substantially the same level (e.g., actively signalled road level crossings, passively signed road level crossings, accommodation crossings, maintenance crossings, pedestrian crossings, etc.).

- 4.73 STAYSAFE notes that the development of database of an inventory of railway level crossings is a lengthy and complex task. However, there are existing models that are appropriate relevant exemplars. In particular, STAYSAFE notes that in early 2003 the United States Federal Railroad Administration announced the online availability of

GradeDec.Net, an internet application and database designed to aid benefit-cost analyses of highway-rail grade crossing infrastructure investments. The application, accessible at www.GradeDec.net, can be used to evaluate the benefits and costs of rail investment projects, specifically those involving highway-rail grade crossing improvements (including grade separation or closure), within a risk analysis framework. GradeDec.Net provides users with easy online access to key databases and statistical models, generates useful charts, graphs and reports, and allows users to save analyses for distribution, reuse, and refinement. GradeDec.Net is a revised version of GradeDec, originally developed in 1998 in consultation with several state departments of transportation and metropolitan planning organizations. State, local and regional government agencies, and railroads have used both versions successfully. The GradeDec model was tested and reviewed at the Institute of Transportation Studies at the University of California at Berkeley. The model employs current research findings on the environment, safety, and traffic network analysis. Users can customize analytical models to reflect regional conditions, and to obtain dollar values for a full range of benefit categories. The National Highway-Rail Grade Crossing Inventory and the United States Department of Transportation Accident Prediction and Severity Model are integrated features of GradeDec.Net. The application allows users to evaluate expected changes in accident risk, travel time savings, vehicle operating cost savings, and air quality benefits, while accounting for changes in highway-rail crossing maintenance and capital costs. Users are able to conduct benefit-cost analyses for individual or multiple crossings at the corridor or regional level. Corridor-level analysis allows users to rank crossing improvements by benefit category and to identify grade crossing investments that may reduce highway traffic congestion. A regional-level analysis allows users to evaluate grade crossings for a geographic area as small as a township, or as large as multiple counties or a state. STAYSAFE encourages the Rail Infrastructure Corporation to refer to sophisticated models such as the National Highway-Rail Grade Crossing Inventory and GradeDec.Net, in developing the database inventory of railway level crossings in New South Wales.

4.74 STAYSAFE recommends that the database of railway level crossings in New South Wales should be a resource that is available for public access through the internet.

4.75 In evidence, rail agencies witnesses noted that:

Mr LEE: ...We are currently reviewing Queensland's Web-based database system and we are reviewing that to see whether that might be implemented for our sites as well.

Mr DARYL MAGUIRE (STAYSAFE): Are you saying that that would then give the public access to information about the 100 sites?

Mr LEE: Yes. I see that you have a question on notice on this very matter. I hope that once we have been able to finalise through the budgetary process the program for 2004-05 we will be able to get those 100 sites up on the Net. (Minutes of evidence of the STAYSAFE Committee, Monday 17 May 2004, page 5)

Administration matters relating to railway level crossings

and later:

Mr GRAHAM: We are establishing an inventory of the level crossings around the State. We have now established an inventory of the 1,400 public level crossings. The Level Crossing Strategy Council has agreed to publish the next 200 level crossings that are earmarked for upgrading. We would want to get public visibility into that program, and to do it through the public internet. (Minutes of evidence of the STAYSAFE Committee, Monday 17 May 2004, page 24)

4.76 STAYSAFE confirms that its recommendation is for the database of all railway level crossings in New South Wales to be available for public access through the internet, not just the top 10 or 100 railway level crossings that have the highest priority.

RECOMMENDATION 15:

The Rail Infrastructure Corporation ensure that there is public internet access to the inventory of all intersections between railways and roads, including intersections where a road and railway meet at substantially the same level.

4.77 Ideally, an internet-based database should allow regional rail staff, Roads and Traffic Authority staff, and local council staff to update entries relating to specific crossings following inspections and maintenance work, or to record crash and incident reports. It should also be a design consideration that local rail and roads officials should be able to interrogate the database regarding proposed upgrades of infrastructure at specific crossings or along segments of rail corridors.

4.78 The internet-based database of an inventory of railway level crossings in New South Wales would then allow for the implementation of a program of audit for all railway level crossings. Road authorities—either local councils or the Roads and Traffic Authority—are responsible for the provision and maintenance of road markings and advance signage and advance warning signals on roads approaching railway level crossings. The rail authority is responsible for the traffic controls at the level crossing.

4.79 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other agencies, should develop and implement a regular and ongoing program of audit for all railway level crossings in New South Wales. At the very least, every railway level crossing should be subject to annual inspections of road markings, signs and advance warning signals on roads approaching railway level crossings. For level crossings fitted with active protective devices such as flashing lights and boom gates, audit inspections should continue to be on a daily basis.

RECOMMENDATION 16:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other agencies, develop and implement a regular and ongoing program of audit for all railway level crossings in New South Wales, including at least annual inspections of road markings, signs and advance warning signals on roads approaching railway level crossings.

4.80 STAYSAFE notes that the provision of audit inspection data onto an internet-based database inventory of railway level crossings would likely improve public confidence in the management of railway level crossings.

Risk assessment and prioritisation of railway level crossings

4.81 The Level Crossing Strategy Council has identified as a priority the need to develop a risk identification model based on risk/consequence analysis, that is agreed to by all stakeholders and that will provide an objective priority ranking for upgrades. This will help to eliminate any potential for an ad hoc and inconsistent approach and enable a state-wide perspective to be developed.

4.82 In evidence, representatives of the Level Crossing Strategy Council commented:

Mr DEEGAN: The Level Crossing Strategy Council is working also on identifying and developing a risk identification model so that we can work through which level crossings need attention and in what order. That is a focus that has been going on for some time, but we have sharpened that. With our colleagues from Queensland Rail we are working with a model they have developed over some time in that prioritisation effort. Clearly, there are competing demands for money and indeed within level crossings issues about how do you identify and recall accidents that occurred at those crossings. The Level Crossing Strategy Council not only has the Department of Transport, Rail Infrastructure Corporation and Roads and Traffic Authority but also will benefit from the Local Government Association and recently New South Wales Police, who have taken on a much bigger role in the council as they have a separate means of reporting incidents and accidents at level crossings. Pulling all of that data together is a much better view to inform our judgments.

Again, as the Committee is aware, the characteristics and condition of the characteristics of the road-rail users, crossings and surrounding environment are important matters in identifying those priorities and the influence that each crossing characteristic has on each accident mechanism. You will have seen trees and shrubs around level crossings, you have seen short roadways up to a level crossing, you see the sight lines from a train perspective and from a road user perspective, the effect of bells and whistles, the boom gates as they come down, a host of issues that we tried to deal with in this prioritisation effort. Clearly, the longer-term planning means that we can better prepare the infrastructure that is required, everything from the boom gates to signalling gear and electric

Administration matters relating to railway level crossings

controls that we need to implement. That then determines the type of crossing protection you may require. We are also working through the impact each of those control measures will have on reducing the risk of each accident mechanism. (Minutes of evidence of the STAYSAFE Committee, 30 October 2001, page 3)

- 4.83 Any risk model will only be effective if the data on which it relies is routinely and consistently collected and able to be analysed. Current data on level crossings in New South Wales is inconsistent, with different organisations recording different information and using different terminology, and with no readily accessible records appearing to exist for some level crossings. A major objective of the Level Crossing Strategy Council has been the development of a centralised, comprehensive database that accurately records relevant information on all level crossings in New South Wales.
- 4.84 The Level Crossing Strategy Council identified the need to ensure a comprehensive policy and standards framework for improving safety at level crossings in New South Wales. As part of this, a policy and procedures document that brings together and outlines Government objectives in respect of level crossings, the responsibilities of the relevant parties, the role of the Level Crossing Strategy Council, and key procedures and processes (e.g., closure of level crossings), was needed.
- 4.85 Once a risk identification model is in place, existing operational standards and guidelines may need to be reconsidered to ensure they are consistent and comprehensive. This will also provide an opportunity to compile all such documents into one comprehensive manual that sets out requirements in respect of level crossings, roles and responsibilities, etc and ensures a consistent approach. In the interim, the Rail Infrastructure Corporation has combined its operational standards into one manual.
- 4.86 A Level Crossing Assessment Model (LCAM) has been developed by New South Wales agencies. The model is developed from a model initially used by Queensland Transport but which now, with modifications, is being accepted as a national standard approach to risk identification and assessment. It identifies risk by:
- The way in which accidents occur at crossings (accident mechanisms);
 - The characteristics, and condition of these characteristics, of the road, rail, users, crossing and surrounding environment (crossing characteristics);
 - The influence that each crossing characteristic has on each accident mechanism;
 - The types of crossing protection, controls or treatment able to be implemented at a crossing (control measures); and
 - The impact that each control measure has on reducing the risk of each accident mechanism.
- 4.87 The Level Crossing Assessment Model also allows for the identification and development of relatively low cost options for improving safety, without necessarily going to the next level of protection. It is hoped that combining the best features of the Queensland model with those of the Rail Infrastructure Corporation model will result in a means of assessing risk that does not require copious amounts of data but that is nevertheless robust and reliable.

RECOMMENDATION 17:

The Rail Infrastructure Corporation, in consultation with other rail agencies interstate, continue to develop and maintain a risk assessment and prioritisation program for railway level crossings.

- 4.88 STAYSAFE is particularly concerned to ensure that the risk identification and prioritisation model is used to examine level crossings occurring on high speed railway corridors, on or interstate corridors.
- 4.89 It is currently internationally recognised that level crossings should not be used on high-speed rail corridors. This is primarily due to the potential consequence to the train following an incident but is also related to the higher energy imparted by the train to the road motor vehicle and the subsequent likely higher fatality potential.
- 4.90 An incident involving a dangerous goods or passenger train at such speeds could result in a high injury/fatality count or substantial recovery costs.
- 4.91 The recent introduction of the Queensland tilt train required additional protection at level crossings. Proposals for a high-speed train service in New South Wales were conditional on the no level crossings. The United States and other countries have adopted a similar stance and are also actively reducing the number of level crossings on high-speed lines as well as other practices.
- 4.92 The Level Crossing Strategy Council advised that documentation regarding the introduction of XPT passenger trains in New South Wales in the late 1980's and the practices considered at that time relating to high-speed operations affecting level crossings is being sought for review.
- 4.93 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with other rail agencies interstate, ensure that the development of a risk assessment and prioritisation program for railway level crossings is organised to readily identify issues associated with high speed passenger services, and high speed rail operations generally.

RECOMMENDATION 18:

The Rail Infrastructure Corporation, in consultation with other rail agencies interstate, ensure that the development of a risk assessment and prioritisation program for railway level crossings is organised to readily identify issues associated with high speed passenger services, and high speed rail operations generally.

Rail corridor management

- 4.94 During the inquiry, STAYSAFE noticed that the management of railway level crossings tended to take place on a site by site basis, rather than through an overall assessment or evaluation of a rail corridor (or segment of a rail corridor). This could be contrasted with the experience of STAYSAFE during visits of inspection, where Rail Infrastructure Corporation officials and train crews commonly discussed issues associated with a rail corridor or segment (e.g., the Wagga Wagga to Albury section of track on the Main

Administration matters relating to railway level crossings

South Line), or the route of scheduled passenger or freight services (e.g., the XPT service to Dubbo on the Central West Line, or the XPT service on the New South Wales North Coast Line).

4.95 STAYSAFE recommends that the Ministry of Transport, in consultation with in the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, rail operators, and other agencies, should develop and implement rail corridor management strategies for New South Wales railway lines. As noted in an earlier section, in the past the recurrent funding model used only allowed for the management of railway level crossings on a site by site basis. STAYSAFE understands that increased funding that has been earmarked for railway level crossing improvements through to 2006/07 will allow more comprehensive planning and the commencement of longer term strategic planning for corridor management.

RECOMMENDATION 19:

The Ministry of Transport, in consultation with in the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, rail operators, and other agencies develop and implement rail corridor management strategies for New South Wales railway lines.

4.96 A particular issue for STAYSAFE is the management of railway lines where trains have been permitted to travel at high speeds (up to 160 km/h for express passenger trains, and 115 km/h for express freight trains). The intersection, at right angles, of roads and railway tracks at level crossings provides the most difficult and the most risky of traffic management challenges within the New South Wales road network. Nowhere else within the road transport network do speeds of vehicles transiting intersections exceed 110 km/h (i.e., at road/road intersections).

4.97 STAYSAFE believes that closed corridor policy for high speed railways should be adopted and implemented as soon as possible.

RECOMMENDATION 20:

The Ministry of Transport, in consultation with in the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, rail operators, and other agencies adopt a closed corridor strategy for high speed railway lines in New South Wales.

4.98 STAYSAFE understands that such a strategy is the long term goal of the Level Crossing Strategy Council.

4.99 There are, in the interim, a number of initiatives that can be taken to manage high speed railway lines, including:

- lowering the speed of trains
- closure and relocation of railway level crossings
- review of policy regarding the establishment of new railway level crossings

4.100 In evidence before STAYSAFE, transport agency witnesses indicated that the lowering of train speeds across the New South Wales rail transport network is desirable:

Mr GRAHAM: When one looks at high-speed corridors in this State, one looks at the potential risks to three groups: first, the occupants of road motor vehicles; second, our employees, and clearly our drivers at the front of the trains are obviously very much there in terms of the consequence of level crossing accidents; and, third, passengers who are on the train itself. I think the results of the Baan Baa level crossing and the other level crossing accidents that have involved the XPT over the past three years must give us some cause for concern to review the current high-speed corridor strategy in this State. Last week I wrote to the regulator in New South Wales, proposing that pending a more thorough risk assessment of the network that we impose a maximum speed of 120 km/h on all our high-speed corridors. On those corridors we know that we have in the order of 250 passively protected level crossings.

Clearly the magnitude of dollars required to do something about 250 passively protected level crossings is something that needs detailed serious risk assessments. To allow that review to be undertaken, I have suggested that we might in the very short term move to a maximum speed of 120 km/h. Currently the maximum speed for XPTs is 160 km/h and a maximum speed for the Xplorer trains is approximately 140 km/h. There are three benefits in the short term that will flow from adopting that interim strategy. First, clearly the response time for motorists will be slightly increased. The period of time for the train to travel the last 100 metres on its approach to a level crossing will marginally increase, therefore increasing the response time of motorists who may be approaching or on the level crossing.

Second, there is a benefit for the train itself in reduced braking distances. If the level crossing is obstructed because a motor vehicle—car or truck—has stalled on the level crossing, clearly in those circumstances, by reducing the speed of the train, we can significantly reduce the braking distance required; albeit for an XPT at 160 km/h, we are bringing the braking distance down from 1.2 kilometres at 160 kilometres per hour to approaching half of that, at 120 km/h. So we certainly get a benefit there. Third, the energy that needs to be dissipated in the event that the collision causes a derailment of the train. There is certainly a low probability, but potentially a high consequence of a level crossing accident when a train at high speed derails and the consequence for, albeit, 100 or more passengers on that train. Pending that more detailed review the indication I have given to the regulator is that it would be sensible to move to a maximum speed of 120 km/h. It is a policy that is adopted in Queensland and is in the process of being adopted in a similar form in Victoria.

Hon GEORGE SOURIS MP (STAYSAFE): Do you mean at the crossings, or absolutely for the entire journey?

Mr GRAHAM: For the entire journey. The preponderance, unfortunately, of both public and private level crossings—for example, Werris Creek to Moree—is such that probably on that section of track there is of the order of 30 passively protected public level crossings. You could more than

Administration matters relating to railway level crossings

double that for the number of private access level crossings. To put up speed boards and restrict the train across those level crossings, a driver would no sooner recover from one level crossing than he is onto another. Indeed, the time taken to post the speed boards at all those level crossings, even if that were the appropriate thing to do, is such that I believe it is probably a better proposition to put in place a corridor speed restriction as we go about a more detailed risk assessment.

Hon GEORGE SOURIS MP (STAYSAFE): What did you mean by "to improve the response time for drivers"? Surely there is no response time required if the lights are flashing or the boom gate is down. No response time required: Stop! Perhaps it could even be thought that a slower train might just encourage people to try to outrun it.

Mr GRAHAM: I am talking very specifically about public level crossings where there are no lights or bells; that is, they are passively protected. (Minutes of evidence of the STAYSAFE Committee, Monday 17 May 2004, pages 28-29)

4.101 STAYSAFE agrees with this proposed course of action, and recommends that the maximum speed of trains within the New South Wales rail network should not exceed 120 km/h unless the rail corridor is a closed corridor.

RECOMMENDATION 21:

The maximum speed of trains within the New South Wales rail network should not exceed 120 km/h unless the rail corridor is a closed corridor.

4.102 STAYSAFE also notes the following discussion involving train drivers on the issue of train speeds, during the public hearing on 30 October 2001:

Mr STONER (STAYSAFE): It is valuable to have the experience of drivers in the front line, as it were. I am interested in your comments on the notion of slowing down trains as some sort of a safety measure. Is it your view that, from your experience, decreasing the train speed does nothing to reduce the frequency of incidents but may, in fact, encourage it?

Mr LEONARD: I agree with what you said except for the word "may". It definitely promotes it.

Mr WYLLIE: I fully agree with Mr Leonard. Once you begin to slow down the trains they now believe that they have a longer time to get across in front of you. You may slow down the train only about 20 km/h, but their perception is that it is down to about a walking pace so they have plenty of time to get across.

Mr McMAHON: In the level crossing accident in which I was involved I was doing 8 km/h. The car that hit the train was doing about 75 km/h or 80 km/h and it derailed the train.

Mr LEONARD: I add that, as an example, a level crossing in my territory had the speed limit lowered from 145 km/h to 100 km/h. It still takes my train more than a kilometre to stop from that speed. So there will be no difference in outcome. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 26)

4.103 STAYSAFE has noted that little work has been undertaken to review the need for many level crossings across the New South Wales rail network. STAYSAFE recommends the adoption of a general policy by rail and road agencies that the at-grade intersection of roads and railway tracks is to be avoided wherever possible.

RECOMMENDATION 22:

The general policy to be adopted by rail and road agencies is that the at-grade intersection of roads and railway tracks through provision of a railway level crossing is to be avoided wherever possible.

4.104 STAYSAFE understands that the Level Crossing Strategy Council has established a policy that no new railway level crossings will be created within the New South Wales rail network

4.105 It follows, therefore, in STAYSAFE's view, that there should be a program to identify and either close or relocate railway level crossings in New South Wales. STAYSAFE recommends that the Ministry of Transport, in consultation with the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other agencies, actively seek the closure or relocation of railway level crossings across the New South Wales rail network.

RECOMMENDATION 23:

The Ministry of Transport, in consultation with the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other agencies, actively seek the closure or relocation of railway level crossings across the New South Wales rail network.

4.106 An important aspect of the closure or relocation of railway level crossings is a review of the statutory powers of rail authorities to direct what is, in effect, the closure of a roadway. In the past, this has proved problematic, with communities and local councils, in particular, showing significant reluctance to accept that a railway level crossing should be closed and an alternative route used for road travel. Indeed, in evidence it was noted:

Mr GIBSON MP (CHAIRMAN): Why should we not look to closing those? Is there any reason to not physically close them?

Mr GRAHAM: A number of the level crossings are fairly significant regional local roads. The community issue associated with the permanent closure of all of them would be significant for many of the local communities. However, there is a very solid case for the closure of many level crossings. That proves to be a difficult, indeed intractable, proposition as we have gone about attempting to do that. I think we closed of the order of 14 public level crossings last financial year, and of the order of half a dozen so

Administration matters relating to railway level crossings

far this financial year. You can guarantee that almost every single one of them, once it is proposed, becomes a local issue for the community. While I understand that, obviously getting the balance right between public safety of those communities and public convenience is a difficult issue. (Minutes of evidence of the STAYSAFE Committee, Monday 17 May 2004, page 23)

4.107 STAYSAFE recommends that there should be amendment of legislation concerning procedures for the closure and relocation of railway level crossings to provide for clearer powers to be vested in the Director-General of the Ministry of Transport to order the closure of railway level crossings. An appeal mechanism, including grounds for an appeal, should be included within any legislative amendments required.

RECOMMENDATION 24:

The relevant legislation be amended to:

- (a) allow the Director-General of the Ministry of Transport to order the closure or relocation of intersections where a road and railway meet at substantially the same level;
- (b) specify the mechanism and grounds for appeal of a decision by the Director-General of the Ministry of Transport to close or relocate an intersection where a road and railway meet at substantially the same level;
- (c) provide for the Roads and Traffic Authority and the local council to be a party to any appeal of a decision by the Director-General of the Ministry of Transport to close or relocate an intersection where a road and railway meet at substantially the same level.

Investigation of level crossing incidents

4.108 STAYSAFE examined the procedures, systems, protocols involved or within the Ministry of Transport to investigate railway level crossing crashes.

4.109 At the commencement of the inquiry into the safety of railway level crossings, STAYSAFE was advised that incidents within the rail system were categorised to Level 1, 2 or 3. Level 2 or 3 incidents are investigated by the relevant rail entity. Level 1 incidents may be investigated by external parties. The Coroner investigates fatalities that occur within the rail system. Level crossing incidents are investigated by the rail entities, with reports provided to Transport agencies. The Level Crossing Strategy Council advised that the database had only one Level 1 railway level crossing incident recorded by mid-2001, primarily due to issues regarding how such investigation details are recorded and reviewed and the allocation of resources to provide and maintain such a system.

4.110 The Rail Safety Act 2002 reformed the management of rail safety investigations. The Hon. Carl Scully MP, then Minister for Transport, in his second reading speech of 31 October 2002, commented:.

These changes are in response both to Justice McInerney's recommendations and to reforms occurring at a national level. As I previously stated, the rail industry is becoming increasingly national. The Commonwealth Government is currently enacting legislation which will enable the Australian Transport Safety Bureau [ATSB] to

undertake investigations into any accidents on the interstate network. In New South Wales, this is the network from Sydney north to the Queensland border, south to the Victorian border and west to Broken Hill. ... New South Wales will work with the ATSB to manage the interface between our two investigative regimes.

This bill details a multi-tiered investigation system, which provides for independent investigation of all major rail accidents and interfaces with the new Commonwealth legislation. There will be an appropriate level of investigation for each level of seriousness of incident. The Government has the power to appoint a royal commission or judicial special commission of inquiry in the most serious of cases, as was the case in the Glenbrook tragedy. For most major incidents on interstate track, the Commonwealth ATSB will have the first right of refusal to conduct an investigation. If that body elects not to investigate, or if a major accident occurs outside the interstate network, an independent Rail Accident Investigation Panel will investigate the accident or incident. For less serious incidents, the Rail Safety Regulator will have the power to investigate. For the least serious incidents, an operator will conduct an internal review. To preserve the panel's independence, the Governor will appoint the chair for a three-year term. While not wanting to have a proliferation of rail agencies, a statutory independent panel chair is vital to ensuring continued community confidence in the rail system.

For each accident investigation the chair will be provided with the specialist expertise he or she requires. The ATSB may also be asked to join the panel. The chair will have a self-referral power to investigate all major rail accidents, which are defined in the bill using wording which captures the Australian Standard definition of a major incident. The Minister or director-general may also refer investigations to the panel. To preserve the integrity of the panel, all investigations will be funded directly by Treasury. The panel will be independent not only of the rail operators, but also the Rail Safety Regulator. This will enable the activities of the regulator also to be reviewed and for recommendations to be made. This provides an effective check on the regulator to ensure that all statutory responsibilities are being effectively undertaken.

Reports of the panel will be tabled in Parliament, and also published on both the parliamentary web site and the regulator's web site. Investigations undertaken by the ATSB will be published on its web site. Reports of investigations by the Rail Safety Regulator will be published on the regulator's web site. The existing provisions which protect witnesses from self-incrimination will be retained. The primary focus of rail investigations is to identify causes and to address management and system problems, not to apportion blame to frontline workers. However, in undertaking investigations both the panel and the regulator will have expanded powers to compel witnesses to attend, and to demand production of documents. They will also have powers of entry to railway property or places where rail safety documents are stored. There will also be penalties for false and misleading statements. Rail safety workers have a critical role in identifying safety problems. This bill enforces an employee's right to report safety problems directly to the regulator, and provides protection for employees against victimisation for reporting safety problems. (Minutes of the Proceedings of the Legislative Assembly of New South Wales, 31 October 2002, p.6380)

Administration matters relating to railway level crossings

4.111 STAYSAFE notes that under the new structural arrangements within the Transport portfolio it remains unsure and unclear as to the full gamut of the various interrelationships and mechanisms for the identification, investigation and reporting of incidents and crashes at railway level crossings. Nevertheless, it is well established that the Level Crossing Strategy Council provides the most obvious mechanism for the monitoring and review of investigations of railway level crossing crashes.

Contingency planning for level crossing crashes involving passenger trains or trains carrying hazardous materials

4.112 Given that railway level crossing crashes result in more than one train derailment per year in New South Wales alone, STAYSAFE was interested in contingency planning for railway level crossing crashes involving passenger trains or trains carrying hazardous materials.

4.113 Governments should be ready to deal more efficiently with the less obvious ramifications that may be associated with major crashes, or disasters, arising from railway level crossing crashes.

4.114 The National Railway Level Crossing Safety Strategy clearly identified that railway level crossing crashes have the potential to be catastrophic. Several possible railway level crossing crash scenarios representing major community disasters were judged to be foreseeable, some of which are:

- a crash involving a train carrying many passengers;
- a crash involving a goods train or truck carrying dangerous goods;
- a crash involving a bus;
- a derailment which closes a major freight or passenger line for many days.

4.115 Apart from immediate clean-up, relief and recovery operations, there may be direct financial effects such as the retrieval and replacement of damaged transport infrastructure (road vehicles, locomotives and rolling stock, signalling and track installations), uninsured losses (including loss of personal income) and medical and rehabilitation costs. The ripple effects of a disaster may produce such indirect costs as higher insurance premiums, social security costs linked to death and disability benefits, tax deferrals/losses for businesses, plus the cost of measures to prevent such an accident from repeating itself. These costs mount up.

4.116 Railway level crossing crashes result in incalculable pain and suffering for families and others associated with victims as well as any rail operator staff involved in the crash.

4.117 STAYSAFE was interested if agencies within portfolios such as Transport, Emergency Services, Environment, etc., had commissioned or conducted risk assessments for serious incident scenarios such as the derailling or crashing of a fast passenger train or a fast freight train on metropolitan, regional and rural railway lines? STAYSAFE was particularly interested if such scenarios, if they have been developed, included a crash at a railway level crossing.

- 4.118 The Level Crossing Strategy Council replied that the Transport Portfolio, in conjunction with Emergency Services do conduct scenario crashes to test response times to rail emergencies. The last railway level crossing crash scenario conducted involving the Department of Transport was in Newcastle in 1996. In 2001, the National Rail Corporation undertook a mock level crossing crash scenario at Murray Bridge, which involved a freight train hitting a school bus at a level crossing.
- 4.119 As part of a rail operator or rail owner's accreditation to operate within the New South Wales rail network, they are required to provide assessments of the key risks that exist in their business. In their accreditation submissions, they provide a list that ranks their identifiable risks: derailments and level crossing accidents are consistently identified in the top ten risks facing rail operators and rail owners.
- 4.120 While rail operators and rail owners are not required to provide scenarios in their accreditation applications, they are sometimes included. For example, in the application for the now defunct very fast train proposal between Sydney and Canberra, the proponents did include a risk assessment that resulted in them eliminating railway level crossings on the line (i.e., creating a closed corridor), with only overbridges or underpasses being acceptable when the railway line intersected with roads.
- 4.121 STAYSAFE also asked for advice regarding the probabilities estimated for the likely occurrence of railway level crossing crashes, the projected human costs, capital costs, and economic costs likely to be associated with such crashes.
- 4.122 The Level Crossing Strategy Council replied that there have been no studies undertaken in New South Wales regarding the probability of level crossing incidents nor the costs associated with such incidents.
- 4.123 With regard to contingency planning for railway level crossing crashes involving passenger trains or trains carrying hazardous materials, STAYSAFE make two recommendations.
- 4.124 First, STAYSAFE recommends that the Minister for Emergency Services, in consultation with the Level Crossing Strategy Council, should review the State Disaster Plan and other statewide emergency plans to ensure adequate and effective contingency planning for serious incident scenarios such as a crash at a railway level crossing involving a fast passenger train or a freight train carrying dangerous goods (hazardous materials) on metropolitan, regional and rural railway lines within New South Wales.

RECOMMENDATION 25:

The Minister for Emergency Services, in consultation with the Level Crossing Strategy Council, should review the State Disaster Plan and other statewide emergency plans to ensure adequate and effective contingency planning for serious incident scenarios such as a crash at a railway level crossing involving a fast passenger train or a freight train carrying dangerous goods (hazardous materials) on metropolitan, regional and rural railway lines within New South Wales.

Administration matters relating to railway level crossings

4.125 Second, STAYSAFE recommends that the Ministry of Transport commission or conduct research to estimate the probabilities for the likely occurrence of railway level crossing crashes. STAYSAFE also recommends that the Ministry of Transport commission or conduct research to estimate the human costs, capital costs, and economic costs likely to be associated with such crashes.

RECOMMENDATION 26:

The Ministry of Transport commission or conduct research to estimate:

- (c) the probabilities for the likely occurrence of railway level crossing crashes; and
- (d) the projected human costs, capital costs, and economic costs likely to be associated with such crashes.

Heritage and tourist railway operations

4.126 STAYSAFE notes that there are particular issues that arise regarding heritage and tourist railways.

4.127 Heritage and tourist railways are a particular and unique niche of general railway operations, and pose particular challenges for rail regulation, not the least because these railway operations are likely to use technologies that are obsolete or outmoded.

4.128 Heritage and tourist railways have been particularly challenged by the general public liability insurance crisis over the past 2-3 years. The response of various State and Territory governments has been to develop specific proposals with respect to heritage and tourist railway (e.g., the Pichi Richi railway in South Australia)

4.129 The provision of railway level crossing protection would seem to provide particular challenges to heritage and tourist railways, and it is unlikely that their current funding arrangements will cover the full cost of the provision of effective railway level crossing protection. As most heritage and tourist railways have interface agreements with rail track providers (such as the Australian Rail Track Corporation), there will need to be a resolution of this issue to allow safe continued operation by heritage railways. Funding sources include State and Territory tourism authorities as well as more traditional transport-related funding sources.

4.130 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, ensure that issues associated with railway level crossings on heritage and tourist railways are identified, considered, and addressed in general policies and programs to improve the safety of operation of railway level crossings.

4.131 The Rail Infrastructure Corporation, to an extent, already deals with this issue when heritage and tourist operators seek access to the general railway network.

RECOMMENDATION 27:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, ensure that issues associated with railway level crossings on heritage and tourist railways are identified, considered, and addressed in general policies and programs to improve the safety of operation of railway level crossings.

Other private railways in New South Wales

4.132 STAYSAFE also notes that the many of the issues confronting heritage and tourist railways also impact on other forms of private railways (i.e., rail operations that do not interface with rail track providers (such as the Rail Infrastructure Corporation or the Australian Rail Track Corporation) on the public rail network in New South Wales.

4.133 The principal difference, of course, is that private railways—apart from heritage and tourism railways—use modern technologies in rail infrastructure.

4.134 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, ensure that issues associated with railway level crossings on private railways are identified, considered, and addressed in general policies and programs to improve the safety of operation of railway level crossings.

4.135 STAYSAFE notes that this recommendation relating to private railways outside of the rail track providers on the public rail network in New South Wales also includes, for convenience, the broad gauge network extending from Victoria across the Murray River.

RECOMMENDATION 28:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, ensure that issues associated with railway level crossings on private railways are identified, considered, and addressed in general policies and programs to improve the safety of operation of railway level crossings.

CHAPTER FIVE - ROAD ENVIRONMENT MATTERS ASSOCIATED WITH RAILWAY LEVEL CROSSINGS

5.1 Land transport in New South Wales was first developed in the era of horse-drawn vehicles and steam locomotives. Today, roads in New South Wales reflect a diversity of types and function, ranging from unsealed country lanes and quiet residential streets in small towns and villages, through to major divided multi-lane highways carrying a significant proportion of Australia's transport. Until the major State and Commonwealth roads projects of the past two or three decades, roads were developed with no conception of the volume of road traffic that would eventuate in the modern Australian economy, while railways similarly were developed with no conception as to train sizes, axle weights, and the speeds that are demanded today. There is much legacy infrastructure where the road network and railways intersect—at railway level crossings—particularly at private access roads and local roads, but also with two-lane undivided highways. STAYSAFE noted that many of the railway level crossings examined in site inspections had very low volumes of both road and rail traffic, and featured either gravel approach roads or narrow one lane bitumen surfaces. Often, these roads at the railway level crossing featured insufficient friction to allow a motor vehicle to stop, did not provide sufficient queuing space for modern motor vehicles (e.g., trucks operating in B-double configuration) at either the railway level crossing or at road junctions adjacent to the railway level crossing, had road profiles at the crossing itself which could be problematic for large vehicles to traverse (e.g., steep approaches on either side of the crossing so that long vehicles could ground across the railway tracks), and featured a diversity of signage and road markings. These types of deficiencies are known to be factors involved in crashes at railway level crossings. For example, Wigglesworth (1990) reported four cases where driver fixation on the surface of the approach road or between the rail tracks at the crossing itself prevented the visual search for trains.

Standards for signs, signals and road markings at railway level crossings

- 5.2 STAYSAFE, in seeking to understand the basis for the design and installation of signs, signals and road markings for railway level crossings, noted that there are two sets of level crossing safety standards in use in New South Wales:
- the Traffic Engineering Manual Department of Transport Technology Division, dated March 1998; and
 - the Manual of Uniform Traffic Control Devices, Part 7—Railway Crossings (AS1742.7), dated 1993.
- 5.3 As well, some level crossings still feature infrastructure installed under even earlier, and now obsolete, standards.
- 5.4 STAYSAFE questioned representatives of the Level Crossing Strategy Council on this issue:

Road environment matters associated with railway level crossings

Mr STONER MP (STAYSAFE): ... it would appear that there are two sets of level crossing safety standards in use in New South Wales; the Traffic Engineering Manual Department of Transport Technology Division dated March 1998 and the Manual of Uniform Traffic Control Devices Part 7 Railway Crossings AS1742.7, 1993. Would it be fair to say that whilst most level crossings in New South Wales meet the latter standard, many do not meet the former standard?

Mr FORD: The latter standard AS1742 is the current Australian Standard and as such our crossings are aligned to that standard. We are currently reviewing that standard and there will be potentially a new standard issued in concert with Standards Australia and hopefully in the very near future and an upgraded standard may be available.

Mr STONER MP (STAYSAFE): So you are reviewing the Roads and Traffic Authority's standard or the Australian Standard?

Mr FORD: The Australian Standard. We actually participate on the Australian Standards committees.

Mr STONER MP (STAYSAFE): How does the Roads and Traffic Authority standards relate to the Australian Standard?

Mr FORD: The Roads and Traffic Authority standard effectively is absorbed within the Australian standard and we align our practice with the Australian Standards where they exist. Where they do not exist we would have an Roads and Traffic Authority standard to cover it.

Mr STONER (STAYSAFE): Would the bar be higher in relation to the Roads and Traffic Authority standard than the Australian Standard because it is a more recent document and is more comprehensive?

Mr LORD: They are complementary. The Australian Standard really sets out that the configuration you put in place for, say an active crossing - like lights and bells - where the Roads and Traffic Authority standard goes further than that and talks about non-active crossings, sight distances and requirements for stop signs or give way signs. If you decided to have a stop signs you go to the Australian Standard and see what it said about where you stick the post. The Australian Standard is very much a configuration standard, what a particular type of protection should look like. In fact, the Rail Infrastructure Corporation standard, which is based on the Roads and Traffic Authority one, talks about what type of protection you use in what circumstances; what sighting is applicable for a give way sign or a stop sign and if you cannot meet that, you look at active protection.

Mr STONER MP (STAYSAFE): It would then be fair to say that all level crossings in New South Wales meet the Australian Standard AS1742, would that be a reasonable assumption?

Mr LORD: Those that have been constructed since that standard came into being.

Mr STONER MP (STAYSAFE): Is there an indication of the proportion that do not meet that standard?

Mr LORD: I could not answer that at this stage.
(Minutes of evidence of the STAYSAFE Committee, 30 October 2001, pages 10-11)

- 5.5 Thus there are a number of railway level crossing safety standards in use in New South Wales, relating to time when each individual level crossing was installed. STAYSAFE asked the Level Crossing Strategy Council for an indication of the proportion of railway level crossings that meet or do not meet the various standards.
- 5.6 The Level Crossing Strategy Council replied that Australian Standard AS 1742.7-1993 "Manual of uniform traffic control devices Part 7: Railway crossings" deals with the placement of regulatory signs, warning signs and pavement markings associated with level crossings. The Roads and Traffic Authority's "Traffic Engineering Manual Section 6 Railway Level Crossings" (draft 1994) incorporates AS 1742.7 – 1993, as do the relevant Rail Infrastructure Corporation standards.
- 5.7 There are sites in New South Wales that do not display the correct signage, that is, the symbolic steam train warning sign (W7-7), but still display the old text warning sign. Technically these sites do not meet AS 1742.7-1993, with most road authorities appearing to consider that this is not critical to the appropriate driver response. However, anecdotal evidence indicates the courts, when determining liability or damages, view any non-compliance (and commensurate liability) poorly. The introduction of the 1993 version of AS 1742.7 required substantial changes to signage. Due to the cost implications most of the road and rail authorities decided to replace signs as the old signs became faded or damaged thus bringing the crossing into line with AS 1742.7-1993.
- 5.8 It is not known how many crossings are non-compliant to relevant sections of the Australian, Roads and traffic Authority and Rail Infrastructure Corporation standards. This would need to be determined by an extensive review of all the crossings by persons competent in applying all the relevant standards. The risk prioritisation model being developed by the Level Crossing Strategy Council currently should, in association with a review of level crossing conformance, provide data regarding level crossing elements, including signage.
- 5.9 STAYSAFE notes that there is a need to develop and implement the Australian Standard AS1742 – Part 7 for level crossings in New South Wales to ensure that there is a consistency of approach across the country. Freight and passenger trains move between and through the States and Territories, rather than being constrained by to intrastate movements by differing rail systems.
- 5.10 STAYSAFE asked the Level Crossing Strategy Council if any developmental work is underway in New South Wales regarding modification of the signage and markings

Road environment matters associated with railway level crossings

associated with railway level crossings, including signs for train crews as well as signs and markings for road users?

- 5.11 The Level Crossing Strategy Council replied that there are no current plans to modify road signs associated with level crossings, apart from the current agreed standardisation of active approach warning signage being installed, similar to other Roads and Traffic Authority signage.
- 5.12 The Level Crossing Strategy Council indicated that it would request Standards Australia to review AS 1742.7-1993, noting that Victoria was supporting this initiative. This may lead to future modification of some signage.
- 5.13 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other agencies, seek a review of Australian Standard AS1742 - Part 7, relating to railway level crossings. The review of the standard should include, but not be limited to, a range of technical issues associated with signals technology, signage, markings, etc..

RECOMMENDATION 29:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other Transport NSW agencies, seek and participate in the review of Australian Standard AS1742 - Part 7 relating to railway level crossings, including, but not limited to a range of technical issues associated with signals technology, signage, markings, etc.

- 5.14 STAYSAFE notes that in October 2001 the Level Crossing Strategy Council had, in fact, written to Standards Australia requesting a review of the Australian Standard AS1742 – Part 7.
- 5.15 In April 2004, the Level Crossing Strategy Council advised that the review was in progress currently, and that New South Wales agencies represented on the review included the Roads and Traffic Authority, the Rail Infrastructure Corporation, and the Independent Transport Safety and Reliability Regulator.

Technologies used for signs, signals and road markings at railway level crossings

- 5.16 During site inspections of railway level crossings, STAYSAFE noted that much of the installed technology and equipment at railway level crossings was older technology and had been manufactured overseas, notably in the United States.
- 5.17 STAYSAFE queried representatives of the Level Crossing Strategy Council on these matters:

MR McBRIDE MP (CHAIRMAN): Another issue raised with the Committee concerned the technology associated with the bells and lights system at rail crossings. For example, we saw the heavy cabling that extends for one kilometre or one and a half kilometres—whatever the distance is—on either side of the track. This costs hundreds of thousands of dollars to install—I

think it costs about \$200,000 just to erect some posts and do the cabling, triggers and so on. It was suggested to the Committee that other, cheaper technology is available that could serve the same purpose. For example, we looked at the assembly. The posts are made in forges and bolted together. They are imported from somewhere in America and they look like something out of the ark; it is perhaps 1930s technology. I am talking about the posts, boxes and the different appendages on the arm. We were surprised to hear that there is only one manufacturer and that they are not made in Australia. It seems ridiculous that steel posts are not made in Australia. Apparently there is electronic technology. Do you need a hard wire? Can you use electronic signals and the like?

Mr DEEGAN: As part of the process of pulling forward a long-term rolling program, the procurement strategy adopted is also being reviewed. What is the sensible approach? How do we ensure that we get value for money? What sorts of industry opportunities are there for Australian players in this? There is a host of Australian players providing some of the materials. There are different arrangements in different States. We have undertaken to review that as well, and I think it will produce some results. Electronic signalling is an issue across the rail system. There are many people with many solutions. From a rail perspective, the safety of those systems comes first. We are very cautious about launching into some of those alternatives. They are all under review as part of this process.

The Hon. JOHN TINGLE MLC (STAYSAFE): Page 16 of the submission refers to potential collisions, or near-misses. I notice that from a total of 2,067 potential collisions, 836 were caused, or deemed to have been caused, by equipment faults. What do you mean by that? Does any particular type of equipment fault dominate that 836 figure? Are we talking about boom gates, lights and train brakes that do not work? What do the 836 faults cover?

Mr GREENE MP (STAYSAFE): I would have thought that circle wiring defects, 37; power failure, 208; and track fails to detect train, 22, would be added to the 836 equipment faults.

Mr LORD: As I understand it, the equipment faults refer to level crossing equipment. So it is equipment at the site.

The Hon. JOHN TINGLE MLC (STAYSAFE): Boom gates, lights and so on.

Mr LORD: Yes. The signalling system we have is as failsafe as possible. In other words, when there is a failure of some sort—either circuitry failure or a problem due to vandalism—the lights flash. That is obviously safer than them not coming on at all. Continuous working of either the boom gates or the flashing lights is a common fault. We have in place a preventative maintenance regime in an attempt to stop that, but it does happen. The more installations of flashing lights we have, given the same technology, the more instances we will have of continuous working or other faults.

Road environment matters associated with railway level crossings

The Hon. JOHN TINGLE MLC (STAYSAFE): Are you saying that the failure of flashing lights is more common than boom gate failures? Does one type of fault predominate in that 836 figure?

Mr LORD: No. There are a number of components. Whether a flashing unit or the power system, there are a number of components which contribute to that equipment fault. I could not tell you what the predominant one is but it often is reported the continuous working of the lights and bells, and it is not until the electrician actually visits the site that he can isolate it to a battery or the flashing unit or some other component.

(Minutes of evidence of the STAYSAFE Committee, 30 October 2001, pages 13-14)

5.18 STAYSAFE believes that it is appropriate to seek to source and use Australian technology and best practice, to encourage the development and implementation of new technologies to improve the safety of railway level crossings, and to ensure that there are opportunities for the assessment of innovative approaches to addressing the problems associated with railway level crossings. STAYSAFE identified that there is a diversity of new technologies being developed that are applicable to the operation of railway level crossings, including such initiatives as:

- examination of railway level crossing illumination at both active and passive crossings;
- new signalling technologies based upon optical fibres, satellite and land-based transmission, acoustic transmission, etc.;
- detection technologies for train and vehicle (obstacle) presence at railway level crossings
- automated gate locking systems for private railway level crossings linked to train detection technologies;
- optimisation of the sound quality and effectiveness of train warning horn signals for drivers of modern motor vehicles;
- improvements to barrier deployment technologies;
- improvements to the visibility (retroreflectivity) of road markings and signage at railway level crossings;
- new surfacing technologies for the crossing points at railway level crossings;
- etc.

5.19 STAYSAFE noted, during a series of site inspections of railway level crossings in regional New South Wales, a number of instances where new technologies and innovative approaches had been implemented. For example, the approaches to the railway level crossing at Bells Road, Gerogery—the scene of the multiple fatality crash in early 2001—had been fitted with perceptual countermeasures for speed reduction on its approaches. These were audiotactile road markings (painted white stripes at right angles across the road with slight upraising, with decreasing distances between the stripes the closer to the crossing). The effect of these markings are to provide visual, tactile and audible cues from the road surface, which are perceived as increasing in speed if a driver does not slow down. (Interestingly, the audiotactile road markings were painted on both the approach lanes and departure lanes of the road on either side of the level crossing—drivers make a left turn to approach and

transit the crossing, and a right turn after transiting the crossing—as presumably some drivers move to the ‘wrong side of the road’ on approaching the crossing, perhaps to ‘iron out’ the corners. At other level crossings inspected by STAYSAFE, advance amber flashing lights provided an alert and warning to drivers that a hazardous location was ahead, and ‘jiggle bars’ or small speed humps, had been installed close to the crossing to remind drivers to slow and keep a look out for the approach of trains.

