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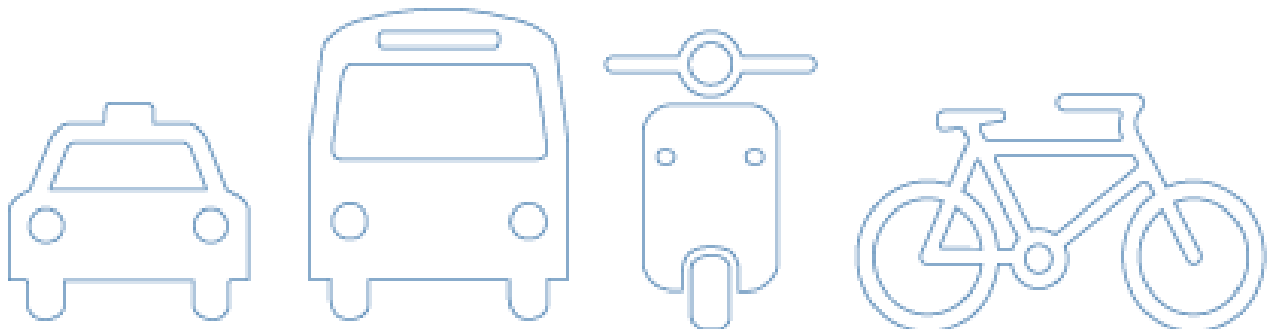
# BEST PRACTICE AMP WORKING GROUP

## Case Study

# Economic Road Network Planning

**Initiative number 2015\_06**

**June 2015**



Version No	Date	Item Affected	Description of Change
1	11/07/15	All	Document Created
2	20/07/15	All	Draft for review
3	23/10/15	All	Final

# Executive Summary

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Southland District Council manages one of the largest road networks in New Zealand. The network serves a large rural area with a few small towns and a strong agricultural base. Dairy farming has become the largest economic sector and the road network is integral in transporting raw milk to Fonterra's factory at Edendale.

In developing a network management approach to deliver a 'fit for purpose' roading network Southland District Council identified economic productivity as a key factor. An Economic Network Plan (ENP) was developed which recognised the relative economic benefit of each portion of the vast Southland District roading network.

The ENP uses export receipts to identify the economic activity derived within each sector and understand how the roading network contributes to the economic achievement of the area. While sheep and beef farming along with forestry are also considerable activities, dairy farming is the largest and the most reliant on the road network.

The ENP operates on a Geographic Information System (GIS) platform, and is the key to prioritised spending on the network. Prioritised spending was required as the perceived needs of the network were beyond the levels of funding available.

The approach has enabled a high level of engagement with industry, farmers, Fonterra, Council and the wider community. Where-ever there is prioritisation there are potential 'winners' and 'losers'. The ENP has enabled the conversation to focus on what is best for the community as a whole rather than individual road users. The degree of understanding has improved considerably and management of the network is able to include transport operations as well as the road pavements themselves.

The significant benefits to Southland District Council and its partners have been to focus its spending where the greatest benefit lies, and to involve the community in the process.

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# 1 Introduction

## 1.1 Project Outline

<b>Project Name:</b>	
Project Location:	Southland District Council
Project Objectives:	Develop a model that defines a 'fit for purpose' network Recognise the benefits each portion of the roading network provides. Provide a robust basis for network management prioritisation
Length:	Southland District Council network 4,962km
Traffic Volume:	Varies across the network
Supplier(s):	Southland District Council and MWH Staff
Project commenced:	2011
Key Issues:	Network Prioritisation Recognising Economic Benefit

