



Office of Transport Safety Investigations

RAIL SAFETY INVESTIGATION REPORT

FATAL LEVEL CROSSING COLLISION

NUNDAH

4 MAY 2012



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EXECUTIVE SUMMARY

At 0911¹ on Friday 4 May 2012, an unladen coal train travelling north-west on the Main North line collided with a utility on a railway crossing on Middle Falbrook Road, Glennies Creek, at a rail location known as Nundah. The driver of the utility was fatally injured in the collision.

The train, operated by QR National Limited, was less than 100 metres from the crossing and travelling at 71 km/h when the crew saw the utility approaching the crossing from their right at a moderate speed and then continuing onto the crossing without appearing to slow. The train struck the left side door of the utility, dragging the vehicle for 70 metres and finally stopping under emergency braking about 400 metres past the point of impact, with the utility on the right hand side of the train on the adjacent track. A laden Pacific National coal train travelling in the opposite direction had been standing for some minutes with its headlight extinguished approximately 800 metres from the crossing on the adjacent track, and its crew immediately secured their train and hurried up the track to lend assistance.

The railway crossing was passively protected by stop signs and associated roadside signs and road markings, except for a stop line on the road immediately before the crossing. The driver's vision of trains approaching from the south-east was limited by the presence of a work compound to his left. However, the stop sign before the crossing was visible for a distance of at least 85 metres.

The reason the utility was driven onto the crossing without stopping is unknown. However, it is possible that the driver was distracted by the busy visual environment as he approached the crossing and that the driver's view of the train approaching from his left was compromised by the presence of the work compound and fences in his line of sight.

Recommendations made relate to the need for rigour in assessing risk caused by the effect of construction sites on visibility at level crossings; marking of appropriately placed stop lines on the approaches to the railway crossing, and finalisation of interface agreements between Singleton Council and the Australian Rail Track Corporation.

¹ Times in this report are in 24-hour clock form, and are in Eastern Standard Time, 10 hours ahead of Coordinated Universal Time.

PART 1 FACTUAL INFORMATION

Overview

- 1.1 At 0911 on Friday 4 May 2012, locomotive 5033, the lead locomotive of an empty coal train, collided with a Ford Falcon utility on a level crossing on Middle Falbrook Road, Glennies Creek, at a rail location known as Nundah. The train, designated BW935 and operated by QR National Limited, was travelling in a north-westerly direction away from Singleton, while the utility was travelling south-west along Middle Falbrook Road.
- 1.2 The locomotive struck the front half of the utility's left side, reducing its width by about 50% at the level of the passenger door. The utility was dragged for approximately 70 metres, rotating clockwise through about 90 degrees before coming to rest to the right of the train on the adjacent line. The driver of the utility was fatally injured in the collision.
- 1.3 At the time of the collision, a loaded Pacific National coal train designated NB914 was standing approximately 800 metres west of the crossing on the adjacent line.

Location

- 1.4 Nundah is a rail location in the Camberwell to Mt. Owen Section of the Main North line, 251 km by rail from Sydney and a short distance north-west of the railway crossing at which the collision occurred (see *Figure 1*). The surrounding area is known as Glennies Creek.

The track

- 1.5 The incident occurred on a double track section of the Main North line in rail territory leased by the Australian Rail Track Corporation (ARTC) from the NSW Government. Under the terms of the lease, ARTC is responsible for track maintenance and train control functions.
- 1.6 The approach to the Middle Falbrook Road rail crossing from the south slopes downhill with a gradient of 1:105, decreasing to 1:213 approximately 125 metres before the crossing.

