

## **Trial of Sharrow Markings**

Trial Results Report

February 2015

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## APPENDICES

### APPENDIX A PERCEPTION SURVEY

## 1 INTRODUCTION

The following report is in response to the Traffic Note 10 application submitted to the NZ Transport Agency in October 2013 with respect to the trial of the sharrow cycle marking symbol. In particular this report summarises the results of the sharrow marking trial completed in Auckland.

### 1.1 Background To Project

The need for a sharrow, or shared lane marking, within the NZ context has arisen due to the need to try and provide an additional “toolbox” measure to help in the design of infrastructure. Internationally the use of sharrows has, on the whole, proved successful in improving safety, wayfinding and awareness of cyclist routes.

In November 2012, a National Cycling Signs and Markings Working Group meeting took place to discuss issues surrounding the provision of adequate information for cyclists and other road users. As part of this working group meeting a number of issues were identified with regards to the following areas:

- ◆ Cycling is not seen as part of an integrated network solution, which affects the quality and quantity of the cycling network
- ◆ Disconnected networks geared towards motor vehicles potentially make cyclists feel they don't belong on the network
- ◆ A limited toolbox leads to a lack of understanding of cycle signs, markings and infrastructure.

These issues were further refined to three problem situations, summarised below, and the two trials being the focus of the Traffic Note 10 application address the first two bullet points.

- ◆ Defining a cycle lane
- ◆ Defining a lane to be shared by motorists and cyclists
- ◆ Defining a safe line for cyclists

With respect to defining a lane to be shared by motorists and cyclists, the introduction of the sharrow marking into New Zealand was seen to address this matter. There were, however, a number of matters that required further consideration. Namely these were:

- ◆ The need to understand the legality of such a marking coupled with how it affects the existing legislation with respect to the cycle lane symbol; is a key matter to be resolved.
- ◆ How the existing legislation could be altered if necessary
- ◆ The preferred design for a shared lane marking.

As a result, further investigations into the potential use sharrows within New Zealand were completed and consensus reached with the National Cycling Signs and Markings Working Group as to the preferred design for the sharrow, with this to be the subject of the Traffic Note 10 trial.

Further to this, and in response to the need to define a cycle lane it was proposed to introduce the word “LANE” to the existing cycle lane markings.

An application to NZ Transport Agency was made in October 2013 with respect to Traffic Note 10, being to “trial a new device or change to an existing one”. In this instance the trial was with respect to:

- ◆ The introduction of the sharrow marking
- ◆ The change to the existing cycle marking to include the word “LANE”

Since the acceptance of this application Auckland Transport has taken a lead role in undertaking the trial of sharrow markings within New Zealand, and has identified and implemented sharrow markings at five locations within Auckland as well as completing an investigation as to the operational outcomes to arise from the introduction of these markings. Cycle “LANE” markings have also been installed along two cycle lane routes, the first being on Mt Albert Road, the second on Lake Road.

## 2 TRIAL SITE LOCATIONS

### 2.1 Sharrows

There are five trial sites for the sharrow markings in Auckland. These sites have been selected based on observed cyclist numbers and specific road environment characteristics:

- ◆ Seacliffe Avenue, Belmont
- ◆ Riddell Road, Glendowie
- ◆ Point Chevalier Road, Point Chevalier
- ◆ Riverside Avenue and Dunkirk Road, Point England
- ◆ Elstree Avenue and Taniwha Street, Glen Innes

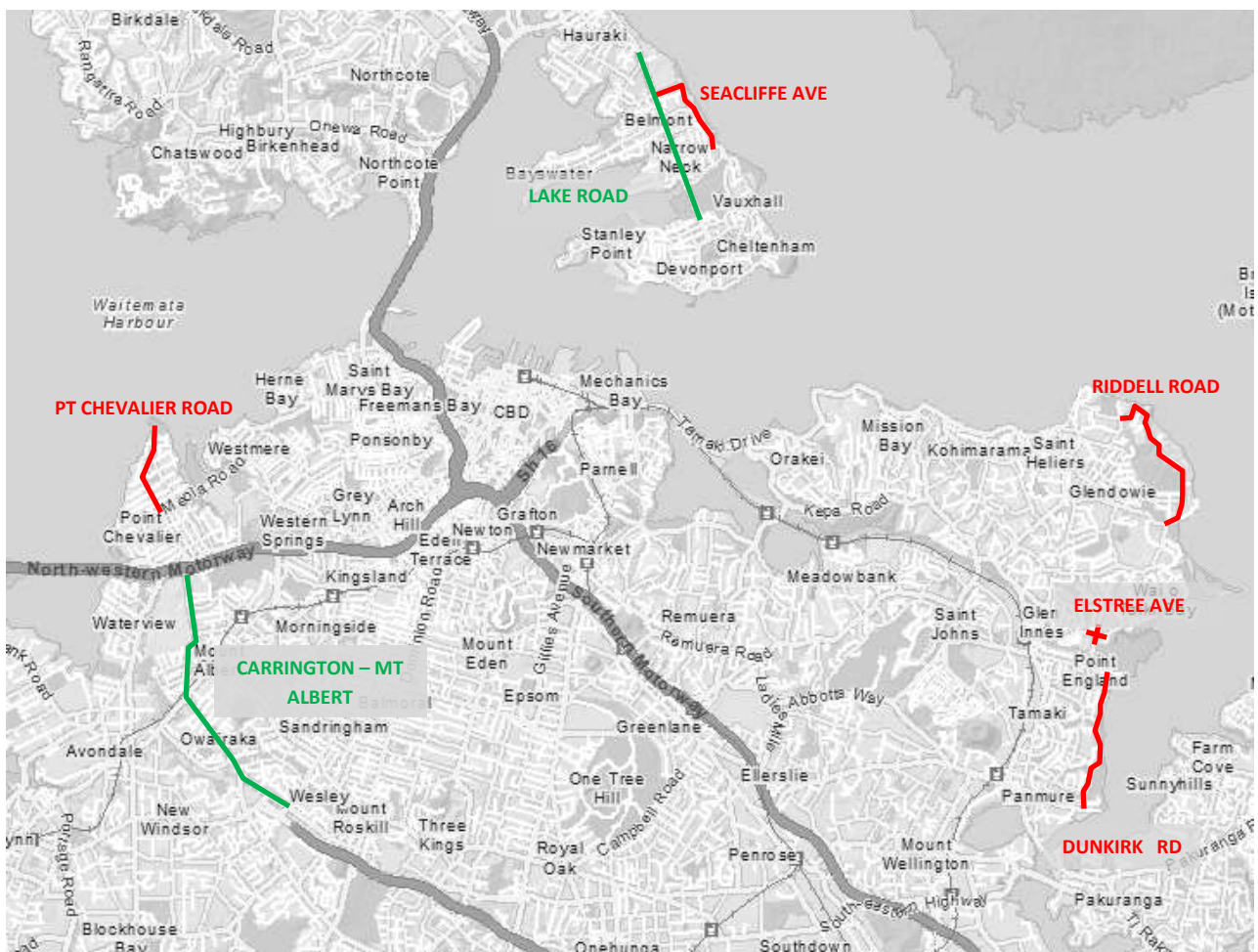
Commentary on each of the selected sites is provided in Section 0.

### 2.2 Trial Sites: Cycle LANE marking

The text “LANE” has been retrofitted to two existing cycle lanes within Auckland; Carrington Road-Mt Albert Road and Lake Road. The LANE text was added above the existing cycle symbols along each route.

The need for the addition of the “LANE” text is to enable a cycle lane to be redefined within the TCD 2004 regulations

Figure 1: Location of Selected Sites



### 3 ASSESSMENT METHODOLOGY

#### 3.1 Sharrow Marking

The assessment of the sharrow marking trial is a mixture of quantitative and subjective data.

An analysis of one weekday and one weekend of video recording has been undertaken to determine the effects of sharrow markings in relation to a cyclists' lateral tracking within the road space. Vehicle speed information has also been captured via tube counts installed at each trail location.

In terms of determining the lateral position of cyclists before and after the sharrow markings, the assessment methodology is as follows:

- ◆ Time stamp or screen shot out each image of a cyclist as they pass a hypothetical datum line at each survey location during the peak periods. This is completed for both the pre- and post-sharrow marking being installed
- ◆ Each image then has a grid overlaid in order to determine cyclists' lateral position on the road. Each grid is calibrated to site measurements to account for the camera angle perspective (see Figure 2)

- ◆ Comparisons can then be made between the cyclists' position both pre- and post-the sharrow marking being installed
- ◆ Consideration has also been given to the lateral positioning of cycle bunches.

Figure 2: Image of Cyclist overlaid with grid



In addition a user perception survey was been completed by Auckland Transport in December 2013, with a questionnaire provided to the Research Panel and a group of local respondents managed by Auckland Transport. A report outlining the results of the perception survey is provided in Appendix A, with a summary of the results discussed in Section 7.

### 3.2 Cycle Lane Markings

It is not proposed to formally survey on-site the implications of the change to the cycle lane markings as there is no measurable statistics able to be gauged from the implementation of LANE markings to a cycle lane. Instead it is proposed to undertake perception surveys with a focus group where different photomontages will be provided and the focus group participants asked to provide a response as to their perception of the photomontage.



## 4 SITE SELECTION

The following provides a summary of the sites selected to trial the sharrow marking along. This provides a brief description of the road type, vehicle volumes, land use and any other pertinent traffic related matters, such as the presence of local area traffic management (LATM) measures.

### 4.1 Seacliffe Avenue

Seacliffe Avenue is located in Belmont, Auckland and is classified as a Collector Road that runs adjacent to the eastern coastline on the North Shore. The majority of the surrounding land use is residential, with Belmont Intermediate and Takapuna Grammar School located at the northern end of Seacliffe Road. Figure 3 shows a typical section of Seacliffe Avenue.

**Figure 3: Seacliffe Avenue**



**Table 1: Key Characteristics of Seacliffe Avenue and Hamana Street**

Criteria	Criteria Assessment
Road Type	Collector Road
Auckland Cycle Network (ACN) Status	Cycle Feeder on the ACN North Shore City Council identified as local cycle network
Average Annual Daily Traffic Volume	No data available
Key adjacent land uses	In proximity to Belmont Intermediate and Takapuna Grammar School
Typical Cross section (approx.)	- 1.5 m grass berm (property to western footpath) - 1.4 m western footpath - 1 m grass berm (western footpath to western kerb) - 2.4 m on-street parking
LATM Measures	Yes – chicane type and raised tables
Crash History	Total Crashes: 1 No reported cyclist crashes

## 4.2 Riddell Road

Riddell Road is classified as a Collector Road and is located in Glendowie, Auckland. Riddell Road provides a connection between Glover Park in the north and Glendowie Park in the south and is adjacent to Churchill Park. At the southern end of Glendowie Road is Glendowie Primary School and Glendowie College. Churchill Park School is located towards the northern end of Riddell Road. Figure 4 shows a typical section of Riddell Road.

