

Proposed Trial of Sharrow and Cycle "LANE" Markings

Application Report



Contents

1 CONTENTS

Introduction	5
1 Outline of the Issues	8
1.1 What is the traffic control device being proposed?	8
1.2 What problem will be addressed by the implementation of sharrow markings?	9
1.3 Where are the proposed trial sites?	10
1.4 What is the time frame of the proposed trial?	12
1.5 Why is the problem proposed to be addressed with a non-standard treatment?	12
1.6 Road users to benefit from sharrow markings (those who need the change)	13
1.7 Whether the proposal is a one-off local solution or will lead to a nationally policy	14
2 Development background	15
2.1 What stage of development is the sharrow markings trial at? What options for sharrow markings have been considered and discarded?	16
2.1.1 Cycle Lane Options	17
2.1.2 Sharrow Options	18
2.1.3 Colour Options	18
2.2 Previous international research, trials and investigations	19
2.2.1 Australia Sharrow Evaluation	20
2.1.1 US Sharrow Evaluation	20
2.3 What is the general outcome of any previous trial or investigation?	21
2.4 What are the relevant international legislation, polices or guidelines that have been referenced?	21
3 Technical analysis	21
3.1 Detailed drawing of the proposed new sharrow marking and modified cycle lane symbol	21
3.1.1 Proposed Sharrow Marking	21
3.1.2 Proposed cycle lane marking	22
3.2 Details of any materials or components used	22
3.3 Theoretical analyses of sharrow markings	25
3.3.1 San Francisco	25
3.3.2 The Federal Highway Administration	25
3.3.3 VicRoads Australia	25
3.4 What computer or other technical analyses was used in deriving the proposal?	26
3.5 Does the proposal require a back-up safety system?	26

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

4	Impacts and Risks	27
4.1	Do sharrow markings create other problems?	26
4.2	Are sharrow markings a potential solution to the identified problem?	27
4.3	Does the proposal address the relevant issues?	27
4.4	Will sharrow markings be easily understood by other road users?	27
4.5	What is the likely uptake of sharrow markings?	27
4.6	Is there an impact on the consistency of standards if sharrow markings are implemented?	28
4.7	What is the impact on the consistency of standards if sharrow markings are implemented?	28
4.7.1	Land Transport (Road User) Rule 2004	29
4.7.2	Traffic Control Devices Manual 2004	29
4.7.3	Traffic Contral Devices Manual (TCDM)	29
4.8	Would Sharrow Markings effect international agreements	30
5	Safety and Efficiency Gains	31
5.1	Would sharrow markings have an effect on road users?	31
5.2	What the benefits and costs of Sharrow Markings?	31
6	Consultation	33
6.1	Who would be Interested in the trial of sharrow markings?	33
6.2	What consultation has been undertaken or is proposed?	33
6.2.1	Sharrow markings	33
6.2.2	Objective	33
6.2.3	Strategy	34
6.2.4	Key Messages	35
6.2.5	Stakeholders	35
6.2.6	Process	36
6.2.6	Modified Cycle Lane Marking	36
7	Proposed Assessment	37
7.1	Ensure information sought is well defined and appropriate	37
7.2	Address all relevant issues including the suitability of any site suggested for the evaluation	37
7.3	Provide all information necessary to support any analysis required to determine whether value for money will be achieved if the proposal is implemented nationally	37
7.4	How will an appropriate level of understanding be obtained from road users?	37

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

7.4.1	Appropriate level of understanding for sharrow marking trial	37
7.4.2	Appropriate level of understanding for implementation of new sharrow marking if a new TCD is implemented nationally	38
7.5	Include a detailed research or evaluation plan that must have a realistic time period for the assessment and provide for close monitoring of any trial especially in the early stages of field implementation	39
7.5.1	Vehicle Speed	39
7.5.2	Road User Interaction	39
7.5.3	Cyclist/motorist perception-sharrow markings	40
7.5.4	Cyclist/motorist perception-modified cycle lane symbol	41
7.5.5	Assessment timeframe	42
7.5.6	Close Monitoring of Trial	42
7.6	Does the trial demonstrate sound scientific design with appropriate controls so that any conclusions reached can be supported by robust statistical analysis?	42
	Appendix A	43
	Appendix B	62

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

INTRODUCTION

The National Cycling Signs and Markings Working Group is proposing to unlock the existing regulatory connotations of the M2-3 cycle symbol in order that this symbol can be used more effectively within a suite of possible markings, such as part of a shared lane symbol or within an advisory symbol as deemed appropriate by the respective Road Controlling Authority (RCA).

The following report has been completed in accordance with Traffic Note 10¹ and provides the information required by these guidelines. The report is structured in a similar manner to Appendix A of Traffic Note 10.

This report provides an overview of proposed changes and additions to the suite of cycle symbol markings available in New Zealand. In short, this report examines

1. the proposal to implement a shared lane, or sharrow, symbol for use in low volume, low speed environments
2. the need to modify the existing cycle lane markings by incorporating the text “LANE” to all dedicated cycle lanes.

In seeking to formalise a standard symbol for sharrows, there is a need to modify the existing cycle symbols as it is legislated within New Zealand’s Traffic Control Devices (TCD) rule to denote a special vehicle lane. Therefore the current cycle symbol can only be used to denote an exclusive cycle lane and any misuse of the existing cycle symbol may result in legality issues with the Land Transport Act 1998.

BACKGROUND TO PROJECT

The need for a 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 shared lane markings has, on the whole, proved successful in improving safety, way finding 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

¹ Traffic Note 10, revision 3, NZ Transport Agency, January 2011

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

- ◆ A limited toolbox leads to a lack of understanding of cycle signs, markings and infrastructure.

With respect to introducing a shared lane marking into New Zealand there are a number of matters that require further consideration. Namely these are:

- ◆ 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 of shared lane markings, or sharrows, within New Zealand have been undertaken. These investigations focussed on the use of shared lane markings internationally with regard to symbol type and operational uses. From this research recommendations have then been made with respect to the sharrow design, its use and how this could be incorporated into the New Zealand context given the existing suite of cycle symbols currently used by practitioners

The purpose of a sharrow is to indicate a shared lane environment for cyclists and motorists. The presence of sharrows increases the visibility to motorists that the carriageway is a valid place for cyclists to travel, reinforcing to the motorist to act accordingly. Sharrows also help to position cyclists on the street, clear of hazards such as car doors, storm water grates and such like and can be used as part of a way finding strategy to mark routes for cyclists to use. The use of sharrows is typical where a separated facility may not be desirable or feasible.

The primary characteristics for the use of sharrows on a route are:

- ◆ low vehicle volumes
- ◆ low vehicle speeds
- ◆ the operational characteristics of the carriageway, including the available width, terrain and vehicle composition.

To achieve these measures it may be necessary to complement sharrows with treatments that optimise a particular route for cyclists. Treatments can include traffic calming measures to both slow and/or remove vehicles from the corridor, signage, and intersection crossing treatments – all of which are aimed at providing a safe and convenient route for cyclists of all confidence levels

With respect to the design of the sharrow it is recommended that the existing cycle symbol be retained, and that this be supplemented with chevron arrow markings, as illustrated in Figure 1. With the cycle symbol being the same as that used to denote a cycle lane (as per the special vehicle lane requirements of the TCD Rules) this therefore requires amendments to the existing cycle lane marking in order to avoid any legal implications. Figure 2 illustrates the proposed changes to the cycle lane markings, incorporating the word “LANE” above the cycle symbol.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 1: Proposed Sharrow Marking

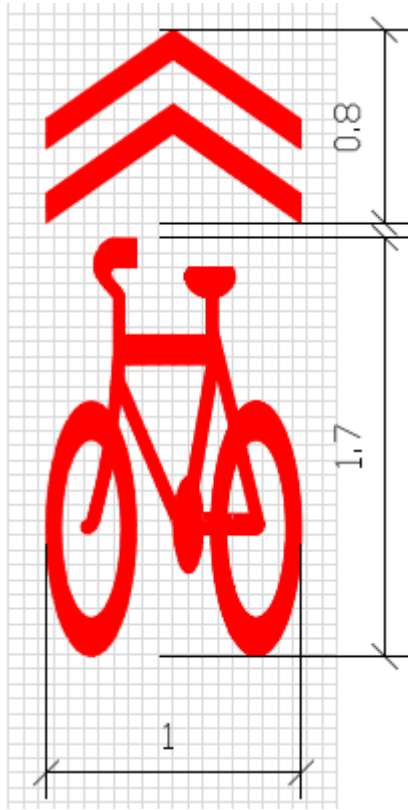
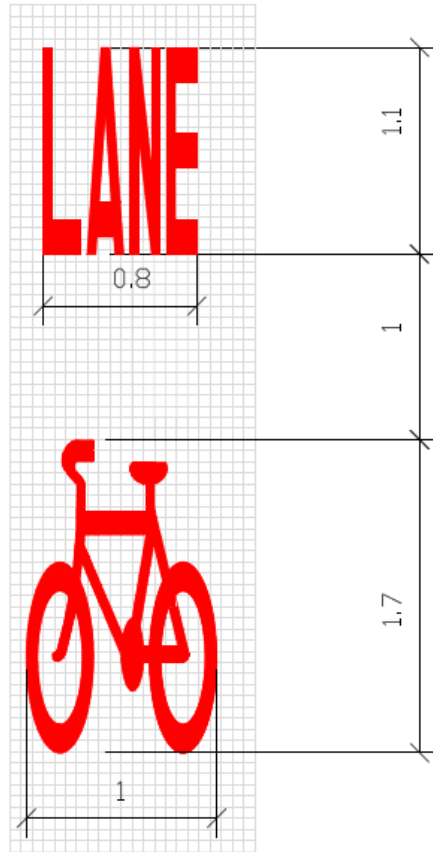


Figure 2: Proposed Additional On-Road Cycle Lane Marking 'LANE'



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings
DOCUMENT No.	1
PREPARED BY	Auckland Transport
FILE NAME/LOC	

VERSION	
DATED	07/11/2013
FILE REF	

1 OUTLINE OF THE ISSUES

1.1 What is the traffic control device being proposed?

The traffic control device (TCD), proposed for trial is the shared lane marking generally referred to in New Zealand and internationally as a sharrow marking. Figure 3 illustrates a photomontage of the sharrow marking symbol being proposed for trial as a new TCD in New Zealand.

Figure 4 also illustrates a proposed change to an existing TCD, the on-road cycle lane symbol marking, which is required should the proposed sharrow marking be accepted as a TCD. This proposed change incorporates the marking "LANE" in conjunction with the existing on-road cycle lane symbol to distinguish a cycle lane and differentiate this from the sharrow marking symbol.

Figure 3: Photomontage of Proposed Sharrow Marking



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 4: Photomontage of Proposed New On-Road Cycle Lane Marking



1.2 What problem will be addressed by the implementation of sharrow markings?

On November 23 2012, a National Cycling Signs and Markings Working Group meeting took place at the NZTA National Office in Wellington. The purpose of this meeting was 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:

- ◆ Cycling is not always 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
- ◆ Despite a relatively limited toolbox of cycle related infrastructure, there appears to still be 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 recommended within this Traffic Note 10 application address the first two bullet points.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

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

The need for a shared lane marking, or “sharrow”, within the New Zealand context has arisen due to the need to try and provide an additional toolbox measure to help in the design of cycle infrastructure. Internationally, the tool most commonly used is a sharrow and on the whole has, proved successful in improving safety, way finding and awareness of cyclist routes.

The purpose of a sharrow marking is to indicate a shared lane environment for cyclists and motorists. The presence of sharrows increases the visibility to motorists that the carriageway is a valid place for cyclists to travel and remind them to act accordingly. Sharrow markings also help to position cyclists on the street, clear of hazards such as car doors, kerb build outs and storm water grates and can also be used as part of a way finding strategy to mark routes for cyclists to use. The use of sharrow markings is typically where a separated and/or dedicated cycle facility may not be warranted.

Auckland Transport has taken a lead role in further investigating the potential use of sharrow markings within New Zealand, and has initiated investigation into the trialling of ‘sharrows’ as an additional tool to support the existing cycle infrastructure treatments and wider network.

