Dale Harris

Developing a Risk Prediction Model for a Safe System Signature Project

abley
transportation consultants

ConnectBetter

Developing a Risk Prediction Model for a Safe System Signature Project

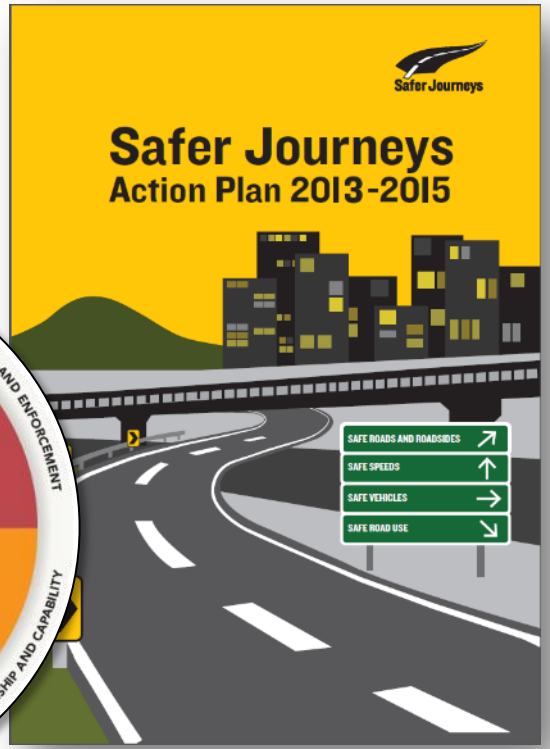
Dale Harris
Paul Durdin

IPENZ Transportation Group Conference 2015

Introduction

- Eastern Bay of Plenty Safe System Signature Project

- Development of a risk prediction model and mapping interface: “SignatureNET”



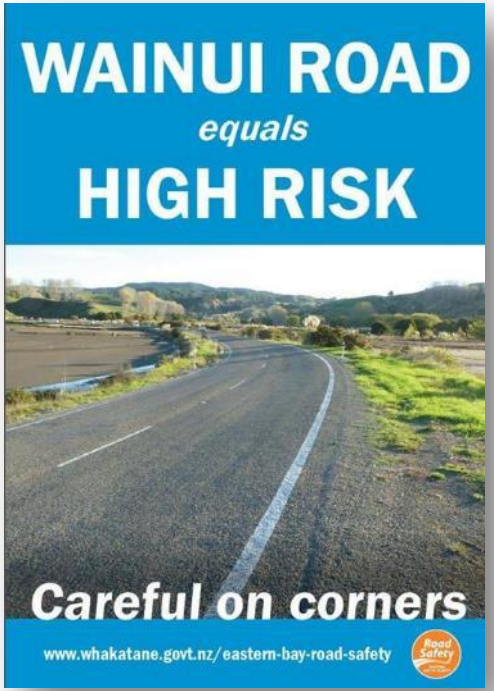
Context – Eastern Bay of Plenty Signature Project

- Whakatane, Opotiki and Kawerau districts
- Focus on rural road safety

Risk Prediction - EBoP

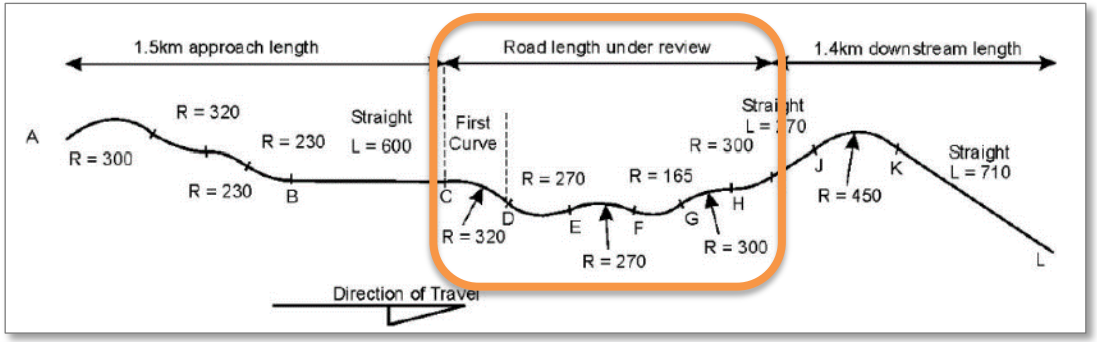
- 57.9% of rural crashes occur on curves
- Low volume road network (1500 km)
- ‘Traditional’ risk assessment using crash history unreliable

