Our Ref: 21395

19 August 2022

JCDecaux Australia & New Zealand
Level 6, 1 York Street
SYDNEY NSW 2000

Attention: Mr Timothy Brosnan

Dear Timothy,

RE: DIGITAL SIGNAGE – DARCY STREET, PARRAMATTA
RESPONSE TO SUBMISSIONS

As requested, please find herein The Transport Planning Partnership (TTPP)'s Response to Submissions (RtS) to road safety queries made by government agencies for the proposed digital signage on Darcy Street in Parramatta.

Background

Sydney Trains sought approval to install two new digital signs off the northern and southern sides of the existing overhead railway bridge above Darcy Street in Parramatta.

A Development Application for the proposal was on public exhibition between 23 May 2022 and 6 June 2022. The application was placed on public exhibition for an additional two weeks between 15 June 2022 and 28 June 2022. Submissions were received from Transport for NSW (TfNSW) dated 31 May 2022 and City of Parramatta Council (Council) dated 20 June 2022.

The Transport Planning Partnership
Suite 402, 22 Atchison Street
ST LEONARDS NSW 2065

Submissions by Transport for NSW

Submission 1: As indicated in the submitted report, this sign would be partially visible to bus drivers utilising the T-way on Argyle Street. Transport Corridor Outdoor Advertising and Signage Guidelines, section 3.2.2 outlines the criteria that needs to be met in regard to line of sight. The location of this sign potentially distracts drivers travelling along Argyle Street eastbound. In addition, there is high pedestrian activities on site at this location with nearby transport hub and Westfield shopping centre.

Argyle Street eastbound traffic flow is permitted for buses only. The digital sign would not be within a bus driver's field of vision as they approach the intersection while travelling along the T-way. The driver's attention would be on the forward roadway ahead. As such, the digital sign would not distract bus drivers. Furthermore, for bus drivers travelling eastbound on Argyle Street, they would not be able to view the digital sign prior to approaching the intersection as visibility would be obstructed by existing trees beside the roadway and the boundary wall of the rail corridor.

Given the nature of a bus driver's role, they are highly exposed to advertising in many forms including digital billboards. However, this does not impede a bus driver's ability to undertake the driving task at hand. For example, a bus driver is able to approach a bus stop and not be distracted by the digital display at the bus shelter. Not only this, but bus drivers would become accustomed to the conditions driving through the area which would likely be several times in a day or week. Therefore, a digital sign in the proposed location is unlikely to impact bus drivers.

Also, Argyle Street and Church Street are posted as 40 km/h High Pedestrian Activity Area. Hence, bus drivers would be travelling at low speeds and cautious of pedestrian movements in the vicinity. It is further noted that travel speeds through the vicinity were observed to be lower than the posted speed limit at times, such as during peak periods, which permits greater awareness for bus drivers and general traffic of pedestrian activity.

Submission 2: There are currently 'No Right Turn' signage at TCS which Council has previously raised that are not appropriately visible to the motorists. Proposed advertising signage will create extra distractions to the motorists travelling along Church Street.

Generally, there is a perception that digital signs would cause an unsafe level of distraction for a motorist which is likely to result in a crash incident. A study was carried out in 2015 by Carolyn Samsa, Level 3 Road Safety Auditor at Samsa Consulting, which assessed whether digital billboards are distracting to motorists. The study identified that the average eye fixation duration spent by drivers observing a digital billboard is 0.207 seconds. This is well below 0.750 seconds which is considered to be the minimum perception-reaction time to an unexpected event. The study identified that digital billboards do not draw drivers' attention away from the road for dangerously long periods of time and drivers maintained a safe average vehicle headway in the presence of such signs. The findings of Samsa's investigation supported international studies which generally found that the presence of billboards did not significantly affect the percentage of time drivers devoted to glancing at the forward roadway.

Further to the above, TTPP undertook an analysis of crash data in the vicinity of existing digital billboards signs, similar to the sign which Sydney Trains is proposing to implement. The aim of the analysis was to determine whether the digital signage at each location resulted in any safety impacts to road users within the vicinity of the signs. This was carried out by assessing and comparing crash data for a period pre-operation and post-operation of the digital signs. The analysis included seven locations having digital signage owned by Sydney Trains. From the study, it could be concluded that the perceived distraction potential for road users due to the presence of a digital signage is minimal and evidently has not resulted in creating a road environment that is any less safe for motorists, pedestrians, and cyclists. The analysis and comparison of sites has been included in Attachment One of this RTS.

For motorists travelling northbound on Church Street the position of the digital sign would not overlap with No Right Turn signage, as shown below. Therefore, the street signage would remain visible to motorists. In addition, the No Right Turn signage located on the nearside of the intersection (southwest corner of the intersection) is located adjacent to the primary traffic signal lantern which is clearly visible to motorists. Installation of pavement left turn arrows and/or "Buses Excepted" line marking on Church Street could be considered by Council to supplement the existing signage.

As observed during the site inspection, there does not appear to be confusion amongst motorists as to the right turn movement; not one illegal right turn movement was observed. Therefore, we presume that Council's concern is more a matter of non-compliance, which may need to be addressed with assistance from the Police.

Submission 3: The sign is proposed to be located directly over the signals at Argyle Street and Church Street and has the potential to distract drivers travelling northbound on Church Street on approach to the signals.

As mentioned in response to Item 2 above, the findings of the study conducted by Samsa indicate that the average eye fixation duration spent by motorists observing a digital billboard is 0.207 seconds which is well below the 0.750 seconds minimum perception-reaction time to an unexpected event. On this basis, motorists would have spare cognitive capacity to observe the road environment ahead in the presence of a digital sign without an increased risk of crash incident.

Further to the above, a *Digital Sign Traffic Safety Assessment* was prepared by Bitzios Consulting in April 2020 for a digital sign on Pacific Highway in Gordon. The Safety Assessment reports on relationships between distraction and crashes, namely:

"There is consensus in the literature that the majority of crashes occur in urban areas are due to driver error. Victor et al. (2005) highlights that human error is the cause of up to 92.6 per cent of external environmental influences, interpret the risks associated with these external environmental influences, make decisions, and carry out actions (Perez & Bertola 2011).

Even though human error is the cause of most crashes, Lam (2002) reviewed NSW crash data and found that out of 414,136 crashes, distraction was a factor in 15,059 (3.6%) of them. Distractions coming from outside the vehicle were determined to be a factor in only 2.5% of all crashes. This low influence of external distractions to crashes was reinforced by the Monash University Accident Research Centre (MUARC) carried out a study on crashes in Victoria and NSW between 2000 and 2011, and found the most common causes of crashes as summarised in Table 6.1 [table below]."