**Figure 4: Riddell Road**



**Table 2: Key Characteristics of Riddell Road**

Criteria	Criteria Assessment
Road Type	Collector Road
Auckland Cycle Network (ACN) Status	Cycle Collector on ACN Auckland Transport cycle map classified Riddell Rd as a “route with space for cyclist, may be on busy roads”
Average Annual Daily Traffic Volume	3,514 vehicles per day measured between Grantham Road and Roberta Avenue (May 2010)
Key adjacent land uses	In proximity to Glendowie Primary School, Churchill Park Primary and Glendowie College
Typical Cross section (approx.)	<ul style="list-style-type: none"> <li>- 2m footpath</li> <li>- 2.5m grass berm</li> <li>- 5.5m lanes</li> <li>- 11m wide kerb to kerb corridor</li> <li>- Unrestricted parking on both side</li> </ul>
LATM Measures	Nil
Crash History	Total Crashes: 8 No cyclist crashes

### 4.3 Point Chevalier Road

Point Chevalier Road is classified as a Collector Road and is located in Point Chevalier. The road terminates at the northern end at Coyle Park. The adjacent land use is predominantly residential with small pockets of commercial premises. Figure 5 below shows a typical cross section of Point Chevalier Road.

**Figure 5: Point Chevalier Road**



**Table 3: Key Characteristics of Point Chevalier Road**

Criteria	Criteria Assessment
Road Type	Collector Road from road end to Meola Rd and District Arterial from Meola Rd to Great North Road
Auckland Cycle Network (ACN) Status	Cycle feeder on the ACN Auckland Transport cycle map classified Point Chevalier Rd as a “route with space for cyclist, may be on busy roads”
Average Annual Daily Traffic Volume	14,725 vehicles per day measured between Great North Road and Walker Road (February 2010)
Key adjacent land uses	In proximity to Unitec at southern end
Typical Cross Section (approx.)	<ul style="list-style-type: none"> <li>- 3m footpath</li> <li>- 7m lane</li> <li>- 14m road corridor</li> </ul>
LATM Measures	Nil
Crash History	Total crashes: 38 2 cyclist crashes, 1 due to a door of a parked car opening on a cyclist and 1 due to a side collision with a turning vehicle

## 4.4 Riverside Avenue and Dunkirk Road

Riverside Avenue and Dunkirk Road are classified as Local Road and are located in Point England. The route runs adjacent to Mount Wellington War Memorial Reserve through to Point England Reserve. The land adjacent to the route on the eastern side is largely reserve and harbour, with the western side being predominantly residential.

**Figure 6: Riverside Avenue and Dunkirk Avenue**



**Table 4: Key Characteristics of Riverside Avenue and Dunkirk Road**

Criteria	Criteria Assessment
Road Type	Local Road
Auckland Cycle Network (ACN) Status	Cycle connector on the ACN
Average Annual Daily Traffic Volume	1,811 vehicles per day measured between Matapan Road and Mareth Street on (March 2010)
Key adjacent land uses	In proximity to Point England Primary School, Panmure Bridge School, St Patrick's School, Tamaki Primary School and Tamaki Intermediate School
Typical Cross Section (approx.)	<ul style="list-style-type: none"> <li>- 1.6m footpath</li> <li>- 3m grass berm</li> <li>- 4.6 lane</li> <li>- 9.2m wide corridor</li> <li>- Unrestricted parking on both kerb side</li> </ul>
LATM Measures	Nil
Crash History	<p>18 total crashes</p> <p>1 cyclist crash due to vehicle failing to see and give way to on coming cycle.</p>

## 4.5 Elstree Avenue and Taniwha Street Roundabout

Elstree Avenue is classified as a Collector Road and Taniwha Street is classified as a District Arterial Road; both located in Glen Innes. This site has been selected in order to understand the effect of sharrow markings at an intersection. The land adjacent to the roundabout is predominantly residential, with one corner being Tamaki College, another corner being a reserve, and the remaining two corners residential.

**Figure 7: Elstree Avenue/Taniwha Street roundabout**



**Table 5: Key Characteristics of Elstree Avenue and Taniwha Street**

Criteria	Criteria Assessment
Road Type	Elstree Avenue is a collector road and Taniwha Street is a district arterial road
Auckland Cycle Network (ACN) Status	Neither road is on the ACN
Average Annual Daily Traffic Volume (AADT)	Elstree Avenue AADT is 9,976 vehicles per day measured between Taniwha Street roundabout and Maybury Street on (June 2013)
Key adjacent land uses	In proximity to Tamaki College and Point England Reserve
Typical Cross Section (approx.)	<p>Taniwha Street</p> <ul style="list-style-type: none"> <li>- 1.8m footpath</li> <li>- 2.8m grass berm</li> <li>- 6m lane</li> <li>- 12m wide corridor</li> <li>- Unrestricted parking on both kerb side approximately 50m from the intersection</li> </ul> <p>Elstree Avenue</p> <ul style="list-style-type: none"> <li>- 2m footpath</li> <li>- 2m grass berm</li> </ul>

**Table 5: Key Characteristics of Elstree Avenue and Taniwha Street**

Criteria	Criteria Assessment
	<ul style="list-style-type: none"> <li>- 5.5 lane</li> <li>- 11m wide corridor</li> <li>- Unrestricted parking on both kerb side approximately 50m from the intersection</li> </ul>
LATM Measures	Yes- pedestrian crossings on Estree Avenue (the northern approach) and Taniwha Street (the eastern approach)
Crash History	10 total crashes 5 cyclist crashes due to vehicles failing to see and give way to traffic on the right.

## 5 RESULTS OF THE SHARROW MONITORING SURVEYS

The “pre-sharrow” surveys were conducted in November 2013, with sharrow markings placed at the five locations mentioned above in December 2013. In May 2014 video footage was collected and studied to understand what effect the markings had on the road users. Both the position of cyclists within the road corridor and the speed of vehicles were measured where possible.

It is noted, however, that due to restraints on the positioning of the video cameras that only three of the five sites have been assessed with respect to the cycle positioning pre and post the sharrow marking. These three sites are Riddell Road, Pt Chevalier Road and Elstree Avenue. The other two sites, Dunkirk Road and Seacliffe Avenue, have not been assessed with respect to the lateral positioning of cyclists. Where possible, other characteristics for the Dunkirk Road and Seacliffe Avenue sites have been considered.

For the three sites where cycle positioning was assessed the cyclists were split into four categories being:

- ◆ Single cyclist counted on a weekday
- ◆ Group cyclists counted on a weekday
- ◆ Single cyclist counted on a weekend
- ◆ Group cyclists counted on a weekend

At all five sites vehicle speed measurements have been recorded through the use of tube count surveys.

### 5.1 Data Analysis

In order to be able to compare the lateral positioning results from the three sites analysed each site has been analysed using ANOVA statistical analysis to enable differences between different groups of data to be compared. ANOVA is used to determine if there is a significant difference in the means of the distributions pre and post the sharrow marking. Essentially this has been used to determine if

installing the sharrow markings changed cyclists behaviour (in this case as measured by the position of the mean).

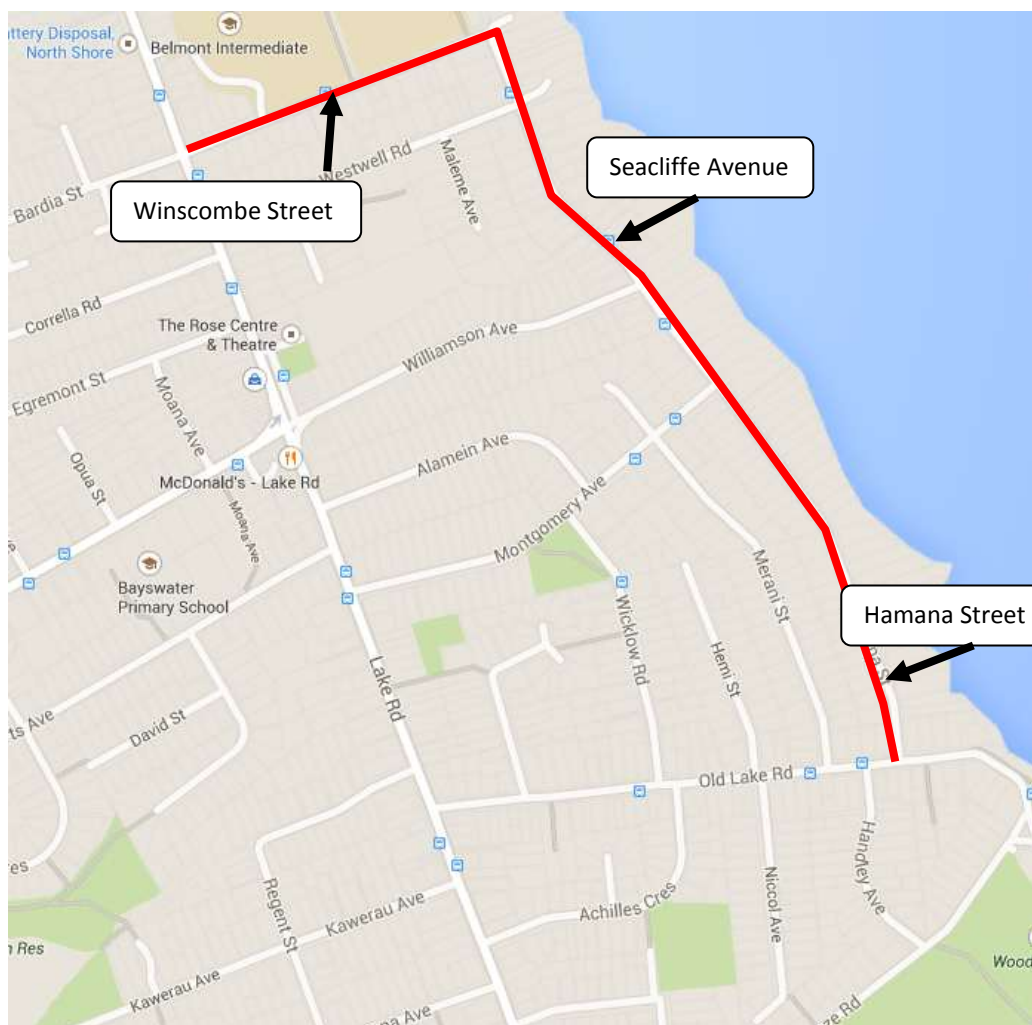
Essentially this process “expands” the sample size to provide a more normalised distribution – with these then able to be compared with the results from other surveys at the same or different sites.

This report acknowledges the data analysis undertaken by two University of Auckland students<sup>1</sup> as part of their Year 4 project to provide the information with respect to the lateral shift pre and post sharrow markings.

## 5.2 Seacliffe Avenue

Sharrow markings were placed on Seacliffe Avenue, Winscombe Street and Hamana Street. Figure 8 indicates the location of the Winscombe Street- Seacliffe Avenue-Hamana Street sharrow marking trial and Figure 9 illustrates one of the sharrow markings painted on Seacliffe Avenue.

**Figure 8: Sharrow Marking Trial Site – Winscombe Avenue, Seacliffe Avenue, Hamana Street**



<sup>1</sup> Abishek Pol, Sunil Prasad, overseen by Senior Lecturer Seosamh Costello

**Figure 9: Sharrow Marking on Seacliffe Avenue**



### 5.2.1 Positioning Results

Due to the presence of overhead power lines along this corridor it was not possible to mount a camera high enough to accurately measure the lateral position of cyclists.

### 5.2.2 Other Observations

Winscombe Street- Seacliffe Avenue-Hamana Street is a popular cycle route serving Takapuna Grammar School and Belmont Intermediate School. The pre-sharrow surveys identified that a large number of cyclists cycled on the footpath on Seacliffe Avenue, and as such, the Seacliffe Avenue site has been assessed to understand whether the sharrow markings encouraged more student cyclists to travel on the road.

The video footage was for the period 8:00 to 9:00 am and was studied to understand the morning school travel peak, and between 3:00 and 4:00 pm to understand the afternoon school travel peak. Table 6 shows the number and percentage of students cycling and their position within the road reserve both before and after the sharrow markings were painted on the road.