- A new methodology is required…



Austroads Operating Speed Model

- Uses road geometry to estimate 85th percentile vehicle operating speeds by modelling:
  - acceleration on long straights
  - deceleration on curves
- Also identifies curve risk (desirable, undesirable, unacceptable)



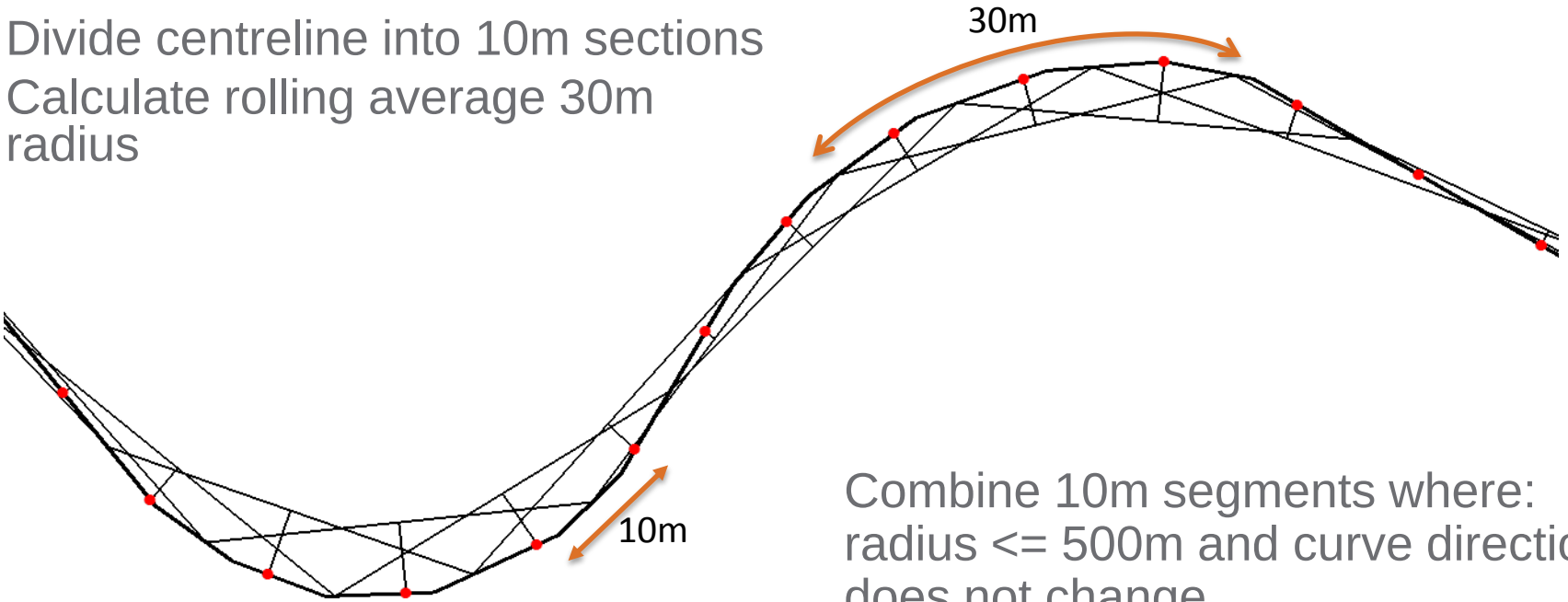
A GIS Approach…

Input: high quality road centreline

A GIS Approach...