Table 6.1: Causes of Vehicle Crashes in NSW and Victoria

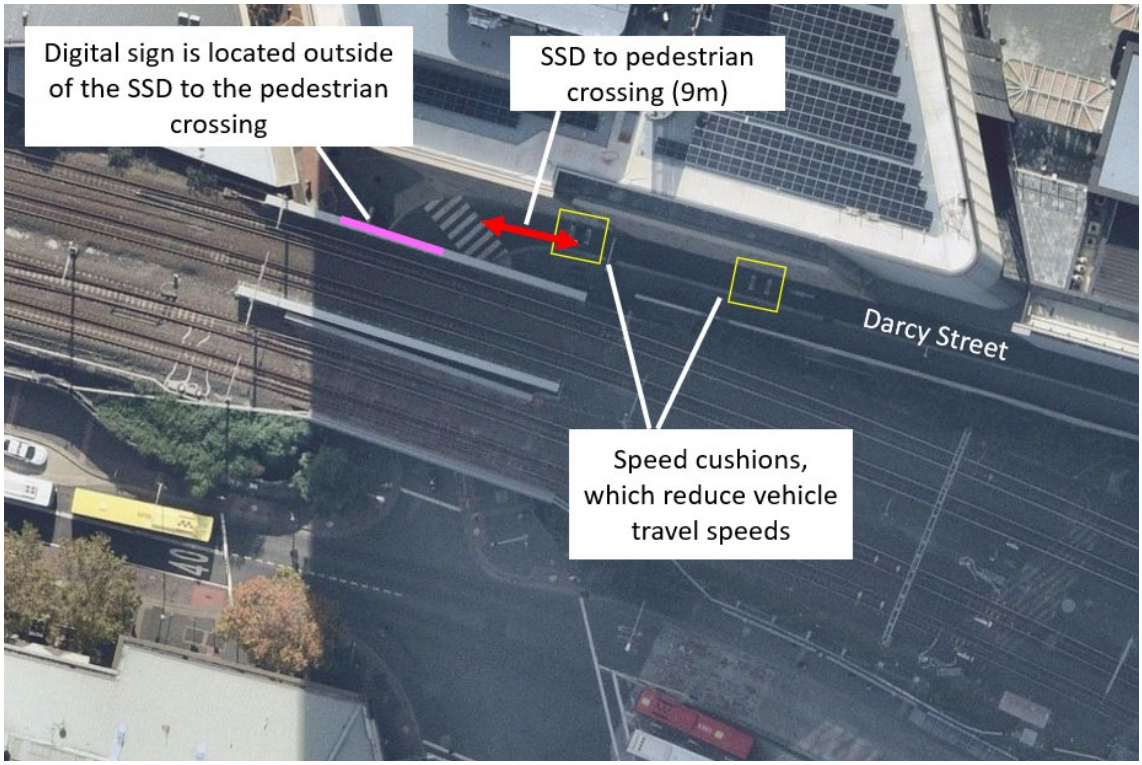
Percentage of Crashes	Cause
13.5%	Intoxication
11.8%	Fell asleep
10.9%	Fatigued
3.2%	Failed to look
3.2%	Passenger interaction
2.6%	Fell ill
2.6%	Blacked out
1.8%	Feeling stressed
1.5%	Looked but failed to see
1.4%	Animal or insect in vehicle
0.9%	Using a mobile phone
0.9%	Changing CD/cassette/radio
0.9%	Adjusting vehicle systems
0.9%	Looking at vehicle systems
0.3%	Searching for objects

From the above table, crashes caused from observing a digital billboard/ sign is not considered to be a common cause of a crash due to internal or external distractions.

Submission 4: With regard to the 'Southbound' signage, the sign is located within the safe stopping sight distance to the existing pedestrian crossing on Darcy Street. The proponent is to discuss with Parramatta City Council regarding any potential impacts and proposed mitigation measures.

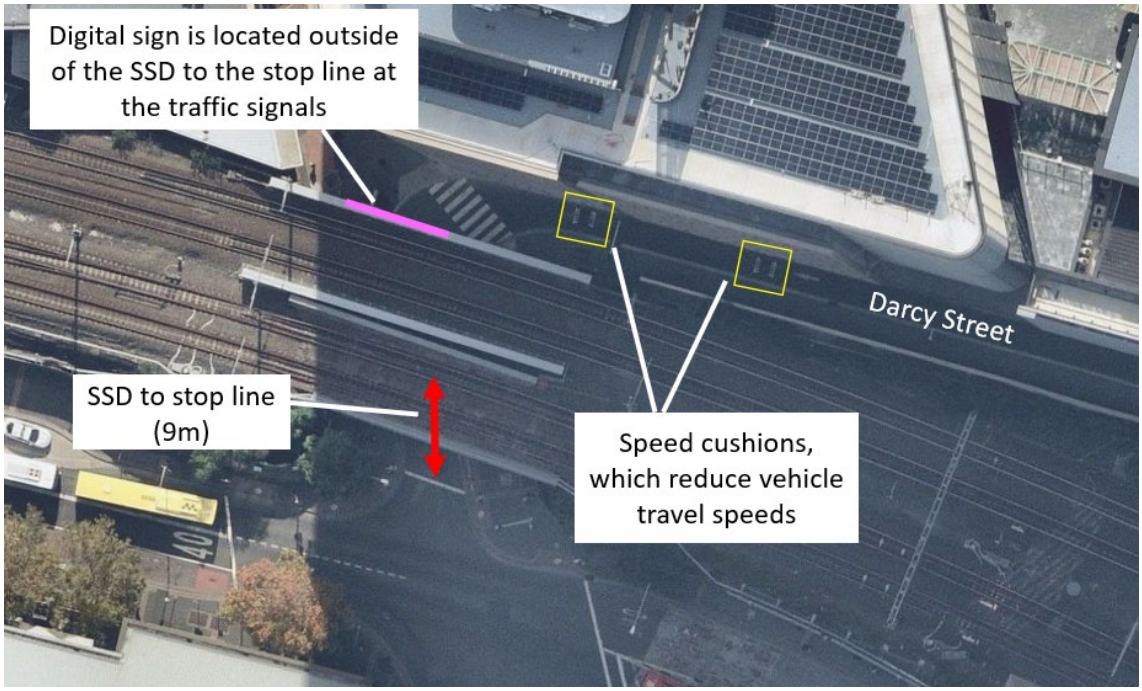
A follow-up site visit was undertaken by TTPP on Wednesday, 3 August 2022 to inspect Darcy Street following the removal of Parramatta Square construction hoarding in the immediate surrounds. Vehicle travel speeds on Darcy Street were observed to be lower than the 40km/h posted speed limit as drivers would slow down on approach to the back-to-back speed cushions located prior to the pedestrian crossing. Vehicles were observed to be travelling around 10-15 km/h on Darcy Street.

Based on a travel speed of 15 km/h, the minimum SSD to the traffic signals is calculated as 9 m. The location of the digital sign would be after the pedestrian crossing, and therefore would not be located within the safe stopping distance to the pedestrian crossing. This is illustrated in the figure below.



Notwithstanding this, the content displayed on the digital sign would be predominately illegible to motorists travelling along Darcy Street due to the acute angle of the sign/ bridge with the roadway. This is illustrated by the close-up of the designer's impression from Darcy Street as shown below. Therefore, motorists' attention would be on the pedestrian crossing ahead of them.

In relation to the traffic signals, the digital sign would be located approximately 25 m north of the stop line which would be outside of the SSD to the traffic signals as shown below.



City of Parramatta Council

Submission 1: The signs are visible from Church Street which does not comply with Section 3.2.3 (a)(iii) of the Transport Corridor Outdoor Advertising and Signage Guidelines which states that *'the sign should not be located so that it is visible from the stem of a T-intersection'* (note that vehicular access is maintained in the future post PLR on Church Street north of Darcy Street).

The comment by Council has been interpreted to be in relation to the "Church Street" label on Google Maps that appears to be similar in nature to a label given to a public roadway (shown below). It is critical to point out that the pedestrian plaza located between Darcy Street to the south and Macquarie Street to the north is not a roadway carrying through traffic flow.

Occasionally, there may be a service vehicle which is required to access the pedestrian plaza via Darcy Street. Notwithstanding, the number of vehicle movements are expected to be minimal. Also, it would be expected that such vehicle movements occur at extremely slow speeds and with the driver having full awareness of their surroundings, paying attention to pedestrians moving about in the driver's forward view and peripheral vision.

From the travel lane on Darcy Street, the digital sign would be facing towards the pedestrian plaza and the content displayed on the digital sign would be predominately illegible to motorists due to the acute angle of the sign/ bridge with the roadway. This is illustrated by the close-up of the designer's impression from Darcy Street as shown below.