5.20 STAYSAFE asked if any railway level crossings were trial sites for the perceptual countermeasures projects run by the Roads and Traffic Authority in the late 1990’s. The Level Crossing Strategy Council advised that perceptual countermeasures installed on the approaches to the Bells Road, Gerogery, level crossing were not part of a trial. No assessment of their effectiveness has been undertaken.

5.21 STAYSAFE makes the following general recommendations:

RECOMMENDATION 30:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, seek to adopt Australian technologies and to adopt best practice principles for the management of railway level crossings.

RECOMMENDATION 31:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, and other agencies, encourage the development and implementation of new technologies to improve the safety of railway level crossings.

RECOMMENDATION 32:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other agencies, ensure that there are opportunities for the assessment of innovative approaches to addressing the problems associated with railway level crossings.

5.22 The Level Crossing Strategy Council has, in general, accepted the principles underpinning these general recommendations, provided that:

- Safety and reliability of operation of railway level crossings always remains the priority; and
- Costs associated with Australian technologies, and the development of innovative approaches and new technologies, are constrained in order to provide for the rolling program of upgrading level crossing to reduce risks at as many sites as possible.

5.23 STAYSAFE notes that the Level Crossing Strategy Council agrees, in particular, to the implementation of the latter two recommendations to encourage the development and implementation of new technologies to improve the safety of railway level crossings, and to ensure that there are opportunities for the assessment of innovative approaches to addressing the problems associated with railway level crossings. Development work is, of course, also under way, and new technology is being rolled out as part of the upgrading program for railway level crossings, including state-of-the-art predictor technology which reads the speed of the approaching train, so the time lag to activate

Road environment matters associated with railway level crossings

the crossing protection systems is the same regardless of the speed at which the train is travelling.

New technologies and innovative approaches for signs, signals and road markings at railway level crossings

5.24 STAYSAFE has provided some examples of how new technologies and innovative approaches might be explored.

Gateway treatments

5.25 For example, STAYSAFE has encouraged the installation of gateway treatments for roads approaching railway level crossings, recommending that the Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority and local councils, develop a program for the installation of gateway treatments and other perceptual countermeasures to provide better cues to motorists on roads approaching railway level crossings, including but not limited to road markings, signage, roadside infrastructure, the road pavement design and construction (e.g., road width, road surface treatment, rumble strips, etc.), and traffic signals (e.g, approach flashing lights).

RECOMMENDATION 33:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority and local councils, develop a program for the installation of gateway treatments and other perceptual countermeasures to provide better cues to motorists on roads approaching railway level crossings, including but not limited to road markings, signage, roadside infrastructure, the road pavement design and construction (e.g., road width, road surface treatment, rumble strips, etc.), and traffic signals (e.g, approach flashing lights).

5.26 The Level Crossing Strategy Council has responded very positively to this recommendation, stating that the:

Roads and Traffic Authority will lead this recommendation in collaboration with local government. Recent upgrades have adopted the use of gateway treatments. This practice will continue to be adopted for all future upgrades on a case by case basis. (Level Crossing Strategy Council, Submission RLC 033.7, page 5)

Integration of rail signals with traffic signals

5.27 STAYSAFE also sees much benefit deriving from the integration of rail signals with traffic signals on roads approaching railway level crossings.

5.28 STAYSAFE notes that this practice is already used where a road intersection is within close proximity to an actively controlled level crossing. The Level Crossing Strategy Council has advised that the integration of rail signals with traffic signals on roads approaching railway level crossings will continue to be implemented wherever possible when level crossings are upgraded,

- 5.29 STAYSAFE recommends, therefore, that the Roads and Traffic Authority and the Rail Infrastructure Corporation, with local councils (where appropriate), should continue to provide for the integration of rail signals with any traffic signals on roads approaching railway level crossings.

RECOMMENDATION 34:

The Roads and Traffic Authority and the Rail Infrastructure Corporation, with local councils (where appropriate), provide for the integration of rail signals with any traffic signals on roads approaching railway level crossings.

Trial of a new railway level crossing signal system based on existing road traffic signals

- 5.30 STAYSAFE notes the comments of a train driver:

Mr LEONARD: All of us can give insight both as train drivers and motorists because we all drive cars and often we drive them through the level crossings that give us the most trouble. One observation I have made is that motorists rarely disobey the ordinary plain red traffic light at a road intersection and that is enough to stop a motorist. Yet the visual defences at a rail crossing are lights, a barrier if it is provided and the headlight has to be switched on the train if it is travelling in country areas, audible warnings—the bell at the level crossing plus the whistle of the train—and then a physical boom gate barrier in the path of a car. There is human defence too where the train driver is keeping a lookout for anything untoward. Yet motorists defeat all those barriers and defences but do not challenge a single red light at a road intersection. That shows that motorists treat a level crossing as a give-way rather than stop and wait. That makes me believe strongly that the infrastructure at the level crossing where it is provided to its maximum configuration is not at fault, and there is a behavioural problem there. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 23)

- 5.31 STAYSAFE examined specific developments that have, or are, occurring with regard to the lights and the lighting configuration used at railway level crossings? For example, amber signals are used in some jurisdictions to indicate the impending closure of a railway level crossing to allow the passage of a train?
- 5.32 The Level Crossing Strategy Council noted that international practice appears to be very similar to New South Wales practice with the lights, bells, booms, signage and level crossing configurations detailed in Australian Standards being similar to the United States, the United Kingdom, and in other jurisdictions. The Level Crossing Strategy Council was not aware of jurisdictions which use amber signals to indicate impending closure.
- 5.33 International practices regarding lighting are currently more in line with improvements that ensure drivers receive the appropriate warning signal or an indication that the driver is approaching a crossing. These include the use of LED's to improve warning light visibility, light sensors to detect lights not working or vandalised and additional

Road environment matters associated with railway level crossings

- innovations to draw the activation to the vehicle driver's attention (eg. LED's in the centreline or road markings) or street lighting designed to enhance the location of the crossing.
- 5.34 While accepting that further research is required to identify potential improvements, STAYSAFE proposed that a trial of a new railway level crossing signal system based on existing road traffic signals is merited.
- 5.35 STAYSAFE examined why we do not have red-amber-green traffic lights at railway level crossings (e.g., amber indicating that a train is coming, red – or double red - to indicate that a train is present, green to indicate no train approaching, flashing amber to indicate signal fault or malfunction and “fail safe” operation, etc.).
- 5.36 STAYSAFE noted that at some sites it appears that normal road traffic lights are used at a railway level crossing, for example, a configuration at the railway level crossing in Orange that seemed to be similar to a normal road intersection.
- 5.37 The Level Crossing Strategy Council replied that, in fact, there are no heavy rail level crossings in New South Wales that are controlled by road type traffic signals using green, yellow and red lights. Some railway level crossings that have active control, either boom gates or lights and bells are linked to road traffic signals that are in close proximity to the level crossing and the order of operation is co-ordinated such that confusion or entrapment on the level crossing does not occur. An example of such a site is the level crossing on Parramatta Road at Clyde, which is located near the traffic signal controlled intersection of Parramatta Road and Marsh Street, west of James Ruse Drive. This is also similar in operation to a site in Orange, Summer Street and Peisley Street, which are controlled by traffic signals and located approximately 35m from a level crossing.
- 5.38 The light rail level crossing at Haymarket, intersection of George Street and Hay Street, is controlled by road intersection traffic signals. However this is not comparable to a heavy rail level crossing. The light rail vehicles are comparative, in size, to a bus or coach and have similar stopping capabilities. The light rail tracks are laid on normal road pavement and therefore present a similar environment to a normal road intersection. By comparison a heavy rail level crossing has heavy, large fast moving trains, which can not stop in a short distances, travelling on tracks which do not resemble a road intersection. The Level Crossing Strategy Council advised that most heavy rail level crossings are in isolated rural settings and road users would be unlikely to expect road intersection traffic signals.
- 5.39 The Level Crossing Strategy Council noted that to provide an additional amber (and green) activation sequence would require additional track circuits at the appropriate distance for the train speed from the existing crossing activation circuits. Green and amber sequences could not be provided using existing track circuits as this would substantially reduce the warning, recognition and response times for motor vehicle drivers. Such arrangements would substantially complicate track circuitry and increase already high installation costs. The Australian Standard AS 1742.7-1993 would also require substantial revision as it currently does not provide for such.

5.40 Issues relating to the feasibility and effectiveness of green-yellow-red traffic lights need to be researched prior to considering any economies of scale. Additionally existing track circuitry would have to be extended to provide adequate amber and red activation. Extension of track circuitry would most probably nullify any potential economic benefit. Current level crossing upgrades (passive to active) are already encountering increased cost due to requirements to replace existing non-insulated steel sleepers with insulated sleepers. The Rail Infrastructure Corporation installs insulated sleepers at passive crossings if and when the track crossing is upgraded to assist any future crossing improvements.

5.41 Overall, the Level Crossing Strategy Council was initially cautious, stating that:

Current active control equipment at level crossings is consistent with current, modern, world practice and standards. The use of road intersection traffic signals at level crossings requires extensive research, which should be pursued at a national level (Level Crossing Strategy Council, Submission RLC 033.7, pages 5-6)

5.42 However, in later hearings representatives of the Level Crossing Strategy Council were interested in further exploring the possibilities of a trial of a new railway level crossing signal system based on existing road traffic signals:

Mr GIBSON MP (CHAIRMAN): We always look for the more sophisticated solution to problems. Why can we not have traffic lights on train lines the same as we have on the roads: stop, amber, go?

Mr FORD: Currently the national standard—and we try for national uniformity—does not include a three signal aspect on railway level crossings.

Mr GIBSON MP (CHAIRMAN): But should it?

Mr FORD: To be quite frank with you, Mr Chairman, I am open to the idea, and I am quite happy to take that up with the national standards group.

Mr GIBSON MP (CHAIRMAN): I would have thought it would have been a cheaper way out too, when you talk about boom gates and all the rest of it.

Mr FORD: That does not necessarily mean though we would do away with the boom gates.

Mr GIBSON MP (CHAIRMAN): No, I am not saying that, I am just saying it works on the roads throughout every country in the world so why would it not work on the railway crossing?

Mr GRAHAM: I think there is one added feature of a railway level crossing and that is you do have a warning phase during which time, where there are boom gates installed, lights and bells are activated for a number of seconds prior to the boom gate falling. Of course, if one had green, amber, red it is

Road environment matters associated with railway level crossings

a question of when the amber would come in because the warning that is already there for those seconds is in fact—

Mr GIBSON MP (CHAIRMAN): That is true, but if I am holidaying or new to that area and I do not know that the bells and whistles are blowing and all the rest of it but I do know, because I have been driving for 25 years, that if you come to an intersection and you have got the green, the amber and the red that it is an indication to stop?

Mr GRAHAM: I think certainly where you have flashing lights and bells without boom gates there is an opportunity to look further but once one goes to boom gates you would actually go to a four-phase system rather than a three-phase. (Minutes of evidence of the STAYSAFE Committee, 17 May 2004, p.32)

- 5.43 STAYSAFE recommends that the Rail Infrastructure Corporation and the Roads and Traffic Authority develop and trial a new railway level crossing signal system based on the existing road traffic signals where a system of green-amber-red lights is displayed to road traffic approaching a railway level crossing so that drivers see:
- a green light when no train is present or approaching,
 - an amber light indicating the approach of a train, and
 - a red light (or double red lights) to indicate the imminent approach and transit of a train;
- 5.44 STAYSAFE further recommends that the trial should include the use of flashing green-amber-red lights, compared with a steady green-amber-red lights display.
- 5.45 STAYSAFE also recommends that any new system for the railway level crossing signals is based upon modern technologies (e.g., LED displays, detection of train speeds, microwave technology, GPS technology, etc.)

RECOMMENDATION 35:

The Rail Infrastructure Corporation and the Roads and Traffic Authority develop and trial a new railway level crossing signal system based on the existing road traffic signals where:

- (a) a system of green-amber-red lights is displayed to road traffic approaching a railway level crossing so that drivers see:
- (i) a green light when no train is present or approaching,
 - (ii) an amber light indicating the approach of a train, and
 - (iii) a red light (or double red lights) to indicate the imminent approach and transit of a train;
- (b) the use of flashing green-amber-red lights is compared with a steady green-amber-red lights display; and
- (c) the railway level crossing signal system uses modern technologies (e.g., LED displays, detection of train speeds, microwave technology, GPS technology, etc.)

Rumble strips

- 5.46 STAYSAFE noted a recommendation of the House of Representatives Standing Committee on Transport and Regional Services inquiry into some measures proposed

to improve train visibility and reduce level crossing accidents was based on the concept of rumble strips as a means of alerting drivers of the approach to a railway level crossing (House of Representatives Standing Committee on Transport and Regional Services, 2004). Rumble strips, as commonly used in road engineering, provide a very cost effective means to warn drives of potential hazard. An extension of this concept was identified by the House of Representatives Standing Committee on Transport and Regional Services as a developing technology: train-activated rumble strips that are operated by hydraulic pressure and triggered by a approaching train. If the technology can be successfully developed, it could provide a means to alert drivers approaching a railway level crossing that a train is nearing the crossing. Such train-activated rumble strips could be used at passive railway level crossings (i.e., in the absence of active protection such as lights, bells, and boom gates), and could have a particular application where train lines are used infrequently or seasonally.

- 5.47 STAYSAFE recommends that the Roads and Traffic Authority and the Rail Infrastructure Corporation assess the feasibility of installing train-activated rumble strips at passive railway level crossings.

RECOMMENDATION 36:

The Roads and Traffic Authority and the Rail Infrastructure Corporation assess the feasibility of installing train-activated rumble strips at passive railway level crossings.

Frangible roadside and railway infrastructure at railway level crossings

- 5.48 In general, road engineering seeks to provide an environment where if a vehicle is at risk of a crash there is a forgiving roadside provided that allows a driver of a vehicle to recover and continue the journey without incident (i.e., provide a recovery area), come to a stop off the road without striking anything (i.e., provide a clear zone), or have a crash with a deforming and frangible structures that minimise damage to the vehicle or its occupants (i.e., provide a protected environment).
- 5.49 The design of many railway level crossings examined by STAYSAFE was in contravention of these goals. STAYSAFE was concerned to note, at number of level crossings examined during site inspections, that the physical infrastructure at the level crossings all too often involved use of discarded railway materials such as sleepers, cut off sections of rail track, etc.. These materials had been used, at some unknown time, to construct barriers at the roadside as part of the physical separation and definition of the intersection between the road and the railway line.
- 5.50 STAYSAFE observed these materials in use at both passive and actively protected level crossings.
- 5.51 Anecdotal reports of level crossing crashes have indicated that these structures could play a part in the damage and trauma from collisions between road vehicles and trains.
- 5.52 This issue was acknowledged in evidence by the then Director-General of Transport:

Road environment matters associated with railway level crossings

Mr DEEGAN: ... Recently on the North Coast the Chief Executive of the Rail Infrastructure Corporation was on the train. He noticed a site where there had been accidents, where someone had been squeezed between the train and the barrier. The barrier was actually the safety problem with railway sleepers and steel that were moved on that site. (Minutes of evidence of the STAYSAFE Committee, Monday 30 October 2004, page 15)

- 5.53 It was suggested to STAYSAFE that the secondary impact with infrastructure associated with a railway level crossings (fencing, cut-off sleepers used as posts, etc.) can a significant factor affecting the severity of crash outcomes involving a motor vehicle and a train (for instance, secondary impact with non-frangible infrastructure in a collision with a train at relatively low speeds, or vehicles being trapped by non-frangible infrastructure in a collision with a train and spun off or dragged back into the train undercarriage). STAYSAFE examined what is known about the influence of secondary impacts with infrastructure associated with a railway level crossings (fencing, cut-off sleepers used as posts, etc.) as a factor affecting the severity of crash outcomes at level crossings.
- 5.54 In years gone by, “wing fences” at level crossings were constructed from timber railway sleepers or old rail posts and timber rails painted white for visibility. While few sleeper fences remain, however, the rail post fence is common and has been used since the 1950s at level crossings with flashing light protection.
- 5.55 The post and rail fence was constructed to a 1959 Railway Standard plan SG424 and has been identified as a potential cause of secondary consequences of a level crossing collision. The 1959 standard fence is no longer constructed, although many remain and are being replaced when major maintenance is required or level crossing upgrades are constructed. Some funding has been directed by the Level Crossing Strategy Council to assist in removing such fencing.
- 5.56 The Level Crossing Strategy Council confirmed that no formal study has been conducted of the risk associated with the placement of non-frangible structures at level crossings in New South Wales. Difficulty arises when providing infrastructure robust enough to protect the level crossing equipment, which would not contribute to the outcome of an incident. Recent level crossing improvements have reduced the number of crossings with heavy rail and post fences, following the fatality at Springhill where such equipment was indicated as contributing to the incident.
- 5.57 The Level Crossing Strategy Council has indicated that non-frangible structures are removed and replaced as level crossings are upgraded.
- 5.58 STAYSAFE recommends that the Rail Infrastructure Corporation ensure that the roadside and railway infrastructure that is installed at railway level crossings minimises the likelihood of serious injury in the event of collisions between a train and a vehicle or person through:
- the design and construction of frangible (breakaway) road side and rail infrastructure; and
 - the removal and replacement of non-frangible roadside and railway infrastructure at railway level crossings.

RECOMMENDATION 37:

The Rail Infrastructure Corporation ensure that the roadside and railway infrastructure that is installed at railway level crossings minimises the likelihood of serious injury in the event of collisions between a train and a vehicle or person through:

- (a) the design and construction of frangible (breakaway) road side and rail infrastructure; and
- (b) the removal and replacement of non-frangible roadside and railway infrastructure at railway level crossings.

Median barriers

- 5.59 STAYSAFE also noted that a potential problem with railway level crossings fitted with boom gates is that motorists may decide to drive around the half boom barrier and enter the crossing. In other jurisdictions, this problem has been addressed by the installation of median barriers to provide for separation of directional traffic on the approaches to railway level crossings.
- 5.60 Median infrastructure provides a tangible and visible barrier to prevent motor vehicles at half barrier railway level crossings from zig-zagging across the road and over the wrong side of the crossing. The median infrastructure can extend from reformable plastic barriers, to bollards and through to a fixed median structures with or without road barriers (Armo barriers, New Jersey barrier, etc.)
- 5.61 STAYSAFE recommends that the Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation and local councils, develop guidelines for the installation of median barriers at railway level crossings.

RECOMMENDATION 38:

The Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation and local councils, develop guidelines for the installation of median barriers at railway level crossings.

Sighting distances at railway level crossings

- 5.62 A critical element to the safe use of railway level crossings is the provision of effective sighting distances that enable a driver approaching and entering the crossing to view the railway line—in both directions—for the presence of a train.
- 5.63 These include train-related factors, such as the use of lighting systems (headlights, ditch lights, strobe lights) and the sounding of the train horn—these issues will be examined in detail in a later chapter
- 5.64 Rail authorities use the term ‘sight triangle’ to describe the relationship between the railway level crossing, a driver that is approaching a crossing, and a train that is approaching a crossing. The sight triangle describes the clear lines of sight between the roadway and the train tracks is important.

Road environment matters associated with railway level crossings

Advance warning signs

5.65 A critical element is, of course, that the sight triangle only comes into play after a driver has recognised that they are approaching a railway level crossing. There is a need for consistent, recognisable and understandable signage, signals and road markings on the approaches to railway level crossings—not just at the crossing itself. STAYSAFE itself commented:

The Hon. JOHN TINGLE (STAYSAFE): ...I have driven pretty well all over the State. On a subjective perception there seems to be a high proportion of level crossings which you come across unexpectedly. Those level crossings are on a bend where there is heavy undergrowth. There might be a warning sign some distance down the road, but it appears to me as though the train driver has more notice of the level crossing than does a car driver or a motorist. (Minutes of evidence of the STAYSAFE Committee, 30 October 2001, p.7)

5.66 During site inspections, STAYSAFE examined railway level crossings where amber flashing lights and advisory warning signage had been installed some distance from the actual level crossings, but there appeared to be no consistency in the provision of appropriate approach warnings. STAYSAFE recommends that the Roads and Traffic Authority, in consultation with local councils and the Railway Infrastructure Corporation, develop a consistent policy regarding the use of approach warning signage, signals and road markings prior to the immediate approaches and entry into a railway level crossing.

RECOMMENDATION 39:

The Roads and Traffic Authority, in consultation with local councils and the Railway Infrastructure Corporation, develop a consistent policy regarding the use of approach warning signage, signals and road markings prior to the immediate approaches and entry into a railway level crossing.

Alignment of roads and rail lines at railway level crossings

5.67 A related issue to signage, signals and road markings to assist in the provision of effective sighting distances for drivers is to ensure that the angles of intersection between the road and the railway line are such to allow the drivers approaching and entering the railway level crossing to view the railway line—in both directions—for the presence of a train.

5.68 STAYSAFE recommends that the Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation, ensure that the angles of intersection between the road and the railway line are such to allow the drivers approaching and entering the railway level crossing to view the railway line—in both directions—for the presence of a train.

RECOMMENDATION 40:

The Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation, ensure that the angles of intersection between the road and the railway line are such to allow the drivers approaching and entering the railway level crossing to view the railway line—in both directions—for the presence of a train.

Elimination of obstructive structures

- 5.69 STAYSAFE noted, during site inspections, that rail authorities have, on occasion, placed structures such as signal boxes with the rail reserve in locations where the view of a driver approaching or stopped at the entry to a railway level crossing has an impeded view of the railway line. This has the potential for a driver to miss seeing the approach of a train because of railway operational structures such as buildings and signal boxes.
- 5.70 STAYSAFE recommends that the Independent Transport Safety and Reliability Regulator, in consultation with the Rail Infrastructure Corporation, Australian Rail Track Corporation and the operators of private rail lines, ensure that structures such as signal boxes within the rail reserve do not impede the view of the railway line of a driver approaching or stopped at the entry to a railway level crossing.

RECOMMENDATION 41:

The Independent Transport Safety and Reliability Regulator, in consultation with the Rail Infrastructure Corporation, Australian Rail Track Corporation and the operators of private rail lines, ensure that structures such as signal boxes within the rail reserve do not impede the view of the railway line of a driver approaching or stopped at the entry to a railway level crossing.

Vegetation

- 5.71 Railway level crossings may also be obscured by vegetation, and the interaction between the roadway delineation and geographical features associated with the railway track delineation (hills, curves, embankments, and gullies). As well, the presence of the sun at low angles during the morning and afternoon, and during the course of the year, may be a prominent contributor to the inability of drivers to see the approach of trains or even the activation of active protective measures at a crossing.
- 5.72 The removal of obstructive vegetation within the sight triangles at railway level crossings is one of the most important elements to the maintenance of an effective sighting distance for motorists approaching and entering a crossing. During site inspections, STAYSAFE examined railway level crossings where vegetation along the roadside, on private property, and on railway property, obscured a driver's vision of the railway lines.
- 5.73 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with local councils, the Roads and Traffic Authority and the Environment Protection Authority ensure that there is a program to removal obstructive roadside and railway vegetation within the sight triangles associated with railway level crossings.

Road environment matters associated with railway level crossings

- 5.74 The Level Crossing Strategy Council noted that the Rail Infrastructure Corporation, already acts to keep sight distances clear of obstructive vegetation at railway level crossings.
- 5.75 The Level Crossing Strategy Council also indicate that it would request road and rail authorities to check for obstructions of sight lines by vegetation during the audits of railway level crossings on at least an annual basis.

RECOMMENDATION 42:

The Roads and Traffic Authority, in consultation with local councils and the Railway Infrastructure Corporation, consider developing a general advisory sign for use on major roads where railway level crossings occur, or on roads intersecting with high use railway lines.

General advisory signage regarding railway level crossings

- 5.76 It also might be appropriate for the placement of general advisory signage on major roads where railway level crossings occur, or on roads intersecting with high use railway lines. General advisory signage is used by the Roads and Traffic Authority in New South Wales to highlight, for example, the use of speed cameras as a traffic enforcement tool, or the need to slow down at road work sites. Local councils often use general advisory signage to promote safe driving practices, such as reminders to wear seat belts.
- 5.77 STAYSAFE recommends that the Roads and Traffic Authority, in consultation with local councils and the Railway Infrastructure Corporation, consider developing a general advisory sign for use on major roads where railway level crossings occur, or on roads intersecting with high use railway lines.

RECOMMENDATION 43:

The Rail Infrastructure Corporation, in consultation with local councils, the Roads and Traffic Authority and the Environment Protection Authority ensure that there is a program to removal obstructive roadside and railway vegetation within the sight triangles associated with railway level crossings.

Departmental and private crossings

- 5.78 STAYSAFE also examined issues associated with railway level crossings that are not on public roads, that is, departmental and private level crossings.
- 5.79 A train driver who testified before STAYSAFE observed:

Mr HOLLOWAY: On the main line in house, our own maintenance sidings level crossings are not positioned as well as they should be. Private level crossings to which the STAYSAFE Committee has been referred are a problem. They are infrequently used but they are more dangerous because we do not expect to find vehicles on them and they do not expect to find trains. Between Menangle and Picton there are any number of private level

crossings and most of them are on tight curves. Some have 105 km/h speeds around a fairly tight curve and there are level crossings right on the curve. Vehicles, trains or the farmer or person using them going to their house, have no vision of a train approaching. That area could be improved. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, pages 22-3)

- 5.80 STAYSAFE recommended that the Rail Infrastructure Corporation, in consultation with rail operators, should review the safety of departmental level crossings associated with vehicular and pedestrian access onto or across railway tracks.
- 5.81 The Level Crossing Strategy Council indicated that risk assessment of departmental level crossings and private level crossings will be carried out as part of the on-going risk assessment process for all railway level crossings in New South Wales.
- 5.82 The Level Crossing Strategy Council also indicated that issues associated with departmental level crossings, in particular, may also be addressed through occupational health and safety obligations to provide a safe working environment.

RECOMMENDATION 44:

The Rail Infrastructure Corporation, in consultation with rail operators, review the safety of departmental crossings associated with vehicular and pedestrian access onto or across railway tracks.

Land use planning and development issues and railway level crossings

- 5.83 A final matter considered by STAYSAFE relates to land use planning and development issues and railway level crossings. As noted earlier, every local Council has a Traffic Committee that deals with all traffic control matters relating to local roads, including railway level crossings.
- 5.84 STAYSAFE recommends that the Rail Infrastructure Corporation and the Roads and Traffic Authority, ensure that local councils, when considering land use planning and development issues, take account of issues associated with railway level crossings, and that such considerations are documented by local council traffic committees.

RECOMMENDATION 45:

The Rail Infrastructure Corporation and the Roads and Traffic Authority, ensure that local councils, when considering land use planning and development issues, take account of issues associated with railway level crossings, and that such considerations are documented by local council traffic committees.

CHAPTER SIX - MATTERS RELATING TO TRAIN CREWS

- 6.1 STAYSAFE identified and reviewed a number of issues associated with trains and railway level crossings, including factors associated with train crews and factors associated with the trains (locomotives and carriages).
- 6.2 STAYSAFE did not conduct a comprehensive review of the human factors associated with the safe operation of trains, noting that an assessment of these, and other issues associated with the safe operation of the rail industry, have been, or are currently, the subject of judicial inquiry (e.g., the inquiries into the Glenbrook rail crash involving a collision between two trains, McInerney, 2002; and the Waterfall rail crash involving the derailment of a train, McInerney, 2004).
- 6.3 STAYSAFE notes that the coronial investigations into level crossing crashes and reports of incidents at railway level crossings that were examined as part of this inquiry did not make findings of mistaken observations of signage and signals by train crew, or impairment of train crew, as elements to the occurrence of the crashes or incidents.
- 6.4 The Labor Council of New South Wales provided an extensive submission to STAYSAFE. The submission provides a snapshot of safety issues and system failures that contribute to injuries and fatalities on New South Wales railway level crossings (see also Hussey, 1991).
- 6.5 Two major issues identified by train drivers were:
- the ability of train drivers to detail the regularity at which "near misses" occur each week on New South Wales rail level crossings; and
 - the level of train driver frustration in relation to having safety concerns addressed.
- 6.6 The Labor Council of New South Wales argued that a further significant systemic problem was that no agency is wholly responsible for level crossing safety. Therefore, there appeared to be no coordinated strategy other than transferring the onus for safety onto train drivers in lieu of developing and funding informed safety strategies.
- 6.7 In preparing the submission, the Labor Council of New South Wales interviewed key rail personnel including Rail, Tram and Bus Union members who are train drivers based at the Flemington Maintenance Centre, Junee XPT Country Link and Freightcorp Enfield, and the Occupational, Health and Safety Co-ordinator from the Rail, Tram and Bus Union's Locomotive Division (NSW).
- 6.8 The major level crossing safety concern was the constant disregard by motorists and truck drivers of the laws and safety warnings governing level crossings.

"...people ignore stop signs, they just go straight through...any [train] driver can tell you of the near misses any day of the week."

Matters relating to train crews

"...a car saw the stop signs but drove through...every day of the week we are having near misses. And what I mean by a near miss is there are lights going and the car has gone through."

Safety concerns at railway level crossings in metropolitan areas

6.9 Safety at metropolitan railway level crossing was considered to be poor. For example, the speed of trains passing through the level crossing at Fairfield was reduced to 20 km/h for freight trains and 40 km/h for suburban trains in both directions, because if the trains came through any faster they would beat the boom gates down.

6.10 A second problem was long trucks "fouling the line", that is, sitting across or moving slowly across train lines, as they waited to turn out of a local street 24 hours a day. To address this issue two people were assigned to monitor the crossing and stop vehicles from doing right hand turns out of the local street.

6.11 There are two level crossings on the Carlingford line, Liverpool and Parramatta. Parramatta was considered well managed despite having the boom gates intermittently knocked out. The freight crossing at Sandown, which has petroleum products and containers move across it, was also identified as a safety concern.

6.12 There was substantial concern in relation to the Carlingford line. The key areas of concern included the two unprotected pedestrian crossings going up the hill at Rosehill where pedestrians regularly walked in front of oncoming trains. One train driver noted there have been a substantial number of near misses in this location with both racehorses and people wandering onto the track as they went to and returned from the races. As one participant stated:

"When I walk on the track, I get my arse kicked if I haven't got an orange vest on. They're allowing people with no rail knowledge whatsoever to be walking across the track in front of trains."

The area heading up the hill to Carlingford where there are two level crossings was considered a safety concern. At Telopea and Dundas, pedestrians continue to walk straight across the tracks despite lights flashing because they know the train will stop at the station, however this might not always be the case.

6.13 The Richmond line was considered one of the worst lines in the metropolitan area. The level crossings at Vineyard, Riverstone meatworks and Riverstone were all identified as problem crossings. A number of level crossings along this line tended to be regarded "bush crossings" with little or no rail traffic passing through. The level crossing near the Sandown is a crossing of concern despite there being people with lights and lollie pop signs patrolling the area:

"The blokes who work out there with their vests on and their lollipops that say stop, and at night shine the red torch, are actually taking their lives in their hands. They don't stand in the middle lane anymore they stand in the gutter as they've nearly been run down. The people who work around there, especially at

Sandown think 'that's a slow old freight train, I'll beat it'. And all the trucks around the area, including those coming from Shell think the same thing. They're not real fast either but they'll try it, kangarooing across the level crossing and getting in front of you while you're blowing your train whistle."

Safety concerns with railway level crossings in regional and rural areas

- 6.14 The train drivers identified Albury as one of the worse areas for railway level crossings in New South Wales. One train driver stated:

"Once a week I'll have a near miss at Albury without a worry. Going in and out of Albury all the time. It won't be one or two, it might be maybe three straight out in front of you."

- 6.15 The train drivers stated that at Bells Road, Gerogery railway level crossing, where five young people died, there are continually near misses as a result of people not heeding the warning signs and the law:

"[The crossing] looks like a big Z. The railway line goes straight down... and... the road goes up. [At the first bend]...that's 20kmph in a truck, no more. So cars are coming along, its all flat, no worries, headlights, and all that sort of thing with the trains. But we are still nearly hitting cars there everyday. They turn around, 'Look at that, they say, he's a way away' because he can see the headlights in the distance. He starts going over, even the road freighters are crossing in front of us every day there."

The point the train drivers stressed was that the Bells Road, Gerogery railway level crossings is not what they would consider a dangerous level crossing. There are easy sight lines from the road in both directions and the road is not only safe but lends itself to slowing motorists down upon approaching the level crossing.

- 6.16 The train drivers stated that the railway line to Werris Creek caused concern, especially through Muswellbrook where there are two railway level crossings that were considered to be problem areas:

"...one's on the New England Highway and a little one further down in town which is the worst one. At New England they tend to slow down a bit but the city side of Scone crossing they don't stop at all."

Reporting of incidents

- 6.17 Participants identified what they perceived as a lack of willingness to address railway level crossing safety. For example, in relation to the safety issues associated with the Rosehill crossing one participant stated:

"I have continually pursued it [crossing safety] but they don't want to do anything about it. They don't want to have any protection."

Matters relating to train crews

This individual had pursued this issue with the Rail Access Corporation (now Rail Infrastructure Corporation) and with his Crew Area Manager (CAM) on a number of occasions. He also raised the issue at consultative forums where the response was that it was "being looked into".

6.18 The Labor Council of New South Wales reported that train crews were extremely frustrated about safety and railway level crossings. One commented that the accident at Bells Road, Gerogery only brought safety to a head because it became a media issue. Many train drivers have spent years attempting to get safety issues addressed with little or no success.

6.19 In another example, one train driver stated he had been trying since 1994 to address safety issues in the Enfield area. He informed the Roads and Traffic Authority that the area was "an accident waiting to happen", but there was no response. He even went as far as getting the safety regulations for that area in order to prove it did not meet safety regulations.

6.20 There were concerns that issues would only be addressed after a fatality. Participants stated that there is an Occupational Health and Safety system known as the "Green Forms" which are used to highlight safety concerns. In this case, the "Green Form" is completed by a train driver in relation to a safety issue at a level crossing and is then submitted to the OH&S Committee. The OH&S Committee is required to respond in writing as to whether any action is to be taken.

6.21 However, the system in relation to level crossings was seen to have "died a natural death" because people were reporting safety issues but they felt no action was being taken. As a result, although the system is still available the frustration of seeing no responses to level crossing safety issues once they have been raised, has meant train drivers no longer see this as a legitimate or effective process of addressing level crossing safety.

6.22 Subsequently, the majority of train drivers do not fill out "Green Forms" in relation to level crossing issues anymore.

"Unless you make boom gates out of concrete, reinforced steel or spikes that come out of the road, people are going to continue to risk it."

6.23 There was a consensus for the need to develop a coordinated approach to increasing level crossing safety. Ownership of the problem continues to be the main issue. That is, who is responsible for which parts of the level crossings and the safety requirements attached to those parts. The tracks are rail responsibility, the Roads and Traffic Authority is responsible for the signs and local government is also involved. This complicates the issue as in the case of Fairfield Council where one participant stated:

"They [Fairfield Council] knew that our outcome was to close the crossing and to them it's a cost factor, so they use it as a lever to get money off the RTA which was \$600,000 or something."

- 6.24 To close the crossing would mean diverting the traffic through the central business district, which would cause various problems both socially, economically, and politically for a wide variety of local interests. Yet there is no money to build an overpass, so the problem remains.
- 6.25 The issue is often two fold. Firstly, who is actually responsible for what part of the crossing, and secondly, does the responsible party have the money to undertake the appropriate maintenance required. For example, the train drivers felt the Roads and Traffic Authority was reluctant to become involved in maintaining roads that were not classified as class one or class two roads and were the responsibility of local government authorities.
- 6.26 There is a need for more research on the causes and the ways of preventing accidents at level crossings. There is a need to identify the conditions that contribute to, or increase the likelihood of accidents occurring at level crossings.
- 6.27 The outcomes and responses to previous accidents need to be documented along with an examination of whether the safety response was effective in reducing or eliminating further accidents. For example, a sign was erected at the level crossing at Warwick Farm only after the crossing had been closed.
- 6.28 Those interviewed stated there was a dire need for a public education campaign as people generally had no regard for the laws governing the use of railway crossings. Such a campaign should be similar to that used for speed cameras or red light cameras. A specific education campaign targeting motorists and truck drivers, as well as property owners with private crossings on their land was also necessary.
- 6.29 There is a considerable misapprehension by motorists that train drivers are easily able to stop the train in order to avoid hitting a car or truck. It is the experience of participants that motorists do not realise that trains need a substantial distance before they are able to come to a complete standstill. This perception needs to be addressed within any education campaign.
- 6.30 There was a substantial concern in relation to the belief by the general public that it was the train driver's responsibility to stop and give way to motorists and that in some way whistle boards and caution boards indicated that onus was only on train drivers to stop. This perception needs to be addressed through an education campaign.
- 6.31 The train drivers stated that boom gates were effective as people:
- "...tend to worry about scratching the paintwork on their vehicles. The ones without boom gates, they don't give a rats about. You get the ones that hesitate. They pull up, 'Have I got time? Yeah, I've got time.' By this time you're coming right down on top of them."

But boom gates installed at level crossings must be double boom gates as motorists will drive around single boom gates in order to beat the trains.

Matters relating to train crews

6.32 STAYSAFE examined the systems in place to obtain information from train crews, maintenance and signalling staff, etc., as to their concerns about railway level crossings, for example, the recording of near misses, vandalism, occurrence of trespass, and other incidents. STAYSAFE was interested in issues such as:

- the immediate and longer term feedback given to train crews, maintenance and signalling staff if a report is made about a railway level crossing;
- are these report systems audited or evaluated as to their effectiveness;
- what is being contemplated to enhance the effectiveness of the reporting systems; and
- what are the specific accreditation requirements under the Rail Safety Act regarding communication with rail staff on safety issues

6.33 A number of systems exist for the reporting and rectification of such issues. Incidents including near misses, vandalism, equipment failures, trespass and other incidents are reported and recorded by the "Telegram" system on the Rail Infrastructure Corporation network. These incidents are recorded at the field entry (station, signal box, driver/controller) and centrally recorded in Rail Infrastructure Corporation's SAD database. The Transport Safety Bureau in the Ministry of Transport maintains a copy of this data as well as other incidents that occur on non-Rail Infrastructure Corporation systems. Additionally the Rail Infrastructure Corporation "Trackwatch" system requires drivers to provide relevant information regarding rail system operational defects, failures etc to the signaller / controller who initiates the appropriate action, including warnings to other drivers, corrective action etc. Rail operators utilise IMS (Incident Management Systems) that record information relating to incidents/investigations. Rail Infrastructure Corporation and rail operators also have 1800 hotlines to report safety issues.

6.34 Problems have and do occur with these reporting systems (or similar system) in that staff do not report incidents (for numerous reasons), the lack of or poor quality of information provided, the lower knowledge base of staff receiving & entering information etc. Additionally feedback to the person reporting may not occur due to that person not being easily contactable following the initial report. The "Telegram" & "Trackwatch" systems are a formal requirement of the Rail Infrastructure Corporation's Safeworking Units 705 and 723 and indicate processes for reporting and recording.

6.35 Train drivers and their union were critical of these mechanisms for reporting incidents:

Mr HAYDEN: I need to say something about Track Watch. Track Watch is something that was introduced by the State Rail Authority. Track Watch is hardly filled out any more. Our members are actually punished for filling it out. In order to fill out a Track Watch form you might have to stop your train, which means holding up or slowing down peak hour services. Our members have actually been charged and attempts have been made to discipline them because they have done their job. So you will find that, at times, very few drivers actually report incidents in regard to defective level crossings. They will not put it on paper, but they might call up on the radio, if it is working, and say, "The light is not working, the boom gate is not working and cars have gone in front."

They will not put it on paper. More often than not it comes back on them. As I have said, in the past drivers have been charged. So it is a "No hassle, hear no evil and see no evil", and they do not report it. An education program should be put in place in the work force. Employers, whether it is through the Department of Transport or whatever, must be told that they must report incidents. Employees must be given indemnity if they report incidents. They must not be punished or fined for reporting incidents. That must somehow or other be inserted into the Rail Safety Act to protect our members. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 25)

Mr MOREY: ... In relation to systemic problems, drivers felt there had been inadequate response to safety concerns within the system. Drivers felt that the onus to take care or to address safety issues had been placed onto them solely and not onto motorists. An example of that is where drivers are continually told to slow down when they are coming to crossings or to reduce speed rather than to address the safety issues around the crossing and the way motorists see level crossings. There has also been a systemic failure in relation to the systems that have been put in place to report areas of concern. Certainly through the occupational, health and safety system ... there was the use of what is known as green forms, which drivers would fill in identifying areas where they thought there were safety concerns. What happened was that initially drivers started filling in those forms but over a period of time there was little or no action around these safety issues. So, drivers decided, well, not decided, but seeing the frustration of not having anything done they saw that system as a failure and there was no point in participating in it because they could see no results for the actions. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 21)

- 6.36 There is no formal requirement in the "Telegram" or "Trackwatch" system for feedback. The lack of reporting back has been identified as an issue; a review of the "Trackwatch" system is being investigated. The Rail Infrastructure Corporation are currently in the process of rewriting the Safeworking Units. In addition to the reporting systems, there are also a number of managerial and maintenance systems that have input from incident data and routine inspections. Rail entities are audited both internally and by the Independent Transport Safety and Reliability Regulator.
- 6.37 The Rail Safety Act does not contain specific accreditation requirements regarding communication with rail staff on safety issues. Safety systems, procedures etc submitted by the railway for their accreditation may specify such processes; the Rail Infrastructure Corporation Safeworking Units are one example of such procedures.
- 6.38 STAYSAFE recommends that the Independent Transport Safety and Reliability Regulator, in consultation with the Rail Infrastructure Corporation, Australasian Railways Association and the Ministry of Transport, ensure the development and implementation of an independent and confidential reporting system to assist in the identification of problems associated with the operation of the New South Wales rail network, and railway level crossings specifically.

RECOMMENDATION 46:

The Independent Transport Safety and Reliability Regulator, in consultation with the Rail Infrastructure Corporation, Australasian Railways Association and the Ministry of Transport, ensure the development and implementation of an independent and confidential reporting system to assist in the identification of problems associated with the operation of the New South Wales rail network, and railway level crossings specifically.

Impact of incidents and crashes on train crews

6.39 STAYSAFE Committee asked the Level Crossing Strategy Council about the impact that incidents and crashes—level crossings, suicides, trespassers, intentional throwing of debris, rocks, etc.—have on train drivers:

- Is there some sort of measure of the problem
- When there are incidents or crashes, what sort of impact do they have on drivers

6.40 The Level Crossing Strategy Council replied that research conducted by the various rail operators on the impact of level crossing incidents and collisions on train crew is not known.

6.41 STAYSAFE also examined the role of occupational health and safety committees regarding the impact of level crossing incidents and collisions on train crew:

The Hon. IAN WEST MLC (STAYSAFE): I understand that there is an occupation health and safety committee that looks at health and safety matters and drivers fill out forms about their concerns. Can you give any indication as to issues that have arisen from those forms by the occupational health and safety committee?

Mr DEEGAN: I will need to take part of your question on notice. We have a number of rail operators in New South Wales, not just State Rail, FreightCorp and Countrylink, which is part of State Rail, but also a number of private operators and there will be an increasing number with the sale of FreightCorp. I will go through the question and find some detail. Each corporation or authority has their own occupational health and safety requirements under the appropriate legislation but I will go back and check through that and come back to the Committee. (Minutes of evidence of the STAYSAFE Committee E, 30 October 2001, page 10)

6.42 The Level Crossing Strategy Council later replied that it was more appropriate that rail operators National Rail Corporation and FreightCorp be approached directly for specific information relating their respective occupational health and safety practices.

6.43 Train drivers who testified before STAYSAFE spoke of the consequences for train crews:

Mr HAYDEN: ... Some things must be put forward. After an incident has occurred on most occasions the car driver or tractor driver is severely or

fatally injured. For the [train] driver, that injury goes on forever. It is always in the driver's head. Whilst most of them come back to work after a period, it is always in their heads. They all talk about it in their meal rooms. They all get frustrated because, no matter what they do, it will always come down to what they have done wrong. That is what normally happens. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 24)

Mr MOREY: ... I think it needs to be noted—the impact on train drivers. We hear a lot about fatalities and the loss of life of motorists, but one of the issues that comes through very strongly and is not often addressed is the psychological impact these accidents have on train drivers; their ability to continue to drive in many cases is halted because of an accident and simply because of the stress of knowing they have actually killed someone. There was a level of frustration amongst drivers we talked to about friends and colleagues who had been in that situation and had never been able to return to work. . (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 20)

6.44 Mr David Edwards, representing the National Rail Corporation noted:

Mr EDWARDS: In terms of the importance of safety to our company it is our first priority and certainly we have a commitment to our employees, to our customers and to the community in general to do everything we possibly can to not only be safe but to reduce the risk of any type of rail incident occurring on the network. Level crossing incidents are one fairly high risk that we face as an operating company and in terms of our drivers and the well-being of our drivers we have a responsibility to try and assist them in everything we can do to make their work place as safe as possible...

