

Mundamia Urban Release Area Assessment

Development Scenarios Assessed:

- **Scenario 1** – 2009 conditions, based on 2009 tube counts & 2008 turning movement counts factored up to 2009 levels where appropriate
- **Scenario 2** – 2021 forecast conditions with West Nowra urban infill & Cabbage Tree Lane large-lot rural development ONLY (ie no additional proposed subdivisions being released) – assumes that all vacant allotments in existing urban area will be developed (ie 344 additional dwellings)
- **Scenario 3** – 2021 forecast conditions with West Nowra infill (as per Scenario 2), plus FULL DEVELOPMENT of the Mundamia urban release area (ie 510 dwellings) – this also includes provision of a neighbourhood shopping centre & child care facility in Mundamia
- **Scenario 4** – 2031 forecast conditions with West Nowra infill, Mundamia urban release area (as per Scenario 3) plus FULL DEVELOPMENT of the Cabbage Tree Lane urban release area (ie 1805 dwellings) – this also includes the provision of a new primary school (500 students) and a neighbourhood shopping centre (5,000m² GFA) east of Flatrock Road
- **Scenario 5** – 2041 forecast conditions with West Nowra infill, Mundamia & Cabbage Tree Lane urban release areas (as per Scenario 4) plus FULL DEVELOPMENT of the Bamarang urban release area (ie 2134 dwellings).

Note that 2021 was chosen as the first forecast year as it is based on a projection of at least 10 years from the time of the analysis, and coincides with a Census collection year for which future TRACKS model projections are based on. For detailed assessment of specific subdivisions undertaken by Council, the analysis would be based on a 10-year projection from the year the application is submitted.

All the above future development scenarios assumed compound growth of existing traffic movements to account for background growth; at a rate of 2% p.a. on Albatross Road adjacent to Yalwal Road, and a rate of 3% p.a. on Albatross Road and Berry St at the intersection of these roads. The higher growth rate of 3% was used to account for slightly higher expected growth at this location on the fringe of the Nowra CBD.

All growth assumed on Yalwal Road is directly attributable to the development proposals outlined in each of the Scenarios. Diagrams showing projected average weekday volumes are provided in Appendix A at the end of this report.

Analysis on future infrastructure requirements has been undertaken using intersection and road link capacity as the performance measure. The projected traffic volumes were analysed with Sidra Intersection, with the following thresholds being used to determine when intersections required upgrading:

- For priority-controlled (ie unsignalised) intersections the target was Level of Service (LOS) “D” based on RTA’s Guide to Traffic Generating Development, which equates to worst-movement delays of 43-56 seconds

- For roundabouts a Degree of Saturation (DOS) of 0.85 was used, which is recommended in Sidra to be the theoretical “practical capacity” of a roundabout
- For traffic signals a DOS of 0.90 was used, which is recommended in Sidra to be the theoretical “practical capacity” of traffic signals

Findings of the Intersection & Lane Capacity Assessment Has Shown:

Scenario 1 – Existing (2009) traffic volumes

- Traffic volumes on Yalwal Road between Depot Road and Albatross Road exceed the RTA’s maximum environmental capacity threshold for a collector road
- Modelling of the intersection at Yalwal Road & Albatross Road indicates that traffic flows on Albatross Road are resulting in the Give-Way sign-controlled junction to operate at or below LOS D during the PM peak – consideration should be given to upgrade this intersection to traffic signals as conditions will continue to deteriorate under the ongoing growth
- Traffic volumes on Yalwal Road between Lightwood Drive and Albatross Road are approaching the limit threshold for road traffic noise under the EPA’s ECRTN
- Traffic volumes on Albatross Road exceed the RTA’s maximum environmental capacity threshold for a collector road
- Traffic volumes on Albatross Road between Yalwal Road and Berry Street indicate that side road sign-controlled intersections (ie Maclean Street, McDonald Avenue & Albert Street) are operating at or below LOS D during both the AM and PM peaks (particularly during the PM peak)
- Traffic volumes on Albatross Road are already exceeding the threshold for road traffic noise under ECRTN
- Traffic volumes on Albatross Road between McDonald Street & Berry Street exceed the Austroads target threshold for upgrade to two-lanes two-way (ie four lanes required to be provided)

Scenario 2 – 2021 Infill development only

- Traffic volumes on Yalwal Road between Rannoch Drive and Albatross Road exceed the RTA’s maximum environmental capacity threshold for a collector road
- Traffic volumes on Yalwal Road between Depot Road and Albatross Road exceed the threshold for road traffic noise under ECRTN
- Traffic volumes on Albatross Road between Yalwal Road & Berry Street exceed the Austroads target threshold for upgrade to two-lanes two-way (ie four lanes provided) – consideration should be given to provide a two-lane roundabout at the intersection of Albatross Road and McDonald Avenue, with Albert Street & Maclean Street restricted to left-in left-out access
- Traffic volumes on Albatross Road will have significantly breached the practical capacity threshold for the single lane roundabout at the intersection of Albatross Road & Berry Street – upgrade to traffic signals may be required as practical capacity is to be reached only a few years after 2009

Scenario 3 – 2021 Infill & Mundamia release

- Traffic volumes on Yalwal Road between George Evans Road and Albatross Road exceed both the RTA's maximum environmental capacity threshold for a collector road and the threshold for road traffic noise under ECRTN
- Traffic volumes on Yalwal Road between Depot Road and Albatross Road indicate that Lightwood Drive is operating at or below LOS D during peak periods – intersection upgrade to a roundabout should be considered
- For purposes of comparison, traffic volumes on Albatross Road between Yalwal Road and Berry Street are above traffic volumes observed in 2009 on Illaroo Road
- Traffic volumes on Albatross Road well exceed the practical capacity threshold for the single lane roundabout at the intersection of Albatross Road & Berry Street – upgrade to traffic signals should be considered

