Evaluation of the Moggill Road Cycle Bridge

Prepared for Queensland Department of Transport and Main Roads

CDM RESEARCH

Contents

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Executive Summary

The Department of Transport and Main Roads (TMR) commissioned CDM Research to undertake an evaluation of the Moggill Road Cycle Bridge, which opened in late 2015. The project cost around $8.6 m and provides a grade-separated crossing of Moggill Road and on- and off-ramps onto the Centenary Motorway.

Two fieldwork activities were undertaken to obtain input data for the evaluation:

- video-based manual counts classified by mode, direction of travel and time of day over a sequential 7-day period (Thursday 14 April to Wednesday 20 April 2016), and
- intercept surveys with bridge users undertaken over three weekdays between 7 pm and 10 am and two weekend days from 2 pm to 5 pm.

The data was input into a cost-benefit analysis to estimate the monetary project benefits. The key results of this evaluation are as follows:

- Average daily (6 am – 7 pm) cycling traffic on the bridge of around 820 riders, with slightly higher demand on weekdays (860) than weekend days (718).
- A reduction in rider delay of between 44 and 136 seconds depending on the data source. Almost all delay was incurred at the main crossing of Moggill Road rather than at the on- or off-ramps.
- Modest diversion from car (2%) and public transport (1%) to cycling as a result of the project, and similarly a low proportion (3%) of riders made all-new riding trips as a result of the project. Instead, most bicycle riders (94%) would have ridden irrespective of the presence of the bridge.
- The average cycling trip across the bridge for recreation was reported as being about 36 kilometres, compared to 18 kilometres for transport trips.
- The main transport cycling trips were from Kenmore to the CBD (13% of weekday AM period transport cycling trips), followed by Jindalee to the CBD (10%) and Fig Tree Pocket to the CBD (9%).
- Almost all transport riders indicated the bridge had reduced the amount of riding they had done over the previous month, presumably as a result of reducing their travel time at Moggill Road.
- Around two thirds of bridge users travelling for transport purposes had a car readily available with which they could have made their trip, and most of the remainder could readily have borrowed a car for their trip. Almost half of those who could have used a car indicated it would have taken *longer* than riding, compared with 21% for whom it would have taken less time.
- The cost-benefit analysis suggests the project represents good value for money; the BCR for the central discount rate of 7% was in the range of 1.8 to 2.0 depending on assumptions regarding the avoided delay at Moggill Road.

1 Introduction

1.1 Background

CDM Research was commissioned by the Queensland Department of Transport and Main Roads (TMR) to undertake an evaluation of the cyclist-only bridge on the Centenary Cycleway over Moggill Road (Indooroopilly). The bridge provides a grade-separated crossing over Moggill Road and the on- and off-ramps onto the Centenary Motorway (Figure 1.1). The project cost was around $8.6 m and was officially opened in November 2015.

Figure 1.1: Moggill Road Cycle Bridge (aerial image: Nearmap, 1 July 2016)

1.2 Methodology

This evaluation adopted a cost-benefit analysis (CBA) methodology as developed previously for TMR (CDM Research 2016). The CBA tool is implemented online[1]. The methodology requires a number of inputs, of which the most important are:

- average daily pedestrian and cyclist counts,
- average distances walked/ridden, and
- diversion rates and induced travel proportions.

The latter refer to the proportion of demand that:

- was already walking/riding before the project, and have changed their route to use the project,
- have diverted from other transport modes (e.g. private car, public transport), and

[1] https://cdmresearch.shinyapps.io/ActiveTravelBenefits/

- all-new trips that would not have otherwise occurred in the absence of the project.

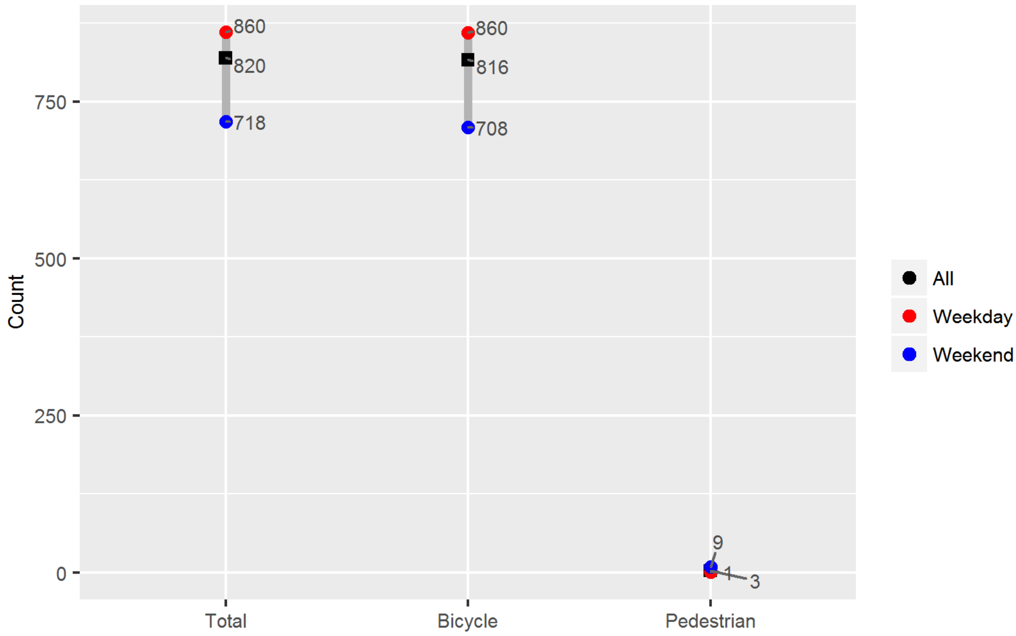
In order to obtain these input parameters two fieldwork activities were undertaken:

1. video-based manual counts classified by mode, direction of travel and time of day from 6 am to 7 pm between Thursday 14 April 2016 and Wednesday 20 April 2016, and
2. intercept surveys with bridge users undertaken between 7 am and 10 am on Wednesday 1 June to Friday 3 June 2016, and from 2 pm to 5 pm on Sunday 5 June and Sunday 12 June 2016.

This report first presents the summary data obtained from the fieldwork activities before then providing the output of the cost-benefit analysis.

2 Counts

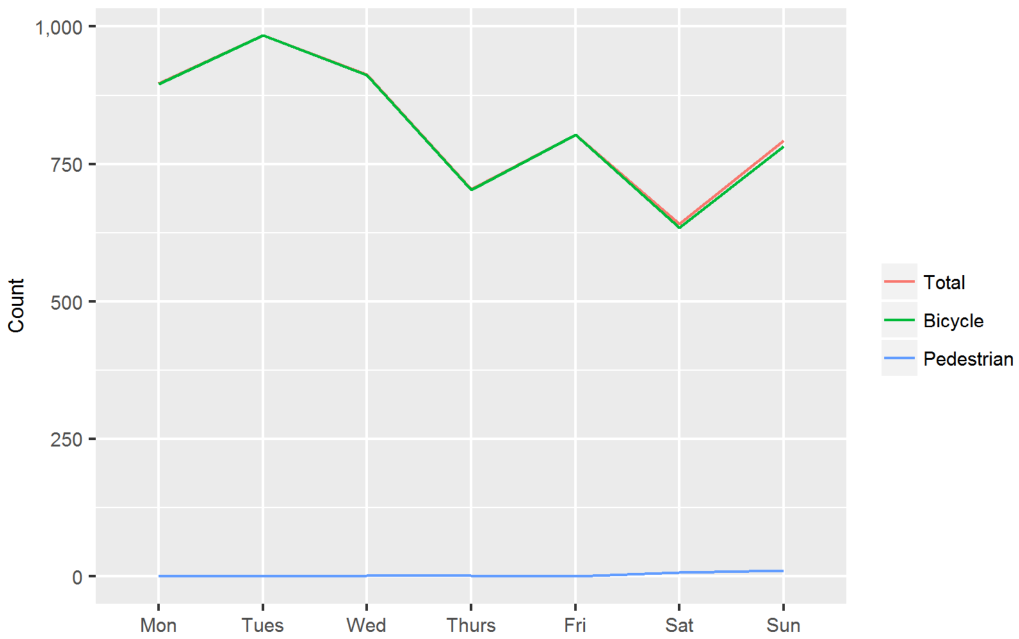
The average daily count at the bridge over the seven-day count period was 820 users per day[2], of which almost all were bicycle riders (Figure 2.1). Average cyclist demand was marginally higher on weekdays (860) than weekends (708).



■ **Figure 2.1: Average count by mode and day of week**

The variation in the count by day of week is shown in Figure 2.2. The cyclist count varied from a low of 635 on the Saturday to a high of 984 on the Tuesday. The time of day profile suggests demand is strongest early on weekday mornings and in the afternoons, and most weekend demand was before 10 am (Figure 2.3).

[2] Note the counts were from 6 am to 7 pm, or 13 hours such that they do not correspond to a 24-hour day. Full 24-hour counts may be of the order of 10% higher.



■ **Figure 2.2: Day of week by mode**

■ **Figure 2.3: Time of day by day of week (hourly bins) for all modes**

3 Travel time impacts

One of the justifications for the bridge was that it would provide a quicker, delay-free journey across Moggill Road. Prior to construction of the bridge bicycle riders were required to dismount[3] and use the zebra crossings of the freeway on- and off-ramps and the single stage signalised crossing of Moggill Road. The bridge entirely avoids these interactions with the roadway. Equally, the bridge precludes the need for motorists to have to give way to bicycle riders at the on- and off-ramp and may also reduce delay for motorists on Moggill Road itself[4].

In order to obtain an indication of the avoided travel time delay for bicycle riders video data from April 2014 on the southern side of Moggill Road was used to estimate the typical rider delays[5]. Delay was estimated using the frame count in the video (recorded at 12 fps) and only where a rider was observed to completely stop (Figure 3.1). This measure of delay will be an underestimate, as there were numerous instances where a rider was observed to slow to varying degrees to allow a motorist to pass through the southern slip lane without actually stopping. Moreover, even where a rider stops there will be additional delay associated with slowing and starting that are not accounted for by this measurement.

