

# **The costs and benefits of inner city parking vis- à- vis network optimisation**

## **October 2015**

F Powell, C Bowie, L Halsted, J Beetham and L Baker  
Opus International Consultants, Wellington and Auckland

ISBN 978-0-478-44528-2 (electronic)  
ISSN 1173-3764 (electronic)

NZ Transport Agency  
Private Bag 6995, Wellington 6141, New Zealand  
Telephone 64 4 894 5400; facsimile 64 4 894 6100  
research@nzta.govt.nz  
www.nzta.govt.nz

Powell, F, C Bowie, L Halsted, J Beetham and L Baker (2015) The costs and benefits of inner city parking vis-à-vis network optimisation. *NZ Transport Agency research report 575*. 117pp.

Opus International Consultants Ltd was contracted by the NZ Transport Agency in 2014 to carry out this research.

This publication is copyright © NZ Transport Agency 2015. Material in it may be reproduced for personal or in-house use without formal permission or charge, provided suitable acknowledgement is made to this publication and the NZ Transport Agency as the source. Requests and enquiries about the reproduction of material in this publication for any other purpose should be made to the Manager National Programmes, Investment Team, NZ Transport Agency, at research@nzta.govt.nz.

**Keywords:** cost-benefit, cycling, economic evaluation, parking reallocation, public transport, road space, shared space, urban realm

## **An important note for the reader**

The NZ Transport Agency is a Crown entity established under the Land Transport Management Act 2003. The objective of the Agency is to undertake its functions in a way that contributes to an efficient, effective and safe land transport system in the public interest. Each year, the NZ Transport Agency funds innovative and relevant research that contributes to this objective.

The views expressed in research reports are the outcomes of the independent research, and should not be regarded as being the opinion or responsibility of the NZ Transport Agency. The material contained in the reports should not be construed in any way as policy adopted by the NZ Transport Agency or indeed any agency of the NZ Government. The reports may, however, be used by NZ Government agencies as a reference in the development of policy.

While research reports are believed to be correct at the time of their preparation, the NZ Transport Agency and agents involved in their preparation and publication do not accept any liability for use of the research. People using the research, whether directly or indirectly, should apply and rely on their own skill and judgement. They should not rely on the contents of the research reports in isolation from other sources of advice and information. If necessary, they should seek appropriate legal or other expert advice.

# Acknowledgements

The authors would like to acknowledge the input of the following people for their valuable contributions to this work:

- Steering Group chair Iain McAuley (NZ Transport Agency)
- Steering Group members Steve Spence (Wellington City Council), Scott Ebbett (Auckland Transport), Barry Kidd (Bus and Coach NZ), Patrick Morgan (Cycling Advocates Network), Jacqueline Blake (NZ Transport Agency) and Quintin Howard (NZ Transport Agency)
- External peer reviewers Anna Johnson and Glen Hazelton (Dunedin City Council) and Jean-Paul Thull (Thull & Associates Consulting)

We would also like to thank all of the people who gave their time to attend the industry workshops in Wellington, Auckland, Hamilton, and Dunedin for their valuable insights.

# Abbreviations and acronyms

AT	Auckland Transport
BCA	business case approach
EEM	<i>Economic evaluation manual</i>
NOF	network operating framework
PT	public transport
Transport Agency	New Zealand Transport Agency
WCC	Wellington City Council

# Contents

- Executive summary** .....7
- Abstract** ..... 10
- 1 Introduction**..... 11
  - 1.1 Key research questions/project objectives..... 11
  - 1.2 Report structure ..... 11
- 2 Methodology**..... 12
  - 2.1 Key project stages ..... 12
    - 2.1.1 Stage 1: Kerbside parking reallocation drivers, policy and strategy approaches and economic evaluation tools ..... 12
    - 2.1.2 Stage 2: Case study evidence of cost–benefit assessment in New Zealand. 12
    - 2.1.3 Stage 3: Industry workshops ..... 13
    - 2.1.4 Stage 4: Proposed kerbside parking evaluation framework ..... 13
- 3 Project drivers, policy context and evaluation tools**..... 15
  - 3.1 Introduction..... 15
  - 3.2 Kerbside parking reallocation context ..... 15
    - 3.2.1 Future trends affecting inner city parking ..... 18
  - 3.3 Kerbside parking in local and central government policy ..... 19
    - 3.3.1 Major urban areas ..... 20
    - 3.3.2 Regional cities and towns ..... 22
  - 3.4 Transport Agency planning and evaluation frameworks ..... 22
    - 3.4.1 Integrated transport and land use planning..... 23
    - 3.4.2 The Network Operating Framework..... 23
    - 3.4.3 Urban Design Protocol ..... 24
    - 3.4.4 The business case approach ..... 24
    - 3.4.5 The *Economic evaluation manual*..... 25
  - 3.5 Summary ..... 26
- 4 Case studies of kerbside parking reallocation** ..... 28
  - 4.1 Introduction..... 28
  - 4.2 Pedestrianised shared spaces and quality urban realms ..... 28
    - 4.2.1 Fort Street, Auckland ..... 29
    - 4.2.2 Totara Avenue, Auckland ..... 29
    - 4.2.3 Lower Cuba Street, Wellington ..... 30
  - 4.3 Cycle infrastructure ..... 31
    - 4.3.1 Thorndon Quay Clearway, Wellington..... 31
    - 4.3.2 Beach Road, Auckland ..... 32
    - 4.3.3 Lake Road, Devonport ..... 32
    - 4.3.4 State Highway 1, Dunedin (proposed) ..... 33
    - 4.3.5 Island Bay to city arterial cycle way, Wellington (proposed) ..... 34
  - 4.4 Public transport services ..... 34
    - 4.4.1 Papanui Road, Christchurch ..... 35
    - 4.4.2 The Golden Mile, Wellington ..... 36
  - 4.5 Extra vehicle lanes ..... 36

4.5.1	Willis Street, Wellington .....	37
4.6	Additional findings from the case studies.....	38
4.7	Summary .....	39
<b>5</b>	<b>Findings from the industry workshops.....</b>	<b>40</b>
5.1	Introduction.....	40
5.2	Methodology .....	40
5.2.1	Workshop locations .....	40
5.2.2	Workshop participants.....	40
5.2.3	Workshop formats .....	41
5.3	Industry workshops summary .....	42
5.3.1	Local drivers of kerbside parking reallocation .....	42
5.3.2	Common barriers to kerbside parking reallocation .....	44
5.3.3	Limitations to this information.....	46
5.3.4	Summary of workshop discussion .....	46
5.4	Findings for the draft framework.....	47
5.4.1	Travel time .....	47
5.4.2	Mode share .....	48
5.4.3	Journey satisfaction .....	49
5.4.4	Mode choice availability.....	49
5.4.5	Existing parking supply .....	50
5.4.6	Occupancy of existing parking.....	50
5.4.7	Use of existing parking.....	51
5.4.8	Capital and operating expenditure.....	51
5.4.9	Vehicle operating costs.....	51
5.4.10	Parking revenues .....	52
5.4.11	Public transport revenues .....	52
5.4.12	Business income.....	53
5.4.13	Adjacent land use and value .....	54
5.4.14	Crashes.....	54
5.4.15	Population health .....	55
5.4.16	Pedestrian use.....	56
5.4.17	Visitor satisfaction.....	56
5.4.18	Environmental impacts .....	57
5.5	Participant comments on the value of such a framework.....	57
<b>6</b>	<b>Proposed framework and alignment with current approaches .....</b>	<b>60</b>
6.1	Proposed kerbside parking evaluation framework.....	60
6.2	Comparisons with existing approaches .....	60
6.3	Measuring costs, benefits and contextual elements .....	61
<b>7</b>	<b>Conclusions and recommendations.....</b>	<b>65</b>
7.1	Key overall findings from this research.....	65
7.2	Potential limitations of this work.....	66
7.3	Recommendations for evaluation of inner city kerbside parking reallocation .....	67
<b>8</b>	<b>References.....</b>	<b>68</b>
<b>Appendix A: Industry workshop summaries.....</b>		<b>72</b>

# Executive summary

The New Zealand Transport Agency (the Transport Agency) is seeking to understand the costs and benefits of inner city kerbside parking, versus the opportunity cost of the corridor space being allocated for other uses. Increasing demands for multi-modal transport networks that support efficient movement of people and goods, and greater emphasis on the amenity value of inner city streets, has created competition for road space. Given limited space on city streets, kerbside parking reallocation is often proposed along routes and on streets, where alternative uses of space are desirable. Kerbside parking reallocation, as discussed in this report, is a new use of road space (such as cycle lanes, public transport infrastructure, extra vehicle lanes, or pedestrianised shared spaces and better quality urban realms) that was previously occupied by vehicle parking spaces. This research was carried out in New Zealand between August 2014 and June 2015.

## **The Transport Agency undertook this research with the stated knowledge gap:**

- What are the costs and benefits of inner city kerbside parking?

## **The report provides a summary of the four stages of work undertaken:**

- Stage 1: Literature review of drivers, challenges and monetary and non-monetary costs and benefits related to kerbside parking reallocation projects, both in New Zealand and overseas. The local New Zealand policy context is described as are existing economic evaluation and decision making tools.
- Stage 2: New Zealand case study examples of kerbside parking reallocation projects, supported by evidence from pre- and post-project evaluation reporting where available.
- Stage 3: Industry workshops to understand practitioners' information needs and gaps in current knowledge of the costs and benefits of reallocating inner city parking. A range of New Zealand cities and organisations was included to identify differences between cities and regions.
- Stage 4: A proposed framework that captures the range of costs and benefits of inner city kerbside parking reallocation. The framework accounts for variation in the type and scale of reallocation projects that take place in different local contexts across New Zealand.

## Specific findings

- 1 The benefits of reallocating corridor space to uses other than kerbside parking are widely recognised within the transport and planning sector. Reallocation of inner city kerbside parking can, when implemented in the right settings, deliver benefits for network optimisation, the safety of active mode users and motorcyclists, multi-modal transport systems, integrated transportation and land use planning and quality urban environments. These can be achieved by outcomes such as reduced travel time for all, or a particular, transport mode, fewer injuries to cyclists from crashes, increased transport options for users, and better urban realms that attract visitors and shoppers. The primary barrier to change is therefore not a lack of understanding of the potential costs and benefits of kerbside parking reallocation, but common misconceptions held by the public and media that can influence decision makers.
- 2 There is a growing body of overseas evidence for the costs and benefits of kerbside parking reallocation. However, in New Zealand there is limited local evidence in a range of contexts that planners can draw upon when engaging with project stakeholders. These groups, such as business owners, local residents and car drivers, can be sceptical about the relevance of overseas examples and

evidence in their local context. There is therefore a need to develop a local evidence base of the positive and negative effects kerbside parking reallocation has on different groups in New Zealand. This needs to be based on robust pre- and post-project evaluation that is carried out in a consistent manner across New Zealand so that findings can be compared between places. Such an evidence base would help to: overcome misconceptions; improve decision-making; deliver evidence of the effectiveness of parking removal as a 'lever' for achieving transportation and land use benefits; assess whether the stated project goals have been achieved; and provide examples of best practice.

- 3 Current evaluation methodologies for transport projects, including the Transport Agency's business case approach and *Economic evaluation manual*, capture some monetary and non-monetary costs and benefits associated with kerbside parking reallocation. Where non-monetary factors are excluded from cost-benefit analysis in the *Economic evaluation manual*, they are often reported as potential costs and benefits in the wider business case. None of these methodologies explicitly include measures of kerbside parking as a use of road space to consider when modifying the transport environment. Furthermore, these methodologies omit factors that industry experts believe are important to understand when identifying the impacts of parking removal, namely the impacts on inner city parking availability, adjacent businesses and residents, journey satisfaction and the quality of the central city environment.
- 4 A conceptual framework for evaluating the costs and benefits relating to kerbside parking reallocation projects was developed and tested on industry experts. This framework includes factors that are important to evaluate for all kerbside parking reallocation projects, and a further subset that are most relevant only when reallocating for specific new uses of the space. The proposed evaluation framework is set out in section 6.1.
- 5 The conceptual framework includes a wider range of costs and benefits, as well as contextual factors (such as parking supply in the vicinity), than are currently included in evaluation tools utilised by the Transport Agency. We identify that the costs and benefits, and contextual factors presented here could be aligned with the existing Strategic Options Toolkit provided by the Transport Agency. Including a wider range of costs and benefits in the evaluation of transport interventions follows international examples, where both monetary and non-monetary factors are weighted and assessed within the same calculations of economic efficiency.
- 6 Through the industry workshops and evaluation of existing evaluation frameworks we identified a range of methods for measuring the factors in the proposed evaluation framework. There are however a number of issues constraining local authorities from effectively assessing the full range of costs and benefits. Building a wider New Zealand evidence base may help to alleviate these difficulties for councils where it is not practical to assess each factor before and after reallocation has taken place. These include:
  - a Cost: it may only be practical or cost effective to survey users and carry out extensive parking beat surveys for large or contentious projects. Small projects or those that are unopposed are less likely to warrant investment in collecting this information.
  - b Scale: first, it can be awkward to claim that a single project is solely responsible for improving travel times for example, and second, data may only be available for whole city and not along the specific route affected by parking removal.
  - c Timeliness: data collection is a problem when data is collected via secondary surveys that may be conducted infrequently.



- d Hard to measure: the impact of kerbside parking reallocation on factors like population health and the environment are important to understand, but presently are problematic to measure at the scale of a single project.
  - e GIS tools: spatial information is used by planners to inform the planning, evaluation and design of transport projects, but further work is required to collate data in a way that facilitates better visualisation and communication with stakeholders.
- 7 Feedback on the value of this proposed evaluation framework from expert stakeholders at the industry workshops held during this research was very positive. Consistently evaluating kerbside parking reallocation against the same set of costs and benefits, and contextual elements, across New Zealand is expected to reduce misconceptions about negative impacts on businesses, provide a robust evidence base for the net benefits of reallocation, reduce reliance on overseas and anecdotal evidence and contribute to best practice decision making for future reallocation projects.

## Abstract

This research project investigated the monetary and non-monetary costs and benefits associated with reallocation of inner city kerbside parking to new uses in New Zealand. This research developed a framework of relevant costs and benefits, based on evidence collected from case study examples of kerbside parking reallocation in New Zealand and overseas, and feedback from industry experts provided at workshops held in Wellington, Auckland, Hamilton and Dunedin. This framework was compared with current approaches to business case development and evaluation of transport projects in New Zealand.

The study shows there are a number of costs and benefits commonly attributed to reallocation of inner city kerbside parking, both in New Zealand and overseas. At present, there is a lack of local evidence for the potential impact of projects in local settings that in some cases has created a barrier to change. This may be overcome with best practice guidance for pre- and post-assessment of kerbside parking reallocation impacts. Other potential benefits are improved decision making and the delivery of knowledge of the effectiveness of kerbside parking reallocation as a 'lever' for achieving transportation and land use benefits.

# 1 Introduction

The New Zealand Transport Agency (the Transport Agency) is seeking to understand the costs and benefits of the value of inner city kerbside parking versus the opportunity cost of the corridor space being allocated for other uses. Traditionally, kerbside parking has been a default use of road space along the majority of inner city streets in New Zealand. Increasing demands for multi-modal transport networks that support efficient movements of people and goods, and greater emphasis on the amenity value of inner city streets, has created competition for road space. Given limited space on city streets, kerbside parking reallocation is often proposed along routes and on streets where alternative uses of space are desirable.

Reallocation or removal of inner city kerbside parking is often resisted due to the assumed negative impact on businesses along the corridor. Evidence from previous examples in New Zealand and overseas suggests this could be a misconception, as in many cases the removal of kerbside parking has not had the expected negative economic impacts. Additionally, new uses of kerbside parking space have been shown to improve inner cities through better accessibility for multiple modes, the quality of urban environments and the function of urban transport networks.

## 1.1 Key research questions/project objectives

The Transport Agency sought to address the stated knowledge gap:

- What are the costs and benefits of inner city kerbside parking?

The main objectives of this research were to:

- define the range of monetary and non-monetary costs and benefits that are most often considered during pre- and post-project evaluation of kerbside parking reallocation projects, both in New Zealand and in comparably international settings
- identify the costs and benefits currently assessed on a regular basis for kerbside parking reallocation projects in New Zealand, including identifying current gaps in local evidence and/or knowledge
- inform the Transport Agency of the effectiveness of methodologies set out in current analytical and planning frameworks for understanding the relative costs and benefits of allocating corridor space for parking, and identify areas where additional information or analysis would be required for such assessment
- develop a practical costs and benefits analytical framework, which could then be tested within the sector.

## 1.2 Report structure

This report describes the research process and findings of each stage, and concludes with a concise summary of the research results, key overall findings and recommendations regarding an analytical framework for assessment of kerbside parking reallocation projects.

The appendix provides a detailed write-up of findings from the four industry workshops conducted in Wellington, Auckland, Hamilton and Dunedin.

## 2 Methodology

### 2.1 Key project stages

The research was undertaken in several stages from August 2014 to June 2015. The methods for each stage were agreed between the researchers and the Steering Group:

#### 2.1.1 Stage 1: Kerbside parking reallocation drivers, policy and strategy approaches and economic evaluation tools

In 2013 the Transport Agency published the report 'Reallocation of road space' (Allatt et al 2013) which examined the need for reallocation of road space in New Zealand, and the economic impact of transport choice and road space allocation on shopping areas in New Zealand cities. The current document builds on the findings of Allatt et al (2013) to identify a wider range of costs and benefits of kerbside parking reallocation. Chapter 3 briefly establishes the background of competing demands for road space, which drive the need to evaluate how our roads and streets are allocated to different uses. Reallocation of road space is an increasingly common strategy proposed by transport planners and decision makers seeking to optimise a transport network for all modes, as well as the quality of adjacent land use.

In keeping with the practical purpose, papers and reports were reviewed for information about future transportation trends likely to impact on the need for roadside parking allocation, the drivers of parking projects being initiated, and evidence of outcomes. While relevant to the bigger transport picture, the literature discussing social pressures and political systems that shape how transport networks are managed in response to changing demands were beyond the scope of this project. Chapter 3 finally provides an introduction to the relevant planning and policy frameworks in which the reallocation of road space in New Zealand fits. In particular the report describes the Transport Agency's approach to integrated transport and land use planning and guidance for decision making around the hierarchy of roads and streets within the network. This is followed by examples of local government approaches to inner city road function and parking priorities in Auckland, Wellington, Christchurch, Hamilton, Rotorua and Invercargill. These cities were chosen to demonstrate the challenges and demands that guide different approaches between centres.

#### 2.1.2 Stage 2: Case study evidence of cost-benefit assessment in New Zealand

Case studies of parking reallocation are reviewed in chapter 4. The review of cases concentrates on four common 'types' of inner city road space reallocation. These were identified in the literature and agreed upon with the Steering Group for the purpose of this research; they are not intended to be an exhaustive list of alternative uses of inner city road space. The four types of reallocation discussed in this report are:

- pedestrianised shared spaces and quality urban realms
- cycle infrastructure
- public transport (PT) services
- extra vehicle lanes.

The Steering Group set the following criteria for identifying New Zealand case studies where possible:

- availability of relevant before and after data
- projects that have been completed since 2010

- sites from both Auckland and Wellington should be included
- multiple types of projects (eg urban realm improvement, cycleway)
- range of project scales in terms of the number of parking spaces removed
- projects in CBD and suburban centres to be included.

There is relatively little publicly available information for pre- and post-assessment of kerbside parking reallocation projects in New Zealand, and even less evidence for evaluation of the costs and benefits of reallocation. Subsequently the case study examples presented in this report are skewed towards completed projects in the major urban areas of Auckland, Wellington and Christchurch. These areas are more likely to undertake large-scale reallocation that will have significant impacts on the transport network and adjacent land use and therefore requiring a higher level of justification for decision making and use of public funds. The funding needed to conduct comprehensive impact assessments is also more likely to be available in large cities.

### 2.1.3 Stage 3: Industry workshops

Given the lack of comprehensive assessments of previous kerbside parking reallocation projects in New Zealand, and the inconsistency in approaches for those that have been undertaken, the researchers and Steering Group members agreed a series of workshops attended by transport practitioners, decision makers and advocates would be the best approach to develop a cost-benefit framework rather than an in-depth examination of a small number of previous projects. Four workshops were held in Wellington, Auckland, Hamilton and Dunedin to provide a mix of geographic locations, city scales, and pressures on the transport network and inner city economies. A draft list of costs and benefits identified during the case study review were presented to each workshop to determine the perceived importance of each factor in the local context. Participants were provided with the opportunity to expand the list given their local context if needed as well. A full methodology for the industry workshops can be found at the beginning of chapter 5.

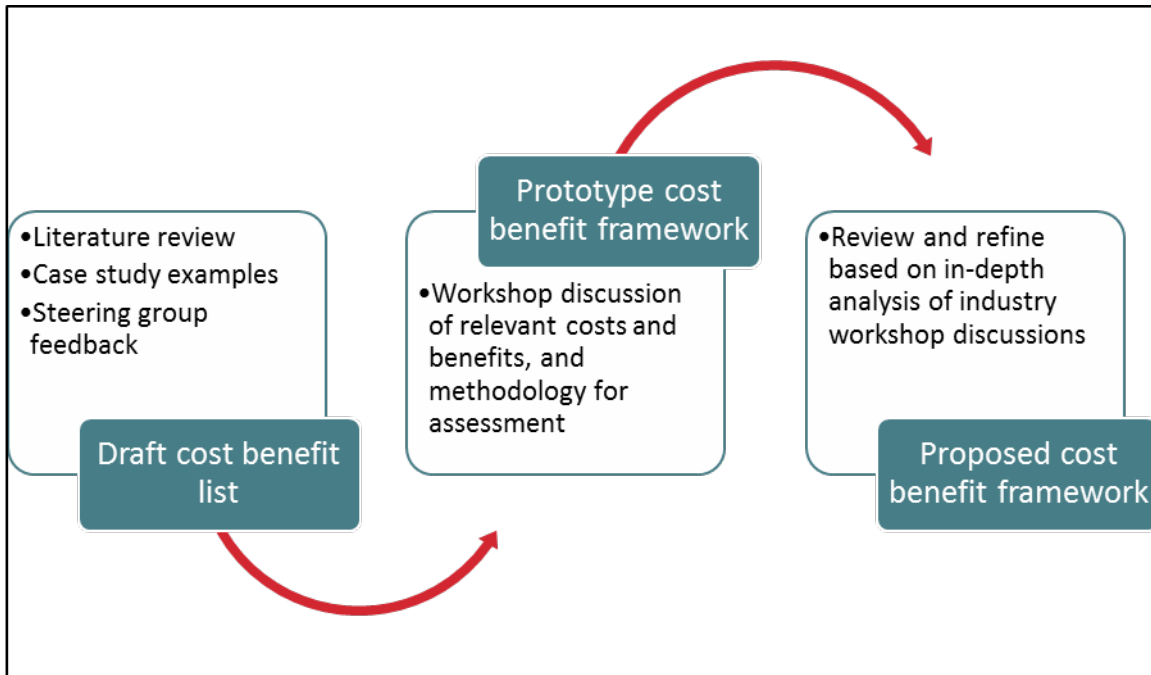
The literature review identified a number of potential costs and benefits such a framework might include, and some evidence for the methodology of measuring these. However, the magnitude of effects, particularly for inner city businesses, resulting from previous projects in New Zealand is not well documented outside of a few major projects. Therefore the primary purpose of the workshops was to identify, with industry input, a common set of costs and benefits arising from inner city kerbside parking reallocation projects that should, and could, realistically be included in the pre- and post-project evaluations.

The summary findings from the industry workshops capture discussions at each of the workshops but do not reflect the views of all participants at the workshop or their employers. Additionally, the comments recorded at the discussions do not necessarily reflect the views of the authors, peer reviewers, or the Transport Agency.

### 2.1.4 Stage 4: Proposed kerbside parking evaluation framework

The proposed cost-benefit framework for evaluation of inner city kerbside parking reallocation projects in New Zealand is presented in chapter 6. This framework was developed iteratively over the course of the project (summarised in figure 2.1). A prototype framework was initially developed from the literature review and case study findings, then discussed and critiqued with workshop participants and the Steering Group, and then refined to the final version.

Figure 2.1 Stages of development for the proposed cost-benefit framework



Workshop participants cited the need for local evidence of kerbside parking reallocation impacts, both positive and negative, for:

- better decision making around suitable locations for reallocation
- understanding what best practice approaches and project outcomes look like
- the effect of previous projects locally, or in areas not dissimilar from their own, on local businesses.

The proposed framework is intended to be a practical tool to guide local assessment of kerbside parking reallocation in New Zealand. It could be developed as a toolkit aligned with the existing Strategic Options Toolkit provided by the Transport Agency’s business case approach. The benefits of doing so are discussed in chapter 6.

## 3 Project drivers, policy context and evaluation tools

### 3.1 Introduction

Previous research conducted on behalf of the Transport Agency has examined the effect of road space reallocation on economic activity in shopping areas (Allatt et al 2013). This research identified the significant contribution users of walking, cycling and PT modes provide to spending in local shopping areas. The findings suggest that the costs of reallocating road space, in particular kerbside parking, to support non-car based travel modes are outweighed by the economic and urban amenity benefits that can be achieved.

This research takes a wider view than the previous report and considers the costs and benefits of reallocation for a number of stakeholder groups and across different project types, city sizes and scale of parking reallocation. This chapter focuses on the following topics:

- modern drivers of kerbside parking reallocation and common new uses for parking spaces in inner city locations
- future trends likely to increase demands for alternative uses of inner city road space in New Zealand
- local and central government policy and planning frameworks that consider the role and function of urban roads and streets across New Zealand
- current New Zealand approaches to cost-benefit analysis of land transport programmes and interventions

### 3.2 Kerbside parking reallocation context

A hallmark of modern planning approaches to city streets overseas and in New Zealand's larger urban areas is to provide spaces that cater for users of multiple transport modes, and to attract visitors to quality urban environments. Where road networks have historically been developed around the movement and parking of vehicles (as in the road layout in figure 3.1), current transport planning identifies a hierarchy of use and prioritises road space accordingly. In New Zealand the One Network Road Classification places roads and streets in functional categories, which consider the movement of people and goods, and the economic and social functions corridors within each category should aspire to support (NZ Transport Agency 2015a).

Modern inner city roads and streets must perform a wide range of functions to optimise the efficiency and productivity of transport corridors themselves, and to promote social and economic vitality in the adjacent spaces. Given a lack of space to increase the road network footprint in central cities, it is necessary to consider how existing space may be better allocated to produce an efficient transport system that meets the needs of its users, and contributes to the economic vitality of adjacent land. Kerbside parking reallocation is a widely used transport intervention, where road space previously occupied by vehicle parking spaces is modified for use by a new transport mode or user group.

When off-street parking is taken into account, an aerial view of a typical New Zealand city shows a large amount of land allocated to parked cars. However kerbside parking rarely, if ever, operates with maximum efficiency, areas of over and under demand often exist so a loss of parking may be not increase pressure on remaining stock (MRCagney Pty Ltd 2013). Vehicle movements relating to kerbside parking have also

been shown to reduce the efficiency of transport networks. Approximately 30% of inner city traffic is estimated to be the direct result of drivers 'cruising for parks', although the effect varies between streets (Shoup 2007).

**Figure 3.1 View of Tory Street road layout, Wellington**



Source: Beetham 2014

At a strategic and policy level, inner city parking reallocation aims to achieve transport network optimisation and/or improved urban amenity. Busy urban centres have a high density of retail, hospitality and office space, so better access is often a desired outcome of reallocation projects. On urban arterial and major inner city corridors the movement of people and goods is prioritised so reallocation often aims to produce a more efficient and/or equitable use of road space for one or more modes (Cairns et al 2002). However, these spaces are not always distinct from one another and urban arterials often pass through urban centres creating a complex transport environment.

Reallocating kerbside parking to a different use of space is not desirable, or practical, on all inner city streets. As such, the type of infrastructure built that replaces kerbside parking and the success of any project is dependent on a range of local conditions and factors (Beetham 2014; Marsden 2006). These factors include the current and potential future characteristics of:

- the existing supply of on- and off-street parking on adjacent streets and the type of parking (including time restricted, paid parking, mobility spaces, motorcycle parking, commuter parking and reserved spaces)
- the accessibility of the area by all transport modes
- the travel characteristics and preferences of local residents, workers, and visitors to the area
- the types, attractions, mixture and density of existing land use and future planned development
- the characteristics and needs of local residents and businesses
- the alignment of expected benefits of reallocation across user groups and modes with stated strategies and goals for the corridor itself
- political will or mandate.



Kerbside parking is often reallocated to bus lanes and bus stops to improve the reliability and travel time of these services. PT requires less road space for the movement of more people than cars, and does not require kerbside parking for vehicle storage at the destination. The cycle network may be also improved by reallocating kerbside parking to dedicated cycle lanes that create safer transport environments. Cycling is often promoted as an alternative to car use as issues of carbon emissions, climate change and oil consumption increasingly drive transport policy. On corridors and routes with high vehicle volumes, particularly at peak periods, an alternative approach is removal of kerbside parking temporarily at certain times of the day to increase capacity and reduce congestion. Reallocation of kerbside parking is also undertaken to improve the amenity value of urban environments and benefit pedestrian movement. This type of reallocation makes inner city streets and neighbourhoods more attractive, in turn increasing the number of visitors to the space.

These approaches are used overseas where governments have introduced policies and regulations aimed at increasing inner city population densities, encouraging mixed use development, reducing space allocated to private cars, and lending greater support to PT, cycling and walking modes. As is the case in current New Zealand transport policy, other countries have recognised that transport and land use are linked and have a direct relationship on the economic vitality and social fabric of inner city destinations (Halsted 2014, pers comm). Developing attractive inner city destinations, which are appealing to pedestrians and shoppers and accessible by multiple transport modes, is an important strategic goal of modern inner city transport networks.

In the UK, USA, Canada and Australia some town parking bays have been reallocated temporarily to different innovative uses to gather evidence and public support to reallocate the space permanently. For example, this approach has been used to successfully reallocate single or multiple parking bays in New York City for pocket parks, cycle parking and public space (3News NZ 2014). During Janette Sadik-Khan's time as the commissioner of the New York City Department of Transportation almost 300 miles of cycle lanes were built and cars were excluded from some inner city areas, including Times Square. She attributes the subsequent rise in pedestrians and cyclists to the streets of New York now being the safest they have ever been. Many of these changes were strongly opposed before their introduction but have been successful in the long term.

Despite the often promoted benefits of kerbside parking reallocation, the outcomes are often not equally distributed across groups and to achieve a positive outcome for some users requires a trade-off from others. Inner city transport networks have a large number of users, each with their own set of priorities and interests for how roads and streets should function. It is also apparent that kerbside parking reallocation is a highly localised response to corridor productivity, with projects varying widely in scale and approach even if the end goals are broadly similar between cities and neighbourhoods. It is therefore important to evaluate kerbside parking reallocation across a range of monetary and non-monetary costs and benefits, to better understand if the value created by a project is worth the trade-offs.

The importance of kerbside parking to business vitality and for local resident accessibility is a common point of discussion when reallocation of this space is proposed. Business owners generally expect a loss of parking to cause a reduction in trade, as customers can no longer park outside their building. There is a bias in the literature towards demonstrating the benefits, or lack of negative effects, of reallocation for local business. Allatt et al (2013) in their study of the economic impact of kerbside parking reallocation on local shops found that the importance of kerbside parking is often overstated. The authors found that pedestrians and cyclists contribute a higher economic spend proportionate to their modal share and are important for the economic vitality of local shopping areas. While business owners value kerbside parking highly, shoppers were more concerned with high-quality pedestrian spaces and urban environments and do not usually expect to park immediately outside their shopping destination.

Further, the retail and hospitality industries have been shown to benefit most from kerbside parking reallocation, especially when an improved urban environment is built in its place (Carmine and Williamson 2012; Transport for London 2011). Reallocation of kerbside parking to PT or cycle infrastructure will bring new users into the space; these visitors have been shown to spend less per trip, but more in the long term as they visit more frequently (Lee 2008; Transport for London 2011). It is important, though, to recognise that some types of businesses are more likely to require nearby parking, such as trade and wholesale outlets where items sold are too bulky to carry on foot, bicycle, or PT. In addition there are many types of businesses that are reliant on purposeful visits as opposed to passing foot traffic, and in these cases, a lack of parking may discourage customers from making the trip.

