MOT and NZTA
Traffic Counting Project

Fergus Tate

MWH

BUILDING A BETTER WORLD

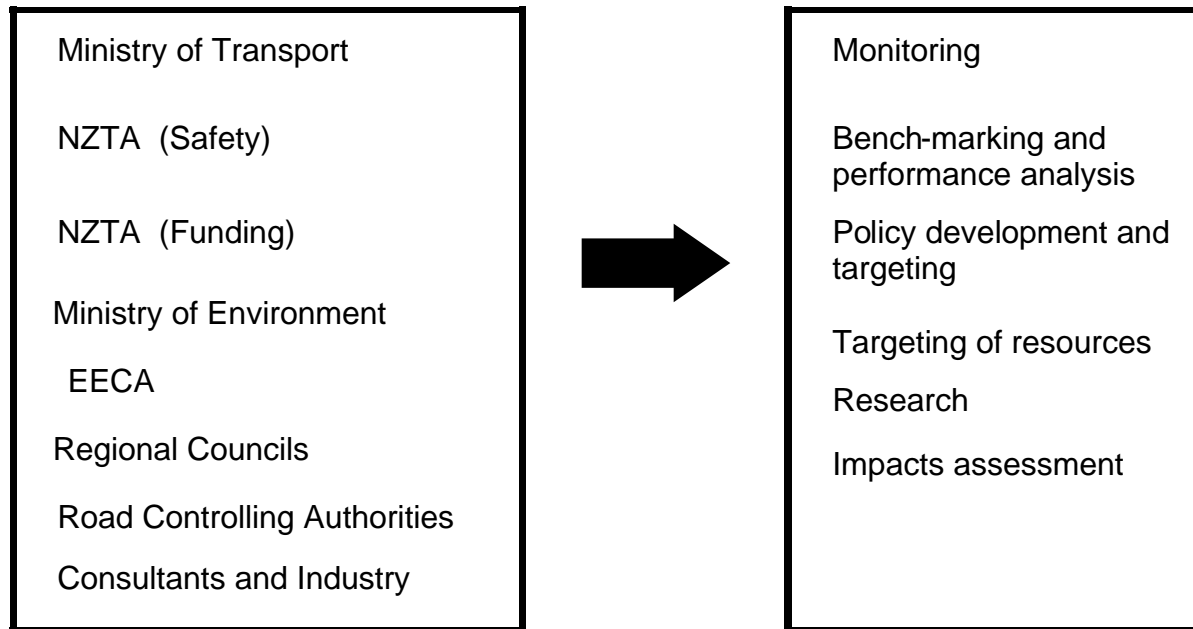# Introduction

- Purpose

  To inform RCA Forum about and the progress to date on the joint MOT and NZTA project improving traffic data in RAMM

- Session Outline
  - Project Background
  - Project Outline
  - Concept
  - Trial Results
  - What next

Background

- High quality traffic data important
- Has many users

| Ministry of Transport	Monitoring
NZTA (Safety)	Bench-marking and performance analysis
NZTA (Funding)	Policy development and targeting
Ministry of Environment	
EECA	Targeting of resources
Regional Councils	Research
Road Controlling Authorities	Impacts assessment
Consultants and Industry	

- Attempts at creating a national traffic database for more than 15 years (1994,01,05,2006/7)

2005 Study

- Current Project grew from a 2005 study
- 2005 Study Investigated
  - Range of users, uses
  - Benefits of improved traffic counting
  - Current system
  - Data issues and quality
  - User needs

- 2005 Study Proposed
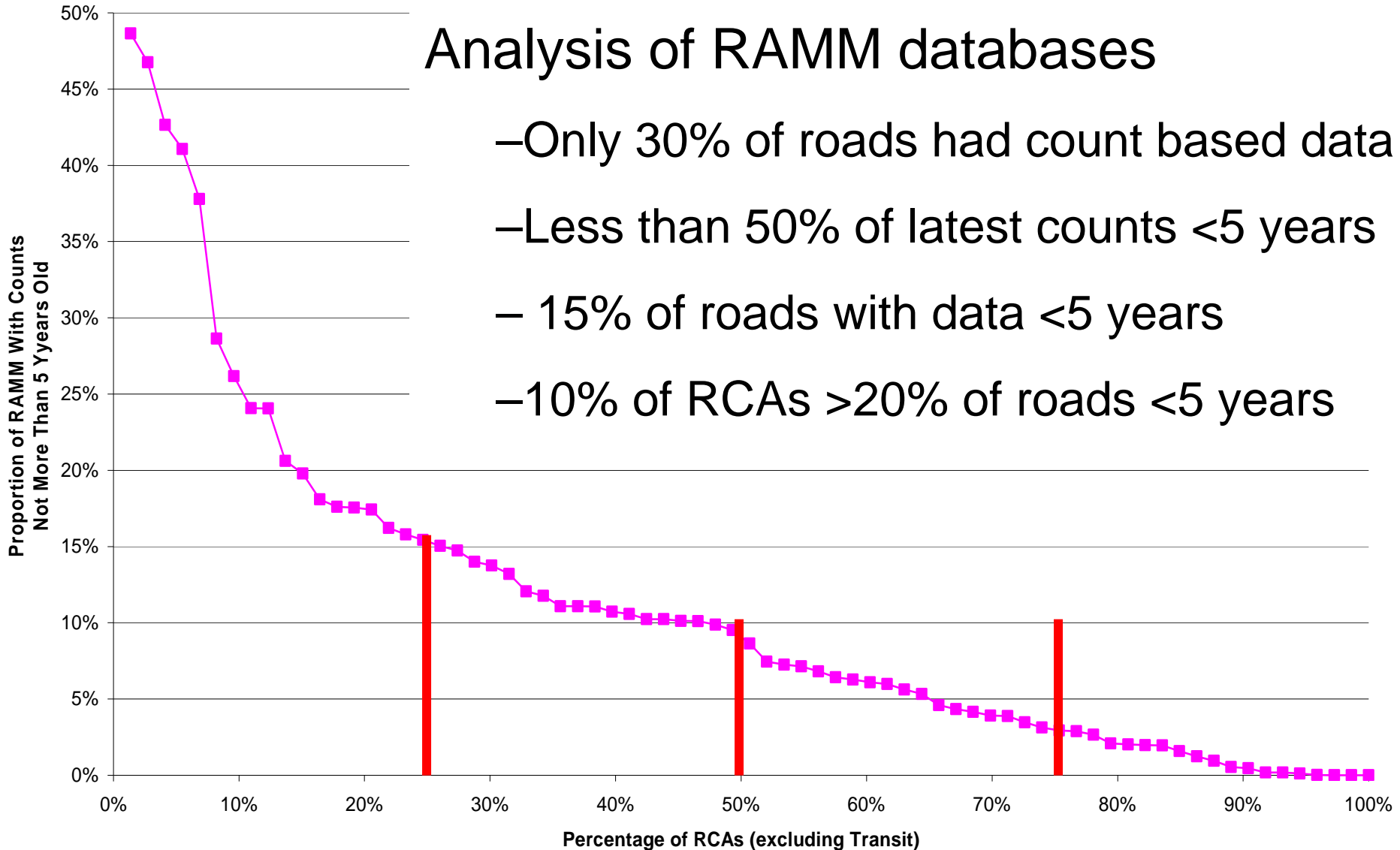 - New approach to traffic counting
  - A way forward