1.3 Where are the proposed trial sites?

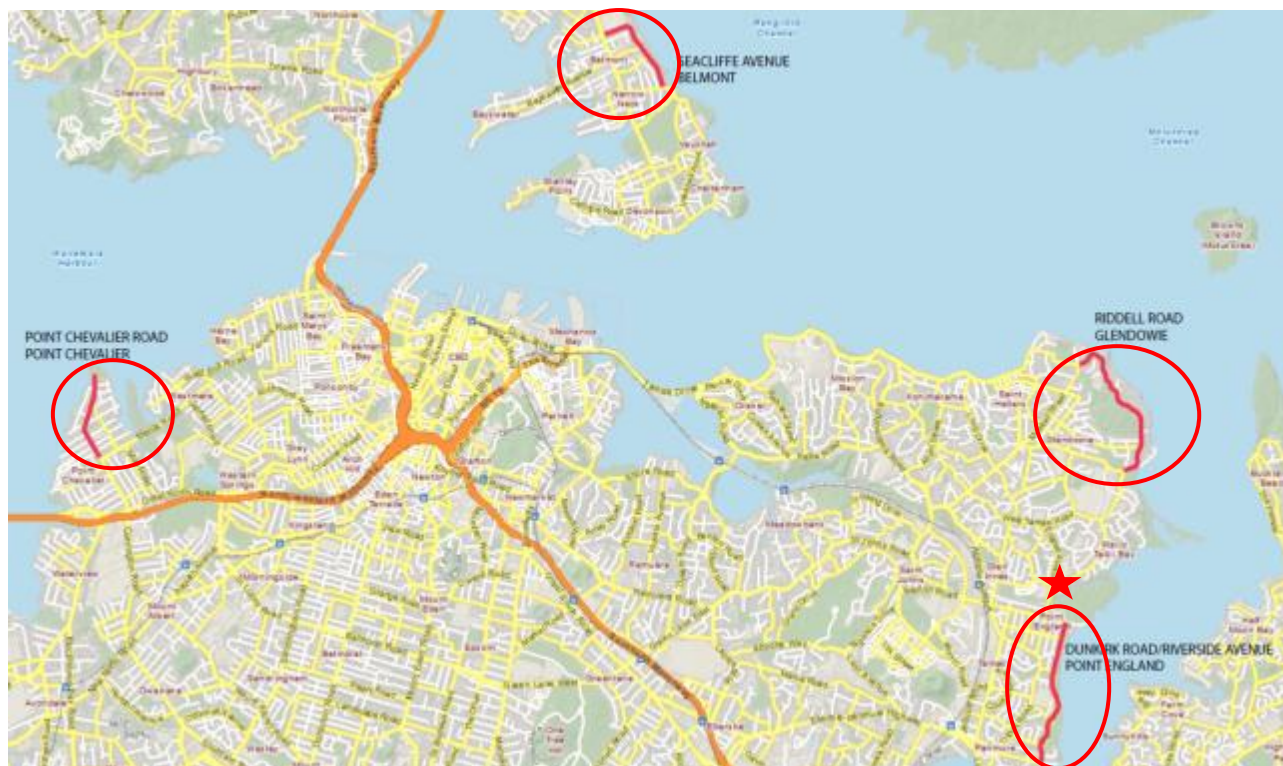
There are five trial sites being proposed for the sharrow marking trial in Auckland. These sites have been selected based on observed cyclist numbers and specific road environment characteristics. The five sites are noted below and illustrated in Figure 5.

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

The Working Group has collectively visited a number of these sites, namely Pt. Chevalier, Riddell Road, Elstree Avenue and Dunkirk Road. The Working Group concluded from these site visits the appropriateness of using these sites for the trial of the sharrow markings

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 5: Location of Selected Sites

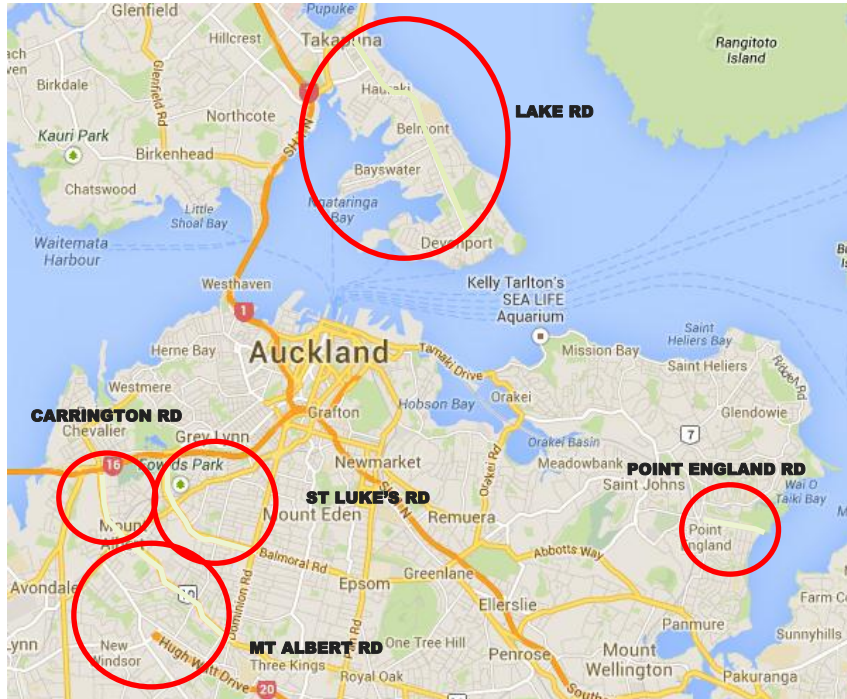


Appendix A provides a discussion with respect to the characteristics of each trial site as well as surveys of the existing cycle usage of each site.

With respect to the addition of “LANE” markings to existing cycle lanes, required to address the legal matters arising from the use of the cycle symbol as per TCD 2004, it is proposed to formally trial this on-site even though there are limited measurable statistics that can be gauged from the implementation of LANE markings to a cycle lane. In addition to the marking it is proposed to undertake perception surveys with a focus group where different photomontages will be provided and the group participants asked to provide a response as to their perception of the image. The intended locations for this trial are Mount Albert Road, Point England Road, Lake Road, Carrington Road and St Luke’s Road. The five sites are illustrated in Figure 5.2

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 6.2: Location of Selected “Lane” Sites



Appendix B provides the proposed perception survey information.

1.4 What is the time frame of the proposed trial?

It is proposed that the trial will involve sharrow markings being installed at the trial locations for around two months prior to video recording data being undertaken. The data will be collected over four week days and one weekend day of data collection. It is desirable that sharrow markings are on the road for at least a month during school term.

Subject to acceptance of this application, sharrow markings are proposed to be implemented at the five trial sites in November/December 2013 with assessment undertaken in February/March 2014.

1.5 Why is the problem proposed to be addressed with a non-standard treatment?

Existing cycle infrastructure generally consists of on-road cycle lanes, shared paths (for use by cyclists and pedestrians), off-road cycle lanes and shared bus/bike lanes. These treatments are, in the main, more suited to routes that are identified as key components of the wider cycle network, from connections through parks and open space to arterial routes that may carry higher volumes of traffic

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

and/or higher speeds. Local roads and/or collector roads carrying lower volumes of traffic are less likely to warrant these kinds of more dedicated treatments which offer a degree of separation from general traffic.

Sharrow markings offer the unique potential to encourage cyclists to ‘take the lane’ when safe to do so ; that is, travel within a general traffic lane with guidance as to where they may be best positioned to travel more safely on the road. Sharrow markings offer the added advantage of raising the awareness to all road users as to the presence of cyclists in a particular location, encouraging cyclists to travel via certain routes, educating drivers that cyclists are likely to be travelling on the route without the need for costly road side signage and can also act as way finding signage for cyclists.

The introduction of sharrows, and the proposed symbol design, does pose a legislative issue as the existing cycle symbol denotes a special vehicle lane within the Traffic Control Devices 2004. Consequently for sharrows to be introduced there is a need to change the current cycle lane markings in order to “unlock” the use of the cycle symbol. To that end it is proposed to supplement the cycle symbol with the text “LANE” when looking to denote an exclusive cycle lane, and therefore a special vehicle lane. This will require a modification to the Traffic Control Device rules to redefine the special vehicle lane definition.

1.6 Road users to benefit from sharrow markings (those who need the change)

The proposed sharrow marking will benefit all road users. Cyclists will benefit by being directed to ‘take the lane’ when safe to do so in locations where travelling kerbside could be less safe, for example, where vehicles are parked intermittently requiring cyclists to merge with general traffic.

Vehicle drivers will benefit through being alerted to the likely presence of cyclists. The likelihood of a cyclist unexpectedly merging in front of a vehicle is expected to reduce with the implementation of a sharrow marking.

It is believed that the presence of sharrow markings on the road could result in a small reduction in vehicle speeds which would be an additional benefit to all road users including pedestrians.

In summary, it is anticipated that sharrow markings will:

- ◆ Help motorists and cyclists know they have to share the same traffic lane on local and collector roads
- ◆ Help direct cyclists away from parked vehicles and other road treatments such as kerb build outs, reducing the chance of being struck by an opening door
- ◆ Be used through intersections and merge areas to support straight-line cycling and to increase the visibility of cyclists by ensuring they are well positioned on the road

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

- ◆ Provide an additional benefit of contributing to a way finding system on popular new or existing cycle routes on quieter roads.
- ◆ The proposed sharrow marking adopts the already recognisable cycle symbol, supplemented with chevron type markings. This should ensure the symbol is readily recognisable by road users, and with some education, clearly understood as to the purpose and meaning of the marking
- ◆ Adopting the cycle symbol for the sharrow marking also ensures it can be easily marked given the symbol is already widely used by the road marking industry and stencils already exist. There will be a need to develop a “chevron” stencil to supplement the cycle symbol, as well as the need to develop a “LANE” stencil to supplement existing cycle lane marking

1.7 Whether the proposal is a one-off local solution or will lead to a nationally policy

Assuming a successful trial of sharrow markings, the intention is that the identified new sharrow marking and the identified modification to the existing on-road cycle lane symbol outlined in this application become nationally accepted TCDs.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

2 DEVELOPMENT BACKGROUND

2.1 What stage of development is the sharrow markings trial at? What options for sharrow markings have been considered and discarded?

The sharrow marking trial is in a position to be undertaken in the next few months. As earlier mentioned it is intended. Subject to acceptance of this application, sharrow markings are proposed to be implemented at the five trial sites in November/December 2013 with assessment undertaken in February/March 2014.

With respect to the options that have been considered, the following provides a summary of the assessment undertaken in determining the preferred solution.

2.1.1 Cycle Lane Options

Options that were considered (and ultimately discarded) for modifying the existing cycle lane markings are discussed in the following

2.1.1.1 Option 1: Inclusion of an Edge Line as a Legal Requirement-DISCARDED

The identification of a cycle lane could be reinforced further by seeking the requirement for a cycle lane to have a white edge line along its extent – with this requirement being incorporated into the TCD rule. If this were to become a requirement, all other special vehicle lanes would also be subject to this change, unless the cycle lane is completely separated from the special vehicle lane status.

MOTSAM identifies the design requirements for a cycle a lane, with the wording “shall” and “should” used to identify features that must be installed and those features which are recommended. As it currently stands, a cycle lane shall have a cycle lane symbol, and should have edge line markings.

By re-wording the “should” to “shall” the use of edge line markings would become a requirement with respect to the marking of a cycle lane, offering up an additional design feature that must be included for a cycle lane to be legally enforceable.

This option was discarded because best practice cycle lane design typically includes edge lines alongside the cycle lane, so making such a change to the TCD rule would not have a considerable effect on the existing cycle lane infrastructure.

2.1.1.2 Option 2: Cycle “Only” Symbol-DISCARDED

This option for a change to the TCD rule suggests the adaptation of the text “ONLY” to supplement the existing cycle symbol to denote a cycle lane retrofitted to existing cycle lanes.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

This option was discarded as it was deemed more in keeping with the nature of special vehicle lanes to modify a cycle lane symbol by inclusion of the word “LANE”. For example, special vehicle lane signage for a bus lane is “BUS LANE”.

2.1.1.3 Option 3: Installation of Signs-DISCARDED

This option for a change to the TCD rule change suggests the removal of the existing cycle symbol road marking’s regulatory status and replacing it with the requirement of signage installation.

This option was discarded because, if implemented, it would require the installation of signs to all on-road cycle networks within New Zealand and would be costly in terms of additional signage requirements. Signage clutter and visual pollution could be an additional negative outcome.

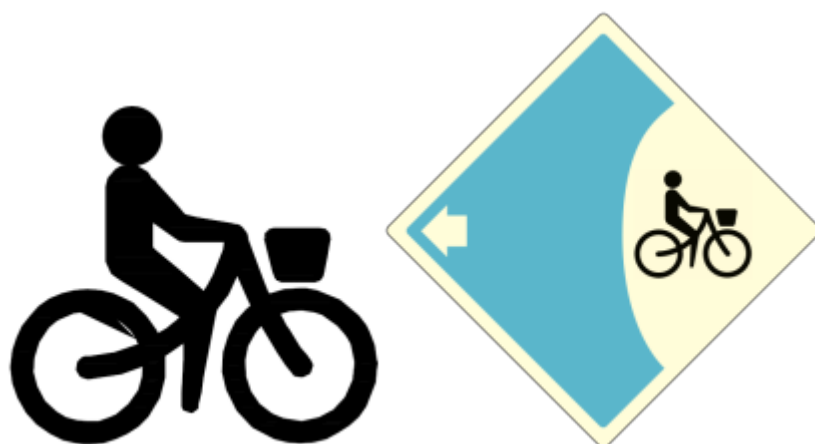
2.1.2 Sharrows Options

Options that were considered but discarded as the preferred sharrows marking symbol are outlined below.

2.1.2.1 Option 1: Great Urban Rides Symbol-DISCARDED

This option, illustrated in Figure 7 below, is an adaptation of the cycle symbol as used on the “Great Urban Rides” sign. This option was discarded because despite it likely being recognised by Auckland cyclists, it would not have universal recognition around New Zealand. It is also noted that this image is possibly symbolic of novice and leisure cyclists but be less appropriate as a representation of commuter cyclists or trainer cyclists who may also be using the route.

Figure 7: Great Urban Rides Symbol



DOCUMENT NAME	Proposed Trial of Sharrows and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

2.1.2.2 Option 2: United States Cycle Symbol-DISCARDED

This option, illustrated in Figure 8 below, was discarded as the cycle lane symbol is from the United States of America and is different from the cycle lane symbol used in New Zealand. It is unfamiliar to New Zealand cyclists and road users.

Figure 8: United States of America Cycle Symbol



2.1.2.3 Circle Symbol Design-DISCARDED

This option, illustrated in Figure 9 below, consists of a cycle symbol within a circle and an arrow above it indicating the direction of the preferred cycle route. This option was discarded because it was considered hard for all road users to identify, in particular vehicle drivers, given its relatively small size. It would be more expensive than the preferred solution if applied at a larger size due to increased paint requirements. It is noted that case studies show cyclists are less inclined to cycle over the centre of the round symbol reducing its effectiveness in preventing door crashes.