In contrast to the academic and local government reported evidence of benefits, much of the media coverage for kerbside parking reallocation projects cites costs for local businesses. This perception is a barrier to implementing reallocation projects, particularly in towns and cities where there is little local evidence or examples of successful projects. In New Zealand cities such as Auckland, where a number of successful reallocations of parking have achieved the intended transport network outcomes or economic vitality of inner city areas, this may be less of a problem as decision makers have best-practice examples on which to base future decisions.

Rarely in New Zealand do inner city residents have guaranteed access to kerbside parking for their vehicles, so reallocation of this space is unlikely to directly affect their accessibility. However, on urban arterials and in suburban areas, reallocation of parking has the potential to have a greater impact on residents and their visitors. In suburban areas where off-street parking is not often provided it has been suggested that a loss of kerbside spaces may reduce the value of adjacent property (Elliott 2014, pers comm). Reallocation to new uses may also reduce the amenity of a street or neighbourhood, for example introducing extra vehicle lanes could be expected to increase the amount of traffic and create an unappealing pedestrian environment with moving traffic no longer separated by parked vehicles. PT infrastructure may also be viewed negatively by businesses if reallocation leads to idling buses and a congregation of people on the sidewalk at stops.

### 3.2.1 Future trends affecting inner city parking

In the future, Seba (2014) argues, emerging technologies such as the sharing/collaborative economy and connected society, ubiquitous access to the internet via smart phones, electric vehicles and autonomous/self-driving vehicles have the potential to change or even disrupt the transport system, placing very different demands on infrastructure. These technologies, coupled with overseas research showing that younger people are choosing to drive less could potentially impact on inner city transport and parking in the future through fewer vehicles on the road due to:

- lower ownership rates and more sharing of trips
- little to no parking required in community or commercial hubs as fewer vehicles arrive
- fewer or no taxis as services like Uber and Lyft displace traditional taxis and their requirement for ranks
- self-driving vehicles that replace both private vehicles and taxis
- neighbourhoods becoming better connected and walkable (Dutzik and Masden 2013; Rive et al 2014).

New Zealand research has also shown evidence of changing transport behaviour across population demographics (Roy Morgan Research 2013). Those aged over 65 years are now more likely to drive than 25–34 year olds, while overall the proportion of New Zealanders driving is in decline.

Previous work from Rive et al (2014) has revealed there is a large latent demand among New Zealand travellers for increased use of public and active transport. For example, even without improvements to the PT system being implemented, it is projected there will be a relative increase of about 40% for New Zealanders' main trips by PT over the next five years, with increased use for other trips (eg recreational trips) being substantially higher, particularly for younger New Zealand travellers. An increase in the number of bus priority lanes to improve the punctuality of services was rated in the top 10 priorities for future improvements to PT for the next five years for New Zealand travellers. A key way in which this may be achieved within existing road space is through the reallocation of kerbside parking within inner cities. Overall, this work provides evidence to suggest that New Zealanders are motivated to increase their use of both public and active transport, and that improvements to the PT systems will assist in this desire being translated into actual travel behaviour change (eg mode shift). It is therefore fair to conclude that if this latent demand for public and active transport were realised, demand for private vehicle-related factors such as kerbside parking would be reduced.

Frith et al (2012) examined demand for transport services for older persons in New Zealand and found that a failure to take into account the ageing population is likely to produce excessively high travel projections, overstating the increase in household travel on New Zealand roads between 2006 and 2056 by around 40%. The authors recommend that urban planning ensures community services and facilities are more accessible by PT and non-motorised forms of transport, including walking. Investment is also needed to make PT more acceptable to and useable by older passengers. Increased demand for walking and PT is likely to require reallocation of road space to support higher levels of service for these modes. Highway design should also be moderated to meet the special mobility and safety challenges presented by a future larger proportion of older drivers.

In 2012, the City Centre Future Access Study commissioned by Auckland Transport (AT) predicted vehicle traffic would face significant delays and congestion on all arterial corridors within the following decade (Bell and Darlington 2012). It recommended a city rail link, stating that bus only solutions would provide short-term relief but in the long term would suffer from the same congestion as private cars. An integrated light rail and surface bus option is deemed to provide the best strategic fit to meet growth and demand. This approach will require the reallocation of large amounts of road space, in particular parking spaces, along key corridors to cater for bus priority lanes and bus stops.

When making decisions about transport infrastructure, city planners and designers will consider how the asset might be used over the course of its life. In the inner city, transport professionals are concerned with safety and efficiency, and encouraging more sustainable transport. While local government is often keen to reduce congestion at peak periods, such efforts may be held in check by a desire to respond to demand for parking from drivers, local residents and businesses etc.

### 3.3 Kerbside parking in local and central government policy

The Transport Agency is responsible for managing the state highway system in New Zealand, while local roads and streets, as found in central city areas, are the primary responsibility of the relevant local authority. The Transport Agency interacts with these local authorities through investment in regional networks and as a provider of funding and planning support. Parking policy is often set out in regional land transport strategies, district plans and parking policy documents that each have a view to the long term. These documents are set within the framework of central and local government Acts and policies that shape national, regional and local transport strategies, policies and packages. The approach taken by individual councils is widely varied and specific to the local context.

### 3.3.1 Major urban areas

In New Zealand's largest urban areas, Auckland, Wellington and Christchurch, inner city road space is at a premium and local authorities face significant challenges providing a transport network that reduces unsustainable private car trips and promotes alternative modes of travel.

In Auckland, AT is responsible for all parking within the road reserve while Auckland Council is responsible for off-street parking. Auckland Transport (2014a), in its *Draft Auckland parking discussion* document, identified kerbside parking reallocation as a lever for changes to transport behaviour and patterns in Auckland. In this document the stated objectives for future management of parking in Auckland are:

- Facilitate a transformational shift to PT.
- Support the economic development of the Auckland City Centre, metropolitan and town centres.
- Prioritise the safe and efficient movement of people, services and goods on the road network.
- Provide an outstanding customer experience at AT operated on- and off-street facilities.
- Support place-making, amenity and good urban design outcomes.
- Ensure the efficient use of land in centres.
- Ensure a fiscally responsible approach to providing, managing and pricing parking facilities and that benefits cover costs.

To achieve this, AT proposes to:

- Control off-street parking provision through the use of maximum parking controls and making the provision of stand-alone parking buildings a discretionary activity.
- Establish a hierarchy of use for kerbside space in the city centre, considering the needs of PT, emergency and service vehicles, cyclists and motorcyclists.
- Employ time, price (demand-responsive), and user restrictions on kerbside parking in the city centre and fringe to reduce commuter occupation.
- On arterial roads with peak- or all day- congestion, or where there are significant safety issues or PT delays, kerbside parking should be replaced with clearways, no-stopping lanes, PT lanes, or cycle ways.
- Prioritise and price off-street parking for short-stay trips rather than commute trips, to reduce demand for kerbside space to be used for parking.

Public feedback on the discussion document informed the development of the AT parking strategy. This feedback included general support for parking removal on urban arterials for network optimisation outcomes, but opposition to removal in town centres, particularly from businesses (Auckland Transport 2014b). AT's parking strategy provides an overarching framework to guide parking provision through customised responses to local transport demands and neighbourhood characteristics (Auckland Transport 2015).

Local-level government in Wellington consists of the regional authority, the Greater Wellington Regional Council, and the territorial authority, the Wellington City Council (WCC). All of the Greater Wellington Regional Council's transport-related plans, projects and activities come from the *Wellington regional land transport strategy 2010-40* (Greater Wellington Regional Council 2010). With the transport policy

hierarchy and the Local Government Act 2002 in mind, the WCC has prepared transport plans and policies for Wellington city.

Central city road space in Wellington is limited and faces increasing demand from non-car based transport modes as the council seeks to develop a sustainable transport system. WCC's most recent transport strategy states that:

*Road space in our CBD is at a premium, and choices need to be made about competition for that space amongst private cars, buses, cyclists and pedestrians. In common with the rest of the developed world, we have challenges regarding the sustainability of our transport system* (Wellington City Council 2006, p2)

WCC considers future transport challenges to include both an increase in congestion and an increase in competition for road space between different modes of travel. The transport strategy considers that a successful transport system in Wellington will require 'making trade-offs between the differing demands for road space by different modes'. (Wellington City Council 2006, p4)

The use and design of public road space is also guided by the Public Space Design Policy (Wellington City Council 2010a). This was adopted in December 2010 and gives direction to the design, delivery and management of Wellington's public spaces. Objective three of this policy is to improve accessibility for all. This objective states that:

*Streets should operate more efficiently than just as traffic channels for vehicles. They should offer a safe and attractive environment for all. The city's public spaces are experienced at their most intense on foot and by cycle...* (Wellington City Council 2010a, p6)

Under this accessibility objective, policy three states that:

*Traffic efficiency and on-street parking requirements should not dominate, and needs to be considered in the context of pedestrian and cycle use and amenity.* (Wellington City Council 2010a, p6)

The purpose of on-street parking in central Wellington is 'primarily to support retail and entertainment facilities, servicing for commercial and professional activities, community recreational facilities and events. Commuter parking and residents' parking are not a priority for on-street parking' (Wellington City Council 2007, p10). Kerbside parking reallocation is one lever used in the central city to improve network efficiency, though a balance must be struck to ensure the above activities are still supported for trips made by private cars. On arterial routes, network efficiency is prioritised and on these corridors parking may be reallocated at peak times to optimise the movement of people to and from the central area. (Wellington City Council 2007, p10).

The post-earthquake rebuild of Christchurch's central city is being shaped by the *An accessible city - Christchurch Central recovery plan* (Canterbury Earthquake Recovery Authority 2013). The planned transport system for Christchurch incorporates a hierarchy approach that prioritises specific modes and movements on different routes. This includes better provision of bus, pedestrian and cycle facilities on inner city roads and streets, while also catering for vehicles on distributor corridors (Canterbury Earthquake Recovery Authority 2013, p5). Kerbside parking will be restricted to limited short-term spaces on main streets to provide a high standard of landscaping, street furniture and lighting to match the local character of the neighbourhood. Off-street parking located near key precincts and destinations is preferred to kerbside parking spaces. The overall number of kerbside spaces will be reduced from pre-earthquake levels to provide space for PT, cycleways, streetscape enhancements and urban design improvements (Canterbury Earthquake Recovery Authority 2013, p18).

### 3.3.2 Regional cities and towns

In contrast to the competing demands for urban and arterial street space observed in Auckland, Wellington and Christchurch, smaller regional cities and towns experience different pressures regarding street space allocation. Congestion and network efficiency is less of an issue with a smaller population base, though there may still be some bottlenecks on different routes during peak travel periods. A more significant challenge facing these smaller urban areas is a decline in economic vitality of traditional retail centres due to competition with outer lying big box retail developments. The approaches taken to revitalise inner cities in these areas are varied and relevant to the local context; a small selection of these is presented below.

Hamilton City Council, in its central city transformation plan, highlights the importance of the downtown precinct for regional economic growth over the coming decades (Hamilton City Council 2014). This document promotes a pedestrian-oriented central city achieved by integrated transport and land use planning where pedestrian priority spaces are provided, quality urban realms are designed and commercial buildings have active ground floor street frontages. Images in this document show reallocations of existing road space to pedestrian-only environments and pedestrian priority shared spaces.

Invercargill City Council (2011) is concerned with the effect of outer-urban 'large format retail' developments on the vitality and trade of the city centre. Parking provision has been positioned as an attractor for increased visits to the central city as existing businesses compete with these retail developments that include large amounts of free off-street parking. Solutions proposed for the Invercargill city centre include:

- introducing minimum parking requirements in the city centre, or targeted rates for the council to provide off-street parking
- investigating the reallocation of median strips and bus-bays to kerbside parking.

Rotorua Lakes Council is also seeking to improve the social vibrancy and economic vitality of its central city, and the *Inner city revitalisation strategy* sets out a draft action plan for achieving this (Rotorua District Council 2015). Changes to the inner city transport network to improve efficiency and cater for the movement of people and goods across a range in modes will require some reallocation of road space, and a reduction in the number of kerbside parking spaces is expected. This loss is to be offset by an increase in council owned off-street parking. The document states that to revitalise the centre of Rotorua, the council can only do so much as far as urban design and transport planning is concerned, the onus is also on central city businesses to offer a range goods and services that attract visitors and compete with offerings elsewhere.

## 3.4 Transport Agency planning and evaluation frameworks

This section describes the current application of the Transport Agency's business case approach (BCA) and *Economic evaluation manual* (EEM) to the evaluation of land transport programmes and interventions in New Zealand. These frameworks outline the approach project managers should follow to make best use of available funds. The prescribed approach is a form of social cost-benefit analysis that includes both monetary and non-monetary factors in the evaluation of individual projects.

It should be noted that the economic evaluation frameworks presented here are mainly applied to state highway infrastructure projects or large-scale transport packages seeking significant investment. Smaller

kerbside parking reallocation projects may be unlikely to follow such a high level of evaluation; however, we present these planning and evaluation frameworks as they are important guiding documents for planners seeking to understand the costs and benefits of transport and land use related decision making.

### 3.4.1 Integrated transport and land use planning

Integrated planning of transport systems and land use is identified as a key factor in ensuring that the land transport system achieves its short- to medium-term objectives in the *Government policy statement on land transport funding 2015/16–2024/25* (New Zealand Government 2014). Such an approach sees the development of transport strategies and activities alongside land use strategies and implementation plans, which in turn encourages efficient use of public spending relating to transport, urban design and land use.

The Transport Agency has developed an integrated planning toolkit aimed at regional and local government officers and consultants (NZ Transport Agency 2015b). A range of tools or levers are demonstrated that can achieve a desired outcome, such as cycle lanes and bus lanes as mechanisms to increase transport choices in urban areas, to reduce car usage, or to encourage healthy lifestyles. The toolkit recognises that what works in one location may not work in another so it acts as a source of knowledge of potential solutions rather than ranking a specific tool over another.

The objectives and mechanisms/tools to achieve these are described in the integrated planning toolkit in relation to relevant impacts outlined in the Government Policy Statement. They include provision improvements, more choice, better accessibility, improved safety, reduced environmental effects and contributions to health. Many of these impacts will be achieved through reallocation of road space. In central urban areas bus lanes and facilities, shared zones and pedestrian precincts, kerbside cycle lanes, clearways, maximum parking standards and restricted parking allocations and improved accessibility are advocated while 'urban design should permeate all projects'.

### 3.4.2 The Network Operating Framework

The Network Operating Plan (NOF), developed by Austroads in 2009, is an innovative approach to managing competing demands for transport services within limited available road space (Smith 2009). The NOF focuses on how the overall network functions and the hierarchy and role of corridors within the network. Transport network managers are assisted in setting targets for the level of service on urban streets, and assigning priority to different transport modes on specified corridors at different times throughout the day.

There is a focus on surrounding land uses, the costs and benefits to users of different modes and the implication of decisions on the surrounding corridor/network (Smith 2009). Such an approach leads to benefits for some user groups and disbenefits, or costs, for others on specific routes. The NOF is therefore designed to cover all proposals which impact on traffic operations, and the degree of fit with stated targets and priorities enables decision makers to make necessary trade-offs for allocation of road space.

The NOF approach has been adopted by some local government organisations in New Zealand alongside the Transport Agency. The approach complements the BCA described in section 3.4.4 and helps to turn strategic priorities into operational and planning decisions (NZ Transport Agency 2014). At a strategic level, the NOF approach does not explicitly consider kerbside parking alongside other uses of this space. Rather, it leaves the identification of interventions to manage the network, in order to achieve the agreed outcomes, to the key stakeholders. Therefore, the benefit, or disbenefit, of providing kerbside parking on an inner city street must be evaluated on a case-by-case basis.

The Transport Agency's One Network Road Classification defines the function of New Zealand roads and informs local and central government how to plan, invest in, maintain, and operate roads (NZ Transport Agency 2015a) This type of policy is relevant to reallocation of kerbside parking as it will direct planners towards the most appropriate type of reallocation that should and can occur on specific roads. By maximising the performance and capacity of the existing network based on the functions identified in the classification the need for major investment in new infrastructure is reduced.

### 3.4.3 Urban Design Protocol

The Ministry for the Environment's Urban Design Protocol identifies a range of qualities that contribute to successful towns and cities through good urban design (Ministry for the Environment 2005). This non-binding document is a sign of the government's commitment to quality urban design and provides a platform for policy makers and professionals working in the built environment. The Transport Agency has also produced guidelines for quality urban design in transport projects (NZ Transport Agency 2013a). The role of the transport network in creating quality urban environments is described and places a high priority on walking, cycling and PT. Streets and thoroughfares are treated as 'spaces that serve multiple functions as opposed to catering primarily for the thoroughfare and parking of private vehicles'. Development of attractive and quality urban spaces is an important component of building liveable towns and cities that are healthy to live in and support thriving social and economic activities.

### 3.4.4 The business case approach

Treasury's Better Business Case model is a platform for stakeholder collaboration and fit for purpose analysis of costs and benefits. This enables decision makers to have confidence a proposed project or programme is justified (NZ Transport Agency 2013b). A five case model approach is undertaken:

- 1 Strategic case – strategic assessment and context examined
- 2 Programme business case – identifies programme of work and/or activities that deliver on a strategic case
- 3 Indicative business case – individual activities are progressed with business cases developed where necessary
- 4 Detailed business case – more detailed analysis of the costs, risks and benefits for the preferred option
- 5 Implementation/post implementation – detailed design, planning and consenting, and subsequent assessment of benefits realisation, lessons learnt and auditing/review process

The Transport Agency's BCA is adapted from this model for specific use in transport planning and activity development in New Zealand. The BCA is similar to the Treasury model as it promotes:

- early engagement with stakeholders and the public, early engagements and influence on direction from project managers
- clear expectations and flexibility for risk and scale from business case developers
- better strategic alignment, value for money and evidence-based assurance for decision makers (NZ Transport Agency 2013b).

The BCA model is to be used for all transport planning activities and significant new investment proposals in the 2015–2018 National Land Transport Programme (NLTP) (NZ Transport Agency 2015c). Therefore all regional councils, territorial authorities and other approved organisations seeking funding from the NLTP will use the BCA model. Longer term, the BCA model is expected to be used for development of regional



land transport plans. These establish regional transport objectives, policies and measures for at least the following 10 years. The Transport Agency states that the BCA model is 'fit for purpose' to be used alongside spatially integrated planning approaches.

The BCA model promotes the NOF, described in section 3.4.2, as a best practice process for testing the efficiency and effectiveness of transport interventions. Both approaches are focused on partnerships, an integrated network, and optimisation of projects and investment.

The Transport Agency's BCA model aligns with our recommended framework of costs and benefits that are most relevant to reallocation of inner city kerbside parking for a variety of reasons:

- *Stakeholder engagement.* Much of the costs and benefits of parking reallocation are distributed unequally across different groups. As such, there are large differences in stakeholder perceptions of effects and outcomes to them personally. Early engagement with stakeholders enables project managers to identify the monetary and non-monetary factors that carry a high weight among stakeholders.
- *Weighting of monetary and non-monetary factors.* Where possible, and appropriate, both monetary and non-monetary factors should be quantified, and included in economic efficiency calculations. The BCA approach ensures that where non-monetary factors cannot be valued they also carry weight in the decision-making process. This is relevant to parking reallocation where the economic effect on local business is not included in economic calculations but may form an important part of the strategic case. The contribution of parking to inner city economies and the potential for reallocation to increase or decrease current economic vitality is an important consideration for many stakeholders. Additionally pedestrian activity and user perceptions of new infrastructure can be taken into account.
- *Scalable based on risk and size of project.* As stated previously, reallocation of inner city parking may force the removal of a handful of parking spaces or hundreds. As such, not all projects will warrant investment in a full BCA approach; however, the principles can still be applied to ensure that best practice engagement, project planning and decision making is undertaken. As the BCA model becomes more integrated with regional land transport plans, individual programmes of work carried out under these plans will have better business case principles applied to them no matter their size.

### 3.4.5 The *Economic evaluation manual*

The procedures for economic appraisal of transportation projects in New Zealand are set out in the EEM, a two-volume document (NZ Transport Agency 2013c). Volume 1, released in 2006, focused primarily on road renewals and improvements while volume 2, released in 2010 and updated in 2013, included procedures for appraisal of other modes including PT, walking and cycling. The EEM procedures are a form of social cost-benefit analysis. This economic tool evaluates project impacts based on both financial effects, such as capital costs and direct benefits to users, and social effects, such as safety and amenity values.

Social cost-benefit analysis under the EEM integrates the relevant costs and benefits of different project options into one calculation. This includes monetary and non-monetary effects, the latter being quantified as much as is practical. The appraisal provides insight into who bears the costs of a project and who will reap the benefits as these are often unequally distributed across different stakeholder groups. The output of this appraisal is a cost-benefit ratio that can be used to compare the economic efficiency of project options and/or alternatives to each other. For New Zealand transportation projects a cost-benefit ratio of 1-2 is considered low, 2-4 medium, and 4+ high.

Table 3.1 describes the factors set out in the EEM that are relevant to investment in walking and cycling, PT (new and existing services) and general road improvement transportation projects in New Zealand. Cost-benefit analysis outputs from EEM processes are likely to be included as part of the ‘economic case’ under the BCA.

**Table 3.1 Overview of factors calculated in cost-benefit analysis using the EEM**

Project spreadsheet	Calculated factors
Walking and cycling (SP11)	Capital costs Operating and maintenance costs Travel time savings for pedestrians and cyclists Health and environmental effects Crash cost savings Cycle demand
Public transport – new services (SP9)	Capital costs Operating and maintenance costs New public transport users Maximum willingness to pay (user charges) Road traffic reduction benefits
Public transport – existing services (SP10)	Capital costs Operating and maintenance costs Additional passenger trips Road traffic reduction Public transport reliability benefits In-vehicle time benefits
Road improvements (SP3)	Capital costs Operating and maintenance costs Travel time cost savings Vehicle operating cost savings CO <sub>2</sub> savings Crash cost savings

Source: (NZ Transport Agency 2013c)

The EEM approach is largely similar to our recommended framework including all of the proposed monetary factors. There are some measures currently in the EEM that the sector did not consider relevant to kerbside parking reallocation projects, eg vehicle operating costs. As the EEM is a standardised method applied to a wide range of land transport programmes, we do not consider this to be a problem.

The effects and outcome of reallocation that carry greatest weight among the public, and somewhat within the sector as a result, are generally non-monetary, or external costs and benefits, in nature. Without the ability to directly quantify or apply market values to these costs and benefits they cannot be included in EEM calculations. Again, this is not a shortcoming of the EEM as it is not intended to do so. It is, however, further reinforcement of the value NOFs and the BCA have for planning and execution of kerbside parking reallocation projects.

### 3.5 Summary

There is a common set of drivers for kerbside parking reallocation on inner city streets and roads, with these projects predominantly focused on:

- making the movement of people and goods through the transport network more efficient
- improving infrastructure for non-car based transport modes
- creating pedestrian priority spaces and quality urban realms.

The need for kerbside spaces to be reallocated to achieve these goals varies between places; large urban areas are more likely to experience significant pressure for road space by a number of user groups compared with smaller regional centres. Even within central city environments reallocation of parking is not a blanket approach to be applied to all roads and streets. There remains a need for vehicle access to many destinations, so a common approach is prioritising specific transport modes on different corridors to develop an optimised multi-modal network.

Future trends in transport behaviour and patterns will continue to drive demand for new approaches to managing local transport networks. In New Zealand there are existing tools available for evaluating the economic benefit of these projects; however, they may be unsuitable for small-scale projects and those that are focused on improving the amenity value of an urban environment, which is a non-monetary benefit difficult to assess alongside economic costs and benefits.

## 4 Case studies of kerbside parking reallocation

### 4.1 Introduction

This chapter examines a range of kerbside parking reallocation projects that have previously taken place in New Zealand. As stated in chapter 2, the case study examples were selected based on criteria agreed on by the Steering Group. It is by no means a comprehensive list of previous, or most successful, projects to date in New Zealand. Rather we have included a range of kerbside parking reallocations that are accompanied by evidence of pre- and/or post-assessment for a range of monetary and non-monetary factors, or clearly stated project drivers and goals. Of the full range of case study examples examined during the course of this project only a handful are presented here for brevity and to reduce repetition.

Kerbside parking reallocation projects have been grouped by the following types:

- pedestrianised shared spaces and quality urban realms
- cycle infrastructure
- PT services
- extra vehicle lanes

In addition, we describe key themes and learnings that were common across the full range of case study examples studied. Finally we give a draft list of kerbside parking reallocation costs and benefits, which was then refined through input from the Steering Group and transport professionals at the industry workshops.

### 4.2 Pedestrianised shared spaces and quality urban realms

International approaches to design and retrofit of urban arterials has shifted toward best practice movements such as Living Streets, Shared Streets and Complete Streets. Each is based on the approach that streets should function in a manner that promotes safe and convenient travel for users of all modes. The design of these types of streets aims to reduce the speed and volume of motor vehicles and encourage cyclists and pedestrians to utilise the space. Removal of parking is an often-used measure to reduce the appeal of these streets as a vehicle destination. This space is then reallocated to non-car based users to encourage and support their use.

Reallocation of parking for the creation of spaces that follow best-practice urban design principles is often used in inner city centres. Town centre managers and business improvement districts are often advocates for these schemes and commonly contribute to their implementation. Such projects aim to create vibrant hubs that may benefit local businesses via increased foot traffic, increased customer spend and improved property values. Quality urban realms include pedestrian priority spaces, outdoor seating and landscaping among a range of aesthetic improvements.

Selected New Zealand examples of kerbside parking reallocation to shared pedestrian space and attractive urban environments follow.

### 4.2.1 Fort Street, Auckland

Fort Street is located in Auckland's central business district. In 2008 a plan for the Fort Street area was announced that would see shared spaces introduced on six streets as part of creating a high-quality, attractive inner city destination. As part of the transformation to a shared space, kerbside parking was completely removed from Fort Street with exceptions for Police vehicles, five-minute loading and deliveries between 6am and 11am (figure 4.1).

**Figure 4.1** Post treatment layout of Fort Street



Source: Carmine and Williamson (2012)

Outcomes of the project were evaluated in 2012 and despite the Fort Street shared space being relatively recent when the evaluation was undertaken, there was evidence that it was successfully attracting more visitors to the area. Footfall surveys suggested an increase in users and perceptions of amenity in the area had significantly improved. A wider range of activities were taking place on Fort Street and the area had become a destination rather than a thoroughfare. Fewer vehicles were visiting, and at slower speeds, with no discernible impact on congestion in the area. There had not been any instances of pedestrian injuries in the space and at peak periods pedestrians assumed the right of way in the space.

Economic performance was more difficult to measure given the short timeframe, although there had been a significant rise in hospitality sector spending in early 2012 compared with previous years. Business owners contacted during the post-evaluation were favourable in their assessment of the shared space. As the shared space project formed part of a wider programme of works, economic improvements cannot be attributed to Fort Street alone; however, the overall effect of reallocation road space in the wider area is believed to have been a positive one for local business and property owners.

Assessment of the desired outcomes for the Fort Street shared space focused on the benefits for pedestrians, urban design and economic performance. The evaluation was based on observations of pedestrian and shopper activity, vehicle movements and reported perceptions of the new space.

### 4.2.2 Totara Avenue, Auckland

In 2009 Waitakere City Council undertook preliminary design investigations for the revitalisation of Totara Avenue West in New Lynn's town centre. This area had poor quality retail offerings and a vehicle dominated environment that was not pedestrian friendly, had a poor quality streetscape and no social

offerings (Waitakere City Council 2009). The town centre project was part of a wider range of efforts at improving the quality and vibrancy of New Lynn, including the construction of a transport interchange to improve connectivity to the wider city. Further street projects were also planned to help create a more accessible environment and appealing destination for people to live, work and visit.

The new urban environment gives pedestrians priority and the new road layout requires drivers to travel at lower speeds improving safety for all users. The economic vitality of the area is expected to benefit from this reallocation of road space through better opportunities for outdoor dining and hospitality, and increased pedestrian footfall. Kerbside parking was removed along Totara Avenue while, unlike other shared spaces in Auckland such as Fort Street, some 30-minute restricted parking was retained on the northern side of the street. The overall supply of car parking in the area has increased with the construction of a 299-space off-street facility nearby.

### 4.2.3 Lower Cuba Street, Wellington

Lower Cuba Street was redeveloped in 2011 from a conventional street layout into a shared space where pedestrians have right of way as part of the council's Golden Mile project. The objective of the project was to provide a pedestrian space that compensated for the loss of the nearby Manners Mall pedestrian zone due to bus transport improvements. A number of changes to the provision of kerbside parking on Lower Cuba Street were made (Wellington City Council nd-b):

- 33 kerbside (two-hour, paid) public car parks were reduced to 18
- two mobility kerbside parks were reduced to one
- three police kerbside car parks were reduced to one
- four loading zone kerbside parks were reduced to two.

In addition bicycle parking was provided and the space prioritised pedestrians over vehicles through a 10km/h speed limit introduction and the installation of seating and landscape improvements. Although the project would reduce the number of kerbside parks, there was little media opposition, and political will was supportive as the project was designed to overcome public backlash resulting from the loss of Manners Mall.

A pre-reallocation survey of people using the kerbside parking on Lower Cuba was undertaken by WCC (Wellington City Council nd-a). This survey found that 29% of kerbside parking users were there for shopping, 50% were spending money in the local area and 80% of kerbside parkers were not regular visitors to the area (visited weekly or less). This study found that the kerbside parking on Lower Cuba Street generated, on average, one paying customer per day per business.

Following completion, evaluation of the project by WCC included visual analysis, street user intercept surveying, behavioural observation, tenant interviews, analysis of retail transaction data and pedestrian counts (Robertson 2013). Street user perceptions were generally very positive. However, the majority of pedestrians interviewed believed the central road space was mainly for vehicles, resulting in the shared space philosophy and creation of pedestrian space being not fully achieved. The WCC evaluation attributes this primarily to the retention of some kerbside parking on both sides of the street, effectively delineating a vehicle channel through the centre. This failure to fully achieve the project objectives is described by the WCC evaluation as being due to 'compromises [which were] made during the design phase' (Robertson 2013, p24). It recommended that in the future, similar projects should be 'bolder and stronger' and that 'careful thought should be given to negative effect of parking to a shared space' (Robertson 2013, p24). The evaluation also recommended that measureable project objectives should have been more clearly

defined during the initial scoping phases, and that pre- and post- measurement of all objectives should be budgeted for and undertaken.

The evaluation also found that following the reallocation, pedestrian volumes did not appear to have changed significantly, or may have increased only slightly (however, counts may have been affected by weather). Pedestrian behavioural observations were not made before the reallocation so no comparison could be made. Retail transaction data showed that sales on Lower Cuba Street fell relative to the rest of Wellington CBD during the construction period, but increased steadily once the project was completed, and as of the end of 2012, retail sales were higher than they were before the project began, and higher again relative to the rest of the CBD (Robertson 2013). The mix of businesses on Lower Cuba Street also changed during the period investigated, with the trend appearing to be toward more high-end shops and a higher business density. Tenants interviewed reported that the construction phase negatively affected their business, but were generally positive about the effect of the project on their trade and future prospects for the street. WCC conclude that 'there is clear evidence of enhanced performance of the street from an economic perspective' (Robertson 2013, p7).

Post-reallocation media coverage criticised the space for being too oriented toward the movement and parking of cars, and therefore, not a true compensation for the loss of Manners Mall, with one media review stating 'the street is still very much a place for cars, with two-thirds of it given over to parking and a one-way lane down the centre' (Tindill 2011). However, media coverage of local business perceptions of the change tend to focus on it being, overall, beneficial for businesses although the construction period was not.

## 4.3 Cycle infrastructure

In New Zealand and overseas cycle lanes are commonly installed on roads with high traffic volumes and speeds. These are spaces separated from vehicle traffic, unless contained in a shared PT lane, to improve cyclist safety. The type of separation can vary from painted lines to physical barriers. Cyclist safety has been shown to increase with greater separation from vehicle traffic (Cycling Safety Panel 2014). Cycle lanes have been shown to increase the rate of recreational and commuter cycling in cities as perceptions of safety rise. In many instances creating cycle lanes, in particular physically separated lanes, requires the removal of parking to provide space.

Reallocation of vehicle parking to bicycle parking has also been implemented internationally as an effective tool to increase the number of visitors to local centres. The space required to park a single vehicle can accommodate a significantly higher number of cyclists. Examples of temporary and permanent reallocation of kerbside parking, including two major proposed cycle ways, follow.

