

# What does a foot path do



By  
Michael Lowe

A thesis  
submitted to the Victoria University of Wellington  
in fulfilment of the requirements for the degree of  
Masters of Architecture (Professional)

Victoria University of Wellington

2012

Thank you most gratefully to my family, Claire Kibblewhite, and my  
persistent supervisor Penny Allan, for all kinds of moral support.





# Abstract

---

In New Zealand pedestrian infrastructure is not a robust area of transport planning. As a funding class it receives minimal monetary allocation. This thesis argues design interventions in the pedestrian environment need to be both responsive to the surrounding context and effective in promoting walking patronage. To achieve this goal this thesis argues that the current process used by central authorities and local authorities for researching, designing, and implementing pedestrian infrastructure, needs to change.

As a solution this thesis develops a new methodology for researching, designing and implementing pedestrian infrastructure. The methodology is developed through a series of design experiments using Central Wellington as a site. The methodology uses a multi paradigm framework adopted from landscape perception research, which allows it to successfully alternate between 'top down' expert orientated approaches.

For example, on one hand the methodology uses standardized typological solutions as a cost and time efficient approach to resolving pedestrian barriers to walking; as well as a 'top down' macro scale urban analysis in order to ensure any resources being spent at a micro scale street level are also improving larger urban scale problems in the pedestrian network.

While on the other hand uses a 'bottom up' qualitative approach through a newly developed 'cognitive survey and interview technique', to research

from the perspective of the public where pedestrian *accessibility* barriers to walking are located in the built environment.

The research is significant as it reveals new insight into the practical application of a standardized typological approach to pedestrian design. In particular it reveals how a new hybrid methodology combining a 'top down expert' and utilitarian approach, with a 'bottom up qualitative' and contextual approach, makes for efficient employment of design resources when implementing pedestrian infrastructure.

## Table of Contents

<b>Chapter 1:</b>	<b>7</b>
<b>Introduction</b>	<b>7</b>
1.01 Research Question?	7
1.02 Research Aim	7
1.03 Context of the Research: Pedestrian Infrastructure Funding in New Zealand	8
1.04 Why is a Decline in Walking Patronage Significant?	8
1.05 Problem Identification: Walking in Wellington New Zealand	9
1.06 Problem Statement?	10
1.07 Thesis Overview	10
<b>Chapter 2:</b>	<b>13</b>
<b>Literature review:</b> The behavioural decision making process and designing for pedestrian accessibility in Central Wellington	<b>13</b>
<b>2.1 The Behavioural Decision Making Process:</b>	<b>15</b>
2.1.1. Environmental Psychology	15
2.1.2. Environmental Geography	17
Operational perception	18
Responsive perception	18
Inferential perception	18
Summary	22

<b>2.2. How Changes in the Built Environment Affect Travel Behaviour:</b> A Qualitative Understanding of Accessibility	<b>24</b>
2.2.1 Accessibility and Travel behaviour	24
Accessibility,	<b>24</b>
2.2.2 Measuring Accessibility: The Absence of a Qualitative Approach	25
<b>2.3 Designing for Pedestrian Accessibility:</b>	<b>28</b>
2.3.1. Review of Contemporary Walking Behaviour Theory	28
2.3.2. Combining the Three Walking Models	32
<b>2.4 Current Pedestrian Design Practice in Central Wellington.</b>	<b>35</b>
2.4.1 (Part 1) Pedestrian Design in Wellington: A Lack of Understanding of the Relationship Between Pedestrian Accessibility and the Built Environment.	35
2.4.2 (Part 2) Criticisms of Pedestrian Design Process in Wellington	40
<b>2.5. Forming a New Pedestrian Design Methodology</b>	<b>43</b>
2.5.1. Perception Research	43
2.5.2 An Environmental Perception Framework	44
<b>Summary</b>	<b>47</b>
<b>Chapter 3:</b>	<b>49</b>
<b>Methodology</b>	
The Methodology	51

<b>Chapter 4:</b>	<b>53</b>	5.1.2 Findings	97
<b><i>Understanding Site and Pedestrian Accessibility in the Built Environment</i></b>		5.1.3 Further direction: The Untapped Potential of Place	104
<b>4.1 Stage 1: ‘Top down’ Typological Study</b>	<b>54</b>	<b>5.2 Conclusions of the Typology So Far</b>	<b>106</b>
4.1.1 The Experiment Method	54	5.2.1 Further Direction	107
4.1.2 Findings	55	<b>5.3 Design Experiment 3: ‘Place-making’</b>	<b>109</b>
<b>4.2 Stage 2: ‘Bottom up’ Cognitive Survey Pilot test</b>	<b>61</b>	5.3.1 Method	109
4.2.1 The Cognitive Map and Cognitive Mapping	61	5.3.2 The design	112
4.2.2 The Experiment Method	63	5.3.3 Findings	120
4.2.3 Findings From the Cognitive Survey Pilot Test	63	5.3.4 Further direction	120
Conclusions	65	<b>5.4 Design Experiment 4: ‘Rethinking the Larger Pedestrian Network’</b>	<b>123</b>
<b>4.3 Design Test 1: A New Method of Site Analysis Using Typological Pattern Maps &amp; Qualitative Perception</b>	<b>66</b>	5.4.1 Method	123
4.3.1 Method	66	<b><i>‘Bottom up’ Qualitative Analysis: Survey Results</i></b>	<b>124</b>
4.3.2 Findings	73	<b><i>‘Top down’ expert analysis</i></b>	<b>128</b>
4.3.3 Further Direction for the Typological and Cognitive Mapping Methodology of Site Research	77	<b><i>Forming a response to the site analysis</i></b>	<b>136</b>
Summary	78	5.4.2 Results	164
<b>4.4 Further Direction: The ‘New Pedestrian Design Strategy’.</b>	<b>80</b>	1. The Cognitive Survey Process	164
		2. Two Emerging Design Themes in the ‘New Pedestrian Design Strategy’	166
<b>Chapter 5:</b>	<b>81</b>	5.4.3 Further Direction	168
<b><i>Pedestrian infrastructural solutions</i></b>			
<b>5.1 Design Experiment 2: ‘Creating Typological Solutions’</b>	<b>82</b>		
5.1.1 Method	83		

## Chapter 6:

**Discussion:** The 'New Pedestrian Design Strategy' and Contributions to Contemporary Theory and Practice 170

**(Part 1)** 6.1 Improving Pedestrian Design Practice in Central Wellington: 170

*The Problems with Wellington's Current Pedestrian Design Process:* 171

*The 'New Pedestrian Design Strategy': How it can Improve the Problems With Pedestrian Design Practice in Central Wellington.* 174

**(Part 2)** 6.2 Typologies and the Architecture and Urban Design Professions; and Other Contributions to Contemporary Practice 179

**Conclusion** 182

**Bibliography** 186

**List of Figures** 191

**Appendix** 193

**Appendix (A):** Typological study 194

(Access typologies) 194

(Hybrid typologies) 205

(Land use typologies) 210

**Appendix (B):** Cognitive survey pilot test 219

**Appendix (C):** Cognitive survey 1 questionnaire 220

**Appendix (D):** Wellington road hierarchy (obtained from Wellington City Council 2012) 224

**Appendix (E):** Table review of pedestrian design practise in Central Wellington 226

**Appendix (F):** Cognitive survey 2 questioner (front and back) 230

**Appendix (G):** Pedestrian count data (obtained from Wellington City Council 2008) 233

## Chapter 1:

### *Introduction*

---

#### 1.01 Research Question?

In New Zealand very little funding is allocated for spending on pedestrian infrastructure. Through combining a top down typological process with a qualitative bottom up design process, this thesis explores how improvements to the pedestrian network can be designed to achieve more than simply increased walking *accessibility*. Instead, can improving the pedestrian network also be a way to create new and improved public spaces in the built environment? And how can this be achieved considering the limited funding economic environment in New Zealand?

#### 1.02 Research Aim

To improve the current processes that Wellington City Council and Central Government use to design pedestrian infrastructure in Central Wellington by:

- Improving authorities' understanding of how pedestrian *accessibility* is affected by the design of built environment.
- Demonstrating that new interventions to the pedestrian network, which respond to their surrounding context, create opportunities for place-making in the built environment. Further more by capitalising on these opportunities the quality of public spaces in the urban environment can be improved.

### 1.03 Context of the Research: Pedestrian Infrastructure Funding in New Zealand

When Central Government transport spending is compared to transport mode patronage in New Zealand, it is apparent pedestrian infrastructure in New Zealand is a neglected transport mode. In terms of funding, spending on walking and cycling infrastructure in New Zealand has declined over the last three years, as indicated in *Figure 1*. In addition to this, according to the New Zealand Transport Agency (NZTA), in New Zealand between years 2009-2012 walking and cycling together received just **\$51 Million** of the total **\$8710 Million** funds being allocated for land transport spending (25-27). This in comparison to the largest spend, *New*

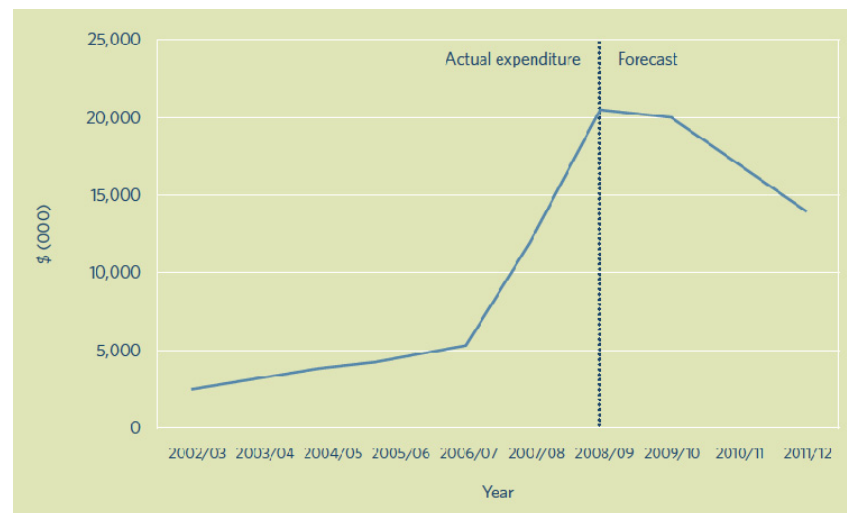


Figure 1: NLTF spending on walking and cycling since 2002 (NZTA 49)

and Improved State Highways that received a whopping **\$3070 Million** (25-27), the outlook for walking is not promising.

Walking and Cycling = % 0.59 (total funds \$)

New and improved state highways = % 35.25 (total funds \$)

This high roading expenditure has been described by Mees and Dodson as a national bias towards roading infrastructure in New Zealand (1), and is having a negative effect on alternative transport modes such as walking. This is evident in research done by Statistics New Zealand where between the years 1996 – 2006, walking patronage in New Zealand declined in parallel with an increase in the use of the private car as the main means of travel (2).

### 1.04 Why is a Decline in Walking Patronage Significant?

In New Zealand a decline in walking patronage can be associated with an increase in the use of the private automobile. This is significant in a number of ways:

Culturally, if we look to Auckland as an example city, the dominant use of the private car has facilitated urban sprawl, and subsequently an elevated reliance on the road network (Bean et al 2837). Also, high car reliance has

caused a reduction in the number of child pedestrians present in the street. For example, the literature argues vehicle dependence is causing parents to become ‘child chauffeurs’ between activities (Bean et al 2837), (Keall 52-53). The subsequent social effect of this is a decline in interaction and public engagement in the community (Litman 11).

Environmentally, the benefit of having more people commute by walking is less reliance on vehicles. This results in less carbon vehicle emissions, and also less development of roadway infrastructure, which both contribute to the global green house effect and rise in respiratory health problems (Duany et al 234), (Hillman 36).

Economically, it is difficult to quantify the benefits of walking into a cost figure (Litman, Alexander Todd 5). However, some of the recognised benefits are:

- On a person to person basis walking commuters have less car dependency meaning less petrol, less running costs, and therefore lower overall transport costs (Litman, Alexander Todd 8).
- Also, less vehicle reliance means cost savings through “less parking facilities, traffic congestion, crash risk, and environmental damages”, according to Murphy and Delucchi (Litman, Alexander Todd 9).

## 1.05 Problem Identification: Walking in Wellington New Zealand

Despite the decline in walking patronage nationally, when you look at walking patronage in Wellington, shown in *Figure 2*, there has in fact been a slight increase between years 2006-2009. Interestingly also, the figure shows one problematic statistic, which is the significant decline in walking trips that occur when the distance a person has to commute increases from ‘less than 1km’ to ‘between 1 to 2km’.

MODE OF TRAVEL	Total short trips			Trips up to 1 km			Trips between 1 & 2 kms		
	2004	2006	2009	2004	2006	2009	2004	2006	2009
	%	%	%	%	%	%	%	%	%
Walk	37	39	54	73	72	75	16	24	43
Cycle	2	3	4	1	2	3	3	3	4
Car or private vehicle	59	55	33	25	24	20	78	69	40
Bus or train	2	3	7	1	1	1	3	4	9
Other	x	x	2	-	1	1	x	x	4
TOTAL TRIPS	100	100	100	100	100	100	100	100	100

**Figure 2: (GWRC Short trip active mode research 12)**

On the map of Central Wellington *Figure 3*, these 1-2km journey distances are likely to occur anywhere between the CBD and the residential catchments that are located within a 15-25 min walking proximity of the CBD.

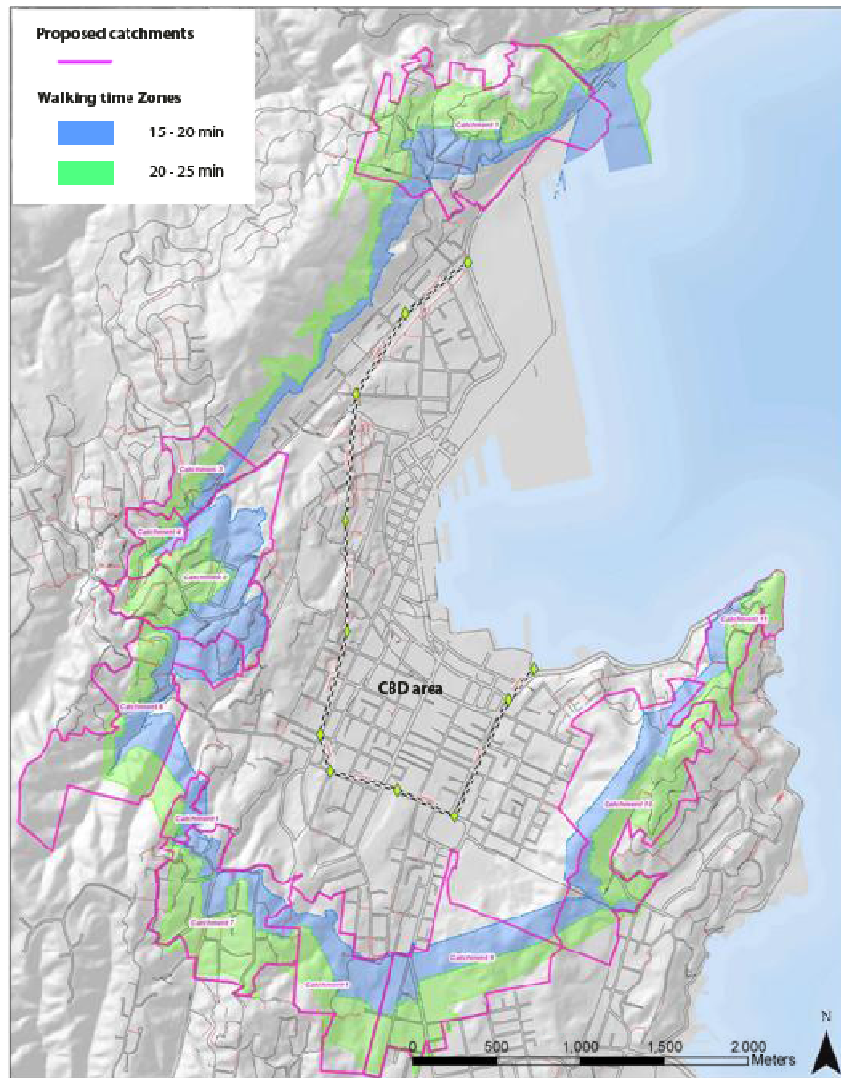


Figure 3: Pedestrian catchments (WCC Walking Times Using Footpath Network)

## 1.06 Problem Statement?

- Why do a significant proportion of people choose not to walk distances between 1-2 km in Central Wellington?
- Is the design of the built environment affecting their travel behavioural decision? And why is this happening?

## 1.07 Thesis Overview

### *Chapter 2 Literature review*

The literature draws from three important research fields: Environmental psychology, Environmental geography, and Urban design. In the chapter four theoretical areas of research will be discussed. These are key to understanding the problem statement in point 1.06.

1. The mental processes that cause behavioural decision making
2. How changes in the built environment affect *accessibility* and therefore travel behaviour; and as a result why it is important to understanding qualitatively how the design of the built environment affects *accessibility*.
3. How to improve pedestrian travel behaviour through designing for pedestrian *accessibility*
4. A proposal for a new framework for perception research: Forming a better pedestrian design methodology.



Lastly, the chapter will also critique the current pedestrian design practice in Central Wellington.

### *Chapter 3 Thesis Research Methodology*

In response to the literature review Chapter 3 introduces a 'Hypothesis Design Strategy' as the first attempt to improve the current process for researching, designing, and implementing pedestrian infrastructure in Central Wellington.

Following this, the chapter outlines the methodology used to carry out the design research experiments in this thesis. The purpose of each design experiment is outlined below in Chapters 4 and 5.

### *Chapter 4 (Design Experiment 1)*

Chapter 4 begins by testing how successful the initial 'Hypothesis Pedestrian Design Strategy' is when applied in practice. Throughout the experiment as the limitations of this strategy are highlighted, subsequently a new strategy for researching, designing and, implementing, pedestrian infrastructure in Central Wellington begins to develop.

### *Chapter 5 (Design Experiment 2, 3, &4)*

Chapter 5 has two objectives:

- Firstly to explore the most effective way of researching and understanding what characteristics of a site within the built environment will affect pedestrian *accessibility*. In order to do this, two techniques from the 'Hypothesis Pedestrian Design Methodology' are trialled as a way of researching pedestrian *accessibility* barriers within a site. These techniques are a 'top down' typological study of pedestrian *accessibility*, and a 'bottom up' cognitive survey of pedestrian *accessibility*.
- Secondly, to explore how to design cost effective pedestrian infrastructural solutions that are responsive to their context. The chapter initially experiments with using 'standardised typological solutions' as a way for resolving pedestrian barriers in the built environment. However, the limitations of this approach are uncovered, and subsequently in response two further design experiments are carried out using:
  - A customised design approach, as a way of being responsive to context.
  - Macro scale analysis, to ensure all changes made on a micro scale are contributing to the broader urban issues.

In conclusion the chapter suggest a new strategy for implementing pedestrian infrastructure in Central Wellington.

### *Chapter 6: Discussion*

The chapter discusses in two parts the contributions of this thesis to contemporary practice:

1. Why using a combined 'Top down' and 'Bottom up' approach to researching, designing, and implementing pedestrian infrastructure can improve pedestrian design practice in Central Wellington.
2. How typologies can be applied to the professions of architecture and urban design.

## Chapter 2:

### *Literature review:*

The behavioural decision making process and designing for pedestrian accessibility in Central Wellington

---

The background chapter highlighted a theoretical problem that improving walking patronage in Central Wellington is a behavioural issue. This chapter is divided into five key theoretical areas in order to understand the following four questions:

- What are the mental processes that cause behavioural decision making?
- How do changes in the built environment affect travel behaviour?
- How can pedestrian travel behaviour be altered through the design of the built environment?
- What is the state of current pedestrian design practice in Central Wellington, and how could it be improved?

The five key theoretical areas are:

#### 2.1 The Behavioural Decision Making Process.

This section gives the reader an insight into the travel behavioural decision making process. It reviews the literature on travel behaviour theory and discusses the three key terms *perception*, *cognition*, and *accessibility*. These terms are taken from the fields of psychology, environmental geography, and urban design respectively, and are important in understanding the travel behavioural decision making process.

## 2.2 How Changes in the Built Environment Affect Travel Behaviour: A Qualitative Understanding of Accessibility.

Section two looks at the spatial characteristics of the built environment that affect pedestrian travel behaviour. In particular how the *accessibility* of the built environment affects travel behaviour. This section also highlights from the travel behavioural literature that the current quantitative research, which examines how the design of the built environment affects pedestrian *accessibility*, is limited in explanatory power. Therefore more qualitative research needs to be carried out in order to understand this relationship. For example quantitative research cannot be used to question pedestrians on what parts of the built environment they consider to be *accessibility* barriers. Quantitative research is therefore unable to explain why people make behavioural decisions in response to the built environment.

## 2.3 Improving Pedestrian Travel Behaviour Through Designing For Pedestrian Accessibility.

This section looks at the theory on designing for walkability, in particular three walkability models by Southworth, Alfonzo, and Metah, which explain how the built environment affects walkability. These models are then used to formulate a spatial framework for assessing pedestrian accessibility in the built environment.

## 2.4 Pedestrian Accessibility in Current Pedestrian Design Practice in Central Wellington.

This section looks at the current pedestrian design practice for researching, designing, and implementing pedestrian infrastructure in Central Wellington. The section highlights two points:

- The limited way pedestrian *accessibility* is understood within the two key documents used to design, research, and implement, pedestrian design infrastructure in Central Wellington.
- Secondly, the problems with the current pedestrian design process regarding the use of 'top down' and 'bottom up' approaches to design.

## 2.5 A New Framework for Perception Research: Forming A Better Pedestrian Design Methodology.

This final section reviews a useful framework, developed by Taylor, Zube and Sell, for researching environmental behavioural problems, in such as increasing walking patronage in Central Wellington. The framework is useful because it ensures there is a balance between 'top down' and 'bottom up' approaches to the pedestrian design process. In subsequent chapters this framework is used to develop the 'Hypothesis Pedestrian Design Methodology', which through a series of design experiments is

tested and the findings used to develop a new methodology for designing pedestrian infrastructure in Central Wellington.

The five key theoretical areas will now be discussed:

## 2.1 The Behavioural Decision Making

### Process:

---

The background chapter highlighted that getting people to walk more in Central Wellington was a behavioural problem. This chapter begins by investigating behavioural theory, to find out what causes people to make behavioural decisions. Behavioural theory argues that a strong relationship exists between the built environment and the psychology of human behaviour (Kaplan 64), (Gold 19), (Handy 196). In order to understand why people make behavioural decisions, the literature from following two key research fields must be examined (Tolman 27):

- **Environmental psychology**, which focuses on understanding psychological processes.
- **Environmental Geography**, which focuses on the relationship between the physical environment and human behaviour.