Current procedures (2005)
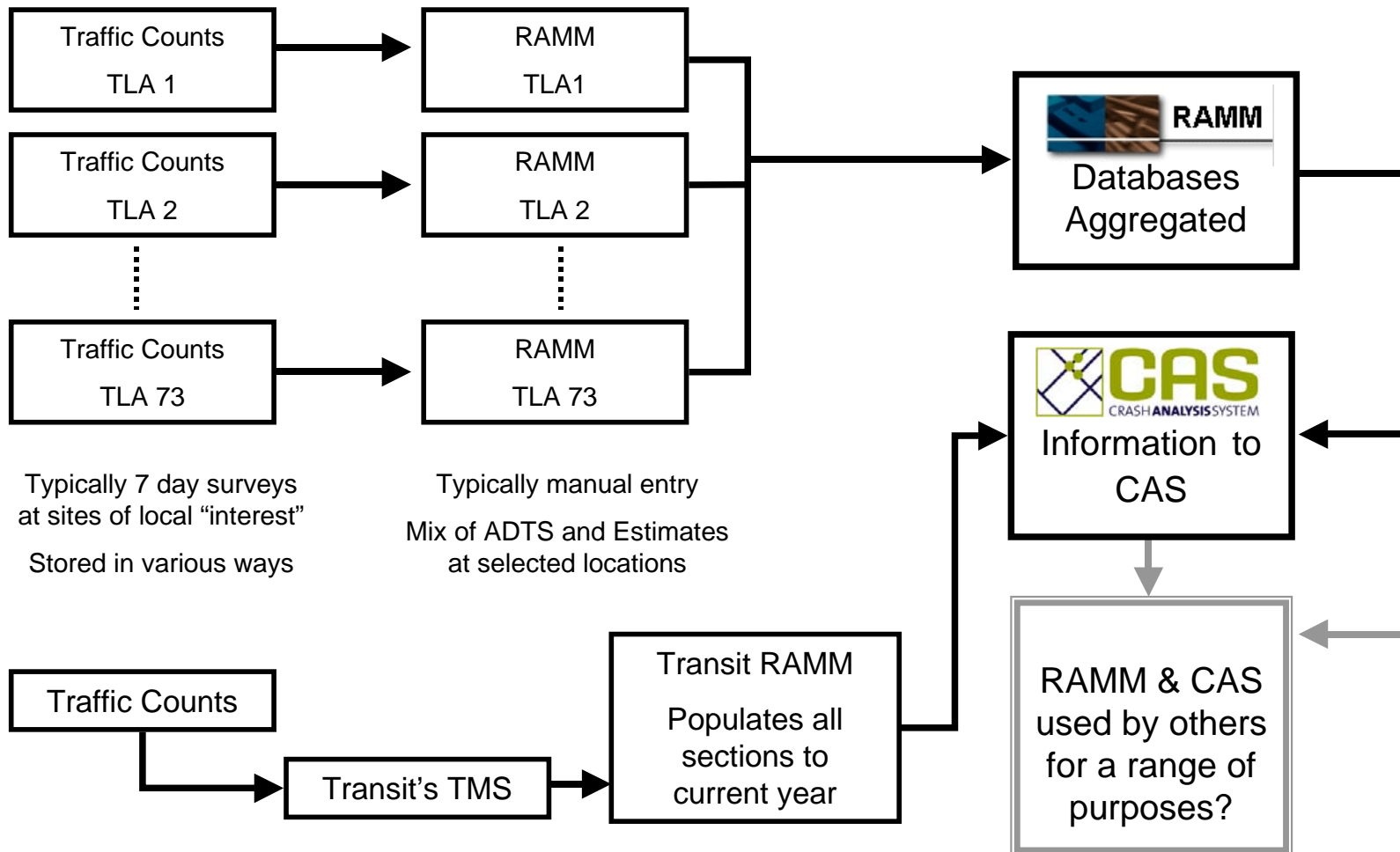
2003 RAMM

Analysis of RAMM databases

- Only 30% of roads had count based data
- Less than 50% of latest counts <5 years
- 15% of roads with data <5 years
- 10% of RCAs >20% of roads <5 years

Numerous quality issues

STREETNAME	START_M	END_M	START_DESC	END_DESC	AADT_EST	AADT_COUNT	EST_DATE	COUNT_DATE
Street Z	0	215	Street A	Street B	9000	9082	2001/12/01	2001/10/01
Street Z	215	258	Street B	Street C	11000	11305	2001/12/01	2001/10/01
Street Z	258	330	Street C	Street D	11000		2001/12/01	
Street Z	330	400	Street D	Street E	8500	11976	2001/12/01	2001/10/01
Street Z	400	532	Street E	Street F	14000	14000	2001/12/01	1996/06/01
Street Z	532	716	Street F	Street G	6000	2922	2001/12/01	2001/10/01
Street Z	716	899	Street G	Street H	6000	5811	2001/12/01	2001/10/01
Street Z	899	1076	Street H	Street I	8500	8405	2001/12/01	2001/10/01
Street Z	1076	1127	Street I	Street J	14000		1996/11/20	
Street Z	1127	1190	Street J	Street K	14000		1996/11/20	
Street Z	1190	1251	Street K	Street L	14000	19008	1996/11/20	1996/06/01
Street Z	1251	1311	Street L	Street M	14000		1996/11/20	

Date entered or when undertaken?

