

# Technical Memorandum

<b>Title</b>	West Byron Development Area Independent Review of TIA		
<b>Client</b>	Byron Shire Council	<b>Project No</b>	QTT17012
<b>Date</b>	10th November 2017	<b>Status</b>	V01
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## Introduction

Cardno has been engaged by Byron Shire Council to provide an independent review of the West Byron Development Area- Western Precinct A, Traffic Impact Assessment Report undertaken by Bitzios Consulting.

The report focuses on the impact of traffic generated from the western precinct A (Villa World Site) only, although consideration is given to the potential development yields and traffic generation from the surrounding and adjacent parcels of land (Western Precincts B, C and D).

Figure 1 Proposed West Byron Development Area (extract from Bitzios Report)

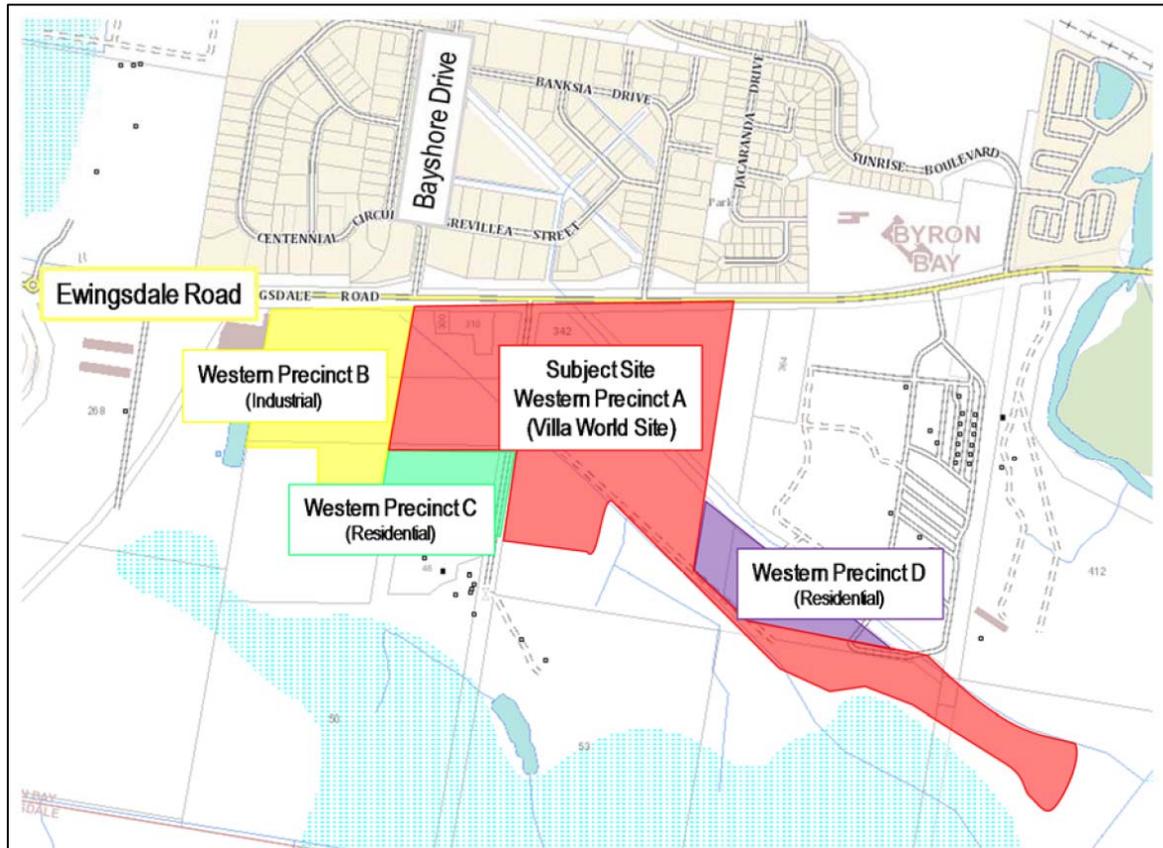


Figure 3.1 West Byron Development Area Western Precinct

## Review of TIA Report

The report establishes the following conditions.

- > Access to Ewingsdale Road will be via two new roundabouts to create 4 way intersections with existing intersections on the northern side of Ewingsdale Road at Bayshore Drive and the SAE institute (300m west of Sunrise Boulevard roundabout). The existing intersection with Melaleuca Drive (south of Ewingsdale Road) will be terminated.
- > Traffic surveys for the existing road conditions were undertaken on Tuesday 16<sup>th</sup> August 2016 to obtain AM and PM peak traffic flows at the intersection of Ewingsdale Road and Bayshore Drive and also the intersection of Ewingsdale Road and Banksia Drive. (Peak hour traffic flows for 2016 for Ewingsdale Road/Bayshore Drive intersection are shown in Figure 2.1 of the Bitzios Report).
- > Traffic growth used in the assessment was obtained from the VLC Zenith Model and was less than 1% per annum compounded (refer to Table 4.1 of Bitzios Report).
- > The traffic generation for the proposed development site has been calculated based on land use (refer to Table 4.2 of Bitzios Report).
  - The trip generation for Western Precinct A is 290 trips during the AM peak period and 305 trips during the PM peak hour.
  - The total ultimate trip generation for the site (Western Precincts A-D) during the AM peak is 579 vehicles per hour and the PM peak is 623 vehicles per hour.
- > The distribution of traffic to the external road network has been based on a split of the following;
  - Movements to and from the east – 38%
  - Movements to and from Bayshore Drive – 32%
  - Movements to and from the west – 30%

