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ABSTRACT
A project was undertaken to review Bicycle Awareness Zones (BAZ). The project involved video analysis of the interaction between cyclists and motorists; a questionnaire survey of motorists and cyclists about their perceptions of BAZ; and crash data analysis of Brisbane cycle crashes. The video analysis showed that BAZ were effective on roads with up to 14 000 AADT with minimal impact to the traffic flow in constrained width conditions, where BAZ are interspersed with bicycle lanes. The observed cyclists’ operating widths and offsets from parked cars have provided argument for changes to the BAZ symbol, its position and/ or size. The questionnaire survey showed motorists had a lack of understanding of the purpose of the BAZ symbols, whilst cyclists had a better understanding. Both motorists and cyclists agreed that BAZ make a safer road environment for cyclists than a road without any bicycle symbols. Based on the outcomes of the crash analysis, there is no evidence to suggest BAZ are statistically more dangerous than a bicycle lane.

Introduction
Bicycle Awareness Zones (BAZ) are an on- road bicycle treatment first introduced by Brisbane City Council as a trial in 1996/7 and are now also installed on Sunshine Coast Regional Council and Gold Coast City Council roads (Connell Wagner 2001). BAZ are based on a similar treatment, known as sharrows, which were developed by the City of Denver and are now being used across America (Yeates 2000). BAZ are an advisory bicycle treatment, rather than a dedicated bicycle facility. They are implemented on roads which, according to the Austroads Guide to Road Design or Manual of Uniform Traffic Control Devices, are too narrow for a designated bicycle lane. BAZ are defined by a yellow on- road bicycle symbol. They advise motorists of the possibility of on- road cyclists and provide guidance to cyclists on the position they should take on the road (Transport and Main Roads 2009).
In 2009, BAZ were included in the Queensland Department of Transport and Main Roads’ (TMR) *Traffic and Road Use Management Manual (TRUM)* which contains guidelines for the use of BAZ.

A final year university project, under the direction of the TMR, reviewed the safety and effectiveness of Bicycle Awareness Zones. This project coincided with a TMR review of the current operational guidelines for the use of BAZ. BAZ were installed in the *TRUM* under the provision that the guidelines be reviewed in 24 months (Traffic Management Practices Committee 2011).

The following sections describe the project elements used to evaluate BAZ and the results of each element. A summary of the safety and effectiveness of BAZ is presented and a list of the recommendations formulated from the results of each element.

**Methodologies**

The evaluation of BAZ was based on the findings of crash data analysis, video analysis and a questionnaire survey of motorists and cyclists.

**Video Analysis**

Video analysis was conducted at three Brisbane BAZ sites: Annerley Road, Riding Road and Kedron Brook Road. These sites are sufficiently used by cyclists and they have varying traffic volumes, parking lane width and parking turnover. This made the sites suitable for a comparison of cyclists’ and motorists’ behaviour between the sites.

An overhead mounted video camera was erected at each site. From the videos of each site, the positions of the cyclists relative to passing vehicles, parked cars and the parking edge line were measured. In addition, any conflicts or crashes were noted.

**BAZ Questionnaire Survey**

The motoring public were approached at parks adjacent to roads with BAZ symbols and asked to participate in a survey that tested their understanding of on-road bicycle facility linemarking and their perception of its safety. A survey specifically for cyclists was emailed to organizers of bicycle user groups in the Brisbane and Sunshine Coast Regions for distribution to their members. The cyclists’ survey included additional questions about past history of conflicts and crashes.

**Crash Data Analysis**

The crash data for all cyclist crashes occurring in Brisbane between 2004 and 2009 were obtained using WebCrash, an
online database containing crash information for crashes which occurred on Queensland’s roads. There were 1100 bicycle crashes occurring in Brisbane in the 5 year period. However the majority of crashes occurred on roads without bicycle facilities and as such, only 100 crashes were analysed.

Crash reports and site characteristics were assessed for each mid-block bicycle lane and BAZ crash to determine if there were any links between certain site characteristics and crashes. Any trends in BAZ crashes were compared to trends in bicycle lane crashes to determine if BAZ facilities were any more dangerous than dedicated bicycle lanes.

**Results**

**Video Analysis**

The video analysis provided an indication of the operational space required by a cyclist on roads with varying parking widths. The required clearance to parked cars and passing vehicles could be used as a guide in the design of bicycle facilities. In constrained conditions, the operating envelope ranged from 1.58m in peak hour to 1.9m outside peak period.

**BAZ Symbol**

Cyclists were found to generally ride 3m from the kerb. If the centre of the symbol which is aligned with the parking edge line is supposed to represent the intended line of travel of the cyclist, it is suggested the centre of the BAZ symbol be positioned 3m from the kerb, except when the parking demand is low on narrow roads.

The mean operating space of the cyclist even in constrained conditions is larger than the width of the current 1.1m wide symbol. If the intent of the symbol is to indicate the positioning of the cyclist, a new symbol may be warranted which should be closer to the minimum operating space in constrained conditions which was 1580mm.

**Cyclists’ Impact on Traffic**

Traffic was not disrupted on Riding Road and Kedron Brook Road which had peak hour volumes in the recorded direction of 400veh/h and 955veh/h respectively. On Riding Road, which had a 3m parking lane and a 3.3m traffic lane, the majority of motorists passed rather than followed the cyclists and as a result, queuing was minimal even in peak hour. On Kedron Brook Road, where the parking lane was 3.5m and the traffic lane was 3.3m, there were no disruptions to traffic since all motorists had sufficient width to pass the cyclist.
On Annerley Road which was the most constrained environment with a 2.5m parking lane and a 3.3m traffic lane and 1200veh/h (14 000 AADT), the majority of motorists chose to follow rather than pass a cyclist. Queuing was observed in peak conditions, though the impact to the traffic stream was minimal due to the interspersion of BAZ and bicycle lanes.

**BAZ Questionnaire Survey**
The responses from the motorists indicated a lack of understanding of the purpose of BAZ. Of the three purposes of BAZ listed on the questionnaire, the purpose most known was that BAZ warn of the presence of cyclists, which was recognized by 55% of motorists. Understanding of bicycle lanes was far more acceptable with 90% recognizing that the white bicycle symbol designates a bicycle lane.

The responses from cyclists indicated a greater understanding of bicycle facilities. As would be expected, cyclists commented that they feel safer riding in a bicycle lane than a BAZ. However, BAZ were still considered to be safe by cyclists.

**Crash Data Analysis**
Crash rate calculations, based on crashes per km per year of each type of facility, suggest that cycling in a BAZ is no more hazardous than cycling in a designated bicycle lane. Mid-block crashes are more likely to occur on BAZ due to greater probability of dooring but of the 12 mid-block crashes associated with BAZ, only five dooring incidents were recorded. The majority of BAZ (70% of total) and bicycle lane (89% of total) crashes occurred at intersections which are known to be regions of high potential conflict (Forester 1994, p 97). Aside from the greater risk of a dooring incident (which was only minimal over five years), the available data suggests that BAZ don’t have any obvious crash history that would lead to a conclusion that BAZ are unsafe to use.

**Conclusions**
- video analysis demonstrated that BAZ can be effective on roads with up to 14 000 AADT with minimal impact to the traffic flow. In constrained width conditions, the impact on the traffic stream can be minimized by interspersing BAZ with bicycle lanes;
- changes to the BAZ symbol, position and/or size could be justified based on calculated operating envelopes and offsets from parked cars;
- questionnaire survey showed a general lack of understanding of the meaning of the BAZ symbols particularly by motorists but both
motorists and cyclists groups agreed that BAZ makes a safer road environment for cyclists than a road without any bicycle symbols at all;

- based on the outcomes of the crash analysis, there is no evidence to suggest BAZ are statistically more dangerous than a bicycle lane;
- bicycle lanes should always be used in preference to a BAZ where the carriageway width permits but BAZ have proven to be a useful and effective link in local government cycle networks.

**Recommendations**

- BAZ are suitable for roads with traffic volumes up 14 000 AADT but on narrow roads with high traffic volumes, consideration should be given to providing reasonable passing opportunities;
- installation of BAZ on a road needs consideration of parameters such as the available width, cyclist operating widths, the length of BAZ, passing opportunities, traffic volume and parking demand;
- consideration needs to be given for the adoption of the TMR (2009) standard 1530mm BAZ symbol to better reflect the operating envelopes and perhaps the inclusion of tracking lines;
- other aspects of BAZ linemarking, such as the preferred position of the symbol relative to the edge line and the spacing of symbols, also need to be considered;
- educate motorists and cyclists about BAZ.

**References**


An Evaluation of Bicycle Awareness Zones

Nicole Eileen Smart (s2679457)

10/6/2011 (Semester 1)

Department of Transport and Main Roads
Mark McDonald
Dr. Kali Prasad Nepal

A report submitted in partial fulfillment of the degree of Bachelor of Civil Engineering

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EXECUTIVE SUMMARY

Bicycle Awareness Zones (BAZ) are an advisory bicycle treatment, rather than a dedicated bicycle lane, represented by yellow on-road bicycle symbols. The Queensland Department of Transport and Main Roads’ (TMR) Traffic and Road Use Management Manual (TRUM) provides guidelines for the use of BAZ. An IAP project was undertaken in conjunction with TMR to evaluate the safety and effectiveness of BAZ with the results to be considered in a scheduled review of the TRUM. Three elements of analysis were used to evaluate BAZ: video analysis of the interactions between motorists and cyclists; questionnaire survey of motorists and cyclists; and crash data analysis.

Video analysis was conducted at three Brisbane BAZ sites. Video cameras recorded the interactions between motorists and cyclists and their positions on the road. BAZ were found to be effective on roads with up to 14 000 AADT with minimal impact to the traffic flow in constrained width conditions where BAZ are interspersed with bicycle lanes. The operating envelopes and offsets from parked cars observed in the analysis have provided argument for changes to the BAZ symbol, position and/or size.

Separate questionnaires were developed for motorists and members of bicycle user groups. The results of the surveys showed motorists had a lack of understanding of the purpose of BAZ, whilst cyclists had a better understanding. Both motorists and cyclists agreed that BAZ makes a safer road environment for cyclists than a road without any bicycle symbols.

Crashes involving cyclists on either a BAZ or bicycle lane were analysed to determine if BAZ are any more dangerous than dedicated bicycle lanes. Based on the outcomes of the crash analysis, there is no evidence to suggest BAZ are statistically more dangerous than a bicycle lane.

A number of recommendations have been made based on the outcomes of the analysis. The main recommendations are as follows:

- BAZ are appropriate for use on roads with an AADT of 3000 or greater subject to consideration of parking conditions, operating envelopes and passing opportunities;
- consider changes to the BAZ symbol, placement and spacing;
- educate motorists and cyclists about BAZ.
ACKNOWLEDGEMENTS

Throughout the duration of this project, a number of contributions were made by others to ensure successful completion.

The Department of Transport and Main Roads, in particular Mark McDonald and Robyn Davies, must be acknowledged for accepting me to take on the project and for providing the necessary resources.

Firstly I would like to thank my industry supervisor, Mark McDonald. In addition to his continuous support and suggestions, Mark provided a significant amount of his time helping me use the Geographic Information System software, MapInfo. Mark also thoroughly reviewed all documents I prepared and provided helpful feedback.

Robyn Davies also offered invaluable support and reviewed a number of documents, always providing feedback and ongoing suggestions.

The expertise of Heidi Bushell, also from the Department of Transport and Main Roads, was a strong asset to the project. Heidi used her experience in developing surveys to ensure that the questions in the surveys produced for this project would prompt the required information from the respondents. Heidi formatted the surveys online and provided assistance in collating the results.

It is quite possible that the video analysis wouldn’t have been as successful without the enormous contribution made by Skyhigh Data. Skyhigh Data supplied and erected video cameras and supplied the video recordings at no cost. They also checked on the cameras and the road markings on a regular basis, even over the Easter break.

Finally, the guidance and feedback provided by Dr. Kali Nepal, the Griffith University academic advisor for the project, must be recognized.
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1 INTRODUCTION

1.1 Background

Cycle networks are comprised of off-road paths, on-road bicycle lanes, and wide kerbside lanes (Austroads 2011). In the 1990s, as Brisbane City Council tried to expand its on-road facilities, it found that road widths and parking constraints made it increasingly difficult to install bike lanes whilst still maintaining parking. Council recognised the need to implement a solution which would provide a safe and convenient cycle network whilst still maintaining parking. This lead to trial projects of alternative facilities (Yeates 2000).

After a failed trial of wide shared parking lanes, Brisbane City Council adopted the City of Denver’s approach of shared use lanes, identifiable by pavement markings (Yeates 2000). Brisbane City Council’s version of Denver’s shared use lanes are called Bicycle Friendly Zones and they were introduced as a trial in 1996/7 (Connell Wagner 2001). Bicycle Friendly Zones were later renamed Bicycle Awareness Zones, hence to be referred to as BAZ. BAZ are now used on Gold Coast City Council and Sunshine Coast Regional Council roads.

BAZ are an advisory bicycle treatment, rather than a dedicated bicycle facility. They are implemented on roads which, according to the Austroads Guide to Road Design or Manual of Uniform Traffic Control Devices, are too narrow for a designated bicycle lane. BAZ are defined by a yellow on-road bicycle symbol. They advise motorists of the possibility of on-road cyclists and provide guidance to cyclists on the position they should take on the road (Transport and Main Roads 2009).

In 2002, representatives of a Traffic Management Practices Committee who provide advice on the operational practice and road safety measures on Queensland’s road network, recommended that BAZ be included in the Traffic and Road Use Management Manual (TRUM) with a provision to be reviewed in 24 months (Traffic Management Practices Committee 2011). BAZ were included in the TRUM in 2009. The TRUM stipulates thresholds for the use of BAZ based on Austroads guidelines for formal bicycle facilities given in Austroads Guide to Traffic Engineering Part 14: Bicycles (Austroads 1999). At above 3000 vehicles per day, the guidelines recommend use of a formal bicycle lane rather than BAZ (Austroads 2011). However, a number of local governments would like to be able to use BAZ
on roads with traffic volumes greater than this because of the width and parking constraints on many local roads.

This IAP project conducted under the direction of the Department of Transport and Main Roads (TMR) will review the safety and effectiveness of Bicycle Awareness Zones. This project coincides with the Department’s review of the current operational guidelines for the use of BAZ as stipulated in the TRUM. Results and findings from this project will be considered in the scheduled revision of the TRUM guidelines on BAZ which commenced in May 2011 (Traffic Management Practices Committee 2011).

1.2 Project Justification

Apart from a small public survey on the effectiveness of BAZ which was undertaken by Connell Wagner in 2001 when BAZ were quite new, very little research has been undertaken on the safety or otherwise of BAZ. No research has been undertaken on the traffic thresholds stated in the TRUM, and whether installing BAZ on roads with an annual average daily traffic (AADT) greater than 3000 vehicles per day, has any implications. Using crash data, together with on-site observations, this project should establish relationships that could be used in TMR’s review of the TRUM operational guidelines for BAZ.

Currently the TRUM gives some guidelines on the appropriate usage of BAZ but there is some reluctance by engineers to install BAZ notwithstanding TRUM guidelines because, “Main Roads deems that BAZ provides neither a safe nor attractive facility” (Transport and Main Roads 2009). By clarifying operating parameters of cyclists on different road configurations and establishing links between crash history, bicycle facility and their locality characteristics, this project will provide relationships that designers can use to quantify the risks of using BAZ in different road environments. The information provided in this project should help establish if BAZ have any specific safety issues or whether they have a high incidence of conflicts and crashes. One of the recommendations in the TRUM was that local education campaigns be implemented to improve the education of motorists and cyclists with respect to BAZ (Transport and Main Roads 2009). The Department has no information on the implementation of such programs and hence the need for a current test of the public’s knowledge. Random questionnaire surveys undertaken as part of this project will identify if
education campaigns are still required and will show if there has been a change in the public’s understanding of BAZ since the 2001 Connell Wagner study.

1.3 Objectives

To date, there has been minimal evaluation of the safety and effectiveness of the treatment. The research and findings of this project will seek to improve the understanding and operational implementation of BAZ, and could potentially lead to recommendations of a review of the traffic volume and other thresholds stipulated by the TRUM which provide guidance to the appropriateness of a BAZ at a particular site.

1.4 Summary of Methodologies

Three project elements were used to evaluate BAZ: video analysis; a questionnaire survey of motorists and cyclists; and crash data analysis.

Video analysis was conducted at three Brisbane BAZ sites to observe the interactions between motorists and cyclists and their positions on the road. A questionnaire survey was asked of motorists and cyclists to gain an understanding of their knowledge of and experiences with BAZ. Cyclist crashes occurring on roads with BAZ or bicycle lanes were analysed to determine if BAZ are any more dangerous than dedicated bicycle lanes.

1.5 Structure of the Report

This report will outline the investigations and results of the project review of the safety and effectiveness of BAZ. Specifically, the following will be discussed:

- literature review of BAZ and sharrows;
- purpose of each project element being video analysis; questionnaire survey; and crash data analysis;
- methodologies of each project element;
- results and discussion of the results for each project element;
- recommendations.
2 LITERATURE REVIEW

2.1 Relevant Standards and Guidelines


2.2 Advisory Treatments Used Elsewhere

New South Wales’ advisory bicycle treatment is called bicycle shoulder lanes. As with BAZ, bicycle shoulder lanes are installed on roads too narrow for a bicycle lane. They are typically used when there is high demand for parking. Bicycle shoulder lanes have a similar appearance to bicycle lanes, however they are narrower and the adjacent parking lane has a reduced width in comparison to bicycle lanes. The treatment also incorporates parking “tee” pavement markings to encourage vehicles to park as close to the kerb as possible. This feature is generally not included with BAZ treatments (RTA 2005).

In the United Kingdom, an advisory treatment is used at locations where motorists are likely to encroach on a cycle lane if one existed. A coloured surface is used for the lane to alert motorists of cyclists in situations where motorists may block the lane, such as when motorists are queuing to join the main road. The advisory treatment generally has lane markings, though these may be dropped, leaving just the coloured surface and providing symbols and direction arrows, at junctions (Cycling England 2008).

Some American cities use a similar treatment to BAZ called sharrows. Like BAZ, sharrows convey to motorists and cyclists that they must share the road on which they are travelling and clarify where the cyclists are expected to ride (Federal Highway Administration 2010).

Unlike BAZ, sharrows are included in the American version of the Manual of Uniform Traffic Control Devices following a recommendation by the National Committee on Uniform Traffic Control Devices to include the treatment (Federal Highway Administration 2010). It was recommended that the centre of the sharrow marking be placed 11ft (3.4m) from the kerb face or the edge of pavement on a street with parallel parking (National Committee on Uniform Traffic Control Devices 2005). The 2009 edition of the MUTCD (American Version) adopted...
this recommendation despite only limited research conducted on the 11ft spacing and no research on other spacing options (Federal Highway Administration 2010).

2.3 Video Analysis
Video analysis is a common method used to observe and measure the interaction between motorists and cyclists, and the positions they uptake on the road (Alta Planning and Design 2004, Federal Highway Administration 2010 and Houten & Seiderman 2005). A fourth study by Bhat et al. (2009) actually conducted preliminary tests to determine the best method of capturing the lateral position of the motorist and cyclist as they passed a parked motor vehicle. The preliminary testing conducted by Bhat et al. (2009) determined that the most suitable method for collecting video data was a camera mounted on a tripod in a fixed location. The test also found that the video recorders didn’t have good depth perception. Therefore, reference markers are required to determine the distance between the cyclist and the parked motor vehicle (Bhat et al. 2009). In the Federal Highway Administration study (2010), calibrations were provided by using either grid lines painted on the street or traffic cones placed on the sidewalk beside the roadway. The sharrows were also used as a calibrator (Federal Highway Administration 2010). In previous video research by Alta Planning and Design (2004), a tripod mounted video was angled at the cyclists. However, they recommended that other studies use an overhead-mounted camera to reduce measurement error (Alta Planning and Design 2004).

2.4 Sharrow’s Influence on the Position of Motorists and Cyclists
A number of studies demonstrated that sharrows have a positive impact on the position of cyclists and motorists (Alta Planning and Design 2004, Federal Highway Administration 2010 & Houten & Seiderman 2005).

Results from the Federal Highway Administration’s Evaluation of Shared Lane Markings indicate that cyclists are provided with more operating space in the presence of sharrows (Federal Highway Administration 2010).

The increase in operating space has been quantified by Alta Planning and Design (2004). As a result of the markings, the lateral distance between the cyclists and parked cars increased by eight inches. The pavement markings caused an increase of three to four inches in the distance between cyclists and parked cars when a passing vehicle was present. An increase of over two
feet was also achieved between cyclists and passing vehicles (Alta Planning and Design 2004). Houten and Seiderman (2005) also found that cyclists ride further away from parked cars than when no markings were present.

3 BAZ EVALUATION APPROACHES

3.1 Video Analysis

Video analysis was used together with crash statistics to test the validity of the TRUM guidelines and to help identify if there are specific safety issues with BAZ.

The video analysis was used to establish how the behaviour and interactions compared on the roads with varying traffic volumes and lane widths, and if there were any safety issues. Comparisons were also made between roads to determine if a multilane road had any influence on behaviour, interactions and safety.

3.2 BAZ Questionnaire Survey

Motorists and members of bicycle user groups were asked to complete separate questionnaire surveys. The results of the motorist’s survey were used to assess the effectiveness of BAZ based on motorist’s understanding of BAZ and whether or not they alter their behaviour on a road with BAZ. Cyclists were also tested on their knowledge of BAZ. The survey included a number of questions to establish how safe a cyclist feels in BAZ and any crashes or conflicts they have had on BAZ which could relate back to the safety of BAZ and motorist’s behaviour.

The questionnaire asked respondents to answer the same questions for bicycle lanes and roads without any bicycle symbols/lanes, to assess how they compare to BAZ in terms of safety.

The guidelines for the provision of BAZ, which are documented in the Traffic and Road Use Management Manual (TRUM), advise that an education campaign should be targeted at motorists and cyclists when BAZ have been installed (Transport and Main Roads 2009). There is no evidence of campaigns in the past. The survey will indicate if a campaign is still required.
3.3 Crash Data Analysis

Crash data was analysed to aid in evaluating the safety of BAZ, which until now, has not been the focus of any research. It was expected that defined links would be formulated between crash history, bicycle facility and their locality characteristics.

The guidelines in the TRUM (2009) recommend that on roads with an AADT in excess of 3000, a formal bicycle facility be used rather than BAZ. However, a number of local governments are using BAZ on roads with traffic volumes greater than this because of the width and parking constraints on many local roads. The analysis will hopefully determine whether exceeding the thresholds stated in the TRUM, such as installing BAZ on roads with an annual average daily traffic greater than 3000 vehicles per day, has any implications.

This project should establish relationships that could be used in TMR’s scheduled review of the TRUM operational guidelines for BAZ.

4 VIDEO ANALYSIS

4.1 Methodologies

Video analysis was conducted at three Brisbane BAZ sites. The bicycle coordinator from Brisbane City Council was consulted for his advice on which Brisbane BAZ sites may be worth analysing. The coordinator provided a fairly extensive list of sites.

The three sites were chosen because they have reasonable cyclist volumes and they have varying traffic volumes (all exceeding the 3000 AADT threshold), parking lane width and parking turnover. One road was multilane. This made the sites suitable for a comparison of the interaction between motorists and cyclists and their positions on the road in different environments. Peak and non peak periods of analysis were compared for each road to assess if there was a change in behaviour.