Curve Identification

- Divide centreline into 10m sections
- Calculate rolling average 30m radius

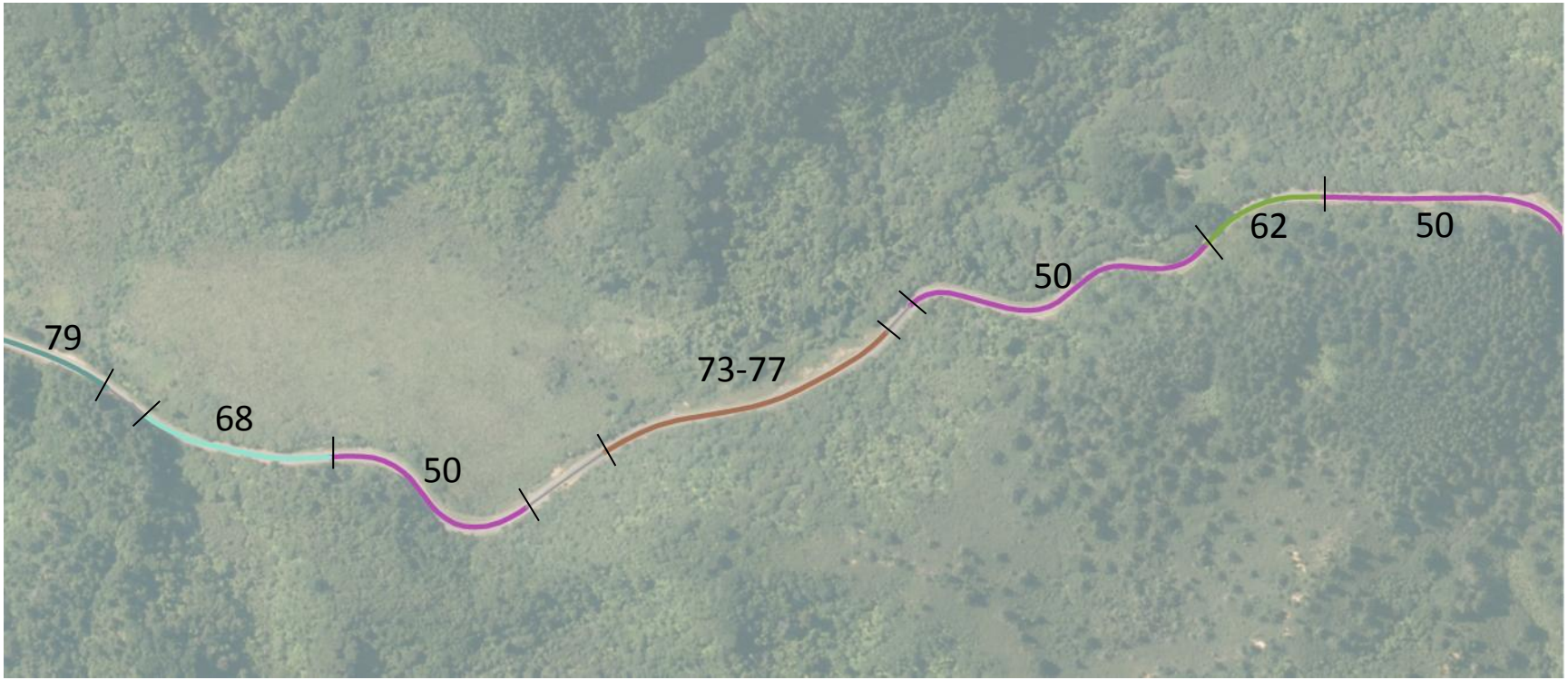