Whilst a review of current traffic patterns indicates that this distribution is a reasonable assumption for the intersection, a sensitivity analysis is recommended to determine the impact of a different distribution assumption and the effect on the overall capacity of the roundabout with Bayshore Drive and Ewingsdale Road.

### Traffic Analysis

- > The operational performance of the roundabout with Ewingsdale Road and Bayshore Road was modelled in SIDRA.
- > The roundabout was assumed to have a diameter of 16m with two circulating lanes and two approach lanes on Ewingsdale Road, two approach lanes on Bayshore Drive and only one approach lane on the proposed development access leg. Refer to Figure 2 for the SIDRA layout extracted from the Bitzios Report.
- > Analysis was undertaken for 2018 and 2028 for both without and with development traffic scenarios.
- > The roundabout was analysed with traffic generated from Precinct A (352 lots) and was also analysed for traffic generated from all Precincts A, B, C and D.
- > Results of analysis indicated that the roundabout performs within acceptable limits and has spare capacity for all scenarios for the 2028 planning horizon year.
- > For traffic generated from Precinct A for the 2028 planning horizon year in the AM peak period the queue length for the single lane development access approach to the roundabout is 12m and for the 2028 PM peak the queue length is 6.7m. The overall level of service for this approach is B with delays less than 12 seconds. The single lane approach operates adequately with no requirement for additional lanes.

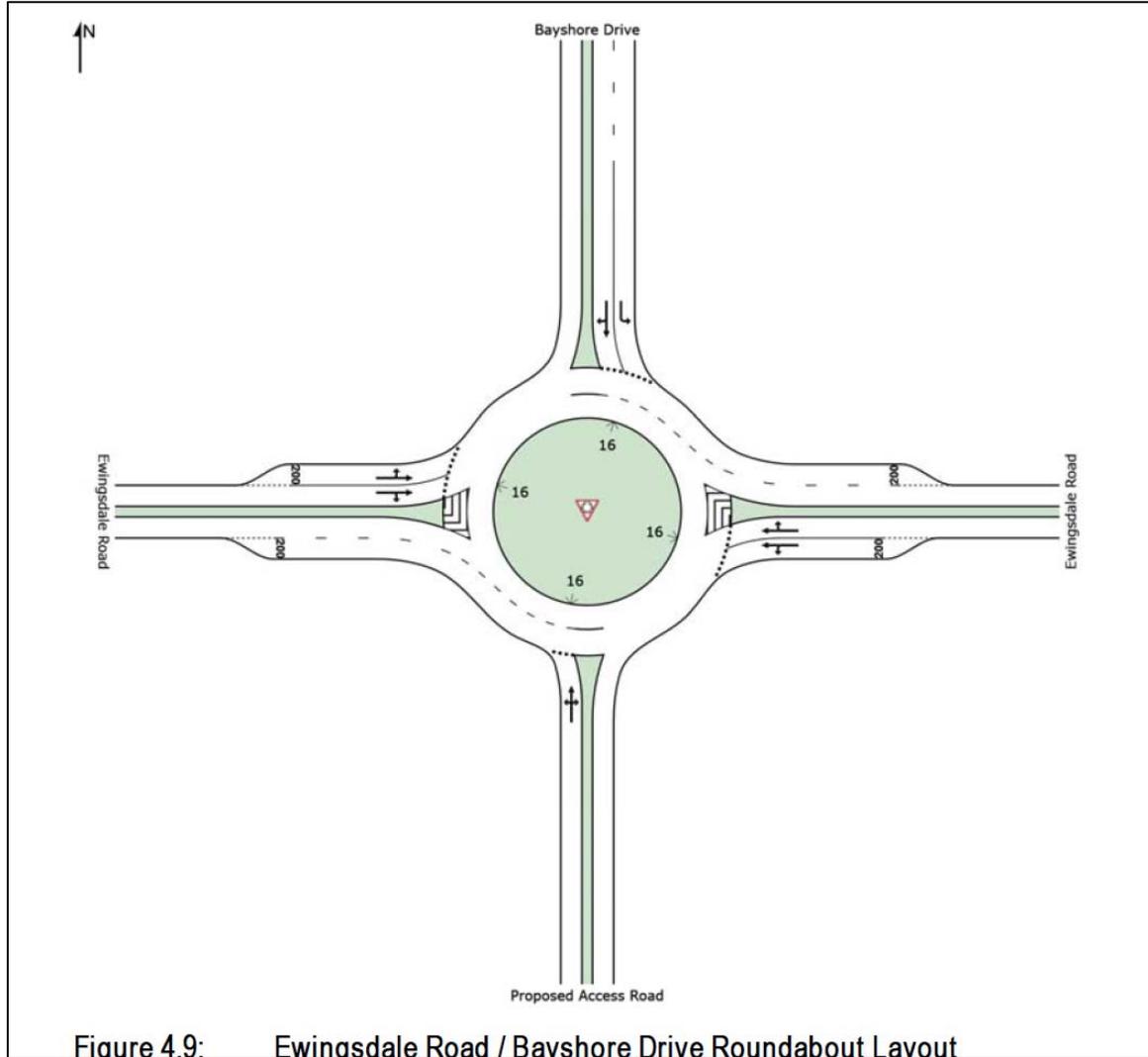
Whilst the Bitzios Report concludes that all development from the Western Precinct and the ultimate development scenario can be accommodated from the one access via the roundabout with Ewingsdale Road and Bayshore Drive, it has been proposed that the ultimate development of the West Byron Area will also have access to Ewingsdale Road via a new four-way roundabout with the SAE institute (300m west of Sunrise Boulevard roundabout).