All rider crossing events in the northbound direction[6] from 6 am to 7 pm on Wednesday April 23, 2014 were analysed. The total sample was 295 observations, of which 235 (80%) of riders were observed to stop at the on-ramp or main carriageway of Moggill Road or both. Unsurprisingly, the greatest rider demand was during the early morning (Figure 3.2). While 20% of riders did not have to stop at all, 67% had to stop at the main carriageway, 4% at the on-ramp and 8% at both the on-ramp and main carriageway (Figure 3.3).

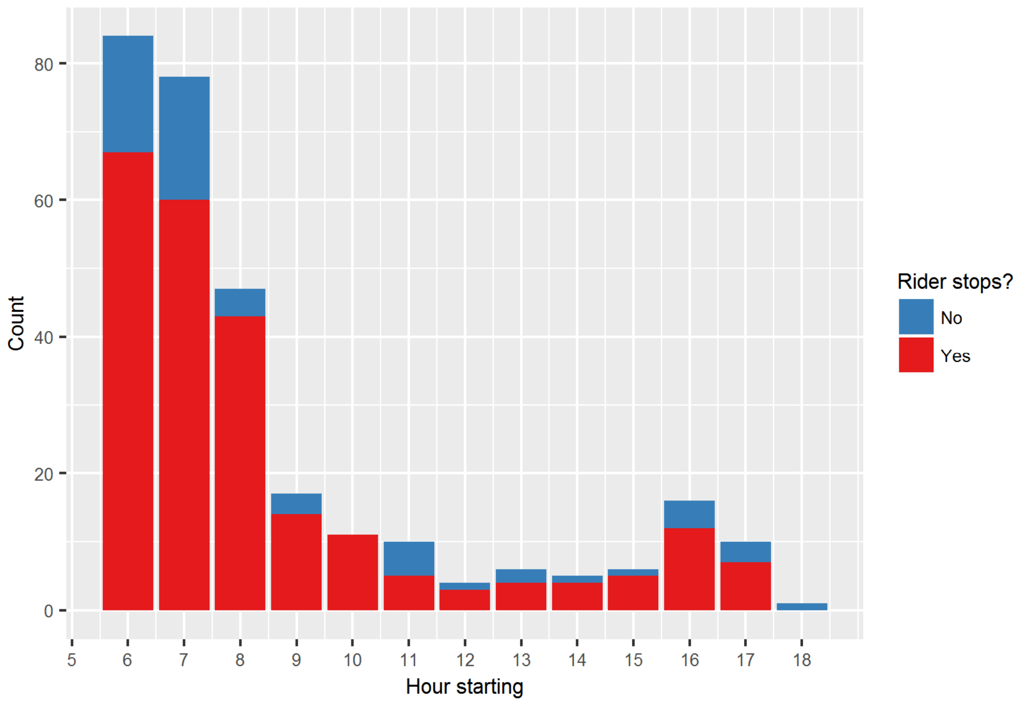
[3] In practice very few bicycle riders dismounted; observations undertaken in 2014 of 350 cyclist crossings of the north ramp and 394 at the south ramp failed to observe a single bicycle rider stopping and dismounting (CDM Research 2014).

[4] Whether it does so will depend on the traffic signal operation prior to the installation of the bridge; if the path crossing green phase was coordinated with the right turning movement to the west of the freeway interchange there would have been negligible travel time disbenefit to bicycle riders. If on the other hand the crossing operated as an independent phase it would have resulted in meaningful delays to motorists on Moggill Road which have now been eliminated.

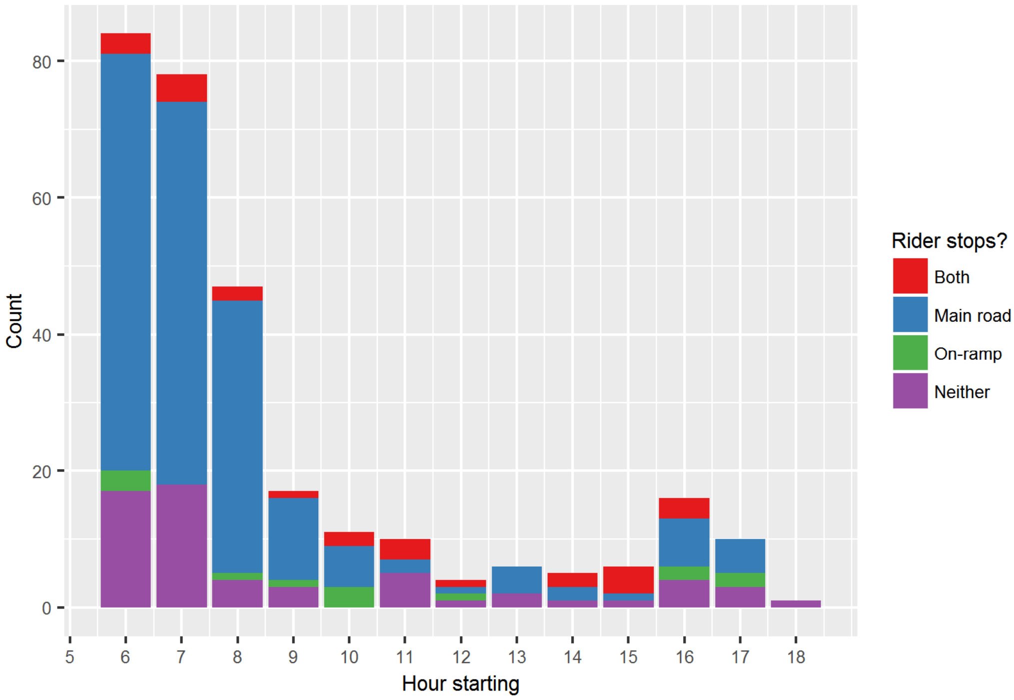
[5] This video was obtained for an altogether separate observational study. Videos from the north side of Moggill Road were also obtained as part of that earlier study, but the field of view was inadequate to be able to observe rider delay.

[6] The field of view was inadequate to observe rider delays in the southbound direction on the main carriageway.

■ **Figure 3.1: Video screenshot**



■ **Figure 3.2: Northbound rider crossing events by time of day and stopping**



■ **Figure 3.3: Location at which riders stop**

The waiting time distribution at the on-ramp is illustrated in Figure 3.4. The distribution is heavily skewed by the 87% of riders who do not need to stop at the on-ramp. Once these observations are excluded the distribution is as shown in Figure 3.5. As shown, the average wait time for those that need to do so is 4.2 seconds (median 2.6 seconds) with a maximum wait time of 19 seconds. The on-ramp generally presented no delay to bicycle riders and on the rare occasions where a rider did have to wait they usually only needed to do so for a few seconds.

Unsurprisingly, at the main carriageway the wait time was much more significant; in 75% of cases the bicycle rider had to stop (Figure 3.6). The overall average wait time at the main carriageway was 43 seconds (median 38 seconds). Among those riders who stop the average wait time was 54 seconds (median 51 seconds) with a maximum wait time of 122 seconds (Figure 3.7).

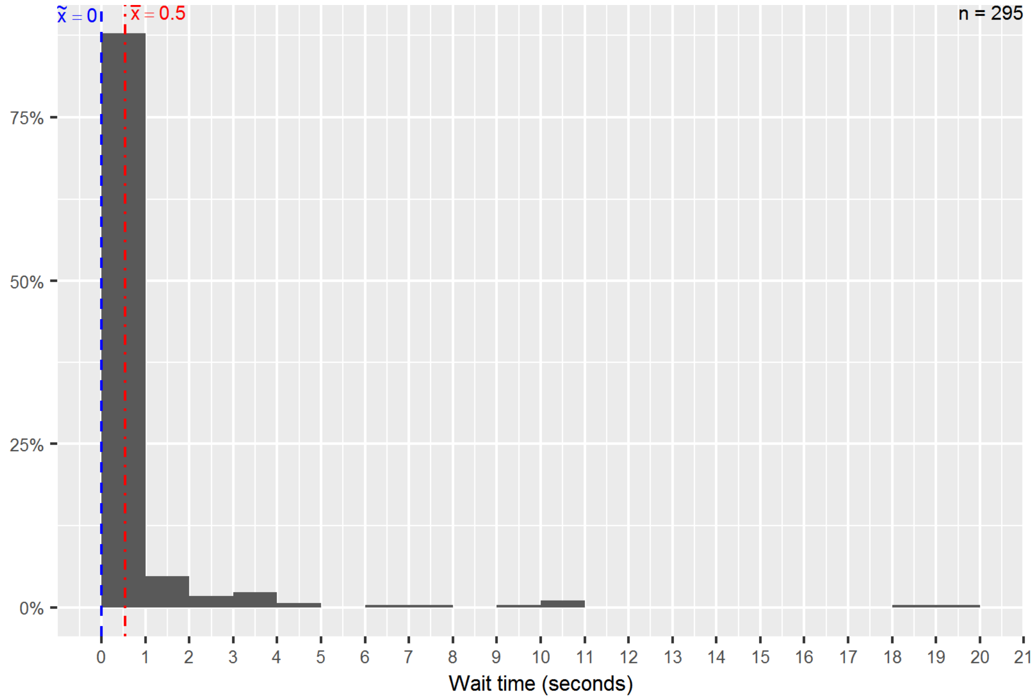
The combined delay distribution incurred at the on-ramp and main carriageway is shown in Figure 3.8. The average wait time is 43 seconds (median 38 seconds). For those that need to wait at least once the average delay was 54 seconds (Figure 3.9).

What is not known is the frequency and magnitude of delay incurred by riders travelling southbound. At the main carriageway the delay is likely to be similar to that in the northbound direction given that the signal control is identical. It is less likely the delay incurred at the freeway off-ramp is the same as at the on-ramp, given the varying motor vehicle traffic demand. However, in the absence of any data to the contrary it is assumed in the cost-benefit analysis that follows that the delays incurred in the southbound direction are identical to the northbound direction; that is, bicycle riders incur on average a delay of 43 + 2 x 0.5 = 44 seconds.