Scenario 4 – 2031 Scenario 3 + Cabbage Tree release

- Traffic volumes on Yalwal Road from west of George Evans Road to Albatross Road exceed the Austroads target threshold for upgrade to two-lanes two-way (ie four lanes provided) – the existing two-lane bridge across Flat Rock Dam will be a considerable choke-point unless extra lanes are provided (ie construction of a new bridge)
- For purposes of comparison, traffic volumes on Yalwal Road between George Evans Road and Albatross Road exceed traffic volumes observed in 2009 on Illaroo Road
- Traffic volumes on Yalwal Road from George Evans Road to Albatross Road well exceed the threshold where all side road sign-controlled intersections are operating at or below LOS D during peak periods – intersection upgrades to either traffic signals or roundabouts will be required on some or all of these intersections
- Traffic signals with ultimate lane configuration at intersection of Yalwal Road with Albatross Road will have exceeded capacity – northern east-west link road required to relieve traffic congestion at this intersection in order for acceptable intersection operation during peak periods
- Traffic volumes on Albatross Road are approaching the practical capacity threshold for the proposed 2-lane roundabout at McDonald Avenue – this would be relieved if northern east-west link road provided

Scenario 5 – 2041 Scenario 4 + Bamarang release

- Without northern east-west link road, traffic volumes on Yalwal Road would be approaching double the traffic volumes observed in 2009 on Illaroo Road, two-lane roundabouts would have well-exceeded the threshold for practical capacity, and traffic signals at intersection of Yalwal Road & Albatross Road would be well beyond capacity
- Without northern east-west link road, traffic volumes on Albatross Road would be more than double the traffic volumes observed on Illaroo Road in 2009, a two-

lane roundabout at the intersection of McDonald Avenue & Albatross Road (as suggested below) would be well beyond capacity, and the proposed traffic signals at the intersection of Albatross Road and Berry Street would be at the threshold of capacity

- With provision of northern east-west link road, traffic volumes on Yalwal Road will reduce to around levels at or above that observed on Illaroo Road in 2009 – ie less than Scenario 4 with no link road being provided
- With provision of northern east-west link road, traffic volumes on Albatross Road would be around 1.5 times the traffic volumes that observed on Illaroo Road in 2009, with the proposed two-lane roundabout operating within the threshold for practical capacity
- With the northern east-west link road provided, the traffic signals at the intersection of Yalwal Road & Albatross Road (with 3 × approach lanes provided on each leg) would be close to reaching practical capacity
- With provision of a southern east-west link road, traffic volumes on Yalwal Road would be somewhat less than the traffic volumes observed on Illaroo Road in 2009
- With provision of a southern east-west link road, traffic volumes on Albatross Road south of Yalwal Road would be slightly higher than the traffic volumes observed on Illaroo Road in 2009

Northern east-west link road only – effectively single lanes in each direction on Yalwal Road could be maintained up to Scenario 4 (including only single-lane roundabouts), with Scenario 5 triggering the need for four lanes

Northern & Southern east-west link roads – effectively single lanes in each direction on Yalwal Road could be maintained up to Scenario 5 (including only single-lane roundabouts)

Infrastructure Planning Recommendations

For the purposes of apportioning infrastructure needs on future development, the following separate areas could be considered:

1. **West Nowra Infill** – includes all vacant residentially-zoned land in the West Nowra Locality that would have access to Yalwal Road via Filter Road, Rannoch Drive, Glenair Avenue, Depot Road and Lightwood Drive, or proposed access to Albatross Road anywhere north of the current access to the Archer Racecourse
2. **Mundamia** – consisting of the proposed Mundamia urban release area (includes residential development plus a proposed village commercial centre), and any further development at the University of Wollongong/TAFE campus
3. **Cabbage Tree Lane** – consisting of the proposed Cabbage Tree Lane urban release area (includes residential development plus a proposed village commercial centre) and proposed separate primary school and high school

4. **Bamarang** – consisting of the proposed Bamarang urban release area (residential development only)

The following table outlines a number of potential road & intersection projects and flags which development area (outlined above) is recommended to be responsible for contributing funding towards each project.

	1 West Nowra	2 Mundamia	3 Cabbage Tree	4 Bamarang
Southern road-network in West Nowra, including internal link-roads and turn-around bay on Depot Rd	●	●		
Intersection of Yalwal & Albatross – upgrade to traffic signals with 2 × approach lanes on each leg	●	●		
Intersection of Berry & Albatross – upgrade from roundabout to traffic signals	●	●		
Albatross Road from Nowra Creek bridge to Kinghorne Street – provide two-lanes two-way	●	●		
Intersection of McDonald & Albatross – upgrade to 2-lane roundabout, restrict Albert & Maclean to left-in left-out	●	●		
Intersection of Lightwood & Yalwal – upgrade to 1-lane roundabout		●		
Intersection of Depot & Yalwal – upgrade to 1-lane roundabout		●		
Intersection of Rannoch & Yalwal – upgrade to 1-lane roundabout		●		
Intersection of Filter & Yalwal – upgrade to short CHR(S) right-turn lane		●		
Intersection of George Evans & Yalwal – upgrade to full CHR right-turn lane & 2 approach lanes on Yalwal		●		
Yalwal Road from Flat Rock Dam bridge to Albatross Road – provide two-lanes two-way (if no link roads)			●	●
Intersection of Yalwal & Albatross – upgrade signals to 3 × approach lanes on each leg			●	●
Intersection of George Evans & Yalwal – intersection upgrade (either roundabout or signals)			●	●
Northern east-west link road			●	●
Southern east-west link road			●	●
Intersection of Lightwood & Yalwal – upgrade to 2-lane roundabout (if no link road)			●	●
Intersection of Filter & Yalwal – upgrade to 2-lane roundabout (if no link road)			●	●

Southern road-network in West Nowra

Whist subdivisions have been progressively developed in the West Nowra locality, currently no area-specific DCP exists to ensure an optimum network of roads, especially in the area south of Yalwal Road.

