

INSPECTION REPORT AND RECOMMENDATION

Concept Proposal for
Wagga Wagga City Council – Dunns Road Upgrade

26 November 2018

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PART 1: WWCC CONCEPT PROPOSAL

a) Description of Work

Dunns Road is a local road 5.03km long within the City of Wagga Wagga connecting Holbrook Road (MR211) and Olympic Highway (MR78). The road is located wholly within an 80km/h speed zone and is partly within the Wagga Wagga City urban area. It is general a two lane gravel unsealed pavement with a bitumen seal around 6.0m wide for the first 1.45km, where most of the residential development occurs, and over five (5) isolated crests which are BB barrier line marked.

b) Traffic composition

The majority of the traffic for the eastern (Holbrook Road) end of the road is local residential with through traffic and some local traffic on the remainder of the route. The current AADT is around 350 with projection to 1000 in the future. Through traffic is generated by the outlying townships of Uranquinty and The Rock and the Australian Army base at Kapooka. The road is the shortest direct route from the Olympic Highway to the southern suburbs of Wagga Wagga and to the Mater Dei schools via Lloyd Road, which is the eastern extension of Dunns Road.

c) Existing Road Condition

The existing sealed sections of Dunns Road are quite narrow; the edge line and BB line marking is faded and worn and the sight distance over the crests is less than desirable. The unsealed lengths between the sealed sections comprise a loose gravel surface with creek crossings protected by steel guardfence barriers. Sight distance to property accesses is restricted, especially either side of the crests.

d) Concept Proposal

A standard complying design was originally proposed for the construction of Dunns Road, for 80k speed limit, but cost was found to be prohibitive. A simplified concept has been prepared incorporating the following:

- Construct a 250mm DGB pavement over the existing unsealed pavement material (existing pavement is assumed to be 150mm local gravel);
- Place a 6.2m wide seal over the pavement (similar to existing over crests)
- Line-mark appropriately
- Install 12 Intelligent solar powered traffic signs (two at six locations)
- Install wire rope safety fence for the total length of the existing rural section of Dunns Rd (2 x 3300m)
- Install roundabout at Holbrook Rd intersection
- Install appropriate intersection treatment at Olympic Highway
- Seek agreement from RMS to reduce speed limit to 60k based on recognised safety concerns along Dunns Road (this will be necessary as sealing the existing vertical geometry would not meet current design speed requirements for 80k speed limit)

PART 2: RMS REVIEW OF CONCEPT PROPOSAL

a) Pavement

The proposed 250mm DGB pavement over the existing unsealed pavement is considered sufficient for the projected traffic volumes and composition. A pavement investigation would need to be undertaken to determine the strength of the existing local gravel and for shoulder widening associated with the overlay.

b) Seal width of 6.2m (similar to existing)

The seal width between edge lines should be at least 6.5m with 0.5m-1.0m sealed shoulders with a 0.5m verge.

c) Linemarking

Edge line marking is recommended with S1 and BB lines as required.

d) Intelligent Solar Powered Traffic Signs

Installation and maintenance of 12 solar powered signs would be quite expensive and prone to vandalism. If the road is aligned, signposted and line marked correctly they are probably not necessary.

e) Wire Rope Safety Barrier

Installation of a wire rope safety barrier over the rural sections is not considered necessary. Steel barriers with appropriate end terminals will be required over the drainage structures, but with relocation of some utilities, tree removal and flattening of batters, additional barriers will not be required.

f) Roundabout at Holbrook Road

A roundabout at Holbrook Road should be considered when traffic volumes increase in the future.

If the speed limit on Dunns Road and Lloyd Road is posted at 60km/h for the urban length of both, then the safety of the intersection, especially in the approaches to Holbrook Road, would be enhanced.

g) Intersection with Olympic Highway

An appropriate intersection treatment with Olympic Highway would be a CHR (S). A re-alignment to square up Dunns Road may be required.

h) Reduced Speed Limit

The speed limit on Dunns Road (and Lloyd Road) urban sections could be reduced to 60km/h. The remaining rural section should remain at 80km/h as it would be difficult to justify or police a lower speed limit where the frequency of access points is low.

