

5/10/12

SUMMARY REPORT OF RESEARCH COMPLETED AND FINDINGS ON THE CYCLE LANE ROAD MARKINGS

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ROAD MARKINGS

Background

Road markings are addressed in the New Zealand Design Manuals and Road Controlling Authorities (RCA's) are generally to adhere to these to ensure consistency within the National network. However, due to the fact that Hastings became a Model Community participant in the nationally funded project of retrofitting cycle lanes to existing road networks, it created the opportunity for Hastings District Council to consider and test certain alternatives.

Initial research involved technical data evaluation and community input which was obtained through a "Communitrak" survey, whilst technical data was obtained from the Council's asset management system, RAMM.

Further information obtained from discussions with individuals and personal observation as a new comer to New Zealand at the time suggested that the standard white line marking with white cycle symbols and green surface colouring at intersections did very little to enhance cycling awareness and perceived safety with not many road users actually realising that cycle lanes were present within certain parts of the network.

In addition almost 200,000 people in New Zealand are suffering from colour blindness and can find it difficult to distinguish between cycle lanes and normal traffic lanes as the green boxes used to identify cycle lanes are hard to recognise. Further research emphasized that green and red colour spectra are generally difficult to distinguish due to the inabilities of colour blind individuals to recognise the applicable wavelengths, whilst the blue colour spectra is likely to be more visible. This is evident in the following set of diagrams.



(Source: Wikipedia)

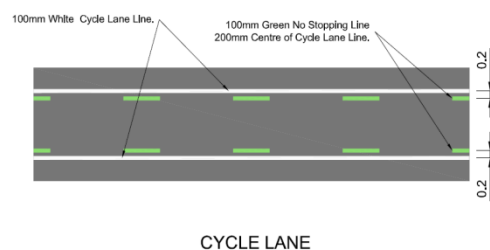
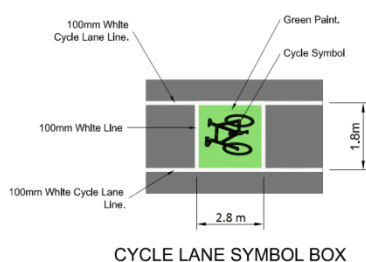
Difficulty in seeing the standard cycle lane green has been confirmed by colour impaired colleagues.

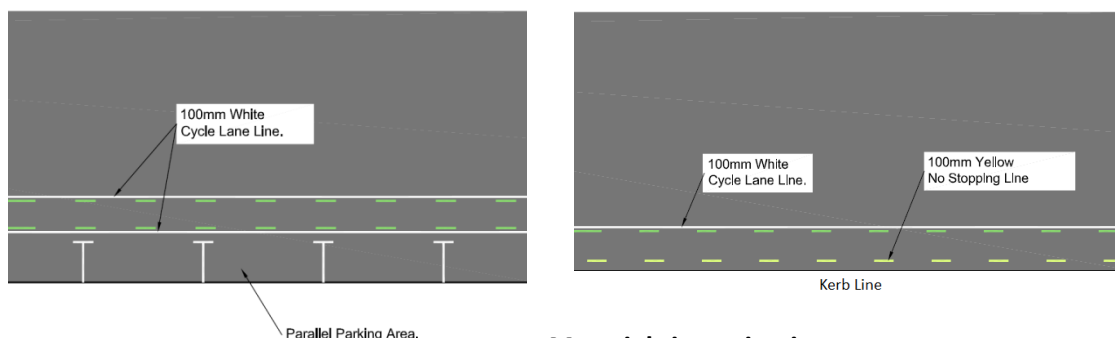
Data collected at the time showed the following:

- > Only 25% of residents felt cycling was safe (75% perceived it to be unsafe)
- > 7% of all crashes within Hastings involved cyclists
- > The majority of crashes happened within the urban area of Hastings
- > Cyclists' casualties by age group showed almost 20% within the 10-14 age group (our children)
- > Over two thirds of accidents involving cyclists are crossing/turning movements where either the cyclist or the driver has failed to give way or did not see the other party
- > 1 out of 12 men suffers from colour vision deficiency
- > 1 out of 270 women suffers from colour vision deficiency
- > Visibility issues with standard markings in poor weather conditions and night time
- > Parking on cycle lanes

