

Technical Memorandum

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| Subject | Traffic and Transport Review | | |
| Client | Harley Dykstra | Project No. | CW1154600 |
| Date | 27/11/2020 | Status | A |
| Author | Brian Sii | Discipline | Traffic and Transport |
| Reviewer | Scott Lambie | Office | Perth |

1 Introduction

Cardno was commissioned by the Harley Dykstra to review and assess the recommended condition by the Shire of Serpentine-Jarrahdale, for the proposed development applications at Lot 101 and 132 Boomerang Road. The recommended *Condition* states the following:

“Within six months of the date of approval, the section of Boomerang Road from the property entrance to the intersection with King Road being upgraded to a minimum bitumen sealed width of 7m, with 1m gravel shoulders, to the satisfaction of the Shire of Serpentine Jarrahdale. Plans and specifications depicting the road upgrade are to be submitted to and approved by the Shire of Serpentine Jarrahdale within three months of the date of this approval, to allow completion of the road upgrade within the following three months, in order to meet the six month timeline.”

It is noted that the Shire has met with the planner and agreed that partial upgrades to Boomerang Road could be accepted with further technical study.

This technical note has been prepared to discuss the operation and upgrading requirements of Boomerang Road in respect to the proposed development.

2 Existing Road Condition

2.1 Road Condition

The existing Boomerang Road, between King Road and the Site access, has a road reserve width of 20m, with approximately 4m of sealed carriageway and 2m of unsealed shoulder on both sides of the road. During Cardno's site visit. It was observed that the existing sealed carriageway edge is showing signs of damage at various locations along the road section. An example of the damaged carriageway edge is shown in **Figure 2-1**.

Figure 2-1 Damaged Carriageway



2.2 Road Hierarchy and Posted Speed

In reference to the Main Roads WA Road Information Mapping System, Boomerang Road is marked as Access Road, with the default speed limit (Grey zone). As the surrounding land environment of the road is not considered as built-up, and with the lack of posted speed limit signs along the road, Boomerang Road is defaulted to a speed limit of up to 110km/h. Observed behaviour of the road users noted vehicle speeds of above 80km/h as typical.

2.3 Existing Traffic Volume

Due to the lack of traffic volume data available publicly, Cardno conducted a manual traffic count along Boomerang Road on the 24th of November 2020 for both AM peak (7:30am-8:30am) and PM peak (4:30pm-5:30pm). The observed traffic volume data is summarised below:

| Peak Period | Eastbound | Westbound | Total |
|---------------------------|-----------|-----------|-------|
| AM Peak (7:30am – 8:30am) | 13 | 24 | 37 |
| PM Peak (4:30pm – 5:30pm) | 18 | 34 | 52 |

Conservatively, the observed peak hour volume could be derived into an expected Daily Traffic Volume of approximately **450VPD**. It was noted during the site visit that a traffic counter had been deployed along Boomerang Road, though it had been installed at the Gossage Road end of Boomerang Road – outside of the road section identified within the Shires approval condition.

3 Traffic Assessment

3.1 Constrained Low Traffic Situations

According to *Austrroads Guide to Road Design Part 3, Table 4.5* and Main Roads WA Supplementary documents, it is noted that a road which carries an average traffic volume of less than 150AADT could be identified as a “Constrained Low Traffic condition”, and could have a minimum single carriageway road width of 3.7m, as shown in **Figure 3-1**.