PART 2: RMS CONCEPT RECOMMENDATION

An assessment was made of the existing road condition and the following is recommended:

a) Pavement and Seal Width

A cross section comprising 2/3.25m lanes and 2/1.0m shoulders (0.5m sealed) is proposed.

b) Drainage

A review of the existing drainage has revealed the following:

- (i) Culvert at 0.46km (concrete box.) – Requires widening or driveable headwalls.
- (ii) Culvert under Lilli Pilli Place (concrete box) – Requires driveable headwalls.
- (iii) Culvert at 1.075km (concrete box.) – Requires widening or driveable headwalls.
- (iv) Culvert under Kunzea Place (small dia) – may need a capacity assessment as table drain is scoured either side.
- (v) Culvert at 1.8km (1200 dia. Concrete) – Requires widening on the left and new headwalls and barriers.
- (vi) Culvert at 1.9km (1200 dia. conc. 8.3m between barriers) – Will require widening and new barrier system.
- (vii) Culvert at 2.47km (1200 dia. corrugated steel 9.5m between barriers) – No headwalls. This culvert has failed in the centre and will require replacement with a concrete pipe.
- (viii) Culvert at 3.0km (2/600 dia. conc. 12.6m between headwalls) – Requires new barrier system.
- (ix) Culvert at 3.6km (1500 dia. corrugated steel 7.5m between barriers) – Will require widening and a new barrier system.
- (x) Culvert at 4.05km (450 dia. 9.4m wide, silted) – Will require widening and clean out.
- (xi) Cutting at 4.4km – Requires widening and longitudinal drainage (possibly SO gutter)
- (xii) Culvert at 4.8km (450 dia. 9.6m wide) – Will require widening.

Existing transverse drainage lines will require assessment to prevent scour and sedimentation (evident throughout site). Inlet and outlet drains should be graded to existing creek beds to remove bunds at property boundaries. A review of culvert hydraulics, and erosion and sedimentation control measures should also be undertaken.

c) Horizontal Alignment

- (i) Section 1 – 0.00 (Holbrook Road) to 1.78km – Bitumen seal 6.2m wide with S1 linemarking and BB lines and E1 lines over the crest at 1.7km.
This section of Dunns Road has 14 individual property accesses and 3 local street intersections. There are reverse curves near the Kunzea Place intersection which have 45km/h and slippery road warning signs. This “wobble” could be removed if the power pole at 1.25km was relocated. A left hand curve at the crest could also be eliminated by relocating the power poles at 1.46km and 1.67km (see utilities section)
- (ii) Section 2 – 1.78km to 2.05km – Unsealed gravel pavement approx. 7m wide.
The culverts at 1.8km and 1.9km could be widened and the alignment shifted right to remove the reverse curves between 1.9km and 2.05km and align with section 3.
- (iii) Section 3 – 2.05km to 2.37km – Bitumen seal 6.2m wide with S1, BB (crest) and E1 linemarking. There is 1 property access on the left at 2.1km.
Widening on right to achieve cross section widths in (a) above.
- (iv) Section 4 – 2.37km to 2.64km - Unsealed gravel pavement approx. 7m wide.
The alignment could be improved by widening the culvert at 2.47km on the left and shifting the road alignment left to align with section 5.

- (v) Section 5 – 2.64km to 2.86km - Bitumen seal 6.2m wide with S1, BB (crest) and E1 linemarking. There are 2 property accesses at 2.73km left and 2.77km right. The access at 2.77km right has inadequate sight distance to the east and could be moved 30m east for safer intersection sight distance. Widening on the right is recommended as the left side is close to the road boundary. This would entail removal of 8 or 9 mature trees and some saplings.
- (vi) Section 6 – 2.86km to 3.23km - Unsealed gravel pavement approx. 7m wide. Widening on the right from 2.86km to the culvert at 3.0km is recommended, cross the culvert in the centre, then widen to the right to align with section 7 widening. Approximately 6 mature trees will need to be removed. There is a property access at 2.95km right and another at 3.18km left.
- (vii) Section 7 – 3.23km to 3.41km - Bitumen seal 6.2m wide with S1, BB (crest) and E1 linemarking. Widening on the right to avoid adjacent property boundary on the left. Approximately 6 mature trees will need to be removed.
- (viii) Section 8 – 3.41km to 3.72km - Unsealed gravel pavement approx. 7m wide. Widen on right from 3.41km to culvert at 3.6km. Widen culvert to the left and continue widening on the left to align with section 9. One very large tree adjacent to the culvert will need to be removed along with 4 mature trees on the right. Property access on left at 3.72km.
- (ix) Section 9 – 3.72km to 3.90km - Bitumen seal 6.2m wide with S1, BB (crest) and some E1 linemarking. Widening to left recommended to avoid large trees and cutting on the right. Removal of 2 mature trees on the left will be necessary.
- (x) Section 10 – 3.90km to 4.74km - Unsealed gravel pavement approx. 7m wide. Widening on left to the cutting at 4.3km then, raise the pavement levels through the cutting to achieve a 7.5m sealed width adjacent to SO gutter on both sides. From 4.47km (approx.) widen on left to align with section 11.
- (xi) Section 11 – 4.74km – 5.03km - Bitumen seal 6.2m wide with no S1, some BB (intersection) and no E1 linemarking. Moving the intersection with Olympic Highway around 80m to the north will provide an improved alignment, safer intersection sight distance to the south and a greater separation (240m) from the accesses immediately to the south of the existing intersection. A CHR (S) type intersection is recommended for Olympic Highway/Dunns Road. Re-alignment of Dunns Road to intersect at right angles with Olympic Highway is recommended. This would involve 185m of new formation and approximately 0.6ha of property acquisition of which 0.25ha could be disposed of to the adjoining owner.