Certainly from our perspective the company has developed a lot of programs in terms of fatigue management, in terms of drug and alcohol testing and awareness, ensuring that our people have proper and healthy lifestyles in terms of being fit and proper to perform their important duties. The risk of a level crossing incident occurring, in addition to any other such as Superintendent Sorrenson mentioned about suicide and trespass and so forth, the effect of stress and trauma on our drivers can be quite horrific at times given it is very difficult to do anything to prevent hitting a road motor vehicle who puts himself onto the train line.

Overall, level crossing incidents take a great toll on our company, our employees and of course there is a dollar cost which is quite extreme that can go to the normal incident in terms of some damage to a locomotive, the time lost of productivity, the delays to the train and subsequent train services, also the potential for lost time and injury as a result of the driver suffering stress and trauma, right through to the potential high risk of a derailment which can cost several millions of dollars in lost productivity and damage, in addition to the risk of killing or causing serious injury to a member of the community or one of our staff members as a result of the motorist not complying with the

Matters relating to train crews

road rules and keeping a sharp look out. I have several examples of incidents that have occurred both around Australia and in New South Wales, where level crossing incidents can cause a very high cost to the community and to us as an operating company. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, pages 18-19)

- 6.45 STAYSAFE accepts that there are significant industry-level issues associated with rail staff attending level crossing crashes. STAYSAFE believes that there may be benefits from a co-ordinated approach to dealing with these issues, rather than to leave each organization or agency to support its own staff.
- 6.46 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with the WorkCover Authority, New South Wales Health, rail unions, rail operators, New South Wales Police, and other relevant agencies and organisations, review the support provided for train crews and other personnel involved in attending level crossing crashes to:
- identify best practice principles.
 - develop and implement improved programs to support train crews and other personnel involved in attending level crossing crashes

RECOMMENDATION 47:

The Rail Infrastructure Corporation, in consultation with the WorkCover Authority, New South Wales Health, rail unions, rail operators, other Transport NSW agencies, New South Wales Police, and other relevant agencies and organisations, review the support provided for train crews and other personnel involved in attending level crossing crashes to:

- (a) identify best practice principles; and
- (b) develop and implement improved programs to support train crews and other personnel involved in attending level crossing crashes.

CHAPTER SEVEN - MATTERS RELATING TO LOCOMOTIVES AND ROLLING STOCK

- 7.1 STAYSAFE considered a number of issues relating to locomotives and rolling stock, including train speeds, the conspicuity of trains, and issues associated with the crashworthiness of trains in impacts with motor vehicles or pedestrians at railway level crossings.

Slowing train speeds

- 7.2 The New South Wales Labor Council submission stated that train drivers were adamant that there was a lack of a comprehensive strategy to deal with railway level crossing safety. In lieu of a comprehensive safety strategy, the train drivers believed they were simply directed to drive slower through areas of concern. For example, rather than addressing a visibility problem at a railway level crossing train drivers were directed to drive slower:

"Instead of doing something about the crossings... they slow the trains down because of poor visibility. You'll have a crossing in one direction at one speed and another in the other direction...because from that end there are trees. Instead of trimming the trees or making the visibility better, they just slow the trains down. Instead of educating the public that this is a rail crossing and trains come along here, they slow us down to, well for want of a better term to make up for the stupidity of the public."

- 7.3 There was a very strong sense that the slowing down of trains was an inappropriate response to safety that is now excessively used across New South Wales:

"There was a problem with one siding [the sight of one track] but they reduced both tracks back to 100 kph. And that's only a farmer's crossing. So they've gone that far overboard really it's just ridiculous and people...don't always take notice of it."

- 7.4 The slowing of trains at private crossings in rural and regional areas was seen as an inadequate response to safety. Such a strategy was seen to be placing the responsibility for safety solely onto the train drivers:

"...they've lowered the speed so if we hit some idiot and we happen not to be doing that speed, well they are going to blame us. They are going to say you hit that idiot because you were doing 8 kilometres over the recommended speed when you know that they've only dropped that [the speed] because people keep pulling out [in front of our trains]. That's the way train drivers look at it. It's not achieving anything by dropping that speed...They are dropping that speed so they're looking for some way to blame us, not the individual that's pulled out in front of us."

Matters relating to locomotives and rolling stock

The strategy absolves the general public and landowners from having to take any responsibility for their actions in relation to adhering to the laws governing level crossings:

"I think he [the general public] needs to be better educated. He needs to be told, look mate the railway's been here for a hundred and something years, you've got your crossing there. When you're going in and out the law state, the RTA regulations or the traffic law states that you must stop at that crossing, look both ways, make sure the track is clear before you proceed."

- 7.5 Rail operators voiced similar concerns about railway level crossings and train speeds. STAYSAFE noted the comments of Mr Robert Jeremy, General manager (Commercial) for Pacific National, at the AusRAIL 2002 conference, just a week after the fatal railway level crossing crash at Salisbury in South Australia in October 2002, which involved a passenger train and a bus:

"Our drivers—and by the way, it was one of our locomotives pulling that train—have to suffer the trauma of level crossing accidents that are no fault of theirs.

There is no recognised risk-based system for the protection of human lives at level crossings. Most level crossings are not actively protected, by which I mean they don't have bells, they don't have lights. No authority is accountable. The road authorities point to the rail authorities and vice versa. No one wants to own a level crossing.

Committees have been formed. Consultations are taking place. Overseas fact-finding missions are being dispatched. The buck stops nowhere; nothing is done. In some cases the public is offered the regulatory placebo of slower trains at level crossings. But we all know that it doesn't make much difference whether a train hits a person at 50 kilometres an hour or 80 kilometres an hour.

This smokescreen has already been deployed at Salisbury. If Salisbury has been a busy road intersection it would have been protected by well set back traffic lights and the cops would have been there day in day out booking people to stop them queuing across it. For some reason a rail and road intersection does not deserve the same attention. Worse still, more often than not people killed at level crossings do not count in the official road toll. They are not even statistics.

Governments are quick to say that they are transfixed by the need for safety on the roads and on rail yet timely and effective solutions elude them when road and rail intersect. Our hearts go out to those affected by the Salisbury incident but they shouldn't be fooled by the knee-jerk reaction of a speed restriction. Train speed was not the issue. That has not solved the problem at all." (pp.12-13)

The subsequent report of the investigation of the Salisbury fatal railway level crossing crash did not find train speed to be a causal factor (Australian Transport Safety Bureau, 2003).

- 7.6 The concern to train drivers is not the speed at which they travel but the fact that people ignore the laws, signs and flashing lights at crossings and continue to drive straight through level crossing in order to beat the trains:

"There's a crossing at Mascot and I was coming down the hill from Botany. That crossing is set up so we have to stop at a red signal and then the lights flash and the boom gates would come down. We don't get the signal to proceed until it's all down. The lights are flashing and off we go from a standing start. A State Transit bus crashed straight through the barrier. I couldn't believe it. I thought, it's a bus! Because it's a wooden barrier it just splinters. People are not paying any attention."

- 7.7 Slowing the trains down was seen as "protecting the public from themselves", but it was seen as ineffective because it provided motorists with an extra couple of seconds to think about whether they were going to try to beat the train across the crossing:

"They're slowing the trains down and saying you're blowing on the whistle and you slow down mate. All that means is that they [motorist] get longer to see you coming and a longer time to say, 'Well he's a fair way away, and I'm going.' And a lot of them are more likely to jump because they know he [the train] is slowing down."

- 7.8 Another train driver agreed stating that slowing trains down had the adverse affect of making people wait longer for the trains to pass. He felt that people do not like to have to wait and this would increase some people's desire to try to beat the trains across crossings:

"They're slowing the trains down - I'm going back to Fairfield...But can you imagine one train on the down and one train on the up...The bells ding and I come down and reduce speed to 40 I dribble through the crossing, and I've gone and cleared the crossing. The other train has departed Fairfield. The bells go ding and he comes down to 40 and he dribbles across. It might take 10 minutes. So the next time that person is caught he says, "I'm going to make a dash for it so I don't have to sit here for 10 minutes".

- 7.9 STAYSAFE notes that at the public hearing on 17 May 2004, it was announced that:

Mr GRAHAM: When one looks at high-speed corridors in this State, one looks at the potential risks to three groups: first, the occupants of road motor vehicles; second, our employees, and clearly our drivers at the front of the trains are obviously very much there in terms of the consequence of level crossing accidents; and, third, passengers who are on the train itself. I think the results of the Baan Baa level crossing and the other level crossing accidents that have involved the XPT over the past three years must give us some cause for concern to review the current high-speed corridor strategy

in this State. Last week I wrote to the regulator in New South Wales, proposing that pending a more thorough risk assessment of the network that we impose a maximum speed of 120 km/h on all our high-speed corridors. On those corridors we know that we have in the order of 250 passively protected level crossings.

Clearly the magnitude of dollars required to do something about 250 passively protected level crossings is something that needs detailed serious risk assessments. To allow that review to be undertaken, I have suggested that we might in the very short term move to a maximum speed of 120 km/h. Currently the maximum speed for XPTs is 160 km/h and a maximum speed for the Xplorer trains is approximately 140 km/h. There are three benefits in the short term that will flow from adopting that interim strategy. First, clearly the response time for motorists will be slightly increased. The period of time for the train to travel the last 100 metres on its approach to a level crossing will marginally increase, therefore increasing the response time of motorists who may be approaching or on the level crossing.

Second, there is a benefit for the train itself in reduced braking distances. If the level crossing is obstructed because a motor vehicle—car or truck—has stalled on the level crossing, clearly in those circumstances, by reducing the speed of the train, we can significantly reduce the braking distance required; albeit for an XPT at 160 km/h, we are bringing the braking distance down from 1.2 kilometres at 160 km/h to approaching half of that, at 120 km/h. So we certainly get a benefit there. Third, the energy that needs to be dissipated in the event that the collision causes a derailment of the train. There is certainly a low probability, but potentially a high consequence of a level crossing accident when a train at high speed derails and the consequence for, albeit, 100 or more passengers on that train. Pending that more detailed review the indication I have given to the regulator is that it would be sensible to move to a maximum speed of 120 km/h. It is a policy that is adopted in Queensland and is in the process of being adopted in a similar form in Victoria.

Hon. GEORGE SOURIS (STAYSAFE): Do you mean at the crossings, or absolutely for the entire journey?

Mr GRAHAM: For the entire journey. The preponderance, unfortunately, of both public and private level crossings—for example, Werris Creek to Moree—is such that probably on that section of track there is of the order of 30 passively protected public level crossings. You could more than double that for the number of private access level crossings. To put up speed boards and restrict the train across those level crossings, a driver would no sooner recover from one level crossing than he is onto another. Indeed, the time taken to post the speed boards at all those level crossings, even if that were the appropriate thing to do, is such that I believe it is probably a better proposition to put in place a corridor speed restriction as we go about a more detailed risk assessment. (Minutes of evidence of the STAYSAFE Committee, 17 May 2004, p.27)

7.10 And later:

Hon. GEORGE SOURIS (STAYS SAFE): Mr Graham, just on that prioritisation issue, and I ask this question with the background of today's announcement—at least it is the first time I have heard it—that there would be a 120 km/h blanket speed limit across the network, and also with the background that if we are to consider any possible high-speed corridor it would be the Sydney-Melbourne corridor, the priority of that route and the high-speed corridor, if there is such a thing, what does that do to the priorities, now that you have imposed the 120 km/h? Attaching to that question is, how long will this limit therefore be in place? Is this forever, or is this until enough upgrading is done to reinstate the corridor once again as a high-speed corridor?

Mr GRAHAM: The imposition of that maximum 120 km/h has not yet been put in place. As I say, I have written to the regulator last week and I would expect to have some input from the regulator by the end of this week. I will also undertake some discussions with our train crew who operate the CountryLink service to ensure that I get their coal-face input prior to finalising a decision on the matter. In terms of the likely impact, it will vary. The train from Sydney to Brisbane, for example, there will be minimal impact; it will be lucky to be five or 10 minutes, simply because on the North Coast rail you cannot get to that speed.

On the trip to Melbourne, once one leaves Junee through to Albury of course that is a fairly high-speed corridor and I would expect that we could see an increase in journey times of the order of 25 or 30 minutes for XPTs on the Sydney to Melbourne corridor. Therein is the balance of this issue. We know that we will inconvenience some travellers by slowing it down to 120 km/h, but what we are trying to do is weigh up here what is a low probability event, that is, a level crossing accident, and potentially leading to a high energy derailment against the increased travel time for passengers on that corridor. (Minutes of evidence of the STAYS SAFE Committee, 17 May 2004)

- 7.11 STAYS SAFE supports the imposition of a lower maximum speed for trains within the New South Wales rail network. The lowering of maximum train speeds to 120 km/h affects passenger train services only, as the maximum speed for freight trains on the New South Wales network is 115 km/h.
- 7.12 STAYS SAFE expects that the imposition of a lower maximum speed for trains within the New South Wales rail network would be well received by the community, particularly in rural areas where higher train speeds have been allowed in open rail corridors. STAYS SAFE notes that the imposition of a lower maximum speed for trains within the New South Wales rail network has been a recommendation made by several coroners who have investigated fatal railway level crossings crashes involving the XPT trains.

Matters relating to locomotives and rolling stock

7.13 STAYSAFE therefore recommends that the maximum speed for trains within the New South Wales rail network should be 120 km/h unless there is a closed corridor for train operations.

RECOMMENDATION 48:

The maximum speed for trains within the New South Wales rail network should be 120 km/h unless there is a closed corridor for train operations.

Train conspicuity

7.14 STAYSAFE also examined the question of train conspicuity, or capacity for a train (locomotives and rolling stock) to be visible and recognisable to a driver or pedestrian seeking to travel across a railway level crossing. As noted earlier, this issue has been the subject of specific inquiry and investigation (see, e.g., Cairney, Cornwall & Mabbott, 2002; Cairney, Gunatillake. & Wigglesworth, 2002; House of Representatives Standing Committee on Transport and Regional Services, 2004).

7.15 STAYSAFE proposed that there was a need to identify and review the efficacy of measures to improve the conspicuity of trains, with specific attention to issues associated with trains travelling across railway level crossings, including but not limited to:

- locomotive ditch lights,
- locomotive strobe lights,
- general locomotive lighting,
- the use of locomotive highlights
- the use of retroreflective marking on locomotives, goods wagons and passenger carriages.

7.16 The Level Crossing Strategy Council has since advised that the National Standing Committee on Transport is currently addressing the issue of train conspicuity as a national issue, under the leadership of Western Australia.

7.17 The Level Crossing Strategy Council also advised that in New South Wales, the Rail Infrastructure Corporation has adopted a rolling stock standard that required the retrofitting of retroreflective markings on all goods wagons and passenger carriages operating on the New South Wales standard gauge network by mid-2004.

7.18 STAYSAFE questioned Mr Graham, of the Rail Infrastructure Corporation, on train conspicuity:

Mr DARYL MAGUIRE MP (STAYSAFE): I refer to signalling, etc.. There was a suggestion ... that new technologies be looked at to light the trains, for example, strobe lights. Would you give us an update on your view in relation to that recommendation?

Mr GRAHAM: I think that strobe lighting on some of our country trains has already been implemented—on Xplorers, etc.. I think the broader issue of the conspicuity of trains, particularly long freight trains going across

passively protected level crossings at night, is a more difficult issue. (Minutes of evidence of the STAYSAFE Committee, Monday 17 May 2004, page 36)

- 7.19 The House of Representatives Standing Committee on Transport and Regional Services recently reported on train illumination, recommending that all locomotives and rolling stock in the Australian rail industry are fitted with retroreflective material, and that all locomotives are fitted with rotating beacon lights (House of Representatives Standing Committee on Transport and Regional Services, 2004).
- 7.20 STAYSAFE recommends that the Ministry of Transport, in consultation with rail operators, rail unions, the WorkCover Authority, and other relevant agencies and organisations, identify and review the efficacy of measures to improve the conspicuity of trains, with specific attention to issues associated with trains travelling across railway level crossings, including but not limited to:
- locomotive ditch lights,
 - locomotive strobe lights,
 - general locomotive lighting,
 - the use of locomotive highlights
 - the use of retroreflective marking on locomotives, goods wagons and passenger carriages.

RECOMMENDATION 49:

The Ministry of Transport, in consultation with rail operators, rail unions, the WorkCover Authority, and other relevant agencies and organisations, identify and review the efficacy of measures to improve the conspicuity of trains, with specific attention to issues associated with trains travelling across level crossings, including but not limited to:

- locomotive ditch lights,
- locomotive strobe lights,
- general locomotive lighting,
- the use of locomotive highlights
- the use of retroreflective marking on locomotives, goods wagons and passenger carriages.

- 7.21 STAYSAFE notes that the effectiveness of retroreflective markings on rolling stock can be diminished over time through deterioration of the materials and through the accumulation of dirt, dust and grime:

Hon. GEORGE SOURIS (STAYSAFE): My question follows a remark made earlier by Mr Maguire about long dark trains on country routes, in particular, in the Hunter Valley. There has been quite an improvement with the painting of reflectors along those trains. Some of these trains can have as many as 84 units. I suggest that those trains need to be cleaned a lot more frequently. The coal dust and grime that gets on them makes them a little ineffective at times.

Mr GRAHAM: We will pass on those comments to those now privately owned freight operators. (Minutes of evidence of the STAYSAFE Committee, 17 May 2004, p.34)

Improvements in locomotive passive safety

- 7.22 One matter considered by STAYSAFE was the potential for improvements to passive safety, that is, protecting occupants in an impact, associated with railway locomotives and rolling stock.
- 7.23 In the past, for example, some steam locomotive designs included a 'cow catcher' or structure placed at the front of a locomotive. The cow catcher was designed to protect the boiler assembly from frontal damage in an impact with objects or animals on the tracks by displacing the objects or animals to the side of the locomotive. Wigglesworth (2002) reviewed the use of the potential for the use of energy absorbing structures on the fronts of locomotives:

"The suggestion to fit airbags or other energy-attenuating devices to trains has substantial merit since the number of locomotives is an order-of-magnitude lower than the number of crossings. Hence implementation of any locomotive-based proposal would be easier, cheaper and faster than any proposal for additional devices installed at crossings. Moreover, 85% of crashes in Australia are ones where the locomotive hits the car (Wigglesworth, 1979) and locomotives on average strike two vehicles during their service life (Wakeland, 1978).

This proposal was first suggested by Cox in 1970 and has been repeatedly suggested since then. In example, Anderson (1975) reported four locomotive-automobile crash and concluded that some form of "shock absorber" device seemed feasible and desirable. Hence a computer modelling of the outcome would seem to be a desirable project." (p.13)

- 7.24 STAYSAFE noted that while recent railway level crossing fatalities have typically involved trains travelling at high speeds, many crashes at railway level crossings occur at much lower train speeds (even, as one train driver testified, at a train speed of 8 km/h) and crashes have occurred with trains that a stationary across a railway level crossing.
- 7.25 STAYSAFE considered whether more crashworthy structures might be developed to provide increased protection to the occupants of motor vehicles or to pedestrians, as well as the more general issue of passive protection to train crews and passengers:

Hon. IAN WEST (STAYSAFE): Do any of the train sets in New South Wales—the XPT and the Xplorer—have deformable sections that absorb or manage to absorb crash energy? What sort of financial involvement is there in relation to that area?

Mr GRAHAM: The whole issue of improving the crashworthiness of trains by installing crushable zones that take the energy of a collision or derailment is probably something that is relatively new, that is, in the last 10 years in particular. The XPTs, of course, are now more than 20 or 25 years old and the Xplorers and Endeavours are now 10 to 12 years old. We have seen, however, the performance of this rolling stock where it has derailed. Baan

Baa is the most recent level crossing accident. The passenger areas of the rolling stock have performed exceptionally well in relation to their crashworthiness. (Minutes of evidence of the STAYSAFE Committee, 17 May 2004, p.34)

- 7.26 STAYSAFE recommends that the Rail Infrastructure Corporation investigate and review crashes involving trains and motor vehicles, and trains and pedestrians, to identify the characteristics of the point of impact between the train and motor vehicle or pedestrian (e.g., front of locomotive or power car, side of locomotive or power car, side of rolling stock) and the potential for the use of energy absorbing structures at common points of impact.

RECOMMENDATION 50:

The Rail Infrastructure Corporation investigate and review crashes involving trains and motor vehicles, and trains and pedestrians, to identify:

- the characteristics of the point of impact between the train and motor vehicle or pedestrian;
- the potential for the use of energy absorbing structures at common points of impact locations between trains and motor vehicles or pedestrians.

Risk assessment for level crossing crashes involving passenger trains or trains carrying hazardous materials

- 7.27 Ideally, this work should be included in a general research program to assess the crashworthiness of locomotives and rolling stock (particularly passenger carriages), the use of energy absorbing structures, safe train crew and passenger compartments interior design, train occupant crash kinematics, and injury prediction and analysis. STAYSAFE is particularly aware that in the high speed level crossing crashes involving the XPT train derailment of the train is a common occurrence, but the power cars and passenger carriages have not, to date, tipped over. In the Baan Baa railway level crossing crash referred to by Mr Graham above, the train did roll over after the impact causing injuries to the train occupants.
- 7.28 STAYSAFE recommends that the Ministry of Transport, in collaboration with the Emergency Services, Police, Health, Environment, and Roads portfolios, should commission or conduct risk assessments for serious incident scenarios such as a crash at a railway level crossing involving a fast passenger train or a freight train carrying dangerous goods (hazardous materials) on metropolitan, regional and rural railway lines within New South Wales.

RECOMMENDATION 51:

The Ministry of Transport, in collaboration with the Emergency Services, Police, Health, Environment, and Roads portfolios, should commission or conduct risk assessments for serious incident scenarios such as a crash at a railway level crossing involving a fast passenger train or a freight train carrying dangerous goods (hazardous materials) on metropolitan, regional and rural railway lines within New South Wales.

CHAPTER EIGHT - MATTERS ASSOCIATED WITH MOTOR VEHICLES AT RAILWAY LEVEL CROSSINGS

- 8.1 Although it was a head of inquiry, few submissions addressed motor vehicle factors that may be involved in the safe approach, entering and transit through railway level crossings. This is not unusual, as even major reviews of railway level crossing safety do not address motor vehicle factors to any extent (see, e.g., Cairney, 1991)
- 8.2 An important issue being debated currently by the road safety community relates to driver distraction. Driver distraction is typically considered to arise from an increased attentional demand associated with the concurrent use of communications devices, such as mobile telephones, and in-vehicle driving aids such as satellite navigation systems that are increasingly available in motor vehicles. Of course, driver distraction can also arise from interaction with passengers, the use of now standard vehicle features such as radios and other entertainment systems, smoking, or the presence of insects and arachnids.
- 8.3 Distraction—a driver being distracted from the driving task—may arise from not only additional demands being placed on a driver but also the minimisation of features of the driving task and experience. In STAYSAFE's view, driver distraction can arise from:
- engineered insulation from the road system (windows closed because of airconditioning systems, soundproofing); and
 - design features of motor vehicles (obscuring of a driver's lines of sight by headrest, seatbacks, the A- and B-pillars of the vehicle's cabin structure.
- 8.4 Distraction— a driver being distracted from the driving task—may also arise from a driver's need to identify and comprehend a complex road environment within a short period of time, as might occur on approaching and entering a railway level crossing (Wigglesworth, 2002). Railway level crossings can be quite complex and demanding environments, with changes in road surfaces, road delineation, a multiplicity of signage and road markings, the presence of other vehicles and road users, and, of course, the possible presence or impending presence of a train that may be moving at a speed faster than that encountered anywhere else in the road transport system .
- 8.5 STAYSAFE recommends that the Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation and other relevant agencies and organisations, identify and review the possible mechanisms and contribution of driver distraction as a contributor to level crossing crashes, including but not limited to placement and complexity of road side signage and signals, in-vehicle devices and instrumentation, and the vehicle environments (soundproofing, air conditioning, etc.).
- 8.6 The Level Crossing Strategy Council has indicated that the Roads and Traffic Authority recognises this issue, and has agreed to work with other agencies to identify and review the possible mechanisms and contribution of driver distraction as a contributor to level crossing crashes. It is thought that this may best be done as a national

Matters associated with motor vehicles at railway level crossings

project, rather than just a New South Wales review, and that the need for research and testing in both laboratory or real settings may extend the study.

- 8.7 The Level Crossing Strategy Council has also indicated that the process of an audit of railway level crossings on at least an annual basis will include some assessment of the likelihood of driver distraction on the approach to ,and at, the crossing.

RECOMMENDATION 52:

The Roads and Traffic Authority, in consultation with the Rail Infrastructure Corporation and other relevant agencies and organisations, identify and review the possible mechanisms and contribution of driver distraction as a contributor to level crossing crashes, including but not limited to placement and complexity of road side signage and signals, in-vehicle devices and instrumentation, and the vehicle environments (soundproofing, air conditioning, etc.)

- 8.8 STAYSAFE also noted that developments in computer technologies are making in-vehicle navigation systems more common in motor vehicles. One development that has the potential to assist in improving the safety of railway level crossings is Road Angel, a navigation technology developed by Sentinel Geo Systems. This navigation technology incorporates global positioning system (GPS) codes to identify that a motor vehicle is being driven towards a railway level crossing, and visual and audible (spoken) alerts or prompts are issued to the driver.

- 8.9 STAYSAFE recommends that the Roads and Traffic Authority support the development of a capability within in-vehicle navigation systems to alert drivers to the presence of a potentially hazardous situation such as a railway level crossing.

RECOMMENDATION 53:

The Roads and Traffic Authority support the development of a capability within in-vehicle navigation systems to alert drivers to the presence of a potentially hazardous situation such as a railway level crossing.

- 8.10 STAYSAFE notes the comments of the House of Representatives Standing Committee on Transport and Regional Services regarding the potential of intelligent transport systems to improve the safety of railway level crossings:

“Intelligent Transport Systems (ITS) provide possible solutions to increase train conspicuity. ITS are already being used as effective safety tools in the transport industry ... Further developments of ITS specifically for the rail industry could help to achieve a reduction in road-rail fatalities. Such systems could alert a train or road vehicle entering a level crossing to the presence or approach of the other.

Currently there are several systems available for use in level crossing situations. One in particular ... is used by the sugar industry in Queensland. It is called the EV-Alert. A radio transmitting device is fitted to all locomotives, and constantly sends out a coded signal. This signal is received by an in-car (or in-tractor) device and decoded to activate a flashing light in the cabin, with a sound to warn vehicle drivers that a train is approaching or that it is in the vicinity of a train.

The system can also use the transmitting signal to activate an active crossing. The bells, flashing lights and boom barrier would only return to open status after the train had left the defined area.” (House of Representatives Standing Committee on Transport and Regional Services, 2004, p.17).

- 8.11 Similarly, Ditmeyer (2002), in a briefing paper prepared for STAYSAFE, commented that the Federal Railroad Administration in the United States and the railway industry are:

“... working on the development of intelligent railroad systems that will incorporate the new sensor, computer, and digital communications technologies into train control, braking systems, grade crossings, and defect detection, and into planning and scheduling systems as well. The [Federal Railroad Administration] believes that these technologies will prevent collisions and overspeed accidents, prevent hijackings and runaways, increase capacity and asset utilization, increase reliability, improve service to customers, improve energy efficiency and emissions, increase economic viability and profits, and enable railroads to measure and control costs and the ‘manage the unexpected’. Intelligent railroad systems will enable railroads to respond with flexibility and agility to rapid changes in the transportation marketplace.” (p.1)

- 8.12 These optimistic comments must, however, be balanced with research findings indicating that the reliability of the application of intelligent transport systems to railway level crossings is still uncertain. For example, Carroll, Gordon, Reiff and Gage (2002) examined the performance of a number of technologies for their ability to detect trains and motor vehicles approaching and entering railway level crossings, reporting that::

“The categories of evaluation included train approach detection, train island detection, static highway vehicle detection and dynamic highway vehicle detection. Intelligent transportation system information was also collected to evaluate the technologies’ ability to determine train direction, train speed and train length.

Results suggest that although promising performance was observed, most of the prototype systems using these alternative detection technologies did not always interpret train and highway vehicle presence within prescribed limits. In some instances, these problems were due to the placement of sensors. In revenue service applications, alternate locations for certain sensors may improve performance. Features of some of the prototypes detection systems tested were encouraging and future evaluations are planned.” (p.2)

CHAPTER NINE - MATTERS ASSOCIATED WITH DRIVERS AND OTHER ROAD USERS AT RAILWAY LEVEL CROSSINGS

- 9.1 Driver and pedestrian behaviour lies at the heart of the issues associated with risk and safety at railway level crossings. Yet, while human factors lie very much at the heart of risk and safety at railway level crossings, STAYSAFE recognises that the many effective ways of dealing with this problem address the technical components such as the road and vehicle factors, rather than trying to make the human element mistake-free.
- 9.2 Nonetheless, there are interventions that can be made directly with drivers and pedestrians that can improve safety at railway level crossings. In particular, addressing non-compliant behaviour by drivers and pedestrians can serve to reduce hazardous situations arising. The effective provision of general education can also be beneficial, particularly in circumstances where rail operations are infrequent or seasonal.

Behaviour of motorists at railway level crossings

- 9.3 Many submissions received by STAYSAFE identified circumstances where drivers disobeyed traffic laws relating to the safe passage through railway level crossings. Witnesses appearing before STAYSAFE also testified on drivers behaving inappropriately and illegally at railway level crossings.
- 9.4 Non-compliance with traffic law relating to railway level crossings has been the focus of significant research in North America and Europe (see Covance, 2002). For example, Hughes, Stewart and Rodgman (1999) examined drivers in North Carolina who had been observed entering railway level crossings after boom gates had been lowered to allow the transit of a train. While there were some differences noted in contrast to a general sample of drivers, there was no general relationship identified between prior driving history in terms of crashes and traffic violations and the likelihood of non-compliance with railway level crossing laws. Hughes et al. concluded that effective countermeasures to drivers entering railway level crossings when a train is about to transit of a train would likely involve physical barriers (full length booms or 'quad gates', median barriers, etc.) to prevent the behaviour and the application of enforcement methods such as automated cameras to circumvent problems with traditional traffic police enforcement methods.
- 9.5 Meeker and Barr (1989) observed 57 drivers at a railway level crossing fitted with active protection (flashing lights) in a rural area when the signals had been activated by an approaching train. The trains were all freight trains, travelling at between 32-88 km/h, with 50-120 goods wagons. The trains were not regularly scheduled. Two-thirds of the drivers crossed the railway tracks in front of the approaching train. All but four of these drivers slowed perceptibly, or stopped, prior to entering into the railway level crossing despite the active signals, indicating that they had seen the signals and the train, and had made a conscious decision to cross. Shinar and Raz (1982), in a

Matters associated with drivers and other road users at railway level crossings

similar study involving just 15 drivers at a railway level crossing in Israel, reported that two-fifths of the drivers entered a railway level crossing in front of an approaching train, despite the activation of warning signals. In a second, later study, Meeker compared driver behaviour at the same railroad grade crossing with two different active protection systems: flashing lights, and flashing lights and a half-boom barrier gate. The behaviour of 60 drivers was observed after the addition of the boom gates at the railway level crossing. The addition of a half boom gate reduced but did not eliminate the incidence of illegal behaviour: whereas 67% of drivers had driven through the railway level crossing in front of a train when the crossing was fitted with a flashing light only, but 38% drivers still drove through the crossing after it was fitted with a flashing light and a half boom barrier (Meeker, Fox & Weber, 1997).

- 9.6 Surprisingly, there is little recent Australian information available about non-compliance with traffic laws pertaining to railway level crossings (see, e.g., Wigglesworth, 1976, 1979; Wigglesworth & Uber, 1991). It is unknown if Henderson's (1991) summary of drivers involved in fatal railway level crossing crashes—widely accepted as applicable to the general situation regarding non-compliance at railway level crossings—is still current:

“Wigglesworth showed many years ago that in most cases, fatal level crossing accidents mostly occurred to law-abiding citizens going about their ordinary business. More occurred during the day, for instance, and fewer involved alcohol, than among other fatal accidents. The picture is of a few road users who got it terribly wrong for an instant of time.” (p.51)

Wigglesworth (1979) reported that a typical driver involved in a railway level crossing crash is observed to drive steadily, without any head movements indicating recognition of the approach to the crossing or scanning for the presence of a train, straight into the path of the train regardless of any activated flashing lights and alarm bells.

- 9.7 The non-compliance with laws concerning railway level crossings may be inadvertent or mistaken. Inadvertent or mistaken non-compliance with laws concerning railway level crossings may be a result of “looked-but-failed-to-see” errors (see Herslund & Jørgensen, 2003), or confusion about appropriate behaviour concerning a railway level crossing. This can be illustrated in the following incident examined by STAYSAFE involving a railway level crossing at Casula, as mentioned in evidence:

Mr DEEGAN: “We still have people driving through—and none of us are going to solve the answer quickly—closed boom gates. Recently there was an incident at Casula ... of a woman in her car right next to the boom gate, she actually poked through the boom gate. The train missed by a matter of millimetres.” (Minutes of evidence of the STAYSAFE Committee, 30 October 2001, p.5)

The incident appears to have occurred due to the woman driver stopping on the railway level crossing (fouling the adjacent track) as the warning lights and boom gates were activated. It would appear that she slowed entering the crossing and when the lights and booms in front of her activated, she stopped. Because of the boom

Matters associated with drivers and other road users at railway level crossings

gate descending behind she was then unable to reverse clear of the track. However, she could have quite easily continued driving across and cleared the crossing safely before the train arrived even with the boom fully lowered. This appears consistent with the apparent lack of knowledge, situational awareness or experience road motor vehicle drivers have in regard to railway level crossings. This is exacerbated on low traffic rail lines where the learned behaviour is that trains are infrequent and vehicle drivers don't need to stop or can easily beat a train across a crossing.

9.8 But the non-compliance with traffic laws relating to railway level crossings is all too often intentional (see Witte & Donohue, 2000).

9.9 The New South Wales Labor Council indicated that there is a definite issue in the way motorists and truck drivers approach railway level crossings. Both groups in many cases simply ignored warning signs, flashing lights and even boom gates. One train driver detailed how he has seen motorists manoeuvre their cars around single boom gates in order to beat the train:

"The number of [train] drivers that were in fatalities have the opinion now that the car saw [them]...it wasn't a case he didn't see me, he saw me and thought he could get across the crossing."

9.10 Among train drivers there was a consensus that the main issue in relation to safety was that motorists were uneducated and prepared to take what they thought to be "calculated risks" despite all the warnings signs and in a number of cases even the presence of closed boom gates.

9.11 The train drivers identified the perception and understanding of train speeds as a particular problem for drivers: they stated that drivers seemed unable to effectively estimate the speed at which trains were travelling, and that they may give rise to attempts to "beat the train" across a railway level crossing. It was thought that this was one factor that significantly contributed to accidents on level crossings:

"They [motorists] might see an XPT and think that it's travelling along at 80 - 100 kph, but he's [the motorist] doing 115 kph and the XPT is actually doing 150 kph."

9.12 The evidence of train drivers is telling:

Mr MOREY: ... in regional and rural areas, the classic example was drivers who stop or pull up to a railway crossing, have a quick look each way and then shoot across in front of trains. There are examples also in the submission that when we have only single boom gates blocking off each lane drivers will continue to drive around the boom gates, even though they are down, thinking that they are able to beat the train. Then there is the human issue of people who are driving along thinking, "I know how fast that train is going. I'm sure I can nip in front of it" and obviously getting wiped out continually. One of the big issues was just a flagrant ignorance of the laws. People just do not adhere to the laws around level crossings; they do not understand why they have to stop and wait as opposed to just stopping,

Matters associated with drivers and other road users at railway level crossings

having a look and shooting through. There is not a general knowledge of what those laws are and the reasons why people stop. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 20)

Mr WYLLIE: Most of the wagons running around now have an illuminated patch on their sides. It does not seem to work though because we actually had a bloke at Moss Vale run into the side of a train when it was parked over a level crossing. In support of what Mr Aller said, there seems to be a problem with who is responsible. It is not unusual to have a near miss and call the closest signal box to report it and they will say, "Yes, that bloke does it all the time", and nothing seems to be done about it. People see him do it and they continue to do it. We had a problem at Moss Vale and we contacted the local police. They said that they would put on a blitz. They advertised the blitz, everything calmed down for a week. They then had the blitz and nothing happened for that week of the blitz. After the blitz it was calm for a week and then bang, straight back into it. They knew that they were not going to get booked so they did not worry about it. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 22)

Mr HOLLOWAY: ... I have been involved in two incidents on level crossings: one unfortunately involved a fatality and, fortunately, the second one did not. From a train driver's perspective, they are a terrible thing to negotiate as when you are travelling on high speed trains and the level crossing is there, you cannot do anything about it. You only have to react once someone has done something wrong. A lot of problems on the railway is the identification of level crossings in so far as the lower B and D grades, not so much type F. For example, on the private railway line from Berrima Junction out to the cement works you will come across two level crossings with exactly the same protection for a motorist, that is, a stop sign. Yet one has clear vision either side and the next has banks either side so one cannot see. Motorists are told to consider both of those level crossings of equal danger, yet one they can clearly see and the next one provides them extremely limited vision. That must generate in their minds some sort of confusion as to the real standard. That is a small usage line. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, pages 22-3)

and reflected in many individual experiences:

Mr GIBSON (CHAIRMAN): My dad was hit at a level crossing by one of the old red rattlers. They would have been lucky to do 30 km/h. He traversed that line four times a day, seven days week for years.

MR LEE: It is an issue with locals who know the train timetables. If a train is delayed for any reason, especially if it is a one-train-a-day event, community complacency can be a factor. Someone might believe that the XPT has gone past when in fact it is running late. The locals know when the train goes by, so complacency is a major issue in some country towns. . (Minutes of evidence of the STAYSAFE Committee, 17 May 2004, p.17)

- 9.13 During site visits in metropolitan Sydney and throughout regional and rural New south Wales, STAYSAFE was able to observe firsthand some of the inappropriate behaviours by drivers, including on a number of occasions drivers not stopping at Stop signs on passive railway level crossings, driving through active railway level crossings when the bells and lights were still activated after a train that traversed the crossing, drivers appearing to accelerate and speed up to enter and pass through a railway level crossing as a train approached the crossing, and drivers crossing to the wrong side of the road on approach and departure from a railway level crossing in a manner that seemed to 'iron out the corners' and enable the crossing to be entered at a higher speed than would otherwise be possible. That these types of behaviour were observed by a party of officials who were present at the roadside or within the rail reserve during inspections of particular railway level crossings was worrying to STAYSAFE.
- 9.14 STAYSAFE notes Mrs Wooden's testimony:

Mrs WOODEN: The Austroads 2002 report entitled "Reducing collision risks at passive level crossings in Australia" states in part:

"Higher train speeds pose serious questions for the future of passively controlled crossings on some lines, in that the decision about whether it is safe to cross may be beyond human capacity."

It also states:

"An analysis of current situations suggests the drivers of some road vehicles may already be faced with decisions at open level crossings which are beyond human capacity to resolve."

It continues:

"With a train speed of 100km/h—"

Not the 160 km/h that the train was travelling when our boys were killed, although there were lights, or the 130 km/h as in the case of the poor woman at Baan Baa, or 120 km/h in the accident at Albury—

"—(27.8 metre/sec) ... If the road user glances in the direction of the train for 3 seconds, the train will have covered approximately 86 metres. In that time the retinal image will have expanded to 0.29 degrees."

It further states:

"... it seems unlikely that it is capable of giving an adequate impression of train speed... The basic case remains that the task asked of drivers in these situations is beyond human abilities. "

That is at a speed of 100 km/h. Even if the speed were reduced to 120 km/h, if there is a stop or give-way sign it is humanly impossible to judge when it is safe to cross.

Matters associated with drivers and other road users at railway level crossings

....At school crossings we are required to slow to 40 km/h because obviously children do not have the ability to judge when a car is coming. Even red lights are not good enough. It is not too much to ask for a train to be required to slow 60 km/h when travelling through an open crossing. Of course, if that were to happen people would start losing money and would insist that the corridor be gated so that they could get their goods and passengers through as quickly as possible.

With regard to competing with all other black spots, there is no other transport route has speeds of 160 km/h, 130 km/h, or 120 km/h; as far as I know, 110 km/h is the highest speed allowed. We are talking about an intersection. Why do train crossings with those speeds have to compete with every other road black spot? I know there are horrible road black spots, but I also know that these crossings have been neglected for a long time. It is time that they were attended to. There should be no excuses. I do not believe that the Government cannot come up with \$10 million a year to deal with that neglect to stop all these deaths. As Barry said, it is not simply a case of our child being killed in an accident, it is all the other things such as not even being able to see the body. Those things complicate the situation. It is horrific. There should be separate funding. I do not think it is too much to ask the State Government to spend \$10 million a year. The Federal Government should also contribute \$10 million because this is a horrendous problem. (Minutes of evidence before the STAYSAFE Committee, 17 May 2004, page 43)

Education and awareness of motorists and pedestrians

- 9.15 There is also a need to ensure that the community is aware of the risks present at railway level crossings, and is knowledgeable and able to take necessary safety precautions.
- 9.16 STAYSAFE notes the testimony on railway safety by Marion Blakey, then Chairman of United States National Transportation Safety Board (NTSB), before the Subcommittee on Surface Transportation and Merchant Marine, Senate Committee on Commerce, Science, and Transportation, on 10 July 2002. Not only does this testimony indicate the scale of the problems faced at level crossings in the United States, it also defines some of the critical issues associated with driver behaviour and compliance with protective technologies deployed at level crossings:

Mr. Chairman, I would be remiss if I did not discuss a long-standing safety concern of the Board's—grade crossing safety. Data indicate that every 160 minutes a collision between a train and a car or a truck occurs at one of the more than 259,000 highway/rail grade crossings in the United States, resulting in 419 fatalities in 2001.

The most recent railroad/highway grade crossing accident report adopted by the Board involved an accident that occurred on March 15, 1999, in Bourbonnais, Illinois, which resulted in 11 fatalities. The Safety Board's investigation revealed

Matters associated with drivers and other road users at railway level crossings

that the truck driver had ample time to safely stop his truck and avoid an accident, but likely as a result of fatigue, he failed to respond appropriately to the signals and instead decided to cross ahead of the train.

On-going grade crossing accidents include accidents that occurred November 20, 2000, in Intercession City, Florida, that involved an Amtrak train and an oversize/overweight tractor-trailer combination vehicle at a protected crossing, and May 14, 2002, in Coosawhatchie, South Carolina, that involved an Amtrak train and a tractor-trailer carrying logs at an unprotected crossing.

Ideally, the Safety Board believes that closing crossings or separating rail traffic from highway traffic through bridges and overpasses are the most effective means to eliminate accidents between highway vehicles and trains. The Safety Board recognizes that closures or traffic separation is not always possible. Therefore, the NTSB has also recommended that grade crossings be equipped with active devices that warn motorists of on-coming trains. We have seen, however, that even those crossings with flashing lights and gates do not prevent all accidents. Many Board investigations of accidents that occurred at active crossings have involved drivers who did not comply with train-activated warning devices installed at the crossings. Drivers often drove around lowered crossing gates or ignored flashing lights. Because of these deliberate actions by drivers, the Safety Board believes strong consideration should be given to the installation of devices that will prevent motorists from driving around lowered gates or median barriers.

As a result of the grade crossing accident in Bourbonnais, Illinois, the NTSB recommended that the Department of Transportation provide Federal highway safety incentive grants to States to advance innovative pilot programs. These programs are designed to increase enforcement of grade crossing traffic laws at both active and passive crossings. We recognize that not all passive grade crossings will be upgraded in the near future with active warning devices, and we believe that education and enforcement, such as the use of cameras to catch violators who drive around the gates, must be a part of any effective grade crossing improvement plan. Many motorists fail to understand the level of risk at grade crossings, and do not realize that a 150-car train traveling at 50 miles per hour will take about 1½ miles to stop. The Safety Board fully supports the education efforts of Operation Lifesaver and other endeavors to provide information about grade crossing safety to drivers, and has recommended that grade crossing questions be included on all drivers' license tests.

Advertising and education relating to seasonal rail operations

- 9.17 The Roads and Traffic Authority does not undertake any general education campaign for level crossings. Its education campaigns revolve around speeding, fatigue and drink driving. However, some localised public information campaigns have been undertaken by Local Government Road Safety Officers, advising communities of the re-opening of seasonal rail lines.