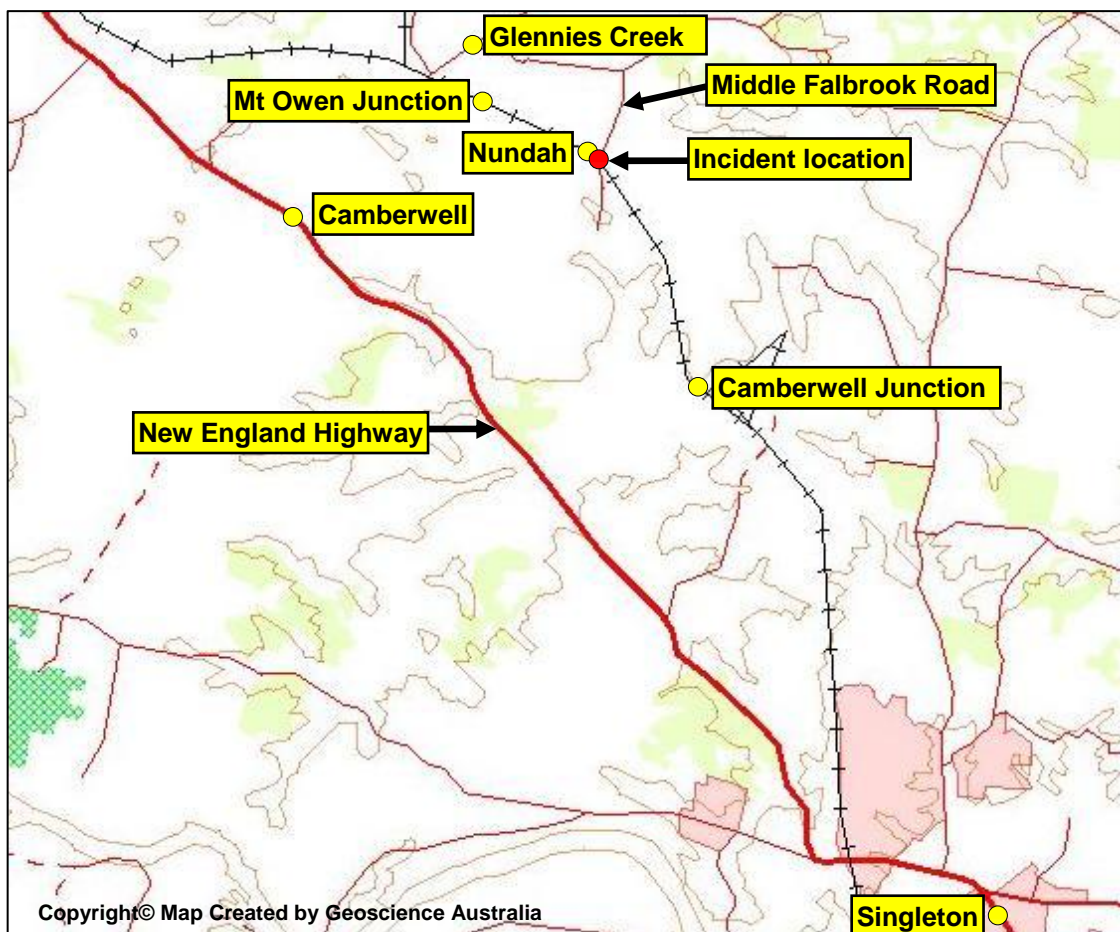


Figure 1: Incident location

- 1.7 Permitted track speeds varied according to the train type, with a maximum permitted speed of 110 km/h for trains travelling from the south. Coal trains with a maximum axle loading of 25 tonnes were restricted to 80 km/h, while those with a maximum axle loading of 30 tonnes were restricted to 60 km/h. For trains travelling from the north, the maximum permitted track speed was 100 km/h, with coal trains again restricted to 80 or 60 km/h depending on wagon axle load limits.

The train

- 1.8 The train involved in the incident was an empty coal train owned, operated and crewed by QR National Limited (QR). It consisted of 74 QHBH wagons drawn by one 5020 Class locomotive and one 5000 Class locomotive, and was designated BW935.

- 1.9 The train was 1280 metres long with a mass of 1998 tonnes. It had left Kooragang on time at 0730 and was on schedule as it approached the crossing.

The train crew

- 1.10 The driver of the train was 46 years of age and had been employed by QR for five years. After three years of training, he became a train driver, a position he had held for the past two years.
- 1.11 The second person was 32 years of age and his tasks included observing and calling signals, maintaining documentation and communication with Network Control and the loading terminals.
- 1.12 Both crew members were tested after the collision for the presence of drugs and alcohol, with negative results.

The utility

- 1.13 The utility was a white Ford Falcon AU manufactured in the year 2000. It had recently passed its annual roadworthiness inspection. Prior to this, a fluid leak from the braking system had been rectified and a general brake overhaul carried out, but no other significant repairs had recently been performed.

The utility driver

- 1.14 The driver of the utility was a 50 year old male who was from interstate but had been living locally since moving into his current role. He was employed as a Project Manager and had been in that position for seven months.
- 1.15 His health was generally good, although he was slightly overweight and had diabetes which was controlled effectively by diet. He was not on any medication at the time of the collision and there was no evidence in the post-crash medical examination of any substance that may have affected his driving performance.
- 1.16 On the day of the collision he had left his place of residence in nearby Singleton to travel to a business appointment, his route taking him along Middle Falbrook Road and over the railway crossing. This route, which had

been a through road to the Pacific Highway prior to the development of the Integra coal mines, provided access to Integra's underground mining facility and to other private properties.

- 1.17 Indications from both the driver's manager and his family were that he was happy in his work and was good at his job.

Environmental conditions

- 1.18 The weather at Singleton was not recorded by the Bureau of Meteorology on the day of the collision, but records from the days before and after, and from nearby recording points on the day, indicate that the temperature at 0900 was around 15°C and there was a light breeze. The sun was at an azimuth of 44.5° and an altitude of 28.2°. The alignment of the road at the crossing was approximately 26° east of north, resulting in a sunlight direction from behind and to the left side of the utility driver and from the right hand side of the train driver, as illustrated in *Figure 2*.

- 1.19 Neither driver would have been looking toward the sun as they approached the crossing.