Figure 9: Cycle Symbol in a Circle



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

2.1.2.4 Line Marking Design-DISCARDED

This option, illustrated in Figure 10 below, consists of a cycle symbol with a line marking above and the word “SHARE” below. This option was discarded because it was considered that the directional line could be confusing for cyclists. It was also determined that the use of a word as part of a sharrow marking was less desirable than a stand-alone image and that it was a more complex image and more prone to wear resulting in higher maintenance costs.

Figure 10: Cycle Symbol with “SHARE” and Line Marking Above



2.1.2.5 Cycle Symbol within an Arrow-DISCARDED

This option, as illustrated in Figure 11, is an adaptation of the “Bike in House” design and depicts a cyclist within a larger arrow, indicating the preferred route and safe path for cyclist out of the “door zone”. This option was discarded as international literature² suggested this symbol was not as effective as other symbols.

Figure 11: Cycle symbol within an Arrow



2.1.3 Colour Options

Colour options that were considered but discarded are:

- ◆ Blue - This option was discarded because it could be confused with tourist signage

²San Francisco’s Shared Lane Pavement Markings: Improving Bicycle Safety, prepared by Alta Planning+Design, February 2004

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

- ◆ Green - This option was discarded because green is often used as the background to the white cycle symbol behind the white cycle lane symbol
- ◆ Yellow - This option was discarded as the colour yellow typically denotes ‘permanent warning’ type road matters.

2.2 Previous international research, trials and investigations

2.2.1 Australia Sharrow Evaluation

A Vic Roads’ evaluation of sharrow markings³ mainly focused on the following before and after effects of the trial implementation:

- ◆ Cyclist Lateral Tracking
 - Video recordings of a single AM, Inter and PM peak before and after the implementation of sharrows with this information manually assessed
 - Lateral distances of cyclist to the kerb, parked vehicles or general traffic was obtained via reference points on the road.
- ◆ Vehicle Speeds
 - Speed samples were collected randomly using hand held speed gun before and after sharrows implementation
- ◆ Road User Interaction
 - Interaction of cyclists with both parked and moving vehicles was manually allocated into 5 different categories. Each category represented the different ways a cyclist reacted to surrounding vehicles. For example, “no incident” where no effect was observed between cyclist and car and “major adjustment required” where cyclist need to significantly alter course or adjust speed to avoid collision
 - Similar to cyclist interaction classification, the interaction of moving vehicles to cyclist was also manually allocated into 7 different categories. For example, “follows or leads patiently” where motorist patiently follows cyclist and “fails to overtake aggressively” where motorist showed aggressive driving behaviour but failed to complete overtaking manoeuvre.
- ◆ The cyclist perception of sharrow markings purpose and use was also obtained via roadside interviews.

This trial concluded that sharrow marking can form part of the toolbox of engineering treatments to improve conditions for cycling, but that like all treatments, their use needs to be considered within the context of the road environment to which they may be applied.

³ Evaluation of Shared Lane Markings for Cyclists, Prepared for VicRoads by CDM Research, February 2013, pp 40.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

1.1.1 US Sharrow Evaluation

Similar to the Vic Roads’ study, The Federal Highway Administration (FHWA) has undertaken a similar but more comprehensive behavioural focused evaluation of sharrow markings.⁴ The study measures the following before and after effects at the trial sites:

- ◆ Vehicle Speed
 - Speed samples were collected randomly using hand held speed gun before and after sharrow implementation.
- ◆ Cyclist Gender and Cyclist wearing a helmet
 - Cyclist gender and their use of helmets were manually recorded based on video footage.
- ◆ Road User Interactions
 - Interaction of cyclists with both parked and moving vehicles was manually allocated into nine different categories. Each category represents a different way a cyclist reacts to surrounding vehicles. For example, one category identified cyclists who were required to make a full stop as an avoidance measure, a second category identified when a cyclist’s pedal speed changed to avoid surrounding motorist
 - Similar to cyclist interaction classification, the interaction of moving vehicles to cyclist was also manually allocated into eight different categories. For example, one category identified the number of motorists who applied the brakes as an avoidance measure, a second category identified motorists who changed lanes to avoid cyclist.
- ◆ Vehicle Lateral Tracking
 - Using video processing software, the following before and after lateral distances were measured:
 - Cyclist to the kerb, parked vehicles or general traffic
 - Lateral distance of vehicles to parked vehicles.

The FHWA’s evaluation was purely based on observed field data and cyclist perception was not factored into the evaluation.

Furthermore, a report from the San Francisco Department of Parking and Traffic concluded that ‘shared lane pavement markings in San Francisco have a positive impact on motorist and cyclist behaviour, positions and safety’.⁵

⁴ Evaluation of Shared Lane Markings, US Department of Transportation Federal Highway Administration, December 2010

⁵ San Francisco’s Shared Plan Pavement Markings: Improving Bicycle Safety. Prepared by Alta Planning and Design for San Francisco Department of Parking and Traffic, February 2004, pp 17.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

2.3 What is the general outcome of any previous trial or investigation?

It can be fairly stated that, internationally, sharrow markings have been generally accepted as a legitimate and useful tool to promote and encourage safer cycling.

2.4 What are the relevant international legislation, polices or guidelines that have been referenced?

As noted above, a review of the international use of shared lane markings has been conducted referencing several sources, primarily published in the United States of America and Australia. This review was primarily in relation to shared lane marking's purpose, effectiveness and implementation guidelines. Specific reference is made to:

- ◆ San Francisco's Shared Lane Pavement Markings: Improved Bicycle Safety, February 2004, Department of Parking and Traffic
- ◆ Evaluation of Shared Lane Markings, US Department of Transportation Federal Highway Administration, December 2010
- ◆ Evaluation of Shared Lane Markings for Cyclists, Vic Roads, February 2013

3 TECHNICAL ANALYSIS

3.1 Detailed drawing of the proposed new sharrow marking and modified cycle lane symbol

The following solutions have been developed based on:

- ◆ Easily identifiable design for its intended use.
- ◆ Similarity with existing special vehicle lane markings
- ◆ The need to ensure the solution can be practically implemented to existing infrastructure.

The preferred sharrow marking option consists of a cycle symbol with two chevrons located above it. This option has been widely adopted in the United States and Australia. The symbol is easy to identify and scalable to suit different environments. A stencil for the cycle symbol is already available and is used nationally.

3.1.1 Proposed Sharrow Marking

Simply replicating the cycle symbol as part of a shared lane marking would render the road a special vehicle lane, meaning only cyclists could use the road, with motor vehicle use being illegal. However, it is recommended that the existing cycle symbol be retained but supplemented with chevron arrow

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

markings. This would require a relatively simple modification to the existing cycle lane symbol as illustrated in Figure 13.

Based on the overseas examples, it is recommended that the symbol be painted white as this gives the greatest contrast on a black asphalt surface for a stencilled symbol.

The proposed new sharrow marking is illustrated in Figure 12 below.

3.1.2 Proposed cycle lane marking

As the existing cycle lane symbol is detailed within New Zealand’s TCD rule, any misuse of the existing cycle symbol may result in legality issues with the Land Transport Act 1998. That is, the current cycle symbol denoted within a cycle lane legally means this lane becomes a special vehicle lane, and is not able to be used by motorists, hence giving the ability for any illegal use to be enforced.

The proposed new on-road cycle lane marking is illustrated at Figure 13 below. It is recommended that the word “LANE” be added to cycle lanes to distinguish the symbol from the proposed sharrow marking symbol.

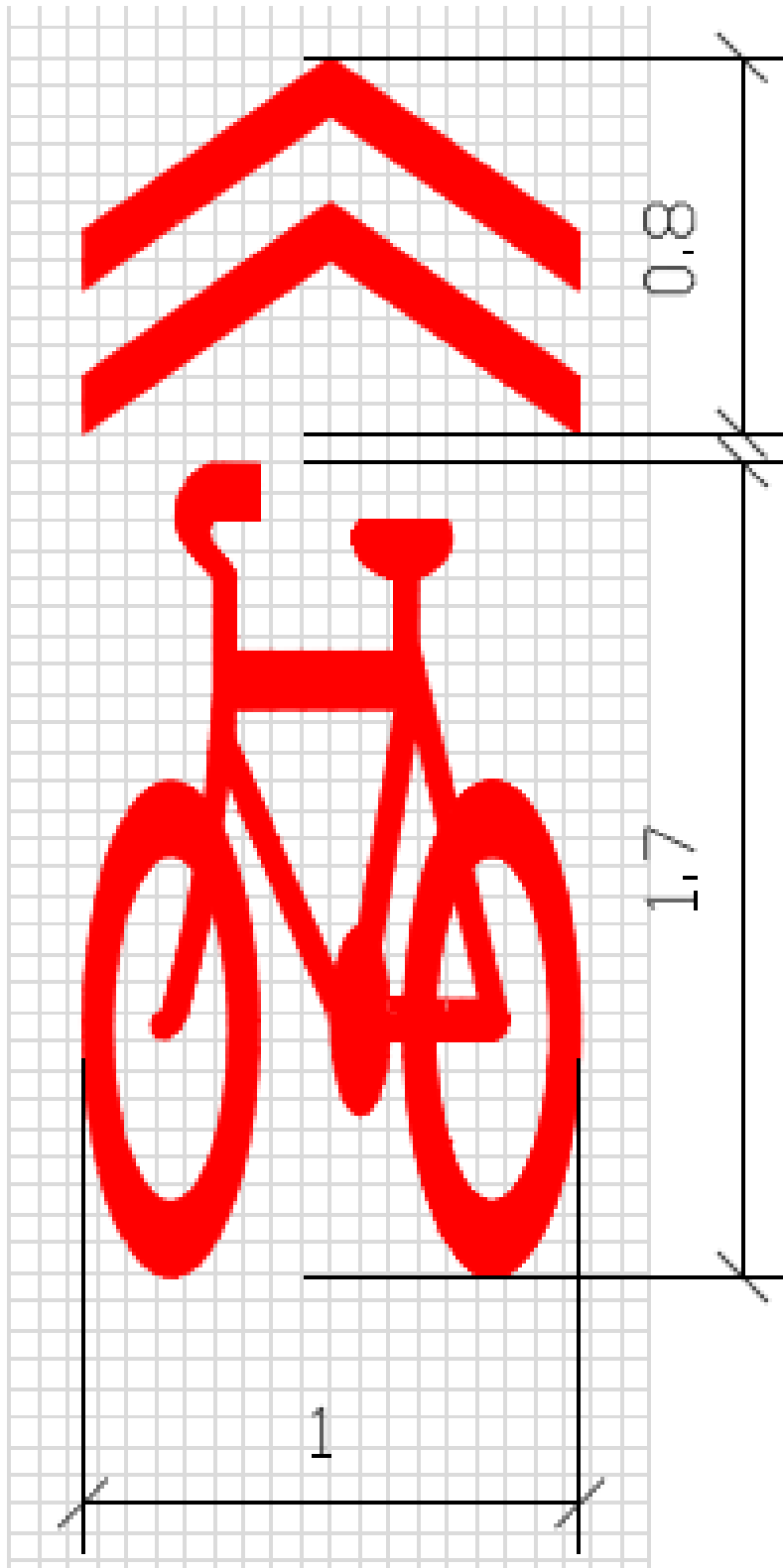
Based on the overseas examples, it is recommended that the symbol be painted white as this gives the greatest contrast on a black asphalt surface for a stencilled symbol.

3.2 Details of any materials or components used

Paint is the only material that is required for the sharrow marking trial and cycle lane symbol modification trial. The paint should be the same as that used for existing cycle lane symbols being skid resistant.

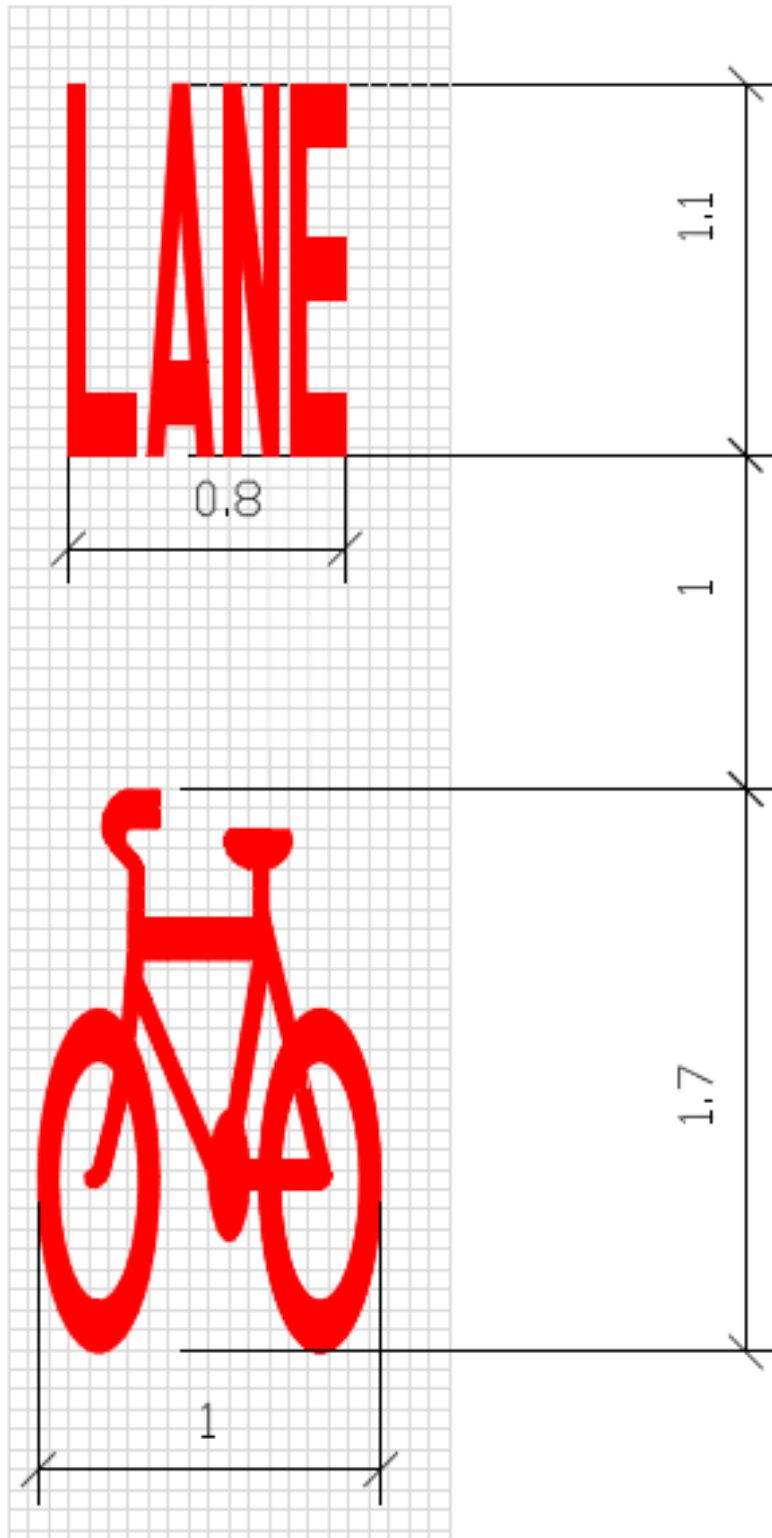
DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 12: Proposed Sharrow Marking



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 13: Proposed Additional On-Road Cycle Lane Marking 'LANE'



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

3.3 Theoretical analysis of sharrow markings

3.3.1 San Francisco

The city of San Francisco undertook research into the subject of shared lane markings in 2004⁶.