Side road one way

2001 Estimate same as 1996 count

Estimates not updated and 25% less than "count"

Estimates not updated

Lack of seasonal correction

2005 Study Key Issues

- Looked at alternatives database tools
  - Transits TMS
  - Bespoke
  - RAMM

- Confirmed RAMM as favoured
  - Cost
  - General understanding
  - No double handling

2005 Study Key Issues

- There are a range of different needs
  - Summary Monitoring
    - VKT by TLA
    - Growth
  - Detailed Traffic Data on Individual Roads
    - For CAS
    - Network assessment and asset management
  - Ad hoc
    - Renewals/projects
    - Traffic models
   - Sites of interest

Summary of Key Outcomes

- Needed to
  - Increase traffic count coverage
  - Improve efficiency of counting
  - Improve estimates
  - Provide for annual updating
  - Meet the multiple needs

Increasing Coverage
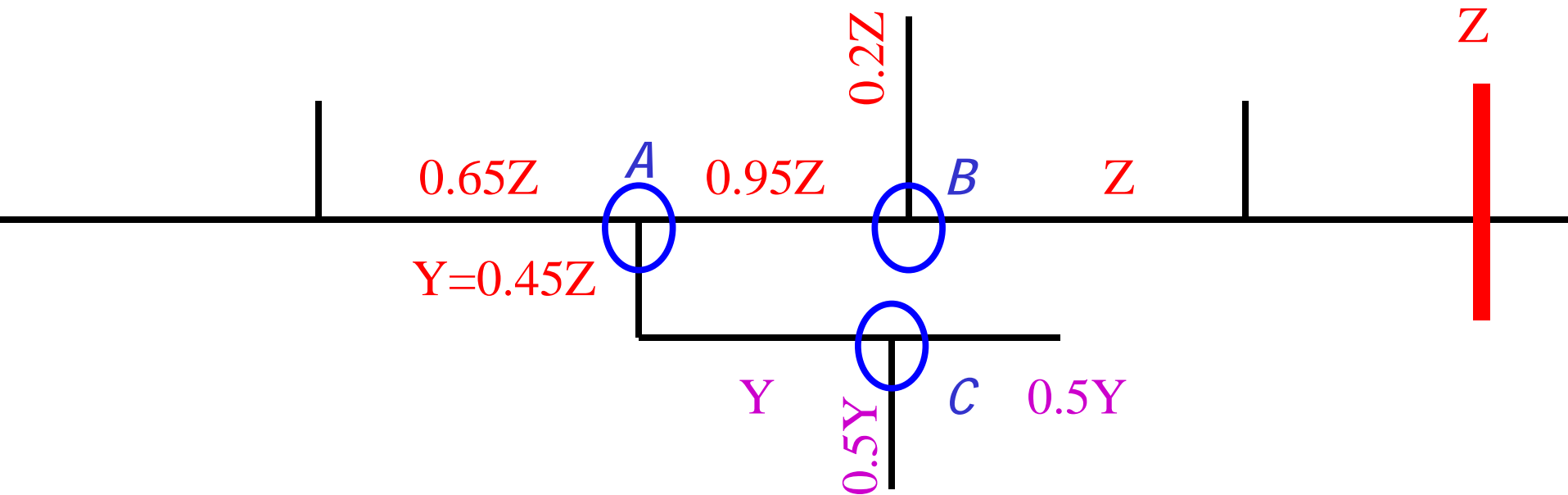
- Define Traffic Links
  - Sequential RAMM carriageway sections carrying similar traffic volumes
  - This reduces the sampling framework

T.Link_id: 1950

Cway_id: 1949

Cway_id: 1951

C_way_id: 1953

Cway_id: 1950

Cway_id: 1952
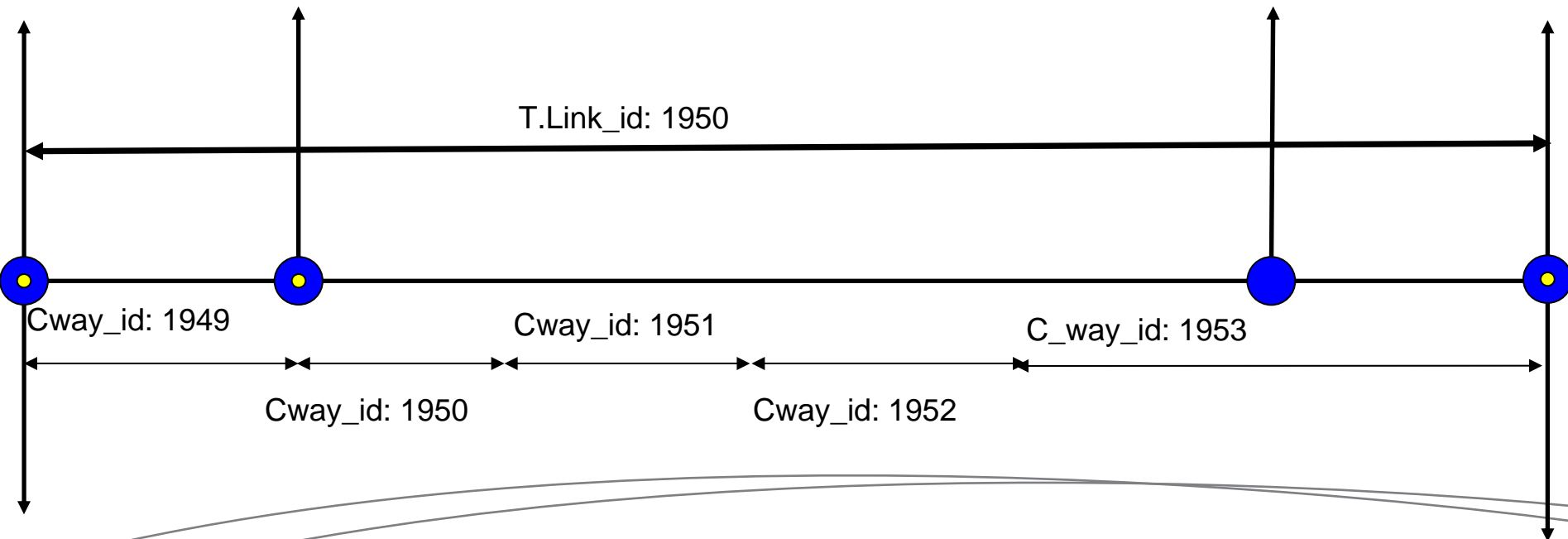
More Efficient Counting

- Create Link Associations
  - Extends coverage and reduces issues with updating estimates

Improved Estimates

Annual Updating

- Allocate traffic links to growth groups

- Routine looks at all count sites in a growth group

- Calculates growth rate
  (based on seasonally corrected estimates)

- Identifies possible outliers

- Applies the rate to all other sites
  (in growth group not counted in current year)