#### 2.1.1. Environmental Psychology

The field of Behavioural Analysis within Environmental Psychology is important to understanding why people's behaviour is affected by the built environment. Behavioural Analysis is:

*“the science that studies environmental events that change behaviour (Miller 5)”*,

Note ‘environmental events’ are those events that occur in a person’s surroundings (Miller 5). Behavioural Analysis is important to this thesis because the field investigates the principles that alter human behavioural ‘problems’ (Miller 159).

### The Behavioural Principle

Eminent behaviourist B F Skinner believed the essential principle of behaviour was:

*“Organisms tend to repeat responses that lead to positive outcomes, and they tend not to repeat responses that lead to neutral or negative outcomes (Weiten 8).”*

For example, when I commute from home to university I have a choice whether to walk or drive. Ten times out of ten I will walk although the trip takes longer to walk than drive. But why is this? As a ‘poor’ student I enjoy using the \$10 per day, which would be otherwise spent on parking, to buy a nice lunch in town. Because I consider buying lunch a positive outcome, I walk more and seldom take the car. This behavioural principle is important to this thesis because instigated further research investigating how human behaviour can be intentionally altered. As a result of this research Skinner developed the term *Operant Conditioning* and within it

the two important concepts of *Positive* and *Negative Reinforcement*, which this thesis argues are significant towards altering people’s travel behaviour through the design of the built environment.

### Operant Conditioning: Positive and Negative Reinforcement

Operant conditioning can be defined as a:

*“form of learning in which responses come to be controlled by their consequence (Weiten 224).”*

The principle of operant conditioning is applied through Skinner’s concept of *Reinforcement* (Weiten 225), whereby a ‘reinforcer’ is used to increase how often a behaviour occurs (Miller 159). A ‘reinforcer’ is an event that occurs after a behavioural action, and increases the rate of the behavioural action (Miller 159). This is illustrated in *Figure 4*:

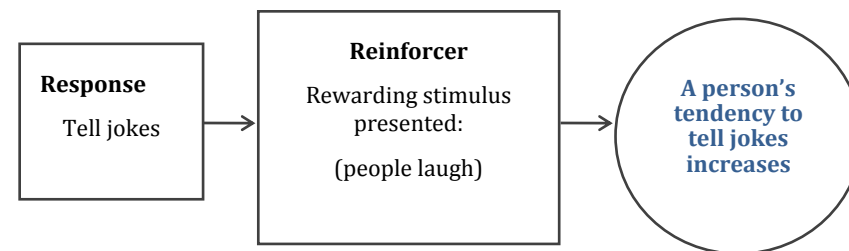


Figure 4: Example of a Reinforcer (Weiten 226)

Reinforcers occur in both positive and negative categories:

- Positive Reinforcement

Occurs when a behavioural response is strengthened due to the **presence** of a pleasing stimulus (Nevid 176), (Weiten 223).

- Negative Reinforcement

Occurs when a behavioural response is strengthened due to the **removal** of a disliked stimulus (Nevid 176), (Weiten 223). In terms of the design of the built environment, a 'stimulus' can be considered anything within the built environment that causes a behavioural response.

These two behavioural principles from psychology are important to understanding how the design of the built environment affects travel behaviour. For example, because Central Wellington's built environment is constantly changing, as a result so do pedestrians' experiences of the built environment. Therefore, considering throughout this process the two behavioural principles are actively engaged, changes in the built environment are affecting people's travel behaviour for better or worse.

The following section will now look at the behavioural decision making process from the perspective of the Environmental Geographer. The research field is important because it can explain how the mind processes change in the built environment that subsequently affects human travel behaviour.

### 2.1.2. Environmental Geography

Within the field of Environmental Geography in order to understand why individuals make travel decisions such as the decision to walk, it is important to examine the mental processes that mediate between the environment and a person's travel behaviour (Alfonzo 809). These mental processes are *perception* and *cognition*. Gold states that *perception* and *cognition* are the most influential elements in,

*"Individual-to-environment transactions...", as they are,  
"...the internal mental processes by which individuals  
sense, perceive, interpret, and make decisions about their  
environment (19)."*

These mental processes of *perception* and *cognition* are important because they are the connection between the spatial environment and people's travel behaviour (Hannes, Janssens and Wets 76). Therefore, understanding individuals' *perception* and *cognition* of the pedestrian environment is crucial towards understanding their travel choice decision

making. The significance of each of these processes will now be covered in more detail.

## Perception

Perception is defined as the “*immediate apprehension of information about the environment*” through the senses, which arises when an object is present (Golledge 190). It is a process that involves recognizing and understanding new environments by “*capitalizing*” on information learnt from past experiences (Kaplan 67). Theory developed by Kevin Lynch, Jan Gehl, and Donald Appleyard, suggests that the perceived nature of the built pedestrian environment may influence an individual’s decision to walk (Hendy 186). In this sense *perception* is significant because the design of pedestrian infrastructure in the built environment therefore will affect how pedestrians initially process the environment, and subsequently whether they have a positive or negative walking experience. For example on my walking journey to University, I constantly have an unpleasant experience along a certain busy road because I have to walk dangerously along a narrow footpath with no buffering between fast passing cars and myself.

This section will discuss the theory explaining how perception is used by individuals to process information in the environment. Within perception there are two types of spatial information that influence people’s decision

making in the pedestrian environment (Appleyard 112), (Golledge 190), (Gold 50):

- **Primary sensory information**, which is information received directly from the environment by means of sensory experience. For example, as you walk through a busy car park you feel vulnerable and uncomfortable around the manoeuvring vehicles, causing you to avoid walking through that car park.
- **Secondary information** on the other hand is information received through communication with people and what is seen in the media. For example, you might believe a certain part of your route home is dangerous because you have heard so through conversation with friends, although you may never have experienced this danger in person.

Appleyard argues that within these two categories of spatial information there are also three more ways that individuals process sensory information. These three further categories can affect a person’s travel behaviour and have become cemented in Environmental Geography theory (Carter 353):

- Operational perception,
- Responsive perception,
- Inferential perception (Appleyard 111),



### Operational perception (choosing)

Appleyard defines operational perception as the process, for a commuting individual carrying out tasks in the built environment, of choosing “particular aspects of the environment for the purpose of carrying out these tasks (109)”. During this process the chosen aspects of the environment are perceived and remembered as operational “reference points” to the commuting individual (Carter 340). Note these operational reference points have a functional purpose. Therefore, when a person is commuting,

*“An operationally complex environment, which can be used in many ways, may be much more satisfying than one that only creates complex images (Appleyard 110)”.*

For example, when a commuting individual perceives and uses objects in the environment; e.g. when a pedestrian uses a laneway as a means of a short cut to their destination; the perceptual information of the laneway experienced through their journey will be much stronger than that of a pedestrian who doesn’t use the laneway, and only perceives it in passing. This is because in the latter the laneway gives no operational contribution to the pedestrian’s activity, and thus is of less significance in their travel behaviour decision making process.

In this sense functional aspects of the built environment that affect a pedestrian’s journey feature more strongly in the perception process. The

aspects of the built environment that interfere with the functionality of a pedestrian’s environment with regards to walking, have a strong negative influence on the perception process and thus a pedestrian’s travel behaviour.

### Responsive perception (reacting to environment)

In contrast to *operational perception*, which is an active perception process for a commuter, is *responsive perception*, which is a passive process. Passive because *responsive perception* takes place unintentionally while a commuter is navigating in the environment. Appleyard describes responsive perception as being,

*“Distinctive elements intrude on the operational search patterns of the traveller (110).”*

These elements are what Lynch theorised as the “*imageable*” parts of the environment that contribute to the process of navigation and way finding (Appleyard 110). They come in any form such as landscape, building, including visual mediums such as signage or advertising (Carter 341), and can be identified through any sensory experience, not only sight (Lynch 10).

### Inferential perception (deciding)

Appleyard defines *inferential perception* as,

*“The fitting of information into categories, predicting probabilities, forming and testing hypotheses...A kind of process that leads to conclusion based on reason (110).”*

In a new situation, an individual's actions are concluded based on information learned from past experience (Carter 341). Note that the multidisciplinary use of the terms *perception* and *cognition* terms in the fields of Geography, Psychology, and Urban Design, has confusingly caused *inferential perception* to merge similarly to the definition of *cognition* (which will be discussed in the next section). However according to Gold, these differences in terminology are not significant, but only are research “heuristic devices (20)”. Therefore the principle of *inferential perception* can be considered the same as the principle of *cognition*, which will be explained after the following summary.

In summary of the theory on *perception*:

1. Firstly, individuals receive spatial information in the environment through the mental process of perception, and this affects how individuals respond to the built environment.
2. Secondly, as a result of the perception process, the travel decisions individuals make through perception appear to be two sided. On one hand informed by the mind of the individual through the perception of ‘primary sensory information’:

- *Operational perception*, choosing and using elements in the environment that enable a certain task to be performed; Along with *inferential perception*, the cognitive process of making decisions based on previous experience.

However, on the other hand travel decisions are influenced subconsciously by:

- Sensuous distracting objects in the built surroundings through the process of *responsive perception* (Appleyard 111); as well as ‘Secondary information’ through mass media and communication with others.

## Cognition

Cognition is the mental process by which individuals “code and organise (Golledge 190 Spatial behaviour)”, and “store and operate upon (Gold 20)”, the information of the built environment gained through perception. Downs explains that cognition functions at a larger environmental scale than perception, and at a level beyond the immediate human sensory field (14). Cognition is not associated with immediate behaviour, but with past experience and understanding what will occur in the future (14). For example an entire environment is never understood at one instant. Instead when people experience the built environment their complete understanding of the environment is formed over multiple perception

experiences over time, and information gathered from the different mediums of perception.

*Cognition* is significant to understanding a person's travel behaviour for two reasons:

- Firstly, it influences a person's decision making. It is the mental processing of,

*"Perception, imagery, retention and recall,  
reasoning and problem solving, and the making of  
judgements and evaluations (Golledge 191)."*

- Secondly, an outcome of the cognition process is that a person develops a,

*"Mental representation of the environment  
(Golledge 191)."*

See bottom of *Figure 4 page 16*. This is significant because people's behaviour is a reaction towards their mental representation of the environment, not the environment itself (Golledge 191)

A person's mental representation of the environment' is significant in terms of uncovering what aspects of the built environment affect their travel decision making. This thesis argues that tapping into people's cognitive processes, and thus their transformed mental image, will reveal

why people choose not to walk as a result of the built environment.<sup>1</sup> In this sense cognition plays an important role in this thesis in terms of understanding travel behavioural decision making because it is the final process that determines how people comprehend and form their opinions of their experiences of walking in the built environment.

## Attitudes

As a final order of address, *attitudes* will be discussed. *Attitudes* can be defined as 'learned predispositions' that cause an individual to act in a particular way towards an object (Gold 23), (Downs 14), (Golledge 200). *Attitudes* are important because they are a hidden variable when trying to understand how the built environment affects people's travel behaviour. This is because a strongly grasped *attitude* can cause individuals' to "*predispose behavioural actions*" regardless of the influence of the built environment (Gold 23). Collective research by Snellen, Aloys, and Timmermans has found that "*Mobility nature*" or *attitude* of people can affect people's travel behaviour (1207).

This is significant in relation to the design of the pedestrian environment for two reasons:

---

<sup>1</sup> Note a technique called cognitive mapping can be used to abstract a person's mental representation of the environment. This technique will be introduced in *Chapter 4*.

- Firstly, design improvements to the pedestrian environment might not affect a person's travel behaviour if a pedestrian has a strong attitude is towards some aspects of the built environment (Gold 25).
- Secondly, repeated past good or bad experiences of the built environment can contribute toward the formation of an attitude (Downs and Stea 14). Therefore there is the ability for the design of the built environment to contribute to the formation of an attitude, and subsequently, affect people's travel behavioural actions in regards to walking for better or worse.

## Summary

In summary of this review of the behavioural decision making process, the following points can be noted:

- Firstly, people experience the built environment directly through *perception*. Over multiple experiences their mind then reflects and interprets these experiences through the *cognitive* process.
- Secondly, an outcome of both the *perception* and *cognitive* process is that people develop a mental image or representation of the environment. This is significant towards understanding travel behaviour because people make behavioural decisions based on their mental representation of past experiences of the built environment.

- Thirdly, tapping into people's mental representation of the built environment is therefore a crucial step towards learning how pedestrians perceived the built environment through the mental processes of *perception* and *cognition*, and subsequently what aspects of the built environment are affecting their decision to walk. This is significant because learning how pedestrians perceived the built environment enables pedestrian infrastructural design interventions to be targeted to improve people's walking experience and therefore also their travel behaviour.
- Fourthly, the design of the built environment can contribute to the formation of an attitude, which can subsequently affect people's travel behavioural actions in regards to walking for better or worse.

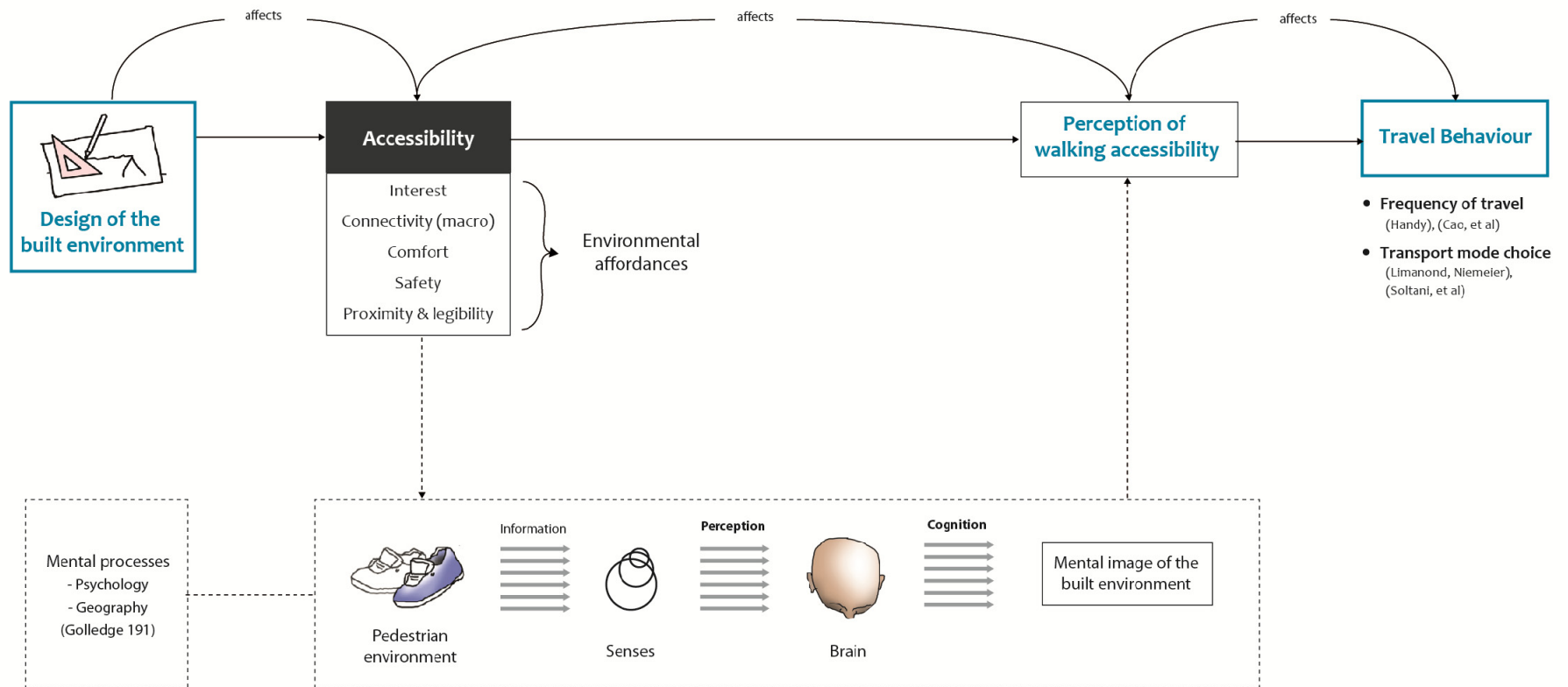


Figure 5: Map summarising how the design of the built environment affects travel behaviour.

Note this discussion so far has given the reader an insight into the behavioural decision making process. By the end of this chapter, the reader should be familiar with *Figure 5*, which shows in summary the key

theory behind why the design of the built environment affects pedestrian *accessibility*.

## 2.2. How Changes in the Built Environment

### Affect Travel Behaviour: A Qualitative

#### Understanding of Accessibility

---

This section will be discussed in two parts:

- Firstly, how *accessibility* in the built environment affects a person's travel behaviour.
- Secondly, why the limited qualitative understanding of how the design of the built environment affects *accessibility* is problematic when designing pedestrian infrastructure.

#### 2.2.1 Accessibility and Travel behaviour

Currently within the field of Environmental Geography there is limited research identifying the spatial characteristics of the environment that affect commuting (Alfonzo 827), and this has arguably contributed to the debate as to whether the built environment influences people's travel behaviour.

On one side the theory argues the built environment influences people's travel behaviour in two ways (Naess 648), (Thill and Kim 246):

- **The frequency of travel:** Whether it by private vehicle, walking, or cycling (Handy 196), (Cao and Mokhtarian 554).

- **The transport mode choice:** Meaning the decision to travel by one mode over another (Limanond and Niemeier 237), (Soltani, Primerano and Allan 185).

The factor common to both of these travel behavioral occurrences is the *accessibility* of the built environment. *Accessibility* is defined as,

#### ***Accessibility:***

*"The ability of a person to be able to access the destination; the distances to a destination; the physical and perceived barriers to walking to a place; and the connectivity between land uses (Mehta 220)."*

where 'the ability' to reach a desired destinations refers to time, cost, and effort (Pucher 166).

The relationship between *perception cognition* and *accessibility* is important to this thesis in terms of understanding how people's travel behavioural decision making is affected by the design of the built environment. This is because how people perceive *accessibility* in the built environment has been found to affect travel behavioural decision making (Hannes, Janssens and Wets 96). Research by Alfonzo demonstrates an example of this relationship between *accessibility*, *perception*, and *cognition*. When a person carries out *necessary activities* – the "*compulsory*" activities that individuals are required to carry out within the urban environment, such as commuting to work, or waiting for a bus

(Gehl 365) – the perception of distances and perceived barriers to a destination can affect a person’s understanding of how accessible the built environment is (Alfonzo 826-827).

On the other side of the debate there is research claiming only a modest relationship exists between people’s travel behaviour and the built environment. However many of these arguments are described as being invalid because the conclusions often come from problematic computer simulation experiments (Naess 649). These simulation experiments are flawed because they require a computer to predict how the environment will affect people’s travel behaviour. As a result the quality of the simulation relies on the quality of the researchers inputted assumptions of how they understand the ‘built environment vs. travel behaviour’ relationship. In terms of this thesis therefore, I argue the travel behavioural theory derived from simulation cannot be used to further understand how the design of the built environment can cause people to walk more. Consequently the first side of the argument in which the theory does so will be focused on in this thesis.

### 2.2.2 Measuring Accessibility: The Absence of a Qualitative Approach

The travel behavioural literature argues there is a need for a better understanding of how the built environment affects pedestrian *accessibility* (Alfonzo 827), (Mondschein, Blumenberg and Taylor 849). Bean writes,

*“Traditionally, transport literature has been dominated by quantitative research, with many studies using techniques such as travel surveys or traffic volume data in order to understand travel behaviour (2831).”*

This has caused the research to date on *accessibility* to be focused on understanding the quantifiable measures. Some of these measures include researching whether geographical distance from a destination affects travel frequency, by the likes of Alfonzo; Schlossberg, Greene and Phillips; and Thill and Kim. However, there is still a lack of qualitative understanding underlying why we make behavioural decisions (Hannes, Janssens and Wets 79), (Crane 18). In particular little is known about how people’s travel behavioural decision making is affected by certain spatial characteristics of the built environment (Zacharias 4). This lack of qualitative information is a problem because qualitative information is vital towards understanding what parts of the built environment affect pedestrian *accessibility* (Crane), (Hannes 76), and therefore a person’s travel behaviour (Handy 196). I argue this is significant, as authorities

need to be aware of what in the built environment is causing people to walk less, so the problems can be targeted through new pedestrian infrastructural improvements to the built environment.

Furthermore, Zacharias argues that relying on quantitative information alone is problematic when designing for the pedestrian environment because the design process,

*“requires assumptions about how pedestrians will respond to characteristics of the environment (3).”*

This lack of qualitative research is therefore significant, as qualitative knowledge provides a different kind of information to designers. In particular from the perspective of the user, what the characteristics of the built environmental are that impact negatively on pedestrian *accessibility*. For example, the following focus group experiment conducted by Bean, Kearns and Collins, explored social mobilities of walking and driving in New Zealand. In the experiment the members of the focus group did not allow their children to walk to school because they felt Auckland’s roads and streets were dangerous and unsafe. As a result the parents were chauffeuring their children to school by car (2841). This qualitative information from the focus group is significant in terms of resolving the ‘safety’ problem through the design of the built environment. By understanding qualitatively what aspects of the built environment were affecting the parents’ perceptions of pedestrian *accessibility*, each aspect could then be resolved effectively through a specific design intervention. For example a strategy could be developed for improving the safety of the

pedestrian and vehicle interface along the key routes the children took to school.

In summary of this section the travel behaviour theory has highlighted:

- That *accessibility* of the built environment affects a person’s travel behaviour.
- There is a lack of qualitative research relating to how the design of the built environment affects pedestrian *accessibility* and therefore travel behaviour.

Therefore in recapping this chapter so far:

- Firstly, *perception* and *cognition* are the mental processes by which individuals make decisions about their environment (Gold 20).
- Secondly, *accessibility* of the built environment, in terms of the physical and psychological barriers to walking, plays an important role in how individuals choose to travel (Hannes 96), (Naess, Accessibility), (Thill, Kim 246).
- Thirdly, in the design of the pedestrian environment it is important to understand qualitatively how individuals perceive *accessibility* in the built environment. Therefore in combining all these points together; by understanding qualitatively, and designing for, individuals’ perceptions of pedestrian *accessibility*



in the built environment, this thesis argues the pedestrian infrastructural improvements can influence people's travel behaviour and thus the likelihood of them walking more.

Lastly as a final point this chapter has highlighted that a person's travel behaviour is influenced by the built environment as well as their mental *attitude*. However, it should also be acknowledged that there is one other influence in the form of socio-cultural and economic circumstance (Cao and Mokhtarian 538), (Mondschein, Blumenberg and Taylor 863).

The next section will discuss how to design for pedestrian *accessibility*, and what spatial characteristics of the built environment are relevant to *accessibility*. This will begin by examining the theory on walkability, which is key to understanding how the design of the environment affects the pedestrian experience.