Submission 2: The signs on the Darcy Street Railway Overpass is located just behind the traffic signals facing northbound traffic on Church Street and just in front of the traffic signals facing southbound traffic on Church Street. Any advertisement displayed can distract drivers from the traffic signals at a critical time which is a safety concern. This does not comply with Section 3.3.1 (a) of the Transport Corridor Outdoor Advertising and Signage Guidelines which states in part that *'the advertisement must not distract a driver from, obstruct or reduce the visibility and effectiveness of traffic signals'*.

As shown in **Error! Reference source not found.** (above), the proposed digital sign would not be situated directly behind traffic signal lanterns and existing signage from the view of northbound motorists on Church Street. Rather, there would be reasonable depth and lateral spacing from the digital sign and traffic signals and other signage. Therefore, the digital sign would not obstruct or reduce visibility or effectiveness of the traffic signals and other roadway signage.

There is a general misconception that roadside digital signs cause unsafe levels of distraction which could lead to crash incidents. As mentioned in response to Item 2 above, the findings of the study conducted by Samsa indicate that the average eye fixation duration spent by motorists observing a digital billboard is 0.207 seconds which is well below the 0.750 seconds minimum perception-reaction time to an unexpected event. On this basis, motorists would have spare cognitive capacity to observe the road environment ahead in the presence of a digital signage without an increased risk of a crash incident.

Notwithstanding this, the area around the proposed digital signage is marked as a 40 km/h High Pedestrian Activity Area for which a dwell time of 10 seconds for the digital signage would be suitable (in accordance with the guidelines). However, given the proximity of the digital sign to nearby traffic signals, it is proposed to increase the dwell time up to 15 seconds (minimum) for the digital sign on the south approach.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,

Wayne Johnson
Director

Attachment One

Existing Signage Crash Analysis, prepared by The Transport Planning Partnership for Sydney Trains

Our Ref: 20406

26 March 2021

Ethos Urban
173 Sussex Street
SYDNEY NSW 2000

Attention: Mr Gareth Bird

Dear Gareth,

RE: DIGITAL SIGNAGE SAFETY ASSESSMENT
EXISTING DIGITAL SIGNAGE CRASH DATA ANALYSIS

As requested, please find herein The Transport Planning Partnership (TTPP)'s crash data analysis at locations along the Sydney Trains network with existing digital signage billboards.

Background

Ethos Urban, on behalf of Sydney Trains, have submitted proposals for a new digital signage at various locations within Sydney NSW. Submissions made by Council and Transport for NSW (TfNSW) have been received which identify concerns for such digital sign boards to cause potential distraction to road users.

There is a perception that digital signage boards would result in an unsafe level of distraction to a motorist or pedestrian which is likely to result in a crash incident. As such, a review has been undertaken of crash data in the vicinity of existing digital billboard signs, like those which Sydney Trains is proposing to implement. The aim of the analysis is to determine whether the digital signage at each location has resulted in any safety impacts to road users within the vicinity of the signage.

This study assessed crash data that has been obtained from TfNSW at seven locations having digital signage owned by Sydney Trains. The crash data has been analysed to compare the number of crashes and severity of crashes for the same duration of time before and after the digital signage was installed. The findings of the analysis as presented herein identifies whether existing digital signs cause sufficient distraction to road users which result in road crashes.

Existing Digital Signage Locations

Existing digital signs which have been assessed as part of this investigation are as follows:

- M4 Motorway, Homebush,
- Parramatta Road, Lewisham,
- City West Link Eastbound, Lilyfield
- City West Link Westbound, Lilyfield,
- Pacific Highway, Pymble,
- Boundary Street, Roseville, and
- Victoria Road, West Ryde.

The location of each digital signage within the context of the surrounding road network is shown in Figure 1 to Figure 6.

Figure 1: M4 Motorway, Homebush

Figure 2: Parramatta Road, Lewisham

Figure 3: City West Link, Lilyfield

Figure 4: Pacific Highway, Pymble

Figure 5: Boundary Street, Roseville

Figure 6: Victoria Road, West Ryde

Crash History Analysis

Historic crash data has been obtained from TfNSW and assessed for incidents at seven locations with digital signage. The crash data analysis includes incidents that have occurred within the visible distance of the existing digital signage. For the purpose of this assessment, the visible distance has been based on desktop observations.

Crash data has been assessed on the approaches to the digital signage for a period prior to its installation and whilst it has been operational. The installation date varies for each signage location (as detailed below). Notwithstanding this, crash data during the operation of each digital signage has been assessed up to 31 December 2020.

M4 Motorway, Homebush

A digital signage is located on the eastern side of an overhead railway bridge across the M4 Motorway as shown in Figure 1. This digital signage, which was installed on 25 July 2016, is visible to motorists travelling on the M4 Motorway east approach within approximately 350m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 18 February 2012 to 24 July 2016. 4 years, 5 months, 7 days
- Post installation period: 25 July 2016 to 31 December 2020. 4 years, 5 months, 7 days

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 1. The location of crashes recorded during these periods are illustrated in Figure 7 and Figure 8 respectively.

Table 1: Crash History Summary on M4 Motorway, Homebush

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (18 February 2012 - 24 July 2016)					
Rear End (RUM CODE 30)				1	7
Accident or Broken Down (RUM CODE 62)		1			
Struck Object (RUM CODE 66)			1		
Load or Missile Struck Vehicle (RUM CODE 91)					1
Sub-total	**0**	**1**	**1**	**1**	**8**
Total	**11**				
Operational Period (25 July 2016 – 31 December 2020)					
Rear End (RUM CODE 30)					1
Other Same Direction (RUM CODE 39)					1
Sub-total	**0**	**0**	**0**	**0**	**2**
Total	**2**				