Matters associated with drivers and other road users at railway level crossings

- 9.18 In previous years at harvest time, rail agencies have advertised in regional press the movement of "seasonal" grain trains on branch railways that might not have seen a train for several months. However in recent years with continuing good harvests and increased grain varieties, train patterns on grain lines have become more consistent year round. Consequently, the focus of publicising level crossing danger awareness has changed statewide. For example, in 1999, the Rail Infrastructure Corporation spent \$400,000 on advertising and direct mail to residents in western New South Wales during the wheat season, in which additional traffic was expected. In December 2000, just prior to the busy Christmas travelling period, level crossing safety letters were distributed to 410,000 residents in regional New South Wales.
- 9.19 This community awareness campaign has been continued. For example, STAYSAFE was advised of the development of an inter-agency public awareness campaign regarding the safety of railway level crossings, comprising a statewide media releases issued by the Minister highlighting the need for road user safety awareness at level crossings, and statewide advertising, which can be used on an ongoing basis.
- 9.20 STAYSAFE examined two media releases issued by the Minister for Roads, the Hon. Carl Scully MP as examples of this approach to make the community more aware of the safety of railway level crossings:

NEW MEASURES TO ENCOURAGE SAFE BEHAVIOUR
BY MOTORISTS AT LEVEL CROSSINGS

The State Government will introduce tougher new road safety measures to encourage safe behaviour by motorists near level crossings.

The Minister for Roads, Mr Carl Scully, said today the new measures were aimed at stopping motorists from queuing on level crossings and had been identified following recent accidents in other States.

"Following the tragic events in South Australia and Victoria, I asked my departments to investigate ways of reducing the likelihood of similar tragedies occurring here in New South Wales."

"Initial investigations show that traffic congestion was a major contributor to the accident in South Australia, so today I am announcing a new package of initiatives to address this risk in NSW."

The new measures include:

- Boosting fines and introducing the loss of 3 demerit points for level crossing related offences;
- Identifying level crossings where, despite safety measures and warning devices, congestion is a problem;
- Trialling new road markings and signs at these high risk crossings;
- Investigating the use of "red-light" cameras to deter dangerous driving behaviour;

"From the 1st of January next year, drivers caught blocking or queuing on a level crossing or disobeying warning devices will lose 3 demerit points and face a \$300 fine.

Matters associated with drivers and other road users at railway level crossings

"The fines will rise from \$74 for queuing across a level crossing and \$209 for entering a level crossing when warning devices are operating.

"We hope these new tougher penalties will send a strong message to motorists about the importance of safe driving near level crossings."

Mr Scully said he had asked the Roads and Traffic Authority (RTA) and Rail Infrastructure Corporation (RIC) to trial the painting of criss-crossed bright yellow lines - similar to those at busy intersections around the Sydney CBD - to show drivers the danger zone.

"These high-visibility road markings at high-risk crossings will alert drivers that it is not safe to queue in these areas.

"I've also asked RIC and the RTA to look at installing additional signage, particularly at crossings near T-intersections or busy road intersections, to alert drivers of the added risks.

"The Level Crossing Strategy Council, made up of the RTA, RIC, Transport NSW, NSW Police and Local Government, will also consider the feasibility of using "red-light" style cameras to enforce the law at level crossings.

"The RTA has just commenced a new level crossing awareness campaign in country and regional areas.

"Roads and Traffic Authority figures show that the vast majority of level crossing accidents over a four-year period involve drivers who live within 100 kilometres of the accident site.

"We want to get the message out to drivers that trains can't stop as quickly as cars can."

Mr Scully said the NSW Government already had in place a comprehensive level crossing strategy which has led to the upgrade of a large number of crossings.

"In 2001, the State Government doubled spending on level crossing upgrades over three years to \$12 million.

"By mid-2004, 180 level crossings across the state will have been improved, including signage, warning lights and bells and boom gates."

Wednesday, 13 November 2002

and:

RAIL LEVEL CROSSINGS - DRIVERS TAKE CARE

New statistics released today show that local men are most likely to be involved in a rural rail level crossing accident, Minister for Transport, Mr Carl Scully said.

Mr Scully said that Roads and Traffic Authority figures show that 76 per cent of level crossing accidents over a four-year period involved men living within 100 kilometres of the accident site.

Matters associated with drivers and other road users at railway level crossings

"This is a warning to those who, although they may know their surrounding roads and crossings, do not always know when a train is about to come.

"It is essential that drivers, especially locals, take every precaution when approaching a level crossing - even if you are familiar with the area you never know if a train is coming until you stop and look."

The study found that of 78 level crossing accidents between 1996 and 2000:

- 59 drivers were male (76 per cent)
- 59 drivers were local (76 per cent)
- 17 were aged 40 to 49 years old (21 per cent)
- 14 were aged 20 to 29 years old (17 per cent)

Mr Scully said spending on level crossing improvements had doubled to \$12 million over the next three years, with major improvements such as additional signage, fencing, flashing lights or boom gates made at 20 priority sites over the past six months.

"Already 16 level crossings have been upgraded with lights, bells and/or boom gates this financial year and nearly 50 sites are planned for similar upgrades by 2003-04.

"These improvements will help to prevent level crossing accidents, but ultimately it is up to drivers to be cautious when driving on rural roads.

Mr Scully said recent incidents in the State's south-west where two trucks and a car collided with freight trains in three separate incidents highlighted the need for extra care around level crossings.

"The Level Crossing Strategy Council will review these sites to provide improved safety, however it is essential that country drivers take care, especially during harvest time when extra freight trains are operating - remember trains can't stop as quickly as cars can."

Mr Scully said improving driver awareness remained a key priority for the Government, with a level crossing awareness campaign for drivers commencing on radio across rural NSW in February 2002. (17 December 2001)

- 9.20 Further stages that have been considered include statewide distribution of bumper stickers and pamphlets through service stations, and an education campaign through schools in regional New South Wales.
- 9.21 The Level Crossing Strategy Council stated that it recognises the need for a greater emphasis on educating road users and the community about the risks at level crossings and the need for safety awareness, through coordinated and strategically targeted campaigns. The Level Crossing Strategy Council is also keen to examine the way that enforcement can play an educative/deterrent role and will work with New South Wales Police and other relevant bodies in pursuing this as a strategy. Related to this is the need for more research into the characteristics of, and factors contributing to, level crossing accidents in New South Wales so that effective, cost efficient campaigns can be designed accordingly. The low number and seemingly random nature of level crossing incidents mean that education campaigns need to be based on sound research, appropriately targeted and able to deliver results.

Matters associated with drivers and other road users at railway level crossings

9.22 STAYSAFE notes that the Rail Infrastructure Corporation's strategic framework provides a general statement that:

RIC will not accept injuries or deaths to passengers, the general public, to persons working on the track or in trains. RIC firmly believes that safety incidents can and should be prevented. However, it is also acknowledged that our zero accident philosophy will take time to achieve and that performance-based milestones are needed to drive a continuous improvement program.

Public safety

RIC aims to provide the public who come into contact with the railway with a level of safety which is significantly better than pedestrians in the motor vehicle environment. For level crossings, RIC will work to eliminate level crossing collisions...

OBJECTIVE 5

There will be an independent analytical review which will improve our knowledge of public behaviour and attitudes, particularly where that behaviour puts themselves, or others, at risk.

Specifically, this will be achieved in conjunction with the Department of Transport and the NSW Police Service by:

- Assessing road user behaviour at level crossings

9.23 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with local councils, and the Roads and Traffic Authority review the current approaches to the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour where a road, road-related area, pedestrian access route or other access route meets a railway at substantially the same level, with particular regard to the effectiveness of public advertising, driver education materials, and road signage. It would be appropriate, in STAYSAFE's view, for the Rail Infrastructure Corporation and the Roads and Traffic Authority to consult with the Australasian Railway Association with regard to a pilot education program underway in Western Australia, and with the Northern Territory Department of Infrastructure, Planning and Environment with regard to the railway level crossing safety education program ("Tracks are for Trains") developed for the opening of the Alice Springs to Darwin railway line.

RECOMMENDATION 54:

The Rail Infrastructure Corporation, in consultation with local councils, and the Roads and Traffic Authority review the current approaches to the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour where a road, road-related area, pedestrian access route or other access route meets a railway at substantially the same level, with particular regard to the effectiveness of public advertising, driver education materials, and road signage.

9.24 Train drivers suggested that landholders with private railway level crossings on their land should be sent information regarding safe and appropriate behaviour at railway level crossings, and specifically identified that landholders needed to be reminded to stop before entering a railway level crossing.

Matters associated with drivers and other road users at railway level crossings

- 9.25 As well, landowners need to be advised that they have a responsibility to maintain safety around a private railway level crossing, that is, there is an onus on them to maximise visibility in both directions by trimming bushes and trees for a substantial distance around the crossing.
- 9.26 It was seen as useful to provide landowners with timetables of regular and irregular passenger and freight trains passing over their property.
- 9.27 Mr David Edwards, representing the National Rail Corporation, called for a national approach to community education:

MR EDWARDS: In summary of my opening remarks it really comes down to needing a nationally focused education program with the community in terms of making them more risk aware of the dangers of level crossings. At the end of the day I think people do not appreciate the difficulty there is. A train cannot stop quickly having seen a car approaching a level crossing that appears to have no intention of stopping, and of course, as we have previously heard, the difficulty that a motorist may have in judging the approaching speed of a train can be quite horrendous. We have trains operating to a maximum speed of 115 kilometres per hour. Those trains might be 1,500 metres in length in New South Wales but we are operating them up to two and half kilometres on the Nullabor and out of Adelaide, and they can be anything from 2,000 to 3,000 or 3,500 tonnes in total weight. It is certainly very difficult to control the speed of a train. You can not stop quickly, it may take several kilometres, and the effects of motorists treating give way signs and stop signs at level crossings as if they are not the same sort of stop sign or give way sign as they find at a normal intersection is a concern to us. (Minutes of evidence of the STAYSAFE Committee, 3 December 2001, page 19)

Education and awareness actions to also address "culture of blame"

- 9.28 A particular issue identified during the inquiry into the safety of railway level crossings was the tendency to 'blame the train' when incidents and crashes occurred at railway level crossings.
- 9.29 Train drivers felt that Government authorities were not eager to address issues such as compliance with traffic law, maintenance of sighting distances, and general safe practices with landowners, motorists and pedestrians, preferring to inappropriately address safety issues by regulating train drivers and slowing down trains.

Mr HAYDEN: Broadly, that is why so many drivers are present. This is not the union. We wanted to put the membership out in front. I think all of them have said quite graphically what is happening outside. Some things must be put forward. After an incident has occurred on most occasions the car driver or tractor driver is severely or fatally injured. For the driver, that injury goes on for ever. It is always in the driver's head. Whilst most of them come back to work after a period, it is always in their heads. They all

Matters associated with drivers and other road users at railway level crossings

talk about it in their meal rooms. They all get frustrated because, no matter what they do, it will always come down to what they have done wrong. That is what normally happens.

A train driver's industry is strictly regulated. There are things that he or she has to do when approaching a crossing—headlights in outer metropolitan; sounding of the horn; and travelling at the correct speed. Those things, which are enforceable, can be checked on most trains. State Rail is now in the process of fitting a data logger on all suburban trains. Freight trains have them, XPTs have tapes and Endeavours have data loggers. Those data loggers record everything. They will then go through that when an incident occurs and ensure that the drivers were travelling at the exact speed for the track; ensure that the horn was blown at the right time; and ensure that the headlights were on for a certain distance.

It will tell them how far away from the crossing a whistle was blown and what throttle notch a driver was in. It will establish whether a driver made an attempt to stop his train and if he applied the brakes. They can tell the time, the place and the mileage. That is always in the driver's mind. They are after me now because they think that I have done something wrong. Drivers normally give a leeway of 5 per cent for speed. So it is always in the driver's head that he is going to be blamed for an incident. Ultimately, if someone gets hit at a level crossing, they have done something wrong to be on the level crossing. The driver cannot swerve or stop. The distance that it takes to actually stop a train—XPTs travel at 160 km/h and superfreighters travel at up to 115 km/h—is about 2,000 metres.

Train drivers are regulated. Those regulations are enforced on them and they can be punished. Car drivers are not regulated. Sure, they have regulations, but they are always too hard to enforce—probably because they are votes. Car drivers are not regulated, those regulations are not enforced and, in most cases, they cannot be punished because they are no longer here. So it falls back on the train driver. (Minutes of evidence of the STAYSAFE Committee, 30 October 2001, pp.24-25)

- 9.30 STAYSAFE recommends that the Roads and Traffic Authority, in consultation with local councils and the Rail Infrastructure Corporation, ensure that the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour at level crossings addresses issues associated with the "culture of blame" where the train and train driver are seen as responsible for a crash or near miss incident.

RECOMMENDATION 55:

The Roads and Traffic Authority, in consultation with local councils and the Rail Infrastructure Corporation, ensure that the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour at level crossings addresses issues associated with the "culture of blame" where the train and train driver are seen as responsible for a crash or near miss incident.

Matters associated with drivers and other road users at railway level crossings

9.31 STAYSAFE noted the following comment published in the Rail and Road Journal, which would appear to indicate that there are concerns of about the institutionalization of a 'blame culture':

Recently I was contacted by a Pacific National Driver in regards to the appearance of new Level Crossing Speed Boards on the Broken Hill to Orange corridor.

The boards require 115kph Freight Trains and 145kph Passenger Trains to slow to speeds of between 10 and 70 kph before some level crossings for a short distance then regain normal speed. The majority of these level crossing are non sign posted farmer or private crossing, and have no lights, barriers or gates, but are used on an add hock basis.

It would seem that RIC has decided it is easier to place the onus on the Train Driver rather than the person/s who use the level crossing if and incident occurs. The Train Drivers every move is logged via data logger and you can just see it now in a Coronial Inquiry when they use the tapes against the Driver.

Recently the RTBU with Labor Council made a submission (which can be found on the Locomotive Division Web Page) to the NSW Parliaments Stay Safe Committee who at the time was investigating Level Crossings on the NSW Network. It was at this enquiry that we raised the very situation, which is occurring now, when it is deemed easier to put the onus back on the Train Driver rather than the public.

We raised the common practice of the use of speed boards to slow trains rather than put practical measures in place to either slow the motorist down, educate the general public or fit red light cameras at know bad level crossings.

Is it not RIC's role to assist in the development of the Rail Industry in NSW and not place further restrictions which do nothing more than slow trains down, thus placing another hurdle in the way of the expansion of Rail in NSW, in favour of its direct competition the, Road Lobby.

I have now raised this matter with the Department of Transport and will be forwarding correspondence onto the NSW Parliamentary Stay Safe Committee as just another example of what we endeavored to highlight in our submission. (Hayden, 2002)

9.32 Under the Australian Road Rules, Part 10—Level crossings, road users are required to:

- At level crossings with a stop sign—stop at the stop line on the roadway, or (if there is no stop line) at the stop sign, and give way to any train on, approaching or entering the crossing. (Rule 121)
- At level crossings with a give way sign—stop at the give line on the roadway, or (if there is no give way line) at the give way sign, and give way to any train on, approaching or entering the crossing. (Rule 122)

Matters associated with drivers and other road users at railway level crossings

- Not enter a level crossing if warning lights (e.g., twin red lights) are operating or warning bells are ringing (Rule 123 (a))
- Not enter a level crossing if a gate, boom or barrier at the crossing is closed (Rule 123 (b))
- Not enter a level crossing if a gate, boom or barrier at the crossing is opening or closing (Rule 123 (b))
- Not enter a level crossing if a train is on or entering the crossing (Rule 123 (c))
- Not enter a level crossing if a train approaching the crossing can be seen from the crossing and there would be a danger of collision with the train if a driver entered the crossing (Rule 123 (d))
- Not enter a level crossing if a train approaching the crossing is sounding a warning and there would be a danger of collision with the train if a driver entered the crossing (Rule 123 (d))
- Not enter a level crossing if the driver cannot drive through the crossing because the crossing is blocked (Rule 123 (e))
- Not enter a level crossing if the driver cannot drive through the crossing because a road beyond the crossing is blocked (Rule 123 (e))
- Leave the level crossing, once entered, as soon as the driver can do so safely (Rule 124)

Under the Australian Road Rules, 'give way' means that a driver must remain stationary until it is safe to proceed. Examples are provided for Rule 123 (e), where a level crossing, or a road beyond the crossing, may be 'blocked' by congested traffic, a disabled vehicle, a collision between vehicles, a collision between a vehicle and a pedestrian, or by stock on the road.

9.33 In reviewing the list of offences under the Australian Road Rules, STAYSAFE was struck at the complexity of decisions required of drivers when approaching and transiting railway level crossings. The complexity of decisions involves such matters as:

- a rapid recognition and assessment of road infrastructure as being a railway level crossing
- wide scanning of the road side environment
- detection of train-mounted devices such as headlights, warning horns, retroreflective markings or other light system such as strobe or ditch lights
- assessments of whether active protective devices have been activated at the crossing

These decisions are all required within a dynamic environment of approach where decisions to slow, stop or continue must be made in an often rapidly contracting time frame (see Eck, 2002, for an analysis of this issue at passive railway level crossings).

9.34 While acknowledging the complexity of decisions required of drivers when approaching and transiting level crossings, STAYSAFE also recognises that the frequency of drivers encountering trains approaching, entering or on a level crossing is typically very low. Away from the metropolitan rail network, train movements on many railway lines is relatively infrequent, and may be seasonal in nature. This implies that drivers may

Matters associated with drivers and other road users at railway level crossings

became complacent with encountering level crossings, either not expecting trains or believing that the scheduled train has already past.

- 9.35 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, conduct research into the knowledge, behaviour and beliefs of motorists and pedestrians about railway level crossings. STAYSAFE notes that research is already underway, with the Centre for Accident Research and Road Safety—Queensland, based at the Queensland University of Technology, conducting a Delphi research project into motorist behaviour at railway level crossings currently.

RECOMMENDATION 56:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, conduct research into the knowledge, behaviour and beliefs of motorists and pedestrians about railway level crossings.

Enforcement issues associated with railway level crossings

- 9.36 STAYSAFE was surprised that the Level Crossing Strategy Council has no statistics on the number of road vehicles who break the law and disobey flashing warning lights, boom gates or indeed “stop” signs. Only a very small number of infringements are reported through the rail industry reporting processes, when train crew experience a “near miss”. The New South Wales Police also indicated there is some difficulty in extracting useable data concerning infringements at railway level crossings. The Travelsafe Committee (1997) noted that infringements associated with railway level crossings were often detected under unusual circumstances:

“The Committee understands that a significant proportion of these contraventions [at railway level crossings] is also likely to have been detected by police while attending road accidents at level crossings” (p.37).

- 9.37 The Level Crossing Strategy Council can provide details from a database that has reported incident data recorded. Generally incidents involving broken boom gates are recorded, however the root cause of the breakage may not always be identified. There can be different scenarios, including deliberate breakage by a driver through to a semi trailer end gate that catches the boom as it lowers.

Investigation and reporting of incidents of non-compliance by drivers at rail level crossings

- 9.48 STAYSAFE examined the investigation and reporting of incidents of non-compliance by drivers at rail level crossings. STAYSAFE examined the reporting mechanisms for incidents at railway level crossings that involve the New South Wales Police.
- 9.49 Police may report motorists for offences at level crossings by specific violation of the Australian Road Rules. This includes any crash where a driver has committed a specific offence.

Matters associated with drivers and other road users at railway level crossings

- 9.50 In certain circumstances there may be issues regarding a crash that require police, with evidence, to use other transport legislation e.g. negligent driving or some other legislation such as criminal law.
- 9.51 There may also be issues of significance (such as alcohol and drug use or injuries or death) which may incur different charges. This is not specific to rail crossing crashes.
- 9.52 These mechanisms are at the disposal of police who witness an offence or investigate a crash. The end result could be an infringement notice either issued on the spot or posted or a summons and charge.
- 9.53 If a member of the public observes an offence, they are required to provide police with a statement and be prepared to attend court. In most such instances, the accused defends these matters as police did not observe the offence and it becomes one person's word against another.
- 9.54 A number of the train drivers also raised concerns with regard to the policing and fining of motorists who disobeyed the laws governing level crossing. The train drivers gave a number of examples, specifically in rural areas, where motorists had ignored level crossing laws in front of police officers and no action was taken by the police officers. They felt there was a culture in rural areas where ignoring, or at best, disregarding level crossing laws was allowed to occur. There is a need for police, especially those in regional and rural New South Wales to be diligent in enforcing the laws that govern railway level crossings.

Camera enforcement

- 9.55 STAYSAFE has earlier noted that encountering trains approaching enter on on a level crossing is often an infrequent occurrence for many road users, particularly away from metropolitan lines and other high use railway lines (e.g., the Main South Line).
- 9.56 Camera-based enforcement technologies could, in STAYSAFE's view, play a significant role in ensuring compliance by road users at level crossings. This concept was supported by the Level Crossing Strategy Council:

Mr DEEGAN: "At Islington near Newcastle I stood at the signal box for a couple of hours and just watched the number of people go through after the boom gates were closed. We have started to consider putting red light cameras at some of those level crossings. There are some issues that we are working through. People might accuse the government of a revenue option but that might be something the committee might look at, to record the people who are going through after the boom gates are down. It is not only potentially deadly for the person in the car but we have a lot of people on those trains and derailling a freight train would be a serious incident."
(Minutes of evidence of the STAYSAFE Committee, 30 October 2001, p.5)

- 9.57 Existing red light cameras are located at road intersections and operate with loop detectors embedded in the road pavement on the approach side of intersections near the stop line. The cameras are linked to the traffic signal operation so those vehicles

Matters associated with drivers and other road users at railway level crossings

passing over the loop detectors during a red light are photographed at least three times. Photos are taken of the vehicle passing the stop line, in the centre of the intersection and on the far side of the intersection. Three photos are required as admissible evidence if the infringement is contested in court. An image of the red light must also be displayed in each of the photos together with a clear image of the vehicle numberplate so that the vehicle owner can be identified. Camera film is unloaded and developed periodically throughout the year and infringements notices processed by New South Wales Police.

9.58 The following issues need to be considered regarding using red light cameras at railway level crossings:

- There are approximately 300 actively controlled railway level crossings in New South Wales.
- The cost of installing, road traffic signal red light cameras at one site can vary between \$120,000 and \$200,000, depending on the number of cameras required. At railway level crossings the costs may be higher due to the remoteness of many locations and depending on the technology used.
- There are a number of unsealed roads on the approach to some railway level crossings and therefore vehicle loop detectors would not be able to be installed.
- There is a very high probability of vandalism or theft given the remoteness of many railway level crossings.
- Extraction of film and servicing of cameras will be costly due to the remoteness of cameras and distances between railway level crossings.
- The system could impact on New South Wales Police resources.
- There is currently no legislation allowing the installation of red light cameras at railway level crossings. Section 56 of the Road Transport (Safety and Traffic Management) Act 1999, which covers traffic signal red light cameras, would require amendment. The amendment would most likely require a change to the Act and creation of a new offence in the Regulations.

9.59 STAYSAFE further explored this issue with representatives of the Level Crossing Strategy Council:

Mr FORD: There are approximately 300 actively controlled level crossings in New South Wales that are controlled by flashing lights, bells and boom gates. We spoke to a number of train drivers who reported instances of blatant disregard at level crossings. These included driving through the flashing lights during the activation of the lights; driving around half boom gates after they had been lowered; driving through a level crossing as the boom gates were being lowered, sometimes resulting in boom gate damage; and driving through a level crossing as the boom gates were being lifted but the red lights were still flashing.

As a result of that we elected to put in place an interim strategy whereby the issue of driving through F-type signals could be reduced or eliminated by the upgrading, for example, of the boom gates. The issue of driving around half boom gates was addressed by implementing approach median

Matters associated with drivers and other road users at railway level crossings

strips so the approaching traffic was separated. We considered that damage to a boom gate was not sufficient justification for the implementation of a red light camera. Secondly, there is an issue with the operation of the camera, with the current flashing light control.

Red light cameras respond to both the amber traffic signal as well as the red light traffic signal. We talked earlier about moving towards a signal display similar to that which is observed by motorists. A red light camera installation would be infinitely more adaptable to that type of operation than the current flashing signal display that is evident at a railway level crossing. We need to do some more work in this area. As Vince Graham mentioned earlier, it would not be a three-signal display; rather, it would be a four-signal display to indicate the approach of a train rather than, for example, the clearance time across the track.

There are some legislative issues in the introduction of red light cameras. The current legislation certainly would not cover any installation with a railway level crossing. It certainly is something that I am quite keen on having a much closer look at, but there are some technical and operational constraints. Certainly there are some legislative constraints to the current introduction. We are pursuing that and we are having a look at a number of options. As I mentioned earlier, I would like to talk more with the RIC about a proposal to have a look at a consistent display to motorists. I would like, with the RIC, to examine the national agenda to see what we could do in that area. As part of that I would like to look at the application of red light camera technology. I am quite pleased to do any or all of that.

Mr MAGUIRE MP (STAYSAFE): Mr Graham, what is your view in relation to the installation of video cameras on trains, or some kind of technology to record whether cars or trucks were not doing the right thing?

Mr GRAHAM: I do not think the technology on trains is appropriate, given the variety of conditions, day and night, that the trains are obviously running through. The visibility of a car coming across a train is obviously not what it would be from a camera that is seeing approaching or departing road motor vehicles. That technology has its application on the roadside and not on the train.

(Minutes of evidence of the STAYSAFE Committee, Monday 17 May 2004, page 35)

- 9.60 The New South Wales Labor Council thought that the use of red light cameras activated once the bells start sounding would assist in deterring people driving through the crossings. The train drivers felt people take more notice of laws and directions when a financial disincentive is attached. The standard applied to level crossings should be the same as that applied at any set of traffic lights. There is a need for police blitzes in conjunction with this strategy and an education campaign to enforce the laws governing the use of level crossings. Cameras should also be used in rural and regional areas. These cameras did not necessarily have to be permanent and could be rotated around a number of railway level crossings in any one area.

Matters associated with drivers and other road users at railway level crossings

Participants felt strongly that the money raised through such strategies should not go into consolidated revenue but should be used to fund further education campaigns and to improve the safety of level crossings.

9.61 STAYSAFE recommends that the Roads and Traffic Authority, in consultation with New South Wales Police and the Rail Infrastructure Corporation, review the means currently and potentially available to enforce traffic law regarding motorists transiting a railway level crossing, including but not limited to red light camera technologies and locomotive-mounted video cameras.

RECOMMENDATION 57:

The Roads and Traffic Authority, in consultation with New South Wales Police and the Rail Infrastructure Corporation, review the means currently and potentially available to enforce traffic law regarding motorists transiting a railway level crossing, including but not limited to red light camera technologies and locomotive-mounted video cameras.

The question of “fail safe” signals

9.62 Railway level crossing equipment is designed to “fail safe” signalling principles, which means that signals will activate if a failure occurs. This is intended to prevent use of the railway level crossing by road users, who are obliged, because of the activation of signals (and the lowering of boom gates, if fitted) to not enter and traverse the crossing. The railway level crossing, when the fail safe signalling is activated, becomes, in effect, a closed corridor for train movements and road movements are completely blocked.

9.63 The usual convention is to have the signal default to the ‘presence of train’ condition. Although in many circumstances this will be a false alarm, it is reckoned to be preferable to an ‘unrevealed’ situation where a train may be present but no signal is given to a motorist approaching or entering the railway level crossing (see Smith, Russell and Looi, 2003, for a discussion of approaches to control errors and failures in safety-critical systems such as railway signalling).

9.64 STAYSAFE was struck by the ambiguity of the “fail safe” approach to signals at railway level crossings:

- the signals are appropriate for train crews approaching the railway level crossing where a signal has failed
- the signals are inappropriate for motorists, who experience a traffic environment indicative of a train passing through the crossing but without this event actually occurring

9.65 The general prohibition that motorists and pedestrians should not enter a actively protected railway level crossing in “fail safe” mode of operation appears to be, in STAYSAFE’s judgment, a particularly difficult situation for these road users. It is unclear if drivers breach the law relating to railway level crossings and enter an actively protected railway level crossing in “fail safe” mode of operation, or if drivers reverse their travel and seek an alternative route.

Matters associated with drivers and other road users at railway level crossings

- 9.66 Without making a formal recommendation, STAYSAFE suggests that the Roads and Traffic Authority, as part of a general program of research into the knowledge, behaviour and beliefs of motorists and pedestrians about railway level crossings, should specifically examine the behaviour of motorists and pedestrians at actively protected railway level crossings when in “fail safe” mode of operation where, on realising that the signal has failed, the driver or pedestrian chooses to proceed over the railway level crossing.
- 9.67 In the road network, there is a unique signal at when traffic lights at signalised intersections have failed—flashing amber lights activated on all of the road approaches to the intersection.
- 9.68 In an earlier chapter, STAYSAFE examined why we do not have red-amber-green traffic lights at railway level crossings (e.g., amber indicating that a train is coming, red – or double red - to indicate that a train is present, green to indicate no train approaching, flashing amber to indicate signal fault or malfunction and “fail safe” operation, etc.). The Level Crossing Strategy Council argued that to provide an additional amber (and green) activation sequence would require additional track circuits at the appropriate distance for the train speed from the existing crossing activation circuits. Green and amber sequences could not be provided using existing track circuits as this would substantially reduce the warning, recognition and response times for motor vehicle drivers. Such arrangements would substantially complicate track circuitry and increase already high installation costs. The Australian Standard AS 1742.7-1993 would also require substantial revision as it currently does not provide for such.
- 9.69 Nonetheless, STAYSAFE has called for a trial of a new railway level crossing signal system based on existing road traffic signals.
- 9.70 STAYSAFE therefore recommends that the Rail Infrastructure Corporation and the Roads and Traffic Authority examine the use of flashing amber to indicate signal fault or malfunction and “fail safe” operation for motorists approaching an actively protected railway level crossing.
- 9.71 STAYSAFE recognises that the development of a system of “fail safe” operation based on a flashing amber light would also require review of Australian Standard AS 1742.7-1993 and of the Australian Road Rules.

RECOMMENDATION 58:

The Roads and Traffic Authority and the Rail Infrastructure Corporation examine the use of flashing amber to indicate signal fault or malfunction and “fail safe” operation for motorists approaching an actively protected railway level crossing.

Criminal offences regarding motorists using of railway level crossings

- 9.72 In addition to reviewing the Australian Road Rules and traffic law enforcement at railway level crossings, STAYSAFE also examined other criminal offences that may apply to motorists using railway level crossings.

Matters associated with drivers and other road users at railway level crossings

- 9.73 It would be appropriate, in STAYSAFE's judgement, for the Attorney General's Department, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, review the current criminal law regarding motorists and pedestrians using railway level crossings and determine if the current offences are sufficient to deter unsafe and inappropriate behaviour and if further specific offences are required.
- 9.74 The Level Crossing Strategy Council agreed that such a review would be appropriate, noting that the penalties for queueing across railway level crossings or driving contrary to signals were increased in January 2003, with 3 demerit points added to the penalty as well as the increase in monetary fines from \$74 to \$300.

RECOMMENDATION 59:

The Attorney General's Department, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, review the current criminal law regarding motorists and pedestrians using railway level crossings and determine if the current offences are sufficient to deter unsafe and inappropriate behaviour and if further specific offences are required.

Civil liabilities regarding railway level crossing crashes and incidents

- 9.75 STAYSAFE was interested to examine the civil liabilities regarding railway level crossing crashes and incidents. Concurrently with statutory penalties under criminal and traffic legislation, the rail owners and operators retain the option of civil action. For example, in the law of torts potential actions include negligence, trespass, or strict liability.
- 9.76 STAYSAFE noted that commentaries on civil liabilities (e.g., Levine, 2001) typically have a focus on contributing factors that are the responsibility of railway or road authorities, and do not usually consider liabilities that fall upon drivers and pedestrians who breach traffic laws concerning the transit across a railway level crossing.
- 9.77 Thus issues such as poor design of road approaches (alignment, profile and sighting distances), maintenance, human error by railway operators and train crews, and equipment failure are well established as causal factors to be considered in civil actions.
- 9.78 What is less clear is the situation regarding human error, or intentional actions, by drivers and pedestrians using a level crossing.
- 9.79 STAYSAFE recommends that the Attorney General's Department, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, review the current civil law regarding motorists and pedestrians using railway level crossings and determine if the current tort liabilities are sufficient to deter unsafe and inappropriate behaviour.
- 9.80 The Level Crossing Strategy Council indicated that the Rail Infrastructure Corporation and the Roads and Traffic Authority would work with the Attorney General's

Department on a review of the civil liabilities regarding railway level crossing crashes and incidents.

RECOMMENDATION 60:

The Attorney General's Department, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, review the current civil law regarding motorists and pedestrians using railway level crossings and determine if the current tort liabilities are sufficient to deter unsafe and inappropriate behaviour.

Pedestrians, cyclists and other non-motorised transport user behaviour at railway level crossings

- 9.81 In many reviews of the safety of railway level crossings, issues associated with pedestrians, cyclists, and people using wheelchairs when crossing railway lines are often overlooked. STAYSAFE recognized that there were some major differences associated with pedestrians, cyclists, and people using wheelchairs, who may use road-railway level crossings, stand-alone pedestrian railway level crossings, or unauthorised, 'short-cut' crossing points over railway lines (trespass).
- 9.82 The Level Crossing Strategy Council reported that within the New South Wales there are 115 separate stand-alone pedestrian railway level crossings. Pedestrian railway level crossings—also known as crib crossings—are those specifically designed to allow pedestrians to cross the rail lines. Pedestrian railway level crossings may be located off the end of station platforms, or at points in between stations to provide access for pedestrians across operating railway lines. Pedestrian railway level crossings may be in association with a road crossing.
- 9.83 In Victoria, several deaths to people in wheelchairs at railway level crossings prompted the establishment of a Wheelchair Safety Taskforce to investigate disabled safety at railway level crossings. The Wheelchair Safety Taskforce identified a need to tackle the issue of stand-alone pedestrian railway level crossings, not adjacent to road railway level crossings.
- 9.84 It is not uncommon for pedestrian crossing points over operating railway lines to be unauthorized, and used by the public as short-cuts or for convenience. STAYSAFE observed several such unauthorized pedestrian crossing points during site inspections. In such cases, these crossing points do not provide any safety protection such as warning signs, footpaths, gates or rails. STAYSAFE did not estimate the number of unauthorized crossing points within the New South Wales rail network, but did note that in 2000 the Victorian Government initiated a study of stand-alone pedestrian crossings, finding a large number of crossings which were unauthorised and in use. STAYSAFE will consider the use of unauthorized pedestrian crossing points in a later section dealing with trespass.
- 9.85 STAYSAFE recommends that the Rail Infrastructure Corporation, the Roads and Traffic Authority, and local councils review the safety of pedestrian facilities associated with crossing railway tracks, including pedestrian-only level crossings as well as level crossings used by motor vehicles.

Matters associated with drivers and other road users at railway level crossings

RECOMMENDATION 61:

The Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other Transport NSW agencies, review the safety of pedestrian facilities associated with crossing railway tracks, including pedestrian-only level crossings as well as level crossings used by motor vehicles.

- 9.86 STAYSAFE notes that in Victoria a Railway Pedestrian Crossing Upgrades Committee has been established to examine the safety of pedestrians, cyclists, and people using wheelchairs, who use railway level crossings at roads or as stand-alone pedestrian crossing points. It will consult with train operating companies and councils to establish priority sites for upgrade works across Victoria.
- 9.87 STAYSAFE recommends that the Level Crossing Strategy Council consult with the Victorian Railway Pedestrian Crossing Upgrades Committee regarding the safety of pedestrians, cyclists, and people using wheelchairs, who use railway level crossings at roads or as stand-alone pedestrian crossing points.

RECOMMENDATION 62:

The Level Crossing Strategy Council consult with the Victorian Railway Pedestrian Crossing Upgrades Committee regarding the safety of pedestrians, cyclists, and people using wheelchairs, who use railway level crossings at roads or as stand-alone pedestrian crossing points.

Trespass across railway lines

- 9.88 As noted earlier, as part of the general inquiry into the safety of railway level crossings, STAYSAFE adopted a 'person under train' conceptualisation that sees a continuum of incidents extending from unintentional or mistaken entry into a railway level crossing, through intentional non-compliance by drivers or pedestrians with the legal requirements to transit railway level crossings, to trespass across railway tracks, risk-taking and 'hoon' actions on railway tracks, and suicidal behaviour involving railway operations.
- 9.89 STAYSAFE reviewed trespass across railway tracks, as this behaviour has many facets that are similar to the use of railway level crossings. Trespass includes walking across or along railway property, as well as the use of unauthorised crossing points by drivers of motor vehicles (e.g., trail bikes, farm vehicles, etc.) (see Lobb, Harre & Suddendorf, 2001; Lobb, Harre & Terry, 2003).
- 9.90 During site visits, which included travel with train crews on scheduled train services, STAYSAFE observed locations where trespass associated with the use of illegal crossings occurs, involving vandalism of fencing, and the creation of obvious paths and tracks across railway lines.
- 9.91 Earlier, STAYSAFE noted that the Rail Infrastructure Corporation's strategic framework provides a general statement that the organization will not accept injuries or deaths to passengers, the general public, to persons working on the track or in trains, and that it firmly believes that safety incidents can and should be prevented. As part of its

Matters associated with drivers and other road users at railway level crossings

commitment to public safety, the Rail Infrastructure Corporation indicated that it aimed to provide the public who come into contact with the railway with a level of safety that is significantly better than pedestrians in the motor vehicle environment. As well as specific action to assess road user behaviour at railway level crossings, the Rail Infrastructure Corporation will conduct a research project to examine public understanding of the dangers of trespassing on the railway corridor and violating railway rules.

9.92 STAYSAFE noted that in May 2000, National Rail in South Australia launched a new safety initiative to combat dangerous behaviour around trains in the Port Augusta rail corridor and in local shunting yards. National Rail met with other rail operators, representatives from the local police, aboriginal community groups and the Port Augusta Town Council to discuss ways in which the community can work together to prevent the local youth from playing on or near the track. A number of options were identified:

- train operators will identify high risk areas where improved lighting and surveillance cameras will be installed and improved signage will be put in place to highlight the dangers of playing near the tracks;
- security guards will be employed to patrol sections of the line, with local police to supplement these patrols at high usage times;
- these practical measures will be complimented by an "education in schools in program", designed to involve those most at risk. The program will culminate in a competition where local schools will be asked to submit posters and songs about rail safety.

9.93 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with the New South Wales Police Service and other Ministry of Transport agencies, review the incidence of trespass across railway lines and develop, where possible, effective means for the prevention of trespass and intervention with trespassers on railway property.

9.94 The Level Crossing Strategy Council indicated that the Rail Infrastructure Corporation will continue to consult with the New South Wales Police Service and other transport agencies on this issue. Radio and billboard advertising has recently been implemented to reduce trespass incidents. The Rail Infrastructure Corporation will continue to record and monitor reported incidents of trespass, implement its fencing standards, and consider locations where trespass is identified for further action.

9.95 Mr Graham, Chief Executive Officer, RailCorp, testified:

Mr GRAHAM: "Recently RailCorp has undertaken a three quarter of a million dollar anti-trespass program that I am sure has been seen both in metropolitan areas and in country areas. That program is specifically targeted at teenage children, in particular, in the danger zone of the railway. The Level Crossing Strategy Council has undertaken one education program in rural areas and it is about to embark on a second education program for the rural community in particular." (Minutes of evidence of the STAYSAFE Committee, 17 May 2004).

Matters associated with drivers and other road users at railway level crossings

RECOMMENDATION 63:

The Rail Infrastructure Corporation, in consultation with the New South Wales Police Service and other Transport NSW agencies, review the incidence of trespass across railway lines and develop, where possible, effective means for the prevention of trespass and intervention with trespassers on railway property.

9.96 STAYSAFE noted that in Victoria a recent program to address the safety of stand-alone pedestrian railway level crossings not only included funding to upgrade the standard of safety protection at existing crossings, but also provided for safety protection at unauthorised, short-cut sites, and closing unauthorised sites where reasonable alternative public access is available. STAYSAFE reiterates its earlier recommendation that as a general policy there should be no new railway level crossings installed within the New South Wales rail network, and recommends that where unauthorised, short-cut sites are identified that allow pedestrian movement across operating railway lines, action should be taken to ensure that these crossing points are closed permanently.

RECOMMENDATION 64:

The Rail Infrastructure Corporation, in consultation with the New South Wales Police Service, ensure that where unauthorised, short-cut sites are identified that allow pedestrian movement across operating railway lines, action is taken to close these crossing points permanently.

Suicides at railway level crossings

9.97 As part of the general inquiry into the safety of railway level crossings, STAYSAFE examined suicides at railway level crossings, again as part of a 'person under train' conceptualisation that sees a continuum of incidents extending from unintentional or mistaken entry into a railway level crossing, through intentional non-compliance by drivers or pedestrians with the legal requirements to transit railway level crossings, to trespass across railway tracks, risk-taking and 'hoon' actions on railway tracks, and suicidal behaviour involving railway operations.

9.98 In recent years, the Australian Coroners Society has commenced a study into high risk sites for jumping and railway suicides, while the Monash University Accident Research Centre began a project into examine patterns associated with railway suicides in Victoria, with a view to identifying preventive measures. The project involves collating data from the Australian Bureau of Statistics, the Transport Accident Commission in Victoria, National Express Group, Connex, the Rail Industry Incident Database and from States other than Victoria and comparing, reconciling and analysing these data sets to obtain an overall picture of who, how, when and where has attempted suicide by this method, focusing on the electrified rail network centred in Melbourne, and utilising the interstate data to compare overall patterns and incidence and differences in systems and practices, e.g., closed versus open, fenced versus unfenced. There will also be a review of relevant literature.

9.99 It is well established that from the train driver's point of view, a 'person under train' incident is a serious life event. Studies of train drivers suggest that about one-third of

Matters associated with drivers and other road users at railway level crossings

drivers suffered a severe psychological reaction following a railway suicide, but several months after the incident most train drivers reported a marked reduction in symptoms. There is some evidence that train drivers who have been involved in an incident where the person struck by a train is seriously—rather than fatally— injured may have a more severe reaction than train drivers with mildly injured or dead victims.

Train crews raised the issue of suicides at railway level crossings in evidence to STAYSAFE, during testimony relating to the psychological impact of railway level crossing crashes on railway staff:

Mr STONER (STAYSAFE): I am interested in the impact on train drivers of accidents and near misses. You say in your submission that drivers involved in fatal accidents are psychologically affected in a variety of ways and that a number of train drivers are never able to return to work as a result of accidents they have been involved in. Is there any record—kept either by the union or the employer—of the amount of sick leave taken by drivers for conditions such as anxiety, hypertension or psychological problems resulting from accidents and near misses? Similarly, is there any record of driver retirements for the same reasons?

Mr McMAHON: FreightCorp—it went from Freight Rail in 1996—has a record of lost-time injuries through Figtree, a computer program that tells you everything. State Rail has workers compensation figures, lost-time injuries, fatalities, manual handling, psychological problems and stress—or anxiety now. You can get those figures through management.

Mr STONER (STAYSAFE): Do you have a feel for how significant that problem is in terms of staffing?

Mr McMAHON: As the chairperson for ETR drivers and for occupational health and safety committees across the State, we have finally made sure that everybody gets the statistics every month. The committee meets every three months and we view that information. It is quite significant. Manual handling was No. 1 and this was No. 2.

Mr HOLLOWAY: A driver at Moss Vale had a fatality at an unprotected level crossing—it turned out to be a suicide but he did not know that at that time—and he has never driven trains since. He is no longer on the railway. That was his third fatality. (Minutes of evidence of the STAYSAFE Committee, 30 October 2001, page 32)

9.100 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with employee organisations and New South Wales Health, review the incidence of suicide at railway level crossings and develop, where possible, effective means for the prevention of suicides and intervention with persons exhibiting suicidal tendencies.

9.101 The Level Crossing Strategy Council noted that the development of measures to prevent suicide would be difficult, as the extremely low incidence of suicide would

Matters associated with drivers and other road users at railway level crossings

mean that it was unlikely that valid conclusions about prevention actions could be developed.

9.102 Nevertheless, the Level Crossing Strategy Council agreed to consult with New South Wales Health on this issue, particularly with regard to the recommendation to examine intervention actions for persons exhibiting suicidal tendencies.

9.103 In testimony before STAYSAFE, concerns about suicidal behaviour were confirmed by Mr Graham, Chief Executive Officer, RailCorp:

Mr GIBSON (CHAIRMAN): What about the suicide factor? Do you take that into account, or can it be taken into account, or does it happen?

Mr GRAHAM: Yes, it can happen, and the model does not address that; that is a deliberate obstruction, whether that be by pedestrian or by road motor vehicle. Fortunately the preponderance of that circumstance is by pedestrian rather than road motor vehicle. (Minutes of evidence of the STAYSAFE Committee, 17 May 2004, page 27)

9.104 STAYSAFE suggests that the Rail Infrastructure Corporation and New South Wales refer to the work of O'Donnell, Farmer and Tranah (1994), who edited a general review of railway suicides in the February 1994 issue of the journal *Social Science and Medicine*, as well as Ladwig and Baumert (2004), who in a recent study noted that people who engaged in suicidal behaviour involving railway operations showed marked different characteristics to persons in the general population who committed suicide.