After analysis of over 140 hours of video material, the study found that

- ◆ The distance between cyclists and parked cars increased by approximately 200 mm
- ◆ The distance between cyclists and passing cars increased by approximately 600 mm
- ◆ The number of cyclists riding on the sidewalk reduced by 35%
- ◆ The amount of people riding in the wrong direction reduced by 80%.

3.3.2 The Federal Highway Administration

In 2010, the FHWA in the United States of America undertook an evaluation of Shared Lane Markings⁷.

The results showed that the percentage of cyclists cycling within the “dooring” range of parked vehicles reduced significantly, with 94% of the cyclists riding over the sharrow marking. While before the application of the sharrow marking, the percentage of cyclists taking avoiding measures to avoid a vehicle was 76%, in the after period, this dropped to 37%, indicating a more segregated traffic flow with less potential conflict. The research also shows that the spacing between vehicles in the travel lane and parked vehicles increased by approximately 360 mm. At the same time, the percentage of vehicles changing lanes to overtake a cyclist decreased from 12% to 3% after application of the sharrows.

The overall results of the research show that application of the shared lane markings resulted in a more segregated flow for cyclists and vehicles, giving the cyclists more operating space.

Overall, the results from the evaluation research were positive. It found that applying shared lane markings reduces the number of people riding on the footpath by 25 to 35% and the separation between cyclists and parked vehicles increased by 80 m to 100 mm. Most importantly, whilst overtaking the cyclist, the distance between cyclists and cars in the vehicle lane increased by more than 600 mm which greatly improved (perceived) safety for cyclists.

3.3.3 Vic Roads Australia

VicRoads has undertaken an evaluation of shared lane markings in Melbourne⁸. Three sites were evaluated, all on relatively quiet streets with a speed limit of 40-50 km/h. At two of the sites the lateral

⁶ San Francisco’s Shared Lane Pavement Markings: Improved Bicycle Safety, February 2004, Department of Parking and Traffic

⁷ Evaluation of Shared Lane Markings, US Department of Transportation Federal Highway Administration, December 2010

⁸ Evaluation of Shared Lane Markings for Cyclists, Vic Roads, February 2013

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

location of cyclists shifted significantly towards the centre of the lane by up to 380 mm. At one site, the lateral position did not change significantly, with this lack of lateral shift partially attributable to the location of a pinch point at this site.

At one site, the number of cyclists travelling in the “door zone” reduced dramatically from 23 % to 4 %. At a second site, the percentage decreased from 62 % to 40 %. This indicates that sharrow markings do have a potential impact on the risk of “dooring” but their appropriateness needs to be assessed on a case-by-case basis.

3.4 What computer or other technical analysis was used in deriving the proposal?

To-date, the only analysis that has been undertaken is an analysis of video monitoring that determined proposed trial sites had sufficient existing cyclist numbers to be appropriate as a sharrow marking trial site.

3.5 Does the proposal require a back-up safety system?

Other than a modification to the existing cycle lane symbol recommended post-acceptance of the sharrow marking for a TCD, it is not considered that the trial or the consequent implementation of sharrow markings in New Zealand would require a back-up safety system.

4 IMPACTS AND RISKS

4.1 Do sharrow markings create other problems?

As noted, there is the potential that sharrow markings could create some confusion amongst vehicle drivers and/or cyclists as to the meaning of the symbol. It is possible that some vehicle drivers and/or cyclists could confuse the sharrow marking symbol with a ‘cycle lane’ symbol which could cause confusion about required road user behaviour.

There may also be a potential issue with cyclists ‘taking the lane’ when not safe to do so or when there is no apparent need to do so. Cyclists should keep left wherever possible and a sharrow marking may draw a cyclist more to the centre of a general traffic lane than is warranted at a given time. For example, if on street car parking is intermittent and not being utilised a cyclist should ride as close to the kerb as practical but may be inclined to be more central in the lane if they come upon a sharrow marking. This issue is considered a possible problem of perception rather than resulting in safety concerns.

There is the potential issue of sharrow markings being implemented on routes that are less appropriate, for example, used as a panacea to address issues of cycle safety and connectivity in locations where

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

dedicated infrastructure is the preferred outcome. It is believed that the development of New Zealand best practice guidelines (for sharrow marking implementation), would address this.

The implementation of a modified cycle lane symbol is not considered to create any real or perceived problems.

4.2 Are sharrow markings a potential solution to the identified problem?

Given international research results that indicate the implementation of shared lane markings resulted in a more segregated flow for cyclists and vehicles, giving the cyclists more operating space, it can be fairly stated that sharrow markings are a potential solution to the problem of creating a shared lane environment for cyclists and motorists.

4.3 Does the proposal address the relevant issues?

It is considered that the recommended modified cycle lane symbol will be sufficient to address legality issues that could arise in relation to use of the existing symbol in sharrow lane markings (in reference to the Land Transport Act 1998).

4.4 Will sharrow markings be easily understood by other road users?

The trial and early implementation of sharrow markings may not be immediately understood by road users. Education and information dissemination in relation to the trial is proposed and outlined in this application. The development of literature and promotional materials that would educate all road users about sharrow markings is also strongly recommended should the trial be successful and sharrow markings be accepted as national policy and a TCD.

4.5 What is the likely uptake of sharrow markings?

It is considered that sharrow markings will be an attractive option for road controlling authorities seeking an appropriate treatment to support and encourage safer cycling on quieter roads that are not likely to warrant the implementation of dedicated separate cycling infrastructure.⁹

In the context of the Auckland region, early discussions about the implementation of sharrow markings have been positive with appropriate locations already identified including the five trial sites proposed in this application.

⁹ It is noted that some quieter routes, due to higher cycle numbers, may warrant dedicated separate cycling infrastructure and that sharrow markings should not be considered an automatic treatment for roads carrying lower volumes of traffic

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

4.6 Is there an impact on the consistency of standards if sharrow markings are implemented?

There is an impact on the consistency of standards if sharrow markings are implemented. The sharrow marking symbol recommended for trial in this application conflicts with the existing TCD cycle lane symbol used nationally.

4.7 What is the impact on the consistency of standards if sharrow markings are implemented?

There are a number of matters that require further consideration with respect to the implementation of sharrow markings in New Zealand. The need to understand the legality of such a marking, coupled with how it affects the existing legislation with respect to cycle lanes is a key matter to be resolved. The following provides further analysis of the existing legislation, as well as offering options as to how sharrow markings could be implemented in NZ.

4.7.1 Land Transport (Road User) Rule 2004

The Road User Rules 2004 provide the following interpretations:

- ◆ *cycle lane* means a longitudinal strip within a roadway designed for the passage of cycles
- ◆ *special vehicle lane* means a lane defined by signs or markings as restricted to a specified class or classes of vehicle; and includes a bus lane, a transit lane, a cycle lane, and a light rail vehicle lane.

4.7.2 Traffic Control Devices Manual 2004

The TCD manual provides guidance on industry good practice including, where necessary, practice mandated by law in relation to the use of TCDs.

Of particular importance to the use of a sharrow marking are the following excerpts from the TCD Manual

Purposes of markings

A marking has one of the following functions:

- (a) 'regulatory', that is, it instructs road users by requiring or prohibiting specified actions in using a road;*
- (b) 'warning', that is, it informs road users of permanent hazards on a roadway or gives advance notice of features on or near a road;*
- (c) 'advisory', that is, it provides road users with information or guidance in the intended use of the road.*

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Special vehicle lanes

If defining a part of a road as a special vehicle lane, a road controlling authority must, at the start of the special vehicle lane and at the point at which the lane starts again after each intersection:

- (a) mark on the road surface a white symbol, that complies with [Schedule 2](#), defining the class or classes of vehicle for which the lane has been reserved; and*
- (b) if for other than a 24-hour restriction, install a special vehicle lane sign that complies with [Schedule 1](#):*
 - (i) defining the class or classes of vehicle for which the lane has been reserved; and*
 - (ii) stating the periods for which the reservation applies.*

A road controlling authority may provide the following traffic control devices to discourage use of a special vehicle lane by other vehicles, or to draw attention to the likely presence of vehicles entitled to the use of the lane:

- (a) additional white special vehicle lane symbols described in [11.2\(1\)\(a\)](#) or signs described in [11.2\(1\)\(b\)](#) along the length of the lane; or*
- (b) if for a 24-hour restriction, special vehicle lane signs; or*
- (c) a surface treatment that provides a contrasting colour or texture to that of adjacent lanes used by other vehicles:*
 - (i) at locations along the length of the lane; or*
 - (ii) along the length of the lane*

On that basis and in the context of dedicated on-road cycle lanes, these lanes are identified by

- ◆ A white cycle symbol at the beginning of the lane
- ◆ Signage is required **IF** the special vehicle lane does not apply 24 hours
- ◆ Additional white cycle symbols, signage and or surface treatments are optional along the length of the lane.

It is worth noting that the TCD does specify that a road marking can have a regulatory, a warning or an advisory function. In the case of special vehicle lanes, the function of the marking is clearly regulatory.

4.7.3 Traffic Control Devices Manual (TCDM)

If adopted, it will be necessary to add a shared lane symbol/sharrow marking to the NZTA Traffic Control Devices Manual (TCDM). Currently the Manual of Traffic Signs and Markings (MOTSAM) Part 2 specifies the currently permitted road markings, and its inclusion in TCDM will ensure consistency across the country.

According to MOTSAM a cycle lane is denoted as follows:

- ◆ *Shall* have a cycle lane symbol

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

- ◆ *Should* be marked on the right hand side by a continuous white line
- ◆ Where parking is provided, the left hand edge of the cycle lane *should* be marked

Should sharrow markings be implemented, it is recommended that the word “LANE” be added to the cycle lane symbol to differentiate it from a sharrow marking symbol.

4.8 Would Sharrow Markings effect international agreements?

The sharrow marking symbol, as proposed, is in keeping with internationally accepted shared lane marking symbols.

Safety And Efficiency Gains

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

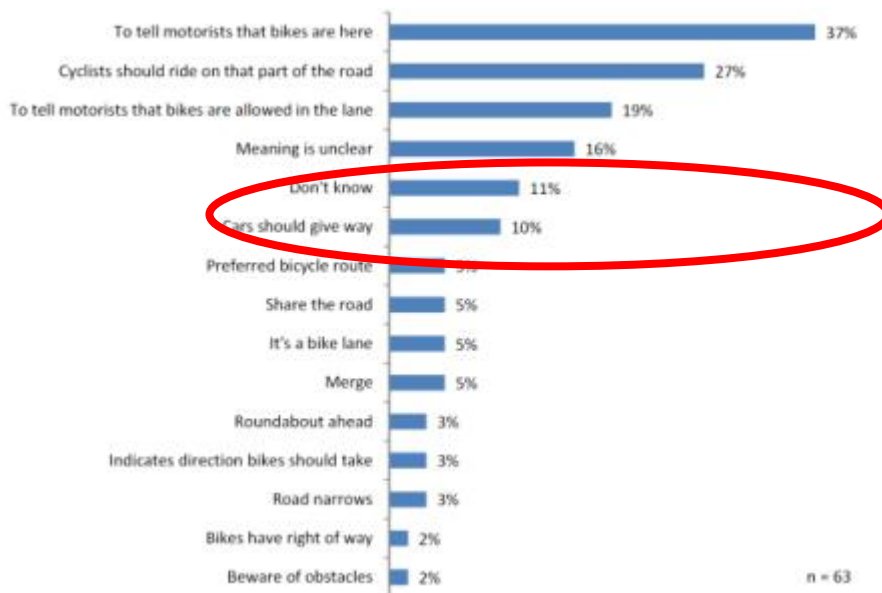
5.0 Safety and Efficiency Gains

5.1 Would sharrow markings have an effect on road users?

Concerns have been raised about the possible confusion of the sharrow marking with the cycle lane symbol, which could raise uncertainty for vehicle drivers with regards to the legal status of the road. A lack of clarity about meaning should not negatively affect drivers, and assuming sharrow markings are implemented in New Zealand, appropriate education would be recommended.

