

Case Study Project: Eelup Roundabout

Client: Main Roads Western Australia

Overview

Demand imbalance on roundabout approaches can present significant operational and road safety challenges.

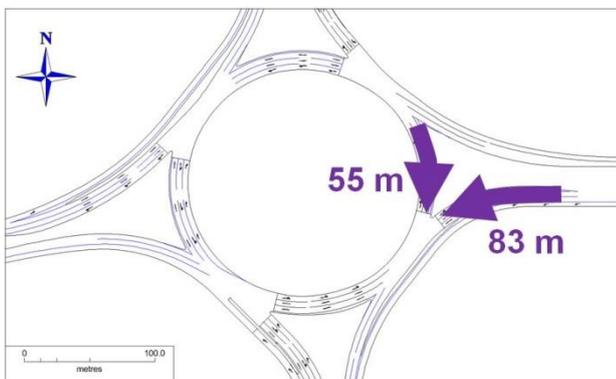
The Eelup roundabout in Bunbury Western Australia represented an especially complex case due largely to its size and existing capacity. With an internal diameter of about 180m and the need to increase the number of circulating lanes to 3, consideration had to be given to resolving movement conflicts and managing the flows on a permanent basis.

The Study

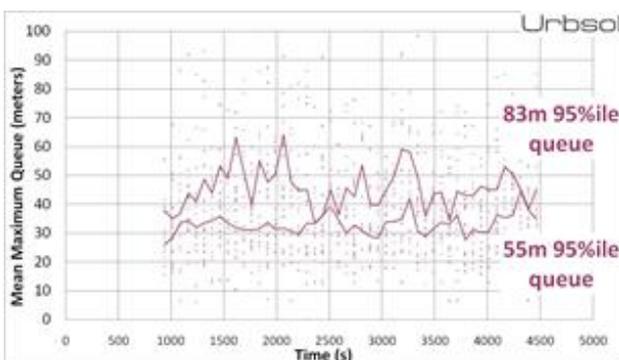
The Eelup roundabout represented one of Western Australia's most dangerous roundabouts and the cause of significant delays and frustration for motorists.

Simulation based analysis was required to help understand the implications of signalling the existing roundabout to better ration capacity and improve road safety. Detailed microsimulation modelling was undertaken to test the proposed design and to find indicative traffic signal parameters and suitable phasing for different conditions.

Queue storage within circulatory area needed to be assessed for all 4 conflict points.



95%ile Maximum Queue Length Assessment at every conflict point



Maximum Average Queue Length stability assessment

The optimal cycle time selection involved an iterative process of incrementally changing the cycle time and analysis of queue lengths and their stability. Modified phasing was also tested for Easter Monday to cater for return holiday trips.

Simulation

Urbsol used VISSIM microsimulation software to assess the appropriateness and effectiveness of the upgrades to identify potential operational issues and to increase awareness of the operating characteristics of the treatment.

The simulator proved indispensable for modelling various scenarios for this large roundabout due to complex relationship between queues in the circulatory area.



Implemented signal treatment and upgrades

VISSIM was chosen as the most suitable tool for this work for a number of reasons:

- o Proper modelling of priority rules and driver behaviour at roundabouts.
- o Flexibility in applying roundabout signal logic using detector loops actuation.
- o Accuracy of delay per vehicle modelling.
- o Robust data collection and extraction.

Post implementation there has been a significant drop in accidents in terms of both number and severity with data suggesting a drop of over 50% in the first three months of operation in comparison to the same period the previous year.

Weekday morning and evening peak queuing on all legs has been significantly reduced and it is very unusual for traffic queued on any of the legs not to be cleared in one cycle. On the Australind Bypass (busiest approach) queues used to extend for as much as 1km before the upgrade was carried out.