

ILLUMINATED SIGNAGE, OLD WINDSOR ROAD, BELLA VISTA

SIGNAGE SAFETY ASSESSMENT

PREPARED FOR MULPHA NORWEST PTY LTD | 12 SEPTEMBER 2022
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Illuminated Signage, Old Windsor Road, Bella Vista

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Illuminated Signage, Old Windsor Road, Bella Vista

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1 Introduction

1.1 Background

The existing illuminated signage on the Old Windsor Road pedestrian bridge near Norbrik Drive at Bella Vista was previously consented and installed in 2010. The consent for the existing signage has lapsed and a new development application is to be prepared and submitted to the Department of Planning and Environment. Calibre Professional Services Pty Ltd have been engaged by Mulpha Norwest to prepare the development application. Stantec has been engaged to conduct a signage safety assessment as part of the development application for the existing signage to determine suitability of the proposal with respect to road safety along Old Windsor Road.

The assessment has been primarily based on the Transport Corridor Outdoor Advertising and Signage Guidelines, Assessing Development Applications under SEPP 64 (NSW Government Department of Planning, Industry and Environment, 2017) – herein referred to as the NSW Guidelines. The assessment considers clarification previously provided by Transport for NSW (TfNSW) regarding application of criteria in the NSW Guidelines related to Stopping Sight Distance and the appropriate parameters for calculating the Stopping Sight Distance specific to the site.

1.2 Purpose of this Report

This report sets out the findings of Stantec's Signage Safety Assessment for the existing signage against the 2017 NSW Guidelines. The following items have been considered in this report:

- potential for the signage to obstruct a driver, pedestrian or cyclist's view of the road and/ or traffic control devices.
- distance from upstream or downstream intersections or other decision points.
- potential for the signage to distract at a critical time or for an extended period of time.
- location within the carriageway and its potential to be a physical obstruction for vehicles or other road users.
- location in relation to other signage.

1.3 References

In preparing this report, reference has been made to the following:

- an inspection of the site and its surrounds
- Transport Corridor Outdoor Advertising and Signage Guidelines – Assessing Development Applications under SEPP 64 (NSW Government Department of Planning, November 2017)
- crash data sourced from the Transport for NSW Centre for Road Safety
- Guide to Road Design, Part 3: Geometric Design, Austroads, 2016



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- Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections, Austroads, 2017
- other documents and data as referenced in this report.



2 Existing Conditions

The existing signs are located on the north and south sides of the pedestrian bridge over Old Windsor Road in Bella Vista. The pedestrian bridge is located approximately 50 metres south of the Old Windsor Road/ Norbrik Drive intersection.

Near the existing signs, Old Windsor Road has a posted speed limit of 80 km/h and is aligned in a north-south direction. It is a two-way road with generally three travel lanes in each direction, separated by a central median. Additional left and right turn lanes are provided on approach to key intersections and acceleration lanes provided on the departure side.

Norbrik Drive is a local road running in a two-way loop configuration. At its intersection with Old Windsor Road, it runs in an east-west direction, with four approach lanes and three departure lanes. It is a two-way road with a posted speed limit of 50km/h. The Northwest Transitway is located to the west of Old Windsor Road and has a separated carriageway, accessible at the Old Windsor Road/ Norbrik Drive intersection.

The location of the subject site and its surrounding environs are shown in Figure 1.

Figure 1: Existing signage location and surrounds



Base image source: <http://www.street-directory.com.au/>

2.1 Existing Signs

The existing signs are each 12.66 metres x 3.55 metres illuminated static billboards, equating to a total area of approximately 44.94 square metres.



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A photo montage of the existing northbound and southbound signs is shown in Figure 2 and Figure 3 respectively.