Safety for cyclists could be affected if a cyclist was to mistake a sharrow marking for a cycle lane marking and assume that the indicated space is for cyclists only. Research undertaken amongst cyclists in Australia suggested this was not the case with only a small percentage of surveyed cyclists mistaking a sharrow marking for a cycle lane marking. This is illustrated at Figure 14 below.

Figure 14: Meaning of shared lane markings according to cyclists (Vicroads 2012)



However, a noticeable percentage (27%) of the survey participants was unclear about the meaning of the sharrow marking. This does not necessarily result in a safety concern but rather reiterates the need for education.

5.2 What the benefits and costs of Sharrow Markings?

The benefits of sharrow markings include:

- ◆ Providing an additional tool to encourage and support cycling through infrastructure improvements

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

- ◆ Promoting cycling for transport and recreation by introducing an additional cycle symbol on the road network
- ◆ Enabling an alternative way finding system for cyclists that does not involve an increase in road side signage
- ◆ Offering a mechanism to provide cycle improvements on routes not likely to warrant the provision of dedicated/separate cycle infrastructure.
- ◆ Help motorists and cyclists know they have to share the same traffic lane on local and collector roads
- ◆ Help direct cyclists away from parked vehicles and other road treatments such as kerb build outs, reducing the chance of being struck by an opening door
- ◆ Be used through intersections and merge areas to support straight-line cycling and to increase the visibility of cyclists by ensuring they are well positioned on the road
- ◆ Provide an additional benefit of contributing to a way finding system on popular new or existing cycle routes on quieter roads.
- ◆ The proposed sharrow marking adopts the already recognisable cycle symbol, supplemented with chevron type markings. This should ensure the symbol is readily recognisable by road users, and with some education, clearly understood as to the purpose and meaning of the marking
- ◆ Adopting the cycle symbol for the sharrow marking also ensures it can be easily marked given the symbol is already widely used by the road marking industry and stencils already exist. There will be a need to develop a “chevron” stencil to supplement the cycle symbol, as well as the need to develop a “LANE” stencil to supplement existing cycle lane marking

The costs of implementing sharrow marking symbols will not be excessive as they involve the application of paint only. Similarly, a relatively modest cost would be required for the retrofit of all existing cycle lanes in New Zealand with the modification recommended in this application, that is, “LANE” added to the existing on-road cycle symbol. Road controlling authorities will be aware of the location of cycle lanes and therefore, modification of the cycle lane symbol would only result in a labour and paint cost implication.

A further budget would be required to develop educational materials and information for national distribution.

Overall, it is considered that the benefits of sharrow markings would exceed the relatively low cost of implementation.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

6 CONSULTATION

6.1 Who would be Interested in the trial of sharrow markings?

Groups who should be consulted about the proposed sharrow markings trial include:

- ◆ Auckland based cycle advocates and Bicycle User Groups, including Cycle Action Auckland (CAA), the Cycle Advocates Network, Bike NZ, sports cycle groups, recreational cyclists
- ◆ The Automobile Association
- ◆ Auckland Transport
- ◆ Auckland Council
- ◆ NZTA

6.2 What consultation has been undertaken or is proposed?

6.2.1 Sharrow Markings

The plan outlines an engagement and communication strategy, ensuring that for each of the five sites, key stakeholders and the local communities are kept informed and have the opportunity to provide feedback on the project. Feedback will be accepted in the lead up to and during the trial itself. It will be used to inform an assessment of the success of the project at the trial's conclusion.

6.2.2 Objective

- To raise awareness of sharrow markings and the reasons for trialling them in Auckland.
- To ensure key stakeholders and the local community have awareness of activities associated with the trial, e.g. video recording.
- To provide stakeholders and the community with the opportunity to ask questions and provide feedback on the trial.
- To promote AT as an organisation committed to delivering an integrated transport network.
- Promote AT as an organisation committed to improving safety for all road users.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

6.2.3 Strategy

Internal:

Inform and seek approval from Traffic Operations, Parking, Traffic Systems, Public Transport, Road Maintenance, Corridor Access, and Road Safety. This process is ongoing.

External:

- Letter drops to stakeholders within and surrounding the five trial sites. Area of delivery to be determined, however it should be as wide as is practicable.
- Letter/email to identify key stakeholders.
- Direct engagement with key stakeholders as required, e.g. trial site walkover with local board representative.
- Advertising in community papers, e.g. Central Leader.
- Project page on AT website.
- Project poster and information for display at local schools, libraries, community centres.
- Call centre informed, project information added to i-know, including project stakeholder liaison contact details.
- Provide Cycle Action Auckland (CAA) with information package for CAA website.
- Consider providing information to the Auckland Transport Blog.

6.2.4 Communication and engagement risks

Cyclists are not aware or do not support.	Engage early with CAA to ensure project is promoted on CAA website. Ensure there is awareness of the trial nature of the project and the road user analysis that will be undertaken. Share findings from the trial with CAA.
Local community are not aware or do not support.	Publicise trial widely in advance through area letter drop. Engage with local schools, libraries and community centres.
Road users/wider public confused by / raise concerns about road markings.	Publicise trial widely in advance. Ensure that information is available on AT website and that call centre has project stakeholder liaison contact details to direct customer calls.
Local boards do not support.	Direct engagement early with local boards via Elected Member Liaisons. Arrange site walkover. Ensure awareness of the trial nature of the project and the road user analysis that will be undertaken. Promote potential safety benefits for all road users.
Internal opposition to trial.	Identify key internal stakeholders and engage early in the process. (currently ongoing)

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

6.2.3 Key messages

- Auckland Transport is undertaking a six month trial of sharrow markings at locations around Auckland.
- Sharrow markings help motorists and cyclists share the road safely by increasing cyclist visibility.
- Sharrow markings protect cyclists by directing them away from hazards such as parked vehicles.
- Sharrow markings are an easily recognisable and understood form of road marking.
- Auckland Transport will be conducting monitoring and analysis of road user behavior at each of the five trial sites. This will inform whether sharrow markings are used more widely.
- Community feedback will help inform our assessment of the success of this project.
- Auckland Transport is undertaking this trial as part of its commitment to delivering a safer, more integrated and better connected transport network.

6.2.4 Stakeholders

Category	Stakeholders
Internal	Traffic Operations, Traffic Systems, Public Transport, Road Maintenance, Corridor Access, Road Safety
Political	Albert-Eden Local Board, Maungakiekie-Tamaki Local Board, Devonport-Takapuna Local Board, Orakei Local Board
External	Businesses and residents within trial boundaries and surrounding area Local business, residents and community associations NZTA Cycle Action Auckland (CAA) Emergency services including local police. AA Road Transport Forum NZ Heavy Haulage NZ Bus (via Public Transport team) Taxi and courier companies Schools Libraries, community centers
Iwi	Identify and include local iwi in consultation
Media	Transport reporters, engage via AT Comms

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

6.2.5 Process

Internal

Meetings and direct engagement with identified stakeholders. This is currently ongoing.

External

1. Engage with local boards one month in advance of the trial start date.
2. Letter drop/email to communities within the trial areas three weeks in advance of the trial start date. Letter to include:
 - Information regarding the trial and its purpose, including information on the wider context, i.e. other sharrow marking trials across Auckland.
 - A detailed map of the trial area.
 - Information on how to provide feedback. A cut off date of 8 weeks will be provided, allowing feedback to be provided during the trial.
 - Offer of face to face meeting for key stakeholders, e.g. community associations.
3. Three weeks in advance of trial start date, email to identify stakeholders from wider Auckland area, e.g. AA. Email to include project info and feedback opportunity as for letter drops, but will not be area specific.
4. Place advertising for display in local community paper (e.g. Central Leader) three weeks in advance of trial start date. Advertising to refer readers to AT website for further info and feedback.
5. Place information/posters in local community centers, libraries, schools three weeks in advance of trial start date.
6. AT website project page to go live three weeks in advance of trial start date. Include information for each trial area and details on how to provide feedback. Update call center and i-know.
7. Engage with CAA three weeks in advance of trial start date. Provide information for CAA website.
8. AT Comms to provide media release at trial start date.

6.2.6 Modified cycle lane marking

The adoption of the text “LANE” is proposed to supplement the existing cycle symbol to denote a dedicated cycle lane. This is proposed to be retrofitted to existing cycle lanes.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

7 PROPOSED ASSESSMENT

7.1 Ensure information sought is well defined and appropriate

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

An analysis of four weekdays and one weekend of video recording will determine the effects of sharrow markings in relation to road users positioning within the road space. Cyclist lateral tracking and road user interaction will be captured by video and manually reviewed and summarised. Vehicle speed information will also be captured via tube counts installed at each trail location.

To determine cyclist and other road user perceptions of sharrow markings and their effectiveness, focus group and online perception surveys are proposed.

With respect to the addition of “LANE” to existing cycle lanes it is proposed that perception surveys will be undertaken in order to measure respondent’s response to a series of photomontages.

7.2 Address all relevant issues including the suitability of any site suggested for the evaluation

Auckland Transport accepts the five proposed trial site as appropriate locations and supports the trial of sharrow markings and proposed modified cycle lane symbol outlined in this application.

7.3 Provide all information necessary to support any analysis required to determine whether value for money will be achieved if the proposal is implemented nationally

There is currently no information that is required to support the quantitative or subjective analysis proposed for the trial.

7.4 How will an appropriate level of understanding be obtained from road users?

7.4.1 Appropriate level of understanding for sharrow marking trial

Once a sharrow marking trial has been approved, it is recommended that localised promotion of the sharrow marking trial be undertaken. It is proposed that the following road user groups, institutions and organisations be contacted with information about the trial and application of sharrow markings:

- ◆ Schools in close proximity to a trial site

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

- ◆ Road Controlling Authorities, being Auckland Transport. It would be useful to advise call centre staff and all other officers involved in cycle infrastructure design, promotion and education
- ◆ Road user groups and advocacy groups, for example, CAA, Walk Auckland and the Automobile Association
- ◆ The New Zealand Police, specifically, School Community Officers (previously called Police Education Officers).

7.4.2 Appropriate level of understanding for implementation of new sharrow marking if a new TCD is implemented nationally

With the introduction of a new symbol to the road environment there will be a need to educate motorists, cyclists and pedestrians as to the meaning of the new symbol and the required behaviours of all roads travelling along these routes. The intended goals and expected outcomes from implementing sharrow markings should also be communicated.

One of the key target audiences for the use of sharrow markings is less confident cycle commuters, recreational cyclists and school children. With the expectation that the implementation of sharrow markings will involve linking key destinations such as local schools, parks, shopping areas, public transport interchanges and community facilities there are a number of mechanisms for which to get community involvement and support for sharrow markings indicating a new or existing cycle route. This could involve:

- ◆ A community cycle day along the route
- ◆ Organising with local schools for cycling school buses to be implemented, with these initially supported by a confident cyclist
- ◆ Cycle skills training programme – utilise these routes for cycle training programmes to encourage less confident cyclists.

Ideally there may be a number of regions about the country wishing to implement sharrow markings and a national campaign may be able to be launched. Alternatively, if each region promotes the sharrow markings in a consistent approach then this will help educate the public without necessarily undertaking a nationwide campaign.

It is recommended that, if implemented, information about sharrow markings should be:

- ◆ Added to Road Code and the NZ Cyclist Code information, including a question about sharrow markings in the Drive License Test
- ◆ Provided to all Driver Licensing and Learn to Drive organisations in New Zealand
- ◆ Promoted in the Education Gazette (provided to all New Zealand schools)

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

- ◆ Promoted through School Community Officers and all other professional undertaking cycle training in schools and in the community
- ◆ Made available to cycle clubs, cycle shops and advocacy groups for promotion on websites and applicable materials
- ◆ Made available to well-known road user groups, for example, the Automobile Association and Heavy Vehicle Industry, MOTO NZ (motorcycle advocacy group).

7.5 Include a detailed research or evaluation plan that must have a realistic time period for the assessment and provide for close monitoring of any trial especially in the early stages of field implementation

To determine the effects of sharrow markings in relation to road users positioning within the road space, spacing data as listed below is to be obtained by captured video footage and manual processing against marked/known reference points within the corridor:

- ◆ Distance between bicycles and parked motor vehicles (tyre to tyre).
- ◆ Distance between bicycles and the kerb at the edge of the road (tyre to kerb) where there was no parking
- ◆ Distance between bicycles and passing motor vehicles (tyre to tyre).
- ◆ Distance between motor vehicles in the travel lane and parked motor vehicles (tyre to tyre) or to the kerb (tyre to kerb) when no bicycles were present.

7.5.1 Vehicle Speed

To examine whether the implementation of sharrow markings in relation to operating speed, tube count devices would be used to record the speed of vehicles at the trial sites. This would also capture vehicle volumes at the trial sites and indicate any change in traffic volumes before and after the trial

7.5.2 Road User Interaction

To determine the effects of sharrow marking on the interaction between all vehicles within the road space, a similar approach is to be used as detailed in the VicRoads study. Interaction is defined with the field of view of the camera and classified by types and severity as shown in Table 1 and Table 2 below.