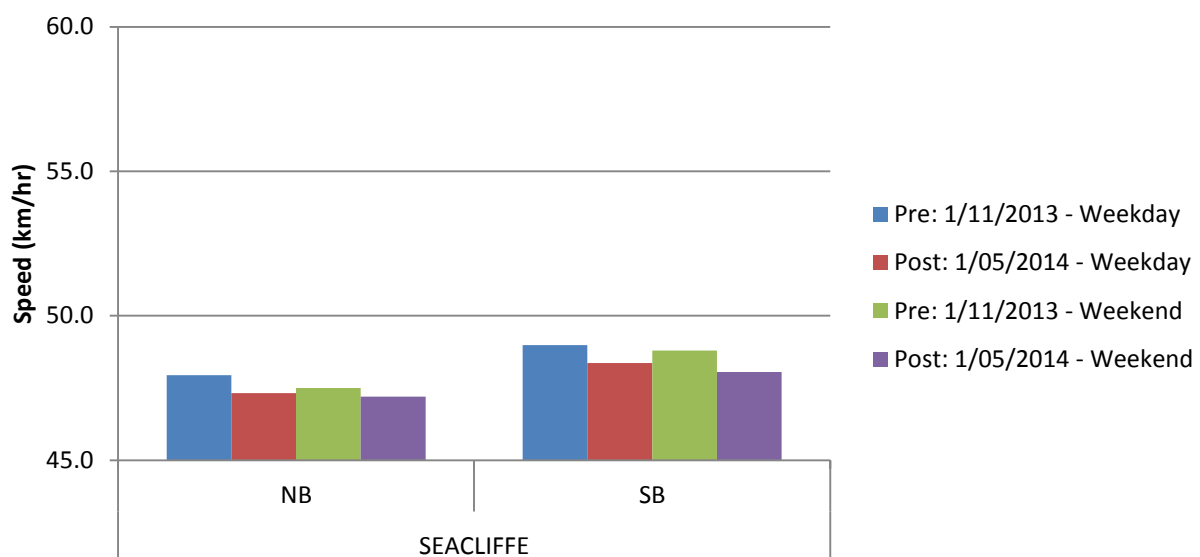
**Table 6: Seacliffe Avenue cyclist positioning**

	Pre-sharrow Survey		Post-sharrow Survey	
	Footpath	Road	Footpath	Road
Morning	48 (69%)	37 (65%)	92 (81%)	50 (57%)
Afternoon	22 (31%)	20 (35%)	21 (19%)	38 (43%)

### 5.2.3 Vehicle Speed Results

The 85th percentile speeds measured pre and post the sharrow markings being implemented are shown in Figure 10, illustrating both the weekday and weekend vehicle speed results for northbound (NB) and southbound (SB) traffic.

**Figure 10: Seacliffe Avenue vehicle speeds**



Overall the results show a reduction in the vehicle speeds on Seacliffe Avenue after the sharrow markings were implemented. The southbound direction shows a greater decrease in vehicle speed, with a similar reduction on both week days and weekend days. The northbound direction also shows a decrease in vehicle speed for both week days and weekend days.

### 5.2.4 Interpretation of Results

With respect to the positioning of cyclists either on-road or on the footpath the following comments are made:

- ◆ There has been a noticeable increase in the number of cyclists between November 2013 and May 2014. Reasons for this increase are not clear and could be due to a number of factors such as weather, time of year, change in the school roll etc

- ◆ The total percentage of cyclists on the footpath compared to the road suggests the sharrow markings have had minimal effect in encouraging cyclists' to leave the footpath and to cycle on-road:
- ◆ There has been a slight increase in cyclists' using the road in the afternoon period. Conversely there has been a decrease in cyclists' using the road in the morning period. Again there is no clear reason why these slight changes may have occurred

A number of observations were noted whilst watching the survey videos, with the observations being:

- ◆ Cyclists appeared to continue cycling on the far left, close to the parked cars, not taking the centre of the sharrow marking
- ◆ A number of cyclists travelling north on Seacliffe Avenue cycled diagonally across the road just before the intersection of Seacliffe Avenue and Williamson Avenue
- ◆ A few cyclists that undertook the above movement, cycled on the wrong side of the road for a short distance before moving to the footpath
- ◆ A few cyclists were observed to move from the footpath to the road just prior to the intersection with Williamson Avenue in order to have right of way going through the intersection.

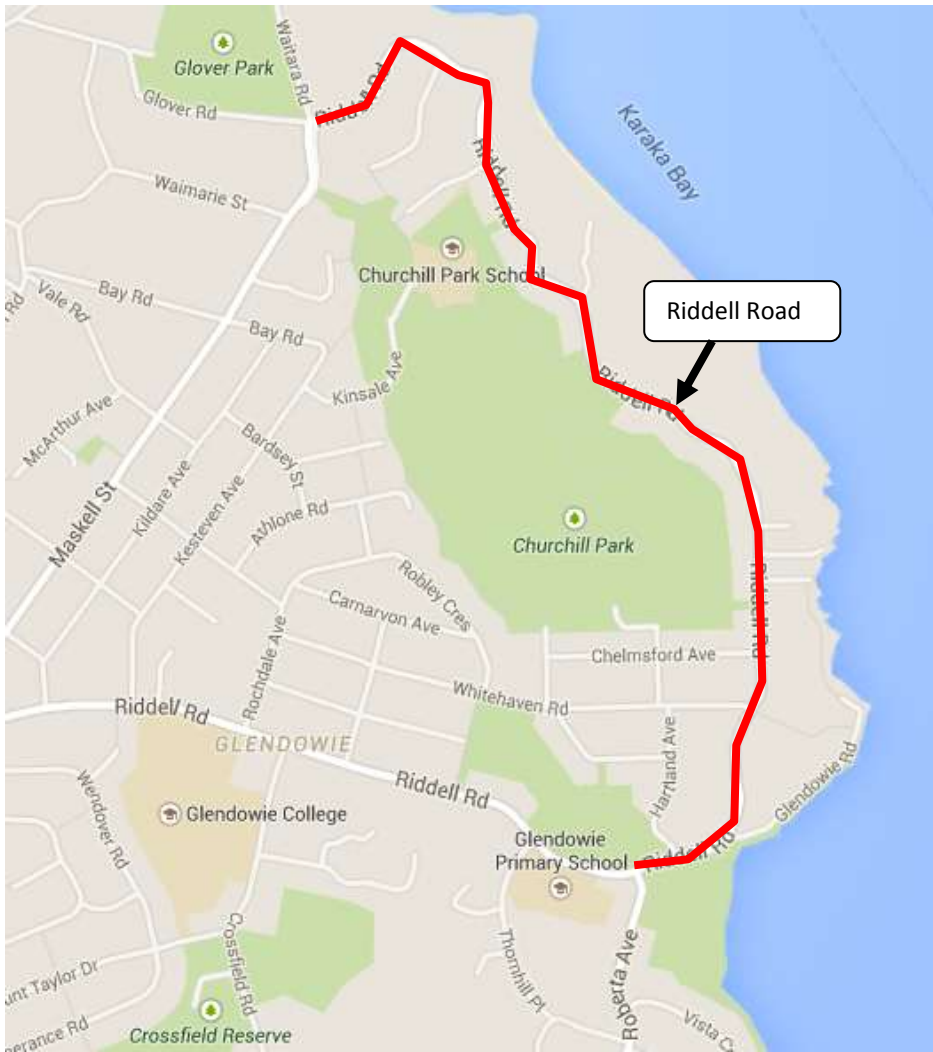
With respect to the vehicle speeds, whilst there may be other factors as to why vehicle speeds on this corridor have changed (for example weather, side friction etc), the sharrow markings may have played a role in reducing vehicle speeds.

### 5.3 Riddell Road

Sharrow markings were placed between Roberta Avenue and Glover Road on Riddell Road. Figure 12 shows one of the sharrow markings painted on Riddell Road.

Sharrow markings were placed on Riddell Road between Roberta Avenue and Glover Road. Figure 11 indicates the location of the Riddell Road sharrow marking trial and Figure 12 illustrates one of the sharrow markings painted on Riddell Road.

**Figure 11: Sharrow Marking Trial Site-Riddell Road**



**Figure 12: Sharrow Marking on Riddell Road**

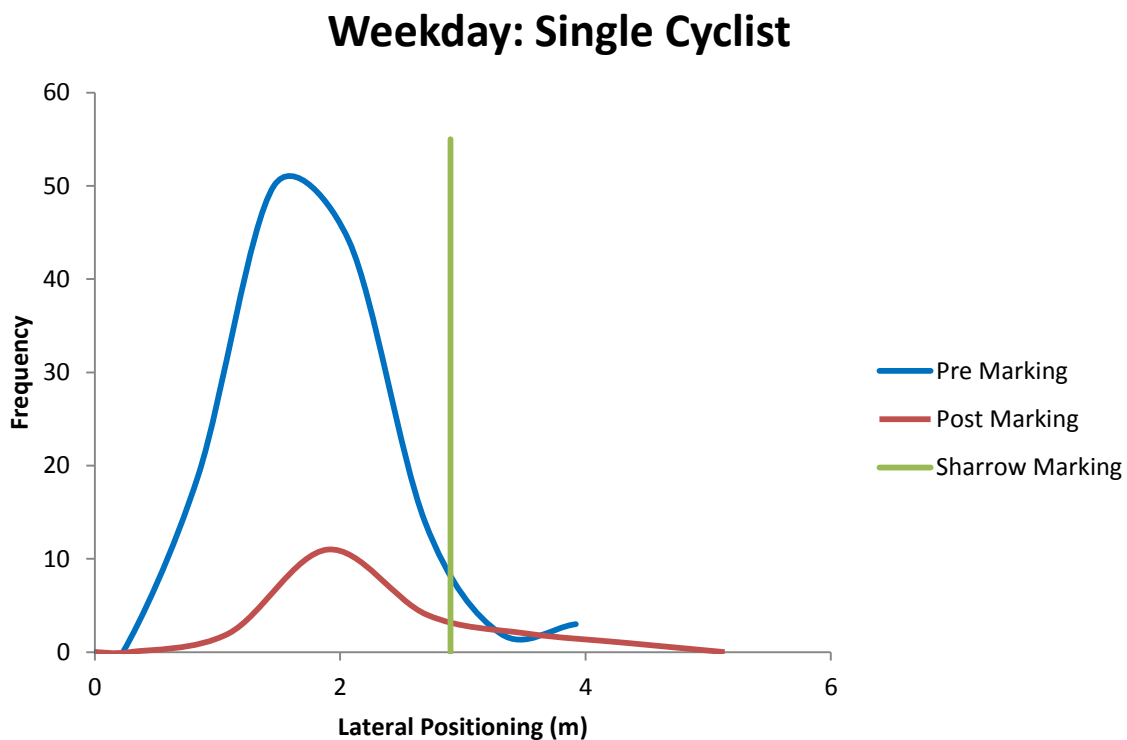


### 5.3.1 Positioning Results

As previously discussed the positioning results have been represented based on ANOVA, or Analysis of Variance. ANOVA has been used to analyse the differences between two groups of data in order to illustrate their associated variation between each data set.

