



# Measuring the Cost of Operational Resilience on State Highways



Thanura Rabel, REAAA Conference  
Wellington 2017

# Presentation Outline

1. Operational Resilience – High probability Low Impact Events
2. Strategic Context
3. NZ Transport Agency's Current Guidance
4. Introduction to Assessment Methodology
5. Case Studies
6. Conclusions and Outcomes
7. Lessons Learnt and Final Thoughts

# High Probability Low Impact Events

- Incidents which occur in an operational sense
- Short duration – typically resolved in a matter of hours not days



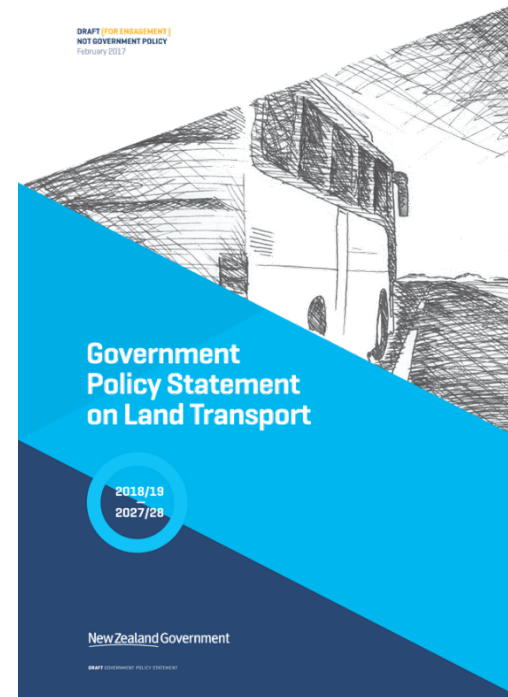
NZTA Wellington @NZTAWgtn · Jul 27

CRASH: #SH2 Ngauranga Interchange blocking the right hand southbound lane. Congestion is back past Petone so please be patient. ^IF



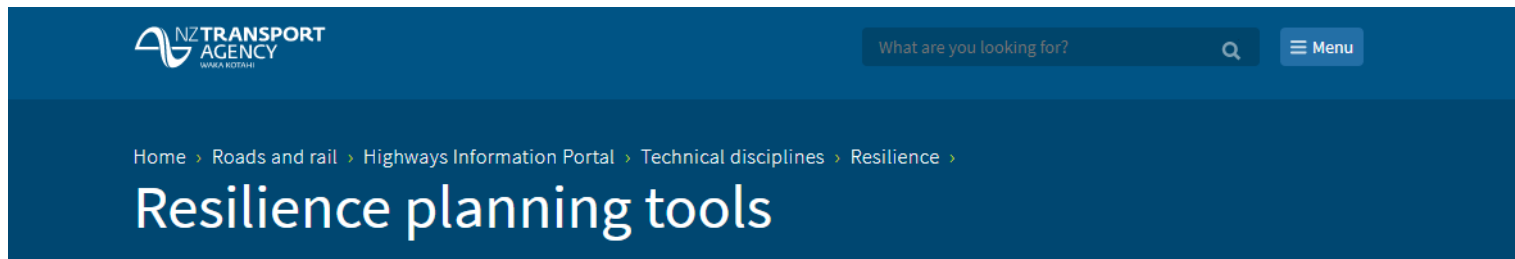
# Context

- Government Policy Statement Draft 2018
- Predictable Journey's
- Customer satisfaction



# Resilience Planning - NZTA

- Resilience Planning Tools
- Traffic Road Event Incident System (TREIS)
- One Network Road Classification
- Economic Assessment – MERIT Tool



The screenshot shows the top navigation bar of the NZ Transport Agency website. On the left is the NZTA logo with the tagline 'MAKING MOTORS'. In the center is a search bar with the placeholder text 'What are you looking for?' and a magnifying glass icon. On the right is a 'Menu' button with a hamburger icon. Below the navigation bar is a breadcrumb trail: 'Home > Roads and rail > Highways Information Portal > Technical disciplines > Resilience >'. The main heading of the page is 'Resilience planning tools' in a large, white, sans-serif font.