9.105 It would be appropriate, therefore, for the Rail Infrastructure Corporation and New South Wales Health to review suicidal behaviour associated with railway operations.

RECOMMENDATION 65:

The Rail Infrastructure Corporation, in consultation with employee organisations and New South Wales Health, review the incidence of suicide at railway level crossings and develop, where possible, effective means for the prevention of suicides and intervention with persons exhibiting suicidal tendencies.

Operation Lifesaver

9.106 STAYSAFE also examined the Operation Lifesaver program used in North America. Operation Lifesaver involves education, engineering and enforcement to help prevent and reduce crashes, injuries and fatalities on public and private highway-rail intersections. This includes a major public media campaign, increased enforcement activity and educational programs aimed at the general community and those with particular responsibilities concerning safety at level crossings. STAYSAFE attended an Operation Lifesaver training workshop in Melbourne in February 2002, associated with the 7th International Symposium on Railroad-Highway Grade Crossing Research and Safety. STAYSAFE believes that the Operation Lifesaver program would be worth examining for its applicability to the New South Wales context.

Matters associated with drivers and other road users at railway level crossings

- 9.107 When STAYSAFE asked the Level Crossing Strategy Council if Operation Lifesaver had ever been contemplated for New South Wales, it was indicated that New South Wales has never undertaken a community education program along the lines of North America's Operation Lifesaver, possibly because of the low number on incidents and fatalities. The Level Crossing Strategy Council also noted that Operation Lifesaver was introduced to reduce incidents of trespass and the illegal use of the rail corridor, which appears less prevalent in Australia (STAYSAFE has made recommendations regarding trespass in earlier paragraphs)
- 9.108 STAYSAFE queried the Level Crossing Strategy Council as to who had the world's best standard in regard to safety associated with railway level crossings. The Level Crossing Strategy Council indicated that this was not known, as the definition of "world's best practice or standard" is difficult to determine and it is not necessarily worthwhile in determining or attempting to determine a benchmark. Comparative results would be difficult to achieve. Data would need to be normalised for the number and types of level crossings, rail and road volumes, accident/incident rates and other factors. Unknown factors such as motor vehicle driver behaviour/compliance and why incidents occurred have a major effect and would be difficult to determine. Factors regarding driver behaviour, rail and road traffic volumes, crossing equipment, public awareness and many other aspects need to be determined when considering the 'achievement' of a level of safety, why accidents occur and how to stop them, particularly when incident rates are low.
- 9.109 Currently, the one country that shows good achievements in improving safety at level crossings is the United States of America. The high crash and fatality rate involving railway level crossings and trespass has been considerably reduced through a concerted effort involving federal, state and local authorities including schools, volunteer, road and rail entities. STAYSAFE noted, however, that a number of countries appear to achieve an equivalent level of safety without such programs.
- 9.110 The House of Representatives Standing Committee on Transport and Regional Services (2004) inquiry into train visibility and railway level crossing safety reported:

"The Committee heard from Dr Cairney about the role that education can play in helping to reduce level crossing fatalities. He explained that the means already exist to deliver education programs in this area already:
... much of Australia has very active community road safety programs which are often run by local governments and, if we are going to embark on education, this is really a ready made infrastructure for delivering this type of message.

The expansion of level crossing safety education programs was supported by Austroads, which commented that:
... many of the stakeholder organisations recognized that hardly any educational activity was undertaken in relation to safe procedures at railway level crossings.

Austroads also supported the adaptation of 'Operation Lifesaver', a ... level crossing education program that runs in Canada and the United States of

Matters associated with drivers and other road users at railway level crossings

America. It was suggested by Austroads that this is a cost effective, non-profit education program ...” (p.18)

9.111 The House of Representatives Standing Committee on Transport and Regional Services indicated that it believed that it would be worth investigating whether this program could be adapted for Australian conditions and culture. STAYSAFE has had discussions with the Australasian Railways Association about issues of road user behaviour at railway level crossings. The Australasian Railways Association has been assigned responsibility—as a member of the Australian Rail Crossing Safety Implementation Group—to develop a national behavioural program to improve railway level crossing safety. One initiative already commenced is a pilot local community joint road safety and railway safety program being trailed in three communities in Western Australia.

9.112 STAYSAFE reviewed a number of Operation Lifesaver community programs. For example, in Ventura County in southern California in March 2002, rail operators joined together to form "railroad safety train" to address dangers along the railway network. A media release stated:

More than 25 trains travel through Ventura County every day; they carry both passengers and freight and provide a vital link for businesses and commuters throughout the state. But on Friday, Mar. 1, the Southern California Operation Lifesaver Grade Crossing Safety Team will join forces with the California Highway Patrol to bring a new train into the area - a Farm Worker's Railroad Safety Train made up of equipment from Metrolink, Amtrak, the Burlington Northern and Santa Fe Railway, and the Union Pacific Railroad

“For Metrolink and all of the members of the Southern California Grade Crossing Safety Team, ‘Look, Listen and Live’ is not just a slogan, it represents our passion for saving lives lost to simple acts of carelessness,” said Brian Humphrey, a member of the Metrolink Board of Directors and the Ventura County Transportation Commission. “Together with the farm community, we remain committed to ending this senseless and tragic loss of life caused by simple neglect for the speed and frequency of trains passing through our region.”

The Railroad Safety Train's first stop will be at the Camarillo Metrolink Station located at 30 Lewis Road. There, representatives from Metrolink, Operation Lifesaver, the California Highway Patrol, and the California Public Utilities Commission (PUC) will outline the safety education program to farm owners, local business people, and members of the media.

From the Camarillo Station the Safety Train will travel to two farm locations - at 11:00 a.m. it will be at the corner of 5th Street East and Pleasant Valley Rd, and at 1:00 p.m. the train will be at 5100 Olivas Park Drive. At each of these locations representatives from the Southern California Grade Crossing Safety Team will give presentations to the farm workers about the dangers of taking risks around railroad tracks. These presentations will be conducted in Spanish.

Matters associated with drivers and other road users at railway level crossings

“The PUC supports Operation Lifesavers Farm Worker Safety Education trains' efforts to bring the railroad safety message to the farm workers in the outlying rural areas,” said Trina Horner, Interim Director of the PUC's Rail Safety Division. “Many of these workers are learning the facts of grade crossing and railroad safety for the first time, and leave the event better prepared to protect themselves and their families from the dangers surrounding the nearby tracks. This public service will pay dividends by saving lives.”

Capt. Scott MacGregor, Commander of the Ventura area California Highway Patrol, which will also be participating in the Railroad Safety Train event, added “It is the goal of the California Highway Patrol to prevent future tragedies both on the highways and at rail grade crossings.”

The Southern California Grade Crossing Safety Team is a coalition of rail operators, transit agencies and rail safety advocates. The Team was formed in June of 2000 and includes members from California Operation Lifesaver, the Federal Railroad Administration, the California Public Utilities Commission, Amtrak, Metrolink, the Burlington Northern and Santa Fe Railway, the Union Pacific Railroad, the Pacific Harbor Line, and the Los Angeles County Metropolitan Transportation Authority. (Los Angeles, CA March 1, 2002)

- 9.113 STAYSAFE recommends that the Ministry of Transport, Roads and Traffic Authority and local councils review the Operation Lifesaver program in Canada and the United States of America for possible use, when adapted to Australian conditions and culture, in New South Wales.

RECOMMENDATION 66:

The Ministry of Transport, Roads and Traffic Authority and local councils review the Operation Lifesaver program in Canada and the United States of America for possible use, when adapted to Australian conditions and culture, in New South Wales.

- 9.114 As noted earlier, STAYSAFE believes that it is necessary to develop a coordinated approach to the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour at railway level crossings.
- 9.115 As noted earlier, STAYSAFE has had discussions with the Australasian Railways Association about issues of road user behaviour at railway level crossings. The Australasian Railways Association has been assigned responsibility—as a member of the Australian Rail Crossing Safety Implementation Group—to develop a national behavioural program to improve railway level crossing safety.
- 9.116 The Australasian Railways Association has indicated that it is considering organising a workshop and seminar on road user behaviour at railway level crossings. STAYSAFE recommends that Australasian Railways Association seek the assistance of the Rail Infrastructure Corporation and the Roads and Traffic Authority to hold a workshop and seminar on road user behaviour at railway level crossings. Ideally, this workshop and seminar will consider the broad range of issues affecting road user safety at railway level crossings, as identified and discussed in this report.

Matters associated with drivers and other road users at railway level crossings

RECOMMENDATION 67:

The Australasian Railways Association, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, hold a workshop and seminar on road user behaviour at railway level crossings.

CHAPTER TEN - MATTERS RELATING TO THE RAILWAY ENVIRONMENT AT LEVEL CROSSINGS

- 10.1 There are a number of issues associated with the railway environment: the rail reserve itself, and infrastructure associated with the railway tracks, rail signals, etc..
- 10.2 As well, there are issues associated with the overall railway network: metropolitan and rural railway lines (including restricted railway lines, or pioneer lines, used for shipment of agricultural products such as grain), heritage and tourist railways, and other private railways.
- 10.3 This chapter addresses some of the safety issues identified and considered by STAYSAFE regarding the railway environment issues associated with level crossings.
- 10.4 A critical issue associated with the environment at railway level crossings is vandalism.

Vandalism

- 10.5 STAYSAFE is concerned with vandalism and criminal damage associated with railway level crossings. This may extend from such matters as graffiti and deliberate damage to fencing at allow for trespass and transit across railway tracks (at locations away from level crossings), damage to signals and signage, through to deliberate theft of cabling and other infrastructure. Witnesses representing the Level Crossing Strategy Council commented:

Mr DEEGAN: Finally, I simply bring to the attention of the Committee our increased concern particularly in rail—and I am it is the same in road—with vandalism. A lot of level crossings are intervened with. We have people stripping out wire from signal equipment, particularly in remote New South Wales. The police have recently arrested someone who has been consistently taking out a set of boom gates on the North Shore line and the person is being dealt with in another fashion. People have put graffiti on signs, and have taken out lights and a host of those issues cause us a great deal of concern. We do not have a ready answer and, indeed, those issues impact greatly on the rail system. There are provisions under both the Rail Safety Act and the criminal code for action against individuals found interfering with rail safety gear. It is one of those other issues that affects the efforts put in by the people on either side of me and their colleagues that takes some of the spirit out of their efforts. We continue to have that as a concern and a focus. (Minutes of evidence of the STAYSAFE Committee, 30 October 2004, page 4).

Matters relating to the railway environment at level crossings

- 10.6 From the road perspective, anecdotal evidence suggests that warning signs, directional signs and regulatory signs in rural areas are subject to vandalism more frequently than in urban areas. This is due to the isolated location of signs in rural areas. Vandalism is usually in the form of using signs as target practise although in some instances signs have been covered in graffiti. The Roads and Traffic Authority does not keep specific data on vandalised signs at railway level crossings. The Roads and Traffic Authority, Council or sub-contractors maintain signage; while records of the type of signs replaced and date of replacement is kept, the specific reason for replacement is not always recorded.
- 10.7 From the rail perspective, vandalism frequently affects level crossing safety, particularly at active crossings. Vandals frequently affect the boom gates, signage, lights and track circuitry at or approaching level crossings. Callouts to address vandalism are costly and depending upon the location may require an extended response time to determine and carry out corrective action. While the Rail Infrastructure Corporation can provide data relating to reported incidents, although unfortunately, not all incidents or vandalism is centrally recorded.
- 10.8 Vandalism at level crossings encompass extensive actions that may cause disruption o rail services and particularly the safe operation of level crossings. One simple form that affects track circuitry controlling level crossings is the simple act of placing a coin across an insulated joint, which causes the crossing to activate but no physical damage. The rail authority, upon detection, is required to slow trains and investigate the problem, incurring callout and delay costs. The other end of the scale is the physical damage to signage and lights that may cause a motor vehicle driver to cross tracks while a train is approaching, resulting in a fatality.
- 10.9 Due to the extensive rail network and its comparative isolation it is extremely difficult to effectively monitor the rail system. Vandals when caught may be dealt with in a number of ways by police or the courts. Generally, good support is provided by the police and the court system if and when apprehended, although where vandals are juveniles, charges may not be laid. The incidence of apprehending vandals who disrupt level crossing protection (or other signalling) is quite negligible. Evidence regarding vandalism issues, particularly vandalism of trackside telephones, was most recently presented to the inquiry into the Glenbook rail crash during its hearings (McInerney, 2002).
- 10.10 STAYSAFE recommends that the Rail Infrastructure Corporation, in consultation with New South Wales Police, the Roads and Traffic Authority, and local councils:
- (a) Develop policies and strategies to combat vandalism associated with railway level crossings; and
 - (b) Review the adequacy of current legislation to effectively deal with vandalism and criminal damage of railway and road infrastructure.

RECOMMENDATION 68:

The Rail Infrastructure Corporation, in consultation with New South Wales Police, the Roads and Traffic Authority, and local councils:

- (a) Develop policies and strategies to combat vandalism associated with railway level crossings; and
- (b) Review the adequacy of current legislation to effectively deal with vandalism and criminal damage of railway and road infrastructure

Other offences associated with railway level crossings

10.11 STAYSAFE reviewed the provisions under both the Rail Safety Act and the criminal code for action against individuals found interfering with rail safety equipment. The relevant statutes for actions and penalties against individuals tampering with rail equipment are:

Crimes Act 1900

Section 195 - Maliciously destroying or damaging property.

- A person who maliciously destroys or damages property belonging to another or to that person and another is liable to penal servitude for 5 years.
- If the destruction or damage is caused by means of fire or explosives they are liable to penal servitude for 10 years.

Section 196 - Maliciously destroying or damaging property with intent to injure a person.

- A person who maliciously destroys or damages property, intending by the destruction or damage to cause bodily injury to another is liable to penal servitude for 7 years.
- If the destruction or damage is caused by means of fire or explosives they are liable to penal servitude for 14 years.

Section 198 - Maliciously destroying or damaging property with the intent of endangering life.

- A person who maliciously destroys or damages property intending by the destruction or damage to endanger the life of another is liable to penal servitude for 25 years.

Section 211 – Criminal acts relating to railways.

- A person who maliciously does any act on or in connection with the operation of a railway with the intention of causing death of, inflicting bodily injury on or endangering the safety of a person on a railway, a locomotive or rolling stock is liable to penal servitude for 25 years.
- A person who maliciously omits any act on or in connection with a railway with the intention of causing death of, inflicting bodily injury on or endangering the safety of a person on a railway, a locomotive or rolling stock is liable to penal servitude for 25 years.
- A person who maliciously does any act on or in connection with the operation of a railway with the intention of causing any locomotive or other rolling stock to be derailed, destroyed or damaged is liable to penal servitude for 14 years.

Matters relating to the railway environment at level crossings

- A person who maliciously omits to do any act on or in connection with the operation of a railway with the intention of causing any locomotive or other rolling stock to be derailed, destroyed or damaged is liable to penal servitude for 14 years.

Section 212 – Endangering passengers etc. on railway

- A person who, by unlawful act or a negligent omission endangers the safety of any person who is on or is being conveyed on a railway is liable to penal servitude for 3 years.

Section 213 – Obstructing a railway

- A person who intentionally and without unlawful excuse, does an act, or a negligent omission, endangers the safety of any person who is on, or who is being conveyed on a railway is liable penal servitude for 3 years.

Rail Safety Act

Section 78 - Tampering with railway equipment

- A person who tampers or disables the safety equipment of a railway or unit/units of rolling stock is guilty of an offence.
- A person who tampers or disables the interlocking system of a railway is guilty of an offence.
- “Interlock” is defined as any lever or collection of levers, or electrical and mechanical devices, or electrical devices that operate or control points and/or signals at locations where trains can be directed from one track to another and that are interlocked to prevent conflicting movements of trains.
- Each offence carries a maximum penalty of \$110,000.

Rail Safety Regulation

Clause 27 – Interference with train doors

- A person must not, without reasonable excuse, block a train door.
- A person must not, without reasonable excuse, open a locked train door at any time.
- A person must not, without reasonable excuse, open an unlocked train door while the train is moving.
- A person must not, without reasonable excuse, in any way interfere with an automatically operated door.
- Each offence carries a maximum penalty of \$550.

Clause 30- Unauthorised use of certain equipment

- A person without reasonable excuse must not use the public address system of a train or on a station or at a light rail stop.
- A person without reasonable excuse must not use any other communication device or information system of a train or a station or any other part of the infrastructure of a railway beyond its proper purpose.
- A person without reasonable excuse must not apply or release any brake on a train.
- A person without reasonable excuse must not use or interfere with any emergency or safety equipment on a train or on a station or any other part of the infrastructure of a railway.

Matters relating to the railway environment at level crossings

- A person without reasonable excuse must not operate or otherwise interfere with any electrical or mechanical apparatus or device that is on railway land or is attached to any part of a train.
- A person without reasonable excuse must not throw any article or thing at, towards or interfere with any electrical supply line. This includes any electrical or mechanical apparatus on railway land.
- “emergency or safety equipment” includes emergency breakdown equipment, alarms, stretchers, fire extinguishers and similar items.
- The maximum penalty for an offence is \$550.

10.12 Offences under the Rail Safety Act and Rail Safety Regulation incur only monetary penalties (no provision for custodial sentences).

10.13 The Level Crossing Strategy Council indicated that the current penalties provided for under the Crimes Act, Rail Safety Act and Rail Safety Regulation appear adequate.

CHAPTER ELEVEN - CONCLUDING COMMENTS

One family's story

- 11.1 At its final hearing, STAYSAFE heard evidence from Mr Barry Wooden, father of Kyle Wooden who, together with four of his friends, was killed on 27 January 2001 at the Bells Road, Gerogery, railway level crossing in a crash involving an express passenger train:

Mr WOODEN: I would like to start by letting everyone know who I am. My name is Barry Wooden and I am Kyle's dad. I would like to thank you all for giving me the opportunity to speak today. It is quite possibly the last chance I will get to give you my story. My story is about the grief, the horror, the waiting, the injustice and the frustration, amongst other things, that I have been placed under since 27 January 2001...

I would like to start off with my background, about where I come from. My mother was sent out from England basically back in the fifties with what we called the Big Brother scheme at the time, where a lot of the children were farmed out after the Second World War. When she arrived I was born and I was promptly adopted out to a wonderful mum and dad, whom I still love and who are still with me. I went through young life with normal things. I got a job, got married and had three beautiful kids. That was my little dynasty. My little dynasty starts with me because I do not know my father. Kyle was my only son so, yes, that was my little dynasty. I did build my little dynasty. I started a business, after working for other people for many years, as an automotive repairer. Kyle was my apprentice, incidentally. He was hopefully going to take on the business, when I got out, and keep the family business running.

Some years back when the adoption laws were changed I found my natural mother. She told me, on our first meeting, which was by phone, that my natural father had died the year I was born. As is the case with many adoption reunions, the wheels fell off completely a few years later. Happy days. My life was basically spent happily with a great wife and three beautiful perfect kids. We used to attend all sorts of sporting functions. They played every sport known to man—things like fishing, camping, water-skiing. I was teaching them and I was learning from them. I was enjoying their company. Our house was like an open house. All Kyle's friends would come through in single file. We all became very good friends. Kyle's friends were our friends as well. I am very proud of my family and I was looking to the future.

Now, on the work situation, the business that I started and built has been going 17 years now. There were three of us in the workshop and Alison in the office. It was a great workplace; it was full of fun—things like crackers

Concluding comments

going through the toilet window, jokes, fun; we were great mates and it was a great place to be. I had a qualified mechanic working for me at one stage to make up the three of us in the workshop. There was me, Jason, a qualified mechanic, and Kyle was my apprentice. Jason and Kyle got on very well, so well, in fact, that Jason was one of Kyle's bearers at the funeral.

Then 27 January 2001 came along. That was the day hell opened up. It is just a normal day, too, a normal morning, the twenty seventh. Friends from the coast had stayed the night and there was the normal thing in the morning. I could hear Kyle on the phone making plans to go and watch his friend Nick Anderson play his first, first-grade game against, I think it was Penrith. He was playing for the Melbourne Storm at the time. He now plays for the Canberra Brumbies. It was a normal morning, with Kyle making plans, having brekky. Kyle left in the morning after Graham picked him up. I remember him walking out the door. He just turned to me and he said, "Bye"—normal, nothing to worry about.

Later on in the day I was working in the shed, just doing a bit of woodwork or whatever it was. Alison heard a report and she came down to me from the house. She had heard a report that there was an accident at the railway crossing near Albury. The report gave virtually no details. It said there had been an accident involving a car and an XPT. Of course, we were immediately concerned and we tried to ring. We continually tried to ring all afternoon—never getting an answer of course. We did not really know but after a while we started to convince ourselves that it was okay, we would have heard by now. So much so, that around about 9.30 p.m. Alison went to bed, which was her normal bedtime. My eldest daughter got in touch with me and said, "Have you heard about the accident?" I said, "Yes." She said, "Do you think it would be the boys?" and I said, "I don't think so." She said, "Have you heard from Kyle?" I said, "No. I have been trying to ring him all afternoon. I will ring him again, I will try him once more and see what happens."

Well, 10 o'clock came around and things did happen. There was a news report on the television and then I knew. That is how I found out; I saw it on the news. The news report stated that five young Wagga men in a white Holden Statesman had been killed at Bells Road crossing. And I knew straightaway. It was just a matter of waiting for the police to arrive. At around about 10.15 there was a knock at the door. I actually turned the front light on for them so that they could find the place. At 10.15 there was a knock on the door. I looked out through the glass panel in the door and I saw a police officer and a priest. I said to him, "I hope you are not here for what I think you are" and the look on his face is going to stay with me forever.

After that your body goes into shock. I had to wake Alison. It was one of the hardest things I have ever had to do. Imagine waking your wife and telling her that your only son is dead. We also had to pick up our two daughters,

who were staying at friends' places for the evening. That took a long time to organise. The police were wonderful. Nothing was a problem to them and they were at our call, basically. Sunday: you know when you have a nightmare and you wake up and you think, "Thank God, it was only a nightmare." This is the reversal of that; when you wake up in the morning, you are waking up into the nightmare. You are okay when you are asleep, but the nightmare starts as soon as you wake.

Then the papers started. On the Monday there were news reports in all the papers, some claiming that the boys had been racing the train. That story came from one—I do not know how I should describe this particular person—his name is Sam Durland. He was sitting on the train, I think, five carriages back. He claimed that he saw the car trying to race the train, trying to beat the train through the crossing. As it turns out, during the course of the inquest Mr Durland's evidence was completely debunked by the Coroner. It turns out that Mr Durland did not see a thing. He saw basically the back of the car for, as he described it, that long. What that did to us and the other families is beyond comprehension.

The days following were much of the same—more lies, more bad press. It was a blur, basically. One day just blended into another. Things like eating did not seem even important. The time was spent choosing coffins and so forth, organising funerals. It was about this time, I am sure you probably remember, early 2001, the story started to surface from Glebe morgue about how bodies had been mistreated, hit with hammers, stabbed and so forth for, I think experimental reasons were the excuse that they used at the time. The boys were there then. Kyle was there then; he was in the morgue.

There was another problem about getting the bodies back in time for the funeral. There were no guarantees that we would be able to get them back for the funeral on the Friday. We asked could we see him and we were told categorically, "No, there is no way you will be able to see him before the funeral." We then had another advice from one of the people from Glebe morgue actually, who said, "Yes, there would be no problem with seeing Kyle." When the bodies arrived back in Wagga on Thursday, the funeral director rang us and said, "There is no way I would let you see him. You will have nightmares for the rest of your life." Well, I am having nightmares anyway, so it would not have mattered.

About three weeks later we went to the crossing for the first time. There was myself, Ray Wilkins, Benny's father, and my brother-in-law, Tony Durnan. The area around the crossing, the tall grass, which was two metres high, had been burned a couple of days after the accident. Obviously, I know why. At the scene of the accident we found things like watches. In fact, Cameron Tucker's watch had survived the fire and it had survived the accident. The glass had fallen out of it and the band had been ripped off but the watch was still working. I found pieces of Kyle's watch. I found Kyle's phone, which had been melted in the fire, and about three sets of

Concluding comments

Graham Kelly's keys. We stood there and looked at all the cars, the number of cars, buses, B-doubles and semi-trailers. We looked at the alignment of the road and thought, "This is ridiculous." There were signs of destruction everywhere.

There were parts of the car lying through the grass that had not been removed. In fact, the bullbar, or whatever you call it, the cowcatcher, the big piece of steel on the front of the train, is not a crumple zone. It is a big section of steel, possibly made out of, I would imagine, 5 millimetres to 10 millimetres of steel. The bar from the train had been left on the side of the track where it had been torn off but in the centre of the bullbar, there is an imprint of a mag wheel off a Holden Statesman. It had been punched and imprinted into the metal. That will give you some idea of the impact that must have happened.

A week later myself, Bruce Milne, Alison and my eldest daughter, Aimie, went back to the crossing again with a video camera, and we photographed the crossing—and the B-doubles, and the buses and the cars and the old type-F level crossing that was in place at the time, what I would call a ding-ding, 21-watt, 12-volt set-up—about the same as a brake light on a car. They are not LEDs, like they are now, which are very bright and you can see them from miles away. I thought, "This crossing doesn't belong on a major highway, simply because it's the fastest section of track in Australia, it's the fastest train in Australia, it was doing its fastest posted speed, which was supposedly 160 km/h, and it was going through an open level crossing."

Bells Road was not always a highway. It was a back road actually; it was a short-cut to the Hume Highway that a lot of people used, particularly trucks. And it was consequently upgraded for monetary reasons—because the original highway went through a section of hilly country through a town called Jindera and back onto the Hume Highway further towards Albury. There had been repeated calls—too many calls to mention here; I would be here all day if I had to mention every call—from local councils and so forth, that wanted to upgrade the crossing, to bring it up to the standard of a highway. Well, they did not do much. There was very little done actually to upgrade that crossing after it had been re-posted as a highway. Bells and lights were fitted in 1982. What a marvellous piece of technology they were! Fifty years ago they would have been.

It is interesting to note, though, that years ago—and I can remember this—when I was young, all those little country crossings had gatekeepers. There was a gatekeeper's house right beside the crossing, and they pulled the gate shut when a train was due to come through. I would call that a closed corridor system myself—and that was even in the days of steam trains! A bridge was planned, and due to start, I think, in January 2000 and to be finished in January 2001. The funding for that project was rejected on a priority basis; it was not given high priority.

Another interesting note is that a government department report was done—and we have copies of it—as part of the coroner's brief, that listed the 14 worst crossings in New South Wales, rated on accident history. Guess which one was at the top? That would be right—good old Bells Road. In April, new boom gates were installed. Ripper! Too late for us! It took the deaths of five fine sons. They were great mates. They worked second jobs together at a local hotel to supplement their income. They enjoyed each other's company. They were like a band of brothers. They played sport together, quite often at representative level. They had fun and laughs together. That is what they were doing. It is ironic that they were having the time of their lives when they died. A few days later we were having a Green Day song "Time of Your Life" played at their funeral. I was back to work in a week and a half—I still had to put bread on the table.

We have continued our lobbying for upgrades for all crossings, not just that one. Trying to function, basically, for a time after that—trying to function like a person. Then, when I go to work now, it's just me; I'm the only one there; there are too many memories and reminders; I just exist. That's about it—I exist. Most days I am actually physically ill before I leave to go to work. I have actually put the business on the market. After 17 years, it is time for a change of life. I cannot keep going back in there.

On 2 August 2001 there was a truck crash at the crossing, one of Hume Transport's. It was carrying a load of dog food, ironically. It flattened the new boom gates that they had installed. It flattened the one on the Albury side. That shorted the track lights back to Culcairn. This was at night time, and there was a train coming. It was an XPT coming from Sydney towards Melbourne. Picture a semitrailer lying on its side on this crossing; the driver of the train, thank God, had the forethought to stop the train when he realised there were no track signal lights. By the time he pulled the train up, it had come to a halt, the truck was visible in the headlights of the train, lying across the crossing. I shudder to think of the carnage that would have been caused if those two had come into contact. The train was carrying over a hundred people.

The 4 August 2001 was the day hell opened up a bit further. Alison and I went to the crossing, I think it was two days after the truck crash, to make sure the crosses that were standing beside the road had not been damaged. As we walked up to the crosses, about two metres away from the crosses, lying in a piece of open ground, were some human remains. In shock, I buried them. I held them in my hands, and I anguished for about six weeks about that, all the time knowing in my heart and my soul that they belonged to my son. It got the better of me, so on 22 August I went down and dug them up. This triggered a chain of events that has left me completely devastated and is going to fester in my soul forever. It took months more of hell before our suspicions were confirmed. Then we had a second cremation. I once said to Kyle, when there was a bit of a minor emergency and I had to pick him up from somewhere, and he was a bit emotional, and he said to me, "Thanks for coming and picking me up,

Concluding comments

Dad," I said, "Son, I love you. I'll always come and pick you up." I had no idea what that phrase meant.

The inquest came about. It had actually been postponed—incidentally, because another XPT had killed somebody else at Albury, Mr Tom Vildovas. Mr Durland was in the same room as I was. I did forget to thank him for magnifying the grief for five families! Also at the inquest were various self-important fools who, for reasons known to themselves, needed to have their five minutes of fame. I would like to thank sincerely all the people who gave clear, honest, concise evidence.

Consequently, the boys were cleared. The racing the train story was struck out. Unfortunately, some of that has stuck. It is surprising the number of people who think that was the case. We were chased and basically held to ransom by some members of the press. As if we didn't have enough on our plate! But one good thing did come out around the time of the inquest: the concept of Five Mates Crossing. It was not going to be five mates bridge; it was not going to be five mates anything but Five Mates Crossing because it had a double meaning. Now it is a railway crossing, but it also signifies where those five mates crossed over to the other side. And I would suggest people in office read the coroner's findings, some of which were printed in last Friday's *Sydney Morning Herald*, thanks to Joseph and Wade from the *Sydney Morning Herald* for their compassion and their thoughtfulness.

Since then we have battled misinformed fools, insurance companies, the legal system, government departments, and basically been brick-walled at every turn. The Government did see fit to reimburse itself by taxing Kyle's life insurance policy! Probably one of the most recent things we have had to do—we did not have to do it, but we were advised to by our psychological experts, our counsellors, my psychologist, who said it would probably be a good thing, it would be some sort of closure—was to see a photo of Kyle after the accident. We did. I am glad I did—but it's had a hell of an effect on me. The whole thing has changed me. I am not the same person I used to be. I am not anywhere near the same person I used to be. I have become a hermit. I do not do a lot much anymore, including enjoying the company of others. It has also put a huge strain on my married life and my life in general.

We would like to make a couple of proposals.

Number one, we need a Minister under whose authority the issue of level crossing safety and upgrades is handled between the appropriate government departments, someone whose job it is to protect the community where road meets rail.

Number two, crossings to be upgraded on a basis of priority—being the number of deaths at the crossing, train speed, train frequency, car frequency, road-rail alignments, and things to that effect. We could also adopt the Queensland system, which recommends that a train travelling in

excess of 120 km/h uses what they call a closed corridor system. In effect, what I think that will do is keep the gate shut and not let the horse loose. In this case it is an iron horse, and a lethal one at that. I am asking for the powers that be to be proactive, instead of reactive.

I put it to you, Bob Carr, and your Government: make a commitment to upgrading infrastructure west of what I call the big hill. People are dying needlessly out here in the country. Who cares? Well, we do. I would also like you, Mr Carr, to respond to our repeated letters to you personally which you seem to ignore and pass on to others. This submission only scratches the surface of the constant hell we have to go through every day. But, even after all that, we apparently have not suffered enough to even claim compensation, according to Mr Carr's legislation. The people in power, the people who are charged with the task of keeping our population safe, may not answer to or be judged by that population. That will be done by a higher power.

I would like to thank you all for letting me have my say. I would like to thank the police for the way they conducted themselves right from the start. I would like to thank Carl Milovanovich and his staff who during the course of the inquest were wonderful. I would like to thank my wife and two daughters for their love. I would like to thank John Hennessey for steering us and giving us a little bit of direction to try and work our way through a system that does not work. I would like to thank Daryl Maguire and other local government people, councillors, etc., who have supported us, especially Alison, who has written to every mayor of every shire in New South Wales, for their support as well. I would like to thank you for listening.

Mr GIBSON MP (CHAIRMAN): There are no words that can express what we feel for you and the family. There were five mates, I think you said he had, and you were a great mate of his, and that shows through. All I can say is that we have taken in everything you have said, and we will endeavour to make it law. I was going to ask you what you thought we should be doing at level crossings, and you have given us that information. But nobody knows what you have been through unless they have been through it themselves.

Mr WOODEN: That is right.

Mr GIBSON MP (CHAIRMAN): One think I will say: you have got more guts than I or anybody else here. I thank you for your evidence. (Minutes of evidence of the STAYSAFE Committee, 17 May 2004, pages 37-41)

The bigger picture—the review of responses to inquiry findings and recommendations

11.2 STAYSAFE also considered a number of more general issues affecting the safety of railway level crossings.

Concluding comments

- 11.3 During the course of the inquiry into the safety of railway level crossings there were major changes the New South Wales transport portfolio underwent significant restructuring, and a new Minister, the Hon. Michael Costa MLC, was appointed. Transport NSW was abolished and its functions were transferred to existing rail entities such as the Rail Infrastructure Corporation, the Ministry of Transport, and the Independent Transport Safety and Reliability Regulator.
- 11.4 The development of new and revised policies and programs to address the safety of railway level crossings is therefore occurring under new bureaucratic structures and functions, and new legislation, in the Transport Services portfolio.
- 11.5 The impact of the major changes within the Transport Services portfolio remain unclear at this time—particularly with regard to the role of Independent Transport Safety and Reliability Regulator, and the specific role of the Office of Transport Safety Investigation in the investigation of railway level crossings.
- 11.6 There are also a number of major research projects underway, including a Cooperative Research Centre for Railway Engineering and Technologies study into level crossing risk management, with a focus on developing a community intervention program for level crossing safety, and the Centre for Accident Research and Road Safety—Queensland, based at the Queensland University of Technology, is conducting a Delphi research project into motorist behaviour at railway level crossings.
- 11.7 As well, at a national level organisations such as the Australasian Railways Association and the Australian Rail Track Corporation are expressing an interest in the safety of railway level crossings. The newly established National Transport Commission provides for an integrated national approach to transport planning and regulation across all land transport modalities.
- 11.8 Taken together with coronial and other investigations (e.g., Australian Transport Safety Bureau) into fatal crashes at railway level crossings, STAYSAFE has concluded that there are significant actions underway current that have great promise to improve the safety of railway level crossings.
- 11.9 However, STAYSAFE notes the different response given to the railway crashes at Glenbrook in 1999 and Waterfall in 2002. The Glenbrook crash involved two passenger trains colliding, resulting in seven deaths and injuries to fifty people. The Waterfall crash involved the derailment of a passenger train, and resulted in seven deaths and injuries to all other passengers. Following each of these crashes, special commissions of inquiry were established to investigate the causes of the crashes and the factors which contributed to them, the adequacy of safety and risk management systems applying to rail operations, and to recommend safety improvements to rail operations which are considered necessary (see McInerney, 2002, 2004). The road-railway crash at the Bells Road, Gerogery, railway level crossing in 2001 did not provoke a similar response, despite the deaths of six people and the severe risk of injury to all passengers on the train. The Gerogery crash occurred at a speed of 160 km/h, markedly in excess to the speeds at the Glenbrook and Waterfall crashes, and the risk of a catastrophic outcome was therefore so much

greater. The reasons for such a difference in response to these crashes is not clear, and this difference in response should not, in STAYSAFE's view, go unremarked.

- 11.10 On a broader scale, the Commonwealth government has announced a program for major investment in the rail sector—AusLink. In the AusLink program, the Commonwealth government has foreshadowed spending of \$1.8 billion in rail capital works over the next five years, out of \$11.8 billion in land transport spending. The Commonwealth government has completed an upgrade of the east-west rail routes from Melbourne to Perth via Adelaide. The major part of the new expenditure will go into the north-south interstate rail corridor linking Brisbane, Sydney and Melbourne, that is, into the interstate rail network through New South Wales.
- 11.11 Some of the specific projects have already been announced, including construction of a 30 kilometre stretch of dedicated freight railway track on the main south line in the outskirts of southwestern Sydney, and replacement of an obsolete signalling system in northern New South Wales on the north coast line.
- 11.12 An important element to the Auslink program is the leasing by the New South Wales government to the Australian Rail Track Corporation of the New South Wales interstate and Hunter Valley rail corridors and the dedicated metropolitan freight lines to the Sydney ports. The Australian Rail Track Corporation will have responsibility for funding rail infrastructure on these lines and for train control by rail operators using these lines. As well, the Australian Rail Track Corporation has taken over management of the remaining country rail network, although the New South Wales government will retain funding responsibility. Rail infrastructure maintenance and train control staff will remain employed by New South Wales.
- 11.13 STAYSAFE believes that an important element of the AusLink program should be a focus on eliminating some of the longstanding rail network management and operational deficiencies associated with railway level crossings, which are critical to improve the interstate network. STAYSAFE also notes that the Australasian Railway Association has released a detailed rail infrastructure policy outlining a string of further improvements needed for the national rail network, including common operating systems and safety regulations, standardised communications and information technology systems, and more attention to regional freight and urban passenger rail.
- 11.14 For these reasons:
- the restructuring of the Transport services portfolio, with the creation of new agencies with rail safety and reliability functions;
 - significant current research programs into railway level crossing safety; and
 - the announcement of major national programs to revitalise and upgrade the interstate rail network through New South Wales

STAYSAFE recommends that the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other agencies, be subject to a further review in 2006 by the STAYSAFE Committee regarding the response to the findings and recommendations of the inquiry into the safety of railway level crossings in New South Wales.

RECOMMENDATION 69:

The Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other agencies, be subject to a further review in 2006 by the STAYSAFE Committee regarding the response to the findings and recommendations of the inquiry into the safety of railway level crossings in New South Wales.

APPENDIX A

Draft recommendations of the STAYSAFE Committee of the 52nd Parliament, forwarded to the Minister for Transport and Minister for Roads, 30 January 2004

The draft recommendations addressed the following issues:

- Lead agency
- Management of matters associated with rail level crossings
- Review of the funding formula for upgrading rail level crossings
- Inventory
- Internet access to inventory
- Audit process
- Risk assessment and prioritisation program
- Organisation of priorities
- Rail corridor management
- Closed corridor policy for high speed railways
- Closure and relocation of railway level crossings
- Amendment of legislation concerning procedures for the closure and relocation of railway level crossings
- New railway level crossings
- Review of AS1742 - part 7
- Australian technology and best practice
- New technology
- Commitment to innovation
- Gateway treatments for roads approaching railway level crossings
- Integration of rail signals with traffic signals on roads approaching railway level crossings
- Trial of a new railway level crossing signal system based on existing road traffic signals
- Frangible roadside and railway infrastructure at railway level crossings
- Removal of obstructive vegetation within the sight triangles at railway level crossings
- Land use planning and development issues and railway level crossings
- Heritage and tourist railways
- Distraction
- Education and awareness of motorists and pedestrians
- Education and awareness actions to address "culture of blame"
- Enforcement issues associated with railway level crossings
- Criminal liabilities regarding use of railway level crossings
- Suicides at railway level crossings
- Trespass across railway lines
- Pedestrian behaviour at railway level crossings

Appendix A

- Support for train crews and other personnel involved in level crossing crashes
- Departmental crossings
- Train conspicuity
- Risk assessment for level crossing crashes involving passenger trains or trains carrying hazardous materials
- Costs of level crossing incidents
- Contingency planning for level crossing crashes involving passenger trains or trains carrying hazardous materials
- Review of response to inquiry findings and recommendations

LEAD AGENCY

RECOMMENDATION 1:

Ministry of Transport be the lead agency for matters associated with railway level crossings, that is, intersections where a road and railway meet at the same level.

MANAGEMENT OF MATTERS ASSOCIATED WITH RAIL LEVEL CROSSINGS

RECOMMENDATION 2:

Matters associated with railway level crossings in New South Wales be:

- (a) co-ordinated and directed through a high level council comprising the relevant Minister(s) and chief executives of the roads and transport portfolios;
- (b) managed through a railway level crossings manager employed by Transport NSW;
- (c) administered in terms of budget and works programs by Transport NSW; and

with responsibilities regarding roads in the immediate vicinity of railway level crossings to be negotiated and co-ordinated by the railway level crossings manager in consultation with the Rail Infrastructure Corporation, the Roads and Traffic Authority and local councils

REVIEW OF THE FUNDING FORMULA FOR UPGRADING RAIL LEVEL CROSSINGS

RECOMMENDATION 3:

The Minister for Transport and Minister for Roads review the recurrent funding formula for the upgrading of railway level crossings, with specific regard to:

- (a) the adequacy of the recurrent funding to achieve the necessary and desirable improvements in public rail safety and road safety within a reasonable timeframe and in a manner that promotes the development of rail transport in New South Wales;
- (b) the capacity of local councils to contribute to the recurrent funding formula; and
- (c) whether the recurrent funding formula allows the effective and efficient planning of upgrading works associated with railway level crossings.

INVENTORY

RECOMMENDATION 4:

The Rail Infrastructure Corporation develop and maintain an inventory of all intersections between railways and roads, including all intersections where a road, road-related area, pedestrian access route or other access route meets a railway at substantially the same level (e.g., actively signalled road level crossings, passively signed road level crossings, accommodation crossings, maintenance crossings, pedestrian crossings, etc.).

INTERNET ACCESS TO INVENTORY

RECOMMENDATION 5:

The Rail Infrastructure Corporation ensure that there is public internet access to the inventory of all intersections between railways and roads, including intersections where a road and railway meet at substantially the same level.

AUDIT PROCESS

RECOMMENDATION 6:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other Transport NSW agencies, develop and implement a program of audit for all intersections where a road and railway meet at substantially the same level.

RISK ASSESSMENT AND PRIORITISATION PROGRAM

RECOMMENDATION 7:

The Rail Infrastructure Corporation, in consultation with other rail agencies interstate, continue to develop and maintain a risk assessment and prioritisation program for intersections where a road and railway meet at substantially the same level.

ORGANISATION OF PRIORITIES

RECOMMENDATION 8:

The Rail Infrastructure Corporation, in consultation with other rail agencies interstate, ensure that the development of a risk assessment and prioritisation program for intersections where a road and railway meet at substantially the same level is organised to readily identify issues associated with high speed passenger services, and high speed rail operations generally.

RAIL CORRIDOR MANAGEMENT

RECOMMENDATION 9:

Transport NSW, in consultation with in the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, rail operators, and other Transport NSW agencies develop and implement rail corridor management strategies for New South Wales railway lines.

CLOSED CORRIDOR POLICY FOR HIGH SPEED RAILWAYS

RECOMMENDATION 10:

Transport NSW, in consultation with in the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, rail operators, and other Transport NSW agencies adopt a closed corridor strategy for high speed railway lines in New South Wales.

CLOSURE AND RELOCATION OF RAILWAY LEVEL CROSSINGS

RECOMMENDATION 11:

Transport NSW, in consultation with the Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other Transport NSW agencies, actively seek the closure or relocation of intersections where a road and railway meet at substantially the same level.

AMENDMENT OF LEGISLATION CONCERNING PROCEDURES FOR THE CLOSURE AND RELOCATION OF RAILWAY LEVEL CROSSINGS

RECOMMENDATION 12:

The relevant legislation be amended to:

- (a) allow the Director-General of Transport NSW to order the closure or relocation of intersections where a road and railway meet at substantially the same level;
- (b) specify the mechanism and grounds for appeal of a decision by the Director-General of Transport NSW to close or relocate an intersection where a road and railway meet at substantially the same level;
- (c) provide for the Roads and Traffic Authority and the local council to be a party to any appeal of a decision by the Director-General of Transport NSW to close or relocate an intersection where a road and railway meet at substantially the same level.

NEW RAILWAY LEVEL CROSSINGS

RECOMMENDATION 13:

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other Transport NSW agencies, adopt a policy that actively seeks to ensure that there are no new intersections built where a road and railway meet at substantially the same level.

REVIEW OF AS1742 - PART 7**RECOMMENDATION 14:**

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other Transport NSW agencies, seek and participate in the review of Australian Standard AS1742 - Part 7 relating to railway level crossings, including, but not limited to a range of technical issues associated with signals technology, signage, markings, etc.

AUSTRALIAN TECHNOLOGY AND BEST PRACTICE**RECOMMENDATION 15:**

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, seek to adopt Australian technologies and to adopt best practice principles for the management of railway level crossings.

NEW TECHNOLOGY**RECOMMENDATION 16:**

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, and other Transport NSW agencies, encourage the development and implementation of new technologies to improve the safety of railway level crossings.

COMMITMENT TO INNOVATION**RECOMMENDATION 17:**

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, local councils, and other Transport NSW agencies, ensure that there are opportunities for the assessment of innovative approaches to addressing the problems associated with railway level crossings.