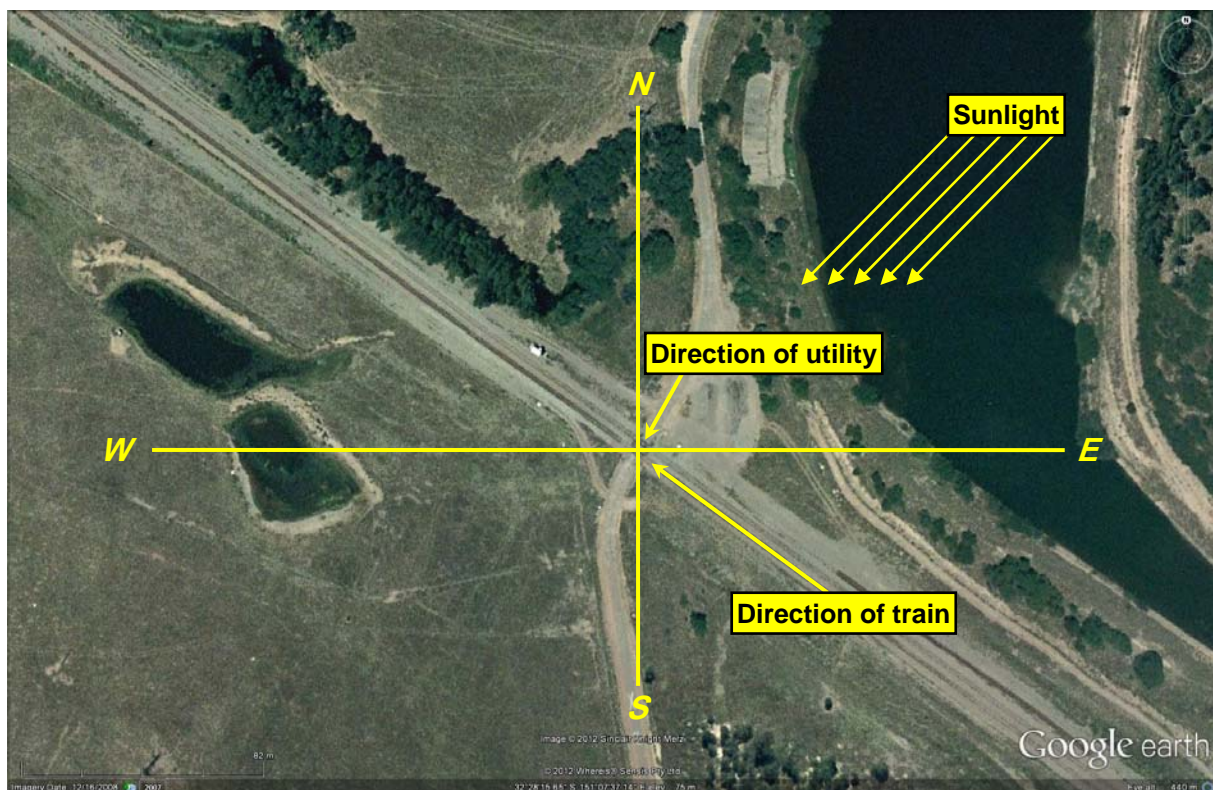


Figure 2: Sun direction relative to utility and train

The crossing

- 1.20 The Middle Falbrook Road railway crossing is on the Main North line 251.494 km from a reference point at Sydney's Central Station.
- 1.21 The crossing was protected by a passive control system comprising stop signs, associated warning signs and road markings, alerting drivers of road vehicles to the presence of the crossing but requiring drivers to detect the presence of trains by direct observation.
- 1.22 As Middle Falbrook Road is a public road, responsibility for the level crossing signage and road markings resides with the roads authority, in this case Singleton Council.
- 1.23 Middle Falbrook Road runs in a generally north-south direction and was covered by a speed limit of 80 km/h. However, due to road works on the approach to the crossing from the north at the time of the collision, a "Road Work" sign had been erected approximately 200 metres before the crossing and a local speed limit of 25 km/h imposed.
- 1.24 The road sloped slightly downward as it approached the crossing from the north before rising slightly immediately before the crossing and levelling as it crossed the railway line at right angles.
- 1.25 The approach by rail from the south-east was around a left hand curve of 600 metres radius leading into a straight of approximately 250 metres length immediately before the crossing. The crossing was visible to approaching trains for a distance of approximately 440 metres.
- 1.26 On the approach by road from the north (i.e., the path of the utility) the first indication of the crossing was the pavement marking shown in *Photograph 1*, located approximately 220 metres from the crossing. Although visible at the time of the collision, the marking was well-worn and inconspicuous on a poor road surface. More conspicuous at this point was a "Railway Ahead" warning in the form of a black steam locomotive silhouetted on a yellow background with which the previously mentioned Road Work sign had been co-located. This sign is described in *Australian Standard 1742.7—2007*² as an advance

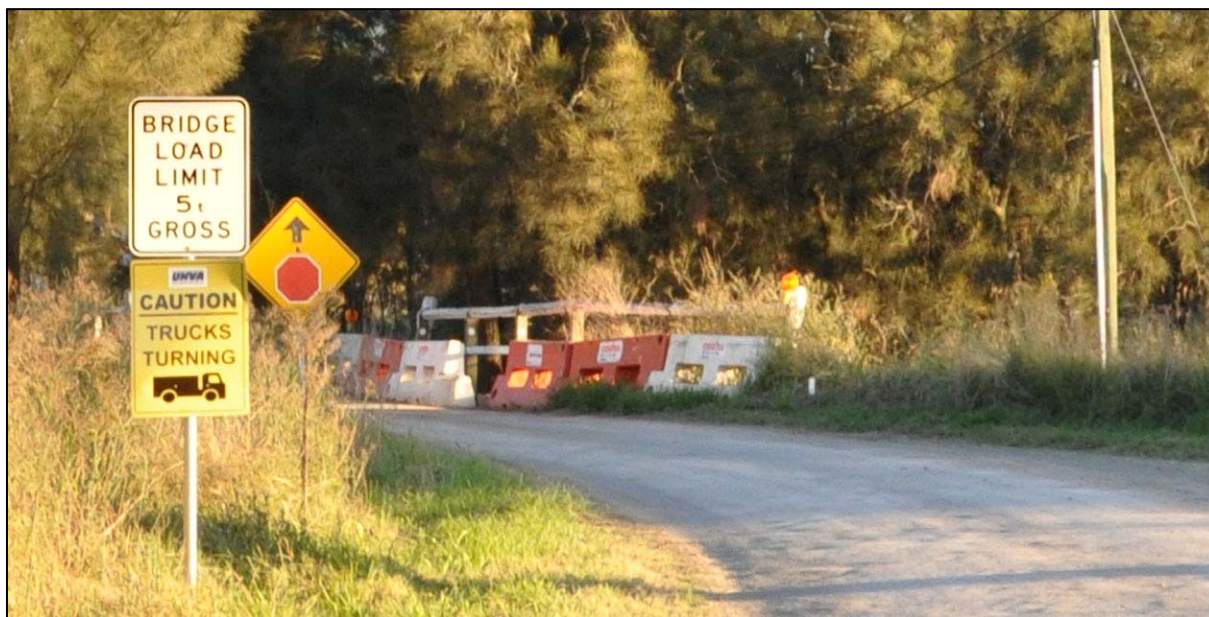
² Australian Standard AS 1742.7—2007, Manual of uniform traffic control devices, Part 7: Railway crossings.

warning of a crossing with passive control and its distance from the crossing is consistent with this purpose.



Photograph 1: Road work sign, pavement marking and early warning sign

- 1.27 A “Bridge Load Limit” sign and a “Caution Trucks Turning” sign were co-located 50 metres further on, followed after a further 12 metres by a “Stop Sign Ahead” warning, as seen in *Photograph 2*. As these signs came into view, a bridge with safety barriers placed alongside its railings could also be seen.