Figure 2: Photomontage of the existing south facing sign (northbound traffic)



Figure 3: Photomontage of the existing north facing sign (southbound traffic)



2.2 Sign Exposure

Old Windsor Road has a straight alignment on approach to the signs. The vertical alignment of Old Windsor Road is such that it impacts the sign visibility, particularly for the northbound approach. The existing signs become visible and readable at the following distances:

- Northbound:
 - Visible: 260 metres south of the existing location (sign is visible at 450 metres south of the sign, however, is obstructed by the vertical crest between 350 to 260 metres south of the sign)
 - Readable: 160 metres south of the existing location
 - Sign out of view: 5 metres south of the existing location.
- Southbound:
 - Visible: 320 metres north of the existing location.
 - Readable: 160 metres north of the existing location
 - Sign out of view: 5 metres north of the existing location.

On Norbrik Drive, the north facing sign is visible to drivers turning onto Old Windsor Road. The sign is generally blocked by roadside vegetation and becomes visible in a drivers cone of vision approximately 25 metres east of the intersection stop line. Drivers turning left onto Old Windsor Road will be able to read the sign for approximately 50 metres before it goes out of view overhead.

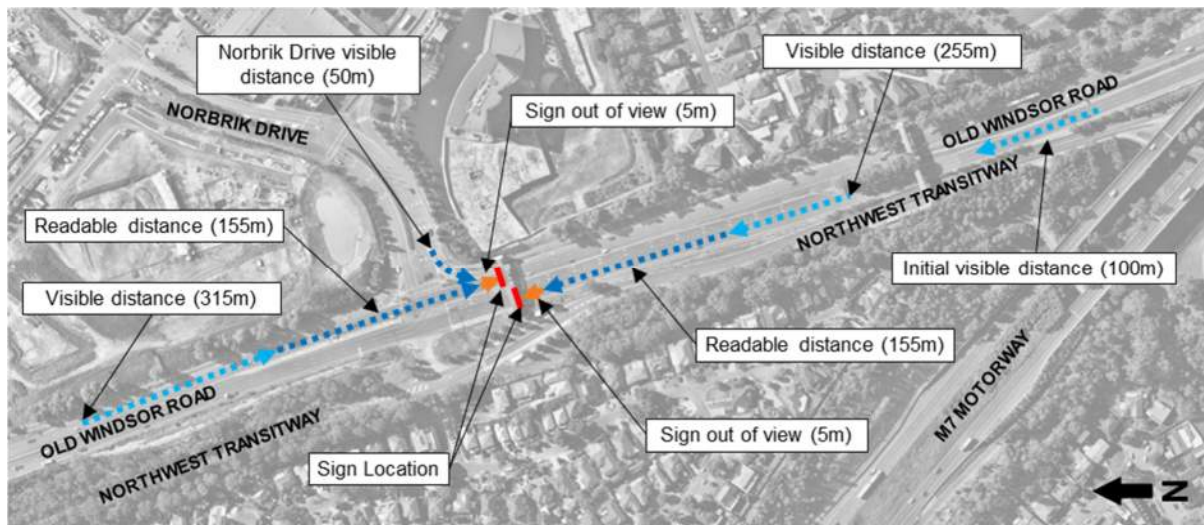
On the Northwest Transitway, it is expected that the north facing sign is briefly visible to southbound buses, however, is significantly offset from the carriageway and obstructed by trees. It is anticipated that the south facing sign is visible to northbound buses at the same distances indicated above, however is offset from the carriageway and occasionally obstructed by trees. Due to the higher elevation of the Transitway compared to the Old Windsor Road carriageway this distance may be further increased. Buses turning out from the Transitway onto Old Windsor Road, particularly right turning buses, will also be able to view the sign.

The visible and readable distances are shown in Figure 4, while the view of the sign from the above readable distance is shown in Figure 5 and Figure 6. Given access to the Northwest Transitway is restricted the view looking south from the pedestrian bridge is shown in Figure 7 to demonstrate the south-facing sign would be visible to northbound buses.



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Figure 4: Signage exposure



Base image source: Nearmap, accessed June 2022

Figure 5: Northbound drivers' view from 160 metres south of the sign



Figure 6: Southbound drivers' view from 160 metres north of the sign



Figure 7: View looking south from the existing pedestrian bridge, either side of the signage



2.3 Crash History

Reported crash data was sourced from the Transport for NSW Centre for Road Safety statistics for the most recent five-year period available (1 January 2016 to 31 December 2020).