A list of the variables coded for each cyclist at the sites is contained in Appendix A. In summary, the positions of the cyclists relative to passing vehicles, parked cars and the parking edge line were measured. In addition, any conflicts or crashes were described. The coding was largely based on that used by the Federal Highways Administration (2010) and Houten and
Seiderman (2005) who conducted similar studies of an American treatment similar to BAZ, known as sharrows.

Three requests for quotes to conduct the video recording were made to traffic data companies. Skyhigh Data were chosen as they have a pro bono agreement for cyclist research and they had appropriate equipment. The video cameras were erected similar to the camera in Figure 1.

![Figure 1. An example of the video camera set-up.](image)

In this study, chalk lines were marked on the road in the parking lane and the traffic lane at 20cm increments measured from the parking edge line. The chalk lines were remarked daily. The video recorded for ten days to ensure enough data. The marking of the road and position of the video camera reflected that used in previous studies by Alta Planning and Design (2004), Bhat et al. (2009), Federal Highway Administration (2010) & Houten & Seiderman (2005) as discussed in section 2.3 of the literature review.

The videos were supplied in AVI format and were viewed on a laptop computer. The data for each cyclist was entered into an Excel spreadsheet and was later analysed.

### 4.2 Characteristics and Locations of Video Sites

As previously mentioned, three Brisbane BAZ sites with varying characteristics were analysed. Table 1 compares the sites.
Table 1. Site characteristics at the locations of the video recording

<table>
<thead>
<tr>
<th></th>
<th>Annerley Road</th>
<th>Kedron Brook Road</th>
<th>Riding Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>AADT Note 1</td>
<td>14 000</td>
<td>5000</td>
<td>7000</td>
</tr>
<tr>
<td>Peak hour traffic (veh/h) Note 2</td>
<td>1200</td>
<td>955</td>
<td>400</td>
</tr>
<tr>
<td>Lanes/direction</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Lane width (m)</td>
<td>3.3</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Parking width (m)</td>
<td>2.5</td>
<td>3.5</td>
<td>3</td>
</tr>
</tbody>
</table>

Note 1: AADT data is modelling data supplied by TMR
Note 2: Peak hour traffic was only counted in the direction of the video recording

Annerley Road is a 4 lane arterial road that extends from Ipswich Road, Annerley to Stanley Street, South Brisbane. From the Gladstone Road intersection, Annerley Road has a dedicated bicycle lane to the pedestrian crossing opposite Dutton Park Primary School. At this location the BAZ commences and the BAZ extends to the intersection with Park Road. Further north of Park Road, BAZ is interspersed with sections of bicycle lane. The video site was located in a BAZ section marked on the edge of a parking lane on the northbound side of Annerley Road, opposite Dutton Park State School as seen in Figure 2. The parking in this location appeared to be long term resident parking.

![Figure 2](image_url)

**Figure 2.** a) Annerley Road Site View  b) Location of Video Site on Annerley Road
Kedron Brook Road is a two lane connecting road that links Days Road to Newmarket Road in Wilston. The road passes through a residential precinct, with a few small restaurants to the north of the video site location. BAZ linemarking straddles the parking edge line on both sides of the road. The BAZ section is fairly extensive along Kedron Brook Road, stretching from Main Avenue (430m prior to the video site) to 212m past the video site where Kedron Brook Road meets with Silvester Street. The video site was located on the southbound side of Kedron Brook Road, opposite Jeffery Street. The parking at this site was rarely utilised residential parking. The video site is shown in Figure 3.

Figure 3. a) Kedron Brook Road Site View b) Location of Video Site on Kedron Brook Road

Riding Road is a 2 lane local collector road with a few small shops and connects Wynnum Road to Oxford Street/ Lytton Road. BAZ linemarking adjacent to parking lanes extends the entire length of Riding Road. The video site was located on the northbound side of Riding Road, just south of Pashen Street which is on the opposite side of the road as seen in Figure 4. Morningside State School is located off Riding Road near the video site. The site was adjacent to a playing field and a few small businesses were on the southbound side of the road.
road, opposite the video site. This site had the highest parking turnover of all the sites with most motorists attending the nearby businesses.

Figure 4. a) Riding Road Site View b) Location of Video Site on Riding Road

4.3 Summary of Video Statistics

The statistics of the cyclists’ positions for each analysed road have been averaged and are reflected in Table 2.
<table>
<thead>
<tr>
<th>Site</th>
<th>Time Period</th>
<th>No. of cyclists in Sample</th>
<th>No. of cyclists no interaction</th>
<th>Cyclists’ offset to edge line</th>
<th>Cyclists’ offset to parked car</th>
<th>No. of cyclists passed by veh</th>
<th>Cyclists’ offset to edge line</th>
<th>Cyclists’ offset to parked car</th>
<th>Cyclists’ offset to passing veh</th>
<th>No. of cyclists followed by veh</th>
<th>Cyclists’ offset to edge line</th>
<th>Cyclists’ offset to parked car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annerley Rd</td>
<td>Morning Peak Period</td>
<td>89</td>
<td>2</td>
<td>37</td>
<td>69</td>
<td>89</td>
<td>19</td>
<td>40</td>
<td>60</td>
<td>98</td>
<td>33</td>
<td>49</td>
</tr>
<tr>
<td>Annerley Rd</td>
<td>Non Peak Period</td>
<td>95</td>
<td>6.5</td>
<td>70</td>
<td>80</td>
<td>106</td>
<td>6</td>
<td>52</td>
<td>77</td>
<td>113</td>
<td>19</td>
<td>58</td>
</tr>
<tr>
<td>Riding Rd</td>
<td>Evening Peak Period</td>
<td>13</td>
<td>3</td>
<td>5</td>
<td>32</td>
<td>82</td>
<td>4</td>
<td>3</td>
<td>53</td>
<td>100</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Riding Rd</td>
<td>3 days peak and non peak</td>
<td>73</td>
<td>35</td>
<td>38</td>
<td>3</td>
<td>69</td>
<td>21</td>
<td>-13</td>
<td>56</td>
<td>127</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Kedron Brook Rd</td>
<td>Morning Peak Period</td>
<td>88</td>
<td>2</td>
<td>61</td>
<td>-43</td>
<td>NA</td>
<td>27</td>
<td>-50</td>
<td>NA</td>
<td>171</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kedron Brook Rd</td>
<td>Evening Peak Period</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>-80</td>
<td>NA</td>
<td>3</td>
<td>-33</td>
<td>87</td>
<td>153</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kedron Brook Rd</td>
<td>Non Peak Period</td>
<td>35</td>
<td>2</td>
<td>32</td>
<td>-13</td>
<td>107</td>
<td>3</td>
<td>-33</td>
<td>87</td>
<td>153</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kedron Brook Rd</td>
<td>Non Peak Period</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>-74</td>
<td>NA</td>
<td>1</td>
<td>-40</td>
<td>NA</td>
<td>180</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: All measurements are mean values and are in centimetres.
4.4 **Annerley Road**

4.4.1 **Peak Period**

For the analysed peak hour period between 7am and 9am on the 27th April 2011, 89 northbound cyclist movements were recorded on Annerley Road. Cycle movements in the morning peak time are predominantly CBD commuters.

4.4.1.1 **Annerley Road- Peak Period- Vehicle Interactions**

During the morning peak period along Annerley Road, there were 52 instances where a vehicle either followed or passed a cyclist. This equates to 58.4% of recorded cyclists interacting with vehicles. The interactions typically involved a car, though there was one incident of a motorbike following a cyclist, one truck followed a cyclist, one truck passed a cyclist and one bus followed a cyclist.

The 52 interactions were comprised of 33 vehicles following cyclists and 19 vehicles passing cyclists. For one-third of the cases where vehicles followed cyclists, a queue of traffic did result. This queue ranged from 2 vehicles to 14 vehicles. Table 3 shows the times when the queues occurred.

<table>
<thead>
<tr>
<th>Time (am)</th>
<th>No. of Cyclists</th>
<th>Queue Length (number of vehicles) (Time)</th>
<th>Traffic Volume (veh/ 15mins)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Kerb Side Lane</td>
<td>Lane 2</td>
</tr>
<tr>
<td>6:15- 6:30</td>
<td>13</td>
<td>3 (6:22)</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>48</td>
</tr>
<tr>
<td>6:30-6:45</td>
<td>14</td>
<td>4 (6:39), 7 (6:41)</td>
<td>113</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>65</td>
</tr>
<tr>
<td>6:45-7:00</td>
<td>10</td>
<td>3 (6:53), 8 (6:52)</td>
<td>123</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>75</td>
</tr>
<tr>
<td>7:00- 7:15</td>
<td>8</td>
<td></td>
<td>165</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>66</td>
</tr>
<tr>
<td>7:15- 7:30</td>
<td>14</td>
<td>2 (7:42), 5 (7:25), 10 (7:20)</td>
<td>177</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>116</td>
</tr>
<tr>
<td>7:30- 7:45</td>
<td>18</td>
<td>2 (7:42), 5 (7:39), 14 (7:39)</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>117</td>
</tr>
<tr>
<td>7:45-8:00</td>
<td>13</td>
<td>5 (7:57), 6 (7:50), 6 (7:54)</td>
<td>212</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>141</td>
</tr>
<tr>
<td>8:00- 8:15</td>
<td>13</td>
<td>7 (8:14)</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>132</td>
</tr>
<tr>
<td>8:15-8:30</td>
<td>12</td>
<td>13 (8:16)</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>101</td>
</tr>
</tbody>
</table>

Note: The table also contains queues at non-peak time.
It can be seen from Table 3 that all queues occurred over a two hour period. The majority of the queues were between 7:15am and 8am where cyclist and traffic volumes were at a peak. For most of the cyclists recorded at this location, no queue formed so the traffic flow was sufficiently dispersed with sufficient overtaking opportunities to avoid queuing. It’s not known where the queue started to form as there was a 90m section of BAZ on the approach to the video monitoring point.

The mean position of cyclists who were followed was 69cm from the side of the parked car and 49cm from the parking edge line, inside the traffic lane. This offset places the cyclist just within the outer limits of the BAZ symbol.

When vehicles were recorded passing the cyclists, the mean position of the cyclist was 60cm from the side of the parked car and 40cm inside the traffic lane. Cyclists seem to be slightly adjusting their lateral position when they sense a car is passing. In passing movements, the mean offset from the passing car to the cyclist was 98cm. Based on these recorded offsets, it appears that even for the constrained parking and travel lane arrangements at Annerley Road, a car could still pass a cyclist without encroaching into the adjacent lane. Notwithstanding these averaged results, about 37% of passing vehicles either drove on or crossed the dividing line.

The cyclist’s separation between the parked car and passing vehicle can be combined and referred to as the cyclist’s envelope, or operating space. Austroads states that the minimum required operating space is 1m, though additional clearance is required to fixed objects and passing vehicles (Austroads 2011). Despite the constrained conditions on Annerley Road, the recorded envelope was 158cm.

4.4.1.2 Annerley Road- Peak Period- No vehicle Interactions

When the cyclist was not passed or followed by a vehicle, the mean position of the cyclist was calculated at 69cm from the outside of the edge line into the travel lane and 89cm from the side of the parked car.

The position of the cyclist in the traffic lane seems to be influenced by the presence of vehicles. The mean offset from the edge line is greatest when there are no vehicles approaching from behind and is least when vehicles are passing.
Consistent with the trend of the offset from the edge line, the mean offset of the cyclist from the parked car increases when there are no vehicle interactions and is smallest when cyclists are being passed. The maximum offset was 89cm and the smallest was 60cm.

4.4.1.3 Annerley Road- Peak Period- Conflicts

There were 2 conflicts, both of similar nature, which occurred during peak hour. The cyclists rode up the side of the moving traffic which was flowing rather slowly. In both cases, the cyclist allowed 80cm between themselves and the moving traffic. One cycled 40cm from the parked cars, whilst the other cycled 60cm from the parked cars. Both cyclists lost their balance and became unsteady as they passed the traffic. The cyclists were forced to make a fairly abrupt stop to avoid hitting the parked cars.

4.4.2 Annerley Road- Non Peak

Analysis of cyclist movements for Annerley Road in non-peak times was undertaken on Thursday 21st April and Wednesday 27th April 2011. Between 10:30am to 1:00pm on the 21st April, and 5am to 7am and 9am to 10am on the 27th April, there were 95 northbound cyclist movements.

4.4.2.1 Annerley Road- Non Peak- Vehicle Interactions

There was significantly less vehicle interactions during non-peak hour than peak hour, with only 26.3% of cyclists being either passed or closely followed by a vehicle. All interactions involved cars apart from one truck and one bus interaction.

76% of interacting vehicles chose to follow the cyclist, with only six or 24% passing the cyclist. Vehicles are more inclined to follow a cyclist in non-peak hour than peak hour.

There were four instances, or 21% of following cases, which resulted in a queue of traffic forming behind the initial following car. These queues ranged from three vehicles to eight vehicles. Compared to peak hour, there were fewer cases of queues forming and the maximum queue was half the size of the maximum queue during peak hour.

As shown in Table 2 the offsets during non-peak conditions were slightly greater than peak time.
The total operating envelope for passing movements during non-peak hour is about 30cm greater than in peak hour.

Half of the passing vehicles drove on the centre line and another two crossed the dividing line. This equates to 83% of passing vehicles either driving on or crossing the dividing line, a figure far greater than during peak hour.

The two vehicles which crossed the dividing line left 1.4m separation between themselves and the cyclists.

4.4.2.2 Annerley Road- Non Peak- No Vehicle Interactions

As summarized in Table 2, there is a higher tendency for cyclists to ride further in the traffic lane when there are no vehicles. Offsets for non-peak times with no vehicle interaction were consistently greater than offsets with no vehicle interactions in peak times.

No conflicts occurred during the period of analysis.

4.5 Kedron Brook Road

4.5.1 Peak Period

For the analysed peak hour period between 7am and 9am on the 27th April 2011, 88 southbound cyclist movements were recorded on Kedron Brook Road. Cycle movements are strongly directed to the CBD with only three southbound cyclist movements recorded in the evening peak period of 3pm to 6pm.

4.5.1.1 Kedron Brook Road- Peak Period-Vehicle Interactions

There were 27 incidences of vehicle interactions with cyclists during the morning peak hour period of analysis of Kedron Brook Road. This equates to interactions with 31% of observed cyclists. All interactions involved cars, apart from one interaction with a bus and one interaction with a truck. There were no interactions in the evening peak hour period.

All interactions were recorded as passing the cyclist. There were no parked cars during the period of analysis and consequently all cyclists rode within the parking lane. As a result, there was no need for a vehicle to follow a cyclist.
The average position of the cyclist when they were passed was 43cm inside the parking edge line. This alignment is on the inner extremity of the 1100mm BAZ symbol.

There were no parked vehicles during peak hour so the mean cyclist envelope cannot be calculated. The mean distance between the cyclists and passing vehicles was quite substantial at 171cm. Although the cyclists are well clear of the passing vehicle, motorists are still positioning themselves well within the lane to maximise the offset to the cyclist.

Only one vehicle, out of the 27 vehicles that passed cyclists, crossed the centre line of the road. This vehicle allowed 2m separation between the cyclist and themselves and consequently crossed 10cm over the centre line.

4.5.1.2 Kedron Brook Road- Peak Period- No Vehicle Interactions

Whether or not the cyclist is interacting with a vehicle seems to have little effect on the position of the cyclist. The mean position of the cyclist when there are no interactions was 43cm inside the parking lane versus 50cm inside the parking lane when the cyclists were being passed.

Interestingly, a higher percentage of the cyclists who didn’t interact with vehicles than cyclists who did interact, rode 1m or more inside the parking lane. There were even four cyclists who rode 1.6m in the parking lane, which is greater than the maximum distance inside the parking lane ridden by a cyclist who was being approached by a vehicle.

There were no conflicts observed during the period of analysis.

4.5.2 Kedron Brook Road- Non Peak

A total of eight non-peak hours were reviewed in the 5am to 7am and 9am to 3pm period of analysis on the 27th April. For two hours, a car was parked in the parking lane and 35 cyclist movements were recorded. For the other hours, only eight cyclist movements were noted and there were no parked cars.
4.5.2.1 Kedron Brook Road- Non Peak- Vehicle Interactions

There were substantially less vehicle interactions during the non peak hour period of analysis than the peak hour period. Only 9% of observed cyclists were involved in interactions with vehicles during the morning non peak-hour period and only one vehicle interaction in the afternoon non-peak hour period. All interactions between vehicles and cyclists during non-peak periods only involved cars and all interactions were passing manoeuvres (no vehicles were seen to follow a cyclist).

The average position of the cyclist when a car passed the cyclist in the morning non-peak hour period was 33cm inside the edge line of the parking lane and 87cm from the edge of the parked car. The average offset between cyclists and passing vehicles for this period was 153cm. During the afternoon period, the cyclists averaged 40cm inside the parking and 180cm offset between cyclists and passing vehicles. The cyclists didn’t ride as far in the parking lane as they did during peak hour, however unlike in peak hour, there was a parked car during the morning non peak hour period of analysis.

None of the passing vehicles drove on or crossed the centre line of the road, which apart from the one vehicle who crossed the centre line during peak hour, is a very similar outcome to peak hour.

4.5.2.2 Kedron Brook Road- Non Peak- No Vehicle Interactions

In the morning non-peak hour period, the mean position of cyclists who are being passed is 33cm inside the parking lane which is 20cm further inside the parking lane than cyclists who aren’t interacting with a vehicle. At this time, there was a parked car. It seems that the parked car was influencing the cyclist’s position as in the afternoon when there was no parked car, the mean position of the cyclist was 74cm inside the parking lane.

When there are no parked cars, 50% of the cyclists rode between 80cm and 1.2m in the parking lane. When there are parked cars, the furthest a cyclist rode in the parking lane was 60cm.

The average offset between the parked car and the cyclist was 87cm when the cyclist was being passed and 107cm when there were no vehicle interactions. Therefore, even with the
wide parking lane, cyclists are still riding in the dooring zone. The dooring zone is the region next to the parked car where conflict could be caused by an open car door, which can be up to 1m wide if the door is fully opened (Austroads 2011). The parked car was 120cm from the parking edge line, so the cyclists had the option to ride out of the dooring zone without encroaching into the traffic lane.

4.6 Riding Road

4.6.1 Peak Period

Cyclist movements on Riding Road were substantially less than either Annerley Road or Kedron Brook Road. Combining the cyclist movements on Thursday 28th April and Friday 29th April, there were only nine cyclists recorded in the 7am to 9am peak hour period and 13 cyclists in the afternoon peak period from 3pm to 6pm.

4.6.1.1 Riding Road- Peak Period- Vehicle Interactions

In the afternoon peak hour period, 62% of the cyclists were either passed or followed by a vehicle. All interactions involved cars.

The interactions were evenly split between passing and following interactions.

There was only 2cm difference between the average positions of the cyclists who were followed and the cyclists who were passed. Since the difference is so minimal, and both positions were only slightly in the traffic lane, the cyclists’ position wouldn’t influence the motorists’ decision to pass or follow.

The mean cyclists’ envelope was 153cm between the parked car and the passing car.

4.6.1.2 Riding Road- Peak Period- No Vehicle Interactions

The mean positions of the cyclists who were followed and passed, were very close to the parking edge line. However, when there are no interactions the mean position is further in the traffic lane at 32cm, though still within the region of the BAZ symbol.

The mean offset of the cyclist from the parked car was greatest when there were no interactions. Even though there were no approaching vehicles, cyclists only allowed an
average of 82cm between themselves and the parked cars and as such, rode within the dooring zone. There was minimal difference in the separation between the cyclist being followed and passed with their offsets being 55cm and 53cm respectively.

4.6.2 Riding Road- Combined Period

Due to the comparatively low numbers of cyclist movements, three days of aggregated cyclist movements were used to obtain better structured representation of cyclist and vehicle positions for Riding Road.

4.6.2.1 Riding Road- Combined Period- Vehicle Interactions

There were slightly less interactions between cyclists and vehicles during non- peak hour than peak hour with 48% of cyclists interacting with a vehicle. Each interaction was between a cyclist and a car.

At 60%, the majority of interactions involved vehicles passing the cyclists rather than following. This is slightly higher than in peak hour where the number of passing and following incidences were even.

The average position of the cyclist when being followed was 5cm in the traffic lane, which is no different to peak hour, and following vehicles had sufficient width to pass the cyclist.

Despite the positions of the cyclists who were followed being passable, the positions of the cyclists who were passed were more easily passable. The average position was 13cm inside the parking lane which is a 16cm difference in position to that in peak hour.

On average, passing vehicles were allowing 127cm separation between themselves and the cyclists. The mean operating space was 183cm between the parked car and passing car.

4.6.2.2 Riding Road- Combined Period- No Vehicle Interactions

The mean position of the cyclist when there were no vehicle interactions was slightly inside the traffic lane. This is therefore very similar to the mean position of the cyclist when they were followed.
There was little difference in the cyclists’ mean offset from the parked car when cyclists were either passed, followed or didn’t interact with a vehicle. In peak hour, the offset was more varied between interaction types. The mean offset from the parked car was 69cm when there were no interactions, 56cm when cyclists were passed and 67cm when cyclists were followed. When there were no vehicle interactions, the offset was smaller than in peak hour whilst when the cyclist was being passed, the offset was similar to peak hour. Compared to peak hour, the offset when the cyclist was being followed was 12cm larger.

Although the sample size for the evening peak period was small, the averaged offsets to the passing vehicle or parked cars were quite similar to those of the larger sample size obtained from three consecutive days of data. This demonstrates there were no cyclists with large offsets, or cars passing with large offsets, in the single day of analysis.

4.7 Validity of TRUM Guidelines

4.7.1 Cyclist Envelope

Currently Austroads provide little guidance on the clearance requirements of cyclists. Austroads’ publication, *Cycling Aspects of Austroads Guides* (2011), suggests that a 1m wide envelope should provide the basis for the design of bicycle facilities as in Figure 5.

![Figure 5. 1m wide cyclist envelope (Austroads 2011)](image)

This 1m envelope takes into consideration the width of the bicycle and allows for tracking. It doesn’t allow for the clearance required to parked cars and passing vehicles. Instead, the
An Evaluation of Bicycle Awareness Zones

4.7.1.1 Constrained Situation

The results of the video analysis have been used to produce Figure 6 which shows the required offsets in a constrained situation where the parking is 2.5m wide and the traffic lane is 3.3m. From these results, if a cyclist is passing a parked car, a vehicle will need to encroach onto or over the dividing line if it chooses to pass. The majority of motorists will follow a cyclist until there is an overtaking opportunity. The use of BAZ in this situation needs consideration of parking demand, passing opportunities, and traffic volume.

![Figure 6. Cyclist envelope in constrained conditions (adapted from Austroads 2011)](image)

4.7.1.2 Unconstrained Situation (3m parking lane width, 3.3m traffic lane)

In an unconstrained situation, the majority of vehicles interacting with a cyclist have sufficient width to pass the cyclist. The resulting envelopes are shown in Figures 7.
Note: Offsets in the unconstrained peak condition are based on limited data.

**Figure 7.** Cyclist envelope in unconstrained conditions (adapted from Austroads 2011)

4.7.1.3 Wide Parking Lane (parking lane width: 3.5m, traffic lane: 3.3m)

In this arrangement, all interacting vehicles have sufficient width to pass the cyclist. The envelopes for this arrangement are shown in Figure 8 and Figure 9.

**Figure 8.** Cyclist envelope on a road with a car parked in a wide parking lane
Note: Offsets in the non-peak condition are based on limited data.