Photograph 2: View on approach to bridge

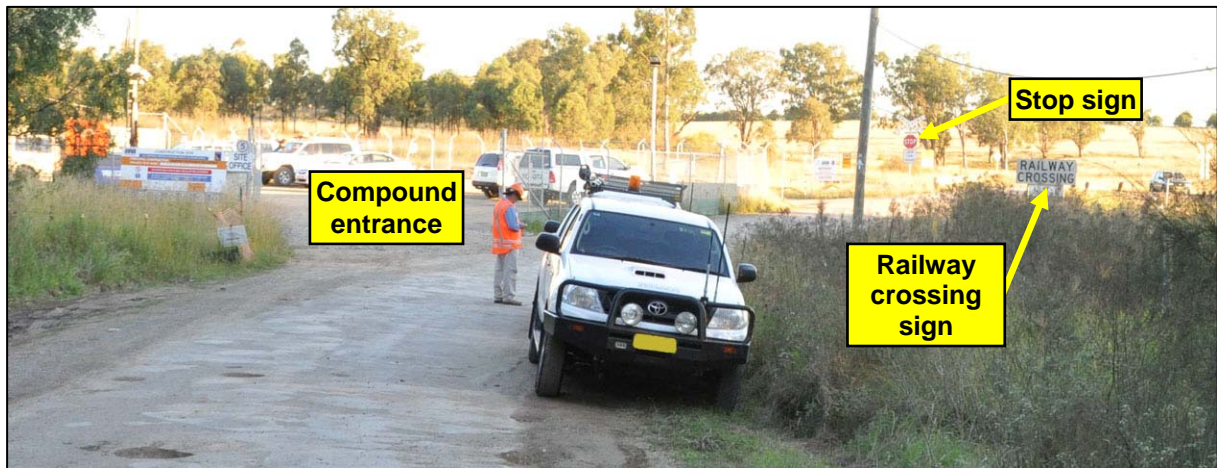
- 1.28 Once across the bridge and approximately 100 metres from the crossing, the road could be seen curving to the right. The crossing was not yet visible, concealed by the foliage of trees growing beside the bridge, as seen in *Photograph 3*. However, an additional warning sign, as specified in the *Australian Standard* for use with a give way sign, was visible on the left of the roadway although partly obscured by foliage. An Upper Hunter Valley Alliance (UHVA)³ sign had been co-located with it.



Photograph 3: Looking towards the crossing from the bridge

³ The Upper Hunter Valley Alliance was an alliance of ARTC, Leighton Contractors, Parsons Brinckerhoff, Coffey Geotechnics, KMH Environmental and ARTC Ansaldo STS Network Control Systems Alliance (AANCSA).

- 1.29 On the left of the road immediately before the crossing, a UHVA compound containing a parking area and site office had been constructed. When viewed from the bridge, the entrance to the compound was directly ahead with the road curving to the right. From 20 metres further on, a stop sign and a railway crossing sign could be seen but the track and crossing were obscured by fencing around the UHVA compound and undergrowth to the right of the roadway (*Photograph 4*).



Photograph 4: Railway crossing and stop signs

- 1.30 After a further 30 metres, the crossing could be seen (*Photograph 5*) and was clearly visible from that point onwards. However, the railway track to the left remained hidden by the UHVA compound and car park and by long grass. At the time of the collision, the vehicles in the car park included a mid-sized bus and a pantechicon parked nose-in against the south western fence which would have further obstructed the utility driver's view of any train approaching from the left as he drove towards the crossing.
- 1.31 The road pavement on the approach to the crossing was in a poor state of repair, as can be seen in *Photograph 6*. The surface was of broken and potholed asphalt interspersed with dirt and there was no stop line visible.
- 1.32 The car park and compound fencing continued to present an obstruction to the driver's view to the left approaching the crossing, as seen in *Photograph 7*.



Photograph 5: Crossing in sight, track obscured



Photograph 6: Road surface on approach to crossing



Photograph 7: Visual obstruction due to compound

- 1.33 Had the driver stopped at the stop sign, which was 7.5 metres from the nearest rail, his view would have been as seen in *Photograph 8*. Note the rear of a train on the bend, obscured by the fence posts. At the time the utility passed the stop sign without stopping, the train would have been approximately 50 metres, or 2.5 seconds, from the point of impact.



Photograph 8: View to the left when stopped at stop sign

- 1.34 A clear view of the track to the left was not available to the driver until the vehicle had passed the stop sign and was no more than 3.5 metres from the nearest rail (*Photograph 9*).
- 1.35 In contrast, the view to the right (*Photograph 10*), although partially obstructed by a signal hut, was otherwise clear and a train standing approximately 800 metres away which was present at the time of the incident, was clearly visible. Note that the glare from the afternoon sun seen in this photograph would not have been a factor at the time of the collision.



Photograph 9: Clear view taken 3 metres from nearest rail



Photograph 10: View to the right when stopped at stop sign

The collision

Unladen QR National coal train BW935 left Kooragang coal terminal at 0730 on Friday 4 May, passing through Singleton as scheduled at 0905. When about 200 metres from Middle Falbrook Road level crossing, the driver

sounded the horn as is routinely required. When less than 100 metres (5 seconds) from the crossing and travelling at an indicated speed of 71 km/h, the driver saw a white utility approaching from the right. The driver observed that “It didn’t look like the vehicle was going fast ...” and didn’t appear to slow as it neared the crossing. The driver sounded the horn twice more.

- 1.36 The other crew member on the train also saw the utility approaching the crossing from his right. His impression was that the utility was travelling slowly as it approached the crossing and continued at the same speed without slowing further.
- 1.37 At 0910:48 the right front corner of the lead locomotive struck the left side of the utility in line with the seat. The utility was dragged for 70 metres, rotating clockwise through approximately 90° before coming to rest on the adjacent track to the right of the train. The train travelled a further distance of approximately 330 metres, the driver having activated emergency braking at about the time of the impact.



Photograph 11: Extent of damage to the utility

- 1.38 Damage to the utility was extreme, with its width reduced by approximately 50% at the seating position (*Photograph 11*).
- 1.39 As the QR train was approaching the crossing, Pacific National coal train NB914 was standing on the adjacent track approximately 800 metres north-west of the crossing and the crew, on seeing the collision, secured their train and hurried up the track to render assistance.