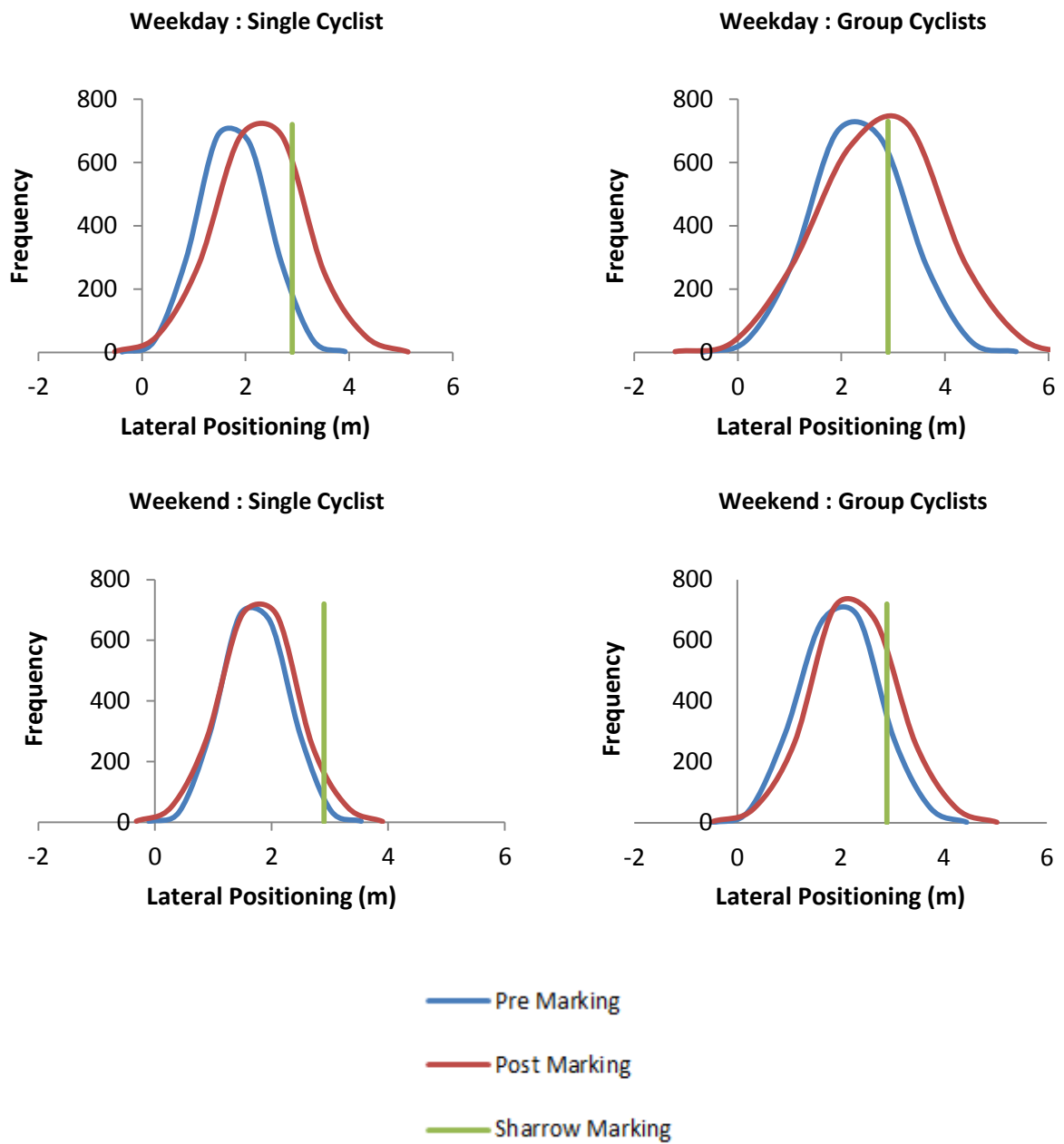
Were the positioning results to be graphed as raw data, Figure 13 illustrates the pre and post marking results. Given the differences in sample size, this is difficult to interpret. Hence the use of ANOVA.

**Figure 13: Riddell Road cyclist positioning within the road corridor: Raw Data**



The cyclist positioning results for Riddell Road using ANOVA are shown in Figure 14.

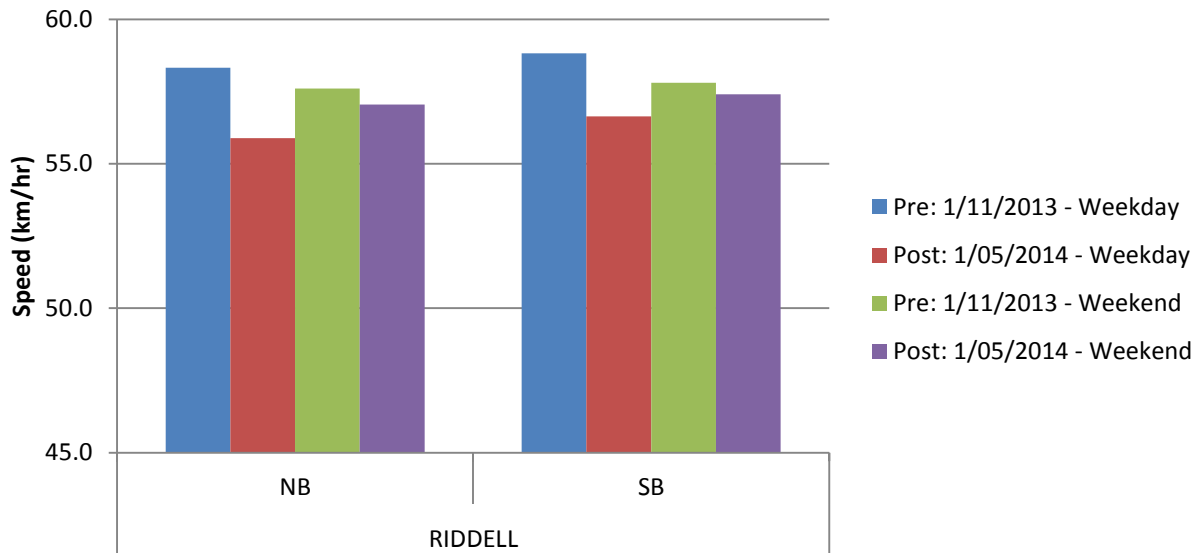
Figure 14: Riddell Road cyclist positioning within the road corridor: ANOVA



### 5.3.2 Speed Results

The 85th percentile speeds measured before and after the sharrow markings being implemented are shown in Figure 15, illustrating both the weekday and weekend vehicle speed results for northbound and southbound traffic.

**Figure 15: Riddell Road Vehicle Speeds**



### 5.3.3 Interpretation of Results

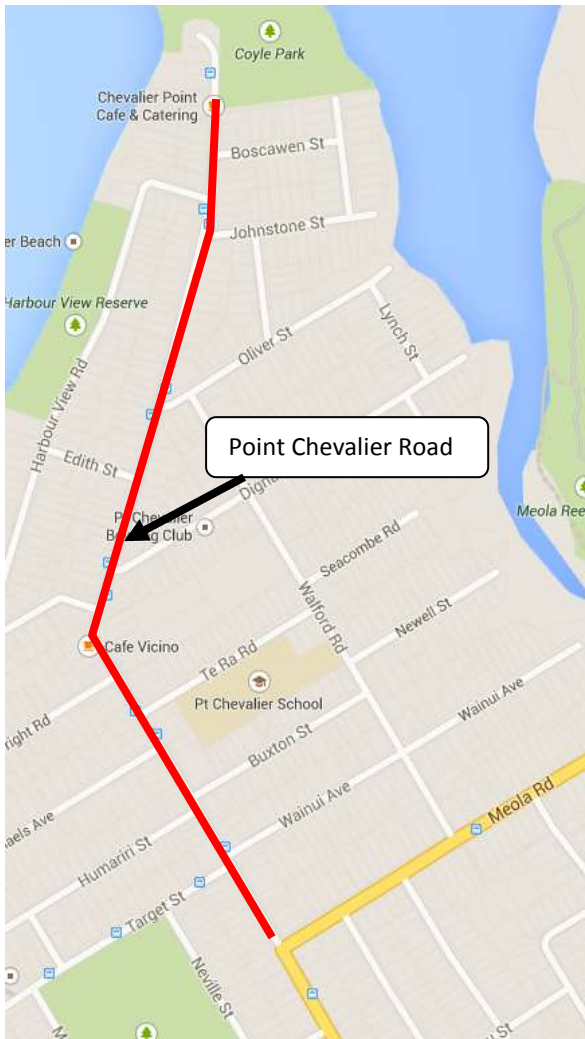
With respect to the cyclists’ positioning all four categories show a general shift in the lateral position of cyclists towards the sharrow marking. The post results also suggest that the cyclists may be slightly more dispersed across the traffic lane given the width of the red curve in the above graphs. This may suggest cyclists are “claiming the lane” more with the sharrow marking in place.

With respect to the vehicle speeds the results indicate that both the northbound and southbound directions had similar decreases in vehicle speed post sharrow marking. There is a more significant reduction in vehicle speed between the weekday speeds in comparison to the weekend speeds. Whilst there may be other factors as to why vehicle speeds on this corridor have reduced (for example weather, side friction etc), the sharrow markings may have played a role in reducing vehicle speeds.

## 5.4 Point Chevalier Road

Sharrow markings were placed on Point Chevalier Road between Meola Road and Coyle Park. Figure 16 indicates the location of the Point Chevalier sharrow marking trial and Figure 17 illustrates one of the sharrow markings painted on Point Chevalier Road.

**Figure 16: Sharrow Marking Trial on Point Chevalier Road**



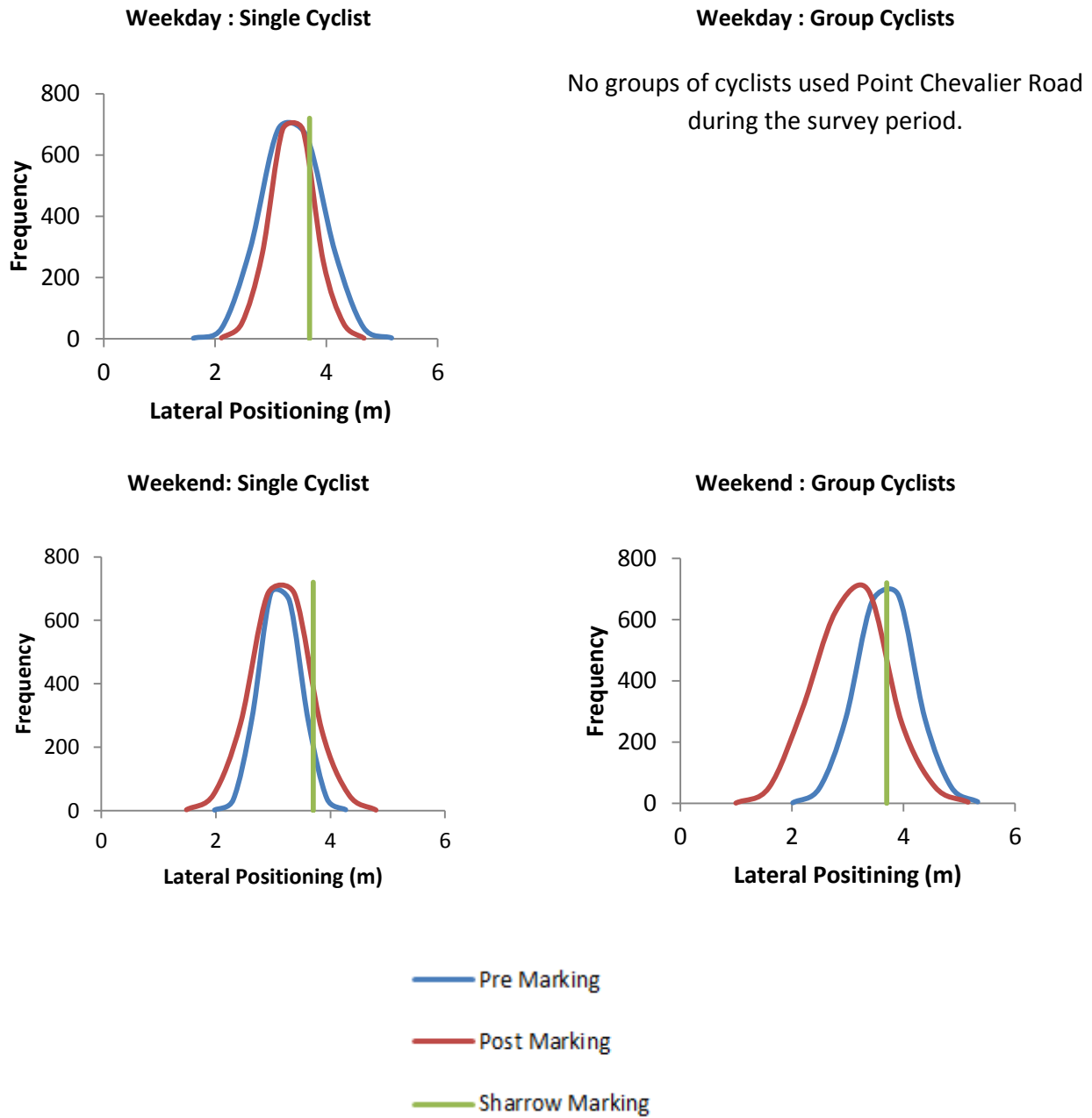
**Figure 17: Sharrow Marking on Point Chevalier Road**