HDC approach to address issues

ISSUE	RESPONSE
Cycle lane prominence & the right of cyclists to road space	Improve cycle lane prominence by providing additional markings (either solid coloured line inside of white line or broken coloured line to both sides of cycle lane or broken coloured line to inside of white line and yellow no-stopping line to kerb edge of cycle lane).
Visibility based on colour blindness, night time visibility and bad weather visibility	Develop green paint containing blue pigments to improve its visibility to the visually impaired. Enhance line reflectivity to improve night time and bad weather visibility.
User safety	Improve user safety by: Cycling education programmes, marketing drives and high publicity events to create awareness, Consider where possible the provision of on-road cycle lanes only in low speed (50km/h) environments and within urban area.
Parking on cycle lanes	Provide yellow no-stopping lines to the kerb side of cycle lanes as the majority of the New Zealand road users generally respect yellow (no-stopping) prohibition lines and can be prosecuted if they ignore it.





Materials investigation

Whole of life costs are fundamental in selecting the method of distinguishing cycle lanes from the rest of the traffic lanes. Options considered for marking were coloured road marking paint and resin & glass surfacing.

Additional road marking adds additional cost to network maintenance, however, the opinion was that additional cost would be significantly offset by the fact that the cycle lanes are typically in areas subject to low vehicle over-run and therefore wear-and-tear. Consequently they should last at least 50% longer than traffic lane markings and would therefore only require remarking every two to three years. It was however acknowledged from the outset that localised high wear areas like intersections would require more frequent marking replacements, e.g. annually to coincide with the yield/stop line markings. Lifecycle calculations were based on a 5 year period, which is the replacement cycle claimed by the resin and glass product provider.

Comparisons between these options were made and the results provided in the next table.

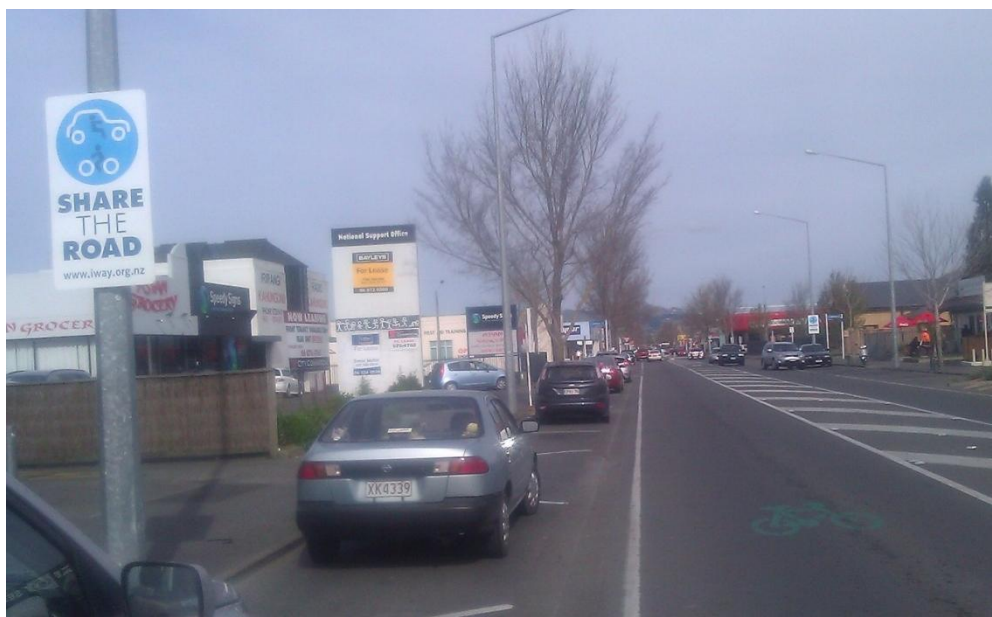
Topic	Road Marking Paint	Resin and glass surfacing
Price – construction costs	\$8.50 per square metre	\$45.00 per square metre
5 yearly - replacements	\$42.50 per square metre for high wear areas and \$25.50 for low wear surfacing after 5 years	\$60.00-\$80.00 per square metre – remove & replace seal & resin every five years
Colour requirements	Designed to accommodate requirements for colour vision impairment	Fixed colours to choose from
Ease of removal/replacement	Removal is relative easy by water/sand blasting and/or painting out	Reportedly removed by stripping seal surface
Skid resistance	Complying with NZTA skid resistance requirements	Complying with NZTA skid resistance requirements. Very sharp finish – concerns that it will increase severity in injuries should cyclist fall on this surfacing
Overall life span	To be replaced every 2-3 years; and 6 monthly in high wear areas	Replacement suggested by suppliers every 5 years; not yet confirmed by evaluation
Bad weather/night visibility	Highly visible due to reflectivity compliance	Did not appear to be more visible during night or bad weather conditions

Shared space

The Hastings District Council as part of its CBD revitalisation programme suggested the speed limits around the CBD area be set at 30km/h. This is not achieved by means of signs but by road design, with platforms, chicanes and roundabouts as the main tools used in this approach.

