

Route Optimisation / SmartRoads

Glossary

| | |
|-----------------------------------|--------|
| Auckland Council | (AC) |
| Auckland Transport | (AT) |
| Benefit Cost Ratio | (BCR) |
| Full-time Equivalent | (FTE) |
| Joint Transport Operations Centre | (JTOC) |
| Level of Service | (LOS) |
| New Zealand Transport Agency | (NZTA) |
| Public Transport | (PT) |
| Quality Assurance | (QA) |
| Statement of Intent | (SOI) |
| Territorial Local Authority | (TLA) |

Executive Summary

In May 2011 a progress update presentation was given to the AT Board on the newly established JTOC. One of the initiatives to deliver benefits to customers as a result of AT working more closely with NZTA is the Regional Route Optimisation Programme. This report summarises the results so far and provides a status update on the 2011-2012 and provisional 2012-2013 programme.

Recommendations

It is recommended that the Board:

- i). Receive the report

Strategic Context

An established programme of traffic signal route optimisation will directly improve the efficiency and flow of vehicles, public transport, pedestrians and cyclists on the arterial roads of the Auckland region. A region-wide signal optimisation programme will provide a coordinated approach and regular review of the signal performance and operation on strategic routes throughout the wider region.

The SOI outlines key performance indicators to measure progress and performance against the five key goals. With respect to Goal 1, the following are particularly pertinent to signal optimisation:

- Maintain or reduce travel times along strategically important arterial routes during peak periods.
- Increase efficiency on routes with specific focus on travel modes outlined in Regional Arterial Route Plan (e.g. general traffic, PT, freight, cyclist or pedestrians where within town centres or on school walking routes).
- Increase the arterial routes with signal optimisation.
- Maintain or reduce travel times along strategically important freight routes during the inter-peak.
- Reduce variation in travel time on selected routes

Background

The May 2011 presentation to the AT Board provided an overview of the Regional Route Optimisation Programme, the principles for route optimisation, the four year optimisation cycle and progress on some of the work done.

Prior to 2011 there has been some signal optimisation completed on routes with known inefficiencies, however this was often of limited benefit when routes traversed former TLA boundaries as these were seldom linked up. Up till now there has not been sufficient funding to undertake a co-ordinated programme throughout the region. To undertake a comprehensive regional route optimisation programme over a four year cycle the following programme and funding stream has been established, and the programme commenced.

Table 1: Implementation Time Table

| Year | Route Optimisation | Systems | Training | Resources (FTE's) | Costs | Route review |
|---------------|-----------------------------------|--|----------------------------------|-------------------|---------|--|
| Year 1 | Optimise 10% of sites | System Setup, QA, funding mechanisms, | Hire/Train Resources, | 6 | \$1.28m | |
| Year 2 | Priority 30% of network optimised | Database development, standardise procedures | Continue training | 6 | \$3m | |
| Year 3 | Priority 30% of network optimised | Standardised offline modelling capability | Continue training | 6 | \$3m | |
| Year 4 | Priority 30% of network optimised | Maintain and develop systems. | Update and maintain skill levels | 6 | \$2.72m | Route review from year one and maintenance |

A programme for route optimisation has been established based on a number of factors including:

- Perceived benefits to the region.
- Opportunity to coordinate with other projects along the route that can be more cost effectively tied in with the Signal Route Optimisation work.
- Urgent requests –e.g.: give way rule change effects, strategic changes to network operations, special vehicle lanes.
- New developments.
- New infrastructure.
- Special events (e.g. Rugby World Cup).

The four year programme has commenced with 2011-2012 being the first year of the programme. Part of the work in the first year has been to put together a comprehensive

Scheme Assessment Report to secure NZTA funding subsidy for the work. The funding application has been submitted for consideration.