The data indicates that a total of nine collisions occurred on Old Windsor Road within the visible distances of the existing signs during the five-year study period. Six of these were north of the existing signs and the remaining three were south of the existing signs. These collisions are shown in Figure 8. It is noted that the data provided on the TfNSW Centre for Road Safety site is limited and the above crashes may have occurred downstream of the existing signs, i.e., where the sign would not have been visible.

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Figure 8: Crash map from 1 January 2016 to 31 December 2020



Base image source: <https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/index.html>, accessed 7 July 2022



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Table 1 Summary of crashes – Northbound (south facing sign)

Year	Location	Severity	RUM Code	Description
2016	Old Windsor Road approximately 300 metres south of Norbrik Drive	Non-casualty	30	Rear end
2017	Old Windsor Road approximately 170 metres south of Norbrik Drive	Moderate injury	73	Off carriageway into object
2019	Old Windsor Road approximately 170 metres south of Norbrik Drive	Moderate injury	30	Rear end

Table 2 Summary of crashes – Southbound (north facing sign)

Year	Location	Severity	RUM Code	Description
2016	Old Windsor Road/Norbrik Drive intersection	Moderate injury	30	Rear end
2016	Old Windsor Road approximately 50 metres north of Norbrik Drive	Minor/ other injury	30	Rear end
2017	Old Windsor Road/Norbrik Drive intersection	Non-casualty	39	Other same direction
2018	Old Windsor Road approximately 50 metres north of Norbrik Drive	Moderate injury	30	Rear end
2018	Old Windsor Road/Norbrik Drive intersection	Minor/ other injury	30	Rear end
2019	Old Windsor Road/ Norbrik Drive intersection	Serious Injury	85	Off carriageway on left bend into object

Figure 8 indicates that within the exposure distance of the north facing sign there is a small cluster of crashes at or on approach to the Norbrik Drive and Old Windsor Road Intersection. Of the six crashes recorded at this intersection, four (67%) were classified as rear-end crashes, which are typical in busy urban environments where congestion is common. The grades through the area likely contributed to the moderate severity of two of the recorded rear end crashes.

There have been an additional three crashes reported within the exposure distance of the south facing sign. Two of these were classified as rear-end crashes, which as indicated above is typical for the road environment.

Considering that a significant proportion of the recorded crashes were rear-end crashes (which are typical at major road intersections that are prone to congestion) and there were no other relevant observable trends in terms of crash types or influences, the location of the existing advertising signs does not present a safety concern.

It should also be noted that internationally, no empirical studies conducted to date have shown a causal link between advertising signage and road safety statistics.



3 Statutory Requirements

This section of the report assesses compliance with the road safety assessment criteria established in the NSW Guidelines. In particular, the guidelines require analysis as to whether the proposal will reduce the safety of:

- any public road
- pedestrians and cyclists
- pedestrians by obscuring sight lines from public areas.

To assess any new installation against the above key road safety assessment criteria, a series of detailed criteria are set out in Section 3.2 and Section 3.3, Sign Location and Design of the NSW Guidelines. It is noted that the existing signs were installed in 2010 prior to the 2017 release of the NSW Guidelines and therefore the existing signage has been reviewed against the new guidelines to support the development application.

3.1 Sign Location Criteria (NSW Guidelines Section 3.2)

Criteria 3.2.1 - Road Clearance

a) The advertisement must not create a physical obstruction or hazard. For example:

- Does the sign obstruct the movement of pedestrians or bicycle riders? (e.g. telephone kiosks and other street furniture along roads and footpath areas)
- Does the sign protrude below a bridge or other structure so it could be hit by trucks or other tall vehicles? Will the clearance between the road surface and the bottom of the sign meet appropriate road standards for that particular road?
- Does the sign protrude laterally into the transport corridor so it could be hit by trucks or wide vehicles?