GATEWAY TREATMENTS FOR ROADS APPROACHING RAILWAY LEVEL CROSSINGS**RECOMMENDATION 18:**

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority and local councils, develop a program for the installation of gateway treatments and other perceptual countermeasures to provide better cues to motorists on roads approaching railway level crossings, including but not limited to road markings, signage, roadside infrastructure, the road pavement design and construction (e.g., road width, road surface treatment, rumble strips, etc.), and traffic signals (e.g, approach flashing lights).

INTEGRATION OF RAIL SIGNALS WITH TRAFFIC SIGNALS ON ROADS APPROACHING RAILWAY LEVEL CROSSINGS

RECOMMENDATION 19:

The Roads and Traffic Authority and the Rail Infrastructure Corporation, with local councils (where appropriate), provide for the integration of rail signals with any traffic signals on roads approaching railway level crossings.

TRIAL OF A NEW RAILWAY LEVEL CROSSING SIGNAL SYSTEM BASED ON EXISTING ROAD TRAFFIC SIGNALS

RECOMMENDATION 20:

The Rail Infrastructure Corporation and the Roads and Traffic Authority develop and trial a new railway level crossing signal system based on the existing road traffic signals where:

- (a) a system of green-amber-red lights is displayed to road traffic approaching a railway level crossing so that drivers see:
 - (i) a green light when no train is present or approaching,
 - (ii) an amber light indicating the approach of a train, and
 - (iii) a red light (or double red lights) to indicate the imminent approach and transit of a train;
- (b) the use of flashing green-amber-red lights is compared with a steady green-amber-red lights display; and
- (c) the railway level crossing signal system uses modern technologies (e.g., LED displays, detection of train speeds, microwave technology, GPS technology, etc.)

FRANGIBLE ROADSIDE AND RAILWAY INFRASTRUCTURE AT RAILWAY LEVEL CROSSINGS

RECOMMENDATION 21:

The Rail Infrastructure Corporation ensure that the roadside and railway infrastructure that is installed at railway level crossings minimises the likelihood of serious injury in the event of collisions between a train and a vehicle or person through:

- (a) the design and construction of frangible (breakaway) road side and rail infrastructure; and
- (b) the removal and replacement of non-frangible roadside and railway infrastructure at railway level crossings.

REMOVAL OF OBSTRUCTIVE VEGETATION WITHIN THE SIGHT TRIANGLES AT RAILWAY LEVEL CROSSINGS

RECOMMENDATION 22:

The Rail Infrastructure Corporation, in consultation with local councils, the Roads and Traffic Authority and the Environment Protection Authority ensure that there is a program to removal obstructive roadside and railway vegetation within the sight triangles associated with railway level crossings.

LAND USE PLANNING AND DEVELOPMENT ISSUES AND RAILWAY LEVEL CROSSINGS**RECOMMENDATION 23:**

Transport NSW, in consultation with the Rail Infrastructure Corporation and the Roads and Traffic Authority, ensure that local councils, when considering land use planning and development issues, take account of issues associated with railway level crossings, and that such considerations are documented by local council traffic committees.

HERITAGE AND TOURIST RAILWAYS**RECOMMENDATION 24:**

The Rail Infrastructure Corporation, in consultation with the Roads and Traffic Authority, ensure that issues associated with railway level crossings on heritage and tourist railways are identified, considered, and addressed in general policies and programs to improve the safety of operation of railway level crossings.

DISTRACTION**RECOMMENDATION 25:**

The Roads and Traffic Authority, in consultation with Transport NSW agencies, and other relevant agencies and organisations, identify and review the possible mechanisms and contribution of driver distraction as a contributor to level crossing crashes, including but not limited to placement and complexity of road side signage and signals, in-vehicle devices and instrumentation, and the vehicle environments (soundproofing, air conditioning, etc.)

EDUCATION AND AWARENESS OF MOTORISTS AND PEDESTRIANS**RECOMMENDATION 26:**

The Rail Infrastructure Corporation, in consultation with local councils, and the Roads and Traffic Authority review the current approaches to the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour at where a road, road-related area, pedestrian access route or other access route meets a railway at substantially the same level, with particular regard to the effectiveness of public advertising, driver education materials, and road signage.

EDUCATION AND AWARENESS ACTIONS TO ADDRESS "CULTURE OF BLAME"**RECOMMENDATION 27:**

The Roads and Traffic Authority, in consultation with local councils and the Rail Infrastructure Corporation, ensure that the education and awareness of motorists and pedestrians regarding safe and appropriate behaviour at level crossings addresses issues associated with the "culture of blame" where the train and train driver are seen as responsible for a crash or near miss incident.

ENFORCEMENT ISSUES ASSOCIATED WITH RAILWAY LEVEL CROSSINGS

RECOMMENDATION 28:

The Roads and Traffic Authority, in consultation with New South Wales Police and the Rail Infrastructure Corporation, review the means currently and potentially available to enforce traffic law regarding motorists transiting a railway level crossing, including but not limited to red light camera technologies and locomotive-mounted video cameras.

CRIMINAL LIABILITIES REGARDING USE OF RAILWAY LEVEL CROSSINGS

RECOMMENDATION 29:

The Attorney General's Department, in consultation with the Rail Infrastructure Corporation, and the Roads and Traffic Authority review the current criminal law regarding motorists and pedestrians using railway level crossings and determine if the current offences are sufficient to deter unsafe and inappropriate behaviour and if further specific offences are required.

CIVIL LIABILITIES REGARDING USE OF RAILWAY LEVEL CROSSINGS

RECOMMENDATION 30:

The Attorney General's Department, in consultation with the Rail Infrastructure Corporation, and the Roads and Traffic Authority review the current civil law regarding motorists and pedestrians using railway level crossings and determine if the current tort liabilities are sufficient to deter unsafe and inappropriate behaviour.

SUICIDES AT RAILWAY LEVEL CROSSINGS

RECOMMENDATION 31:

The Rail Infrastructure Corporation, in consultation with employee organisations and New South Wales Health, review the incidence of suicide at railway level crossings and develop, where possible, effective means for the prevention of suicides and intervention with persons exhibiting suicidal tendencies.

TRESPASS ACROSS RAILWAY LINES

RECOMMENDATION 32:

The Rail Infrastructure Corporation, in consultation with the New South Wales Police Service and other Transport NSW agencies, review the incidence of trespass across railway lines and develop, where possible, effective means for the prevention of trespass and intervention with trespassers on railway property.

REVIEW OF RESPONSE TO INQUIRY FINDINGS AND RECOMMENDATIONS**RECOMMENDATION 33:**

The Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other Transport NSW agencies, be subject to a further review in 2007 by the STAYSAFE Committee regarding the response to the findings and recommendations of the inquiry into the safety of railway level crossings in New South Wales.

PEDESTRIAN BEHAVIOUR AT RAILWAY LEVEL CROSSINGS**RECOMMENDATION 34:**

The Rail Infrastructure Corporation, the Roads and Traffic Authority, local councils, and other Transport NSW agencies, review the safety of pedestrian facilities associated with crossing railway tracks, including pedestrian-only level crossings as well as level crossings used by motor vehicles.

SUPPORT FOR TRAIN CREWS AND OTHER PERSONNEL INVOLVED IN LEVEL CROSSING CRASHES**RECOMMENDATION 35:**

The Rail Infrastructure Corporation, in consultation with the WorkCover Authority, New South Wales Health, rail unions, rail operators, other Transport NSW agencies, New South Wales Police, and other relevant agencies and organisations, review the support provided for train crews and other personnel involved in attending level crossing crashes to:

- identify best practice principles.
- develop and implement improved programs to support train crews and other personnel involved in attending level crossing crashes

DEPARTMENTAL CROSSINGS**RECOMMENDATION 36:**

The Rail Infrastructure Corporation, in consultation with rail operators, review the safety of departmental crossings associated with vehicular and pedestrian access onto or across railway tracks.

TRAIN CONSPICUITY

RECOMMENDATION 37:

Transport NSW, in consultation with rail operators, rail unions, other Transport NSW agencies, the WorkCover Authority, and other relevant agencies and organisations, identify and review the efficacy of measures to improve the conspicuity of trains, with specific attention to issues associated with trains travelling across level crossings, including but not limited to:

- locomotive ditch lights,
- locomotive strobe lights,
- general locomotive lighting,
- the use of locomotive highlights
- the use of retroreflective marking on locomotives, goods wagons and passenger carriages.

RISK ASSESSMENT FOR LEVEL CROSSING CRASHES INVOLVING PASSENGER TRAINS OR TRAINS CARRYING HAZARDOUS MATERIALS

RECOMMENDATION 38:

Transport NSW, in collaboration with the Emergency Services, Police, Health, Environment, and Roads portfolios, should commission or conduct risk assessments for serious incident scenarios such as a crash at a railway level crossing involving a fast passenger train or a freight train carrying dangerous goods (hazardous materials) on metropolitan, regional and rural railway lines within New South Wales.

COSTS OF LEVEL CROSSING INCIDENTS

RECOMMENDATION 39:

Transport NSW should commission or conduct studies regarding the probabilities estimated for the likely occurrence of level crossing incidents in order to identify the projected human costs, capital costs, and economic costs likely to be associated with such level crossing incidents.

CONTINGENCY PLANNING FOR LEVEL CROSSING CRASHES INVOLVING PASSENGER TRAINS OR TRAINS CARRYING HAZARDOUS MATERIALS

RECOMMENDATION 40:

The Minister for Emergency Services should review the State Disaster Plan and other statewide emergency plans to ensure adequate and effective contingency planning for serious incident scenarios such as a crash at a railway level crossing involving a fast passenger train or a freight train carrying dangerous goods (hazardous materials) on metropolitan, regional and rural railway lines within New South Wales.

APPENDIX B

Level Crossing Strategy Council, Yearly Report, 2002-03

Chairman's Report

The LCSC has built on the achievements of the 2001/02 level crossing upgrade program by reducing safety risk at 137 level crossings in 2002/03. Over \$4.9 Million was spent on level crossing safety during the year, not counting in-house staff or cost of grade separation.

2002/03 saw the Government commit to an acceleration of the level crossing upgrade program, with an additional \$13 Million allocated over 4 years until 2007/08. It should be noted however, with over 3,800 level crossings in NSW, many of them on interstate track, the LCSC will continue to argue in national forums that the Commonwealth needs to contribute to quickly bring all level crossings into the twenty-first century.

2002/03 major achievements include the risk assessment of all public road / public rail level crossings (over 1400 sites), the establishment of a dedicated level crossing closures team (with 14 closures facilitated), and the successful continuation of the public press, billboard and radio education campaign to alert locals, especially in country areas, to the dangers of complacency when using level crossings.

While there were no fatal road accidents at NSW level crossings during the year, the LCSC was greatly assisted by the recommendations from two Coronial Inquiries and a NSW Parliamentary Staysafe Committee. The LCSC is indebted to these broad community efforts to investigate and understand how safety of road users and rail passengers can be improved. The LCSC is committed to implementing all the recommendations to the best of its ability.

The LCSC has taken note of incidents interstate, with particular interest in the traffic queuing issues associated with the level crossing accident at Salisbury in Adelaide and the review of pedestrian requirements (particularly persons with disabilities) arising from incidents in Victoria.

NSW has achieved world's best practice by basing its risk reduction program on a model that prioritises where resources can best be deployed. This means that taxpayer dollars are targeted at the level crossings where there will be the greatest safety benefit.

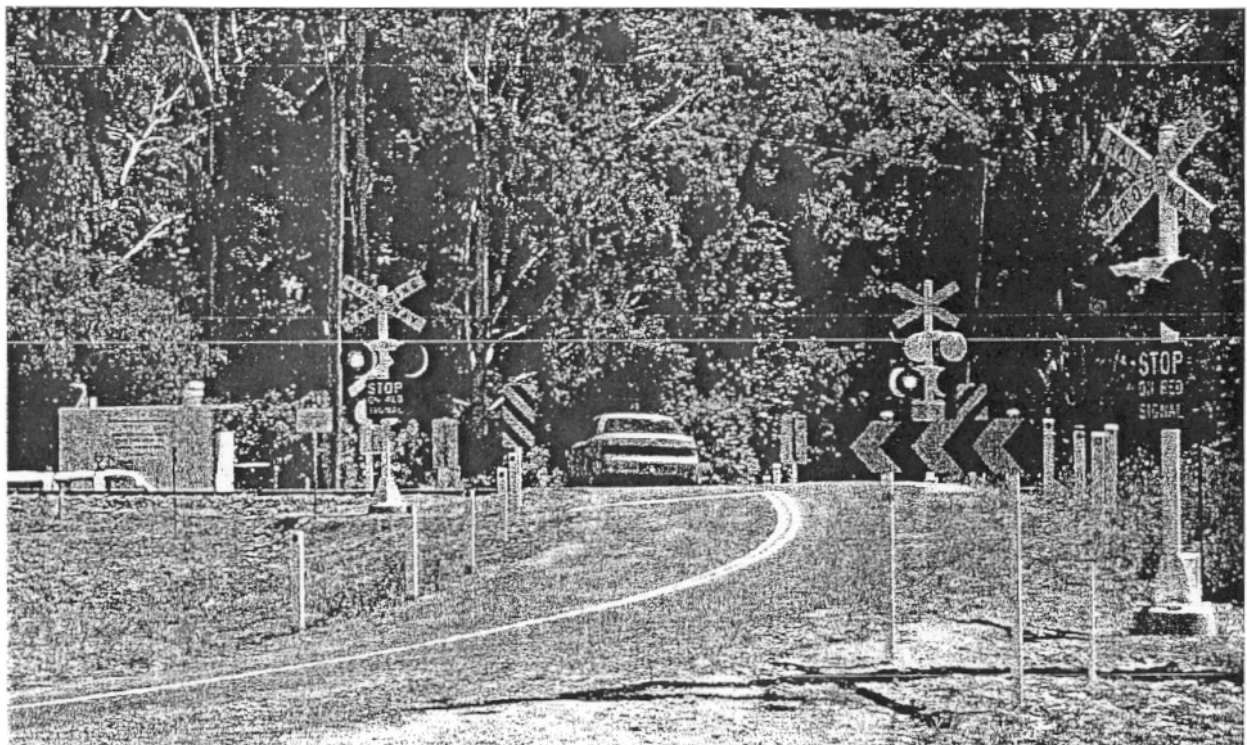
The key to the success of the LCSC is that it ensures that State and local agencies responsible for level crossings speak and act collectively. That this simple arrangement generated such an impressive safety achievement is in large part due to the leadership of Michael Deegan who chaired the LCSC for the first nine months of the year.



JOHN LEE
Chairman

Content

	Page
Highlights	1
Upgrade & Closures Program	2
Upgrade Program – Photo Gallery	5
Achievements	13
Chronology	16
Annual Incident Report	17
Accident Trends	18
Issues Encountered	19
Acknowledgments	20



Upgrade to Type-F Active Protection - Upper Burringbar West (Upper Burringbar Road)

Report prepared by the NSW Level Crossing Upgrade Project

Project Manager:	Derek Williams	(M) 0418 270 421
Risk Manager:	Chris Lees	(M) 0411 154 327
Construction Manager:	Godwin Camilleri	(M) 0418 117 365

Highlights

<p>123 sites safety upgraded</p>	<ul style="list-style-type: none"> • 11 Major Upgrades. • 11 Advanced Warning Upgrades. • 101 Minor Upgrades. • Various levels of upgrade: from passive (Stop / Give Way signs) to active, from flashing lights to booms, installation of advanced warning lights, improved signage, LED retrofits, sighting improvements, other minor works. • Further 25 sites commenced in 2002/03 for completion in 2003/04.
<p>14 level crossings closed</p>	<ul style="list-style-type: none"> • Various locations across NSW. • Based on sites identified by RIC / SRA.
<p>Risk assessments carried out on all public road / public rail level crossings in NSW</p> <p>ALCAM group formed</p>	<ul style="list-style-type: none"> • LCAM (Level Crossing Assessment Model) priority listing established using available data. • 1,467 crossings assessed. • List now in use to determine the future program of works. • National group (Australian LCAM group) with a focus on the standardisation of risk assessment of level crossings nationally as well as a coordinated approach to the ongoing improvement of the LCAM. • Representatives from Queensland, New South Wales, Victoria, South Australia, Tasmania, and Northern Territory.
<p>LCAM adopted nationally</p>	<ul style="list-style-type: none"> • LCAM model endorsed by the Standing Committee on Transport (SCOT) and adopted nationally by the Australian Transport Council (ATC).
<p>Public education and awareness program</p>	<ul style="list-style-type: none"> • Funded and prepared jointly by RTA and RIC.
<p>Staysafe report</p>	<ul style="list-style-type: none"> • Aimed at improving awareness of risks at level crossings and changing driver behaviour. • 40 recommendations covering the management of level crossings in NSW. • Monitor progress on recommendations with review in 2007.
<p>Dedicated closures team</p>	<ul style="list-style-type: none"> • Joint RIC / DOT Team with a focus on the closure of level crossings. • Formal process introduced including community consultation.
<p>Pedestrian level crossing strategy</p>	<ul style="list-style-type: none"> • Development of the pedestrian LCAM commenced. • Consideration of disability standards for assessable public transport. • Initial report and database compiled of pedestrian crossings in NSW.
<p>Queuing treatment development and implementation</p>	<ul style="list-style-type: none"> • Motor vehicles queuing across level crossings has been identified as a high risk. • Queuing treatment consisting of signage and pavement marking developed by RTA. • Treatment implemented at 9 high-risk queuing level crossings across NSW.



Upgrade Program

- Upgrade Summary
- Upgrade Map
- Photo Gallery

Upgrade Program – Summary

The following maps illustrate the location of level crossing safety improvements carried out in the 2002/03 financial year along with a brief scope of works for each site. A summary table and description of improvement types is also included for ease of reference.

Summary of 2002/03 level crossing safety improvements

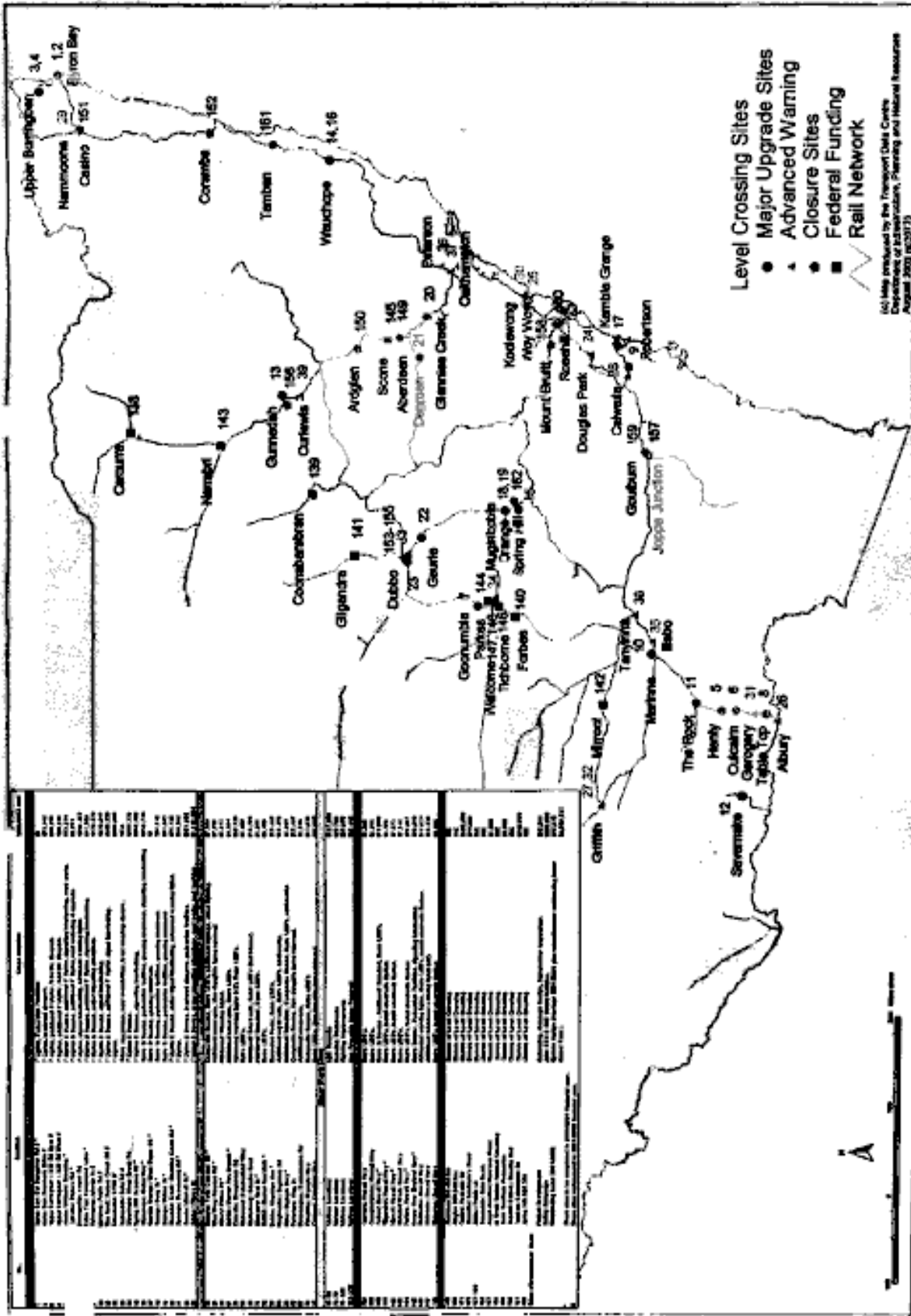
	Number of Sites Completed in 2002/03	Number of sites commenced in 2002/03 due for completion 2003/04	Dollars spent in 2002/03
Active Upgrade Sites	11	9	\$3,613,213
Advanced Warning Sites	8	8	\$196,478
Minor Works Sites	98	-	\$305,877
Federal Funded Sites	6 (3 advanced warning / 3 minor works)	5 (2 major upgrade, 1 advanced warning, 2 minor works)	\$227,372
Closure Sites	14	-	\$316,070
TOTALS:	138	25	\$4,939,621

Descriptions of Upgrade Types referred to on maps.

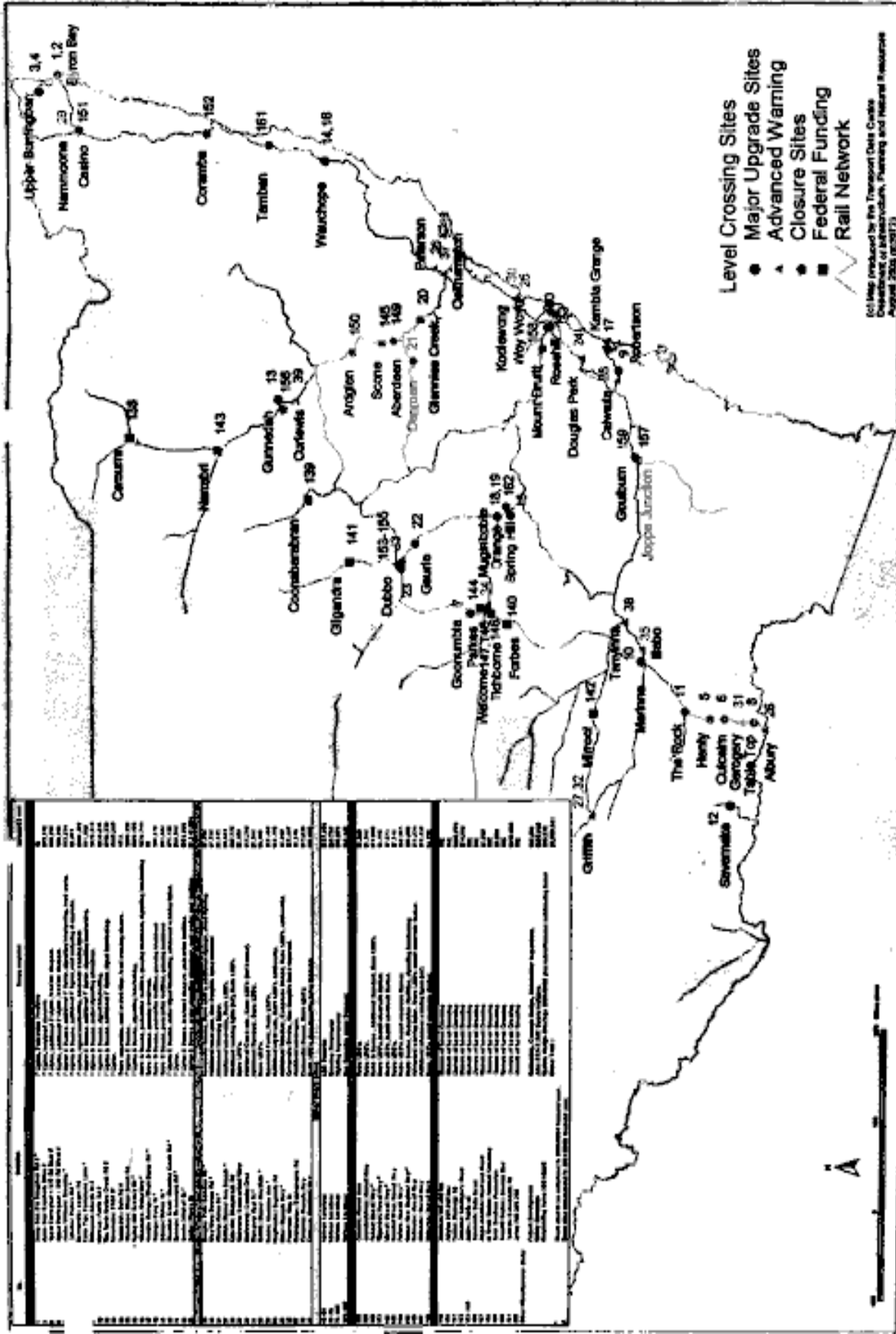
F Lights & Booms:	Type-F Flashing Lights and ½ Boom Barriers.
F Lights:	Type-F Flashing Lights.
Pedestrian Facilities:	Installation of / or improvements to pedestrian facilities adjacent to the road crossing.
Insulated Sleepers:	Installation of insulated steel sleepers or insulating biscuits as required for train detection on active level crossing upgrades
Signal Interlocking:	Signalling works to allow active crossing protection to interface with adjacent signal interlocking (eg. turnouts, loops, other crossings etc).
Road Works:	Road works in association with level crossing upgrade (eg road widening, new crossing track panel etc).
Advanced Warning Lights:	Train activated flashing amber lights positioned on the approach to the level crossing for the purpose of improving visibility of the level crossing active warning operation particularly on approaches with curves and/or other sighting constraints.
Additional Cross-arm	Additional set of red flashing lights on an existing light post to improve sighting of active protection from side street or curved approach.
Retro LED's	Change out of existing incandescent lamp units and replacement with high intensity Light Emitting Diode units providing improved visibility of the crossing in operation.
Queuing Treatment	Yellow crosshatched pavement marking on the crossing road surface in combination with "Keep Clear" signs.
Composite Booms	Replacement of existing ½ boom barrier arms with new composite boom arms.
Extended Post	Install extended post to allow for additional cross-arm.
Sighting Improvements	Embankment widening and vegetation removal to improve sighting of approaching trains for vehicles at the crossing.
Non-frangible Items Removal	Removal of non-frangible (rigid eg rail line post) items to reduce the risk of vehicles being crushed after impact with a train.
Closure of Level Crossing	Closure of level crossing to road vehicles.
Install Electronic Flasher	Installation of an electronic flasher unit to allow the installation of LED lamp units.
Realign Road Approaches	Realignment of road approaches to allow improved sighting of approaching trains for vehicles at the crossing.



2002/03 Level Crossing Program Works



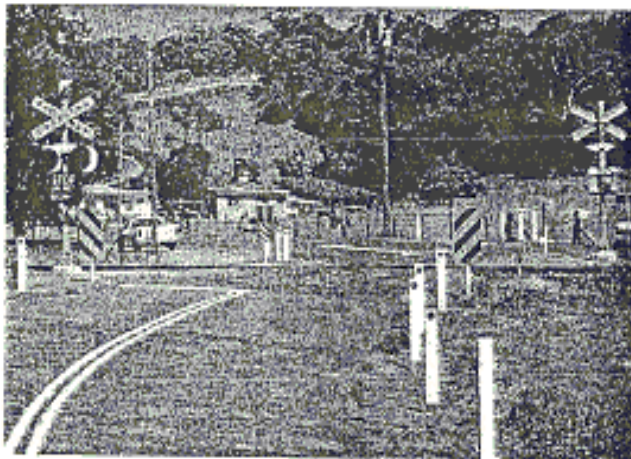
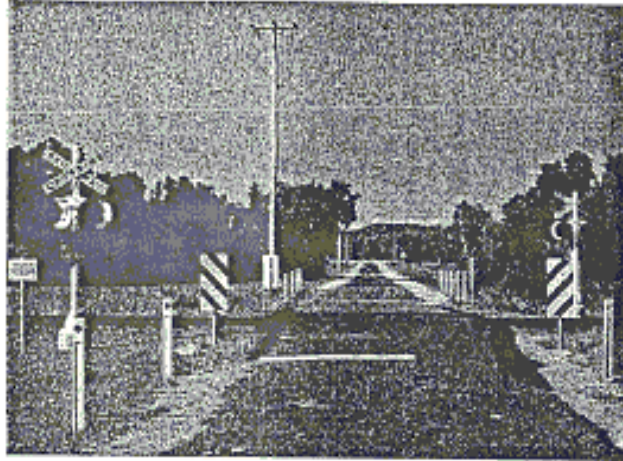
2002/03 Level Crossing Program Works



Upgrade Program – Photo Gallery

BYRON BAY BAYSHORE DRIVE

Previous protection: Stop signs (urban area)
 Upgrade: Type F lights
 Road authority: Byron Shire Council
 Comments:



UPPER BURRINGBAH U/B ROAD EAST

Previous protection: Stop signs (rural area)
 Upgrade: Type F lights
 Road authority: Tweed Shire Council.
 Comments:

- Modified bell installation as requested by community.

UPPER BURRINGBAH U/B ROAD WEST

Previous protection: Stop signs (rural area)
 Upgrade: Type F lights
 Road authority: Tweed Shire Council
 Comments:

- Additional lights due to curved approach



Upgrade Program – Photo Gallery

GOONUMBLA BOGAN ROAD

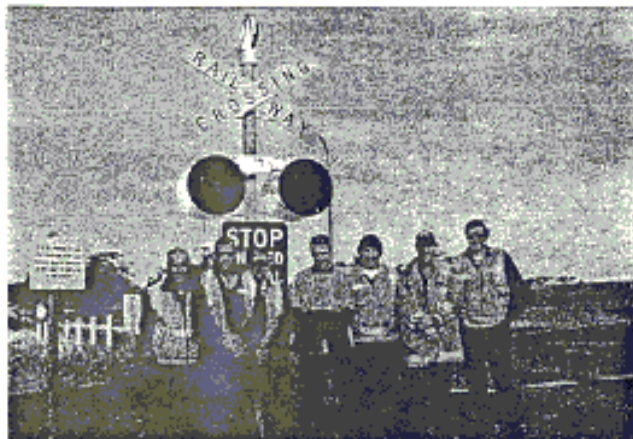
Previous protection: Give Way signs (rural area)

Upgrade: Type F lights, booms, advanced warning lights.

Road authority: Parkes Shire Council

Comments:

- Solar power used
- Advanced warning lights installed due to road conditions (heavy vehicles, high speed) and occurrence of fog
- Funding contribution Jointly by Parkes Shire Council and Nth Parkes Mine.



ROBERTSON MERYLA STREET

Previous protection: Stop signs (urban area)

Upgrade: Type F lights, booms

Road authority: Wingecarribee Shire Council

Comments:

- Previous fatality at the crossing.
- Half booms installed due to the occurrence of fog.

MARINNA PUBLIC ROAD

Previous protection: Stop signs (rural area)

Upgrade: Type F lights, booms

Road authority: Junee Shire Council

Comments:

- Double Track / High Speed.
- First double track grade crossing predictor installed in NSW.
- Additional lights due to alignment of approach roads.



Upgrade Program – Photo Gallery

THE ROCK BURKES CREEK ROAD

Previous protection: Stop signs (rural area)
 Upgrade: Type F lights, booms
 Road authority: Wagga Wagga City Council
 Comments:

- High speed corridor
- Additional lights due to alignment of approach roads.



SAVERNAKE STATE HIGHWAY 20

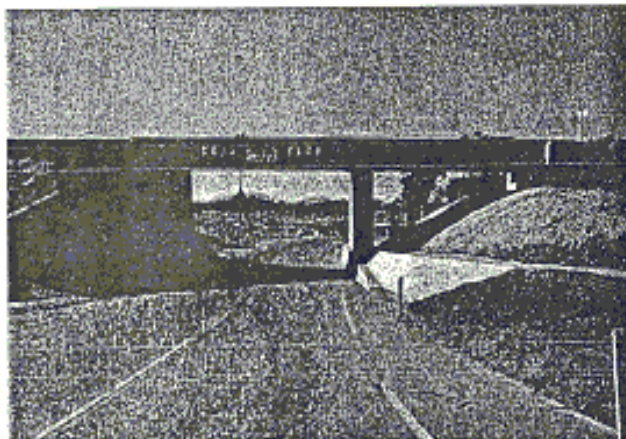
Previous protection: Stop signs (rural area)
 Upgrade: Type F lights
 Road authority: RTA
 Comments:

- Broad gauge Victorian network.
- Constructed by VIC Track.

GUNNEDAH QUIA ROAD

Previous protection: Stop signs (urban/rural area)
 Upgrade: Grade Separation
 Road authority: Gunnedah Shire Council
 Comments:

- Road underpass upgraded.
- Quia Rd level crossing closed.



Upgrade Program – Photo Gallery

WAUCHOPE KINGS CREEK ROAD

Previous protection: Stop signs (urban/rural area)

Upgrade: Type F lights, booms

Road authority: Hastings Shire Council

Comments:

- High speed corridor.
- Recorded near miss prior to installation of active protection.



DUBBO FITZROY STREET

Previous protection: Stop signs, rail operated gates (urban area)

Upgrade: Type F lights, booms, road works

Road authority: Dubbo City Council

Comments:

- Multiple lines.

DOUGLAS PARK CAMDEN ROAD

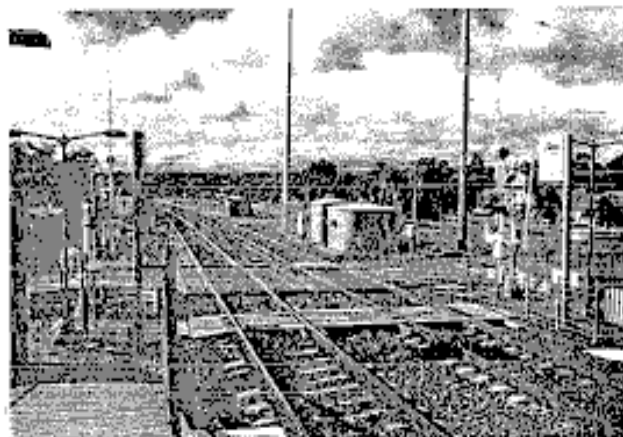
Previous protection: Booms (urban area)

Upgrade: Retro fit composite booms / install LED's

Road Authority: Wollondilly Shire Council.

Comments:

- Signage improvements.
- Queuing treatment to be installed in 2003/04.



Upgrade Program – Photo Gallery

WOY WOY RAWSON ROAD

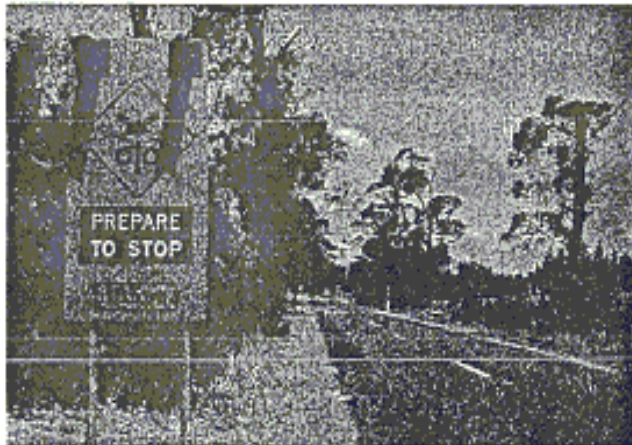
Previous protection: Booms (Metro area)

Upgrade: Install LED's , Additional lights

Road authority: Gosford City Council

Comments:

- High speed corridor



CALWALLA SHEEPWASH ROAD

Previous protection: Type F (100km/hr area)

Upgrade: Advanced Warning Lights

Road authority: Wingecarbee Shire Council

Comments:

- High speed road.
- Susceptible to fog.

NAMOONA SUMMERLAND WAY

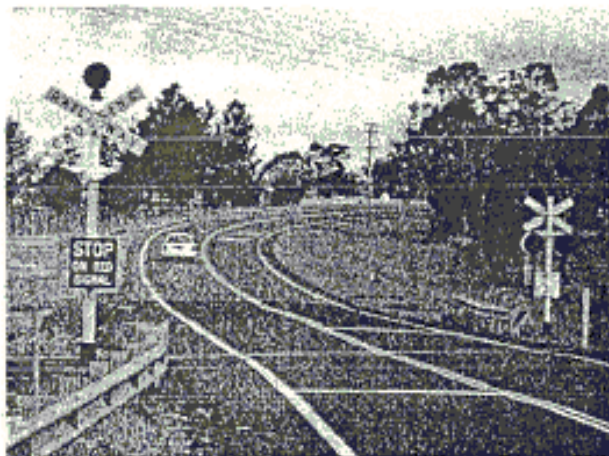
Previous protection: Type F (100kmh area)

Upgrade: LED Upgrade

Road authority: RTA (Richmond Valley Shire Council)

Comments:

- Previous fatality
- Curved approach Northbound



Upgrade Program – Photo Gallery

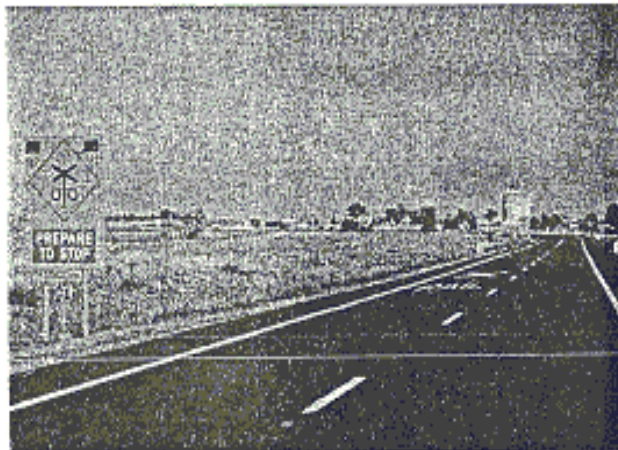
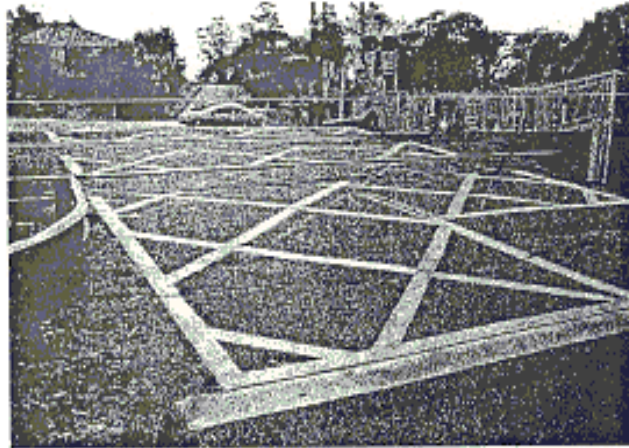
KOOLEWONG COUCHE CRESENT

Previous protection: Booms (Metro area)
Upgrade: LED's, Queuing Treatment, Additional lights.

Road authority: Gosford City Council

Comments:

- Pedestrian and traffic improvements proposed in 2003/04.



TICHBOURNE NEWELL HIGHWAY

Previous protection: Type F (100kmh area)

Upgrade: Additional Advanced Warning Lights

Road authority: RTA (Parkes Shire Council)

Comments:

- Significant level of heavy vehicles.
- History of incidents.
- High road speed.

WELCOME NEWELL HIGHWAY

Previous protection: Type F (100kmh area)

Upgrade: Additional Advanced Warning Lights

Road authority: RTA (Parkes Shire Council)

Comments:

- Significant level of heavy vehicles.
- History of incidents.
- High road speed.



Upgrade Program – Photo Gallery

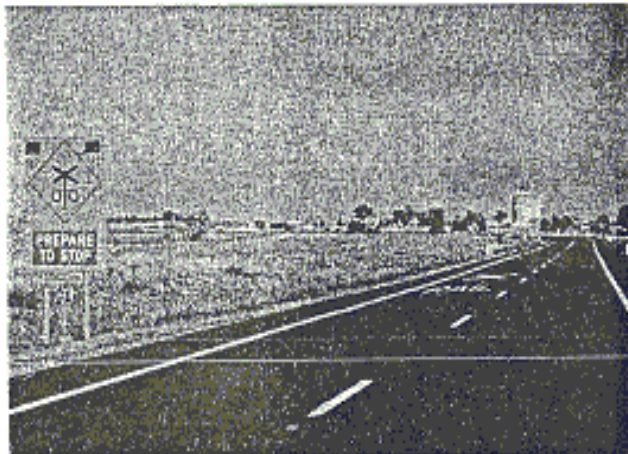
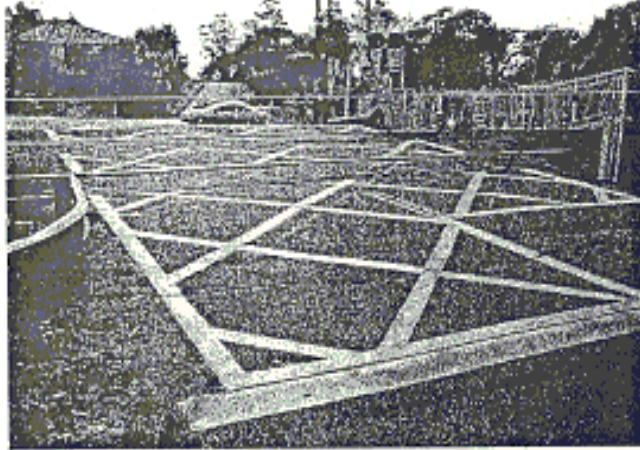
KOOLEWONG COUCHE CRESENT

Previous protection: Booms (Metro area)
Upgrade: LED's, Queuing Treatment, Additional lights.

Road authority: Gosford City Council

Comments:

- Pedestrian and traffic improvements proposed in 2003/04.



TICHBOURNE NEWELL HIGHWAY

Previous protection: Type F (100kmh area)

Upgrade: Additional Advanced Warning Lights

Road authority: RTA (Parkes Shire Council)

Comments:

- Significant level of heavy vehicles.
- History of incidents.
- High road speed.

WELCOME NEWELL HIGHWAY

Previous protection: Type F (100kmh area)

Upgrade: Additional Advanced Warning Lights

Road authority: RTA (Parkes Shire Council)

Comments:

- Significant level of heavy vehicles.
- History of incidents.
- High road speed.



Upgrade Program – Photo Gallery

BOMEN TRAHAIRS LANE

Previous protection: Stop signs (rural area)

Upgrade: Removal/Replacement of Non-Frangible Items.

Road authority: Wagga Wagga City Council

Comments:

- Previous rail post cattle grid hazard to motorists.
- High speed corridor.



TAMBAN LEVEL CROSSING CLOSURE

Previous protection: Stop signs

Closure: Crossing closed to road traffic

Comments:

- Alternated access provided.

PUBLIC EDUCATION STRATEGY

“Stop or Get Stopped in Your Tracks”
Billboard and Radio campaign

- Joint RTA / RIC funding
- Proposed yearly campaign to reinforce message.



Achievements

- Table of Achievements

Table of Achievement

<p>Level Crossing Assessment Model</p>	<ul style="list-style-type: none"> • LCAM development under way with the aim of improving assessment outcomes. • Independent Verification of NSW LCAM carried out – minor improvements recommended. • Commencement of a national workshop to fine tune the LCAM and implement a standard national risk assessment model.
<p>Working List</p>	<ul style="list-style-type: none"> • Risk assessments carried out at all intersections between public roads and public rail (standard gauge) lines currently in use in NSW. • Priority order listing of all public roads/rail level crossings identifying existing characteristics and controls as well as proposed treatments and budgets used to manage the upgrade program and report to the LCSC.
<p>Public release of LCAM Working List</p>	<ul style="list-style-type: none"> • Details future upgrade sites based on priorities. • Proposed distribution to stakeholders.
<p>Additional state funding</p>	<ul style="list-style-type: none"> • Additional funding announced for level crossing upgrades of \$13M over the next 4 years. • Total program funding now \$23M over 4 years.
<p>Federal funding</p>	<ul style="list-style-type: none"> • Federal Funding of \$270K in 2002/03 and \$560K in 2003/04 for improvements on National Highways.
<p>Public education and awareness program</p>	<ul style="list-style-type: none"> • Development of a public awareness program targeting driver behaviour. • Program carried out with a billboard and radio campaign. • Focus group testing with Positive outcomes achieving the original goals.
<p>Level crossing closures team</p>	<ul style="list-style-type: none"> • Dedicated closures team introduced with the focus on level crossing closures. • 14 Level Crossings Closed.