An analysis of existing vacant residentially-zoned land indicates a potential yield in excess of 300 dwellings that can be provided in the West Nowra locality that would have access to Yalwal Road via Filter Road, Rannoch Drive, Glenair Avenue, Depot Road or Lightwood Drive, or access to the western side of Albatross Road south of Yalwal Road.

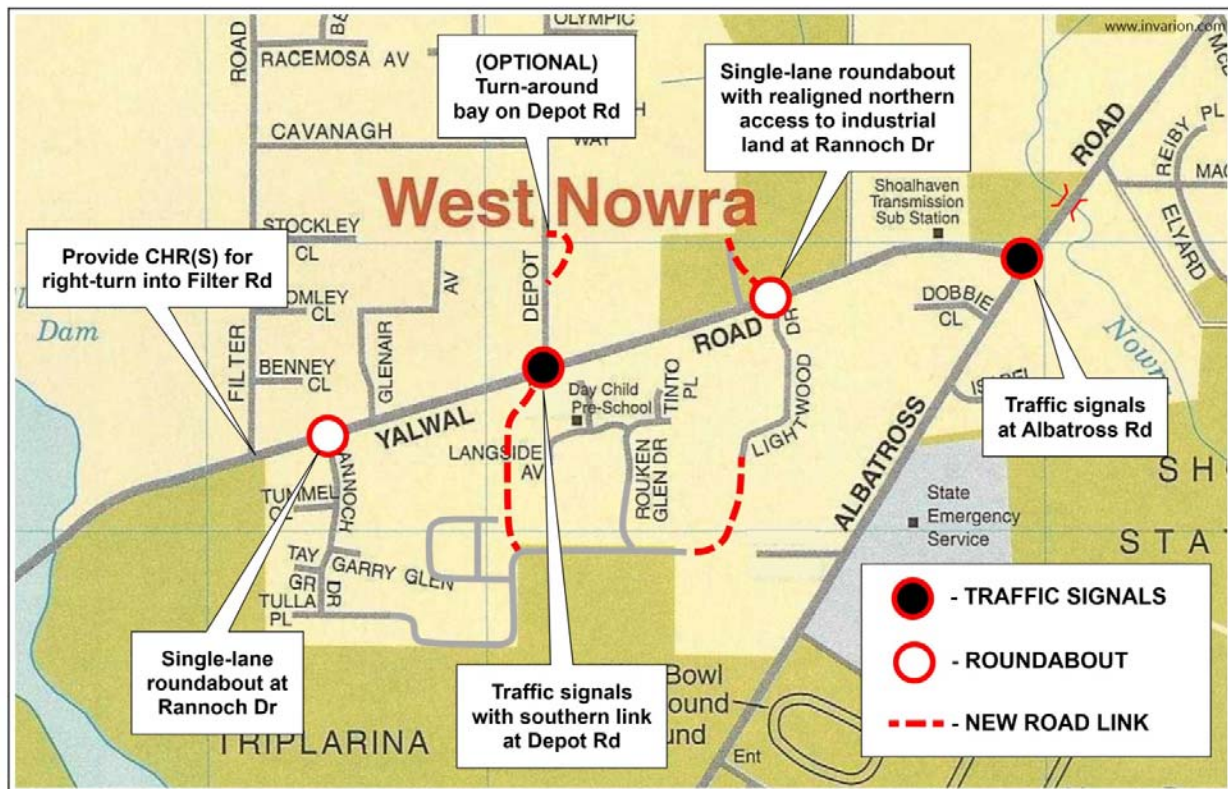
It is considered essential for a DCP to be imposed on this area if Council plans to release approximately 4,500 new dwellings to the west as indicated in the Nowra-Bomaderry Structure Plan to ensure the existing and new residents of the West Nowra locality do not suffer from substantially-reduced amenity and/or road safety if the current uncoordinated approach to the road network continues.

The objectives of the DCP should include:

- An optimal road network that provides efficient links to primary collector roads whilst minimising conflicts on Yalwal Road and Albatross Road
- Any new collector-function roads should have minimal accesses to residential properties
- Additional efficient links should be established to compliment proposed intersection upgrades on Yalwal Road (ie roundabouts, traffic signals) to supplement left-in left-out restrictions being placed on Glenair Avenue & improve access options for properties directly fronting Yalwal Road
- Safe and efficient pedestrian/cyclist connections integrated into Council's existing PAMP

A preliminary road network is suggested in the diagram below and is explained as follows:

- Roundabouts (white dots with red border) are proposed to be provided on Yalwal Road at Rannoch Drive and Lightwood Drive – will initially be one-lane roundabouts however may need to be upgraded in the future if link roads are not provided
- Traffic signals (black dots with red border) are proposed to be provided on Yalwal Road at Depot Road, and on Albatross Road at Yalwal Road and Coral Sea Drive / The Shoalhaven Integrated Emergency Management Centre
- Note that an existing temporary access exists on the south side of Yalwal Road, to the east of Depot Road, providing access to Langside Avenue until the linen plan is released for a subdivision with road network already provided as an extension of Rannoch Drive to Rouken Glen Drive – temporary access has been conditioned to be closed once Rannoch Drive extension is formalised