Both signs are currently fixed against the side of the overhead pedestrian bridge. The bottom of the signs do not protrude below the bridge. As such, the signs do not create a physical obstruction or hazard.

b) Where the sign supports are not frangible (breakable), the sign must be placed outside the clear zone in an acceptable location in accordance with Austroads Guide to Road Design (and RMS supplements) or behind an RMS-approved crash barrier.

Both signs are fixed against the side of the overhead pedestrian bridge. Therefore, no additional structure is required that would fall within the clear zone. It is noted that barrier protection is provided for the pedestrian bridge structure adjacent to the northbound carriageway, with the eastern end of the structure set back behind the shared path.



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c) Where a sign is proposed within the clear zone but behind an existing RMS-approved crash barrier, all its structures up to 5.8m in height (relative to the road level) are to comply with any applicable lateral clearances specified by Austroads Guide to Road Design (and RMS supplements) with respect to dynamic deflection and working width.

Given the locations and mounting of the signs, this criterion is not relevant.

d) All signs that are permitted to hang over roads or footpaths should meet wind loading requirements as specified in AS 1170.1 and AS1170.2. All vertical clearances as specified above are regarded as being the height of the sign when under maximum vertical deflection.

The signs are flush mounted on the overhead pedestrian bridge. It is understood the provision of advertising signage was integrated in the bridge design. As such, it is assumed that the wind loading requirement would be met.

Additional Road Clearance Criteria for Footpath/ Nature Strips

To ensure adequate clearance for pedestrian and wheelchair access, the sign must be positioned so that an absolute minimum envelope of 900mm x 2000mm of unobstructed clear path of travel is maintained for the entire length of the advertising structure.

Given the location of the signs above the road carriageway, this criterion is not relevant.

Criteria 3.2.2 – Line of Sight

a) An advertisement must not obstruct the driver's view of the road, particularly of other vehicles, bicycle riders or pedestrians at crossings.

The signs do not obstruct a driver's view of the road, other vehicles, cyclists and/or pedestrians, with the signs elevated above the road and fixed to the pedestrian bridge.

b) An advertisement must not obstruct a pedestrian or cyclist's view of the road.

The signs do not obstruct a pedestrian or cyclist's view of the road, with the signs elevated above the road and fixed to the pedestrian bridge.

c) The advertisement should not be located in a position that has the potential to give incorrect information on the alignment of the road. In this context, the location and arrangement of signs' structures should not give visual clues to the driver suggesting that the road alignment is different to the actual alignment. An accurate photomontage should be used to assess this issue.

Old Windsor Road is generally straight in alignment on approach to the signs and therefore the signs would not give visual cues to the driver suggesting a different alignment of the road. Figure 5 and Figure 6 provide an indication of the driver's view of the road on approach to the northbound and southbound facing signs respectively.

For northbound buses on the Transitway the south-facing sign is offset to the right of the transitway carriageway. The northbound alignment on approach to the sign is generally straight, however kicks out left at the location of the subject signage. Furthermore, the previous pedestrian bridge (located 300 metres south) spans over the Northwest Transitway whereas the pedestrian bridge with the



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subject signage only spans Old Windsor Road. Given the road level difference between the Transitway and Old Windsor Road, in conjunction with a controlled driver group using this carriageway, it is not anticipated to create confusion about the correct alignment of the transitway.

d) The advertisement should not distract a driver's attention away from the road environment for an extended length of time. For example:

- The sign should not be located in such a way that the driver's head is required to turn away from the road and the components of the traffic stream in order to view its display and/or message. All drivers should still be able to see the road when viewing the sign, as well as the main components of the traffic stream in peripheral view.
- The sign should be oriented in a manner that does not create headlight reflections in the driver's line of sight. As a guideline, angling a sign five degrees away from right angles to the driver's line of sight can minimise headlight reflections. On a curved road alignment, this should be checked for the distance measured back from the sign that a car would travel in 2.5 seconds at the design speed.

