

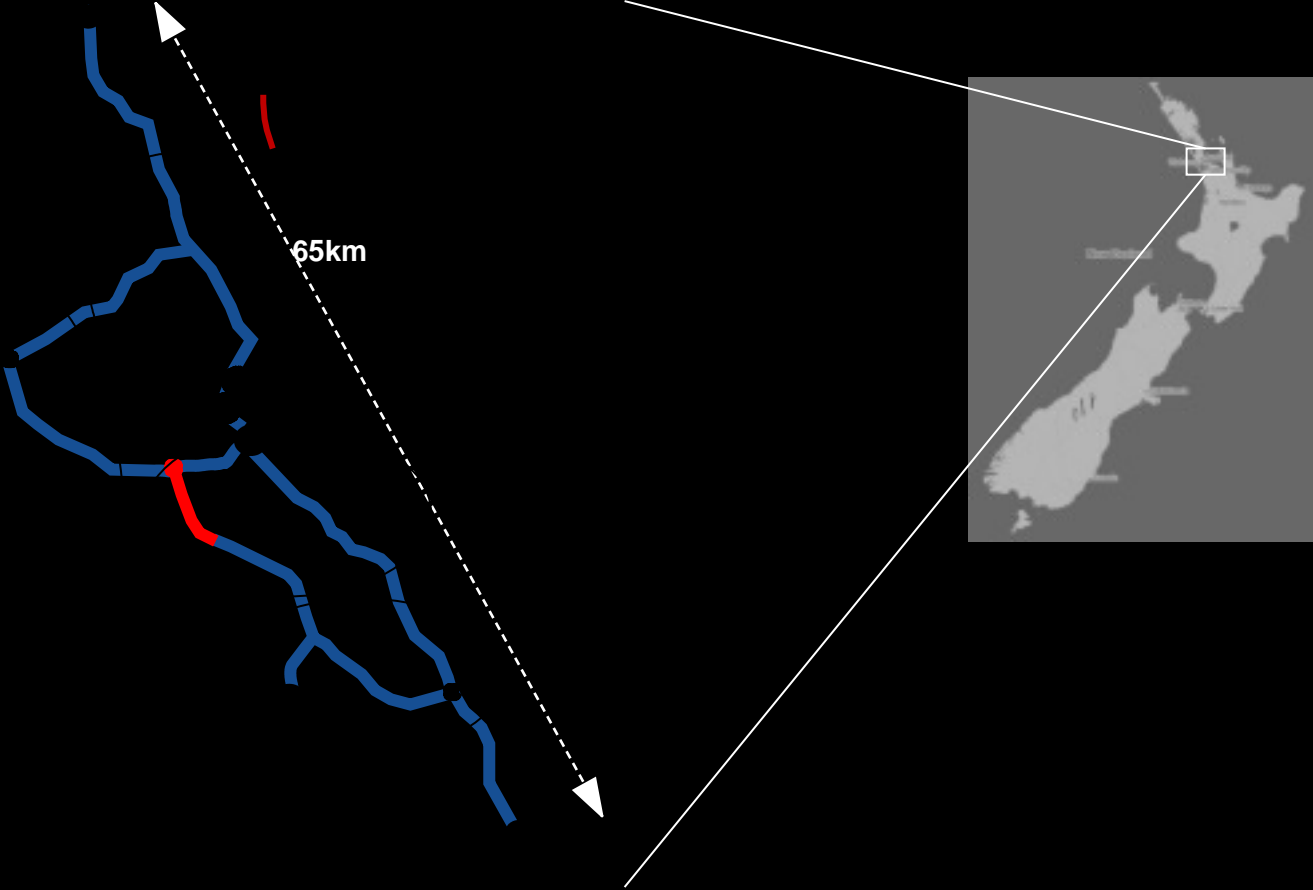


# Waterview Tunnel: Assessing the Early Impacts

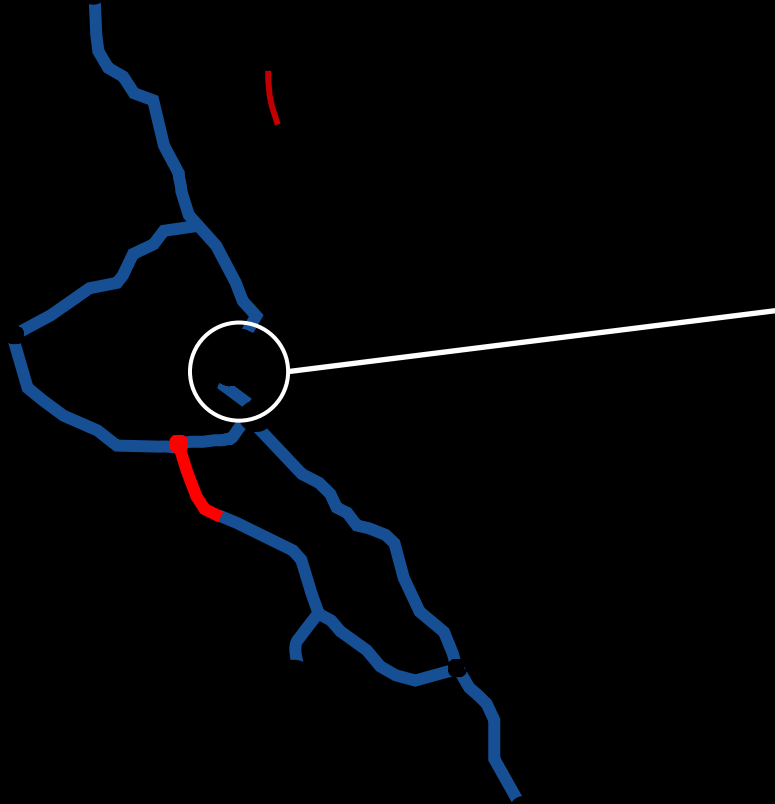
*Andy Hooper*

*Chamika de Costa, Hoda Rezaie,  
Ranjan Pant, Soroush Rashidi, Taylor Carnell*

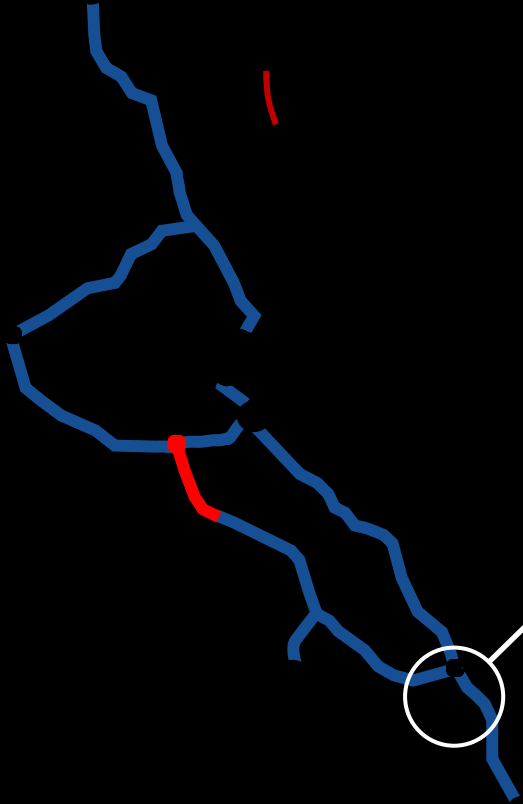
# Auckland's Motorway System



# Auckland Harbour Bridge opening 1959



# SH20 – SH1 Interchange - 2010



NEW ZEALAND

## \$220 million link road creates more motorway congestion

14 DEC, 2010 12:58am © 2 minutes to read



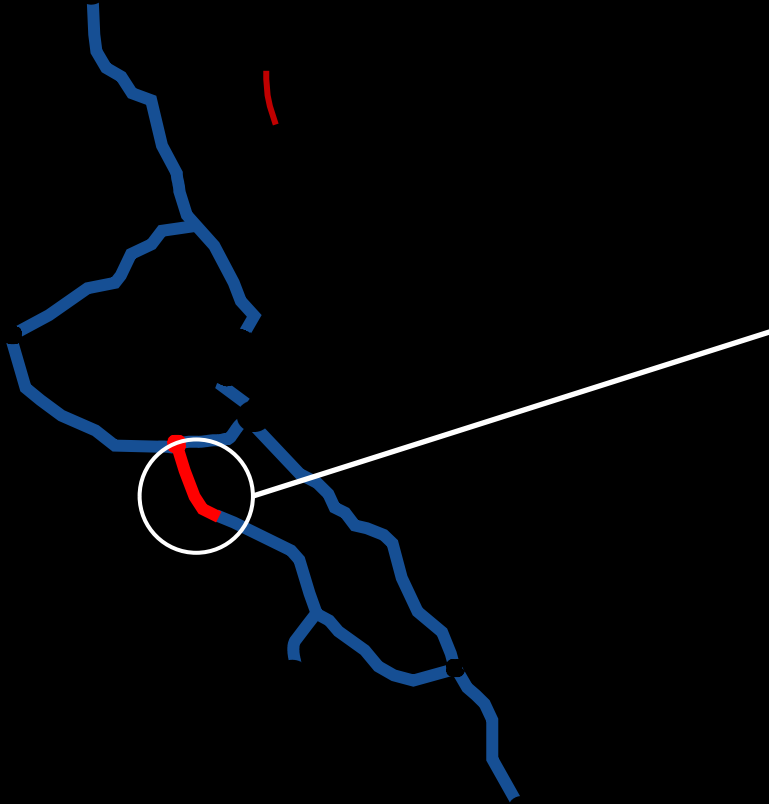
Photo: Paul Edwards

NT 1 road  
By Matthew Greenaway