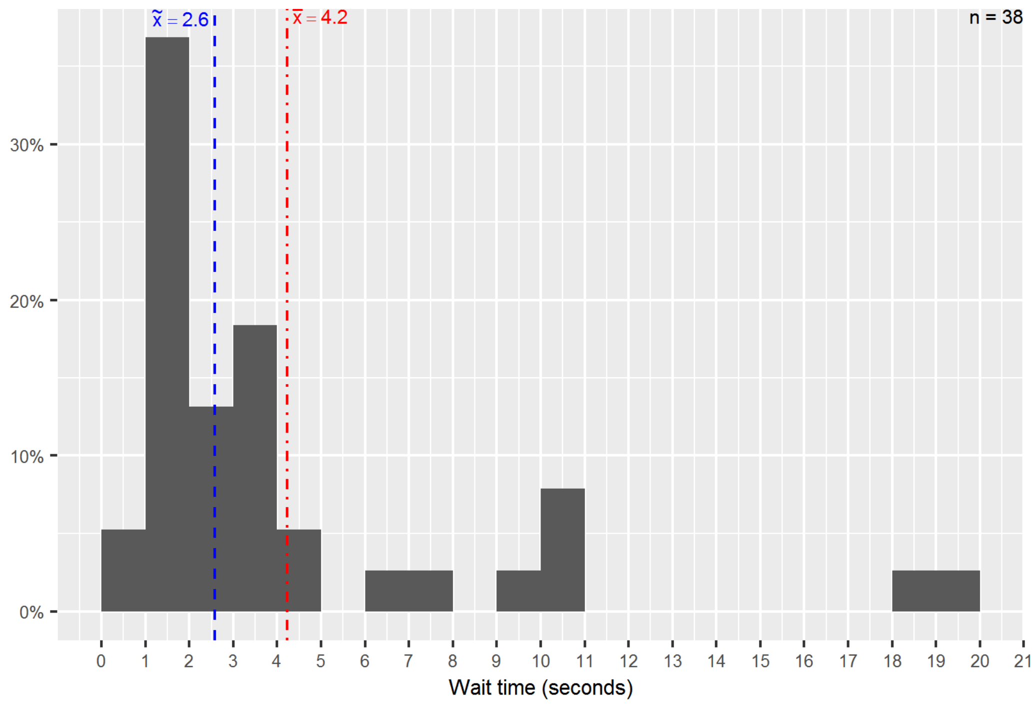
An independent analysis of the change in travel time experienced by bicycle riders at this intersection was undertaken by Strava for TMR. That analysis relied upon GPS data of cycling trips before and after the completion of the bridge and reported an average reduction in travel time of 136 seconds. This is much higher than our video-based estimate. The discrepancy cannot be entirely explained, although we note the following:

- The Strava data includes the additional time incurred by riders slowing down and accelerating after stopping, and the additional descent and climb from the road grade that is avoided by the bridge. As such, it is reassuring that the Strava estimate is higher than the video estimate. However, the average saving due to these effects was estimated to be only 8 seconds; instead, almost all of the saving was due to reduced stopping time.
- The Strava timing nodes appear to be setback some distance from the intersection; the total travel time is in the order of 190 seconds, which clearly extends some distance beyond the bridge on either side. This may not be a significant issue given the path away from the bridge has not altered.
- The off-ramp may impose much higher levels of delay upon riders than the on-ramp, such that our assumption of doubling the average delay from the off-ramp is incorrect.

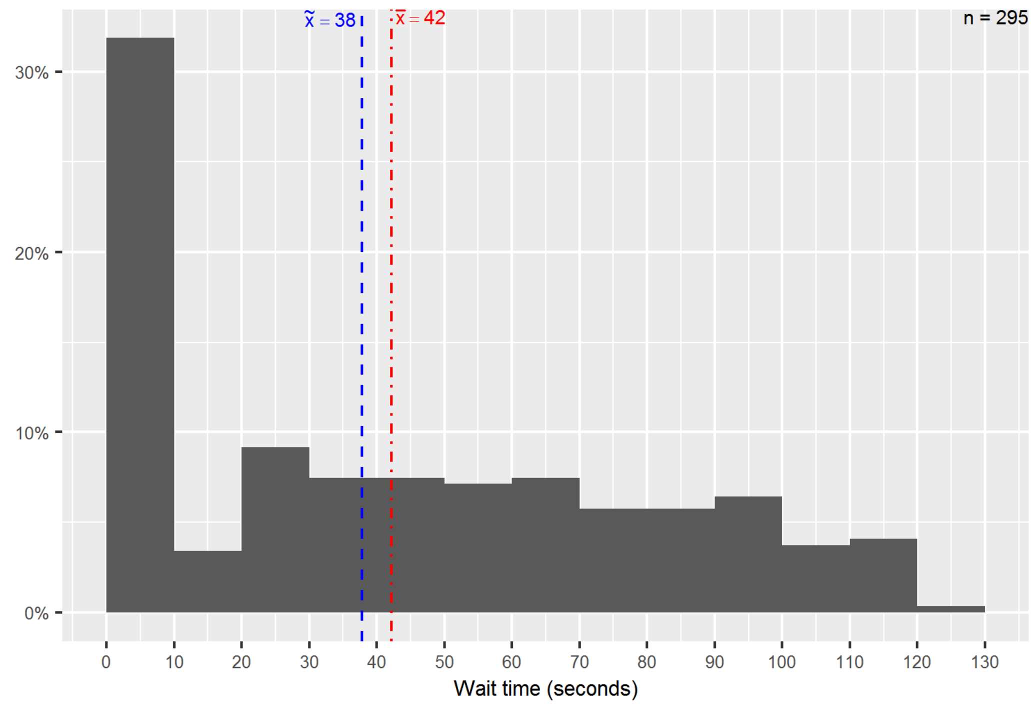
While this discrepancy is significant, as described in Section 5 the differences are not material to the cost-benefit analysis. As such, there does not appear to be much merit in investigating this discrepancy further. Instead, we have conducted sensitivity analysis of the BCR by testing both of these delay estimates.



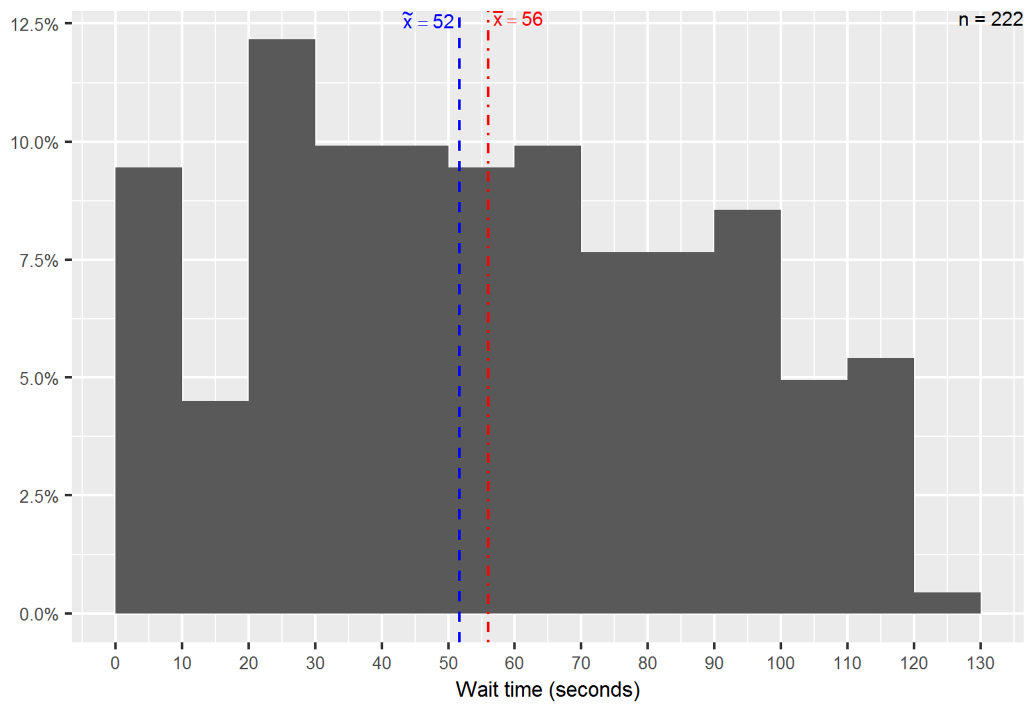
■ **Figure 3.4: On-ramp waiting time distribution**



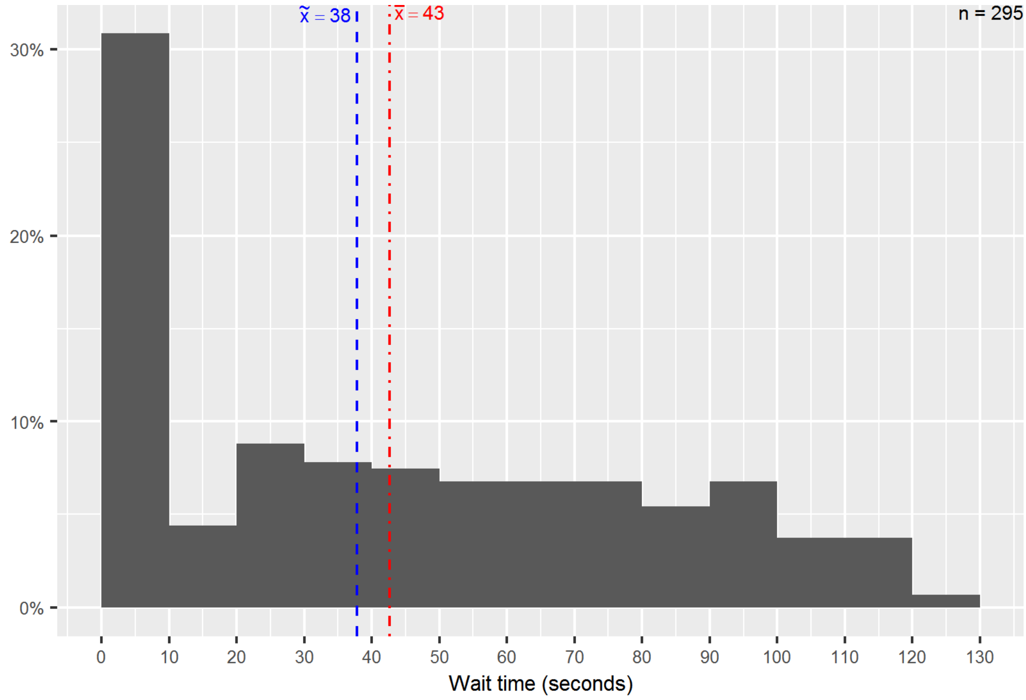
■ **Figure 3.5: On-ramp waiting time distribution (excluding those who do not wait)**



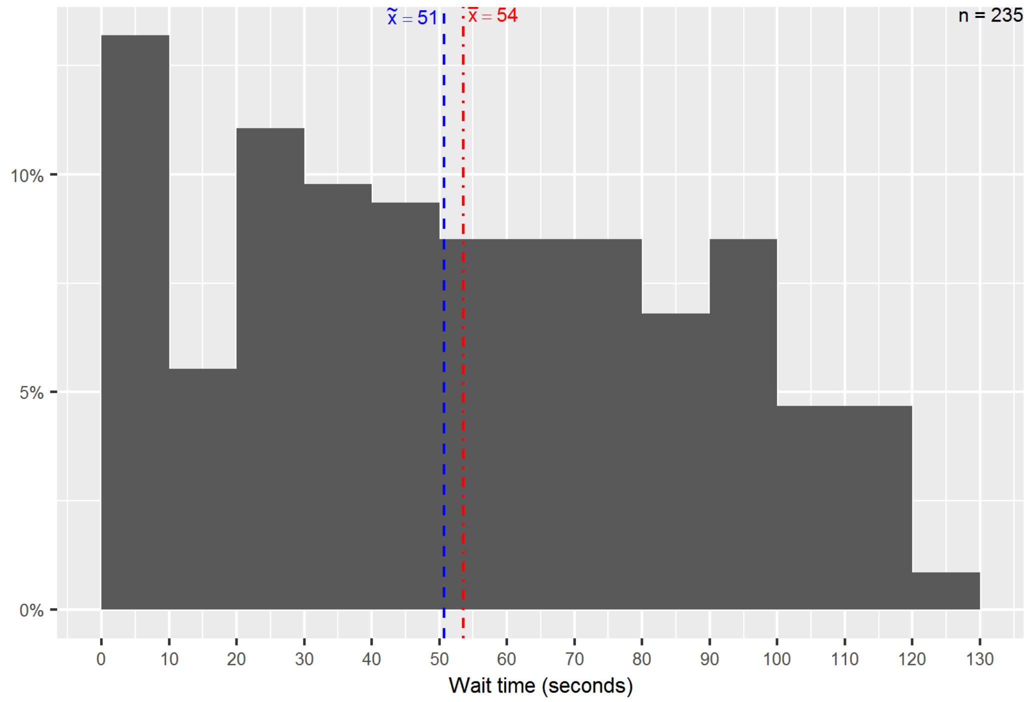
■ **Figure 3.6: Main carriageway waiting time distribution**



■ **Figure 3.7: Main carriageway waiting time distribution (excluding those who do not wait)**



- **Figure 3.8: Total waiting time distribution**

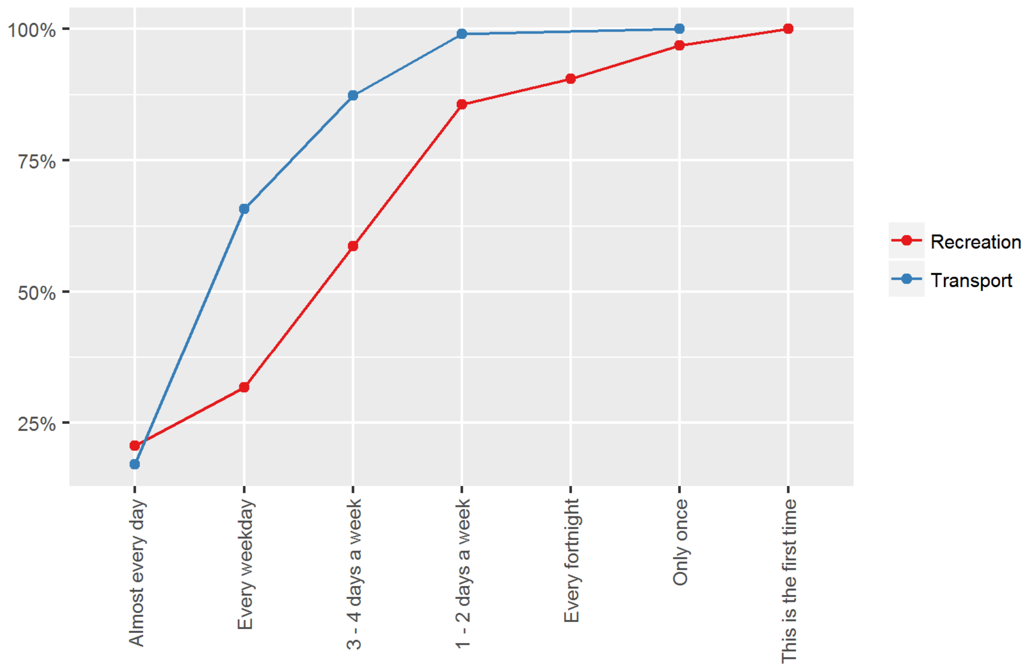


- **Figure 3.9: Total waiting time distribution (excluding those who do not wait)**

4 Intercept surveys

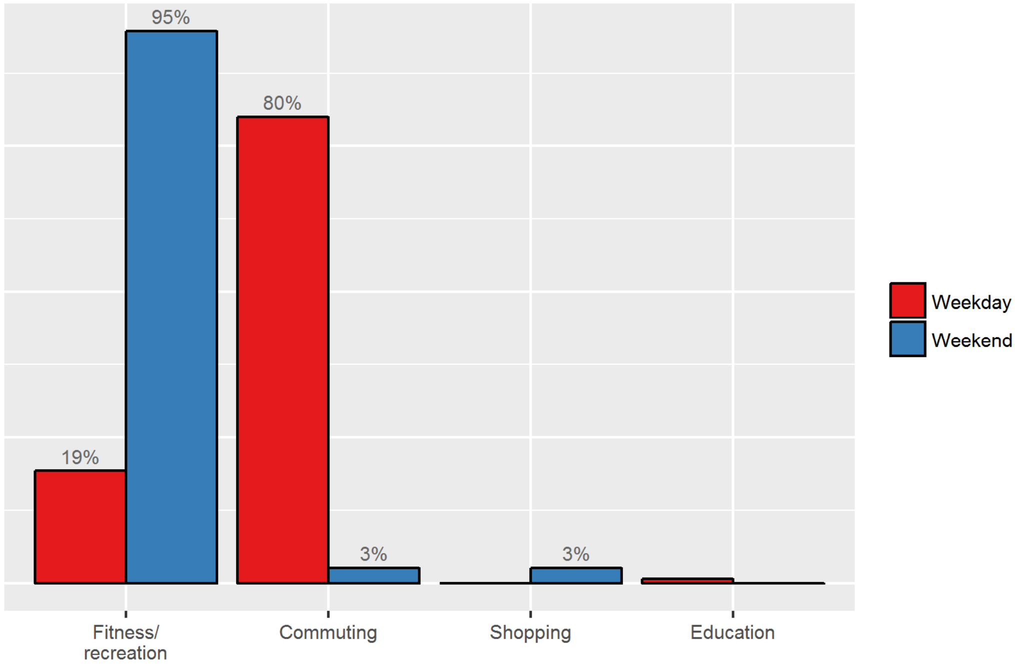
Intercept surveys were conducted with bridge users between Wednesday 1 June and Friday 3 June 2016 between 6 am and 9 am, and on Sundays 5 and 12 June between 2 pm and 5 pm. A total of 176 complete interviews were obtained, of which there was a single pedestrian interview. This interview is removed from the analysis presented in this section.

Familiarity with the bridge is high; 87% of transport riders and 59% of recreational riders use the bridge at three to four times a week (Figure 4.1). Transport riders tend to use the bridge more often than recreation riders.



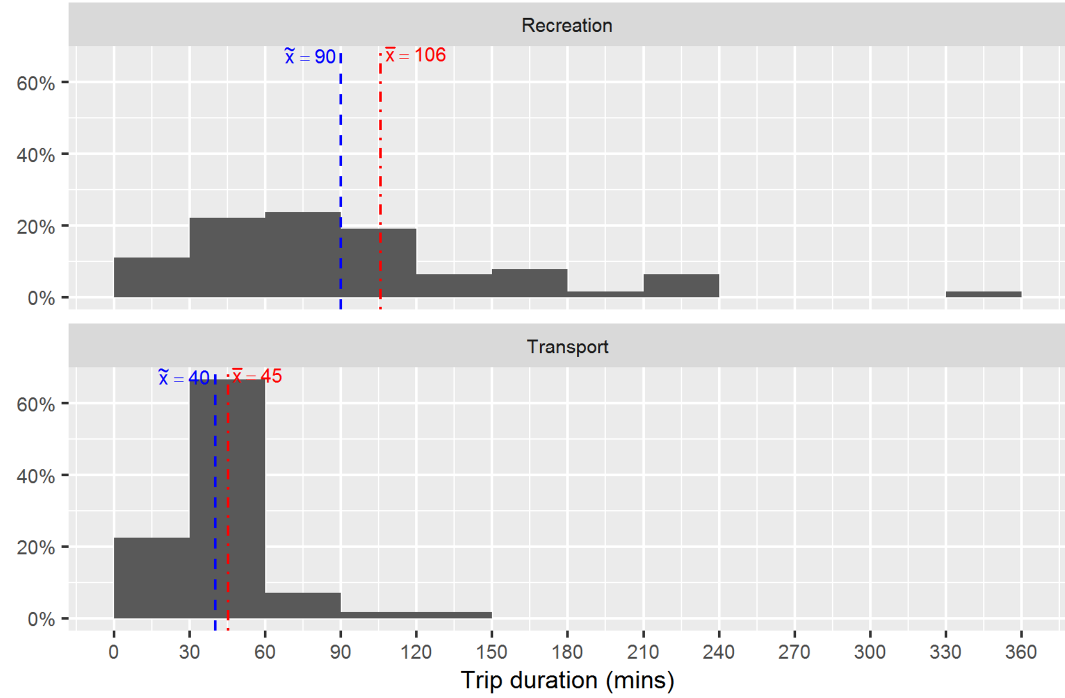
■ **Figure 4.1: Frequency of use by purpose of travel**

On weekdays 80% of bicycle riders were travelling for commuting and most of the remainder for fitness (Figure 4.2). On weekdays almost all bicycle riders (95%) were riding for recreation.