The signs are fixed on the side of the pedestrian bridge directly above Old Windsor Road and within the direct line-of-sight of drivers. Drivers are not required to turn their head away from the road to view either sign. With respect to the south-facing sign and northbound buses on the Transitway, the sign is located within a driver's cone of vision. Drivers would therefore not be required to turn their head away from the road to view the sign.

As a single sign within the general field of view of a driver, glances to view the sign would be expected to be less than one second and accordingly would not be for an extended length of time where there could be an impact on crash risk (two second threshold as referenced in Austroads Table C1 2 of AGTM13-16).

Due to the elevation of the signs, the signs would not create headlight reflections in drivers' line-of-sight.

Criteria 3.2.3 – Proximity to Decision Making Points and Conflict Points

a) The sign should not be located:

- less than the safe sight distance from an intersection, merge point, exit ramp, traffic control signal or sharp curves
- less than the safe stopping sight distance from a marked foot crossing, pedestrian crossing, pedestrian refuge, cycle crossing, cycleway facility or hazard within the road environment
- so that it is visible from the stem of a T-intersection.

The definition of Sight Distance in the Guide to Road Design, Part 3 (Austroads, 2016) is the distance that must be provided to "enable drivers to perceive and react to any hazardous situation". Sight Distance including Stopping Sight Distance (SSD) and Approach Sight Distance (ASD) for an intersection is dependent on the operating speed of the road, road gradient and other road characteristics.



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The application of this definition requires an unobstructed line-of-sight between the road feature, object or hazard and a vehicle located at the relevant minimum sight distance. When considering the SSD and ASD requirements along Old Windsor Road, it is noted that the signs are elevated above the roadway and therefore cannot interfere with the line-of-sight as relevant to the first two dot points of this criterion.

Notwithstanding the above, a design speed of 90km/h (noting posted speed limit of 80km/h) has been used to calculate the maximum SSD and ASD. Referencing the Supplement to Austroads Guide to Road Design Part 3 (TfNSW, August 2017), TfNSW practice is to use a 1.5 second reaction time for speeds of 90km/h and below. Based on this, the applicable SSD for Old Windsor Road is 126 metres. The SSD would reduce with corresponding speed limit reductions and/ or congestion.

TfNSW clarified that application of Criteria 3.2.3 requires SSD to be measured horizontally in the direction of travel back from the stop line. As such, the first two points of Criteria 3.2.3 apply to the south facing sign given it is located approximately 50 metres from the relevant stop line. The view of the south facing sign at the SSD from the stop line is shown in Figure 9.

Figure 9: Southbound drivers' view at SSD from Norbrik Drive intersection



Although the south facing sign is within the SSD from the intersection, given the static nature of the sign and straight alignment of the road, it is not anticipated that the sign compromises road safety at this location.

The north facing sign is within the SSD for the merge point between southbound vehicles on Old Windsor Road and vehicles turning left out of Norbrik Drive. The sign is located approximately 100 metres up stream of the merge point and therefore the first two points of Criteria 3.2.3 also apply to the north facing sign. The view of the north facing sign at the SSD from the merge point is shown in Figure 10.



Figure 10: Southbound drivers' view at SSD from southbound merge point



Although the north facing sign is within the SSD from the intersection, given the static nature of the sign and straight alignment of the road, it is not anticipated that the sign compromises road safety at this location. Furthermore, the north facing sign is only visible for the 20 metres of the SSD before it is out of sight.

b) The placement of a sign should not distract a driver at a critical time. In particular, signs should not obstruct a driver's view:

- of a road hazard
- to an intersection
- to a prescribed traffic control device (such as traffic signals, stop or give way signs or warning signs)
- to an emergency vehicle access point or Type 2 driveways (wider than 6-9m) or higher.

A “critical time” is interpreted as a point in time when a driver decision is required, implying that a road safety implication could occur if a driver was distracted at this time. The signs are fixed to the overhead pedestrian bridge and therefore do not obstruct a driver's view of any road hazards, intersections, traffic control devices or accesses.

