# Case Study Project: The Protected Intersection
## *Managing user conflicts at signalised intersections*

**Urbsol**

## Overview

Traffic analysis typically focuses on the performance of intersections from the perspective of motor vehicles. However this focus can under represent the perspective of other users of the network, particularly cyclists and pedestrians.

The Protected Intersection (PI) is a concept that focuses not only on the separation of vehicles and other modes, but also on how they interact with one another at intersections.

## The Study

Based on the Dutch intersection design, the PI consists of the following four major elements:

- o A corner refuge island
- o A forward stop bar for cyclists
- o A setback bike and pedestrian crossing
- o Bicycle friendly signal phasing

While the PI is seen as unconventional from an Australian standards perspective, it can maximise the protection between road users and minimise road safety issues associated with car-bike type conflicts at intersections. It also ensures priority for all modes using the intersection are considered.

An analysis technique was required to help understand the implications of these treatments in terms of person delay. The adopted approach considered how the intersection was performing from a *user* as opposed to *vehicle* perspective.

Detailed simulation modelling was undertaken to test the proposed design and to find indicative traffic signal inputs and suitable phasing for different conditions.
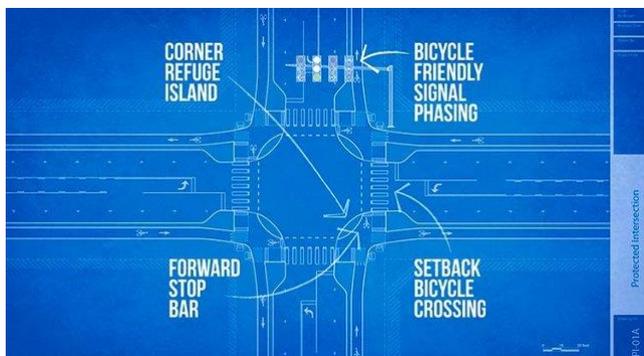


Protected Intersection major design elements

Further details of this design concept can be found at http://www.protectedintersection.com/

## Simulation

Urbsol used the nanosimulation software developed by Azalient, Commuter, to assess the effectiveness of the PI design and identify potential operational issues and to increase awareness of its operating characteristics.

The simulator proved indispensable for modelling the PI in being able to implement the four major elements to the design and see the resulting interaction between all transport modes.



Protected Intersection modelled in Commuter

The model indicated promising results when it came to implementing PIs through observance of general agent behaviour.

Given acceptable demands, flow balance, right-turn filtering phases and appropriate pedestrian priorities, this intersection format would encourage a reduction in speed and greater awareness of other agents using the intersection, improving safety aspects.

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

- o Inter-modal journey simulation capabilities
- o Cyclist simulation abilities
- o Realistic traffic signal emulation
- o Accuracy of person delay modelling
- o Spatially aware agent modelling
- o Ability to emulate priority rules and agent behaviour/awareness at these types of signalised intersections

The analysis has shown a number of operating regimes can be adopted to promote the priority of specific user groups.

Considering performance from the user as opposed to vehicle perspective also means priorities can be set to optimise overall system operation.

An example of the simulation can also be viewed at: https://www.youtube.com/watch?v=DiEnTPT4TAQ