## 1.2 Key Contacts

Name	Organisation / Role	Contact Details (Email and Telephone)
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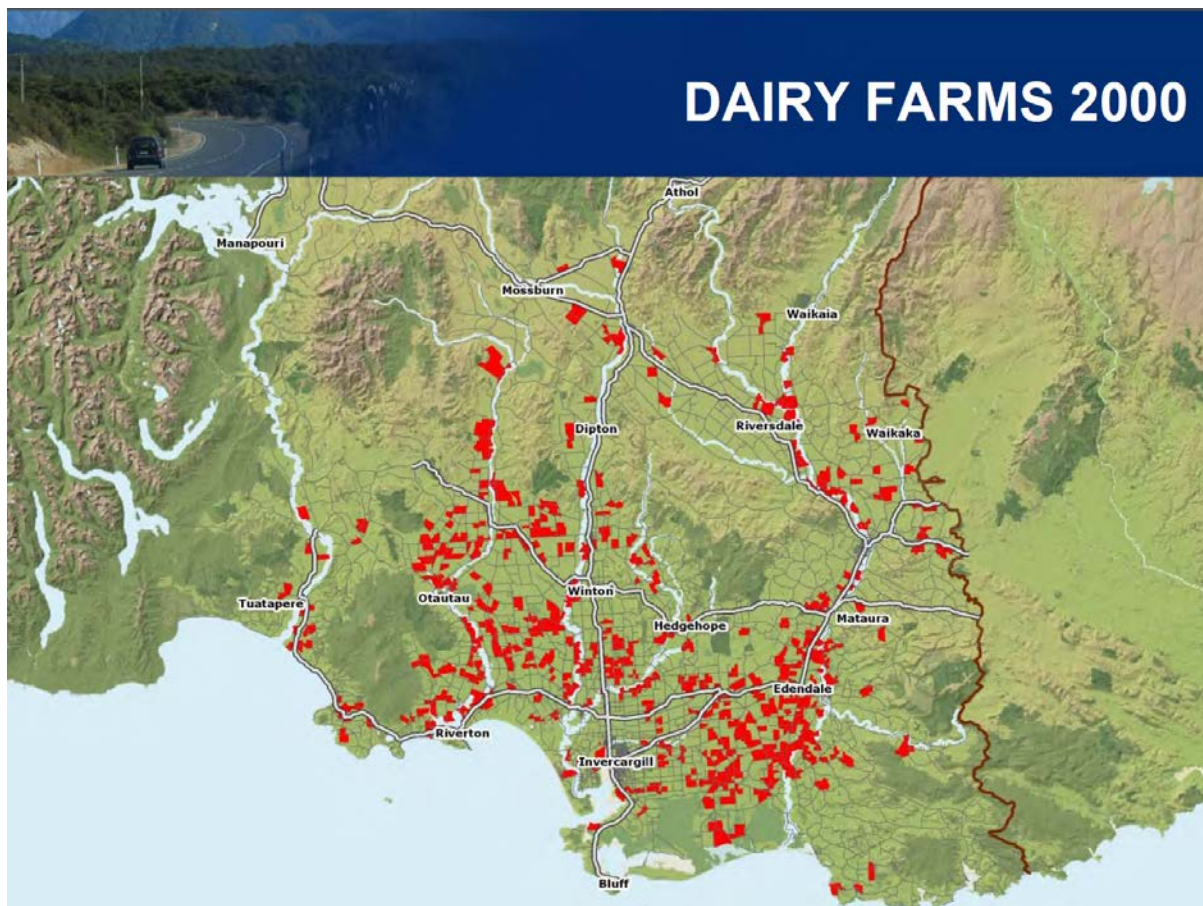
## 2 Case Study

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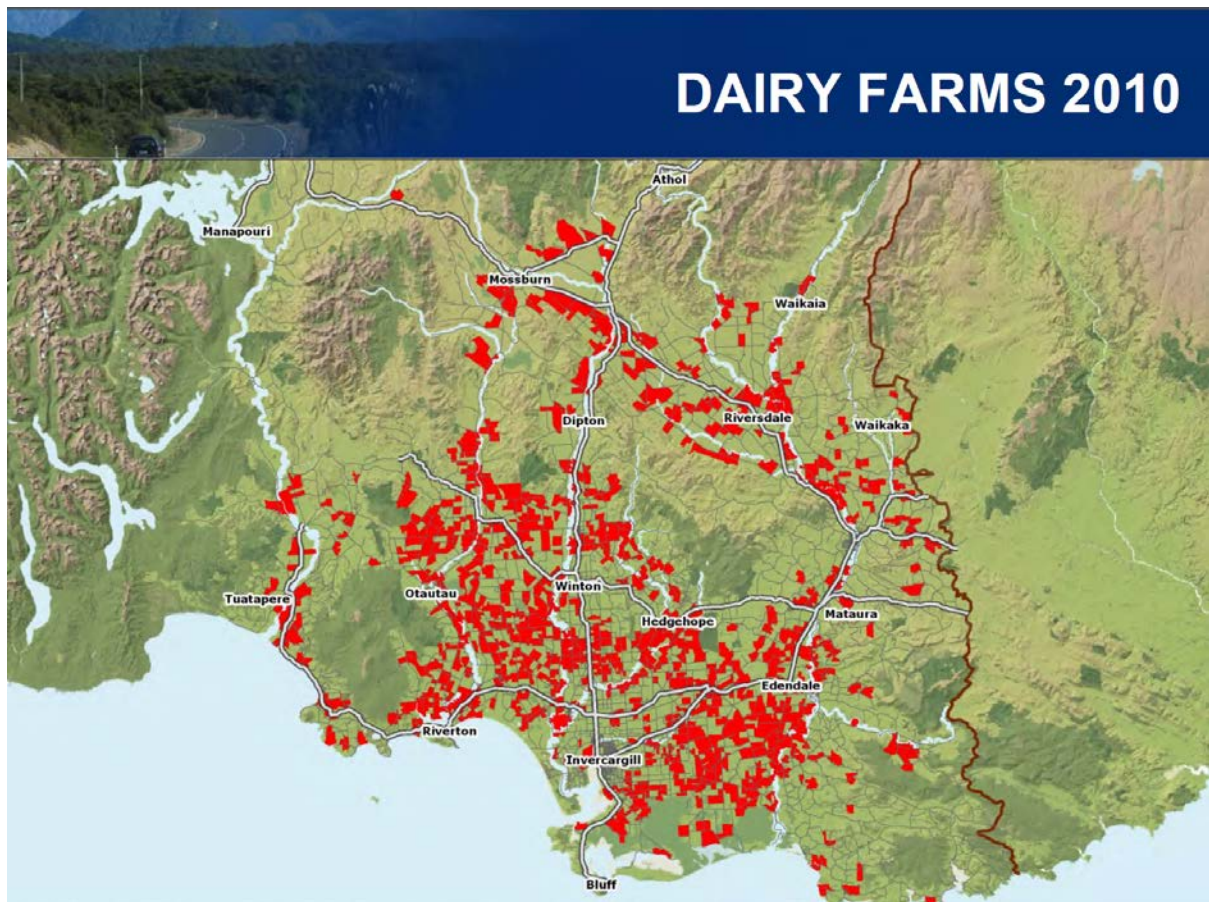
### 2.1 Overview