- The Rannoch Drive road reserve connects with Coral Sea Drive, which intersects with Albatross Road opposite the Shoalhaven Integrated Emergency Management Centre, as a priority-controlled T-intersection with Albatross Road
- Coral Sea Drive has been constructed to provide access to an approved but uncompleted medium density housing development at 99 Albatross Road, on the north side of Coral Sea Drive
- It is recommended that Rannoch Drive ultimately be restricted so that no connection exists with Albatross Road to ensure that this would not be a desirable route for rat-running traffic re-routing to avoid the intersection of Yalwal Road & Albatross Road
- It is recommended that a new southern leg of Depot Road is provided to project south and connected with Rannoch Drive – this could serve as an alternative route for vehicles to improve accessibility and access options, whilst dispersing traffic demands more evenly across all intersections
- Lightwood Drive is recommended to be projected southwards and connect into the eastern extent of Rannoch Drive to allow alternative access arrangements to local residents, however effective LATM would be necessary to ensure that this road's primary function as a local road is retained
- It is recommended that the existing unnamed public road on the north side of Yalwal Road (to the west of Lightwood Drive) which currently provides access to the occupied industrially-zoned land adjacent to the Integral Energy depot, be

- realigned so that it forms a northern leg at the proposed roundabout at Lightwood Drive
- To improve network accessibility an optional turn-around facility in Depot Road north of Yalwal Road is proposed in conjunction with traffic signals being provided at this intersection

Mundamia Urban Release Area – Contribution Planning

Notwithstanding the above recommendations for infrastructure upgrades, the Traffic Unit was also required to make recommendations for the imminent rezoning of the Mundamia Urban Release Area lands. It should be noted that the below recommendations are a significant compromise when compared to the preferred provision of infrastructure outlined above, as they represent the minimum essential upgrades to ensure adequate network performance albeit at less-desirable levels of service.

Analysis of the staged release of residential and commercial land at Mundamia was undertaken to determine when certain upgrades are required to be provided. The full release potential of 510 dwellings as well as a village retail facility and child care centre was divided into 10 separate stages, described as follows:

- Stage 1 – 50 dwellings
- Stage 2 – 100 dwellings
- Stage 3 – 150 dwellings
- Stage 4 – 200 dwellings
- Stage 5 – 250 dwellings
- Stage 6 – 300 dwellings
- Stage 7 – 350 dwellings + retail & childcare centre at 68.6% of full operation
- Stage 8 – 400 dwellings + retail & childcare centre at 78.4% of full operation
- Stage 9 – 450 dwellings + retail & childcare centre at 88.2% of full operation
- Stage 10 – 510 dwellings + retail & childcare centre at full operation

The above staging plan was based on planning advice that the commercial component of a major subdivision will not be viable until the latter stages of release, once a significant population had moved into the area. The percentage of operation for each stage was based on the number of dwellings divided by the full potential – ie for Stage 7 the percentage was calculated as $350 \div 510 = 68.6\%$.

The analysis for this component differs from the above long-term assessment, as capacity should not be the only consideration in the assessment of individual development proposals. Consideration of road safety is also important, as the probability of road crashes rises with increases in traffic volumes, with high crash-rates being observed at busy intersections still functioning at levels of service better than LOS C.

Accordingly, the incremental introduction of additional traffic attributable to the staged release of the Mundamia Urban Release Area will trigger the need for a number of

upgrades to the road network south-west of Nowra. In total 9 intersection upgrades have been identified at various stages, which are as follows (see supporting diagram on following page):

Stage 1 – When 50 Dwellings are Constructed

1. Intersection of Albatross Road and Yalwal Road will need to be upgraded to traffic signals and associated road works including provision of additional lanes and path works
2. Intersection of Yalwal Road and George Evans Road – construct full channelised right turn bay for the right turn into George Evans Road from Yalwal Road (CHR treatment)
3. Intersection of Yalwal Road and George Evans Road – widen George Evans Road to provide 2 approach lanes to Yalwal Road from the first internal roundabout (approximately 110m)

Stage 5 – When 250 Dwellings are Constructed

4. Intersection of Yalwal Road and Lightwood Drive will need to be upgraded to single lane roundabout and associated works
5. Intersection of Yalwal Road and Rannoch Drive will need to be upgraded to single lane roundabout and associated works
6. Intersection of Yalwal Road and Filter Road will need to be upgraded to provide partial channelised right turn bay for the right turn into Filter Road from Yalwal Road (CHR(S) treatment)