Emergency response

- 1.40 Emergency services were advised of the collision at 0912, and an ambulance arrived at approximately 0935. The driver of the utility was found to have been fatally injured in the collision.
- 1.41 An ARTC site co-ordinator arrived at approximately 1000, and ARTC's safety investigator arrived at approximately 1200.
- 1.42 The OTSI Duty Officer received notification of the collision at 0932 and two OTSI investigators travelled to the site, arriving at 1345 to conduct a preliminary investigation.

PART 2 ANALYSIS

Speed

- 2.1 The train crew estimated the train's speed approaching the crossing to be about 70 km/h, with the permitted track speed being 80 km/h. The locomotives were equipped with electronic data loggers and analysis of the stored data leading up to and immediately after the collision confirmed that the train had been travelling at 71 km/h before slowing slightly and then coming to a stop under emergency braking.
- 2.2 The approach speed of the utility towards the crossing was described by the train drivers as moderate, with no apparent slowing as it neared the crossing. No independent witness has been found to corroborate this impression and the utility was not visible in the video record obtained from a forward facing camera on the lead locomotive until less than one second before the collision.
- 2.3 Analysis of individual frames of the video record of the last second before the collision, where either the front of the utility or its shadow was visible, indicate that the likely speed of the utility was in the range of 30 to 40 km/h.
- 2.4 Section 121 of the NSW Road Rules requires the following:
- A driver at a level crossing with a stop sign must:
- (a) stop as near as practicable to, but before reaching, the stop line or, if there is no stop line, as near as practicable to, but before reaching, the stop sign, and
 - (b) give way to any train or tram on, approaching or entering the crossing.
- 2.5 A vehicle travelling at 40 km/h would take approximately 35 metres to stop, assuming a reaction time of 2 seconds and an easily achievable deceleration rate of 5 m/s². The stop sign was visible for a distance of at least 85 metres.

Visibility

- 2.6 It was a clear dry morning at the time of the collision, with the sun at an altitude of 28.2° and behind the left shoulder of the utility driver as he

approached the railway crossing. The prevailing daylight would have provided near optimal visibility conditions for the utility driver.

- 2.7 The video record from the locomotive indicates that visibility for the locomotive crew as they approached the crossing was not adversely affected by the sun position or the level of daylight.
- 2.8 However, there were obstructions to the line of sight from both train and utility as they approached. From the perspective of the train driver, the utility's approach was obscured by trees and undergrowth, by the buildings in the UHVA compound, by the compound fencing and by vehicles in the compound car park. Visual obstruction such as this is not unusual in rail corridors as trains travelling at speed are unable to stop quickly even with clear vision of approaches to crossings and must rely on road vehicle drivers to adhere to the crossing control measures.
- 2.9 From the utility driver's perspective, the compound and fencing were major obstructions to the extent that a clear view of the track to the left, and of any train approaching from that direction, was not available when approaching or stopped at the stop sign. If the driver had stopped at the stop sign, he would have had to move forward a further 4 metres in order to obtain a clear view. The front of the utility would then have been no more than 3.5 metres from the track and the driver's view would have been similar to that shown previously in *Photograph 9*.

Signage

- 2.10 Although the stop sign was clearly visible and in good condition, the required stop line was not visible, possibly due to the poor condition of the pavement.
- 2.11 Except for the stop line, the usual signs warning of the railway crossing were in good condition. One sign, which was additional to the requirements of the *Standard*, was slightly obscured by foliage, while the others were readily visible. *Figure 3* illustrates the signage seen by a road vehicle driver approaching the rail crossing from the north.