# Basic Methodology

## 1. Assess Probability

- Annual frequency of Occurrence

## 2. Assess Consequence

- Travel time delay

## 3. Determine Lifecycle Cost

- Economic Evaluation Manual

**Case Study One**: Simple (First Principles)

**Case Study Two**: Complex (Traffic Modelling)

# Case Study One

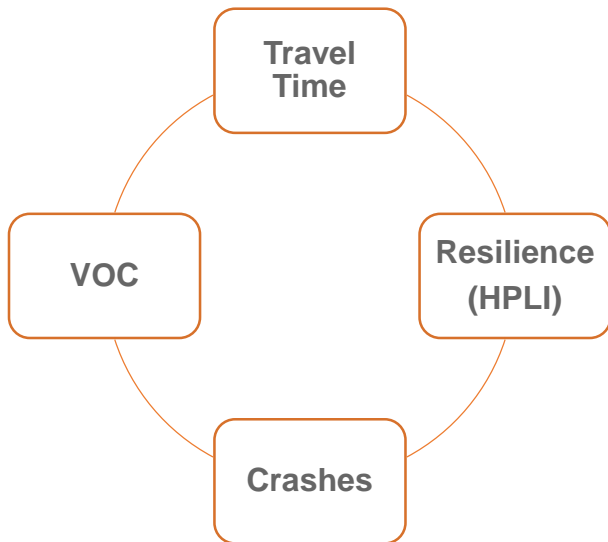
- ONRC Regional Strategic Highway
- Suffers from frequent road closures from slips, crashes and weather events
- Only alternative route is a 175 minute diversion
- Response time over 45 minutes
- As such, some vehicles are known to wait through entire duration of closure
- Option to provide improved route and capacity

## REGIONAL



# Case Study One

1. **Assess Probability:** TREIS records for partial and full road closures. Confirmation with NOC operator
2. **Assess Consequence:**
  - Full road closure
  - Partial road closure
3. **Determine Cost:** Economic Evaluation Manual



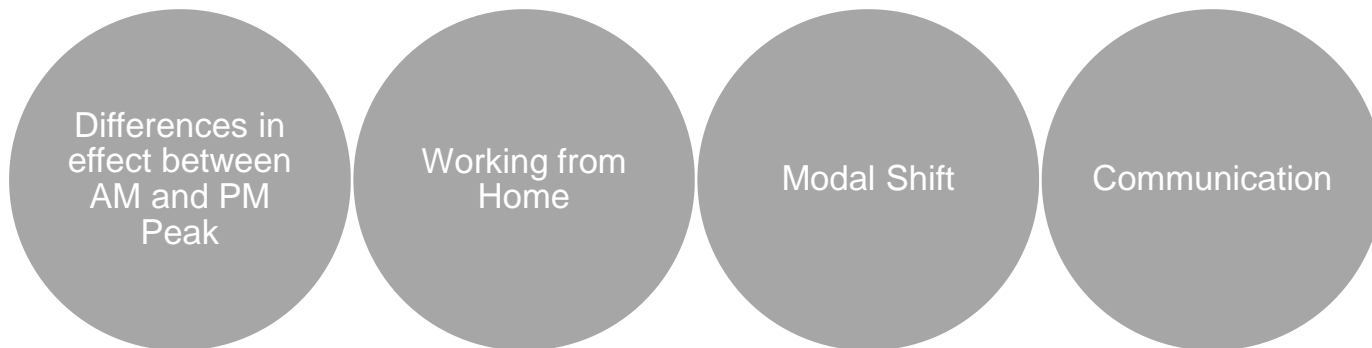
*Preliminary results show that HPLI benefits account for **15% to 19%** of the total PV benefits package*



# Case Study Two

- ONCR National High Volume Urban Road
- Suffers frequent crashes during peak hours with slips and flooding also common
- Strategic level transport model for the surrounding network available
- Option to provide alternative route

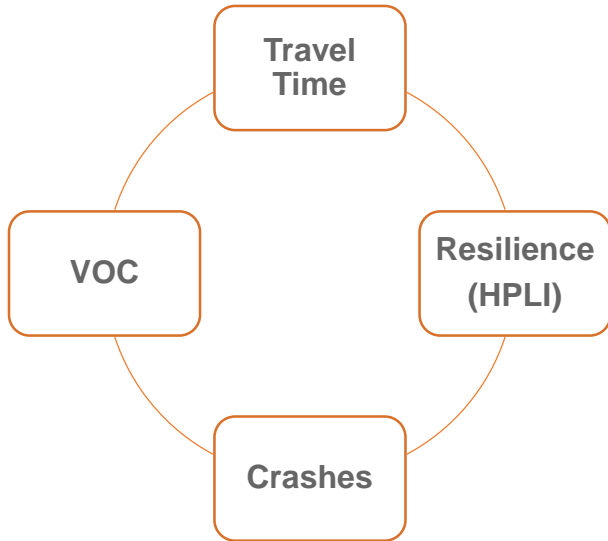
## Other considerations for Urban Context



# Case Study Two

1. **Assess Probability:** TREIS records for partial and full road closures. More detailed analysis to categorise into time periods (i.e. AM, PM and Inter-peak)
2. **Assess Consequence:** Transport modelling used to assess network wide impacts
  - a) Full road closure: Link fully closed and vehicles are required to use alternative routes
  - b) Partial road closure: Capacity reduced on link to emulate one lane.
  - c) Effects on traffic already using alternative routes
3. **Determine Cost:** Economic Evaluation Manual