**Figure 9.** Cyclist envelope on a road without a car parked in a wide parking lane (adapted from Austroads 2011)

### 4.7.2 BAZ Symbol (Alignment, Size and Symbol Profile)

**Table 4.** Cyclists’ offsets from the edge line and kerb on each analysed road

<table>
<thead>
<tr>
<th>Road</th>
<th>No. of Cyclists</th>
<th>ParkedCars?</th>
<th>Mean offset to edge line (cm)</th>
<th>Standard deviation of mean offset to edge line (cm)</th>
<th>Mean offset to kerb (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annerley Road, peak hour</td>
<td>89</td>
<td>Yes</td>
<td>55</td>
<td>27</td>
<td>305</td>
</tr>
<tr>
<td>Annerley Road, non-peak hour</td>
<td>95</td>
<td>Yes</td>
<td>74</td>
<td>46</td>
<td>324</td>
</tr>
<tr>
<td>Riding Road, peak hour</td>
<td>13</td>
<td>Yes</td>
<td>15</td>
<td>21</td>
<td>315</td>
</tr>
<tr>
<td>Riding Road, 3 days</td>
<td>73</td>
<td>Yes</td>
<td>-1</td>
<td>31</td>
<td>299</td>
</tr>
<tr>
<td>Kedron Brook Road, morning peak hour</td>
<td>88</td>
<td>No</td>
<td>-45</td>
<td>52</td>
<td>305</td>
</tr>
<tr>
<td>Kedron Brook Road</td>
<td>3</td>
<td>No</td>
<td>-80</td>
<td>28</td>
<td>270</td>
</tr>
</tbody>
</table>
Table 4 shows the cyclists’ mean offset from the edge line for each analysed road and condition. This offset was then represented in terms of the offset from the kerb. If the centre of the BAZ symbol is supposed to represent the intended cyclists’ line of travel, then it appears the symbol is incorrectly placed since cyclists don’t necessarily feel comfortable riding on the edge line. On roads such as Annerley Road with narrow parking (2.5m), cyclists choose to ride to the right of the edge line when passing parked cars. On roads such as Kedron Brook Road with wide parking (3.5m) cyclists choose to ride to the left of the edge line. As noted in Table 4, the cyclists’ offsets from the kerb are generally around 3m on each road. The overall mean offset from the kerb, calculated using the offset for each road, is 3.04m. This therefore provides argument that the centre of the BAZ symbol should be located 3m from the kerb regardless of the parking lane width. At Annerley Road it was also observed that as soon as the cyclists passed a parked car they changed their alignment to the left of the edge line. It seems reasonable then that for narrow parking lanes of 2.5m or less, the suggested 3m offset for the symbol should only be used where parking demand is high.

With the current placement of the symbol, it is quite likely cars which are parked in a 2.5m wide parking lane will obscure the symbol. This will be rectified by moving the symbol to 3m from the kerb in locations of high parking demand.

If there is a deviation from current practices and the bike symbol is not centred on the edge line but could be up to say 0.5m either side of the edge line as for Annerley Road and Kedron Brook Road, then perhaps the spacing of the symbol should be reduced so that the cyclists
have frequent guidance of their alignment. The TRUM currently suggests 200m spacing of bicycle symbols (Transport and Main Roads 2009). A 50m spacing of the symbol may be more reasonable if the centre of the symbol is off the edge line. It may also be worth considering a different stencil which would more clearly define the intended path of the cyclist. Appendix B shows some possible stencils. Each of the stencil options includes some line marking each side of the symbol to give a better guidance for the tracking position of the cyclist. The centre of the current symbol stencil is difficult to judge for cyclists.

The commonly used BAZ symbol is 1100mm wide x 1800mm high (Transport and Main Roads 2009). The symbol is 100mm wider than the envelope as shown in Figure 5. If the centre of the symbol is supposed to align with the preferred position of the cyclist, then perhaps consideration should be given to using a wider symbol to take into account more variance in tracking of the cyclists’ alignment. The standard deviation for the alignment of cyclists varied depending on the traffic conditions and available lane widths but in the most constrained situation on Annerley Road, the standard deviation was about 300mm. On this basis there could be a case for a symbol width of maybe 1700mm. However, as most cyclists and motorists have a poor understanding of the meaning of the symbol, the wider symbol may encourage cyclists to ride on the extremities of the symbol. If this occurs, cyclists will be occupying too much of the traffic lane width. Perhaps consideration should be given to adopting the Transport and Main Roads (2009) standardized 1530mm wide symbol (based on the minimum envelope of 1580mm on Annerley Road in the most constrained condition) with line marking each side of the symbol to give better guidance on tracking.

Although there was no video investigation of BAZ on roads without parking lanes, the offset for the constrained conditions are likely to reflect the expected outcome. In Figure 6, the edge line of the parked car would approximate the face of the kerb for roads without parking. Clearly there is not sufficient width to overtake a cyclist with a minimum 1.6m operating envelope unless the lane width is 3.5m or more. The recorded offset data supports the TRUM guidelines for kerb side lanes up to 3.6m wide (refer Appendix C) that the BAZ symbol should be placed more centrally within the lane to discourage overtaking. For lanes of 3.7m width or greater, the symbol placement of 3m from the dividing line provides sufficient offset from the kerb for the cyclist and still sufficient width for motorists to pass.
The standardized 1530mm wide symbol would still be the preference for roads without parking as it better defines the operating envelope than the current 1100mm wide symbol. For wide kerb side lanes, if the wider symbol is to be adopted, a tracking line is suggested to encourage ideal positioning of the cyclist which would allow passing.

4.7.3 Annual Average Daily Traffic

The AADT on Annerley Road far exceeds the 3000 AADT threshold given in the TRUM and was greater than the AADT on the other analysed roads. There were no apparent safety issues on Annerley Road. Only two conflicts were recorded on Annerley Road and the nature of the conflicts could have occurred on lower volume roads.

Although there were no apparent safety issues caused by the high volume road, traffic congestion arising from interaction with cyclists was more of an issue on Annerley Road than the other roads. Of the total 89 cyclists in the 2 hour peak period, 52 had interactions with a vehicle (either being passed or closely followed) and in 63% of cases a motorist chose to follow rather than pass the cyclist. The mean offset in peak hour for a passing vehicle was 98cm which is recognised as an appropriate passing distance (Amy Gillett Foundation 2009). As the mean edge line offset of cyclists in a following condition was essentially the same as in a passing condition, clearly the majority of drivers are not confident in passing cyclists in these conditions. One-third of following vehicles on Annerley Road caused a queue, which at times was up to 14 vehicles in length in peak hour. This queue would have formed over a relatively short distance as there was considerable length of dedicated bicycle lane on approach to the 90m monitored BAZ section. On the lower volume Riding Road, queues were infrequent and only two or three vehicles in length. No queues were observed on Annerley Road outside the hours of 6:30am to 8:15am. Annerley Road’s high traffic volumes combined with narrow width (parking and adjoining travel lane 5.8m) seem to be the conditions at which the traffic stream could become disrupted by cyclists. However, even with 754 vehicles per hour in the adjoining kerb side lane, the impact at Annerley Road was not significant. Since the BAZ on Annerley Road is interspersed with dedicated bicycle lanes, it is likely that on other roads with similar lane width to Annerley Road, but with longer BAZ sections, the impact on traffic would be greater.

The data collected from this survey suggests BAZ are still appropriate for roads with kerb side parking lanes and at least 14 000 AADT, such as Annerley Road, where BAZ are interspersed...
with bicycle lanes. However more research may be needed to confirm traffic impacts on roads with more continuous sections of BAZ, with narrow lanes, and high traffic volume. It is interesting to note that on Kedron Brook Road there were no following cases where the available width was 6.8m, with 955 vehicles per hour during peak hour. The BAZ section preceding the monitoring point was 430m. This indicates that the available width to the dividing line is the main factor that will dictate whether vehicles will pass or follow. Traffic thresholds for the use of BAZ are likely to include parameters such as the available width and for constrained conditions, the length of the BAZ and parking demand.

4.7.4 Amendments to Parking

It was observed in the videos that 95% of cyclists on Annerley Road either rode on the parking edge line or inside the parking lane after passing the parked cars. On this basis, it would be expected that cyclists would move to the left after passing parked cars and allow the following motorist to pass. For sites with a parking lane, high traffic volumes, narrow widths and high cyclist demand, perhaps intermittent ‘no parking’ locations may need to be considered to allow opportunities for passing. This would produce a similar affect to having BAZ interspersed with dedicated bicycle lanes, as on Annerley Road, where the disruption to traffic was fairly minimal.

For sites with wide parking lanes (3m or more), it would be beneficial to encourage motorists to park close to the kerb to maximise the available width to cyclists. Inverted T or L pavement markings could be used to create parking bays 2.1m to 2.3m off the kerb line. The edge line should be retained in these circumstances.

4.7.5 BAZ through Intersections

Where a BAZ is located either side of an intersection, a single continuity line is currently provided for the extension of the parking edge line. A double continuity line with the kerbside line 1200mm off the traffic side line, would guide cyclists to the left of the traffic side line, and increase opportunities for passing. Transitions to the BAZ alignment should be provided each side of the intersection so that the cyclist can reposition themselves. Parking should not be allowed in these transition zones.
4.7.6 Multilane Roads

The additional lane on Annerley Road didn’t seem to have any impact on the safety of the site. In fact, it may have had a positive impact as it allowed 37% of passing motorists to drive on the dividing line or cross into the adjacent lane in peak conditions. It was surprising that with the high traffic volume on Annerley Road, only 58.4% of cyclists interacted with a vehicle during peak hour. Perhaps some motorists were changing lanes in advance of the cyclists to avoid passing or following the cyclist. The video was not able to capture lane changing more than 30m in advance of the video site.

Research has suggested that vehicles increase their travel speed on multilane roads (Rakotonirainy & Schramm 2010). Although speeds were not actually measured, observations indicated that most passing vehicles were travelling only slightly faster than the cyclists in peak conditions.

5 BAZ QUESTIONNAIRE SURVEY

5.1 Methodology

The motoring public were approached at parks adjacent to roads with BAZ symbols and asked to participate in the survey. These sites were:

- Marine Parade, Labrador
- Eagle Terrace, Shorncliffe

The answers provided by the respondents on site were entered into Survey Monkey, a program which assists in developing surveys and analysing the results.

A survey specifically for cyclists was emailed to organisers of bicycle user groups in the Brisbane and Sunshine Coast Regions, for distribution to their members. Survey Monkey was used for the survey of bicycle user groups. Survey Monkey allowed participants to click on a link to fill out the survey online.

Survey Monkey collated the results and presented the results in tables and graphs which were analysed.
The analysis results were compared to the results from a similar survey undertaken by Connell Wagner in 2001, to investigate if there has been a change in the public’s understanding of BAZ and the effectiveness of BAZ.

Copies of the motorists’ and cyclists’ surveys are included in Appendix D and the full results are in Appendix E.

5.2 Survey of Motorists

5.2.1 Motorists’ Survey Sample Size
The survey was completed by 70 motorists, 56.5% of whom were also cyclists. However, only 17.1% of these cyclists were frequent cyclists, which have been classified as those cycling in excess of one day a week.

5.2.2 Motorists’ Awareness
Of the 70 motorists surveyed, only 3 people could not recall seeing the yellow symbol. Neither of these 3 people were cyclists.

5.2.3 Motorists’ Understanding

5.2.3.1 Motorists’ Response Regarding BAZ on a Road without Parking
This question allowed respondents to pick one or more possible purposes of the yellow bicycle symbol. As shown by the results in Figure 10, the majority indicated its purpose was to warn of the presence of cyclists but a large proportion incorrectly indicated it denoted a bicycle lane, with 20% of respondents believing that the only purpose was to denote a bicycle lane. Only about 20% recognized the symbol indicated the position cyclists are expected to ride. A small minority, 14.3%, were able to correctly recognize the three purposes indicated in the TRUM, though they all also thought that the symbol indicated a bicycle lane. The correct responses are shown in Figure 10 with ticks.
5.2.3.2 Motorists’ Response Regarding BAZ on a Road with Parking

The options for the question were the same as for above. This question was to test if respondents viewed the purpose of BAZ differently if there was a parking lane. The difference in responses for BAZ symbols with and without parking are shown in Table 5.

Table 5. Variance between responses for symbols with and without parking

<table>
<thead>
<tr>
<th>Purpose of BAZ</th>
<th>BAZ on a Road without Parking</th>
<th>BAZ on a Road with Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td>To warn motorists of the possible presence of cyclists</td>
<td>60.9%</td>
<td>49.3%</td>
</tr>
<tr>
<td>To denote a bicycle lane</td>
<td>55.1%</td>
<td>33.3%</td>
</tr>
<tr>
<td>To indicate the position cyclists are expected to ride</td>
<td>23.2%</td>
<td>21.7%</td>
</tr>
<tr>
<td>To provide continuity in a bicycle route when there is not enough space for a full width bicycle lane</td>
<td>29%</td>
<td>37.7%</td>
</tr>
<tr>
<td>Other</td>
<td>1.4%</td>
<td>8.7%</td>
</tr>
</tbody>
</table>
Surprisingly, significantly more respondents believe the symbol denotes a bicycle lane on a road without parking than a road with parking. This result is contradictory to what was expected. It was thought that the symbol combined with a parking edge line may lead motorists to believe that it is a bicycle lane. However the edge line doesn’t appear to have this effect on motorists.

5.2.3.3 Motorists’ Response Regarding Bicycle Lanes

In this question, 90% of respondents correctly answered that the white symbol indicates a bicycle lane. A significant number also responded that the symbol indicated the position cyclists are expected to ride. While this is generally correct, cyclists are only required to use the bicycle lane when it is practical.

5.2.4 Motorists’ Behaviour

5.2.4.1 Passing a Cyclist

A number of the survey questions tested motorists’ tendencies in passing a cyclist where there was either a BAZ, bicycle lane, or a street with no bicycle symbols or lanes. As would be broadly expected, motorists indicated that they feel the need to cross the centre line of the road when passing a cyclist riding in a BAZ, or on a street with no bicycle symbols or lanes, more often than a road with a bicycle lane. Motorists seem to recognize that cyclists in a bicycle lane have their own space, unlike a BAZ, and hence there is no warrant for crossing the centre line. However, there were still a high number of respondents who would still cross the centre line to pass a cyclist in a bicycle lane. Motorists seem to react to a road with a BAZ in a very similar way to a street with no bicycle symbols or lanes.

A number of respondents commented that they would only cross the centre line of the road if it was legal to do so at that location. Others also stated that the separation they feel necessary to provide to the cyclists depends on the confidence of the rider.

Motorists feel far safer passing a cyclist in a bicycle lane when there is oncoming traffic, than a cyclist in a BAZ or on a street with no bicycle symbols or lanes. This mirrors the results of how often a motorist crosses the centre line when passing a cyclist in a BAZ. Again, motorists are recognising the difference in degree of separation between a BAZ and bicycle lane environment.
Motorists feel the least safe passing a cyclist on a road without any bicycle symbols or lanes. Although it is not necessarily desirable to encourage motorists to pass cyclists, BAZ seems to offer a higher level of confidence to motorists.

5.2.4.2 Waiting behind a Cyclist

Motorists are far less likely to wait behind a cyclist in a bicycle lane than a cyclist in a BAZ or on a road with no bicycle facility. Again it appears evident that motorists are recognising the separation a cyclist has in a bicycle lane, and their behaviour reflects the separation. Motorists seem to react to a cyclist in a BAZ in a similar way to a cyclist riding on a road with no bicycle facilities. The tendency to follow or pass a cyclist was one of the major outcomes tested in the video analysis for different lane widths and the questionnaire results seem to reflect recorded driver behaviour. Refer discussion in section 4.4 to 4.7.

5.2.4.3 Parking

Two questions were directed at testing responses in parking situations: whether or not a motorist checks for cyclists when entering/ exiting parking spaces; and whether a motorist checks for cyclists before opening their car door. In general, motorists seem to be aware of the risk to cyclists in parking situations. Irrespective of the type of bicycle facility, the majority of respondents (64%) indicated they check for cyclists all the time when they entered or exited a car parking space. Slightly fewer respondents (54%) checked for cyclists all the time, regardless of the facility, when opening a car door.

5.2.4.4 Motorists’ Speed

This question tested the motorists’ perceived need to slow down when passing cyclists either in a BAZ, bicycle lane, or a street without bicycle symbols or lanes. Responses indicate that the separation provided by a bicycle lane has an effect on the motorist’s perceived need to reduce their speed. Motorists reduce their speed more often on roads with BAZ and no bicycle facilities than on roads with a bicycle lane. The number of respondents for each frequency was pretty similar for BAZ and roads with no bicycle facilities. Only 30% of respondents answered they reduce their speed all the time regardless of the facility.

5.2.4.5 Motorist’s Opinion of the Effectiveness of BAZ

In this question, there was an overwhelmingly positive perception of BAZ. 88% of respondents either strongly agree, agree or somewhat agree that BAZ make a safer road
environment for cyclists than a road without any bicycle symbols. The most common agreement was ‘strongly agree’ which was answered by 46% of the respondents.

These results are not entirely reflective of those obtained in other questions. The safety would largely be influenced by motorists’ caution when entering/ exiting a parking space or opening their car door in a parking situation, and their speed around cyclists.

In the previous questions, motorists answered that they behave very similarly regardless of whether there is a BAZ or a road with no bicycle symbols. On this basis, they have not provided evidence to support the statement, “Bicycle Awareness Zones make a safer road environment for cyclists than a road without any bicycle symbols at all.” It is assumed that when motorists first see the statement, it seems obvious that a bicycle facility would make a safer road environment than one without.

5.2.5 Motorists’ Response to a Scenario

The scenario presented in the question involved rating responses to the changes in parking or bicycle facilities that a road authority should implement if a cyclist had been sideswiped whilst passing a parked car.

The scenario demonstrates the value of parking to the public. The least preferred response was removing parking to enable the installation of bicycle lanes. The most preferred treatment was split equally between widening the street to retain parking and enable bicycle lanes; and retaining all parking and installing a bicycle awareness zone. The second and third preferences for the two aforementioned options were also very balanced. Assigning points to the degree of preferences found that bicycle awareness zones were most preferred. However there was not a clear preference, and as such, it is only recommended that parking not be removed to install a bicycle lane.

5.2.6 Motorists’ Comments with Respect to BAZ

Respondents were encouraged to comment on positive aspects or any problems or issues with BAZ. The full range of comments is included in Appendix F. The overall consensus of motorists was cyclists should not be allowed to ride on the road if there is not a bicycle lane. A number of people with this view also made mention that cyclists shouldn’t have the right to cycle on the road since they don’t pay registration.
One motorist made a very interesting point with regards to the colouring of BAZ. They thought it was inconsistent to paint an area to be used by cyclists in yellow, since the ‘no standing’ line is also painted yellow.

5.3 Survey of Cyclists

5.3.1 Cyclists’ Survey Sample Size

The survey of cyclists was completed by 311 cyclists who are members of Brisbane and Sunshine Coast bicycle user groups.

5.3.2 Cyclist’s Awareness

A high proportion of survey respondents, 95.8%, have cycled along roads with BAZ. The remaining respondents have either not ridden, or couldn’t recall if they had ridden along a BAZ section.

5.3.3 Cyclists’ Understanding

5.3.3.1 Cyclists’ Response Regarding BAZ

There seems to be a fairly strong understanding of BAZ amongst the cycling fraternity. 84.4% of respondents are aware that BAZ don’t provide an area exclusively for cyclists and 88.8% realise that they are not legally required to ride in a BAZ.

The question posed to motorists about their understanding of the purpose of BAZ was also asked of cyclists. 29.4% of survey respondents correctly selected all 3 purposes of BAZ. Respondents were most aware that the symbols warn motorists of the possible presence of cyclists. Of the correct answers, the fewest respondents, 55.4%, knew that the symbols indicated the position cyclists were expected to ride. It was surprising that 30.9% incorrectly thought that BAZ denotes a dedicated area for cyclists. This is inconsistent with the response to the earlier question where most respondents were aware that BAZ don’t provide an area exclusively for cyclists.

5.3.3.2 Cyclists’ Response Regarding Bicycle Lanes

It appears that most cyclists understand the difference in exclusivity between BAZ and bicycle lanes, with the cyclists recognising that BAZ don’t provide an area exclusively for...
cyclists, and also answering that bicycle lanes do provide an area exclusively for cyclists. However, only 46.84% knew that bicycle riders are legally required to ride in bicycle lanes. However, it is acknowledged that there may be some degree of confusion with this question since bicycle riders are legally only required to ride in bicycle lanes when it is practical.

5.3.3.3 Cyclists’ Response Regarding the Difference between BAZ and Bicycle Lanes

Cyclists have a very negative opinion of the motorist’s understanding of BAZ and bicycle lane linemarking. 81.4% of respondents disagree, to various extents, that the average motorist understands the differences between linemarking for bicycle lanes and bicycle awareness zones. The highest response was cyclists strongly disagree that motorists understand the difference in linemarking. These results are supported by the responses given by motorists, where it was a common response that the yellow BAZ symbol indicates a bicycle lane.

5.3.4 Cyclists’ Response Regarding the Safety of Bicycle Facilities

There isn’t an overwhelmingly general perception of safety amongst cyclists who cycle along a main street with no bicycle facilities/ symbols. One- third of respondents only feel safe some of the time or occasionally and almost 40% rarely feel safe or never feel safe. In contrast, and as would be expected, cyclists generally feel safe on a quiet street with no bicycle facilities/ symbols, with 85.5% of respondents indicating a positive degree of safety. Only 1.5% feel safe rarely or never on a quiet street with no facilities.

Half of the respondents answered positively about their degree of safety in a BAZ, with the highest response being the cyclists feel safe ‘much of the time’. 11.9% of respondents rarely or never feel safer riding in a BAZ. Cyclists feel most safe in bicycle lanes, with just over three quarters of respondents answering they feel safe all the time, most of the time (the highest response) or much of the time when riding in a bicycle lane. 2.6% of respondents rarely or never feel safe in a bicycle lane.

Comparing the percentage of respondents answering positively and negatively about their perception of safety, a quiet street with no bicycle facilities/ symbols was deemed to be most safe, closely followed by bicycle lanes. Since there was a fairly high proportion of cyclists who rarely or never feel safe on main thoroughfares with no bicycle facilities/ symbols, this reinforces the need to provide a bicycle lane or BAZ, both of which have been perceived to be safer in this survey.
In summary, on a main thoroughfare, cyclists feel most safe in a bicycle lane. On a quiet street, cyclists don’t seem to require a facility in the form of a BAZ or a bicycle lane to feel safe. Where possible on a non-quiet street, a bicycle lane should be installed instead of a BAZ. Cyclists’ level of safety therefore mirrors the guidelines in the TRUM which states that BAZ must only be used if bicycle lanes cannot be provided due to constrained road space (Transport and Main Roads 2009).

Cyclists were asked to agree or disagree with the statement, “Bicycle Awareness Zones make a safer road environment for cyclists than a road without any bicycle symbols at all.” Respondents generally believe that BAZ do make a safer road environment, with 64.7% of respondents strongly agreeing, agreeing or somewhat agreeing with the statement. The most common agreement was ‘somewhat agree’.

5.3.5 Cyclists’ Response to Cycling Hazards

Respondents were asked to comment on the hazards they face when cycling. Over half of the respondents took this opportunity to voice their concerns. Responses are outlined in Appendix G. Some of the identified hazards are associated with BAZ and a discussion of these hazards is presented below.

A high proportion of cyclists are concerned that motorists are not aware of the presence of cyclists and regularly turn left in front of a cyclist, thereby cutting off the cyclist. Although this issue is largely the motorist’s responsibility, rather than a design deficiency, BAZ symbols should be placed more frequently, and particularly in the lead up to an intersection or frequently used driveways such as takeaway shops.