Figure 3-1 Single Carriageway Rural Road Width

Table 4.5: Single carriageway rural road widths (m)

| Element | Design AADT | | | | |
|---|------------------|------------------|--------------------------|------------------|------------------|
| | 1–150 | 150–500 | 500–1000 | 1000–3000 | > 3000 |
| Traffic lanes ⁽¹⁾ | 3.7 (1 x 3.7) | 6.2 (2 x 3.1) | 6.2–7.0 (2 x 3.1/3.5) | 7.0 (2 x 3.5) | 7.0 (2 x 3.5) |
| Total shoulder | 2.5 | 1.5 | 1.5 | 2.0 | 2.5 |
| Minimum shoulder seal <small>(2),(3),(4),(5),(6)</small> | 0 | 0.5 | 0.5 | 1.0 | 1.5 |
| Total carriageway | 8.7 | 9.2 | 9.2–10.0 | 11.0 | 12.0 |

The existing traffic volume surveyed by Cardno indicates that the existing Boomerang Road appears to potentially be carrying approximately 450 vehicle per day, a volume significantly higher than the 150 AADT threshold for the “Constrained Low Traffic condition” even before the inclusion of any additional traffic generation of the proposed development. As such, it can be suggested that need / nexus for the upgrading of Boomerang Road to at least 6.2 metres of sealed carriageway already exists and should not be attributed to the proposed development.

3.2 Traffic Safety

As mentioned within section 2.2, during the site visit, it was observed that majority of vehicles were travelling along Boomerang Road at a high speed. Occasionally, when two vehicles travelling in opposing directions would meet within the road section, both vehicles would adjust their speed and move further left onto the unsealed shoulder to allow each other to pass.

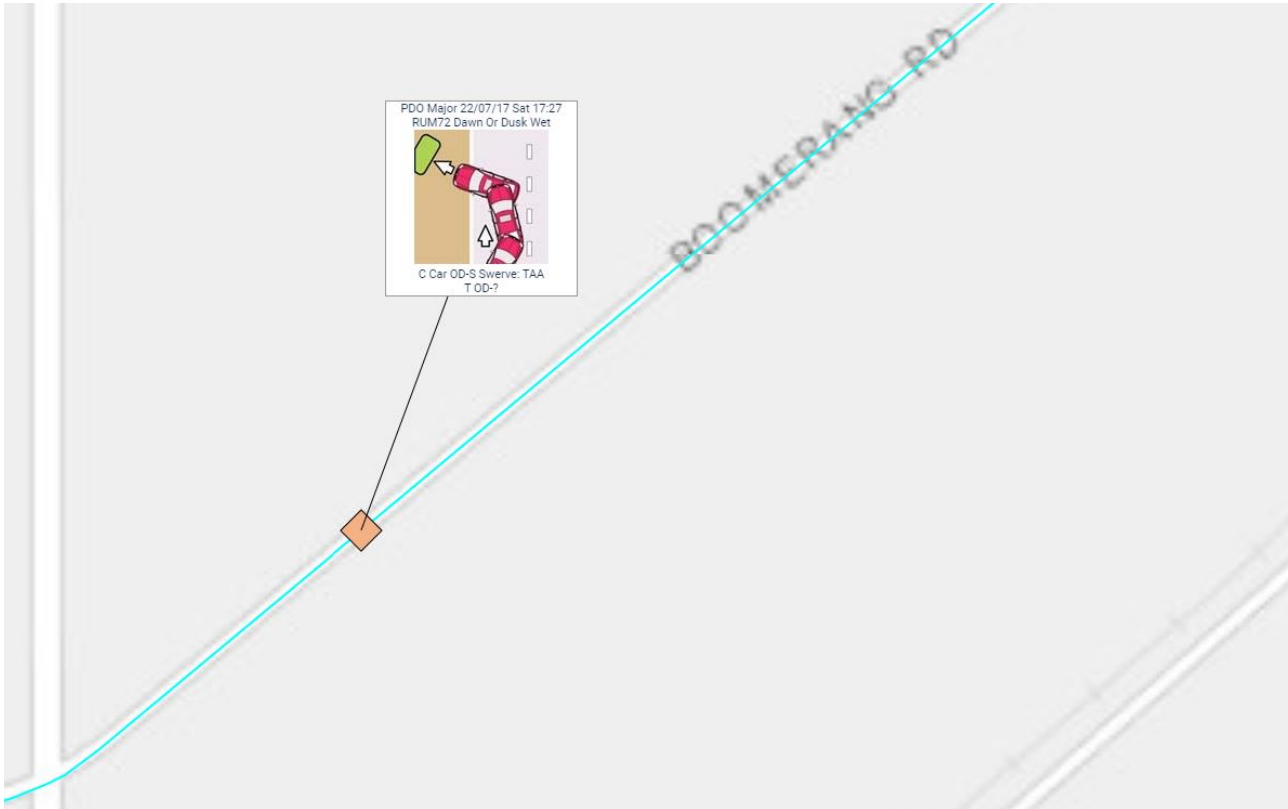
The subject road section is relatively straight with minimum vertical displacement, which provides drivers from both directions with excellent line of sight. This allows drivers sufficient reaction time when an opposing vehicle is observed. As such, no significantly hazardous behaviour by drivers was noted