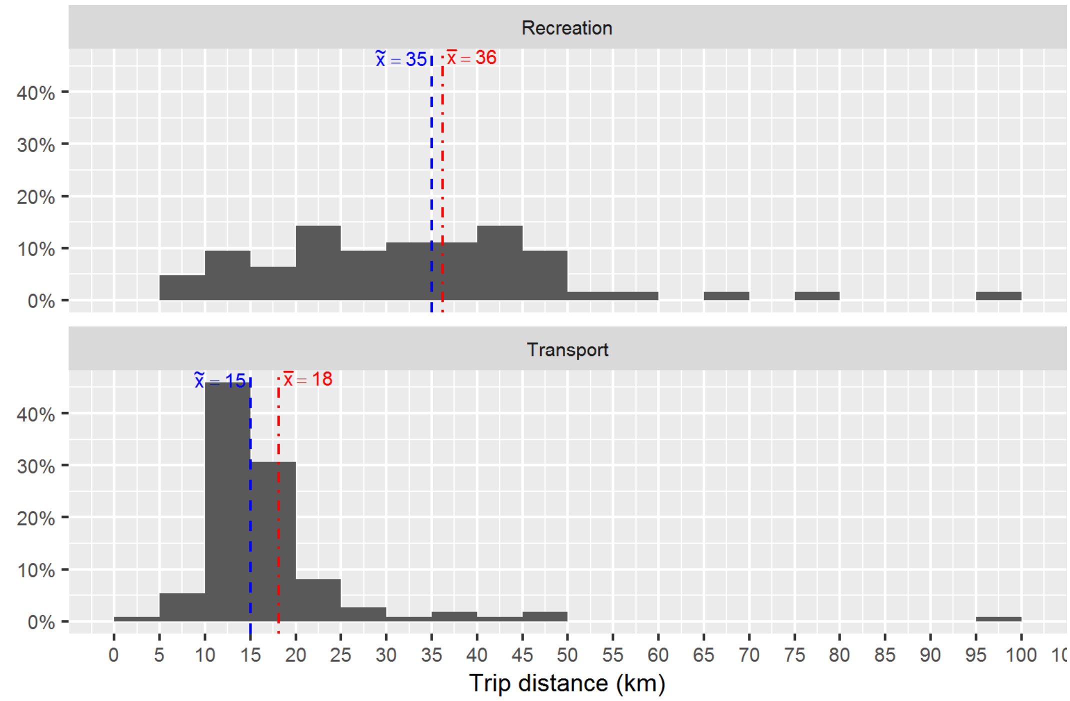


- **Figure 4.2: Trip purpose by day of week**

The average bicycle trip for recreation had a duration of 106 minutes (Figure 4.3) over a distance of 36 kilometres (Figure 4.4). Transport cycling trips were shorter, with an average duration of 45 minutes over 18 kilometres, and most had a duration of 30 to 60 minutes.



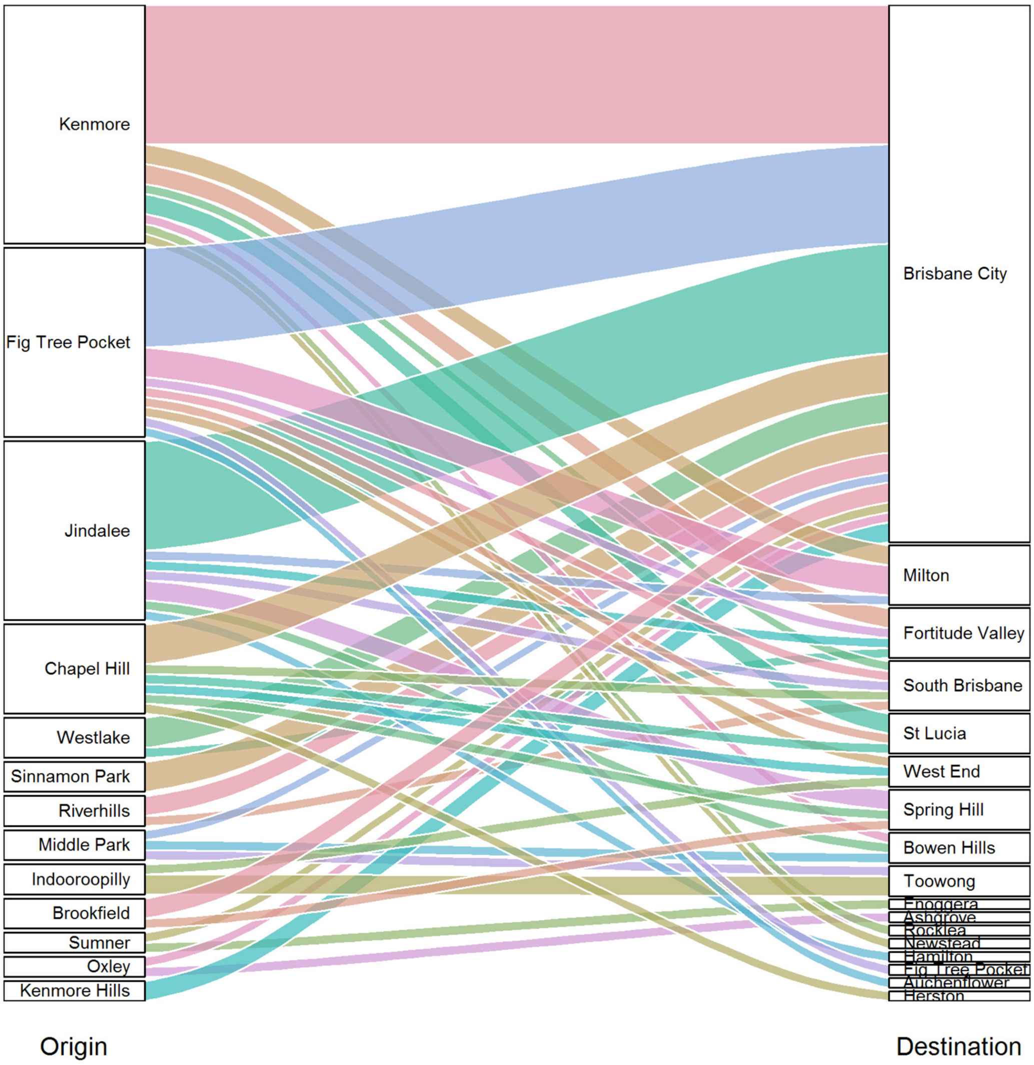
■ **Figure 4.3: Trip duration by mode and purpose**



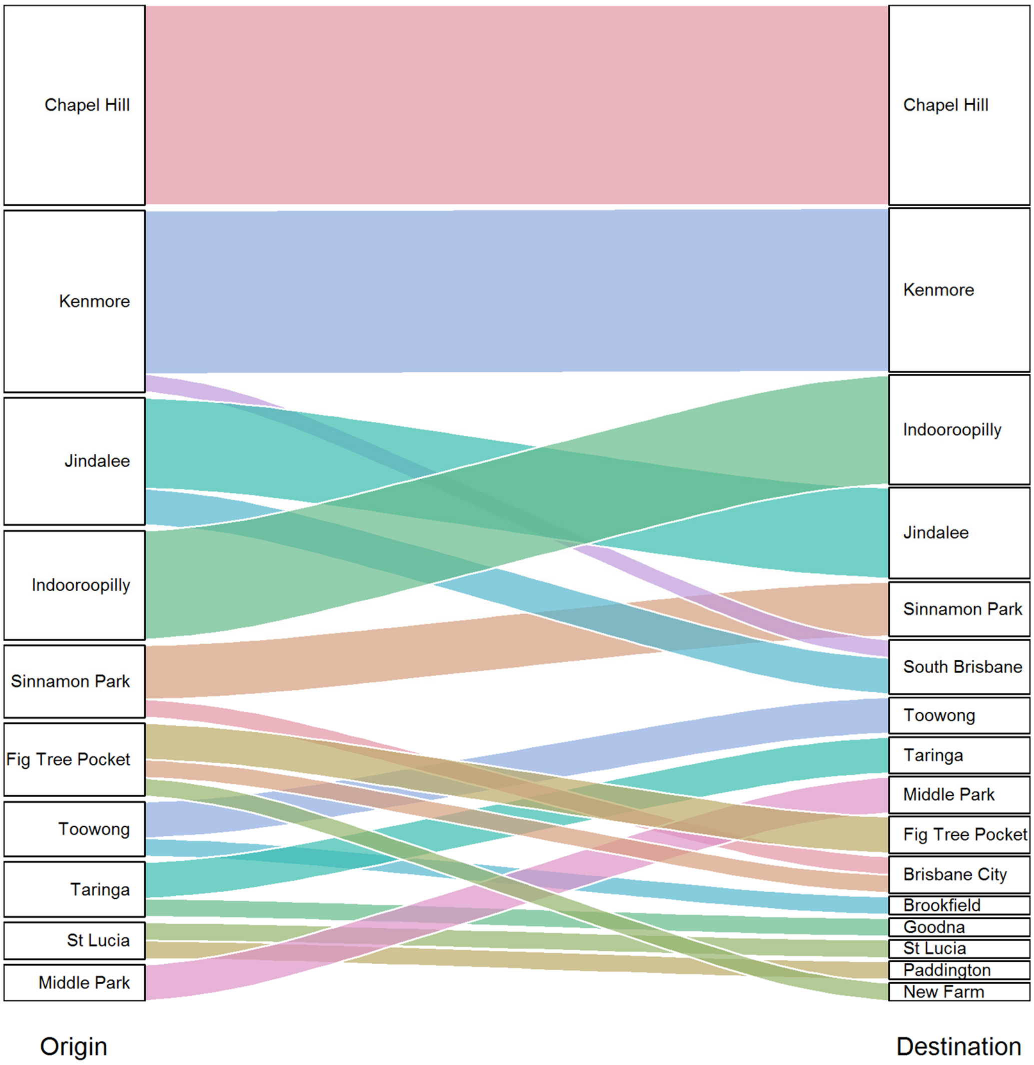
■ **Figure 4.4: Trip distance by mode and purpose**