### 5.4.1 Positioning results

The cyclist positioning results for Point Chevalier Road are shown in Figure 18.

Figure 18: Point Chevalier Road cyclist positioning within the road corridor

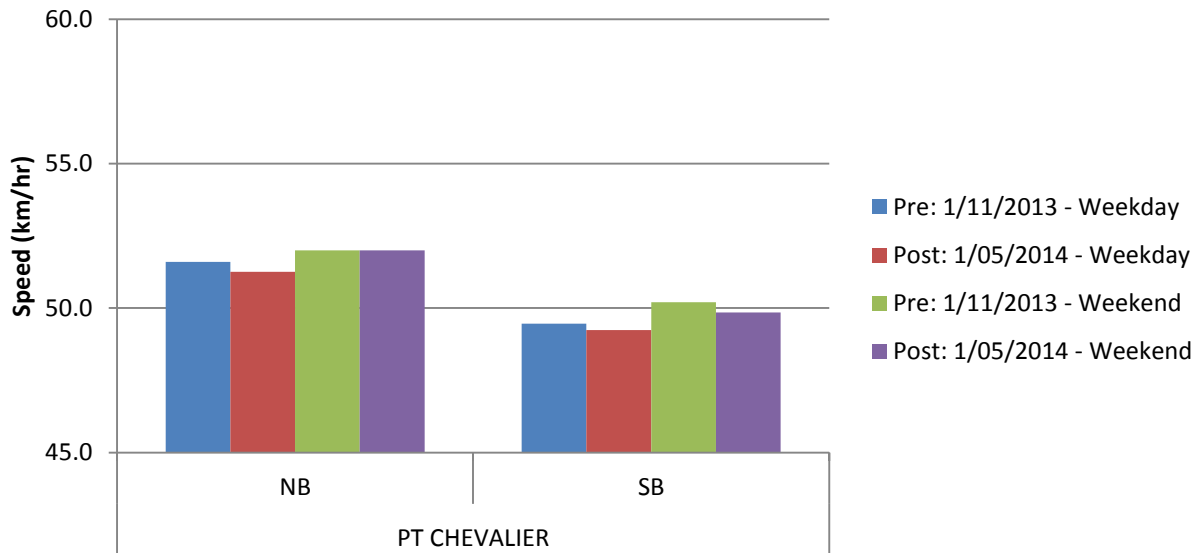




### 5.4.2 Speed Results

The 85%ile speeds measured before and after the sharrow markings being implemented are shown in Figure 19, illustrating both the weekday and weekend vehicle speed results.

**Figure 19: Point Chevalier Road vehicle speeds**



### 5.4.3 Interpretation of Results

With respect to the cyclists' positioning:

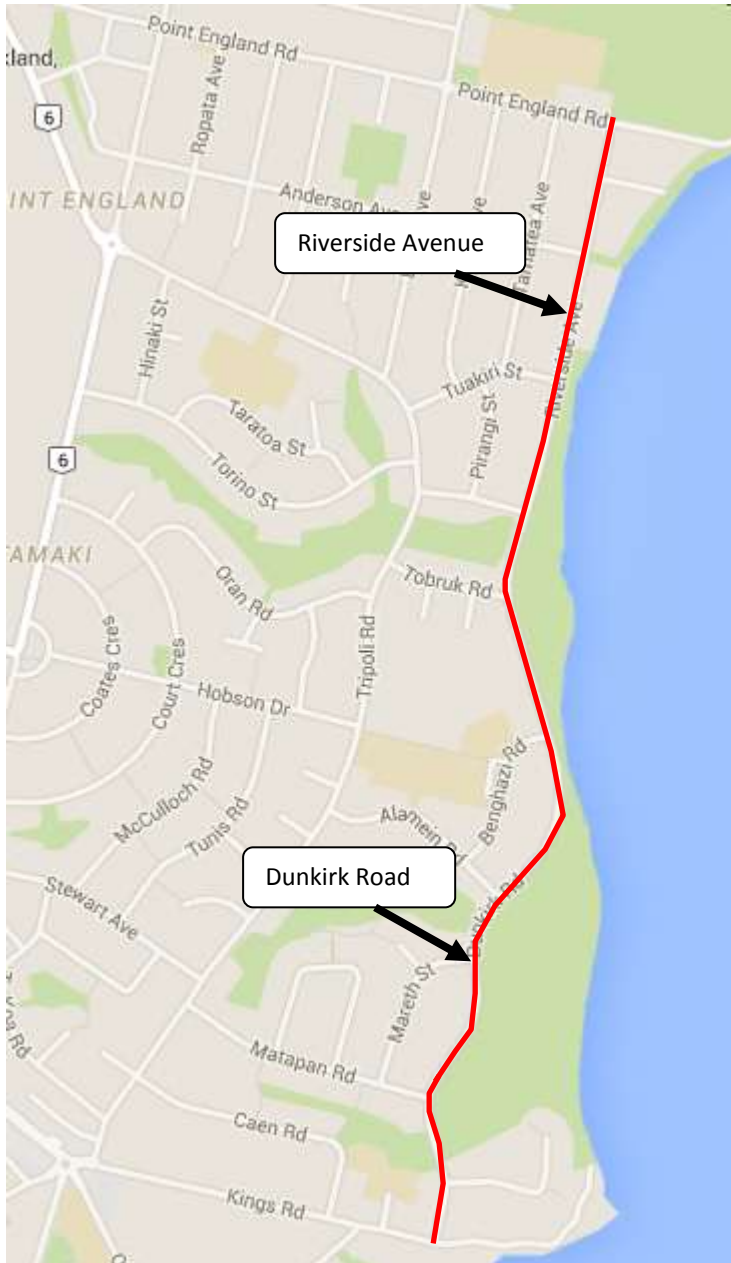
- ◆ The weekday single cyclists have remained in a similar position on the road, with a narrower dispersion of cyclists across the traffic lane post sharrow markings. Weekend single cyclists have also remained in a similar position; however their utilised corridor of the road widened post sharrow markings, suggesting they have "claimed the lane" more post sharrow marking.
- ◆ The weekend group cyclists show a shift away from the sharrow marking during the weekend, closer to the left hand side of the road. These cyclists also have used more of the traffic lane in comparison to before the sharrow markings were implemented. This may have been influenced by the presence of on-street parking. If, during the post marking surveys the parking space alongside the sharrow marking was vacant, cyclists are likely to position themselves closer to the kerbline.

In general the vehicle speeds on this section of Point Chevalier Road decreased when the sharrow markings were implemented albeit that the vehicle speeds remained the same pre and post sharrow marking for northbound traffic on a weekend.

## 5.5 Riverside Avenue and Dunkirk Road

Sharrow markings were placed on Riverside Avenue and Dunkirk Road between Kings Road and Pt England Road. Figure 20 indicates the location of the Riverside Avenue and Dunkirk Road sharrow marking trial

**Figure 20: Sharrow Marking Trial on Riverside Avenue and Dunkirk Road**



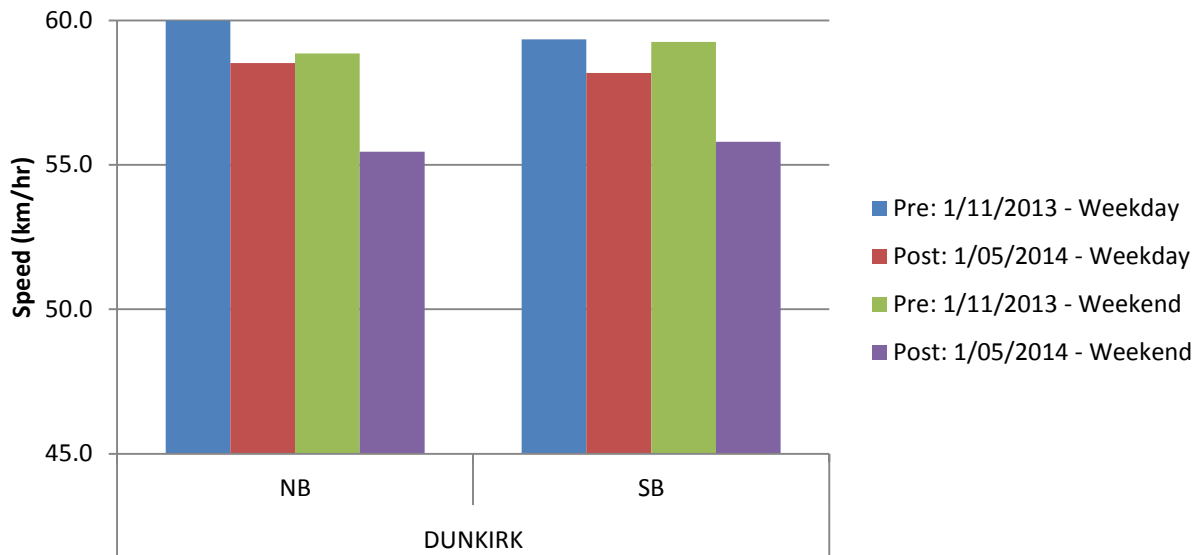
### 5.5.1 Positioning results

Due to the presence of overhead power lines along this corridor it was not possible to mount a camera high enough to enable the lateral positioning of cyclists to be observed.

### 5.5.2 Speed Results

The 85th percentile speeds measured on Dunkirk Road pre and post sharrow markings being implemented are shown in Figure 21, illustrating both the weekday and weekend speed results for both northbound and southbound vehicles.

**Figure 21: Dunkirk Road Vehicle Speeds**



### 5.5.3 Interpretation of Results

The Dunkirk Road vehicle speeds were among the highest recorded as part of this assessment, with the 85th percentile vehicle speeds all over 55 km/h, with most of the results being closer to 60 km/h.