Many cyclists believe that motorists don’t know the road rules and in particular the cyclist’s right to cycle on the road and the requirement to give way to cyclists. They also believe that motorists need to be educated about the spacing they should be providing between the cyclist and their vehicle. One respondent suggested that there should be an additional section in the licensing test to ensure motorists know how to drive around vulnerable road users such as cyclists and pedestrians. Perhaps after education, there will be a reduction in unruly behaviour directed to cyclists from motorists, which is currently a common hazard experienced by cyclists.
Cyclists feel at risk when their lane ends at hazardous locations such as at intersections. For this reason, further investigation needs to be conducted to develop a consistent approach for providing cyclist facilities through intersections. This should also include roundabouts which were another hazard identified by cyclists.

5.3.6 Cyclists’ Response Regarding Conflicts

Cyclists were asked to comment on how often they have been involved in conflicts on roads with no bicycle facilities, roads with BAZ, and roads with bicycle lanes. Conflicts were defined as being a sudden change in speed or direction to avoid the other party. Weighing up the number of regular conflicts (daily and weekly conflicts) to infrequent conflicts (conflicts occurring rarely or never), bicycle lanes are safer than BAZ. A quiet street with no bicycle facilities/ symbols is the safest, and a main thoroughfare with no bicycle facilities/ symbols is the least safe. Additional comments provided by the respondents about the conflicts they have been involved in are presented in Appendix H.

5.3.7 Cyclists’ Response Regarding Crashes

Cyclists were also asked to comment on how often they have been involved in crashes on the various road types and markings. The results indicated that crashes were three times more common on a main thoroughfare with no symbols than the other road types, which again reinforces the inadequate safety on these types of roads. In terms of crashes, a quiet street with no bicycle facilities/ symbols is as safe as a road with a bicycle lane and a road with a bicycle awareness zone. Additional comments provided by the respondents about the crashes they have been involved in are presented in Appendix I.

5.3.8 Cyclists’ Response Regarding Motorists’ Behaviour in BAZ

Cyclists were asked what ways BAZ affects motorists’ behaviour compared to riding where there is no bicycle facility/ symbol. The general consensus amongst cyclists is that BAZ have only a minimal affect on motorist’s behaviour. Figure 11 shows the behavioural changes cyclists were asked to assess and the results.
Respondents were also asked to list any other changes in motorist’s behaviour on roads with BAZ compared to a road without any bicycle facilities/symbols. A number of cyclists commented that the BAZ symbol seems to legitimise the cyclist’s right to cycle on the road and as a result, they have less abuse directed at them.

5.3.9 Cyclists’ Response Regarding Motorists’ Behaviour in Bicycle Lanes

Cyclists were also asked if they thought bicycle lanes affect motorist’s behaviour compared to roads with no facilities/symbols. As with BAZ, bicycle lanes are perceived to have little effect on behaviour with the highest responses being a combination of rarely and not at all. The only behaviour that was made more frequently (combination of all the time, most of the time and much of the time) than infrequently (combination of rarely and not at all) was motorists giving cyclists more space when passing cyclists. However, this change could be due to motorists being guided to give the cyclist more space by the bicycle lane edge line, rather than the motorist making a conscious decision to give more space to the cyclist.

Again some respondents commented that motorists seem to be more patient and courteous as the cyclist’s right to cycle on the road is evident.

5.3.10 Cyclists’ Response Regarding Issues with BAZ

When given the opportunity to comment, many cyclists mentioned that motorists believe that the cyclists should stay to the left of the parking edge line if there is a line. Consequently,
when a cyclist is forced into the traffic lane to avoid a parked car or debris, motorists have little respect for them. According to cyclists, motorists need to be better informed about BAZ; how to drive in the presence of cyclists; and be made aware that cyclists may need to change their position to avoid hazards.

5.3.11 Recommendations Made by Cyclists

- move the BAZ symbol to the middle of the traffic lane so that motorists are more likely to see it;
- include the words ‘LOOK’ or ‘BEWARE’ on the pavement at the start of the section with BAZ;
- at the lead up to roundabouts, paint ‘watch for cyclists’ on the pavement;
- remove Raised Retroreflective Raised Pavement Markers from the left of the BAZ symbol as these pose a hazard to cyclists.

5.4 Comparison between Motorists’ and Cyclists’ Responses

The cyclists’ comments and responses to survey questions, such as the question asking the cyclists to agree/ disagree with the statement that the average motorist understands the differences between linemarking for bicycle lanes and BAZ, of which the majority of cyclists disagreed to a certain extent, are supported by the motorists’ lack of understanding of BAZ as evident in their survey responses.

Although most respondents in both the motorists’ and cyclists’ surveys agree, to a certain extent, that BAZ make a safer road environment than a road without any bicycle symbols at all, motorists were far more in agreement. 88% of motorists either strongly agree, agree or somewhat agree, with the majority strongly agreeing, with the statement, whilst only 64.7% of cyclists agree to an extent, with the majority only somewhat agreeing with the statement.

5.5 Comparison with Connell Wagner Study

Following the analysis of the motorists’ responses to this survey, some interesting observations are made when compared to the survey conducted by Connell Wagner in 2001.

- In 2001, only 55% of respondents had observed BAZ symbols compared to 96% in the 2011 survey. This result reflects the increased implementation of BAZ since 2001.
• The Connell Wagner study found yellow symbols lead to positive driving changes in 82% of drivers. Motorists stated that they watched for cyclists, drove more cautiously and moved away from the edge line in the presence of BAZ. The IAP project’s study found the behaviour of drivers in BAZ locations is positive, though the responses indicated that the symbol didn’t really have any influence on behaviour as the motorists are behaving similarly on roads without any bicycle symbols.

In the Connell Wagner questionnaire, all cyclist respondents believed that the symbol was effective in changing behaviour. This perception seems to have changed as cyclists aren’t noticing any changes in motorist’s behaviour between BAZ locations and roads without any bicycle symbols or lanes. It was however commented in both surveys that the BAZ symbols endorse cyclists’ legitimate right to be on the road.

5.6 Conclusions of Questionnaire Survey

Although awareness of BAZ has greatly increased, and understanding has improved since the Connell Wagner study, the surveys highlighted the need for an education campaign. Although cyclists had a significantly better understanding of bicycle facilities, an education campaign also needs to be directed at cyclists. The education campaign should explain the purposes of the various bicycle facilities; how motorists should drive in the presence of a cyclist in the various facilities; inform motorists of the reasons cyclists may need to cycle further in the traffic lane; and also advise cyclists of the ideal position they should be riding in a BAZ. Once motorists and cyclists are better informed, the effectiveness of BAZ will be improved.

As would be expected, cyclists feel safer riding in a bicycle lane than a BAZ. However, BAZ were still considered to be safe by cyclists. The number of conflicts had by cyclists in BAZ and bicycle lanes suggested that bicycle lanes were safer than BAZ. In terms of crashes, the safety of BAZ and bicycle lanes was similar.

BAZ don’t seem to be affecting the motorists’ behaviour. Many motorists behave similarly on roads with BAZ and roads without any bicycle lanes/ symbols. The motorists’ responses suggested that their behaviour is generally safe, with a high proportion of respondents reducing their speed around cyclists, and checking for cyclists when entering/ exiting parking and as they open their cars doors. The results of the cyclist survey supported this finding with the majority suggesting that there is no change in motorists’ behaviour on roads with BAZ.
compared to a road without any bicycle symbols/lanes. The cyclists’ survey didn’t ask cyclists to specifically rate the motorists’ behaviour, so the results of the motorists’ behaviour in the motorists’ survey can’t be validated.

Despite the responses to a number of survey questions indicating that BAZ are no safer than a road without any bicycle symbols/lanes, both motorists and cyclists agreed that BAZ makes a safer road environment for cyclists, than a road without any bicycle symbols at all.

In summary, the results indicated that a BAZ or bicycle lane should be provided on a main thoroughfare, with a bicycle lane being the first preference. A quiet street however, does not seem to require a bicycle facility and installing a BAZ would unlikely alter motorist’s behaviour.

6 CRASH DATA ANALYSIS

6.1 Methodology
The crash data for all cyclist crashes occurring in Queensland between 2004 and 2009 were obtained using WebCrash, an online database containing crash information for crashes which occurred on Queensland’s roads. The crash data didn’t indicate the facility at the crash location.

The 4000 Queensland cyclist crashes were plotted on MapInfo but only the crashes occurring in South East Queensland were selected, since BAZ are predominately used only in South East Queensland. This reduced the number of crashes to approximately 2500.

Bicycle facility maps were requested from Brisbane City Council, Gold Coast City Council and Sunshine Coast Regional Council. Gold Coast City Council doesn’t have such maps and Sunshine Coast Regional Council was unable to provide the maps within the timeframe assigned for the analysis. As a result, only the 1100 or so crashes occurring on Brisbane City Council roads were analysed.

MapInfo was used to tabulate the crash and the associated facility on the road where the crash occurred. The MapInfo table was used to determine the number of crashes on BAZ, bicycle
lanes, or roads where there is no bicycle facility. The analysis mainly focussed on the 100 crashes which occurred on either a BAZ or bicycle lane section.

Network traffic modelling data was used to determine the AADT at each crash location.

Each crash site on a road with a bicycle lane or BAZ was located on aerial imagery using MapInfo and Google Maps. Site characteristics were recorded for each crash site, such as whether or not the crash occurred at mid-block or an intersection; whether or not there was parking at the crash location; an estimation of the parking turnover based on the land use in the vicinity of the crash; whether there was a parking edge line; parking and traffic lane widths; and the gradient of the road.

All mid-block crashes were split into BAZ or bicycle lane sites, and similarly for the intersection crashes. The crash report for each mid-block crash was reviewed to assist in indentifying the contributing factors in the crash. The abovementioned site characteristics of each mid-block crash were compared, to determine if there were any links between certain site characteristics and crashes. The crash reports were not reviewed for any intersection where only a single crash occurred, due to the large proportion of intersection crashes and the fact that intersections are already known to be higher risk conflict zones (Forester 1994, p 97).

Any trends in BAZ crashes were compared to trends in bicycle lane crashes. Single crashes which occurred on roads with no bicycle treatments were not analysed due to the large number of crashes.

Mid-block and intersection locations with multiple crashes were tabulated for each facility. Crash sites on roads without a bicycle facility were included in this section of the analysis. The crash reports for each crash occurring at a single location were compared. Similar reasons for the crash could indicate a site specific problem, rather than random driver error.

Sites with multiple crashes were compared for each facility to indentify if there were certain site characteristics influencing a crash for a particular facility. This would complement the analysis of sites with a single crash.

A summary of the crash statistics for the Brisbane City Council region is shown in Table 6.
Table 6. Brisbane City Council crash statistics

<table>
<thead>
<tr>
<th>Facility</th>
<th>Midblock Single Crash Sites</th>
<th>Midblock Multiple Crash Sites</th>
<th>Intersection Single Crash Sites</th>
<th>Intersection Multiple Crash Sites</th>
<th>Total Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>No facility</td>
<td>Not analysed</td>
<td>2</td>
<td>Not analysed</td>
<td>16</td>
<td>1023</td>
</tr>
<tr>
<td>Bicycle lane</td>
<td>6</td>
<td>0</td>
<td>37</td>
<td>6</td>
<td>56</td>
</tr>
<tr>
<td>BAZ</td>
<td>10</td>
<td>1</td>
<td>24</td>
<td>2</td>
<td>40</td>
</tr>
</tbody>
</table>

Note: Single incident crashes where there was no bicycle facility (BAZ or bicycle lane) were not analysed.

6.2 Crash Rate Calculations

To enable comparison between the number of crashes occurring on BAZ and bicycle lane sections, crash rates have been calculated in terms of the number of crashes per kilometre per year of the respective facility type and are shown in Table 7.

Table 7. BAZ and bicycle lane crash rates

<table>
<thead>
<tr>
<th>Facility</th>
<th>Crashes per km of facility</th>
<th>Crashes per km per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAZ</td>
<td>0.58 (70.5km of BAZ)</td>
<td>0.12</td>
</tr>
<tr>
<td>Bicycle Lanes</td>
<td>0.67 (83.1km of bicycle lanes)</td>
<td>0.13</td>
</tr>
</tbody>
</table>

The above calculations suggest that cycling in a BAZ is no more hazardous than cycling in a dedicated bicycle lane. The number of crashes per kilometre per year of BAZ and bicycle lane is very similar. However, it is acknowledged that the calculations don’t take into account the number of cyclists or vehicles on that section of road. The number of cyclists and vehicles could have a fairly significant impact on the comparison, since it is expected that the number of crashes would be proportional to the usage of the route. A more detailed assessment of the crash types as outlined below, suggests that some crashes would have been preventable if a bicycle lane was used in place of a BAZ.
6.3 Analysis of Mid-Block Crashes

6.3.1 General Analysis of Mid-Block Crashes

Table 8. Proportion of total crashes occurring on mid-block sections

<table>
<thead>
<tr>
<th>Facility</th>
<th>% of Total Crashes Occurring on Mid-Block</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAZ</td>
<td>30% of total BAZ crashes</td>
</tr>
<tr>
<td>Bicycle Lanes</td>
<td>10.7% of total bicycle lane crashes</td>
</tr>
</tbody>
</table>

Again, with only a small dataset, it is difficult to make any defensible conclusions, though the data is indicating that mid-block crashes are more likely to occur on BAZ as seen in Table 8. There was a higher number of dooring incidents on BAZ mid-block sections and this would be influencing the outcome. Typically, bicycle lanes are only installed adjacent to parking where a safety zone of 0.4m to 1m is available next to the parking (Austroads 2011). Therefore, it is logical that there should be less dooring incidents associated with a bicycle lane.

6.3.2 Detailed Assessment of Mid-Block Crashes

The specific details of each mid-block crash in either a BAZ or in a bicycle lane has been undertaken to check for trends or common features. Table 9 outlines the crashes which occurred on mid-block sections of BAZ. Refer Appendix J for DCA coding.

Table 9. Crashes which occurred on mid-block sections of BAZ

<table>
<thead>
<tr>
<th>DCA Code</th>
<th>Number of Crashes</th>
<th>Crash Description</th>
<th>Preventable?</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>3</td>
<td>Car reversed out of driveway and hit a cyclist</td>
<td>This could have occurred even if there was a bicycle lane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driver opened car door into the path of the cyclist and the cyclist hit the door</td>
<td>Bicycle lane could help to avoid this situation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driver opened car door into the path of the cyclist and the cyclist hit the door</td>
<td>Bicycle lane could help to avoid this situation</td>
</tr>
<tr>
<td>604</td>
<td>2</td>
<td>Driver opened car door into the path of the cyclist</td>
<td>Bicycle lane could help to avoid this</td>
</tr>
</tbody>
</table>
An Evaluation of Bicycle Awareness Zones

<table>
<thead>
<tr>
<th>DCA Code</th>
<th>Number of Crashes</th>
<th>Crash Description</th>
<th>Preventable?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>and the cyclist hit the door</td>
<td>situation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Driver opened car door into the path of the cyclist and the cyclist hit the door</td>
<td>Bicycle lane could help to avoid this situation</td>
</tr>
<tr>
<td>408</td>
<td>3</td>
<td>Cyclist left the footpath to ride in the BAZ, and in doing so, collided with a car in the traffic stream</td>
<td>Since the facility was a BAZ, the cyclist entered into the traffic stream. A bicycle lane would have provided some separation for the cyclist from the traffic stream.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A car made a u-turn in front of a cyclist. The cyclist swerved around the car and crashed</td>
<td>Unknown if a bicycle lane could have prevented this crash</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cyclist swerved around a stormwater drain grate and rode into the side of a bus</td>
<td>A bike lane would have given the cyclist more clearance between the traffic. All grates adjoining BAZ or bike lanes should be bike friendly.</td>
</tr>
<tr>
<td>309</td>
<td>2</td>
<td>A car turned into a driveway in front of a cyclist who was travelling in the same direction and clipped the cyclist</td>
<td>This is likely to occur even in the presence of a bicycle lane.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A car turned into a driveway in front of a cyclist who was travelling in the same direction and clipped the cyclist</td>
<td>This is likely to occur even in the presence of a bicycle lane.</td>
</tr>
<tr>
<td>703</td>
<td>1</td>
<td>A cyclist was sideswiped by a car</td>
<td>Less likely to occur in the presence of a bicycle lane</td>
</tr>
<tr>
<td>600</td>
<td>1</td>
<td>Driver opened car door into the path of the cyclist and the cyclist hit the door</td>
<td>Bicycle lane could help to avoid this situation.</td>
</tr>
</tbody>
</table>

Of the 12 mid-block crashes that were associated with a BAZ, it is possible that eight of these crashes could have been avoided if there had been sufficient width to provide a dedicated bicycle lane.

Some of the accidents occurring on BAZ have been assigned DCA codes which appear to be inconsistent with the crash description. It appears that although there were only two accidents coded as being dooring crashes (DCA code 604), there were actually five dooring incidents. As a result, dooring was the most common crash type along mid-block sections of BAZ.
DCA codes 309 and 408 only occurred at BAZ sections. The crashes coded as DCA 309 are unlikely to be solely related to a BAZ. Rather, the cause of this crash is more attributed to a lack of attention by the driver. Perhaps installing the BAZ symbol at more frequent intervals would remind drivers of the presence of cyclists. In the case of the crash coded as DCA 408, a bicycle lane may have helped to prevent this crash as described in Table 9.

The crashes which occurred on mid-block sections of a bicycle lane are presented in Table 10.

**Table 10. Crashes which occurred on mid-block sections of bicycle lane**

<table>
<thead>
<tr>
<th>DCA Code</th>
<th>Number of Crashes</th>
<th>Crash Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>703</td>
<td>1</td>
<td>A car swerved into the bicycle lane and sideswiped the cyclist travelling in the bicycle lane</td>
</tr>
<tr>
<td>604</td>
<td>1</td>
<td>Driver opened car door into the path of the cyclist, though in this case the driver was illegally parked</td>
</tr>
<tr>
<td>401</td>
<td>1</td>
<td>A car pulled out of parallel parking and into the path of the cyclist</td>
</tr>
<tr>
<td>400</td>
<td>3</td>
<td>A cyclist was riding in the bicycle lane against the traffic. A car pulled out of a driveway and only looked at oncoming traffic and subsequently the car hit the cyclist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A car moved left into a taxi rank and cut off the cyclist who was in the bicycle lane</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A cyclist was riding in the bicycle lane against the traffic. A car pulled out of a driveway and only looked at the oncoming traffic and subsequently the car hit the cyclist</td>
</tr>
</tbody>
</table>

In the case of the bicycle lane crashes, excluding the cases where the cyclists were moving against the traffic, driver negligence was the cause of the crash.

6.3.3 BAZ Dooring Incidents

Although there was a parking edge line at all crash locations, the width of the traffic lane was minimum in all cases, and it is likely the cyclists rode to the left of the edge line rather than on the edge line, which makes them more susceptible to dooring. Based on the crash data, it appears that the combination of minimum parking and traffic lane widths seems to be associated with dooring incidents, as this was a common factor in all dooring incidents which occurred on BAZ.
It is not possible to draw any conclusions about the effect of parking turnover in dooring incidents. The project timeframe didn’t allow site visits to the crash sites to assess the parking turnover, and so only aerial imagery was used to gain a vague indication of the parking turnover. Based on the aerial imagery, it appears that 3 of the 5 dooring incidents occurred at sites with fairly continuous parking demand.

6.3.4 AADT at Mid-Block Crash Locations

Table 11. Mid-block crash data relationships with traffic volumes

<table>
<thead>
<tr>
<th></th>
<th>&lt; 3000AADT</th>
<th>3000-10 000AADT</th>
<th>&gt; 10 000AADT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAZ crashes</td>
<td>9 (7P, 2NP)</td>
<td>3 (3P)</td>
<td>0</td>
</tr>
<tr>
<td>Bicycle lane crashes</td>
<td>3 (1P, 2NP)</td>
<td>1 (1P)</td>
<td>3 (3NP)</td>
</tr>
<tr>
<td>P- Parking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NP- no parking</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As seen in Table 11, of the 12 crashes which occurred on mid-block sections of BAZ, 9 occurred at sites where the AADT is less than the TRUM threshold of 3000. As there are no trends to suggest a higher crash history on higher volume roads, there doesn’t appear to be sufficient justification to apply an AADT threshold for the use of BAZ. The 3000 limit currently in the TRUM appears to be invalid. Brisbane City Council use BAZ on a number of four lane roads with volumes in excess of 10 000 AADT. There is no data to indicate that BAZ are unsuited on these high volume roads.

Under Austroads Guide to Traffic Engineering Part 14: Bicycles, dedicated bike facilities are generally not provided on roads where the AADT is less than 3000, presumably because the risk to cyclists is deemed to be low (Austroads 1999). So it is surprising that a large proportion of the crashes occurred on roads that have less than 3000 AADT. Perhaps the threshold for not providing facilities should be less than 3000 AADT.

6.3.5 Multiple Crashes at Mid-Block Locations

There were no mid-block bicycle lane crash sites with multiple crashes. There was one case of multiple crashes at a mid- block section of a BAZ and two sites with multiple crashes on roads without any bicycle facilities. At each site with multiple crashes, the crashes occurred
due to varying reasons which indicates that there wasn’t a site specific issue contributing to the crash.

6.4 Analysis of Intersection Crashes

6.4.1 General Analysis of Intersection Crashes

Table 12. Proportion of total crashes occurring at intersections

<table>
<thead>
<tr>
<th>Facility</th>
<th>% of Total Crashes Occurring at Intersections</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAZ</td>
<td>70% of total BAZ crashes</td>
</tr>
<tr>
<td>Bicycle Lanes</td>
<td>89.3% of total bicycle lane crashes</td>
</tr>
</tbody>
</table>

The values in Table 12 suggest BAZ through intersections are no more hazardous than a dedicated bicycle lane. Irrespective of whether there is a BAZ or bicycle lane at intersections, crashes are significantly more likely to occur at intersections rather than mid-block. The high incidence of crashes at intersections is supported in research by Forester (1994) who suggests that 95% of car-bike collisions occur as the result of turning or crossing movements, which are generally located at intersections.

6.4.2 Multiple Crashes at Intersections

There were only two multiple crash sites at intersections with BAZ and the crashes at one of the sites were unique and not due to a site specific issue. There were a high number of multiple crashes at intersections with bicycle lanes and at intersections with no bicycle facilities. Of the multiple crashes at intersections with bicycle lanes, six crash sites may have contributed to the crash, whilst at the multiple crash sites at intersections on roads without any bicycle facilities, site specific issues at four of the sites may have contributed.

Of the 11 multiple crash sites at intersections, five involved a cyclist travelling downhill on approach to the intersection and vehicles pulling out in front of the cyclist or turning across the path of the cyclist. In these cases, the grade ranged from 2.8% to 12%. Crashes of this nature occurred on roads with either BAZ, bicycle lanes or no bicycle facilities. Four sites seemed to involve motorists not observing and giving way to cyclists who were on the far side of two traffic lanes. The other apparent site specific issues involved:
• motorists turning left and cutting off the cyclist who was on the motorist’s left hand side;
• motorists turning left from a left turning lane which is adjacent to a right turning lane and failing to see the cyclist approaching from the motorist’s right hand side;
• motorists failing to give way to cyclists on a roundabout that is particularly small and doesn’t satisfy the minimum required dimensions for the central island diameter (10m) and circulating carriageway width (7.6m) as stated in the Road Planning and Design Manual: Chapter 14 Roundabouts (2006);
• motorists turning left from a slip lane and failing to give way to a cyclist.

Some sites appeared to have multiple site specific issues. The crash locations and a detailed discussion of the crashes at each site, are presented in Appendix K.