This assisted the Council in utilising the CBD area as a shared space environment. No signs or markings are used in the approach but observations suggested that shared usage occurs naturally and with very little conflict.

The more prominent roads adjacent to the CBD area, has been signposted with the HDC “Share the Road” campaign signs with green cycle symbols being painted on the road surface to draw attention to the presence of cyclists. Without any publication to this effect, motorists have identified the green cycle symbol with the presence of cyclists. The initial indications are that these markings have been found to be very effective with cyclists and cars finding it relatively easy to share the traffic lanes with minimum effort.



“Share the road” campaign signs and green cycle symbol, Hastings District, 2011-2012

ROUNDABOUTS

A few years ago Hastings District Council started changing its roundabouts to comply with the “Aust-Roads” requirements by opening the approaches in order to accommodate both vehicles and cyclists simultaneously through roundabouts.

A few accidents and near misses however suggested that this strategy is flawed and the programme was halted. With the initiation of the Model Communities Project, the treatment of cyclists within

roundabouts was identified as a critical safety issue which would need to be addressed in order to support the user safety initiatives.

All roundabouts were analysed and redesigned to facilitate only single vehicle lane occupancy. Simultaneously, angled pram cut-downs were provided at the suspension of the cycle lane (30m from the approach entrance). These give the option for cyclists to either “take the traffic lane” or use the “off-road” option.

The section of footpath between sequential cut-downs were upgraded and widened to accommodate shared facilities. These are clearly marked with markings identical (“Share-with-care”) to the HDC shared off-road paths.

Initially, green cycle symbols were tested within roundabout travel lanes to identify the presence of cyclists, but this idea was quickly abandoned in favour of green cycle symbols on the straight approach sections due to the high wear-and-tear associated with symbols provided within the roundabout. These have been found to be more effective, with the majority of vehicle operators understanding its meaning without it being promoted and/or published.