Table 1 Cyclist Interaction severity chart

Interaction Severity	Description
no incident	Cyclist does not need to alter course or speed. The cyclist experiences no apparent effect as a result of the interaction

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

minor adjustment required	Cyclist alter course slightly, gently brakes or alters pedalling rhythm to allow for a comfortable passing distance.
major adjustment required	Cyclist needs to significantly alter course or adjust speed to avoid collision.
near collision	A rapid change of course or speed is required by the cyclist, motorist or both parties to avoid imminent collision
collision	physical contact between parties

Table 2: Motorist Interaction categories

Title	Description
follows or leads patiently	Motorist follows or leads cyclist patiently, giving good room and not accelerating or braking rapidly or swerving
follows impatiently or aggressively	Motorist may follow the cyclist at an uncomfortable close distance and express aggressive driving behaviour
overtakes successfully	Motorist overtakes cyclist successfully, giving good clearance and without any obvious intimidating behaviour
overtakes successfully but aggressively	Motorist overtakes cyclist successfully but does so in an aggressive or intimidating manner
fails to overtake	motorist attempts to overtake, but fails to do so and instead waits patiently behind the cyclist
fails to overtake aggressively	motorist attempts to overtake in an aggressive or intimidating manner, but fails to do so
Car stationary / queue	motorist is stationary in a queue of traffic

7.5.3 Cyclist/motorist perception-sharrow markings

To determine cyclist and/or motorist perception of sharrow markings and their effectiveness, roadside interviews could be held following the implementation of the sharrow markings. Alternatively a focus group of users could be encouraged to meet on site specifically to gain their feedback. Focus groups could also be held prior to the installation of sharrow markings to determine what cyclists are hoping to get out of the trial sites with respect to vehicle behaviour, safety of travel etc. An example of a possible road side questionnaire is shown in Table 3 below.

Table 3: Road Side Questionnaire

Questions	Responses
1. Hello, I am undertaking a two minute survey of cyclists on behalf of Auckland Transport. Would you mind participating?	OK (I don't mind) Refusal – THANK AND END

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

2. Have you noticed any difference in the road markings on this street over the past week?	Yes – sharrows No – nothing appears different – GO TO (5) Other – GO TO (5)
3. What do you think the markings mean?	It's a bike lane Bikes have right of way Indicates direction bikes should take It's to tell motorists that cyclists are here Cyclists should ride on that part of the road Cars are not allowed to drive there Cars should give way Merge Road narrows Beware of obstacles Share the road Meaning is unclear Other
4. Cyclists- Do you feel safer with the markings there? 4. Motorists-Do you think cyclists would feel safer with the markings there	A lot safer A little safer No change A little less safe A lot less safe
5. INTERVIEWER Record respondent gender	Male Female
6. INTERVIEWER Estimate respondent age	Age:
7. INTERVIEWER Record verbatim any other comments of relevance	Comments:

7.5.4 Cyclist/motorist perception-modified cycle lane marking

For the assessment of the proposed modification to the existing cycle lane markings, it is proposed to undertake perception surveys to determine cyclist and motorist perceptions of the proposed changes to the cycle lane markings and the effectiveness of the message being delivered. This is to be completed via focus group surveys presented with a range of photomontage(s) with participants shown 'before' and 'after' photomontages of a particular site and their feedback and thoughts recorded.

Appendix B contains the focus group surveys currently proposed to be undertaken. These have been reviewed by the Working Group.

If necessary, the proposed "LANE" marking can also be implemented within an existing cycle lane and users of the cycle lane could then be targeted for their response. A suitable site for such a trial is Mt

DOCUMENT NAME DOCUMENT No. PREPARED BY FILE NAME/LOC	Proposed Trial of Sharrow and cycle "LANE" Markings 1 Auckland Transport	VERSION DATED FILE REF	07/11/2013
---	--	----------------------------------	------------

Albert Road with existing cycle lanes already in place. An in-situ trial also offers the ability to remark the existing line markings which are currently faded in some locations.¹⁰

7.5.5 Assessment timeframe

Focus groups and/or online surveys will be completed before, during and/or immediately following the trial.

7.5.6 Close Monitoring of Trial

It is recommended that an email contact is identified for inclusion on Auckland Transport’s website and with applicable officers (for example call centre staff) so that any road user with questions or concerns about the sharrow marking trial and modified cycle lane symbol marking can make contact with an appropriate person to raise concerns or ask questions about the trial.

7.6 Does the trial demonstrate sound scientific design with appropriate controls so that any conclusions reached can be supported by robust statistical analysis?

Yes, as agreed with the working group this approach will enable the team to reach an educated conclusion to the trial.

¹⁰ In addition, there is the ability to trial alternative green surfacing treatments currently on the market to ascertain their effectiveness, colour contrast and durability of the current surfacing treatments available. In particular the “hotpour” surfacing method and the “Bright Green TechGrip” are of interest in the marking of cycle lanes.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

APPENDIX A

Trial site locations

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

SEACLIFFE AVENUE, BELMONT

Seacliffe Avenue is a collector road located in Belmont, Auckland 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 15 shows a typical section of Seacliffe Avenue.

Figure 15: Seacliffe Avenue



Table 4: Key Characteristics of Seacliffe Avenue and Hamana Street

Criteria	Criteria Assessment
Road Type	Collector Road
Extent of Trial Site	Inclusive of Hamana Street, Seacliffe Avenue and Winscombe Street
Auckland Cycle Network (ACN) Status	Cycle Feeder on the Auckland Cycle Network (ACN) Identified as part of the local cycle network on the Legacy North Shore City Council cycle network Auckland Transport directional cycle map classifies Seacliffe Avenue as a “route with space for cyclists, maybe on busy roads”
Average Annual Daily Traffic Volume	No data available
Key adjacent land uses	In close 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

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

LATM Measures	Chicanes and raised tables
Crash History	Total Crashes: 1 No reported cyclist crashes

Cycle Counts

Cyclists travelling on the Seacliffe Avenue site were surveyed on the 17 September 2013. The survey was located at the intersection of Seacliffe Road and Williamson Avenue. These surveys were undertaken from 6:00 am to 6:00 pm and counted all cyclists in both directions. The survey noted whether a cyclist travelled on the footpath or on the road.

The majority of cyclists were observed to travel in the morning commuter period between 6 am and 9 am and in the afternoon/evening commuter period between 3 pm and 6 pm. **Error! Reference source not found.** illustrates the cycle movements recorded during these periods.

Outside of these periods, in the 6 hour period from 9 am to 3 pm, cyclist numbers were considerably lower with 30 cyclists recorded. Figure 17 illustrates the cycle volumes measured throughout the survey period.

Over the 12 hour survey period 209 cyclists were surveyed travelling along Seacliffe Avenue. Of these, 100 cyclists were recording riding along the footpaths on Seacliffe Avenue and were predominately (if not all) school children.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 16: Weekday Cyclist Count Seacliffe Avenue

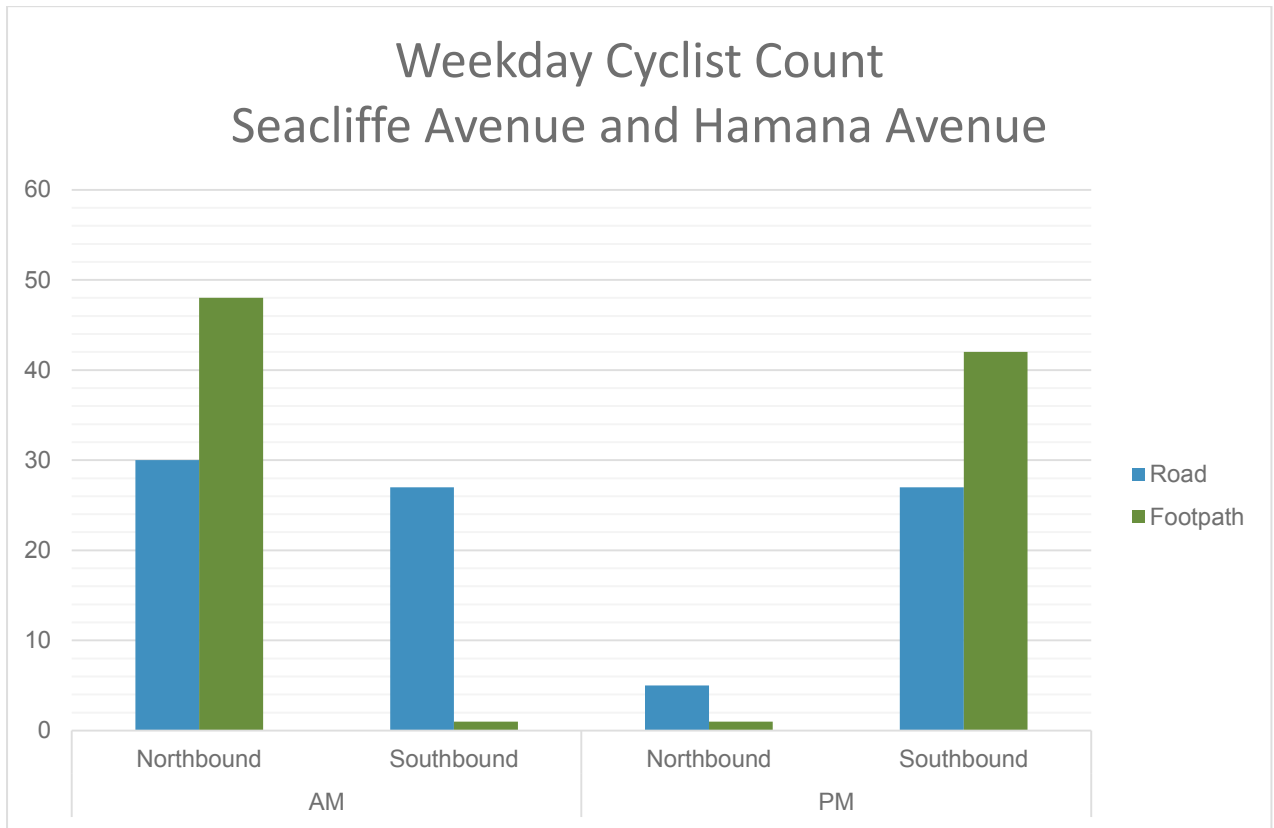
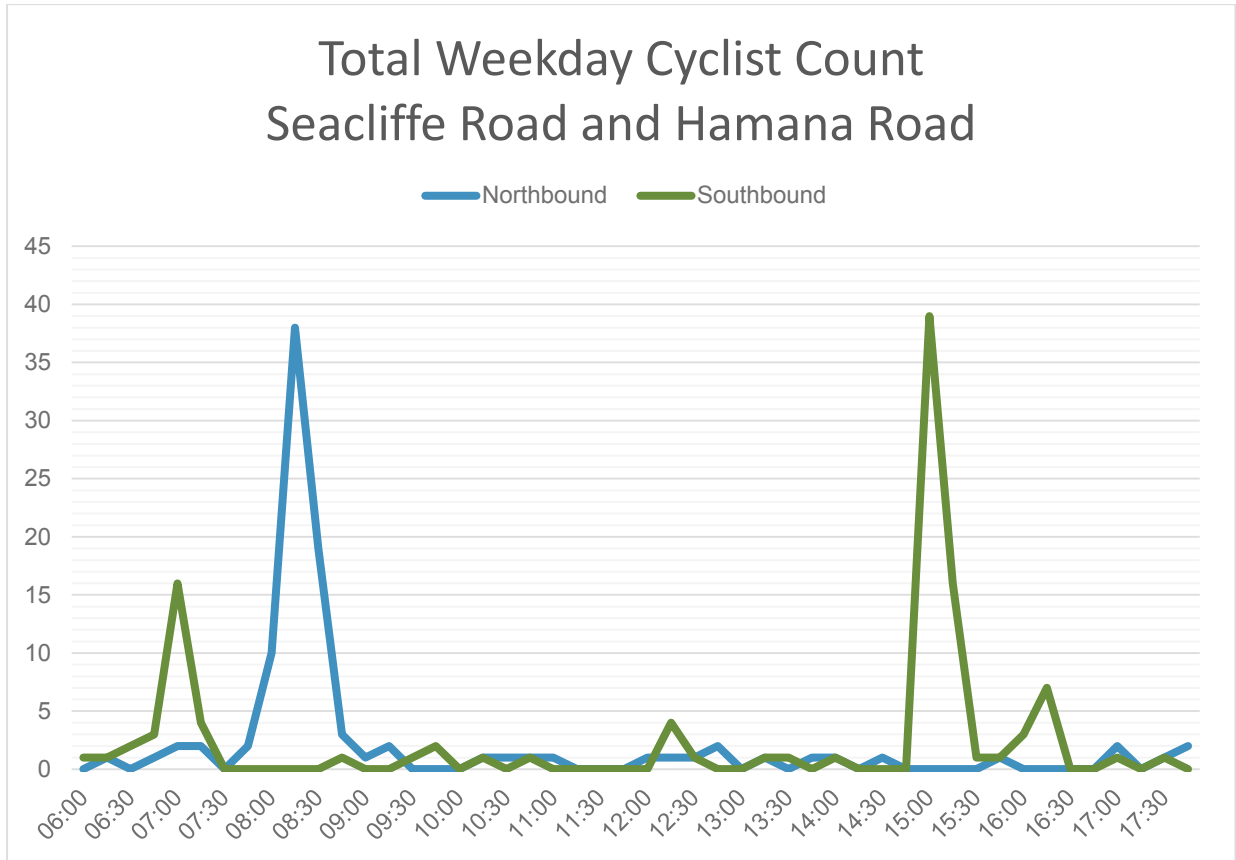


Figure 17: Total Weekday Cyclist Count Seacliffe Avenue



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

RIDDELL ROAD, GLENDOWIE

Riddell Road is a collector road 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 18 shows a typical section of Riddell Road.