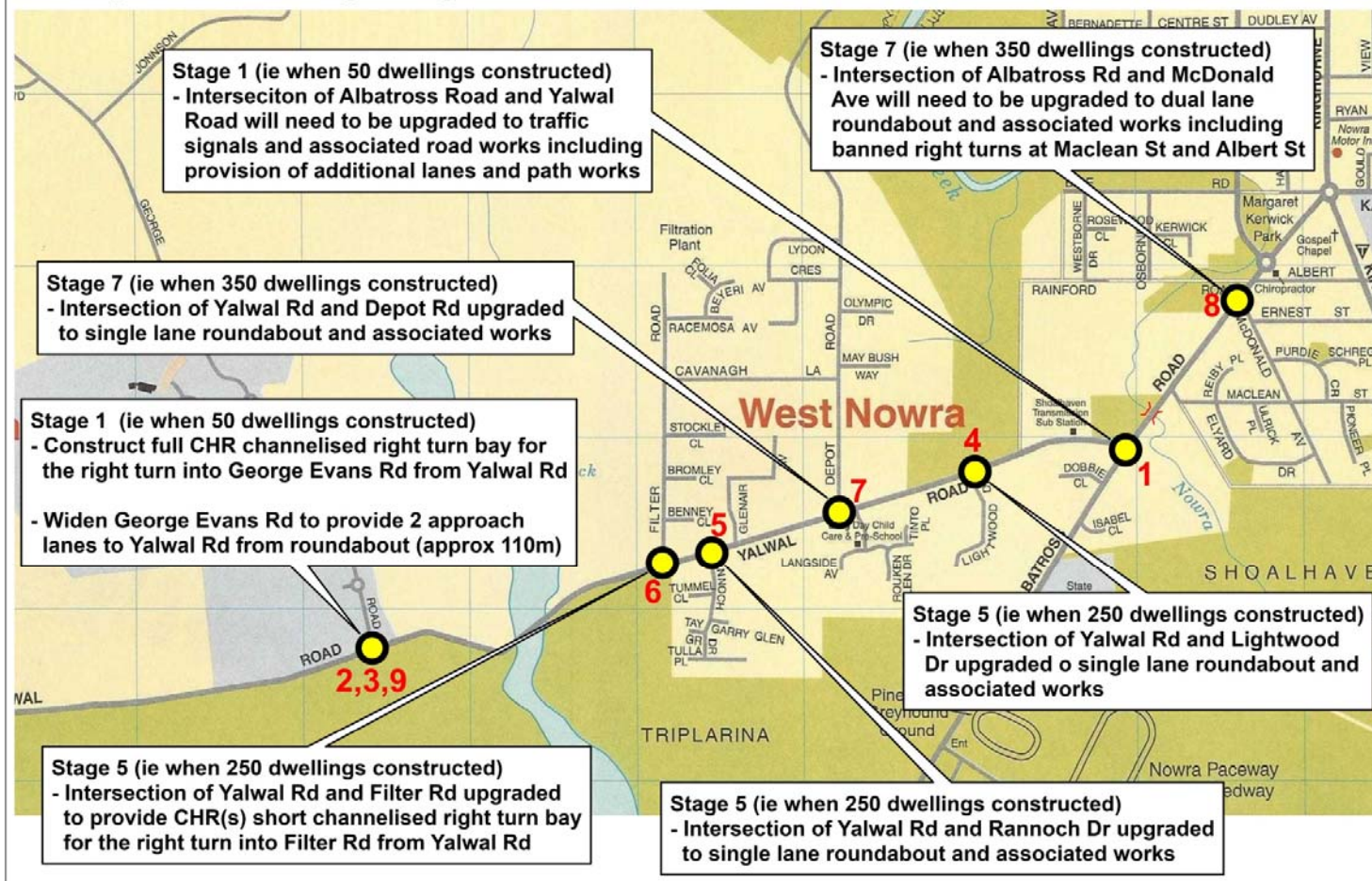
Stage 7 – When 350 Dwellings are Constructed

7. Intersection of Yalwal Road and Depot Road will need to be upgraded to single lane roundabout and associated works
8. Albatross Road and McDonald Avenue will need to be upgraded to dual lane roundabout and associated works including banned right turns out of Maclean Street and Albert Street (ban right turns on to Albatross Road, perhaps initially just in peak periods)

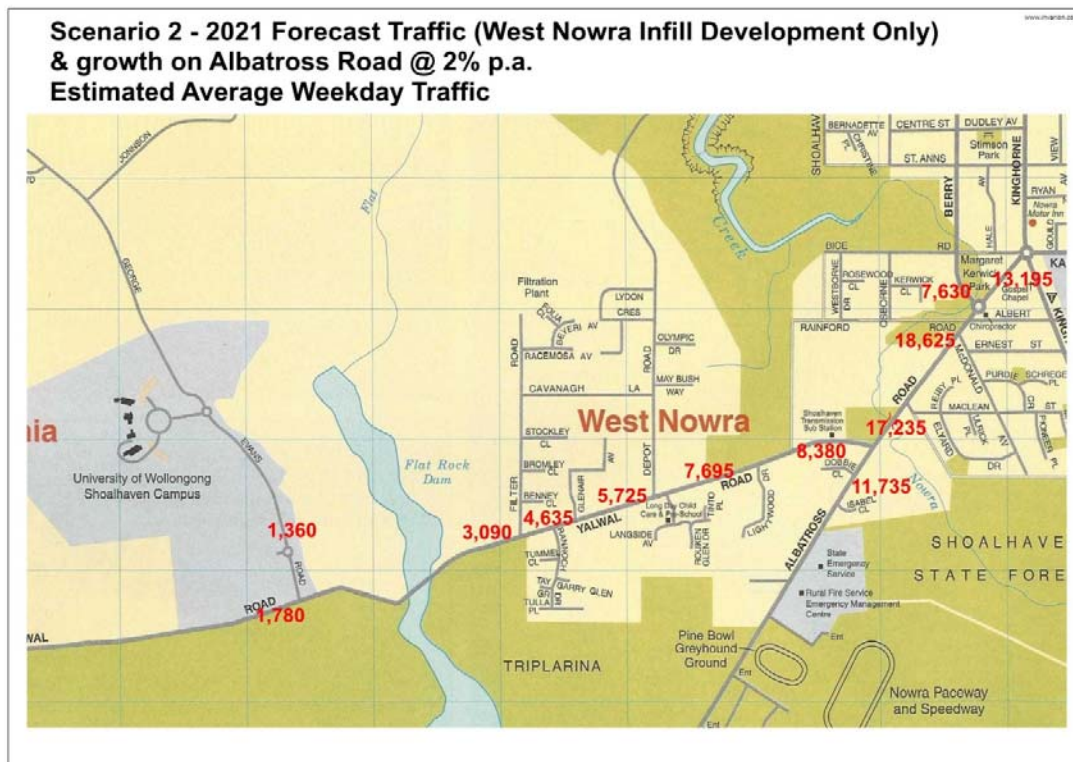
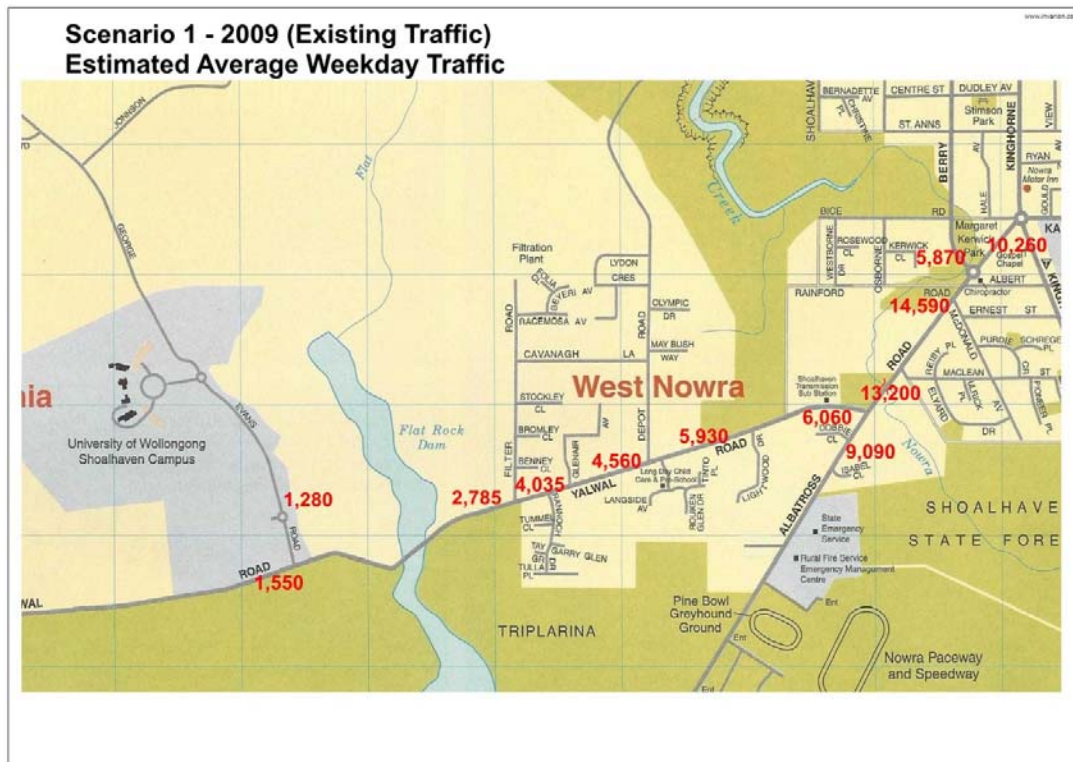
Additional Works over and above residential traffic generation when the Retail Centre Constructed and / or child care centre are constructed