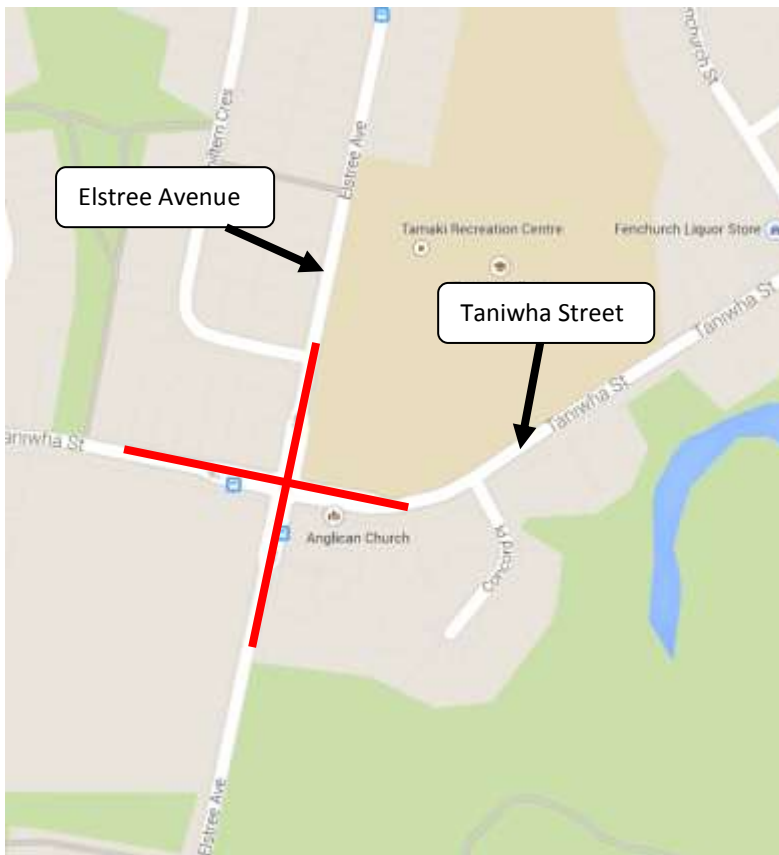
The vehicle speeds are indicated to have reduced after the sharrow markings were implemented as shown above. A significant reduction in the speed on the “post marking” weekend survey days can be seen for both the northbound and southbound traffic. This, however, is likely to be due to the presence of on-street parking in the May weekend results, with considerable on-street parking evident, likely linked to sporting activities being undertaken at the Mt Wellington War Memorial Reserve.

A reduction in vehicle speeds post marking is also observed with the weekday traffic.

## 5.6 Elstree Avenue and Taniwha Street Roundabout

Sharrow markings were placed on all four approaches to the Elstree Avenue/Taniwha Street roundabout. Figure 22 indicates the location of the Elstree Avenue/Taniwha Street sharrow marking trial and Figure 23 illustrates one of the sharrow markings painted at the Elstree Avenue/Taniwha Street roundabout.

**Figure 22: Sharrow Marking Trial at the Elstree Avenue/Taniwha Street roundabout.**



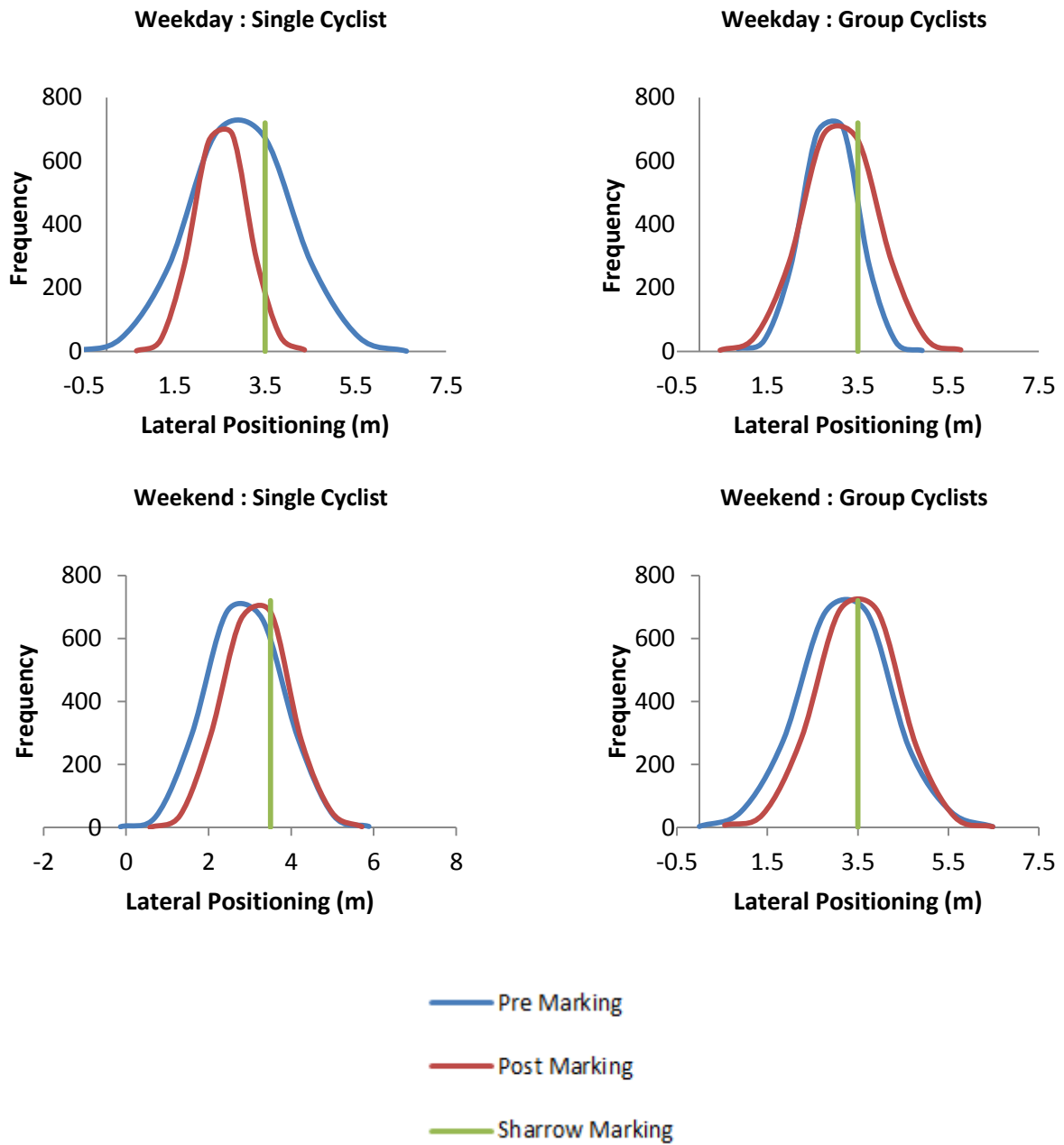
**Figure 23: Sharrow marking at Elstree Avenue/Taniwha Street roundabout**



### 5.6.1 Positioning results

The results for Elstree Avenue/Taniwah Street roundabout are shown in Figure 24.

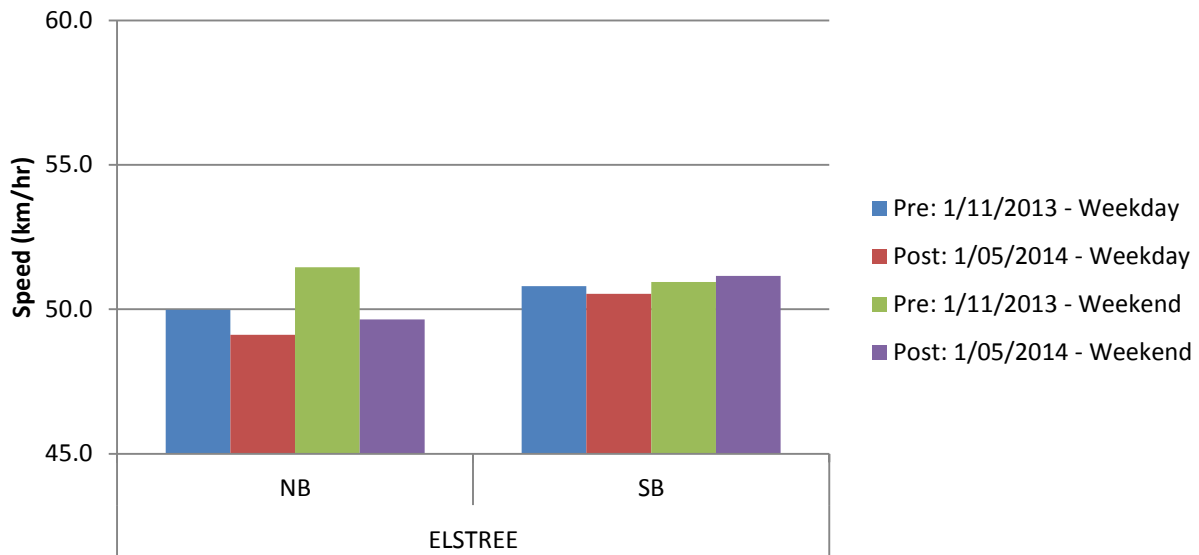
Figure 24: Elstree Avenue/Taniwha Street roundabout cyclist positioning



### 5.6.2 Speed Results

The 85<sup>th</sup>ile speeds measured on Elstree Street pre and post sharrow markings being implemented are shown in Figure 25, illustrating both the weekday and weekend speed results for northbound and southbound vehicles.

**Figure 25: Elstree Avenue vehicle speeds**



### 5.6.3 Interpretation of Results

In general, the sharrow markings changed cyclists’ lateral position with the cyclists shifting towards the centre of the sharrow marking. The one exception to this is single cyclists on a weekday. These cyclists however did change their positioning within the traffic lane. Post sharrow marking weekday single cyclists’ utilised a significantly narrower corridor.

With respect to the vehicle speeds on Elstree Avenue the results indicate vehicle speeds decreased when the sharrow markings were implemented. The one exception to this is the southbound movements on the weekend, where there is a very slight increase in speed. The northbound movements show more significant changes in speeds with vehicle speeds reducing below 50km/hr after the sharrow markings were implemented. These results are somewhat expected given that the sharrow marking is on the approach to the roundabout, being the northbound movements, whereas there is no sharrow marking on the southbound exit from the roundabout.

## 6 SUMMARY OF RESULTS: ALL SITES

### 6.1 Positioning Results

The positioning results across the three sites surveyed are mixed. In some situations the results suggest the cyclists' are travelling closer to the sharrow marking; whilst in others this is not the case. In some situations the cyclists seem to be cycling within a more defined road space, whilst in other situations the cyclists' are more spread out following the sharrow being installed. Overall, however, there does not appear to be any significant correlation between a cyclists' position pre or post sharrow marking. Results at a number of locations illustrate a wider spread of cyclists post sharrow marking suggesting cyclists are "claiming the lane".

### 6.2 Vehicle Speeds

In contrast the vehicle speeds at each of the survey sites are generally shown to decrease post sharrow markings. Whilst there are a number of factors that may have influence the vehicle speeds along each of the corridors, the general trend of reduced speeds post sharrow markings suggest that the markings have influenced a drivers behaviour.

## 7 PUBLIC PERCEPTION SURVEY

A survey was undertaken by Auckland Transport (AT) to understand the public's perception of sharrow road markings. This was undertaken using the Auckland Transport Research Panel, a database of local residents who have volunteered to receive information from AT. This Panel were sent a perception survey to complete during December 2013. 715 respondents replied to the survey with the results summarised in Appendix A – with this information provided by Auckland Transport. No information was provided to the Research Panel as to the meaning of the sharrow marking and thus the public's "uneducated" understanding of the symbol was able to be gauged.