Southland District Council (SDC) manages one of the largest roading networks in New Zealand. This includes nearly 5,000km of formed road (39% sealed) and over 800 bridges. The roading network is key to supporting primary production which is a large part of the NZ economy. There are 30,000 residents spread across Southland District's small communities and rural area.

Ongoing network demand changes included dairy farming, forestry and tourism; with the collection of raw milk representing a significant portion of heavy traffic. Dairy farming has expanded across Southland province and considerable further conversion to dairy farming is likely.







Maintenance and renewal costs are in the order of \$25 million per year. Funding this work has become increasingly difficult over the past five years with reductions in the Financial Assistance Rate and the National Land Transport Programme allocation.

SDC's roading rates were among the highest in the country; and there was a need to address ongoing affordability. The challenge for funding expenditure related to ongoing issues, which is quite different to addressing an expenditure or debt spike.

Council has consulted the community about future options, including reverting some low use roads to unsealed roads. This was strongly rejected by the community.

## **2.2 The Attributes of a Focussed Approach**

In 2011 SDC recognised the need to change from 'business as usual' network management to a more focussed approach to deliver a fit for purpose road network. This including acknowledging the service function of the road and the value delivered to its' residents, visitors and the New Zealand economy.

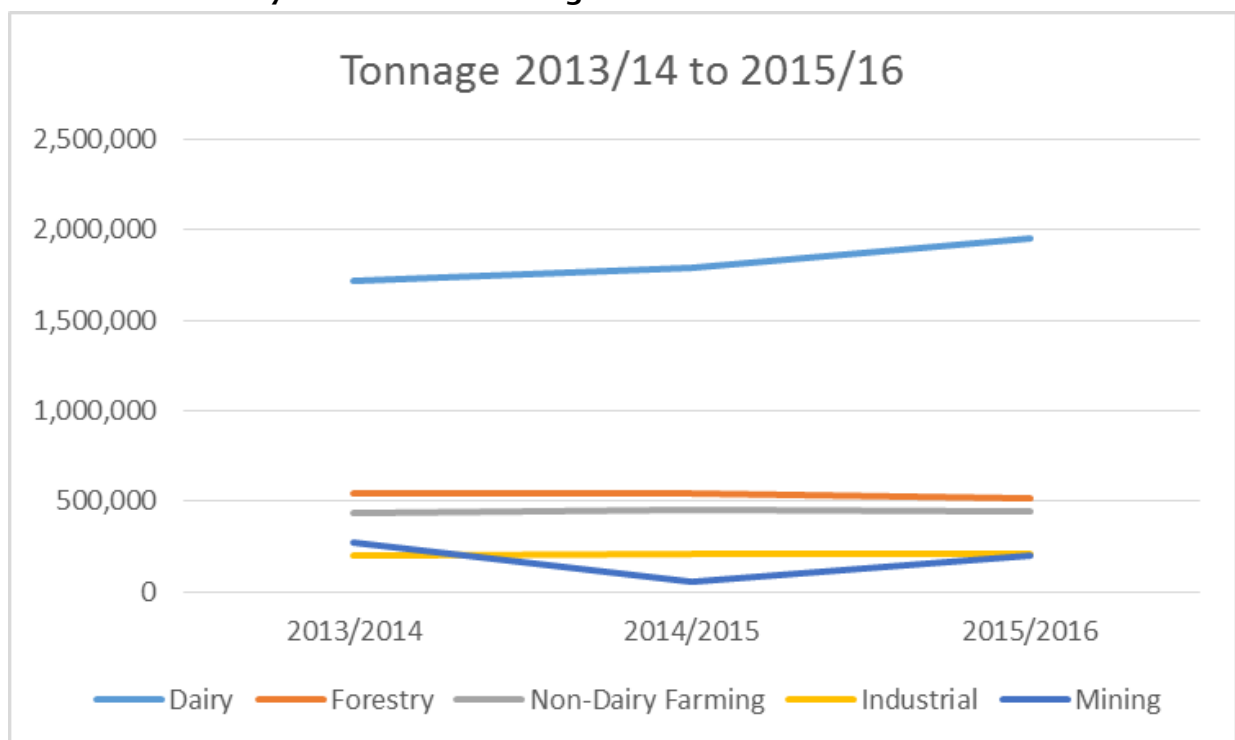
Having identified the outcomes desired by the Southland Community ('Our Way 2005'); SDC was aware of the role roading plays in terms of contributing towards the achievement of the four well-beings (cultural, economic, environmental and social) including specific safety objectives.