The trip origin and destination suburbs by mode of travel and purpose are illustrated in Figure 4.5 for transport purposes and Figure 4.6 for recreation purposes. The dominant trip flows are as follows:

- 13% of all cycling transport trips were from Kenmore to Brisbane City, followed by Jindalee to Brisbane City (10%) and Fig Tree Pocket to Brisbane City (9%) (Figure 4.5).
- Unsurprisingly, most recreation cycling trips started and finished in the same location; 18% started and finished in Chapel Hill, 14% started and finished in Kenmore and 10% started and finished in Indooropilly (Figure 4.6).



■ **Figure 4.5: Origins and destinations of cycling trips for transport (n=111)**



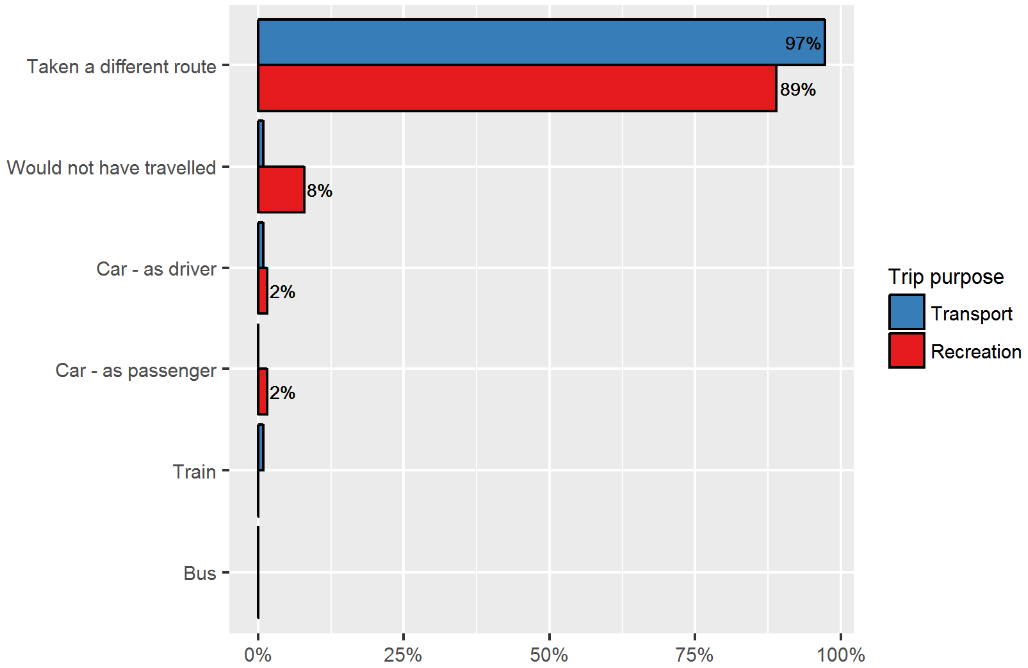
■ **Figure 4.6: Origins and destinations of cycling trips for recreation (n=63)**

Respondents were asked what they would have done for their trip if the bridge were not present. In most cases the respondent indicated they would have taken a different route[7] (Figure 4.7). Around 8% of recreation riders would not have travelled and a negligible proportion would have used public transport or private car. A further question then asked what the respondent would have done if cycling was not an option at all for their trip. Around two thirds of recreational riders would not have travelled at all, and only 26% indicated they would have substituted riding for some other form of physical activity (Figure 4.8). Unsurprisingly, no transport rider would not have travelled if they could not have ridden. Instead 40% would have taken a bus and 23% a train to complete their journey. A third would have driven a motor vehicle. Taken together, these results suggest that:

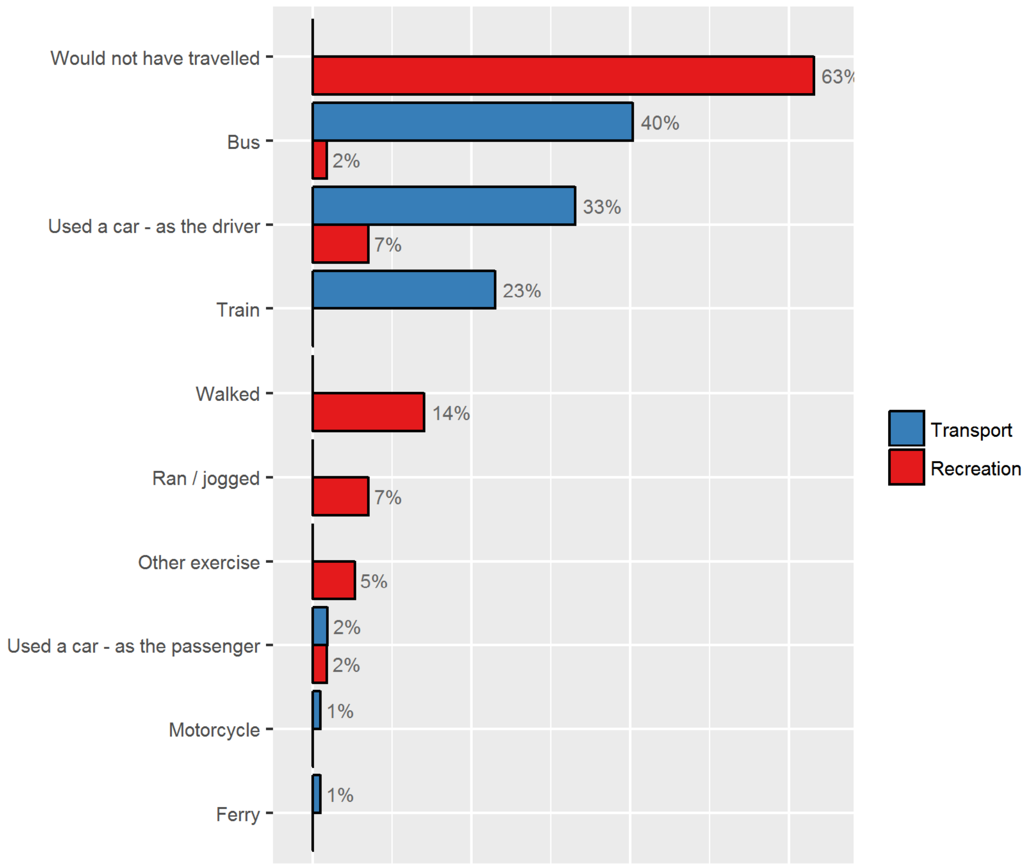
- the bridge has had a negligible impact on encouraging bicycle riding for transport *but* it has encouraged a small increase in recreational bicycle riding, and
- the Centenary Cycleway in its entirety has encouraged those living along the corridor to ride for both transport and recreation, and if the cycleway were not present riders would instead travel by car or public transport for commuting or not travel at all in the case of recreation trips.

These results appear plausible insofar as the bridge represents an incremental improvement to the cycleway but that the cycleway in its entirety is a substantial asset – and one for which there is no obvious, attractive cycling alternative along the corridor.

[7] What this almost certainly means in this instance is that they would have used the cycleway and at-grade crossing of Moggill Road as existed prior to construction of the bridge.

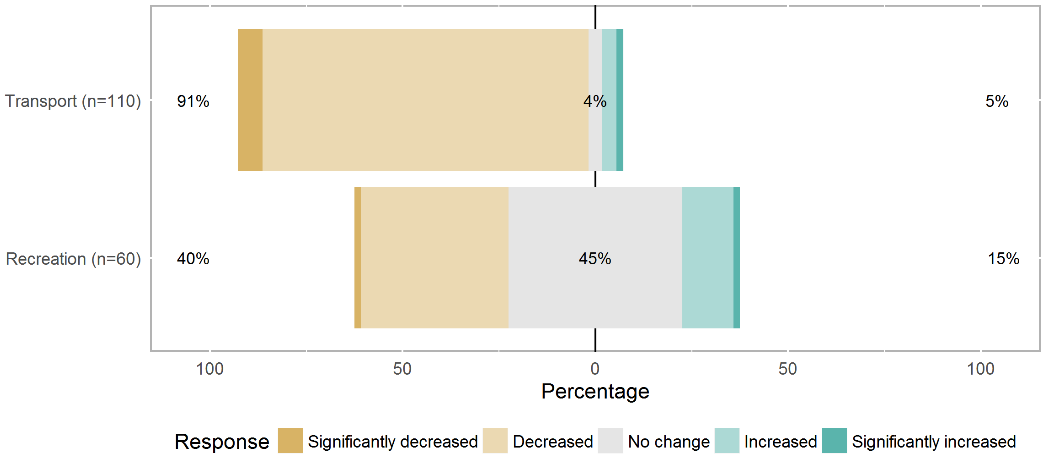


■ **Figure 4.7: What would you have done if this bridge was not here?**



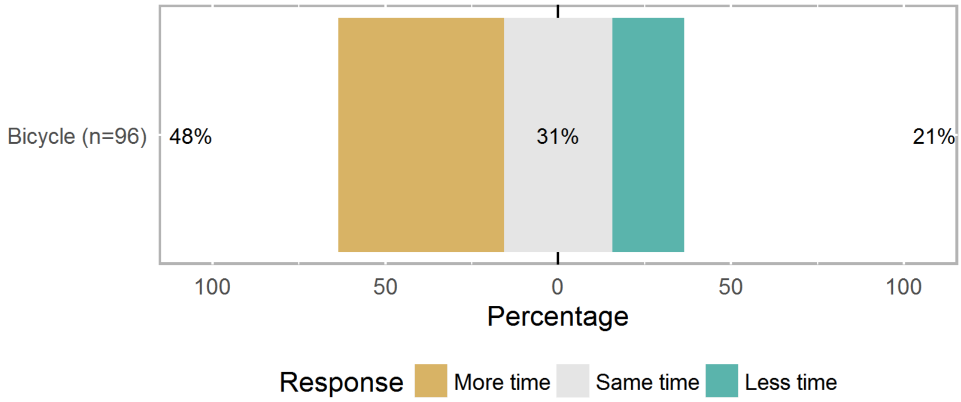
■ **Figure 4.8: What would you have done if your bicycle was not available for this trip?**