Table of Achievement (cont)

<p>Close-out process</p>	<ul style="list-style-type: none"> • Process developed and implemented to ensure the close out of issues raised in relation to level crossing safety. • Close our register maintained by LCSC secretariat.
<p>Pedestrian report</p>	<ul style="list-style-type: none"> • Identifies issues associated with pedestrian crossings. • First cut database of pedestrian crossings in NSW. • Recommendations for future strategy.
<p>Pedestrian disability issues</p>	<ul style="list-style-type: none"> • SKM report to Victorian Department of Infrastructure. • Impact on design of pedestrian facilities. • Additional information being gathered.
<p>Pedestrian level crossing standards forum</p>	<ul style="list-style-type: none"> • Level of protection to be applied. • Impact of high speed lines. • Disability issues.
<p>Pedestrian assessment model</p>	<ul style="list-style-type: none"> • Development commenced. • In conjunction with ALCAM group.
<p>Queuing treatment</p>	<ul style="list-style-type: none"> • Development by the RTA of a NSW Standard for the application of queuing treatment at level crossings, including road surface painting and associated signage. • Application of queuing treatment at 9 sites identified as potential queuing locations.
<p>Culcairn Shire study</p>	<ul style="list-style-type: none"> • Road/Rail study under way to review the requirements of rail crossings in the Culcairn Shire. • "Whole of Shire" strategy. • High speed closed corridor principles to be considered. • Options to be prepared for consideration by stakeholders.



Table of Achievement (cont)

Corridor approach to improvements commenced	<ul style="list-style-type: none"> • LED installations completed Wagga to Albury. • Non-frangible items removed Cootamundra to Albury.
Program of minor works safety improvements	<ul style="list-style-type: none"> • An initiative to remove Non-Frangible items in the section of track from Cootamundra to Albury on the Main South. • Implementation of a program of sighting improvements in the West involving embankment widening and the removal of unwanted vegetation to improve sighting of oncoming trains. • Upgrade of 30 Active crossing from incandescent lights to LED's to achieve greater visibility and reliability.
Gerogery Coronial Inquiry	<ul style="list-style-type: none"> • Submission to coronial. • Assessment and implementation of recommendations
Albury Coronial Inquiry	<ul style="list-style-type: none"> • Submission to coronial. • Assessment and implementation of recommendations.
Review of guardrail use at level crossings	<ul style="list-style-type: none"> • RTA recognise safety issues with use of guard rails • RTA / RIC working together to develop new guide post delineation treatment.
LCSC / LCWG co-operation	<ul style="list-style-type: none"> • Program activity supported by committee members. • Entities working together to deliver outcomes.
Outsourcing of Signal Design	<ul style="list-style-type: none"> • Used to supplement RIC resources. • Assists delivery of accelerated program.

Chronology

- Timeline of Events.

Timeline of Events

	July	August	September	October	November	December	January	February	March	April	May	June
Level Crossing Strategy Council meetings												
Level Crossing Working Group meetings												
Minister announces accelerated program												
Close-Out Process Introduced												
Dedicated Closures Team in Place												
Level Crossing Assessment Model (LCAM)												
Risk Assessments carried out												
LCAM Validation												
ALCAM Group Formed												
National Adoption of LCAM												
Database												
2003/04 Program Approved												
Staysafe												
Staysafe report recommendations												
LCSC response to Staysafe recommendations												
Gerogery: Olympic Hwy (Bells Rd) Coronial Inquest												
Albury: Fallon Street Coronial Inquest												
Queuing Treatment												
Identification of high Risk Queuing Sites (9 Sites Identified)												
Implementation of Queuing Treatment at Nominated Sites												
Public awareness												
Development of campaign for country residents and holiday travel												
Public education and awareness campaign carried out												
Pedestrian Crossings												
Legislation for accessible standards for public transport												
Victorian report - Requirements of Disability Standards at Ped Crossings												
Preliminary report / database of pedestrian level crossings in NSW												



Annual Incident Report

- Fatal Train / RMV Collisions
- Minor Train / RMV Collisions
- RMV Driver Carelessness
- Vandalism
- Other Recorded Incidents

2002/03 Level Crossing Incident Summary

Issue:

- Level crossing incidents between 1 July 2002 and 30 June 2003

For information:

- Provide a summary of reported major level crossing incidents for the above period.

Important facts:

- 7 Train/RMV collisions recorded (1 SRA XPT, 5 Freight, 1 RIC track machine)
 - only minor injuries reported
- 33 broken boomgate incidents caused by vehicles
 - 7 relate to Pine Road, Fairfield
- 29 “near miss” incidents
 - 5 incidents where RMV deliberately drove around boomgates (1 NSWFB)
- 1 incident where RMV “playing chicken”
- 4 incidents reported where vehicle blocking rail lines
- 34 vandalism incidents recorded

Comment:

- The blocked crossing, “near miss” and broken boom gate incidents are all potential collision occurrences.
A disturbing aspect is the deliberate behaviour of driving around boom gates. All 5 incidents were reported in the Newcastle/Hunter region.
 - NSWFB have investigated the incident and suspended the driver
 - Penalty Infringements issued are to be obtained from the Infringement Bureau if data is available
- Due to the nature of the data, it has not been determined if these figures indicate trends or better incident reporting

Close out process:

- As indicated at the 19 June LCSC a number of actions proposed to the LCSC to address such occurrences are :
 1. Increased public awareness advertising
 2. Increased enforcement focus by all agencies to ensure prosecution, in line with the increased penalties introduced in January 2003

Prepared by: Steven Ford, Transport Safety Ph 9268 2986

25 August 2003

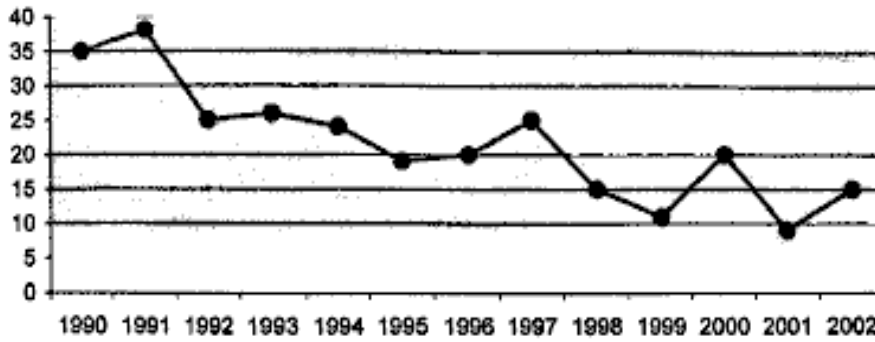


Accident Trends

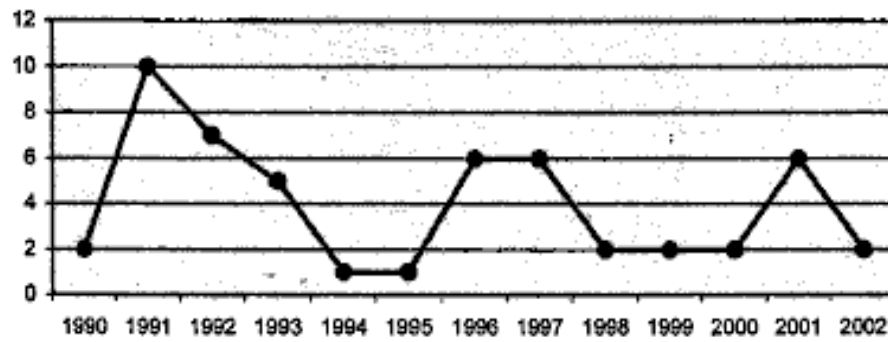
- **Collisions at Level Crossing**
- **Fatalities at Level Crossing**
- **Fatalities per Accident**

Accident Trends

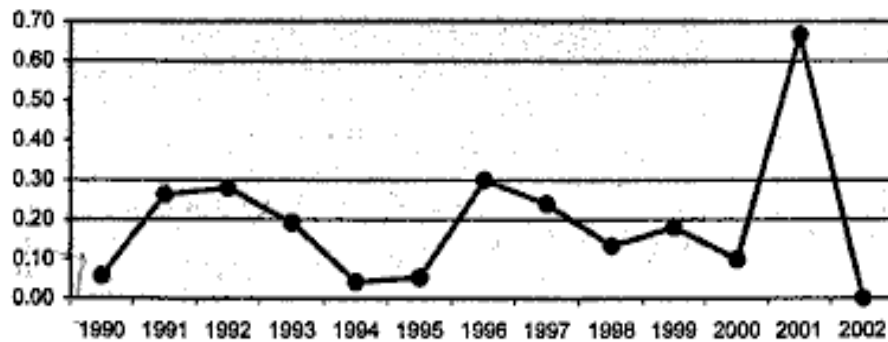
Collisions at Level Crossings by Year



Fatalities at Level Crossings by Year



Average Number of Fatalities per Collisions at Level Crossings by Year



Issues Encountered

- Local Government Support
- Pedestrian Crossings
- Compliance with AS 1742.7
- Closures



Issues Encountered

<p>Funding for the current upgrade program</p>	<ul style="list-style-type: none"> • Program based on the LCAM List. • Potential funding requirements over \$70 million.
<p>Funding for high speed closed corridor program</p>	<ul style="list-style-type: none"> • On public road level crossings with rail speed greater than 120km/hr. • Potential funding requirements over \$50 million.
<p>Funding for pedestrian level crossing improvements</p>	<ul style="list-style-type: none"> • Over 500 level crossings in NSW provide pedestrian access across the rail corridor. • A number of sites will require safety improvements and/or improvements in accordance with the accessibility standards for public transport. • Budget requirements yet to be determined.
<p>Funding for private road level crossing improvements</p>	<ul style="list-style-type: none"> • Over 2,000 private level crossings, with many on high-speed lines. • Budget requirements yet to be determined. • There is currently no LCSC funding allocated for safety improvements.
<p>Local government funding contributions</p>	<ul style="list-style-type: none"> • Limited availability and willingness for financial support from Local Government • Local Government agreement under preparation.
<p>Pedestrian crossings standards</p>	<ul style="list-style-type: none"> • Requirements at level crossings in relation to the Disability Standards for accessible public transport. • The design requirements of "Mobility Devices" at level crossing mazes are unresolved. • Requirements for pedestrian access on high-speed corridors (train speeds up to 160km/hr).
<p>Local government compliance with as 1742.7 (signage and road markings for level crossings)</p>	<ul style="list-style-type: none"> • Many Local Councils do not have regular audits or maintenance programs for level crossing approach signage and road markings.
<p>Signalling design and construction resources</p>	<ul style="list-style-type: none"> • RIC signalling design and construction resources are in short supply due to demands from major country resignalling works. • This has the potential to delay the upgrade program.
<p>Opposition to level crossing closures</p>	<ul style="list-style-type: none"> • Communities can be strongly opposed to the closure of level crossings. • Significant community consultation is required.

Acknowledgments

MEMBERS OF THE LEVEL CROSSING STRATEGY COUNCIL

Department of Transport / Transport Co-ordination Authority / Ministry of Transport

Michael Deegan (Chair) July 2002 – March 2003

John Lee (Chair) April-June 2003

Ken Ryan
Bill Dupesvoski

Kent Donaldson
Steve Ford

Roads and Traffic Authority

Chris Ford

Phil Margison

Rail Infrastructure Corporation

Gary Seabury
Bruce Lord
Andrew Vickery

John Cowling
Derek Williams

Local Government and Shires Association

Richard Connors

NSW Police

Ron Dorrough



The Following are also Acknowledged

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Howard Barton	Ministry of Transport
Mark Kerr	Ministry of Transport
Meghan Vesey	Roads & Traffic Authority
Mellisa Bowden	Ministry of Transport
Leah Szabo	Rail Infrastructure Corporation

RTA Grafton Road Safety Managers and Officers
RTA Newcastle Road Safety Managers and Officers
RTA Parkes Road Safety Managers and Officers
RTA Wagga Road Safety Managers and Officers
RTA Wollongong Road Safety Managers and Officers

Byron Shire Council Road Safety and Engineering
Corowa Shire Council Safety and Engineering
Dubbo City Council Road Safety and Engineering
Dungog Shire Council Road Safety and Engineering
Gosford City Council Road Safety and Engineering
Gunnedah Shire Council Road Safety and Engineering
Hastings Shire Council Road Safety and Engineering
Junee Shire Council Road Safety and Engineering
Maitland Shire Council Road Safety and Engineering
Parkes Shire Council Safety and Engineering
Richmond Valley Shire Council Safety and Engineering
Tweed Shire Council Safety and Engineering
Wagga City Council Road Safety and Engineering
Wingecarribee Shire Council Road Safety and Engineering
Wollondilly Shire Council Road Safety and Engineering

RIC Bathurst Signal Construction Team
RIC Cootamundra Signal Construction Team
RIC Hamilton Signal Construction Team
RIC Rail Equipment Centre Staff
RIC Signal Design Staff
RIC Signalling Standards Staff
RIC Stores and Supply Managers and Staff
RIC Signalling Asset Engineers / Managers



REFERENCES

- Australasian Railway Association (2004). Australian Rail Industry Report 2003. Canberra, ACT: Australasian Railway Association.
- Australian Transport Safety Bureau (2002). Fatal crashes at level crossings. Canberra, ACT: Department of Transport and Regional Services.
- Australian Transport Safety Bureau (2003). Rail investigation report: Collision between the passenger train 5AL8 and vehicles at the Salisbury Interchange level crossing, Salisbury, South Australia, 24 October 2002. Canberra, ACT: Department of Transport and Regional Services.
- Bureau of Transport and Regional Economics (2003). Rail accident costs in Australia. Canberra, ACT: Department of Transport and Regional Services.
- Cairney, P. (Ed.)(1991). Improving safety at railway level crossings. Conference proceedings, 26-27 September 1991. Vermont South, Vic.: Australian Road Research Board.
- Cairney, P. (2003). Prospects for improving the conspicuity of trains at passive railway level crossings. Road Safety Research Report CR 217. Canberra, ACT: Australian Transport Safety Bureau.
- Cairney, P., Cornwall, D. & Mabbott, N. (2002). Conspicuity of enhanced lighting treatments for railway locomotives. Vermont South, Vic: ARRB Transport Research.
- Cairney, P., Gunatillake, T. & Wigglesworth, E. (2002). Reducing collisions at passive railway level crossings in Australia. Sydney, NSW: Austroads.
- Carroll, A.A., Gordon, J. E., Reiff, R. P. & Gage, S.E. (2002). Evaluation of alternative detection technologies for trains and highway vehicles at highway rail intersections in the United States. Paper presented at 'Getting active at passive crossing': The 7th International Symposium on Railroad-Highway Grade Crossing Research and Safety, Monash University, 20-21 February 2002.
- Covance (2001). Level crossing accidents: A literature survey. Canberra, ACT: Department of Transport and Regional Services.
- Dennis, P.S. (1999). Investigation of rail level crossings in the eastern Downs area of Queensland. Unpublished B. Eng. (Civil) thesis. Faculty of Engineering & Surveying, University of Southern Queensland.
- Ditmeyer, S.R. (2002). A vision for the future: Intelligent railroad systems. Unpublished paper prepared for the STAYSAFE Committee, 7 February 2002. Washington DC: Federal Railroad Administration.

References

Eck, R.W. (2002). A context-sensitive approach to improving safety at passive crossings. Paper presented at 'Getting active at passive crossing': The 7th International Symposium on Railroad-Highway Grade Crossing Research and Safety, Monash University, 20-21 February 2002.

Economic and Social Commission for Asia and the Pacific (2000). Evaluation of cost-effective systems for railway level crossing protection. New York, NY: United Nations.

Elliott, B. Elliott, D. & Lysaght, A. (1995). Older drivers risks and countermeasures: Source book. Canberra, ACT: Federal Office of Road Safety

Farnham, W.L. (2000). Guarded crossings: An in-depth analysis of the most effective railroad crossing protection. Unpublished paper.

Federal Railroad Administration (2002). Five-year strategic plan for railroad research, development and demonstrations. Washington DC: United States Department of Transportation.

Ford, G. & Matthews, A. (2002). Analysis of Australian grade crossing accident statistics. Paper presented at 'Getting active at passive crossing': The 7th International Symposium on Railroad-Highway Grade Crossing Research and Safety, Monash University, 20-21 February 2002.

Hayden, R. (2002). New speed boards between Broken Hill & Orange: Will they ever learn? Rail and Road Journal, July 2002.

Henderson, J.M. (1991). Improving safety at railway level crossings: Some perception of the problem. In: P. Cairney, (Ed.). Improving safety at railway level crossings. Conference proceedings, 26-27 September 1991. pp.50-59. Vermont South, Vic.: Australian Road Research Board.

Henstridge, J., Homel, R. & Mackay, P. (1997). The long-term effects of random breath testing in four Australian states: A time series analysis. Canberra, ACT: Federal Office of Road Safety.

Herslund, M.-B. & Jørgensen, N.O. (2003). Looked-but-failed-to-see-errors in traffic. Accident Analysis and Prevention, 35, 885-891.

Hussey, F. (1991). Level crossings: A train driver's perspective. In: P. Cairney, (Ed.). Improving safety at railway level crossings. Conference proceedings, 26-27 September 1991. pp.40-43. Vermont South, Vic.: Australian Road Research Board.

House of Representatives Standing Committee on Transport and Regional Services (2004). Train illumination: Inquiry into some measures proposed to improve train visibility and reduce level crossing accidents. Canberra, ACT: Parliament of Australia.

Hughes, R., Stewart, R. & Rodgman, E. (1999). Prior driver performance and expressed attitudes towards risk as factors associated with railroad grade crossing violations. Report

- prepared for the North Carolina Department of Transportation – Rail Division. Chapel Hill, NC: University of North Carolina Highway Safety Research Center.
- KPMG Management Consultants (1994). Increasing safety at railway level crossings: A five year strategic plan, 1995-2000. Sydney, NSW: Roads and Traffic Authority.
- Ladwig, K.-H. & Baumert, J.J.(2004). Patterns of suicidal behaviour in a metro subway system: A study of 306 cases injured by the Munich subway, 1980-1999. *European Journal of Public Health*, 14, 291-295.
- Levine, H. (2001). The misguided public process of providing safe crossing at railroad-highway intersections. Unpublished paper.
- Lobb, B., Harre, N. & Suddendorf, T. (2001). An evaluation of four types of railway pedestrian crossing safety intervention. *Accident Analysis and Prevention*, 33, 157-165.
- Lobb, B., Harre, N. & Terry, N. (2003). An evaluation of a suburban railway pedestrian crossing safety programme. *Accident Analysis and Prevention*, 35, 487-494.
- McInerney, P.A. (2002). Final report of the Special Commission of Inquiry into the Glenbrook rail accident. Sydney, NSW: New South Wales Government.
- McInerney, P.A. (2004). Interim report on the causes of the Waterfall rail accident. Sydney, NSW: New South Wales Government.
- McClurg, B. (2000). Railway level crossing safety. Unpublished paper. Website: www.eo.com.au/documents/Crossing.pdf, accessed 27 June 2001.
- Meeker, F.L. & Barr, R.A. (1989). An observational study of driver behavior at a protected railroad grade crossing as trains approach. *Accident Analysis and Prevention*, 21, 255-261.
- Meeker, F.L., Fox, D. & Weber, C. (1997). A comparison of driver behavior at railroad grade crossings with two different protection systems. *Accident Analysis and Prevention*, 29, 11-16.
- Metaxatos, P., Sriraj, P.S., Sööt, S. & DiJohn, J. (2002). Factors affecting collisions at gated rail-highway crossings: A northeastern Illinois case study. Paper presented at the 17th annual Metropolitan Conference for Public Transportation Research, Chicago IL, 7 June 2002.
- National Transportation Safety Board (1998). Safety study: Safety at passive grade level crossings. Washington DC: National Transportation Safety Board.
- New South Wales Ministry of Transport (2004). Rail Safety Act 2002—Industry safety report 2003. Sydney, NSW: Ministry of Transport.
- O'Donnell, I., Farmer, R. & Tranah, T. (1994) Introduction to railway suicide. *Social Science and Medicine*, 38, 399-400.

References

Queensland Transport (1996). The safety of railway level crossings in Queensland, 1991-1995. Brisbane, Qld.: Queensland Transport Rail Accreditation Unit.

Shinar, D. & Raz, S. (1982). Driver response to different railroad crossing protection systems. *Ergonomics*, 25, 801-808.

Smith, J. Russell, S. & Looi, M. (2003). Security as a safety issue in rail communications. In: P. Lindsay & T. Cant (Eds.). 8th Australian workshop on safety critical systems and software (SCS '03). Canberra, ACT: Conferences in Research and Practice in Information Technology

Transport NSW (2002). Level Crossing Strategy Council, Yearly Report, 2001/03. Sydney, NSW: Transport NSW.

Travelsafe Committee (1997). Brisbane's Cityrail network—Part 1: Safety of the rail system and infrastructure. Report No. 23. Brisbane, Qld.: Legislative Assembly of Queensland.

Van der Horst, R. & Bakker, P. (2003). Safety measures at railway level crossings for pedestrians and bicyclists. Paper presented at International Co-Operation on Theories and Concepts In Traffic Safety (ICTCT) workshop, Vancouver, BC.

Western Australian Government Railways Commission (2001). Report into improving safety at passively protected level crossings, with particular reference to the findings of the State Coroner with respect to a fatal crash at Yarramony Road level crossing. Perth, WA: Western Australian Government Railways Commission

Wigglesworth, E.C. (1976). Report on human factors in road-rail crossing accidents. Melbourne, Vic.: Ministry of Transport, Victoria.

Wigglesworth, E.C. (1978a). Human factors in level crossing accidents. *Accident Analysis and Prevention*, 10, 229-40.

Wigglesworth, E.C. (1978b). The effect of local knowledge and sight restrictions on driver behaviour at open road-rail crossings. *Journal of Safety Research*, 11, 162-171.

Wigglesworth, E.C. (1990). How can safety be improved at 'open' level crossings? *Australian Road Research*, 20 (4, December), 61-75.

Wigglesworth, E.C. (2001). A human factors commentary on innovations at railroad-highway grade crossings in Australia. *Journal of Safety Research*, 32, 309-321.

Wigglesworth, E.C. (2002). Passive railroad-highway grade crossings: What are the research priorities? Paper presented at 'Getting active at passive crossing': The 7th International Symposium on Railroad-Highway Grade Crossing Research and Safety, Monash University, 20-21 February 2002.

Wigglesworth, E.C. & Uber, C.B. (1991). An evaluation of the railway level crossing boom barrier program in Victoria, Australia. *Journal of Safety Research*, 22, 133-140.

Witte, K. & Donohue, W.A. (2000). Preventing vehicle crashes with trains at grade crossings: The risk seeker challenge. *Accident Analysis and Prevention*, 32, 127-139.

WITNESSES WHO TESTIFIED BEFORE THE STAYSAFE COMMITTEE ON THE SAFETY OF RAILWAY LEVEL CROSSINGS

Monday 12 February 2001, at Wagga Wagga

Mr Daryl Maguire MP, Member for Wagga Wagga

Mr Severian Hill, Wagga Wagga Coroner

Tuesday 30 October 2001

Mr Michael Francis Deegan, Chair, Level Crossing Strategy Council

Mr Kenneth Joseph Ryan, Department of Transport

Mr Bruce William Lord, Rail Infrastructure Corporation

Mr Christopher Patrick Ford, Roads and Traffic Authority

Mr Mark Morey, Labor Council of NSW

Mr Keith James Aller, Rail Tram and Bus Union

Mr Robert Norman Haydon, Rail Tram and Bus Union

Mr Vincent Noel Holloway, Rail Tram and Bus Union

Mr John Francis Leonard, Rail Tram and Bus Union

Mr Keith Henry McMahon, Rail Tram and Bus Union

Mr Ian Bruce Willie, Rail Tram and Bus Union

Mr Bradley David Weyland

Mr Hugh Christopher Cowling

Mr John Malden Elliott, Cumec Pty Limited

Monday 3 December 2001

Mr Guy Leslie Creber, G. Creber & Associates

Witnesses who testified before the STAYSAFE Committee on the safety of Railway level crossings

Mr Graham Cowan, Rail Infrastructure Corporation

Chief Superintendent Ronald Alexander Sorrenson, New South Wales Police Service

Mr David Stanley Edwards, National Rail Corporation

Dr Peter Thompson Cairney, ARRB Transport Research

Mr Keith Hoskins, FreightCorp

Mr Christopher David Church, FreightCorp

Mr Phillip John Pritchard, FreightCorp

Cr Barry Edward Ryan, Mayor, Gloucester Shire Council, and Chair, Roads and Transport Committee, Local Government and Shires Associations

Mr David John Hale, Local Government and Shires Associations

Monday 17 May 2004

Mr John Lee, Ministry of Transport

Mr Derek Williams, Rail Infrastructure Corporation

Mr Richard Connors, Local Government and Shires Associations

Mr Patrick Ford, Roads and Traffic Authority

Mr Vincent John Graham, Railcorp

Mrs Alison Wooden

Mr John Hennessey

Mr Barry Wooden

SUBMISSIONS RECEIVED BY THE STAYSAFE COMMITTEE ON THE SAFETY OF RAILWAY LEVEL CROSSINGS

- RLC 001 Ms Ruth Fagan
- RLC 002 Mr David Bennetts
- RCL 003 Mr Terry Wise
Further Submission RLC 003.1: Mr Ian Glachan MP, Member for Albury, on behalf of Mr Terry Wise
Further Submission RLC 003.2: Mr Terry Wise
Further submission RLC 003.3: Mr Terry Wise
Further Submission RLC 003.4: Mr Ian Glachan MP, Member for Albury, on behalf of Mr Terry Wise
- RLC 004 Michael & Kay Cowley
- RLC 005 Mr David Barr MP, Member for Manly
- RLC 006 Mr John Elliott, Cumec Pty Limited
- RLC 007 Mr Daryl Maguire MP, Member for Wagga Wagga, on behalf of Mrs Alison Wooden
Further submission RLC 007.1: Mrs Alison Wooden
Further submission RLC 007.2: Mrs Alison Wooden
Further submission RLC 007.3: Ms Alison Wooden
Further submission RLC 007.4: Ms Alison Wooden
Further submission RLC 007.5: Mrs Alison Wooden
Further submission RLC 007.6: Mrs Alison Wooden
Further submission RLC 007.7: Mr Daryl Maguire MP, Member for Wagga Wagga, on behalf of Mrs Alison Wooden
- RLC 008 Mr Laurie Gilbert
- RLC 009 Mr Harvey A. Levine
- RLC 010 Mr Noel Selway
- RLC 011 Mr Craig Hill, New Zealand Land Transport Safety Authority
Further submission RLC 011.1: Mr Craig Hill, New Zealand Land Transport Safety Authority
- RLC 012 Mrs Caroline Fitzroy
- RLC 013 Ms Laura Fortey
Further Submission RLC 013.1: Ms Laura Fortey

Submissions received by the STAYSAFE Committee on the safety of Railway level crossings

- RLC 014 Mr Kevin Witt
- RLC 015 Mr Daryl Maguire MP, Member for Wagga Wagga
Further submission RLC 015.1: Mr Daryl Maguire MP, Member for Wagga Wagga
Further submission RLC 015.2: Mr Daryl Maguire MP, Member for Wagga Wagga
Further submission RLC 015.3: Mr Daryl Maguire MP, Member for Wagga Wagga
Further submission: RLC 015.4: Mr Daryl Maguire MP, Member for Wagga Wagga
- RLC 016 Mr Andrew Stoner MP, Member for Oxley, on behalf of Mr R.G. Chapple
- RLC 017 Mr Russell Grove, Clerk of the Legislative Assembly, on behalf of Mr Alan Sanderson, Barraba Shire Council
- RLC 018 Mrs L. Slater
- RLC 019 Mr Fred King
- RLC 020 Ray and Kim Wilkins
- RLC 021 Mrs M.J. Reilly
- RLC 022 Mr Anthony Healy
- RLC 023 Mr H. F. Slater
- RLC 024 Mr John Brewer, Roads and Traffic Authority
- RLC 025 Mr Alan McCormack, Parkes Shire Council
- RLC 026 Mr Alan Tierney
- RLC 027 Mr Mark W. Simpson, Highlands Driving Academy
- RLC 028 Mr Severian Hill, Wagga Wagga Coroner
- RLC 029 Associate Professor Ron Ayers, University of Southern Queensland
Further Submission RLC 029.1: Associate Professor Ron Ayers, University of Southern Queensland
- RLC 030 Mr Bradley Weyland and Mr Hugh Cowling
- RLC 031 Mr Geoff Meers, Queensland Transport
- RLC 032 A.G & E. J. Williams

Submissions received by the STAYSAFE Committee on the safety of Railway level crossings

- RLC 033 Mr Brian Solomon, Department of Transport
Further submission RLC 033.1: Mr Michael Deegan, Level Crossing Strategy Council
Further submission RLC 033.2: Mr Guy Creber, G. Creber & Associates, and Mr Graham Cowan, Rail Infrastructure Corporation, on behalf of the Level Crossing Strategy Council
Further submission RLC 033.4: Mr Ken Ryan, Transport NSW
Further submission RLC 033.5: Mr Steven Ford, Transport NSW
Further submission RLC 033.6: Hon. Carl Scully, MP, Minister for Roads
Further submission RLC 033.7: Mr John Lee, Ministry of Transport
Further submission RLC 033.8: Mr Michael Petrie, Ministry of Transport
- RLC 034 Mr Darryl Kelly
- RLC 035 Mr Peter Black MP, Member for Murray Darling, on behalf of Mr Andrew Prior, Director, Engineering Services, Central Darling Shire Council
- RLC 036 Mr R. Simmons
Further submission RLC 036.1: Mr Ron Simmons
- RLC 037 (confidential)
- RLC 038 Mr Brett Watson, Hunter Valley Signs
- RLC 039 Mr Mark Morey, Labor Council of New South Wales
- RLC 040 Ms Anne Hill, Western Australian Government Railways Commission
Further submission RLC 040.1: Ms Anne Hill, Western Australian Government Railways Commission
Further submission RCL 040.2: Ms Anne Hill, Western Australian Government Railways Commission
Further submission RCL 040.3: Ms Anne Hill, Western Australian Government Railways Commission
Further submission RCL 040.4: Ms Anne Hill, Western Australian Government Railways Commission
Further submission RCL 040.5: Ms Anne Hill, Western Australian Government Railways Commission
- RLC 041 Mr Guy Creber, G. Creber & Associates
- RCL 042 Mrs Jean Palmer
- RLC 043 (confidential)
- RLC 044 Dr Eric Wigglesworth
- RLC 045 Mr David Edwards, National Rail Corporation Limited

Submissions received by the STAYSAFE Committee on the safety of Railway level crossings

- RLC 046 Dr Peter Cairney, ARRB Transport Research
- RLC 047 Mr Keith Hoskins, FreightCorp
- RLC 048 Dr W K Hunter
- RLC 049 Mr Aidan Nelson, Railway Safety (UK)
- RLC 050 Mr Steven Ditmeyer, Federal Railroad Administration, United States Department of Transportation.
- RLC 051 Mr Ian Glachan MP, Member for Albury, on behalf of Mrs Christine Cusson
- RLC 052 Mr John Leonard
- RLC 053 Mr Ian Glachan MP, Member for Albury
- RLC 054 Mr Matt Brown MP, Member for Kiama, on behalf of Mr Richard Pratt
- RLC 055 Mr Brendan Hartnett, Local Government and Shires Associations
- RLC 056 Mr Daryl Maguire MP, Member for Wagga Wagga, on behalf of Mrs Marj Bollinger, Highway Safety Action Group
- RLC 057 Hon. Rick Colless MLC, on behalf of Ms Margaret Lloyd
- RLC 058 Mr Adrian Piccoli MP, Member for Murrumbidgee
- RLC 059 Mr Brian Harvey, Vision Communicators
- RLC 060 Mr David Hannan, Central Coast Business Park
Further Submission RLC 060.1: Mr David Hannan, Central Coast Business Park

RELEVANT EXTRACTS FROM THE MINUTES OF THE STAYSAFE COMMITTEE REGARDING THE SAFETY OF RAILWAY LEVEL CROSSINGS

STAYSAFE Committee of the 52nd Parliament

MEETING OF THE STAYSAFE COMMITTEE
at 8:15 a.m., MONDAY 12 FEBRUARY 2001
AT WAGGA WAGGA and DUBBO

Chairman
Mr McBride

Legislative Council
Mr West
Mr Jobling

Legislative Assembly
Mr Campbell
Mr Stoner

The Chairman, Mr McBride, presiding.

Also in attendance: Mr Faulks, Director, and Ms Brdaroska, Committee Officer.

1. Apologies

Apologies were received from Mr Tingle, Mr Greene, Mr Bartlett, and Mr Smith.

...

4. Road-rail level crossing safety

Mr Daryl Maguire MP, Member for Wagga Wagga, briefed the Committee on safety aspects of road-rail level crossings.

Mr Severian Hill, Wagga Wagga Coroner, briefed the Committee on safety aspects of road-rail level crossings.

5. General business

The Committee then travelled to Dubbo.

...

There being no further business, the Committee adjourned at 10:30 p.m.

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE
at 12:30 p.m., WEDNESDAY 4 APRIL 2001
AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council

Mr West
Mr Jobling

Legislative Assembly

Mr Greene
Mr Stoner
Mr Smith
Mr Bartlett

The Chairman, Mr McBride, presiding.

Also in attendance: Mr Faulks, Director, Ms Brdaroska, Committee Officer, and Ms Allen, Assistant Committee Officer.

1. Apologies

Apologies were received from Mr Campbell and Mr Tingle.

2. Inquiry into the safety of railway level crossings

By leave of the Committee.

The Chairman welcomed the attendance of Mr Daryl Maguire MP, Member for Wagga Wagga.

The Chairman reported that the Minister for Roads had announced on Thursday 29 March 2001 that he would ask the Committee to conduct an inquiry into the safety of railway level crossings in New South Wales. The terms of reference provide for a review of:

- the status of railway level crossings in New South Wales
- factors contributing to crashes at railway level crossings
- countermeasures which may increase the safety of railway level crossings
- motorist behaviour and education regarding the use of railway level crossings
- and any other related matters

Mr Maguire briefed the Committee on matters relating to the safety of railway level crossings, noting, in particular, the need to consider modern motor vehicle design as a contributing factor to crashes at railway level crossings.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

On the motion of Mr Smith, seconded Mr Jobling:

That the Committee conduct an inquiry into the safety of railway level crossings in New South Wales.

Passed unanimously.

Mr Maguire thanked the Committee for its decision.

...

7. General business

...

There being no further business, the Committee adjourned at 1:40 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE
at 12:40 p.m., WEDNESDAY 11 APRIL 2001
AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council

Mr Jobling

Legislative Assembly

Mr West

Mr Stoner
Mr Smith
Mr Bartlett
Mr Campbell

The Chairman, Mr McBride, presiding.

Also in attendance: Mr Faulks, Director, Ms Brdaroska, Committee Officer, and Ms Allen, Assistant Committee Officer.

2. Apologies

Apologies were received from Mr Tingle.

...

5. Inquiry into the safety of railway level crossings

The Chairman reported that the inquiry into the safety of railway level crossings in New South Wales was announced on Saturday 7 April 2001.

The Chairman reported that he, accompanied by the Director, had met with Mr Michael Deegan, Director-General, Department of Transport, and Mr Vish Beri, Advisor to the Minister for Transport, the Hon. Carl Scully MP, on Tuesday 10 April 2001 to discuss the inquiry into the safety of railway level crossings in New South Wales.

The Chairman indicated that it would be appropriate to inspect railway level crossings in New South Wales that are representative of the range of situations faced by train drivers and motor vehicle drivers.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

On the motion of Mr Smith, seconded Mr Jobling:

That the Committee

- (a) conduct visits of inspection of railway level crossings in New South Wales that are representative of the range of situations faced by train drivers and motor vehicle drivers;
- (b) request the Minister for Transport and Minister for Roads to
 - (i) nominate an appropriate official of the Rail Infrastructure Corporation and Roads and Traffic Authority, respectively, to accompany the visits of inspection, and
 - (ii) provide logistic support to the Committee as necessary during the visits of inspection; and
- (c) such visits of inspection take place as soon as practicable.

Passed unanimously.

10. General Business

...

There being no further business, the Committee adjourned at 1:40 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE
at 10:00 a.m., THURSDAY 26 APRIL 2001
AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council

Mr West
Mr Jobling
Mr Tingle

Legislative Assembly

Mr Greene
Mr Stoner
Mr Smith
Mr Bartlett
Mr Campbell

The Chairman, Mr McBride, presiding.

Also in attendance: Mr Faulks, Director, Ms Brdaroska, Committee Officer, and Ms Allen, Assistant Committee Officer.

...

4. Inquiry into the safety of railway level crossings

The Chairman reported that to date nine submissions had been received for the inquiry into the safety of railway level crossings in New South Wales. A summary of the submissions received was distributed to Members.

It was agreed that the period Tuesday 15 May 2001 – Friday 18 May 2001 be set aside for inspections of railway level crossings in regional and rural New South Wales, subject to appropriate arrangements being made through the office of the Minister for Transport and Minister for Roads.

...

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

9. General Business

There being no further business, the Committee adjourned at 9:30 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE

at 9:30 a.m., MONDAY 14 MAY 2001

AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council

Mr West
Mr Jobling
Mr Tingle

Legislative Assembly

Mr Greene
Mr Stoner
Mr Smith
Mr Bartlett
Mr Campbell

The Chairman, Mr McBride, presiding.

Also in attendance: Mr Faulks, Director, and Ms Allen, Assistant Committee Officer.

1. Apologies

Apologies were received from Mr Bartlett.

...

3. Chairman's report

...

Visit of inspection into railway level crossing safety, Tuesday 15 May to Friday 18 May 2001
The Chairman reported that over the period Tuesday 15 May 2001 to Friday 18 May 2001 a delegation of STAYSAFE Committee Members, accompanied by the Director, is to conduct an inspection of railway level crossings in regional New South Wales. The delegation will inspect railway crossing facilities at Albury, Wagga Wagga, Parkes, Tamworth and Grafton, and obtain briefings from regional staff of the Roads and Traffic Authority and the Rail Infrastructure Corporation.

Mr McBride (Chairman), Mr Jobling, Mr Bartlett, and Mr Stoner, accompanied by Mr Faulks, will form the STAYSAFE Committee delegation.

At the request of the Hon. Carl Scully MP, Minister for Transport, who provided a Ministerial reference to the STAYSAFE Committee for the conduct of the inquiry, Mr Kevin Moss MP,

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

Parliamentary Secretary for Transport, will accompany the delegation. In order to enable the Committee to have direct and relevant technical information, the Minister has also agreed that senior Departmental officials from the Department of Transport should accompany the delegation. The Committee has been advised by Mr Michael Deegan, Director General, Department of Transport, that his nominees are Mr Guy Creber and Mr Stephen Ford, from the Transport Safety Bureau, and Mr Graham Cowan, from the Rail Infrastructure Corporation. The accommodation, meals and incidentals for Mr Moss and the Departmental staff are being met by the Minister or the Department of Transport, respectively. Additionally, at Albury, Wagga Wagga, Parkes, Tamworth, and Grafton, travel by road is being arranged by either the Roads and Traffic Authority or the Rail Infrastructure Corporation.

...

5. General Business

There being no further business, the Committee adjourned at 4:30 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE

at 10:00 a.m., THURSDAY 24 MAY 2001

AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council
Mr West
Mr Jobling

Legislative Assembly
Mr Bartlett
Mr Campbell
Mr Stoner

The Chairman, Mr McBride, presiding.

Also in attendance: Mr Faulks, Director, and Ms Allen, Assistant Committee Officer.

1. Apologies

Apologies were received from Mr Tingle, Mr Greene and Mr Smith.

...

3. Chairman's report

Visit of inspection into railway level crossing safety, Tuesday 15 May to Friday 18 May 2001
The Chairman reported that over the period Tuesday 15 May 2001 to Friday 18 May 2001 a delegation of STAYSAFE Committee Members - Mr McBride (Chairman), Mr Jobling, Mr Bartlett, and Mr Stoner - accompanied by the Director, conducted an inspection of railway level crossings in regional New South Wales. Mr Kevin Moss MP, Parliamentary Secretary for Transport, accompanied the delegation, together with senior Departmental officials from the Department of Transport - Mr Guy Creber and Mr Stephen Ford, from the Transport Safety Bureau, and Mr Graham Cowan, from the Rail Infrastructure Corporation. The delegation inspected railway crossing facilities at Albury, Wagga Wagga, Parkes, Tamworth and Grafton, and obtain briefings from regional staff of the Roads and Traffic Authority and the Rail Infrastructure Corporation. Thirty six railway level crossings used for vehicular and pedestrian traffic were examined, and the delegation observed five trains transiting level crossings at various speeds. During the briefings it was noted, first, that the Victorian Public Transport Authority operates railways into New South Wales at a number of points along the Murray River, and second, that best Australian practice in railway level crossing safety seems to be in Queensland.

On the motion of Mr Bartlett, seconded Mr Jobling:

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

That the Committee investigate policies and practices associated with railway level crossings in Victoria and Queensland; and, if as determined by the Chairman, conduct visits of inspection to Victoria and Queensland to investigate railway level crossing safety

Passed unanimously.

Mr Bartlett returned by rail, observing railway level crossings between Tamworth and Newcastle, and discussing relevant issues with the train crews. In compliance with rail operating procedures for non-rail personnel travelling in the drivers compartment, Mr Bartlett was accompanied by a CountryLink rail inspector.

On the motion of Mr Stoner, seconded Mr Campbell:

That the Committee request the Minister for Transport to arrange for Members to observe railway level crossing transits from trains, and discuss relevant issues with the train crews, as part of the inquiry into railway level crossing safety.

Passed unanimously.

...

5. General Business

There being no further business, the Chairman closed the meeting at 3:30 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE
at 4:30 p.m., WEDNESDAY 20 JUNE 2001
AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council

Mr West
Mr Jobling
Mr Tingle

Legislative Assembly

Mr Bartlett
Mr Campbell
Mr Stoner
Mr Greene
Mr Smith

The Chairman, Mr McBride, presiding.

In attendance: Mr Kevin Moss MP, Parliamentary Secretary for Transport.

Also in attendance: Mr Faulks, Director, and Ms Brdaroska, Committee Officer.

1. Meeting with the New South Wales Level Crossing Strategy Council

The Committee met with the members of the New South Wales Level Crossing Strategy Council:

Mr John Hall, Mr Guy Creber, Mr Steve Ford, Mr Pat Romano, Mr John Hopman, and Mr Michael Petrie, from the Department of Transport
Mr Chris Ford, from the Roads and Traffic Authority
Mr Bruce Lord, and Mr Graham Cowan, of the Rail Infrastructure Corporation

Apologies were received from Mr Michael Deegan, Director General, Department of Transport and Chairman, Level Crossing Strategy Council, and Mr Paul Forward, Chief Executive, Roads and Traffic Authority.

2. Briefing on Queensland Transport's prioritisation model for assessing risk at railway level crossings

The Committee received a briefing on Queensland Transport's prioritisation model for assessing risk at railway level crossings from:

- Mr Geoff Meers, Director (Strategy), Land Transport and Safety, Queensland Transport

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

- Mr Peter Hughes, Corporate Risk Manager, Treasury, Deputy Chief Executive's Group, Queensland Rail, and
- Mr Andrew Matthews, Level Crossing Safety Advisor, Rail Safety Accreditation Unit, Queensland Transport

regarding the Queensland level crossing upgrade program, the Level Crossing Safety Steering Group, and the Risk Scoring Matrix for railway level crossings.

6. General Business and close of meeting

There being no further business, the Chairman closed the meeting at 6:00 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE

at 10:30 a.m., FRIDAY 22 JUNE 2001

AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council

Mr West
Mr Tingle

Legislative Assembly

Mr Campbell
Mr Stoner
Mr Greene
Mr Smith

The Chairman, Mr McBride, presiding.

In attendance: Mr Faulks, Director, and Ms Brdaroska, Committee Officer.

1. Apologies

Apologies were received from Mr Jobling and Mr Bartlett.

...

4. Inquiry into the safety of railway level crossings

Queensland risk prioritisation process for upgrading railway level crossings

The Chairman reported that the Director had attended a further technical briefing on the development and application of the Queensland risk prioritisation process for upgrading railway level crossings on Thursday 21 June 2001.

....

6. General Business

There being no further business, the Chairman closed the meeting at 12:10 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE

at 1:00 p.m., THURSDAY 28 JUNE 2001

AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council
Mr Jobling
Mr Tingle

Legislative Assembly
Mr Campbell
Mr Greene
Mr Smith
Mr Bartlett

The Chairman, Mr McBride, presiding.