6.4.3 Roundabouts

Of the intersection crash locations where multiple crashes occurred, 32% of the locations were at roundabouts. However, only 10% of all bicycle lane and BAZ crashes at intersections were at roundabouts. Therefore, for crash locations where multiple crashes occurred, roundabout accidents are statistically overrepresented, since the number of roundabouts is comparatively small compared to all other intersection types. It should be noted that at each roundabout where a crash occurred, there was no cyclist linemarking in the roundabout.

6.5 Conclusions of Crash Data Analysis

Few conclusions have resulted from this research, and any conclusions drawn have a limited degree of confidence. Primarily, this has been due to a lack of available data.

The numbers of crashes per kilometre per year for BAZ and bicycle lanes were found to be very similar. As such, there is no evidence of a serious safety concern with BAZ. To gain a true understanding of the safety of each facility, ideally the result should be compared to the number of motorists and cyclists using each BAZ and bicycle lane route. Requests were made for data which would allow such a comparison, however the data was not available.

The available crash data indicates that mid-block crashes are more likely to occur on a BAZ section rather than a bicycle lane section. BAZ sections had a significantly higher proportion
of dooring incidents than bicycle lanes. This would be influencing the higher percentage of mid-block crashes on BAZ than bicycle lanes. All dooring incidents occurred on roads where there was a combination of minimum parking and traffic lane width. Since dooring incidents could be prevented with the use of a bicycle lane, it is implied that bicycle lanes are safer than BAZ over mid-block sections.

The high proportion of crashes at intersections is reflective of previous research. Since intersection crashes are significant for BAZ and bicycle lane approaches, this doesn’t indicate a particular safety issue with respect to BAZ.

The crash analysis indicates that there are no trends suggesting that BAZ crashes are more likely to occur on roads with a higher AADT than the current TRUM threshold of 3000. As such, the TRUM threshold seems to be invalid.

Multiple crashes at mid-block sections where there was either a BAZ, bicycle lane or no bicycle facility were compared. Multiple crashes are more likely to indicate a site specific problem, rather than random driver error. However, it was found that many crashes were actually random and couldn’t be linked to any site characteristics. The analysis did not indicate that one particular facility was affected by certain characteristics more than another facility.

It was found that cyclists seem to be particularly at risk when they are travelling downhill on approach to an intersection. Crashes of this nature were not associated with one facility; rather they occurred on BAZ, bicycle lanes and roads with no bicycle facilities. Of the 11 locations which seem to have a site-specific issue at an intersection, the downhill grade appeared to be a factor in five crashes. The grades at these crash locations ranged from 2.8% to 12%. In each case, the motorist was either turning right across the path of the cyclist, or left in front of the cyclist, and failed to give way to the cyclist. It is assumed that the motorists are either not seeing the cyclist due to the pace they are travelling or they are misjudging the speed of the cyclists.

Another common crash on all facility types involved a motorist failing to give way to a cyclist as the motorist turned right across two lanes of traffic. It seems that the motorist’s visibility is
restricted perhaps due to other cars blocking the motorist’s line of sight to the cyclist. This type of crash occurred in three out of 11 crashes.

Perhaps there is a case for a media campaign that could highlight visibility issues with two objectives; the first being for cyclists to be more conscious of the need for high visibility clothing/ lighting; and for motorists to be more cautious and aware of the possibility of cyclists in the area.

6.5.1 Data Collection by Road Authorities

This research, and the findings, could be significantly improved if there was more available data. Local governments would play an important role in the supply of the data. It is suggested that a register is maintained for the location and date of each BAZ or bicycle lane installation. This would not only assist with the research of bicycle facilities but also help local governments review and maintain the facilities.

Cycle numbers and the AADT should be recorded for at least the most important cycle routes. Again, this would be important from a research perspective but local governments could also use the counts to monitor the popularity of routes which may help in prioritising development of the routes.

7 CONCLUSIONS

7.1 General

As part of a review of the TRUM, three project elements were used to test the relative safety and effectiveness of BAZ. Project elements consisted of video analysis of three BAZ sites; a questionnaire survey of motorists and cyclists about their knowledge of and experiences with BAZ and other bicycle facilities; and crash data analysis.

7.2 Video Analysis

Video analysis was conducted at three Brisbane BAZ sites; Annerley Road, Riding Road and Kedron Brook Road. Video cameras recorded the interactions between motorists and cyclists and their positions on the road. The sites chosen for analysis had varying traffic volumes all
exceeding 3000 AADT, different parking lane widths, parking turnovers and one road was multilane.

Annerley Road was the most constrained road environment with 2.5m parking lane and 3.3m traffic lane and had the highest AADT. In peak and non-peak conditions, the majority of motorists chose to follow rather than pass a cyclist. Queuing was observed in peak conditions. The impact of the queuing on the traffic stream was minimal due to the interspersion of BAZ and bicycle lanes. The TRUM recommends that BAZ could be used on roads with a minimum 2.5m parking lane and a minimum 3m travel lane. Based on the recorded operating envelope, motorists would need to cross the dividing line to pass a cyclist in this arrangement if there was active on-street parking. Designers should be mindful of the parameters affecting the safety of BAZ in narrow conditions including parking demand, traffic volume and passing opportunities.

At Riding Road with a 3m parking lane and 3.3m traffic lane, the majority of motorists passed rather than followed the cyclist. The operating envelopes for Annerley Road and Riding Road were relatively consistent at approximately 1.55m for peak conditions and 1.85m for non-peak conditions. Queuing was minimal even in peak hour.

On Kedron Brook Road, where the parking lane was 3.5m and the traffic lane was 3.3m, all motorists had sufficient width to pass a cyclist.

Consistently on all three roads, cyclists rode on about a 3m offset to the kerb line when passing a parked car, and there could be a case to argue that the centre of the BAZ symbol would be better placed 3m off the kerb on roads with high parking demand, rather than on the parking edge line. In these instances where the symbol could be up to 0.5m from the edge line, a different bike symbol has been developed that could be used to give a better indication of the travel path of cyclists. Another advantage of the 3 m offset would be that the symbol would not be obscured by a parked car which is a problem with narrow parking lanes. When a cyclist was not passing a parked car, they were observed to ride to the left of the edge line. Thus, for roads with low parking demand and narrow 2.5m parking lanes, the symbol is probably best left placed centrally on the edge line to deter cyclists from unnecessarily riding in the traffic lane.
Another option that could be considered for the marking of the BAZ symbol could be the implementation of wider symbols. If the centre of the symbol is supposed to be the desired travel path for cyclists (given the width of the symbol is only 1.1m wide and the minimum envelope is 1m), then the standardized 1530mm symbol gives some latitude in the cyclists alignment. The symbol would also be more visible.

Operating envelope data was not obtained for roads without parking lanes, but using the offset to the parking lane as the expected offset to a kerb line, the placement of the BAZ symbol for roads without parking seems to be appropriate.

7.3 BAZ Questionnaire Survey
Separate questions were developed for motorists and members of bicycle user groups. The response from the motorists clearly showed a lack of understanding of the purpose of BAZ and less than a quarter were aware that BAZ indicated the position cyclists are expected to ride. Slightly more than half of motorists recognized the value of BAZ to warn of the presence of cyclists. Almost all respondents recognized that the white symbol designated a bicycle lane. The lack of understanding of BAZ linemarking, particularly by motorists, is a concern and warrants an education campaign.

The responses from cyclists indicated a greater understanding of bicycle facilities. As would be expected, cyclists commented that they feel safer riding in a bicycle lane than a BAZ. However, BAZ were still considered to be safe by cyclists.

A comparison was undertaken of responses given to a similar questionnaire by Connell Wagner 2001. Awareness has greatly increased and understanding has improved since the Connell Wagner study.

7.4 Crash Data Analysis
An analysis was undertaken of 1100 Brisbane cyclist crashes for the period 2004 to 2009 to determine if BAZ facilities are any more dangerous than dedicated bicycle lanes. The majority of crashes occurred on roads without bicycle facilities and as such, only 100 crashes were analysed. Crash rate calculations, based on crashes per km per year of each type of facility, suggest that cycling in a BAZ is no more hazardous than cycling in a designated
bicycle lane. With only a small dataset, it is difficult to draw any succinct conclusions but it would appear that mid-block crashes are more likely to occur on BAZ due to greater probability of doorning. Five doorning incidents were recorded and these all occurred where the combined width of the parking lane and adjoining traffic lane was 5.9m or less. Of the 12 mid-block crashes which were associated with a BAZ, it is possible that eight of these crashes could have been avoided if there had been sufficient width to provide a dedicated bicycle lane. The majority of BAZ (70% of total) and bicycle lane (89% of total) crashes occurred at intersections which are known to be regions of high potential conflict. Aside from the greater risk of a doorning incident (which was only minimal over the five years), the available data suggests that BAZ don’t have any obvious crash history that would lead to a conclusion that BAZ are unsafe to use.

7.5 Summary

- Video analysis demonstrated that BAZ can be effective on roads with up to 14 000 AADT, including multilane roads, with minimal impact to the traffic flow. In constrained width conditions, the impact on the traffic stream can be minimized by interspersing BAZ with bicycle lanes;
- changes to the BAZ symbol, position and/ or size, could be justified based on calculated operating envelopes and offsets from parked cars;
- Questionnaire survey showed motorists had a lack of understanding of the purpose of the BAZ symbols. Cyclists had a greater understanding. Both motorists and cyclists groups agreed that BAZ makes a safer road environment for cyclists than a road without any bicycle symbols at all;
- based on the outcomes of the crash analysis, there is no evidence to suggest BAZ are statistically more dangerous than a bicycle lane;
- bicycle lanes should always be used in preference to a BAZ where the carriageway width permits but BAZ have proven to be a useful and effective link in local government cycle networks.
8 RECOMMENDATIONS

The outcomes of the project have helped to define a number of recommendations which will lead to an increase in utilization of BAZ and improvements to the safety and effectiveness of BAZ. The recommendations are as follows:

- more research to confirm the findings of this project which indicated that BAZ can be effective on roads with up to 14 000 AADT, including multilane roads, subject to consideration of available lane widths, cyclists’ operating envelopes, passing opportunities, and parking demand with minimal impact to the traffic flow.

- ensure passing opportunities are provided on BAZ routes with heavy traffic volumes to minimize the potential for queuing;

- adopt the standard 1530mm BAZ symbol to better reflect the operating envelopes;

- consider the use of tracking lines with the larger BAZ symbol;

- relocate the BAZ symbol 3m from the kerb. For roads with parking lanes less than 3m and where the travel lane is 3.3m or less, the symbol should only be offset off the edge line where parking demand is high;

- reduce the spacing between BAZ symbols and modify the design of the symbol;

- delineate parking bays on roads with a wide parking lane (3m or wider);

- install double continuity lines through intersections with BAZ to increase passing opportunities;

- the TRUM should include the cyclist envelope data for the various road width conditions to assist with the design of cycle facilities;

- educate motorists and cyclists about BAZ including the purposes of the various bicycle facilities; how motorists should drive in the presence of a cyclist in the various facilities; inform motorists of the reasons cyclists may need to cycle further in the traffic lane; and also advise cyclists of the ideal position they should be riding in a BAZ;

- local governments should document the date and locations of each BAZ and bicycle lane installed;

- regular counts of the AADT and cyclist numbers along cycle routes.
9 REFERENCES


RTA 2005, *NSW Bicycle Guidelines*, 03.286, RTA, NSW.


## APPENDIX A: VIDEO ANALYSIS CODING

### Coding Moving Traffic

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Weather</th>
<th>Moving traffic involved in interaction</th>
<th>Interaction</th>
<th>Distance between vehicle and kerb on approach?</th>
<th>Vehicle follow or pass cyclist?</th>
<th>Did vehicle move into adjacent lane, distance?</th>
<th>Width between cyclist and vehicle?</th>
<th>Distance between vehicle and kerb as passed cyclist?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Coding Cyclists

<table>
<thead>
<tr>
<th>Did the cyclist ride over the BAZ?</th>
<th>Was the cyclist riding in the traffic lane?</th>
<th>Distance between cyclist and kerb?</th>
<th>Cyclist pass a parked car?</th>
<th>Distance between parked car and kerb?</th>
<th>Distance between cyclist and parked car?</th>
<th>Any doors opened?</th>
<th>Did the cyclist hit a car door?</th>
<th>Door opened in close proximity to cyclist?</th>
<th>Motorist leave car parking space?</th>
<th>Motorist pull out of car parking space in front of cyclist?</th>
<th>Interaction between cyclist and parked car?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Crash

<table>
<thead>
<tr>
<th>DCA</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B: SUGGESTED SYMBOL DESIGNS

B.1 1100MM X 1800MM SYMBOL, 3M OFFSET FROM KERB, WITH YELLOW TRACKING LINES
B.2  1100MM X 1800MM SYMBOL, 3M OFFSET FROM KERB, WITH ARROWS AS TRACKING LINES
B.3 1530MM X 2500MM SYMBOL, 3M OFFSET FROM KERB, WITH YELLOW TRACKING LINES
B.4  1530MM X 2500MM SYMBOL, 3M OFFSET FROM KERB, WITH ARROWS AS TRACKING LINES
B.5  1530MM X 2500MM SYMBOL, 3M OFFSET FROM KERB, NO TRACKING LINES
## APPENDIX C: TRUM GUIDELINES

### C.1 LANE CONFIGURATIONS WITHOUT PARKING

<table>
<thead>
<tr>
<th>Total lane width</th>
<th>Vehicle lane width</th>
<th>Bicycle facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.6m to 3.0m</td>
<td>2.6m to 3.0m</td>
<td>BAZ (without edge line)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$X=1.3m$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Figure 5</td>
</tr>
<tr>
<td>3.1m to 3.6m$^1$</td>
<td>3.1m to 3.6m$^1$</td>
<td>BAZ (without edge line)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$X=1.3m$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Figure 5</td>
</tr>
<tr>
<td>3.7m to 3.9m</td>
<td>3.7m to 3.9m</td>
<td><strong>Preferred Treatment</strong>: White bicycle symbol refer Austroads GTEP Part 14, Page 31, Figure 4-16(b)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Or yellow bicycle symbol where required for local consistency.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$X=3.0m$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>See Figure 5</td>
</tr>
<tr>
<td>4.0m or greater</td>
<td>2.8m$^2$</td>
<td>1.2m bicycle lane achieved</td>
</tr>
</tbody>
</table>

Notes:

1. Austroads Part 14 Section 4.4.7 and Main Roads Road Planning and Design Manual, Section 7.2.4 both caution the use of facilities between 3.0 and 3.7m. Intermediate widths (3.5m) are wide enough to encourage cars to pass bicycles, but not wide enough to do so safely.

2. Subject to traffic volumes, speeds and road geometry, wide kerbside lanes may be required instead of a BAZ if 2.8m vehicle lane widths are not appropriate.

---

*Figure 5: Dimensions for BAZ without edge lines (without parking) (Adapted from Brisbane City Council - UMS 961)*

(Transport and Main Roads 2009)
### C.2 ROAD CONFIGURATIONS WITH PARALLEL PARKING

<table>
<thead>
<tr>
<th>Total Seal Width (including parking)</th>
<th>Austroads compliant Bicycle lane achievable in lieu of BAZ $^1$</th>
<th>BAZ (not suitable above 3000AADT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10.6m</td>
<td>Parking not achievable, refer to configurations without parking</td>
<td></td>
</tr>
<tr>
<td>10.6m to 10.8m</td>
<td>1 x 2.1m parking bay</td>
<td>BAZ (without edge line)</td>
</tr>
<tr>
<td></td>
<td>1 x 0.4m &quot;safety strip&quot;</td>
<td>See Figure 6</td>
</tr>
<tr>
<td></td>
<td>2 x 1.2m bike lanes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 x 2.3m vehicle lanes</td>
<td></td>
</tr>
<tr>
<td>11m to 12.8m</td>
<td>1 x 2.1m parking bay</td>
<td>BAZ (with edge line)</td>
</tr>
<tr>
<td></td>
<td>1 x 0.5m &quot;safety strip&quot;</td>
<td>2.5m to 3.4m from kerb</td>
</tr>
<tr>
<td></td>
<td>2 x 1.2m bike lanes</td>
<td>2 x 3.0m vehicle lanes</td>
</tr>
<tr>
<td></td>
<td>2 x 3.0m vehicle lanes</td>
<td>See Figure 7</td>
</tr>
<tr>
<td>18m or greater</td>
<td>1 x 2.3m parking bay</td>
<td>BAZ not applicable</td>
</tr>
<tr>
<td></td>
<td>1 x 0.7m &quot;safety strip&quot;</td>
<td>(Austroads GTEP Part 14 compliant bicycle lane is achievable)</td>
</tr>
<tr>
<td></td>
<td>2 x 1.5m bike lanes</td>
<td>1 x 2.1m parking bay</td>
</tr>
<tr>
<td></td>
<td>2 x 3.5m vehicle lanes</td>
<td>1 x 0.4m &quot;safety strip&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 x 1.2m bike lanes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 x 2.8m vehicle lanes $^2$</td>
</tr>
</tbody>
</table>

**Notes:**

1 Refer Austroads GTEP Part 14 figure 4-6 to view Bicycle/Car Parking Lane layout.

2 Reductions to parking availability may be required if vehicle lane widths less than 3.0m are not appropriate. Lane width considerations subject to traffic volumes, commercial vehicles, speeds, road geometry and visibility.

*1.3m Nominal subject to local conditions. Generally paint symbols between wheel paths*

**(Transport and Main Roads 2009)**
APPENDIX D: BAZ QUESTIONNAIRE SURVEYS

D.1 MOTORISTS’ SURVEY

Motorists’s Bicycle Awareness Zone Survey

1. The Department of Transport and Main Roads are conducting an evaluation of different types of bicycle treatments. This study is being conducted in conjunction with a Griffith University thesis project.

How long will it take and what will it cover?
The survey has 21 questions, most of which are multiple choice.

It will take 10-15 mins to complete, depending on how many comments you include.

The survey covers the following topics:
- your understanding of the purpose of Bicycle Awareness Zones
- driver behaviour

What happens with the information you provide?
The information from this survey will be used to help determine the effect certain types of facilities have on cyclists’ safety and will feed into the further development of bicycle facility design and also road user education programs.

The survey closes 10 May 2011.

Anonymity and Confidentiality?
The information that you provide will be anonymous and confidential.

This survey will ask you the following group information to help us to make sense of the results:
- Gender, and
- Age category.

All results are aggregated so that no personal details can be identified.

The survey is being conducted using SurveyMonkey which is based in the USA. Information you provide on this survey will be transferred to SurveyMonkey’s server in the USA. By completing this survey, you agree to this transfer.

This survey is being conducted by TMR in compliance with the Information Privacy Act 2009.

Who do I contact for more information?
If you have any questions about this survey, please contact Nicole Smart on ph 3263 4462.

Using the survey
At any stage you can save your answers and exit the survey. You can then return at a later date to finish it off.

If you find that you cannot move to the next page, scroll through your current page to find one or more questions that you have not completed. The system will only take you to the ‘next’ page once all questions on that page have been completed.
Motorist's Bicycle Awareness Zone Survey

2.

Figure 1
Motorist's Bicycle Awareness Zone Survey

Figure 2

1. Have you noticed the yellow symbols on the road as depicted in figure 1 and figure 2?
   - [ ] Yes
   - [ ] No
   - [ ] Don't know

2. What do you believe is the purpose of the yellow symbol given in figure 1?
   - [ ] To warn motorists of the possible presence of cyclists
   - [ ] To denote a bicycle lane
   - [ ] To indicate the position cyclists are expected to ride
   - [ ] To provide continuity in a bicycle route when there is not enough space for a full width bicycle lane
   - [ ] Other (please specify)
**Motorist's Bicycle Awareness Zone Survey**

3. What do you believe is the purpose of the yellow symbol given in figure 2 (noting that the symbol is adjacent to parking, whereas in figure 1 the symbol is in the traffic lane on a road without parking)?

- [ ] To warn motorists of the possible presence of cyclists
- [ ] To denote a bicycle lane
- [ ] To indicate the position cyclists are expected to ride
- [ ] To provide continuity in a bicycle route when there is not enough space for a full width bicycle lane
- [ ] Other (please specify)

---

**Figure 3**

![Bicycle Awareness Zone Image]
Motorist's Bicycle Awareness Zone Survey

4. What do you believe is the purpose of the white symbol given in figure 3 and figure 4?

☐ To warn motorists of the possible presence of cyclists
☐ To denote a bicycle lane
☐ To indicate the position cyclists are expected to ride
☐ To provide continuity in a bicycle route when there is not enough space for a full width bicycle lane
☐ Other (please specify)
## Motorist's Bicycle Awareness Zone Survey

5. Comparing figure 1 to figure 2, if you encountered a cyclist as in figure 2, would you be more inclined to:

<table>
<thead>
<tr>
<th>Pick one or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Pass when width becomes available</td>
</tr>
<tr>
<td>☐ Hold behind the cyclist</td>
</tr>
<tr>
<td>☐ Cross the centre line of the road to pass the cyclist</td>
</tr>
<tr>
<td>☐ Figure 2 indicates the cyclist must stay left</td>
</tr>
<tr>
<td>☐ Other (please specify)</td>
</tr>
</tbody>
</table>

Yellow bicycle symbols (figure 1 and figure 2) are known as Bicycle Awareness Zones. Bicycle Awareness Zones are implemented on roads which are too narrow for a bicycle lane. A cyclist riding in a Bicycle Awareness Zone shares the traffic lane with vehicles.

White symbols (figure 3 and figure 4) indicate a bicycle lane.

6. In a bicycle lane, the markings require:

<table>
<thead>
<tr>
<th>Pick one</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Cyclists to use the bicycle lane unless impractical</td>
</tr>
<tr>
<td>☐ Cyclists must use the bicycle lane at all times</td>
</tr>
<tr>
<td>☐ Other (please specify)</td>
</tr>
</tbody>
</table>
## Motorist's Bicycle Awareness Zone Survey

1. When passing a cyclist, do you ever cross the centre line of the road (assuming no oncoming traffic) to give the cyclist more room:

<table>
<thead>
<tr>
<th></th>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>on a street with no bicycle symbols or lanes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. If there is oncoming traffic, do you feel it is safe to pass a cyclist:

<table>
<thead>
<tr>
<th></th>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>on a street with no bicycle symbols or lanes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Are you likely to wait behind a cyclist:

<table>
<thead>
<tr>
<th></th>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>on a street with no bicycle symbols or lanes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Do you check for cyclists when entering/ exiting a parking space:

<table>
<thead>
<tr>
<th></th>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>on a street with no bicycle symbols or lanes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Do you check for cyclists when opening your car door in a parking situation:

<table>
<thead>
<tr>
<th></th>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>on a street with no bicycle symbols or lanes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Motorist's Bicycle Awareness Zone Survey

6. Do you reduce your speed when approaching a cyclist:

<table>
<thead>
<tr>
<th></th>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>on a street with no bicycle symbols or lanes</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
Motorists' Bicycle Awareness Zone Survey

4.

1. Please agree/disagree with the following statement:

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Somewhat agree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
</table>
| Bicycle Awareness Zones make a safer road environment for cyclists than a road without any bicycle symbols at all.

2. Recently a serious crash occurred on your street involving a cyclist being sideswiped whilst passing a parked car. The road authority is looking at options to improve safety. What order of preference would you rank the following options:

<table>
<thead>
<tr>
<th>Prefer most</th>
<th>2nd preference</th>
<th>3rd preference</th>
<th>Prefer least</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove parking on one side of the street to enable bicycle lanes (figures 3 and figure 4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widen the street to retain most on-street parking and enable the bicycle lane (figures 3 and figure 4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retain all parking and install a bicycle awareness zone (figure 2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Please feel free to comment on any positive aspects of Bicycle Awareness Zones

4. Please feel free to comment on any issues or problems you may have in relation to BAZ

5. Any other comments
5. **Motorist’s Bicycle Awareness Zone Survey**

1. How often (if ever) do you cycle on the street?
   - Never
   - Daily
   - 2-3 days a week
   - 4-5 days a week
   - 1 day a week
   - A few days per month
   - A few days per year
## Motorist’s Bicycle Awareness Zone Survey

### 6. For cyclists

1. Each time you cycle, what is the average distance you cycle?
   - [ ] 0-2km
   - [ ] 3-4km
   - [ ] 5-9km
   - [ ] 10-19km
   - [ ] 20-29km
   - [ ] 30-39km
   - [ ] 40-49km
   - [ ] 50km or more

2. What are the primary purpose/s for you cycling? (Tick all that apply)
   - [ ] Travel to/from work
   - [ ] Travel to/from school (including taking children to school)
   - [ ] Travel to/from university, college, TAFE
   - [ ] Travel to/from social activities (visiting friends, eating, drinking etc)
   - [ ] For recreation/exercise (not travelling to a destination)
   - [ ] To access public transport or other transportation
   - [ ] Other (please specify) [ ]

---

Page 11
### Motorist's Bicycle Awareness Zone Survey

1. **Gender**
   - Male
   - Female

2. **Age**
   - 15-24
   - 25-34
   - 35-44
   - 45-54
   - 55-64
   - 65-74
   - over 74

3. **Feel free to make any comments about this survey**

---

Page 12
Bicycle Awareness Zone Survey

1. 

The Department of Transport and Main Roads are conducting an evaluation of different types of bicycle treatments. This study is being conducted in conjunction with a Griffith University thesis project.

**How long will it take and what will it cover?**
The survey has 28 questions, most of which are multiple choice.

It will take 10-15 mins to complete, depending on how many comments you include.

The survey covers the following topics:
- your understanding of the purpose of Bicycle Awareness Zones
- driver behaviour
- how safe you feel cycling in different street types and zones

**What happens with the information you provide?**
The information from this survey will be used to help determine the effect certain types of facilities have on cyclists’ safety and will feed into the further development of bicycle facility design and also road user education programs.

**The survey closes 10 May 2011.**

**Anonymity and Confidentiality?**
The information that you provide will be anonymous and confidential.

This survey will ask you the following group information to help us to make sense of the results:
- Gender, and
- Age category

All results are aggregated so that no personal details can be identified.

The survey is being conducted using SurveyMonkey which is based in the USA. Information you provide on this survey will be transferred to SurveyMonkey’s server in the USA. By completing this survey, you agree to this transfer.

This survey is being conducted by TMR in compliance with the Information Privacy Act 2003.

**Who do I contact for more information?**
If you have any questions about this survey, please contact Nicole Smart on ph 3253 4452.

**Using the survey**
At any stage you can save your answers and exit the survey. You can then return at a later date to finish it off.

If you find that you cannot move to the next page, scroll through your current page to find one or more questions that you have not completed. The system will only take you to the ‘next’ page once all questions on that page have been completed.
Bicycle Awareness Zone Survey

2.

Bicycle Awareness Zone without parking edge line

Bicycle Awareness Zone with parking edge line
<table>
<thead>
<tr>
<th>Bicycle Awareness Zone Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have you ever cycled along a Bicycle Awareness Zone?</td>
</tr>
<tr>
<td>○ Yes</td>
</tr>
<tr>
<td>○ No</td>
</tr>
<tr>
<td>○ Don’t know</td>
</tr>
</tbody>
</table>
Bicycle Awareness Zone Survey

3.

Bicycle Awareness Zone

1. Keeping in mind the image of the Bicycle Awareness Zones (BAZ) above and on the previous page, please mark the following statements as true or false?

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bicycle Awareness Zones provide an area exclusively for the use of cyclists (i.e. other vehicles have restricted access)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle riders are legally required to ride in a Bicycle Awareness Zone</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Bicycle Awareness Zone Survey

2. Keeping in mind the image above of a bicycle lane, please mark the following statements as true or false?

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>A bicycle lane provides an area exclusively for cyclists to use (i.e. other vehicles have restricted access)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle riders are legally required to ride in a bicycle lane</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Please list any other differences between Bicycle Awareness Zones (BAZ) and bicycle lanes that you are aware of:

4. Please mark the following statements about the purpose of Bicycle Awareness Zones as true/false?

<table>
<thead>
<tr>
<th>Statement</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>To warn motorists of the possible presence of cyclists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To denote a dedicated area for cyclists</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To indicate the position cyclists are expected to ride when there is no bicycle lane</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To provide continuity in a bicycle route when there is not enough space for a full width bicycle lane</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Bicycle Awareness Zone Survey

5. As a rider, are there any other benefits of a Bicycle Awareness Zones (BAZ) that you are aware of?

6. Please agree/disagree with the following statement:

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Somewhat agree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The average motorist understands the differences between lane marking for bicycle lanes and Bicycle Awareness Zones.

7. Please indicate how often you feel safe riding...

<table>
<thead>
<tr>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- on a main thoroughfare (with no bicycle facility/symbol)
- on a quiet street (with no bicycle facility/symbol)
- in a Bicycle Awareness Zone
- in a bicycle lane

8. Please feel free to comment on the hazards you face in cycling

An Evaluation of Bicycle Awareness Zones
Bicycle Awareness Zone Survey

4. Conflicts

Conflict: When a sudden change in speed or direction is required by either party to avoid the other (For example: because of a door opening, or a vehicle parking, etc)

1. In the last 2 years, have you been involved in a conflict with a motor vehicle when cycling...

<table>
<thead>
<tr>
<th></th>
<th>On a daily basis</th>
<th>Just about weekly</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>on a main thoroughfare (with no bicycle facility/symbol)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>on a quiet street (with no bicycle facility/symbol)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

2. If you have experienced a conflict, please describe what happened (including the name of the street, whether there were any bicycle facilities present, and whether there was parking located where the conflict occurred, if remembered):


3. In the last 2 years, have you been involved in a crash with a motor vehicle when cycling...

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>on a main thoroughfare (with no bicycle facility/symbol)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>on a quiet street (with no bicycle facility/symbol)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

4. If you have been involved in a crash, please describe what happened (including the name of the street, whether there were any bicycle facilities present, and whether there was parking located where the conflict occurred, if remembered):


**Bicycle Awareness Zone Survey**

5. **In what ways have you observed Bicycle Awareness Zones affecting motorists’ behaviour compared to riding where there is no bicycle facility/symbol?**

<table>
<thead>
<tr>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorists open their doors more cautiously</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists give cyclists more space when passing cyclists</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists reduce their speed when approaching/ passing a cyclist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists watch for cyclists when entering/ exiting parking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists park closer to the kerb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. **Please list any other ways you have observed Bicycle Awareness Zones affecting motorists’ behaviour compared to riding where there is no bicycle facility/symbol.**

3. **In what ways have you observed bicycle lanes affecting motorists’ behaviour compared to riding where there is no bicycle facility/symbol?**

<table>
<thead>
<tr>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
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<td>Motorists open their doors more cautiously</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists park closer to the kerb</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. **Please list any other ways you have observed bicycle lanes affecting motorists’ behaviour compared to riding where there is no bicycle facility/symbol.**
### Bicycle Awareness Zone Survey

5. Please agree/disagree with the following statement:

<table>
<thead>
<tr>
<th>Strongly agree</th>
<th>Agree</th>
<th>Somewhat agree</th>
<th>Neither agree nor disagree</th>
<th>Somewhat disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bicycle Awareness Zones make a safer road environment for cyclists than a road without any bicycle symbols at all.

6. Please feel free to comment on any positive aspects of Bicycle Awareness Zones

7. Please feel free to comment on any issues or problems you may have in relation to BAZ

8. Any other comments
### Bicycle Awareness Zone Survey

6.

1. How often do you ride?
   - Daily
   - 2-3 days a week
   - 4-5 days a week
   - 1 day a week
   - A few days per month
   - A few days per year

2. Each time you cycle, what is the average distance you cycle?
   - 0-2km
   - 3-4km
   - 5-9km
   - 10-19km
   - 20-29km
   - 30-39km
   - 40-69km
   - 50km or more

3. What are the primary purpose/s for you cycling? (Tick all that apply)
   - Travel to/from work
   - Travel to/from school (including taking children to/ from school)
   - Travel to/from university, college, TAFE
   - Travel to/from social activities (visiting friends, eating, drinking etc)
   - For recreation/exercise (not travelling to a destination)
   - To access public transport or other transportation
   - Other (please specify):

4. Gender
   - Male
   - Female
### Bicycle Awareness Zone Survey

#### 5. Age
- [ ] 15-24
- [ ] 25-34
- [ ] 35-44
- [ ] 45-54
- [ ] 55-64
- [ ] 65-74
- [ ] over 74

#### 6. Feel free to make any comments about this survey

...
APPENDIX E: SURVEY RESULTS

E.1 MOTORISTS' SURVEY RESULTS

Have you noticed the yellow symbols on the road?

- Yes
- No
- Don't know

What is the purpose of the yellow symbol (without parking edge line)?

- To warn motorists of the possible presence of cyclists
- To denote a bicycle lane
- To indicate the position cyclists are expected to ride
- To provide continuity in a bicycle route when there is not enough space for a full width bicycle lane
- Other (please specify)
Appendix E - Survey Results
An Evaluation of Bicycle Awareness Zones

**Comparing a road with a symbol on the edge line to a road with the symbol but no edge line, would you be more inclined to:**

- Pass when width becomes available? (70%)
- Hold behind cyclist? (10%)
- Cross the centre line of the road to pass the cyclist? (20%)
- Figure 2 indicates the cyclist must stay left (5%)
- Other (please specify) (5%)

**In a bicycle lane, the markings require:**

- Cyclists to use the bicycle lane unless impractical (60%)
- Cyclists must use the bicycle lane at all times (40%)
- Other (please specify) (10%)
Appendix E - Survey Results

**When passing a cyclist, do you ever cross the centre line of the road (assuming no oncoming traffic) to give the cyclist more room**

- **in a Bicycle Awareness Zone?**
- **in a bicycle lane?**
- **on a street with no bicycle symbols or lanes?**

**If there is oncoming traffic, do you feel it is safe to pass a cyclist**

- **in a Bicycle Awareness Zone?**
- **in a bicycle lane?**
- **on a street with no bicycle symbols or lanes?**

**Are you likely to wait behind a cyclist**

- **in a Bicycle Awareness Zone?**
- **in a bicycle lane?**
- **on a street with no bicycle symbols or lanes?**
An Evaluation of Bicycle Awareness Zones

Do you check for cyclists when entering/exiting a parking space?

- All the time
- Most of the time
- Much of the time
- Some of the time
- Occasionally
- Rarely
- Not at all

- in a Bicycle Awareness Zone?
- in a bicycle lane?
- on a street with no bicycle symbols or lanes?

Do you check for cyclists when opening a car door in a parking situation?

- All the time
- Most of the time
- Much of the time
- Some of the time
- Occasionally
- Rarely
- Not at all

- in a Bicycle Awareness Zone?
- in a bicycle lane?
- on a street with no bicycle symbols or lanes?

Do you reduce your speed when approaching a cyclist?

- All the time
- Most of the time
- Much of the time
- Some of the time
- Occasionally
- Rarely
- Not at all

- in a Bicycle Awareness Zone?
- in a bicycle lane?
- on a street with no bicycle symbols or lanes?
Bicycle Awareness Zones make a safer road environment for cyclists than a road without any bicycle symbols at all.

Recently a serious crash occurred on your street involving a cyclist being sideswiped whilst passing a parked car. The road authority is looking at options to improve safety. What order of preference would you rank the following options:

- Remove parking on one side of the street to enable bicycle lanes (figure 3 and figure 4)
- Widen the street to retain most on-street parking and enable the bicycle lane (figure 3 and figure 4)
- Retain all parking and install a bicycle awareness zone (figure 2)
An Evaluation of Bicycle Awareness Zones

How often (if ever) do you cycle on the street?

- Never
- Daily
- A few days per month
- 1 day a week
- 4-5 days a week
- 2-3 days a week
- A few days per month

Each time you cycle, what is the average distance you cycle?

- 0-2km
- 3-4km
- 5-9km
- 10-19km
- 20-29km
- 30-39km
- 40-49km
- 50km or more
Appendix E - Survey Results

What are the primary purpose/s for you cycling?

Gender

- Male
- Female
An Evaluation of Bicycle Awareness Zones
E.2 CYCLISTS’ SURVEY RESULTS

Have you ever cycled along a Bicycle Awareness Zone?

Yes
No
Don’t know

Bicycle Awareness Zones provide an area exclusively for the use of cyclists (i.e. other vehicles have restricted access)
Bicycle riders are legally required to ride in a Bicycle Awareness Zone
A bicycle lane provides an area exclusively for cyclists to use (i.e. other vehicles have restricted access).

Bicycle riders are legally required to ride in a bicycle lane.

To warn motorists of the possible presence of cyclists.
To denote a dedicated area for cyclists.
To indicate the position cyclists are expected to ride when there is no bicycle lane.
To provide continuity in a bicycle route when there is not enough space for a full width bicycle lane.
Appendix E- Survey Results

The average motorist understands the differences between linemarking for bicycle lanes and Bicycle Awareness Zones.

How often the cyclist feels safe riding:

- On a main thoroughfare (with no bicycle facility/symbol)
- On a quiet street (with no bicycle facility/symbol)
- In a Bicycle Awareness Zone
- In a bicycle lane

Frequency of Conflicts

- On a daily basis
- Just about weekly
- Occasionally
- Rarely
- Never
An Evaluation of Bicycle Awareness Zones

Has the Cyclist Been Involved in a Crash?

- on a main thoroughfare (with no bicycle facility/symbol)
- on a quiet street (with no bicycle facility/symbol)
- in a Bicycle Awareness Zone
- in a bicycle lane

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crash?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>on a main thoroughfare</td>
<td>90%</td>
<td>10%</td>
</tr>
<tr>
<td>on a quiet street</td>
<td>95%</td>
<td>5%</td>
</tr>
<tr>
<td>in a Bicycle Awareness Zone</td>
<td>98%</td>
<td>2%</td>
</tr>
<tr>
<td>in a bicycle lane</td>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>

How do Bicycle Awareness Zones affect Motorists’ Behaviour?

- Motorists open their doors more cautiously
- Motorists give cyclists more space when passing cyclists
- Motorists reduce their speed when approaching/passing a cyclist
- Motorists watch for cyclists when entering/exiting parking
- Motorists park closer to the kerb

<table>
<thead>
<tr>
<th>Behaviour</th>
<th>All the time</th>
<th>Most of the time</th>
<th>Much of the time</th>
<th>Some of the time</th>
<th>Occasionally</th>
<th>Rarely</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorists open their doors more cautiously</td>
<td>90%</td>
<td>10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists give cyclists more space when passing cyclists</td>
<td>95%</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists reduce their speed when approaching/passing a cyclist</td>
<td>98%</td>
<td>2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists watch for cyclists when entering/exiting parking</td>
<td>100%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorists park closer to the kerb</td>
<td>100%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Motorists open their doors more cautiously
Motorists give cyclists more space when passing cyclists
Motorists reduce their speed when approaching/ passing a cyclist
Motorists watch for cyclists when entering/ exiting parking
Motorists park closer to the kerb

How do Bicycle Lanes affect Motorists’ Behaviour?

Bicycle Awareness Zones make a safer road environment for cyclists than a road without any bicycle symbols at all.
An Evaluation of Bicycle Awareness Zones

How often do you ride?
- Daily
- 2-3 days a week
- 4-5 days a week
- 1 day a week
- A few days per month
- A few days per year

Each time you cycle, what is the average distance you cycle?
- 0-2km
- 3-4km
- 5-9km
- 10-19km
- 20-29km
- 30-39km
- 40-49km
- 50km or more
Appendix E - Survey Results

What are the primary purpose/s for you cycling?

[Bar chart showing different purposes for cycling, such as travel to/from work, school, university, social activities, for recreation, to access public transport, and other.]

Gender

[Pie chart showing gender distribution with a majority of males and a small percentage of females.]
An Evaluation of Bicycle Awareness Zones
APPENDIX F: MOTORISTS’ SURVEY COMMENTS

F.1 POSITIVE ASPECTS OF BAZ

- any improvement on awareness is worthwhile;
- as a bicycle rider the awareness of drivers has increased over the last few years due to the ad campaigns and the introduction of bicycle lanes;
- visual signage makes awareness more profound;
- the zones raise the awareness of motorists and give cyclists more room;
- good initiative;
- makes you aware of cyclists when there isn't a bicycle lane. Though a bicycle lane is preferred;
- gives kids somewhere safe to ride their bikes;
- makes you more aware of cyclists in the area.

F.2 ISSUES OR PROBLEMS WITH BAZ

- don't know the difference between yellow and white symbols. There should be an educational video for children similar to the 'slip slop slap' campaign to teach them where to ride and teach young drivers how to drive around cyclists. Courtesy ads on the TV may also help;
- cyclists in my area often ride in packs of up to 30 and ride up to 5 abreast and a BAZ does nothing to assist motorist when this occurs;
- most riders ride with their wheel on the white line and the rest of them jutting into the car lane. They don't keep to the left and they tend to ride as if they don't need to be aware of the cars around them;
- need more communication as I thought the BAZ was actually a bike lane. Bike lanes and BAZs should be wide enough for a car door to open and the bike pass safely by;
- excellent strategy for cycling awareness so long as users actually use it correctly. Cyclists need to make sure they ride with the traffic flow;
- cyclists riding adjacent to each other taking up too much of the traffic lane, making it difficult to pass;
- not enough zones;
- not enough information available to motorists about BAZ. I believe if the road isn’t capable of providing a bicycle lane, then the road should not be a predominant cyclist.
route. Motorized scooters are banned on highways for a reason (can’t keep up with speed), and hence if a bicycle doesn’t have suitable space, it should not be on the road;

- the only issue I have is that with BAZ, vehicles and cyclists are still required to interact. I think wherever possible the two should be separated.
**APPENDIX G: HAZARDS FACED BY CYCLISTS**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Number of respondents listing this hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars pass cyclists too closely</td>
<td>32</td>
</tr>
<tr>
<td>Car doors being opened in path of cyclist</td>
<td>32</td>
</tr>
<tr>
<td>Motorists with bad attitudes towards cyclists</td>
<td>43</td>
</tr>
<tr>
<td>Rubbish, potholes, non- cycling friendly drains, uneven surfaces on side of road and in bicycle lanes</td>
<td>26</td>
</tr>
<tr>
<td>Motorists are not aware of cyclists, particularly when turning in front of cyclists</td>
<td>46</td>
</tr>
<tr>
<td>Bicycle lane ends (e.g. at intersections)/ not enough lanes</td>
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<td>Motorists cross into the bicycle lane unnecessarily</td>
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<td>Motorists who don’t know road rules</td>
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<td>Roads/ bicycle lanes are too narrow</td>
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<td>Cars parked in bicycle lanes</td>
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APPENDIX H: DESCRIPTIONS OF CYCLISTS’ CONFLICTS

- Cycling along David Low Way Pacific Paradise, car approaching from behind with intention of turning left, speeds up, cuts straight in front of me finishes on wrong side of street to left
- Cycling on David Low way, Mt Coolum area, abuse levelled at both of us
- BAZ on Compton rd is on the left of shoulder marking, but is not suitable to use. When riding to the right of the shoulder marking vehicles demand you move into the shoulder because they believe the BAZ is a cycle lane.
- In a bicycle lane cars pass on the right and then turn suddenly to the left across the bicycle lane. Drivers do not treat the bicycle lane as a lane of traffic, they do not move into the lane before making a left turn, instead they turn left from the right lane.
- Webster road inbound near Billabong St. There is no verge so riding in the middle of the lane a car shaved me for "sport". I have had this done a number of times.
- I have had a number of incidents on Kedron Brook RD both inbound and outbound around the shops with motorists opening doors into the bicycle lane and performing all sorts of parking manoeuvres. Council should consider separating the bicycle lane in some way from the traffic or making it no-standing during peak times (this could be done inbound in the morning, outbound in the evening to retain some parking). This is the most dangerous part of my commute and it is very disappointing that there are no dedicated bicycle facilities for cyclists going to the CBD from the north of Brisbane.
- drivers opening doors as you pass, taking off just as you approach from the side of the road, cutting you off as they turn a corner
- Parked cars suddenly opening doors. Hoons shouting when passing. Car drivers passing too close for comfort (centimetres). Car drivers blocking the way after having had to let cyclist (coming from right, car had 'give priority markings) go first at a crossing.
- Regular occurrences of vehicles (often tradesmen's utes out early in the morning) having a laugh by driving as close as possible to cyclists riding abreast when there is ample opportunity to safely and legally pass where there are spare lanes.
- Several times while turning right (north) into Nudgee rd from Airport drive (from the green turn arrow/RH lane), motorists often accelerate past and cut across in front of me as it’s a reasonably long gentle turn and cars can accelerate much faster than me. I think the hook-turn may be the solution!
• Motorist tried to drive me off the road. There were no bike lanes or BAZ symbols and no on-street parking. This happens from time to time, and I put it down to idiot drivers determined to scare cyclists. Stupid behaviour.

• Ringtail Creek Rd, Lake McDonald-No Cycle lane, no parking, quiet rural street. Driver following behind in ute blared horn as we attempt was made to go single file, forced us off the road into gravel and swerved close to road edge in threatening manner. On mountain bikes on sealed road.

• Nicklin Way, next to the 7 eleven service station (Kawana Island Blvd), a vehicle suddenly turned left in front of me and some others. Three or four occasions where people have opened doors of cars in front of me on Alexandra Pde at Alexandra Headland. Cars turning in front of me on David Low Way in Coolum. Car overtaking me and several others, overtaking double white lines on Diddilibah Road and narrowing avoiding head on with oncoming vehicle and sideswiping about 5 cyclists.

• While going around a roundabout, a car entered without looking but saw me at the last minute and had to brake hard to prevent a collision.

• Beach road Mudjimba turning left into Ocean drive. Vehicle parked outside shops took off without regard to cyclist turning into Ocean drive from beach road.

• Car door opening, had to swerve into possible traffic. Bradman Ave Maroochydore, no bicycles present, parking on road

• We have been abused for being on the road while riding through traffic lights (legally). We have been abused just for being on the road full stop for no reason.

• Left turn from Sylvan Road Toowong following bike path inbound cars turning left cut across the bike lane turning left.

• Cutting across lane

• Exiting the Roma street parklands onto Roma Street to connect with the Centenary cycle way (and reverse route). There are no markings for the cyclist and peak hour traffic shows little awareness for the cyclist.

• The bicycle lane on Hudson Road Wooloowin as traffic can turn left onto Chalk Street across the bicycle lane.

• A delivery truck with wide mirrors deliberately came close and veered in front of me 17 Mile Rocks Road 0830 6/5/11

• Person opened driver door WIDE just as I was about to pass, no bike lane markings, marooka
• Wynnum road inbound, new bicycle lane that has a turn into a service station and onto entry ramp for the gateway motorway. Cars constantly turn in front of bikes into the lane.

• Wynnum road inbound at galoways hill. there is a 2 way bicycle footpath heading downhill that crosses 2 side streets and then is also intersected by about 40 driveways, cars are constantly either turning into those side streets and don't see bikes or coming out or into driveways and don't see bikes. warnings describing "driveway" are on the path but there should be warnings describing "cyclist" for the cars too, as it does not matter how slow you are going (difficult downhill) when a car pulls across you from behind or out of a driveway obscured by a fence

• Herston Rd - parking occurs at a squeeze in the road where there is a BAZ

• I am very often passed very close by vehicles on the Annerley Road heading into Brisbane from Dutton Park, even though there is a cycle lane. Some people don't seem to see the lane marking and drive in it or over it regularly.

• Drivers cutting the corner into roundabouts, no particular one....just about all of them on the Sunshine Coast.

• Near misses when motorists failed to give way to oncoming bicycle traffic when exiting residential or commercial property, or performed a left hand turn directly in front of me - various locations. In each instance I had a sense of what they might be about to do and was able to brake heavily to avoid collision. Verbal abuse (and road rage) when cycling on major roads where no bicycle symbols exist. Please note I am a considerate road user and obey the road rules at all times. I do not respond to abuse and avoid conflict.

• Having to swerve to miss a car door opening and not having time to look behind for possible traffic coming from behind.

• I was cycling along Mt Ommaney Drive quite some time ago and a motorist opened their car door without looking first and I managed to avoid her. As far as I can remember there were no bicycle lanes or awareness signs and the only cars parked were likely to have been local resident's cars.

• Impatient driver hooting when behind cyclist in single file. Seemed the cyclist had issues. Interesting cycling on Brisbane river loop had more patient motorists. Redlands motorists seem a lot more impatient.

• Motorist entering intersection from left and not seeing cyclist 1x Westlake Drive  1 x Sherwood.
• Someone threw a can of coke at me (Nicklin Way, was on the shoulder, wasn't doing anything)
• Coronation Drive pathway Brisbane, cyclists regularly get into conflict with each other and pedestrians
• Mooloolaba Brisbane Road, old pedestrian abused me for being on the footpath (no room on road for bikes)
• closest one would be on kingsford smith drive, I was filtering on the left, and a car turned into a side street without looking or indicating & almost cleaned me up. No bike lane or parking. Another would be when I was riding down Lancaster rd in Hamilton, car heading the other turned right ahead across my path - either underestimated my speed or didn't see me. There is a bike lane there (which disappears before the intersection, and is frequently parked out anyway) but I wasn't in it - was trying to increase my visibility through the intersection.
• Doors opened in front of me. cars passed me then turned left cutting me off
• Bottle thrown at me for no particular reason. Cars parked in cycle lane - i.e. Nicklin Way near new Edge building, David Low way - surfers north of Peridgian Beach , numerous trailers with signage blocking cycling lanes Nicklin way
• cars were parked in the bicycle lane - motorists opening doors without looking. Herston road.
• Burrendah Road, Jindalee. Outside childcare centre and Jindalee Primary School - cars parked. There's a BAZ (according to what you are referring to as BAZ - I do not consider this to be BAZ). We, myself and partner, cycling in BAZ on Burrendah Road and then indicated (right arm out) with plenty of time and space to move around parked cars into the road but a tailing motorist was not impressed with this so proceeded to beep his horn and make rude gestures at us. There was no on-coming traffic.
• Verbal abuse, cars driving very close either on purpose or because they see bicycles as stationary (i.e. unmoving) objects
• Too many streets to describe, but incidents include:
  - being overtaken and then cut off by a vehicle turning left or stopping to park
  - parked car suddenly pulling out from side of street
  - vehicle pulling out from side street to turn left or right directly in front of me
  - door suddenly being opened by parked vehicle
  - vehicle passing very close to bicycle
- pedestrian crossing directly in front of bicycle
- abuse from drivers for no evident reason

Of these incidents many of these have occurred in bicycle awareness zones and bicycle lanes

- at road junctions, & where parking was not the issue - the driver just didn't see me (the cyclist)
- Quiet street. NO zones/ partial lanes - biggest issue is motorists opening doors or moving to cars or crossing the street without looking.
- Nudgee road; motorist overtook me to turn into a driveway. Had to come to a complete stop to allow the person to go past.
- Kingsford Smith Drive; Semi-trailer overtook me but didn't allow enough room, and merged back into my lane while I was still in it. That road is just plain dangerous.
- I find that bicycle lanes are generally in more built up areas and even when you ride inside of them motorists tend to be rude as they tend to be more hassled (e.g. Gympie Terrace, Noosaville). Generally there is parking where the incidents occur.
- I have not kept a log of the last two years of 'conflicts'. However, today, for instance, turning left from Annerley Rd into Stanley St (at Clarence Corner/Mater Hill), a taxi cut into the bicycle lane (which exists on Annerley Rd, but not on Stanley St for fifty metres or so) causing me to stop. This conflict was not related to parking.
- too many to list - often being cut off by turning traffic on Vulture st with traffic turning up to Leopold st and riverside dr, Kangaroo point.
- Not being given right of way at Cracknell Rd & Tarragindi Rd intersection.
- Turning traffic on Annerley rd, not infrequently traffic cutting the corner and moving into the bike lane at Grey St/ Stanley st intersection outbound, or Annerley Rd/ Gladstone Rd corner outbound, or parking cars on Grey st, Southbank, obstructing the bike lane etc.
- I work near RBWH. There are many cyclists in this area (Bowen Bridge Rd, Herston Rd, and Butterfield Street). Generally, I feel stressed and anxious as a driver because other motorists don't pay attention to cyclists, and cyclists often cycle as part of the traffic. They don't stop at red lights, ride in the middle of the road (thereby disrupting the flow of traffic), and often move from the cycle lane directly across and in front of traffic to turn a corner. I have seen cyclists crash into open car doors (where both the driver and the cyclist were at fault - the driver didn't look before opening the door, and the cyclist wasn't looking straight ahead so didn't the door open).
• I had a frightening experience on TJ Doyle Park Drive, just under the Green Bridge. I was passing one other cyclist at approximately 6:30am and a driver pulled up alongside us, rolled down his window and started screaming obscenities because we were riding two abreast. Then he swerved his car at us and drove off. I haven't noticed whether it is a bicycle awareness zone (there definitely isn't a bicycle lane), but it is a major cycling route.

• Motorist crossing Sylvan Rd Toowong without regard for cyclists in bicycle lane. Motorist turning right out of a side street onto Sylvan Rd Toowong without regard for cyclist turning right into same side street.

• Car pulling out side road in front of me – Townsville

• Car turning in front of me (U turn) St Lucia (BAZ) just off Coronation Drive on the way to UQ on the side street the bike route takes you

• Happens too often to remember. Idiots swinging car doors open. 4WD's wandering across lanes while driving snot-nose, fat kids to school. Last minute indication for a left turn from the right lane. etc.

• Old Cleveland Rd (Camp Hill) a bicycle lane disappeared abruptly and a bus forced me into the gutter. Stanley Rd where two lanes go to one after a set of traffic lights and there is a bicycle lane, but during my commuting times it is always filled with parked cars all the way up the hill. Cars, buses and trucks regularly force me off into the parked cars. Meadowlands Road, in the past two weeks I have been forced into the gravel by semi-trailers travelling at high speed.

• Conflicts occur almost weekly. Most are passive aggressive in which the motorist use engine noise, pass too close almost clipping me when there is plenty of room. I use the Moorooka - Yeronga bike path and then travel along the Brisbane Corso to the Green Bridge. I've had issues along the whole route but higher occurrence along the Brisbane Corso and Park Road, Yeronga.

• Mainly on Montague Rd and Vulture St. There are BAZs, but unless you take up the entire lane motorists will frequently try to get past you in places where there is not enough room for error. I often have to brake quickly to avoid being wedged between a parked car and passing traffic.

• I regularly experience issues with motorists at box junctions (including Ipswich Rd/Stanley St) where motorists misjudge how much room they have and then park across the bicycle lanes once the lights have changed. Clearly marking these with a yellow grid
and using cameras to manage infringements, as they do in many other jurisdictions, would go some way to alleviating this problem. The other issues I've had include being tailgated by b-double drivers who think it's appropriate to drive with horns blaring and lights flashing in an attempt to intimidate cyclists off the road, having abuse shouted at me by pedestrians and passengers in motor vehicles and being nearly squeezed off the road by a BCC bus.

- Conflicts have usually arisen from: random abuse yelled by male passengers in passing P- plated cars; cars not giving way to cyclist despite having seen the cyclist
- Montague Road and yes parking everywhere, doors opening without warning. A lot of cyclist where forced onto Montague Road after the floods. I've had 'tradies' (they are the worst) swerve in front of me and lock up their brakes on two lane roads when they had no other cars around, just because they hate bikes.
- On land street, when travelling toward CBD and cars are turning left into Dixon Street
- Too many to document. About once a month I have a disagreement with a motorist. Most often when they are on their mobile phone and driving erratically.
- A bus cut me off on Hawken Drive at the top of the hill heading down towards Coles. Had I not stopped immediately I would have been crushed against a barrier or thrown down an embankment. This was in a Bicycle Awareness Zone.
- Oxley Rd near the Graceville School. I was in a cycle lane. A police car turned left directly across my front wheel without indicating, causing me to swerve, brake heavily and to give the police inspector driving the vehicle a free and frank character assessment.
- normally verbal abuse from motorists.
- Car failing to give way resulting in near miss on Fernvale Rd, Tarragindi. This is a 60km street which is reasonably quiet with no bicycle markings. Also instances of cars travelling too close in unmarked street. Also seen issues with road crossings at traffic lights. Large amounts of money spent on upgrading road and creating bus facilities but bike riders left without anything. Have to wait at traffic lights which are heavily biased to traffic and take too long to change. This results in bike riders crossing at red light. This street is O'Keefe St between Stones Corner and Ipswich Road.
- Just try riding down Edward Street to the Botanical Gardens during peak hour. Please provide a safe route.
- overtaking or squeezing at facilities inserted into the road creating a squeeze point e.g. ped median islands, added lanes at intersections, added bus stops or parking are typical of
the incidents ... worst case was being overtaken and squeezed into the footpath kerb then
told to use a footpath ... and another being overtaken by a BCC bus on a very narrow road
where the speed limit is 60 despite the road being substandard ... where the BIG BAZ
should be in the middle of the uphill lane to warn motorists of likely cyclists going quite
slowly uphill.

• Every day, a parked car door opens that needs to be avoided. Drivers on mobile phones
cutting across lanes. Drivers not indicating. Trucks and buses forgetting how long they are
and squeezing a corner. etc.

• Cycling along Gympie Terrace (BAZ) and a car made a right hand turn in front of me that
was such a close call, I had to stop and re-gather my composure. I'm sure the driver's only
motivation was to save one second by not giving way to me at this corner.

• Stanley Street, Woolloongabba. The bike lane in front of the Mater Children's has parallel
parking next to it, leading to motorists opening doors into it and using it as parking /
standing / loading zone.

• Cars coming too close. Yelled abuse at and even had objects thrown. This has happened
on numerous occasions, mostly by myself.

• Parked cars along BAZ near school in Wongaburra St and Burrendah Rd; and near sports
ground in Wongaburra St, Jindalee. Car doing a U turn at side street intersection across
BAZ in front of me in Burrendah Rd. Car travelling on wrong side of road as I rounded
corner into Lanena St, and car doing unsignalled U turn (but with hand signals when I
complained loudly) in front of me in same street (no facilities).

• Grey St in South Bank - Often have cars pull out of kerbside parking bays without seeing
me on a bike (in the Bicycle Awareness Zone

• car overtook me, then pulled in close to the kerb and was forced to brake hard due to
stopping traffic in front - left me with very little room to avoid/stop - I had to lean hard on
the back of the car to avoid colliding with it and/or hitting the kerbing and crashing.
Kingsford Smith Drive, Hamilton. No parking, no bike facilities (except footpath).

• The Esplanade, St Lucia, on a downward incline. Driver pulled out in front of his
driveway in front of me without even looking at the road except directly in front of him. It
was 0515. I had to go to the wrong side of the road to avoid a collision. Road was empty
of other vehicles.

• Adelaide St Bne CBD. BAZ and green zones.... Edward St CBD, no bike facilities. No
parking at the times (peak hours).... Vulture St Kangaroo Point. No bike facilities or
parked cars. High St Toowong. No bike facilities, there are parked cars. Moggill Rd Chapel Hill, no bike facilities or parked cars.

- O'Connell Tce, Bowen Bridge Rd & Butterfield St - used to be a bike lane marked on O'Connell Tce but now it is a BAZ. Much more dangerous since the marked bike lanes were removed. Kedron Brook Rd - road is too narrow and the BAZ makes drivers think I should be riding behind the marked line. Intersection with Mina Parade, Wakefield St Fredrick St - this is a very dangerous intersection. Cars do not give way correctly here and I have been nearly run over here several times exercising my right of way (now I come to a complete stop before turning just to make sure). This intersection is part of the 'Northern Suburbs Bikeway' - it is an absolute shocker. To add one more danger here an 'Indoor Sports Complex' has just opened on Mina Pde. Parking is inadequate and cars disregard the road rules.

- Samford Road (Brisbane side of the hill) occasionally get squeezed for room as the verge has been reduced in the resurfacing works) otherwise occasional vehicle entering traffic from left, or making a left turn and misjudging my speed

- Gladstone Rd, Highgate Hill, bike lane: Semi-Trailer passed me at approx. 1m away. The truck was probably travelling between 60 - 70kph, at this speed and proximity I was sucked in to its path by the change in air pressure. I completely lost control and came within a foot of going under its wheels. I only stayed upright by chance.

- Merthyr Rd, New Farm, BAZ: Council bus cut me off with a "right hook" - I was cycling on the road, the bus passed me and failed to give way, it turned in front of me to pull into bus stop. I had to take evasive action and was forced into gutter.

- Haig Rd, Auchenflower, unmarked: Fairly main road, no bike markings, I ride it almost daily, cars cut me off and pull out in front of me almost daily forcing me to take evasive action.

- Roma St, Brisbane City, unmarked: Ride this road almost daily to travel to Paddington. There are minimum to zero bike markings on the road. Evasive action is required almost daily.

- Grey St, South Brisbane, BAZ: Yellow Cab pulled out without seeing me, I made contact with back side door. No damage but evasive action required.

- Montague Rd, West End, BAZ: I ride this street weekly, evasive action to avoid crashes is required daily.

- I exit a bicycle lane to enter into traffic (Roma Street turning right into Parklands
Boulevard) daily. Some motorists do not think there is ever a reason for leaving the bicycle lane.

- Albert st, Brisbane: often needing to stop quickly to avoid car door opening as a passage hopes out while car sitting at lights at intersection with Mary Street in the morning, or pedestrians crossing Albert st (not at the intersection)
- Occassionally on corro bike path, normally to avoid pedestrian or cyclist straying across lines
- Kedron Brook Rd Brisbane - motorist walked straight into bicycle lane without looking for bicycles and opened car door.
- Annerley Rd Dutton Park - riding in bicycle lane, overtaken by car then about 30 metres later the car turned left across bicycle lane. Had to brake suddenly to prevent collision.
- All have included door openings, drivers changing lanes without looking, vehicles entering/exiting driveways (both residential & commercial) in a large number of locations.
- Mitchelton - signalled to driver not to overtake when approaching blind T intersection. Driver did overtake, swerved towards me forcing me onto footpath, spat at me, drove beside me and hit curb, got out of car to fight, waited around next corner to fight again.
- Assorted locations, primarily;
  - vehicles passing too close in order to threaten you.
  - driver abuse and threats.
  - Buses cutting in on you or passing way too close.
  - vehicles turning left across you often without indicting
- Recently a driver in small truck deliberately hit me on shoulder with wing mirror on Cornwall St near Earl St. Would have knocked me off except I realised he was too close and swerved into shopping centre driveway a moment before impact. No bike lane, BAZ or parking present. Action was deliberate as passenger was laughing at moment of impact.
- Lutwyche Road. Most afternoons on commute home from work.
- Latrobe Terrace, Paddington. Bicycle awareness zones. Parked cars exiting without looking for bicycles, cars passing to closely, cars failing to allow me to position myself for a right turn (cnr Latrobe Tce & Enogerra road).
- Wynnum Roar. Cars pushing in front of a cyclist turning left or entering the traffic. Regardless of bike line or not. Sometimes they were accidental. Few cases the drivers were very old people with restricted capabilities to drive a motor vehicle (just my private
An Evaluation of Bicycle Awareness Zones

observation). The same happened on quiet streets.

- Gray St Bridge - no facilities - trucks overtaking close
- Hale St - heading towards the Go Between Bridge - another case where there are designated turning left lanes
- Corro Drive in bound at the Hale St exit
- Corro Drive - Coming off Go Between Bridge onto Montegue Rd, no turning right lane for cyclists
- Coming off Go Between Bridge (north bound) and onto Hale St - no cycle lane between turning left lane and straight ahead lane
- Upper Roma St, Petrie Tce - no bike lane between turning left lane and straight ahead lane.
- Countess St - heading from Roma St intersection on to Gray St bridge, no bike lane between turning left lane and the middle lane - this one is even more dangerous because the middle lane can go either left or straight ahead onto William Jolly Bridge - this is often a hot spot for drivers to get annoyed at a cyclists who needs to go straight ahead onto William Jolly.
- Stanley st near the Mater, the whole way from the SE freeway to the South Bank (Gray St) turnoff (now this one actually has a bike lane for cyclists to turn right from - good example of how it should be everywhere).
- Musgrave Road both inbound and outbound particularly on the uphills of both sides of the hills (i.e. coming from Ashgrove or coming from Normanby 5 ways) this road needs to have bike lanes at least on the uphill sides of the roads.
- College Road, again another turning left scenario coming up to the Normanby 5 ways from the city, no bike lane, and then once you get through the intersection on to Musgrave road the road narrows and then cars are either getting around you to get on to Hale St or to get on to Inner City Bypass. The turn off for the Inner City Bypass from Musgrave road - outbound is particularly bad for drivers speeding up to overtake take the exit.
- Latrobe Tce - cars parked on the side of BAZ during peak hours - is just ridiculous - particularly considering that it is a main bus route, so when buses are passing and wondering if a car door is about open - nerve racking.
- Don't get me started about Buses - I’ve had buses i.e. BCC buses pass me on uphills closer than arm length distances away from me, I make a point to the bus driver by
putting my arm out to the right (which is less than 1 Metre) and sliding my hand along the bus as they pass, only to then stop at the next bus stop where I overtake them on the right again... what was the point of nearly hitting someone just to stop 20m ahead?

• Coming off William Jolly Bridge (heading towards Southbank), cars jump across from the left lane to the left lane in front of you, this is particularly worse during peak hour traffic when the two lanes that turn right are stopped and they want to get to the left lane to go straight ahead... they don't realise when they are overtaking you, half in the lane, that when they just get in front of you that they need to stop because the cars are queued in the traffic jam, hence they pull back in front of you and stop, this has almost caused me to lose it because I have had to swerve and stop in an instant.

• First two due to mainly cars not liking to give space to cyclist. Last one is one location only by a frequent event at the same location Bicycle lane on corner of Oxley Road and Queenscroft Street (next to sporting club) going towards City-Sudden loss of bike lane due to stop line for cars being put forward and cars jutting out into area in which a bike would be travelling. Very thin bike lane on City side of Queenscroft Street then returns to normal then oversized bike lane. No lane indicators on street crossing and then thin lane makes it look as though the cycle lane has stopped prior to Queenscroft Street. I have been hit by slow moving cars 3 times in the past 6 months. Seen others suffer the same fate. No major injuries being hit a low speed and car drivers having exceeded stop line happy to assist rider to return to riding.

• Generally the conflict is a motorist turning or reversing and not noticing the BAZ. Alternatively it is the cyclist trying to go in a different direction from the BAZ or cycling lanes which are very difficult - Brisbane, West End, South Bank and City.

• Kedron Brook Rd is on my daily commute, and I regularly encounter drivers driving in the bicycle/BAZ (it changes along the length of the road) - either because they find it difficult (are lazy) to negotiate slight bends in the road, or the move into the "free space" where I am frequently riding to overtake right-turning vehicles. on the streets around home, where there is traffic calming, but no bicycle facilities, I am frequently pressured at squeeze points (drivers rarely wait until there is sufficient space to pass safely) - although this is no different from travel on main roads.

• On-street parking significantly impacts on sight lines at intersections & drivers frequently nose out into bicycle lanes to "see out" - which means I have to move out into traffic.

• Motor vehicles cutting corners on Dawson Parade as its 60 zone so they try and do it
through the corners.

- Motor vehicles failing to give way or stop at stop signs,
- Motor vehicles running red light in numerous places in particular in the valley on Wickham Terrace in the valley.
- Changing lanes without indicating throughout the city and valley.
- No cycling facilities or BAZ were in the area although there was sufficient road width for either. No car parking was evident along the road.
- Taxi drivers are the worst at pulling out without indicating or cutting you off. Typically it is people not being aware of me rather than anything malicious.
- The bicycle lane leaving the airport from the DFO is new where the old roundabout used to be and goes across the exit to the old Gateway motorway. A car behind me gave way while I was on a bicycle lane but another car overtook us both and then cut across my path on the bicycle lane to turn left and posed a serious threat.
- Cut off, bottles thrown at me
- Hargrave Rd west end near school zone - bike lane and bike awareness zone markings had a car uturn on me and knock me into the gutter. Called ambulance who then had to involve police, pursued the driver and won civil action as well as demerit points for driver. New bike paid for and loss of income to value of 15,000 in conciliation.
- Cars have opened doors in a no parking area of Roma St.
- Cars have cut corners on 5th Pine Rd at Everton Park numerous times.
- Motorist caused me to brake suddenly when they almost entered the roundabout at Karawatha Drive coming from the Sunshine Motorway in Buderim. No bicycle facilities exist here, but many bikes pass through here as it is a main place to pass under the sunshine motorway.
- A motorist tried to turn left across me while riding in a bicycle lane on Boggo road instead of slowing and passing behind me. Had another motorist try the same manoeuvre at a service station in Inala. There was no parking adjacent to both incidents.
- Dornoch terrace. Trucks going up Gladstone Road. Bicycle symbol on road. Trying to squeeze pass cyclists.
- Old Cleveland road. Car doors and cars trying to pass unsafely. Once a truck passed and then pulled in front of the group on a Sunday nearly causing an accident. The truck driver was unapologetic and began berating the cycling group for being on the road.
• Along the main drag in Cleveland, coming off a roundabout I was forced to undertake a sudden change in direction due to a car door suddenly opening. There is a bicycle lane present, but cars were parked all along the street in the bicycle lane.

• I have had cars open doors on me

• I have had a car turn left in front of me, resulting in me hitting the back of his car and me flying into the next lane of traffic

• Whether or not bicycle infrastructure is there, many motorists do not look for, no respect cyclists.

• Where there are roundabouts, Oceanic Dve Wurtulla, or Ocean Dve Twin Waters. If the cyclist keeps to the left of the road, intending to go straight ahead, cars will turn left, forcing the cyclist off the road.

• There is no difference concerning driver attitude whether or not I am in a Baz or bike lane or anywhere else on the road. People think they own the road, they don’t they own a car/truck/etc.

• Shared BAZ with vehicles trying to park or leave.

• Eagle St, Creek St, Adelaide St and Edward St in Brisbane are part of my commute. I occasionally have vehicles changing lanes or moving out from being parked into my path. I have even had one motorist deliberately move his car right in an attempt to block me. This is not as often as weekly, but probably happens most months and I need to ride vigilantly and prepared to give way.

• It’s usually in the form of verbal abuse from drivers telling us to get off the road. Or getting buzzed by drivers who think they have the skill to drive within inches of me.