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A new \$220 million Auckland link road designed to take the pressure off State Highway 1 is having the opposite effect, forcing transport bosses to install traffic lights to ease congestion.

# Pre-Waterview headlines 2017



NEW ZEALAND

## Warning: Waterview tunnel will open to gridlock

20 Feb, 2017 5:08am © 3 minutes to read



Herold on Sunday

Significant delays, or even gridlock, are predicted when traffic lights are installed to enter Auckland's \$1.4 billion Waterview tunnel connection project.

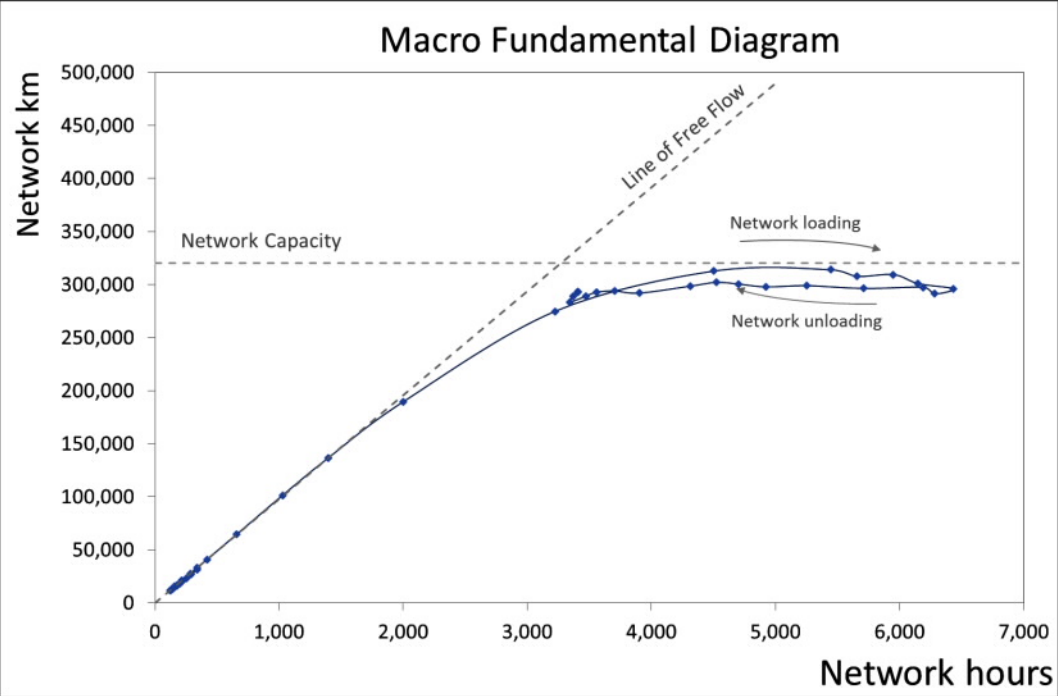
The image shows a news article snippet. At the top, it says 'NEW ZEALAND'. The main headline is 'Warning: Waterview tunnel will open to gridlock'. Below the headline is the date '20 Feb, 2017 5:08am' and a '© 3 minutes to read' indicator. The main image is an aerial view of a highway interchange with a tunnel entrance, overlaid with a play button icon. Below the image are social media sharing icons for email, Facebook, Twitter, and YouTube. At the bottom, there is a caption: 'Significant delays, or even gridlock, are predicted when traffic lights are installed to enter Auckland's \$1.4 billion Waterview tunnel connection project.'