During the first year 2011-2012 a route optimisation programme was initiated which identified a number of major arterial routes where signal coordination and other traffic management initiatives can achieve improvements in travel time reliability, safety and reductions in emissions. These improvements are consistent with Auckland Transport's aim to make efficient and effective use of our existing transport assets. This year, we are implementing route optimisation on 16 segments of arterial routes (Attachment 1).

Three of the routes (five segments) were commenced early in 2011, the post optimisation surveys have been completed, the stage 2 (post optimisation) reports have been completed and the benefits are as follows:

Table 2 Post implementation route optimisation results

| <i>Route</i> | <i>Travel time savings (hours)</i> | <i>CO₂ emission reduction (tonnes)</i> | <i>Fuel savings (litres)</i> | <i>First year benefits (\$m)</i> |
|-----------------------|------------------------------------|---|------------------------------|----------------------------------|
| <i>St Lukes</i> | <i>81,034</i> | <i>266</i> | <i>106,098</i> | <i>1.46</i> |
| <i>Symonds Street</i> | <i>234,052</i> | <i>1,005</i> | <i>402,429</i> | <i>4.41</i> |
| <i>Dominion Road</i> | <i>105,000</i> | <i>117</i> | <i>51,000</i> | <i>1.72</i> |
| Totals | 420,086 | 1,388 | 559,527 | 7.59 |

These three routes will have a combined savings of 0.42 million travel time hours, CO₂ reduction of 1388 tonnes, fuel savings of 0.559 million litres and this represents a first year benefit of \$7.59 million for a cost of \$0.19 million which is a first year BCR of 39.9 ([Attachment 4](#)). The other routes are in various stages of completion with Greenlane, Great South Road, Broadway and Khyber Pass having had signal changes made and post implementation surveys are either in progress or planned for the next few weeks. Following the surveys the stage 2 report will be completed which documents the results of the changes. The table in Attachment 2 shows the current progress on year one of the programme.

Within JTOC two senior traffic engineers and one traffic engineer have been recruited to complement the existing team. The two senior engineers will strengthen our capability to ensure we are prepared to deliver the larger programme (30% of the network) for year two of the programme. The programme has already been developed and a provisional list of routes for 2012-2013 is shown in Attachment 3. A report with the full results of year 1 of the programme will be available in August.

SmartRoads

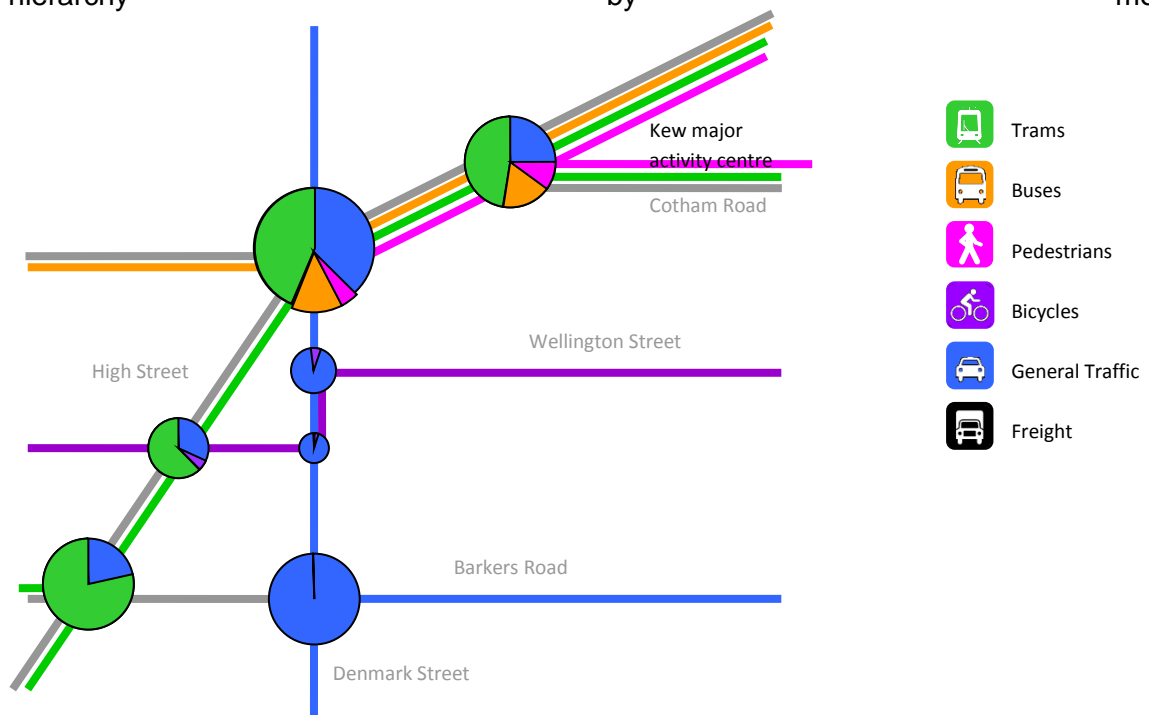
SmartRoads is an innovative approach to road network management that balances competing demands to make the best use of limited existing road space. It has been developed and applied in Melbourne by Vic Roads. The concept builds on the concept of road hierarchy and network operating plans to consider additional parameters such as:

- Strategic transport networks (e.g. freight, public transport, pedestrian)
- Varying level of priority by time of day
- Adjacent land uses (particularly around activity centres and places)
- Availability of alternative routes

SmartRoads is a tool that enables the development of a Network Operating Plan that informs all decisions that affect the way the arterial network operates. It indicates how to make best use of the network by assigning priority to different modes of transport at a particular time of the day. The key principle is that while all road users still have access to the network, some routes will operate better for the priority mode defined for that route. SmartRoads follows a simple 3 step framework that links the **strategic** vision to **network operation** and **performance monitoring**:



Below is a sample of the network operating plan for Melbourne, illustrating a preferred use hierarchy by mode.



The bubbles are a quantitative view of performance across the network between modes. The larger the bubble the greater the performance gap and the proportion of colour indicates the extent of the performance gap for that mode. The measure is based on LOS, Efficiency/Productivity, assigned modal Priority and growth, all of which already are key performance indicators in the SOI between AT and AC.

The main use of such an indicator would be to understand the year-to-year changes in the network and to understand if progress is being made in achieving better network operation. It ensures that wider network strategies and objectives are taken into account and through stakeholder engagement can assist with the management of expectations. The application of SMARTROADS assessment results in a network operating plan that can assist decision makers to assess the impact of proposals on the network.

This is of particular importance to route optimisation where two intersecting routes have competing priorities and priority may be strategically assigned (for example) to the route with higher public transport usage. The development of a comprehensive network operating plan for the network will assist the route optimisation programme by defining strategies and route priorities. A combined team of AT, JTOC and NZTA staff are progressing a project scoping exercise to establish methodology, resources, cost and time frames for initiating a SMART ROADS trial programme for Auckland.

Next Steps

Complete the programme of work for 2011-2012, at an estimated cost of \$1.28m and report on progress in August.

Confirm results of the funding submission to NZTA

Confirm the programme for 2012-2013 and commence work by 1 July 2012

Develop an integrated approach that complements and uses the SMARTROADS approach for optimising the road network

Attachments





Attachment 1 – GIS map of 2011-2012 Regional Route Optimisation

Attachment 2 –Table of current work

Attachment 3 – GIS map of 2012-2013 Provisional Optimisation programme

Attachment 4 – Total gains to date

Attachment 5 – Route Optimisation Presentation

| | | |
|-----------------------------------|--|--|
| WRITTEN BY | Ken Lee-Jones Traffic Systems Manager Andrew Allen Road Corridor Operations Manager |   |
| RECOMMENDED by | Greg Edmonds Chief Operations Officer |  |
| APPROVED FOR SUBMISSION by | David Warburton Chief Executive |  |