

## CONFERENCE PAPER

# A QUALITATIVE ANALYSIS OF CBD SHARED STREET SPACES USING PERCEPTION SURVEYS

Benjamin Wilshere

Graduate Engineer – Fulton Hogan

Email: [Benjamin.Wilshere@gmail.com](mailto:Benjamin.Wilshere@gmail.com)

Presenter and Primary Author

Dr Douglas James Wilson NZCE, BE(Civil, Hons), PhD, MIPENZ, PIARC, REAAA

Senior Lecturer in Transportation Engineering, The University of Auckland

Email: [dj.wilson@auckland.ac.nz](mailto:dj.wilson@auckland.ac.nz)

Second Author

Auttapone (Aut) Karndacharuk BE(Civil), ME(Civil, Hons), MIPENZ, CPEng

Principal Consent Specialist, Auckland Transport

Email: [auttapone.karndacharuk@aucklandtransport.govt.nz](mailto:auttapone.karndacharuk@aucklandtransport.govt.nz)

Third Author

## ABSTRACT

The shared space concept is one response to the realisation of the adverse environmental and social impacts of designing streets primarily for vehicle priority. While the concept has been used internationally for some time, it has only been recently introduced to New Zealand, and there does not yet exist a framework to monitor and evaluate the effectiveness of shared spaces in a New Zealand context. This paper reports upon a Bachelor of Engineering (Civil) final year research project that formed part of a doctoral research programme at the University of Auckland and included collecting and analysing the qualitative data required to develop the shared space evaluation framework.

Interviews were conducted with industry professionals from the fields of Planning, Urban Design, and Transportation Engineering, and user perception surveys were conducted on-site with pedestrians at Elliott Street, Lorne Street, Fort Street (three Auckland CBD shared spaces), and O'Connell Street (a conventional control street) in the Auckland CBD area. The research demonstrated that the shared spaces are performing well, but the Lorne Street space has some potential for improvement. It was also found that different professional experience influenced designers' perspective on some key elements of shared space design and operation.

The research concluded that the main factors influencing the shared spaces in Auckland are land usage, street design, traffic volumes, and operational policies.

## 1.0 INTRODUCTION

In 2009, the former Auckland City Council proposed turning a number of Auckland CBD streets into 'shared spaces', where pedestrians, cyclists and vehicles can all share the same public street space without any physical separation (Shearer, 2011). During these redevelopments, signage and road markings were removed, street furniture installed, and the traditional kerb and footpath layout replaced with a level paving surface (Auckland Transport, 2012).

The function of shared spaces differ significantly from conventional streets because they are intended to be destinations in themselves, along with the conventional street functions of movement and access (Karndacharuk et al, 2011). For this reason, shared spaces cannot be evaluated as conventional streets historically have been. Because the shared space concept has only recently been introduced to New Zealand, no framework currently exists to properly evaluate shared spaces in the New Zealand context, nor internationally. A doctoral research study at the University of Auckland began in 2009 to develop this framework, and this BE(hons) final year research project forms part of that study.

A primary goal of the research was to qualitatively analyse three Auckland CBD shared spaces; Elliott Street, Lorne Street, and Fort Street, in order to gather qualitative data that could be used to develop the framework to assess New Zealand shared spaces. A fourth street, O'Connell Street, was used as a traditionally designed 'control street' against which the shared spaces could be compared. A combination of on-street pedestrian perception surveys and interviews with industry experts was used.

## 2.0 REVIEW OF LITERATURE

### 2.1. Background on Shared Space

A review of the literature revealed that there is significant variance in the understanding of the shared space concept and its application, leading to a plethora of designs and approaches in many different contexts around the world (Hamilton-Baillie, 2008a). However, all such applications follow the same unifying principle, which is to integrate human activity within the road reserve, including multi-modal movement, recreation, and dining (Karndacharuk et al, 2011).

The first application of the shared space concept dates back to experiments carried out in The Netherlands in the late 1960s, which were undertaken to reduce the adverse social impacts of traffic flows on public spaces (Hamilton-Baillie, 2008a). These experiments proved popular, and the shared space concept spread out over continental Europe over the following decades (Hamilton-Baillie, 2008a). The concept spread to the UK in the 1990s, manifesting as the "Home Zone" (Hamilton-Baillie, 2008a), and proved highly successful.

The success of these schemes, to a degree, led the former Auckland City Council to redevelop the Elliott, Lorne and Fort Street areas into shared spaces as part of a CBD streetscape upgrade programme initiated in 2004 as a lead up to the 2011 Rugby World Cup (Shearer, 2011).

### 2.2. Evaluating shared spaces

Ongoing monitoring and evaluation of a street is an important part of the design process (Department for Transport, 2007). However, before any robust evaluation can occur, objectives need to be set for the street to be evaluated against (Department for Transport, 2007). Conventional roads are commonly assessed against how well they achieve two main functions: mobility, referring to how well the road provides vehicle thoroughfare, and access, which describes the road's ability to facilitate access to surrounding land uses (Litman, 2012). In a shared space, a third 'place' function is introduced, which refers to the ability of the road to act as a destination in itself (Karndacharuk et al, 2011). This is illustrated in Figure 1.