### 7.1 Interpretation of Results

Queries regarding the marking of existing cycle lanes were put to the survey respondents. This questioned the respondents understanding of a cycle lane, varying the cycle lane image as follows

Figure 26: Survey figure of cycle lane markings



While all three markings showed positive results with respect to the understanding of the marking, the cycle symbol with green paint was the marking that most of the respondents seemed to understand the best. The cycle symbol with the addition of the “LANE” text rated second, with the cycle symbol on its own third.

In terms of reasoning, the colour change seemed to have the greatest influence on a person’s understanding of the markings, with these clearly able to be identified due to the change in colour.

Queries regarding the proposed sharrow marking were also put to the survey respondents. This questioned the respondents understanding of a proposed symbol as illustrated in Figure 27.

**Figure 27: Survey figure of sharrow markings**



The majority of people surveyed thought the sharrow markings meant that bikes and cars should share the road. A significant portion of those surveyed were unsure whether sharrows imply a right of way.

The public were also asked to rate whether sharrow markings are a clear and easily understood way to mark cycle lanes. The results show one in four consider sharrows to be a good way to mark intersections, or that they would improve safety.



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## APPENDIX A

## perception survey

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# Cycle Lane Marking Trial

Online Survey Results  
December 2013

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## Method

- Online survey of 715 Auckland residents;
  - Includes 288 who cycle at least occasionally.
- Conducted via AT Research Panel November 27 to December 5, 2013;
- Data is weighted by age and gender to Stats NZ population estimates.

## 1. Cycle Lane Marking Options

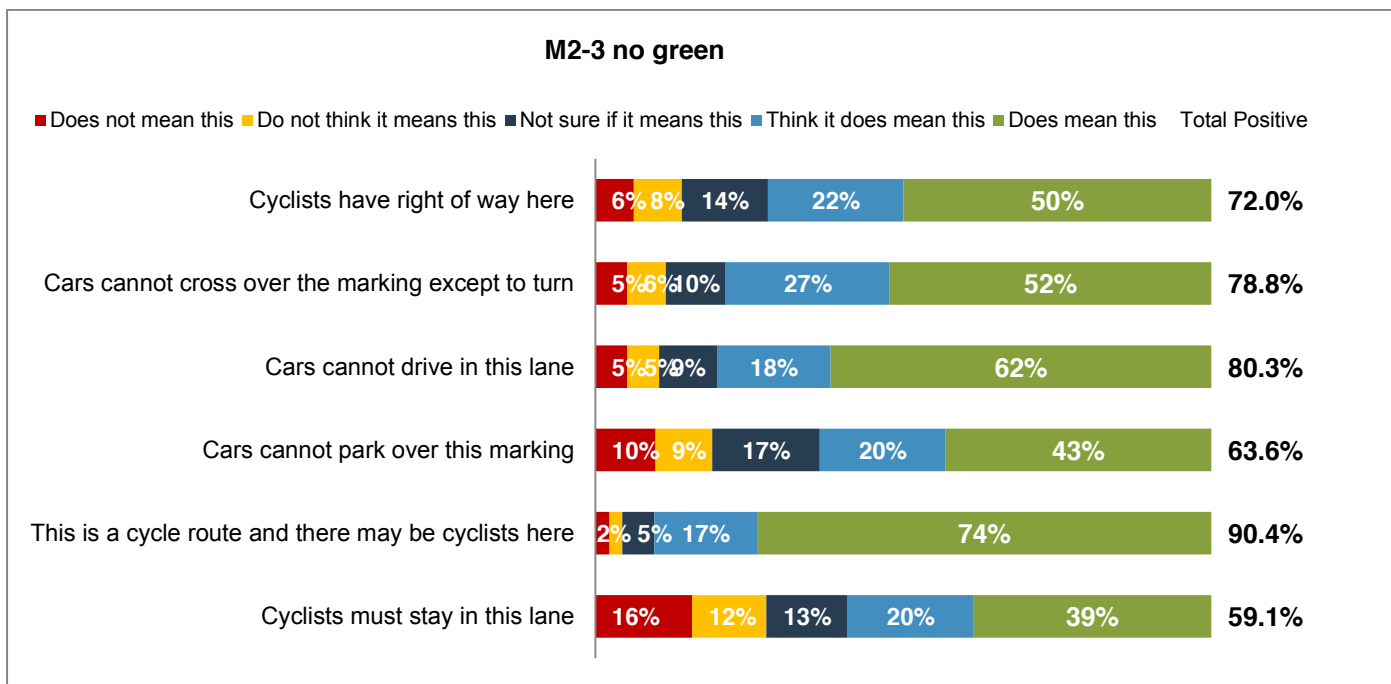
- The **plain M2-3** marking is understood by the majority of respondents.
  - Four in five (80%) think that it means 'cars cannot drive in this lane'.
  - A lower 64% think that it means that 'cars cannot park over this marking'.
  - Two in three (69%) consider this a good or very good way to clearly cycle lanes.
- The **M2-3 marking with green background** scored higher for understanding than other markings.
  - A high 86% think that it means 'cars cannot drive in this lane'.
  - A significantly higher 76% think that it means that 'cars cannot park over this marking'.
  - 86% consider this a good or very good way to clearly cycle lanes.
- The **M2-3 marking with the word LANE** scored slightly higher than the marking without the word.
  - 84% think that it means 'cars cannot drive in this lane'.
  - A similar 66% think that it means that 'cars cannot park over this marking'.
  - Three quarters of respondents (75%) consider this a good or very good way to clearly cycle lanes.



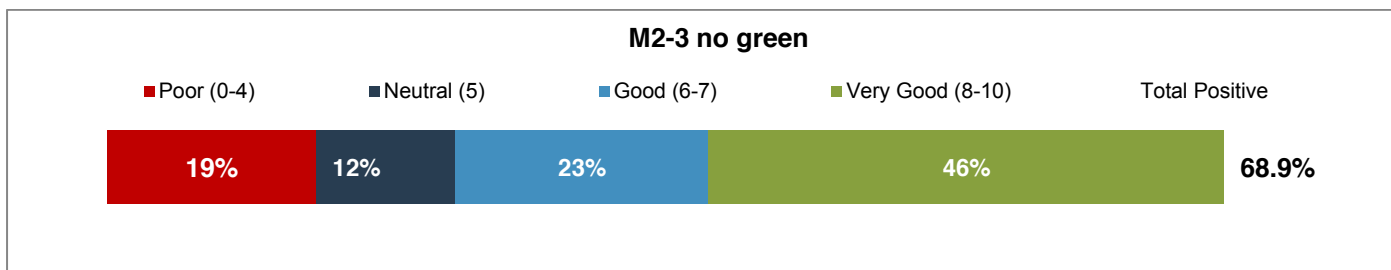
## 1.1. M2-3 no green



What do you think this marking means?



All, n=715; Q: What do you think this marking means?

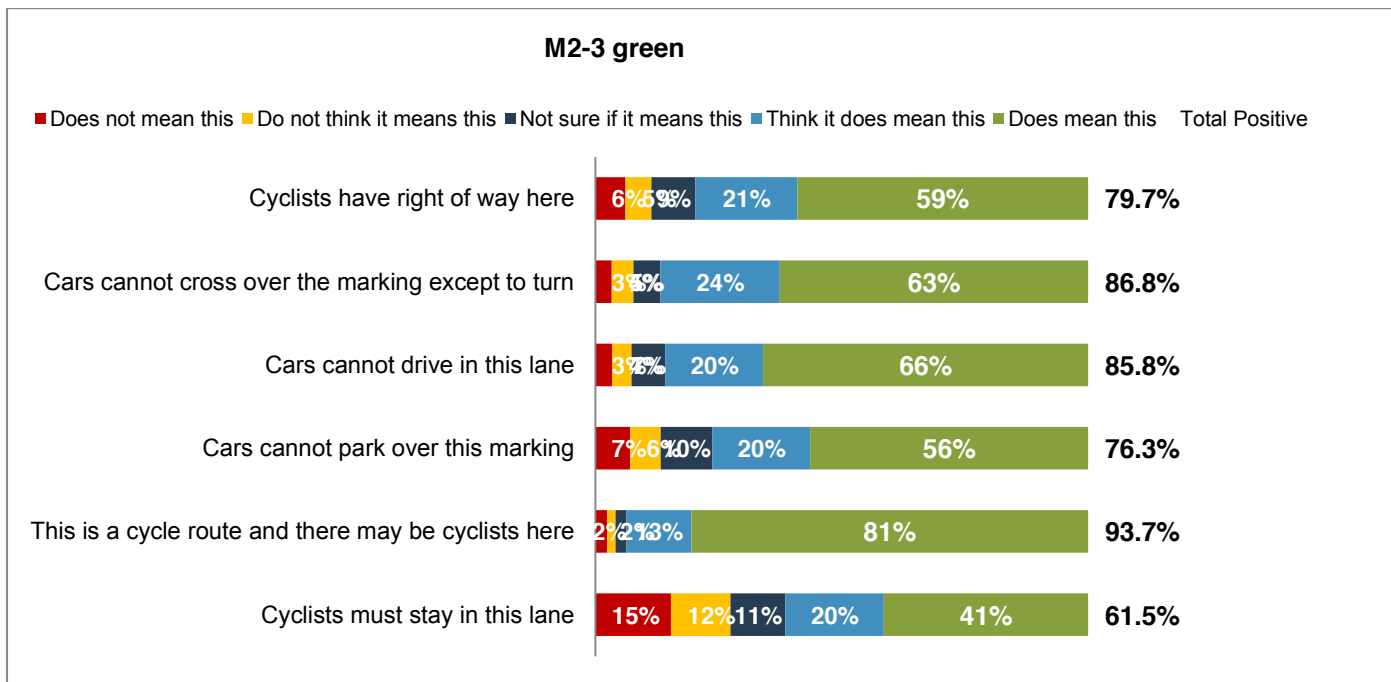


All, n=715; Q: Please rate this as a clear and easily understood way to mark cycle lanes

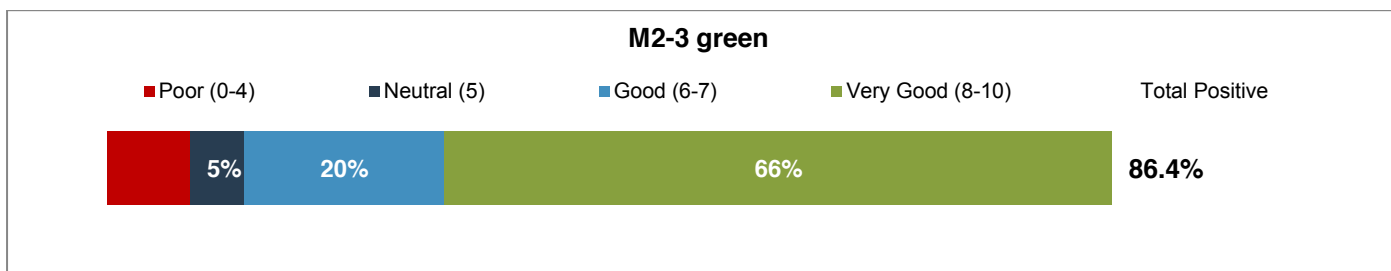
## 1.2. M2-3 green



What do you think this marking means?



All, n=715; Q: What do you think this marking means?