# Summary Network Performance Measures

- Demand
- Capacity
- Delay (Congestion)
  - *Magnitude*
  - *Concentration*
  - *Variability*



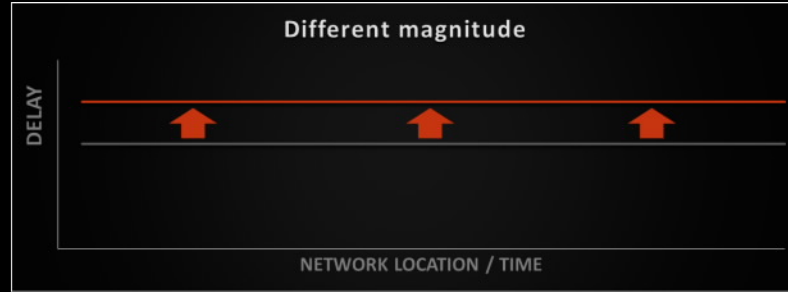
# Network Capacity



Aggregate data across all links for each 15 minute period

# Network Congestion Measures

*Magnitude*



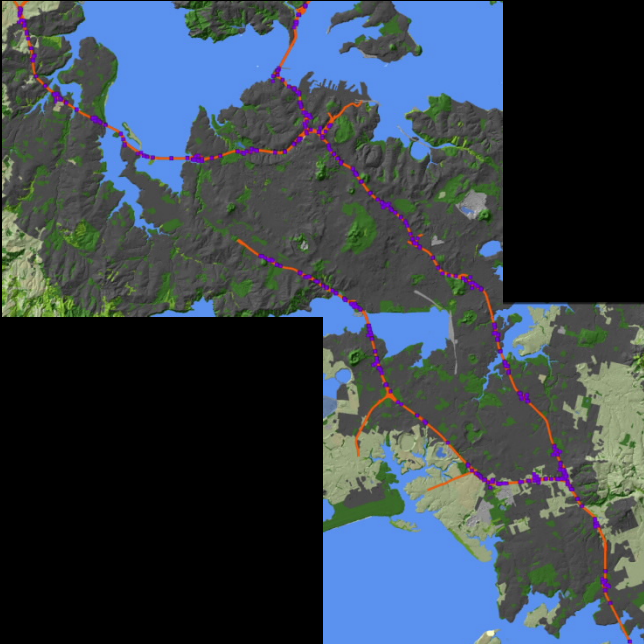
*Network Efficiency*



2,000+ Loop detectors

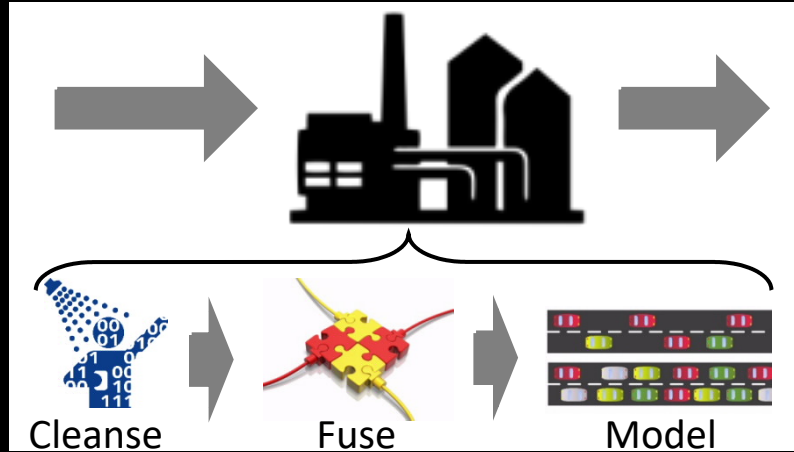
50+ Bluetooth detectors

Third party travel time data



## Input Data

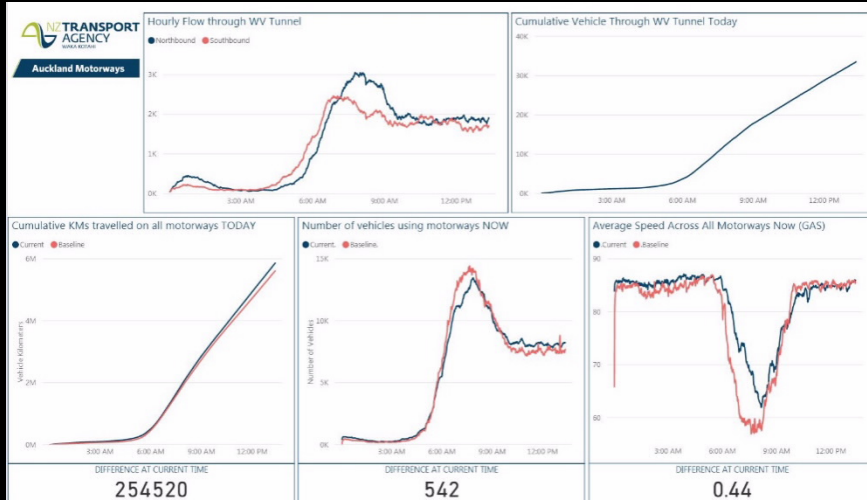
- Variable format
- Variable coverage
- Noise, errors
- Gaps and faults