Figure 7: Crash Locations at M4 Motorway, Homebush – Pre-Installation

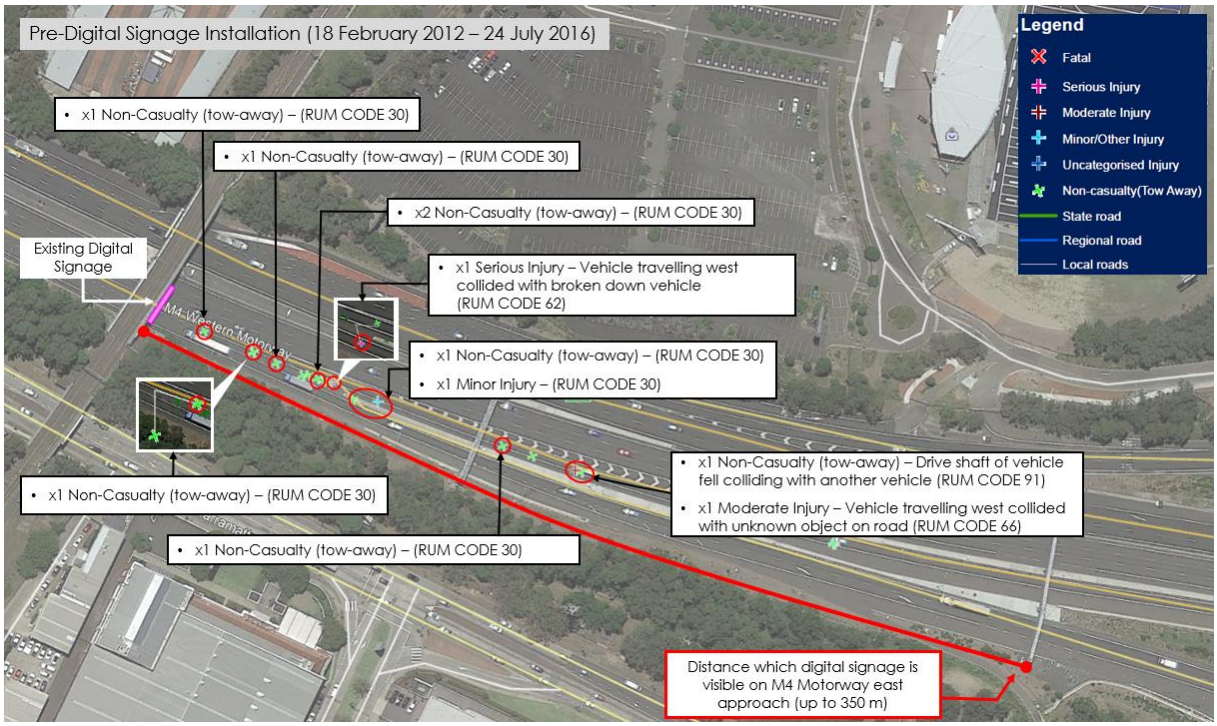
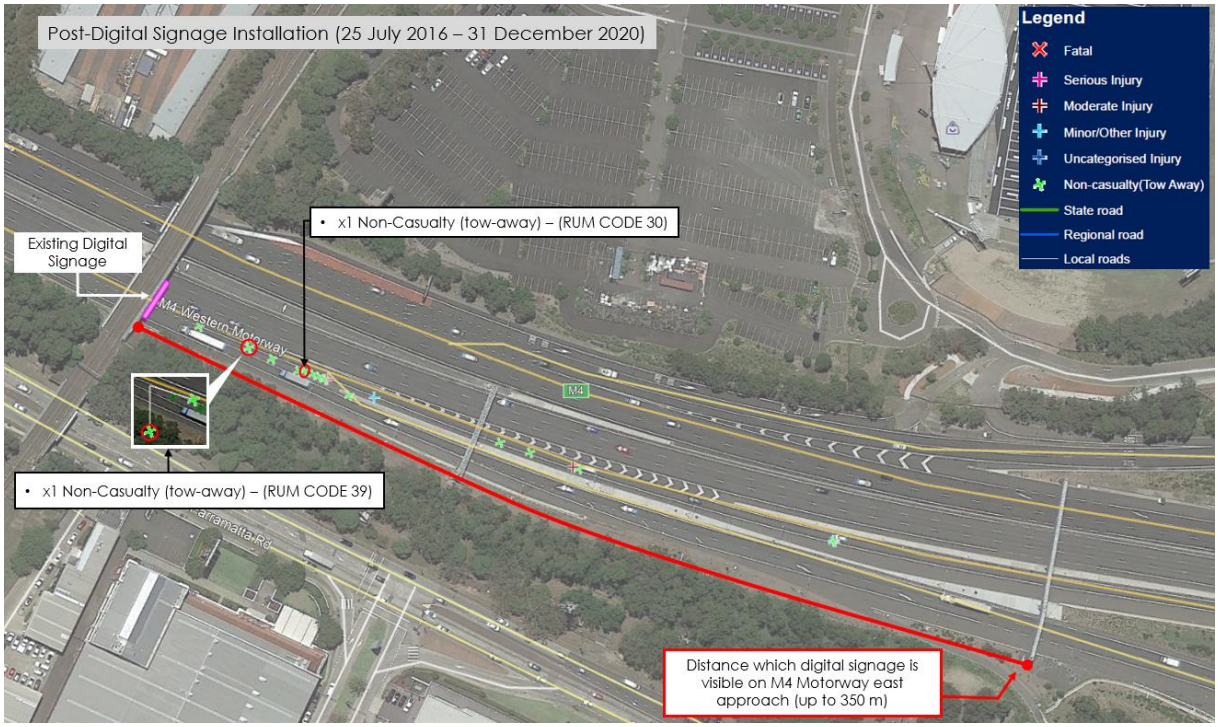


Figure 8: Crash Locations at M4 Motorway, Homebush – Operational



From Table 1, a total of 11 incidents occurred in the time period prior to the digital signage. The majority of the crashes resulted in no injuries or casualties, only vehicles being towed-away; that is, 8 out of 11 crashes. As a result of the crashes, there was one serious injury, one moderate injury, and one minor injury.

The serious injury crash was a result of a vehicle colliding into a broken-down vehicle (RUM CODE 62) on the M4 Motorway. The moderate injury crash occurred when a vehicle collided with an object on the road (RUM CODE 66). The minor injury crash was a result of a rear end collision (RUM CODE 30).

Prior to installation of the digital signage, the most common type of crash was a rear end crash which made up 8 out of 11 crashes.

Once the digital signage was in operation, there was a total of two crashes recorded. Both incidents resulted in a no injuries (tow-away). One incident was a rear end crash and the other was the result of two vehicles travelling in the same direction colliding with one another (RUM CODE 39).

Overall, the number of crashes on the M4 Motorway east approach has not increased following the installation of the digital signage.

Parramatta Road, Lewisham

A digital signage is located on the western side of an overhead railway bridge across Parramatta Road in Lewisham as shown in Figure 2. This digital signage, which was installed on 29 May 2017, is visible to motorists travelling on the west approach on Parramatta Road within approximately 230m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 26 October 2013 to 28 May 2017. 3 years, 7 months, 3 days
- Post installation period: 29 May 2017 to 31 December 2020. 3 years, 7 months, 3 days

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 2. The location of crashes recorded during these periods are illustrated in Figure 9 and Figure 10 respectively.

Table 2: Crash History Summary on Parramatta Road, Lewisham

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (26 October 2013 - 28 May 2017)					
Rear End (RUM CODE 30)			1	2	1
Left Off Carriageway into Object or Parked Vehicle (RUM CODE 71)		1			
Sub-total	**0**	**1**	**1**	**2**	**1**
Total	**5**				
Operational Period (29 May 2017 - 31 December 2020)					
Right Off Carriageway into Object or Parked Vehicle (RUM CODE 73)					1
Sub-total	**0**	**0**	**0**	**0**	**1**
Total	**1**				