9. Intersection of Yalwal Road and George Evans Road – construct full channelized left turn deceleration bay for the left turn into George Evans Road from Yalwal Road

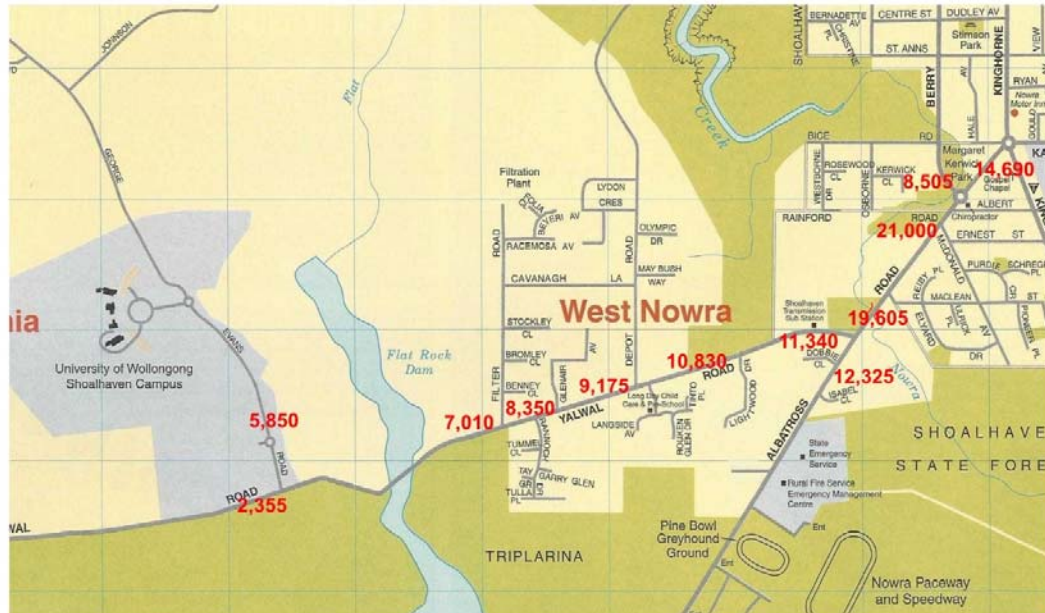
External Upgrade Works Required during staged release of Mundamia Urban Release Area