### 4.3.1 Thorndon Quay Clearway, Wellington

In 2008 WCC adopted a cycling policy with the stated intent of improving the safety of cycling in Wellington and making cycling a more convenient transport mode for users. Once again the issue of cyclist safety on Thorndon Quay was consulted on. During the preceding 10 years commuter cyclists on Thorndon Quay had approximately quadrupled from 75 per hour to nearly 300 and reported crashes involving cyclists on the route had also risen from an average of one to six per year.

Long term, the council proposes to construct a shared off-road cycle route from Hutt Road along Aotea and Waterloo Quays to the Lambton Harbour waterfront promenade. Thorndon Quay cycle facilities will be upgraded during these works as part of full-time bus lanes along the route (Wellington City Council, 2009b). As an interim measure, a clearway on the southbound lanes of Thorndon Quay was implemented

during the morning weekday peak traffic period. Public submissions to this planned change were largely in favour (154 out of 163), with objectors mainly opposing the loss of kerbside parking spaces along the route (Wellington City Council 2010b). WCC policy does not give priority to commuter or residents parking in Wellington, so these submissions were given a low weighting and the project went ahead as planned.

#### 4.3.2 Beach Road, Auckland

In 2011 AT investigated the feasibility of options to provide cycle facilities on Beach Road in central Auckland (AECOM 2011). The objectives of this project were to optimise the regional cycle network in this area by providing a connection between existing and proposed cycle facilities, and to improve the safety of cyclists on the Beach Road corridor. Successful achievement of these goals was anticipated to promote cycle transport and increase the total number of cyclists using the route.

Social and environmental assessment of proposed options found a number of positive impacts. Improved cycle facilities would benefit with accessibility and mobility, public health, and provide better transport and land use integration in the area. This project would also benefit future works to further connect the wider cycle network in Auckland. Adverse effects were considered negligible. The route provides an opportunity for improved urban design through street furniture, trees and landscaping along the path that are complementary to the surrounding environment.

The preferred option was for cycle lanes on the road edge running in each direction along the route, along with additional cycle and pedestrian improvements. Consultation was undertaken with the wider community in 2013 with 212 pieces of individual feedback received (Ben Parsons and Associates 2013). Respondents were overwhelmingly in favour of the proposed cycle lanes with 87% in support and just 4% opposed. A number of respondents felt the project would improve cyclist safety in the area and there would be an overall positive impact on the number of cyclists visiting the area. Economic, social and environmental benefits were expected as a result of this as well as the door being opened for further investment in cycle facilities in Auckland.

Some opposition to the removal of kerbside parking spaces along the route was received. Respondents were concerned that any loss would have a negative effect on the operations of adjacent businesses, through lost trade and loading zones, and on residents, many of whom do not have access to off-street parking options (Ben Parsons and Associates 2013). There was also a small number of submitters who expressed support for removal of kerbside parking for the project. These individuals considered the decrease in parking to be small, and pointed to the area as being highly walkable and already served by PT. One respondent felt parking should be removed along the entire route to construct a fully separated cycle facility, another stated they did not want the removed parks to be simply reallocated elsewhere.

#### 4.3.3 Lake Road, Devonport

Cycle lanes were introduced on Lake Road, a major arterial route in Devonport carrying over 39,000 vehicles daily, in late 2008 (ViaStrada Ltd 2008). This route is popular with commuter cyclists and there are a number of schools along the route. Heavy vehicle flows in both directions were experienced at peak periods; however, due to geographic constraints the road layout was restricted to single vehicle lanes. To improve cyclist safety along the busy route cycle lanes in each direction were installed resulting in the removal of kerbside parking and some vehicle turning lanes at intersections. There were compromises made with parking retained at the Belmont shops causing cyclists to merge into traffic lanes before cycle lanes resumed after the shopping area.

The project created significant controversy, traffic delays during construction, frustrated drivers and a petition to have the lanes removed garnered over 2,700 signatures (North Shore Times 2008). At the heart



of the petition was a belief that the cycle lanes had worsened congestion and increased travel times along the route. A spokesman for the opponents also stated that the disjointed nature of the cycle lane compromised the safety of all road users and advocated for a return to the pre-cycle lane configuration while a dedicated cycle path along the route was considered. This viewpoint received a large amount of media attention; however, the North Shore City Council voted to retain the scheme as initially constructed (Cycle Action Auckland 2010).

A subsequent second petition was then signed by individuals in favour of retaining the cycle lanes to ensure cyclist safety along Lake Road. This was supported by a traffic study that found travel times during the 90-minute peak periods had not been significantly impacted on by the cycle lanes (North Shore Times 2008). Traffic during the evening weekday peak period experienced the same conditions as before the lanes' construction 92% of the time for northbound traffic and 98% for southbound traffic.

#### 4.3.4 State Highway 1, Dunedin (proposed)

The Transport Agency has proposed the creation of separated cycle lanes on 2.7km of State Highway 1 running through central Dunedin. The project is currently at business case stage and is anticipated to cost up to NZ\$5million (NZ Transport Agency and Dunedin City Council 2014a). The driver for the project is to improve cycle safety following several cyclist fatalities and to encourage the uptake of cycling by people who currently do not due to safety concerns.

Two main options were initially considered:

- 1 Two, one-way separated cycle ways, with a loss of 391 kerbside car parks (preferred option as it is seen as the safest for cyclists)
- 2 One, bi-directional separated cycle way, with a loss of 185 kerbside car parks.

The project has received an 'extraordinary' level of media coverage and community interest, and 2,000 submissions (NZ Transport Agency and Dunedin City Council 2014b). The submissions show significant support for the project; however, key opposition is due to loss of parking spaces, primarily from nearby business owners who perceive they will be affected. Media coverage (for example see Morris 2013) showed that business concerns were delaying the project, and might lead to modifications in the design of the cycleway. Media coverage also showed variable levels of political will amongst councillors, with some being highly supportive and some opposed.

The supply and demand for inner city car parking in Dunedin has been studied finding high levels of demand for kerbside parking in some areas, primarily from commuters as this parking is free and has no time limit. Overall, at peak times, there were 65 unoccupied kerbside parking spaces on the route (NZ Transport Agency and Dunedin City Council 2014a).

A resident perception survey found the majority of residents did not consider Dunedin's road network was suitable for use by cyclists (ViaStrada Ltd 2013). Similarly, the SH1 Cycleway Proposal Survey Results (n = 883) found that 86% of residents supported, or strongly supported, separated cycle ways through the city. Additionally, 77% of respondents said they supported or strongly supported the removal of kerbside car parking to provide the cycle way.

A local shopper survey found that retailers tended to overestimate the proportion of shoppers who came to the city centre by car (53% actual, 65% retailers' estimate) (NZ Transport Agency and Dunedin City Council 2014a). Additionally, only 7% of shoppers said if they could not find a car parking close to their destination they would go home, instead of parking elsewhere nearby.

To mitigate parking loss and alleviate business concern, consideration is being given to increasing kerbside parking nearby (\$200,000–\$260,000), providing a new parking building (not costed), better promoting the location of vacant parking (estimated cost \$15,000–\$20,000) reducing footpath widths, or removing a traffic lane instead. The preferred option (option 1) may be modified to retain some parking, and additional mitigation options could reduce net loss to 86 car parks, with nearby capacity at peak times for 150–170 additional cars in kerbside parking spaces (NZ Transport Agency and Dunedin City Council 2014a).

#### 4.3.5 Island Bay to city arterial cycle way, Wellington (proposed)

WCC plans to construct an arterial cycle way connecting the city centre with the southern suburbs. Although the route and design is yet to be finalised, there is a possibility that road space reallocation from kerbside parking may need to occur in some areas. The cycle way is being designed from the southern suburbs, with the Island Bay and Newtown suburbs currently in consultation and design.

Media coverage of the cycle way has tended to focus on opposition, primarily from some retailers who oppose it due to the potential loss of kerbside parking (for example see Webb 2014). The ‘controversial’ coverage of the loss of car parking has resulted in mixed political responses, with some councillors renouncing their support for the project (Chapman 2014).

Beetham (2014) explored the extent to which road space reallocation from on-street parking might be warranted for the city centre portion of the cycle way. Latent demand and preferences for transport cycling were assessed using an intentional behaviour change model. A study of the economic contribution of the on-street parking on Tory Street to adjacent businesses was also undertaken. This study identified a significant latent demand for transport cycling in Wellington, and identified that road safety improvements were the key change required to encourage the uptake of transport cycling. Potential cyclists indicated they would be likely to cycle for transport more often if a cycle path connecting Wellington’s southern suburbs and the city centre was constructed.

Contrary to what might be expected, it appears that the majority of people would support the removal of some on-street parking to provide for this cycle way (Beetham 2014). Additionally, this study found that the contribution of those who use on-street parking to adjacent retail vitality on Tory Street is minor, compared with the contribution of those who do not require parking and those who use off-street parking. This study found that Tory Street kerbside parking accounted for about 3% of the total public parking supply within one street block of Tory Street. Additionally, 72% of street users surveyed travelled into the area using a mode that did not require car parking. Only 10% of people surveyed on Tory Street used kerbside car parking, and only 6% parked on Tory Street kerbside parking, and only 3% of respondents parked in Tory Street on-street parking were regular (weekly or more) visitors, while most regular visitors had not required parking.

## 4.4 Public transport services

Bus lanes have become increasingly common in New Zealand, particularly in major urban centres, with the ongoing development of PT networks. These measures give priority to buses over other vehicle traffic and often result from the removal of parking to provide dedicated lanes along network corridors. In New Zealand bus lanes are also often utilised by other non-private vehicle users such as cyclists and taxis to maximise their benefit to the wider transport network.

Reallocation of road space to improve the bus network often takes place in response to rising patronage and with the aim to further increase utilisation of PT modes. Shifting people from private vehicles to PT is an important tool in reducing congestion and demand for inner city parking. In cities designed around cars the existing road layout does not usually support productive bus routes, making reallocation necessary to improve the overall efficiency of the transport network.

Two major New Zealand kerbside parking reallocations for new bus infrastructure are described below.

#### 4.4.1 Papanui Road, Christchurch

The annual average daily traffic on sections of the route from Bealey Avenue to Cranford Street and onto Queen Elizabeth Drive II in Christchurch were between 21,000 and 32,000 vehicles, with high periods of congestion during the morning and evening commuter peaks. Bus Priority is a joint approach from the Transport Agency, Environment Canterbury and Christchurch City Council (CCC) (Transit New Zealand et al 2007). These projects target mode shift to PT by getting buses from the back to the front of the queues. In 2009 the installation of 4.7km of bus lanes along Papanui Road/Main North Road was undertaken alongside additional infrastructure improvements including bus signals, relocation of bus stops, intersection upgrades, turn restrictions and better provision for pedestrians and cyclists.

The project faced difficulties from different stakeholders during the planning stages. The Transport Agency recommended narrow 3.2m lanes that would run uninterrupted along the length of the route. The lane width would not allow cyclists and buses to overtake each and other wider sections were included for this to occur. Instead CCC opted for 4.2m wide lanes that would allow cyclists and buses to overtake each other anywhere along the lanes (figure 4.2). Political pressures meant that parking was not removed for the entire length of the route, and this ultimately created disjointed lanes and removed capacity at a number of intersections (R Cooney, September 2014, pers comms).

There was still a significant impact on kerbside parking along the route. Prior to treatment there were 549 individual spaces with a mixture of time-restricted and all-day kerbside parking (Transit New Zealand et al 2007). Creating bus priority lanes required the removal of some of these spaces during the morning and evening commuter peaks. During designated clearway times there are now 308 parking spaces available in the morning and 289 in the evening, a 44% and 47% loss respectively. At all other times there are 434 kerbside parking spaces available, a reduction of 21%.

**Figure 4.2 Papanui Road bus and cycle lanes**



Source: ViaStrada (2010)

#### 4.4.2 The Golden Mile, Wellington

In 2008 WCC identified the need for improved reliability of bus services along the 'Golden Mile' between Willis Street and Taranaki Street in the Wellington CBD. This project was part of wider planned improvements to PT in the central city, which was experiencing major delays during the peak and inter-peak periods (Thornton et al 2009). As a result journey times were highly variable with the Willis to Taranaki Street section identified as one of the most significant bottlenecks. With PT patronage expected to grow by 10% to 30% annually until 2016, short- to medium-term enhancements were necessary to improve operations of the bus network.

A number of types of reallocation were required in order to implement the preferred option. Parking was removed on Manners Street and loading zones relocated to allow for uninterrupted PT access. Somewhat more controversially was the reopening to through traffic of Manners Mall, a pedestrian space. This area had previously been open for trams, buses and vehicles until reallocation to pedestrians and cyclists occurred in the late 1970s. Allowing buses back into this space once more would provide a more direct route and allow north and south bound buses to travel along the same route rather than on separate routes (Thornton et al 2009).

In addition to improved transport network efficiencies the perceived benefits of this project included an improved urban realm, better access for pedestrians and cyclists, and increased economic performance for local businesses. The shared space created in Lower Cuba Street was another significant element of the Golden Mile's restoration as outlined in section 4.2.3.

Consultation for the Golden Mile project resulted in the WCC receiving 722 individual submissions. A poll of 500 local residents was also undertaken (Wellington City Council 2009a). The loss of public space in Manners Mall was seen to be a major cost of the project; however, WCC off-set this by developing the Lower Cuba Street shared space. Time-saving benefits were perceived to be minimal by submitters; however, modelling of this effect showed that an expected 32–162 second time saving per user amounted to a \$19.75m benefit over a 30-year period. This was considered to be an extremely positive outcome for a PT project implemented over a relatively short amount of road space.

Feedback from local businesses was mixed with eight being in favour and seven opposed (Wellington City Council 2009a). Those opposed were largely concerned with the loss of public space in Manners Mall and car parking along the rest of Manners Street. Reduced access for customers and deliveries was seen as a potentially negative outcome of this process. Again, Lower Cuba Street's redevelopment was expected to offset the impact of public space reallocation while loading zones were retained where practical to maintain a continuous bus corridor. International and New Zealand examples were promoted where improved urban realms have increased foot traffic in central city areas.

It is noteworthy that reallocation of kerbside parking to pedestrian spaces often meets opposition from business groups who believe they will lose trade. In this instance businesses were concerned for potential business impacts through the removal of pedestrian space in favour of vehicle-oriented road space.

### 4.5 Extra vehicle lanes

Along heavily trafficked routes extra vehicle lanes may be installed to increase thoroughfare of people and goods. Vehicle lanes may be implemented full time with parking permanently removed or on a part-time basis where parking is restricted during specific times, most often during the morning and evening peaks. The focus of this reallocation is to optimise the efficiency of the transport network primarily for private vehicles.

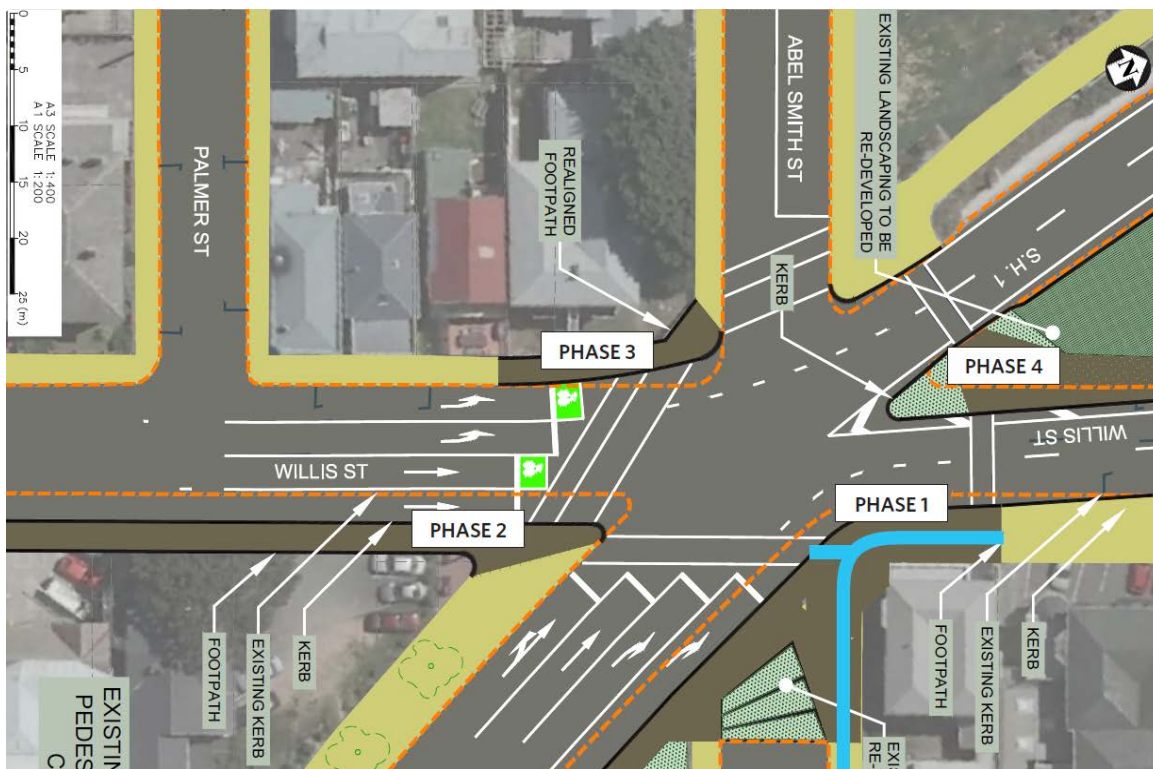
Reallocation of inner city kerbside parking for extra vehicle lanes appears to be relatively rare other than for major arterial corridors carrying traffic in and out of the central city at peak times. The example below instead demonstrates how reallocation of a small number of parks can have a significant effect on reducing congestion at bottle necks.

#### 4.5.1 Willis Street, Wellington

In 2014, as part of the Wellington inner city bypass improvements, a small number of kerbside parking spaces were reallocated to extra vehicle lanes along side streets for network optimisation. A particular example is the realignment of kerbs on Willis Street to create space for additional straight through and turning lanes (NZ Transport Agency 2013d).

Prior to treatment, Willis Street to the south of Karo Drive was two laned with traffic from Aro and Webb Streets required to merge creating congestion problems approaching the Karo Drive intersection. Willis Street has been realigned with parking spaces on the right-hand side removed and the carriageway widened in this direction (phase 2 of figure 4.3). On the left-hand side parking spaces have been retained but now operate as clearways during peak traffic periods (phase 3 of figure 4.3).

**Figure 4.3 Willis Street/Karo Drive intersection vehicle lane improvements**



Source: NZ Transport Agency (2013d)

This project has resulted in two straight-through lanes and two left-turn lanes connecting traffic to the urban motorway and major inner city arterial routes. As part of a wider project this treatment benefits the overall transport network by removing a bottleneck and ensuring the future efficiency of road developments in central Wellington. A new pedestrian path was constructed at the edge of the wider carriageway and the effect on parking is minor, with spaces near corner shops unavailable only between 7am and 9am on weekdays.

As stated in chapter 3, temporary reallocation of kerbside parking to clearways is a common approach to reduce congestion during morning and evening peak travel periods. In the context of this report, no published evaluation of the costs and benefits of these temporary reallocations could be sourced. It is expected that temporary clearways are solely focused on network efficiency outcomes so there may be some modelling undertaken. More than likely, key arterials are by default the preferred location for this type of reallocation and given their temporary nature little cost-benefit analysis is required by decision makers to justify them.

## 4.6 Additional findings from the case studies

Several conclusions can be drawn from the analysis of the case study examples:

- There is little consistency in how schemes that require the reallocation of kerbside parking are assessed or the measures used in assessments.
- Very rarely are both before and after evaluations conducted. Only one scheme (Great Queen Street, 3.1.5) was identified where this had occurred, and in this case the evaluation reports were not discoverable by the researchers.
- There is a wide range of potential measures for assessing schemes that include quantitative measures (eg vehicle speeds) and qualitative measures (eg perceptions of traffic safety).
- The measures used to quantify the likely and actual costs and benefits of schemes can be classified into six main categories:
  - mobility: travel time and costs, and reliability for users
  - accessibility: the opportunity and ease of accessing a destination
  - economic: revenue from transport activities and wider economic benefits
  - safety and health: crashes and transport related health behaviours and outcomes
  - urban amenity: urban environment quality and the activities of users in this space
  - environmental: direct effects on environmental quality and resource use.
- Measures relating to mobility are the most frequently used in evaluations, such as numbers of vehicles or pedestrians, and journey times.
- The measures used to evaluate schemes relate to the purpose of the reallocated road space, for example, numbers of cyclists for cycle path schemes, or use of streetscape amenities for urban realm projects.
- Evaluation measures also relate to drivers of the reallocation scheme, for example where the objective is to reduce the number of cycle crashes, the number of reported cycle crashes is reported.
- Certain evaluation measures are collected routinely (eg in New Zealand all reported crashes are recorded on the Crash Analysis System (CAS) which can be interrogated by geographic location).
- Most non-routine data can be collected either by observation (eg pedestrian patterns or usage of streetscape amenities) or by intercept survey (eg mode share or perceptions of streetscape quality);
- Some measures, such as customer spending, travel times and crash data, can be quantified in monetary terms. However, most of the measures used in the evaluations identified in this study represent non-monetary values.

## 4.7 Summary

Building on the costs and benefits identified in the literature review, case studies and through feedback from the Steering Group, a draft list of kerbside parking reallocation costs and benefits was developed (table 4.1). Individual factors are grouped by direct costs and benefits to users of the transport environment and adjacent land, and contextual elements that are considered during the BCA evaluation of projects. For the purpose of this conceptual framework we have grouped individual factors by themes of direct impacts and some of these may subsequently have a monetary value placed upon them. The draft list was used as a basis for discussion with transport professionals at the industry workshops, presented in chapter 5.

**Table 4.1 Conceptual kerbside parking evaluation framework to be tested within the sector**

<b>Direct costs and benefits</b>		
<b>Theme</b>	<b>Factor</b>	<b>Definitions and examples</b>
Mobility	Travel time	Change in calculated travel time for all modes and by number of people
Economic	Capital and operating expenditure	Up-front capital costs and whole of life estimates of operating expenditure
	Vehicle operating costs	Change in vehicle operating costs
	Parking revenue	Change in revenue stream to council from existing parking supply
	Public transport revenue	Current and future predicted revenue from these services
Safety and health	Crashes	Cost of non-injury, injury and fatal crashes
	Population health	Direct impact of transport intervention on health behaviours and outcomes
Environment	Environmental impacts	Direct impacts of reallocation on the local environment, air quality, resource use etc.
<b>Contextual cost-benefit elements</b>		
Mobility	Mode share	Desired v actual change in mode share as a result of change
	Journey satisfaction	User perceptions of travel environment and subsequent attractiveness of individual modes
Accessibility	Mode choice availability	Social and geographic accessibility to different mode options for users
	Existing parking supply	Quantity and type of parking supply in the adjacent area
	Occupancy of existing parking	Occupancy rates and/or turnover of kerbside parking spaces in the adjacent area
	Use of existing parking	The purpose of trips made by drivers and passengers of vehicles using existing kerbside parking
Economic	Business income	Contribution of parking, or alternate use of this space, to local businesses
	Land use and value	The change in value, occupancy and use of land adjacent to the project area due to reallocation
Urban amenity	Pedestrian use	Change in the number of pedestrians in the area, and type of behaviours/interactions that take place
	Visitor satisfaction	Pedestrian, resident and business owner perceptions of urban quality before and after reallocation

## 5 Findings from the industry workshops

### 5.1 Introduction

This chapter describes the findings from the industry workshops where the draft list of kerbside parking reallocation costs and benefits were discussed in each local context. The aims of this stage of the research project were to establish:

- the relevance of the proposed measures in the draft cost-benefit framework presented in the previous section based on feedback from experts working in relevant local, regional and central government and the private sector, and to document the range of opinions and perceptions from individuals working in different roles across a range of urban locations in New Zealand
- an objective perspective of the relative importance of different measures in the context of developing a business case for reallocation of kerbside parking and informing decision makers and the public of the expected costs and benefits of individual projects
- an overview of the proposed framework measures that are currently measured and/or evaluated as part of cost-benefit analysis and the BCA to kerbside parking reallocation projects in different towns and cities in New Zealand, and to describe the accessibility, cost-effectiveness and reliability of data sources that are/could be used to quantify each factor.

### 5.2 Methodology

#### 5.2.1 Workshop locations

This stage utilised interactive workshops in four New Zealand locations to understand the different needs and opinions of industry experts and to evaluate the potential benefits of taking a different approach to cost-benefit analysis of inner city kerbside parking reallocation projects.

The workshops were held in Wellington, Auckland, Hamilton, and Dunedin during November/December 2014 and February 2015. Auckland and Wellington were chosen as two of the largest cities in the country and are among those making the largest investment into non-car based transport modes and improving the quality of the urban environment. Hamilton was selected as a growing city with competing pressure between 'big box' retail in outer areas and the traditional central city core. Dunedin is an interesting case study site with well-publicised proposals (at the time of writing this report) to remove inner city kerbside parking for cycle infrastructure along the State Highway 1 corridor as well as wider plans to remove parking to improve the pedestrian environment and urban amenity in the Octagon area.

#### 5.2.2 Workshop participants

Participants were recruited primarily through contacts from staff based in local Opus offices. For each workshop we sought to recruit industry experts working in the following disciplines:

- parking management
- transport planning
- transport engineering/design
- urban design
- active transport



- PT
- accessibility planning
- sustainability.

The summary findings presented in sections 5.3 and 5.4 of this chapter capture discussions at each of the workshops but do not reflect the views of all participants at the workshop or their employers. Additionally, the comments recorded do not necessarily reflect the views of the authors, peer reviewers or the Transport Agency.

**Table 5.1 Overview of industry workshops**

Location	Date of workshop	Number of participants	Participant organisations
Wellington	28 November 2014	9	Wellington City Council Greater Wellington Regional Council Cycle Advocates Network Automobile Association Opus – Transport Work Group Manager
Auckland	2 December, 2014	14	Auckland Transport Auckland Council Opus – Principal Transport Planner
Hamilton	3 December 2014	5	Hamilton City Council Waikato Regional Council Opus – Senior Transportation Planner
Dunedin	4 February, 2015	6	Dunedin City Council Otago Regional Council NZ Transport Agency Opus – Principal Resource Management

### 5.2.3 Workshop formats

Each workshop was held from 11am to 2pm and participants were provided with a catered lunch and refreshments during a break in proceedings. Facilitators followed the same format at each workshop. A presentation of the project background and findings to date was delivered to familiarise participants with the topic before introducing the proposed cost–benefit framework themes and measures. Each workshop was recorded using a digital recorder to ensure salient quotations could be accurately included in this report.

It should be noted that following feedback at the Wellington workshop the parking-related measures in the framework were amended from ‘Parking supply’ and ‘Utilisation of existing parking’ to ‘Existing parking supply’, ‘Occupancy of existing parking supply’ and ‘Use of existing parking’.

The workshops were run in two parts. The first sought to identify the main drivers of kerbside parking reallocation projects in the local urban area and what, if any, challenges are commonly faced when trying to implement these schemes. Feedback was sought from the group on the themes and measures in the proposed cost–benefit framework.

In the second part, participants were asked to work in groups for three different tasks and at the end of each task a round table discussion was held to ensure all viewpoints in the room were taken into account. These tasks were:

- 1 The relative importance of measuring the costs and benefits (provided to participants) as part of a pre- and post-evaluation process for different types of kerbside parking reallocation projects.

During this task participants worked individually or in groups to rank each measure in the proposed cost-benefit framework as 'essential', 'useful', or 'non-essential' to evaluating inner city kerbside parking reallocation projects. Rankings were repeated by reallocation project type: PT, cycling facilities, walking, shared spaces and urban realm, and extra vehicle lanes. At the end of the task, individuals and groups came together to discuss their answers and opinions to reach a consensus for each option.

- 2 Are the proposed costs and benefits in the framework currently measured and evaluated for transportation projects in this area?

As a group participants determined if the proposed measures of costs and benefits in the framework are currently quantified and included in economic evaluation and reporting of transportation projects in their local urban area. Ratings of 'Always', 'Sometimes' and 'Never' were assigned to each measure.

- 3 In the context of information currently used to evaluate transportation projects, is the information needed for the costs and benefits discussed today readily available, cost-effective to access/collect and reliable?

During this final task participants discussed the data and information that is or could be used to quantify the costs and benefits included in the proposed framework. There is a mix of monetary and non-monetary factors in the framework that may draw on data currently available in transport models and secondary data sources, while others will need to have data collection carried out on an ad hoc basis for individual projects.

Finally participants were invited to offer any additional comments and asked for their opinion of the potential value of such a framework as presented and discussed in contributing to developing business cases for future reallocation projects and the benefits to the decision-making process for these schemes as a whole.

## 5.3 Industry workshops summary

This section discusses thematic findings from the industry workshops. First, local drivers of kerbside parking reallocation are introduced. These include network optimisation, safety, mode share, urban amenity and economic vitality, and population health and environmental impacts. Following this, common barriers as discussed by attendees are presented. These are local business owner concerns, project funding and a lack of local evidence. Finally, a summary of attendees' experience with kerbside parking reallocation, and the need for quality information for good decision is described.

### 5.3.1 Local drivers of kerbside parking reallocation

#### 5.3.1.1 Network optimisation

At each workshop examples of kerbside parking reallocation for transport network optimisation were cited. Most often parking has been reallocated for PT lanes although there were also examples of parking removal for extra vehicle lanes that benefit all modes. Most examples of removal of parking for network optimisation improvements were in Wellington and Auckland where there is a greater focus on multi-modal transport due to larger populations and also to reduce vehicle-related congestion on inner city streets.

*Reallocation is relevant to the network function and hierarchy of roads, removing parking for cycle lanes on one route may be appropriate but not on another route. Looking at the function and priorities of roads is important when considering the drivers of reallocating that space.* – Wellington participant

Removal of parking for PT generally takes place on busy arterial corridors leading into the central city and along congested city streets. Reallocation of kerbside parking reduces travel time for busy city centres and improves the reliability of buses along the PT network. Improved PT networks are a strategic priority for most major cities in New Zealand as they aim to reduce current and future predicted congestion by lowering the number of vehicle trips. Examples of reallocation for extra vehicle lanes were often for temporary clearways that provide road space for higher traffic volumes during the morning and afternoon commuter peak periods, and examples of these types of clearways were discussed at all of the workshops.

#### **5.3.1.2 Safety**

Improved safety for cyclists and pedestrians who are the most vulnerable road users is an important driver for reallocation of road space for cycle lanes and shared spaces. Cycle lanes are becoming a more common sight on urban roads as transport planners seek to separate vehicle drivers and cyclists on particular routes. Removal of parking reduces conflict with both moving and stopped traffic that cyclists have traditionally moved between creating potential hazards on either side of riders. Perceptions of safety for cyclists are potentially more important than crash rates as perceptions contribute directly to willingness to use a specific route.

Shared spaces and other similar pedestrian focused changes to road layout are undertaken on streets where it is practical to slow cars to safer speeds and to shift the perceived function of a road away from solely vehicle traffic.

Auckland, Wellington and Dunedin have all previously removed inner city kerbside parking to create safer transport routes and urban spaces for cyclists and pedestrians. Dunedin City Council is currently deciding on its preferred separated cycle lane options for the SH 1 route through the central city, with all of these options requiring the removal of a large number of kerbside parking spaces.

#### **5.3.1.3 Mode share**

While not explicitly the motivating factor for all kerbside parking reallocation projects, increasing the mode share of cycling and PT in particular are part of strategic transport goals common to most New Zealand councils. Reallocation to new uses is expected to make non-vehicle transport modes more appealing and increase user numbers. Additionally the removal of kerbside parking spaces is a disincentive to vehicle drivers coming to the inner city where spaces may be more limited and potentially more expensive depending on local approaches to the management of parking.

In central Auckland commuter parking has been discouraged through pricing and time restrictions in council owned off-street parking buildings. This approach is aimed at encouraging commuters to arrive by public and active transport modes where practical and has taken place alongside city-wide improvements to multi-modal transport networks. In Wellington public consultation has been undertaken for a proposed cycle lane running from Island Bay to the central business district to encourage the number of people travelling to town by bike. The options for the route will require parking reallocation.

#### **5.3.1.4 Urban amenity and economic vitality**

Reallocation of parking and road space to create attractive urban realms as a destination for shoppers and diners is becoming a common driver of projects in some New Zealand cities. This is particularly true in Auckland where a number of streets have been pedestrianised with positive effects on neighbourhood

economies and the vibrancy of city streets. Some of these have been so successful that retailers in other areas of Auckland are putting their hand up for similar treatments in a bid to improve business vitality.