Almost all respondents were aware that the Moggill Road Cycle Bridge was new (97%). Riders were asked whether the presence of the bridge had changed the amount they'd ridden over the past month. Almost all transport riders (91%) and a significant minority of recreation riders (40%) indicated the bridge had *reduced* the amount of time they'd spent riding. From a physical activity standpoint this is a counterproductive outcome, but quite probably reflects bicycle riders reporting shorter travel times as a result of the elimination of the intersection delay. For transport riders this result is entirely consistent with Figure 4.7, where it is suggested almost all riders would have ridden irrespective of the presence of the bridge. It is conceivable that the proportion of recreation riders who said they would not have ridden if not for the bridge are also those who state they have significantly increased their riding; indeed, this is supported by the data – 40% of those who would not have ridden in the absence of the bridge indicated they now ride more, compared to 7% of other respondents.



■ **Figure 4.9: Has the bridge changed the amount of time you've spent riding over the past month?**

Respondents who were travelling for transport purposes (e.g. commuting, education, shopping) were asked whether they could have used a motor vehicle for their trip. Two thirds (65%) of respondents indicated they had a car available, a further 24% could readily have borrowed a car and the remaining 10% did not have car access. Among those who could have used a car 48% indicated it would have taken longer than cycling compared with 21% who thought it would have taken less time (Figure 4.10).



■ **Figure 4.10: Change in travel time for those who could have used a car (transport trip purpose only)**

Respondents were also asked about the available of a public transport alternative for their trip; 57% had a public transport alternative but felt it would have taken significantly longer and a further 29% felt they had a convenient public transport alternative. The remaining 14% felt they had no viable public transport alternative.

5 Cost-benefit analysis

The cost-benefit analysis framework as described in CDM Research (2016) was used to estimate the monetary benefits against the costs of the project. The key elements of this framework are:

- broad consistency with the current national guidelines (Transport and Infrastructure Council 2016),
- 30-year economic life with no residual value at the end of the appraisal period,
- estimates mortality and morbidity health benefits using a willingness to pay methodology for valuing statistical life,
- no safety in numbers effect,
- 60% of bicycle travel in the area occurs on-road without provision, 10% on-road with bicycle lanes, 25% on off-road shared paths and 5% on footpaths,
- relative risks for bicycle lanes of 0.5, off-road shared paths of 0.3 and footpaths of 1.8 (all relative to on-road with no provision),
- cumulative annual demand growth of 3%,
- rule-of-half applies to the willingness-to-pay component of health costs, vehicle operating and parking costs, PT fares for all users and travel time savings for new users only,
- Monte Carlo simulation to represent parameter uncertainty,
- capital and operating cost estimates to +/-10% at 95% confidence level, and
- demand estimates to +/-20% at 95% confidence level.

The input assumptions to the cost-benefit analysis are summarised in Table 4.1, and are based wherever possible on the survey data. As observed pedestrian demand was very low (fewer than ten pedestrians per day), they are neglected from the cost-benefit analysis.

■ **Table 5.1: Economic assumptions**

Parameter	Assumption	Source
General assumptions		
Economic life	30 years	
Discount rate	3%, 7%, 10%	
Health benefit ramp-up period	5 years (linear)	Genter et al. (2009)
Effective average motorist speed	30 km/h	Estimate
Effective average cyclist speed	20 km/h	Estimate
Effective average walking speed	6 km/h	Estimate
Effective average PT speed	15 km/h	Estimate
Bicycle riders		
Opening year demand (AADT)	816	Video counts
Average trip distance	24.6 km	Intercept surveys
Diversion: car	2%	Intercept surveys
Diversion: PT	1%	Intercept surveys
Diversion: walk	0%	Intercept surveys
Diversion: reassign	94%	Intercept surveys
Diversion: induced	3%	Intercept surveys
Transport purpose split	62%	Intercept survey
Change in trip distances	0 km	
Travel time saving	44 s	Video observations of delay at Moggill Road
Facility		
Length	0.3 km	New path and bridge
Type	Off-road path	
Diverted motor vehicle travel time by period	Busy: 50% Medium: 30% Light: 20%	Guesstimate
Investment		
Capital cost	2015: $8.6 m	Media release
Operating cost	$10,000 p.a.	Guesstimate

The results of the cost-benefit analysis are summarised in Table 5.2. For the central discount rate of 7% the BCR is marginally positive at 1.3.

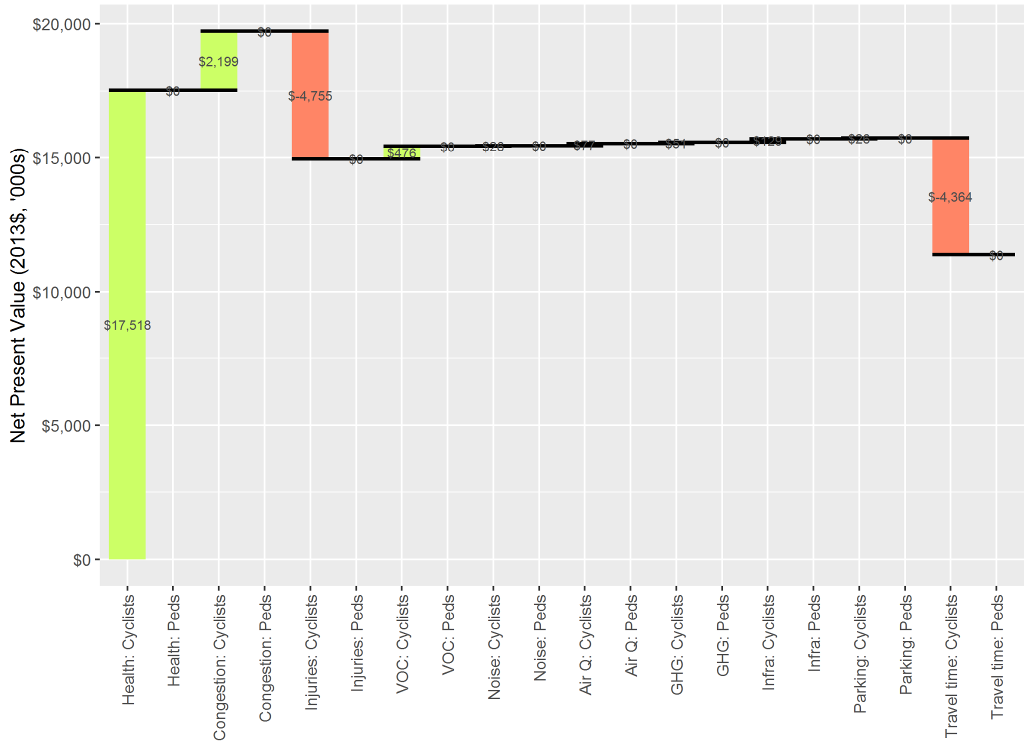
- **Table 5.2: Economic assessment**

	Discount rate		
Parameter	**4%**	**7%**	**10%**
Benefit-Cost Ratio (BCR)	2.0	1.3	0.9
Likelihood BCR < 1.0	0%	0%	100%
Net Present Value (NPV)	\$9.19 m	\$2.49 m	-\$1.26 m
Present Value of Benefits (PVB)	\$18.09 m	\$11.38 m	\$7.64 m
Present Value of Costs (PVC)	\$8.89 m	\$8.89 m	\$8.89 m

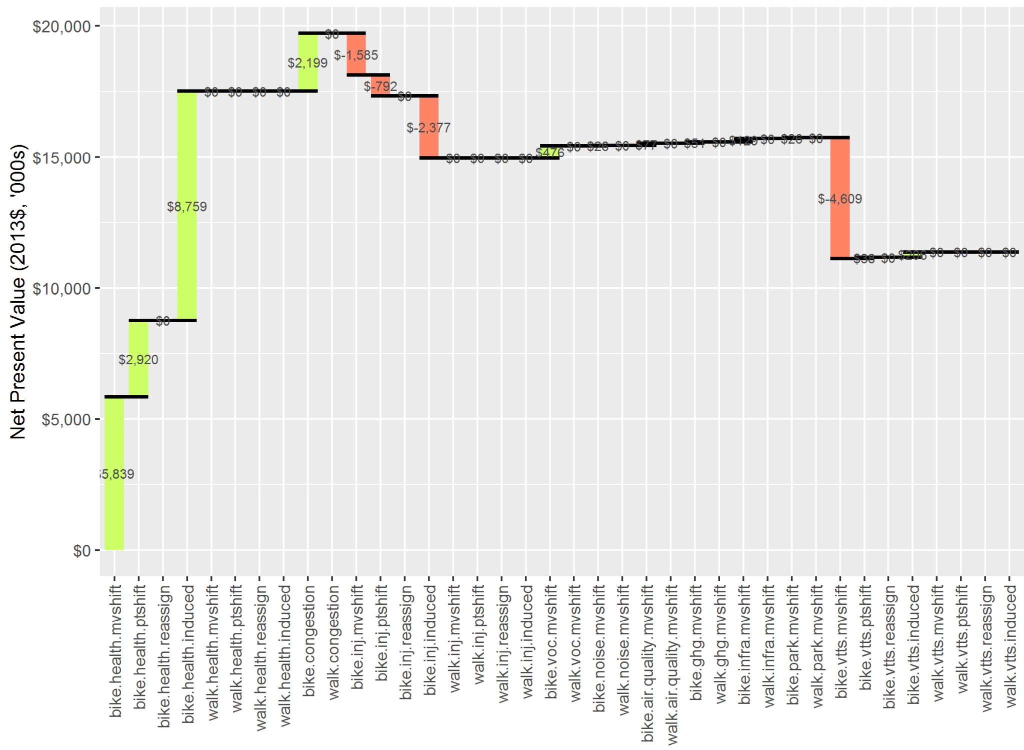
All values are 2013 prices and values.