Criteria 3.2.4 – Sign Spacing

A highly cluttered visual field makes it difficult to locate and prioritise driving-critical information, e.g. regulatory and advisory signs and traffic control devices. The proposed site should be assessed to identify any road safety risk in relation to visual clutter and the proximity to other signs.

The closest advertising sign is currently located 260 metres north of the existing subject signs, however, is offset from the carriageway and generally shielded by the existing vegetation. Furthermore, various regulatory and advisory warning signs are present within proximity of the subject signs. These signs include clearway signage, no left/ right turn signs, advisory signage regarding unauthorised use of the Transitway and directional signage to Norwest Private Hospital.

Notwithstanding the existing signage does not demand attention away from the critical road signs and sign spacing is considered appropriate.

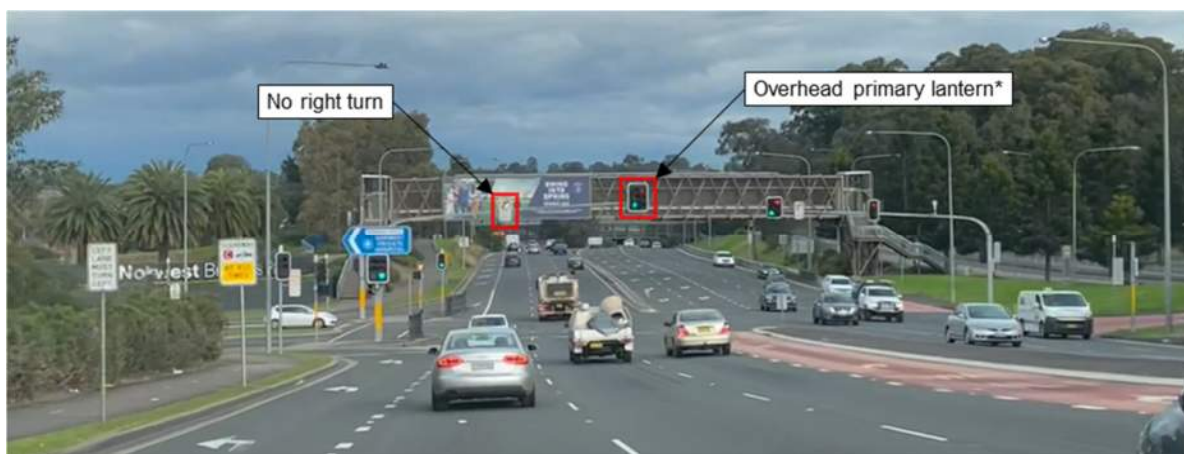
3.2 Sign Design and Operation Criteria (NSW Guidelines Section 3.3)

Criteria 3.3.1 – Advertising Signage and Traffic Control Devices

a) The advertisement must not distract a driver from, obstruct or reduce the visibility and effectiveness of, directional signs, traffic signals, prescribed traffic control devices, regulatory signs or advisory signs or obscure information about the road alignment.

The north facing advertising sign backdrops the overhead primary traffic signal lantern and no right turn sign on the Old Windsor Road southbound approach to the Norbrik Drive intersection as shown in Figure 11. It should be noted that the traffic signal lantern and no right turn sign are only backdropped by the sign briefly.

Figure 11: Southbound overhead primary lantern backdropped by north facing sign



* The overhead lantern is backdropped by the advertising sign when travelling in the central and right-hand lanes

Given the static nature of the sign, the traffic signals would remain more prominent than the advertising sign. It is important to note that there are also other primary, secondary and tertiary



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lanterns and no right turn signs which are visible to southbound drivers in addition to the backdropped lantern and sign. During the previous assessment of the signage installation in 2010 TfNSW (formerly Roads and Traffic Authority) considered this issue and indicated the traffic signal arrangement was satisfactory in relation to the advertising signage.

It is noted that there are various signs on approach to both advertising signs along Old Windsor Road, as shown in Figure 12 and Figure 13. These include clearway signage, intersection direction signs, turning restrictions onto the Transitway and camera enforcement for unauthorised access to the Transitway. Although these are within the readable distance of the advertising signs, it is not expected that the advertising sign reduces the effectiveness of these signs.