Wellington has a great historical example of a successful pedestrian space in Cuba Street following the removal of tram lines and closure to traffic in 1969. More recently shared spaces have been implemented in Lower Cuba Street and temporary reallocations of space have been successful in other areas.

#### **5.3.1.5 Population health and environmental impacts**

Population health and environmental impacts are important factors to be taken into account when planning a transport strategy and setting objectives for the function of city road networks. Increasing active and PT users while reducing the number of vehicles on the road contribute to a more sustainable transportation system with lower emissions and use of oil. Greater participation in active transport modes has benefits for public health through increased exercise and contributing to societal shifts in health related behaviours.

*Environmental impacts. Underlying a lot of these projects are concerns around climate change and carbon emissions. They may not be direct drivers but developing better public and active transport networks are undertaken to achieve this. We should be measuring and quantifying the direct impact on emissions from projects like this. – Wellington participant*

### **5.3.2 Common barriers to kerbside parking reallocation**

#### **5.3.2.1 Local business owner concerns**

Opposition or concern from local businesses adjacent to proposed kerbside parking reallocation projects was the most commonly cited barrier to successful implementation in all cities where workshops were held. Attendees' experience is that kerbside parking is critical to business vitality, though this has been shown to be a misconception overseas and in New Zealand. At a neighbourhood level there often remains a high level of attachment between adjoining business or land owners and publicly owned kerbside parking.

This opposition to removal of parking appears to depend on the new use proposed for the space. In Auckland the suggestion was made that business owners are becoming more aware of the benefits improved urban realms that attract pedestrians can have on their turnover. This is a result of a number of successful reallocations for amenity values in the central city. There does remain opposition towards reallocation along inner city arterials and major streets for cycle lanes and PT lanes where users of these modes are assumed to spend less compared with people arriving by car.

Wellington and Dunedin face similar challenges from retailers although in these cities there is also opposition towards attempts to remove parking to create attractive inner city spaces. Participants felt this is perhaps due to a lack of examples of successful reallocation that provide local evidence of the opportunity cost of reallocating this space. In Hamilton, a comparatively smaller city, there is an added issue of suburban malls with large quantities of free off-street parking taking business away from central city retailers. This is a common theme across many New Zealand towns and cities and for local retailers losing kerbside parking is seen as a competitive disadvantage to the rise of big box retail centres.

At all of the workshops participants felt the occupancy and use of kerbside parking along city streets is poorly understood by retailers. In each city, parking as a whole is underutilised and removal of parking will generally have a negligible effect if parking in adjacent streets is managed better with higher occupancy and turnover of vehicles.

### 5.3.2.2 Project funding

The cost of reallocating space can be a significant barrier to change particularly for urban realm upgrades that require treatments like extensive landscaping, installation of street furniture and repaving. The cost to complete these changes and to maintain them over time can be significant in the context of tight transportation budgets. Successful central city reallocations in Auckland such as Fort Street were made possible through funding from a central business district targeted rate that is collected from businesses, residents and property owners over and above standard rates.

None of the workshops outside of Auckland discussed having access to extra funding sources like this. Given the opposition from many central city business and property owners, participants felt it would be a hard model to sell in their local area leaving the financial burden on the council.

Reallocation to PT facilities or cycle infrastructure can also be expensive along long sections of corridor space and so the expected benefits of doing so are important to quantify during economic evaluation. Often the desired improvements such as increased mode share, more sustainable transport systems and increased perceptions of safety are difficult to quantify in monetary terms. Because of this participants felt it is important to give a lot of weight to alignment with strategic transport goals when undertaking reallocation rather than relying on economic efficiency calculations as a measure of costs and benefits.

*While the Fort Street example is a great demonstration of what can be done it is far beyond the budget of most councils in New Zealand to replicate. It is not just about removing the parking, you need to finish it really well and landscaping, tiling, street furniture etcetera are not cheap. There are counter examples in Wellington where they have just used tarseal and it just looks like a road and not a pedestrian space at all. – Dunedin participant*

### 5.3.2.3 Lack of local evidence

Relying on overseas and non-local New Zealand evidence of potential new uses of space that are more beneficial to the central city transport network has proved to be a barrier to reallocation faced by participants in each of the workshops. AT was the only organisation which discussed carrying out widespread assessment of the outcomes for individual reallocation projects and this practice is expected to become more widespread. Some assessment of previous projects in Wellington has been done though not for all projects, while Hamilton and Dunedin rely on wider city level surveying that is carried out every six months to a year to examine how projects have had an impact.

*Whether data is readily available for a measure is often based on a subjective opinion of how important it is. Our current thinking that it is not worth gathering data on carbon emissions leads to it not being available and is based on past assumptions when we know that this is going to be important in the future and actually already is now. The thinking may need to change and investment be put into collecting data so that we can better evaluate the impacts of decision making on the environment. – Wellington participant*

There is not a consistent approach taken across councils in how or what is assessed after project completion. This was something cited as a barrier to making the case for projects in the first place as it is difficult to draw on a body of New Zealand evidence to present to decision makers, business owners and the public. In some cases even evidence from other cities in New Zealand has been disregarded, creating a situation where it is difficult to get projects approved because of a lack of local evidence. The dilemma is that the required evidence cannot be gathered without projects first being implemented.

*Previous projects that have removed parking have actually looked at very few potential costs and benefits. We have just gone ahead and done them because the decision has been made. – Dunedin participant*

### 5.3.3 Limitations to this information

*Lack of representation of certain sectors and stakeholders:* Given the small number of participants at each of the industry workshops (ranging from five to nine individuals), not all sectors or interests could be represented on the day. As a result the majority of attendees were from local and regional council departments or transport agencies. To limit the effect of this, a local Automobile Association and Cycle Advocates Network representative were present in Wellington, while in Dunedin a representative of Spokes attended. A local business association was also invited to the Dunedin workshop but no response was received. These groups were invited to provide a public viewpoint to the discussion but there was no evidence of a change in opinions between workshops with and without these public representatives present.

*Reliance on self-reporting from local body representatives:* It was the aim of this research to conduct workshops with staff who are familiar with the broad range of drivers and challenges that apply to kerbside parking reallocation projects. Because attendees were predominantly local authority staff, there is a potential bias in that their expressed opinions may be influenced by their personal and professional motivations for reallocating road space, and they may hold a negative view of groups that have opposed them previously in their role. This limitation was reduced by attracting staff from multiple departments and organisations to each workshop so that a broad range of experience was present. Running the workshop in four different cities also helped introduce a range of experiences to the workshop stage of the research. Despite the geographic and cultural differences between places, the drivers and difficulties discussed revolved around common themes. Additionally most participants expressed a need for better information to make good decisions that would not have negative effects on local residents and business owners.

*Participant responses are influenced by the workshop facilitators:* It is possible that the facilitators of each workshop guided discussion and opinion in the room towards a desired outcome. This is especially a challenge given the prescriptive nature of the cost-benefit framework presented for discussion. Attendees with a generous amount of experience in their role were intentionally invited to ensure that they were comfortable in expressing their opinion and not swayed by the facilitators. Completing some tasks individually or in pairs enabled everyone to provide input and all attendees at each workshop participated in the group discussions.

### 5.3.4 Summary of workshop discussion

The four workshops reported differing experiences with kerbside parking reallocation as well as a variety of local contexts that affect the decision-making process. The Auckland and Wellington groups had a number of past, present and future examples to draw on for discussion. In Dunedin kerbside parking reallocation has previously taken place on a small scale but there are a number of major proposals for removal of inner city parking for new uses that all participants have been involved with at some level. In contrast there have been relatively few examples of previous reallocation in Hamilton with just one clearway example cited by participants. The Hamilton group felt this was something that will become more pronounced in the future as the council looks to improve both the transport network and the inner city environment.

A discussion of project scale and street function developed at each workshop. In Auckland, Wellington and Dunedin parking reallocation has ranged from a couple of spaces to hundreds along a route. Different streets are also suited to different types of transport, social and economic activity and this alongside overarching transport strategy and goals will guide planners to the best use of road space on individual streets. Each group wanted to ensure that any time parking is reallocated it is done in the right place and for the right reasons.

Participants cited similar drivers of reallocation and there were common themes of the challenges faced. Most often resistance comes from commercial and resident groups who feel that kerbside parking is

necessary to carry out their daily roles. The stated need for information varied greatly across the workshops. Auckland participants, in particular, desired information on the majority of costs and benefits discussed at the workshop although this is perhaps a reflection of the wide range of interests represented and the complex nature of transport planning in New Zealand's largest city. The information currently available to participants to evaluate the costs and benefits of reallocation was not consistent across each workshop although there were common gaps in knowledge particularly around population health effects, environmental impacts, and a monetary association between kerbside parking and business vitality.

Overall participants supported the concept of an improved evaluation framework for kerbside parking reallocation projects if it contributed to a better evidence base with a local context. Most participants stated it was not the economic evaluation of projects before they were undertaken that was lacking but rather good examples of post-assessment that quantified both positive and negative outcomes of a project. The consensus was that if post-assessment was conducted more frequently in different New Zealand cities the costs and benefits of future projects could be better understood and communicated to elected officials, local businesses and the public. Developing a framework that identified the key costs and benefits relevant to reallocation projects would provide consistency in data capture that could be shared across regions and help to fill current knowledge gaps. Each group stated that an improved evidence base would guide planners and urban designers towards best practice reallocation of kerbside parking.

A full write-up of discussions at each industry workshop is provided in appendix A.

## 5.4 Findings for the draft framework

This section describes the findings from the industry workshops for each of the costs and benefits in the proposed conceptual framework outlined in table 5.1.

### 5.4.1 Travel time

Reallocation of kerbside parking to make the movement of people and goods more efficient may be evaluated by changes to travel time, or travel time reliability, at a network or corridor scale. This may be achieved by providing an extra vehicle lane that adds capacity for all transport modes, or a PT lane that separates buses from general traffic. In each city transport planners seek to provide a transport network that gives users multiple transport options, and that each of these options operates as part of an optimised transport network.

This single network view of local roads and streets means it is important to always evaluate the effect of a network change on all modes to identify unexpected negative/positive outcomes for travel time and reliability. In Dunedin and Hamilton congestion problems are more localised to specific areas and times compared with Auckland and Wellington, so removing kerbside parking for extra lanes may have less impact on travel times across the network. Nonetheless the same problems exist in all four cities at a corridor level, where kerbside parking may be reallocated and achieve relatively large optimisation outcomes along a route.

Construction of cycle lanes may improve travel times for cyclists, although this is likely to be most important for commuter cyclists and the improvement would have to be significant. The workshop participants did not believe that inner city parking reallocation is likely to be driven by this benefit. Similarly, shared spaces or urban realm improvements are unlikely to target network optimisation outcomes, although they may have a negative effect on travel time and reliability for vehicle modes. For this reason, some workshop attendees felt that measuring the effect of reallocation parking to cycling, or shared spaces or improved urban realms on travel times for other modes in the network is important.

Other participants worried that placing a value on increased travel times for cars, freight and buses as a result of these improvements may overshadow the benefits of projects that are often non-monetary in nature.

Travel time and travel time reliability is already frequently measured for large projects, especially for improvements on arterial roads, and on PT and extra vehicle lanes projects. Often these projects may include some level of kerbside parking reallocation to achieve project goals, but reallocation itself is not the primary reason travel time has been assessed.

Based on feedback at the workshops, travel time and travel time reliability for vehicles, freight and PT services were included in the proposed cost-benefit framework in chapter 6. The inclusion of travel time for cycling, pedestrianised shared spaces and quality urban realm type projects reflects the viewpoint that travel time should be measured for all modes, no matter the purpose of the project. This is important in the context of a multi-modal transport system where reallocation may have positive and negative outcomes for different user groups and affect transport behaviours.

## 5.4.2 Mode share

Providing mode-specific space such as bus and cycle lanes where car parking previously existed is an important lever for developing a transport system that provides users with a number of viable mode options. It is therefore important to understand the effects of kerbside parking reallocation on absolute and relative changes to mode share distribution. This should be considered for the route, road or street where space has been reallocated and across the entire network, as an increase in use of a particular mode on one corridor may be a result of a decrease in the same mode on another, with no net increase in use across the network. Attendees felt this may not necessarily be a negative outcome, for example cycle lanes may be built to encourage cyclists to use a particular route and discourage use on another.

Mode share was considered to be an important non-monetary cost-benefit of kerbside parking reallocation by the workshop participants. In particular, larger cities are moving towards a single transport network that provides multiple mode options for users, so an assessment of how new infrastructure affects trip behaviours is important to understand. Demand estimates are currently calculated to predict future use of a facility, service or mode in response to a change in the transport system. Quantifying mode share following implementation informs transport planners if the expected changes have been realised.

Currently, mode share is most often measured at the city level via secondary data sources such as the New Zealand Household Travel Survey and New Zealand Census. For individual projects it is more common to perform a travel demand estimate for a particular mode, for example new cyclists when planning a cycle lane. This is unlikely to occur on smaller projects where the scale or predicted impact does not warrant the time spent on modelling.

Attendees in Hamilton stated that information sourced from existing secondary data sets is sufficient in their context. This is because PT and active modes have a relatively low share of users, and relatively low investment in infrastructure at present. As such, city-level measurement of mode shift gives appropriate insight into the outcome of any projects that have taken place since the previous sampling period.

Based on feedback at the workshops, mode share was included in the proposed cost-benefit framework in chapter 6. As for travel time, mode share is important to consider for all modes, not just those targeted by the intervention. Provision for more cars may have the effect of reducing PT and cycle use, and vice versa.



### 5.4.3 Journey satisfaction

Reported changes in journey satisfaction is an important qualitative measure of how users perceive project costs and benefits. It is an indicator of the successful outcomes or elements of kerbside parking reallocation, as well as the not so successful ones. This feedback can be used to justify similar future projects and develop best practice approaches to road space allocation locally. Journey satisfaction can also be monetised when used as a predictor in travel demand estimate calculations for new infrastructure.

The basis for an individual traveller's journey satisfaction is likely to vary between modes. For vehicle drivers, the primary factors may be congestion, travel speeds, travel time and parking availability at their destination. Alternatively, PT users may be most concerned with the reliability and frequency of services, and the on-board environment. Cyclist perceptions of journey satisfaction are related to route directness, topography and the level of safety provided by infrastructure along the journey.

Pedestrian satisfaction was discussed separately at each workshop under the urban amenity cost-benefit: 'user satisfaction'. However, most PT journeys involve at least one leg to be made on foot at the origin and/or destination end. If this part of the trip is considered unsafe or too far then the overall satisfaction with the journey is likely to be low and discourage use.

Before and after measures of journey satisfaction are infrequently evaluated on a project-by-project basis in New Zealand. However, many quantitative measures of journey satisfaction are represented in economic analysis by other factors such as travel time and safety audits. In Auckland, assessing the impact of PT and major infrastructure projects on journey satisfaction is becoming more common, but this has not been done to assess the impact of a single project in the other cities. Elements of journey satisfaction are reported to decision makers when making a business case for reallocation. For example separated cycle lanes are known to be preferred by cyclists, and are more likely to encourage new users than other cycle infrastructure. Journey satisfaction was seen as a measure that does not feature highly as a driver of projects but is a great measure of people's response to change and helps to inform future projects.

Based on feedback at the workshops, journey satisfaction was included in the proposed cost-benefit framework in chapter 6 for PT and cycle projects only as making these modes attractive is important for uptake in use.

### 5.4.4 Mode choice availability

Mode choice availability is the access and choice users from different social groups and geographic areas have for their daily transport needs. Evaluating the availability of transportation options enables decision makers to make good decisions about transport infrastructure improvements. If an area is under-served by a particular transport mode, there may be a strong case for reallocating road space to increase the coverage of services. Taking mode choice availability into account goes some way to ensuring that inequalities in access to transport options between groups and locations are minimised.

Mode choice availability often underlies the planning and decision-making process for many projects, but is not often explicitly measured or evaluated. Therefore, attendees at each workshop stated that this is only 'sometimes' included for evaluation of reallocation projects, but would always be considered during the planning and decision-making process. Based on this feedback, mode share availability was not included in the proposed cost-benefit framework in chapter 6 given that it is a difficult strategic concept to evaluate alongside monetary and non-monetary costs and benefits.

### 5.4.5 Existing parking supply

Reallocation of kerbside parking should be done in the context of remaining kerbside and off-street stock in the adjacent area. This includes the number of parking spaces retained for use by car-based visitors to the area, and the ways in which these are managed (for example unrestricted, time-restricted and paid parking). Although councils will have good information on parking under their control or ownership, they are likely to be less informed about the management and quantity of off-street parking under private ownership. Often central city parking is oversupplied, so if the proposed removal of parking affects a relatively small number of spaces, there may be a minor impact on total parking availability and revenue.

It is important to consider the impact of removing parking spaces reserved for specific users such as mobility parking, loading zones, motorcycle parking and taxi stands. These groups often have dedicated parking spaces that cannot be used by other vehicles so they may bear a relatively higher cost if spaces are removed. In particular, it may be less practical for disabled visitors or delivery drivers to have spaces located further away on an adjacent street. Many parking reallocation projects seek to retain goods vehicle and mobility parking nearby, or they may restrict the time when deliveries can be made as is the case in Fort Street, Auckland.

Workshop participants in Wellington, Auckland and Dunedin agreed it was essential to consider the function of parking ahead of reallocation. This assessment should consider parking in the wider area and include off-street parking where possible. Information on the number of parking spaces and the users they are provided for should be measured. Demonstrating the actual effect of reallocation on stock in the adjacent area is an important discussion point for stakeholder engagement.

Based on feedback at the workshops existing parking supply was included in the proposed cost-benefit framework in chapter 6.

### 5.4.6 Occupancy of existing parking

As stated above parking is unlikely to ever be fully occupied across a central city area, although there can be large differences between streets. The occupancy and turnover of inner city kerbside parking is an important consideration when proposing to remove parking, as a common assumption is that removal of parking on one street will create a deficiency and increase pressure on remaining stock. If however there is an oversupply and parking operates inefficiently, there will be capacity in existing stock to accommodate a loss. In such a situation, the impact on drivers may be minimal other than perceived loss. It is important though to evaluate this in the context of a street or neighbourhood and not the inner city as a whole.

Workshop participants stated that occupancy and turnover of parking was essential information to evaluate alongside detailed information about existing parking supply in the previous measure. In Auckland, there are occupancy thresholds that affect how kerbside parking is managed, and subsequently reallocated, across the city.

Transport planners and decision makers currently use occupancy data in their assessment of projects; however, with little information available on privately owned car parks in some cities there are limitations to this knowledge. Councils generally record occupancy and turnover data for inner city kerbside parks on a regular basis, although some attendees stated this information is not always easily accessible across different departments within the council.

Based on feedback at the workshops, occupancy of existing parking was included in the proposed cost-benefit framework in chapter 6.

### 5.4.7 Use of existing parking

What drivers and their passengers do with their time while they are parked in the central city is largely a gap in existing knowledge. There are a range of reasons for trips made to inner city parking spaces and not all of them are made with the purpose of spending money. Despite this, kerbside parking is often assumed to have a large economic benefit to adjacent businesses. Previous research in Wellington has found that often kerbside parking users do not necessarily frequent the adjacent shops, and will walk to nearby destinations and businesses on other streets (Beetham 2014). Additionally, where kerbside parking has been reallocated to provide infrastructure for cyclists and pedestrians, users of these modes still visit and spend money while drivers seek parking spaces nearby (Jaffe 2015). In some cases there has actually been an increase in turnover, particularly for hospitality businesses, following urban realm improvements. It is important to understand the local context of parking use when planning reallocation of the space.

This is regarded as an essential measure for evaluation of kerbside parking reallocation projects as it contributes to a better understanding of how important kerbside parking is to adjacent businesses and the wider inner city economy before reallocation. This benchmark can be used to compare post-implementation use of the space including the contribution of non-car based visitors to spending.

Across most of the workshops it was acknowledged that on a project-by-project basis, the purpose of vehicle trips to inner city kerbside parking is infrequently evaluated. However elements of this are captured through annual parking beat and pedestrian intercept surveys which provide some insight into inner city trends.

Based on feedback at the workshops, use of existing parking was included in the proposed cost-benefit framework in chapter 6.

### 5.4.8 Capital and operating expenditure

Capital and operating expenditure are standard estimates taken into account for all transportation projects that seek local or central government funding. These include construction/implementation costs for the 'do minimum' and 'preferred' options, and estimates of future operating and maintenance costs across the life of the infrastructure. In all of the workshops participants agreed that information on capital and operating expenditure was critical to the evaluation of all types of project in order to have funding approved. Based on these statements, capital and operating expenditure has been included in the proposed cost-benefit framework presented in chapter 6.

### 5.4.9 Vehicle operating costs

Vehicle operating costs are the out of pocket costs users must spend on their travel. If, through kerbside parking reallocation, these costs are reduced or increased for particular modes it may influence the economic efficiency of a particular option.

No workshop attendees identified vehicle operating costs as an 'essential' cost-benefit to include in evaluation of reallocation projects despite it being part of the EEM's current calculation of project costs and benefits. Participants felt there would be a low weight given to this measure by members of the public, although it was acknowledged that PT providers may be interested in a change to these costs. Overall, participants stated that travel time is perhaps a more relevant outcome to measure compared with vehicle operating costs. There were also concerns regarding the reliability of vehicle operating cost values for smaller reallocation projects.

Following these discussions, vehicle operating costs were not included in the proposed cost-benefit framework in chapter 6. We acknowledge that for large projects these costs may be significant and are therefore like to be included as part of an EEM assessment.

#### 5.4.10 Parking revenues

If reallocation of kerbside parking removes paid parking spaces, there is potential for a reduction in council revenue. Revenue gained from spaces on a particular street should be taken into account when assessing the occupancy of existing stock in the wider area. If parking is under-utilised and/or improved management of kerbside parking is introduced, it is possible that overall revenue will not change.

In New Zealand inner city parking is commonly managed through pricing and/or time restrictions. In Wellington estimated revenue for high turnover kerbside parking is approximately \$5,000 per annum (Barclay Traffic Planning 2012). There is also financial return to local authorities from parking fines that can be significant; however, these revenues do not usually cover the full cost of providing parking. Previous research of inner city parking in Wellington found that on average parking zones were returning only 29% of their maximum daily income (minimum 9.5% – maximum 54.1%) (Barclay Traffic Planning 2012).

There was some hesitation for including parking revenues in all assessments. If too much weight is placed on parking revenues then some non-revenue generating projects may not be approved. It was recognised that if the outcome of this current research assists in better identification of benefits then this would improve decision making.

Potential reasons for including the effect of parking revenues in economic evaluation of reallocation projects included demonstrating the greater economic benefit that can be derived from an alternative use of the space compared with parking. A potential problem with this is that economic benefits have been redistributed from the council, a public organisation, to private business owners. Additionally, with an oversupply of inner city parking an assessment of parking revenue impacts may demonstrate that reallocation has little total effect. Participants suggested that the previous assessment of existing parking stock, occupancy and use is a more effective method to demonstrate such an effect.

Based on feedback at the workshops, parking revenues were not included in the proposed cost-benefit framework in chapter 6.

#### 5.4.11 Public transport revenues

If reallocation benefits the PT network, any subsequent rise in PT patronage would foreseeably increase revenue as well. New legislation surrounding PT service provider contracts, and the rise of electronic ticketing mean that information of patronage and revenue will become more readily available by route. From a Transport Agency perspective PT revenues are important for assessing whether or not targets are being met. However, when applied to a kerbside parking reallocation project they may not always be informative. Patronage, mode share, and service frequency and reliability were generally considered better measures of reallocation costs and benefits compared with PT revenue.

Even when parking is reallocated to PT infrastructure, revenues are unlikely to be a large driver of projects and so assessment of this measure may not provide any meaningful insight compared with other measures. It may also be difficult to be certain that parking reallocation has had a direct impact on overall PT revenues. Large-scale reallocation of parking for bus lanes is most likely to increase patronage and revenue if it results in a significantly improved travel time, and a faster journey compared with private transport. If travel times are similar across modes, travellers are more likely to use their own car so PT services have to compete on other aspects and provide users with a high journey satisfaction.

Based on this feedback at the industry workshops, PT revenues were not included in the proposed cost-benefit framework in chapter 6; however, PT patronage is included specifically for PT enhancing projects. The effectiveness of this measure is likely to depend on the scale of reallocation taking place with large arterial corridor projects most likely to show a marked increase in use.

#### 5.4.12 Business income

Business owners frequently oppose inner city parking reallocation based on the belief customer patronage and business turnover will decline. The contribution kerbside parking makes to inner city business vitality is often not well understood in New Zealand, particularly in local contexts where information from other cities and countries is considered irrelevant. Because a traditional use of road space has been for car parking in central cities, many business owners and members of the public assume parking is essential to economic success. This has previously been shown to be a misconception in some cases, as studies have shown drivers may not necessarily spend money on the street where they have parked (Lee 2008; Transport for London 2011). In addition, reallocation to new uses can attract more shoppers than before if the quality of the urban environment is improved.

For example, reallocation of a single car park to install bicycle parking has the potential to support many more visitors to the central city than before. While vehicle drivers often spend more on a single trip, walkers, cyclists and PT users have been shown to visit more frequently and may spend more money over the course of a week or a month compared with motorists. For example, analysis of spending on Lygon Street in Melbourne found that a standard car park of 13m<sup>2</sup> could accommodate parking for six bicycles (Lee 2008). Based on an average spend of \$AUD16 per hour this space could potentially contribute \$96AUD per hour to local retailers compared with \$AUD27 per hour for a car parked in the same space. A London Town Centre study also showed higher spending over time from non-car based travellers despite them spending less per visit (Transport for London 2011).

The view of workshop participants was the impact of reallocation is minor in relation to the entire central city economy, but potentially significant for a handful of businesses close to the project area. There is a need to collect evidence of the impact on business income once projects are completed to verify any such assumptions, and to determine if the effect on adjacent businesses is in fact positive or negative. In Auckland the impact of parking reallocation on business income is sometimes taken into account, although this is more common for very large projects. Attendees in Hamilton believed that understanding the impact on business income is especially important for cycling and walking projects, as these will create attractive destinations for residents.

There was considerable debate on this factor in all of the workshops. Kerbside parking occupies what is fundamentally public space and so the economic benefit derived by private business owners is not a right. Nonetheless, inner city business has been established alongside a transport network that in New Zealand has traditionally prioritised vehicle movement and parking. Effort needs to be made to understand the effect of removing parking, as without accurate data it is difficult for council staff to have a fully informed discussion with business owners. It is more likely the council will hear from owners who believe they will be, or have been, negatively affected than those who have not suffered or are doing better.

Some attendees believed too much weight is given to the reduced business income argument, and that by including it within an evaluation framework there is a risk that it would add credibility to this argument. Instead, it was suggested that pedestrian footfall and the use of kerbside parking was considered a more appropriate measure of business vitality, as this is an indicator of economic potential or opportunity.

Business income was included in the recommended cost-benefit framework in chapter 6 given the lack of evidence across a range of local contexts in New Zealand. It appears some cities, such as Auckland, are

more informed than others given a longer history of reallocation and therefore more evidence of successful outcomes. Pedestrian footfall, as discussed in section 5.4.16, is also considered an important indicator of inner city economic vitality, and an easier measure to evaluate and monitor compared with income for council staff.

### 5.4.13 Adjacent land use and value

Evidence for the effect of changes to the transport network on adjacent land use is important for decision makers operating within an integrated planning framework. Reallocation of kerbside parking may drive a change in land use, for example an increase in hospitality businesses adjacent to a shared space as in Fort Street (Carmine and Williamson 2012). This may be a positive outcome of the project if these businesses increase the productivity of the area and improve social activities. Alternatively a negative effect may be experienced by existing businesses that are no longer viable in the space and are forced to move to a new location as a result of the reallocation. This could occur as a result of higher land prices and lease value through increased demand for commercial premises. The type of visitor to the area may also change and frequent particular types of businesses but not others.

Workshop attendees felt that land use and land value should be considered separately during assessment of inner city parking reallocation. Often PT, cycling and shared spaces are built with benefits to the surrounding businesses and neighbourhood promoted so measuring the effect is important. Land use is comparatively more easily observed and monitored over time while land value is driven by a wider range of market factors, many of which are not related to the layout of an adjacent road or street. As for measures of business income, there is a tension between private economic benefit derived from kerbside parking which is a public good.

The cost or benefit to adjacent land use and value of kerbside parking reallocation is only sometimes included for evaluations in New Zealand according to the workshop participants. It is most likely to be considered on large-scale projects that affect a significant amount of kerbside parking. In Auckland, the effect of transportation decision making on land use is becoming an increasingly important consideration for current and future projects.

Based on these discussions, land use was included in the proposed cost-benefit framework in chapter 6 but not land value.

### 5.4.14 Crashes

Safety is an important driver of investment in walking and cycling infrastructure. Kerbside parking may be reallocated to create separated spaces for vulnerable transport users or to create transport environments that reduce vehicle speeds. Parked vehicles can be a hazard to cyclists in the roadway if a door is accidentally opened into their path causing a crash. Cycle lanes that are separated from both moving and parked vehicles are the safest option and most likely to encourage new users. Improved cycle infrastructure has proven crash reduction benefits and also increases cyclists' perceptions of safety. The Transport Agency's Cycling Safety Panel has previously identified poor perceptions of safety as the greatest barrier to cyclist numbers on New Zealand roads (Cycling Safety Panel 2014).

Reallocation of kerbside parking spaces may also improve pedestrian safety. Some literature suggests parking is a potential hazard as it reduces lines of sight for both pedestrians and drivers (Edquist et al 2012). Removal of parking can also be undertaken to create shared spaces and environments where pedestrians have priority and traffic speeds are reduced. Just as for new cycle infrastructure, this type of reallocation is likely to improve overall pedestrian perceptions of safety on central city streets.

Measuring the effect of kerbside parking reallocation on reported crashes is considered essential across all types of projects. Attendees stated that it is critical to know if the change you are making has had a positive effect on crash incidence or an unexpected negative effect. In Hamilton it was not considered essential for PT upgrades, and in Wellington essential only for cycle infrastructure and pedestrian-focused improvements as they are the most vulnerable road users. At the Auckland, Hamilton and Dunedin workshops attendees said it is essential to measure crashes for extra vehicle lanes as there may be an unintended rise in vehicle-related collisions if traffic flows are increased. Reported crashes are easily extracted from the CAS, which records the vehicles or travellers involved in each crash as well as the cause.

Crashes and perceptions of safety were included in the proposed cost-benefit framework in chapter 6 based on the importance cited at each workshop and the ease of data accessibility in New Zealand.

#### 5.4.15 Population health

Perhaps the largest benefit of improved cycling and walking infrastructure is for population health as increased physical activity has positive effects on mortality and morbidity. Lower rates of preventable illness or disability will reduce associated health sector costs and costs to employers from lost output. Population health benefits arise when reallocation encourages new users, or increases the distance travelled or frequency of trips for existing users, of active modes. If parking reallocation contributes to fewer vehicle trips there may also be population health benefits resulting from reduced exposure to vehicle emissions.

Previous New Zealand research estimated the per kilometre benefit of walking and cycling to range from \$3.53 to \$5.01 and \$1.77 to \$2.51 respectively (Genter et al 2008). A review of walking and cycling cost-benefit analysis in the UK and other developed nations found that investment in walking and cycling interventions yielded a median cost-benefit ratio of 19:1. This result is considered to be 'astonishing' and highlights the 'potential for active travel policies to deliver significant health benefits and very high value for money' (Davis 2010).

There was a variety of opinions across the workshops about the importance of estimating population health effects in economic evaluation of parking reallocation projects. At a high level, all participants stated the relationship between transportation and health is important and needs to be better understood. Where perspectives differed was in regard to the ability of current methods to estimate/value this relationship, and the practicality and importance of doing so for what are sometimes relatively small projects. At each workshop, attendees found it difficult to identify how population health effects could be measured given that transportation is but one contributor to health outcomes. Quantifying the costs and benefits to population health at the level of a single reallocation project was also considered nearly impossible to undertake. It was because of this that a number of attendees did not consider population health to be an essential factor for any project evaluations. The cost of developing an accurate measure would be considerable and there remained scepticism as to how reliable any such measure would be.

Based on these discussions, population health has not been included in the proposed framework in chapter 6. To ignore the health effects of any transportation project would be an oversight, but it must be acknowledged that current methods are unlikely to be wholly accurate and perhaps impractical to evaluate on all but the largest reallocation projects. Nonetheless there is a need for ongoing research in this space to evaluate the effect of all transport policies and interventions on population health as the effects are likely to be large in monetary terms.

### 5.4.16 Pedestrian use

Reallocation of kerbside parking may increase the number of pedestrians in an area and influence the way in which the space is used. This may be the result of building a better quality urban realm that becomes a destination people want to visit, linger and socialise in. Reallocating parking for better urban realms may also improve the accessibility of a location, thereby increasing the number of visitors. Conversely, busy streets with high vehicle volumes and speeds are less likely to contribute to the urban realm or encourage visitors to linger in the space.

At each workshop this factor was discussed only in the context of pedestrian numbers and their behaviour. Attendees said it was important to assess the impact of all projects on pedestrian uses of space, and both positive and negative outcomes should be assessed because different road layouts are likely to influence the social and economic activities that occur in an area. Dunedin attendees stated it is essential to measure usage when reallocating PT, cycling and urban realm improvements as these are all projects targeted at bringing more people to a location. Conversely, extra vehicle lanes aim to move traffic through an area and have network optimisation benefits. A number of attendees were of the opinion that usage assessments were essential only for urban realm improvements where more pedestrian activity would be expected but acknowledged negative effects on pedestrians are likely to occur from projects that prioritise vehicle movements.

Based on this feedback, pedestrian usage of inner city streets and environments has been included in the proposed cost-benefit framework in chapter 6 to assess the effect of different road layouts and priorities for space on people.

### 5.4.17 Visitor satisfaction

Where parking is reallocated to improve the amenity and quality of inner city streets direct feedback from users, before and after implementation, is important to assess. This information will inform planners of the success of a project and identify long-term impacts on the local neighbourhood. Evidence of both positive and negative outcomes should be used to create a local guide for planning, designing and assessing future inner city projects. This is especially important for urban realm improvements as planners and urban designers will understand what treatments work best and which streets are best suited to reallocation.

In addition to direct users of the space, such as pedestrians and shoppers, it is important to understand the perceptions of residents and businesses owners affected by the project. As stated, business owners often perceive a loss of trade when parking is removed and oppose projects before they go ahead. Recording this information before and after implementation is important evidence to present to decision makers and the public when future decisions about reallocation of road space are being made.

Attendees at the Auckland and Dunedin workshops said user satisfaction should be measured for all projects where parking is removed on city streets. Their consensus was that it is important to understand how different elements of the transport network drive both positive and negative perceptions of a street or neighbourhood. Fort Street is a good example in Auckland where in-depth assessment of visitors' perceptions of the original and new space has been undertaken. In Wellington this was the case for projects that improve the urban realm only. Many attendees also stated that user satisfaction with PT, cycle infrastructure and extra vehicle lanes may be better quantified through other categories in the framework such as accessibility, safety and mobility.

Visitor satisfaction was included in the proposed cost-benefit framework in chapter 6 for pedestrianised shared spaces and quality urban realm type projects only. It is an important measure to demonstrate real



satisfaction with completed projects when speaking with politicians, local boards and community forums about future plans.

### 5.4.18 Environmental impacts

Road space reallocation that promotes mode shift to public and active transport modes can reduce the number of vehicles on the road. Similarly, provision for extra vehicles through additional lanes or removal of 'pinch points' created by parking spaces can improve flows and reduce congestion. These outcomes have the potential to alleviate negative environmental effects attributed to transport activities, including: resource use; climate change; waste; air pollution; noise and related vibration; and water impacts.

From a planner's perspective, environmental considerations are always taken into account, and at a strategic level there is a push for increased use of more sustainable transport modes to reduce vehicle emissions and fuel consumption. Most attendees cited concerns about estimating carbon emission and fuel use reductions as a result of mode shift to PT and active modes. Different projects will have different impacts so a standardised measure is problematic, while measuring every potential environmental impact would be too costly.

Direct environmental impacts, such as resource use and climate change resulting from carbon emissions, for a single reallocation scheme, are also difficult to quantify. It is more likely the combination of a number of transportation packages and the policy environment in which transport planning operates that will have more a discernible environmental impact. At small spatial scales, direct impacts such as air pollution, noise and vibrations, and water impacts, may be measured. Although monitoring costs may only be justified on larger schemes.

Like population health, environmental impacts were not included in the proposed cost-benefit framework in chapter 6. Direct effects on the surrounding environment are easier to quantify than city or regional transport contributions to emissions and fuel use. Nonetheless, as these issues increasingly become drivers for transport policy and interventions, monitoring and demonstrating reduced environmental effects becomes more important. Based on feedback at the industry workshops and the lack of definitive literature, there is a need to invest in future research on the environmental effect of different transport policies and interventions.

## 5.5 Participant comments on the value of such a framework

At each industry workshop participants were asked 'Would a framework like this help with decision making and/or planning of kerbside parking reallocation projects?' The primary benefit cited was the development of an evidence base that would facilitate better planning and communication of future projects. Reducing some of the misconceptions about the importance of parking to business success was important and participants were interested in measures of satisfaction with and use of new infrastructure to understand what works best on which streets.

*At the moment there is no consistent framework for how councils around the country can approach these projects so having the Transport Agency take a lead role in providing a better quality platform takes some of the pressure off individual councils when they are having these discussions. It is easy to blame the council and currently in Dunedin there is an, at times, very heated debate going on over the costs and benefits of removing parking so some guidance from government is good to have. (Dunedin)*

*Often there is international evidence to show benefits but local New Zealand information would be more relevant and not be discounted. It is important to know the benefits of making a change and the dis-benefits of the impacts on parking and the consequences of removing it. (Wellington)*

*Yes in the context of the spatial planning approach for the roads and streets we are looking at how as an organisation we can develop future documents based on empirical and local data that establishes how things can work because you can't generally challenge data that is out there. (Auckland)*

If an evaluation framework is used consistently across the country the reliance on overseas evidence and academic studies would be reduced and replaced by local evidence that would stand up to scrutiny. It was hoped that better collection of information would also lead to better sharing both within and across council and transport departments. This is particularly important where cost restraints restrict the amount of post-project assessment that can be carried out in smaller centres. These councils rely on best practice examples of successful reallocation projects for their own town centre strategies and planning activities.

*Having a consistent approach to before and after evaluation that was recognised across the whole organisation would not only benefit our projects because we have better information about them but it would benefit the organisation too as all departments would know what is being recorded and have access to it. (Auckland)*

*Something really useful that could come out of this piece of work would be identifying gaps in information that we want to know but don't know how to get. So identifying methodologies for how we can get this information that other people can then take on in their projects like the benefits to businesses using a consistent framework to do this would be really useful. (Wellington)*

*I think that a lot of times we go in and assume that we need to take away parking to improve things but we may not always need to. That is the other side of the coin of having this information available is that it helps us. I think we make a lot of assumptions that it is better for public amenity when in actual fact it might not. (Auckland)*

*Better sharing of information would be helpful, there is obviously good parking information and we have good solid public transport information, maybe a little light on cycling or parts of it, but we are probably all independently doing our own thing so holistically using this data would be good. (Hamilton)*

Having the right information is different from having a lot of information and this is important for developing a best practice approach to kerbside parking reallocation. Where there are unexpected negative effects learnings can be made to fix any problems and avoid them on future projects. It is important to show that the full range of effects have been taken into account and past mistakes acknowledged and learnt from to build a quality relationship between council staff and local business owners and residents. Developing a better evidence base and portfolio of successes is valuable when seeking approval from elected officials, business owners and the public for future reallocation projects.

*It means that we have the right evidence which is different from a lot of evidence. Having the right evidence means there is no wiggly room for politicians to back down if they are under a lot of pressure. Having direct and simple answers that they can use to respond to concerns held by business owners or drivers like 'yes we are removing parking from this spot but there are 2,000 parks around the corner that are only 40% occupied' would be really great. (Dunedin)*

*When we put these projects up to the Council they are going to say 'yes' or 'no'. A better evidence base would make our case much stronger after we have gone through the NZTA process and have to appease local councillors. It is a challenge to make a compelling story.*  
(Hamilton)

## 6 Proposed framework and alignment with current approaches

### 6.1 Proposed kerbside parking evaluation framework

Based on discussion at the industry workshops, the proposed framework of costs and benefits that should be assessed as part of a pre- and/or post-project evaluation is presented below (table 6.1). Most costs and benefits are recommended for evaluation during all types of kerbside parking reallocations. Some costs and benefits are more relevant to some types of project than others and are outlined separately by project type.

**Table 6.1 Proposed kerbside parking reallocation evaluation framework, costs and benefits presented by relevance to project type**

Cost-benefit	Pedestrianised shared spaces and quality urban realms	Cycle infrastructure	Public transport services	Extra vehicle lanes
Travel time	Recommended	Recommended	Recommended	Recommended
Mode share	Recommended	Recommended	Recommended	Recommended
Journey satisfaction	Not recommended	Recommended	Recommended	Not recommended
Existing parking supply	Recommended	Recommended	Recommended	Recommended
Occupancy of existing parking	Recommended	Recommended	Recommended	Recommended
Use of existing parking	Recommended	Recommended	Recommended	Recommended
Capital and operating expenditure	Recommended	Recommended	Recommended	Recommended
Public transport patronage	Not recommended	Not recommended	Recommended	Not recommended
Business income	Recommended	Recommended	Recommended	Recommended
Adjacent land use	Recommended	Recommended	Recommended	Recommended
Crashes and perceptions of safety	Recommended	Recommended	Recommended	Recommended
Pedestrian usage	Recommended	Recommended	Recommended	Recommended
Visitor satisfaction	Recommended	Not recommended	Not recommended	Not recommended

### 6.2 Comparisons with existing approaches

The proposed evaluation framework differs from the EEM by including a number of non-monetary and wider economic factors. In particular, existing parking stock, turnover and use are not explicitly considered in the EEM, and a number of qualitative measures of traveller satisfaction and urban amenity are not captured. As discussed in chapter 5, these elements are either important to the decision-making process when reallocating inner city kerbside parking or are significant outcomes of projects that need to

be better measured or understood (ie post evaluation monitoring enables the relationship between cause and effect to be identified).

This is not a criticism of the EEM as by nature it is intended to evaluate transport packages based on economic costs and benefits. Non-monetary factors are difficult to include in such an evaluation method and are currently included for wider reporting. Economic benefits to local businesses, however, are explicitly omitted to reduce double counting of economic benefits. Internationally we see the development of evaluation frameworks that consider such non-monetary values as direct measures of success, and are assessed alongside monetary costs and benefits of transport interventions. There may be the opportunity for future iterations of the EEM to follow such a shift in evaluating transport projects by including non-monetary costs and benefits, and weighting specific costs and benefits on a project-by-project basis to more closely reflect the priorities of decision makers and stakeholders.

While the EEM does not include some of our proposed factors, the Transport Agency's BCA provides an existing framework to do so when making a business case for reallocation. If the proposed framework presented here is adopted, there is the potential for it to be included in the Transport Agency's BCA Strategic Options Toolkit. This tool helps facilitate the development of a business case by providing suggestions for the type of outcome being sought, potential strategic options that may be explored and strategic interventions that could be implemented. These are all supported by case study examples which detail the costs and benefits of a given transport intervention.

## 6.3 Measuring costs, benefits and contextual elements

This section describes current and potential methods for quantifying and evaluating the individual costs and benefits proposed in our evaluation framework, as well as two factors excluded because of perceived difficulties in assessing them for single projects – population health and environmental impacts. Where possible we draw on currently prescribed techniques used for economic evaluation of transport projects in New Zealand. Where alternative methods were identified in the literature or at the industry workshops, we present these also.

### 6.3.1 Mobility

The two mobility measures included in the proposed evaluation framework are travel time and mode share.

Vehicle travel times are currently measured and valued in New Zealand, primarily through direct measurement or based on outputs from transport modelling. The accuracy of this information is generally reliable and relatively cost effective to capture for an individual project if required. Based on feedback at the industry workshops we recommend that travel time should be measured for non-vehicle modes more frequently, particularly if reallocation is expected to have a positive or negative impact on active transport users. Commuter cyclists in particular were identified as a group that may change their behaviour based on travel time savings. This could be captured by measuring the average time taken for cyclists to pass two fixed points using digital recording equipment.

Secondary datasets can provide an assessment of how mode share has changed on an annual or longer basis. These can be used to demonstrate responses to a range of transport policies and packages, but the frequency of data collection means that data is not timely. The issue of scale means these surveys are relatively ineffective tools for measuring the impact of specific reallocation projects, particularly in large cities. Alternatively, mode share along a route or corridor may be surveyed by counting users across all

modes over time. This approach gives direct representation of changes in travel behaviour related to kerbside parking reallocation, although it is more labour intensive and costly to capture.

### 6.3.2 Accessibility

All of the accessibility measures we present here relate to existing parking in the adjacent area and the impact of reallocation on the remaining stock. Reallocation of kerbside parking will affect current access experienced by drivers and passengers, and may increase the time taken to reach a destination if there is no longer ample convenient parking in the area. We acknowledge that accessibility is important for non-car based modes also, and we believe that elements of these will be captured through alternative factors in the proposed evaluation framework. Mode share is a representation of how accessible a particular route is for users of different modes. Additionally some measures are mode specific, including: PT patronage and pedestrian activity.

Workshop participants stated their councils all have records for the number and type (eg paid, time restricted, unrestricted) of kerbside parks in the inner cities. Some observed this information is occasionally difficult to access across different teams within their organisation, in which case they would conduct their own parking beat surveys to determine stock and use of parking around the project area. Data relating to off-street parking buildings for public and private use is generally very difficult to access, so is traditionally excluded from the evaluation of existing parking supply.

In addition to understanding the quantity of parking supply it is important to observe the efficiency in use of kerbside parking in the adjacent area and the purpose for which people are occupying these spaces. Parking beat surveys can be used to assess both of these elements. For trip purpose, surveys traditionally focus on two core elements: the number of shoppers arriving by car who are shopping at adjacent businesses and the spending habits of these customers. To date this is not information that is regularly collected and assessed, although the PT team in Auckland are currently undertaking this process for large projects where they expect resistance from local businesses. The occupancy and turnover of parking spaces can be via both parking beat surveys and analysis of data from electronic ticketing machines where available.

### 6.3.3 Economic

A primary consideration of any land transport programme or intervention is the estimated whole-of-life capital and operating expenditure. This is important for comparison across different options and to understand how the project fits within the relevant land transport funding allocation. Capital costs of kerbside parking reallocation may include works on the road surface itself, delineation for new lanes, structures such as bus stops and cycle parking, landscaping and street furniture installation. Operating costs will vary between projects depending on the scale and type, for example upkeep of a high-quality pedestrian environment is likely to be more intensive compared with an extra vehicle lane.

PT revenue is becoming more readily available as new contracts with service providers mandate the supply of this information. When reallocation is expected to impact on PT patronage, revenue may be one marker of post-implementation success. PT improvements may have fare recovery targets set for them so there is a need to record revenue from on-board ticketing along particular routes where funding has been allocated. However, it may be difficult to calculate the impact on revenue for a single route unless the scale of the reallocation project is very large.

As cited throughout this research, the effect of kerbside parking reallocation on local businesses is often debated, and in the New Zealand context perhaps not well supported by local evidence. There are a number of reasons for this, primarily because accurate information is difficult to access by council staff.

Relying on disclosure from owners is problematic as they may be reluctant to fully disclose their financial records. Additionally, there is a potential source of bias depending on business owners' personal perceptions of the likely impacts of kerbside parking reallocation nearby. Data is available for electronic transactions in New Zealand. Though these can be difficult to obtain at small spatial scales (due to confidentiality), can be costly to obtain, cover only a proportion of total transactions, and are more appropriate for retail and hospitality spending, compared with wholesale trade where there are fewer electronic transactions. Street intercept surveys are used to estimate spending at a destination between users of different transport modes.

While none of these methods is a perfect solution, most workshop attendees wanted an evidence base for business impacts drawn from New Zealand case studies. Such an evidence base will allow planners and elected officials to make best practice decisions regarding inner city reallocation of parking. It may be possible for future research to examine in depth the effect of some reallocation projects on business vitality. This would require a high level of buy-in from owners, and need to take place in a range of settings. Even still, feedback from workshop participants suggested that in many cases it is evidence from their city only that will satisfy local stakeholders so there may be limited value in such an exercise.

Land use was cited at the industry workshops as being relatively easy and cheap to monitor over time compared with land values (see discussion in section 5.4.13). The effect of kerbside parking reallocation on the surrounding neighbourhood can be evaluated based on land use elements such as new development on unoccupied land, changes in type of activities taking place on adjacent land, changes in vacancy rates of surrounding buildings, and agglomeration of activities such as hospitality and retail businesses following urban realm improvements. Much of this can be monitored by council through direct observation and consent records that they process.

#### 6.3.4 Safety and health

Crash data is currently accessible from the CAS. Major benefits of this source are the ease of access and free extraction of geocoded crash records. CAS information can be monetised for inclusion in economic efficiency calculations using standardised values for crash severity. Participants at each workshop discussed the need for wider measures of safety beyond just reported crashes. Because CAS does not effectively capture near-misses and non- or minor-injury crashes, there is a need to supplement evidence with qualitative measures of safety perceptions. User perceptions of safety are more difficult to quantify, but they are important for informing new infrastructure decisions and are likely to influence the number of new trips made by active transport users in particular.

Population health is currently quantified in economic efficiency calculations for transport projects in New Zealand. The EEM prescribes a composite benefit of \$2.70 per pedestrian per km of new pedestrian facility or \$2.70 per pedestrian for a specific site improvement. The composite benefit for cyclists is \$1.45 per cyclist per kilometre of new facility or \$4.35 per cyclist for a specific site improvement (NZ Transport Agency 2013c). These rates are in line with similar methods used in a number of other countries. This approach does not consider disbenefits to health arising from projects that reduce the number of active transport users such as extra vehicle lanes.

#### 6.3.5 Environment

Environmental impacts are a cost-benefit that all attendees rated highly in terms of importance for decision making. It was the general consensus that there needs to be greater investment made in capturing or modelling the effects of transportation projects on the environment. This is particularly important with regards to factors relevant to climate change, as this underlies many sustainable transport policies and strategies. However it was also acknowledged that the small scale of some parking

reallocation projects could make accurately estimating the environmental effects challenging. Current economic evaluation approaches in New Zealand include a number of environmental factors such as air quality, greenhouse gases, noise and vibration, water quality and landscape impacts.

### 6.3.6 Urban amenity and transport quality

Journey satisfaction data is currently collected in some New Zealand towns and cities via resident surveys, and targeted transport perception surveys. However these are not project specific and are therefore unable to be used to assess the effect of a particular infrastructure improvement. Depending on the purpose and scale of reallocation, residents' surveys can be an effective method to target a geographic subset of individuals. It was recognised that if a project specific survey was required, the survey tools to collect this data are cost effective and reliable.

The costs and benefits to pedestrians resulting from reallocation may be measured through intercept surveys and behavioural observations in an area. Pedestrian counts and use of the space can be assessed easily through passive observation. Pedestrian footfall is an indicator of the attractiveness of an inner city destination and relates to business vitality.

Street intercept surveys are an effective method for identifying the transport mode pedestrians use to arrive at a street or the central city, the purpose of their visit to a street, and, in the case of shoppers, the average spend on the street of interest and the wider city. Central city spending by different transport mode user groups is largely an unknown value, which is important to understand in the context of kerbside parking reallocation.

User satisfaction can be gathered via street intercept surveys in the project area as well as resident opinion surveys that are carried out less frequently and are not usually focused on a specific project. Both are accurate measures of public satisfaction but at different scales. Street intercept surveys provide direct insight into user satisfaction at the micro-scale, such as with street furniture, while resident opinion surveys allow council staff to receive feedback more generally on satisfaction with the direction they are taking across a range of projects. In Auckland, geographic targeting of residents' survey participants has previously been used to gauge localised reaction to parking reallocation.



## 7 Conclusions and recommendations

### 7.1 Key overall findings from this research

- 1 The benefits of reallocating corridor space to uses other than kerbside parking are widely recognised within the transport and planning sector. Reallocation of inner city kerbside parking can, when implemented in the right settings, deliver benefits for network optimisation, the safety of active mode users and motorcyclists, multi-modal transport systems, integrated transportation and land use planning, and quality urban environments. These can be achieved by outcomes such as reduced travel time for all, or a particular, transport mode, fewer injuries to cyclists from crashes, increased transport options for users, and better urban realms that attract visitors and shoppers. The primary barrier to change is therefore not a lack of understanding of the potential costs and benefits of kerbside parking reallocation, but common misconceptions held by the public and media that can influence decision makers.
- 2 There is a growing body of overseas evidence for the costs and benefits of kerbside parking reallocation. However, in New Zealand there is limited local evidence in a range of contexts that planners can draw upon when engaging with project stakeholders. These groups, such as business owners, local residents and car drivers, can be sceptical about the relevance of overseas examples and evidence in their local context. There is therefore a need to develop a local evidence base of the positive and negative effects kerbside parking reallocation has on different groups in New Zealand. This needs to be based on robust pre- and post-project evaluation that is carried out in a consistent manner across New Zealand so findings can be compared between places. Such an evidence base would help to overcome misconceptions, improve decision making, deliver evidence of the effectiveness of parking removal as a 'lever' for achieving transportation and land use benefits, assess whether the stated project goals have been achieved and provide examples of best practice.
- 3 Current evaluation methodologies for transport projects, including the Transport Agency's BCA and EEM, capture some monetary and non-monetary costs and benefits associated with kerbside parking reallocation. Where non-monetary factors are excluded from cost-benefit analysis in the EEM, they are often reported as potential costs and benefits in the wider business case. None of these methodologies explicitly include measures of kerbside parking as a use of road space to consider when modifying the transport environment. Furthermore, these methodologies omit factors that industry experts believe are important to understand when identifying the impacts of parking removal, namely the impacts on inner city parking availability, adjacent businesses and residents, journey satisfaction and the quality of the central city environment.
- 4 A conceptual framework for evaluating the costs and benefits relating to kerbside parking reallocation projects was developed and tested on industry experts. This framework includes factors that are important to evaluate for all kerbside parking reallocation projects, and a further subset that is most relevant only when reallocating for specific new uses of the space. The proposed evaluation framework is set out in section 6.1.
- 5 The conceptual framework includes a wider range of costs and benefits, as well as contextual factors (such as parking supply in the vicinity), than are currently included in evaluation tools utilised by the Transport Agency. We identified that the costs and benefits, and contextual factors presented here could be aligned with the existing BCA Strategic Options Toolkit provided by the Transport Agency. Including a wider range of costs and benefits in the evaluation of transport interventions follows

international examples, where both monetary and non-monetary factors are weighted and assessed within the same calculations of economic efficiency.

- 6 Through the industry workshops and evaluation of existing evaluation frameworks we identified a range of methods for measuring the factors in the proposed evaluation framework. There are, however, a number of issues constraining local authorities from effectively assessing the full range of costs and benefits. Building a wider New Zealand evidence base may help to alleviate these difficulties for councils where it is not practical to assess each factor before and after reallocation has taken place. These include:
  - a Cost: it may only be practical or cost effective to survey users and carry out extensive parking beat surveys for large or contentious projects. Small projects or those that are unopposed are less likely to warrant investment in collecting this information.
  - b Scale: first, it can be awkward to claim that a single project is solely responsible for improving travel times for example, and second, data may only be available for the whole city and not along the specific route affected by parking removal.
  - c Timeliness: data collection is a problem when data is collected via secondary surveys that may be conducted infrequently.
  - d Hard to measure: the impact of kerbside parking reallocation on factors like population health and the environment are important to understand, but presently are problematic to measure at the scale of a single project.
  - e GIS tools: Spatial information is used by planners to inform the planning, evaluation and design of transport projects, but further work is required to collate data in a way that facilitates better visualisation and communication with stakeholders.
- 7 Feedback on the value of this proposed evaluation framework from expert stakeholders at the industry workshops held during this research was very positive. Consistently evaluating kerbside parking reallocation against the same set of costs and benefits, and contextual elements, across New Zealand is expected to reduce misconceptions about negative impacts on businesses, provide a robust evidence base for the net benefits of reallocation, reduce reliance on overseas and anecdotal evidence and contribute to best practice decision making for future reallocation projects.

## 7.2 Potential limitations of this work

- *Literature review and case study examples:* The case studies used to develop the draft list of kerbside parking reallocation costs and benefits were largely restricted to previous New Zealand projects and some overseas examples. It is possible with a broader review that included a wider range of international examples from both English, and non-English speaking cities, more costs and benefits would have been identified. However, a New Zealand focus was considered the best approach for identifying costs and benefits that would be most relevant to the local context. Additional items were also added to the draft list of costs and benefits by the Steering Group members and participants at the industry workshops.
- *Bias in views represented at the industry workshops:* The industry workshops were largely attended by transport professionals working for the local authority, while private consultants and advocacy groups were also represented at some of the workshops. It is possible that the individuals invited to participate may have held preconceived ideas about the effect of reallocating kerbside parking on transport users and stakeholders. At each workshop there was a range of disciplines and given the

alignment in opinions expressed across the workshops we are satisfied that participants were fair in their responses. Kerbside parking reallocation was considered a valuable tool/lever by most participants, but each workshop expressed the need to take a best practice approach to ensure the risk of unnecessary or unexpected negative effects are minimised.

### 7.3 Recommendations for evaluation of inner city kerbside parking reallocation

The following future work priorities are recommended:

- Put the findings of this work into practice for the assessment of upcoming kerbside parking reallocations in different New Zealand cities. Much of the costs and benefits are already considered for planning and evaluation of projects, but rigorous assessment of the current use of parking and the impact of reallocation on different stakeholders, including businesses, is lacking. Considering these effects of reallocation more explicitly from the beginning, rather than a retrospective assessment, is an important next step for evaluation of these projects and will lead to better quality planning and design. The economic effect of kerbside parking reallocation has previously been studied on behalf of the Transport Agency and does not need to be repeated. This recommendation encourages local authorities themselves, perhaps supported by the Transport Agency, to assess the localised effects of reallocation on their future projects as a best practice approach.
- Identify the best format to provide the proposed evaluation framework in the format of a best practice guide for project managers and decision makers. In this report we cite the BCA Strategic Options Toolkit as a potential existing option, although there may be other appropriate channels for implementation.
- Further research is required to better understand and quantify the impact of transportation projects on environmental and population health outcomes. This is not specific to kerbside parking reallocation only, but all projects and policies that could reasonably be expected to have an effect on these.
- Investigate whether a future iteration of the EEM should more explicitly include non-monetary factors and factor stakeholder weighting of individual factors for different projects. This is likely to have benefits for the evaluation of a wide range of transport policies and interventions not just kerbside parking reallocations.

## 8 References

- 3News NZ (2014) *Should Auckland follow in New York's footsteps?* Campbell Live 2 June 2014. Accessed 26 August 2015. [www.3news.co.nz/tvshows/campbelllive/should-auckland-follow-in-new-yorks-footsteps](http://www.3news.co.nz/tvshows/campbelllive/should-auckland-follow-in-new-yorks-footsteps)
- AECOM (2011) *Beach road cycle facilities. Project feasibility report – final report*. Prepared for Auckland Transport. Auckland
- Allatt, TF, S Turner, and L Tarjomi (2013) Reallocation of road space. *NZ Transport Agency research report 530*.
- Auckland Transport (2014a) *Draft Auckland parking discussion*. Auckland: Auckland Transport.
- Auckland Transport (2014b) *Parking discussion document update*. Auckland: Auckland Transport. Accessed 26 August 2015. <https://at.govt.nz/media/873689/Item-108-Parking-Discussion-Document-final.pdf>
- Auckland Transport (2015) *Auckland Transport parking strategy*. Auckland: Auckland Transport.
- Barclay Traffic Planning (2012) *Policy review for the operation of central area parking meters*. Prepared on behalf of Wellington City Council. Wellington.
- Beetham, J (2014) *Re-cycling the streets: exploring the allocation of public space for transport*. Wellington: Victoria University of Wellington.
- Bell, A and J Darlington (2012) *City centre future access study*. Report prepared for Auckland Transport. Auckland: Sinclair Knight Merz.
- Ben Parsons and Associates (2013) *Beach Road upgrade: Feedback from consultation*. Prepared for Auckland Transport. Auckland.
- Cairns, S, S Atkins and P Goodwin (2002) Disappearing traffic? The story so far. In *Institution of Civil Engineers – Municipal Engineer 151*, no.1: 13–22.
- Canterbury Earthquake Recovery Authority (2013) *An accessible city – Christchurch Central recovery plan: replacement transport chapter – October 2013*. Christchurch: Canterbury Earthquake Recovery Authority.
- Carmine, N and J Williamson (2012) *An evaluation of shared space in the Fort Street Area, Auckland, New Zealand full report – July 2012*. Prepared for Auckland Council. Auckland.
- Chapman, K (2014) *Call for all councillors to decide on cycleway*. Wellington. Accessed 26 August 2015. [www.stuff.co.nz/dominion-post/news/wellington/10164872/Call-for-all-councillors-to-decide-on-cycleway](http://www.stuff.co.nz/dominion-post/news/wellington/10164872/Call-for-all-councillors-to-decide-on-cycleway)
- Cycle Action Auckland (2010) Lake Rd. Accessed 26 August 2015. <http://caa.org.nz/key-projects/lake-rd/>
- Cycling Safety Panel (2014) *Safer journeys for people who cycle. Cycling Safety Panel final report and recommendations*. Wellington: NZ Transport Agency.
- Davis, A (2010) *Value for money: an economic assessment of investment in walking and cycling*. Prepared for the Department of Health, United Kingdom.

- Dutzik, T and T Masden (2013) *A new way to go: the transportation apps and vehicle-sharing tools that are giving more Americans the freedom to drive less*. US PIRG Education Fund Frontier Group.
- Edquist, J, C Rudin-Brown, and M Lenne (2012) The effects of on-street parking and road environment visual complexity on travel speed and reaction time. *Accident Analysis & Prevention* 45: 759–765.
- Frith, B, K Mara and J Langford (2012) Demand for transport services: impact on networks of older persons' travel as the population of New Zealand ages. *NZ Transport Agency research report 481*.
- Genter, J, S Donovan, B Petrenas and H Badland (2008) Valuing the health benefits of active transport modes. *NZ Transport Agency research report 359*.
- Greater Wellington Regional Council (2010) *Wellington regional land transport strategy*. Wellington: Greater Wellington Regional Council.
- Hamilton City Council (2014) *Proposed district plan: central city zone*. Hamilton: Hamilton City Council.
- Invercargill City Council (2011) *Invercargill city centre outline action plan*. Discussion document. Invercargill: Invercargill City Council.
- Jaffe, E (2015) *The complete business case for converting street parking into bike lanes*. Accessed 26 August 2015. [www.citylab.com/cityfixer/2015/03/the-complete-business-case-for-converting-street-parking-into-bike-lanes/387595/](http://www.citylab.com/cityfixer/2015/03/the-complete-business-case-for-converting-street-parking-into-bike-lanes/387595/)
- Lee, A (2008) *What is the economic contribution of cyclists compared to car drivers in inner suburban Melbourne's shopping strips?* Melbourne: University of Melbourne.
- Marsden, G (2006) The evidence base for parking policies – a review. *Transport Policy* 13, no.6.
- Ministry for the Environment (2005) *New Zealand urban design protocol*. Wellington: Ministry for the Environment.
- Morris, C (2013) *Worries of businesses hit cycleway*. Accessed 26 August 2015. [www.odt.co.nz/news/dunedin/265074/worries-businesses-hit-cycleway](http://www.odt.co.nz/news/dunedin/265074/worries-businesses-hit-cycleway)
- MRCagney Pty Ltd (2013) *The economic impacts of parking requirements in Auckland*. Report prepared for Auckland Council. Auckland.
- New Zealand Government (2014) *Government policy statement on land transport 2015/16 – 2024/25*. Wellington.
- North Shore Times (2008) *Bike lane battle brews*. Accessed 26 August 2015. [www.stuff.co.nz/auckland/500933](http://www.stuff.co.nz/auckland/500933)
- NZ Transport Agency (2010) *Economic evaluation manual* (Volume 2). Wellington: NZ Transport Agency.
- NZ Transport Agency (2013a) *Bridging the gap: NZTA urban design guidelines*. Wellington: NZ Transport Agency.
- NZ Transport Agency (2013b) *Business case approach to transport planning and project development: a guide*. Accessed 26 August 2015. [http://hip.nzta.govt.nz/\\_\\_data/assets/pdf\\_file/0011/42041/14223\\_NZTA\\_BusinessCaseApproach\\_final.pdf](http://hip.nzta.govt.nz/__data/assets/pdf_file/0011/42041/14223_NZTA_BusinessCaseApproach_final.pdf)
- NZ Transport Agency (2013c) *Economic evaluation manual*. Wellington: NZ Transport Agency.
- NZ Transport Agency (2013d) *Taranaki St to The Terrace tunnel: urban transport improvements*. Wellington: NZ Transport Agency.