In attendance: Mr Faulks, Director, and Ms Brdaroska, Committee Officer.

1. Apologies

Apologies were received from Mr West and Mr Stoner.

...

4. Inquiry into the safety of railway level crossings

Australian Transport Council meeting, 25 May 2001

The Chairman noted that the Australian Transport Council communique from the recent meeting in Darwin on 25 May 2001 had reported:

"Level Crossings

ATC members considered the results of preliminary research undertaken by the Australian Rail Operations Unit into reducing collision risk at level crossings including those fitted with passive protection signs.

Members agreed that Austroads, the Association of Australian Road Authorities, would conduct a survey of current standards and practice across Australia and New Zealand and recommend on best practice approaches to reducing collision risk at passive level crossings."

It was agreed that the Chairman would request the Hon. Carl Scully MP, Minister for Transport, to forward documentation relating to the preliminary research undertaken by the Australian Rail Operations Unit and to provide advice as to the terms of reference,

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

contractor(s), and reporting date for the Austroads survey of current standards and practice for reducing collision risk at passive level crossings across Australia and New Zealand.

Submissions

As of Thursday 28 June 2001, 28 submissions had been received by STAYSAFE. The Chairman noted the requested date for receipt of submissions was Friday 29 June 2001, and that the Department of Transport and the Rail Infrastructure Corporation had contacted STAYSAFE to indicate that their submissions were awaiting approval before forwarding to STAYSAFE.

Invitation from Member for Kiama

The Director reported that STAYSAFE had received an invitation from Mr Matt Brown MP, Member for Kiama, to conduct a visit of inspection of railway level crossings on the South Coast line, including the major level crossings at Dunmore (near Shellharbour) and Omega (near Gerringong)

Dates for public hearings and inspections

The Chairman requested the Director to provide a list of proposed dates for public hearings and inspections for the remainder of the year.

...

6. General Business

...

There being no further business, the Chairman closed the meeting at 1:45 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE
at 10:00 a.m., TUESDAY 30 OCTOBER 2001
AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council
Mr West
Mr Tingle

Legislative Assembly
Mr Campbell
Mr Greene
Mr Smith
Mr Stoner

The Chairman, Mr McBride, presiding.

In attendance: Mr Faulks, Director, Ms Brdaroska, Committee Officer, and Ms Tanzer, Assistant Committee Officer.

1. Apologies

Apologies were received from Mr Jobling and Mr Bartlett.

2. Previous Minutes

On the motion of Mr Greene, seconded by Mr Smith, the minutes of meeting No. 35 were accepted unanimously as a true and accurate record.

...

7. Inquiry into the safety of railway level crossings

Members' travel on trains

The Chairman noted that to date several members had indicated that they wished to travel with train crews to observe railway level crossings, including Mr Stoner, Mr Campbell and himself.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

Visits of inspection to Victoria and Queensland

The Chairman proposed visits of inspection to Melbourne and Brisbane to meet with government agencies involved in road safety, rail operations and rail safety and other interested parties.

On the motion of Mr Smith, seconded Mr Tingle:

That the Committee conduct visits of inspection to Victoria and Queensland for the inquiry into the safety of railway level crossings, to meet with government agencies involved in road safety, rail operations and rail safety and other interested parties.

Passed unanimously.

The Chairman noted that it might be appropriate for the Committee to travel by train, taking the opportunity during the journeys to travel “up front” with the train crews from time to time.

Coronial inquiry into Gerogery deaths

The Chairman noted that the Albury coroner's inquiry into the circumstances surrounding the deaths of five young men in a railway level crossing crash at Bells Road, Gerogery, had not yet been finalised. The Director has discussed the inquest with the coroner, Mr Colin Becker. Mr Becker has indicated that final papers relating to the investigation of the crash are due on Wednesday 31 October 2001. Mr Becker has indicated that the assistance of the Committee in providing reference and research documents, copies of submissions received for the inquiry, etc., would be very helpful.

On the motion of Mr Smith, seconded Mr Tingle:

That the Committee release relevant submissions received for the inquiry into the safety of railway level crossings, as well as supportive research and reference documentation, to the Albury coroner investigating the Gerogery level crossing crash in January 2001.

Passed unanimously.

8. Public hearing into the safety of railway level crossings

The public were admitted.

Mr Michael Francis Deegan, Chair, Level Crossing Strategy Council
Mr Kenneth Joseph Ryan, Department of Transport
Mr Bruce William Lord, Rail Infrastructure Corporation,
Mr Christopher Patrick Ford, Roads and Traffic Authority

were called and sworn.

The witnesses acknowledged receipt of a summons issued by the Chairman.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

The witnesses were examined by the Chairman and Members.

Evidence completed, the witnesses were excused.

Mr Mark Morey, Labor Council of NSW
Mr Keith James Aller, Rail Tram and Bus Union
Mr Robert Norman Haydon, Rail Tram and Bus Union
Mr Vincent Noel Holloway, Rail Tram and Bus Union
Mr John Francis Leonard, Rail Tram and Bus Union
Mr Keith Henry McMahon, Rail Tram and Bus Union
Mr Ian Bruce Willie, Rail Tram and Bus Union

were called and sworn.

The witnesses acknowledged receipt of a summons issued by the Chairman.

The witnesses were examined by the Chairman and Members.

Evidence completed, the witnesses were excused.

Mr Bradley David Weyland
Mr Hugh Christopher Cowling

were called and sworn.

The witnesses acknowledged receipt of a summons issued by the Chairman.

The witnesses were examined by the Chairman and Members.

Evidence completed, the witnesses were excused.

Mr John Malden Elliott, Cumec Pty Limited

was called and sworn.

The witness acknowledged receipt of a summons issued by the Chairman.

The witness was examined by the Chairman and Members.

Evidence completed, the witness was excused.

5. General Business

There being no further business, the Chairman closed the meeting at 4:10 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE
at 9:30 a.m., MONDAY 3 DECEMBER 2001
AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council
Mr West
Mr Jobling

Legislative Assembly
Mr Campbell
Mr Smith

The Chairman, Mr McBride, presiding.

In attendance: Mr Faulks, Director, Ms Brdaroska, Committee Officer, and Ms Tanzer, Assistant Committee Officer.

1. Apologies

Apologies were received from Mr Stoner, Mr Bartlett, Mr Greene and Mr Tingle.

...

5. Inquiry into the safety of railway level crossings

Members travel on trains

The Chairman reported that on Thursday 22 November 2001 he had conducted an inspection of railway crossings on the Main Southern line between Sydney and Albury, travelling in the drivers compartment of the Sydney-Melbourne XPT. Further travel by Members with train crews is being arranged, including an inspection of the South Coast line by Mr Campbell.

The Chairman noted that the Committee had been invited by the Director-General of the Department of Transport to inspect the Pine Road level crossing at Fairfield, and that a number of other sites had been identified in the Sydney metropolitan area (e.g., Sandown near the Shell refinery at Clyde).

On the motion of Mr West, seconded Mr Campbell:

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

That the Director continue to make suitable arrangements with the Department of Transport for Members and Committee staff to inspect the safety of railway level crossings through site inspections or riding with train crews.

Passed unanimously.

Mr West reported that during attendance at the 2001 Road Safety Research Policing and Education Conference in Melbourne the delegation met with Mr Brian Kidd, Western Australian Department of Main Roads, and Dr Peter Cairney and Ms Thanuja Gunatillake, ARRB Transport Research, to discuss the Austroads research project examining the safety of passive railway level crossings in Australasia. Dr Cairney advised that there was a workshop on the safety of passive railway level crossings scheduled for Melbourne on or after 22 February 2002.

Mr West reported that during attendance at the 2001 Road Safety Research Policing and Education Conference in Melbourne the delegation met with Dr Michael Regan, Monash University Accident Research Centre, to discuss the international conference on the safety of passive railway level crossings scheduled for Melbourne in 20-21 February 2002.

Mr West reported that during attendance at the 2001 Road Safety Research Policing and Education Conference in Melbourne the delegation met with Mr Terry Poynton and Mr Bill Uren, National Express Group (Australia) Pty Ltd (the operators of M-Line and V-Line trains in Victoria) to discuss the safety of railway level crossings.

Mr West reported that during attendance at the 2001 Road Safety Research Policing and Education Conference in Melbourne the delegation was advised that there was a symposium on the Operation Lifesaver program for the safety of railway level crossings planned for 19 February 2002.

On the motion of Mr West, seconded Mr Campbell:

That the Committee attend the meetings on the safety of railway level crossings in Melbourne in February 2002, including: Operation Lifesaver symposium; the 7th International Symposium on the Safety of Highway-Rail Grade Crossings; and the Austroads workshop on the safety of passive railway level crossings.

Passed unanimously.

6. Public hearing into the safety of railway level crossings

The public were admitted.

**Mr Guy Leslie Creber, G. Creber & Associates
Mr Graham Cowan, Manager (Safety - Freight), Rail Infrastructure
Corporation**

were called and sworn.

The witnesses acknowledged receipt of a summons issued by the Chairman.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

The witnesses were examined by the Chairman and Members.

Evidence completed, the witnesses were excused.

Chief Superintendent Ronald Alexander Sorrenson, New South Wales Police Service

was called and sworn.

The witness acknowledged receipt of a summons issued by the Chairman.

The witness was examined by the Chairman and Members.

Evidence completed, the witness was excused.

Mr David Stanley Edwards, National Manager (Safety), National Rail Corporation

was called and sworn.

The witness acknowledged receipt of a summons issued by the Chairman.

The witness was examined by the Chairman and Members.

Evidence completed, the witness was excused.

Dr Peter Thompson Cairney, Principal Research Scientist, ARRB Transport Research

was called and sworn.

The witness acknowledged receipt of a summons issued by the Chairman.

The witness was examined by the Chairman and Members.

Evidence completed, the witness was excused.

Mr Keith Hoskins, Senior Environment Health & Safety Coordinator, FreightCorp
Mr Christopher David Church, Environment Health & Safety Coordinator, FreightCorp
Mr Phillip John Pritchard, Coordinator (Yard & Terminals), FreightCorp

were called and sworn.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

The witnesses acknowledged receipt of a summons issued by the Chairman.

The witnesses were examined by the Chairman and Members.

Evidence completed, the witnesses were excused.

Cr Barry Edward Ryan, Mayor, Gloucester Shire Council, and Chair, Roads and Transport Committee, Local Government and Shires Associations
Mr David John Hale, Senior Policy Officer (Water), Local Government and Shires Associations

were called and sworn.

The witnesses acknowledged receipt of a summons issued by the Chairman.

The witnesses were examined by the Chairman and Members.

Evidence completed, the witnesses were excused.

5. General Business and close of meeting

There being no further business, the Chairman closed the meeting at 4:00 p.m..

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE

at 10:00 a.m., FRIDAY 12 APRIL 2002

AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council
Mr West
Mr Jobling

Legislative Assembly
Mr Bartlett
Mr Smith
Mr George

The Chairman, Mr McBride, presiding.

In attendance: Mr Faulks, Director, Ms Dart, Committee Officer, and Ms Tanzer, Assistant Committee Officer.

1. Apologies

Apologies were received from Mr Tingle, Mr Campbell and Mr Greene.

...

3. Appointment of new member

Following the resignation of Mr Andrew Stoner MP on 19 March 2002, the Chairman welcomed the appointment of Mr Thomas George MP, Member for Lismore, to the STAYSAFE Committee.

...

5. Inquiry into the safety of railway level crossings

Coronial investigations

The Chairman advised that the inquest into the multiple fatality crash at the Gerogery railway level crossing – previously listed for hearing at Albury on 11 April 2002 – has been deferred following another fatal crash at a railway level crossing in Albury, and that these inquests are now to be matters heard by the State Coroner at a date to be determined. The Committee has

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

written to the State Coroner requesting advice as to the proposed date for a general coronial inquiry into the safety of railway level crossings.

Visits of inspection regarding the safety of railway level crossings

The Chairman reported that he had held discussions with all Members regarding the possibility of an overseas visit of inspection in early 2002, and that had been agreed unanimously that:

That the Chairman and Mr Jobling, accompanied by the Director, conduct an overseas visit of inspection to India, Europe and North America in early 2002 examine issues associated with the safety of railway level crossings, transport safety, pedestrian safety, the safety of older road users, and other road safety matters.

A visit of inspection was conducted over the period Saturday 26 January 2002 to Saturday 16 February 2002. The Parliamentary Secretary for Transport, Mr Kevin Moss MP, accompanied the delegation at the request of the Minister for Transport. The visit of inspection involved meetings and inspections in India, Germany, Belgium, England, the United States of America and Canada, and examined issues associated with the safety of railway level crossings, transport safety, pedestrian safety, and other road safety matters. A report of this overseas visit of inspection is being prepared currently.

The Chairman reported that over the period Tuesday 19 February 2002 to Thursday 21 February 2002 a delegation of the Committee travelled to Melbourne regarding the safety of railway level crossings. Mr Smith, accompanied by the Director, attended a technical workshop at ARRB Transport Research, Vermont South, to discuss the Austroads review of safety at passive railway level crossings. Mr Smith, again accompanied by the Director, also attended a workshop at Melbourne on Operation Lifesaver, a community rail-highway grade crossings safety advocacy organisation in North America. Later, the Chairman, Mr Smith and Mr Stoner, accompanied by the Director, attended the 7th International Symposium on Railway Highway Grade Crossings at Monash University Accident Research Centre, Clayton.

The Chairman reported that on Wednesday 27 March 2002 he had inspected railway level crossings at Newcastle, accompanied by the Director.

The Chairman reported that on Tuesday 2 April 2002 a delegation of the Committee had conducted a visit of inspection to examine railway level crossings in Western Sydney, the Southern Highlands, and the Illawarra. The delegation comprised Mr McBride, Mr Bartlett, Mr Greene, Mr Jobling and Mr George, accompanied by the Committee Officer, Ms Dart. Several representatives of Transport NSW agencies also accompanied the delegation, including Mr Steven Ford, Transport Safety Bureau, Mr Derek Williams, Rail Infrastructure Corporation, and Mr Graeme Cowan, Rail Infrastructure Corporation.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

8. General business

There being no further business, the Chairman closed the meeting at 1:00 p.m.

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE
at 9:30 a.m., Thursday 21 November 2002
AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council

Mr West
Mr Jobling
Mr Tingle

Legislative Assembly

Mr Bartlett
Mr Smith
Mr George
Mr Campbell
Mr Greene

The Chairman, Mr McBride, presiding.

In attendance: Mr Faulks, Director, Mrs Samuels, Project Officer, and Ms Tanzer, Assistant Committee Officer.

1. Previous Minutes

On the motion of Mr Jobling, seconded by Mr Smith, the minutes of meeting No. 38 were accepted unanimously as a true and accurate record.

...

5. Inquiry into the safety of railway level crossings

Draft recommendations

The Chairman distributed draft recommendations arising from the inquiry into the safety of railway level crossings for Members' comment. The Chairman noted that discussions had taken place with Transport NSW staff regarding the development of the draft recommendations.

Inquests into the Bells Road, Gerogery and Fallon Street, Albury level crossing crashes

The Chairman noted that the Deputy State Coroner conducted an inquest at Albury over the period Monday 8 July 2002 to Friday 12 July 2002, regarding the deaths of five men at the level crossing at Gerogery in January 2001. A copy of the coroner's findings has been forwarded to the Committee. Prior to the inquest, the Government announced that the Bells Road, Gerogery level crossing would be replaced by a road bridge. Subsequent to the

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

inquest, the Government announced that it accepted and would take action regarding the coroner's recommendations. The Deputy State Coroner did not examine the fatal level level crossing crash at Fallon Street, Albury. This inquest is scheduled for Thursday 21 November 2002.

Meeting with the parents of Kyle Wooden

The Chairman reported that on Monday 18 November 2002, at the request of the Member for Wagga Wagga, Mr Daryl Maguire, the Director met with Mr Barry Wooden and Mrs Alison Wooden to discuss the outcomes of inquest into the Bells Road, Gerogery level crossing fatalities and the progress of the STAYSAFE Committee's inquiry.

...

12. Preparation of further reports

The Chairman indicated that work was proceeding on the preparation of the following draft reports, including:

- Safety at railway level crossings in New South Wales: Reducing the risk at road-rail intersections.

...

13. General business

...

There being no further business, the Committee adjourned at 10:00 a.m.

Chairman

Director

MEETING OF THE STAYSAFE COMMITTEE
at 10:30 a.m., Wednesday 11 December 2002
AT PARLIAMENT HOUSE, SYDNEY

Chairman
Mr McBride

Legislative Council
Mr West
Mr Jobling

Legislative Assembly
Mr Campbell
Mr Smith
Mr George
Mr Bartlett

The Chairman, Mr McBride, presiding.

In attendance: Mr Faulks, Director, Mrs Samuels, Project Officer, and Ms Jodie Young, Committee Officer.

1. Apologies

Apologies were received from Mr Tingle, and Mr Greene.

2. Previous Minutes

On the motion of Mr Campbell, seconded by Mr George, the minutes of meeting No. 39 were accepted unanimously as a true and accurate record.

...

**4. Overseas visit of inspection regarding railway safety, 26 January 2002
- 16 February 2002**

The Chairman and Mr Jobling reported on activities undertaken during a visit of inspection to India, Germany, Belgium, England and the United States of America over the three week period, 26 January 2002 – 16 February 2002, to investigate railway safety and road safety issues. The focus of the meetings and inspections related to railway level crossings, where railway tracks and roadways intersect at the same level. Matters examined included:

- historical development of railways and roads
- railway signal and track technologies
- railway crash investigation

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

- occupational health and safety issues affecting train crews, and track and signalling staff
- new and emerging technologies in railway operations
- technologies associated with road pavements, signage and markings, and traffic signals
- driver behaviour at railway level crossings
- road transport law relating to railway level crossings
- enforcement issues associated with railway level crossings

The delegation comprised Mr Grant McBride MP (Chairman) and the Hon. John Jobling MLC. Mr Kevin Moss MP, Parliamentary Secretary for Transport, accompanied the delegation during the visit of inspection to India, Germany, Belgium and England. Mr Ian Faulks, of the STAYSAFE Committee secretariat, also accompanied the delegation.

During the visit of inspection, meetings were held in India, Germany, Belgium and England.

India

While in India, the delegation held meetings and conducted inspections in New Delhi.

The delegation received briefings and held discussions in meetings with the following persons and organisations:

- Mr E. Sreedharan, Managing Director, Delhi Metro Rail Corporation, and his staff and contractor representatives, to discuss the Delhi Metro Rail project.
- Mr G. Garg, Commissioner of Railway Safety (Northern Circle), to discuss rail crash investigations and railway law.
- Mr R. Agrawal, Director, National Railway Museum, to discuss railway infrastructure, signalling and communications technologies, and issues associated with the operation of historical and tourism railways.
- Mr P. Kumar, Station Manager, Old Delhi railway station, Northern Railway, and his staff to discuss railway operations and passenger safety.
- Chaudhury Prem Singh, Speaker, Delhi Legislative Assembly and staff of the Delhi Legislative Assembly.

While in New Delhi the delegation took the opportunity to:

- Inspect the Delhi Metro Rail project, including construction sites along Line 1 (Shahdara – Barwala): Seelampur railway station, the bridge over the Yamuna (Jumna) River at Shastri Park, ISBT railway station and interchange; and construction sites along Line 2 (Vishwa Vidyalaya – Central Secretariat): at Civil Lines railway station and Patel Chowk railway station. The delegation also visited the Khyber Pass depot.
- Inspect Safdarjung railway station
- Inspect Old Delhi railway station and main signals box.
- Inspect the Delhi Legislative Assembly.

The Chairman and Mr Jobling noted the assistance of the Department of Foreign Affairs and Trade – and Ms Clare Duffield of the Australian High Commission, New Delhi, in particular – and the staff of the office of the Consulate General of India, Sydney, in arranging the meetings and inspections in India.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

Germany

While in Germany, the delegation held meetings in Cologne. The delegation received briefings and held discussions in a meeting with:

- Mr M. Heppner, Deutsche Bahn, regarding railway property management.

Belgium

While in Belgium, the delegation held meetings in Brussels.

The delegation received briefings and held discussions in meetings with the following persons and organisations:

- Mr F. Jost, Road Safety and Technology, Directorate-General for Energy and Transport, European Commission, regarding railway level crossing safety
- Mr R. Ferravante, Rail Transport and Interoperability, Directorate-General for Energy and Transport, European Commission, regarding railway level crossing safety and the operation of high speed rail corridors in Europe.

England

While in England, the delegation held meetings and conducted inspections in York and London.

In York, the delegation received briefings and held discussions in meetings with the following persons and organisations:

- Ms J. Murray, Deputy Head of Museum and Head of Public Services, National Railway Museum, and museum staff, to discuss railway infrastructure, signalling and communications technologies, and issues associated with the operation of historical and tourism railways.
- Mr T. Magee and Mr J. Harrison, Transport and Planning Unit, City of York Council, to discuss transport safety and traffic management matters, including school travel.

In London, the delegation received briefings and discussions in meetings with the following persons:

- Mr S. Mullins, Director, London Transport Museum, and his staff, to discuss railway infrastructure, signalling and communications technologies, and issues associated with the operation of historical and tourism railways.
- Mr Danial Kidney MP, and Mr R. Gifford, Parliamentary Advisory Council on Transport Safety (PACTS), to discuss railway safety and road safety.
- Professor A. Evans, European Transport Safety Council, to discuss railway safety and road safety.

United States of America

In the United States of America, the delegation held meetings and conducted inspections in Washington DC, College Station (Texas Transportation Institute, Texas A & M University), and in San Francisco.

In Washington DC, the delegation received briefings and discussions in meetings with the following persons and organisations:

- Dr Allan Williams, Insurance Institute for Highway Safety, to discuss the safety of railway level crossings and general road safety matters.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

- Mr R. Holmes and Mr R. Harvey, of the Brotherhood of Locomotive Engineers, to discuss railway safety and railway operations.
- Mr D. Boston and Mr L. Parker, of the Brotherhood of Railroad Signalmen, to discuss railway safety and railway operations.
- Mr G. Garvalla, Associate Administrator for Safety, Office of Safety, Federal Railroad Administration, to discuss railway safety
- Mr R. Finkelstein, Systems Support Division, Federal Railroad Administration, to discuss railway safety, statistical collection and analysis, and safety regulation.
- Mr A. MacDowell, Staff Director, Track Division, Federal Railroad Administration, to discuss railway safety, and safety regulation.
- Ms B. Boardman, Highway-Rail Crossing and Trespasser Division, Federal Railroad Administration, to discuss level crossing safety and trespass on railway property.
- Mr S. Ditmeyer, Director, Office of Research & Development, Federal Railroad Administration, to discuss emerging and future technologies for level crossings and railway operations.

In Washington DC, the delegation also visited the National Museum of American History, Smithsonian Institution, to examine railway infrastructure, and signalling and communications technologies.

In College Station, the delegation received briefings and discussions in meetings with staff of the Texas Transportation Institute, Texas A & M University:

- Dr H. Richardson, Director, Texas Transportation Institute, Texas A & M University, and his staff, to discuss railway level crossing safety matters.

While at the Texas Transportation Institute, Texas A & M University, the delegation took the opportunity to:

- Inspect the Translink7 interface between road traffic signals and level crossings
- Inspect traffic simulation technologies demonstrating prescription issues in the operation of level crossings
- Inspect the driving simulator operated by the Centre for Transportation Safety

In San Francisco, the delegation received briefings and discussions in meetings with the following persons and organisations:

- Ms T. Horner, Interim Director, Rail Safety Division, California Public Utilities Commission, and her staff, to discuss railway level crossing safety matters.

While in San Francisco, the delegation took the opportunity to:

- Inspect advanced technology signal applications at pedestrian crossings.

5. Consideration of the Chairman's draft report: STAYSAFE 56 – Safety at railway level crossings in New South Wales: Reducing the risk at road-rail intersections

The Chairman presented Recommendations 1-40 of the draft report: "STAYSAFE 56 - Safety at railway level crossings in New South Wales: Reducing the risk at road-rail intersections".

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

(Report 12/52). The Chairman noted that the text of the draft report was still being prepared, and that it was hoped that the final report would be ready for the consideration of the Committee prior to the prorogation of Parliament.

The recommendations were accepted as being read.

The Committee proceeded to deliberate on the recommendations in globo.

On the motion of Mr Jobling, seconded Mr Campbell:

That Recommendations 1-40 of the draft report: "STAYSAFE 56 - Safety at railway level crossings in New South Wales: Reducing the risk at road-rail intersections", be read and agreed to.

Passed unanimously.

The Committee noted that the inquiry into the safety of railway level crossings had been greatly facilitated by the aid and assistance provided by the Director General of Transport NSW, Mr Michael Deegan, and his staff.

6. Consideration of the Chairman's draft report: Where railways and road intersect – Reports of visits of inspection by delegations of the STAYSAFE Committee, 2001-2002.

The Chairman presented the draft report: "Where railways and road intersect – Reports of visits of inspection by delegations of the STAYSAFE Committee, 2001-2002". (Report 13/52).

The draft report was accepted as being read.

The Committee proceeded to deliberate on the draft report in globo:

On the motion of Mr Bartlett, seconded Mr West:

That the draft report: "Where railways and road intersect – Reports of visits of inspection by delegations of the STAYSAFE Committee, 2001-2002", be read and agreed to.

Passed unanimously.

On the motion of Mr Bartlett, seconded Mr West:

That the draft report: "Where railways and road intersect – Reports of visits of inspection by delegations of the STAYSAFE Committee, 2001-2002" be accepted as a report of the STAYSAFE Committee, and that it be signed by the Chairman and presented to the House.

Passed unanimously.

On the motion of Mr Bartlett, seconded Mr West:

That the Chairman and Director be permitted to correct any stylistic, typographical and grammatical errors in the report.

Passed unanimously.

...

13. General business

Valedictory remarks

The Chairman thanked the Members and staff for their efforts with regard to the inquiries by the Committee over the 1999-2002 period.. In particular, the response of the government to the inquiries into traffic control around schools and the safety of railway level crossings has been very pleasing. ...

There being no further business, the Committee adjourned at 11:00 a.m.

Chairman

Director

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

STAYSAFE Committee of the 53rd Parliament

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:30 A.M., THURSDAY 22 MAY 2003
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr Colless
Mr Tingle
Mr West

Legislative Assembly

Mr Barr
Mr Gibson
Mr Hunter
Mr Maguire
Mr Souris

Also in attendance: Mr Grove, Clerk of the Legislative Assembly, Mr Gonye, Clerk Assistant (Committees), Mr Faulks, Manager of the Committee, Mr Jefferis, Project Officer.

The Clerk took the Chair.

1. Apologies

Apologies were received from Mr Bartlett and Ms Saliba.

...

3. Election of Chairman

The Clerk called for nominations for the position of Chairman. On the motion of Mr Hunter, seconded Mr Tingle, Mr Gibson was nominated. No other nominations were received. Mr Gibson was elected unanimously as Chairman of the Committee.

...

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

5. Chairman's report

Mr Gibson took the Chair.

The Clerk and Clerk Assistant (Committees) were excused.

The Chairman reviewed the work of the Committee over the period 1995 to the present. The Chairman noted that some work remained from the STAYSAFE Committee of the 52nd Parliament.

...

7. Next meeting of the Committee

There being no further business, the Committee adjourned at 11:00 a.m..

Chairman

Clerk of the Legislative Assembly

Committee Manager

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:30 A.M., THURSDAY 29 MAY 2003
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr Colless
Mr Tingle
Mr West

Legislative Assembly

Mr Barr
Mr Gibson
Mr Hunter
Mr Maguire
Ms Saliba
Mr Souris

Also in attendance: Mr Faulks, Manager of the Committee, Mr Jefferis, Project Officer.

The Chairman presiding.

1. Apologies

Apologies were received from Mr Bartlett.

...

4. Inquiries by the Committee

...

Safety of railway level crossings

The Chairman noted that the Committee had finalised recommendations arising from the inquiry into the safety of railway level crossings in December 2002, but did not report before prorogation of the 52nd Parliament. The previous Chairman, the Hon. Grant McBride MP, wrote to the then Minister for Transport, the Hon. Carl Scully MP, in January 2003 informing him of the Committees deliberations.

On the motion of Mr Maguire, seconded Ms Saliba, the following resolutions were examined in globo:

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

RESOLUTION: 'The Committee request the Transport Services portfolio (and other portfolio areas involved in level crossing safety) for a response to STAYSAFE's recommendations of December 2002.

RESOLUTION: 'The Committee review actions taken to improve the safety of railway level crossings since the end of 2002.

RESOLUTION: 'The Committee conduct a visit of inspection to Queensland to meet with Queensland Rail and Queensland Transport regarding improvements to railway level crossing.

RESOLUTION: 'The Manager arrange for Members to observe the operation of level crossings (through site inspections, riding with train crews, etc.).

Passed unanimously.

The Committee agreed that the draft report of the Committee on the inquiry into railway level crossing safety, and other relevant documents, be distributed for Members' information.

...

6. General business

...

There being no further business, the Committee adjourned at 11:30 a.m..

Chairman

Committee Manager

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:00 A.M., MONDAY 13 OCTOBER 2003
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr West
Mr Tingle
Mr Colless

Legislative Assembly

Mr Gibson
Mr Barr
Ms Saliba
Mr Souris
Mr Bartlett
Mr Maguire
Mr Hunter

Also in attendance: Mr Faulks, Manager of the Committee, Mr Jefferis, Project Officer, and Ms Wenitong, Assistant Committee Officer.

The Chairman presiding.

...

7. General business

Response of government to recommendations made by the previous STAYSAFE Committee, 1999-2003

It was agreed that the Committee should write to relevant Ministers regarding the response of government to the recommendations made by the STAYSAFE Committee of the 52nd Parliament, 1999-2003, with particular regard to the inquiries into the safety of railway level crossings and traffic control and safety around schools.

...

There being no further business, the Committee adjourned at 4:00 p.m..

Chairman

Committee Manager

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:30 A.M., THURSDAY 20 NOVEMBER 2003
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr West
Mr Tingle
Mr Colless

Legislative Assembly

Mr Gibson
Mr Souris
Ms Saliba
Mr Bartlett

Also in attendance: Mr Faulks, Manager of the Committee, Mr Jefferis, Project Officer, and Ms Wenitong, Assistant Committee Officer.

The Chairman presiding.

1. Apologies

Apologies were received from Ms Saliba, Mr Barr, Mr Hunter and Mr Maguire.

...

6. Inquiry into railway level crossing safety

The Chairman reported that the Roads and Traffic Authority has advised that a meeting of the Level Crossing Strategy Council has been scheduled for Friday 28 November 2003 to finalise a joint response regarding the recommendations made by the STAYSAFE Committee of the 52nd Parliament. The joint response will incorporate the views of the Roads portfolio, Transport Services portfolio (Rail Infrastructure Corporation, Transport Ministry, etc.), and the Police portfolio.

...

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

8. General business

There being no further business, the Committee adjourned at 10:55 a.m..

Chairman

Committee Manager

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:30 A.M., THURSDAY 19 FEBRUARY 2004
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr Colless

Legislative Assembly

Mr Gibson

Mr Souris

Mr Barr

Mr Hunter

Also in attendance: Mr Faulks, Manager of the Committee.

The Chairman presiding.

1. Apologies

Apologies were received from Mr Tingle, Mr West, Mr Bartlett, Mr Maguire and Ms Saliba.

...

8. Inquiry into the safety of railway level crossings

The Chairman and Members discussed the inquiry into the safety of railway level crossings.

The Chairman noted that a formal response by Government to the recommendations agreed to by the previous STAYSAFE Committee in late 2002 was requested on 23 October 2003. On 19 November 2003 the Minister for Transport Services, the Hon. Michael Costa MLC, acknowledged the Committee's request for a response to the recommendations. On 25 November 2003 the Hon. Carl Scully, MP, Minister for Roads, advised that an integrated response to the STAYSAFE Committee's recommendations of December 2002 was being prepared by the Level Crossings Strategy Council and it is expected that it would be adopted at its next meeting on 28 November 2003. To date, no formal response has been received.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

It was agreed that the Minister for Transport would be requested to update the Committee on the outcome of the meeting of the Level Crossings Strategy Council.

The Committee Manager was asked to circulate a document outlining possible dates for a visit of inspection to Queensland to meet with Queensland agencies regarding level crossing safety, vide the resolution of the Committee on 29 May 2003.

...

10. General business

...

There being no further business, the Committee adjourned at 11:10 a.m..

Chairman

Committee Manager

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

No. 53/13

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:00 A.M., THURSDAY 1 APRIL 2004
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr West
Mr Tingle
Mr Colless

Legislative Assembly

Mr Gibson
Mr Barr
Mr Souris

Also in attendance: Mr Faulks, Manager of the Committee, Ms Yeoh and Ms Cyril, Assistant Committee Officers.

The Chairman presiding.

1. Apologies

Apologies were received from Mr Bartlett, Mr Maguire, Mr Hunter and Ms Saliba.

...

6. Inquiry into railway level crossing safety

The Chairman reported that Ms Jacqelene Irwin, Secretary, Level Crossings Strategy Council, had contacted the Committee to indicate that advice had been received from all government agencies involved in level crossing matters and that a formal response to the recommendations made by the previous STAYSAFE Committee had been drafted and was awaiting signature.

7. General business

...

There being no further business, the Committee adjourned at 10:40 a.m..

Chairman

Committee Manager

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:30 A.M., THURSDAY 13 MAY 2004
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr West
Mr Tingle
Mr Colless

Legislative Assembly

Mr Gibson
Mr Barr
Mr Souris
Mr Bartlett
Mr Hunter
Mr Maguire

Also in attendance: Mr Faulks, Manager of the Committee, Mr Jefferis, Project Officer, and Ms Yeoh and Ms Cyril, Assistant Committee Officers.

The Chairman presiding.

1. Apologies

Apologies were received from Ms Saliba.

...

5. Inquiry into railway level crossing safety

The Chairman reported that the submission from the Level Crossing Safety Council providing the response of government to the forty (40) recommendations made by the STAYSAFE Committee under the chairmanship of the Hon. Grant McBride MP in December 2002 was received on 6 April 2004.

6. Public hearing, Monday 17 May 2004

The Chairman noted that the public hearing on Monday 17 May 2004 would feature:

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

...

- Briefing on level crossing safety matters: Mr John Lee, Director-General, Ministry of Transport, and Mr Derek Williams, Rail Infrastructure Corporation:
 - *Restructuring in the Transport Services portfolio.*
 - National developments in rail, including the creation of the Australian Rail Track Corporation
 - The Level Crossings Assessment Model (LCAM)
 - The New South Wales inventory of level crossings
 - Issues associated with level crossings in the Wagga Wagga and Albury areas

...

- Public hearing into the safety of railway level crossings:
 - *Representatives of the Wagga Wagga families whose sons were killed in the level crossing crash at Gerogery: Mr Barry Wooden, Mrs Alison Wooden, Mr John Hennessey, and others to be advised.*
 - *(To be confirmed) Ms Phyllis Miller, President, Shires Association*
 - Representatives of the Level Crossing Strategy Council: Mr John Lee (Chairman), Mr Vince Graham, Mr Chris Ford, Chief Superintendent John Hartley

7. General business

...

There being no further business, the Committee adjourned at 11:10 a.m..

Chairman

Committee Manager

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:30 A.M., MONDAY 17 MAY 2004
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr West
Mr Tingle

Legislative Assembly

Mr Gibson
Mr Barr
Mr Souris
Mr Hunter
Mr Maguire

Also in attendance: Mr Faulks, Manager of the Committee, Mr Jefferis, Project Officer, and Ms Yeoh and Ms Cyril, Assistant Committee Officers.

The Chairman presiding.

1. Apologies

Apologies were received from Ms Saliba, Mr Bartlett and Mr Colless.

...

5. Briefings on level crossing safety matters

Mr John Lee, Director-General, Ministry of Transport, and Mr Derek Williams, Rail Infrastructure Corporation, provided briefings on the following matters:

- *Restructuring in the Transport Services portfolio.*
- National developments in rail, including the creation of the Australian Rail Track Corporation
- The Level Crossings Assessment Model (LCAM)
- The New South Wales inventory of level crossings

...

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

7. Public hearing regarding the inquiry into the safety of railway level crossings

The Committee commenced a hearing into the safety of railway level crossings.

The public were admitted.

Mr John Lee (Chairman), Ministry of Transport
Mr Vince Graham, RailCorp
Mr Chris Ford, Roads and Traffic Authority

representing the Level Crossing Strategy Council, were called and sworn.

The witnesses were examined by the members of the Committee.

Evidence completed, the witnesses were excused.

Mr Barry Wooden, private citizen
Mrs Alison Wooden, private citizen
Mr John Hennessey, private citizen

were called and sworn.

The witnesses were examined by the members of the Committee.

Evidence completed, the witnesses were excused.

The Chairman and Members, accompanied by Mr and Mrs Wooden and Mr Hennessey, viewed a video of the Gerogery level crossing.

8. In camera hearing regarding the inquiry into the safety of railway level crossings

Pursuant to S.O. 337, the Chairman ordered that the hearing be in camera.

The witness was examined by the members of the Committee.

Evidence completed, the witness was excused.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

9. General business

...

There being no further business, the Committee adjourned at 3:20 p.m..

Chairman

Committee Manager

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:30 A.M., MONDAY 28 JUNE 2004

AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr West
Mr Colless
Mr Tingle

Legislative Assembly

Mr Gibson
Mr Barr
Mr Maguire
Mr Hunter

Also in attendance: Mr Faulks, Manager of the Committee, Mr Jefferis, Project Officer, and Ms Yeoh and Ms Cyril, Assistant Committee Officers.

The Chairman presiding.

1. Apologies

Apologies were received from Ms Saliba, Mr Souris and Mr Bartlett.

...

6. Inquiry into the safety of railway level crossings

The Committee noted the release on Monday 28 June 2004 of the report of the House of Representatives Standing Committee on Transport and Regional Services regarding train illumination.

7. General business

...

There being no further business, the Committee adjourned at 4:30 p.m..

Chairman

Committee Manager

No. 53/20

STAYSAFE

PROCEEDINGS OF THE JOINT STANDING COMMITTEE ON ROAD SAFETY

10:30 A.M., THURSDAY 21 OCTOBER 2004
AT PARLIAMENT HOUSE, SYDNEY

MEMBERS PRESENT

Legislative Council

Mr West
Mr Tingle
Mr Colless

Legislative Assembly

Mr Gibson
Mr Barr
Mr Hunter
Mr Bartlett

Also in attendance: Mr Faulks, Manager of the Committee, and Ms Yeoh and Ms Cyril, Assistant Committee Officers.

The Chairman presiding.

1. Apologies

Apologies were received from Ms Saliba, Mr Maguire and Mr Souris.

...

4. Report on the safety of railway level crossings—where roads and railway lines meet at substantially the same level

The Chairman presented the draft report: “Report on the safety of railway level crossings—where roads and railway lines meet at substantially the same level”. (Report 4/53).

The draft report was accepted as being read.

The Committee proceeded to deliberate on the draft report:

Chapter 1
(Paras 1.1 – 1.13) Read and agreed to

Chapter 2
(Paras 2.1 – 2.71) Read and agreed to

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

Chapter 3
(Paras 3.1 – 3.33) Read and agreed to

Chapter 4
(Paras 4.1 – 4.135) Read and agreed to

Chapter 5
Insert new Para. 5.1:

“5.1 Land transport in New South Wales was first developed in the era of horse-drawn vehicles and steam locomotives. Today, roads in New South Wales reflect a diversity of types and function, ranging from unsealed country lanes and quiet residential streets in small towns and villages, through to major divided multi-lane highways carrying a significant proportion of Australia’s transport. Until the major State and Commonwealth roads projects of the past two or three decades, roads were developed with no conception of the volume of road traffic that would eventuate in the modern Australian economy, while railways similarly were developed with no conception as to train sizes, axle weights, and the speeds that are demanded today. There is much legacy infrastructure where the road network and railways intersect—at railway level crossings—particularly at private access roads and local roads, but also with two-lane undivided highways. STAYSAFE noted that many of the railway level crossings examined in site inspections had very low volumes of both road and rail traffic, and featured either gravel approach roads or narrow one lane bitumen surfaces. Often, these roads at the railway level crossing featured insufficient friction to allow a motor vehicle to stop, did not provide sufficient queuing space for modern motor vehicles (e.g., trucks operating in B-double configuration) at either the railway level crossing or at road junctions adjacent to the railway level crossing, had road profiles at the crossing itself which could be problematic for large vehicles to traverse (e.g., steep approaches on either side of the crossing so that long vehicles could ground across the railway tracks), and featured a diversity of signage and road markings. These types of deficiencies are known to be factors involved in crashes at railway level crossings. For example, Wigglesworth (1990) reported four cases where driver fixation on the surface of the approach road or between the rail tracks at the crossing itself prevented the visual search for trains.”

(Paras 5.1 – 5.84) Read and agreed to

Chapter 6
(Paras 6.1 – 6.46) Read and agreed to

Chapter 7
(Paras 7.1 – 7.28) Read and agreed to

Chapter 8
(Paras 8.1 – 8.12) Read and agreed to

Chapter 9
(Paras 9.1 – 9.116) Read and agreed to

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

Chapter 10 (Paras 10.1 – 10.13)	Read and agreed to
Chapter 11 (Paras 11.1 – 11.14)	Read and agreed to
Appendix A	Read and agreed to
Appendix B	Read and agreed to

It was agreed that the summary of recommendations would be amended to provide for the recommendations to be grouped according to subject area, as derived from the chapter headings.

Recommendation 1	Read and agreed to
Recommendation 2	Read and agreed to
Recommendation 3	Read and agreed to
Recommendation 4	Read and agreed to
Recommendation 5	Read and agreed to
Recommendation 6	Read and agreed to
Recommendation 7	Read and agreed to
Recommendation 8	Read and agreed to
Recommendation 9	Read and agreed to
Recommendation 10	Read and agreed to
Recommendation 11	Read and agreed to
Recommendation 12	Read and agreed to
Recommendation 13	Read and agreed to
Recommendation 14	Read and agreed to
Recommendation 15	Read and agreed to
Recommendation 16	Read, amended and agreed to
Recommendation 17	Read and agreed to
Recommendation 18	Read and agreed to
Recommendation 19	Read and agreed to
Recommendation 20	Read and agreed to
Recommendation 21	Read and agreed to
Recommendation 22	Read and agreed to
Recommendation 23	Read and agreed to
Recommendation 24	Read and agreed to
Recommendation 25	Read and agreed to
Recommendation 26	Read and agreed to
Recommendation 27	Read and agreed to
Recommendation 28	Read and agreed to
Recommendation 29	Read and agreed to
Recommendation 30	Read and agreed to
Recommendation 31	Read and agreed to
Recommendation 32	Read and agreed to
Recommendation 33	Read and agreed to
Recommendation 34	Read and agreed to

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

Recommendation 35	Read and agreed to
Recommendation 36	Read and agreed to
Recommendation 37	Read and agreed to
Recommendation 38	Read and agreed to
Recommendation 39	Read and agreed to
Recommendation 40	Read and agreed to
Recommendation 41	Read and agreed to
Recommendation 42	Read and agreed to
Recommendation 43	Read and agreed to
Recommendation 44	Read and agreed to
Recommendation 45	Read and agreed to
Recommendation 46	Read and agreed to
Recommendation 47	Read and agreed to
Recommendation 48	Read and agreed to
Recommendation 49	Read and agreed to
Recommendation 50	Read and agreed to
Recommendation 51	Read and agreed to
Recommendation 52	Read and agreed to
Recommendation 53	Read and agreed to
Recommendation 54	Read and agreed to
Recommendation 55	Read and agreed to
Recommendation 56	Read and agreed to
Recommendation 57	Read and agreed to
Recommendation 58	Read and agreed to
Recommendation 59	Read and agreed to
Recommendation 60	Read and agreed to
Recommendation 61	Read and agreed to
Recommendation 62	Read and agreed to
Recommendation 63	Read and agreed to
Recommendation 64	Read and agreed to
Recommendation 65	Read and agreed to
Recommendation 66	Read and agreed to
Recommendation 67	Read and agreed to
Recommendation 68	Read and agreed to
Recommendation 69	Read and agreed to

On the motion of Mr Bartlett, seconded Mr Barr:

That the draft report: “Report on the safety of railway level crossings—where roads and railway lines meet at substantially the same level”, be read and agreed to.

Passed unanimously.

On the motion of Mr Bartlett, seconded Mr Barr:

That the draft report: “Report on the safety of railway level crossings—where roads and railway lines meet at substantially the same level” be accepted as a report of the STAYSAFE Committee, and that it be signed by the Chairman and presented to the House.

Passed unanimously.

Relevant extracts from the minutes of the STAYSAFE Committee regarding the safety of railway level crossings

On the motion of Mr Bartlett, seconded Mr Barr:

That the Chairman and Director be permitted to correct any stylistic, typographical and grammatical errors in the report.

Passed unanimously.

5. General business

There being no further business, the Committee adjourned at 11:00 a.m..

Chairman

Committee Manager