Although the rare interaction between opposing drivers and their courteous behaviour indicates that the road environment is currently sufficient to accommodate the existing traffic volume along Boomerang Road safely, full upgrade to the road should be considered to improve road safety.

A review of the most recent 5-year crash history shows a single ‘Property Damage Only’ crash being recorded within the relevant Boomerang Road section. The crash has been reported as occurring late afternoon in July 2017 during wet conditions. The crash involved only a single vehicle and has been identified as “Swerving: To Avoid Animal”. There is insufficient evidence to indicate whether this crash could have been avoided had a 7.0m wide sealed pavement width existed.

As such, there does not appear to be any indication by crash history that Boomerang Road is a significant safety concern.

Figure 3-2 5 year Crash diagram



(source – Main Roads WA)

3.3 Proposed Development Traffic Generation

As addressed in the TIS, the proposed development is expected to generate up to 28VPD (Worst Case scenario), with a more likely average traffic generation of 40 vehicles per week (8VPD). This indicates that the traffic generated by the proposed development (some of which is existing) would only contribute less than 6.5% of the existing traffic along Boomerang Road. Under the WAPC Transport Assessment Guidelines for individual developments, developments that generate such a low traffic volume are noted to be unlikely to result in adverse transport impacts on the surrounding area.

4 Proposed Road Upgrade

4.1 Widening of Entire Road Section

As discussed in **Section 3**, it is noted that the existing road standard (width) of Boomerang Road does not comply with current Austroads design requirements under its current traffic conditions. With the road widening of Boomerang Road between King Road and the site access being proposed, there does not appear to be any need / nexus demonstrated that shows that the owner of the subject site should be wholly responsible for the road upgrade cost. A more equitable method of funding the road upgrade would be the creation of a contribution scheme where owners of developing sites contribute a proportion of the road upgrade cost, on a pro-rata basis between to the expected traffic capacity of the upgraded road and the expected traffic generation by the proposed development.

4.2 Partial Road Section Upgrade

Due to the nature of the proposed 'Transport Depot', the number of heavy vehicles using Boomerang Road may increase slightly. To assist with heavy vehicles turning into and out of the Site, and allow vehicles to pass safely, it is suggested that the development crossover and road section 30m east and west of the crossover be upgraded to standard (7m carriageway) with compliant taper length.