- NZ Transport Agency (2014) *How the NZ Transport Agency optimises the NLTP*. Wellington: NZ Transport Agency.
- NZ Transport Agency (2015a) *One network road classification*. Accessed 26 August 2015. [www.nzta.govt.nz/projects/road-efficiency-group/onrc.html](http://www.nzta.govt.nz/projects/road-efficiency-group/onrc.html)
- NZ Transport Agency (2015b) *Business case approach*. Accessed 26 August 2015. [www.nzta.govt.nz/planning/process/approach.html](http://www.nzta.govt.nz/planning/process/approach.html)
- NZ Transport Agency (2015c) *Business case approach to transport planning and project development*. Accessed 3 September 2015. [www.nzta.govt.nz/assets/Planning-and-investment/docs/HNO-Business-Case-Web.pdf](http://www.nzta.govt.nz/assets/Planning-and-investment/docs/HNO-Business-Case-Web.pdf)
- NZ Transport Agency and Dunedin City Council (2014a) *SH1 cycle lanes parking study*.
- NZ Transport Agency and Dunedin City Council (2014b) *Submissions summary report on Dunedin separated cycle lane options*.
- Rive, G, J Thomas, C Jones, B Frith and J Chang (2014) Public transport and the next generation. *NZ Transport Agency research report 569*.
- Robertson, J (2013) *Lower Cuba Street upgrade outcomes evaluation*. Prepared for Wellington City Council. Wellington.
- Rotorua District Council (2015) *Inner city revitalisation strategy: a community view tatau tatau – we together*. Rotorua: Rotorua District Council.
- Roy Morgan Research (2013) *Senior drivers overtake 25–43 year-olds on NZ roads*. Accessed 26 August 2015. [www.roymorgan.com/findings/5245-nz-senior-drivers-overtake-younger-drivers-august-2013-201310152136](http://www.roymorgan.com/findings/5245-nz-senior-drivers-overtake-younger-drivers-august-2013-201310152136)
- Seba, T (2014) *Clean disruption of energy & transportation*. California, USA.
- Shoup, D (2007) Cruise for Parking. *Access (20)*: 16–22
- Smith, K (2009) Network operations planning framework. *Austroads Research Report no. AP-R338/09*.
- Thornton, S, F Fleming, R Burra and D Dunlop (2009) *Restoring the golden mile – Taranaki Street to Willis Street. Final evaluation report*. Prepared for Wellington City Council. Wellington.
- Tindill, M (2011) *Lower Cuba St – shared space or road for cars?* Accessed 26 August 2015. [www.stuff.co.nz/dominion-post/news/local-papers/the-wellingtonian/5282525/Lower-Cuba-St-shared-space-or-road-for-cars](http://www.stuff.co.nz/dominion-post/news/local-papers/the-wellingtonian/5282525/Lower-Cuba-St-shared-space-or-road-for-cars)
- Transit New Zealand, Environment Canterbury and Christchurch City Council (2007) *Everybody wins when the bus comes first*. Christchurch.
- Transport for London (2011) *Town centre study 2011*. London: Transport for London.
- ViaStrada Ltd (2008) *Lake Road cycle options*. Prepared for North Shore City Council. North Shore.
- ViaStrada Ltd (2010) *Christchurch City goes green*. Accessed 26 August 2015. <http://viastrada.nz/project/2010/christchurch-city-goes-green>
- ViaStrada Ltd (2013) *Dunedin central city cycling options*. Prepared for The Joint Dunedin City Council/NZ Transport Agency Inner City Cycle Safety Working Group.
- Waitakere City Council (2009) *Totara Avenue (west) preliminary design report*. Waitakere: Waitakere City Council.

- Webb, P (2014) *Retailers rally against cycle lanes*. Accessed 26 August 2015. [www.stuff.co.nz/dominion-post/news/local-papers/the-wellingtonian/10251619/Retailers-rally-against-cycle-lanes](http://www.stuff.co.nz/dominion-post/news/local-papers/the-wellingtonian/10251619/Retailers-rally-against-cycle-lanes)
- Wellington City Council (nd-a) *Cuba St & Manners St parking survey summary*. Wellington: Wellington City Council.
- Wellington City Council. (nd-b). *Lower Cuba Street shared space design information*. Wellington: Wellington City Council.
- Wellington City Council (2006) *Transport strategy: providing quality connections*. Wellington: Wellington City Council.
- Wellington City Council (2007) *Parking policy September 2007*. Wellington: Wellington City Council.
- Wellington City Council (2009a) *Restoring the golden mile*. Wellington: Wellington City Council Strategy and Policy Committee.
- Wellington City Council (2009b) *Thorndon Quay – proposed cycle improvements*. Wellington: Wellington City Council Strategy and Policy Committee.
- Wellington City Council (2010a) *Public space design policy*. Wellington: Wellington City Council.
- Wellington City Council (2010b) *Thorndon Quay – proposed parking changes*. Wellington: Wellington City Council Strategy and Policy Committee.

## Appendix A: Industry workshop summaries

### A1 Wellington

Nine participants took part in this workshop from the following organisations:

- Wellington City Council
- Greater Wellington Regional Council
- Cycle Advocates Network
- Automobile Association
- Opus International Consultants.

A range of disciplines were represented on the day including transport planners, transport researchers, active and PT planners, parking management and local representatives for cycle and vehicle advocacy groups. All participants had some level of knowledge and/or experience with kerbside parking reallocation projects in Wellington city.

#### A1.1 What are the main drivers of kerbside parking reallocation projects in Wellington?

Attendees stressed the important of road network function and the hierarchy of roads when planning for reallocation of road space. The role an individual street has in the wider network and the productive goals associated with the corridor are perhaps the most influential driver of kerbside parking reallocation projects.

*Reallocation is relevant to the network function and hierarchy of roads, .removing parking for cycle lanes on one route may be appropriate but not on another route. Looking at the function and priorities of roads is important when considering the drivers of reallocating that space.*

A number of drivers for reallocation projects were cited by participants with variation evident depending on the type of reallocation being discussed, eg PT, cycle facilities or urban realm.

PT (bus) improvements are likely to be driven by travel time considerations and reliability of the service. This takes place within over-arching local policy that aims to increase PT patronage and reduce the number of commuters arriving in the central city by car.

*If local transport policy is to do x then you look for opportunities to undertake a project, so transport strategy is likely to be an early consideration or driver and a part of making the case to decision makers, but the wider factors identified in the framework become important in justifying this project as the best option for achieving said goals.*

Cycle facilities are generally built to improve the safety for cyclists on the road network and in turn to encourage new users of this mode. Mobility is also a factor in Wellington where hilly terrain can be discouraging, and preferred cycle routes may not necessarily be the shortest distance but may offer an easier journey.

Walking, shared spaces and urban realm will be built at the expense of kerbside parking for economic factors. Building more pedestrian friendly spaces is expected to increase business vitality in the adjacent area by attracting more foot traffic.



All participants felt that a major driver of kerbside parking reallocation projects is environmental impacts as consideration of current and future impacts shapes transportation policy at a national and local level.

*Environmental impacts. Underlying a lot of these projects are concerns around climate change and carbon emissions. They may not be direct drivers but developing better public and active transport networks are undertaken to achieve this. We should be measuring and quantifying the direct impact on emissions from projects like this.*

*In reality environmental impacts are not driving reallocation projects, but they should. Across the political spectrum the focus is often on economics and what the costs or benefits will be to different groups.*

## A1.2 What are the challenges to reallocation of kerbside parking in Wellington?

Opposition from local businesses often receives the most attention in the media and is subsequently a common reason for elected officials to be wary of or opposed to supporting projects that propose removal or reallocation of kerbside parking.

*There is an underlying assumption that probably needs to be questioned that people come to shop by car whereas if you put in facilities for one bus stop this will bring a lot more people than one car park.*

## A1.3 Comments on costs and benefits in the proposed framework

Project scale was discussed among attendees as this is likely to dictate the level of evaluation required on a specific project. For example 'large projects will have a bigger impact on the network and need to be much more comprehensive than a small scheme that has minimal disruption'.

For PT, reliability of travel time was considered to be just as important to measure as travel time itself. In other words, installing new bus lanes to reduce travel time by a certain level is not a worthwhile investment if journey time reliability is inconsistent. Bus lanes that are not continuous were cited as an example of where the full benefit of the lane has not been realised because parking has been retained in some places for various reasons forcing buses back into traffic lanes.

Where new cycle infrastructure is installed it may not always be in response to reported crashes but rather to increase the perceived safety of cycling on a particular route.

*One thing that a cycle lane achieves is perceived safety along with actual safety. Perceived safety is important to getting people to change their behaviour and actually use a route, this is a different measure to actual safety.*

Business owners should be included in measures of 'User satisfaction' as they are often a very vocal group opposed to the removal of kerbside parking. However, the removal of parking in many instances has been shown to benefit businesses after construction. It is important to record any change in attitudes from previous projects to help convince decision makers of the value of future projects and also to try and change this potential misconception among the public and media.

Population health was considered to be an important yet broad and difficult to quantify factor. Current evaluation using the EEM was considered inadequate in quantifying the actual benefits to health reallocation of active transport modes. It is difficult to get data on 'how can improvements to population health from a single project be measured?' It is particularly challenging to quantify in small areas or for

small projects. 'A per km benefit does not take into account the benefits to population health of encouraging new active transport users or a behaviour shift.'

*Whether data is readily available for a measure is often based on a subjective opinion of how important it is. Our current thinking that it is not worth gathering data on carbon emissions leads to it not being available and is based on past assumptions when we know that this is going to be important in the future and actually already is now. The thinking may need to change and investment be put into collecting data so that we can better evaluate the impacts of decision making on the environment.*

## A1.4 Group task one

Table A.1 presents the group consensus for the relative importance of measuring each cost and benefit in the proposed framework as part of a pre- and post-evaluation process for different kerbside parking reallocation schemes. Specific comments and discussion points for each cost and benefit are described below:

### A1.4.1 Travel time

Measures of travel time were discussed as an easy way of measuring and communicating the expected effects of kerbside parking reallocation on specific modes. As a group it was decided that travel time is more important to factor into PT, cycling and vehicle focused reallocation as it is likely to have an impact on user's willingness to travel by each mode. Measuring travel time for pedestrian focused reallocation for shared spaces and urban realm improvements was not considered to be as important, although it may be of interest to measure the potential effect on other modes if the scheme will increase travel time to destinations as a result.

### A1.4.2 Mode share

It is important to understand how mode share has changed as a result of projects though less so for walking and shared spaces as they may not change the mode in which people travel to the destination. There were mixed views surrounding the importance of measuring mode share when building extra vehicle lanes – some felt this type of project would not have much impact on mode share while others felt it was important to measure as there may be an adverse effect of taking users away from public and active transport modes.

### A1.4.3 Journey satisfaction

Journey satisfaction was considered an essential measure of project success as 'there is no point undertaking projects if the intended users are not satisfied with it'. This type of information is important to have on hand when building a case for similar reallocation projects in the future. Participants considered reliability of travel part of this factor which made it especially important for PT projects and vehicle lanes that have presumably been built to improve travel times for these modes. Journey satisfaction for cyclists would include route elements such as directness, type of infrastructure, elevation and amenity.

### A1.4.4 Vehicle operating costs

'Useful at best' was a comment that summed up participants' views on vehicle operating costs when measuring the costs and benefits of reallocation. Other factors such as travel time are more helpful measures. It may be useful for PT operators if operating costs reduce but as a group it was considered an unnecessary piece of information for other modes.

#### **A1.4.4 Mode choice availability**

It is essential to quantify the availability of cycle and PT infrastructure by geographic areas and for different social groups to ensure equity in access to a variety of transport options for all groups. It is less important for walking, shared spaces and urban realm improvements as this does not necessarily create new or alternative transport options to reach a destination. Similarly for extra vehicle lanes it is unlikely there are destinations accessible by all modes except for private vehicles.

#### **A1.4.5 Parking supply**

It is essential to quantify the existing parking stock in the area before and after reallocation takes place for all project types because parking loss is a highly political issue. Off-street parking stock should be an important factor in this reporting as the links between on- and off-street parking are not well understood and it is possible that removal of kerbside parking in one location will be offset by higher occupancy in kerbside parking on adjacent streets and more vehicles parking in off-street structures.

*If you are making a case to remove parking you need to know what stick is there already and what will be available after the change.*

NB: following the Wellington workshop this cost-benefit factor was renamed 'Existing parking supply' for the remainder of the industry workshops.

#### **A1.4.6 Utilisation of existing parking**

It is important to measure and report on how the existing parking stock is currently being used and the turnover or efficiency of parking spaces. What car occupants are doing while in kerbside spaces is an important knowledge gap that needs to be filled in New Zealand as international evidence suggests business owners' belief that kerbside parking outside their door is vital to their economic success may be misguided.

NB: following the Wellington workshop this cost-benefit factor was split into two new measures 'Occupancy of existing parking' and 'Use of existing parking' for the remainder of the industry workshops.

#### **A1.4.7 Capital and operating expenditure**

Knowledge of capital and operating expenditure is essential for all projects when making a business case.

#### **A1.4.8 Parking revenues**

Parking revenue is 'fully loaded from the council's perspective' and is an essential factor to be evaluated when proposing removal of parking.

#### **A1.4.9 Public transport revenues**

'Increasing or decreasing patronage will impact on the bottom line but it is not going to be a major driver of projects.' It is useful to know if installing extra vehicle lanes will negatively impact on PT revenues but 'mode share of PT patrons is probably a more powerful measure'.

#### **A1.4.10 Business income**

Business income is essential information for all reallocations of inner city kerbside parking 'particularly given the politically charged debate that can occur around removal of central city car parking' and 'is needed to justify current or past projects and to build a case for future projects, it is important to identify both positive and negative outcomes'.

#### **A1.4.11 Surrounding land use and value**

'Often PT, cycling, and shared spaces are built with benefits to the surrounding area promoted so measuring this is important.' This could be a rise in rents and values, lower vacancy rates and a change in

the types of business located in the adjacent area. Again it is important to identify negative or unintended effects.

#### **A1.4.12 Crashes (non- injury, injury, fatal)**

There was a mixture of opinions for this measure, with some of the group feeling crashes are an important factor to be measured before and after any transportation project. However in the context of reallocation, participants decided it was more important for walking and cycling modes than PT and vehicle-related infrastructure.

#### **A1.4.13 Population health**

Population health is a useful measure of the benefits of moving users to active transport modes along with PT given the links to walking and cycling. It is a benefit that some of the group believe is going to become increasingly important to take into account in the future and something that should be measured though how this would be done is unclear and potentially prohibitively expensive given the scale of many reallocation projects.

#### **A1.4.14 Usage assessment**

Usage assessment is 'essential for walking spaces only'; however, how space is being used is better addressed by other measures for the three other types of reallocation as 'they are more about the journey to a destination' rather than behaviours at the destination which is where pedestrian usage of the space becomes important to know.

#### **A1.4.15 User satisfaction**

User satisfaction is essential information for walking spaces and as discussed for journey satisfaction 'if we do things and don't satisfy the public then why are we doing it? It is important to know, absolutely essential'.

#### **A1.4.16 Environmental impacts**

'Like population health, these [environmental effects] are difficult to measure especially if we are talking about removing just a couple of parks.' Even on large projects it may be difficult to quantify things like carbon emissions while potential adverse effects from noise and vibrations would probably be investigated.

Some attendees stated that despite the difficulties it should be essential to include environmental effects related to carbon emissions as reducing them is likely to become a more important transport goal. Reducing carbon emissions is something that will be achieved through a number of projects but 'I don't know how you would measure the effect of a single project' as effects are likely to be monitored on a city or regional scale. Including these types of costs and benefits will become increasingly important when making transport project business cases in the future.

#### **A1.4.17 Strategic transport goals**

It is essential to ensure a project fits with local transport goals from the outset otherwise it is unlikely to succeed.

**Table A.1 Wellington workshop consensus of the relative important of the proposed costs and benefits related to kerbside parking reallocation projects**

Theme	Costs and benefits	Public transport	Cycling facilities	Walking, shared spaces & urban realm	Extra vehicle lanes
Mobility	Travel time	Essential	Essential	Useful	Essential
	Mode share	Essential	Essential	Useful	Essential
	Journey satisfaction	Essential	Essential	Useful	Essential
	Vehicle operating costs	Useful	Unnecessary	Unnecessary	Unnecessary
Accessibility	Mode choice availability	Essential	Essential	Useful	Useful
	Parking supply	Essential	Essential	Essential	Essential
	Utilisation of existing parking	Essential	Essential	Essential	Essential
Economic	Capital and operating expenditure	Essential	Essential	Essential	Essential
	Parking revenues	Essential	Essential	Essential	Essential
	Public transport revenues	Useful	Useful	Useful	Useful
	Business income	Essential	Essential	Essential	Essential
	Surrounding land use and value	Essential	Essential	Essential	Useful
Safety and health	Crashes (non-injury, injury, fatal)	Useful	Essential	Essential	Useful
	Population health	Useful	Useful	Useful	Unnecessary
Urban amenity	Usage assessment	Useful	Useful	Essential	Unnecessary
	User satisfaction	Useful	Useful	Essential	Useful
Environmental	Environmental impacts	Useful	Useful	Useful	Useful
Other	Strategic transportation goals	Essential	Essential	Essential	Essential

## A1.5 Group tasks two and three

Table A.2 presents the group consensus from tasks two and three. These saw participants comment on whether the costs and benefits in the proposed framework are currently measured and evaluated (task two) and if the required data/information to quantify these costs and benefits is readily available, cost effective to access/collect and reliable information (task three). Specific comments and discussion points for each cost and benefit are described below:

### A1.5.1 Travel time

Larger projects are more likely to have a significant impact on the transport network so travel time modelling and estimates will be an important part of the planning for these and some small projects will be run through the model to see what the effects will be. Estimates before the reallocation takes place provide a good benchmark for post-project evaluation of success.

Participants agreed that if you are prepared to pay the money to use this modelling then the project is obviously expected to benefit from it and so it is considered cost-effective information to obtain. For the most part these models are reliable and can be validated through post-project assessment. Currently only vehicle and PT modes are included in the Wellington Transport Strategy Model and the Wellington Public Transport Model.

### A1.5.2 Mode share

Mode share is collected year on year but not often for individual projects as it is costly and difficult to do frequently. It is also hard to say that a specific reallocation project has contributed to a change in mode share. It may impact on modes using that street but has there been an impact on mode share in the wider network? Along a section of road, eg the proposed Island Bay to CBD cycle route there is a rough idea of what the current mode share is and for a large project like this evidence of a change in modes or at least an increase in cycling along the route will be gathered.

As for travel time, mode share changes can be modelled and supplemented by census data and household travel survey data to validate modelling of city-wide mode share shifts.

### A1.5.3 Journey satisfaction

PT perception surveys and resident surveys are carried out annually to cover elements of satisfaction with transportation; however, these are city-level measures of satisfaction and do not focus on a specific transportation or urban design project. On a case-by-case basis there was no recollection among participants of post-project evaluation of users' journey satisfaction.

Measures of journey satisfaction require surveying so are not readily available but these are relatively cost-effective to collect and using good surveying techniques ensures reliability.

### A1.5.4 Vehicle operating costs

Vehicle operating costs are calculated using a formula set out in the EEM so vehicle-focused projects that have followed this procedure will use this, but the formula is not included in PT and walking and cycling worksheets.

The calculations in the EEM are based on travel time data supplied from modelling; however, participants did not think the output is a reliable measure for cost-benefit analysis.

### A1.5.5 Mode choice availability

Mode choice availability is sometimes assessed, 'it is apparent what infrastructure is located where' and there may be some modelling done, eg how many new users living in the surrounding area will benefit from reallocation of parking to a cycle lane.

The location of transport network facilities and routes are known and easy to get hold of, similarly population data is readily available for areas surrounding the reallocation site.

#### **A1.5.6 Parking supply**

Projects that will remove or modify kerbside parking will always look at the existing stock, how it is managed, type, eg pay and display, time limited and disability parking. A lot of information about off-street parking owned privately is unknown.

Where the council holds this data, it is applied to the assessment of projects.

#### **A1.5.7 Utilisation of existing parking**

Although the turnover of on-street parking spaces can be, and is, looked at on inner city streets, off-street parking is largely an unknown from the council's perspective. 'Utilisation is always measured for on-street parking only, while purpose is only examined sometimes and rarely on a project basis. The actual purpose of the trip to that park is not and that would be useful for many reallocation projects when there are concerns from local businesses.' The lack of knowledge around off-street parking utilisation is a problem especially if you expect off-street parking to offset losses from on-street reallocation.

*This factor may need to be modified to look at turnover and who is using the parking or for what purpose separately.*

While the council has occupancy and turnover data, little is known about the purpose of visits. Parking beat surveys can be used to fill in the gaps for specific projects.

#### **A1.5.8 Capital and operating expenditure**

Capital and operating expenditure is always estimated and evaluated in projects; however, workshop attendees said these estimates are not always reliable.

#### **A1.5.9 Parking revenues**

Parking revenue 'is always collected but whether it is considered is debatable'. Often the new use for the space, eg shared spaces with high amenity values, is considered to be more valuable than revenue gathered from the removed parking spaces.

#### **A1.5.10 Public transport revenues**

Again data for PT revenue exists but is never looked at in the context of transportation projects. Benefits to PT are measured in other ways such as travel time and increase in patronage.

*The data exists and is reliable but trying to transpose it onto a specific scheme would be very difficult and expensive to do.*

The new Wellington Public Transport Model has details including the number of passengers that a generic fare could be applied to but patronage is probably a better measure of benefits to PT.

#### **A1.5.11 Business income**

Business income 'is talked about a lot but not often measured'. There have been some studies done after projects were implemented but often not estimated in monetary terms before reallocation took place and it is difficult to get hold of the data afterwards. Surveying of business owners is sometimes carried out, eg Manners Mall reallocation project surveyed business owner reactions but it is difficult to quantify the effects on business beyond positive or negative outcomes. 'Business owners are more likely to comment if they think there has been a negative effect.'

There are secondary sources of data to measure business income, eg Paymark electronic spending data but issues of confidentiality mean that individual merchants or small clusters cannot be examined. It is

also hard to attribute a change in spending to a single reallocation project, as wider effects may be driving the local economy. It would however be 'a useful thing to do some monitoring and get data after schemes are completed'. It is generally difficult to prove that business turnover has improved just by talking to owners but you can probably show reallocation has not had a negative effect.

#### **A1.5.12 Surrounding land use and value**

Sometimes on large projects, eg the Golden Mile scheme, a lot of detail on the impacts on surrounding land uses is examined 'but this would not happen for small schemes'.

This information exists but it is expensive to access and not considered entirely reliable. Again it is difficult to say that a single reallocation project is completely responsible for changes in the adjacent area. The changing mix of business types and vacancies is much easier to assess.

#### **A1.5.13 Crashes (non- injury, injury, fatal)**

Crash information is always examined and taken into account when making transportation decisions. New Zealand and overseas evidence of crash reductions that may be achieved through reallocation of kerbside parking is likely to be drawn on while records from CAS would be used to identify an existing issue or to ensure there are not unintended negative effects of the reallocation. This data is free to access and is kept up to date though it is not a reliable source of information for non-injury crashes and near misses as these are less likely to be reported to the police.

#### **A1.5.14 Population health**

Some estimates of population health have been calculated using the EEM for walking and cycling projects on a per km basis but in reality this is something that is never actually measured or estimated for individual projects outside of this formula. Participant consensus was that this is never measured because all had concerns over the validity of such a standardised formula to estimate population health that does not account for societal level changes in travel behaviour leading to better health outcomes. A package of reallocation projects is likely to help change travel behaviours but measuring it for a single project would probably be difficult.

Information on the benefits of active transport on health outcomes is available but it is very general and not project based. It is 'difficult to see how this could be quantified accurately for a specific scheme, it would be very interesting to do that and be quite valuable to know'.

#### **A1.5.15 Usage assessment**

Urban realm upgrades have sometimes had follow up investigations of pedestrian counts to measure success though these are not mandatory. Observation and intercept surveys to capture this information are relatively cost effective and reliable.

#### **A1.5.16 User satisfaction**

Again urban realm upgrades may be followed up with surveying of user satisfaction as was undertaken for the Lower Cuba pedestrian improvements project. Similarly for usage assessment, user satisfaction surveys can be carried out with relative ease.

#### **A1.5.17 Environmental impacts**

Environmental impacts are always estimated to some degree using the EEM though participants did not think all effects that should be measured or estimated currently are, eg carbon emissions.

There are similar problems with estimating environmental impacts as discussed for population health effects if you want to quantify them for an individual scheme. 'There are so many different environmental impacts' and no method currently in practice to estimate carbon emissions on such small spatial scales.



### **A1.5.18 Strategic transport goals**

Strategic transport goals are always taken into account when evaluating the strategic fit of reallocation projects. This information is available in transport policy/strategy documents and district plans.

### **A1.6 Would a framework like this help with decision making and/or planning of kerbside parking reallocation projects?**

All comments made by participants in response to this question are quoted in full below.

*Something really useful that could come out of this piece of work would be identifying gaps in information that we want to know but don't know how to get. So identifying methodologies for how we can get this information that other people can then take on in their projects like the benefits to businesses using a consistent framework to do this would be really useful.*

*Often there is international evidence to show benefits but local New Zealand information would be more relevant and not be discounted.*

*It is important to know the benefits of making a change and the dis-benefits of the impacts on parking and the consequences of removing it.*

*We need to think about what the purpose of roads is and that is to carry traffic not to store private property. We need to think about the purpose of parking and how significant parking really should be even though people do need to park at times.*

*It all comes down to revenue to be fair from a parking perspective. Another component we forget about is the level of customer satisfaction, drivers having to circle the city looking for parking. There is always going to be a segment of the community that requires it, there are people that can't ride bikes, there are people who don't have access to public transport so it is about weighing up those, it is a fine balance.*

**Table A.2 Wellington workshop consensus on currently evaluated costs and benefits and the availability and quality of required information or data**

Theme	Costs and benefits	Currently measured and evaluated?	Readily available?	Cost effective to access/collect?	Reliable?
Mobility	Travel time	Always	Yes	Yes	Yes
	Mode share	Sometimes	Yes	Yes	Yes
	Journey satisfaction	Never	No	Yes	Yes
	Vehicle operating costs	Sometimes	Yes	Yes	No
Accessibility	Mode choice availability	Sometimes	Yes	Yes	Yes
	Parking supply	Always	Yes	Yes	Yes
	Utilisation of existing parking	Always	Yes	Yes	Yes
Economic	Capital and operating expenditure	Always	Yes	Yes	No
	Parking revenues	Always	Yes	Yes	Yes
	Public transport revenues	Never	No	No	Yes
	Business income	Sometimes	Yes	No	Yes
	Surrounding land use and value	Sometimes	No	No	No
Safety and health	Crashes (non-injury, injury, fatal)	Always	Yes	Yes	Yes
	Population health	Never	No	No	No
Urban amenity	Usage assessment	Sometimes	No	Yes	Yes
	User satisfaction	Sometimes	No	Yes	Yes
Environmental	Environmental impacts	Sometimes	No	No	No
Other	Strategic transportation goals	Always	Yes	Yes	Yes

## A2 Auckland

Twelve participants took part in this workshop from the following organisations:

- Auckland Council
- Auckland Transport
- Opus International Consultants.

On the day a range of disciplines were represented including parking management, transport planning, urban design, PT planners, active transport and sustainability, city centre design, and strategy and planning. A high level of knowledge was demonstrated of the drivers, barriers and implications of kerbside parking reallocation projects with regard to multi-modal network optimisation, public and political perceptions and the strategic planning context.

### A2.1 What are the main drivers of kerbside parking reallocation projects in Auckland?

The main drivers of kerbside parking reallocation are dependent on the type of project. In a city the size of Auckland, there are many competing demands for road space including public and active transport modes as well as the need to increase traffic volumes for all vehicles on some major transport corridors. In Auckland there are a number of completed, ongoing, and planned projects that require kerbside parking spaces to be removed. Bus priority lanes and cycle lanes are common along arterial routes leading into the central city as the city moves towards better provision of a multi-modal transport network.

There have also been a number of successful central city conversions of road space to public realm for pedestrians. As a result of these successes there have been high levels of support for other proposed projects elsewhere with as high as 90% of affected residents and businesses stating their support 'against our better judgement'. It was suggested by participants that the opposition such projects have traditionally faced may be turning in some areas or among certain groups.

Small, low-cost and temporary reallocation of parking is also an important consideration. This is a movement which began overseas and has been carried out in some spots around Auckland. It is seen as a way of demonstrating to the public how this space may be better put to use, for example as outdoor hospitality seating instead of catering solely for parked cars. Even though this may be small scale reallocation it is an important contributor to larger projects in the future as the effects are easy to monitor and can provide evidence that supports permanent removal or parking elsewhere or more widespread acceptance of reallocation, both temporary and permanent.

International examples of reallocation are also important drivers of reallocation in Auckland. This is a practice that is becoming much more widespread in cities aiming to reduce their dependence on private vehicle use and create multi-mode transport networks. Integrated transport and land use planning also has its origins overseas and as the largest city in New Zealand it is seen as important that Auckland follows such 'best practice' approaches to the way our streets facilitate social and economic activity.

### A2.2 What are the challenges to reallocation of kerbside parking in Auckland?

In the central city and suburban centres opposition from business is the most common challenge to be overcome when proposing removal of parking. Participants felt that currently they rely heavily on empirical evidence from overseas examples to make a case for the benefits of removing parking in certain business areas. Greater local evidence from previous projects is needed to convince decision

makers, particularly elected officials, of these benefits in the face of strong public opposition that often gets media attention.

*Having this information available helps us. You have to convince them and say 'well look the businesses are still upset but we have done a lot of xyz and this is what we know based on previous projects.'*

It was acknowledged that carrying out reallocation without a formal evidence base leads to a lot of pressure being placed on businesses. Examples were cited where some owners have opted to leave the area at the end of their lease not because of expected disruption to their business from a project but because they are at the end of their tether fighting the transport organisation. This point of contention between the strategy and aims of Auckland Transport and local business owners is something participants believe needs to be resolved through better monitoring of the actual rather than assumed effects of parking reallocation.

Another challenge is ensuring that removal of parking takes place on the right streets. In some areas the type of business activities being conducted mean car parking is actually an important driver of the number of people on the street, and in these places removing parking may have a very negative effect. Elsewhere, such as Queen Street, there will still be high pedestrian numbers without the provision of kerbside parking.

The streets often targeted for improvements to the urban amenity are like the Fort Street example (see section 4.2.1) and are not main streets. There are a number of laneways in different precincts that AT is targeting for upgrades to improve the quality of the urban environment and accessibility for pedestrians and cyclists. Since these projects do not often have benefits for the wider transport network they are difficult to implement if the businesses they are supposed to benefit are in opposition. There is a large difference in preference for urban amenity and kerbside parking between some of the businesses located in these laneways, such as art dealers, antique stores and hospitality businesses located in a busy pedestrian area like Fort Street.

### A2.3 Comments on costs and benefits in the proposed framework

The group was of the opinion that 'you can't have a standard framework, there have to be options' as projects vary by scale, type and there is a wide range of motivations for carrying them out. Even within a project there are varying conditions along a road so you may need to evaluate different parts individually with their own set of components.

*The strategic drivers of different projects should drive the costs and benefits that you are looking at. All projects cannot be evaluated on the same principles as the expected outcomes will vary greatly and any proposed framework for evaluation should take this into account. There should be something above this such as a centre plan or road function that mandates the priority for parking, cars, public transport, cycling and pedestrians.*

Participants cited the need for disabled groups to always be considered when kerbside parking is proposed to be removed or shifted. If parking is removed and it is assumed there is adequate parking nearby to offset the loss, you need to remember that 100m further down the road is a long way away for groups like this to park. Alternatively improvements to pavements such as widening for a better urban realm may have added benefits to these groups for accessibility that would be valued higher than for non-impaired groups.

From a PT perspective it was considered 'really good to quantify user's journey satisfaction where we are now able to measure the reliability of the current situation and when a bus lane goes in we are able to say

we are getting reliability of travel time on that section'. Comparisons of user perceptions of journey satisfaction with quantified trip measures would be a valuable association to make.