## 2.3 Designing for Pedestrian Accessibility:

---

Having highlighted that *accessibility* is important in understanding pedestrian travel behaviour, the next step was to establish a framework for *accessibility* for three reasons:

- To understand what spatial characteristics of the design of the built environment affect pedestrian *accessibility*, and therefore pedestrian travel behaviour.
- To provide a useful tool for thoroughly reviewing how *accessibility* is understood in current pedestrian design practice in Central Wellington, and therefore how well travel behavioural theory is considered in current practice in Wellington for improving walking patronage.

The section will begin with a brief review of contemporary theory on walking behaviour, before using the review to formulate a new framework for assessing pedestrian *accessibility*.

### 2.3.1. Brief Review of Contemporary Walking Behaviour

#### Theory

Exploring how the built environment affects walking behaviour is a recent field of literature. In this sense it can be argued that pedestrian design is only recently becoming more important in the design of cities. For example, only in the last decade in America has designing for walking become a major part in the planning of transport infrastructure and cities (Southworth 246). This similarly can be seen in New Zealand. The Pedestrian Planning and Design Guide, the first national publication focused towards improving the pedestrian environment in the design of cities, was only published in 2007 by The New Zealand Transport Agency. Southworth argues that over the course of history urban design and transport planning have separated in their development into two professional fields:

*“Urban design focusing on the concrete experiential qualities of the built environment, generally at small to medium scale (246). “*

*“Transportation planning focusing on more abstract function and efficiency, particularly for the motorist, at the scale of cities and regions (246). “*

This specialisation has led to problems in the execution of transport planning in cities. For example it is often apparent that transportation planners fail to consider the quality of the environment from a pedestrian perspective, due to a greater focus on what is considered to be the larger issue of vehicle transport (Ramsay 159-171). Factors such as the quality of the environment are among the frequently ignored opportunities for improving 'non-motorised transport' by transport planners (Mobility Management Litman 7). In a New Zealand example this is evident in Auckland. Auckland is known as one of the worst automobile dependant cities in the world (Mees and Dodson, Backtracking Auckland: Bureaucratic rationality and public preferences in transport planning. 1), (Gehl and Newman, in Auckland City of Cars), and is still suffering from half a century of 'roading obsessed' transport planning initiatives (Mees and Dodson, The American Heresy: Half a Century of Transport Planning in Auckland).

Three recent researchers, Alfonzo, Southworth, and Mehta, found that in the areas of transport planning and the design of cities, research on pedestrian behaviour is still incomprehensive. In response, these authors' research has led to two contemporary theoretical walking models being developed, of which each model is made up of the key attributes believed to be essential measures of walkable environments. To begin with the 'theoretical walking models' will be explained. Then following this, in order to establish a theoretical framework for assessing how the design of

the built environment affects pedestrian travel behaviour, the models will be rearranged to form a new theoretical framework for pedestrian *accessibility*.

### Walking model 1: Southworth 2005

Southworth's research was concerned with the way walkability theory focused so heavily on criteria of "*utilitarian access (248)*" – i.e. the physical distance to a destination. In response, Southworth proposed six new criteria for evaluating walking in the built environment. These were (Southworth 249-254):

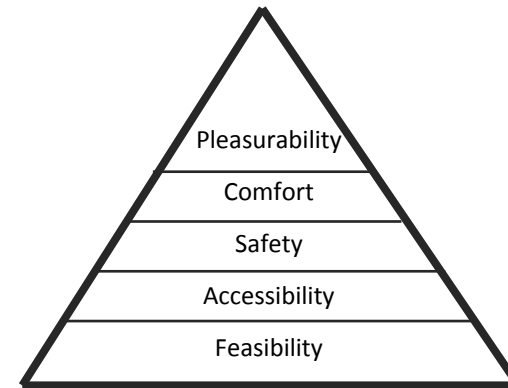
- Linkage to other modes, referring to the connectivity the pedestrian path network has between other transport modes such as train or bus.
- Connectivity, referring to the path network's "continuity and absence of significant barriers (249)." For example highways with large traffic volumes dissecting a pedestrian path network.
- Fine grain and varied land use patterns, referring to the distribution of key activities in the city that serve every day needs, as well as how well a person can access these activities by walking reasonable distances.

- Safety, referring to a person's perception of safety such as fear of traffic or crime.
- Quality of path, referring to how user friendly the path is, and the purpose of the path for being either pedestrian oriented versus vehicle oriented. Path quality is also affected by pedestrian amenities such as planting, landscaping, footpath width, signage and utility obstacles on the path etc.
- Path context, referring to the how the path permits interaction with the surrounding context in order to create physical as well as visual interest to the user. Path context is affected by elements such as,  
*"scale of street space, presence of street trees and other landscape elements, views, visible activity and transparency, scale, and coherence of built form (254)."*

## Walking model 2: Alfonzo 2005

Alfonzo's research, published in the same year as Southworth's, criticised the walkability literature for considered only limited physical characteristics of the built environment that affected pedestrian behaviour (809). Alfonzo argued that this was causing there to be a limited understanding of how the built environment affected walking

(809). In response a theoretical model was developed called 'The Hierarchy of Walking Needs' *Figure 6*.



**Figure 6: Hierarchy of Walking Needs (Alfonzo 825)**

The model works on the basis that places in the built environment offer varying levels of *affordance* to the categories of the hierarchy. This term *affordance*, used by Alfonzo, meaning the accepted level

*"of properties that are present within an environment that allow for the occurrence of a behaviour (Alfonzo 818)."*

Note Alfonzo's 'walking' model is a derived from a much older Hierarchy of Needs model that was theorised by psychologist Maslow. The key principle of Maslow's theory was that people are only prepared to act upon, or be influenced by, a higher tier in the hierarchy only if the lower tiers or "*deficiencies*" have been fulfilled (Huitt).

Expanding of the five levels within the hierarchy: (Alfonzo)

- Feasibility, refers to how practical the walking trip is i.e. is it possible to reach the destination under a time deadline by a given mode of transport. For destination trips i.e. not leisure trips, feasibility could contribute to the choice of transportation mode.

- Accessibility, refers to the  
*“quantity, quality, variety, and proximity of activities present, as well as the connectivity between uses (Alfonzo 826)”*

According to Alfonzo’s theory accessibility can also refer to the physically and psychologically understood barriers to walking i.e. a person’s perception of distance or safety. **Note** this is a much more basic definition of accessibility that this thesis chapter gives on pg 25, and to the *accessibility* framework this chapter is trying to establish.

- Safety, refers to whether a person feels safe from the threat of crime. Attributes of the environment such as land use, the absence of eyes ‘on the street’, lighting conditions, and presence of certain social groups, can all effect a person’s understanding of safety.

- Comfort refers to the “*ease, convenience, and contentment (828)*” a person feels in the environment. Attributes of the built environment include:
  - Elements that affect the pedestrian experience of motorized traffic (i.e. traffic calming, speed limits, etc);
  - The quality or state of the walkway network, protection from undesirable weather conditions such as street canopies;
  - The presence of amenities (seating, public toilets, drinking fountains, etc).
- Pleasurability, refers to how appealing the walking scene is. Attributes relating to this could include the presence of architectural features (contemporary and historic), variety in streetscape aesthetic and street activity.

### Walking Model 3: Metah 2008

Developing further on Southworth’s and Alfonzo’s research, Metah’s research critiqued the previous models for failing to consider the following: (Mehta 219)

- The *usefulness* of activities located along a path or at a destination,

- The influence the path or destination has on social interaction for the user. For example some routes may be used because there are more people around, or have a connection to a place such as the family running the local convenience store.

Metah subsequently extended the Hierarchy of Walking Needs model to include two further needs/categories:

- Usefulness, which is an expansion on Southworth's *Fine Grained and Varied Land-use Patterns*, embodies the idea of land use intensity and land use diversity as factors influencing the walking proximity of key urban activities i.e. school, supermarkets etc (Southworth 250). This definition of usefulness is similar to Alfonzo's definition of accessibility in that they both involve the principle of proximity to a destination.
- Sense of belonging, referring to places encouraging sense of community, which "*may often cater to mundane but essential everyday functions...that help in establishing their community's identity (222).*" In this sense people may choose to walk through or past places that are of personal value. For example, I often walk down a certain street because I enjoy walking past my old primary school.

### 2.3.2. Combining the Three Walking Models

Southworth, Alfonz, and Mehta's theorised walking models give a comprehensive insight into the literature examining walkability, as well as how pedestrian travel behaviour is affected by the built environment. This thesis argues there are three reasons why it is appropriate to combine all the models into one framework for *accessibility*. These are:

1. These walking models are the only theory investigating how the built environment affects pedestrian travel behaviour, which makes them important towards understanding pedestrian *accessibility*.
2. The walking models vary between each author, yet when comparing each to their counterpart, neither model seems entirely robust. This thesis argues the missing points from each model can be resolved by bringing them together under one framework.
3. The overlapping definitions between the models are confusing in the sense that each model has different names and overlapping definitions for the same terms. Thus bringing the models together would remove this confusion of repeated terms and definitions.

Therefore considering the definition of *accessibility* used in this thesis, below,

*"the ability of a person to be able to access the destination;  
the distances to a destination; the physical and perceived*

*barriers to walking to a place; and the connectivity between land uses* (Mehta 220)."

and after examining the relationships between the sub categories of the three walking models, the following *accessibility* framework was created (*Figure 7*). The framework is divided into sub categories, and all together can explain why the built environment affects pedestrian *accessibility*, and therefore pedestrian travel behaviour.

A couple of things should be noted about this framework:

- Firstly the category of *connectivity* is of particular relevance to the built environment at the macro urban scale in terms of land use patterns, density, and urban form. The other categories however, have more relevance at the micro scale at the level of the footpath and its immediate surrounding context.
- Secondly, it must be acknowledged that there is a subjective element in devising the subcategories of the framework. Therefore, although elements from each of the walkability model subcategories are featured in the new framework, undoubtedly an alternative opinion might have ordered the framework differently. *Figures 8 and 9* on page 35 give an indication of where each walkability subcategory from the theory was considered in the new framework.

In summary this section devised an *accessibility* framework from the walkability literature. In the next section the framework will be used to assess how the theory of pedestrian *accessibility* is considered in current pedestrian design practice in Central Wellington.

## Accessibility

Proximity and Legibility	Vehicle safety and (CPTED)	Path quality and comfort	Connectivity (Macro Urban scale)	Interest
<ul style="list-style-type: none"> <li>- The potential for the environment or element to disrupt path continuity.</li> <li>- The environment or element's effect on journey distances with regards to time and physical length.</li> <li>- The environment or element's effect on user perceptions of distance.</li> <li>- How the environment or element interferes with the users awareness of the path's existence.</li> </ul>	<ul style="list-style-type: none"> <li>- The presence of social safety offered by the environment or element.</li> <li>- How the spatial composition of the environment affects Crime Prevention Through Environmental Design (CPTED). E.g the extent of evening lighting offered in the environment.</li> <li>- How the spatial composition of the environment or element affects the pedestrian to vehicle interface.</li> </ul>	<ul style="list-style-type: none"> <li>- How the quality of the path surface /ergonomics affects user mobility.</li> <li>- How the environment or element affects spatial comfort in terms of: <ul style="list-style-type: none"> <li>- Buffering from vehicles.</li> <li>- Noise/air quality.</li> <li>- Shelter from weather.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- Characteristics of the land use pattern in terms of: <ul style="list-style-type: none"> <li>- Density</li> <li>- Building and land use.</li> </ul> </li> <li>- The network's treatment of significant pedestrian barriers such as land features and large roads.</li> <li>- Connectedness between paths within the network.</li> </ul>	<ul style="list-style-type: none"> <li>- The extent of engagement with the surrounding context in the form of views or physical connectedness.</li> <li>- The extent of social interest offered in the environment.</li> <li>- The extent of built interest in the form of sculpture, or architecture that is offered in the environment.</li> <li>- The extent of natural interest in the form of vegetation or scenery that is offered in the environment.</li> </ul>

Figure 7: New Framework for Pedestrian Accessibility



Proximity and legibility	Safety and CPTED	Path quality and comfort	Connectivity (macro)	Interest
1	4	5	1	6
10	9	8	2	7
11			3	13
			10	
			12	

**Figure 8: How Southworth, Alfonzo, and Metah's, walking models are distributed in the new framework for pedestrian *accessibility* in Figure 7.**

Southworth's model	Code	Alfonzo's model	Code	Metah's model	Code
Connectivity	1	Pleasurability	7	Usefulness	12
Linkages to other modes	2	Comfort	8	Sense of belonging	13
Fine grain and varied land use pattern	3	Safety	9		
Safety	4	Accessibility	10		
Quality of path	5	Feasibility	11		
Path context	6				

**Figure 9: Summarised Table of Southworth, Alfonzo, and Metah's, walking Models.**

## 2.4 Current Pedestrian Design Practice in Central Wellington.

The pedestrian design practice in Central Wellington will be looked at in two parts:

- That the main documents used to design pedestrian infrastructure in Central Wellington demonstrate an incomplete understanding of how the built environment affects *accessibility*.
- The problems with the current pedestrian design process in terms of failing to assess in pedestrian infrastructural planning a key area of Central Wellington; and also, the problems with the current techniques used to identify what, and where, are the barriers to walking in the city.

### 2.4.1 (Part 1) Pedestrian Design in Wellington:

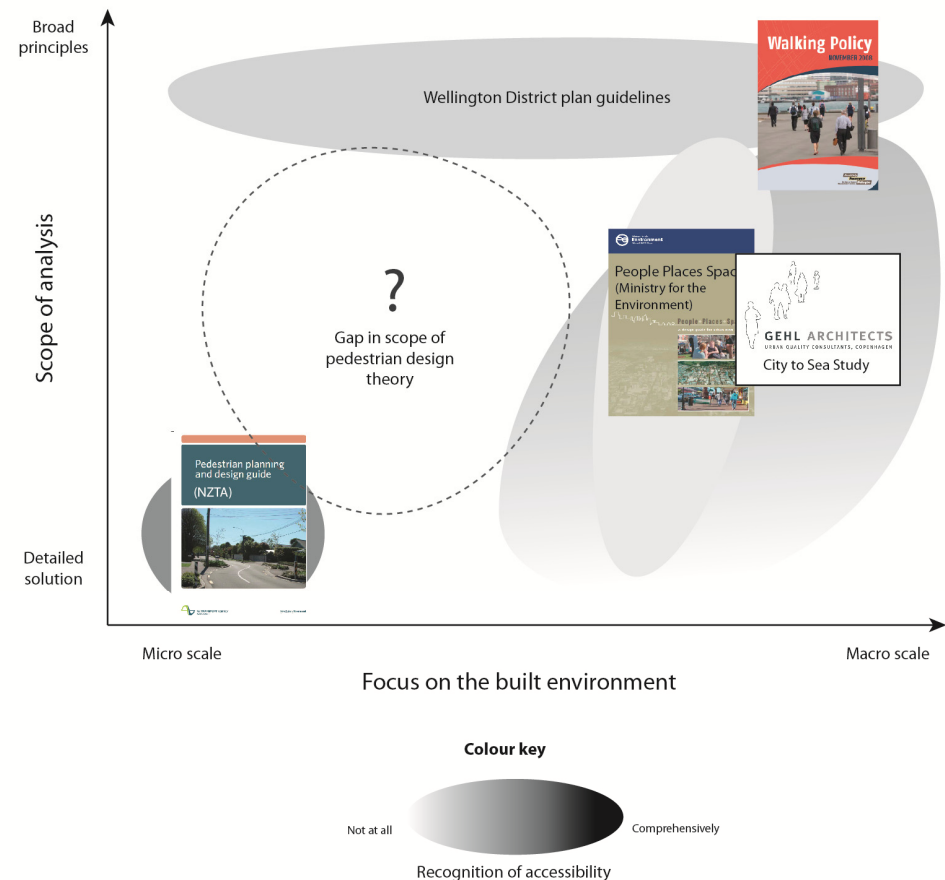
A Lack of Understanding of the Relationship Between Pedestrian Accessibility and the Built Environment.

The previous chapter highlighted that it is important to understand *accessibility* in the built environment in order to understand how people make travel decisions. Subsequently, this discussion will examine how

pedestrian *accessibility* is currently considered in pedestrian design practice in Central Wellington. The following list is a record of national and Wellington regional policy documents that form the basis for pedestrian design practice in Central Wellington. Note the most detailed document in this list is the New Zealand Transport Agency's (NZTA) Pedestrian Planning and Design Guide (PPDG), as it contains the 'best practice' design guidelines for designing in the pedestrian realm.

- **Wellington walking policy**  
(WCC Wellington Walking Policy)
- **Walking and Cycling Regional Walking Plan**  
(GWRC Walking and Cycling Regional Walking Plan)
- **The Pedestrian Planning and Design guide**  
(NZTA)
- **Wellington District plan Guidelines**  
(WCC Wellington City Council District Plan)

This discussion will review the three most relevant documents relating to pedestrian design practice in Central Wellington (indicated in **bold** in the above list). A table was used to conduct the review (*Appendix E pg 226*) however, refer to *Figure 10* as an abstract representation of this table. The table allowed each of the spatial components/typologies/principle guidelines, from the pedestrian design documents, to be assessed in terms



**Figure 10: Representational diagram showing the scope of various pedestrian design theory and guidelines in Central Wellington.**

of their consideration for pedestrian *accessibility*. From this analysis two issues were highlighted about the documents.

1. Firstly, the documents lack a spatial understanding of how pedestrian accessibility barriers are created through the design of the built environment. This is significant because these are the negative spatial characteristics that need to be avoided when designing in the built environment, as they affect pedestrian travel behaviour negatively.
2. Secondly as a consequence, this raises a concern about the subsequent effect this problem has on the promotion of walking patronage in New Zealand.

However, before these above two problems are discussed one further comment needs to be made about the process of reviewing Central Wellington's pedestrian design practice. Pedestrian planning and design practice is broken into two parts:

- Policy, which operates in a 'theories' medium, setting the overarching framework for how pedestrian design should be implemented in practice.
- Design guides, which operate in a theoretical spatial medium mediating between the policy and real world practice.

This thesis argues that a successful pedestrian design process needs to perform well in both the policy and the design guides. Therefore

distinguishing between these parts is important when reviewing how accessibility is considered in pedestrian design practice in Central Wellington.

### The Lack of Understanding Regarding Pedestrian Accessibility

Firstly, the lack of understanding in the PPDG of how the design of the built environment affects pedestrian accessibility, limits how effective improvements in the pedestrian network can be in increasing pedestrian accessibility. At a micro scale (down at street level from the perspective of the pedestrian) the PPDG categorises the pedestrian environment into the following:

- Usability of the footpath - including, quality of the footpath surface, and the amenity benefits of landscaping and street furniture that occur along the path;
- Lighting sufficiency;
- Signage;
- Intersections with the vehicle network.

Each of the categories is then broken further into subcategories containing built elements such as driveways, landscaping etc, as shown in the table (*Appendix E pg 226*). These built elements are important in terms of pedestrian *accessibility*, however this thesis argues the variety of categories mentioned in the PPDG is limited. Furthermore the PPDG's

method of simplifying the pedestrian realm has caused other important environmental elements in the surrounding context to be excluded. Subsequently, the insufficient range of pedestrian design elements featured the PDDG is significant as it limits how far *accessibility* in the pedestrian environment can be understood. For example, if we look at the spatial elements that affect pedestrian *accessibility* in the PPDG: The footpath, shared paths, grade separation, ramps and steps; all these elements only consider the spatial conditions of the immediate footpath. As a result, the PPDG does not recognise the broader environment conditions that occur beyond the footpath boundary such as the different types of buildings and land uses. This thesis argues this is significant because in a pedestrian's journey there is a wide range of land use and building 'typologies' outside the footpath boundary and these contribute to a pedestrian's perception of *accessibility*. For example you may walk certain routes over others because they have more interesting housing facades, perhaps are more sensuous, or comfortable to walk past due to vegetation; or perhaps because there is a possible shortcut by cutting through informal areas like car parks, schools, etc. All these reasons are examples of the environmental conditions that occur outside of the immediate footpath that affect the way pedestrians travel, however they are not considered in the PPDG.

#### How Each Spatial Element is Assessed against Accessibility

The second criticism of the PPDG is that each of the spatial elements such as footpaths or shared paths are not assessed thoroughly against all the sub categories that affect *accessibility* in their assessment of each design elements. This is demonstrated clearly by checking the table again (*appendix E pg 226*), which assesses each spatial element from the PPDG, against the criteria for *accessibility* derived from the literature. The table indicates there is a strong focus on the *accessibility* criteria of 'path quality'; this includes the usability of material surfaces, the ergonomic dimensions; and also the criteria of personal 'safety' in terms of the 'pedestrian vs. vehicle interface' and also 'Crime Prevention Through Environmental Design' (CPTED), which is covered by an independent document by the (Ministry of Justice) National Guidelines for Crime Prevention through Environmental Design in New Zealand. However the table indicates there is little recognition of the all other *accessibility* sub categories of: comfort, interest, connectivity, and 'proximity and legibility', which need to be considered when designing for pedestrian *accessibility* in the built environment. This is problematic considering the literature on pedestrian travel behaviour highlighted that pedestrian behaviour in the built environment is a reaction to their perception of *accessibility* in regards to walking. The consequences of this can be shown through an example using the built element of the 'footpath'. The footpath is a primary way pedestrians move through the built environment. Therefore at a micro scale (at street level to the pedestrian) the material quality,

lighting, and usability of this path is important, and as a pedestrian you may walk certain streets over others because of these factors. However, now consider the *accessibility* subcategory of 'comfort' in terms of shelter from weather, which is a subcategory not considered in the PPDG. When it is raining you will probably take a route because it is more sheltered than others, perhaps it is even a longer route. However, in the evening what if the same sheltered route is secluded or quiet and feels dangerous due to an absence of people on the street? In order to be in a safer area where more people are present, you might have to walk an alternative unsheltered route home. This example demonstrates how an *accessibility* subcategory that is not considered in the PPDG, 'comfort through shelter from weather', can affect a pedestrian's travel behaviour. This example therefore highlights that:

- It is vital to analyse each design element against all subcategories of pedestrian *accessibility*;
- The PPDG cannot give a complete understanding of how pedestrian travel behaviour is affected by the design of the built environment, or how this can be addressed spatially through design.

As a final point, this thesis argues that the two problems with the pedestrian design documents have occurred due to *accessibility* in the policy theory failing to be translated sufficiently into the spatial design guides. The policy for pedestrian design in Central Wellington

demonstrates some understanding of the importance of *accessibility* in the built environment. For example there are a number of policy objectives within the Wellington Walking Policy (WCC) that address some of the subcategories of the pedestrian *accessibility* framework such as:

- Objective 2 - improve pedestrian safety through the city (WCC 9),
- Objective 7 - increase the number of walking trips (WCC Wellington City Council 21).
- And also in the Greater Wellington Council's Regional Walking Plan (GWRC Greater Wellington Regional Council;). The plan outlines a series of actions to be taken when conducting a review of the pedestrian network. Such as improving: footpath surfaces, obstructions, personal safety, aesthetics, shelter, route directness and connectivity, signage, road safety etc. (WCC Wellington City Council 4).