Meeting Multiple Needs

Sites Monitored for Traffic Growth

Sites for Developing Seasonal Factors

Core sample for RCA VKT Estimates

Sites Monitored For Local Interest

Project Investigations

Other sites to populate RAMM on a rotational basis

Annual Monitoring
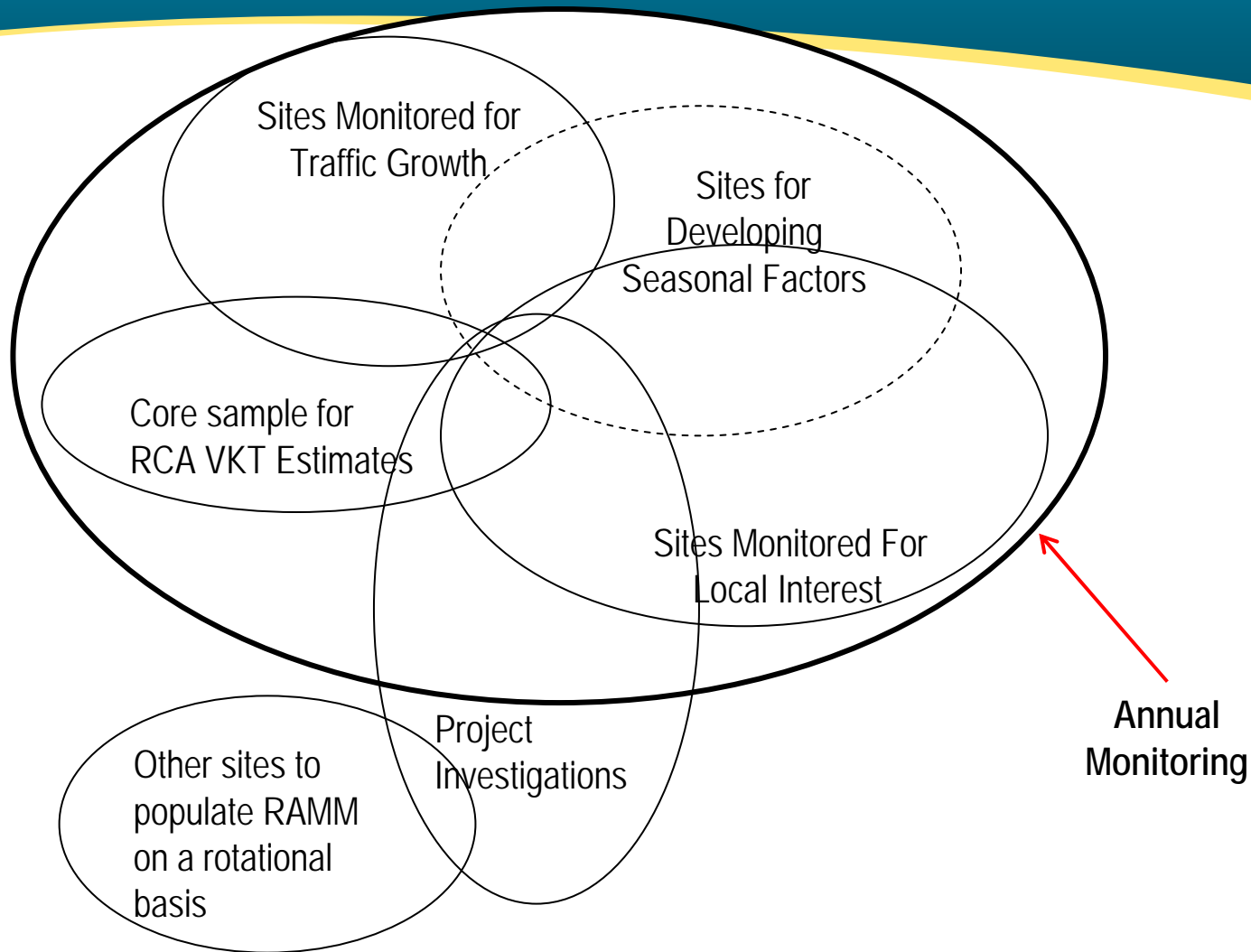
Current Study

- Negotiated late 2006 begun in 2007

- Joint MoT and LTNZ (as it was)

- 3 Stages
  - Stage 1 Proof of Concept
  - Stage 2 Develop of National Process
  - Stage 3 Trial National Process and
    Consultation/promotion

Stage 1 of this Study

- Survey of current practices
  - Looked at current practices confirmed issues identified in 2005
    - 1/3 of RCAs reported they updated estimates when new counts added
    - Even fewer updated adjacent estimates
  - Volume of counting
  - Use of RAMM Map

- Trials in 3 RCAs
- Assess impact for nationwide roll out

Trial RCAs

Network	Southland Dist. Council	Upper Hutt City	Hastings Dist. Council
Description	Largest (rural) TLA	Mid sized city	Mixed
Kilometres of network	6,288	266	1,848
Proportion of Rural	95% rural	35%	83%
Carriageway sections in RAMM	4,079	1,024	2,171
Traffic counts per year	350 (239 sites)	100 sites	300-350 (300 sites)
General outline	20 annual 330 ad-hoc	13 annual 87 bi-annual 138 /5 yrs 10 ad-hoc	63 annual 183 / 5 yrs 200 ad-hoc
Description of programme	Forward works programme	Long term monitoring Traffic Model	Cordon monitoring Seasonal Fluctuation Forward Works