**The first step in determining what fit for purpose means, is to understand what the road is for.** Transporting primary production underpins the economy of the area (and New Zealand) as well as providing the connecting framework for the Southland community.

This leads directly to the 'spend a dollar where you earn a dollar' philosophy. This required an understanding that the cost of providing the transport service needed to be balanced with the return from that investment.

In determining economic activity, SDC focussed on export receipts as a tangible income measure. Other organisations have used different measures for modelling economic activity such as GDP or land value.

### Southland Primary Production Tonnages



Analysis of the economic sectors by tonnage illustrated the dominance of dairying in Southland. In terms of the transport service, the associated value per tonne was much greater than other sectors with daily raw milk collection being central to dairy production. By comparison the forestry value per tonne is low and other farming activity (mostly sheep and beef) is high but involve infrequent transportation.

There was also a logical alignment between the economic return and the demands on the transport system (kilometres travelled, tonnages carried, truck configuration).



The ENP inputs are as follows.

<b>Data</b>	<b>Description</b>	<b>Source</b>
Economic flows	Outputs in value of export receipts per annum	Statistics NZ
Land use	Export value calculated per hectare per annum	SDC GIS/Pathways
Whole of life cost of assets	Annualised maintenance plus depreciation	RAMM and Maintenance Contracts
Vehicle flows	AADT	RAMM
Crash information	Social cost of safety	CAS
Emergency Management considerations	Emergency events, lifeline infrastructure and intervention, historic records of floods, liquefaction assessments.	SDC and Environment Southland GIS

(Adapted from MWH, 2012, Economic Network Plan: Supporting information for the Road Maintenance Task Force)

The costs associated with the lifecycle management of the network projected forward identified the overall state of the asset. There is a considerable portion of the sealed network nearing the end of economic life, and funding ‘wholesale renewal’ was beyond available funding levels.

In summary the attributes considered are:

- value of export of product
- the wellbeing of the community
- the safety context.

## 2.3 Building a Model

The Economic Network Plan is an asset management approach that considers the lifecycle management requirements needs of a road against the costs of meeting that management regime. This is quite different to projecting the costs alone.

Rather than treat all parts of the network the same, the ENP allows SDC to determine where the expenditure will contribute to the greatest financial return to the community. The ENP also allows SDC to determine where the management approach to date represents over-investment or under-investment in any part of the network.

The development of the ENP was jointly funded by SDC and NZTA, and jointly developed by SDC and MWH.

The outcomes required from the ENP revolve around a fit for purpose roading service; this includes:

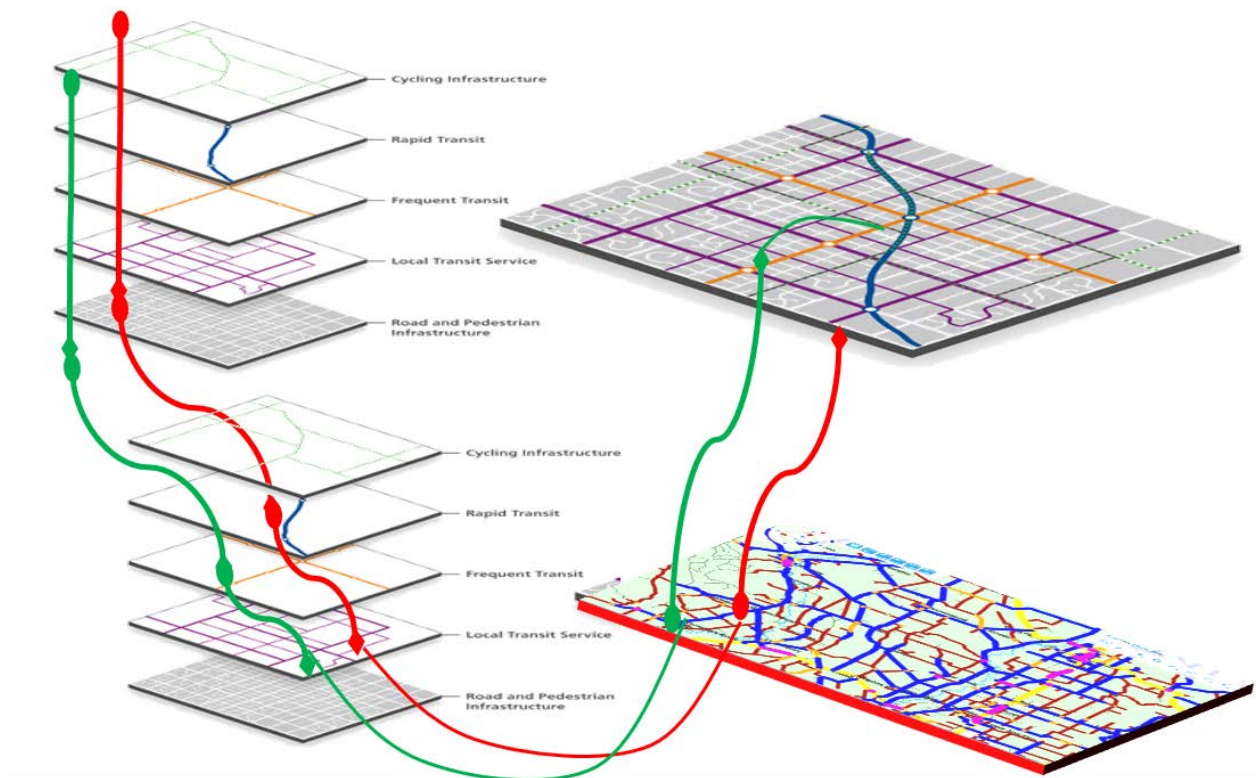
- Safety
- Road Condition (Levels of Service)
- Enable Exports
- Service Delivery

- Customer Quality

The Southland roading network for dairy activity is relatively straight forward. Fonterra's Edendale Plant is the only significant dairy factory in the region and the site has some 1200 movements per day of which 700 are raw milk delivery. All processed product is freighted out by rail.

The ENP relies heavily on SDC's Geographic Information System, incorporating land information, road network and road safety information. The addition of economic information brought in an element that was previously ignored. The ability to compare what was/is proposed to be spent on portions of the roading network, and compare this with the associated economic benefit was a powerful decision making tool.

## ENP Service Taxonomy



The key output of the ENP is the investment strategy for the local roads. These strategies have been grouped as:

- Road uneconomic for Council to own (long term – short term)
- Downgrade levels of service (and resulting reduced cost)
- Consider dynamic change of level of service
- Retain or upgrade level of service
- Optimise use of network for: localised growth, farm gate to plant / port and export growth, commercial and social route and access optimisation
- Multi-modal shift and integration (future greenfield) opportunities

- Develop adaptive response of network use to changing funding scenarios (potentially drive land use behaviours through District Planning processes to match network ability to meet future ability to fund provision of the network)

Over time the communication with transport operators has improved to a point where there is a more integrated approach to the service. Fonterra projections are now part of SDC's planning and the organisations are working together to deliver joint benefits.

## 2.4 Communication Benefits

The Economic Network Plan provided a new platform for discussion. Once the main purpose of the roading service was agreed on, the lines of communication were opened about how the service should be provided. A change occurred in the conversation and this involved, elected officials, staff, the wider community and funding agencies.

**The understanding that 'No one- road is greater than the network' grew.**

This represented a shift in Council's approach:

1. A Shift from "Engineering" to 'Customer Service Network Management' (why the service is provided)
2. Manage Customer Expectations rather than react
3. Make safety a priority
4. Investment in technology and information to understand, manage and integrate with HCV operators.

## 2.5 How do the ENP and ONRC relate to each other

The development of the ENP predates the One Network Road Classification System. The objectives are very similar. Both approaches provide a framework for understanding the function and use of the network, along with a robust basis for prioritisation.

SDC was involved in the development of the ONRC, being one of the road controlling authorities piloting the system.

SDC's classification of its network under ONRC demonstrated this with a 2% variation between the approaches. This may be less once data irregularities are excluded.