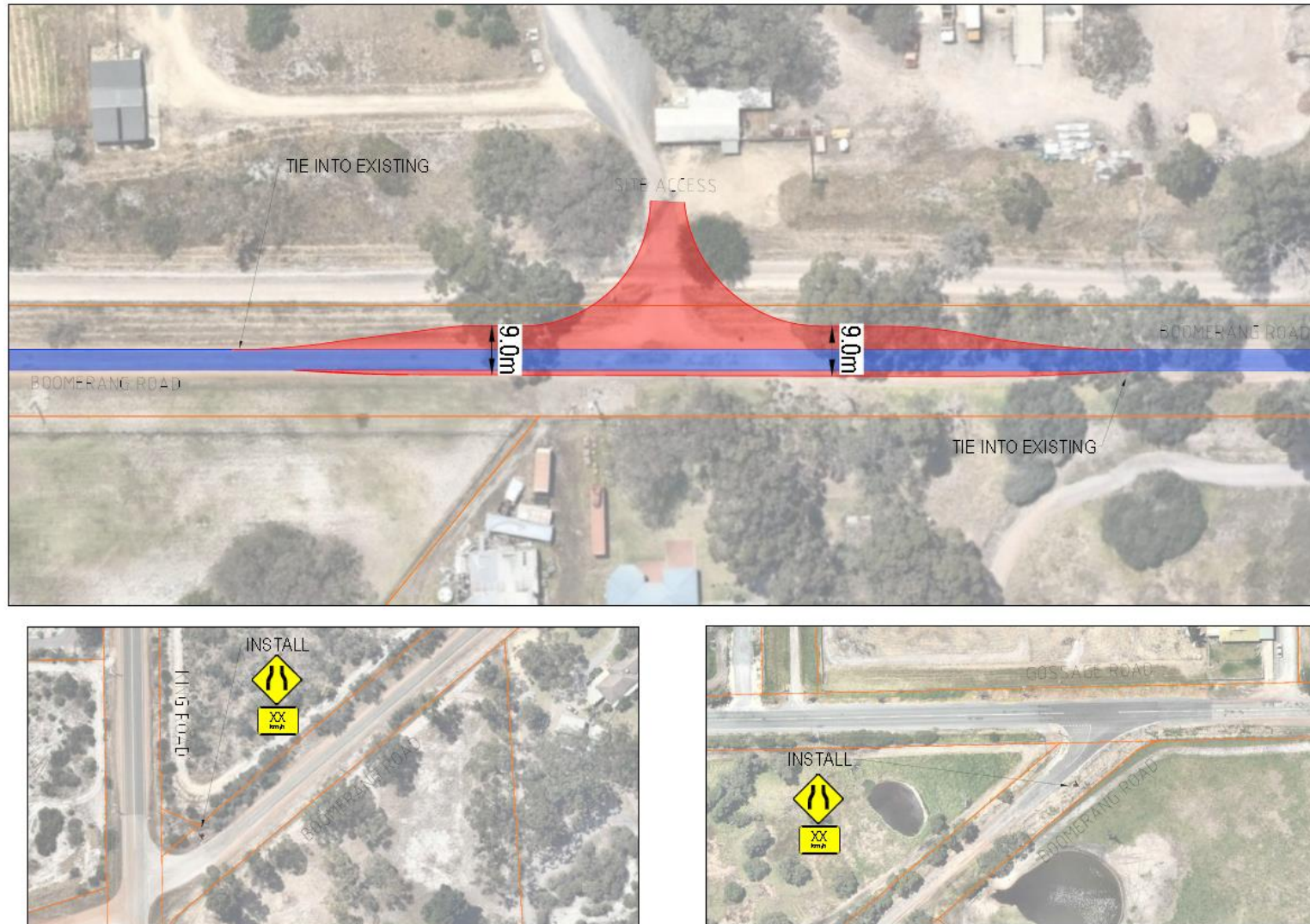
Localised widening (passing bays) have also been considered and it is believed that these would only add confusion as to "right of way" and may end up being inappropriately used.

Given the open road speed limit and a daily volume already in excess of recommended limits, it is viewed that an immediately required treatment is the installation of "Narrow Road" advisory signage to warn drivers unfamiliar with the one lane wide paved road environment. As it is unlikely that Main Roads would support a gazetted speed zone being implemented over Boomerang Road, it is considered that advisory speed drop tags of 50km/h or 60km/h could be added to the signs.

A concept sketch of the proposed road upgrade is shown in **Figure 4-1**.

Technical Memorandum

Figure 4-1 Concept Sketch



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