

Case Study Project: Interchange Design Selection

Client: Main Roads Western Australia

Overview

The intersection of Kewdale Rd / Horrie Miller Drv / Tonkin Hwy represents the key access to both the Kewdale industrial area and the airport commercial precincts.

While this intersection clearly forms a key access it also lies between two proposed freeway to freeway interchanges that together form the *Gateway WA Perth Airport and Freight Access Project*.

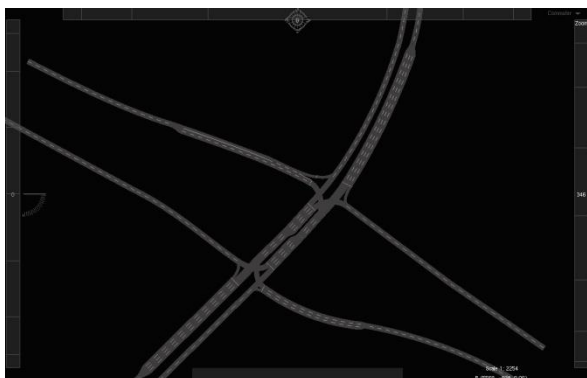


Current intersection layout and typical queue lengths

The Study

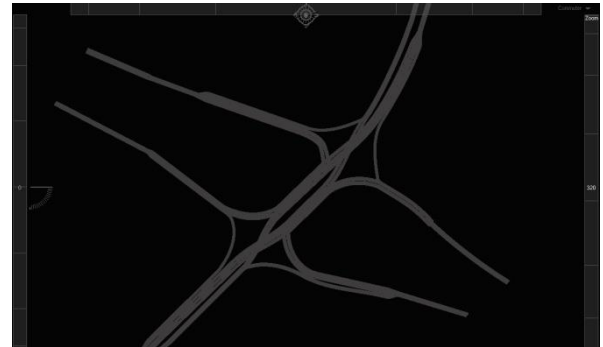
In determining the ultimate design for this key location a series of simulation models were developed to investigate the operation of 3 candidate solutions:

- A conventional diamond interchange
- A diverging diamond interchange
- A single point interchange



Traditional diamond interchange layout

2031 traffic demands were estimated and a number of key intersection metrics were calculated indicative of flow ratios the interchange would ultimately be subject to.



Diverging diamond interchange layout

The analysis clearly indicated the advantages a single point interchange would offer at this location including highly efficient signal phasing with the ability to run simultaneous right turn movements, generous turning radii especially favourable for larger vehicles and ongoing flexibility to cope with a range of possible future traffic conditions.

Simulation

As a number of the designs employ unconventional signal phasing in comparison to more traditional treatments simulation allowed for the best analysis of how the designs would perform during both peak periods.



Single point interchange layout

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

- Ease of coding non-conventional network layouts
- Detailed heavy vehicle kinematic modelling
- Spatially aware agent modelling
- Powerful signal actuation rules
- Detailed LoS reporting including number of stops