Figure 9: Crash Locations at Parramatta Road, Lewisham – Pre-Installation

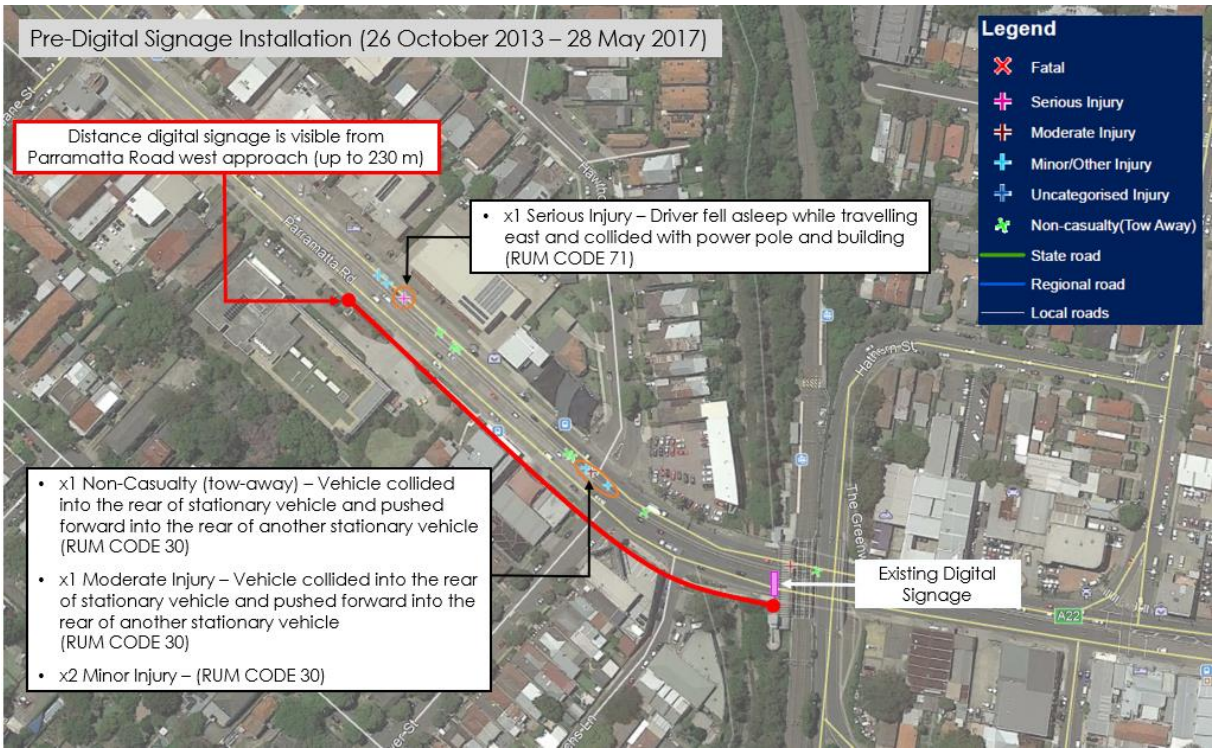


Figure 10: Crash Locations at Parramatta Road, Lewisham – Operational

In the time period prior to the digital signage, there were a total of five crashes recorded within the visible distance of the digital signage. The serious injury crash was the result of driver fatigue which caused the driver to veer from the carriageway and collide into a power pole (RUM CODE 71). The moderate injury crash was related to a rear end incident. There two minor injuries resulting from rear end collisions (RUM CODE 30), and one crash that resulted in no injuries (tow-away).

Since the digital signage has been in operation, a vehicle has veered from the carriageway colliding into a parked vehicle (RUM CODE 73). This crash resulted in the vehicle being towed away, however, no injuries.

Whilst the digital signage has been operational, there has been no increase in the number of crashes within the signage visible distance on Parramatta Road.

City West Link (Eastbound), Lilyfield

A digital signage is located on the northern side of the City West Link carriageway at Lilyfield, facing eastbound traffic as shown in Figure 3. This digital signage, which was installed on 20 April 2015, is visible to motorists travelling on the western approach on Parramatta Road within approximately 350m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 1 January 2010 and 19 April 2015. (5 years 3 months 18 days)
- Post-installation period: 20 April 2015 and 7 August 2020. (5 years 3 months 18 days)

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 3. The location of crashes recorded during these periods are illustrated in Figure 11 and Figure 12 respectively.

Table 3: Crash History Summary on City West Link (Eastbound), Lilyfield

Crash Type	Crash Severity (No. of Crashes)					
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)	Uncategorised Injury
Pre-Installation (1 January 2010 – 19 April 2015)						
Head On (RUM CODE 20)		1				
Rear End (RUM CODE 30)					2	
Sub-total	**0**	**1**	**0**	**0**	**2**	**0**
Total	**3**					
Operational Period (20 April 2015 – 7 August 2020)						
Other Same Direction (RUM CODE 39)				1		
Sub-total	**0**	**0**	**0**	**1**	**0**	**0**
Total	**1**					

Figure 11: Crash Locations at City West Link (Eastbound), Lilyfield – Pre-Installation

Figure 12: Crash Locations at City West Link (Eastbound), Lilyfield – Operational

A total of three crashes have been recorded during the five-year period prior to the digital signage. One incident occurred east of the City West Link – Catherine Street intersection which was a head on crash (RUM CODE 20) that resulted in a serious injury. The other two incidents were rear end crashes which resulted in vehicles being towed away.

Whilst the digital signage has been operational there has been one crash recorded. This crash resulted in a minor injury which was due to an uncommon crash between two vehicles travelling in the same direction (RUM CODE 39).

Overall, there has been no increase in crashes on City West Link western approach following the installation of the digital signage.

City West Link (Westbound), Lilyfield

A digital signage is located on the northern side of City West Link at Lilyfield, facing westbound traffic as shown in Figure 3. This digital signage is located 100m east of the intersection of City West Link – Catherine Street. The digital signage, which was installed on 31 October 2016, is visible to motorists travelling on the eastern approach on City West Link within approximately 230m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 30 August 2012 to 30 October 2016. 4 years, 2 months, 1 day
- Post-installation period: 31 October 2016 to 31 December 2020. 4 years, 2 months, 1 day

It is noted that there have been no crashes recorded following installation of the digital signage. A summary of crashes pre-installation of the digital signage is presented in Table 4. The location of crashes recorded pre-installation is illustrated in Figure 13.

Table 4: Crash History Summary on City West Link (Westbound), Lilyfield

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (1 January 2011 – 30 October 2016)					
Rear End (RUM CODE 30)					1
Sub-total	**0**	**0**	**0**	**0**	**1**
Total	**1**				

Figure 13: Crash Locations at City West Link (Westbound), Lilyfield – Pre-Installation

During the time period prior to the digital signage, there was one rear end crash which resulted in no injuries and only the vehicle/s being towed away. Since the signage was installed, there have been no crashes recorded within the visible distance on City West Link in the westbound direction.

Thus, the digital signage has not contributed to any further road crashes in the vicinity.

Pacific Highway, Pymble

A digital signage is located on the eastern side of Pacific Highway in Pymble as shown in Figure 4. This digital signage, which was installed on 23 March 2015, is visible to motorists travelling on the north approach on Pacific Highway. The digital signage would become visible immediately after passing the Pacific Highway - Livingstone Avenue intersection which is approximately 180m from the signage.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 1 January 2010 and 22 March 2015. (5 years 2 months 21 days)
- Post installation period: 23 March 2015 and 13 June 2020. (5 years 2 months 21 days)

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 5. The location of crashes recorded during these periods are illustrated in Figure 14 and Figure 15 respectively.

Table 5: Crash History Summary on Pacific Highway, Pymble

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (1 January 2010 - 22 March 2015)					
Right Through (RUM CODE 21)					1
Rear End (RUM CODE 30)					2
Off Carriageway Left on Right Bend into Object or Parked Vehicle (RUM CODE 81)			1		1
Off Carriageway Right on Left Bend into Object or Parked Vehicle (RUM CODE 85)					2
Sub-total	**0**	**0**	**1**	**0**	**6**
Total	**7**				
Operational Period (23 March 2015 – 13 June 2020)					
Right Through (RUM CODE 21)					2
Rear End (RUM CODE 30)			1		
Lane Change Left (RUM CODE 35)				1	
Sub-total	**0**	**0**	**1**	**1**	**2**
Total	**4**				