MONITORING & EVALUATION

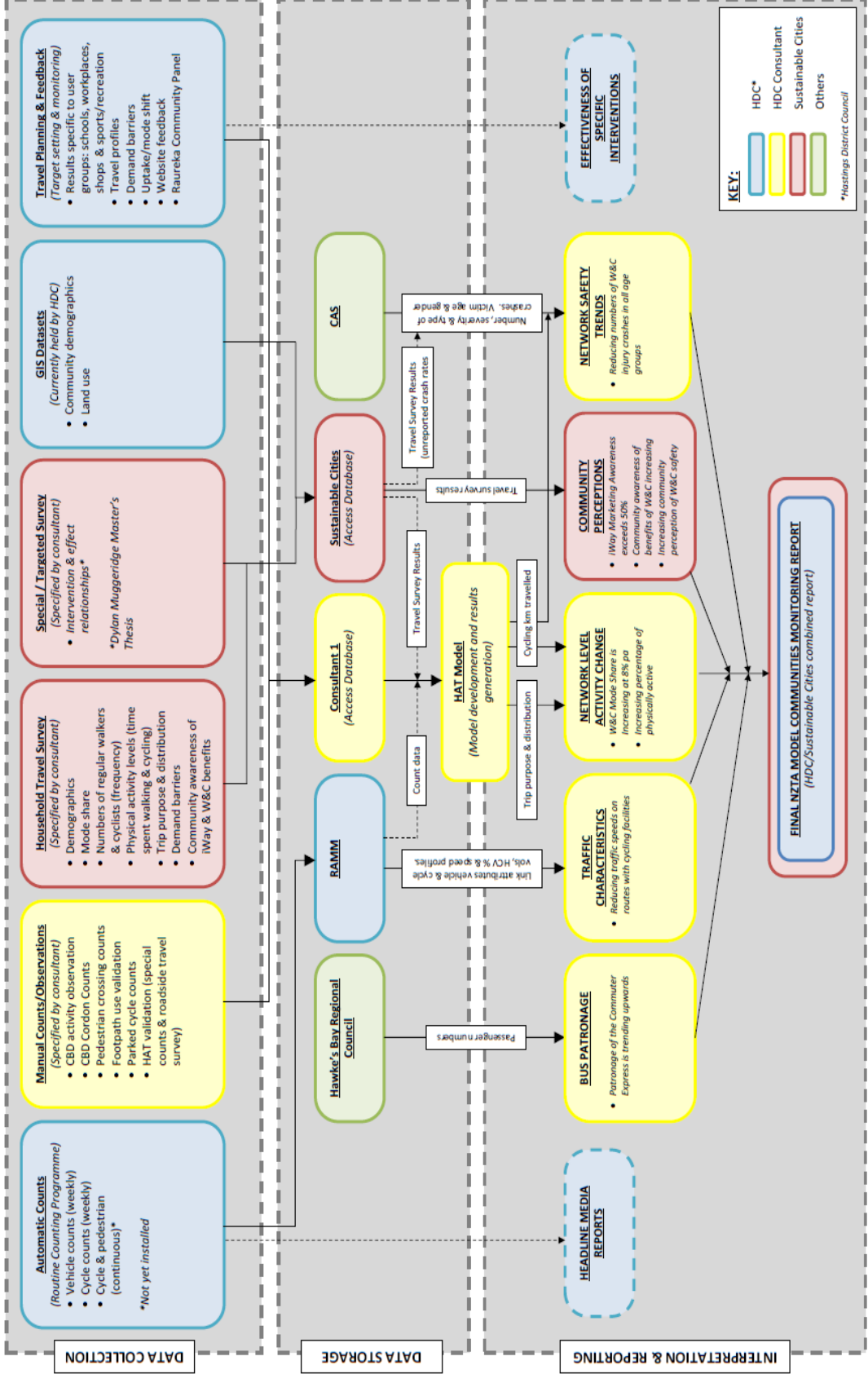
Framework

The primary goal of the monitoring and evaluation work is to measure and track progress towards achieving the key project KPIs.

The aims of the monitoring programme are therefore:

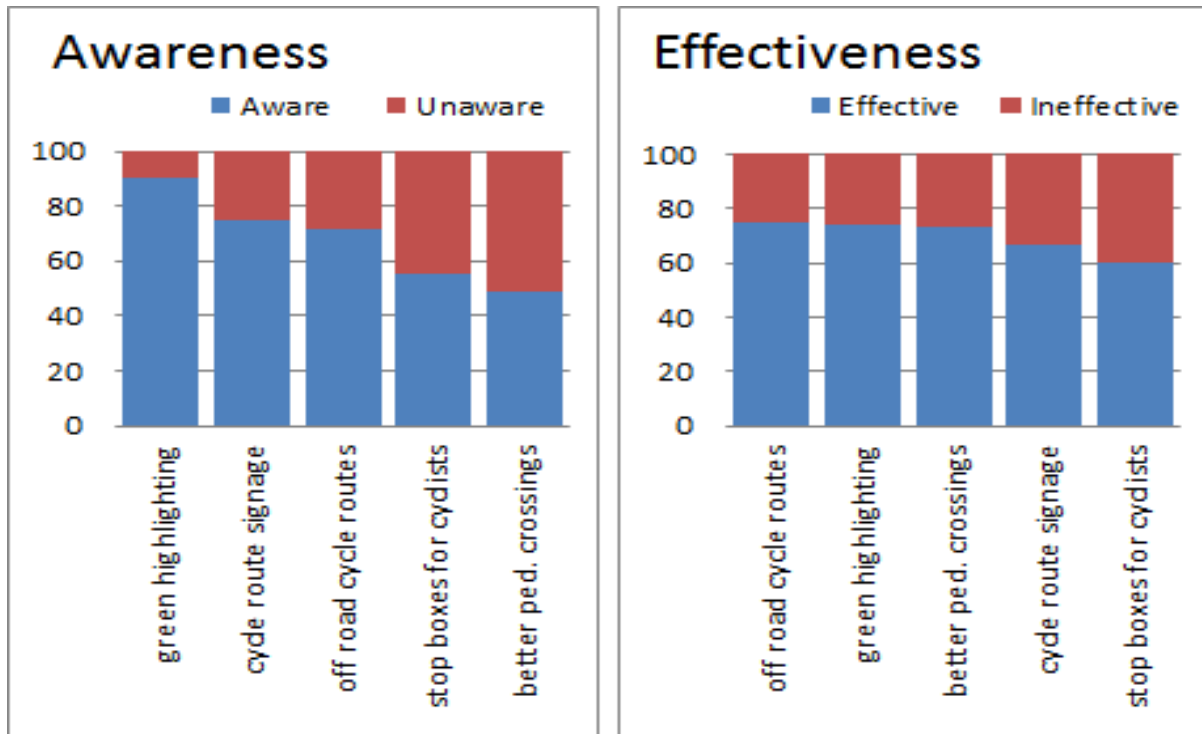
- To give a ‘Network Level’ overview of changes in levels of walking and cycling and covering a variety of types of route and a variety of locations and/or corridors
- To quantify the effectiveness of specific interventions
- To identify changes in perception and attitude to walking & cycling
- To quantify the effect of changing levels of walking & cycling on network safety and traffic characteristics (e.g. speed)