d) Vertical Alignment

There are 4 crests with restricted sight distance:

1. At 2.2km - Stopping Sight Distance $1.1m - 0.2m = 90m$ (80km/h); $1.1m - 1.1m = 140m$
2. At 2.75km - Stopping Sight Distance $1.1m - 0.2m = 60m$ (60km/h based on a reaction time of 1.5 sec.); $1.1m - 1.1m = 90m$
3. At 3.8km - Stopping Sight Distance $1.1m - 0.2m = 80m$ (70km/h); $1.1m - 1.1m = 110m$
4. At 4.3km - Stopping Sight Distance $1.1m - 0.2m = 70m$ (60km/h); $1.1m - 1.1m = 100m$

Given the undulating terrain and low traffic volumes a reaction time of 1.5 seconds has been adopted. It would be expected that an object on the roadway could be avoided by weaving once the widening work is completed. Shoulder widening to 2.0m (sealed) at the crests would provide a safer manoeuvring area. Sight distance vehicle/vehicle is sufficient for 80km/h design speed.

Generally, the vertical alignment could remain as is, except for the following:

- (i) A 250mm DGB pavement overlay of the unsealed sections.
- (ii) Through the cutting between 4.3km and 4.47km (approx.) trim the cutting and raise the pavement levels sufficiently to provide a clear width of 10.5m (batter toe to batter toe) to include a 7.5m seal (linemarked to 6.5m), 2 X 1.0m SO gutters and 2 X 0.5m berms behind the gutters. This would also increase stopping sight distance at crest 4 above.
- (iii) Alignment as required to connect to new intersection with Olympic Highway.

e) Utilities

The following power line adjustments are required:

- (i) Between 0.0km (Holbrook Road) and 1.25km the power line is adjacent to the existing road and approx. 4m – 5m from the edge of the through lane. This is acceptable provided that the speed zone in this section is reduced to 60km/h
- (ii) Power poles at 1.22km, 1.46km, 1.66km and 2.68km are required to be relocated to provide a 5.0m clear zone and allow for formation widening.

f) Safety Barriers

New steel safety barriers with appropriate terminals are required at all larger culvert structures.

g) Vegetation

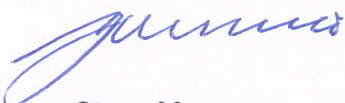
Approximately 25-30 mature trees would need to be removed to allow for formation and culvert widening work.

h) Signposting and Linemarking

The following signs will be required to be relocated or installed:

- (i) Crest warning signs at all 4 sight restricted crests detailed in (d) above. Additional 60km/h warning signs should be placed on the signs for crest 2.
- (ii) The "Reduce Speed" and Give Way Ahead and Give Way signs on the western approach to Holbrook Road should remain as is. The existing "Rumble Strips" should also remain or be replaced.
- (iii) 60km/h signs will be required to delineate the new lower speed limit up to Kunzea Place.
- (iv) "Concealed Driveway" signs where property accesses are located at crests.
- (v) T Junction warning and Give Way signs at intersection with Olympic Highway.
- (vi) Linemarking on Dunns Road should include S1, E1 and BB lines.

Concept sketches and photographs are attached.



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