Combine 10m segments where: radius <= 500m and curve direction does not change

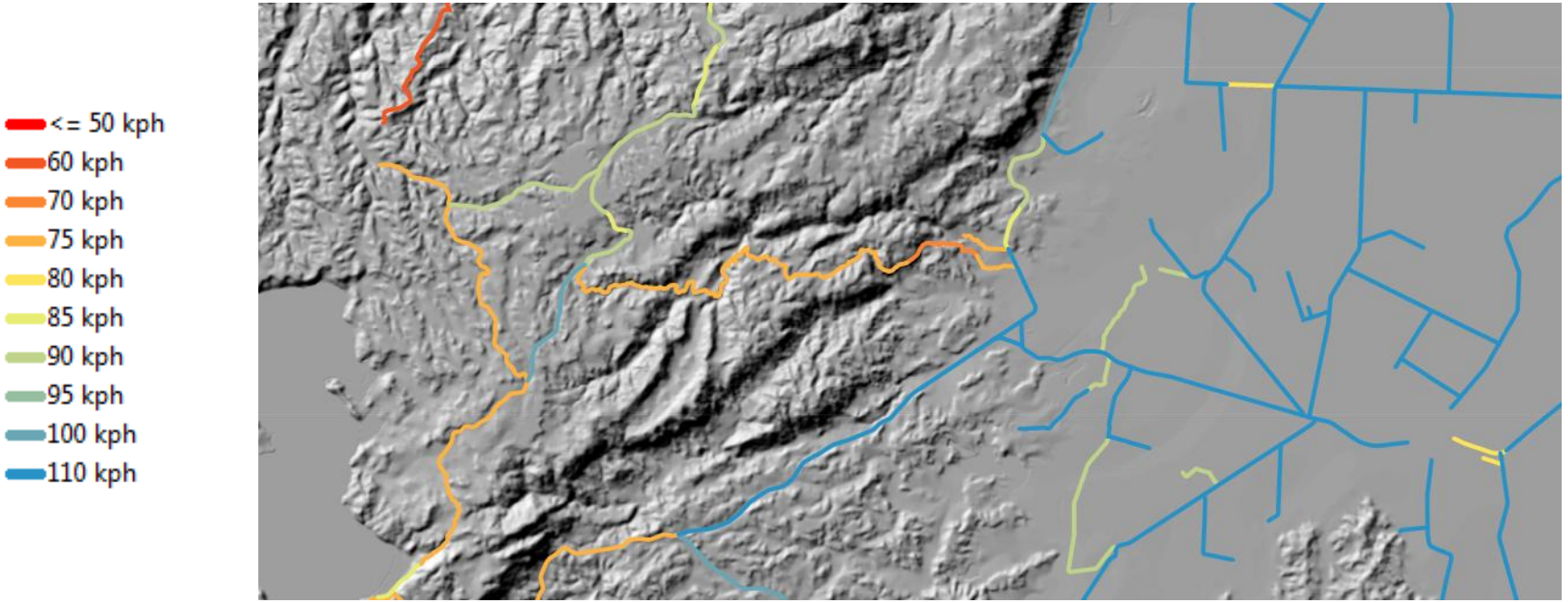
A GIS Approach...