The use of Annual Average Daily Traffic (AADT) combined with the number of Heavy Commercial Vehicles (HCV's) provides a proxy for economic activity; however the nature of HCV movements is not considered. By comparison the ENP models the economic value associated with the use of the road.

SDC has operated a comprehensive traffic counting programme for many years and this has been of real benefit in the analysis of light and heavy vehicle network use.

## 2.7 Lessons Learnt

One of the early learnings was that some roads were poorly constructed, possibly in a race to extend sealed roads into the hinterland. Unfortunately, this leaves a legacy of low volume roads with high lifecycle management costs.

It is clear that these roads wouldn't be sealed if they were being constructed or considered for seal extension today. In effect this represents a historic level of over-investment in some very low volume roads.

While there is a wealth of information available this varies considerably in the way it can be used. While the economic data may be regarded as detailed by economists, it was very coarse when applied to geographic portions of the district.

Initially the tool was developed to assist with network management and decision making, the level of focus involved provided an excellent framework for discussing the network, along with the expectations and the financial ramifications involved.

The shift in focus also represented a culture change from the business as usual approach in place. This required change from the community, Council and the contractor in their expectations and actions.

There is a degree of risk involved in any management regime. The former approach 'came to a head'; when it was clear that there was insufficient funding to continue. With the ENP opening the lines of communication, the risks become clearer and the level of risk that is acceptable was understood much better. Quickly Council had no appetite to overspend on underutilised roads.

The ENP approach is a focus on outputs not inputs, driven by financial constraints. This is very different to an asset management process that produces an expenditure projection, and anticipates the resulting budget will be provided. The process is about providing a fit for purpose network based on good business decisions.

## 2.8 Would an ENP help others?

Road controlling authorities need to consider what the purpose of their network is, and if the information available represents if this is being supported. In the SDC case, the focus on economic productivity could not be defined in terms of traffic numbers or metrics across the network. In applying this approach Council was able to take a very focused approach to lifecycle management.

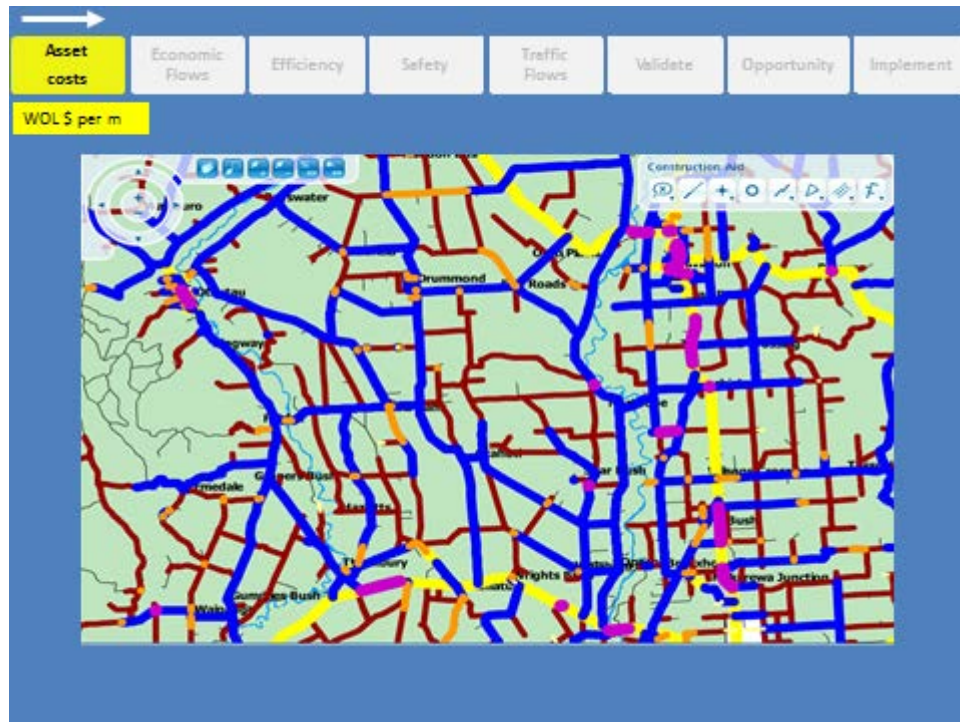
Understanding your network's purpose is key to robust communication and good decision making. While the network statistics may not differ significantly between an ENP and ONRC, the conversation will be different.

The ENP when applied to the specific characteristics of the economic activity in a district will highlight matters of priority.