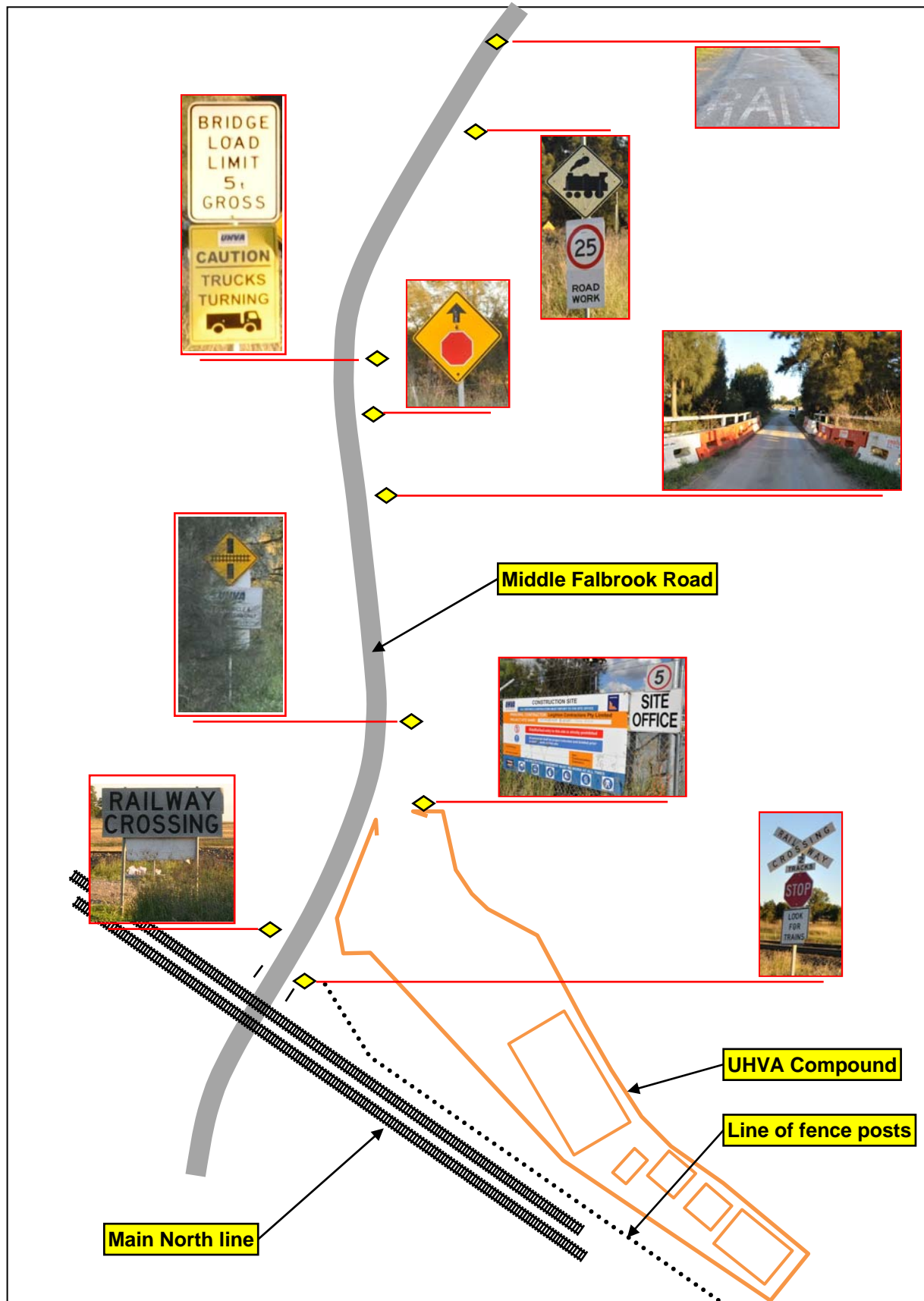


Figure 3: Location of road signs on approach from the north

Distraction

- 2.12 The final 220 metres leading up to the crossing from the north presented a very busy visual environment. The presence of signs and barriers for roadworks, a speed restriction sign, the UHVA compound fencing and signage and the poor condition of the road were all potential detractors from the effective conspicuity of the railway crossing signage.
- 2.13 The utility driver may also have been aware of the presence of the train standing 800 metres away to his right. However this would not have been visible to him until he reached the stop sign, leaving insufficient distance to stop before reaching the tracks, and consequently having no influence on his decision not to stop.

Local knowledge

- 2.14 Although not a long-term resident, the driver of the utility had been working in the area for seven months. His manager reported that he was familiar with the crossing which he used on average about twice a week.

Train frequency

- 2.15 Rail traffic on the Main North line was predominantly freight, mostly coal with the occasional grain or general freight. Passenger services, although infrequent, ran on a regular schedule.
- 2.16 On Fridays between 0800 and 1000, scheduled services were generally 7 coal trains travelling towards the Kooragang coal terminal, and 9 empty coal trains and 1 two-car passenger train travelling in the other direction.
- 2.17 Laden coal trains, usually around 1500 metres in length and travelling uphill, would have blocked the crossing for more than 2 minutes. An unladen train of a similar size travelling downhill would have blocked the crossing for 75 to 80 seconds. A two-car passenger train at 100 km/h would have been on the crossing for less than 2 seconds.
- 2.18 In summary, in the two hours between 0800 and 1000 on Friday 4 May 2012, 17 trains were scheduled to travel over the crossing, and would have blocked it for a total of around 30 minutes.

- 2.19 Train frequency varied little around the clock, with between 7 and 11 trains per hour with a median of 9, and with over 96% being freight trains.
- 2.20 With this high volume of rail traffic, road vehicle drivers using the crossing on average twice a week for seven months would be accustomed to seeing trains on or in the vicinity of the crossing and would almost certainly have experienced delays at times while coal trains cleared the crossing.

PART 3 OTHER ISSUES

Crossing standards

- 3.1 *Australian Standard 1742.7—2007*⁴ specifies the way in which traffic control and warning devices are used to provide for safe movement of road and rail traffic at railway crossings. It does not specify the point at which a transition from passive control⁵ to active control⁶ should take place but discusses in general terms the basis on which the choice of traffic control and warning devices is made. In this instance passive control was implemented with stop signs and warning signs being used on both approaches to the crossing. At the time when the signage was installed, this would have been consistent with the intent of the *Standard* where sight distances must be considered when determining the appropriate controls to be used.
- 3.2 The requirements for the use of stop signs include the marking of a stop line on the pavement at least 3.5 metres back from the rail at its nearest point. Although no stop line was visible at the time of the collision, this could have been due to the poorly maintained condition of the pavement.
- 3.3 Prior to the construction of the UHVA compound, the sight distance from the required location of a stop line was approximately 440 metres, giving the driver of a vehicle stopped at the line a minimum of 14.1 seconds to start and clear the crossing if no train was in sight.⁷ This time is slightly greater than the required clearance time of 13.9 seconds for a 19 metre semi-trailer, calculated using the method set out in Appendix D to *AS1742.7—2007*. The shorter length and higher rate of acceleration of a utility would allow it to clear the crossing well within the available clearance time.
- 3.4 The effect of construction of the UHVA compound was to obstruct visibility of trains approaching the crossing from the south. In particular, the line of fence

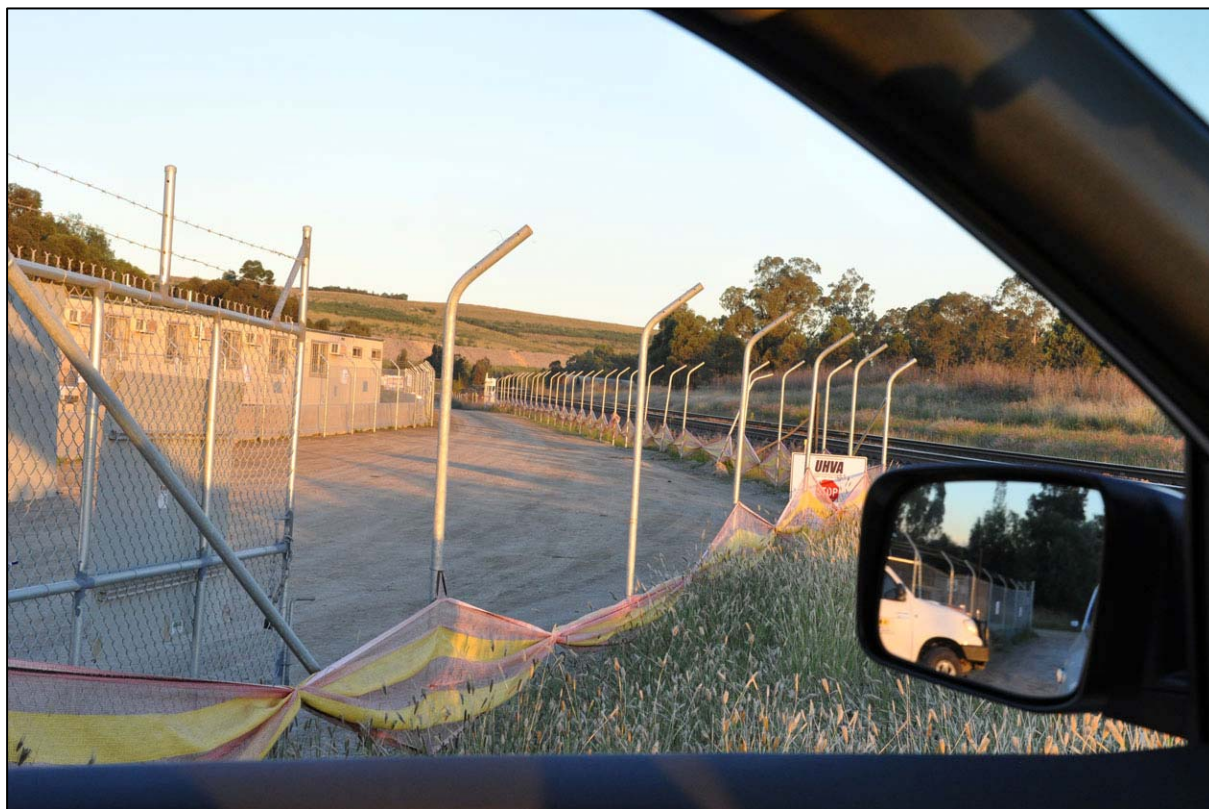
⁴ AS1742.7—2007 was developed with input from Australian road and rail authorities to set out safety requirements at railway crossings in terms of signs, markings and delineation.

⁵ Passive control is the use of devices such as signs and markings, which are not activated by the presence of a train, instead relying on the road user to detect the approach of a train by direct observation.

⁶ Active control is the use of devices such as lights and barriers which are activated prior to and during passage of a train.

⁷ The time of 14.1 seconds is based on the approach of a passenger train at a track speed of 110 km/h.

posts erected along the rail corridor was in a road vehicle driver's line of sight when stopped at the stop sign, 7.5 metres from the nearest rail as seen in *Photograph 12*. Movement forward from the stop sign to a position 3.5 metres from the nearest rail would give the driver a clear view of trains approaching from either direction and would decrease the required clearance time for a semi-trailer to 13.1 seconds from 13.9 seconds.



Photograph 12: View to the left when stopped at stop sign

Interface agreement

- 3.5 At the time of the incident, interface agreement requirements were specified in the *Rail Safety Act 2008* and their implementation was monitored by the Independent Transport Safety Regulator (ITSR). With the implementation of national rail regulation on 20 January 2013, similar requirements form part of the *Rail Safety National Law (NSW)* with the newly formed Office of the National Rail Safety Regulator (ONRSR) assuming the responsibilities previously fulfilled by ITSR.

3.6 Section 27 of the *Rail Safety Act 2008* required that a rail infrastructure manager:

- (a) must identify and assess, so far as is reasonably practicable, risks to safety that may arise from railway operations carried out on or in relation to the manager's rail infrastructure and that may so arise wholly or partly because of the existence or use of any rail or road crossing that is part of a public road or any road work of a public road, and
- (b) must determine measures to manage, so far as is reasonably practicable, those risks, and
- (c) must, for the purpose of managing those risks, seek to enter into an interface agreement with the roads authority for the road.

3.7 Likewise, under Section 29, a roads authority for a public road:

- (a) must identify and assess, so far as is reasonably practicable, risks to safety that may arise from the existence or use of any rail or road crossing that is part of the road or any road work of the road wholly or partly because of railway operations carried out on or in relation to any rail infrastructure, and
- (b) must determine measures to manage, so far as is reasonably practicable, those risks, and
- (c) must, for the purpose of managing those risks, seek to enter into an interface agreement with the rail infrastructure manager of the rail infrastructure.

3.8 The *Rail Safety Act 2008* commenced on 1 January 2009, requiring compliance with the interface co-ordination provisions from 1 January 2012, three years after the date of commencement.

3.9 With regard to the Middle Falbrook Road crossing, the ARTC (as the rail infrastructure manager) and NSW Roads and Traffic Authority (RTA), had jointly written to Singleton Council in December 2011, expressing their desire to enter into an interface agreement for rail or road crossings within the Council area. Although the RTA would not be a party to any resulting agreement concerning the Middle Falbrook Road crossing, it was the roads authority responsible for other crossings and bridges in the Council area. The

letter included a Fact Sheet from the RTA, some responses to issues raised by councils in previous discussions and a draft interface agreement.

- 3.10 After a reminder was sent in March 2012, Singleton Council acknowledged receipt of the correspondence and indicated that it was reviewing the draft interface agreement and would provide a response once the review was finalised. At the time of the collision, their response had not been forthcoming.

Location of UHVA compound

- 3.11 Project approval was given on 23 September 2011 for the Nundah Bank Third Track project which involved construction by ARTC of a third rail track near the existing Main North line between Singleton and Camberwell. This approval covered 4 km of track as well as access roads and temporary construction compounds. The work was to be performed by the UHVA.
- 3.12 The UHVA compound on Middle Falbrook Road was constructed in late 2011 to support the project. At the time of finalising this report the compound had been removed and the project for which it was required was nearing completion.
- 3.13 The compound was located to the north-east of the rail crossing, mainly on ARTC leased property but partly in the road reserve for Middle Falbrook Road. An access track was also constructed between the compound and the railway line to provide access for construction vehicles to the north-west side of the third track works.
- 3.14 A chainwire fence was erected alongside the compound between the access track and the railway track. On 4 May 2012, the posts were in place but no chainwire was present.
- 3.15 Prior to the commencement of the project, of which the compound was an integral part, a preliminary environmental assessment was conducted. This was released in June 2010⁸ and identified the need to assess local road conditions to ensure that safety was maintained.

⁸ Nundah Bank Third Track: Preliminary Environmental Assessment, ARTC June 2010.

- 3.16 A full environmental assessment⁹ was then conducted and released in March 2011. This identified traffic management and safety as key issues. It was found that Station Creek Bridge on Middle Falbrook Road on the approach to the rail crossing from the north-east was structurally unsound and would require significant upgrading in order to carry construction traffic. Consequently some urgent temporary bridge work was performed and a 25 km/h speed limit imposed, bringing Middle Falbrook Road to the condition that existed on 4 May 2012. As there was no sign to indicate the end of the 25 km/h restriction, this had the effect of imposing a 25 km/h limit on the approach to the rail crossing.
- 3.17 As part of the assessment, a 24 hour survey was conducted in August 2010 to quantify road and rail traffic volumes at the Middle Falbrook Road railway crossing.
- 3.18 During the survey period 58 road vehicles and 9 trains passed the crossing with all the train movements being between midnight and 0600. This is significantly different from the train volumes in ARTC's Master Train Plan which indicated that there were around 200 scheduled train movements per day in 2012, and 17 trains were scheduled to pass the crossing between 0800 and 1000 on the day of the collision. As there was only a small change in traffic between 2010 and 2012, there must have been unusual circumstances affecting rail movements on the survey day, or the results have been misreported.
- 3.19 The assessment also indicated that on a typical working day, up to 70 employee vehicles would enter the compound between 0600 and 0700 and would leave between 1800 and 1900.
- 3.20 The manner in which the UHVA would manage the construction phase of the project was set out in the Project Construction Environmental Management Plan. The associated Construction Traffic and Access Management Plan states "... the existing network is able to ensure adequate levels of safety are maintained during construction" and that consultation with the NSW Roads

⁹ Nundah Bank Third Track: Environmental Assessment, ARTC March 2011.

and Traffic Authority and with Singleton Council confirmed that no safety upgrades were necessary.

- 3.21 No detail is provided about the assessment of risk relating to the effect of the compound on the visibility of trains from approaching road traffic. There is also no indication of consideration having been given to the effect on safety of up to 70 employee vehicles leaving the compound in a 60 minute period, all making right hand turns across the paths of vehicles approaching the crossing from the north. Drivers approaching the crossing from the north in this period had to not only consider the high volume of vehicles exiting the compound across their path, but also be aware of the possibility of an approaching train appearing from behind the compound.

Previous incidents

- 3.22 The ITSR maintains a database of incidents reported by rail operators. A search of the database for the two years prior to the incident indicated that there had been two near misses reported at this crossing in that period. The first of these, on 25 January 2012, involved a 4WD vehicle that had to brake abruptly and reverse clear of the crossing to avoid colliding with an unladen coal train after the train driver sounded the horn. The second, on 20 April 2012, involved a vacuum sweeper truck that crossed in front of an unladen coal train, necessitating the use of full braking by the train driver to avoid colliding with the vehicle.
- 3.23 Both these incidents occurred after the construction of the UHVA compound and involved trains approaching the crossing from the south-east. Unfortunately, records of these incidents do not indicate the direction in which the road vehicles were travelling and it is not known whether or not the presence of the compound had any bearing on the incidents.

PART 4 FINDINGS

Immediate cause

- 4.1 The driver of the utility drove past the stop sign without stopping and continued onto the crossing into the path of the approaching train which was unable to stop in time to avoid collision.

Contributing factors

- 4.2 There is no evidence to indicate which of the possible factors contributed to the utility driver's decision to continue across the crossing but either or both of the following factors are plausible contributors:
- The driver was distracted by the number of signs and other roadside furniture, by the presence of the UHVA compound and by the poor condition of the road, and paid insufficient attention to the relatively inconspicuous crossing.
 - The driver's view of the approaching train was obscured by the presence of the compound fencing.

Other safety factors

- 4.3 The railway crossing did not fully meet the requirements of *Australian Standard 1742.7—2007* as there was no visible stop line accompanying the stop sign. Furthermore, the position of the stop sign, although meeting the requirements of the standard, was such that, if used as the only guide for the correct stopping position, afforded the driver an obstructed view to the left.

PART 5 RECOMMENDATIONS

The following recommendations are made in relation to matters identified in the course of this investigation.

Singleton Council

- 5.1 Upgrade or repair the surface of each approach to the railway crossing and place a visible and durable stop line in a position such that approaching trains are clearly visible to the driver of a road vehicle stopped at the line.

Upper Hunter Valley Alliance

- 5.2 The entities comprising the Upper Hunter Valley Alliance note for future reference the need for rigour in risk assessments relating to the effect of construction sites on essential road and rail sight distances at level crossings.

Singleton Council and Australian Rail Track Corporation together

- 5.3 Finalise outstanding interface agreements as a matter of priority.

PART 6 APPENDICES

Appendix 1: Sources and submissions

Sources of information

- Australian Rail Track Corporation
- Bureau of Meteorology
- Employer of the deceased utility driver
- Family of the deceased utility driver
- Independent Transport Safety Regulator
- QR National Limited
- Singleton Council
- Upper Hunter Valley Alliance

Submissions

The Chief investigator forwarded a copy of the Draft Report to the Directly Involved Parties (DIPs) to provide them with the opportunity to contribute to the compilation of the Final Report by verifying the factual information, scrutinising the analysis, findings and recommendations, and to submit recommendations for amendments to the Draft Report that they believed would enhance the accuracy, logic, integrity and resilience of the Investigation Report. The following DIPs were invited to make submissions on the Draft Report:

- Aurizon Operations Limited (previously QR National Limited)
- Australian Rail Track Corporation
- Family of the deceased utility driver
- Independent Transport Safety Regulator
- Singleton Council
- Upper Hunter Valley Alliance

All of the DIPs made submissions.

The Chief Investigator considered all representations made by DIPs and responded to the author of each of the submissions advising which of their recommended amendments would be incorporated in the Final Report, and those that would not. Where any recommended amendment was excluded, the reasons for doing so were explained.