• The one time though was on the Gold Coast at the large roundabout collecting Hope Island Road + Helensvale Road + Broadwater Avenue. I was in the roundabout and in one of the entering lane a small car was approaching but it didn't appear to be slowing down. As they were getting closer I thought that they have not seen me and so I swerved to get away from them but they still kept on approaching me. Only metres from impact I yelled as hard as I could and then the car slowed and went around me. I was so upset when I looked in the side window to see 2 young girls playing with a hand held device and giggling (maybe I am now on U-tube). What got me more upset was that she had a red P plate on the rear window so she was a new driver on the road. Apart from that it's usually the drivers who are just that little bit less cautious or are still not used to look out for such a small sized road user like a cyclist. Early mornings before the sun is up I wear many
lights (flashing and steady) and reflective bands.

• It happens on any street almost every time I ride. Cars cut in front of you, and then turn left. They pass very close to you and press the horn. They cut in front of you then slam on the brakes. Buses will try to drive you into the gutter or into other parked cars. Cars pull out of side streets or from driveways in front of you even when you are going very fast as they have little appreciation of how fast a bicycle can actually travel. There is one place in particular that is bad every time I ride - Cars pull out of the multi-level parking centre in front of bikes onto Fred Schonnel Drive near the University of Queensland. There is a bike lane that ends at the driveway and turns into a lane. Cars assume that there will be no cars in that lane but never check for bicycles. I have been nearly hit there on a regular basis and now just expect cars to pull out in front of me without looking. As a result I sometimes ride in the righthand lane to avoid this happening.

• too numerous to mention. Usually involves cars parked in bike lanes
• Sandgate Rd beer can thrown out of window at me. Childs Rd Nudgee, verbal abuse
• Lomandra Drv Lorrys running me off the Rd (many times)
• Fortitude valley. Traffic merging into lane occupied by me without looking. (weekly occurrence)
• Kichener road, cars parked in cycling awareness zone forcing, me into path of vehicles.
• White bus almost kills me by squashing too close to parked cars when passing.
• Backroads in Deagon, car pulls out in front without looking.
• Cars "buzzing me" as they drive pass
• Cars accelerating to pass me then braking hard to turn left across my nose causing me to brake/swerve suddenly
• Drivers coming too close, in all situations, whether you have a dedicated lane or not, whether there are parked cars or not (but parked cars make it worse as it puts you in the through lane)
• Roma St Parklands, Boulevard. Herston Road. Newmarket Road. Wilston Road. South Pine Road. Old Northern Road.
• Aggressive and dangerous driving, cutting off, illegal lane sharing, tailgating.
• Too many to list and recall the details.
• Been spat at while riding on the Niclan Way Kawana
• On numerous occasions I have had cars pull out in front of me, roar past me and turn left
in front of me and overtake me without leaving enough space.

- On Sugarmill road in Eagle Farm I had a concrete truck come within a foot of me and forced me off the road when there was no on-coming traffic.

- The Minimovers removal van which exits their premises on Ryans Rd Northgate at 7:00 am each morning regularly pulls out in front of me. I don't know if they don't see me or don’t care but sometimes I have to brake hard. Sometimes I have enough speed to have the satisfying experience of passing them as their truck accelerates very slowly. Ryans Road is a popular cycle route but it doesn't have any bicycle markings (despite my requesting the council to apply some). Because there are lots of units and it is near the rail station it always has lots of private cars stored for free on the road shoulder.

- Edward Street in front of the Stanford Plaza a Maxi Taxi driver opened his door almost striking me.

- The old left hook: I'm going straight ahead in a bicycle lane, numpty motorist simply can't cope with the idea of waiting behind me to turn left into an oncoming street. So he pulls in front of me, turns left across me, and drives off with impunity. Meanwhile, I've had to lock the brakes, swerve, mount the kerb, do any one of a number of things to avoid a collision. But somehow cyclists are the menace on the road! This has happened on a number of occasions, but the one that sticks with me is riding down Kedron Brook Rd, Wilston, heading towards Newmarket Road. I'm doing 40Kph in a 40 zone. Numpty pulls in front of me to turn left to head up to the train station (I don't know the name of the road), and then has to hit the brakes because he (due to ridiculously poor judgement, IMO) did not see a pedestrian crossing the road there. Of course, if he'd done the right thing and waited behind me - like he would've done with another car - he would've seen the pedestrian in plenty of time. So: I, doing 40Kph, have to brake super-hard and swerve (thankfully no cars behind me) because not only have I been left-hooked, the fool in the car stopped dead in front of me. What a frigging idiot. I'm sorry if this sounds angry, but people like this shouldn't be allowed to drive. I'm tired of reporting incidents to police only to be told "what do you want us to do about it?". Do I need to be squashed under the wheels of some fool before this sort of thing will be taken seriously?

- Too many to mention. Cutting in front for a turn; not giving way (even at a stop sign!); passing too closely; passing too quickly; overtaking in dangerous (for cyclists) 'pinch points'; I could go on...

- I was riding down the Turbot St bike lane into the CBD when a car pulled across in front
of me and stopped in the bike lane to let out a passenger. I had to brake and swerve around the car to avoid running into the back of it. It appeared that the driver did not consider the bike lane to be a "legitimate lane" and therefore was not required to give way to me.

- Had a car hop into a bicycle lane about 300 metres prior to turning left. I stopped in the middle of the lane and refused to move indicating to the "Asian" driver that they were not allowed to use the lane as an extra car lane.

- Railroad left hooked from bicycle lane, forced to halt to avoid sideswipe in bicycle lane from driver adjusting gps. forced out of bicycle lane by opening doors without time to headcheck traffic lane.

- Cribb St Milton turning into Railway Tce (often cars overtake then cut left in front), or alternatively the opposite direction, turning left into Little Cribb St from Cribb St (where cars similarly overtake then cut in front). I do not believe there is any bicycle priority present, nor is parking generally permitted. I also have experienced problems on Gladstone Road at Highgate Hill, both uphill and downhill with the change from BAZ to bike lane... where there is parking and changing widths and a curve.

- door opening, pedestrians stepping out from the kerb or car

- Cars sometimes stop in the bike lane along Vernon Terrace (Teneriffe) if they are waiting to pick someone up etc.

- Logan Road, Greenslopes (opposite the old bowling alley) (inbound) No bike facilities. Adjacent parked cars and busy bus stop forcing three lanes of traffic through a space wide enough for one and a half. I was riding in the left lane to get around the parked cars. A council truck with a trailer swerved very close around me, cut across my lane and partially into the bus stop leaving me with nowhere to go. I have been similarly cut off by busses who then pull up at a bus stop in front of you.

- Cars parked in the bicycle lanes forcing me into congested traffic lanes. Locations include Logan Road, Holland Park, Stanley Street, South Brisbane and Grey Street, South Brisbane.

- Can't recall much specific - just having to move out of the way of opening doors.

- I have pretty much given up cycling on the road because it is too dangerous. Instead I drive my car now.

- Yesterday a car entering Inala Plaza car park turned in front of me. I had to brake to avoid hitting them. I think they underestimate the speed I am travelling.
• Parked car door opened. I was cycling East in BAZ on Richmond Road (Carina) near Avon St.

• Taxi's making careless u-turns on quiet streets near Shafton Ave (Kangaroo Point)

• Riding in BAZ on Waminda Street a car driving in same direction in front of me indicated to turn right into Moolabar or Foxton St. The car behind him and beside me pulled left to undertake him - directly into the BAZ and on top of me. As I banged on the side of his 4x4 to stop him smashing me onto the barrier he seemed surprised to see me even though he had come from behind me to perform his fantastic manoeuvre so he could get home quicker.

• Nearly killed by large white van which was exiting from Beatrice Ln as I cycled towards city on Albert St. There were no other cars around and she just did not see me even though it was broad daylight and I had my lights and reflective bands on. He pulled out right on top of me and if I had not shouted he would have accelerated over the top of me. He stopped inches from me and there was nothing I could do even though I was going slowly. That was a week ago and I have not cycled since.

• I was cycling outbound along Hawthorne Rd, Hawthorne where a BAZ is present. After allowing for parked cars there is about 2 feet of space left inside the BAZ line. Just free-wheeling down Hawthorne Rd gets you above 40km/hr, so riding within the BAZ line is not an option. I've been abused on at least 4 occasions in the past year for not riding inside the BAZ line.

• At the roundabout at the intersection of Kedron Brook Rd and Days Rd, Grange, I have frequent occurrences of cars failing to give way. I ride up Kedron Brook Rd and turn right at the roundabout onto Days Rd. Cars coming from Days Rd on the left very often do not give way. I have had to brake very hard to avoid being hit. I have also experience multiple times where traffic has banked up and I have been passing traffic on the left. Cars on the side street merging into the banked up traffic do not generally give way or even look for cyclists. This mostly occurs where there is no bicycle lane.

• Climbing Gladstone Rd to the Dornoch Tce intersection. A dump truck from Abyss Demolition, clearly as wide as the curbside lane, did not slow to avoid me but forced me to evade, luckily a bus stop lay-by provided space. The driver, later, claimed ownership of the lane and told me to bugger off. This is typical of driver behaviour. Bicycle facilities such as bike lane or BAZ are irrelevant to these 'professional' drivers.

• car door opening in bike awareness zone on Haig rd Auchenflower/torwood
• Abused by the driver of the car
• Sylvan rd, bike awareness, cars pulling in and out, parking going, to the rugby club
• sylvan rd bike lane, cars cutting the corner taking out the bike lane
APPENDIX I: DESCRIPTIONS OF CYCLISTS’ CRASHES

- cycling along coronation drive, a car swerved at me without looking and force me into the gutter.
- Parked vehicle pulled out of side of road and started executing u-turn. Did not check blind spot or mirrors. I collided with front driver’s side of car. No bicycle facilities present, but is a major thoroughfare for bicycles - Myrtle St, Woolloongabba
- All crashes are glancing collisions by cars passing to the right in the same lane as I am travelling. They have happened all over the place, to many to mention.
- Cur turned left and stopped directly in front of me into on-street parking, without indicating.
- Never involved in physical crash with motor vehicle. Had Off road mountain bike crashes in State Forests but none involving road bike and other road users. Plenty of near misses with vehicles primarily at roundabouts and with cars turning left in front of me going straight ahead.
- No crashes in the last 4 years doing around 400km per week
- Turned left in front of me
- Not been involved myself, but have been close to one on Annerley Road, Brisbane, where a cyclist hit a car which was turning through a gap in stationary traffic into a side road. That was 100% the cyclists fault as he was travelling far too fast down the inside of the traffic queue, and had no appreciation that vehicles may cross in such circumstances. As a motorist as well as a cyclist, I could see the potential danger and had slowed down, but this idiot shot past me and then hit the car. I don't think people should be allowed to ride bikes on roads unless they have a full driving licence and will thus hopefully have some road sense.
- I was hit from behind from a car travelling at 60kph, last November 2010, I have 2 fractures now in my lower spine. I was cycling along Forest Lake Boulevard at 5.50am it was daylight, I had my hi vis vest on and my front and rear bike lights flashing even though it was daylight. There were no bike facilities present, not parking either were the crash occurred.
- I was on footpath (no room on road, Nicklin Way, Currimundi just before bridge) Car turned into a driveway in front of me, I slammed on brakes, went over handlebars
- Boomerang Street, Milton. The alignment of the path at the intersection with Milton
Road is very dangerous as motorists are trying to enter busy Milton Road and cyclists (and pedestrians for that matter) are directed (due to design of path) to cross in front of the motorist. Car clipped my front wheel (and had no idea that he had) but luckily I somehow managed to avoid injury with minor damage to front wheel.

- Had a crash with another cyclist on a blind corner coming off a bridge; no possible way for either of us to have seen the other; and we were both on the bike path. Damaged both bikes and injured both riders.
- I've had a crash riding along Sir William Macgregor Drive at UQ where a taxi was speeding to over take me only to cut in front of me turning into College Road. I came off my bike but the taxi drove off.
- When I lived in Melbourne I car opened there door onto me and I crashed into it and fell off.
- Hit by a car on a roundabout at the junction of Uxbridge Street and Evelyn Street in the Grange. The driver was apologetic and paid for the damage to the bike (broken back wheel). I was unhurt. They said they just didn't see me despite it being perfect weather conditions with no breaks in the light of sight. There were no specific bicycle facilities.
- Chased by a dog, crashed into a parked car (very unfortunate you stipulate in the last 2 years here...)
- Main road in Enoggera. No bike lane. Car passed too close and struck my elbow with his mirror. I didn't fall. He drove off.
- I was hit by a car on Vulture Street while turning right into Ipswich Road. The driver failed to give way.
- Swann Road, Taringa, deliberately hit by a BCC bus, BAZ. Cars parked alongside. Door risk.
- Car door opened in front of me on Old Cleveland Rd, Coorparoo. A parking zone outside of a school with a bicycle awareness adjacent to the parking.
- I fell when taking a corner too fast in the wet. Orange Grove Rd turning left on slip road to Kessle's Rd next to Aldi. Driver went berserk and screamed abuse for several minutes. I couldn't drive for 4 days due to rib damage and no bike for 3 weeks.
- Cnr Simpsons and Chiswick Rd, Bardon, approx 18 months ago, BAZ: vehicle pulled out in front of me, I connected with bonnet, braked quickly enough to avoid damage.
- Grey St, South Brisbane, approx 2 months ago: Contact with taxi.
• Ridge Street, Greenslopes. I was turning right into Bunya Street and a car tried to pass me on the right.

• The car was not happy with the four of us riding on the road. He went very close to us. When we caught up with him at the next intersection (Red light). He reversed and then ran us over. No one hurt but two bikes destroyed. Road rage! We reported him and he copped a fine for leaving scene of accident. Frankly I was happy he left!

• Tristania Way, Mansfield, QLD. No bicycle facilities present. No parking located nearby.

• Cycling through roundabout - driver entered from my left without looking, and hit me.

• Twice - hit by vehicle which approached fast from behind and then turned left across me without indicating.

• Cycling southbound on Kedron Brook Rd, in a bicycle awareness zone, a motor vehicle turned left into Fifth Ave in my path. There was insufficient time for me to stop my bicycle, given the downhill gradient. There were no parked cars, as it is a bus stop just prior to the intersection & no bus was present at the time.

• After the David Low Way Bridge on the Sunshine Coast, heading towards Bli Bli, a car turned across the front of me to enter a petrol station with no interest in the fact that I was there.

• 1. Driver failed to give way at a give way sign on the Esplanade at Yeppoon & t-boned me. No bicycling facilities. The parking is off the main Esplanade with several exit & entry points. 2. Driver cut me off in towards a parked car. I was moving to the right to go around the parked car when the driver of the car blew his horn & drove within a few millimetres of my handle bars. I responded by veering left and braking hard - fell off rather than hit the parked car. The location was Charlton Esplanade Hervey Bay no bike awareness signage or lanes (hundreds of cyclists ride there every day). Parking is parallel to the traffic & there are several dedicated car parks on the beach side of the Esplanade.

• Nearly hit a pedestrian on shared pedestrian/bike path.

• I was stationary on the footpath waiting to enter Sth Pine Rd at Alderley from the Bi-Lo carpark driveway & a 4wd simply drove into me from behind.

• Montague Road, car door with Saturday markets.

• I was riding along Old Cleveland Road near the Coles at Coorparoo in a bicycle awareness zone (I think), when a car travelling in the opposite direction with the
intention of turning right into a sidestreet on my left turned right in front of me. I had no time to brake and hit the car on the left side, flying over the bonnet. There was no parking located where it occurred.

- A bus overtook, the purposely swung left while we were trapped between the bus and the gutter, to stop at a bus stop. I, and other riders hit the side of the bus.
- A dog unleashed ran into front wheel result hospital
- Witnessed an accident with a vehicle just this weekend with a vehicle entering what was a quiet street but did not see the cyclist.
- Minor incident but scary enough. Riding along Samford Road towards the city at the corner of Webster Rd at 6:00 on a Saturday morning. Very little traffic yet one driver still thought it was ok to drive in the left lane and drive close enough to me that his mirror hit my bum and elbow as he went past. No damage to me or my bike but scary to think if he was 100mm closer.
- I was riding along Fred Schonnel Drive away from the university in the left hand lane. Cars were backed up in the right hand lane but had left a space for cars wishing to turn across into a side street. I was riding along and then had a car turn across in front of me without looking to see if there was any traffic coming in the left hand lane (assuming that there would not be any cars). They hit me and I went up over the bonnet of the car. Luckily there was only minimal damage to bike and body. There was a bike lane ahead and behind but not in the spot where I got hit. There was no parking on the side of the street I was riding.
- Car (P Plater) pulled out of side Rd I collided with rear quarter panel of car.
- As per the previous answer locations, cars failing to give way or SMIDSY situations despite the obvious danger.
- Driver drifted into the lane.
- Well not really a crash, but my flat handlebars contacted (and bent) the side mirror of a car as I was attempting to ride southbound on Nudgee Rd past the line of queued cars to turn left at the new intersection at East West Arterial Road. There were no bicycle facilities at the intersection but Nudgee Rd has bicycle lanes further up and down the road from the new intersection. Why the TMR did not install bike lanes at the intersection is a mystery. They built a massive wide kerbside garden instead and didn't even leave enough room for cyclists to squeeze by the left of line of cars to get up to the traffic lights. (If you don't squeeze past likely you will miss the left turning arrow.
and have to wait for another cycle of the lights). Anyway I apologised to the bloke in the car and straightened his mirror best I could.

- Cnr harding street and russell st coburg, stopped at the line to turn right into harding, rear ended by a car who had stopped but then drove into the back of me a minute later. Destroyed my back wheel but I was unhurt. Driver refused to pay for damage. Police report filed but nothing done about it because I was unhurt. No bike facilities present. No parking located there.

- I use my brain to avoid the crash but I often see them about to unfold. I just slow down. Even if we are in the 'right' we still come off second best. We need strict liability laws here. http://www.roadpeace.org/change/safer_streets/stricter_liability/

- They failed to give way from a parked position and reversed directly out into the traffic, causing a collision with myself. Successfully defended from my position in court and 10's of thousands of dollars of compensation awarded to me.

- The fact of so many near misses not being collected in data as not actually representing traffic danger is the most absurd assertion I've heard in my life. When that day comes and I some car does wipe me out, I won't be here to do the survey.

- Pedestrian stepped out from behind parked car in BAZ

- Location: the start of Logan Road, Woolloongabba. There is bike lane. There is parking adjacent. A taxi stopped in the middle of the street and let a woman out on the left side of the car into the bike lane so that I hit the door.

- Thorn Street, Kangaroo Point - yellow bike awareness symbols on road. Driver coming in the opposite direction drove across my path into a driveway. She claimed she didn't see me. Fortunately it was a very low speed accident with nil damage to my bike and reasonable damage to her car. My broken rib mended well!
APPENDIX J:  DCA CODING SYSTEM

(Queensland Government 2010)
APPENDIX K: INTERSECTIONS WITH MULTIPLE CRASHES

K.1 CRASHES AT INTERSECTIONS WITH A BAZ ON APPROACH

Two crashes occurred at the intersection of Fleurs Street with Park Road. For the two crashes which occurred at the site, a motorist pulled out of a side street in front of a cyclist who was travelling down a 7% grade. It appears that either due to the pace the cyclist would have been travelling, the motorist did not see the cyclist before pulling out of the side street, or the motorist misjudged the speed the cyclist was travelling. At this particular site, it is unlikely a bicycle lane would have made any difference to the outcome.

K.2 CRASHES AT INTERSECTIONS WITH A BICYCLE LANE ON APPROACH

On three occasions, a cyclist has been struck by a motorist turning left from Old Cleveland Road into Gallipoli Road as the motorist has not noticed the cyclist on their left hand side. At this site, the bicycle lane is not continued through the intersection. Perhaps if the lane had been continued, the motorists would have been more aware of the cyclists which could have helped prevent this type of crash from occurring.

At the intersection of Saint James Street with Dornoch Terrace, there were three crashes. In each crash, the motorist was turning right from Saint James Street and collided with the cyclist travelling on the motorists’ right hand side. It was noted that there is only about 40m of sight distance at the site. Perhaps the speed that the cyclist is travelling down the 2.8% grade is adding to the motorist’s difficulty in seeing the cyclist.

Two crashes occurred at the intersection of Leicester Street and Old Cleveland Road. The two crashes were not similar, and as such it is difficult to rule a site specific issue. However, it was noted that in one of the crashes the motorist exiting a side street didn’t give way to a cyclist who was turning into the side street across two lanes of traffic. It is thought that when a cyclist is on the far side of two traffic lanes, due to the cyclist’s small size, the motorist may not be able to see the cyclist perhaps because the cyclist is obstructed by other vehicles.

The tee intersection where Bennett Street meets Sylvan Road seems to be particularly notorious for crashes as five crashes occurred at the intersection. Two crashes involved a
motorist failing to give way to a cyclist as the motorist turned right from Sylvan Road into Bennett Street. Similar to the Old Cleveland Road crash, the cyclist may not have been visible to the motorist as the motorist had to cross two traffic lanes. Another two crashes occurred as a motorist turned left from a left turning lane on Bennett Street, into the path of a cyclist who was travelling along Sylvan Road. The left turning lane was adjacent to a right turning lane. It is assumed that the sight of the motorist in the left turning lane is restricted when a vehicle is in the right turning lane. The remaining crash type only occurred once, and cannot be linked to any site issues.

Two crashes occurred at the roundabout between Brunswick Street and Sydney Street. The motorist failed to give way to the cyclist in the two crashes. The roundabout is particularly small and doesn’t satisfy the minimum required dimensions for the central island diameter (10m) and circulating carriageway width (7.6m) as stated in the Road Planning and Design Manual: Chapter 14 Roundabouts. Consequently, the roundabout only provides for a minimum reaction time.

At the intersection of Northgate Road with Sandgate Road, two crashes occurred. In the first crash, the motorist turned left out of Northgate Road onto Sandgate Road, whilst in the other crash, a motorist turned right from Sandgate Road into Northgate Road. In both crashes, a cyclist was travelling down a 6% grade. Although the crashes involved different turning movements, the downhill grade may have played a factor in both crashes. As mentioned previously, the motorists may not have seen the cyclist due to the pace the cyclist would have been travelling, or they misjudged the speed of the cyclist. In the second crash, the motorist had to cross two lanes of traffic which may have further influenced the motorist’s view of the cyclist as described for other sites with two lanes of traffic.

K.3 CRASHES AT INTERSECTIONS WITH NO BICYCLE FACILITY ON APPROACH

The four way, unsignalised intersection joining Seventeen Mile Rocks Road with Ormond Road and Duporth Road, was the site of three crashes. In each case, the motorist turned right from Seventeen Mile Rocks Road into Ormond Road across the path of a cyclist riding down a 4.4% grade. The sight distance appears to be adequate, but perhaps the motorists are either misjudging the speed of the cyclist or not seeing the cyclist, as previously mentioned for other
On Chatsworth Road, vehicles turn left onto Logan Road using a slip lane. Three crashes occurred at this site as the vehicles failed to give way to the cyclist travelling along Logan Road. It appears that at the position vehicles are required to give way on the slip lane, they are unable to see a cyclist travelling along the far left of the left hand lane. Perhaps if there was a bicycle lane across the slip lane, the motorists may have been prompted to specifically check for cyclists.

The crashes occurring at the intersection of Riverview Terrace and Coonan Street are additional examples of a motorist failing to give way to a cyclist travelling downhill. In the two crashes which occurred here, the motorist turned right into Coonan Street, in front of a cyclist travelling down a 12% grade.

At the tee intersection between Sir Fred Schonell Dr and Walcott Street, motorists failed to give way to a cyclist as the motorist crossed two lanes of traffic to turn into Walcott Street. As with similar crash locations previously described, it appears that it is difficult for a cyclist to detect a cyclist who is on the far right of two traffic lanes.