Figure 12: Existing road signs on approach to north facing advertising sign



Figure 13: Existing road signs on approach to the south facing advertising sign



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b) The advertisement must not interfere with stopping sight distance for the road's design speed or the effectiveness of a prescribed traffic control device. For example:

- Could the advertisement be construed as giving instructions to traffic such as 'Stop', 'Halt' or 'Give Way'?
- Does the advertisement imitate a prescribed traffic control device?
- If the sign is in the vicinity of traffic lights, does the advertisement use red, amber or green circles, octagons, crosses or triangles or shapes or patterns that may result in the advertisement being mistaken for a traffic signal?

The operator would be responsible for ensuring that the signage content, including any future content, complies with this requirement. It is assumed that advertising content would comply with this criterion so as to not mislead drivers.

Criteria 3.3.3 – Illumination and Reflectance

Illumination and reflectance criteria for non-digital signs:

The following criteria apply to non-digital illuminated signs, including conventional billboards illuminated by fluorescent and/or incandescent bulbs whether internally illuminated or lit from the exterior:

- a. Advertisements must comply with the luminance requirements in Table 5 below.*
- b. For night time use, the sign (whether internally illuminated or lit from its exterior) must not cast a shadow on areas that were previously lit and that have a special lighting requirement, e.g. pedestrian crossings.*
- c. The light sources for illuminated signs must focus solely on the sign and:*
 - i. be shielded so that glare does not extend beyond the sign*
 - ii. with the exception of back lit neon signs, have no light source visible to passing motorists with a light output greater than that of a 15W fluorescent/LED bulb.*
- d. The level of reflectance of an advertisement, and its content, is not to exceed the 'Minimum coefficients of Luminous intensity per unit area for Class 2A Material', as set out in Australian Standard AS/NZS 1906.1:2007. Flashing illuminated advertisements will not be approved.*

The operator would be responsible for ensuring that the signs comply with this requirement. It is assumed that this operational requirement would be met.



Criteria 3.3.4 – Interaction and Sequencing

a) The advertisement must not incorporate technology which interacts with in-vehicle electronic devices or mobile devices. This includes interactive technology or technology that enables opt-in direction communication with road users.

It is understood that the signs currently do not and will not incorporate technology which interacts with in-vehicle electronic devices or mobile devices. The operator would be responsible for ensuring that the signs continue to comply with this requirement.

b) Message sequencing designed to make a driver anticipate the next message is prohibited across images presented on a single sign and across a series of signs.

The operator would be responsible for ensuring that the signs comply with this requirement. Noting that the signs are static signs with no nearby advertising signage that could be used to create a message sequence.



4 Conclusion

The consent for the existing illuminated signage on the Old Windsor Road pedestrian bridge near Norbrik Drive at Bella Vista has lapsed. Mulpha Norwest have engaged Calibre Professional Services Pty Ltd to complete a new development application to re-consent the existing signs. The existing signs are visible to both northbound and southbound traffic on Old Windsor Road, with restricted visibility from the Northwest Transitway and Norbrik Drive.

The existing signage has been assessed against the current requirements for outdoor advertising as outlined in the Transport Corridor Outdoor Advertising and Signage Guidelines, Assessing Development Applications under SEPP 64 (NSW Government Department of Planning, 2017).

Historic crash data for the past five years indicates a total of nine crashes occurred within the signage exposure distance, with six of these being rear-end crashes. It is noted that rear-end crashes are typical at major road intersections that are prone to congestion. There were no other observable crash trends indicating an existing road safety issue near the existing signs and there is no evidence that the signs have any adverse impact on road safety. Further, it is noted that internationally, no empirical studies conducted to date have shown a causal link between advertising signage and road safety statistics.

There are several assessment criteria that relate to the operation of the installation. These are typically included as conditions of approval and Council would be responsible for ensuring that the installation complies with these conditions.

Based on the analysis and discussions presented within this report, it is our professional opinion as road safety professionals that the proposal can be supported on road user safety grounds.

