TE ARA MUA - FUTURE STREETS: Emerging impacts on road user behaviour

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OUTLINE

• Background to Te Ara Mua – Future Streets
• Methods: road user interactions
• Emerging results and conclusions
TE ARA MUA - FUTURE STREETS

A project to demonstrate ‘healthier’ street and route design

A research project to measure safety, health, environmental, and social effects of improving suburban streets and routes
Making streets around Māngere Central safer and easier to travel around, especially by walking and cycling; and reflecting local identity.
50% walking infrastructure
30% cycling infrastructure
10% traffic calming
10% planting, wayfinding, artwork and cultural references
Pedestrian priority where there are lots of pedestrians, better access to the town centre
METHODS
<table>
<thead>
<tr>
<th>Before</th>
<th>Intervention area Māngere Central</th>
<th>Control area Māngere East</th>
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<tbody>
<tr>
<td></td>
<td><strong>Traffic behaviour</strong></td>
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<td>• Speed &amp; counts measures</td>
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<td>• <strong>Video of behaviour</strong></td>
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<td>Motorists, peds &amp; cyclists</td>
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<td>Footpaths &amp; roads</td>
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<td><strong>Residents surveys</strong></td>
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<td>• Mode use to local destinations</td>
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<td>• Physical activity</td>
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<td>• Neighbourhood perceptions</td>
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<td></td>
<td>• Injuries (self report &amp; data linkage)</td>
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<td>• Children &amp; adults</td>
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**Intervention and control areas were matched for:**

• Access to amenity destinations
• Street layout and age of development
• Demographics
Aim of road user interaction analysis

To understand the effects of Future Streets Treatments on:

- Road user behaviour
- Road user interactions

_Hypothesis:_ Future Streets treatments will create a safer and more user-friendly road network that matches the intended road function.
Video coding system method development

Previous Studies

Point England, Self-explaining Roads (Mackie, 2013)

Traffic Conflict Studies (St Aubin, 2015)

Naturalistic Cycling Studies (Johnson 2010)

Before/After evaluation of infrastructure treatments (Hunter, 2012)

Hybrid automated/manual method – cyclists (Thomas, 2018)

Hyden, 1987
Vulnerable road user behaviour

**Pedestrian**
- Adult
- Child
- Elderly
- Accompanied Group
- Mobility device

**Pedestrian Behaviour**
- Walking
- Running
- Socialising/Lingering/Playing

**Pedestrian Movement**

**Crossing Behaviour**
- Stop, check, give-way proceed
- Didn't stop, check, proceed
- Didn't stop, didn't check, proceed

**Crossing delay**
- No delay
- Actual time*

**Crossing movement**
- 1 movement
- 2 movements

**Crossing Location**
- On designated crossing
- Off designated crossing

**Cyclist**
- Adult
- Child
- Elderly
- Accompanied Group

**Helmet**
- Yes
- No
- Unsure

**Cyclist Movement**

**Cyclist location**
- On-road
- Footpath
- On cycling facility

**Cyclist behaviour**
- Safe & Compliant
- Informal
- Risky or reckless
Road user interactions

- **Interacting User**
  - Motor vehicle
  - Pedestrian
  - Cyclist

- **Road User Actions**
  - e.g. give-way, braking, swerving

- **Type of interaction**

- **Potential crash movement code**
  - NZTA code scheme

- **Conflict Information**

- **Yes**
  - **Standard Encounter**
    - Controlled adaption of speed or direction in response to other road users

- **Close Encounter**
  - No obvious action taken by motor vehicle or cyclist. Automated option: PET, TTC

- **Avoidance**
  - Noticeable change in speed or direction

- **Near-miss**
  - Rapid or evasive manoeuvring to avoid other road users

- **Collision**
EMERGING RESULTS
SLOWER SPEEDS

Speed changes Baseline 2014 vs Post 2017

Change in 85th percentile speed Km/h

-18.0
-16.0
-14.0
-12.0
-10.0
-8.0
-6.0
-4.0
-2.0
0.0
2.0

Speed measurement site

108 Tennessee ave
31 Tennessee ave
Vine st
Wickman way
Buckland road
11 Yates Road
39 Yates Road
Massey Road
Friesian drive
Mascot Near Bader
Imrie
Mascot at Nga Iwi School
Mascot at Friesian
Baker near Orly
Baker near Ashgrove
Ashgrove rd

Intervention
Control
Intervention area
no changes

-0.5
-2.2
-2.9
-1.5
-0.1
-0.9
-2.4
0.2
-16.6
-15.3
-10.5
-9.4
-2.0
-0.4
LESS TRAFFIC

Change in Traffic volumes Baseline 2014 vs Post 2017

Control

Intervention

...and fewer trucks

Measurement site
SAFER CROSSING BEHAVIOUR
CHANGES TO CROSSING MOVEMENTS

‘Wheeled’ movement has increased:

- Mobility-assisted movement has increased from 0.3% to 1.9% of all pedestrians (from 2 pedestrians to 12)
- Pram movements 12 → 14
- Scooting and skating 0 → 5

Pedestrian crossing movements are safer, quicker, and more continuous:

- Crossing movements were continuous (pedestrians had to stop in the middle of the road); 51% → 97% are continuous
- Pedestrians had to wait more than 3 seconds to cross: 77% → 16%
- Fewer running across road
Higher frequency
Lower frequency

FEWER INTERACTIONS

Pedestrian-car interactions

2014

2018
Pre Events

⭐ Close encounter
⭐ Avoidance
⭐ Near Miss
Post Events

🌟 Close encounter
🌟 Avoidance
🌟 Near Miss
Cyclists

Pre

Post
BENEFITS FOR MOBILITY-ASSISTED MOVEMENT

“...I used to push from home to here [gym by the mall] every day and some of the roads were really bumpy, unsafe and even because you have done lots of good changes I feel independent and safe within myself – in my manual chair or in my power chair. All the local places I feel comfortable and it is freedom for me, so I don’t have a bodyguard [someone to push her].”

36 year old woman with mobility impairment

1.9% of pedestrians crossing Mascot Ave used mobility aids at follow-up compared to 0.3% at baseline
CONCLUSIONS

Future Streets treatments at Mascot Ave have created a more user-friendly environment for pedestrians (and cyclists)

Particular benefits for those with mobility devices/prams/shopping trolleys

Road user interactions have migrated to safer locations

There are remaining design issues that could be resolved