Curve Identification

A GIS approach - Identify Operating Speed Sections



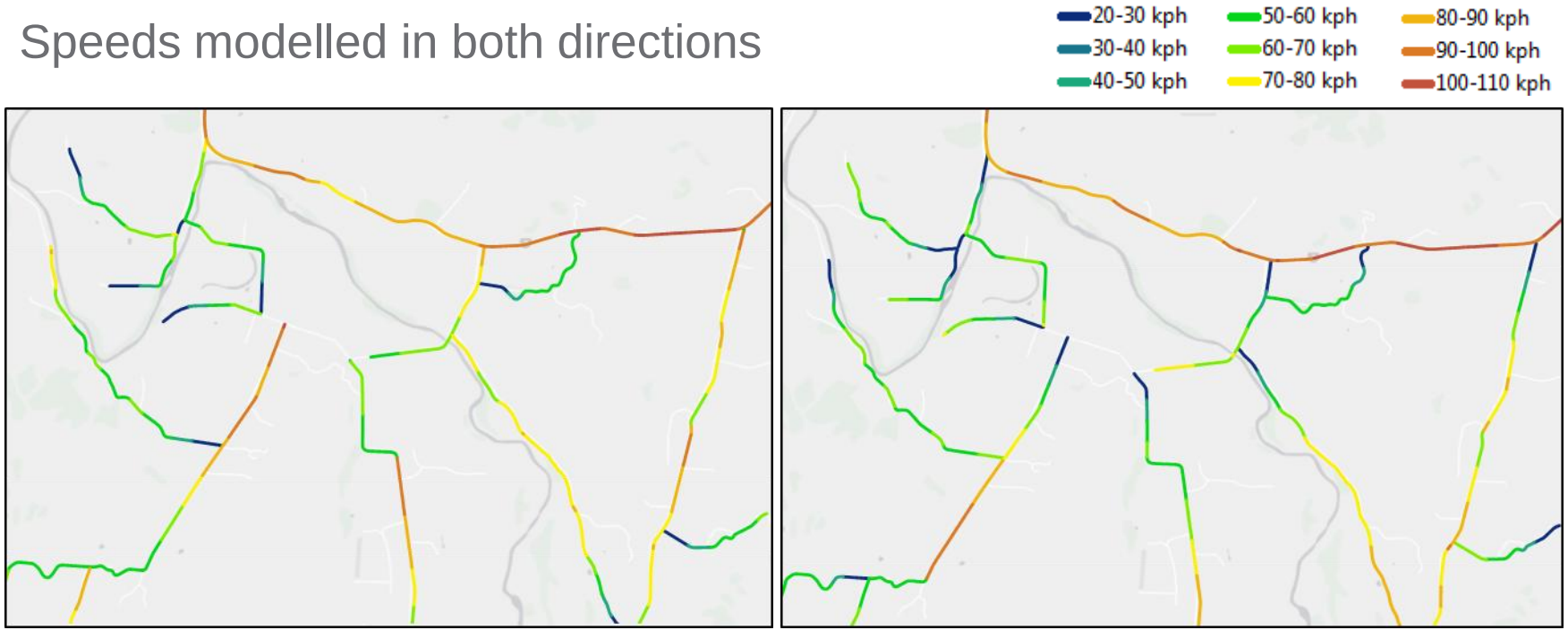
A GIS Approach... Identify Maximum Speeds