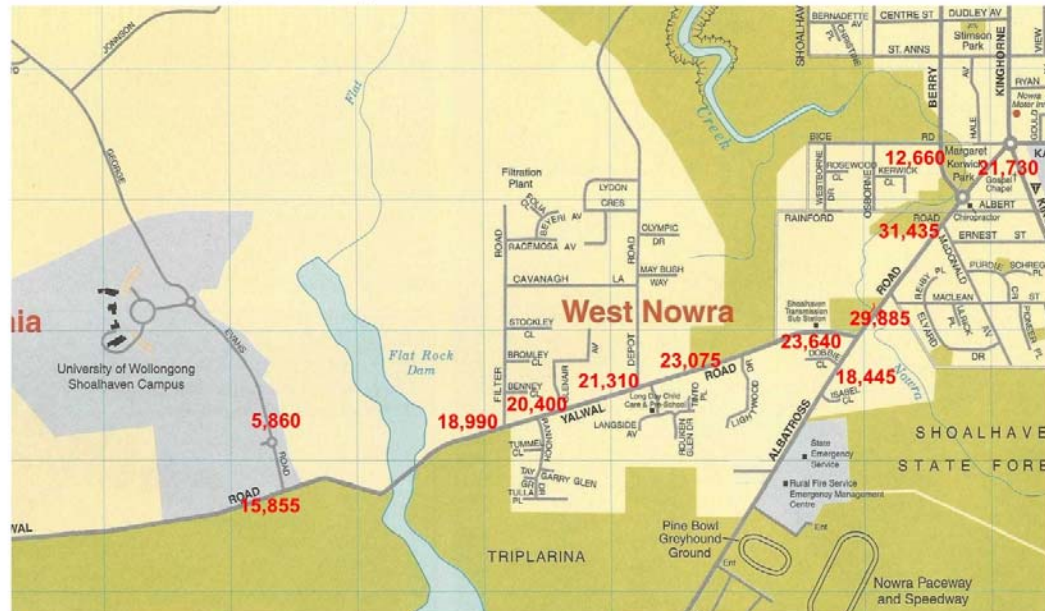
Appendix A

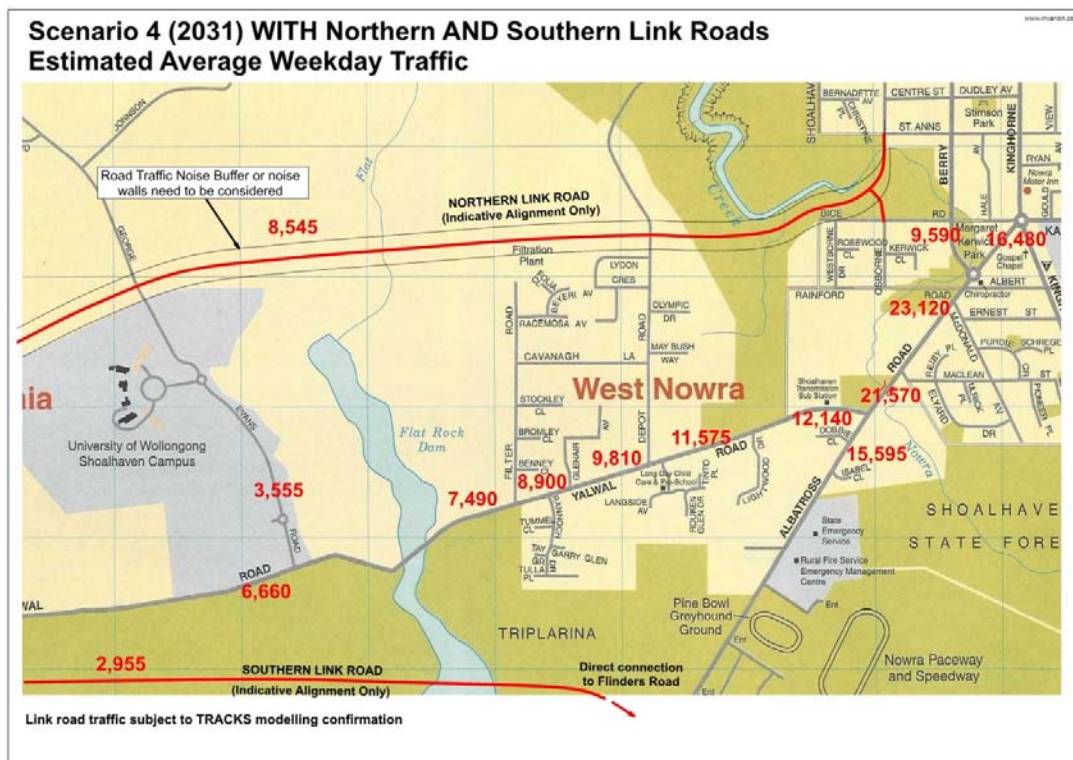
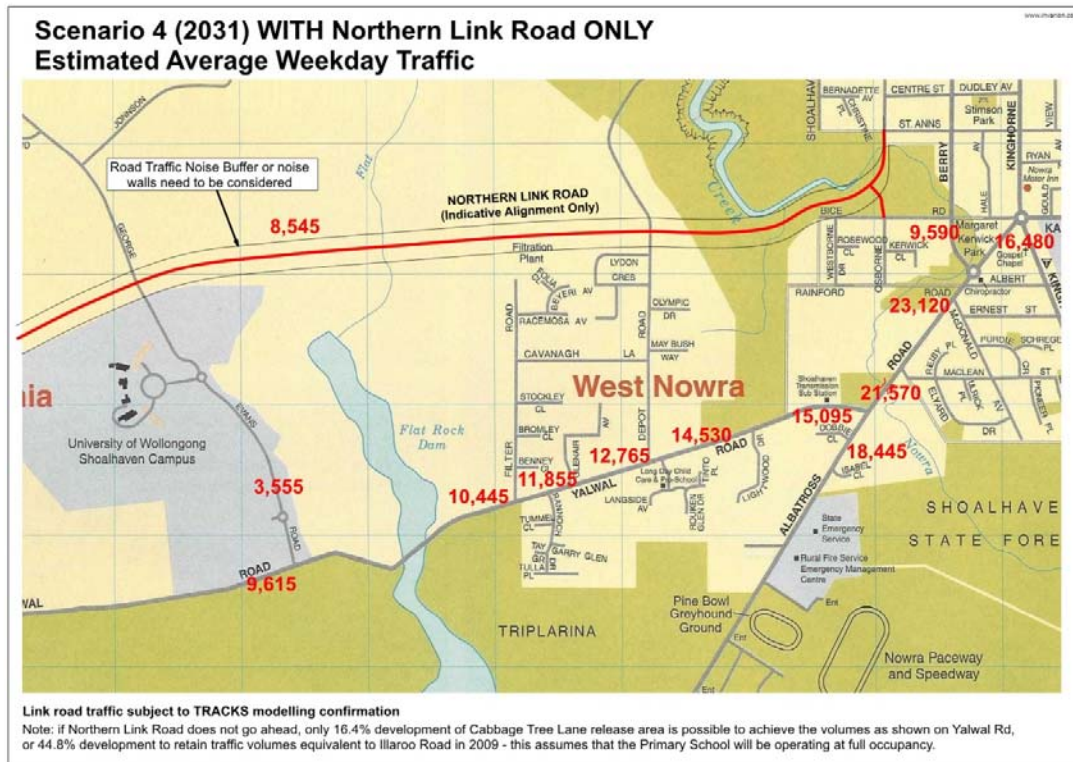