The full framework for the monitoring and evaluation process we have put in place is given on the next page.



Which interventions have been most effective?

Intervention effectiveness was also highlighted as a measure of success. The following graphs demonstrate that the green paint highlighting for cycle lanes was widely recognised amongst survey respondents with 90% being aware of it. It was also considered to be an effective measure with 74% of survey respondents marking it as such.



Some additional results

Surveys have shown that the majority of the Hastings public are now aware of the project, already exceeding our three year KPI. Cycling events have increased hugely in popularity, with the last pathway opening attended by over 800 people.

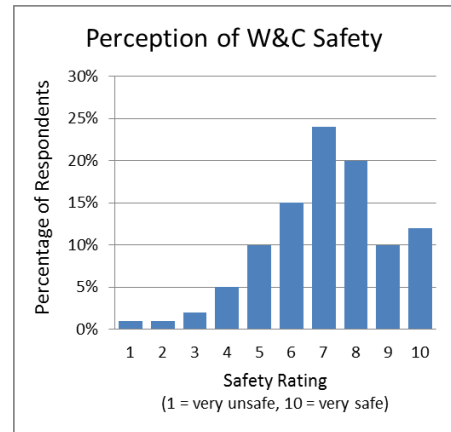
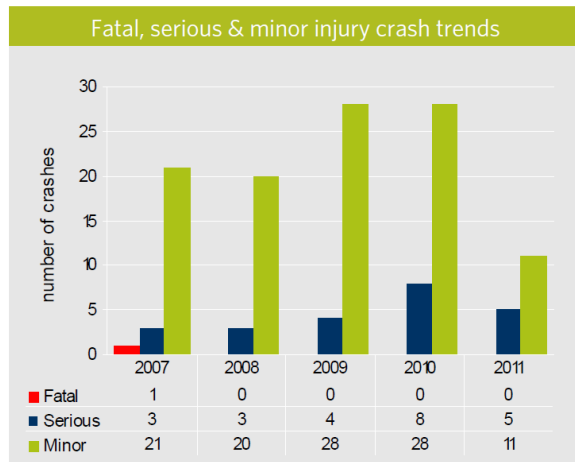
But it is our walking and cycling KPIs that are most important to the project and it is already clear that the number of people using the new facilities is rising. It is still early to reliably identify trends from our monitoring activities, but initial unconfirmed figures suggest a first year increase in the number of cyclists ranging from 10% to 24%.

The perception of safety is much higher amongst those who do actually walk or cycle with at least 65% feeling safe or very safe

This is supported by NZTA figures which show that cycling crash numbers are showing a static trend, despite greater numbers.

Cyclists - Hastings District

Increasing the safety of cyclists is a medium strategic priority identified in Safer Journeys. Locally this issue is of concern due to the number of deaths and/or serious casualties when viewed against the local road use (MHrs), which reflects a high level of personal risk.



Perception of Walking & Cycling Safety

Accidents involving cyclists, Hastings District, 2007-2011

Although the number of walking and cycling crashes has remained static, given the increase in cycle numbers, the estimated crash rate has reduced from 630 crashes per million Cycle Km Travelled (CKT) to 563 per million CKT. This compares with a current crash rate for car travel of 534 per million Vehicle Km Travelled (VKT).

Other responses

Cycling related business such as cycle shops and cafes are also reporting an increase in business, with one shop estimating that bike sales had increased by around 25%.