Figure 18: Riddell Road



Table 5: Key Characteristics of Riddell Road

Criteria	Criteria Assessment
Road Type	Collector Road
Extent of Trial Site	Between Roberta Road and Glover Road
Auckland Cycle Network (ACN) Status	A section of Riddell Road is identified as a Cycle Collector on the ACN, but this is not the section identified as a trial site Auckland Transport directional cycle maps classify 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"> - 2 m footpath - 2.5 m grass berm - 5.5 m lanes - 11 m wide kerb to kerb corridor - Unrestricted parking on both side

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

LATM Measures	Nil
Crash History	Total Crashes: 8 No cyclist crashes

Cycle Counts

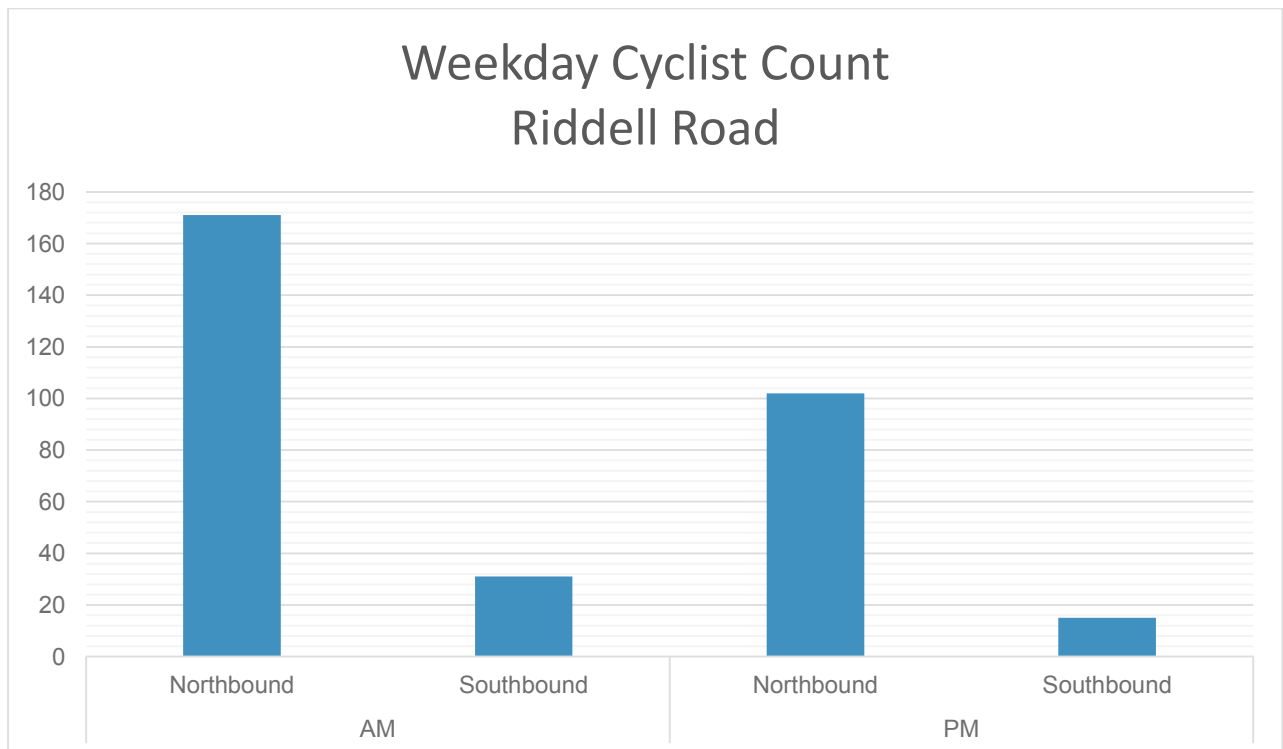
Cyclists travelling on the Riddell Road site were surveyed on the 17 September 2013. The survey was a cycle count survey located at 497 Riddell Road in proximity to Churchill Park. The surveys were undertaken from 6:00 am to 6:00 pm, and counted all cyclists in both directions recording whether the cyclist was travelling on the footpath or on the road. It is noted that at this site there were no cyclists recorded travelling on the footpath.

The majority of cyclists were observed to travel in the morning commuter period between 6 am and 9 am and the evening commuter period between 3 pm and 6 pm Figure 19 illustrates the cycle movements recorded during these periods.

Outside of these periods, in the 6 hour period from 9 am to 3 pm, cyclist numbers were considerably lower with 52 cyclists recorded. Figure 20 illustrates the cycle volumes measured throughout the survey period.

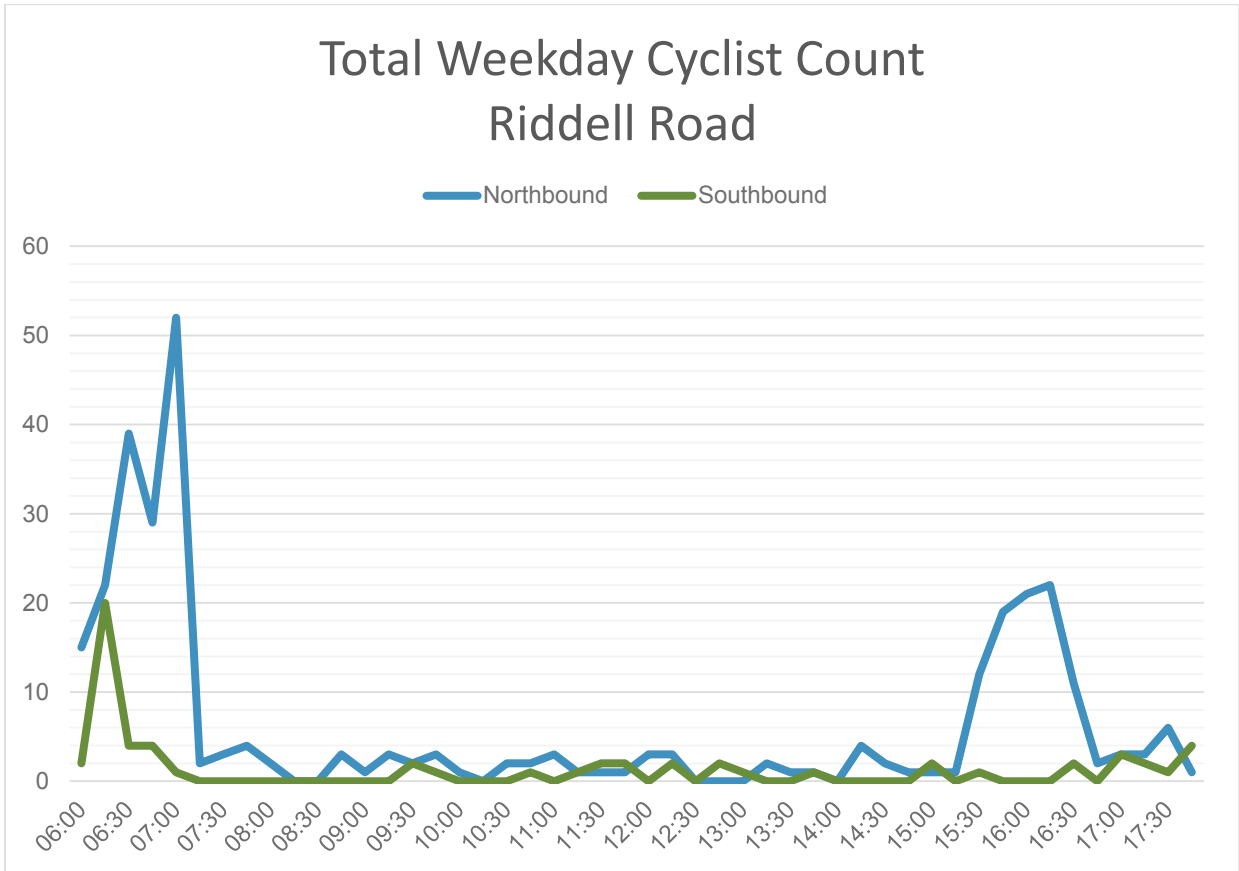
Over the 12 hour survey period 371 cyclists were surveyed travelling along Riddell Road, 84% travelling northbound.

Figure 19: Weekday Cycle Counts Riddell Road



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 20: Total Weekday Cyclist Count Riddell Road



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

POINT CHEVALIER ROAD, POINT CHEVALIER

Point Chevalier Road is a collector road 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 21 below shows a typical cross section of Point Chevalier Road.

Figure 21: Point Chevalier Road



Table 6: 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
Extent of Trial Site	North of Meola Road to Coyle Park
Auckland Cycle Network (ACN) Status	The trial section of Point Chevalier Road is identified as a 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	No traffic flows available for Pt. Chevalier Road north of Meola Road
Key adjacent land uses	In proximity to Unitec at southern end, MOTAT, Auckland Zoo, Pt Chevalier School, Coyle Park, Pt Chevalier Beach
Typical Cross Section (approx.)	<ul style="list-style-type: none"> - 3 m footpath - 7 m lane - 14 m road corridor
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

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Cycle Counts

Cyclists travelling on the Point Chevalier Road site were surveyed on the 17 September 2013. The survey was a cycle count survey located north of the intersection of Meola Road and Point Chevalier Road. The surveys were undertaken from 6:00 am to 6:00 pm, and counted all cyclists in both directions recording whether the cyclist was travelling on the footpath or on the road.

The majority of cyclists were observed to travel in the morning commuter period between 6 am and 9 am and the evening commuter period between 3 pm and 6 pm. Figure 22 illustrates the cycle movements recorded during these periods.

Outside of these periods, in the 6 hour period from 9 am to 3 pm, cyclist numbers were considerably lower with 36 cyclists recorded. Figure 23 illustrates the cycle volumes measured throughout the survey period.

Over the 12 hour survey period 103 cyclists were surveyed travelling along Point Chevalier Road to the north of Meola Road.

Figure 22: Weekday Cycle Counts Point Chevalier Road

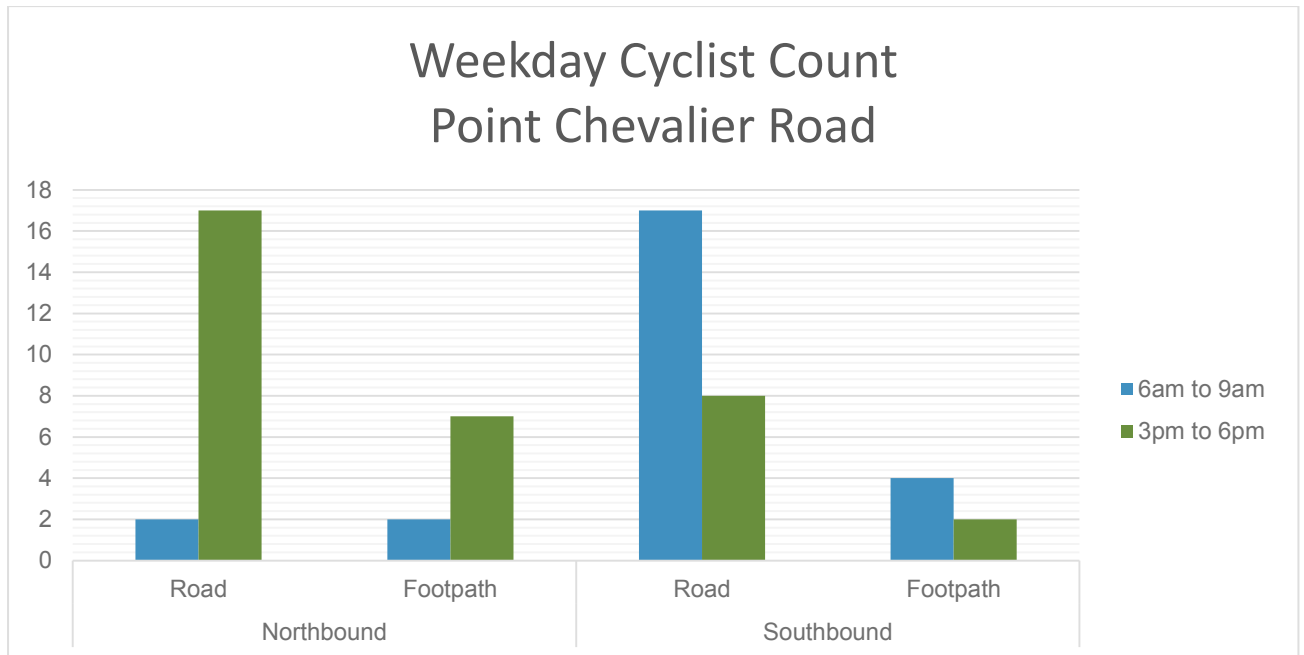
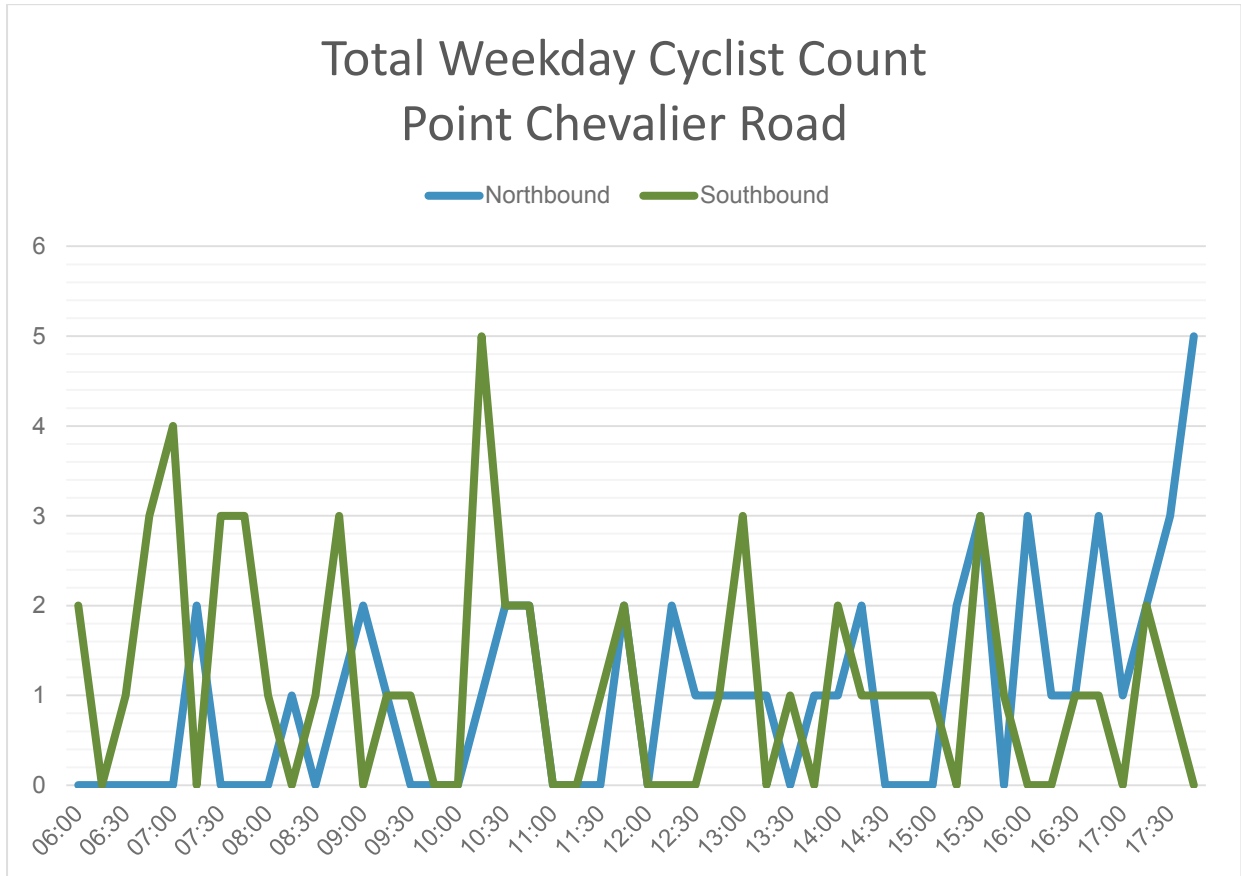