Network optimisation under integrated transport and land use planning should include measures of the productivity of an area or business that is related to the network so 'when we make decisions to reallocate road space and take out parking we should look at the impact that has on people and goods vehicle flows'.

Within an organisation the size of AT sharing of information and knowledge across departments is a major challenge with some participants citing experience with duplication of effort as a result:

*Because Auckland Transport is such a big organisation and so many of us work in different departments it would not be unreasonable to expect that some of the things being discussed here today are actually being measured or recorded but we don't know about it. I have seen it before where two different departments both spend money to carry out the same survey for the same piece of road without knowing about it beforehand.*

Following this discussion it was decided to include 'Corridor productivity' and 'Perceptions of safety' to the 'Other' section of the costs and benefits in the proposed framework. Some participants also felt that 'Journey satisfaction', 'User satisfaction', and 'Perceptions of safety' may be better combined into one factor for cost-benefit analysis as it is unlikely you would include all three in an evaluation. There would be flexibility in how this new satisfaction variable was measured depending on the project type.

## A2.4 Group task one

Table A.3 presents the group consensus for the relative importance of measuring each cost and benefit in the proposed framework as part of a pre- and post-evaluation process for different kerbside parking reallocation schemes. Specific comments and discussion points for each cost and benefit are described below:

### A2.4.1 Travel time

Travel time information is essential for PT, cycling and vehicle lanes. Time is going to be relevant for some cycle infrastructure such as commuter routes and not so for others like leisure paths. The impact on other road users of cycle lanes should also be measured though it is likely to be a wider package of cycle infrastructure that would contribute to reduced congestion at a city level rather than one lane significantly reducing vehicle numbers along a route.

All participants felt it is important to measure travel time for all modes and not just vehicles as has been traditionally done because there are more of them. The effect of one type of reallocation on other modes should always be examined for PT, cycling and vehicle based reallocation, especially on large projects, to ensure there are not unexpected negative effects.

For walking and shared spaces it was considered useful to understand the effect on travel time but not essential. There are likely reasons other than travel time or network optimisation driving these projects and so measuring any effect on travel time in the network may show a negative effect that overshadows the reasons why these projects are taking place.

### A2.4.2 Mode share

As for travel time, participants felt it is important to measure mode share for public, active and vehicle based reallocation as a shift in this is likely to be a policy driver of these projects. Understanding how PT and cycle infrastructure helps to grow these modes is important as is the effect of building more space for private vehicles on reducing mode shift away from cars.

#### **A2.4.3 Journey satisfaction**

As a group it was decided that better measures of user satisfaction with their journey was an important measure to be captured though some felt the satisfaction of vehicle drivers would be so closely related to travel time and parking at the destination it may not be useful for them. Overall it was decided it is important to understand journey satisfaction for all groups as those who are dissatisfied are more likely to complain. Identifying issues that currently exist or have been created through reallocation is therefore important.

There may also be unintended negative effects on users of modes that are not specifically a focus of parking reallocation for example introducing an extra vehicle lane or a clearway may allow an arterial road to carry more traffic but also make the environment less appealing to pedestrians and cyclists.

*Journey satisfaction may not be an important driver of the project but it is a great measure of people's responses and helps to inform future projects.*

There was a lot of discussion around other factors in the framework such as travel time, safety and perceptions of safety, and existing parking supply being potential proxy measures of journey satisfaction.

#### **A2.4.4 Vehicle operating costs**

Vehicle operating costs are useful for all projects as they are an economic measure of project effects on transportation and are currently in the EEM so users are familiar with calculating them, but across the group no one felt they were an essential factor to inform decision making. If you were able to weight the current factors in the EEM workbooks the participants thought these were something that should be given a low weighting.

*Because it is in currently in the EEM it is essential but if you take that out then it is not. This is a good opportunity to reinforce that something is not useful that is being used at the moment.*

#### **A2.4.5 Mode choice availability**

All participants agreed it is essential to understand the range of transport options currently available on a route or to a destination.

#### **A2.4.6 Existing parking supply**

Any project that proposes the removal or parking must first quantify the amount and type of parking currently available in the immediate area.

#### **A2.4.7 Occupancy of existing parking**

As for the supply of parking it is essential to understand the occupancy and turnover of parking in an area where it will be removed. There are occupancy thresholds that affect how parking is managed so this is an important thing to know.

#### **A2.4.8 Use of existing parking**

The use of existing parking is another essential measure especially important for better understanding the economic benefit kerbside parking contributes to local businesses so that real local evidence can be provided when retailers oppose project plans. This 'needs to include who is parking there, why they have parked there, are they spending money?'

#### **A2.4.9 Capital and operating expenditure**

Knowledge of capital and operating expenditure is essential to all projects seeking funding and approval from elected officials.

#### **A2.4.10 Parking revenues**

There was a range of opinions within the group around parking revenue information being 'essential' or 'useful' but in the end consensus was 'essential' as politicians will always be interested in knowing the effect on parking revenue if paid spaces are being reallocated and not replaced. A number of participants felt this should not be a consideration if a better use of the space is being put in.

This was a particular concern for cycle infrastructure and urban realm improvements as they are unlikely to generate direct transportation related revenues and so many participants felt this measure should not have a high weighting.

*Parking revenue has never been a driver of what we are trying to do, it has always been like a cash cow, it is secondary and that is why I don't think it is essential.*

A number of experts were also optimistic that if the opportunity costs of reallocating kerbside parking space could be effectively captured in monetary terms they would significantly outweigh parking revenues and therefore show decision makers in black and white terms that reallocation is the best decision in specific cases.

#### **A2.4.11 Public transport revenues**

It is essential to measure PT revenue when reallocation is for PT infrastructure and extra vehicle lanes that will benefit buses. PT revenues are unlikely to be a driver of projects in the same way as mode share but there will be interest in this measure. It should be noted that many in the group felt it was useful at best but agreed with the PT perspective that it could be a good measure of project achievement from an economic perspective just as mode share is an achievement from a policy perspective.

#### **A2.4.12 Business income**

Business income is the type of factor that is now a part of the benefits realisation mandated under project audits at AT. The removal of two or three car parks is generally not going to cause an issue for a whole area but it may impact on one business significantly depending on the nature of the business. Urban realm improvements that require car parking removal are probably going to be about rejuvenating a whole area so the assumption is there will be an overall positive effect on local business. It is essential to measure this after projects are completed to see if these assumptions are indeed valid.

#### **A2.4.13 Surrounding land use and value**

Surrounding land use and value is especially essential in the context of integrated transport and land use planning. We need to collect evidence of the impacts changes to the road network have on land use to shape future policies and projects.

#### **A2.4.14 Crashes (non- injury, injury, fatal)**

Crash information is essential for all projects as 'it is critical to know if the change you are making is having a positive effect or an unexpected effect'.

#### **A2.4.15 Population health**

Health benefits of transportation projects are becoming increasingly important to factor into the decision-making process so the group decided this is an essential factor to measure. How this would be done is unclear though as it is currently difficult to attribute population health outcomes to a single project. Changes in behaviour that positively or negatively contribute to health outcomes were also considered an important measure.

There are known health benefits of public and active transport use compared with vehicle use so monitoring mode share is an important indicator of population health. Extra vehicle lanes may have a negative effect on health through increased pollution and reduced patronage of other modes.

#### **A2.4.16 Usage assessment**

It is particularly important to monitor how walking, shared spaces and urban realm improvements contribute to pedestrian numbers and the type of social and economic activities carried out by people in the space. Improved accessibility for PT and cycle modes is likely to bring additional pedestrians to the area as well so it is important to measure when reallocation is for these modes. Conversely, it is often assumed extra vehicle lanes may discourage pedestrians from using a street so it is important to better understand if this assumption is valid.

#### **A2.4.17 User satisfaction**

A similar discussion took place as in the 'Usage assessment' factor. The reactions of non-pedestrian users of the space such as local business owners and residents are important to gauge here.

*Really important to measure as far as justification to politicians to get more money for projects like this. To go to local boards and forums and be able to demonstrate real satisfaction with similar projects is beneficial.*

#### **A2.4.18 Environmental impacts**

It is essential to estimate and monitor environmental impacts when evaluating all transportation projects. Transport policy states it is an essential component of cost-benefit analysis and from a planner's perspective it is always an important consideration. Different projects have different effects though and so participants felt there needs to be flexibility in what is measured. Demonstrating to the public that transport projects are taking place with environmental effects and future impacts in mind is also important.

#### **A2.4.19 Strategic transport goals**

These goals are always essential. Projects will not get off the ground without first demonstrating how they meet a specific goal or strategy.

#### **A2.4.20 Corridor productivity**

*This was an additional factor introduced during this workshop.*

As above but at a street or route level, corridor productivity is essential for all projects.

#### **A2.4.21 Perceptions of safety**

*This was an additional factor introduced during this workshop.*

Perceptions of safety was added to the framework list and considered an essential co-measure alongside reported crash data as not all crashes are captured in current databases, particularly near misses or minor injury crashes. Vulnerable road users, such as pedestrians and cyclists, may stop using a route altogether if their perceived safety is reduced following changes to the road layout. Alternatively the removal of parking may create a safer environment causing an increase in users of these modes.



**Table A.3 Auckland workshop consensus of the relative important of the proposed costs and benefits related to kerbside parking reallocation projects**

Theme	Costs and benefits	Public transport	Cycling facilities	Walking, shared spaces & urban realm	Extra vehicle lanes
Mobility	Travel time	Essential	Essential	Useful	Essential
	Mode share	Essential	Essential	Useful	Essential
	Journey satisfaction	Essential	Essential	Essential	Essential
	Vehicle operating costs	Useful	Useful	Useful	Useful
Accessibility	Mode choice availability	Essential	Essential	Essential	Essential
	Existing parking supply	Essential	Essential	Essential	Essential
	Occupancy of existing parking	Essential	Essential	Essential	Essential
	Use of existing parking	Essential	Essential	Essential	Essential
Economic	Capital and operating expenditure	Essential	Essential	Essential	Essential
	Parking revenues	Essential	Essential	Essential	Essential
	Public transport revenues	Essential	Useful	Useful	Essential
	Business income	Essential	Essential	Essential	Essential
	Surrounding land use and value	Essential	Essential	Essential	Essential
Safety and health	Crashes (non-injury, injury, fatal)	Essential	Essential	Essential	Essential
	Population health	Essential	Essential	Essential	Essential
Urban amenity	Usage assessment	Essential	Essential	Essential	Essential
	User satisfaction	Essential	Essential	Essential	Essential
Environmental	Environmental impacts	Essential	Essential	Essential	Essential
Other	Alignment with overarching goals	Essential	Essential	Essential	Essential
	Corridor productivity	Essential	Essential	Essential	Essential
	Perceptions of safety	Essential	Essential	Essential	Essential

## A2.5 Group tasks two and three

Table A.4 presents the group consensus from tasks two and three. These saw participants comment on whether the costs and benefits in the proposed framework are currently measured and evaluated (task two) and if the required data/information to quantify these costs and benefits is readily available, cost effective to access/collect and reliable information (task three). Specific comments and discussion points for each cost and benefit are described below:

### A2.5.1 Travel time

At a strategic level travel time is always considered but for the implementation and delivery of a particular project this will not always be a part of economic evaluation. On central city roads and arterials it would be a more common component compared with less strategic roads in suburban areas.

Travel time data is readily available via the AT models and it is cost effective to obtain reliable estimates on a project specific basis.

### A2.5.2 Mode share

At the city level the New Zealand Household Travel Survey captures mode share information over time. At the scale of an individual project, this can be, and is, sometimes captured. The cost of capturing this data depends on project scale and the time-frame for data capture and reporting but participants felt that if it is considered necessary for project evaluation then the cost is worth it.

### A2.5.3 Journey satisfaction

Journey satisfaction is sometimes captured for PT projects in Auckland. This is becoming much more common especially on large infrastructure improvements. Obtaining the information requires a purpose-built survey that should deliver valuable feedback,

### A2.5.4 Vehicle operating costs

Vehicle operating costs are calculated using the standardised formula in the EEM workbooks. It is a cost effective process to go through if the required information is available and given that it is a widely used formula participants were happy with the reliability of the output.

### A2.5.5 Mode choice availability

Mode choice availability is not something participants felt is measured but is rather an underlying assumption or knowledge about the level of service currently supporting travel by multiple modes to or through an area.

*If I am going to take out four, five, six car parks for bus lanes then I generally don't care about the impact on mode choice because the decision has been made that these improvements are necessary. If I think that I am going to come up against opposition then I will look at what information I need to demonstrate the benefit of improved access for particular modes based on the current provision in the area.*

The information is relatively easy to collect using GIS layers in the AT databases, though the way the data is constructed and managed by different departments means some manual processing is required to bring it all together to query, 'it is just a matter of having someone do it'. This information is also available from network operating plans for corridors, which for most major arterials and central city streets will have been carried out.

#### **A2.5.6 Existing parking supply**

The level of existing parking supply is always considered by the parking team. Other groups felt this was not always taken into account and they struggled to get hold of this information at times and in some cases have conducted their own parking surveys to identify the quantity and type of parking in an area. However it appears the data exists for central city kerbside parks and is analysed when changes to parking are proposed.

#### **A2.5.7 Occupancy of existing parking**

The occupancy of existing parking is always factored into an evaluation and reporting of transportation projects where parking will be reallocated, though the group felt that from a council perspective it is not always an important factor.

The parking team has some information for the city based on pay and display data but again other groups stated they do not have good access to this information. For a specific project, data would need to be compiled and at a street level a survey may be required to determine occupancy.

#### **A2.5.8 Use of existing parking**

The purpose of visits to car parks is not often examined for individual projects though could be carried out using ad hoc surveys. The PT team is currently undertaking this process for a number of major transportation projects where there is a need to provide real evidence of the value of car parking to local retailers who are expected to oppose any changes.

#### **A2.5.9 Capital and operating expenditure**

This information is always required when seeking funding and is therefore considered readily available. At a strategic level there may be more unknowns around the costs of different proposals but 'there will always be a figure in mind'. Estimates of these costs before work is carried out do not always prove to be reliable.

#### **A2.5.10 Parking revenues**

Information on parking revenues is readily available though it is not always looked at and not considered a vital part of economic evaluation for planned works.

#### **A2.5.11 Public transport revenues**

Again information on PT revenue exists and is readily available if there is interest in using it but in reality no participants could cite an example of this information forming a part of a cost-benefit analysis.

#### **A2.5.12 Business income**

The effect on local business vitality is sometimes reported for project cost-benefit evaluations, more often for larger rather than small projects unless there is anticipated opposition from business owners that needs to be mitigated.

The information is not readily available; it requires purchasing of a custom dataset or surveying of local business owners and neither approach is thought to yield reliable results. It is possible to get electronic spending records, particularly for retail and hospitality businesses, but this does not cover all transactions and the information is aggregated to large spatial areas. It is also difficult to rely on business owners for feedback as their opinion of a project will probably influence their response.

*You are more likely to hear from owners who think they have been negatively affected than those who have not suffered or are doing better.*

This factor was discussed as being potentially very expensive to quantify if required for all projects but was recognised as one of the biggest gaps in knowledge that needs to be filled to benefit discussions between transport planners, decision makers and the public.

#### **A2.5.13 Surrounding land use and value**

The use and value of surrounding land is sometimes included in transport evaluations but participants expect it to occur more frequently as the integrated transport and land use approach to planning becomes more ingrained.

*We are becoming more aware of it and it is something that everyone is trying to put in place but maybe not quite there yet across all projects.*

The data is readily available although accessing it is currently cost prohibitive and reliability is not guaranteed. Land use such as changing business demographics is easier to monitor than values or rents. All of these elements can change with relative frequency so keeping up to date records of this can be difficult.

#### **A2.5.14 Crashes (non- injury, injury, fatal)**

It is always essential to monitor crashes and this factor is an important component of all transportation funding requests. The information from CAS is very accessible and free to obtain; however, other sources of crashes that are missed in this database, such as hospital records and near-miss reports, are more difficult to obtain.

#### **A2.5.15 Population health**

'Hardly ever to never' is population health currently measured or included for economic evaluation of transportation projects in Auckland. It is something everyone in the group considered an important gap but accessing the required information to develop this into a monetary measure is a considerable challenge to be overcome. It would be even more difficult to attribute the benefits to health from one project in the context of wider transport packages and societal changes in health-related behaviours.

Participants believed this is a particularly important gap when evaluating the costs and benefits of reallocation as these projects often aim to get people out of cars and into more active modes. If population health benefits are not considered for all proposals then the opportunity cost of reallocating kerbside parking may be diminished. The current standardised formula for calculating health benefits per km of walking and cycling infrastructure was not considered adequate or reliable enough to address this issue.

#### **A2.5.16 Usage assessment**

Post-implementation assessments of use are sometimes carried out as in Fort Street (see section 4.2.1). These require observational survey techniques that can be expensive. There was a split in responses as to the reliability and therefore cost-effectiveness of conducting such surveys.

#### **A2.5.17 User satisfaction**

Similar responses were received for user satisfaction as for usage assessment, with some participants also feeling that this, along with 'Business income', would add significantly to the cost of their projects if it became mandatory.

#### **A2.5.18 Environmental impacts**

Environmental impacts are sometimes measured but not for all projects and the full range of potential impacts is not always considered. It is more likely that direct impacts such as runoff, noise, vibration and

estimated emissions will be evaluated but wider impacts such as carbon emissions and the effect on climate change are not.

Depending on what is being measured, the cost of identifying the impact will vary and if it requires installation of a monitor then this can be prohibitively expensive.

#### **A2.5.19 Strategic transport goals**

Strategic transport goals are 'always taken into account or projects will never get off the ground'.

#### **A2.5.20 Corridor productivity**

This is sometimes taken into account though the goals and strategy for a corridor are more likely to carry weight, while the productivity of the corridor itself drives these policies.

#### **A2.5.21 Perceptions of safety**

'We always consider it but that's not to say we do anything about it, it is not often something that is measured.' Safety is most often considered during pre-assessment, for example what level of separation from vehicle lanes do cyclists require to feel most safe on a specific route. Post-evaluation of these perceptions is almost never done.

As a group it was felt unnecessary to assess perceptions of safety for every project as factors that contribute positively to this, such as separated cycle lanes and well-lit pedestrian spaces, are well known. As a result different departments have information on the types of environment and infrastructure that improve user perceptions of safety. The group therefore felt this information/knowledge is readily available and accessible.

**Table A.4 Auckland workshop consensus on currently evaluated costs and benefits and the availability and quality of required information or data**

Theme	Costs and benefits	Currently measured and evaluated?	Readily available?	Cost effective to access/collect?	Reliable?
Mobility	Travel time	Sometimes	Yes	Yes	Yes
	Mode share	Sometimes	Yes	Yes	Yes
	Journey satisfaction	Sometimes	No	Yes	Yes
	Vehicle operating costs	Sometimes	Yes	Yes	Yes
Accessibility	Mode choice availability	Sometimes	No	Yes	Yes
	Existing parking supply	Always	No	Yes	Yes
	Occupancy of existing parking	Always	No	Yes	Yes
	Use of existing parking	Sometimes	No	Yes	Yes
Economic	Capital and operating expenditure	Always	Yes	Yes	Yes
	Parking revenues	Sometimes	Yes	Yes	Yes
	Public transport revenues	Never	Yes	Yes	Yes
	Business income	Sometimes	No	No	No
	Surrounding land use and value	Sometimes	Yes	No	No
Safety and health	Crashes (non-injury, injury, fatal)	Always	Yes	Yes	Yes
	Population health	Never	No	No	No
Urban amenity	Usage assessment	Sometimes	No	No	No
	User satisfaction	Sometimes	No	No	No
Environmental	Environmental impacts	Sometimes	No	No	No
Other	Alignment with overarching goals	Always	Yes	Yes	Yes
	Corridor productivity	Sometimes	Yes	Yes	Yes
	Perceptions of safety	Sometimes	Yes	Yes	Yes

## A2.6 Would a framework like this help with decision making and/or planning of kerbside parking reallocation projects?

All comments made by participants in response to this question are quoted in full below.

*To move forward with multi-modal transport along the road parking is going to come under pressure because we don't have other space available so we need to be able to weigh it up against all other uses and getting background information and justification for removing parking is going to become more essential.*

*Yes in the context of the spatial planning approach for the roads and streets we are looking at how as an organisation we can develop future documents based on empirical and local data that establishes how things can work because you can't generally challenge data that is out there.*

*Having a consistent approach to before and after evaluation that was recognised across the whole organisation would not only benefit our projects because we have better information about them but it would benefit the organisation too as all departments would know what is being recorded and have access to it.*

*For PT this is really important, some of the designs being developed now are kerb to kerb so parking is completely removed. On some of these short corridors we have all that data, we have the parking data, we have the benefits to PT data. Our evaluation touches on all the key areas we have been talking about. If we are stripping out parking for PT lanes we have to examine the impacts of that including land use, fire and ambulance access, local businesses affected. We have got the data to support it, the PT HOP data, parking data, also travel time and I will be doing post-assessment which I have been asked to do by AT in terms of flush median usage, in terms of what is the usage post-intervention, crash data, user perceptions along the corridor because we are upgrading bus stops and improving PT travel time and reliability. 'Do the cyclist numbers go up?' is being asked because we have bus lanes instead of parking.*

*A better evidence base would be great to help when talking to local businesses and also decision makers. The more information you have the harder it is to ignore it. Having this information available helps us. You have to convince them and say 'well look the businesses are still upset but we have done a lot of xyz and this is what we know based on previous projects'.*

*I think that a lot of times we go in and assume that we need to take away parking to improve things but we may not always need to. That is the other side of the coin of having this information available is that it helps us. I think we make a lot of assumptions that it is better for public amenity when in actual fact it might not.*

*Currently when developing corridor management plans there are a lot of assumptions being made about what should go in and trying to sell that to local business. I think everyone would agree that talking about removing parking does not get a lot of support and businesses say 'don't touch it'. It might also be a case of reallocating the parking, moving it around and not removing it completely, this might help public perceptions as well.*

*Could NZTA develop a database for all transport organisations to share their survey data?*

## A3 Hamilton

Five participants took part in this workshop from the following organisations:

- Hamilton City Council
- Waikato Regional Council
- Opus International Consultants.

A range of disciplines was represented on the day including transport planners, active and PT planners and parking management. All participants had some level of knowledge and/or experience with kerbside parking reallocation projects in Hamilton.

### A3.1 What are the main drivers of kerbside parking reallocation projects in Hamilton?

The major driver of reallocation in central Hamilton is to create attractive urban environments that focus on boosting commercial activity and hospitality as retailing moves to outer areas of the city into big box retail parks like The Base shopping centre in Te Rapa. How to attract people back into the central city is a discussion that may have to take place with more force in the future. Attendees stated that removal of parking to create a more attractive urban environment may be one way of achieving this. In some central city areas kerbside parking occupancy rates of just 20–30% have been identified, suggesting supply would not suffer from the removal of parking in certain places.

Reducing parking-related congestion is also a priority for parking management and transport planning in the city, as 'up to 30% of vehicles on the road are doing this looking for a park directly outside a shop, they are not parking somewhere and walking'.

Parking has been reallocated previously in Hamilton to make space for clearways that benefit PT services. Reducing the availability and affordability of kerbside parking is a key tool in reaching a 'tipping point' in order that other modes, eg PT, become attractive options for travel to the central city.

Future projects are likely to also cater for cyclists to encourage greater mode share in non-car based transport rather than wait until user numbers grow to a point that justifies their installation. In other words, a 'build it and they will come' approach could be applied to active and PT modes. Future transport trends, eg self-driving cars that do not need to park on-street will also be likely to impact on the need for parking in central cities.

### A3.2 What are the challenges to reallocation of kerbside parking in Hamilton?

The mindset of many local drivers is that they should be able to park directly outside their destination and not have to walk. People seem to believe they have a 'right' to parking. We need to remember that roads were designed to move goods and services and not to park cars. This is despite an abundance of parking within 50–100m of the main street that is underutilised, so 'often it seems to be a feeling of loss that people are most vocal about'.

Hamilton has suburban shopping centres competing with central city businesses. Parking is free at these suburban locations, and as a result inner city business owners advocate for parking to be retained and made cheaper, or even free, under the assumption they are a less desirable destination if parking is not readily available. The council's perspective is that free, time-restricted parking would be used by commuters, who are happy to move their car a few times during the day, and as a result parking spaces would not actually be available for shoppers to use.



### A3.3 Comments on costs and benefits in the proposed framework

None cited at this stage of the workshop.

### A3.4 Group task one

Table A.5 presents the group consensus for the relative importance of measuring each cost and benefit in the proposed framework as part of a pre- and post-evaluation process for different kerbside parking reallocation schemes. Specific comments and discussion points for each cost and benefit are described below:

#### A3.4.1 Travel time

Travel time is considered essential for public and vehicle transport focused reallocation, as a key driver of these is likely to be improved network efficiency which is well measured by travel times. Cycling and walking projects are not usually undertaken with travel time benefits in mind and are likely to be better represented by measures of safety and urban amenity.

#### A3.4.2 Mode share

Participants agreed mode share was essential only for cycling facilities as it is usually installed to attract new users, and it is therefore important to measure any resulting mode shift. Travel time was also believed to be a better indicator of the success of PT and vehicle lane projects.

#### A3.4.3 Journey satisfaction

Measuring journey satisfaction is essential for PT and cycling reallocations as 'people are more likely to use these modes based on their perceptions of how good they are'. This is not as important a measure for pedestrian projects 'as these are not really journey environments' and the success of these may be better measured in other ways. Journey satisfaction of drivers was not seen as being an important factor in assessing reallocation projects, as it is assumed that reduced travel time and directness of route will lead to higher satisfaction among drivers.

#### A3.4.4 Vehicle operating costs

Understanding changes in vehicle operating costs may be useful for PT operators if they can save money. From a commuter's point of view, this was not seen to be of any interest at all. 'Car drivers are likely to drive anyway' and so they are conditioned to operating costs, and it is unlikely a single reallocation project would greatly reduce costs for vehicle owners.

#### A3.4.5 Mode choice availability

One participant felt mode choice was essential for PT and cycling infrastructure 'if you are increasing the range of modes available to get to and from a destination'. However the group consensus was to settle on mode choice availability as 'useful' to measure for most modes and 'unnecessary for extra vehicle lanes as adding an extra vehicle lane to an existing carriageway would do nothing to improve access for drivers.

#### A3.4.6 Existing parking supply

'Hamilton doesn't have a parking problem' as there is an oversupply of parks in the central city, and as a result, the removal of parking spaces might require just a short walk to get to the shop/destination of choice. Knowing what stock exists was seen as a useful factor only and unnecessary when removing parking for extra vehicle lanes.

#### A3.4.7 Occupancy of existing parking

Information on the occupancy of existing parking is useful for all projects.

#### **A3.4.8 Use of existing parking**

Information on the use of existing parking is useful for all projects.

#### **A3.4.9 Capital and operating expenditure**

Knowledge of capital and operating expenditure is essential for all projects when justifying the outlay and getting approval from decision makers.

#### **A3.4.10 Parking revenues**

Politicians will want to know about parking revenue but it was only seen as being useful to the project evaluation in practice. Some participants were worried that if parking revenues formed a part of all project evaluations it might become a constraint to change, eg reallocation of paid parking to cycle lanes that have no income may not appeal to decision makers who can clearly see a dollar figure that will be lost from these parking spaces even if overall no loss of revenue occurs in the wider area as drivers would just park nearby instead.

*It is up to elected officials to decide what the community benefit is of reallocating the space so lost revenue would be a part of this.*

#### **A3.4.11 Public transport revenues**

It is useful to know PT revenue, but it would be difficult to measure the effect of parking reallocation on it. In one example cited, parking had been removed to improve bus access to a stop in the central city, and doing so had no effect on business patronage or revenue but instead allowed buses to fit into the stop, resulting in their no longer delaying traffic due to the rear of the bus causing an obstruction when it sat out in the carriageway.

#### **A3.4.12 Business income**

Business income information is useful for PT and extra vehicle lanes if it is expected to have an effect, which may be relevant to large projects. Understanding the impact on income is essential for cycling and walking projects as these are more likely to create attractive inner city destinations for a larger number of people.

Participants thought it is essential to capture local evidence of this as overseas examples indicate there are benefits to local businesses from cycling and walking schemes, 'is the same happening here? We need to absolutely prove it from a New Zealand perspective'.

#### **A3.4.13 Surrounding land use and value**

Participants thought surrounding land use and value is an interesting relationship but agreed it is unnecessary information to collect or evaluate.

#### **A3.4.14 Crashes (non- injury, injury, fatal)**

Information on crashes is essential for all projects.

#### **A3.4.15 Population health**

The group consensus was that population health is a useful benefit to measure though one participant stated we 'need all the information we can get about safety and health'. The mental health benefits of disabled persons having greater mobility through access to PT was also discussed.

#### **A3.4.16 Usage assessment**

'Post-evaluation is a really good thing but something we don't really do much of for any projects' and 'it is something we would like to do but we never have enough money' are comments that effectively summarise the group discussion on assessing usage. If there is evidence of benefits and high usage from

previous projects it would be easier to justify future ones, 'if you find they are under-utilised then why would you do it again?'

**A3.4.17 User satisfaction**

The satisfaction of users is a useful measure of project success.

**A3.4.18 Environmental impacts**

It is useful for extra vehicle lanes to see if there are negative environmental impacts. 'Something we should understand is positive benefits that might arise from shift to other modes.' This is a cost or benefit that is considered very difficult to measure.

**A3.4.19 Alignment with overarching goals**

It is essential for all projects to ensure buy-in from elected figures.

**Table A.5 Hamilton workshop consensus of the relative important of the proposed costs and benefits related to kerbside parking reallocation projects**

Theme	Costs and benefits	Public transport	Cycling facilities	Walking, shared spaces & urban realm	Extra vehicle lanes
Mobility	Travel time	Essential	Useful	Useful	Essential
	Mode share	Useful	Essential	Useful	Useful
	Journey satisfaction	Essential	Essential	Useful	Useful
	Vehicle operating costs	Useful	Unnecessary	Unnecessary	Unnecessary
Accessibility	Mode choice availability	Useful	Useful	Useful	Unnecessary
	Existing parking supply	Useful	Useful	Useful	Unnecessary
	Occupancy of existing parking	Useful	Useful	Useful	Useful
	Use of existing parking	Useful	Useful	Useful	Useful
Economic	Capital and operating expenditure	Essential	Essential	Essential	Essential
	Parking revenues	Useful	Useful	Useful	Useful
	Public transport revenues	Useful	Unnecessary	Unnecessary	Useful
	Business income	Useful	Essential	Essential	Useful
	Surrounding land use and value	Unnecessary	Unnecessary	Unnecessary	Unnecessary
Safety and health	Crashes (non-injury, injury, fatal)	Essential	Essential	Essential	Essential
	Population health	Useful	Useful	Useful	Unnecessary
Urban amenity	Usage assessment	Useful	Useful	Useful	Useful
	User satisfaction	Useful	Useful	Useful	Useful
Environmental	Environmental impacts	Useful	Useful	Useful	Useful
Other	Alignment with overarching goals	Essential	Essential	Essential	Essential

## A3.5 Group tasks two and three

Table A.6 presents the group consensus from tasks two and three. These saw participants comment on whether the costs and benefits in the proposed framework are currently measured and evaluated (task two) and if the required data/information to quantify these costs and benefits is readily available, cost effective to access/collect and reliable information (task three). Specific comments and discussion points for each cost and benefit are described below:

### A3.5.1 Travel time

Travel time is more likely to be used for PT and extra vehicle lanes but is also done through the EEM for walking and cycling projects. The regional travel model is available to estimate travel time changes resulting from specific projects when needed.

### A3.5.2 Mode share

Mode share is taken into account for all projects generally, and is used to work out latent demand for EEM worksheets. The New Zealand Household Travel Survey feeds into this. It is not always calculated for individual projects but rather for the effect of a number of projects over time across the network.

The New Zealand Household Travel Survey is used but this is updated infrequently and participants did not consider it reliable enough to apply to individual projects as it is just a snapshot of travel on one day of the year.

### A3.5.3 Journey satisfaction

Journey satisfaction is important for PT but not on a project-by-project basis.

It requires surveying for specific projects and currently planners use the residents survey. If you want a specialist survey for a particular project this can be done relatively cost effectively and can be relied upon.

### A3.5.4 Vehicle operating costs

Vehicle operating costs are only calculated for some projects, using the EEM worksheets.