Maximum (desired) speed derived as a function of **curvature** and **terrain**

A GIS approach… *calculate operating speeds*

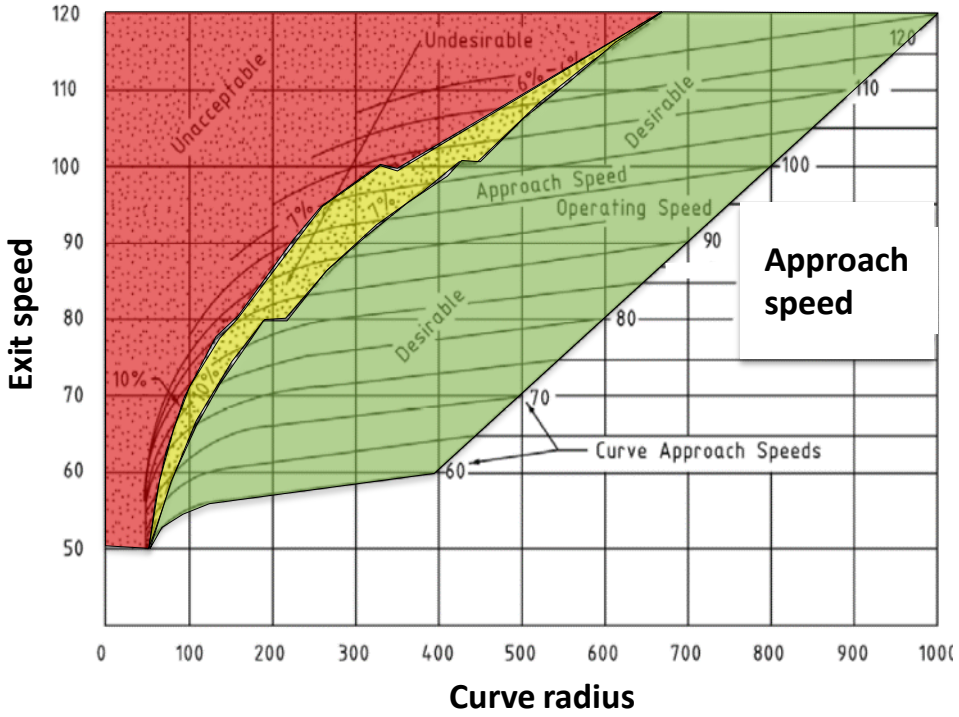
Speeds modelled in both directions



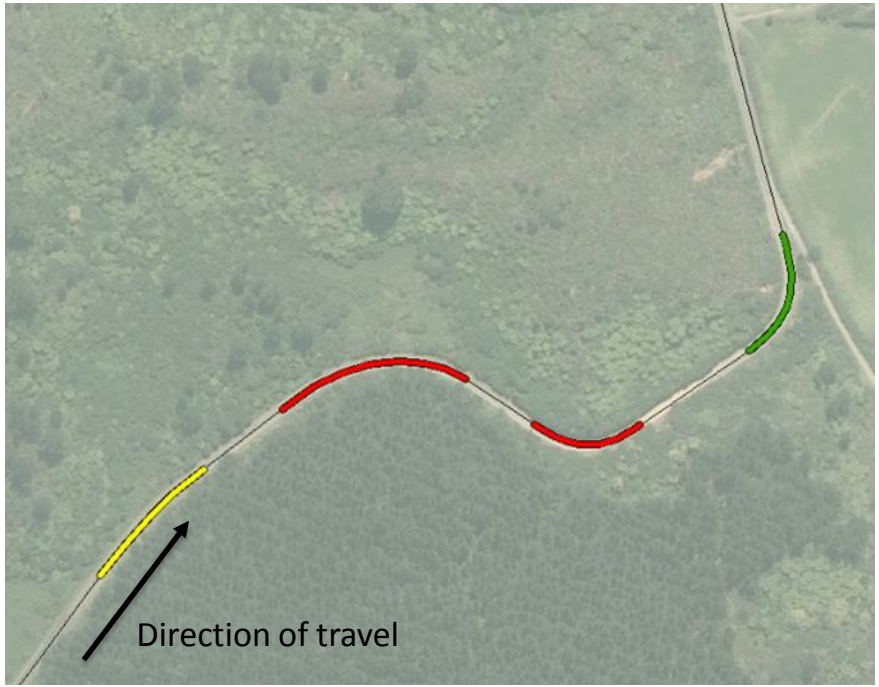
Identifying curve limits

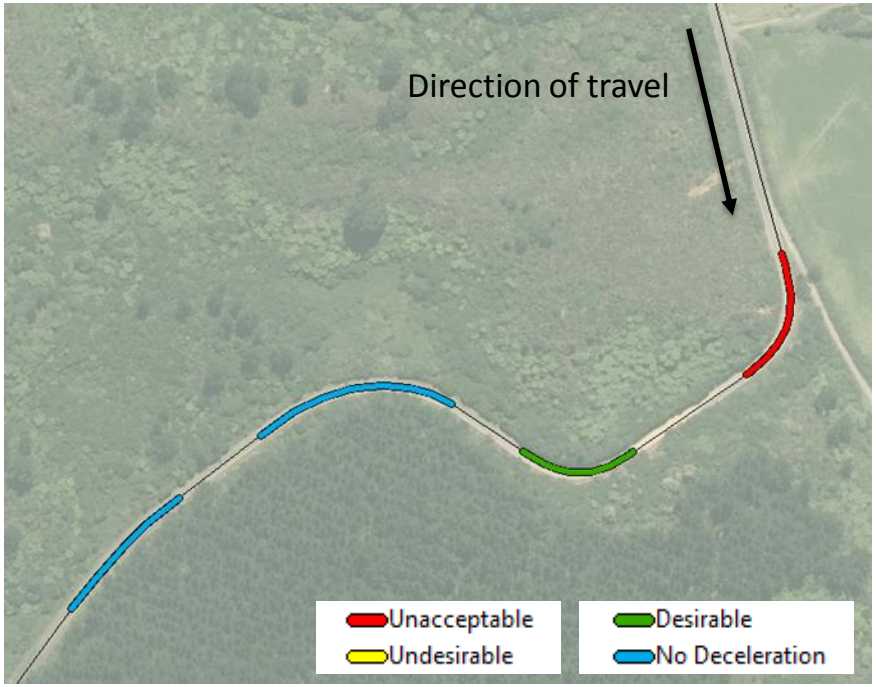
- **Within context:**
- No limit (no deceleration)
- Desirable (some deceleration)