Trial Process

- "Update" Traffic Estimates to Base Year (2005) Growth factors by

- Create Traffic Link Network -GIS based

- Draw Samples
  - Core sample
  - Rotational sample

- Fit Samples and Assess Impacts

Traffic Link Network (1)
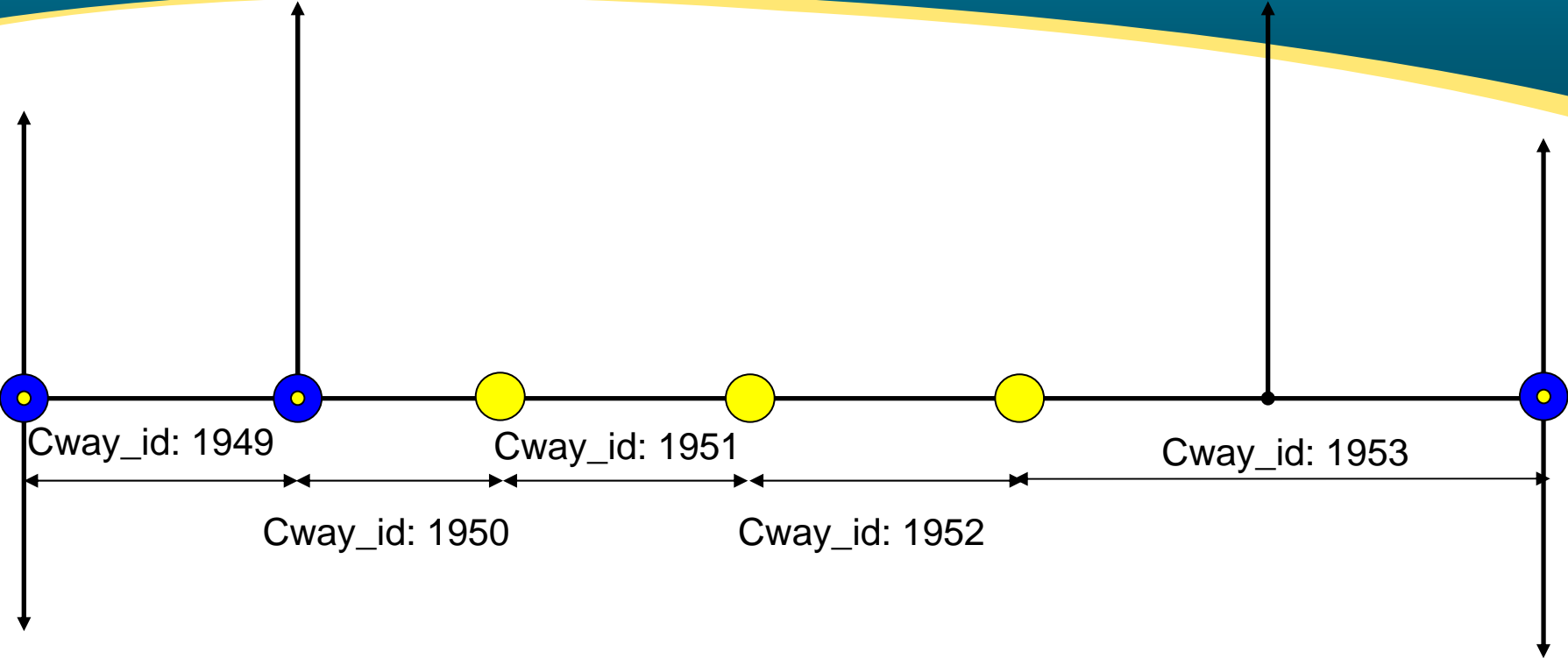
Cway_id: 1949

Cway_id: 1951

Cway_id: 1953

Cway_id: 1950

Cway_id: 1952

Legend:
Node point derived from Spatial model

RAMM C_way section node point

Combined spatial and RAMM C_way
section node point

Traffic Link Network (2)

T.Link_id: 949

T.Link_id: 1951

T.Link_id: 1953

T.Link_id: 1950

T.Link_id: 1952

T.Link_id: 1954

Node 2000

Node 2001

Node 2003

Node 2004

Node 2005

Node 2006

Node 2007

Legend:
Node point derived from Spatial model

RAMM C_way section node point

Combined spatial and RAMM C_way section node point

Traffic Link Network (3)

Adjacent links combined based on exact AADT estimate and minimum 'T.Link_id retained.

T.Link_id: 1949

T.Link_id: 1950

T.Link_id: 1954

Node 2000

Node 2001

Node 2005

Node 2006

Node 2007

Cway_id: 1949

Cway_id: 1951

C_way_id: 1953

Cway_id: 1950

Cway_id: 1952

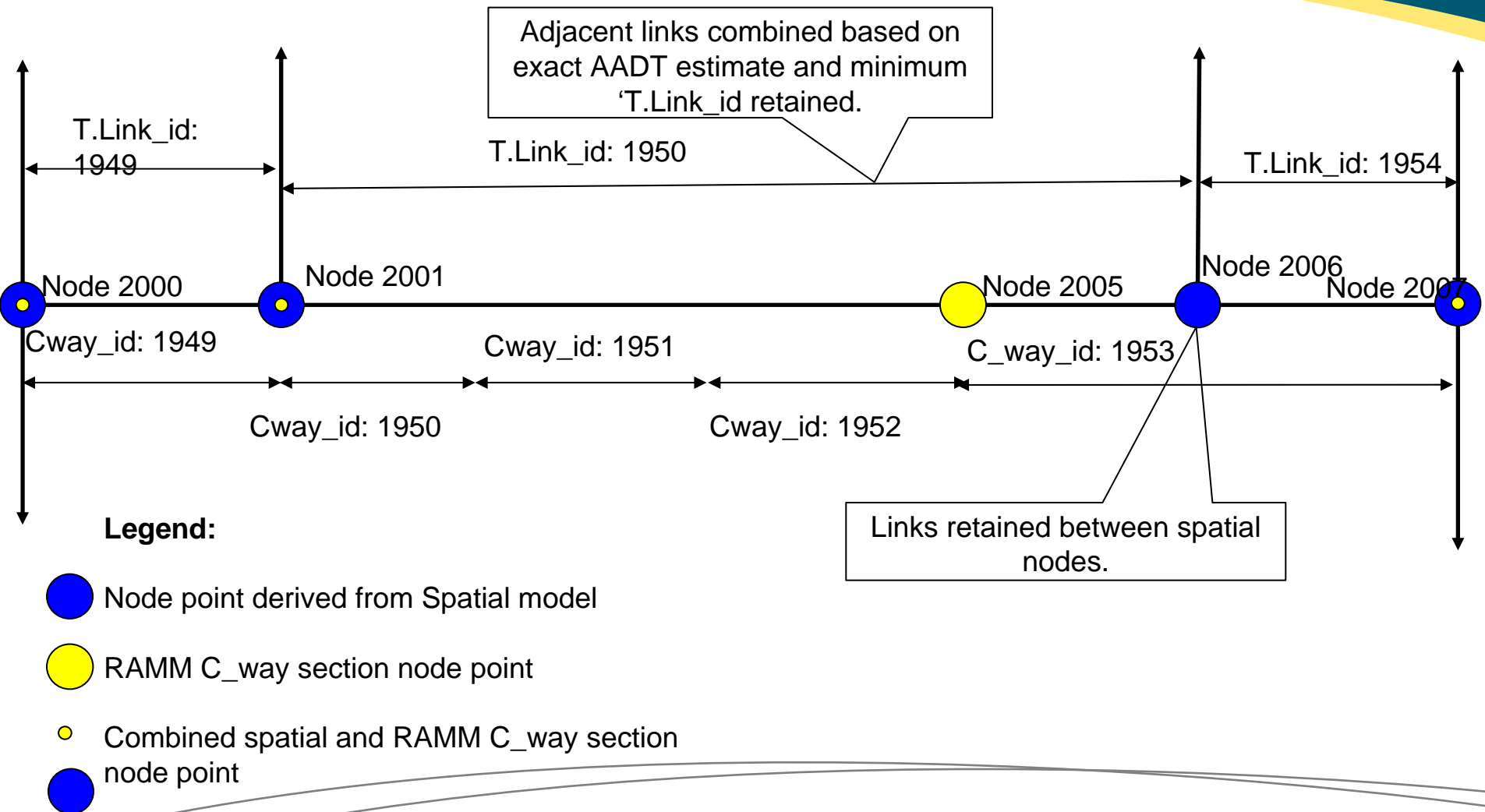Links retained between spatial nodes.
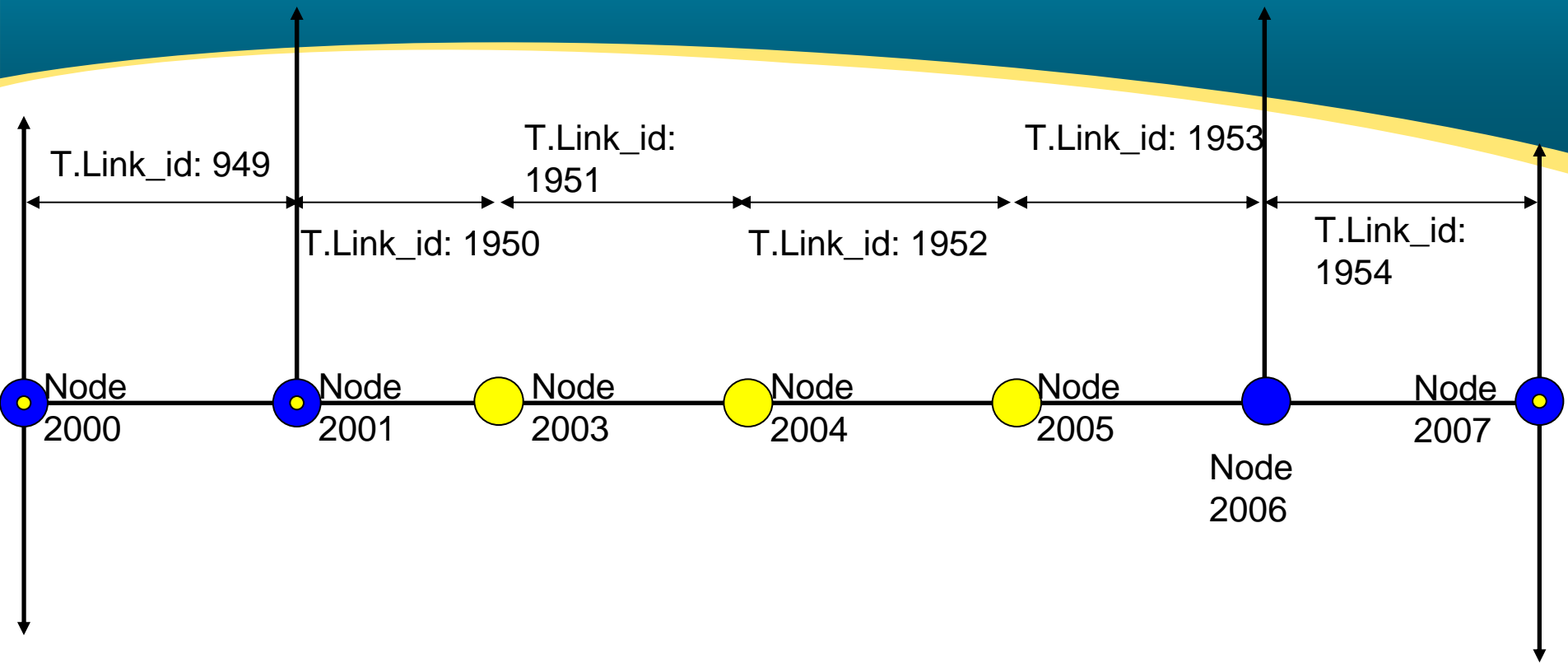
Legend:

Node point derived from Spatial model

RAMM C_way section node point

Combined spatial and RAMM C_way section node point

Aggregation	Description	Total Number of Links		
		Hastings	Upper Hutt	Southland
RAMM Sections	Number of carriageway sections in the RAMM database	2171	1024	4079
Level 1	Number of sections following introduction of spatial nodes	2225	1175	5300
Level 2	Number of sections following aggregation of adjacent links	1417	754	2352
% Reduction	Reduction Level 2/ RAMM	35%	26% (2%)	42%

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┌─────────────────────────┐                    ┌──────────────────────────────┐
│   Obtain spatially       │                    │ Review sample size requirements │
│   referenced RAMM        │                    └──────────────────────────────┘
│   databases              │
└─────────────────────────┘
         ↙        ↘
┌──────────────┐   ┌────────────────────────┐
│ Check and    │   │ Analyse traffic growth │
│ clean the    │   │ and update the RAMM    │
│ spatial      │   │ traffic estimates to a │
│ models       │   │ common base year       │
└──────────────┘   └────────────────────────┘

┌──────────────────────┐        ┌────────────────┐        ┌──────────────────┐
│ Create traffic link  │ ──────→│ Draw core      │        │ Assess practical │
│ models               │        │ sample         │        │ rotational sample│
└──────────────────────┘        └────────────────┘        │ size from national│
                                                           │ RAMM             │
                                                           └──────────────────┘

┌─────────────────────────────────┐
│ Generate the subset of 25% of   │
│ traffic links that contributed  │
│ the highest proportion of vkt   │
└─────────────────────────────────┘

┌──────────────────────┐        ┌──────────────────┐
│ Local review to      │        │ Current and      │
│ confirm traffic link │        │ historic traffic │
│ models               │        │ counting         │
└──────────────────────┘        │ programme        │
                                └──────────────────┘

                        ┌──────────────────────┐
                        │ Fit sample and asses │
                        └──────────────────────┘
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Drawing Samples (1)

- Core Sample
  - Sample monitored annually to give VKT to +/- 10% (95% conf.)

  - Stratified Random Sample

  - Drawn on the basis of AADT

  - Estimation of average AADT over all links

  - Approx 3.2% of traffic links

Core Sample -Hastings (46)
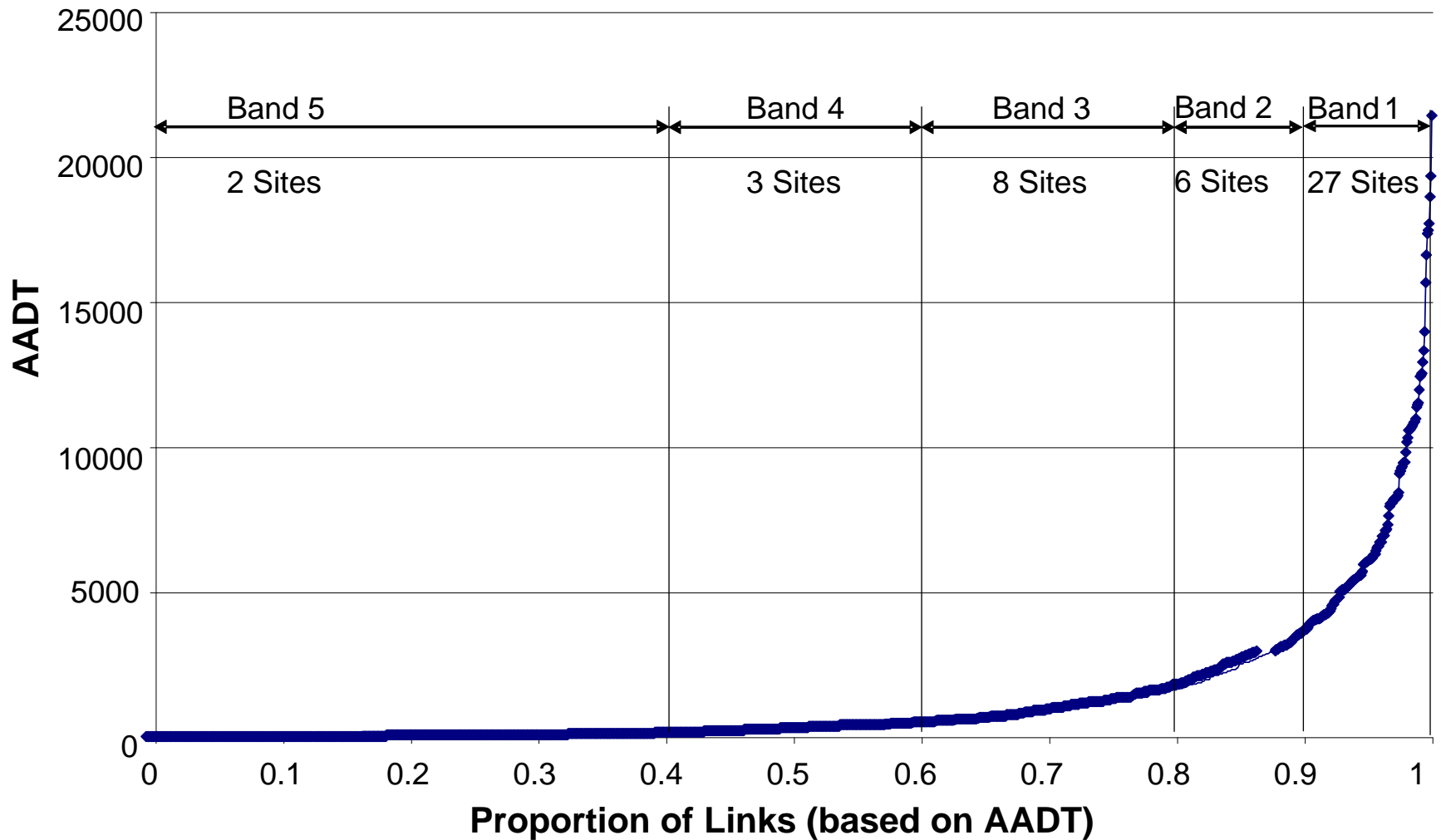
Drawing Sample (2)

- Rotational Sample
  - Input to asset management and CAS uses that are looking at individual links
  - Aim to cover the bulk of the trafficked network

  - Drawn on the basis of VKT
  - Nominally the top 25% of links when ordered by contribution to TLA VKT.
  - Nationally >11,600 sites counted each year 12% to 16% of expected traffic links