**Scenario 3 - 2021 Forecast Traffic (West Nowra Infill + Mundamia)
& growth on Albatross Road @ 2% p.a.
Estimated Average Weekday Traffic**

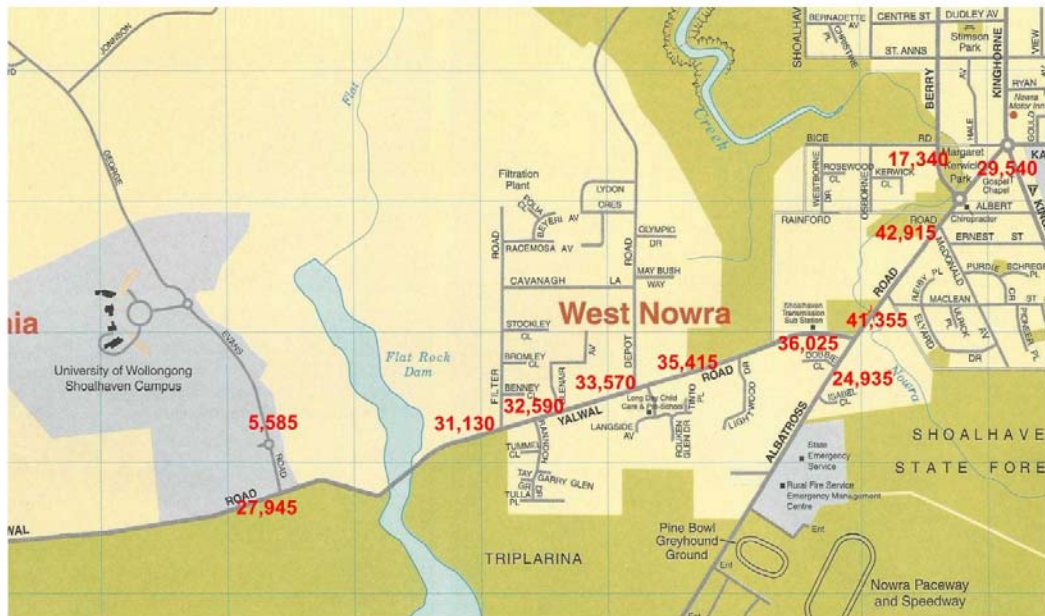


**Scenario 4 - 2031 Forecast Traffic (West Nowra Infill + Mundamia + Cabbage Tree)
& growth on Albatross Road @ 2% p.a.
Estimated Average Weekday Traffic**

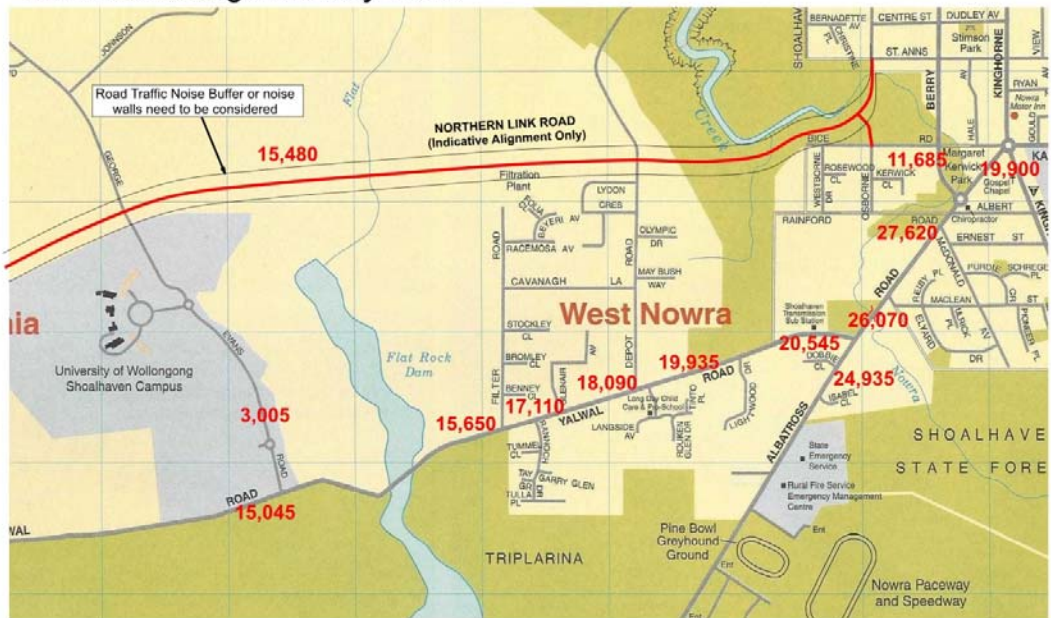




**Scenario 5 - 2041 Forecast Traffic (W Nowra Infill + Mundamia + Cabbage Tree + Bamerang) & growth on Albatross Road @ 2% p.a.
Estimated Average Weekday Traffic**



**Scenario 5 (2041) WITH Northern Link Road ONLY
Estimated Average Weekday Traffic**



Link road traffic subject to TRACKS modelling confirmation

Note: if Northern Link Road does not go ahead, Scenario 4 (2031) indicates that the Cabbage Tree Lane release area can not be provided in its entirety without exceeding traffic volumes equivalent to Illaroo Road in 2009 - accordingly any development of the Bamerang release area would also contribute to exceeding these levels.