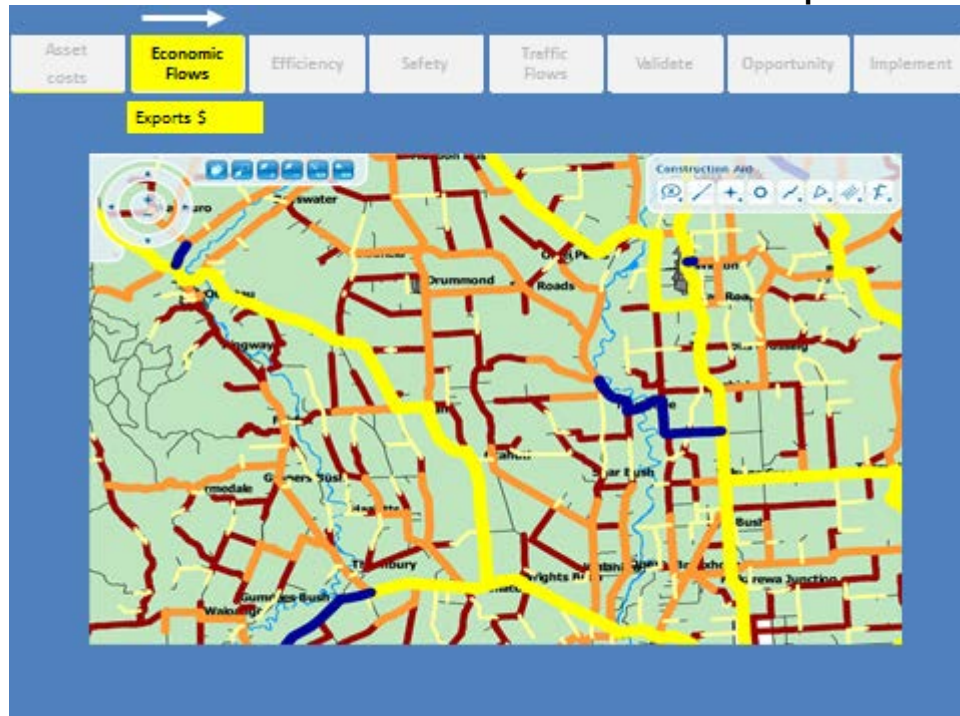
# Appendix

## ENP Illustrations

WHOLE of LIFE Cost ENP MAP:

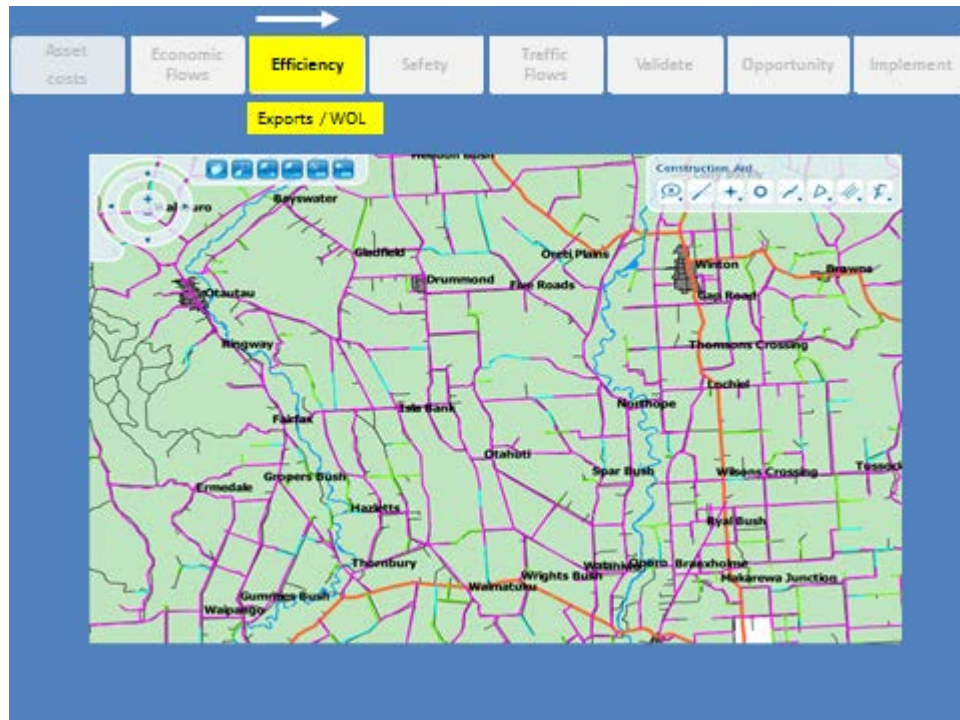


ENP ECONOMIC EXPORT FLOW MAP – EXPORT Merit per ROAD:

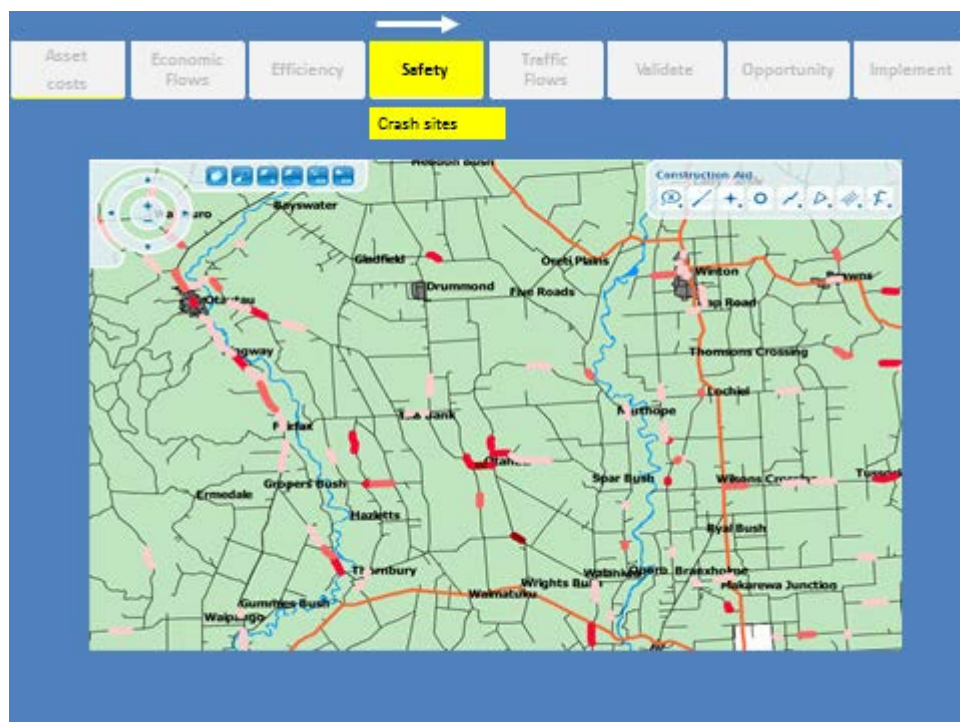




## EXPORT Demand REFLOW EFFICIENCY MAP:

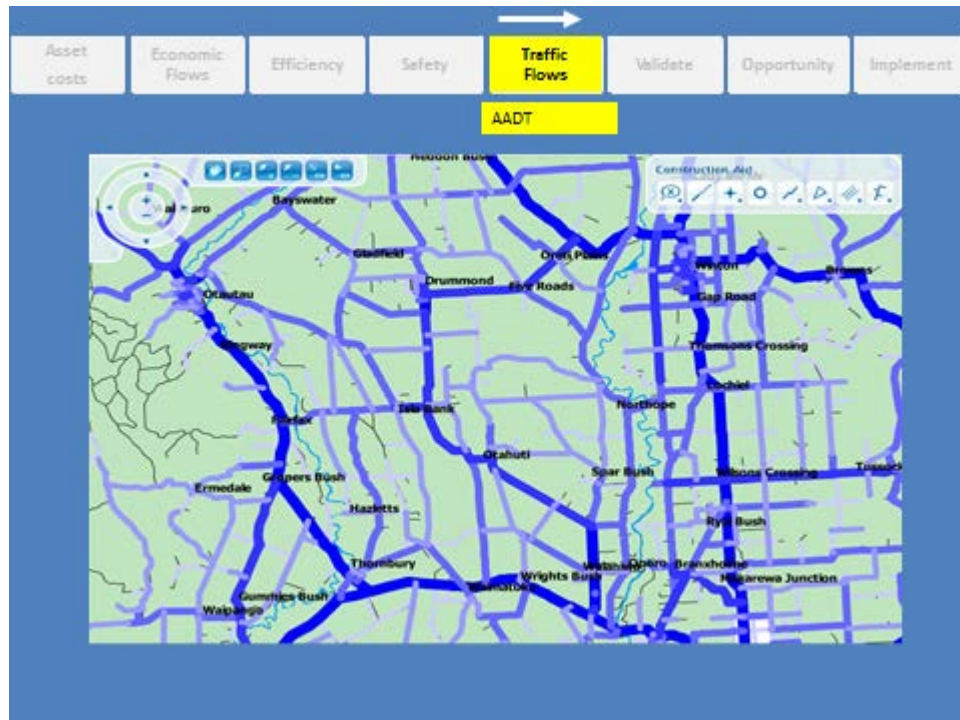


## ENP SAFETY SITES and INDICEES OF COST - LOSS:





## ENP ALIGNED WITH AADT and ONRC Flows:



## MAINTAINANCE ENP USE VALIDATION:

