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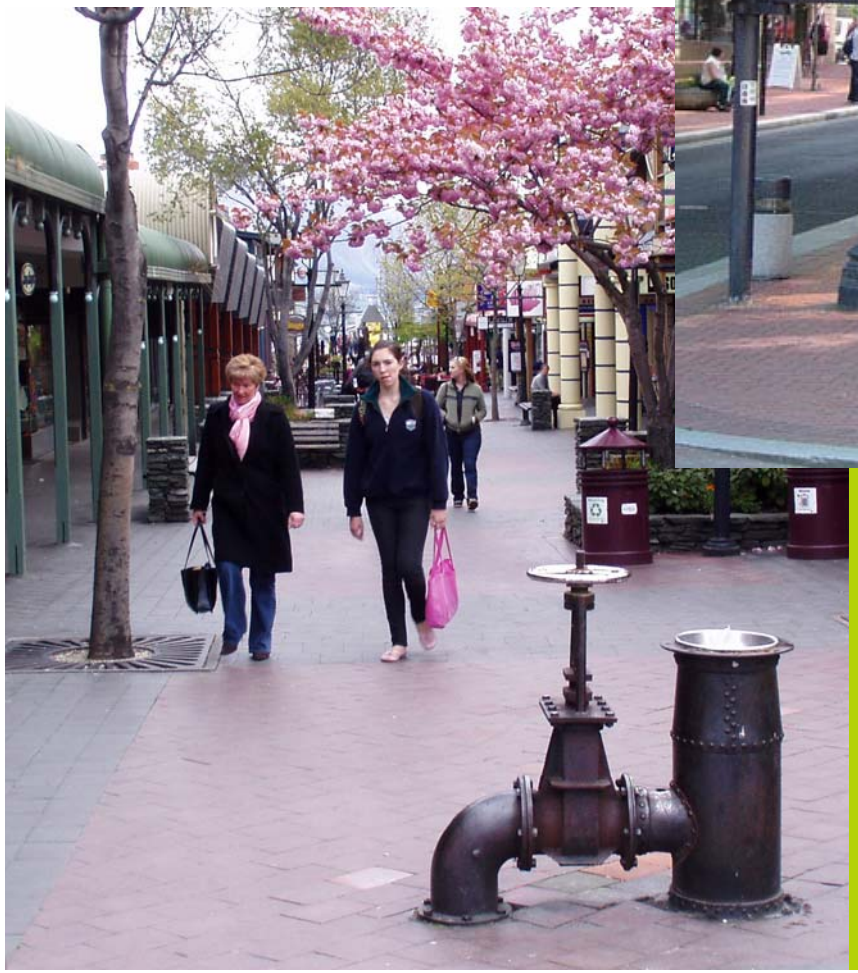

Tim Hughes

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Guidelines

- *Austroads Guide part 13: Pedestrians*
- *TRAFINZ Guide to pedestrian crossing facilities*
- *RTS 14 providing for vision impaired pedestrians*
- *Pedestrian planning and design guide*
- *Crossing choice calculation spreadsheet*
- *Non-motorised user audit & review*
- *Community street review*
- *Benchmarking performance*

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Pedestrian planning and design guide

- An encyclopaedia of existing good practice, pointing out the best from other guides.
- Adding to it based on recent research findings

- Planning and policy context
- Principles of pedestrian network planning
- Pedestrian network planning process
- Design of walking infrastructure
- Monitoring and promotion
- References

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NZ Policy context

- Promoting walking and cycling is government policy
- New Zealand Transport Strategy
- Getting there on foot by cycle
- Road safety to 2010 strategy
- Walking and Cycling Strategic Plans
- Funding from Land Transport Fund
- Part of every project

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Safe increase in use?

Strategies aims to both:

- increase walking
- reduce the road toll

Is this possible?

- Safety in numbers effect?
- Taming traffic
- Better walking facilities
- Perceptions that walking is safe - key to more walking

YES

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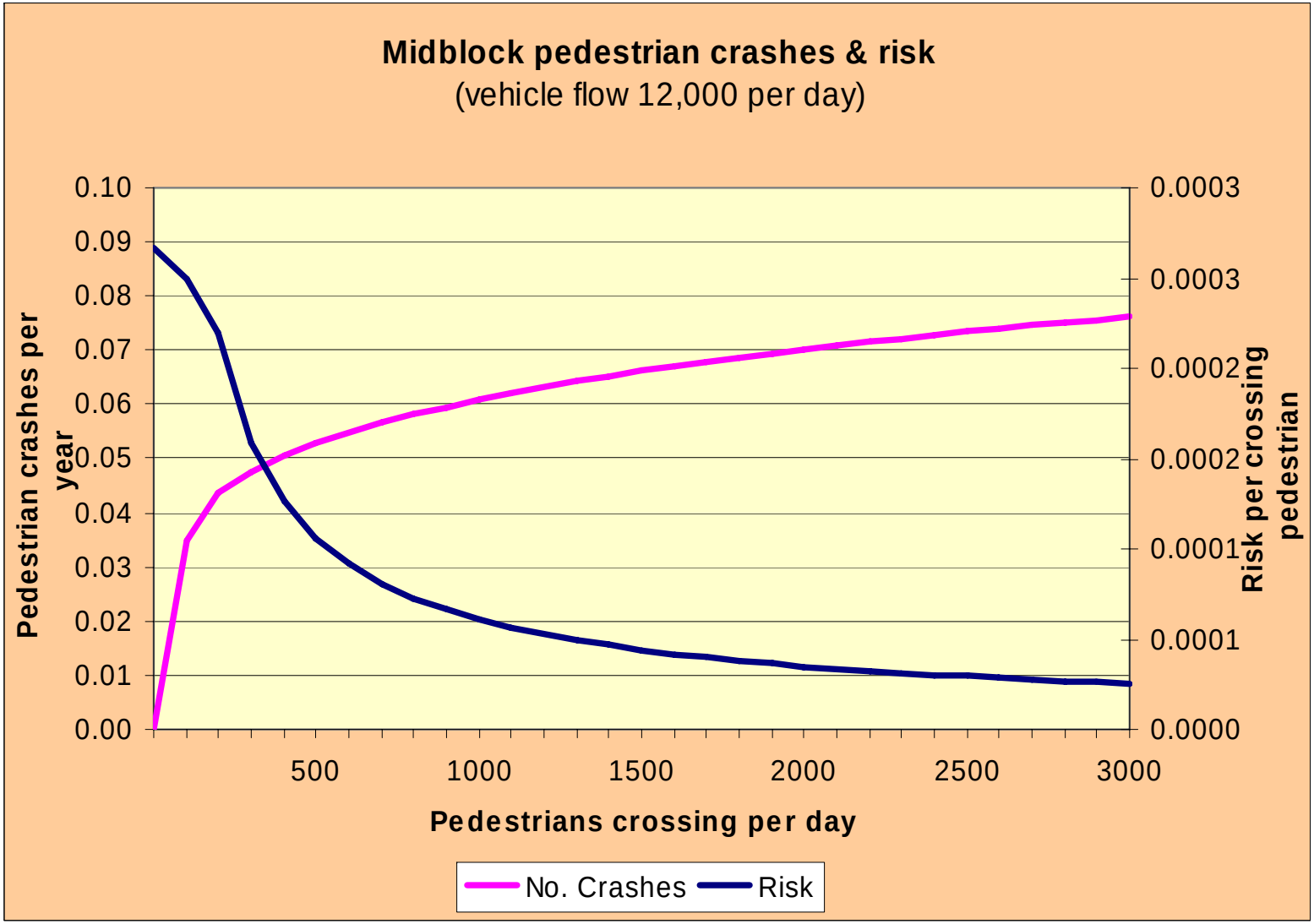
Safety in Numbers

The more pedestrians present,
the lower the risk for each pedestrian

Reasons? Behavioural adjustments by road users

- power relationship: 100% increase in walking/cycling,
  32% increase in casualties (Jacobsen)
- NZ data (Turner) suggests the effect may be even more powerful at low pedestrian numbers (up to one per minute)
- The effect is observed on individual roads and intersections, between different towns in New Zealand and between countries

Example of Effect – Turner (2005)



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The design pedestrian?

- Capable adults
- Children
- Elderly
- On small recreational wheels
- Mobility impaired;
  - sticks, wheelchairs, frames, scooters
- Vision and hearing impaired

All of the above

Ways Pedestrians Vary

Attention span

Width

Balance

Visual ability

Stamina

Walking speed

Encumbered

Height

Cognitive ability

Road experience

- The most diverse group of travellers
- Design for the more challenged

Road User Hierarchy

- Ranks the importance of road users

Increasing Importance

People with mobility impairments

Pedestrians

Cyclists

Public transport users

Powered two-wheelers

Commercial/business

Car-borne shoppers

Car-borne visitors

Car-borne commuters

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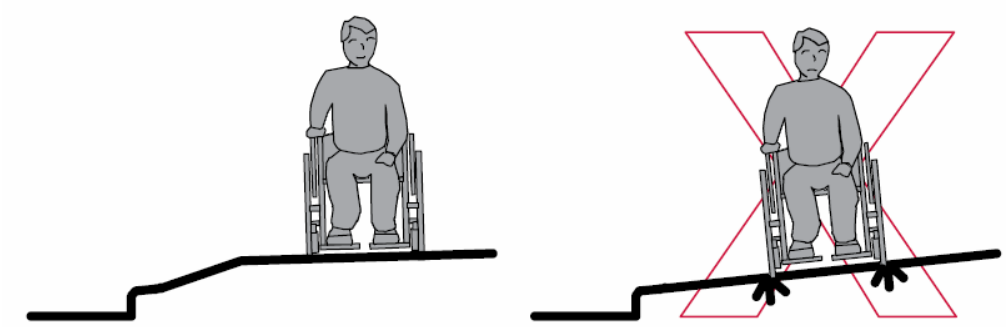
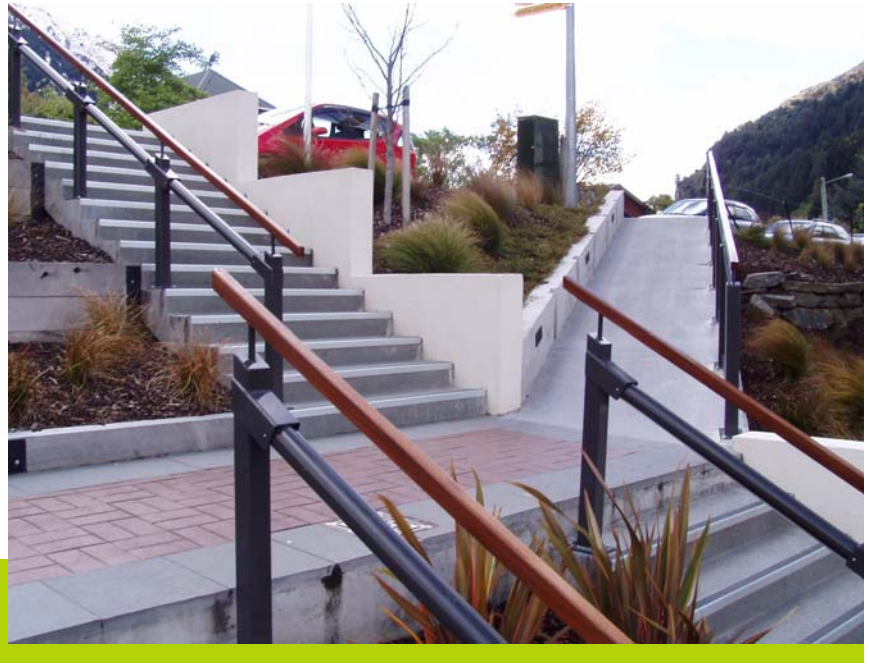
Footpath standards

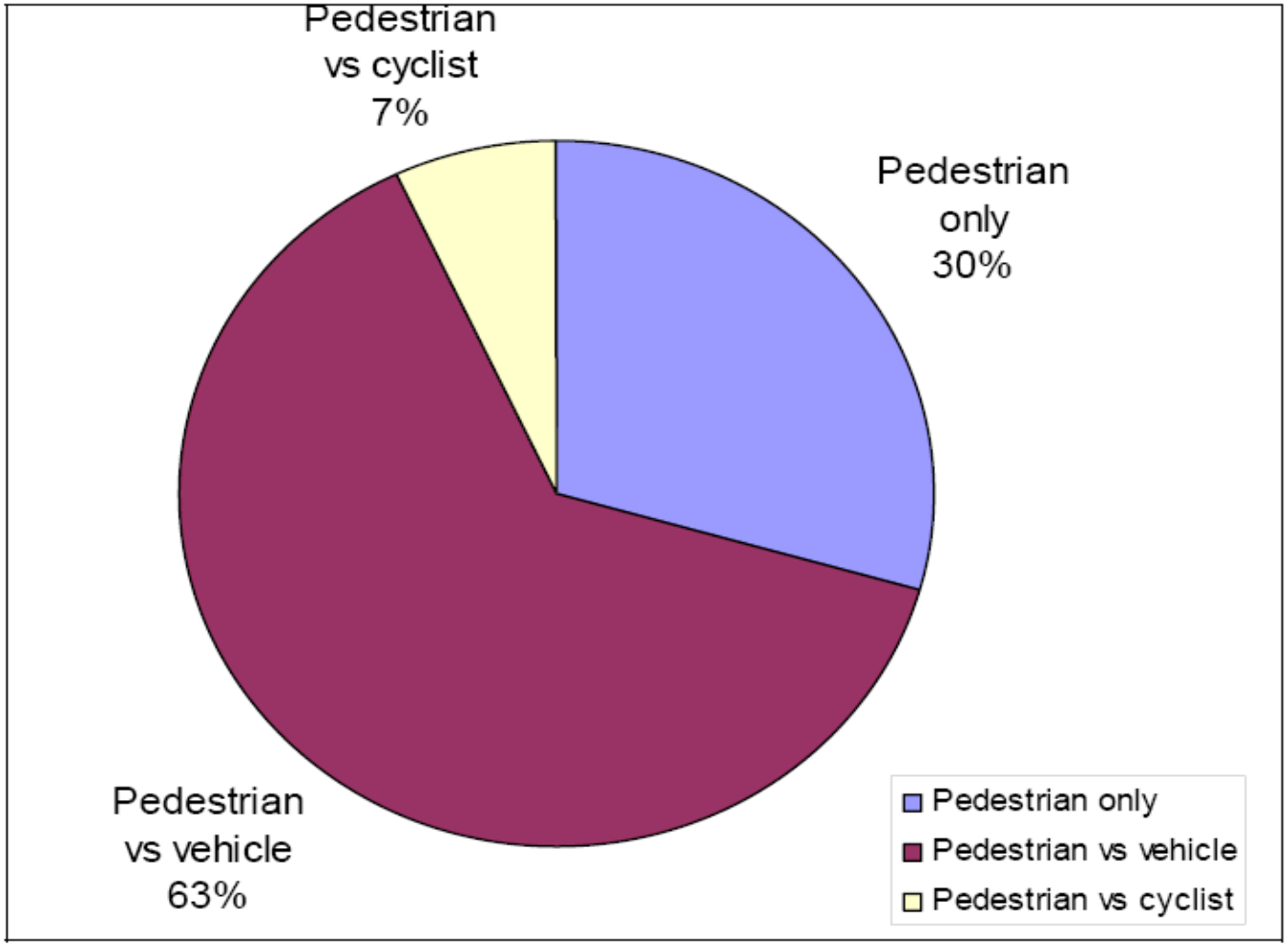
Continuous accessible path

- Width: - 1.8 m preferred, 1.5 m minimum
- Crossfall: - 1% preferred, maximum 2%





Hospital Admissions



Source: Tony Francis

Figure 4.5 Type of accidents involving pedestrians.

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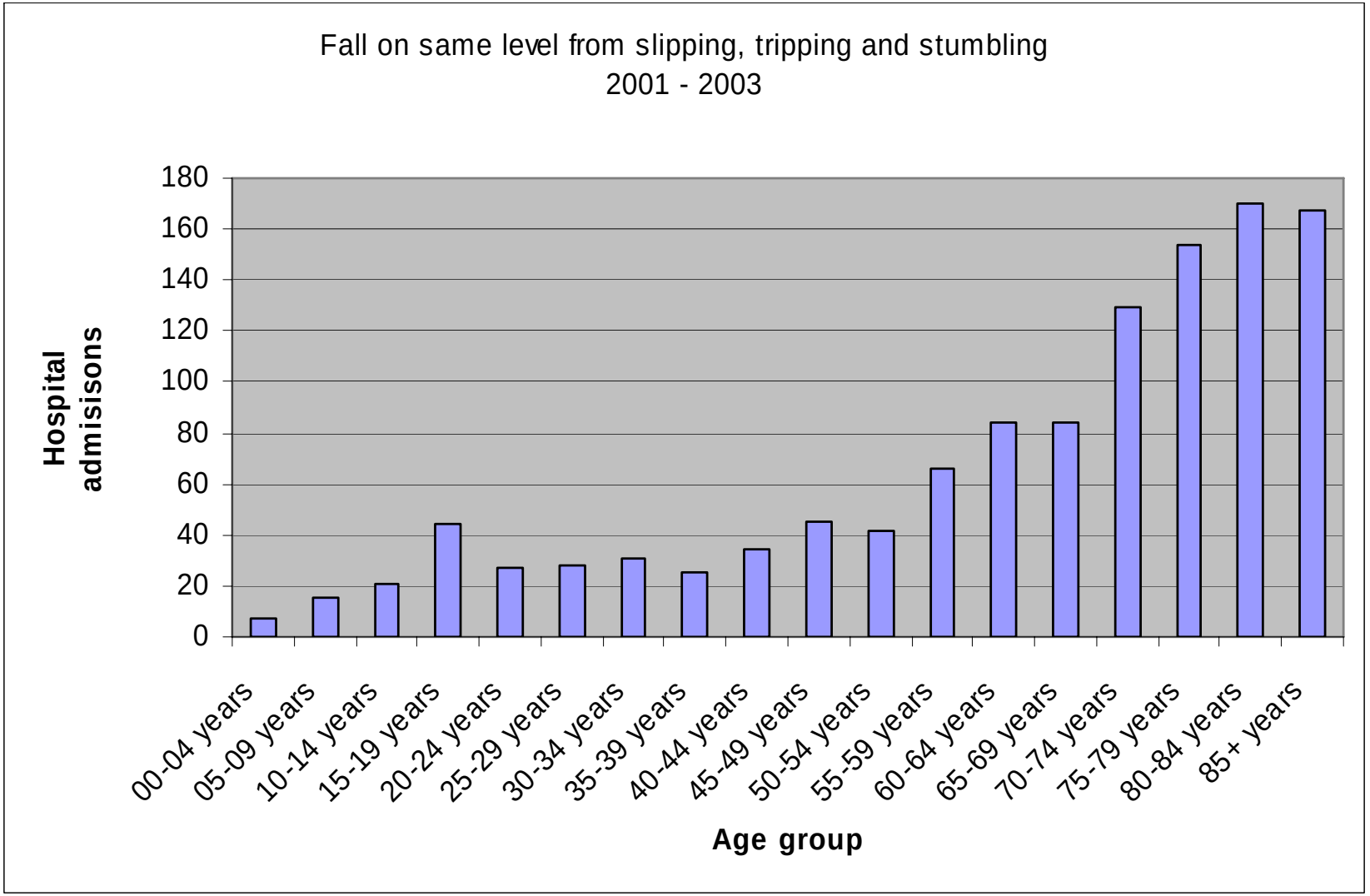
Hospital admissions from falls in road environment, by age

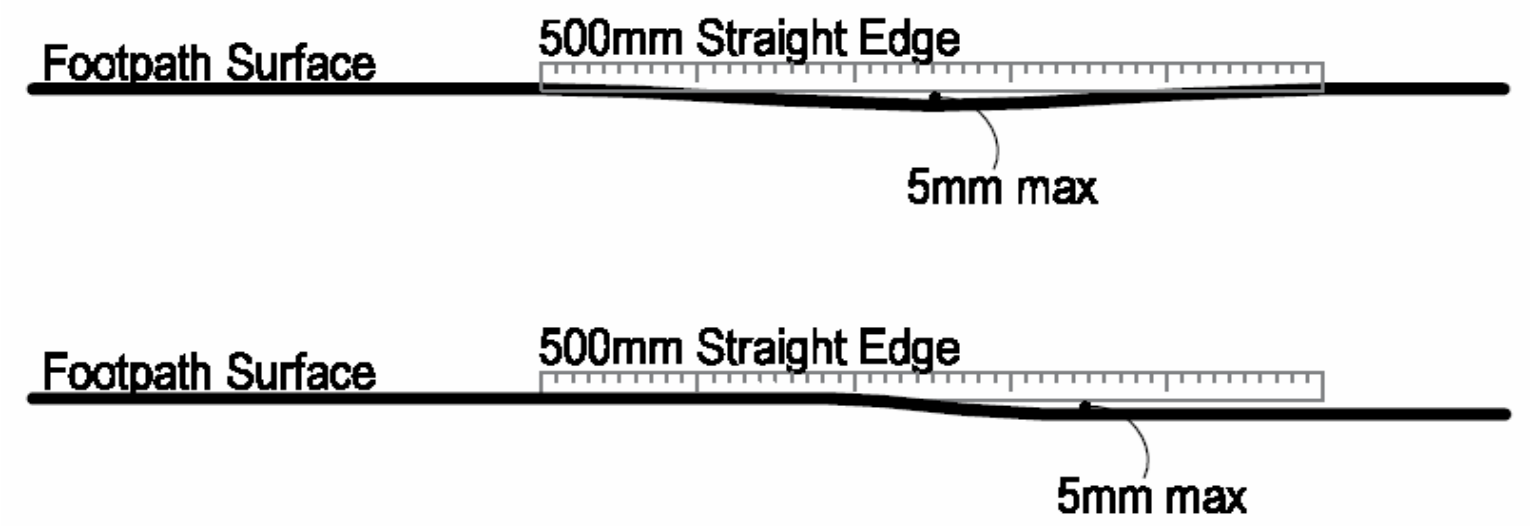


Footpath standards

Reduce fall hazards:

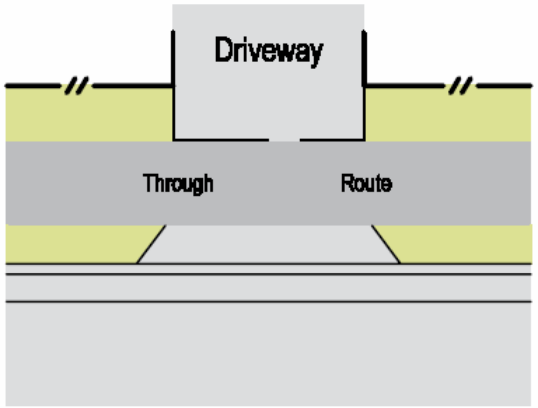
- Slips: - friction specs

  e.g. cof = 0.4 + (0.125 * %slope)
- Trips: - sudden lip, <5mm
- Stumbles: - undulations < 12mm

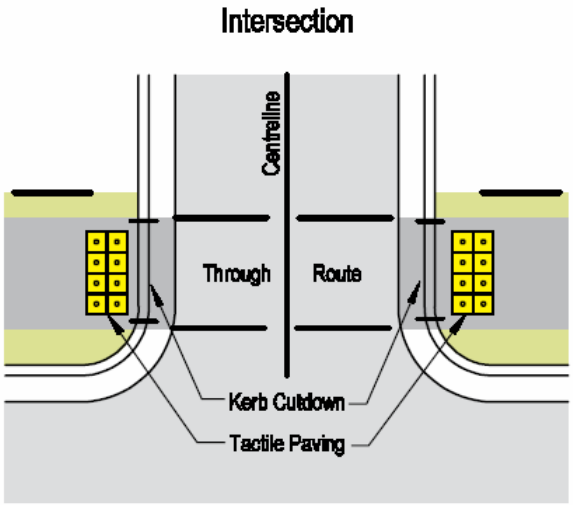


Footpath standards

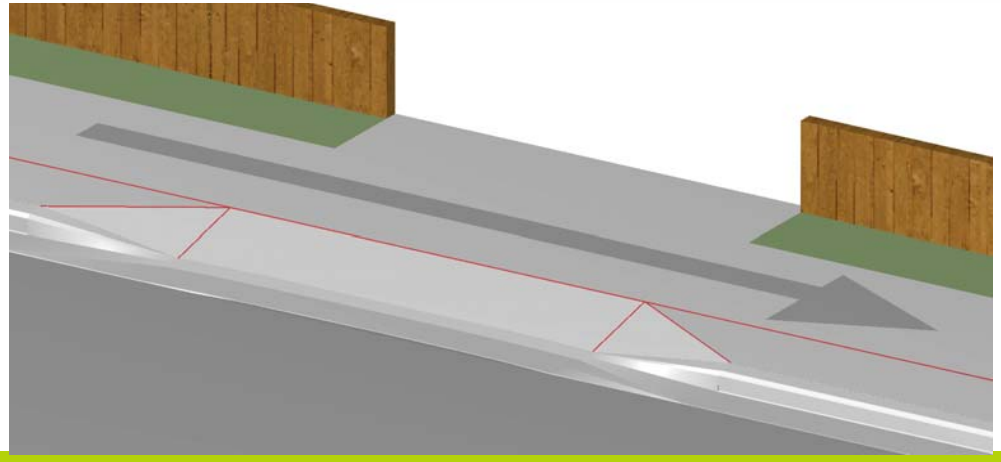
- Driveways – cross footpaths not vice versa



Driveway



Low-volume intersection (high-volume access way)

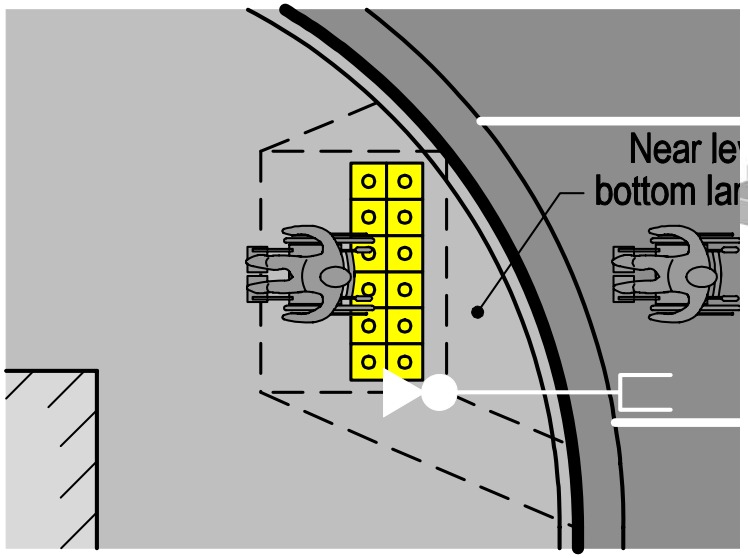


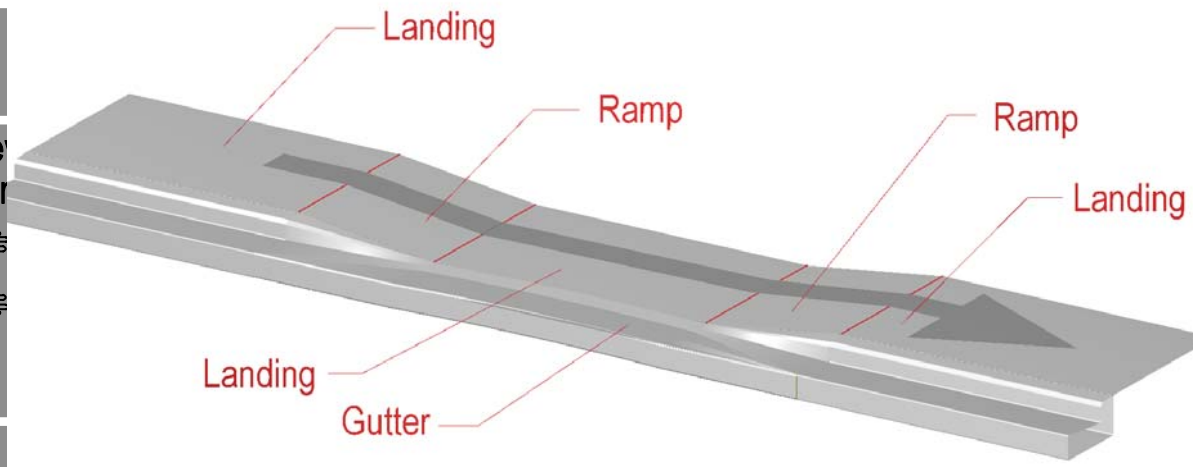
Footpath standards

- Kerb crossings – oriented to pedestrian route

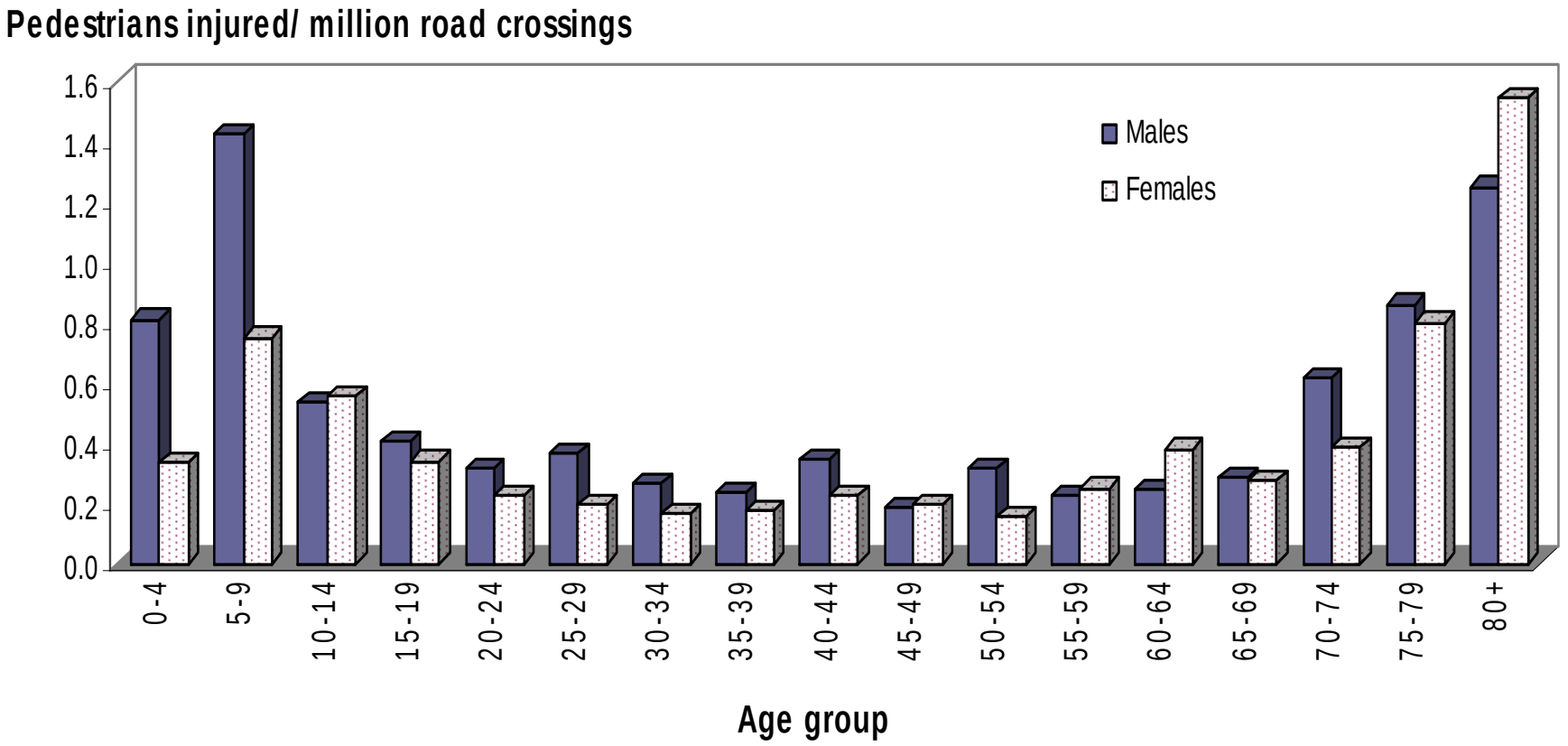
  - top and bottom landings,

    - gentle slopes 12% normal max





Pedestrian vs motor vehicle age vs risk per roads crossed



Source: NZ Household Travel Survey

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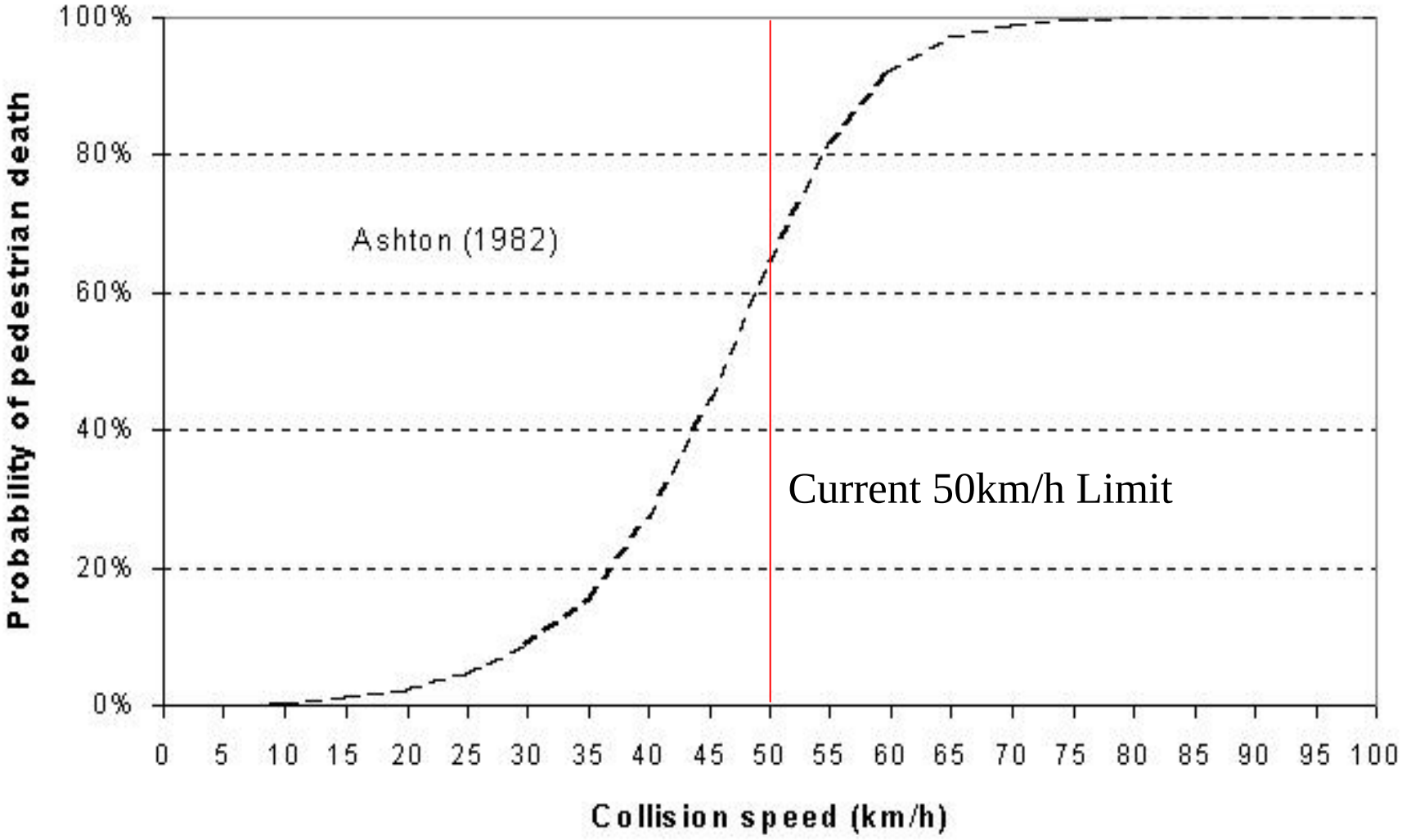
What traffic speed?



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Pedestrian crash types

Basic types of pedestrian vs traffic injury causes

Crossing mid-block:

- hit on near side (from right): inattention
- hit on far side (from left): misjudgement

Crossing at intersections:

- same as mid-block plus hit by turning traffic
- turning right (mostly) or left
- main type at traffic signals

Driveways (mostly reversing vehicles)

80% crossing busier roads – concentrated near commercial land use – main street issues.

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Taming the shopping street

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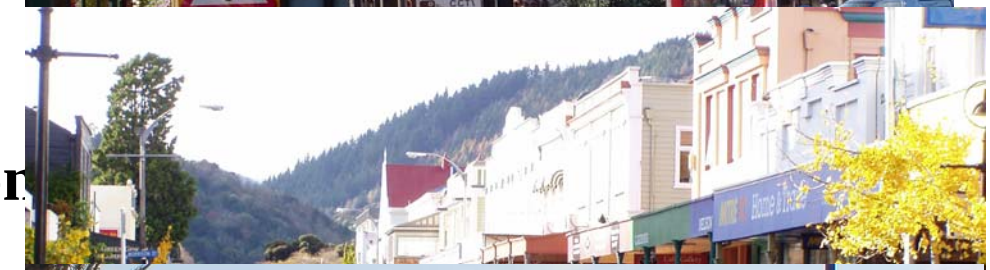
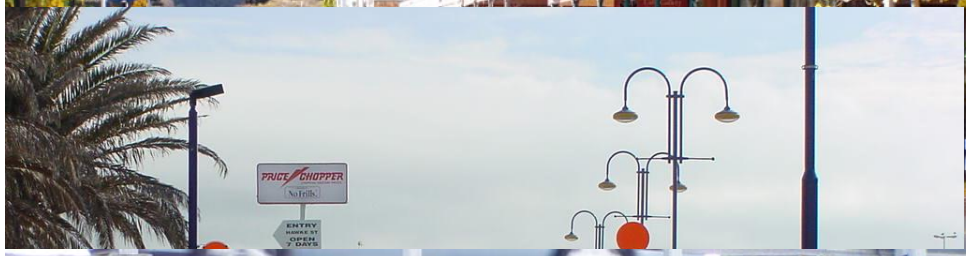
Providing
crossing





Hierarchy of Pedestrian Solution
Consider in this order:

- **Reduce traffic volume**
- **Reduce traffic speed**
- **Reallocate space (road diet?)**
- **At grade crossing facilities**
- **Grade separation**

Providing for pedestrians crossing roads

Then consider in this order:

- **Road environment and land use context**
- **Physical aids to crossing**
- **Appropriate control**
- **Design Detail**

Old NZ Warrants approach for priority pedestrian facilities

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Pedestrian Operated Signals:

▪ Pedestrians x vehicles	> 200,000	(1 hr)
▪ Vehicle flow	> 500	(1 hr)
▪ Pedestrian flow should be	> 200	(1 hr)

Zebra Pedestrian Crossings:

▪ Pedestrians x vehicles	> 45,000	(1 hr)
▪ Vehicle flow	> 300	(1 hr)
▪ Pedestrian flow should be	> 100	(1 hr)

School Patrol Zebra Crossing Points:

▪ Pedestrians x vehicles	> 5,000	(1/2 hr)
▪ Vehicle flow	> 100	(1/2 hr)
▪ Pedestrian flow should be	> 50	(1/2 hr)

School Patrol (Kea) Crossing Points:

▪ Pedestrians x vehicles	> 3,000	(1/2 hr)
▪ Vehicle flow should be	> 100	(1/2 hr)
▪ Pedestrian flow should be	> 50	(1/2 hr)

A Christchurch study concluded that pedestrian delay is a factor that should also be taken into account when assessing the need for priority pedestrian facilities. At uncontrolled crossing point facilities, adult pedestrians were prepared to accept average delays of 15 second on local and collector roads and 30 seconds on arterial routes.

If delays are greater than this, pedestrians take risks crossing the roadway.

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Providing for crossing

Road environment and land use context

- **Traffic volume and composition**
  - **Gaps in traffic, space needed**
- **Speed of traffic**
  - **Speed management / traffic calming needed,**
  - **Platform appropriate?**
- **How many traffic lanes in each direction?**
  - **Are zebras possible?**
- **Road surrounds: CBD, commercial, residential**
  - **What will users expect here?**
- **Where do they cross and to where?**
  - **One place? Spread out? In a hurry?**
- **Who wants to cross, how many?**
  - **Age, walking purpose, school, impaired, suppressed?**
- **What type of facilities are appropriate here?**

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Physical crossing aids

Narrow roadway by kerb protrusions

- **Pedestrian delay**
  below 15 seconds up to
  600 vehicles per hour (2 way)
- **Safety benefit 36% crash reduction**

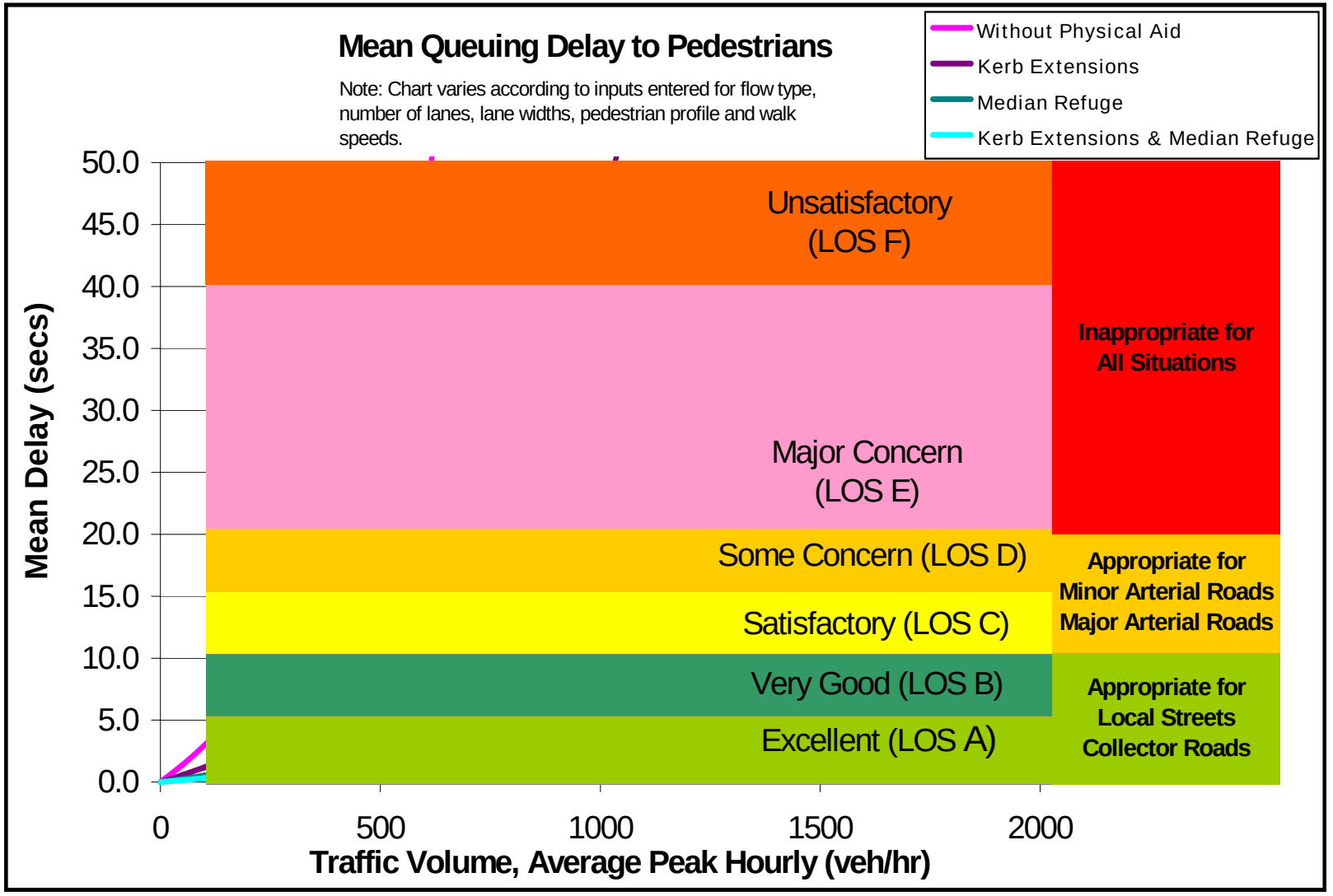
Physical crossing aids

Divide crossing into two parts

Central raised islands

- **Average pedestrian delay below 15 seconds up to 1800 vehicles per hour (two way)**
- **Crash reduction 18%**
- **Delay reduction - awesome !!!**

Physical crossing aids
– uninterrupted flow



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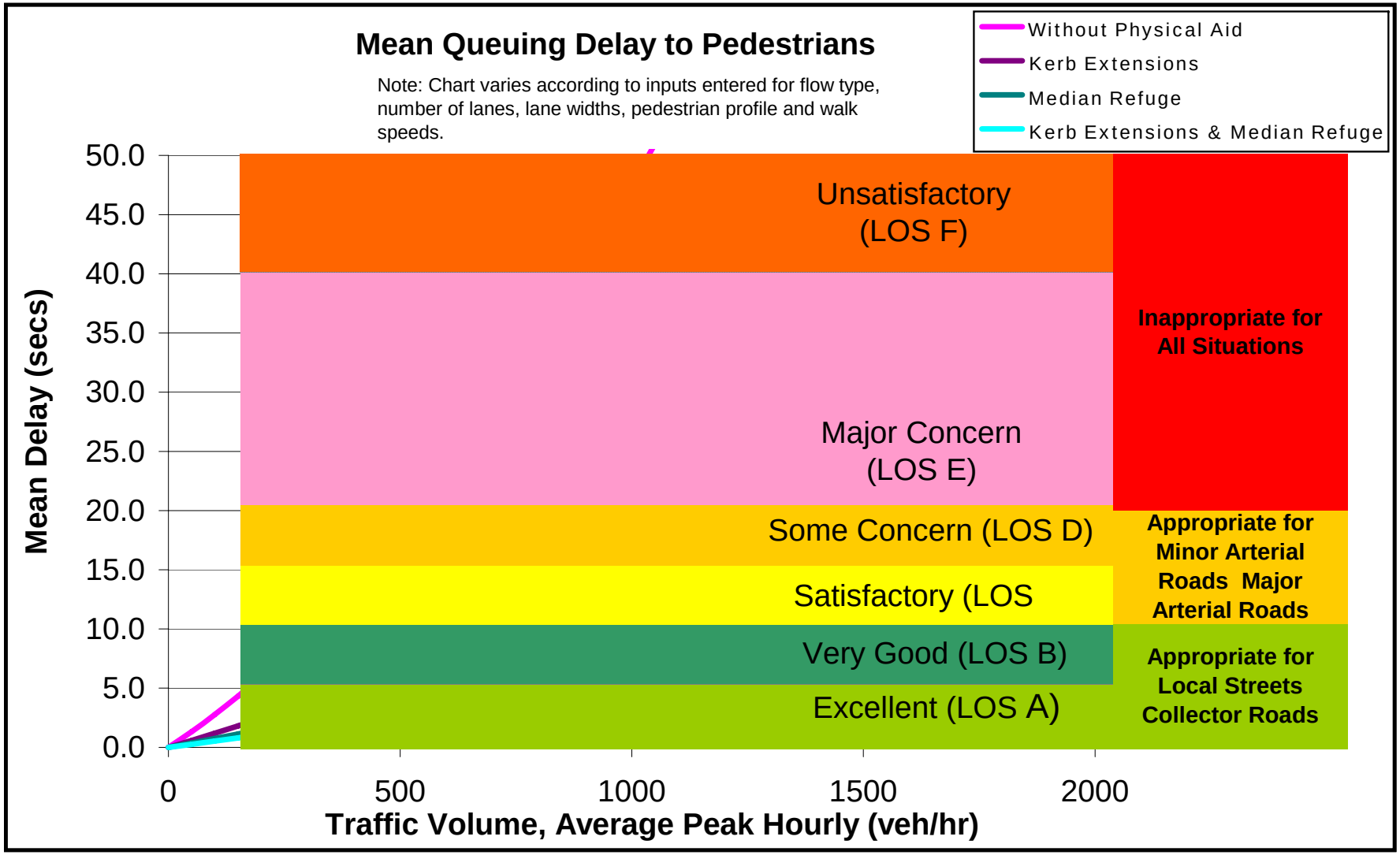
Physical crossing aids
– interrupted flow