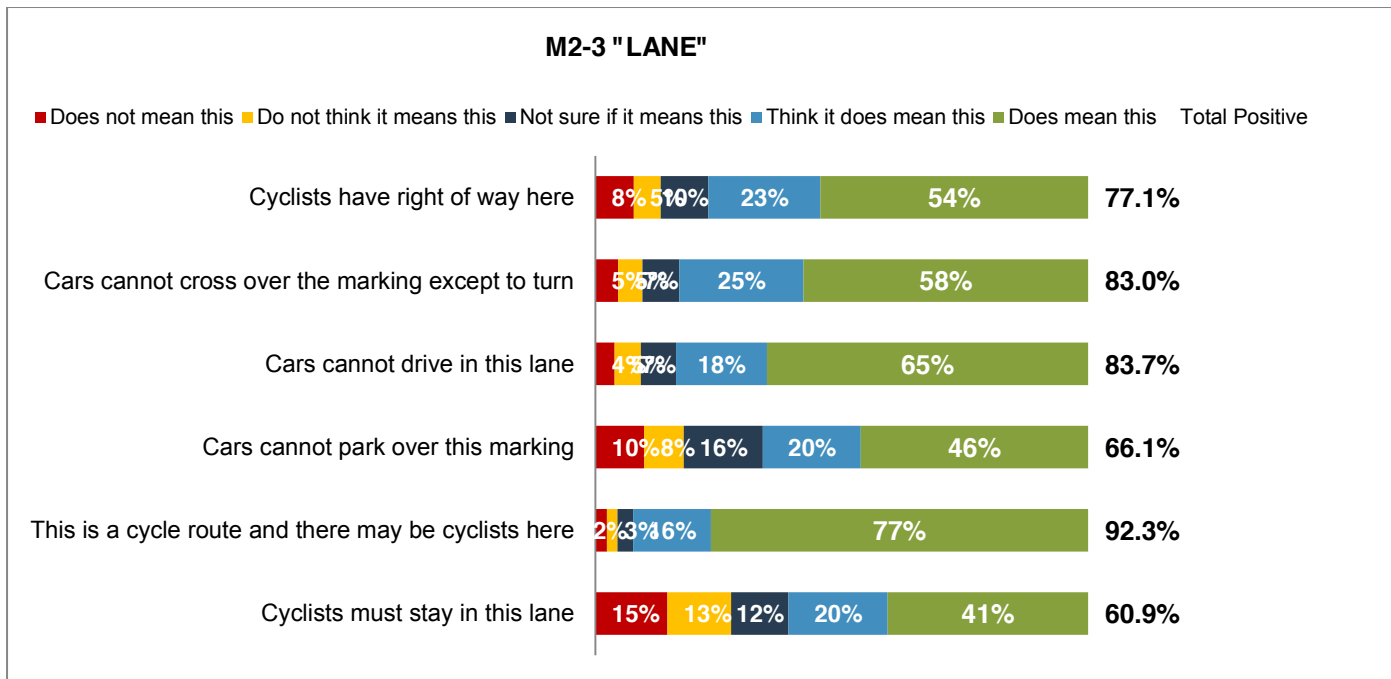
All, n=715; Q: Please rate this as a clear and easily understood way to mark cycle lanes



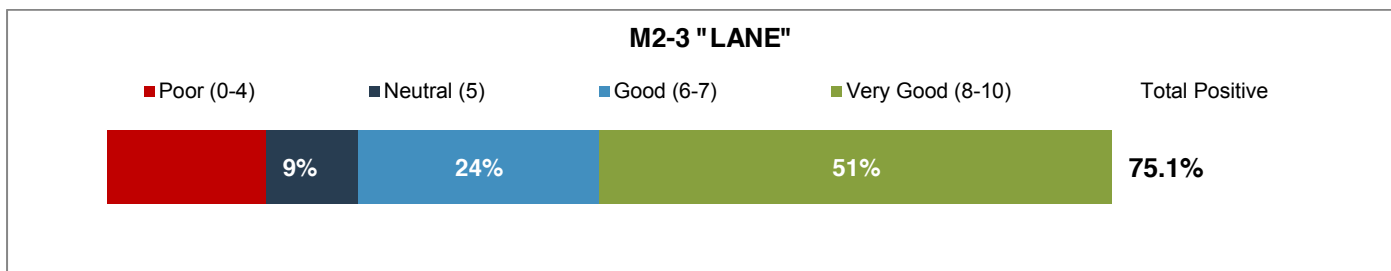
### 1.3. M2-3 "LANE"



What do you think this marking means?



All, n=715; Q: What do you think this marking means?



All, n=715; Q: Please rate this as a clear and easily understood way to mark cycle lanes

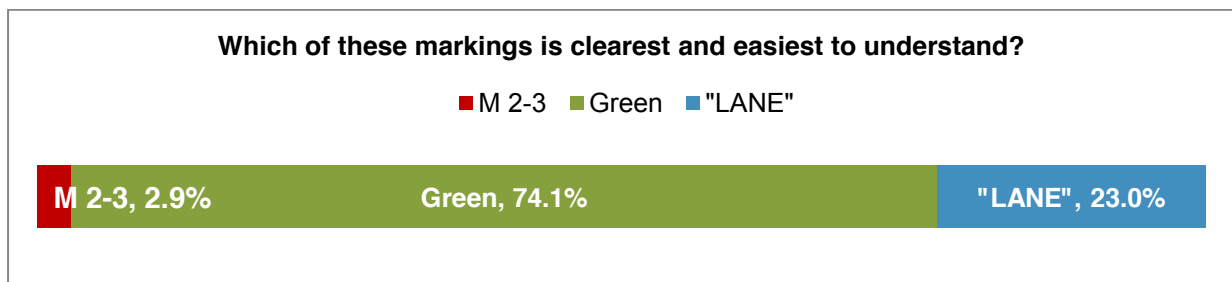


### 1.4. Cycle Lane Marking Comparison

- The green background was selected as the easiest marking to understand by a majority 74%.



Which of these markings is clearest and easiest to understand?



All, n=715; Q: Which of these markings is clearest and easiest to understand?

Q8. Why?

area attention background better bicycle bike bus cars  
 clear clearer clearly colour cycle  
 cyclists different drive drivers easier easy gives  
 green helps highlights indicates lane  
 marking means noticeable obvious paint parking people  
 picture rest road shows similar special stands  
 symbol think traffic turning understand used vehides visible visual white words

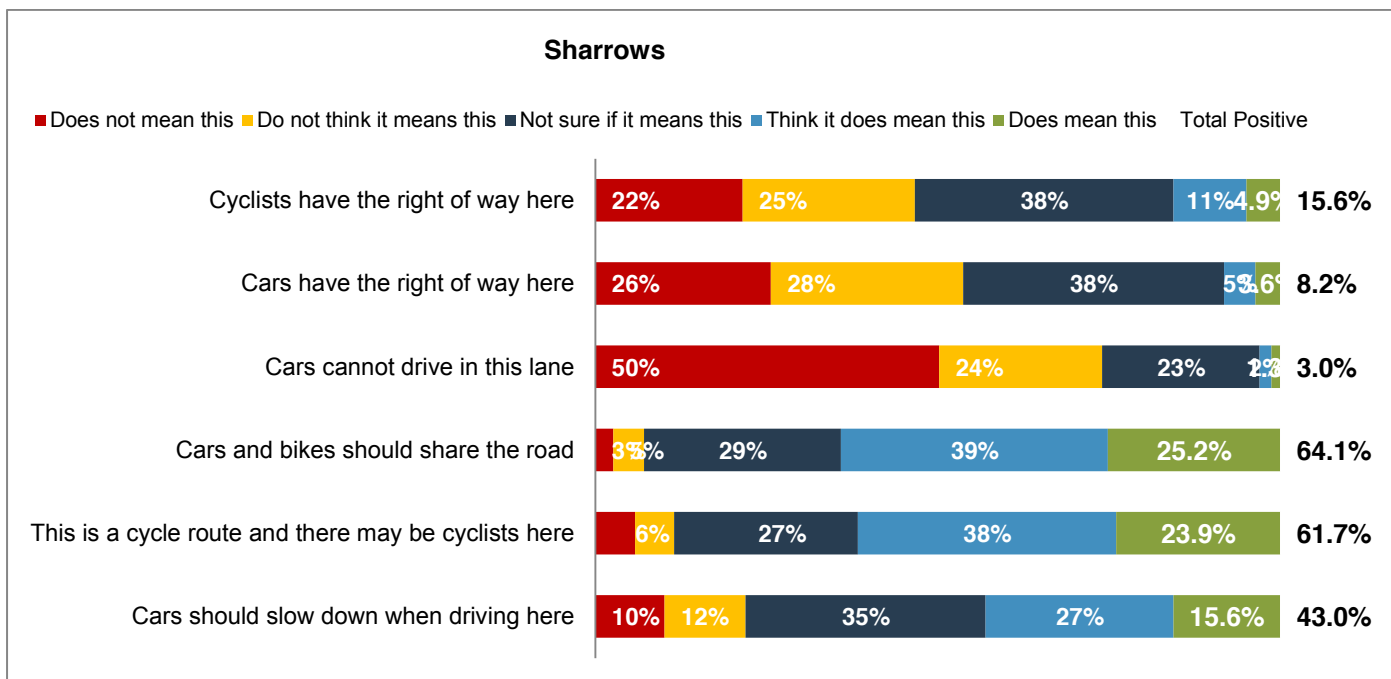


## 2. Sharrows

- A majority think that the Sharrow markings meant that bikes and cars should share the road.
- A significant proportion are unsure whether Sharrows imply a right of way.
- One in four consider Sharrows to be a good way to mark intersections, or that they would improve safety.
  - Note, there was no additional information provided, results would change with education.

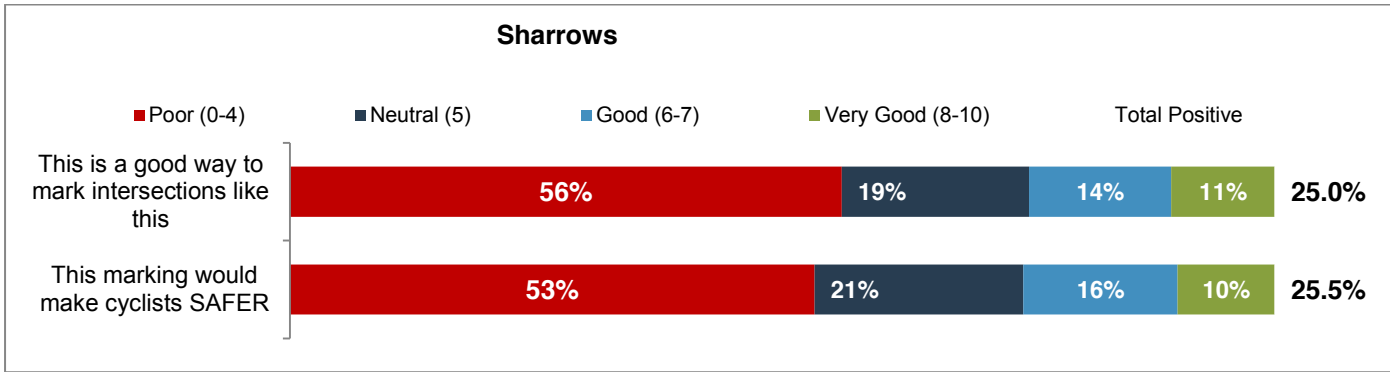


What do you think this marking means?



All, n=715; Q: What do you think this marking means?





All, n=715; Q: Please rate this as a clear and easily understood way to mark cycle lanes