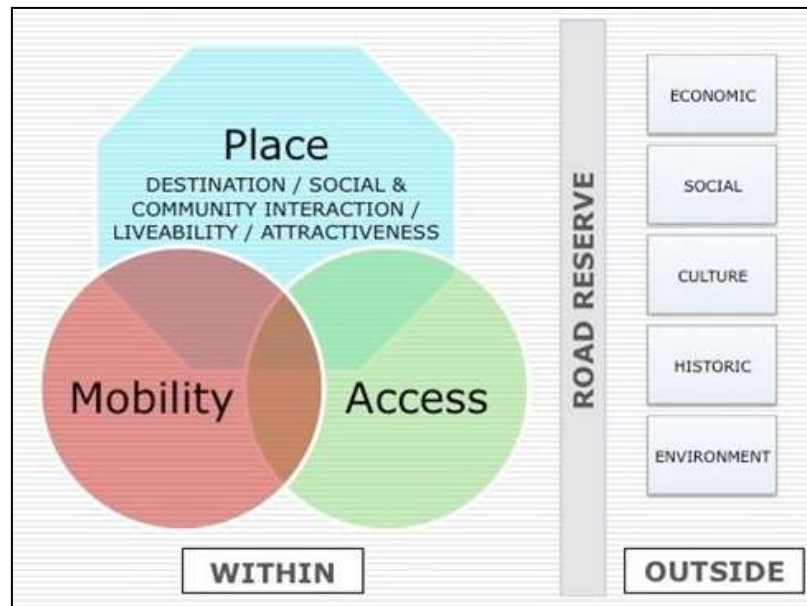


Figure 1: Shared space functions inside and outside the road reserve (Karndacharuk et al, 2011)

The introduction of this third function means that Shared Spaces cannot be evaluated as conventional streets are. Thus, the objectives used to gauge their success need to be chosen carefully, to account for all three functions of shared space. The objectives used for the doctoral research for shared space evaluation in New Zealand were:

- Placemaking, which refers to the quality of the environment, and its overall attractiveness to pedestrians
- Pedestrian Focus, which concerns improving pedestrian priority within the space, so that pedestrians can freely roam the street
- Vehicle Behaviour Change, which is concerned with reducing the dominance and priority of vehicles within the space
- Economic impetus, measuring how the space complements the land uses surrounding it
- Safety for all users.

These objectives were used for this investigation. They are also supported by the research literature, such as the UK's *Manual for Streets* (Department for Transport, 2007).

### 2.3. Factors Influencing Shared Space Success

Shared space has been identified as a highly complex and context sensitive concept to implement (Flow Transportation Specialists, 2012). However, the most important factors that influence shared space performance are reasonably well established.

Vehicle speeds are considered to be the most important factor in determining the success of a shared space (Flow Transportation Specialists, 2012). Guidance from the UK suggests an operating speed of less than 24km/h (15 mph) to ensure that sharing of the space can occur (Department for Transport, 2011). There are conflicting views on how this speed reduction should be achieved. Some advocate using traditional traffic engineering measures, such as chicanes or speed humps (Department for Transport, 2011), while others believe that the space should be left as ambiguous as possible and rely on pedestrian activity to slow drivers (Hamilton-Baillie, 2008b).

Traffic volumes also affect shared space performance and influence its design. Low traffic volumes are preferable (Department for Transport, 2011), however elements of the shared space concept have been successfully implemented on higher traffic volume roads (Flow Transportation Specialists, 2012). Traffic volumes can be influenced through parking policy and consideration of where shared space is implemented on the road network (Department for Transport, 2011)

Several design aspects are also considered to be major influences to shared space success. Such factors include the demarcation between footpath and carriageway (Department for Transport, 2011), the transition between shared space and conventional streets (Flow Transportation Specialists, 2012), and the geometric design of the street (Department for Transport, 2011).

Designing shared spaces to accommodate vulnerable users – particularly the visually impaired – has become a major issue in the UK after some schemes' failed to do so leading to litigation by institutes for the blind (Moore, 2012). Ensuring that the spaces are safe is vital to their success (Department for Transport, 2007).

Finally, while it is generally outside the power of the designers to influence it, the land use surrounding the street is also an important factor in its success (Department for Transport, 2011).

## **2.4. Evaluation of New Zealand Schemes**

While some evaluations of the Auckland CBD schemes have been undertaken by Auckland Council, these have been mostly quantitative in nature, and have been limited to single sites (Auckland Transport, 2012). There is also a lack of information regarding what factors are influencing the performance of shared space schemes in the New Zealand context.

With the help of the literature outlined above, this research project seeks to obtain views from both users and designers of the Auckland CBD shared spaces, to determine how well these spaces are performing and what factors influence their performance.

## **3.0 METHODOLOGY**

The data collection methods used for this investigation were a combination of interviews with industry professionals (hereafter referred to as 'expert interviews'), and on-street pedestrian perception surveys ('perception surveys').

### **3.1. Research Background**

To gain a deeper understanding of shared spaces and to assist in the development of the data collection tools, a comprehensive literature review was undertaken to determine how shared spaces operate, what influences their operation, and how they have been evaluated overseas.

Prior to data collection, the research was reviewed and approved by The University of Auckland Human Participants Ethics Committee (UAHPEC). To achieve this, Participant Information Sheets (PIS) and Consent Forms (CF) were produced. These forms informed participants of the nature of the research, their level of anonymity and data protection, and their rights as participants.