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Calculation tool

For all at grade options except signals:

- Excludes dumb options
- Calculates delays to motorists and pedestrians
- Estimates typical crash rates and reductions
- Summary sheet compares options
- Some assumptions require refinement

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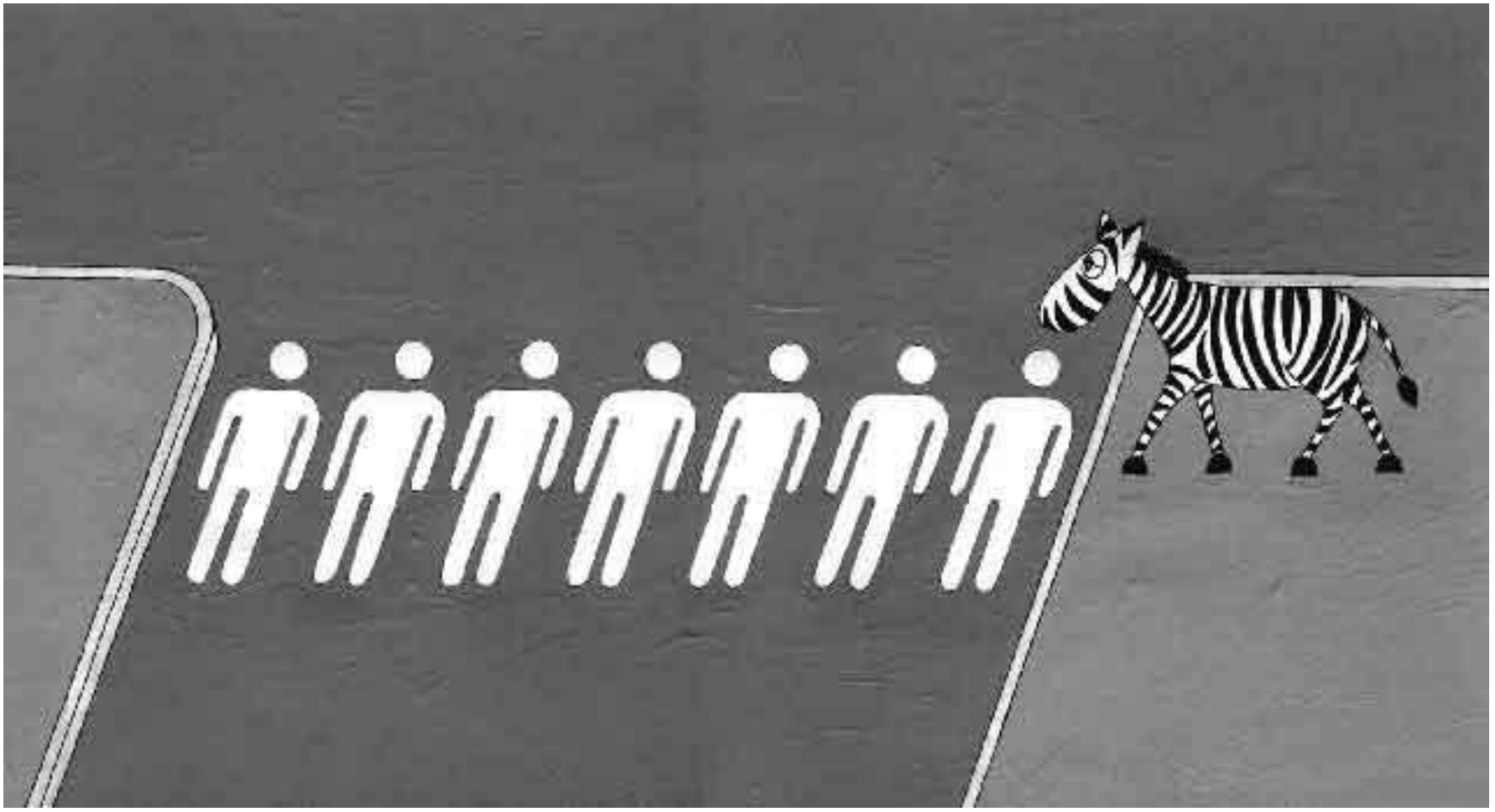
Zebra Crossings



Priority Controls

Zebra Crossings

- Never use across two lanes of traffic in the same direction.
- Extra vehicle delay is usually greater than reduced pedestrian delay. (assuming road is first narrowed as accords with best practice)
- There are no safety reductions from zebra installation, often the converse.
- So, consider where pedestrian delay is unacceptably high, physical aids are not sufficient and consider balance of vehicle and pedestrian delay in road user hierarchy.

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School Crossings

- Only consider a zebra crossing where a school patrol operates and crossing is used outside school patrol times.
- Physical aids and a school crossing point will be better in most cases.
- A school crossing point can be used across two traffic lanes in the same direction, if right lane controlled from a centre island.
- Where traffic volumes are low so there are plenty of gaps, priority to children is not needed.

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Traffic Signals

- Traffic Signals are the only at grade control option on multi-lane roads.
- Because they usually involve a sub-standard level of service to both pedestrians and traffic, always compare the level of service with a central raised island.
- They are an effective safety measure when pedestrians use them lawfully: however badly compromised by the lower safety of people who won't wait or cross near by.
- Carefully consider options for reducing pedestrian delay to increase compliance.

(Article on Leeds in TE&C)

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Typical safety benefits

Measure	reduction pedestrians	overall
Kerb extensions	0.36	
Raised Median Island	0.18	
Kerb ext + Island	0.32	
Kerb ext at existing zebra	0.44	
Zebra plus Platform	0.88	
Midblock traffic signals	0.64	0.35
Zebra only	- 0.28	- 0.26
School patrols	0.35	

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Typical safety benefits

Measure	reduction pedestrians	overall
Intersection signals - parallel phase	-	-
Intersection signals – exclusive phase	0.29	0.22
Cycle lanes	0.30	0.30
Roundabouts	0.48	0.35
Flush medians	0.30	0.19

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Implications

- Better planning concepts and processes for walking infrastructure
- More comprehensive and context sensitive guidance - choose best option don't just rely on warrants.
- Put the right facility in the right place
- Design it better
  – revise your standard drawings

"Every project is a walking project"

Next steps

Print guides and place on web-site www.landtransport.govt.nz.

Training workshops.....

- Half day overview for managers
- Full day practitioners course on
  fundamentals of planning and design for walking
- Potential for an advanced course including
  Non-motorised user audit and community street reviews

Benchmarking performance for walking

More research and development on walkability assessment tools

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Questions?

www.landtransport.govt.nz