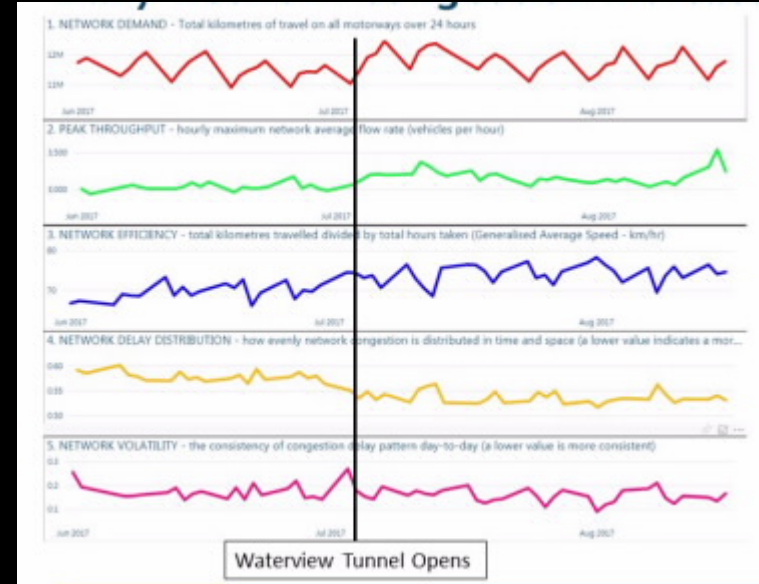
## Output Data

- Standard format
- Complete coverage
- Fully consistent
- No gaps

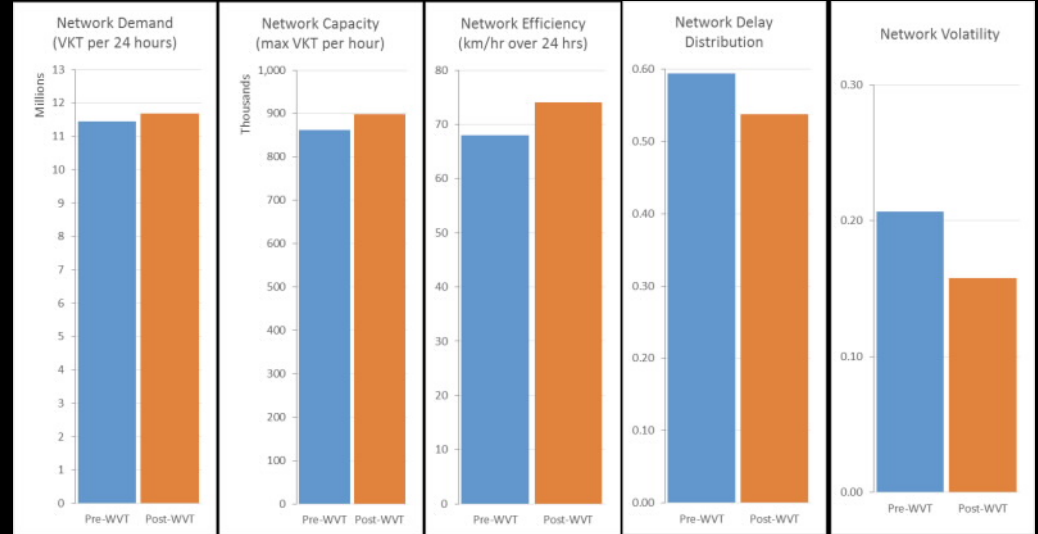
# Real-time Dashboards



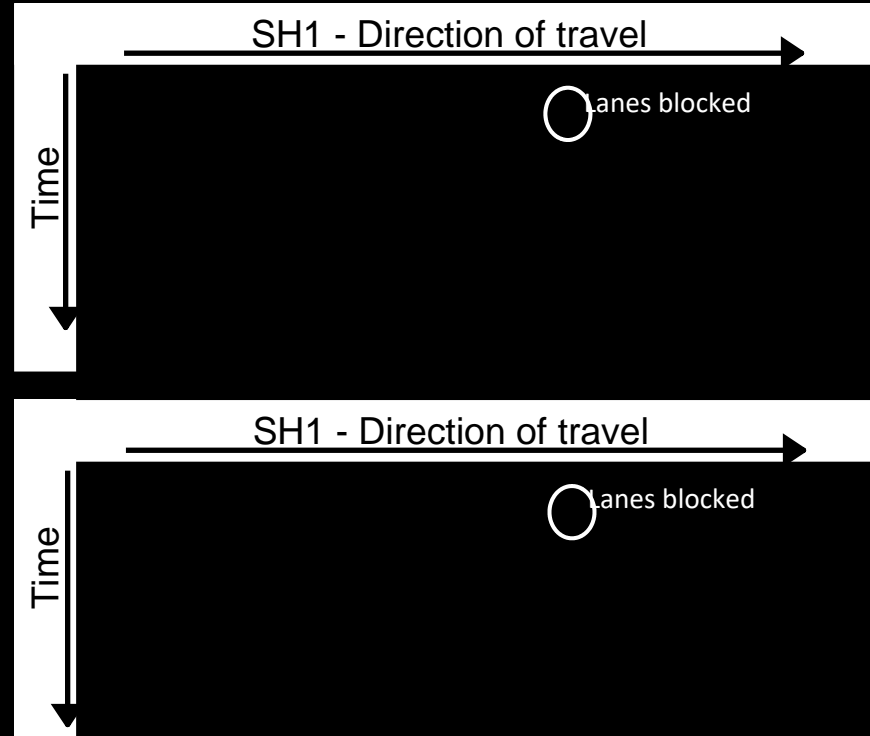
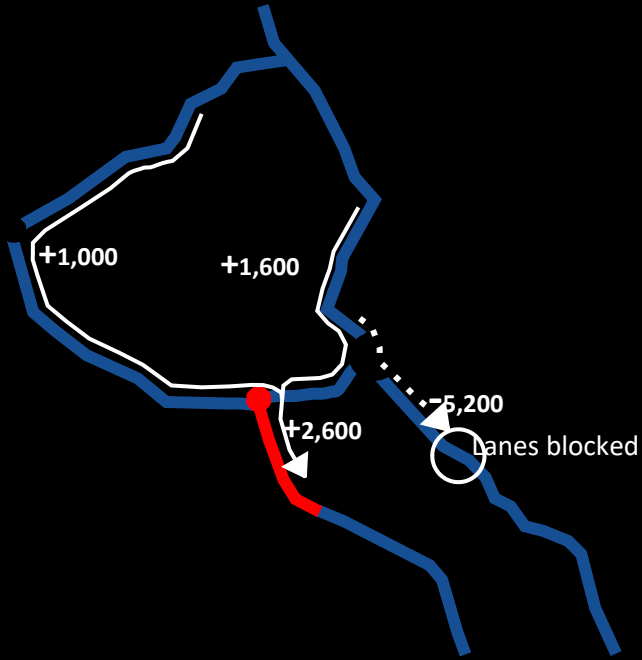
# Daily Performance Metrics