### **3.2. Expert Interview**

The aim of the expert interviews was to gain professional practitioners' perspectives on how the Auckland CBD shared spaces are performing, and to determine what factors affect their performance. The outcomes of the literature review were used to develop the interview script, which was designed to evaluate the shared spaces against the five objectives listed in Section 2.2.

Fifteen interviews in total were conducted. Semi-structured, open-ended questions were used to ensure that comprehensive responses were attained. To obtain a diversity of perspectives on shared space design and operation, a wide variety of professionals were interviewed. Participants included transport engineers, planners, and urban designers both from private and public organisations.

Participants were chosen from the professional contacts of the authors. They were initially emailed an expression of interest. This was followed up with an email containing the PIS and CF, to allow the participant to make an informed decision on whether to participate in the research. Once the participant accepted, the interview time and location was arranged.

Interviews were audio recorded and transcribed into main points. The transcript was then sent to

the participant for their review, to ensure that the interview transcription accurately portrayed their views. After all of the interviews had been transcribed, NVivo<sup>1</sup> was used to analyse the transcripts and find common themes and answers expressed by the participants.

Interviewees were sorted into two main groups: ‘transport engineers’ and ‘urban designers’ (including planners). This was done to separate participants who had a technical engineering background from those who did not, to determine if their professional background and experience influenced their views. If no clear consensus within these groups emerged, the background of each participant was inspected individually.

### 3.3. On-Street Perception Surveys

On-street perception surveys were used to determine how pedestrians in each shared space perceived the performance of the street, to complement the outcomes of the expert interviews. Users were queried on their perceptions of the performance of the spaces against the five objectives listed in Section 2.2., including which of them was most important and least important to them. A Likert scale was used to directly assess the five performance aspects, with stronger agreement indicating better performance in that aspect. The survey sheet is shown in Figure 2.

**Auckland Transport**  
An Auckland Council Organisation

**THE UNIVERSITY OF AUCKLAND**  
NEW ZEALAND  
Te Whare Wānanga o Tāmaki Makaurau

**The Development of a Multi-Faceted Evaluation Framework of Shared Spaces**

**Sheet A : On-Street Perception Survey**

Please circle the option best describes your opinion towards the following five statements.

1) Place: "I like spending time in this street"	-3	-2	-1	1	2	3
2) Pedestrian: "I can freely move around on this street"	-3	-2	-1	1	2	3
3) Vehicle: "Driver behaviour is appropriate in this street"	-3	-2	-1	1	2	3
4) Economic: "This street complements the economic activity"	-3	-2	-1	1	2	3
5) Safety: "I feel safe and secure in this street"	-3	-2	-1	1	2	3

Please further provide us with your impression about this street space and your background information

6) Of the five aspects above, which are the most important ( ..... ) and least important ( ..... ) ?

7) Of the five aspects above, which do you feel could be most improved, and why?

8) What, in particular, do you like most about this street space?

9) How often do you visit this street?

First visit / Very infrequently       Around once a week  
 Around once a month                       Multiple times a week

10) Why have you visited this street today? (e.g. passing through, shopping or eating)

11) Age:  under 20    20 – 34    35 – 49    50 – 65    over 65

12) Gender:  Male       Female

13) Ethnic group:  NZ European    Maori / Pacific Islands    Asian  
 Other .....

Figure 2: Questionnaire used in on-street perception surveys

<sup>1</sup> A qualitative data analysis computer software suite, designed for analysis of text-based information

The questionnaire was offered to pedestrians at each of the four study areas. Surveying was conducted on both weekdays and weekends, and at various times during the day, to capture any temporal variations in shared space use and performance. Surveying was conducted in pairs, with one surveyor at each end of the street area being surveyed. Each surveyor then approached the 5<sup>th</sup> pedestrian that walked into the study area from their side, to prevent any sampling bias. This continued until at least 25 samples had been obtained from each surveying session.

The survey data was analysed using SPSS (a statistical analysis software package often used in the social sciences). Mean and median pedestrian perceptions of each of the five aspects were extracted, and used as indicators of the performance of the spaces. Spearman's rank was used to find correlations between different variables and the Mann-Whitney U test was used to compare median perceptions between different sites and time periods.

### 3.4. Relationship between Expert Interview and On-Street Perception Surveys

The research focussed on analysing the outcomes of the expert interviews and supported them with the results of the on-street perception surveys. The final outcomes of the research were built upon combining the data collection methods and comparing their outcomes against overseas literature.

## 4.0 FINDINGS

### 4.1. Data Collection Summary

The research obtained enough data for statistical analysis. The goal of the research was to obtain 100 samples from each site; however this was not achieved at O'Connell Street (the control site) due to the limited resources of the project. The number of responses collected is shown in Table 1.

Location	Responses
Elliott Street	122
Lorne Street	121
Fort Street	146
O'Connell Street (control)	42

Table 1: Survey responses from each site

A total of 15 expert interviews were conducted. Figure 3 shows the distribution of interviewees from each field of study. It shows that although the majority of the interviewees were engineers, the researchers were able to gain insights and opinions from a variety of industry professionals.