Figure 14: Crash Locations at Pacific Highway, Pymble – Pre-Installation

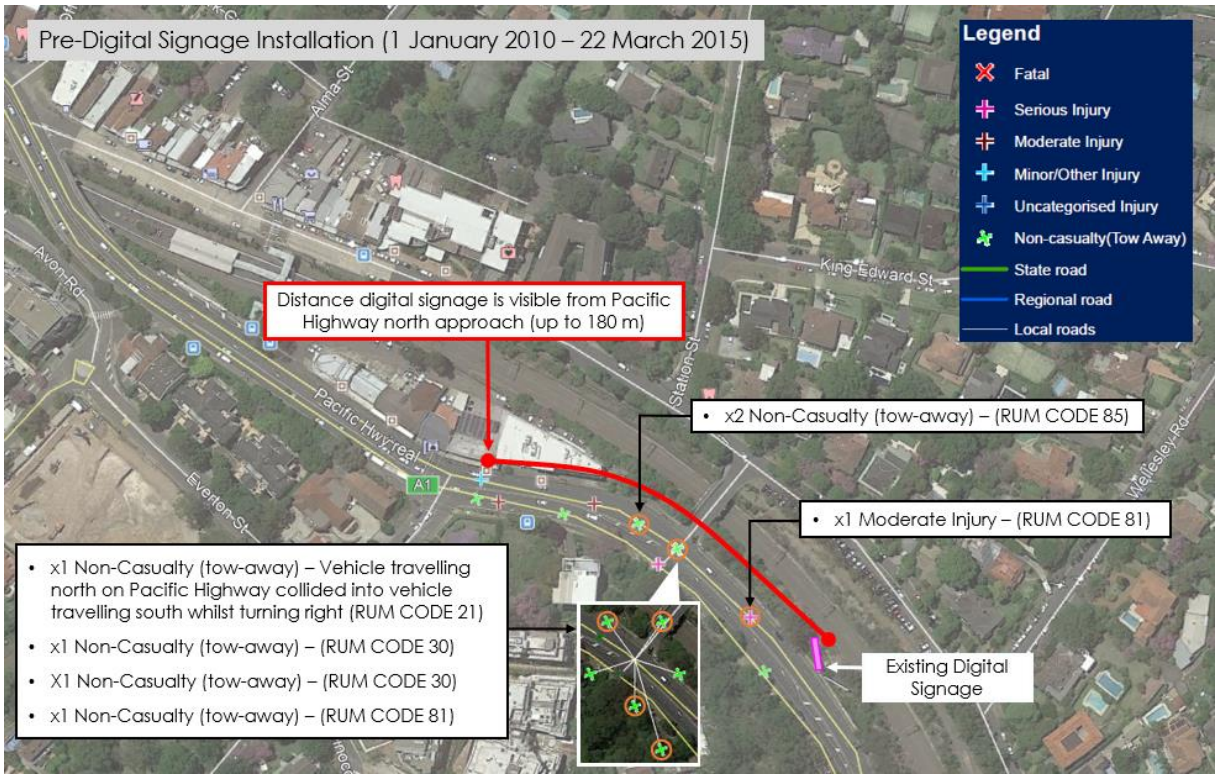
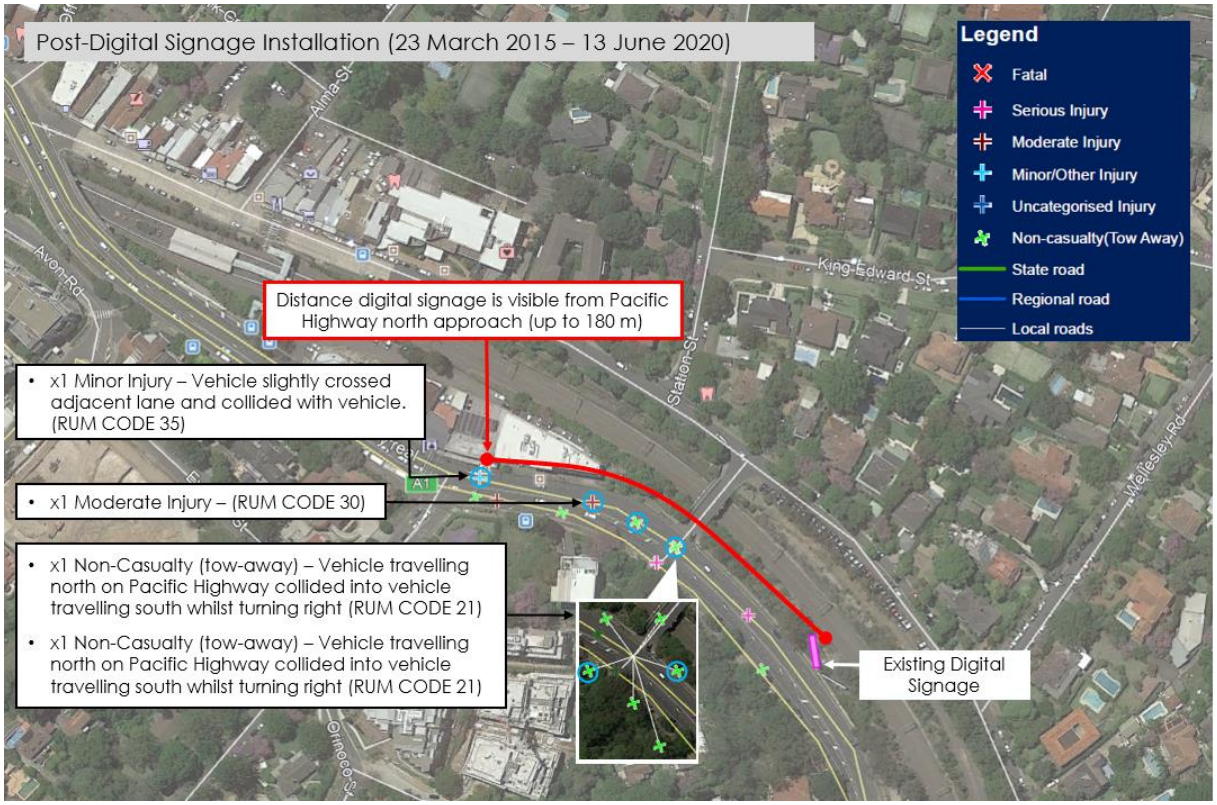


Figure 15: Crash Locations at Pacific Highway, Pymble – Operational



There were seven crashes recorded within the time period prior to the digital signage. Most of these crashes occurred at the intersection of Pacific Highway with the side road bridge crossing towards Grandview Street, and resulted in no injuries. The crashes include two rear end collisions, a vehicle travelling south colliding into vehicle turning right onto the bridge (RUM CODE 21), and three vehicles veering from carriageway at the bend into an object (RUM CODE 81 and RUM CODE 85). A similar incident occurred approximately 40m south of the bridge where a vehicle veered from the carriageway at the bend into an object resulting in a moderate injury.

Following the installation of the digital signage, four crashes have been recorded. Two of the crashes were due to a vehicle travelling south colliding into a vehicle turning right onto the bridge. The remainder of incidents were rear end crashes and a vehicle colliding with another vehicle in the adjacent travel lane (RUM CODE 35).

Overall, the number of crashes at this location has not increased following the installation of the digital signage.

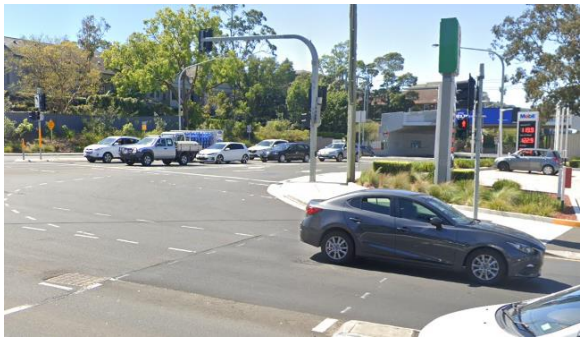
Boundary Street, Roseville

A digital signage is located on the western side of the overhead railway bridge across Boundary Street as shown in Figure 5. This digital signage was installed on 17 July 2017.

On Boundary Road west approach, the signage becomes visible after a motorist has turned left or right from Pacific Highway. The digital signage is not visible on Pacific Highway north approach, and visibility is partially obstructed on the south approach as shown in Figure 16.

Figure 16: Pacific Highway North Approach and South Approach

Motorist's view from north approach



Motorist's view from south approach

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 2 February 2014 to 16 July 2017. 3 years, 5 months, 15 days
- Post installation period: 17 July 2017 and 31 December 2020. 3 years, 5 months, 15 days

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 6. The location of crashes recorded during these periods are illustrated in Figure 17 and Figure 18 respectively.