### A3.5.5 Mode choice availability

The availability of mode choice would form part of an assessment report to outline what other infrastructure currently services the area or destination.

Data would need to be collated using GIS databases.

### A3.5.6 Existing parking supply

The existing supply of parking is always taken into account if the project involves removal of parking – the council has data on what stock is located where.

### A3.5.7 Occupancy of existing parking

Parking occupancy surveys are carried out every six months but not for individual projects. These surveys allow for the effect of an individual reallocation project to be assessed, again the council has data on inner city kerbside parking occupancy.

### A3.5.8 Use of existing parking

Sometimes parking beat surveys are carried out for specific projects that involve parking. The council sometimes looks at the length of stay in parking spaces but does not record the purpose of visits to the central city. This could be examined through a survey.

### A3.5.9 Capital and operating expenditure

Capital and operating expenditure is always estimated for transportation projects.

#### **A3.5.10 Parking revenues**

Parking revenue is sometimes assessed depending on the project type and scale. Hamilton City Council knows how much revenue is gained from inner city parking and can narrow these figures down to small clusters of individual parking spaces using pay and display data.

#### **A3.5.11 Public transport revenues**

There are often fare recovery targets for PT improvements so PT revenue is usually taken into account for these projects. PT operators have information on their revenue and this may be available by individual routes.

#### **A3.5.12 Business income**

Business income has never been looked at in Hamilton in relation to transport projects but some participants had experience doing this in other locations. It is possible to look at spending via electronic transactions, 'the data is available but we don't actually use it'.

#### **A3.5.13 Surrounding land use and value**

The surrounding land use and value is never looked at, though the raw data can be purchased and anecdotal evidence from real estate agents also provides useful insight.

#### **A3.5.14 Crashes (non- injury, injury, fatal)**

Crash safety is always evaluated for transportation projects. CAS data is readily available and accurate.

#### **A3.5.15 Population health**

Population health is usually only measured using the EEM formula for health benefits per km of walking and cycling infrastructure. Sometimes external research is drawn on that quantifies health benefits but this is applied at a policy/strategy level and not quantified for individual projects.

This is currently quantified based mainly on international evidence rather than dollar values used to examine costs and benefits. EEM calculation is considered unreliable for individual projects.

#### **A3.5.16 Usage assessment**

Participants agreed that usage assessment sometimes takes place though no specific examples were cited. It requires post-implementation surveying that is relatively cost effective to carry out and provides accurate information.

#### **A3.5.17 User satisfaction**

Resident surveys capture elements of user satisfaction but they are not project specific. Similar methods could be used as for usage assessments outlined above, and online surveys could be carried out.

#### **A3.5.18 Environmental impacts**

Currently, particular matter (PM<sub>10</sub>) and nitrogen dioxide (NO<sub>2</sub>) is measured at city level but not on a project specific basis so the environmental effect over time from a range of transport projects is all that can be assessed.

City-wide environmental impacts are monitored but often not for specific projects outside of noise, vibration and potential negative effects of construction.

#### **A3.5.19 Strategic transport goals**

Always, 'you have to justify and link it to some goal'.

**Table A.6 Hamilton workshop consensus on currently evaluated costs and benefits and the availability and quality of required information or data**

Theme	Costs and benefits	Currently measured and evaluated?	Readily available?	Cost effective to access/collect?	Reliable?
Mobility	Travel time	Always	Yes	Yes	Yes
	Mode share	Always	No	Yes	No
	Journey satisfaction	Sometimes	No	Yes	Yes
	Vehicle operating costs	Sometimes	Yes	Yes	Yes
Accessibility	Mode choice availability	Sometimes	No	No	Yes
	Existing parking supply	Always	Yes	Yes	Yes
	Occupancy of existing parking	Always	Yes	Yes	Yes
	Use of existing parking	Sometimes	Yes	Yes	Yes
Economic	Capital and operating expenditure	Always	Yes	Yes	Yes
	Parking revenues	Sometimes	Yes	Yes	Yes
	Public transport revenues	Sometimes	Yes	Yes	Yes
	Business income	Never	Yes	Yes	Yes
	Surrounding land use and value	Never	Yes	Yes	Yes
Safety and health	Crashes (non-injury, injury, fatal)	Always	Yes	Yes	Yes
	Population health	Sometimes	Yes	Yes	Yes
Urban amenity	Usage assessment	Sometimes	No	Yes	Yes
	User satisfaction	Sometimes	No	Yes	Yes
Environmental	Environmental impacts	Sometimes	No	No	Yes
Other	Alignment with overarching goals	Always	Yes	Yes	Yes

### A3.6 Would a framework like this help with decision making and/or planning of kerbside parking reallocation projects?

All comments made by participants in response to this question are quoted in full below.

*When we put these projects up to the Council they are going to say 'yes' or 'no'. A better evidence base would make our case much stronger after we have gone through the NZTA process and have to appease local councillors. It is a challenge to make a compelling story.*

*An evidence base certainly would help from my perspective. Regionally we are looking at improving cycle infrastructure and dealing with lots of different organisations and they are all saying the same thing, they haven't got the evidence to back up what they know is right, so just having a single place to go would help.*

*Having a better idea of the benefits would be beneficial to getting someone at the top to support the project and drive it forward politically.*

*Better sharing of information would be helpful, there is obviously good parking information and we have good solid public transport information, maybe a little light on cycling or parts of it, but we are probably all independently doing our own thing so holistically using this data would be good.*

## A4 Dunedin

Seven participants took part in this workshop from the following organisations:

- Dunedin City Council
- Otago Regional Council
- New Zealand Transport Agency
- Opus International Consultants.

On the day a range of disciplines were represented including transport planning, urban design, PT planners, active transport and sustainability, and planning and investment. All participants were familiar with the current drivers and challenges of reallocating kerbside parking in central Dunedin where a number of large projects are currently being discussed in political and public forums.

### A4.1 What are the main drivers of kerbside parking reallocation projects in Dunedin?

Building a city-wide cycle network of over 100km of cycle lanes is currently the biggest driver of kerbside parking reallocation in Dunedin. At the forefront of this is a proposal to remove car parking along the central city State Highway 1 north that is being driven by safety concerns following three cycling fatalities in the past decade. Despite relatively low numbers of cyclists compared with vehicle drivers using the route, cyclists are perceived to be a vulnerable group requiring separation from vehicles to reduce their day-to-day risk.

The one-way state highway routes are some of the few continuous north-south routes through the central city and offer the best and most direct route for cycling. Proposed options require the removal of between 185 to 390 kerbside parking spaces depending on the preferred option. Off-street car parking in the area and kerbside parking on adjacent streets has been identified as being under-utilised, thus helping to offset the impact of parking removal along the route. Across the wider city a proposed network of cycle lanes will probably require removal of kerbside parking in residential areas and suburban centres.



Removal of kerbside parking has previously been undertaken in the central city for improved pedestrian spaces and urban amenity. These projects have been worked through alongside the business owners expected to benefit from the change. In many cases kerbside parking in the surrounding area is now managed differently, for example, a change from non-restricted parking to time-restricted parking and paid parking. These same principles of economic vitality and improved urban amenity through higher pedestrian footfall are also drivers of current plans to reallocate parking in the Octagon area of central Dunedin.

#### A4.2 What are the challenges to reallocation of kerbside parking in Dunedin?

As with other centres opposition from some central city businesses and opposition within the media and the public represent the greatest challenge to reallocation of kerbside parking in Dunedin. While there have been examples of projects not getting approval from elected officials, the reallocation of kerbside parking has often gone ahead successfully, particularly when the schemes are small.

*In Dunedin the elected councillors are really supportive of what we are trying to do despite ongoing opposition that is often based on anecdotes rather than any real evidence of negative impacts.*

Cost was also cited as a barrier particularly for a relatively small council which does not have a large budget to undertake extensive urban design upgrades in the central city with large construction and ongoing maintenance costs.

*While the Fort Street example is a great demonstration of what can be done it is far beyond the budget of most councils in New Zealand to replicate. It is not just about removing the parking, you need to finish it really well and landscaping, tiling, street furniture etcetera are not cheap. There are counter examples in Wellington where they have just used tarseal and it just looks like a road and not a pedestrian space at all.*

Some New Zealand and overseas examples of great central city spaces that have been made possible by the removal of kerbside parking are a result of public-private partnerships where the local council, affected businesses and sometimes central city residents have all contributed towards the costs. Participants felt that in the present Dunedin climate this 'would be a really hard model to sell' given that businesses owners expect that the removal of kerbside parking would have a negative effect on their economic vitality. 'We need good examples of where it has been successful in Dunedin, not Auckland or overseas, to show retailers the benefits but to do this we need money and support'. The group discussed the irony of needing to actually build projects that many are against before they can then show the benefits of these retrospectively.

#### A4.3 Comments on costs and benefits in the proposed framework

*We are good at measuring money but not good at measuring people.*

*Previous projects that have removed parking have actually looked at very few potential costs and benefits we have just gone ahead and done them because the decision has been made.*

Sometimes surrounding land use will be looked at but only to make sure that urban amenity improvements are taking place in the right area. The wider parking supply may also be looked at, 'we have previously removed 18 parks and changed another 80 in the immediate area to time restricted to ensure that there was a turnover of parking to offset the loss of parking outside the shops we were making the changes to benefit'.

Monitoring of usage both for pedestrians and vehicle parking is often done very informally through parking warden perspectives. This anecdotal evidence can be supplemented by annual parking surveys to put some numbers to it.

Crash data alone does not sufficiently factor in the full range of safety elements including personal security, perceptions of safety, driver and user behaviours etc.

## A4.4 Group task one

Table A.7 presents the group consensus for the relative importance of measuring each cost and benefit in the proposed framework as part of a pre- and post-evaluation process for different kerbside parking reallocation schemes. Specific comments and discussion points for each cost and benefit are described below.

### A4.4.1 Travel time

Participants on the whole agreed that measuring the effect of reallocation on travel time for cycle infrastructure and extra vehicle lanes was essential, 'it's essential for cyclists as installing safer cycle infrastructure that allows for a quicker and more direct journey is important'. Evaluating travel time when installing extra vehicle lanes could be a direct measure of a project's goals, which are likely to focus on reduced congestion and improved traffic flows along a particular route. Some participants felt the current approach to including travel time in cost-benefit analysis 'only deals with vehicle travel time and this reinforces the paradigm that cars are the most important mode'. The consensus on this point was that if travel time is to be included as part of economic evaluation it should be measured across all modes expected to be affected either positively or negatively by the reallocation.

Travel time as a measure of costs or benefits for PT was considered useful at best as 'for many users of this service they choose to use PT instead of a car or they do not have another transport option, for these groups travel time is not as important as reliability, frequency and access to the service'. 'In Dunedin PT will always fall behind the use of private cars unless parking becomes non-existent.' Low congestion on most Dunedin streets also means that PT is not considerably slowed by traffic so reallocation of parking would have to take place along a considerable corridor length to significantly reduce travel time for this mode.

Travel time is a useful measure for walking, shared spaces and urban realm improvements in Dunedin as there is a high commuter population who walk (8% at the last census). This is because of a large student population and the close proximity of residential areas to the central core. Most participants felt reallocation for pedestrian improvements are rarely, if ever, undertaken with thought given to reducing travel time for walkers. Additionally if reallocation is undertaken for urban realm improvements, a large number of pedestrians observed in the space will have arrived by other modes. There is potential for improvements to other modes to increase pedestrian travel time if an area is made less accessible, for example through the removal of safe crossing points.

### A4.4.2 Mode share

It is essential to measure mode share for all projects as it directly relates to overarching transport policy and is a direct measure of meeting future transportation objectives such as increased use of sustainable transport modes.

### A4.4.3 Journey satisfaction

It is essential to quantify, or at least understand, the satisfaction of transport users and the public around trip elements including frequency, reliability and the information users have to plan a trip. While it was considered essential for all modes the group felt this measure was especially important for users of PT and cycle infrastructure.

#### **A4.4.4 Vehicle operating costs**

Vehicle operating costs are a useful economic measure for extra vehicle lanes but unnecessary for the other modes discussed. If parking is removed to improve the network then it is usually to reduce travel time and participants felt vehicle operating costs were 'just another component of this'.

*For public transport improvements it is about people and their ability to travel and not about the cost of running buses. If you increase the frequency of bus services you would increase the operating costs but you have improved the service provided to the public so it is not a particularly relevant measure to include.*

#### **A4.4.5 Mode choice availability**

Availability of choice is essential for all modes for a variety of reasons. For PT improvements 'the level of service is a critical factor in any element and for people's journeys. It is not just a frequency thing but a geographic and social thing'.

*For some shared spaces you might actually close off the space to other modes and it is important to examine the effect of that particularly for disadvantaged groups if they have worse options for getting to or from a destination.*

Some participants questioned if mode choice availability is relevant for extra vehicle lanes given there is no shortage of access for private vehicles to the network and any reallocation would not increase availability, because if kerbside parking is being removed then vehicle lanes presumably already exist along the corridor. As a group it was decided to leave as essential to measure for the potentially adverse effects as 'if you are putting in extra vehicle lanes it may reduce the options for other modes like cyclists so we should measure those reverse effects'.

#### **A4.4.6 Existing parking supply**

Existing parking supply is always essential 'because that is what you are taking out that is what you need to measure'.

#### **A4.4.7 Occupancy of existing parking**

It is essential whenever you are proposing parking removal to know its current occupancy as 'if it is not being efficiently used then we need to know that because there is a better case for using the space better but if it is highly used then we need to think more about the impact of removing it'.

#### **A4.4.8 Use of existing parking**

As above, knowing the purpose of visits to kerbside parking spaces is an important element of any debate around reallocation of the space.

#### **A4.4.9 Capital and operating expenditure**

It is essential to know capital and operating expenditure, as 'we expect whole of life and it is what all these other costs and benefits are being compared to when you are justifying spending the money'.

#### **A4.4.10 Parking revenues**

Participants believed parking revenue is a good piece of evidence to show to both councillors and local business owners to demonstrate there has been no reduction in visitors arriving in the area by car. From a council perspective it is important to show that a reduction in parking in the central city where there is an oversupply of car parking will have no impact on the overall revenue stream from paid parking spaces.

*It is essential to measure this because in many cases locally parking occupancy is very low so removing a set of parks when there are still more nearby has actually resulted in no loss of revenue.*

*We have to get our councillors to invest too and unless they see the benefit to individual ratepayers they won't invest in the project that I want them to.*

The difference between how paid and non-paid parking is viewed can be important also when seeking approval from elected officials. A previous example where unpaid parking was removed in the face of local business opposition may not have been approved if councillors had to deal with unhappy retailers and a potential loss of revenue from the parking spaces.

*This argument is somewhat of a red-herring. We don't have 100% occupancy and so if we take away some parks they are just going to move to another area and overall revenue won't change at all.*

#### **A4.4.11 Public transport revenues**

PT revenue was only considered to be essential for PT projects and unnecessary for the rest, although participants felt patronage is a better measure of economic costs and benefits to PT. Issues were cited with using revenue:

*What public transport revenue are you looking at? Over a route? Over a contract? Over the whole network? What revenue would you use? There are so many things that influence why and when people use the buses including the weather even that you would struggle to find a link between public transport revenue and removal or parking along one small section of the route.*

The central government's perspective of what makes a good or bad PT route is based on patronage. While these expectations may be difficult to achieve in Dunedin given a relatively low user base compared with Wellington and Auckland, participants felt it is currently the best measure of economic vitality for individual routes.

Following this 'Public transport revenues' were discussed as 'Public transport patronage' for the rest of the workshop. Table D.1 has been amended to show this while table D.2 has had a new factor appended that was discussed in tasks two and three.

#### **A4.4.12 Business income**

Business income was a much discussed factor at the workshop with participant views ranging from 'useful' to 'unnecessary' as a factor to include in economic evaluation of kerbside parking reallocation projects. The following quotes are from a number of participants who supported the majority view held in the room:

*I think that it is a dangerous connection that we make and it keeps getting reinforced. We say it is not directly related to the fact that people can park right outside the shop but if we then measure things in certain ways you give a lot of credence to it and the suggestion then is there is a connection to it.*

*We need to have a good way of communicating that to business owners, identifying the number of people actually using the space is an important economic indicator that could do this. I would want to avoid giving business income credibility by having it in there, I prefer footfall.*

*Personally I wouldn't say business income is essential. I would say it is possibly useful but at the end of the day you can bring a number of people to a shop but if they don't have the product that you want or the sales staff and customer service people won't buy full stop.*

*Just saying it increases our business or decreased our business revenue isn't a good reflection actually on what any change in parking has done. It is more about foot count*

*because that provides opportunity to run their business. Businesses go out of business all the time, I don't think you can rely on business income as a very good measure of parking influence because there is a range of things that drive central city economies.*

*From an integrated land use and planning perspective you want to avoid having revenue in there as a driver for projects.*

All participants cited experience dealing with central city business owners in Dunedin where removal of parking is often quoted as contributing to a 30% reduction in their business revenue. Without access to trading figures it is a difficult discussion to engage with in an informed manner.

*It has become the standard response and actually reported in the media so the public accepts it also. It is unlikely that we will ever be able to change this opinion because we do not have the figures so we need to move away from trying to combat it with evidence of our own by producing projects that have benefits that the public and business owners can easily notice.*

Tables D.1 and D.2 have added 'Pedestrian footfall' as a standalone factor that was discussed by the group across all tasks.

#### **A4.4.13 Surrounding land use and value**

Similar to including business income in economic evaluation of reallocation projects, participants felt that quantifying land values and rents is an unreliable measure as rents being demanded may not reflect the actual value of that space. Property markets also fluctuate based on a much wider range of factors than just the presence of any kerbside parking outside the front door. Additionally the question was asked:

*Is there a real risk when you equate increasing land values or rents with success as you may have actually priced existing tenants out of the market? You need to look at what good has actually been done and was this a desirable outcome if success has actually had very negative impacts on existing businesses. We already have problems where we can't get social services into local centres because it is so expensive. It might be great for the building owners but in small cities like Dunedin there is a need for affordable land and buildings in the central city.*

Alternatively land use was considered to be 'linked to urban amenity values when separated from land values and this along with accessibility is an important indicator of a successful central city'.

*If you are removing parking then often you are doing something to improve that area so you are probably going to end up with some kind of increase in value. But it's the perception of value versus what is actually attained that is important so the general improvement to amenity rather than the actual value of land that is what ratepayers are likely to respond to. There are other measures that you could use rather than land values that indicate the value of the project to adjacent buildings such as increased occupancy and investment in building improvements.*

Overall the group consensus was that land use and value is an unnecessary economic measure to include for cost-benefit analysis of reallocation projects as there are a range of other benefits that would better capture these such as pedestrian footfall user satisfaction with the new space.

#### **A4.4.14 Crashes (non- injury, injury, fatal)**

It is essential to measure crash data for walking and cycling modes across all projects as often improved safety is one of the main reasons for reallocating space for these modes as is happening on the State Highway 1 routes through central Dunedin. It is essential, when introducing extra vehicle lanes, to identify any unforeseen crashes in the carriageway as well as unintended negative effects for active transport users if there is now more traffic and less space on a route.

This is useful only for PT upgrades as it is unlikely to be a driver of projects but good to have the information in the event there are unexpected positive or negative outcomes for traveller safety.

#### **A4.4.15 Population health**

Participants all felt population health is a relevant measure to include in economic evaluation of projects, labelling it essential for cycling and walking modes and useful for PT and vehicle lanes. There are potential negative effects of extra vehicle lanes if they contribute to higher vehicle use and more sedentary lifestyles.

Everyone in the group struggled to identify how health outcomes could be quantified and included in any type of economic evaluation framework. There is a wide range of contributors to health and as one participant stated 'I find it difficult to accept the link that people are getting healthier because of one change when it is likely that they are getting healthier from a whole lot of other lifestyle changes as well'.

#### **A4.4.16 Usage assessment**

Usage is essential to understand for all modes. Participants stated that pedestrian footfall would be a key element of an evaluation for urban amenity improvements. The type of usage and how you will measure it is likely to be different for each mode and project type. It is important to understand public perspectives of how successful a project has been, 'if there is a perception that a lot of people are now using the space compared to before then it gives a lot of confidence that the area is thriving'.

#### **A4.4.17 User satisfaction**

User satisfaction is essential for all projects, although participants felt elements of this are captured in journey satisfaction and mode choice availability for PT users and travel time for vehicle drivers. Recreational cyclists may be more interested in the amenity values of a route compared with commuter cyclists so it is important to measure for this group of users.

#### **A4.4.18 Environmental impacts**

Environmental impacts relating to emissions from the vehicle fleet are important to consider when improving traffic flows or shifting people to more sustainable modes through reallocation of parking.

*If you introduce extra vehicle lanes then you should be reducing congestion for travel times improve and fewer vehicles are stationary idling leading to lower emissions. Moving people to cycling and walking modes will also have benefits if there are less cars on the road, the same for move people to public transport.*

*When you are justifying walking and cycling infrastructure health and the environment are often talking about a lot we just don't measure the direct effects well.*

#### **A4.4.19 Strategic transport goals**

It is essential to align with strategic transport goals when planning any transportation project.

#### **A4.4.20 Pedestrian footfall**

*This was an additional factor introduced during this workshop.*

It is essential to measure pedestrian usage for all projects. This was the group's preferred indicator of economic vitality as vibrant inner city areas that have high foot traffic are known to be more desirable destinations and likely to be home to thriving businesses. It is important to measure for all modes in order to better understand how different street layouts affect pedestrian numbers both positively and negatively.

**Table A.7 Dunedin workshop consensus of the relative important of the proposed costs and benefits related to kerbside parking reallocation projects**

Theme	Costs and benefits	Public transport	Cycling facilities	Walking, shared spaces & urban realm	Extra vehicle lanes
Mobility	Travel time	Useful	Essential	Useful	Essential
	Mode share	Essential	Essential	Essential	Essential
	Journey satisfaction	Essential	Essential	Essential	Essential
	Vehicle operating costs	Unnecessary	Unnecessary	Unnecessary	Useful
Accessibility	Mode choice availability	Essential	Essential	Essential	Essential
	Existing parking supply	Essential	Essential	Essential	Essential
	Occupancy of existing parking	Essential	Essential	Essential	Essential
	Use of existing parking	Essential	Essential	Essential	Essential
Economic	Capital and operating expenditure	Essential	Essential	Essential	Essential
	Parking revenues	Essential	Essential	Essential	Essential
	Public transport patronage	Essential	Unnecessary	Unnecessary	Unnecessary
	Business income	Useful	Useful	Useful	Useful
	Surrounding land use and value	Unnecessary	Unnecessary	Unnecessary	Unnecessary
Safety and health	Crashes (non-injury, injury, fatal)	Useful	Essential	Essential	Essential
	Population health	Useful	Essential	Essential	Useful
Urban amenity	Usage assessment	Essential	Essential	Essential	Useful
	User satisfaction	Essential	Essential	Essential	Essential
Environmental	Environmental impacts	Essential	Essential	Essential	Essential
Other	Alignment with overarching goals	Essential	Essential	Essential	Essential
	Pedestrian footfall	Essential	Essential	Essential	Essential

## A4.5 Group tasks two and three

Table A.8 presents the group consensus from tasks two and three. These saw participants comment on whether the costs and benefits in the proposed framework are currently measured and evaluated (task two) and if the required data/information to quantify these costs and benefits is readily available, cost effective to access/collect and reliable information (task three). Specific comments and discussion points for each cost and benefit are described below.

### A4.5.1 Travel time

For previous kerbside parking reallocation projects in Dunedin travel time is not something anyone in the group could remember being a part of any economic evaluation. PT projects often happen one stop at a time or along a small section of a route so the effect on travel time is often minimal. Cycling and walking infrastructure is never implemented with travel time as a driver so it is not included for these. Extra vehicle lanes are the most likely to benefit from any modelling of travel time for cost-benefit analysis but this would happen only on large projects with widespread removal of parking which has not taken place in Dunedin recently.

Modelling of travel time was undertaken for the proposed cycle lanes on State Highway 1; however, this was only because there was a need to change intersection signalling to provide cyclists with separation from cars at intersections and was not related to the reallocation of road space in itself.

Dunedin does have transport models that can be used so if travel time is considered an important factor on a larger project the information can be obtained quickly and relatively cheaply using the validated models.

### A4.5.2 Mode share

Mode share is measured at a city level at each census so the transport team can get an indication of how transport behaviour is changing over time due to a number of interventions but not the effect of a single project. The data is updated infrequently but is an accurate and cheap reflection of mode share in the city over time.

### A4.5.3 Journey satisfaction

Local quality of life and residents surveys are carried out annually in Dunedin and include questions on kerbside parking and central city; however, these are not project-specific indicators of journey satisfaction.

### A4.5.4 Vehicle operating costs

A study of vehicle operating costs has never undertaken on projects anyone in the room was familiar with although the formula is there in the EEM if required.

### A4.5.5 Mode choice availability

'We would normally consider what are the other transport options for people getting into that area.' Mode choice is taken into account when planning projects rather than during economic evaluation of them.

'There is an oversupply of parking in central Dunedin based on current stock of about 20,000 parks and the occupancy of these parks is low so there is no issue of availability for cars to drive in and park.'

Information about what infrastructure is currently provided is held by the council and easy to get hold of.

### A4.5.6 Existing parking supply

The existing parking supply is always measured and taken into account based on council data.



#### **A4.5.7 Occupancy of existing parking**

Parking occupancy is always measured and taken into account based on council data obtained through parking beat surveys that are carried out every six months to annually.

#### **A4.5.8 Use of existing parking**

'We use information on duration of stay and our parking beat surveys to determine what people parking in the city are there to do.' This does not extend to estimating expenditure by vehicle but is a good reflection of activity.

#### **A4.5.9 Capital and operating expenditure**

Capital and operating expenditure is always estimated for whole-of-life costs.

#### **A4.5.10 Parking revenues**

When paid parking is going to be affected, parking revenue is always considered and is an important factor that councillors want to know about.

#### **A4.5.11 Public transport revenues**

PT revenue is never taken into account. The information exists but it would be difficult to calculate for a single route and relate to improvements that result from a single reallocation project unless the scale is very large.

#### **A4.5.12 Business income**

Some information on business income exists, but it is not accurate enough to the detail required so 'we never measure it because we don't have the information to do it properly'.

#### **A4.5.13 Surrounding land use and value**

Land value is never taken into account but land use is. Participants wanted to be clear on this point that the two should be treated as separate costs and benefits. Land use adjacent to a project site is easy to evaluate and monitor.

#### **A4.5.14 Crashes (non- injury, injury, fatal)**

Crashes are sometimes reported on depending on the type of upgrade, For a bus stop there may be no assessment undertaken, but in the case of a cycle lane it would be likely as safety is a key measure. Safety audits for improved pedestrian facilities are carried out that include crash data in them. Crash data is easy and free to obtain from the CAS system.

#### **A4.5.15 Population health**

Participants agreed that quantifying population health effects is likely to becoming more important to the evaluation of transportation projects in the future. This would require significant investment in order to develop more accurate measures of direct links between transportation and health than are currently available and used.

*I would like to think we will but we haven't yet. It is something that is considered but not measured because we don't have the tools to do that at the moment.*

*You have to trade-off between existing estimates of benefits with the value of developing a new measure that is likely to be costly.*

Population health was cited as something that is considered at a strategic level but not at a project level because the detail is too fine.

#### **A4.5.16 Usage assessment**

*Not for all but ideally it would be for all. It is related to the amount of funding available for each project.*

Usage assessments have been carried out previously for larger projects where the effect of a change is monitored over time. Pedestrian counts are carried out at least annually in the central city and allow for assumptions to be made about the impact of different schemes in the area. This measure requires ad-hoc surveying that may be an annual snapshot or project-specific evaluation.

#### **A4.5.17 User satisfaction**

The Dunedin quality of life and opinion surveys are taken into account when planning projects. These are infrequent but considered a reliable indicator of public attitudes towards past projects and their appetite for future ones.

#### **A4.5.18 Environmental impacts**

Air quality and water quality for example are monitored at a city level but project-specific environmental impacts beyond potential adverse effects during construction and direct effects of runoff and noise are not measured.

#### **A4.5.19 Strategic transport goals**

Strategic transport goals are always taken into account.

#### **A4.5.20 Public transport patronage**

*This was an additional factor introduced during this workshop.*

PT patronage is sometimes taken into account if large changes to a route or the network are proposed.

#### **A4.5.21 Pedestrian footfall**

*This was an additional factor introduced during this workshop.*

Pedestrian usage is always surveyed on an annual basis and also following specific projects.

**Table A.8 Dunedin workshop consensus on currently evaluated costs and benefits and the availability and quality of required information or data**

Theme	Costs and benefits	Currently measured and evaluated?	Readily available?	Cost effective to access/collect?	Reliable?
Mobility	Travel time	Never	Yes	Yes	Yes
	Mode share	Sometimes	No	Yes	Yes
	Journey satisfaction	Sometimes	No	Yes	No
	Vehicle operating costs	Never	Yes	Yes	Yes
Accessibility	Mode choice availability	Sometimes	Yes	Yes	Yes
	Existing parking supply	Always	Yes	Yes	Yes
	Occupancy of existing parking	Always	Yes	Yes	Yes
	Use of existing parking	Always	No	Yes	Yes
Economic	Capital and operating expenditure	Always	Yes	Yes	Yes
	Parking revenues	Always	Yes	Yes	Yes
	Public transport revenues	Never	No	No	Yes
	Business income	Never	No	No	No
	Surrounding land use and value	Always	Yes	Yes	Yes
Safety and health	Crashes (non-injury, injury, fatal)	Sometimes	Yes	Yes	Yes
	Population health	Never	No	No	No
Urban amenity	Usage assessment	Sometimes	No	Yes	Yes
	User satisfaction	Always	No	Yes	Yes
Environmental	Environmental impacts	Never	No	No	No
Other	Alignment with overarching goals	Always	Yes	Yes	Yes
	Public transport patronage	Sometimes	No	Yes	Yes
	Pedestrian footfall	Sometimes	No	Yes	Yes

#### A4.6 Would a framework like this help with decision making and/or planning of kerbside parking reallocation projects?

All comments made by participants in response to this question are quoted in full below.

*There is an element of having a strategic framework that has undergone public consultation and sets a platform for future development. A framework like this provides the tools for decision makers to make decisions based on good evidence.*

*Having an easily laid out framework is useful in the real world because not every project is the same, but it makes it easy to look at what is relevant to my project. It gives everyone the same starting point.*

*It means that we have the right evidence which is different from a lot of evidence. Having the right evidence means there is no wriggly room for politicians to back down if they are under a lot of pressure. Having direct and simple answers that they can use to respond to concerns held by business owners or drivers like 'yes we are removing parking from this spot but there are 2,000 parks around the corner that are only 40% occupied' would be really great.*

*If you can get some sort of guidance to be able to say 'well this is what NZTA believes is important to consider' it gives it some credibility. It is easy to blame the council and currently in Dunedin there is an, at times, very heated debate going on over the costs and benefits of removing parking so some guidance from government is good to have.*

*At the moment there is no consistent framework for how councils around the country can approach these projects so having the Transport Agency take a lead role in providing a better quality platform takes some of the pressure off individual councils when they are having these discussions.*

*It looks like we are very good at measuring the easy to measure things like how many parks will be lost and how much revenue do they bring in rather than measuring the more important things like how does this contribute to the council's and communities' vision for Dunedin? Too often it comes down to 'we are going to lose this, this, and this'.*

*It is about giving the tools to the councillors to make decision based on the right costs and benefits. The most difficult challenge we face is combating the perspective of owners that removing parking will reduce revenue by 30%. We need to decide what parameters we need to make our case around and this is likely not going to include the direct effect on local business revenue. In this case we need to leave it to them to actually prove their case as we do not have access to their financial information. If we can demonstrate the costs and benefits we know to be based on good evidence and get buy-in from councillors, then hopefully this is enough to have good decisions made.*

*There appears to be a gap between the weight given to the opinion of shopkeepers over the opinion of the wider community. We need to measure the latter more so that we can better communicate the desire for projects among the majority.*

*Any information that is gathered under a framework like this needs to be in an accessible format and if it is too academic based it will likely be discounted by business owners and the public. We need something that contributes to collecting local evidence that is easy to interpret.*

*Also if we quote research that has been done elsewhere like Jean Beetham's work in Wellington then everyone says 'well that's Wellington' but if we had evidence from a wider range of cities that includes Dunedin that the NZTA has helped to develop then we have a much stronger position to stand on.*