All these components are relevant to pedestrian *accessibility*, however, although *accessibility* is well recognised in policy as a 'theories' medium, unfortunately it fails to be translated into the spatial medium as design guidelines. This was highlighted in the Pedestrian Planning and Design Guide as the subcategories of *accessibility*, which were established in the framework for accessibility in section 2.3.2, were not all recognised in the guides.

### 2.4.2 (Part 2) Criticisms of Pedestrian Design Process in Wellington

There are two different approaches used by Local Authorities to research, design, and implement, pedestrian infrastructure in Wellington Central. These are:

- The 'top down' expert approach, such as 'The City to Waterfront study' by Copenhagen urban design consultants (Gehl Associates).
- And the 'bottom up' approach 'Community Street Audits' by the NZTA.

Both approaches are subject to criticism and will be discussed in detail beginning with Gehl's top down approach.

#### 'Top down' approach: Gehl Associates

The purpose of the 'The City to Waterfront study' was to understand how Wellingtonians use public space in the city, how they commute, and also to provide some suggestions as to how the city's public spaces could be improved. This thesis considers 'The City to Waterfront study' as a 'top down' expert approach to improving pedestrian *accessibility*, the approach is problematic as it fails to identify three key issues:

1

Firstly, what the public consider to be the most significant barriers to walking in the built environment, as well as where they are located and the spatial conditions that have led the barriers to occur in the first place. As a result Gehl's designs lack focus in addressing the key barriers to walking, resulting in the design interventions that are less effective. The cause of this problem is that Gehl's approach to understanding the site is quantitative and not qualitative. His approach uses expert analysis to make educated judgments as to how the city can be improved. For example Gehl's approach has a heavy reliance on using pedestrian counts to locate what areas in the city are less used by pedestrians, and therefore need improving. This thesis argues this technique is problematic, as pedestrian counts do not explain what areas of the built environment pedestrians consider to be barriers to walking.

2

Secondly, Gehl's approach provides an overall framework of direction to improving the quality of the pedestrian environment. For example his approach outlines spatial principles such as:

*"Step up pedestrian priority city wide... or... Introduce more walking routes with pedestrian priority etc (Gehl Associates 50)."*

However, this approach is limited because the spatial principles are broad, and therefore fails to provide a detailed solution to Wellington's walking

problems. This is problematic because in practice the designer then can only refer to the guidelines within the PPDG, which were proven earlier to have an incomplete understanding of pedestrian *accessibility*.

3

Thirdly Gehl's study is limited in scope in that it only addresses the CBD area. This is problematic as it causes the area between the city's residential catchments and the CBD to be neglected (*Figure 3 pg 10*). This same limited scope is also evident in a more recently commissioned report by the Central Wellington local authorities, The Space Syntax City Centre Movement Infrastructure Analysis, which focused specifically on the CBD. This thesis argues the area joining the residential catchments to the CBD must be addressed in order to improve pedestrian *accessibility* throughout the wider pedestrian network. In this sense, both Gehl's and Space Syntax's reports expose a gap in Wellington's pedestrian infrastructure planning.

### 'Bottom up' approach: NZTA Community Street Audit

Contrasting to the 'top down' expert approach of Gehl is the NZTA's 'bottom up' Community Street Audit. The Community Street Audit is used by local authorities to find out which streets within the city are underperforming from the perspective of the pedestrian. The audit's method involves members of the community carrying out a walkthrough survey within a site in order to review the sites 'walkability'. The

principle of this method is successful because it reaches a conclusion based on consultation with the public on their perceptions of walking in the built environment. However, the technique used to carry out the assessment is limited:

1

Firstly, the on-site walkthrough method requires significant organisation of the survey participants. Thus the method is time consuming, resource heavy, and limited to small-scale analysis, or as far as people are prepared to walk. This is a significant limitation because the method is not suitable for large census scale analysis, or as a way of identifying pedestrian barriers across the city on a macro scale; both of which are necessary in order to fully understand the pedestrian barriers present in a city's built environment.

2

Secondly, the survey technique used to question the respondents uses *perception* but is not *cognitive*. This is evident in two ways: Firstly, the survey questions are prescriptive in that they force participants to answer a range of questions as prescribed by the interviewer. As a result, participants are not given the opportunity to identify the barriers they consider most significant, therefore causing the technique to be less accurate resulting in the design outcomes being less efficient. Secondly, behavioural theory says both perception **AND** cognition affect behaviour, therefore, in order to understand a behavioural problem, both need to be

considered. Thus the technique of using on site walk-throughs is problematic as it relies on *perception* and observation to identify barriers in the environment, and as a result doesn't allow a respondent to recall barriers through the mental process of cognition. This is also dangerous because relying only on user perception of the environment, without considering a person's cognitive understanding of the environment, can distort the accuracy of the barrier analysis. For example respondents are able to search the surroundings at the time of the interview to identify any objects/spaces as barriers, thus placing a strong emphasis on using perception to identify barriers as oppose to cognition.

3

Thirdly, the approach is limited to only improving accessibility at the micro scale. There are two reasons for this: The approach operates within the context of the footpath, for example improving the quality of the footpath surface, and road crossings etc; and therefore has no broad consideration of how accessibility can be improved at the larger macro scale. Also, as mentioned previously, is limited because the walkthrough approach is not suitable for large-scale analysis across the city.

In conclusion of this analysis, two important improvement need to be made to the pedestrian design process in Wellington:

#### Improvement One

Firstly, to gain a better understanding of how pedestrian accessibility is affected by the built environment, higher order frameworks such as the PPDG need to:

1. Acknowledge the complete spectrum of pedestrian *accessibility* criteria outlined in the literature, therefore ensuring a thorough level of analysis when assessing each pedestrian typology, in terms of its affect on *accessibility*.
2. Be familiar with a wider range of built elements that affect pedestrian *accessibility* within the built environment, such as those that occur outside of the immediate footpath, as well as their spatial conditions that affect *accessibility*. Note in order to achieve this further research needs to be undertaken to reveal a wider range of design elements that are present in the surroundings, which were not identified in the PPDG.
3. In addition to researching the pedestrian access typologies at the micro street scale, there needs to be an awareness of how *accessibility* is also affected by the environment at the macro scale across the city.

#### Improvement Two

In terms of the overall method used in the current pedestrian design process:



1. A wider analysis of the pedestrian network needs to be considered in Wellington's pedestrian infrastructure planning, which includes the area between the outer residential catchments and the CBD.
2. A new more effective method of identifying barriers in the built environment needs to be designed using *cognitive* and *perception* theory, as this theory is crucial in understanding people's travel behavioural decision-making.

The following section will look at a key strategy for achieving a balanced 'top down' and 'bottom up' approach when researching why people make travel behavioural decisions in the environment. This thesis argues that this strategy, if adopted, would improve the current methodology for designing pedestrian infrastructure in Central Wellington.

## 2.5. Forming a New Pedestrian Design Methodology

---

This section looks at research by Taylor, Zube and Sell, who have developed a robust strategy for carrying out perception research in the built environment. The theory is significant because it will be used, along with the other findings from this chapter, to form the initial 'Hypothesis Pedestrian Design Methodology' for implementing pedestrian infrastructure in Wellington. The hypothesis methodology is tested through a series of experiments later in this thesis. Because Taylor, Zube and Sell's strategy is centred around the theory on perception research, it is important this discussion begins by recapping on what role perception research has when resolving travel behavioural problems.

### 2.5.1. Perception Research

'Perception' of accessibility was highlighted earlier in this chapter as the fundamental principle affecting pedestrian travel behaviour. For example, Feimer states environmental perception is the central research issue in Environmental Psychology (61). Perception is an important part of the human and environment transaction,

*“providing the link between the physical context and subsequent cognitive, affective, and behavioural response (61).”*

Therefore understanding how pedestrians perceive *accessibility* in the built environment is a crucial step towards designing more accessible pedestrian environments. The following research by Taylor, Zube, and Sell looks at some of the problems faced when carrying out perception research.

### 2.5.2 An Environmental Perception Framework

The research identifies and critiques the four paradigms that exist within perception research techniques exploring the relationship between humans, landscape, and their resultant interaction process. Their research is important because it develops a new research strategy that reduces the unwanted variability that is often present in perception research, by achieving the right balance of ‘top down’ versus ‘bottom up’ approaches. Their research is significant to this thesis as it can be used to create a new strategy for researching and understanding how pedestrians’ experience *accessibility* in the built environment. The four paradigms are represented in the table *Figure 11* and are discussed below (Taylor, Zube and Sell 361-389):

Taylor, Zube, and Sell argued that each research paradigm could be critiqued for its research intent. On one hand the **Expert** and **Psychophysical** approaches seem to be focused on achieving utility in their results as a trade off for easier application. This is evident in the techniques used in the approaches such as: in the expert approach a trained expert makes educated judgments about what in the environment they think is significant to the public users; in the Psychophysical approach public perception of new environments is predicted in order to bypass further public research. The consequence of this is twofold:

- Firstly, it has been found that expert assessment as a way of representing greater population views is inaccurate due to a “*sensitivity differential*” between opinions of professionals and non-professionals (Feimer 75).
- Secondly, bypassing public opinion causes the research information to become simplified as subtle and local knowledge is lost (Taylor, Zube and Sell 387).

On the other hand, **Cognitive** and **Experiential** approaches seek out the grassroots knowledge of the public’s understanding, in particular how public values of the environment are formed through human and environment interaction (Taylor, Zube and Sell 388). This is beneficial because the Cognitive and Experiential approaches essentially gather more diverse variations of perception knowledge; however, this is also their shortfall as the subtlety of the information is often subjective to

	Description	Weaknesses
<b>Expert assessment</b>	<ul style="list-style-type: none"> <li>- Description of the landscape from the view of a trained observer.</li> <li>- The assessment embodies attributes that are adopted from the expert's profession, and, can be altered by the profession through design.</li> </ul>	<ul style="list-style-type: none"> <li>- Professionals notice superfluous attributes that are 'un-noticeable' to the general public.</li> <li>- Subjective to the expert. This causes an issue when designing for the public's needs.</li> </ul>
<b>Psychophysical</b>	<ul style="list-style-type: none"> <li>- Predicting public perception of new environments by drawing on past ratings made by the public. These ratings are "obtained from controlled, experimental manipulations of landscape views, or landscape surrogates or simulations (387)."</li> </ul>	<ul style="list-style-type: none"> <li>- Rating scales are often developed by professionals and therefore reflect their intentions, not the perception of the public.</li> </ul>
<b>Cognitive assessment</b>	<ul style="list-style-type: none"> <li>- Understanding why the public subconsciously value selected aspects of the landscape, and why are they important to them.</li> <li>- How meaning becomes assigned to the landscape through experience.</li> </ul>	<ul style="list-style-type: none"> <li>- Subjective to the respondent.</li> </ul>
<b>Experimental</b>	<ul style="list-style-type: none"> <li>- How the participants' involvement in the landscape forms new values.</li> <li>- Focuses on the interaction between human and landscape, and the subsequent outcome</li> <li>- How people derive their values from the landscape.</li> </ul>	<ul style="list-style-type: none"> <li>- Subjective to the respondent.</li> </ul>

Figure 11: Benefits and Weaknesses of Taylor, Zube, and Sell's, four paradigms for perception research.

each individual and therefore not representative of a wider population (Taylor, Zube and Sell 388). Another theory by Southworth regarding 'designing for walkability' in transportation planning, has also demonstrated the importance of a grass roots approach to the pedestrian design process. For example, three of the following five principles that Southworth argued would lead to walkability being implemented into the design of cities, were 'bottom up' approaches (254-255):

- *Context specific understandings of walkability need to be assessed in cities and suburbs - 'bottom up'*
- *Regulations need to be re-established to promote walkability.*
- *Walking behaviour in various social groups needs to be understood, and what aspects in the design of the pedestrian environment are most influential in assisting walking - 'bottom up'*
- *New innovative ways need to be designed to enhance walkability in the built environment.*
- *Include public involvement in the planning process - 'bottom up'*

In conclusion, due to the contradicting strengths and weaknesses of each paradigm, Taylor, Zube and Sell recommend using a multi-paradigm approach when carrying out environmental perception research. The multi-paradigm strategy will be applied in the following chapter when the findings from this literature review are used to develop a 'Hypothesis Pedestrian Design Methodology', which is the foundation of the design component of this thesis.

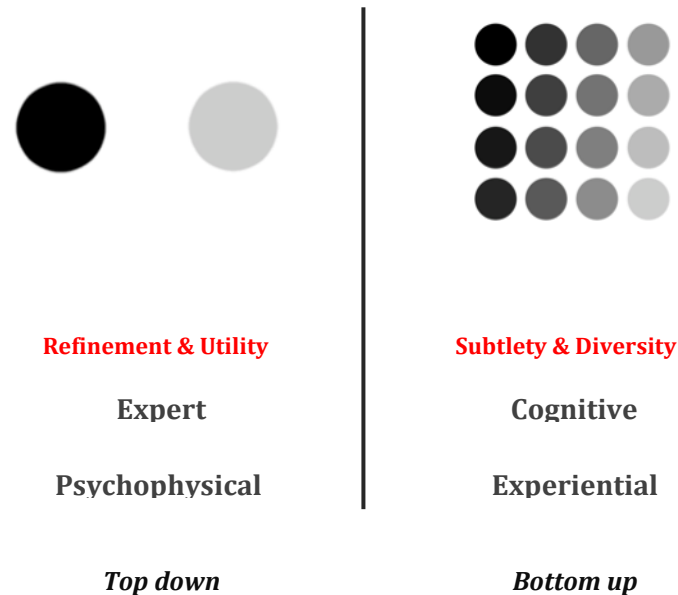


Figure 12: The four Research Paradigms ordered into 'bottom up' and 'top down' approaches

## Summary

---

The reader should now be familiar with the summarised diagram of the theory introduced at the start of this chapter (*Figure 5 pg 22*). This literature review has provided insight into a number of theoretical areas, highlighting:

- Firstly, the way people understand pedestrian *accessibility* in the built environment, through the mental processes of perception and cognition, is the key reason affecting pedestrian travel behaviour in the built environment.
- Secondly, in the main documents used to design pedestrian infrastructure in Central Wellington there is no comprehensive spatial research explaining how the design of the built environment affects pedestrian *accessibility*.
- Thirdly, the current 'bottom up' and 'top down' approaches used to research, design, and implement pedestrian infrastructure in Central Wellington are subject to criticism. The literature review indicates that the approaches are inefficient when they are used separately, and therefore are problematic considering Wellington's limited pedestrian funding context.
- Fourthly, when resolving behavioural problems, such as getting people to walk more in Central Wellington, using a multi

paradigm approach that combines together both 'top down' and 'bottom up' approaches is most effective.

The next chapter introduces the initial 'Hypothesis Pedestrian Design Methodology'.



## Chapter 3:

### Methodology

---

The literature review exposed two problems with the current way pedestrian infrastructure is researched, designed and implemented in Central Wellington, these were:

1. There is no comprehensive spatial research within the main pedestrian infrastructure documents in Central Wellington documenting how the design of the built environment affects pedestrian *accessibility*.
2. The current 'bottom up' and 'top down' approaches, used to design pedestrian infrastructure in Central Wellington, are not efficient considering the limited funding context in Wellington. As a result each approach is problematic when used in isolation.

In response, an eight-staged/multi paradigm 'Hypothesis Pedestrian Design Strategy' was created as a first attempt to improve the current process for researching, designing, and implementing pedestrian infrastructure in Central Wellington (*Figure 13*). Over the course of the four upcoming design experiments each of the eight stages of this methodology, and their accompanying 'bottom up' or 'top down' approach, were tested, critiqued, and developed into a '**New Pedestrian Design Strategy**'. The aim of this new strategy was to ensure that authorities carried out an efficient and effective process when implementing pedestrian infrastructure in Central Wellington. Note both these strategies are important to the thesis because they informed how the design research experiments were carried out.





## The Methodology

The following section outlines the research methodology used to carry out the design experiments in this thesis. The thesis methodology is divided into two parts, with the overall aim being to investigate how the current process for designing pedestrian infrastructure in Central Wellington can be improved, in order to increase walking patronage between Wellington's CBD and the outer residential catchments.

### (Part 1) Chapter 5: Understanding Site and Pedestrian

#### Accessibility in the Built Environment

The methodology starts by testing the first four stages of the 'Hypothesis Pedestrian Design Strategy' (*Figure 13*) in order to test how successful each stage is when they are applied in practice to Wellington.

##### *Stage 1: 'Top down' approach*

- A 'top down and expert' typological analysis of pedestrian *accessibility* in Wellington was carried out in order to collate a library of typologies as an educative tool in improve local authorities' understanding of how the built environment affects pedestrian *accessibility*.

##### *Stage 2: 'Bottom up' approach*

- A pilot test was carried out using a newly developed 'bottom up' cognitive survey technique, in order to find out whether the survey method was a successful way of identifying from the perspective of the public, where the reoccurring *accessibility* barriers, or *accessibility* barrier 'hot spots', are in the pedestrian network.

##### *Design Experiment 1*

- The experiment trialled using the typological analysis and the cognitive surveys technique in combination, with a particular focus on whether mapping together the information obtained from the two research techniques was an effective way of researching *accessibility* within a site. In particular, whether this mapping technique could be used to predict where *accessibility* barriers are located within new sites elsewhere in the built environment.

### (Part 2) Chapter 6: Designing Pedestrian Infrastructural Solutions

While the initial 'Hypothesis Pedestrian Design Strategy' was tested, each experiment presented a range of problems and new ways the strategy could be improved. In Part 2 the focus of the researched shifted away from testing this hypothesis strategy, and instead into developing a 'New

Pedestrian Design Strategy' for implementing pedestrian infrastructure in Central Wellington. The experiment:

- Continues to develop the combined 'bottom up' and 'top down' technique for researching *accessibility* barriers within a site, by incorporating a second 'top down expert' layer of macro scale site analysis.
- Incorporates the process of improving public space in the built environment together with the process of resolving pedestrian *accessibility* barriers, into the one strategy for researching, designing, and implementing pedestrian infrastructure.

#### *Design Experiment 2: Pedestrian Infrastructural solution*

- This section experiments with using 'standardised typological solutions' as a way of resolving pedestrian *accessibility* barriers within a site. This section uncovers the limitation of using a typological approach to resolving pedestrian infrastructural problems.

#### *Design Experiment 3*

- Explores how having an awareness of the place-making qualities hidden within a site, enables a design intervention to act as a catalyst to improve the quality of public space in the broader pedestrian network as well as resolving pedestrian *accessibility* barriers on a micro scale.

#### *Design Experiment 4*

- This last experiment collates all the findings from the experiments in this chapter. The experiment tests whether the techniques and approaches that were developed throughout the previous design experiments can be combined into a one strategy for researching, designing, and implementing pedestrian infrastructure. This final strategy aims to improve pedestrian *accessibility* and the quality of public space within the micro scale (the 'barrier hot spot' areas), and also the macro scale (the larger urban context).
-

## Chapter 4: Understanding Site and Pedestrian

### Accessibility in the Built Environment

---

Stages 1 and 2 of the 'Hypothesis Pedestrian Design Strategy' (*Figure 13*) are important for developing an understanding of pedestrian *accessibility* within a site. This chapter will begin by testing how these stages work individually in practice, then together in combination, in order to see whether they could be used to improve Central Wellington Local authorities' current approach for researching pedestrian *accessibility* within a site.

The purpose of each stage is to:

1. (Stage 1)  
Carry out a 'top down' typological study of pedestrian *accessibility* in order to understand the spatial characteristics of the built environment that affect pedestrian *accessibility*.
2. (Stage 2)  
Carry out a 'bottom up' cognitive survey of pedestrian *accessibility* in Wellington, in order to identify what and where the accessibility barriers in the Central Wellington are.

## 4.1 Stage 1: 'Top down' Typological Study

---

Pedestrian *accessibility* within a site is a complex spatial problem and is affected by many environmental elements. When trying to make sense of a complex urban environment, establishing a framework of typologies for the environment can help towards identifying, understanding, and predicting how to resolve problems that exist within it. Connolly argues,

*"The identification of type is the identification of the workings of the complexity of the real world (27)"*

Note a typological analysis in this thesis refers to the term given to the process of ordering into categories the various ways pedestrians move through the built environment.

Because the real world is highly complex the utilitarian nature of a typological approach is useful because it offers a way of simplifying the complex environment into categories. The following quote by Peter Downton argues the importance of the typology/'model' in research by design.

*"They are part of the core of the notion. A model is useful because it is easier to deal with than the things, events, states, processes, and relations it models. It is more comprehensible and manipulable if it is a simplification (Downton 83)."*

In terms of researching *accessibility*, part of this thesis's aim was to gain a better qualitative understanding of *accessibility* in Central Wellington. However, one of the problems faced was the lack of resources, which made it un-feasible to research every persons walking experience in Wellington. I argue however that generalising the public's experiences into typological categories presents an alternative way of understanding environmentally complex problems when resources are limited. The decision to engage a typological method was therefore for three reasons.

- Firstly, typologies are a useful way of isolating the key spatial elements within the environment that directly affect pedestrian *accessibility*.
- Secondly, as demonstrated in the review of current pedestrian design practice in Wellington, no previous research of this detail existed about pedestrian accessibility in the built environment for Wellington.
- Thirdly, because the typological approach is a 'top down' expert approach, as a method of analysis it enables a complex environment to be researched relatively quickly when resources are limited.

### 4.1.1 The Experiment Method

The typological analysis was carried out by me, the researcher, who was performing the role of the 'expert'. The expert approach was adopted for

its efficiency benefits as it enabled a large area of the city's built environment to be analysed under the time and resource constraints of this thesis.

The typological study began with me envisioning and documenting into typologies, from the opinion of an 'expert', the different ways a pedestrian could walk through the built environment.<sup>2</sup> Each of the identified typologies was then assessed against the *accessibility* criteria from the literature (*Figure 7 pg 34*). This is a significant step because unlike the NZTA assessment of typologies in the Pedestrian Planning and Design Guide, it ensured pedestrian *accessibility* was assessed consistently for each typology. *Figure 14* and *15* are a sample of the typological study (see *Appendix A pg 194* for the full typological study):

#### 4.1.2 Findings

Two observations were made during the process of carrying out the typological analysis:

- The typologies needed be distinguished into categories of either *access* or *land use* types.

---

<sup>2</sup> Note here the subjectiveness of this method, a criticism of the 'expert' paradigm stated earlier (*Figure 11 pg 45*).

- There were a number of difficulties faced when translating the 'complex' real world environment into the typologies.

#### Sub Categories Within the Typological Study

The first observation was that the typologies could be categorised further into two groups, *Access Typologies* and *Land use Typologies*. This was because *accessibility* was found not only to be affected by the immediate spatial characteristics of the path that pedestrians walked on, such as ergonomics, and the presence of street planting; but also is affected by the kinds of buildings, land uses, and activities that are present in the surroundings.