The breakdown of the NPV for the central discount rate is shown in Figure 5.1. The vast majority of the benefits accrue from cyclist health benefits. These health benefits outweigh the injury disbenefits by around four to one. There is marginal congestion relief, primarily as a result of motorists shifting to cycling (Figure 5.2), and significant travel time disbenefits resulting from motorists shifting to cycling. This is contrary to the intercept survey finding in Figure 4.10, where half of respondents indicated that a car would have taken longer than riding with only 21% agreeing it would have taken less time. The model assumes effective cycling speeds of 20 km/h and 30 km/h for driving, hence travel times increase by 50% for those shifting from driving to cycling. Given the survey evidence, it seems unlikely this model assumption holds true. Instead, it seems reasonable to argue that there will be no travel time disbenefits for those shifting from car to cycling[8]. As such, if the travel time disbenefits for those shifting from car to cycling are neglected the BCR for the central case increase to 1.8 (Table 5.3). In our view this is a more robust and defensible estimate of the BCR.

[8] Indeed, the survey findings suggest twice as many riders will save travel time by riding compared with those who will have a longer trip compared with car travel. Hence, this assumption is conservative.



■ **Figure 5.1: Summary breakdown of net present value**



■ **Figure 5.2: Detailed breakdown of net present value**

■ **Table 5.3: Economic assessment (without travel time disbenefits for diversion from car to cycling)**

	Discount rate		
Parameter	**4%**	**7%**	**10%**
Benefit-Cost Ratio (BCR)	2.8	1.8	1.2
Likelihood BCR < 1.0	0%	0%	0%
Net Present Value (NPV)	$16.15 m	$7.10 m	$2.02 m
Present Value of Benefits (PVB)	$25.04 m	$15.99 m	$10.92 m
Present Value of Costs (PVC)	$8.89 m	$8.89 m	$8.89 m

All values are 2013 prices and values.

As noted in Section 3, the estimated average delay from the video observations was around 44 seconds. This avoided delay accounts for around 3.4% of the discounted benefits in Table 5.3. In other words, it is a comparatively minor contributor to the benefit stream. If instead the upper bound estimate of delay of 136 seconds as estimated by Strava is used the BCR increases to 2.0 for the central case and the avoided delay accounts for 10% of the discounted benefits. We suggest the “true” answer is somewhere in this range, but note that the outcome is essentially independent of which delay assumption is preferred.

6 Discussion

The Moggill Road cycle bridge provides a comfortable and safe alternative for bicycle riders to cross Moggill Road at the Centenary Motorway. The bridge enables the 820 bicycle riders using the Centenary Cycleway on a typical day to avoid the three-stage crossing of the intersection that was previously required. However, these benefits need to be balanced against the $8.6 m project cost. The issue is whether the benefits to these users exceed the costs. This is the purpose of the cost-benefit analysis, which attempts to assign monetary values to the benefits and costs of the project over its economic lifetime.

The reported BCR of around 1.8 (neglecting travel time disbenefits for those diverting from car to cycling) suggests the project represents good value for money. The main factors contributing to the BCR are as follows:

- Health benefits accrued from new recreational bicycle trips (i.e. induced), with less contributions from transport cycling trips that have diverted from car and public transport.
- Congestion relief from the diversion of car travel for commuting to bicycle riding on arterial roads that are heavily congested during the peak periods.
- The long distances over which bicycle trips occur (24.6 km/h), which in turn generate high health benefits.

Conversely, the main factors constraining the BCR are as follows:

- Comparatively low levels of diversion from other modes (2% from car and 1% from public transport).
- The high capital cost of the project.
- The additional injury burden assumed to be incurred as a result of motorists and public transport users diverting to another mode (cycling) which has, on average, higher per kilometre travelled injury risk.

We suggest the low levels of mode shifting are not entirely surprising. The Centenary Cycleway provides a high quality, long distance cycling facility. While the bridge is undoubtedly highly supported by bicycle riders, and provides them with real benefits, in itself the bridge is unlikely to attract significant trips from other modes.

The model assumes safety disbenefits for those shifting from car and public transport, and very small benefits for those who were already riding. The former assumption is based on indicative relative risks per kilometre travelled by mode. While indicative for the state of Queensland, these assumptions may be wildly incorrect for this particular corridor. While local values cannot be readily estimated (as there will be little to no exposure data, and crashes will be heavily underreported) we suggest the effect on the BCR will be small. However, if it could be argued the project would save a single riders' life the economic benefit would be around $4 m, which would go a long way towards meeting the project cost of $8.6 m[9].

We suggest that overall our approach to estimating the impacts of travel time delays are conservative for two reasons:

- there has been no consideration given to the delay avoided by motorists having to wait at the on- and off-ramps for bicycle riders, nor at the signalised intersection itself, and
- no penalty has been applied to wait time.

It is suggested that a credible argument could be mounted to include motorist delay. However, for most conservative assumptions on motorist delay the impact on the CBA is likely to be minimal. For example, if each rider crossing event were to result in delaying a motorist by five seconds the value of the delay would be around $14 per day, or under $6,000 per year. This will have a negligible impact on the CBA.

It is common in transport appraisal practice to weight waiting time for public transport higher than travel time; usual practice is to weight every minute of waiting time as three times more onerous than one minute of travel time (Transport and Infrastructure Council 2016). However, it is also suggested in these guidelines that no additional travel time weight should be applied to wait time for active transport[10]. While it may be argued bicycle riders have a higher willingness to pay to avoid delay than travel time doing so would be inconsistent with motor vehicle transport appraisal (where delay time is treated similarly to travel time). As such, we would not recommend such an approach – and in any case would note that it will have at most a small effect on the CBA.

[9] However, it should be recognised that any (hypothetical) life saved would to need occur early in the project life for the benefit to be of material economic benefit given the effect of discounting.

[10] It is not clear from the guidelines why it should be that a traveller would see waiting time for, say, public transport, as three times more onerous than travel time, but not perceive waiting time for bicycle riders waiting at intersections in the same way.

References

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Appendix A: Intercept survey script

We're completing a quick survey on the path. Could you help us?

1. INTERVIEWER enter mode of travel
   a. Bicycle rider
   b. Pedestrian
2. In what suburb did you start your trip, and where will you finish your trip?
   a. Start: ___________
   b. Finish: __________
3. How long will the trip take?
   a. Hours: _____
   b. Minutes ____
4. How far is the trip?

   ____ km
5. What is the purpose of your trip?
   a. Commuting to or from work
   b. Fitness, recreation or sport
   c. Shopping
   d. School, university or other education activity
   e. Other: _________
6. How often have you walked/ridden here in the past month?
   a. Almost every day
   b. Every weekday
   c. 3 – 4 days a week
   d. 1 – 2 days a week
   e. Every fortnight
   f. Only once
   g. This is the first time
7. This bridge has only recently been built. Are you aware that it's new?
   a. Yes
   b. No
8. How would you have made this trip if this bridge wasn't here?
   a. Taken a different route (incl. used the road)
   b. Would not have travelled

c. Car – as driver
d. Car – as passenger
e. Motorcycle
f. Train
g. Bus
h. Ferry
i. Taxi
j. Don't know
k. Other: _________

9. What change, if any, would you say the construction of the bridge has had on the amount of time you've spent walking/riding over the past month?
   a. Significantly decreased (by at least an hour a week)
   b. Decreased (by less than an hour a week)
   c. No change
   d. Increased (by less than an hour a week)
   e. Significantly increased (by at least an hour a week)
10. IF BICYCLE RIDER: What would you have done if you couldn't ride your bike for this trip?
   a. Would not have travelled
   b. Used a car – as the driver
   c. Used a car – as the passenger
   d. Motorcycle
   e. Train
   f. Bus
   g. Ferry
   h. Taxi
   i. Walked
   j. Ran / jogged
   k. Don't know
   l. Other: ___________
11. IF TRANSPORT PURPOSE: Which of the following best describe how easily you could have used a car for this trip?
   a. I had a car available and could easily have got access to it
   b. I could have got a car from another person where I started my trip (e.g. another household member)
   c. I did not have ready access to a car to make this trip
   d. I do not have a drivers licence
   e. Other: _________

12. IF COULD HAVE USED CAR: Would it have taken more or less time to reach your destination by car?
    a. More time
    b. Same time
    c. Less time
13. IF TRANSPORT PURPOSE: Which of the following best describes how easily you could have made this trip by public transport?
    a. I had a convenient public transport alternative
    b. I had a public transport alternative but it would have taken longer
    c. I did not have a viable public transport alternative
    d. Other: __________
14. IF COULD HAVE USED PUBLIC TRANSPORT: Would it have taken more or less time to reach your destination by public transport?
    a. More time
    b. Same time
    c. Less time
15. INTERVIEWER enter any other comments: _______________