It should be noted that it is generally best practice to provide two access intersections to the external road network for catchments with 300 lots or greater. It is concerning that in the event the main distributor road to the catchment is blocked, there is no alternative access for this catchment to exit the area. For the

purpose of incident management and emergency access it is considered essential to provide an alternative interim access for Precinct A.

Precinct A (Villa World) provides for a residential catchment exceeding 300 lots and therefore a secondary intersection or point of access should be required for future development. In particular, consideration should be given to providing alternative access to Ewingsdale Road for traffic associated with the light industrial land uses. It is considered reasonable to provide two intersections on Ewingsdale Road for future stages of the West Byron Development as per the original intention.

Figure 2 Roundabout Geometry (extract from Bitzios Report)



The traffic impact assessment report only analyses the first intersection with Ewingsdale Road and does not analyse the impact of development traffic at other intersections on Ewingsdale Road to the east and west of Bayshore Drive.

## Roundabout Design - Merge Lane Length

The preliminary traffic analysis undertaken by Bitzios Consulting indicates a merge lane length of 200m in the SIDRA geometric model. Preliminary design plans of the intersection upgrade to a dual lane roundabout (undertaken by Lambert and Rehbein on behalf of Byron Shire Council) show dual lanes at the roundabout which continue as dual lanes both east and west along Ewingsdale Road. This is shown on Figure 3.

Figure 3 Roundabout Concept Design Plans (provided by Council)



The merge lane length for the upgraded roundabout on Ewingsdale Road with the access to the sports fields indicates a lane and merge length of 202m. To determine the appropriate length to transition from two circulating lanes to one lane reference is made to Austroads Guide to Road Design Part 4B: Roundabouts Clause 4.3.4.

*“It is desirable that the two lanes extend from the exit a distance equivalent to six seconds of travel time (absolute minimum of 4 seconds), followed by a merge length based on 0.6m/s lateral shift. It is also desirable that a run-out (e.g. shoulder) area be provided as an escape path in the event of potential conflict between merging vehicles”.*

The proposed taper from the roundabout (assuming a speed of 60km/h) would require a total distance (lane length plus taper) of 198m. Refer to Table 2 for the calculated values. The roundabout has been modelled based on a lane length of 200m and is therefore considered to be appropriately analysed.

Table 2 Merge Distance (6 second travel time)

Speed (km/h)	Lane Length (m)	Merge Distance (m)	Total (m)
50	83.33	81.02	164.35
60	100.00	97.22	197.22
70	116.67	113.43	230.09

## Recommendations

A review has been undertaken of the Traffic Assessment for the West Byron Development Area – Western Precinct provided by Bitzios Consulting. The assumptions outlined in the report are considered reasonable for the purpose of assessing the impact of development traffic.

Following this review, Cardno provides the following recommendations:

- > Whilst a review of current traffic patterns indicates that this distribution is a reasonable assumption for the intersection, a sensitivity analysis is recommended to determine the impact of different distribution assumption and the effect on the overall capacity of the roundabout with Bayshore Drive and Ewingsdale Road.
- > Whilst the Bitzios Report concludes that all development from the Western Precinct (and the ultimate development scenario) can be accommodated from one access via the roundabout with Ewingsdale Road and Bayshore Drive, an alternative point of access should be provided to Ewingsdale Road to assist with incident management and emergency access as a minimum for Precinct A.
- > The single lane approach to the roundabout for the development access is considered appropriate based on Sidra intersection analysis indicating minimal queue lengths and delays.
- > It is recommended a 100m lane length and 98m merge be provided on the western Ewingsdale Road approach from the roundabout with Bayshore Drive to transition from two lanes back to one lane.
- > The impact of the development traffic on the network beyond the intersection with Ewingsdale Road and Bayshore Drive has not been analysed. The impact on intersections along Ewingsdale Road to the east and west of Bayshore Road should be assessed.