##### *Access Typologies*

Spaces that allow pedestrians to move through the built environment. They physically improve pedestrian connectivity by providing routes through the built fabric and the site's natural typography.

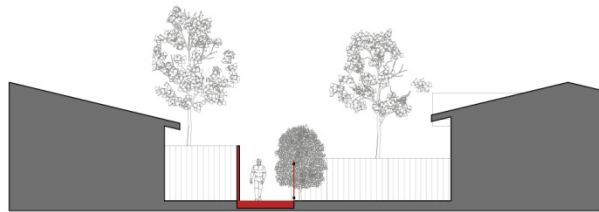
##### *Land use Typologies*

Land uses that occur in the surrounding areas off the footpath. They create spatial conditions that affect pedestrian's experience as they move past or through a space.

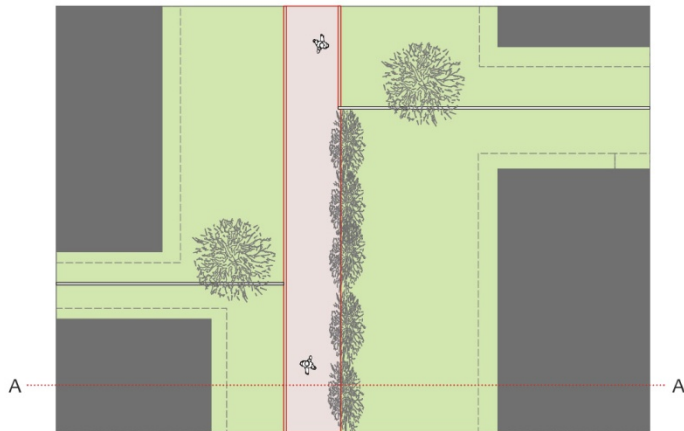
## Passageway - Residential

### Description

A narrow path passing between residential sections. There are no entrances fronting the passageway, and the path is generally lined with property fences either side.



Section AA



Plan

### Proximity & legibility

**- Route continuity**  
Is reduced greatly in the evening due to a number of safety issues.

**- Route proximity**  
Improves journey proximity by allowing direct thoroughfare between streets. Essentially adding fineness to the street network thus significantly reduces block sizes.

**- Legibility**  
Routes are local and can go unnoticed when not located on a map, or are poorly signposted.

### Safety

**- Social safety**  
Low due to absence of people. But varies with fence heights and eyes on the street from surrounding houses.

**- Evening Lighting**  
Generally insufficiently lit, particularly around dense vegetation.

**- Spatial design**  
Bends along the path and impressions in the building walls can create secluded alcoves that can be viewed by the public as associated with crime. Also single entry and exit points offer few escape routes.

### Path quality & comfort

**- Footpath quality**  
Poorly maintained (broken and overgrown) paths can be uninviting to some users.

**- Shelter from weather**  
Some shelter offered through walls either side of the path, and also when vegetation is present.

**- Comfort**  
Spatially dependent on the narrowness of path and fence height causing the space to feel overly confined.

**- Noise/air quality**  
Improves as the user moves away from the road.

### Connectivity

**- Characteristics of the land use pattern:**

**- Density**  
NA

**- Building land use**  
NA

**- Treatment of significant barriers**  
Reduces block sizes.

**- Connectedness between paths within the network**  
Together networks of passageways can immensely improve the connectivity of the street network.

### Interest

**- Engagement with surrounding context**  
Physically restricting due to the property boundaries and fence lines. However, the level of social and visual engagement depends on the height of property fences permitting views into neighbouring properties.

**- Social interest**  
None due to absence of social activity.

**- Visual interest**  
Dependent on height of property fences preventing views into surrounding properties. Also the degree of variation in fence aesthetic.

**- Natural scenery**  
Dependent on heights of property fences preventing views into property gardens, also visible height of neighbouring trees.

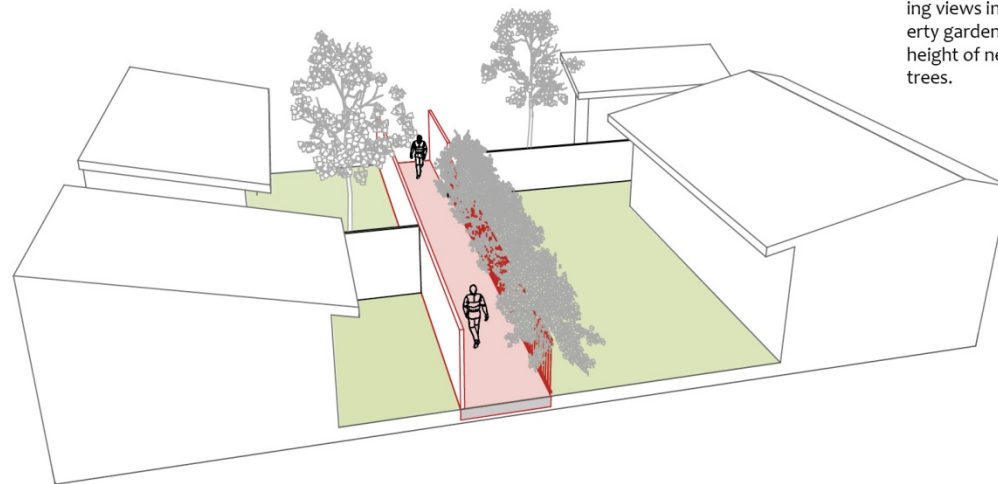
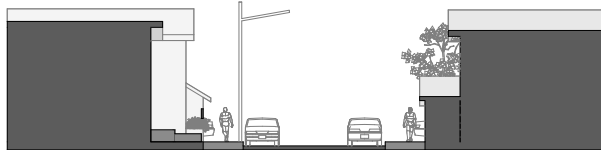


Figure 14: (Access typology) example

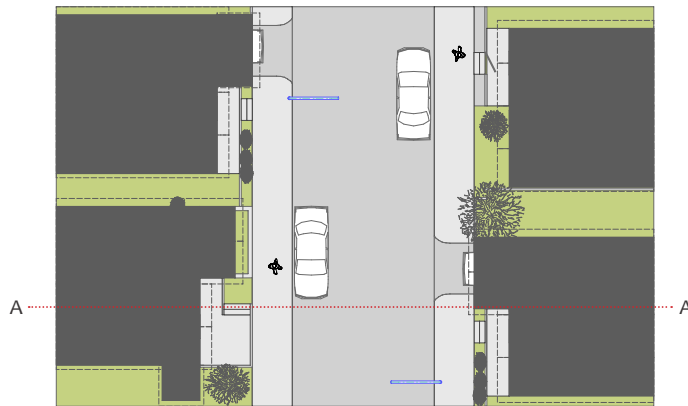
## Street- Residential Urban

### Description

A pedestrian and vehicle street with residential land use. Building development is of a higher density than suburban residential streets. Sections are widely covered by the building's footprint, which extend up to the footpath's edge. The footpath is narrow and has little room for vegetation and planting.



Section AA



Plan

### Path quality & comfort

#### - Foot path quality

On some streets as a compromise for road space narrow footpaths can occur making it difficult for pedestrians to pass in both directions.

#### - Spatial comfort

The small scale of the street feels more intimate at street level as pedestrians are physically closer to the residential activity. However, narrow footpaths cause poor vehicle-pedestrian buffering.

#### - Shelter from weather

No shelter from the weather.

#### - Noise/air quality

Becomes an issue if there is high vehicle thoroughfare as the narrowness of the street causes pedestrians to be closer to vehicles.

### Safety

#### - Social safety

Eyes on the street is present in the houses through all hours.

#### - Evening Lighting

In addition to street lighting, nighttime lighting is enhanced from lighting coming from windows of the surrounding houses.

#### - Spatial design

'Eyes on the street' can be reduced significantly if tall fences/hedges/retaining walls, block views into houses, or if footpath lighting is inadequate.

### Connectivity (Macro)

#### - Characteristics of the Land use pattern

Single land use means close proximity to basic shops or a town centre is important for reducing trip distances. Having walkable distances between a variety of land uses relies on the disbursement of town centres

#### - Treatment of significant pedestrian barriers

N/A

#### - Connectedness between paths in the network

N/A

### Proximity & legibility

#### - Route continuity

The street provides passive surveillance at night-time due to the nearby houses offering 'eyes on the street'.

#### - Route proximity

N/A

#### - Legibility

N/A

### Interest

#### - Engagement with the surrounding context

Obstacles such as high property fences/planting can prevent interaction between pedestrians and neighbouring properties.

#### - Social interest

Relies on buildings having openings that are visible from the street exposing internal residential activity.

#### - Built interest

Interest is offered through the variety of housing and garden types. However, lack of interest can become a barrier when views into properties are blocked by tall boundary fences, or when the site's topography causes houses to require retaining walls or banks at street level.

#### - Natural Interest

The narrow street space often results in no street trees or grass verge. Thus natural interest relies on views into property gardens.

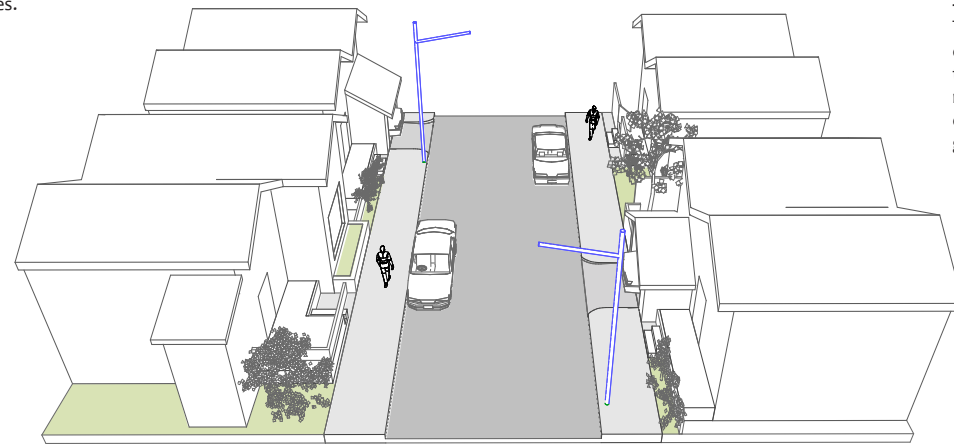
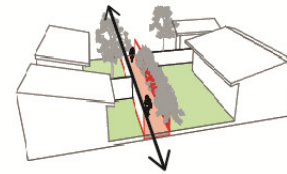


Figure 15: (Land use typology) example





Residential passageway

Scenario (A)

Scenario (B)



Figure 16: Two scenarios of a 'residential passageway' typology

Splitting the typologies into two definitions is important because it allows for a more detailed analysis of *accessibility* when analysing the built environment. For example in the *access typology* of a 'residential passageway' in (Figure 16), *accessibility* within the site is understood better if the *land use typologies* on either side of the footpath are analysed in addition to the *access typology*. In Figure 16 both scenarios, **A** and **B**, fall under the *access typology* of 'residential passageway', however, the characteristics of the different *land use typologies* that occur outside of the footpath on each site, that is 'vegetation' vs. 'urban residential' *land use*, demonstrate different *accessibility* problems.



## Moving From a Text Format to a Spatial Format

The second observation about the typological study occurred while translating the *accessibility* literature, which previously existed in a 'theories' medium, into the new spatial/diagrammatic medium of the *accessibility* typologies. What initially seemed like straightforward theoretical criteria such as, *proximity*, *safety*, *connectivity* etc, became complicated when trying to translate their spatial implications for pedestrian *accessibility* into a typology. I argue this was difficult because there is strong interconnectedness between each of the *accessibility* theory subcategories (proximity, comfort, CPTED, interest etc) at different micro and macro scales, which is difficult to separate. The following two examples demonstrate this:

### 1

If we look at the pedestrian access typology '*Residential Passageway*' (Figure 14), and consider how this typology affects the *accessibility* subcategory of '*proximity*'. The residential passageway can improve journey proximity by adding finer connections to the street network and thus allowing more direct thoroughfare between streets. However, *proximity* can also be affected by other *accessibility* criteria. For example, if the *accessibility* criteria of *safety* in terms of CPTED is introduced. When an *accessibility* barrier towards *safety* is present along a user's most direct route to a destination, despite the 'residential passageway' in theory offering a more direct route for the pedestrian, because the pedestrian can

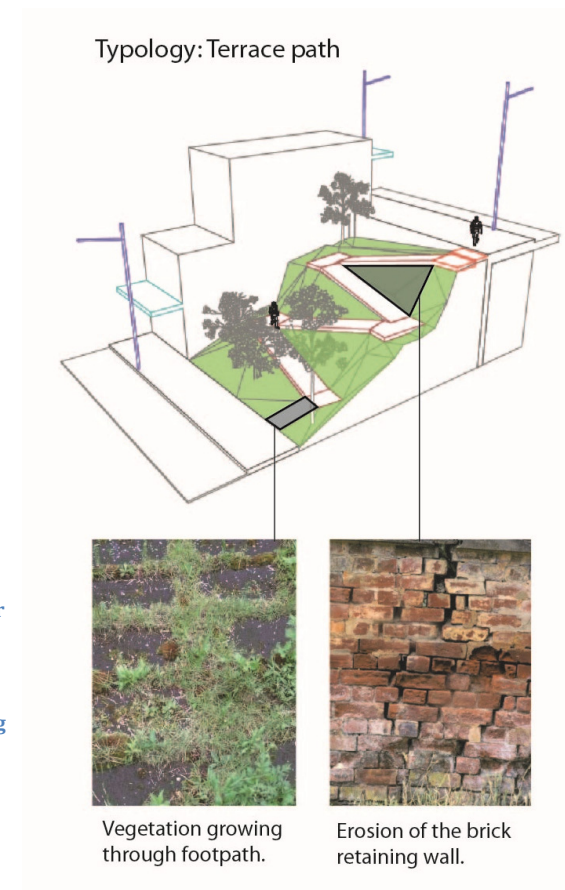


Figure 17: Run down or Character? Some *accessibility* spatial qualities are conflicting

no longer use the passageway the CPTED *safety* barrier can remove this *proximity* benefit.

### 2

In a second example, if we take the access typology of an old '*Terrace Path*' (Appendix A pg196) and examine it in regards to it's *path quality* in Figure

17, two contrasting interpretations can be made about the spatial qualities of the typology. On one hand the steep gradient of the path, erosion of the masonry retaining walls, and the overgrown vegetation, could be assessed as being hazardous, neglected, and in need of maintenance. However in contrast, these spatial qualities can be assessed very differently when considering their contribution towards the *accessibility* subcategory of 'path interest'. For example there is an appealing quality to both the eroded materiality from the worn stair treads, repaired mortar patchwork; and also the eroded, bulging and cracked masonry retaining walls. These contrasting interpretations are problematic because in the typological process the typology is unable to separate the unique *interest* qualities of site like age and character, from the categories of poor *path quality* i.e. maintenance. This is because the standardisation and utilitarian simplification of the surrounding site context is a fundamental characteristic underlying the typological process.

In conclusion of the typological study of pedestrian *accessibility*, despite employing a rigorous process of analysis that assessed each typology against the *accessibility* framework derived from the travel behaviour literature, the typological study was still flawed. This is because the study did not consult with, or factor into the analysis, any public perceptions of the built environment. This is a problem because all the relationships identified in the study between the built environment and pedestrian *accessibility* were strongly weighted towards the expert researcher's

personal walking perceptions. In this sense I argue that relying entirely on a 'top down typological study' of pedestrian *accessibility* as an approach to site analysis is flawed. This is because fundamentally *accessibility* is a product of people's perceptions toward the built environment, and therefore is highly subjective and contextual. Thus any conclusions regarding pedestrian *accessibility* in Central Wellington should be derived through robust public consultation. In reflecting on this 'typological study' I acknowledge that if the research time constraints were removed, employing a 'bottom up' process of analysis in which qualitative opinions from a wider portion of the community were considered, the typological study would result in a more truthful spatial understanding of Wellington's built environment's pedestrian barriers.

In terms of pedestrian design practice in Central Wellington, considering the lack of understanding about how the design of the built environment affects pedestrian *accessibility* (which was outlined in the chapter 2.4), this chapter has demonstrated that a typological analysis of pedestrian *accessibility* could fill this gap. This is because a typological analysis could be used to translate the *accessibility* theory into a spatial format that makes the travel behavioural theory more applicable to real world practice.

## 4.2 Stage 2: 'Bottom up' Cognitive Survey Pilot test

---

Following on from the 'top down' typological study, the next step towards understanding the relationship between pedestrian *accessibility* and the built environment was to find out where pedestrian *accessibility* barriers exist in Central Wellington from the perspective of the public. This involved developing a 'cognitive survey' technique. Note the cognitive survey is 'stage 2' of the initial 'Hypothesis Pedestrian Design Strategy' (Figure 13 pg50).

To begin with, the term *cognitive mapping* will be explained.

### 4.2.1 The Cognitive Map and Cognitive Mapping

The term *Cognitive map* comes from travel behaviour theory discussed in the literature review chapter. In order to understand the concept of cognitive mapping it is helpful to recap on the following travel behaviour theory:

- When a person makes travel behavioural decisions they act according to their mental representation of the built environment; and this mental representation is formed through the mental process of cognition, which processes a person's

*perception* experiences of the built environment over time (see Figure 5 pg 23).

The cognitive map is an important concept in understanding a person's travel behaviour as it represents a person's understanding of *accessibility* in the built environment. For example Mondschein, Blumenberg, and Taylor argue that although it is unclear exactly how transport infrastructure affects people's travel behaviour, research so far suggests when a person's travel actions interact with various transport infrastructure, e.g. roads and sidewalks, their experience affects their cognitive map, and subsequently their travel behaviour (849).

In order to access a person's mental representation of the environment, the idea of a *cognitive map* or cognitive mapping is important. This is because a *cognitive map* is a spatialised form of the cognitive process as a mental image (Hart and Moore 248). As a child you may have drawn 'mind maps' or *cognitive maps* of your journey to school, in which you drew the things along the journey that you remember. *Cognitive mapping* in this sense can be seen as a representational drawing of your mind's 'mental image' of the environment (Mondschein, Blumenberg and Taylor 847).

## Why is Cognitive Mapping Important?

Cognitive mapping is important for this research because it can be used in addition to the earlier typological study to understand how certain groups of people perceive pedestrian *accessibility* in the built environment. Therefore considering there are a number of problems with the current process Central and Local Authorities use to identify pedestrian barriers in the Central Wellington, highlighted in *section 2.4.2*, cognitive mapping needs to be trialled in order to see whether it could become a successful 'bottom up'/qualitative method of identifying pedestrian *accessibility* barriers in the built environment.

Before carrying out any survey experiments, two past examples of cognitive mapping research by Hannes and Lynch were examined in order to gain some insight into likely problems faced when using a cognitive mapping survey method. Two points were highlighted from their work:

- Hannes

Hannes used the technique of combining people's recorded travel routes from the cognitive maps, with accompanying qualitative information from an additional survey. His method was useful because it allowed qualitative information about certain aspects of the respondents' cognitive maps to be teased out while they were drawing. This technique was beneficial because it meant

more detailed information could be extracted from the respondents (Hannes, Janssens and Wets 76-96).

- Lynch

Lynch's experiment compared using verbal interviews as a survey method against the drawn cognitive mapping method. Lynch found that the cognitive mapping technique (or as Lynch calls it 'sketch mapping') had a higher threshold for depicting information than verbal interviews. This means that some elements that were highlighted in the verbal interviews did not feature on the respondents sketch map. In conclusion, Lynch expressed that it was essential to have an accompanying verbal survey working in parallel with the cognitive mapping drawing (Lynch 144).

As a final comment, Bechtel criticised cognitive mapping research as being unreliable due to much of the data within cognitive maps being uninterpretable to the researcher when viewed in isolation (95). This thesis argues however, Bechtel's criticism can be avoided. This is because the research by Hannes and Lynch suggests that by combining together cognitive sketch maps with additional verbal interviews, the researcher is able to ask questions about how to interpret the unreadable parts of the respondents' sketch maps. Similarly to Hannes and Lynch, a dual method will be adopted for the cognitive mapping surveys in this thesis.

## 4.2.2 The Experiment Method

A pilot cognitive mapping survey was carried out first to test how successful the survey questions were at evoking the desired responses from the interviewees. Note because this exercise was only a test, just three respondents were interviewed. This pilot test was broken into two components:

1

The first component required the respondents to draw on a map of Central Wellington their journeys through the city as directed by the interviewer. The respondents were required to draw/comment on the parts of the journey they disliked and liked the most when they walked to and from home to two different locations within the survey boundary. As the respondents drew these journeys, the interviewer asked probing questions to tease out qualitative reasoning regarding each of their answers. The outcome of the survey was a map showing where each respondent perceived there to be *accessibility* barriers when walking, and subsequently where in the city the main problem areas are located (See *Figure 19 pg 71* as an example of this map).

2

The second component was to compare the qualitative comments from the surveys, against the typologies that were present along the respondents' routes. This was to see whether there was any relationship between the typologies and the kinds of *accessibility* barriers that the

respondents had perceived within the site. This was done using a mapping technique which represented each of the respondents' journeys in a line showing the *land use typologies* they walked past on either side of the footpath, as well as the *access typologies* they walked through. As a final step the qualitative comments made about each typology were graphed alongside this (see *Figure 20 on pg71* foldout).

## 4.2.3 Findings from the Cognitive Survey Pilot Test

Three observations could be made from the pilot test:

1

Firstly, the pilot survey questionnaire (*Appendix B 219*) contained too many questions, and some questions were too open-ended, which caused the answers to be inefficient. This exposed a problem for later on when the survey was to be up-scaled and the data collated, as the questions need to be concise to avoid unnecessarily wasting resources.

2

Secondly, the level of detail respondents were able to recall and comment on about sites was often vague. For example one respondent generalised large sections of a route up to 200m long as being "dark" and with "not much happening". However, only once interrogated further were they able to give more useful insight about the cause of the problems and the exact location i.e.

*“the site felt dark due to dense tree cover blocking the overhead street light”* – anonymous respondent.

In contrast to this however, some respondents found it hard to expand critically on their statements. For example, to explain why certain streets or places were “scary” or felt “dirty”. This difficulty appeared to be because the cognitive methodology relies on memory, and therefore causes some parts of the respondents’ journeys to be better recalled than others. This variation in the accuracy of the respondents’ answers is problematic as the exact origins of each *accessibility* barrier are needed for:

- The upcoming design experiment, which searches for a pattern between typologies on site and the identified *accessibility* barriers located by the respondents;
- And also in the later experiments when trying to design a solution to each *accessibility* barrier.