Figure 23: Total Cycle Counts Point Chevalier Road



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

RIVERSIDE AVENUE AND DUNKIRK ROAD, POINT ENGLAND

Riverside Avenue and Dunkirk Road are local roads 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 24: Riverside Avenue and Dunkirk Avenue



Table 7: Key Characteristics of Riverside Avenue and Dunkirk Road

Criteria	Criteria Assessment
Road Type	Local Road
Extent of Trial Site	Extent of Riverside Avenue and Dunkirk Road
Auckland Cycle Network (ACN) Status	Riverside Avenue and Dunkirk Road are identified as Cycle Feeder routes 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"> - 1.6 m footpath - 3 m grass berm - 4. m lane - 9.2 m wide corridor - Unrestricted parking on both kerb side
LATM Measures	Nil
Crash History	18 total crashes

DOCUMENT NAME | Proposed Trial of Sharrow and cycle "LANE" Markings
DOCUMENT No. | 1
PREPARED BY | Auckland Transport
FILE NAME/LOC |

VERSION

DATED | 07/11/2013

FILE REF

	1 cyclist crash due to vehicle failing to see and give way to on coming cyclist.
--	--

Cycle Counts

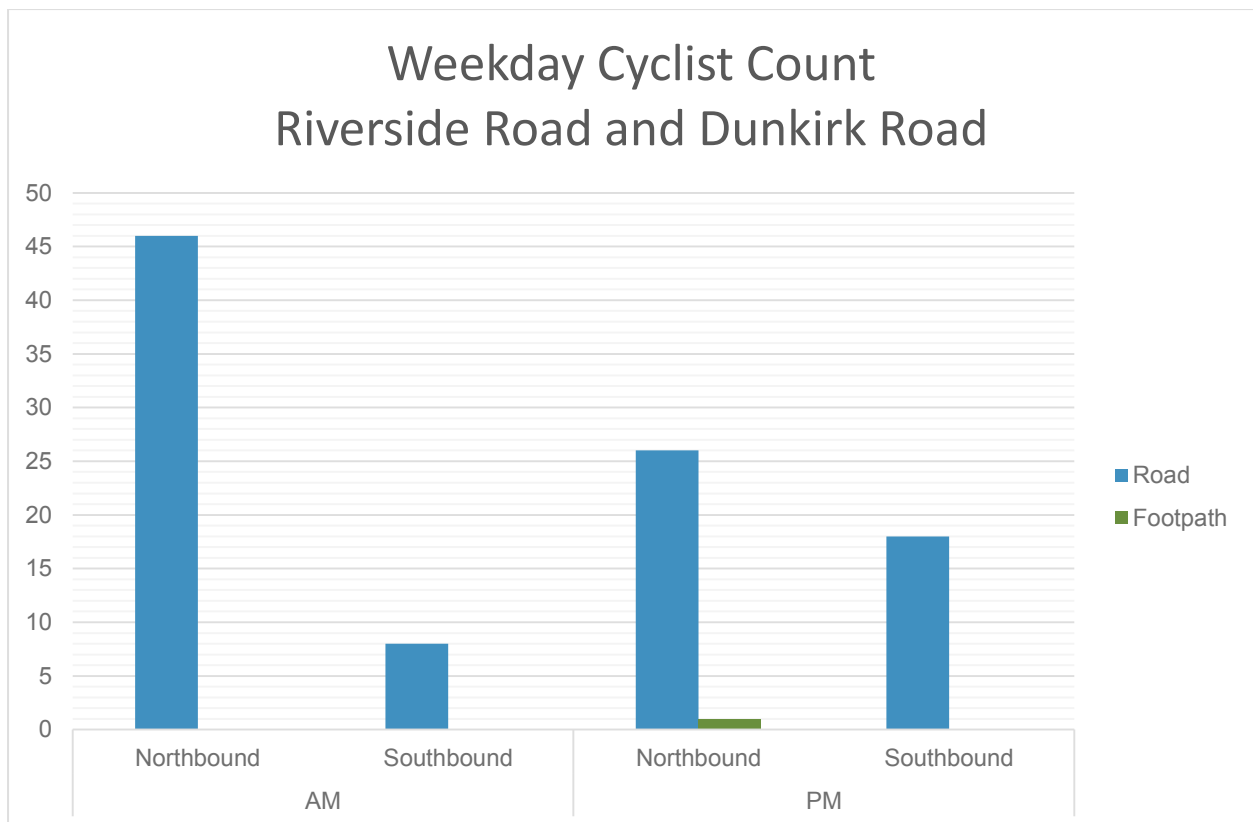
Cyclists travelling on the Riverside Avenue and Dunkirk Avenue site were surveyed on the 17 September 2013. The survey was a cycle count survey located at the intersection of Dunkirk Road and Benghazi Road. The surveys were undertaken from 6:00 am to 6:00 pm, and counted all cyclists in both directions recording whether the cyclist was travelling on the footpath or on the road.

The majority of cyclists were observed to travel in the morning commuter period between 6 am and 9 am and the evening commuter period between 3 pm and 6 pm. Figure 25 illustrates the cycle movements recorded during these periods.

Outside of these periods, in the 6 hour period from 9 am to 3 pm, cyclist numbers were considerably lower with 32 cyclists recorded. Figure 26 illustrates the cycle volumes measured throughout the survey period.

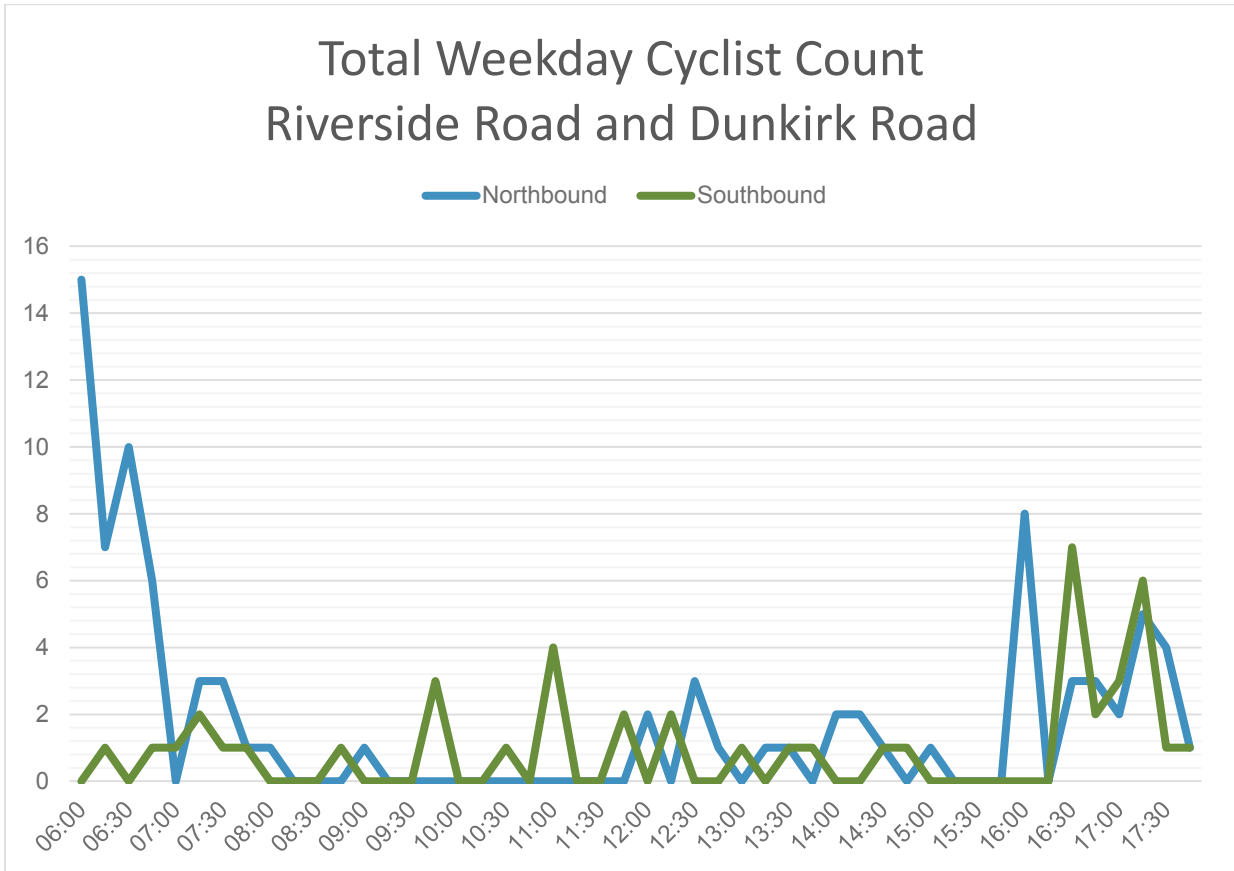
Over the 12 hour survey period 132 cyclists were surveyed travelling along Dunkirk Road, with 66% of cyclists travelling northbound.

Figure 25: Weekday Cycle Counts Riverside Road and Dunkirk Road



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Figure 26: Total Cycle Counts Riverside Road and Dunkirk Road



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

ELSTREE AVENUE – APPROACH TO ROUNDABOUT INTERSECTION WITH TANIWHA STREET, POINT ENGLAND

Elstree Avenue is a collector road within Glen Innes. The surrounding land uses consist of residential, community pools and Tamaki College. Its intersection with Taniwha Street is controlled by a roundabout as illustrated in Figure 27.

Figure 27: Elstree Avenue approach to roundabout



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Table 8: Key Characteristics of Elstree Avenue

Criteria	Criteria Assessment
Road Type	Collector Road
Extent of Trial Site	Elstree Avenue – southern approach to the roundabout intersection with Taniwha Street
Auckland Cycle Network (ACN) Status	Riverside Avenue and Dunkirk Road are identified as Cycle Feeder routes on the ACN
Average Annual Daily Traffic Volume	10,818 vehicles per day measured south of Taniwha Street (2001)
Key adjacent land uses	In proximity to Tamaki College, Glen Innes Pools
Typical Cross Section (approx.)	
LATM Measures	Nil
Crash History	tbc

Cycle Counts

Cycle volumes travelling on Elstree Street was surveyed on Friday 27 September 2013. The survey hours were 6am-9am and 3pm-6pm. A total of 83 cyclists were counted using this roundabout from all approaches.

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

Cycle Lane Trial Sites.

Mount Albert Road

Criteria	Criteria Assessment
Road Type	Arterial
Extent of Trial Site	Sandringham Road- New North Road
Auckland Cycle Network (ACN) Status	Cycle Connector
Average Annual Daily Traffic Volume	14,000



Point England Road

Criteria	Criteria Assessment
Road Type	Collector
Extent of Trial Site	Pilkington Road- Erima Avenue
Auckland Cycle Network (ACN) Status	Cycle Feeder
Average Annual Daily Traffic Volume	6,000

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			



Carrington Road

Criteria	Criteria Assessment
Road Type	Arterial
Extent of Trial Site	New North Road- Great North Road
Auckland Cycle Network (ACN) Status	Cycle Connector
Average Annual Daily Traffic Volume	18,000



Key Characteristics Lake Road

Criteria	Criteria Assessment
Road Type	Arterial
Extent of Trial Site	Albert Road – Williamson Avenue
Auckland Cycle Network (ACN) Status	Cycle Connector
Average Annual Daily Traffic Volume	18,000

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			



St Lukes Road

Criteria	Criteria Assessment
Road Type	Arterial
Extent of Trial Site	Duncan Maclean Link- Jesmond Terrace
Auckland Cycle Network (ACN) Status	Cycle Connector
Average Annual Daily Traffic Volume	30,000



DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			

APPENDIX B

Perception surveys

DOCUMENT NAME	Proposed Trial of Sharrow and cycle "LANE" Markings	VERSION	
DOCUMENT No.	1	DATED	07/11/2013
PREPARED BY	Auckland Transport	FILE REF	
FILE NAME/LOC			