# Case Study Two



*Preliminary results again show that HPLI benefits account for **10% to 15%** of the total PV benefits package*

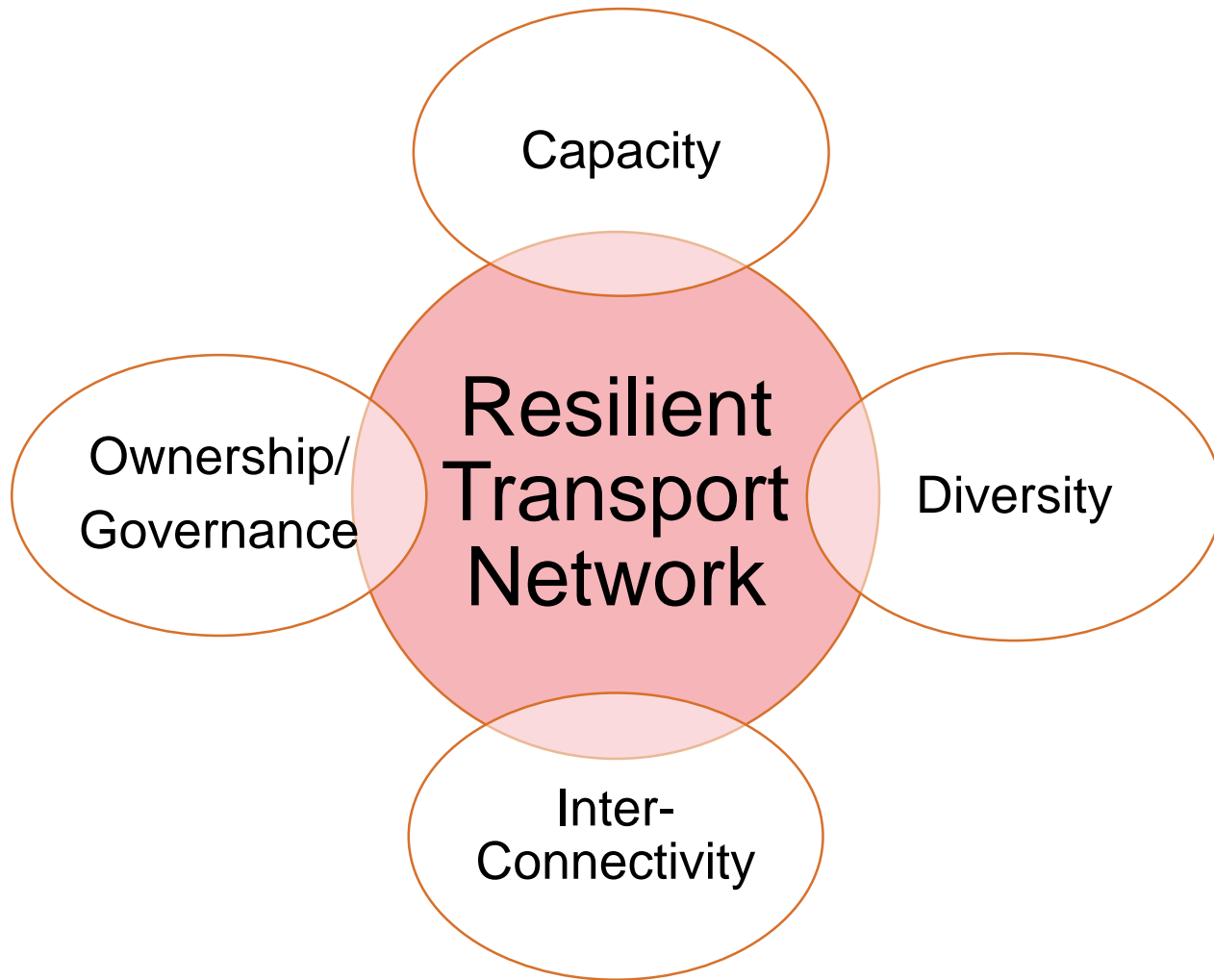
# Conclusions

- HPLI resilience benefits are there and worth pursuing at the right sites!
- Establish site context. These are the key drivers for HPLI benefits:
  - What are the alternatives and associated delays?
  - Traffic volumes
  - Obvious problems with road closures?
- Access to incident records (alternatives to TREIS is the NZTA twitter feed)
- Benchmarking through performance regime based on ONRC – much like PPP projects

# Lessons Learnt

- Variability in TREIS data. Duration of closure is not necessarily the actual duration of closure but rather when it was logged
  - Important to confirm TREIS data with NOC operator
- Uncertainty always going to be there!
  - Sensitivity testing
- NZTA Incident Management Tool

# Final Thoughts



# Acknowledgements

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