A dilemma arises here because by asking questions the interviewer has the ability to influence the respondents’ answers, and thus distort the survey information. For example, Kearns argues that there is a danger in the influence the researcher has over the process of observation. Kearns argues that the researcher has an active role in the observation process whereby they can choose *what* and *how* they wish to observe (193). Thus the researcher must be aware of his or her own relationships and views towards the research field that is being studied (205).

There are two alternative solutions for improving the level of detail respondents can recall on site. The first one is to move from a cognitive survey to a site-based discussion where respondents are asked to provide walking commentary whilst they navigate the streets. This is the same technique used in the *Community Street Audit* used by the NZTA. However this technique is also problematic. For example Marans argues that one benefit of an on site-based discussion is that it

*“Allows the interviewer to gather information about the physical setting while he or she is at the site (69).”*

However, I argue that this ability to gather information from the surroundings not only applies for the interviewer, but also to the respondent. On one hand the literature highlighted that individuals’ behavioural actions, such as the decision to walk or drive, is an action based on the cognitive processes, this is their mind’s recollection of the perceived experiences in the environment. However in contrast, when using walkthrough site-based interviews, a respondent is able to draw attention to elements and qualities of the street environment that they might not have recalled cognitively at a desk interview. Therefore, although in a site-based interview the respondent can give more detailed answers about the areas of the surroundings that affect their experience of walking, this is less relevant. Information that respondents recall from memory through their cognitive process is key to understanding the *accessibility* barriers that affect a pedestrian’s decision to walk.

Thirdly, given the limited sample size of the pilot test, perhaps on a much larger survey the proportion of the vague comments (where respondents were unable to expand on their answers) in relation to the survey sample size would be less.

## Conclusions

In conclusion to this pilot test these above points have:

- Highlighted that the interviewer has a responsibility towards the quality of research produced. It is vital that the interviewer is familiar with the survey process and knows when, and how far, to interrogate respondents' answers when probing for more information.
- Highlighted that the information that respondents recall from memory through their cogitative process is key to understanding what *accessibility* barriers affect a pedestrian's decision to walk.
- Affirmed Bechtel's argument that in cognitive mapping research it is necessary to train the researchers/interviewers to ensure that there is a controlled consistency in the survey data (95).

In response to the pilot test, the following changes were made to the cognitive mapping survey method before carrying out 'Design Experiment 1':

- The survey questions were refined.
- The interviewer was aware to what level, and when, to interrogate the respondents to expand on their comments.

## 4.3 Design Test 1: A New Method of Site Analysis Using Typological Pattern Maps & Qualitative Perception

---

So far it has been established that the typological study is a useful way of learning about the spatial conditions, associated with each typology, that affect pedestrian *accessibility*; and how these conditions could result in *accessibility* barriers being created in the built environment. The purpose of this next experiment, 'Design Experiment 1', was to combine the typology analysis and cognitive surveys method into one 'bottom up' and 'top down' method for locating where *accessibility* barriers are in the built environment, as well as the spatial principles that are causing them.

In order to do this the same mapping exercise was carried out, as in the earlier pilot test, to compare the built environment in a typological medium against the *accessibility* barriers raised through the 'bottom up' survey. As a research hypothesis I was interested to see whether a pattern would emerge between the kind of *accessibility* barriers that were being raised along a person's route, and the typologies that were present on site. Finding a pattern is significant in terms of 'stage 3' of the 'Hypothesis Pedestrian Design Strategy' (Figure 13 pg 50), which aims to create standardised typological solutions for each *accessibility* barrier, because:

- Firstly, a pattern between typologies and the barriers would expose how many typologies are in need of a standardised solution.
- Secondly, finding a pattern also suggests there is a common spatial problem associated with each *accessibility* barrier, and therefore makes designing a standardised solution for each barrier much easier.

### 4.3.1 Method

The method was broken into three steps:

1. Cognitive surveys were carried out to locate on a macro city scale what and where were the barriers to walking in Central Wellington as viewed by the public.
2. Next these areas where most problems occurred ('barrier hot spots') were organised into and re-represented as typologies.
3. Next the typologies were then compared against the pedestrian *accessibility* barriers raised by the respondents.

#### (1) Interviews

The cognitive surveys were carried out to achieve two goals:



1. To locate the areas of the city where *accessibility* towards walking is currently viewed as a problem.
2. To understand qualitatively how the surrounding environment had caused these barriers to occur.

Due to the time consuming nature of processing each interview, only nine interviews were conducted in this experiment. Note it is important to understand that this minimal sample size does not hinder the experiment. This is because the aim was not to produce generalisable data about pedestrian *accessibility* in Wellington, but instead to test how the new cognitive survey methodology functioned as a way of identifying pedestrian *accessibility* barriers on an infrastructural scale. It is acknowledged however, that if a larger sample size were possible this methodology would be tested more rigorously.<sup>3</sup>

#### *Site Boundary*

The survey site boundary was restricted to the residential catchments surrounding the Central Wellington area (*Figure 18*). This area was chosen because it included the key walking distance between 1-2km,

which was identified in the *chapter 1.05 (Figure 2 pg 9)* as the threshold when a significant decrease in walking trips tended to occur.

---

<sup>3</sup> A larger survey sample would both, expose new problems when organising/interpreting the survey data, and also, result in a more democratic representation of the public's perceptions towards pedestrian *accessibility* in the Central Wellington.



Figure 18: Map showing the outer residential catchments surrounding the CBD (not to scale)

## (2) Survey Questions

The criteria for the survey group were as follows. Respondents must:

- Have access to a vehicle and drive in Central Wellington.
- Walk within Central Wellington,
- Live within a defined area of the site research boundary,
- Be between the ages of 20-25.

The survey demographic was chosen because:

- They are a younger and more active age group, and therefore likely to have walked over a wider scope of the city (Ministry of Transport 6).
- For convenience reasons as it was easier for me the researcher to organise to meet with this demographic.

The interview consisted of four questions asking the respondents to draw on a large map of Wellington the journey from their homes to two different *necessary activity* locations - these are the activities which individuals must carry out within their lives in the urban environment, such as commuting to work, waiting for a bus, or commuting to the shops for a specific purpose (Gehl 365) –

Each survey question addressed one of the different environmental, time and weather conditions below:

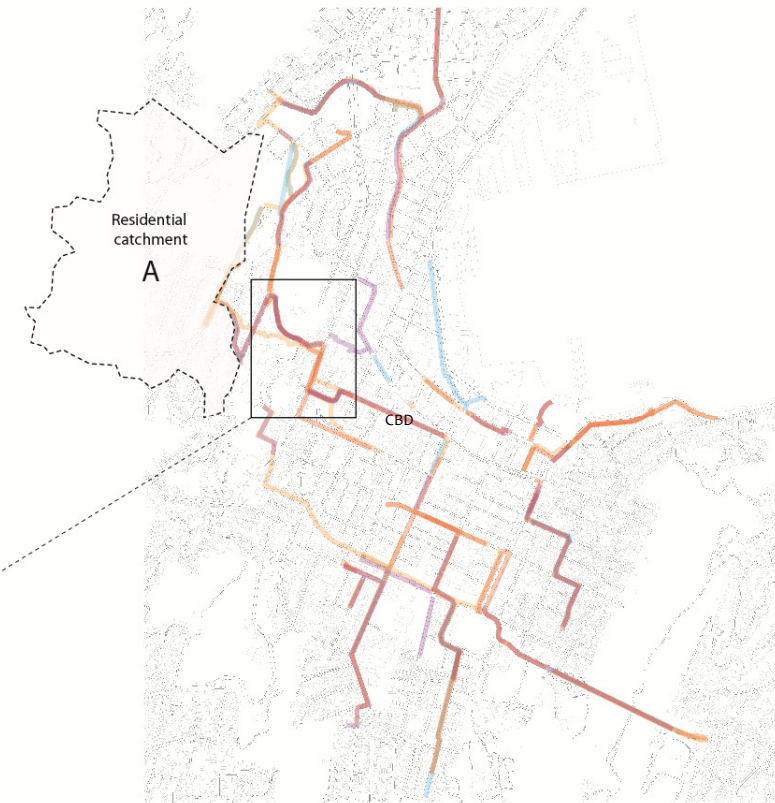
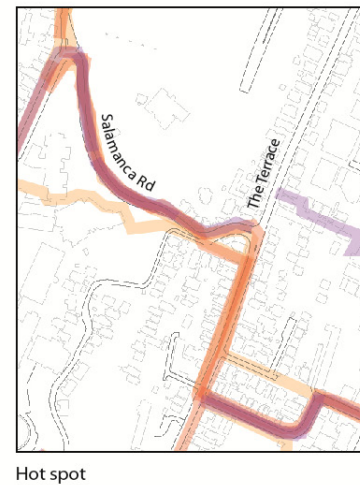
- Night time calm weather
- Night time extreme weather
- Daytime calm weather
- Daytime extreme weather

Following this, the respondents were then asked to identify the places along each of these routes that they found least enjoyable (the barriers in their journey). (For more details of the questionnaire see *Appendix C pg220*). All together 72 routes through the city were documented:

9 surveys x 2 journeys to different locations x 4 varied  
conditions = **72 routes**

Each survey was then overlayed onto a single map so the areas where most barriers occurred, the 'barrier hot spots', could be identified (*Figure 19*). The diagram shows the most intense barrier 'hot spot' was along in the area which formed a key link connecting 'residential catchment A' to the city centre.

Figure 19: Map showing the main 'accessibility barriers hot spot' after overlapping all the respondents survey data

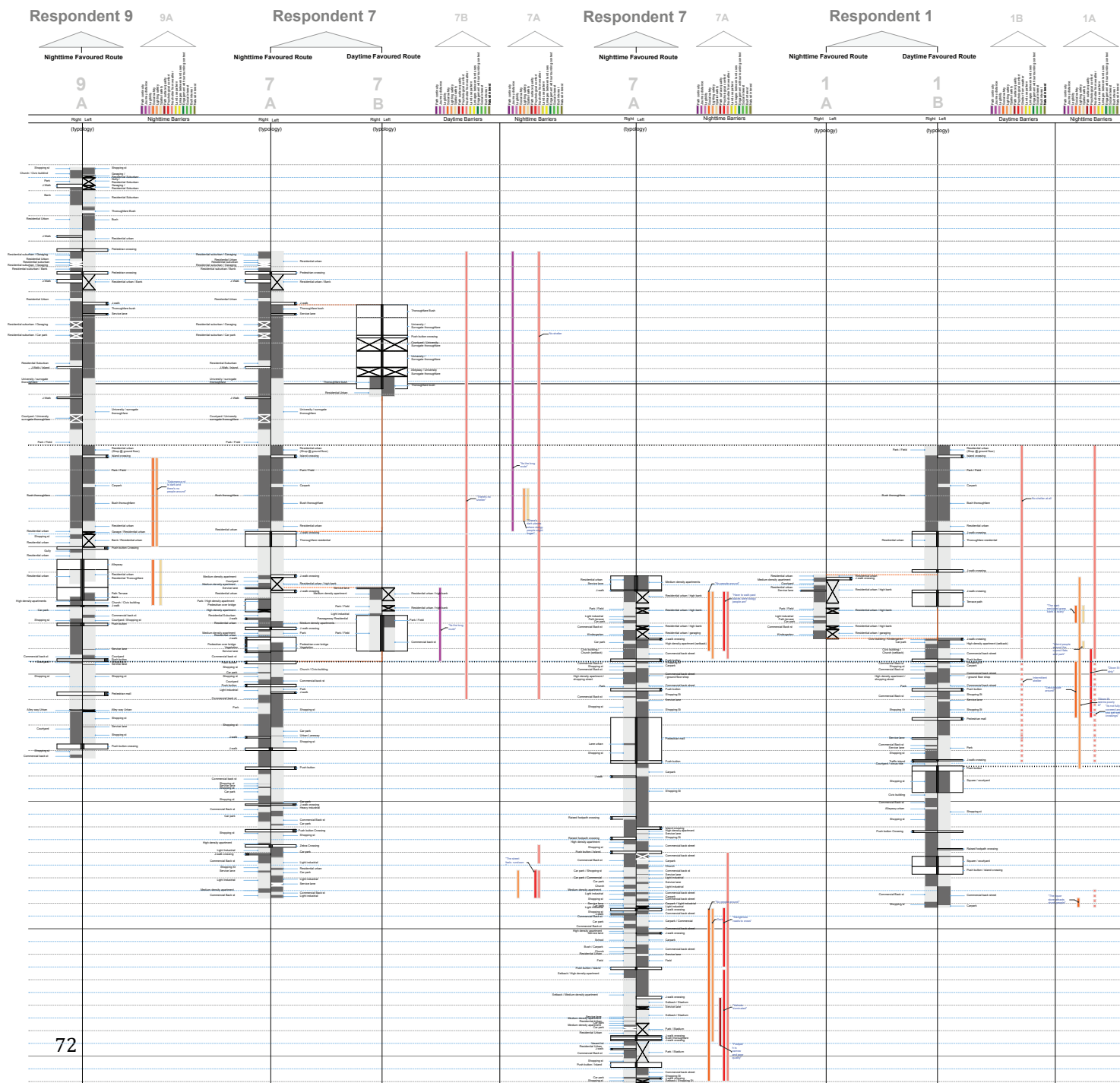


### (2 & 3) Re-representing Site and Finding a Pattern

Having identified the main problem area/barrier 'hot spot', the site was then re-represented typologically. This task involved me fulfilling the role of an 'expert', walking through the 'barrier hot spot' on site and identifying the *access typologies* and *land use typologies* that occur along each side of the road.

The respondents' qualitative perceptions that were recorded from the cognitive mapping interviews were then diagrammed in parallel alongside the typological representation of site. This allowed the typologies to be compared against the *accessibility* barriers, and any patterns to be observed (Figure 20).





### 4.3.2 Findings

Three observations were made about the use of typological pattern maps. The first two are limitations regarding the problems faced when applying the typologies as theory into practice on a real world site. These are:

- The difficulty of re-representing the complex real world environment as simplified typologies.
- The typological analysis was unable to recognise the influence of the larger urban environment on pedestrian *accessibility*.

The third observation is a reflection on why the 'typological pattern method' is un-successful for researching how pedestrian *accessibility* is affected by the built environment within a site; and as a result, why it has no further application in this thesis research.

#### Re-representing a Site Typologically

The first problem with the typological method of analysis was the difficulty faced when trying to align the diverse range of real world typologies within the site, with the theoretical *access* and *land use typologies* from the typological study. This was because the real world typologies were more complex than anticipated. Unlike the theoretical typologies, the real world typologies were often formed from a combination of typological spatial conditions, and as a result they were difficult to sort into obvious typology categories. This was problematic as

each of these variations in real world typologies had different affects on pedestrian *accessibility*. For example:

#### *Example 1*

One of the positive attributes of the 'urban residential typology' (*Figure 15 p 57*) is the presence of 'eyes on the street', which results in a safer environment for walking after hours. However, one of the negative attributes or *accessibility* barriers that can arise in this typological condition is the obstructing of the 'eyes on the street'. This can occur due to a variety of reasons as demonstrated in *Figure 21*:

- Firstly, the sloping topography of the site can cause houses to be raised on bank walls or lowered into a gully.
- Secondly, significant garaging on the ground floor, essentially acting as a large blank wall;
- Thirdly other obstructions such as vegetation or high fences.



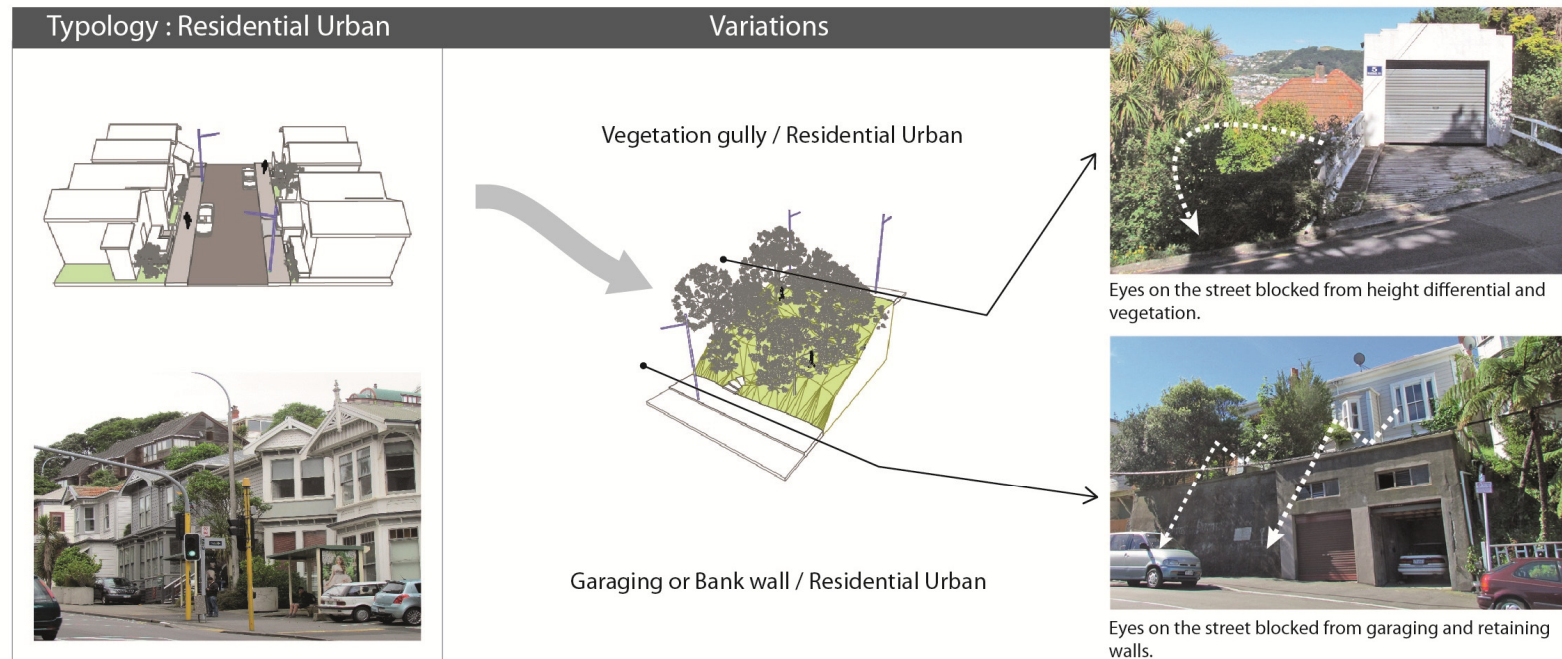


Figure 21: Some different ways in which 'eyes on the street' can be obstructed for a 'urban residential street' typology

### Example 2

The second example is based on the shopping street typology. In a mixed-use building the ground floor might be leased by a retail shop, and have a number of residential floors above. However, in a different scenario a similar building, which has residential floors above ground floor, might have instead a restaurant on the ground floor. In both cases the buildings

are categories as 'shopping street' typologies, yet both have completely different ground floor opening hours. This is problematic as *accessibility*, in terms of visual and social interest varies between each building at ground floor throughout the day.

The experiment found as a solution to these problems each typology needed to be broken down more specifically. So, for example, if a real



world typology on site had a significant spatial condition on the ground floor that needed to be highlighted, the typology was labelled using this format.

*Significant activity - ground floor / Typology - 1<sup>st</sup> floor upward*

*i.e.*

*Retail / High density apartment*

Or in other circumstances,

*Significant activity at the footpath's edge / Ground floor typology*

*i.e.*

*Bank wall / Residential Urban*

#### Typologies and wider site context

The second problem that emerged from this experiment was that the typologies and their simplified spatial conditions of the built environment were unable to consider the larger urban systems which the typologies function within. This became evident when the larger site conditions, which were influencing *accessibility* on site, went by unnoticed in the typological method analysis. For example, in many instances respondents identified a number of *accessibility* barriers to be present within certain

'real world' typologies on site. However, when each 'real world' typology was compared back to the initial typological study, the study proved incorrect as those 'real world' typologies were not supposed to cause any *accessibility* barriers. Conversely, at times in the experiment respondents viewed an entire street positively despite the street containing typologies that in theory should have caused an *accessibility* barrier. So why was this inconsistency occurring? And why was it proving difficult to find a definitive relationship/pattern between typological theory and the perceived *accessibility* barriers on site? I argue there are two reasons for this:

#### 1

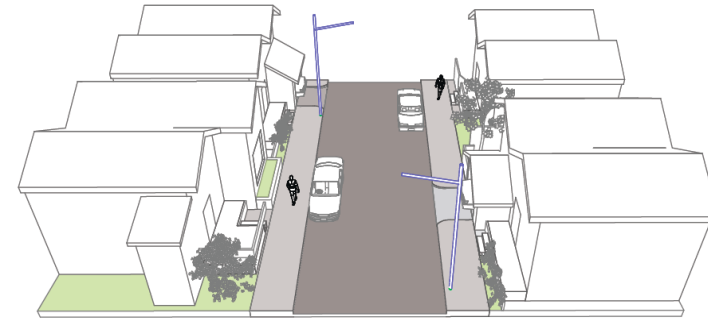
Firstly, *accessibility* within site is influenced by wider site conditions outside the context of the individual typologies. This was apparent in a number of situations during the cognitive surveys. For example, one of the respondents commented on their perception of *safety* at night when walking along a particular street (The Terrace) - The Terrace was categorised as an 'Urban Residential street typology'. According to the theoretical typological study, *safety* along the 'urban residential street' should be attributed to the surveillance from the after hour occupation of the houses. However, contrasting to this, during the cognitive mapping interviews the respondents attributed the feeling of safety in the evening along the street due to the high volume of vehicle traffic. The cause of this evening traffic is because The Terrace is as a principle road in the larger vehicle network, which feeds into a significant State Highway on-ramp

(see Appendix D pg 224). Therefore, because the road network is a larger urban scale site condition that occurs beyond the influence of an 'urban residential Street' typology, however has still affected the respondent's perception of *accessibility*, this demonstrates that when researching *accessibility* within a site there are larger scale environmental factors that the typological method of assessment is unable to identify.

## 2

The experiment also highlighted that the respondents' perceptions of *accessibility* is influenced by spatial conditions simultaneously between typologies on both sides of the street, highlighting that it is important to think about a site being made up of more than just a series of individual typologies in isolation, but instead as a matrix of relationships between multiple typologies. For example, take the **Bank wall (at ground floor) / Urban residential typology** and think about the spatial conditions that contribute towards the *accessibility* criteria of *interest*. As a theoretical typology in isolation, the level of *built interest* a pedestrian experiences in this spatial condition depends on the:

- Building's aesthetic, such as architectural details and material qualities of the bank wall,
- View shafts, whether the bank wall at ground floor still permits views to the building.