- **Out-of-context:**
- Undesirable
- Unacceptable



Identifying curve limits

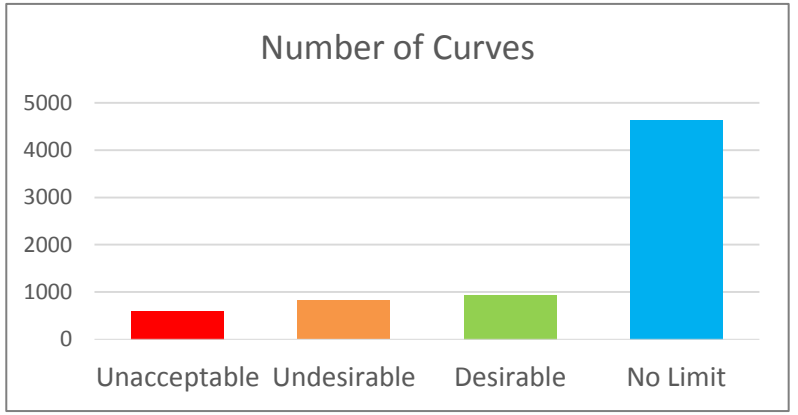


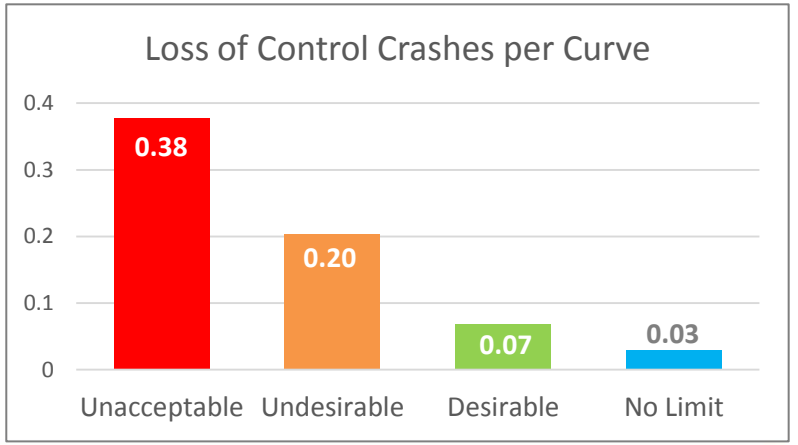


Results / Validation

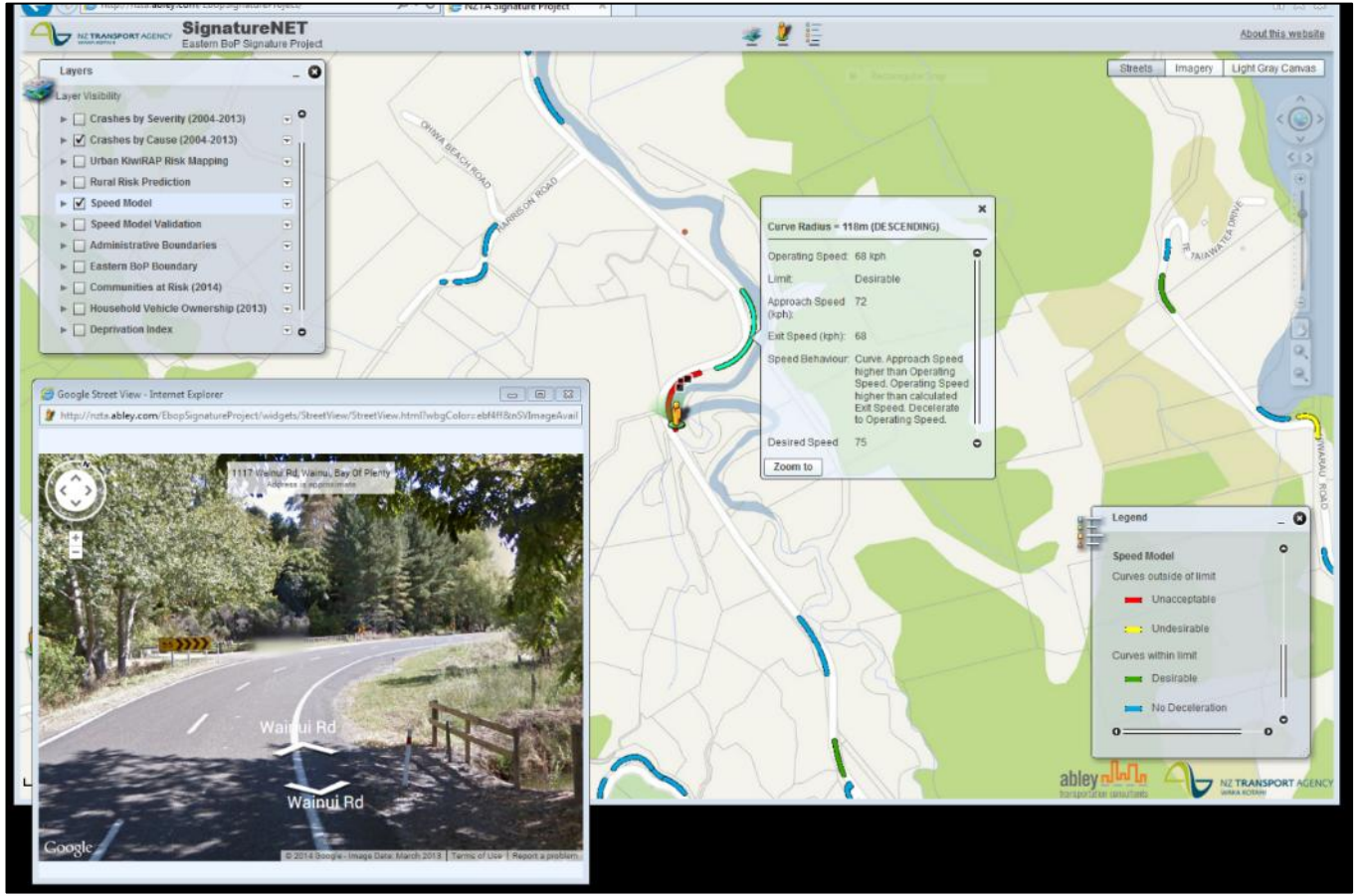
6,985 curves identified

66.6% of loss of control crashes
occurred on the
20.3% of curves
classified as ‘unacceptable’ or ‘undesirable’.





"SignatureNET" web viewer



Applications / Conclusion

- Supports prioritisation of targeted road safety interventions
- SignatureNET as single source of road safety information for all project partners
- Demonstrates innovation within a safe systems project

- Speed model as an alternative to GPS operating speed data?

Dale Harris

T +64 3 367 9071

M

E dale.harris@abley.com

Contact the office

T +64(0)3 377 4703

M +64(0)3 377 4700

W **www.abley.com**

Auckland

Level 8, 57 Fort Street
P O Box 911336
Auckland 1142
New Zealand

Christchurch

Level 1 and 2,
30a Carlyle Street.
PO Box 25350,
Christchurch 8144
New Zealand

Safety