Table 6: Crash History Summary on Boundary Street, Roseville

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (2 February 2014 - 16 July 2017)					
Left Far (RUM CODE 12)			1		
Rear End (RUM CODE 30)			1	2	2
Lane Change Left (RUM CODE 35)					1
Left Turn Side Swipe (RUM CODE 37)				1	1
Other Same Direction (RUM CODE 39)					1
Left Off Carriageway into Object or Parked Vehicle (RUM CODE 71)				1	
Sub-total	**0**	**0**	**2**	**4**	**5**
Total	**11**				
Operational Period (17 July 2017 - 31 December 2020)					
Pedestrian Far Side (RUM CODE 02)	1				
Cross Traffic (RUM CODE 10)					1
Other Same Direction (RUM CODE 39)					1
Left Off Carriageway into Object or Parked Vehicle (RUM CODE 71)				1	
Sub-total	**1**	**0**	**0**	**1**	**2**
Total	**4**				

Figure 17: Crash Locations at Boundary Street, Roseville – Pre-Installation

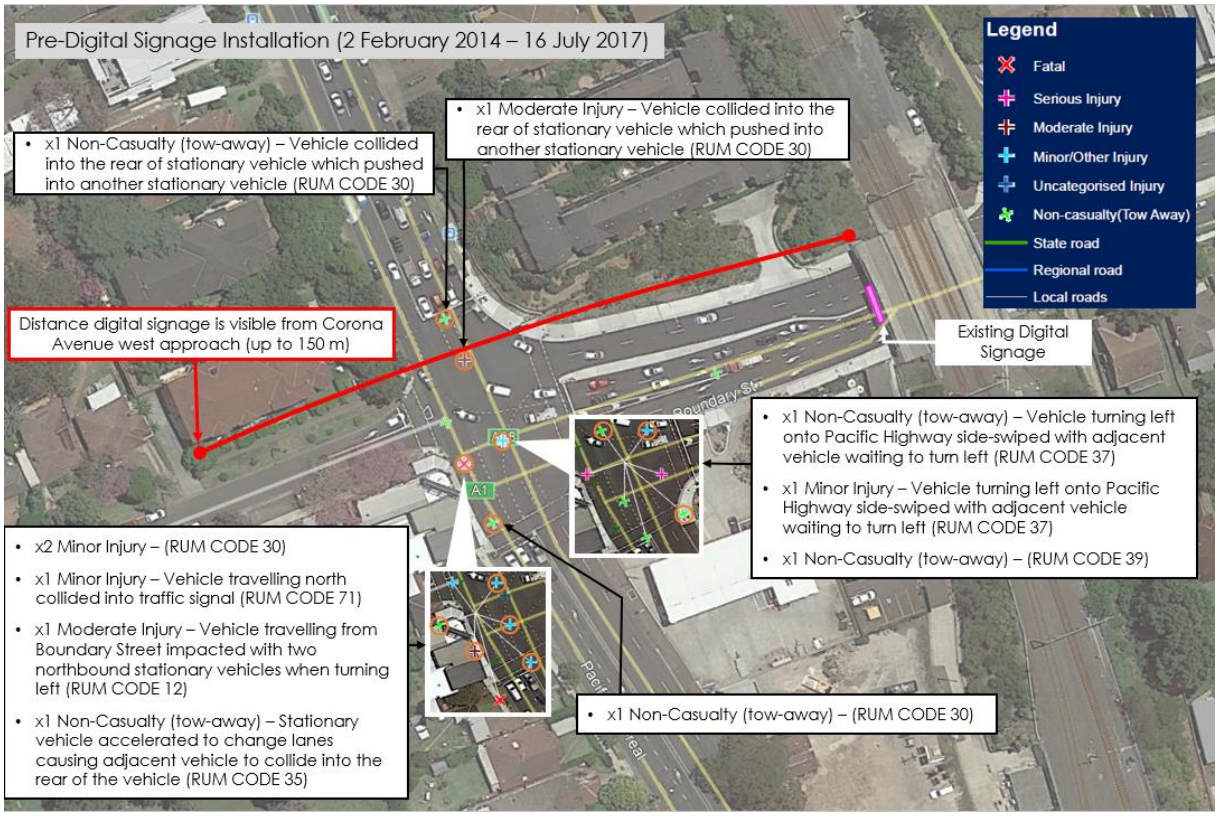


Figure 18: Crash Locations at Boundary Street, Roseville – Operational

From Table 6, the recorded crashes have all occurred at the intersection of Pacific Highway-Boundary Street. There was a total of 11 crash incidents within the time period prior to the digital signage. Of those 11 crashes, there were two moderate injuries, four minor injuries, and five non-casualties (tow-away). It is noted that these crashes occurred at the signalised intersection of Pacific Highway - Boundary Street where vehicles were recorded as travelling north and south through the intersection. Given that the digital signage is partially obstructed or not visible from the north approach and south approach, such crashes would be unrelated to the presence of a digital signage on Boundary Street.

Following the installation of the digital signage, four crashes have been recorded at the Pacific Highway - Boundary Street intersection. Of these incidents, one crash resulted in a fatality, one minor injury, and two non-casualties with vehicles being towed away. The incident which resulted in a fatality involved a pedestrian illegally crossing the intersection from the north-east corner to the south-west corner which resulted in the pedestrian being struck by a vehicle travelling northbound on Pacific Highway. The driver's visibility of the pedestrian was obstructed by a truck waiting to turn right from Pacific Highway to Boundary Street. Since the pedestrian breaking the law by crossing at an unmarked crossing location, this incident is an uncommon situation. More importantly, such incident was unrelated to the digital signage on Boundary Street.

Overall, the number of crashes within the visible distance of the digital signage has not increased since being installed in 2017.

Victoria Road, West Ryde

A digital signage is located on the western side of an overhead railway bridge across Victoria Road in West Ryde as shown in Figure 6 This digital signage, which was installed on 3 October 2016, is visible to motorists travelling on the west approach on Victoria Road from 265m.

Crash history data has been assessed for the periods as follows:

- Pre-installation period: 4 July 2012 – 2 October 2016. 4 years, 2 months, 29 days
- Post installation period: 3 October 2016 – 31 December 2020. 4 years, 2 months, 29 days

A comparison of crashes pre-installation and during operation of the digital signage is presented in Table 7. The location of crashes recorded during these periods are illustrated in Figure 19 and Figure 20 respectively.

Table 7: Crash History Summary on Victoria Road, West Ryde

Crash Type	Crash Severity (No. of Crashes)				
	Fatality	Serious Injury	Moderate Injury	Minor Injury	Non-casualty (tow-away)
Pre-Installation (1 January 2011 - 2 October 2016)					
Pedestrian Near Side (RUM CODE 0)		2			
Pedestrian Far Side (RUM CODE 02)		1			
Left Near (RUM CODE 16)		1			
Right Through (RUM CODE 21)					1
Rear End (RUM CODE 30)			1	2	1
Lane Side Swipe (RUM CODE 33)					1
Lane Change Left (RUM CODE 35)			1		
Other on Path (RUM CODE 69)					1
Out of Control on Carriageway (RUM CODE 74)			1		
Off Carriageway Left on Left Bend into Object or Parked Vehicle (RUM CODE 87)					1
Sub-total	**0**	**4**	**3**	**2**	**5**
Total	**14**				
Operational Period (3 October 2016 - 31 December 2020)					
Right Off Carriageway into Object or Parked Vehicle (RUM CODE 73)			1		
Sub-total	**0**	**0**	**1**	**0**	**0**
Total	**1**				