Network Travel
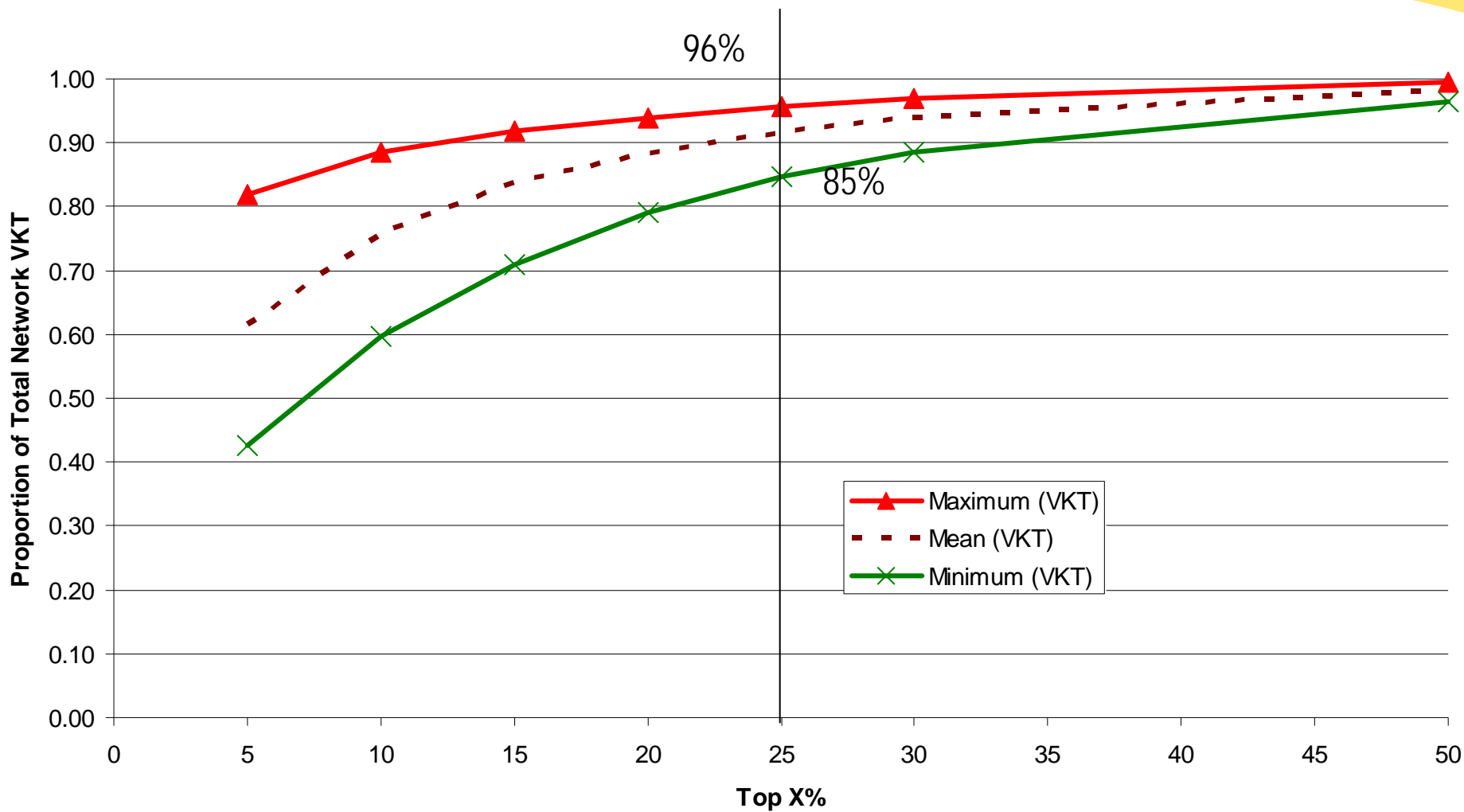
Injury Crashes
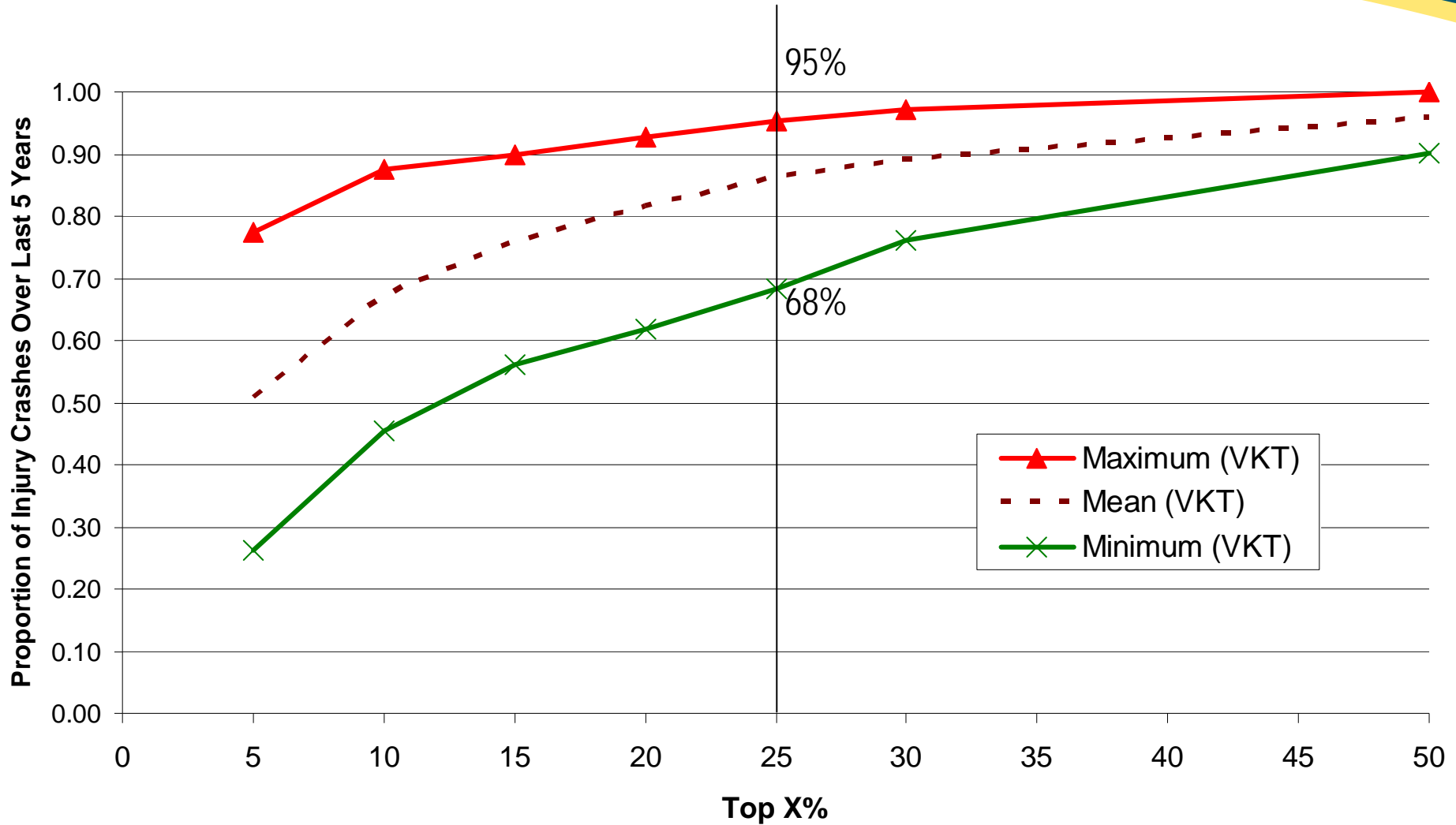
Fitting Sample

- With systematic substitution Core Sample is contained in the top 25% of links selected on the basis of vkt.

- The degree to which the new counting strategy overlaps the current varies

- For each of the trial TLAs it was possible to cover 80% of vkt using the top 17% to 19% of traffic links

- It may be better to cover the 80% of vkt over 2 years
This provides some spare for ad-hoc counting

- Impact
  – Hastings 10% reduction ($10,000)
  – Upper Hutt 50% increase ($14,000)
  – Southland no change (but 80% requires 3 years)

Stage 2 of this Study

- CJN implemented in RAMM:
  - Routine for creating/suggesting traffic links
  - Identification of those without count sites
  - Allocating sites to:
    - Seasonal Traffic Profiles –to improve AADT estimates from counts
    - Traffic Growth groups
    - Count Schedules/groups
  - Routine for updating estimates to current year based on count group

- These were then tested in 2 TLAs

Stage 3 of this Study

- Testing the
  - Final product and
  - Manual
  - 2 novices and 1 experienced
  - Applying the process from start to finish

- Currently identified major issue with functionality of link model