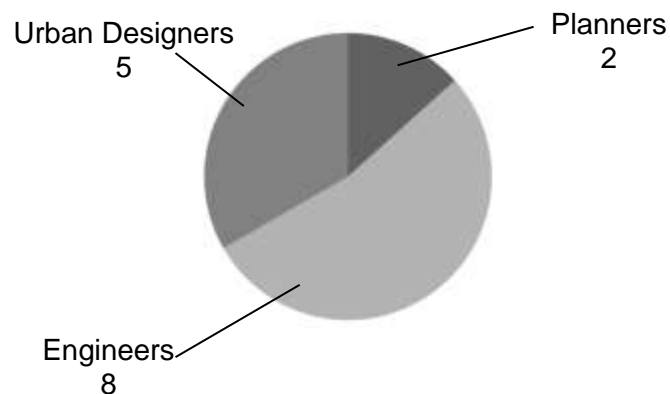


Figure 3: Distribution of interviewees from each field

Interview participants also had varying experiences with shared spaces. It was found that among the participants there were three main groupings of involvement in shared spaces in New Zealand:

- Direct professional involvement in the development of the Auckland CBD shared space schemes
- Substantial professional involvement in shared space schemes in suburban or residential areas of Auckland, such as Totara Ave in New Lynn
- Little or no professional involvement in shared space development.

Figure 4 shows the proportion of interview participants within each of these groups.

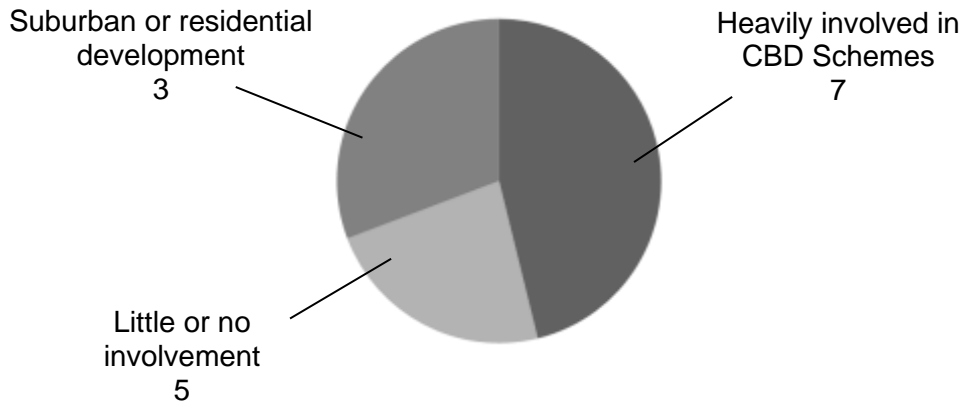


Figure 4: Distribution of interviewees by professional involvement in shared space

This ensured that an assortment of insights and experiences were incorporated into the research. However, care was taken when applying the views of those with little or no involvement with CBD shared space schemes as such schemes were the primary focus of this investigation.

#### 4.2. Overall shared space performance

There was a strong consensus among the expert interviewees that the shared spaces are, overall, performing well and contributing positively to the vitality of the CBD. Figure 5 shows that the outcome of the on-street perception surveys support such findings (stronger agreement indicates better performance); the shared spaces generally outperformed the control street, which represents a conventional street.

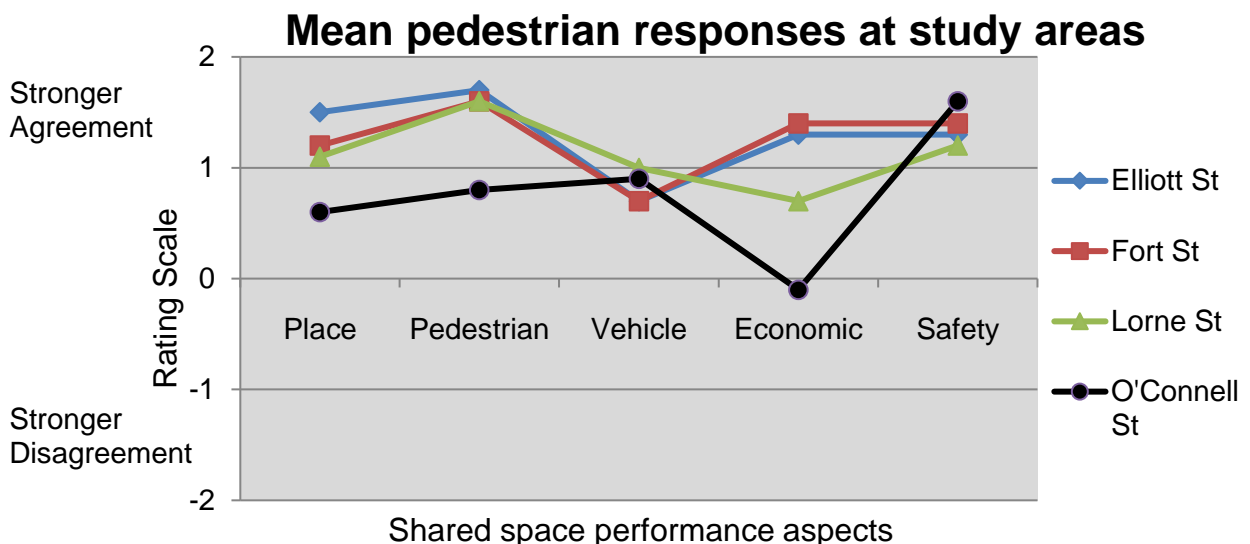


Figure 5: Mean pedestrian perceptions of the performance of the study areas

It is noted that the shared spaces did not outperform the control street in the vehicle behavior and safety measures. This is addressed in Sections 4.3-4.8, which examine each of the five aspects of shared space performance in detail.

#### 4.2.1. Temporal Variations

Survey responses showed no statistically significant variations in user perceptions across different time periods. For this reason, it was deemed suitable to aggregate together all of the responses from each site for analysis.

#### 4.2.2. Shared space objective ranking

The primary researcher sought input on the relative importance of each of the five shared space objectives. To that end, expert interviewees were asked to rank them from most important to least important. The outcomes of this were:

- Placemaking was the most or second most important objective for 80% of participants
- Economic Impetus was ranked 4<sup>th</sup> or 5<sup>th</sup> by 80% of participants
- There was little consensus on the ranking of the remaining three objectives (Pedestrian focus, vehicle behaviour change, and safety)

Some of the justifications that participants provided for their rankings were:

*“Safety is important, but if you excessively design for safety, you’ll have something that looks like a motorway interchange”*

*“Vehicle behaviour change is last, because if you achieve the other four objectives, the behaviour change will follow”*

*“Safety is most important; if you don’t create a safe environment, no one will use the space”*

These findings illustrate the difficulty in ranking the objectives. Analysis of the transcripts reveals that some professionals may have ranked the objectives from a design perspective, while others may have ranked them from an operational perspective. This could have affected the reasoning behind their rankings. For example, ‘Economic Impetus’ is not a distinct design element, but from an operational perspective it is an important indicator of shared space performance.

To garner a user’s perspective, pedestrians were asked about which of the five aspects were most and least important to them as part of the perception survey process. The majority of pedestrians responded that safety was most important to them, and Placemaking or Economic Impetus to be least important. However there was no clear consensus and the results reinforce that ranking the five objectives is a complex issue.

#### 4.2.3. Shared Space Definition

To provide insight into how the expert interviewees viewed shared space, they were asked to give their definition of it. While all of the professionals agreed that the overall goal of shared space is to create a pedestrian friendly environment, they disagreed on some finer details. Particularly, they disagreed on priority within the spaces. 53% defined the spaces as being equal priority, 20% defined them as being pedestrian-oriented, and the remaining 27% explicitly defined pedestrian priority within the space.

This distribution appears to conflict with the Land Transport (Road User) Rule, which governs shared space operation in New Zealand. The rule states that *“A driver... must give way to a pedestrian in the shared zone”* (New Zealand Government, 2004). Auckland Council also explicitly states that pedestrians have right of way in shared spaces (Auckland Council, 2013a).

### 4.3. Placemaking

Expert Interviewees felt strongly that the Elliott and Fort Street spaces were highly attractive environments, but thought that Lorne Street was underperforming in this regard. This was commonly attributed to land use; Fort and Elliott Streets have a myriad of bars, cafes, and restaurants scattered throughout them, which draw pedestrians into the space and provides street activity. Conversely, Lorne Street is dominated by the Auckland Central Library on one side, and the blank facade of the back of the St James Theatre on the other, giving pedestrians little reason to dwell in the space. The professionals felt that this gave the street a barren and lifeless



appearance. One interviewee clearly spelled out this effect by saying:

*“The least successful of the shared spaces is Lorne Street, simply because you don’t have a high level of activation on both sides of the street”*

Accompanying this, interviewees noted that placemaking is highly complex and context sensitive, and land use is only one of many factors that affect shared space attractiveness.

When the professionals were asked whether adequate street furniture and pedestrian facilities had been provided in the spaces, the prevailing response was that a fine balance had been struck in providing those elements while not cluttering up the street. Both users and professionals expressed that the streets lacked greenery and had a drab, grey appearance; but this was strongly rebutted by one interviewee, who said:

*“All streets are grey; the cobblestones of Venice and Rome, and the piazzas of the great cities of the world, are all grey...the colour of the city is its people, and its buildings; the paving is merely a canvas”*

Interviewees unanimously responded that the deliberate approach to keep the streets open and uncluttered had succeeded in allowing the spaces to cater for a wider range of street activities, such as markets and events. However, many of the professionals felt that the council had not properly taken advantage of this feature.

#### 4.3.1. Comparison with pedestrian surveys

The results of the on-street pedestrian surveys are illustrated in Figure 6.

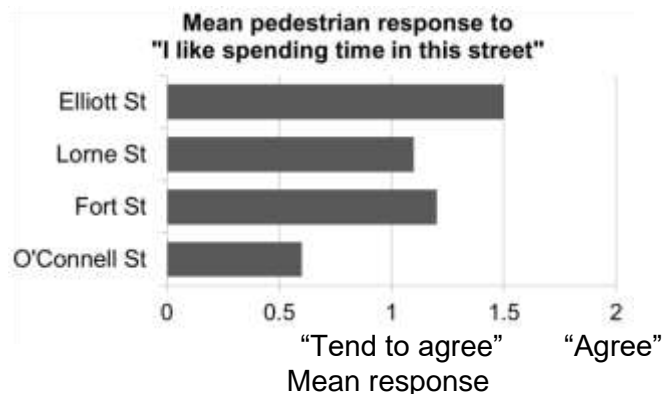


Figure 6: Mean pedestrian perceptions of attractiveness at study areas

Figure 6 shows only minor differences between the three spaces, despite the expert interview consensus that Lorne St is easily the least successful of the three. This may be due to the complex nature of placemaking; the attractiveness of the library frontage, the design of the street itself, or a variety of other factors that may be affecting pedestrian perceptions. Similar factors may be influencing the positive perceptions recorded at O'Connell Street.

#### 4.4. Pedestrian focus

Professionals agreed that the shared spaces were all giving pedestrians freedom to roam throughout them, though some responses were caveated. Regarding Fort St, one professional explained that some of the outdoor dining along the street had become permanent, hindering pedestrian movement through the space. This was attributed to poor licensing conditions. Another mentioned that pedestrians in Lorne St occasionally lack the confidence to cross the street due to the lack of pedestrian activity. This was attributed to the poor land use abutting the street.

Most professionals felt that the legal regulations around shared spaces in New Zealand are sufficient. However, they noted that creating an environment which is clearly different to a conventional street is a much better way to influence user behaviour than through legal regulation.

#### 4.4.1. Comparison with perception surveys

The interview responses matched the findings of the pedestrian perception surveys, illustrated in Figure 7, which show that the shared spaces outperformed the control street.



Figure 7: Mean pedestrian perceptions of freedom at study areas

Overall, the combined results show that the shared spaces can be considered to be successfully providing freedom to pedestrians. This can be attributed to the designers' deliberate approach in ensuring that the streets are free of cluttering elements.

#### 4.5. Vehicle behavior

Vehicle behaviour proved to be a contentious issue amongst those interviewed, with some significant disagreements being uncovered.

The professionals agreed that the driver behaviour was generally appropriate during the day, when pedestrian volumes were sufficient to reduce vehicle speeds. However, at off-peak time, when pedestrian activity decreases, it was asserted that vehicle speeds increase. Some of the professionals highlighted this as a safety issue; however others disagreed, claiming it to be merely users of the space adapting to changing conditions. When asked what vehicle operating speeds are acceptable for shared space operation, there was consensus that lower speeds (10-20km/h) were preferable, however it was again found that the professionals disagreed on whether speeds above this range were an issue.

##### 4.5.1. Parking

A range of opinions were received regarding what parking should be provided in the spaces. Views ranged from strict enforcement of a no-parking policy, to allowing parking within the spaces up to one hour. Those who felt that there should be no parking justified their position by claiming that the parking restricted pedestrian freedom, while proponents of parking felt that it increases the flexibility and usability of the space. All interviewees agreed that the 'loading time' that applied between 6am and 11am was a successful mechanism to supply local businesses.

##### 4.5.2. Linearity

Interviewees disagreed over how to achieve lower speeds within the spaces. Some felt that traditional traffic engineering measures (such as horizontal or vertical deflections) should be used to enforce lower speeds within the space. Others felt that instead designers should rely on pedestrian activity to slow vehicles. The latter group had three main justifications for this position:

- The use of extensive traffic engineering measures contradicts the shared space concept
- Introducing such measures would lead to drivers focussing on avoiding them, rather than interacting with other users of the space
- Such elements are detrimental to the aesthetics of the space and limit pedestrian freedom.

Some members of that group also warned of the dangers of mistaking the *perception* of a lack of safety for fact, with one participant saying:

*“There is a perception that because drivers can see from one end of the street to the other, they are going to drive as fast as they can. Show me the data. Show me the accidents.”*

Comparing the responses of the professionals with quantitative data leads to some interesting insights. Traffic data recorded in Elliott St in 2011 and 2012 confirms interviewee assertions that vehicle speeds increase during off peak times; mean vehicle speeds peak at approximately 22km/h at 6am and 9pm, up from below 15km/h during the early afternoon (Karndacharuk, 2014). However, at these times traffic volumes are reduced and pedestrian volumes are at their minimum. This results in fewer interactions between vehicles and pedestrians.

While crash records show no reported accidents at the shared spaces thus far (Karndacharuk, 2014), little can be inferred from this due to high rates of crash underreporting in pedestrian environments (Turner et al, 2006) and the short time that the spaces have been operating.

It therefore could not be conclusively determined whether a safety risk exists at off-peak times. The transcripts were analysed further to determine what factors may be influencing the views of the professionals. Some of the outcomes of this analysis were:

- Those who had heavy involvement with suburban-type shared spaces where lower pedestrian activity is expected (such as Totara Ave in New Lynn) all argued FOR traffic engineering measures
- Amongst those who had heavy involvement in the CBD spaces, professionals were split 50-50. Their educational background appeared to have little influence on their view; there were urban designers and traffic engineers in both camps.

The findings re-iterate that shared space design is context sensitive; as it appears that the contexts where the interviewees had been involved with shared space have influenced their views. The educational background of the expert interviewees appeared to have no bearing on their views.

It is not the aim of this investigation to determine which of these approaches is correct. Instead, a rigorous, evidence-based approach is recommended for determining whether to include such measures in future shared spaces in New Zealand.

#### *4.5.3. Comparison with perception surveys*

The responses of the professionals were compared those of the pedestrians. The pedestrian perception survey data yielded very consistent and positive responses at all four study areas. Little could be gained from this comparison, due to the framing of the question. Pedestrians were asked whether they thought driver behaviour was ‘appropriate’ in the street. Since O’Connell St is a conventional street, appropriate driver behaviour is very different than when in a shared space. A similar logic applies to Lorne Street – it is much emptier than Fort St and Elliott St, so driver behaviour there would be expected to be different. It is also noted that pedestrians who feel that driver behaviour was unsafe may be avoiding the spaces, causing a sampling bias.

## **4.6. Economic impetus**

Interviewees were asked about some economic aspects of shared space: how the current spaces are performing, what land usage types are best for shared space, and how much active frontage is needed for shared space success. Responses to these questions were all very consistent.

The professionals agreed that the Fort and Elliott schemes are successfully complementing their surrounding businesses. However it was again noted that Lorne St is underperforming due to the lack of commercial land use on the street. Such views correlate well with quantitative assessments undertaken by Auckland Council, which show significant turnover and rent increases after the implementation of shared space in the Fort and Elliott St areas (Auckland Transport, 2012). However, little data has been received from Lorne St due to its lack of commercial land uses.

It was also agreed that the quality and type of land use is important. Hospitality and high-quality retail were agreed to be most optimal for shared spaces, as they provide a wide range of activities. The need to have a mix of land uses that would draw pedestrians into the space at all times of the day was also highlighted. Interviewees also noted that there should be as much activated frontage

along the street as possible, and spread throughout the street.

4.6.1. Comparison with perception surveys

The findings compare well with results from the perception surveys, shown in Figure 8.

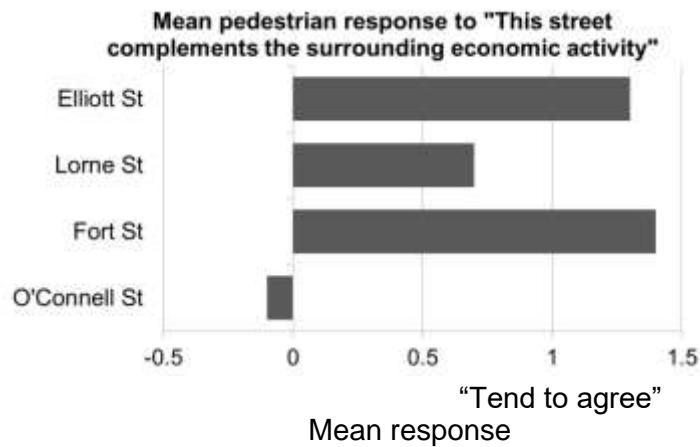


Figure 8: Pedestrian perceptions of economic impacts of shared space

The on-street perception surveys show the shared spaces out-performed the control street, and that Lorne St is underperforming relative to Fort and Elliott Street.

4.7. Safety

This was seen as an important issue by the professionals, and they were highly positive about the shared space schemes in this regard. In particular, they felt that the shared space designs had catered exceptionally well to vulnerable and impaired users – to the point where many felt that we are leading the world in this aspect of shared space design. This was attributed to the development of the ‘safe zone’ which runs along each building line of the Auckland CBD shared spaces. This approach was described as a major innovation in shared space design. These sentiments were shared by the disability groups themselves, who commended the designers on the design and consultation process.

4.7.1. Comparison with perception surveys

Many of the professionals responded that it is important to gather the users’ perspective on the safety of the spaces. The findings from the perception surveys are shown below, in Figure 9.

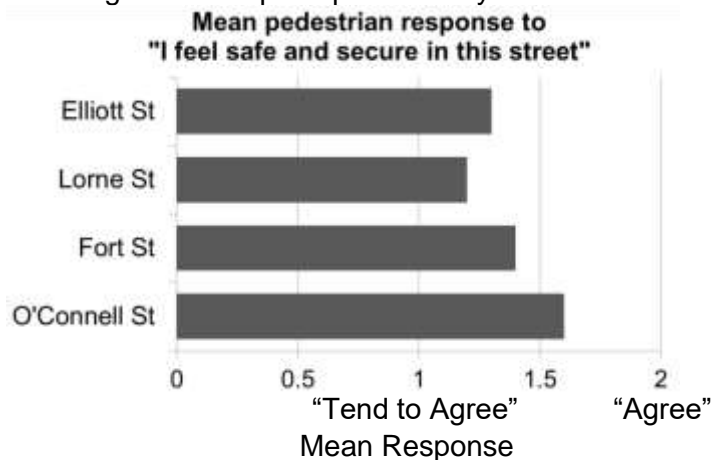


Figure 9: Mean pedestrian perceptions of safety

The surveys confirm the interview responses regarding the safety of the spaces. They also show that pedestrians tended to perceive O’Connell Street to be safer than the shared spaces. This was expected, as the shared space concept is new to New Zealand and users of the spaces are still becoming accustomed to sharing the street with vehicles. An important finding is that pedestrians

perceive the shared spaces as being safe environments – which is needed for pedestrians to use them freely (Department for Transport, 2011). Sampling of disabled groups was not possible due to time constraints.

#### **4.8. General enquiries**

Some more general enquiries about shared space and its implementation in New Zealand were put forward to the interviewees. Interviewees were first queried on what they thought were the key design components of an effective shared space. A wide variety of responses followed, but there were several common themes and answers that were identified. They included:

- Ensuring that the space clearly looks and feels different to conventional streets, and careful design of the transition between them
- Complete removal of kerbs to create a level surface for all users to interact on
- The significance of activated land-use surrounding the space.

When asked about how they felt about the education and knowledge base in New Zealand for a wider application of the shared space concept, most of the professionals expressed confidence that it could be done. However, some warned that caution must be taken, as poor implementation of the concept could lead to negative public perception of the streets.