Figure 19: Crash Locations at Victoria Road, West Ryde – Pre-Installation

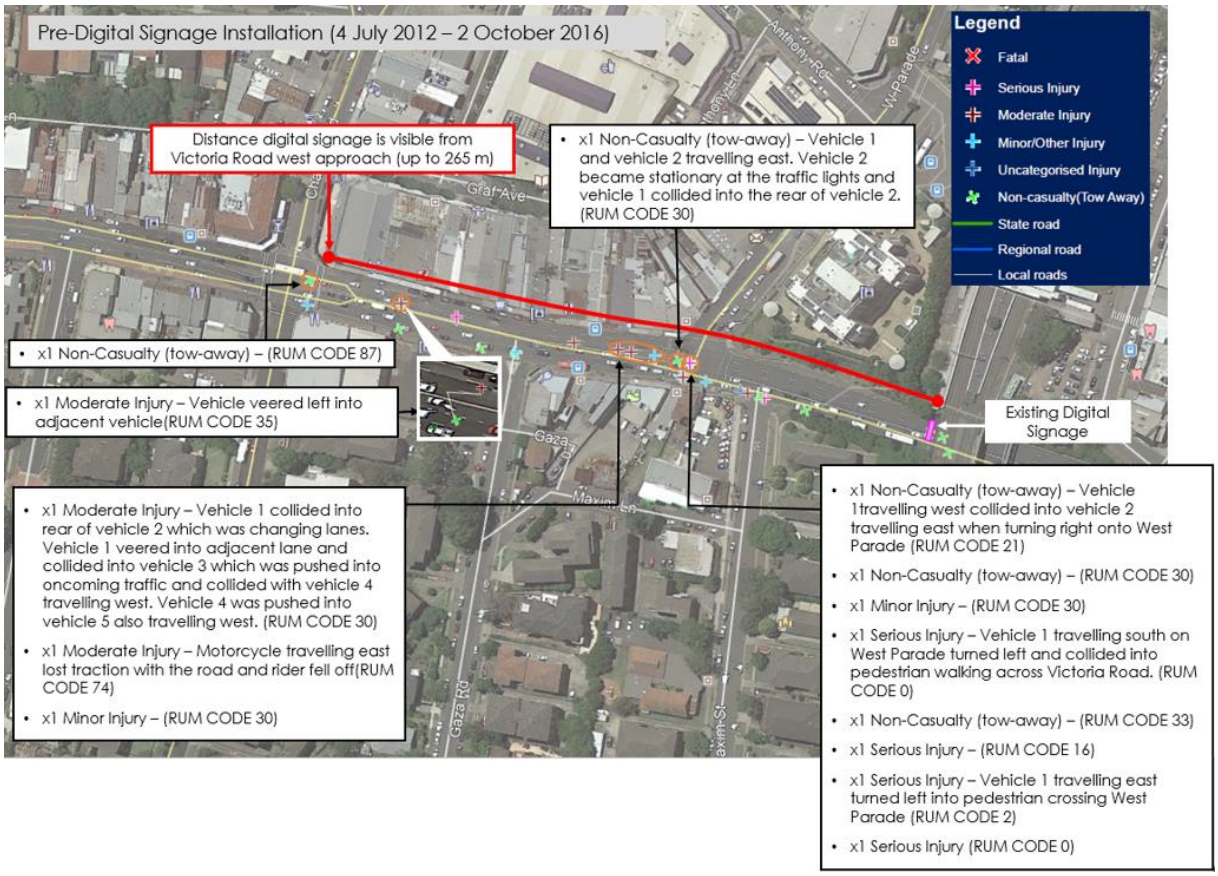
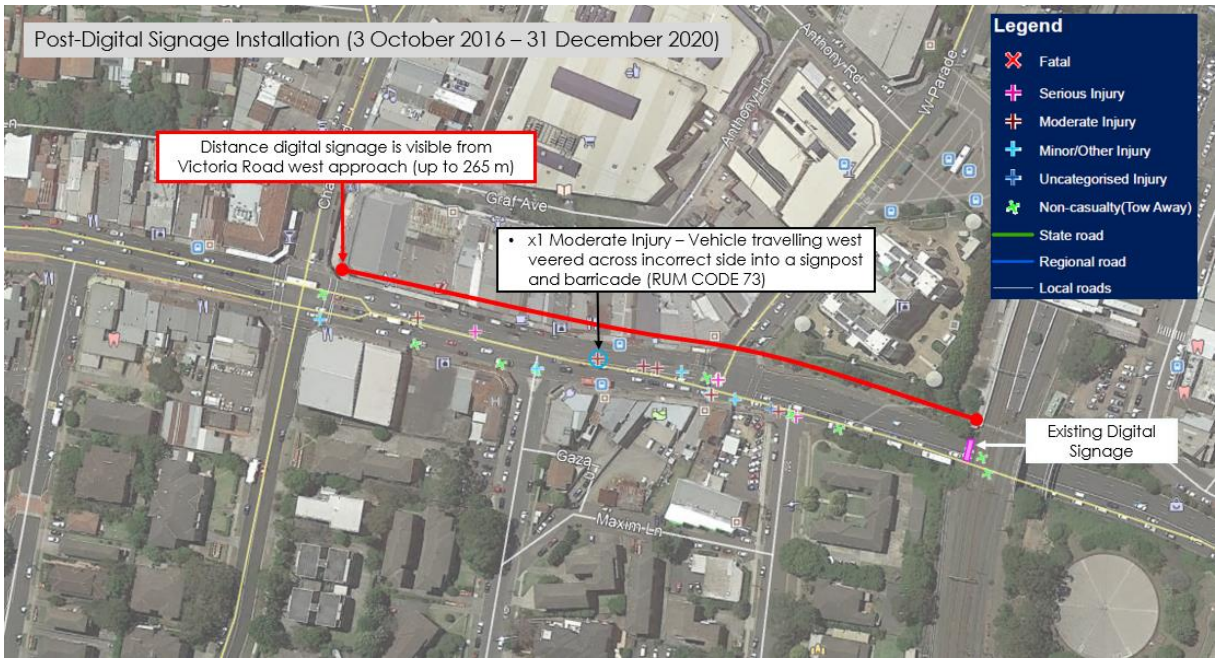


Figure 20: Crash Locations at Victoria Road, West Ryde – Operational



From Table 7, there are a total of 14 crashes recorded in the period prior to the digital signage. Of these incidents, four crashes resulted in serious injuries, three crashes with moderate injuries, and two crashes with minor injuries. Five crashes resulted in no injuries and a vehicle tow-away.

The four incidents resulting in a serious injury occurred at the signalised intersection of Victoria Road - West Parade where three crashes involved a pedestrian (RUM CODE 0 and RUM CODE 02), and one crash involved a vehicle colliding into the rear of a vehicle after turning left from West Parade (RUM CODE 16). The moderate and minor injuries were the result of a rear end, lane change (RUM CODE 35), and loss of control (RUM CODE 74) incidents.

After the digital signage was installed in 2016, there has been one crash recorded within the visible distance on Victoria Road. The crash occurred approximately 20m east of Gaza Road which involved a vehicle travelling eastbound veering to the opposite side of the carriageway causing the vehicle to collide with a signpost and barricade (RUM CODE 73).

Hence, it is concluded that the number of crashes on Victoria Road eastbound has not increased since the installation of the digital signage.

Summary and Conclusion

There is a perception that digital signage boards would result in an unsafe level of distraction to a motorist of pedestrian which is likely to result in a crash incident. As such, a review has been undertaken of crash data in the vicinity of existing digital billboard signs, like those which Sydney Trains is proposing to implement. The aim of the analysis is to determine whether the digital signage at each location has resulted in any safety impacts to road users within the vicinity of the signage.

This study assessed crash data that has been obtained from TfNSW at seven locations having an existing digital signage owned by Sydney Trains. The crash data has been analysed to compare the number of crashes and severity of crashes before and after the digital signage was installed. The findings of the analysis suggest that existing digital signs do not cause distraction to road users which leads to road crashes. In fact, at all site locations, historic crash data indicates that there were a greater number of incidents recorded prior to the installation of each digital signage.

Based on the analysis presented in this letter, it can be concluded that the perceived distraction potential for road users due to the presence of a digital signage is minimal and evidently has not resulted in creating a road environment that is any less safe for motorists, pedestrians, and cyclists.

We trust the above is to your satisfaction. Should you have any queries regarding the above or require further information, please do not hesitate to contact the undersigned on 8437 7800.

Yours sincerely,

Wayne Johnson
Director