# Early Results – Network Metrics

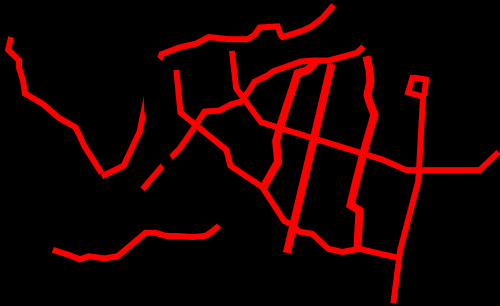


# Early Results – Network Volatility and Resilience

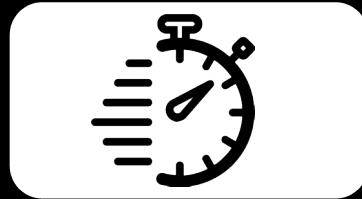


Speed (km/hr)
0 - 16
16 - 34
34 - 48
48 - 64
64 - 80
80 - 100

# Early Results – Wider Network

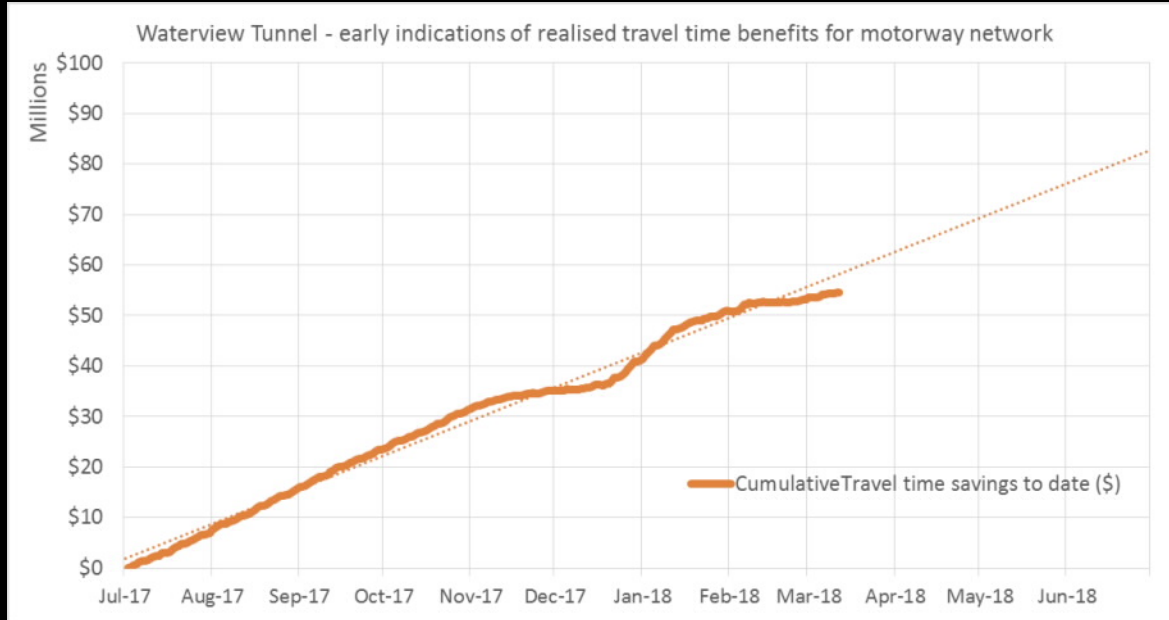


1,000 – 9,000  
vehicles per day



0 – 7 minutes  
average travel time

# Early Results - Headlines



## Waterview Tunnel has 'slashed' travel times

2:27 PM Thursday 03 August, 2017



Auckland's Waterview Tunnel has cut travel demand on State Highway 1 in the city by about 7 per cent, officials say.

There has been a corresponding increase on SH20 and SH16 and the redistribution "is resulting in a more efficient motorway system with around 8500 fewer hours each



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# System Development