### **5.0 CONCLUSIONS**

The research methodology enabled both user and professional practitioner perspectives on the Auckland CBD shared spaces to be gathered. The findings from each data collection method generally supported each other and could be compared to existing literature. This enabled the objectives of this project to be achieved. The main conclusions of this investigation are as follows:

- The Fort and Elliott Street shared spaces performed well against the evaluation objectives, and generally outperformed the control street.
- Lorne Street performed similarly or worse to Fort and Elliott Street against the objectives. However there is potential for improvement through activation of the St James facade.

The factors which influence shared space performance most are identified as:

- The type, quality, and amount of active land use which surrounds the street
- The design of the street, particularly how effectively it triggers a change in driver behaviour from conventional streets
- Characteristics of traffic flow, including traffic volumes, composition, and speeds
- How the space is operated, including parking enforcement, programming of activities, and policing.

A logical connection can be established between each of these factors and the performance of the Auckland CBD shared spaces.

The research confirmed that shared space design can be context sensitive, as many of the expert interviewees' views appeared to be influenced by their involvement in shared space. This led to disagreement on how to achieve lower speeds within shared spaces, and what amount of parking should be allowed within a shared space. This investigation did not seek to determine the correct approach. Instead, it is encouraged that a rigorous and evidence-based approach is taken to determining which approach to use when designing and operating shared spaces in New Zealand.

### **6.0 RECOMMENDATIONS**

Based on the outcomes of the research, some recommendations around designing shared space in New Zealand are:

- Be conscious of the surrounding land use, as it is a major influence on shared space success - if possible, encourage local businesses to adapt their frontages to make better use of the space

- A mix of land uses is optimal for shared space, to provide activity in the space at all hours
- Shared space design should not be set in stone, but instead adapted to local contexts
- The 'safe zone' design for disabled users is quite effective, and should be considered in future shared spaces
- Shared spaces should not be evaluated as conventional roads are, but instead use a combination of quantitative and qualitative assessments, such as in the framework under development by Karndacharuk.

It is suggested that O'Connell Street could be surveyed again after its planned redevelopment into a shared space is complete. This would provide the first set of before and after data of pedestrian perceptions of shared space in New Zealand.

## 7.0 ACKNOWLEDGEMENTS

The authors would like to thank Michael Wu, a Bachelor of Engineering (Civil) final year student who was involved with many facets of the research, including development of the research methodology, assistance in conducting surveying and interviews, and data analysis. The authors would also like to thank Roger Dunn for his assistance in developing the research methodology.

## 8.0 REFERENCES

- AUCKLAND COUNCIL(2013a). Shared Spaces. Available: <http://www.aucklandcouncil.govt.nz/EN/planspoliciesprojects/CouncilProjects/sharedspaces/Pages/home.aspx> [May 28th, 2013].
- AUCKLAND COUNCIL(2013b). O'Connell Street Upgrade. Available: <http://www.aucklandcouncil.govt.nz/EN/PLANSPOLICIESPROJECTS/COUNCILPROJECTS/Pages/oconnellstreetupgrade.aspx> [May 30th, 2013].
- AUCKLAND TRANSPORT, 2012. *An evaluation of shared space in the Fort Street Area, Auckland, New Zealand*. Auckland, New Zealand: Auckland Transport.
- DEPARTMENT FOR TRANSPORT, 2011. *Local Transport Note 1/11 - Shared Space*. London: Department for Transport.
- DEPARTMENT FOR TRANSPORT, 2007. *Manual for streets*. London: Department for Transport.
- FLOW TRANSPORTATION SPECIALISTS, 2012. *Shared space in urban environments: guidance note*. IPENZ.
- HAMILTON-BAILLIE, B., 2008a. Shared space: Reconciling people, places and traffic. *Built Environment*, 34(2), pp. 161-181.
- HAMILTON-BAILLIE, B., 2008b. Towards shared space. *Urban Design International*, 13(2), pp. 130-138.
- KARNDACHARUK, A., 2013. *Operational Guiding Principles for Shared Space Design*.
- KARNDACHARUK, A., WILSON, D. and DUNN, R. (2014). Safety performance study of shared pedestrian and vehicle space in New Zealand, *TRB 93<sup>rd</sup> Annual Meeting, 12-16 January 2014*, Transportation Research Board, Washington, D.C.
- KARNDACHARUK, A., WILSON, D. and TSE, M., 2011. *Shared space performance evaluation: quantitative analysis of pre- implementation data*. IPENZ Transportation Group Conference, 27-30 March 2011, IPENZ Transportation Group, Auckland.
- LITMAN, T., 2012. *Evaluating Accessibility for Transportation Planning*. Victoria, Australia: Victoria Transport Policy Institute.
- MOORE, R., 2012, Exhibition Road, London – review, The Observer. Available: <http://www.theguardian.com/artanddesign/2012/jan/29/exhibition-road-rowan-moore-review> [October 15th, 2013].

MVA CONSULTANCY, 2009. *DfT shared space project: Appraisal of shared space*. London: Department for Transport.

MVA CONSULTANCY, 2010. *Designing the future; Shared Space: Qualitative research*. London: Department for Transport.

NEW ZEALAND GOVERNMENT, 2004. *New Zealand Land Transport (Road User) Rule 2004*.

SHEARER, D., 2011. *Shared spaces in New Zealand urban areas*. Masters Thesis. Dunedin: University of Otago.

TURNER, S.A., ROOZENBURG, A.P. and FRANCIS, T., 2006. *Predicting accident rates for cyclists for pedestrians*. Land Transport New Zealand Research Report 289.