However, assessing *built interest* became more complicated in the design experiment. For example on a number of occasions streets that contained a run of 'bland' bank walls were not, surprisingly, considered by the respondents as being un-interesting, despite the bank walls failing to achieve either of the above two points. The reason for this was because directly opposite the road the pedestrians' interest was satisfied by a variety of interesting houses, as depicted in *Figure 22*. This example highlights that there is a tension in trying to understand the environment as a single simplified typological entity, when clearly pedestrian *accessibility* in the built environment is more complex. The environment is made up of many relationships between multiple typologies on either side of the road at a micro scale, as well as other larger macro scale influences.



Figure 22: Diagram showing a person engaging with typologies on the adjacent footpath

#### 4.3.3 Further Direction for the Typological and Cognitive Mapping Methodology of Site Research

The final problem that emerged from this experiment was the difficulty of observing a pattern between the typologies within site, and the *accessibility* barriers raised by the respondents. Note this is a significant problem considering the intention of the typological method was to be a process for researching how pedestrian *accessibility* is affected by the

design of the built environment. The absence of a clear relationship was due to two reasons:

- Firstly, the amount of survey information obtained for each area of site was insufficient. For example, when all the respondents' routes from the interviews were overlayed into a single image there were very few 'hot spots' where the respondent's routes overlapped. Therefore as a consequence a minimal range of perception data was gathered for each site. This is problematic because a large range of perception data must be obtained for

each problem site/hotspot in order to truly investigate a relationship between the barriers and typologies.

- Secondly, the number of typological variations used in this experiment was too simplistic in comparison to the diverse range of real world typologies on site. As a result, failing to identify a pattern was therefore an indication that *accessibility* within a site is much more complex than can be explained through the typological analysis method used in the experiment.

Marrying a typological understanding of a site with the public's perceptions of *accessibility* is a somewhat disconnected process. On one hand, a user's perception of a site is unique and complex, affected by multiple typologies and spatial relationships between them, across a range of spatial scales. Yet in contrast, a typological method of analysis attempts to simplify the complex nature of site by removing and reducing these unique spatial qualities into a singular typology. As a result, this disconnection is problematic because it causes the typological method of analysis to produce an incomplete assessment of the site's built environment.

In conclusion, the hypothesis of this experiment was to uncover a pattern between the typologies and the *accessibility* barriers pedestrians perceived within a site. This experiment highlights however, that further

research is required (in terms of a larger interview sample size and detailed typological study) before a pattern can be observed, and thus before a typological analysis can be used specifically to understand, and pre determine, where *accessibility* barriers are within a new site.

## Summary

### *Limitations of the typology*

The experiment found that using a typological method to carry out site analysis is problematic. This is because typologies cannot identify where within a site, or explain how, pedestrian *accessibility* is affected by the built environment at a macro scale. This is significant because the highly important *accessibility* categories such as *connectivity* and journey *proximity* can only be improved through understanding the macro context.

The experiment identified the cause of this problem as being centred on the fundamental dichotomy between the complex nature of a site, versus the simplification process governing a typological method of analysis. For example, on one hand understanding the complexity of a site requires an awareness of the macro scale site systems that occur off the footpath; the diverse and unique range of spatial types that are present on a site; and, the interrelationships that exist between them. However in contrast to

this, the typology method of analysis, aims to simplify all these complexities to understand what is going on within a site in isolation.

Secondly, the experiment highlighted there is a disconnection between the simplified context-less 'theoretical typologies' (from the typological study), and the diverse contextual 'real world' typologies (from site). This was highlighted when the initial typological study proved unable to represent site in a typological medium, and thus made it difficult to observe a pattern between the typologies on site and the *accessibility* barriers that were identified in the surveys. The experiment highlighted that fundamental to this problem is that there is a unique contextual quality to each 'real world' typology in the built environment that is unable to be 'typologised' without an apparent endless number of typological variations.

#### *Benefits of the Typology*

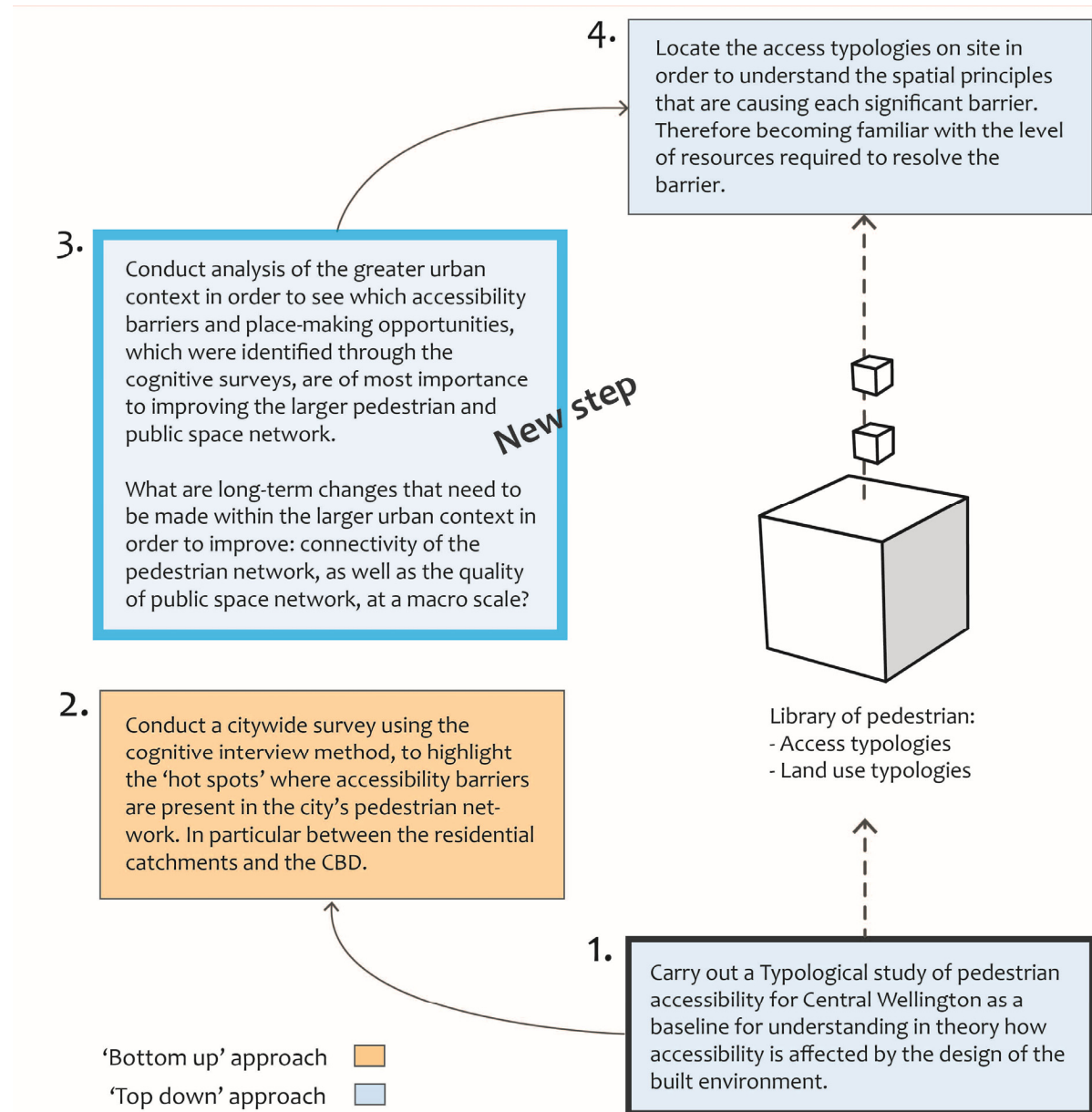
Despite the earlier limitations, typologies are a useful tool for understanding in principle the spatial conditions of a site that are likely to affect pedestrian *accessibility*. Therefore, when typologies (which do not consider context) are used alongside the findings from the cognitive surveys (which are contextual), typologies can help researchers understand more about why the pedestrian *accessibility* barriers occur in the built environment.

In conclusion, when researching pedestrian *accessibility* barriers on a site in practice, there are a number of considerations that need to be made:

1. Professionals should have an awareness of the interrelationship between each of the real world typologies on site, and how they affect pedestrian *accessibility*.
2. Typological analysis needs to distinguish between:
  - *Theoretical typologies*, which operate in a simplistic realm without context;
  - *Real world typologies*, which are unique to context, and embody an accumulation of qualities that are inherent across a range of theoretical types.
3. Professionals should have an awareness of the larger systems on site that affect pedestrian *accessibility* and that occur beyond the influence of the typologies. This could range from the influence of the typologies present across the road, to a macro scale system such as the location of the site within the city's transport network.

## 4.4 Further Direction: The 'New Pedestrian Design Strategy'.

This chapter found a number of limitations with the initial 'Hypothesis Pedestrian Design Methodology'. Thus in reaction to these limitations, over the course of the next three design experiments a new 'Refined Pedestrian Design Strategy' was developed. The first iteration to this new methodology is diagrammed opposite.



## Chapter 5: Pedestrian infrastructural solutions

---

The previous chapter trialled the first two stages of the initial 'Hypothesis Pedestrian Design Strategy'. These were a typological analysis of pedestrian *accessibility* in Central Wellington as well a pilot study of the cognitive survey method. The purpose of this next chapter is to explore the remaining stages (3-7) of the hypothesis methodology with the main objective of discussing:

?

How can pedestrian barriers in the built environment be resolved most cost efficiently through design? What are the consequences that arise from a focus on efficiency, and how do they need to be addressed?

The chapter is structured in the following order:

### *Design Experiment 2*

The experiment investigates using 'standardised typological solutions' as a way of resolving pedestrian *accessibility* barriers within the built environment. The experiment uncovers: firstly, the pros (such as cost efficiency) and cons (the lack of response to context) of using this design approach. Secondly, that making small interventions on the macro scale



can be a catalyst for larger scale change, altering how people move through the city can affect the way a the city functions.

#### *Design Experiment 3*

The experiment begins by addressing from 'Design Experiment 2' the key problems that arise when using a standardised typological design, particularly when the design interventions fail to respond to the surrounding context. Following this, 'Design Experiment 3' uncovers that there is an opportunity to improve the quality of public space within site during the process of resolving *accessibility* barriers. The experiment pursues this opportunity by identifying the areas of site that have place-making potential and subsequently designing to develop these areas into new public space.

#### *Design Experiment 4*

Lastly, 'Design Experiment 4' combines what was learnt in the previous three design tests, Design Experiment 1, 2 and 3, into one complete strategy for research, designing, and implementing pedestrian infrastructure. Most importantly, this experiment demonstrates that designing for *accessibility* barriers, and place-making opportunities, on a micro scale has a significant effect on the larger macro scale. However, only if both the micro and macro scale are researched, designed, and implemented, for together.

## 5.1 Design Experiment 2: 'Creating Typological Solutions'

---

The purpose of 'Design Experiment 2' was to explore two things:

- Firstly, to trial the cognitive mapping survey technique on a larger sample size.
- Secondly, to test how effective a standardised typological approach could be at resolving *accessibility* barriers on site in a limited economic funding context.

A standardised typological approach was used because of two reasons:

- The initial typological study simplifies site into categories that are characterised by a common spatial condition, thus it is an easy progression to design standardised solutions for each typology.
- Standardised solutions are both time and cost efficient because the design can be replicated on multiple sites, which enables parts of the design to be mass produced.

Note, the Adshel Bus Shelter (*Figure 23*), is an example of a standardised solution that is replicated throughout Wellington's built environment.





Figure 23: Adshel's standardised bus shelter

### 5.1.1 Method

The main design experiment was carried out using the same 'barrier hot spot' site identified in the cognitive survey in 'Design Experiment 1' (Figure 19 pg 70). Note prior to this, a pilot test was carried out using a separate site; however the findings from this will be discussed later on after the main design experiment.

To begin with the Salamanca hot spot was broken down typologically (Figure 24) and compared against the qualitative comments from the interviews (Figure 25). The diagram shows the barriers present along Salamanca Rd were:

- **Comfort:** because of an "absence of shelter from weather"
- **CPTED lighting safety:** because of some areas being "too dark".
- **Route proximity:** because one respondent had to walk an "unnecessarily long route".
- **CPTED social safety:** because "not enough people were around"

Re-representing site in a typological manner was important as it allowed each typology to be compared against the *accessibility* barriers that were raised by the respondents. Then by using the initial typological study to understand how each *accessibility* barrier is created by each of the typologies, the following process was carried out:

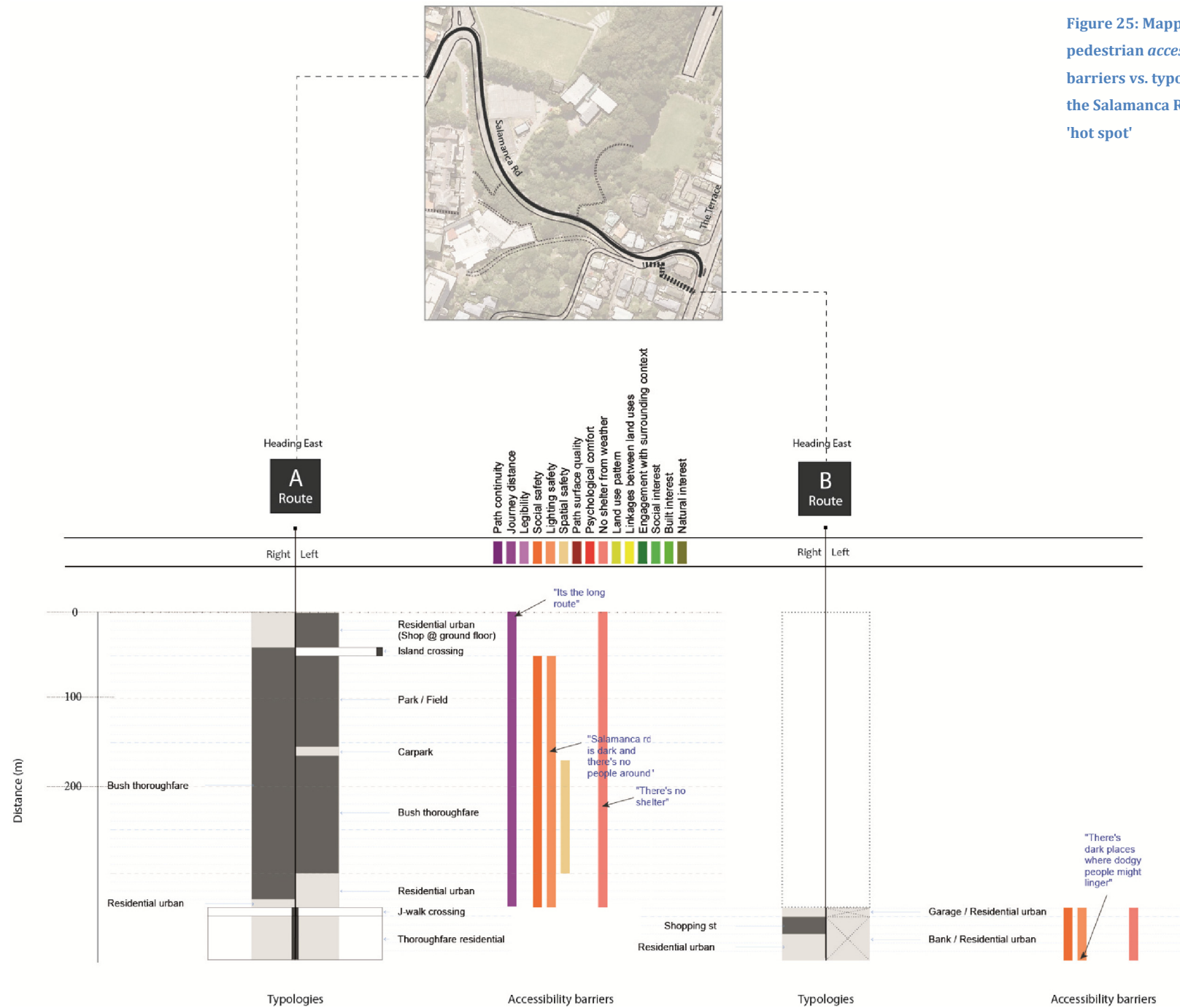
1. Typological solutions were created to address each of the *accessibility* barriers on site.
2. The typological solutions were documented and expanded further into a 'design guideline' format, so that the solutions could be transferable to other sites later on.
3. Each typological solution was then applied to site.

The following Figures 25 - 32 demonstrate this process.



Figure 24: Typologies within barrier 'hot spot' site

Figure 25: Mapping the pedestrian *accessibility* barriers vs. typologies - for the Salamanca Rd barrier 'hot spot'





### Example 1

The cognitive surveys identified four *accessibility* barriers at the area of site shown in *Figure 26*. This area of site was overlooking an 'urban residential St' typology. The barriers were:

1. No shelter from weather.
2. Absence of evening lighting.
3. Journey distance (as it was not the shortest route for some respondents)
4. The lack of social safety in the evening.

Note only barriers 1 and 2 can be addressed through a typological intervention as their sphere of influence is refined to the micro street scale. Thus barriers 3 and 4 were not addressed in this experiment as they required interventions to be made in the wider macro scale environment which is beyond the influence of a typological solution.



Type = Street front urban residential

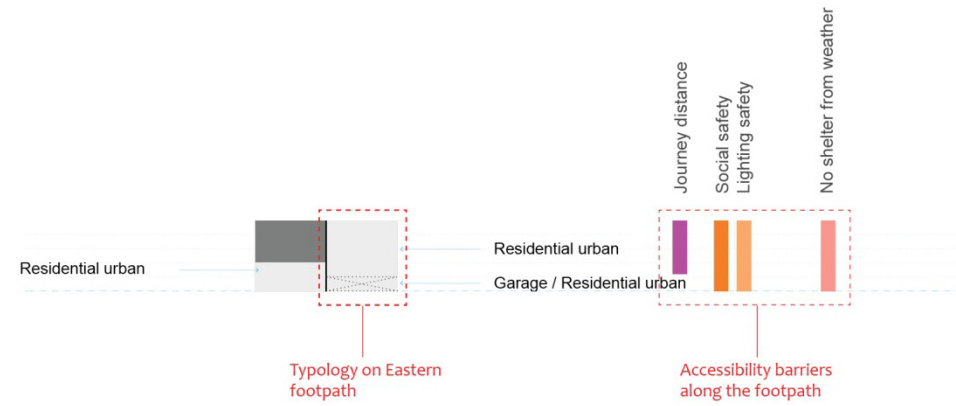
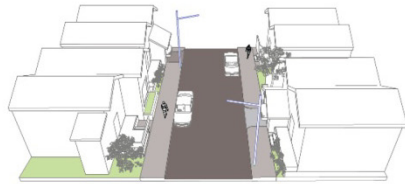
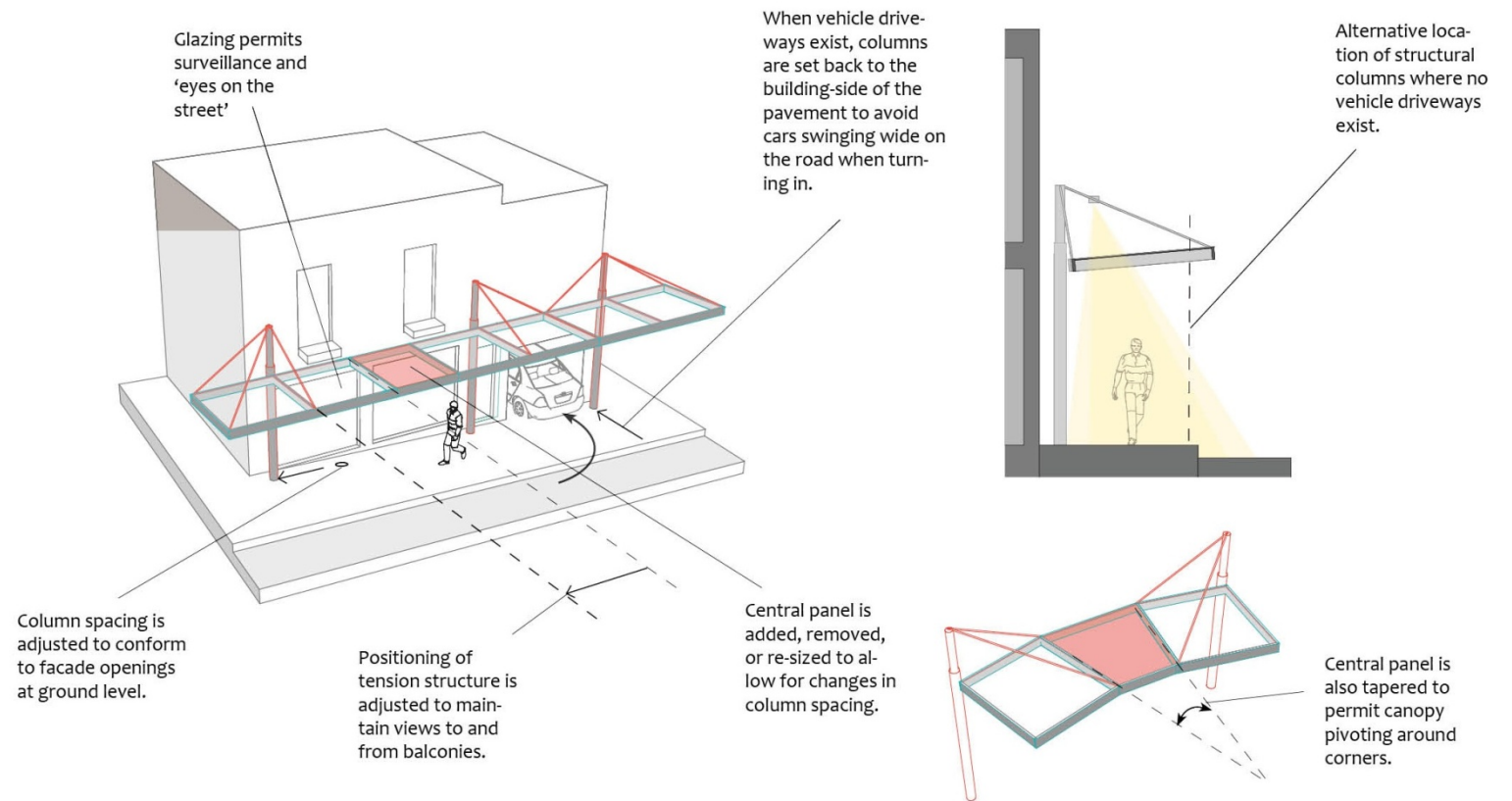


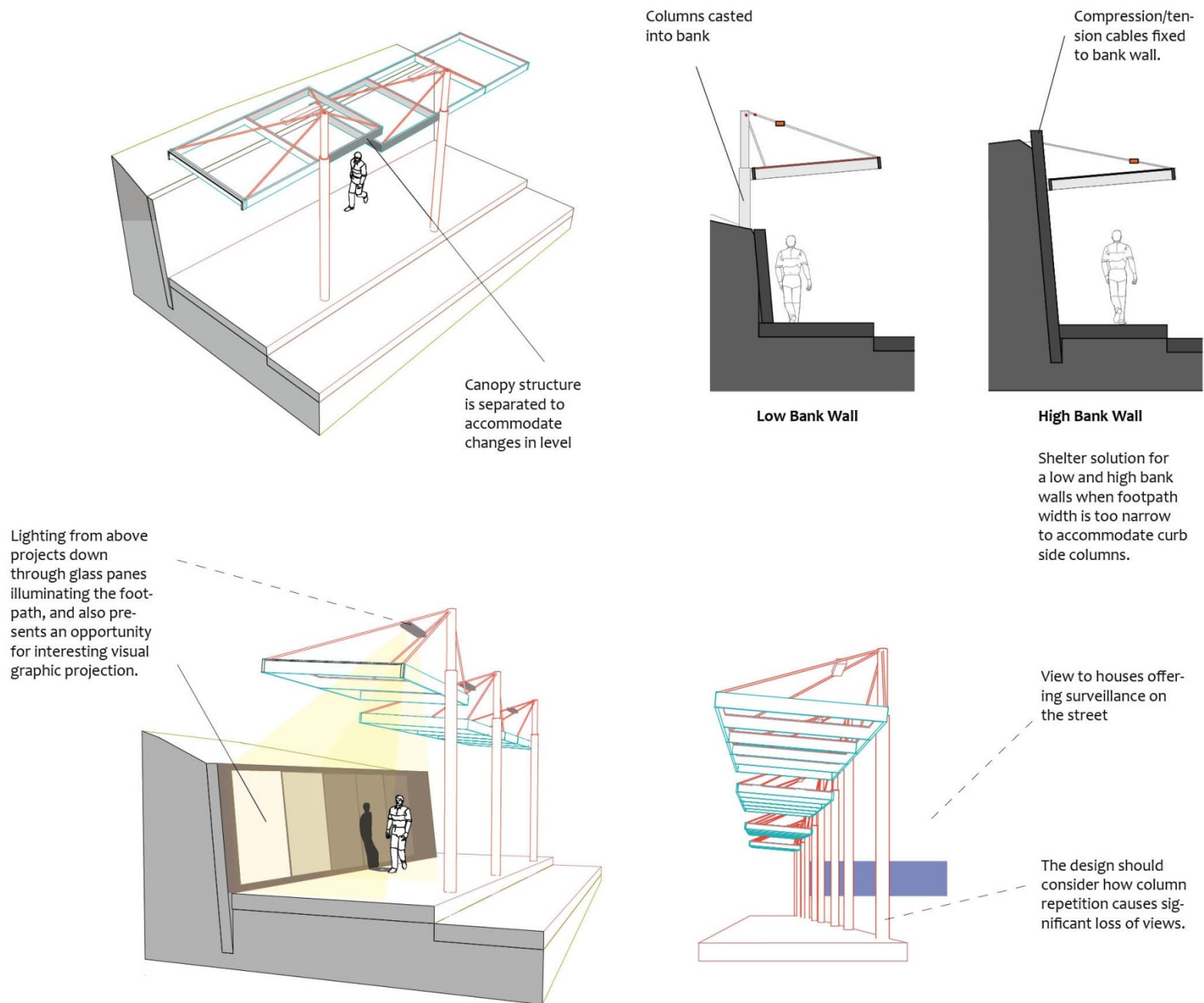
Figure 26: Land use typology and associated accessibility barriers identified on site



**Figure 27: Standardised typological canopy shelter solution for the 'urban residential St' typology.**



**Figure 28: Standardised  
typological canopy  
solution for 'bank wall'  
typology**







Before -> After



Before -> After



Figure 29: Before and after - canopy typological solution for 'Urban residential st' typology

## Example 2

The cognitive surveys identified the five *accessibility* barriers along an area of site shown in (*Figure 30*). This area of site was categorised as a 'vegetation/gully' typology (*Appendix A pg 212*). The barriers were:

1. Journey distance
2. Social safety (lack of people around in the evening)
3. Lack of sufficient lighting
4. Spatial safety (CPTED) due to an adjoining path that leads directly down a bank into secluded dense vegetation
5. No shelter from weather

Note as with the previous example, barriers 1 and 2 were not addressed as they required intervention on a wider scale than what could be resolved through a typological intervention at street level. Barriers 3 – 5 however, could be resolved using the typological intervention.

Type = Vegetation

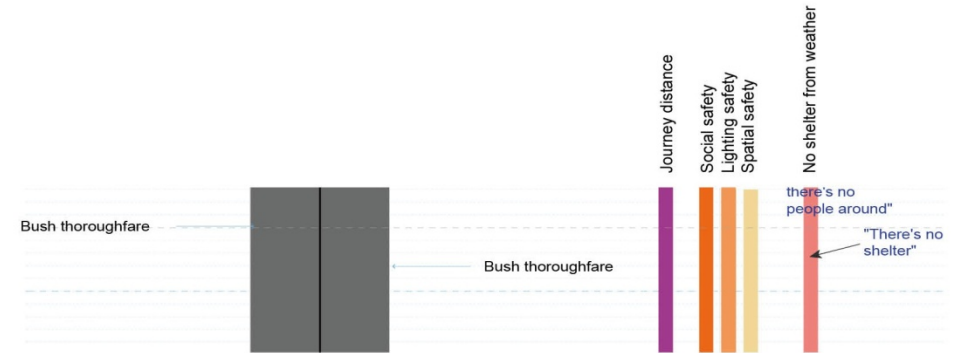
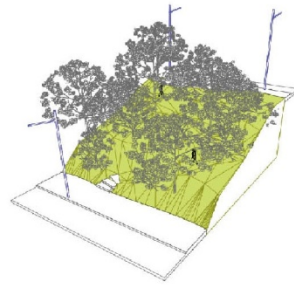


Figure 30: land use  
typology and associated  
*accessibility* barriers  
identified on site

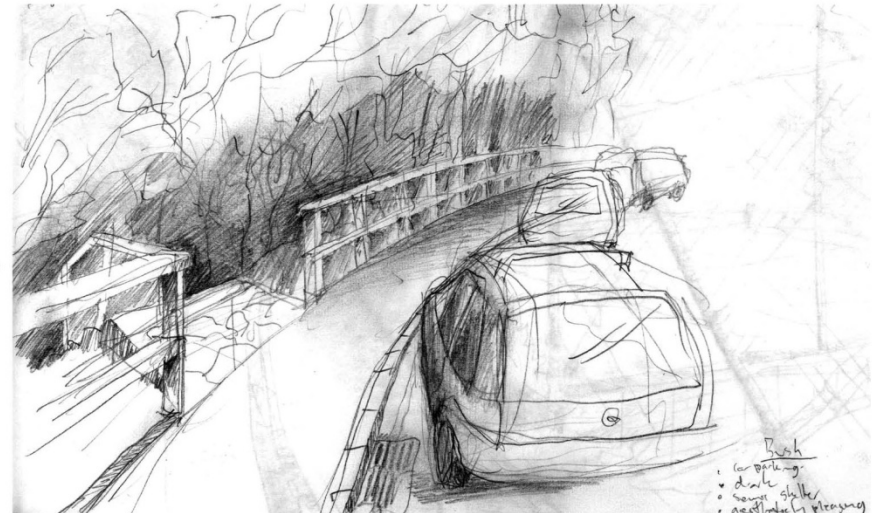
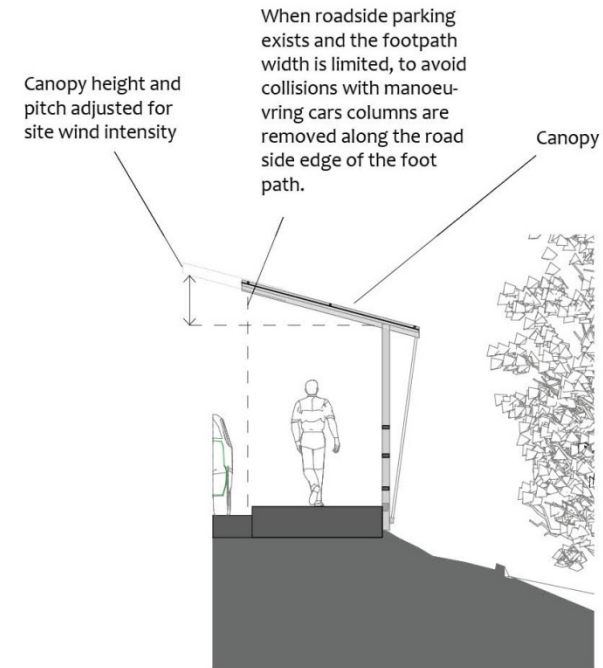
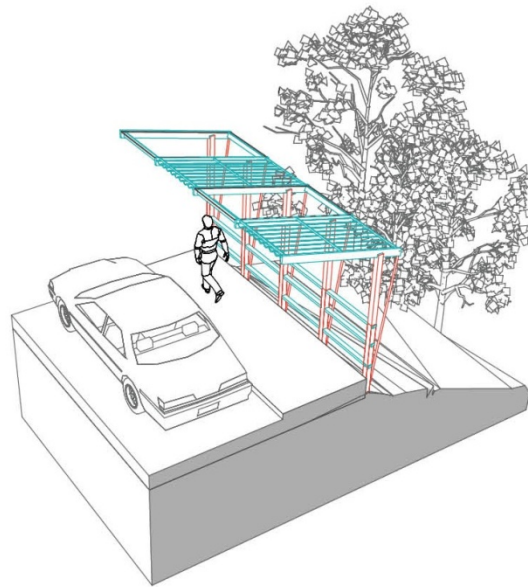
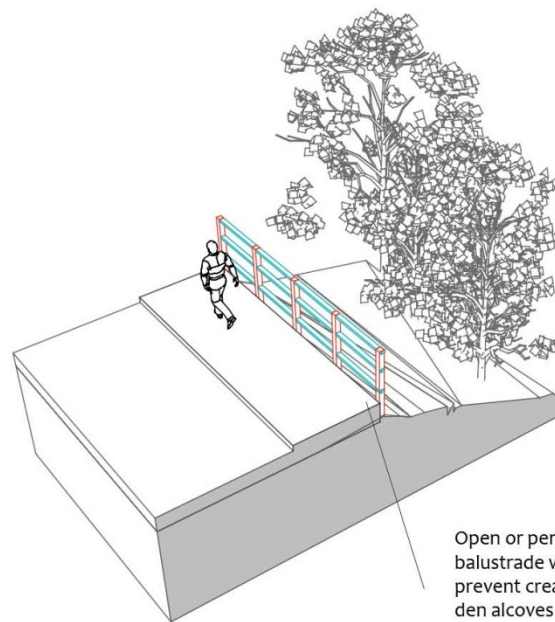


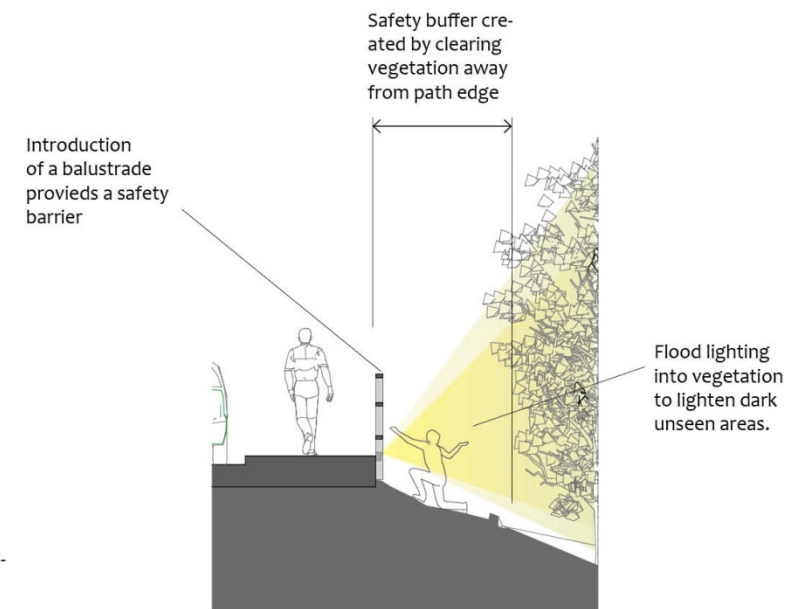
Figure 31: Standardised typological shelter solution



Standardised typological solution for buffering between path and dense vegetation (CPTED)

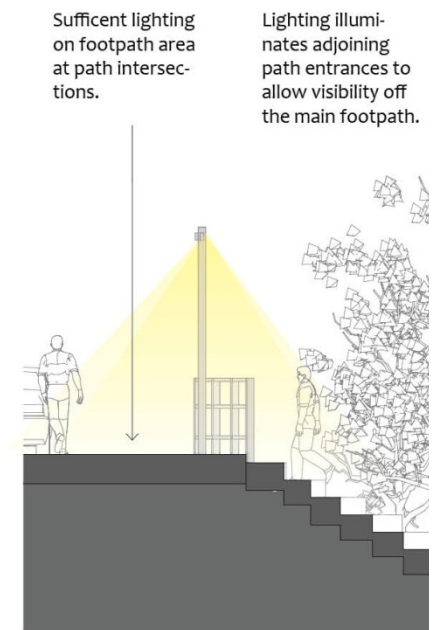
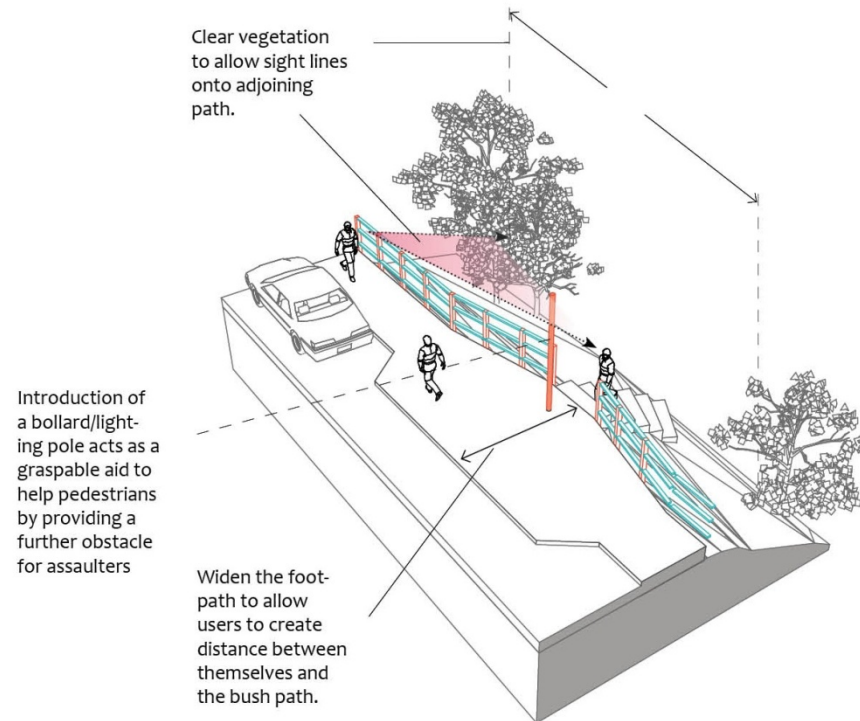


Open or permeable balustrade wall to prevent creating hidden alcoves off the footpath





**Figure 32: Standardised (CPTED) typological solution for the junction where a side path meets the footpath**





Before -> After



Before -> After



Figure 33: Before and after - canopy typological solution for 'vegetation' typology

### 5.1.2 Findings

The discussion will begin with the findings from an earlier pilot test, which tested what problems would arise when employing this typological solution method of design.

#### Pilot test

When designing a solution to the *accessibility* barriers that were identified in the cognitive survey, the pilot test found that the designer needs to be aware of the other typologies within site and not just the location of the *accessibility* barrier. This is because by being familiar with the other typologies within site, the designer may be able to find other routes through site that could resolve the *accessibility* barriers yet require less intervention to do so. For example, when resolving the respondents' *accessibility* barriers, a variety of solutions were possible when other routes were considered that were different to the routes identified in the cognitive survey. In one interview, a respondent identified:

- Firstly a lack of shelter along their route,
- Secondly, a concern for safety due to the regular presence of people whom lingered on the footpath outside a large state housing complex.

When addressing this problem a dilemma was presented between the two possible solutions:

On one hand, a sensitive solution to the 'concern for safety' would be to provide two path options to allow pedestrians to walk past the state housing complex at a distance. However, in order to provide 'shelter from weather' along this alternative route, this scenario resulted in two problems.

- Firstly, placing a canopy shelter in front of a visually appealing historic church (*Figure 34*).
- Secondly, this canopy would be an intervention that requires some level of sophistication and customisation in its design in order to avoid blocking views to the church, and clashing aesthetically.

Conversely to this, in an alternative scenario, which on one hand would preserve the views and heritage quality of the historic Church by diverting the shelter intervention across the road, would however not eliminate public interactions outside the state housing complex (*Figure 34*). The benefit of this second option is that the blank wall typology along the opposite footpath requires much less design attention. Also the blank wall is suited to a 'standardised typological solution' that results in a much lower design and build cost than the alternative customised church canopy.

This dilemma reinforces that using a 'top down' typological study in addition to the 'bottom up' qualitative cognitive survey is important. This is because although the cognitive surveys can specifically locate the

*accessibility* barriers present along a respondent's route, the pilot survey demonstrated that the design solution might end up shifting away from the original surveyed route. The problem therefore, is there is no survey data for the new route, and as a result no knowledge of what barriers need to be addressed by the designer. This thesis argues that if the designer uses a 'top down' typological study to become familiar with the typologies along new and unfamiliar routes through a site, the designer can use the typological study to learn about what *accessibility* barriers need to be addressed in these areas.



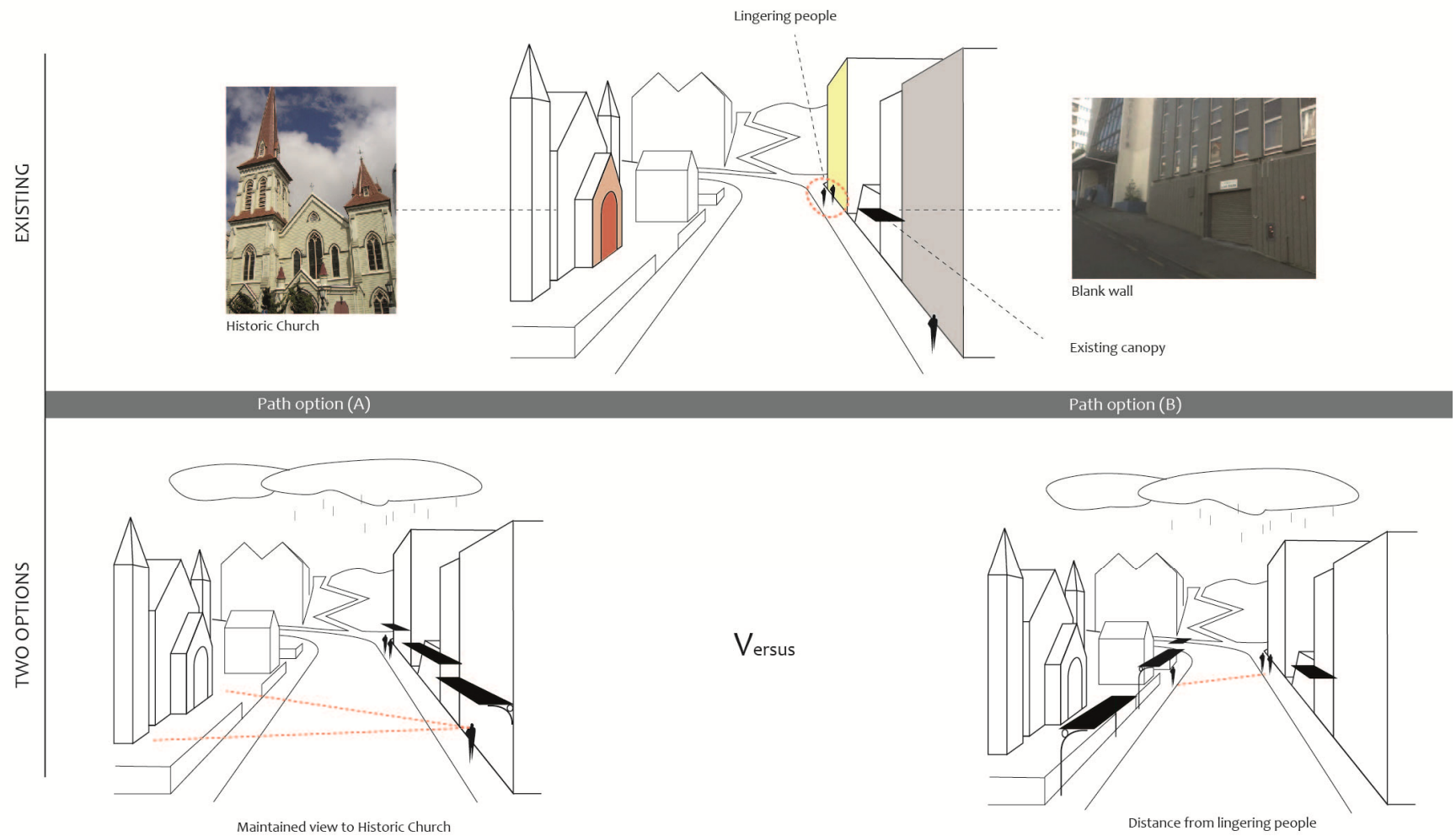


Figure 34: Diagram showing two different options for introducing shelter along a street

## Plug in typological solutions

In addition to the findings from the pilot test, 'Design Experiment 2' uncovered two limitations of using typological solutions to resolve *accessibility* barriers within site. These limitations were:

1. Typologies have no awareness of the site's context and do not consider the surrounding environment.
2. When using a typological method of designing the process fails to recognise the hidden place-making qualities within site and subsequently opportunities for improving the quality of public space in the pedestrian network are lost.

### *1. Typologies and their lack of response to the surrounding context*

Firstly, at the micro scale (the street), the typological solutions failed to respond aesthetically and formally to the surrounding context. The design experiment demonstrated that through using a standardised typological design process, designing for materiality and form became arbitrary, as the final outcomes ignored the unique characteristics of the surroundings. This was problematic, as responding to the contextual qualities of site affected how the design solution fitted into its surroundings. This is clearly evident in the standardised canopy shelter solution designs, *Figure 29* and *33* earlier. Therefore despite the fact that standardised designs were able to resolve the problem *accessibility* barrier, the designs were unsuccessful in their response to the adjacent buildings or vegetation.

The second example of the typologies failing to consider the surrounding context is highlighted through the key simplification ideology behind the typological process. The experiment demonstrated there are two contrasting ideas behind a design process that uses standardised typological solutions (as a means of cost efficiency), and also customised solutions (as a means of achieving responsiveness to a site).

On one hand there are the simplified spatial principles of a typology that operate without context. These are the spatial principles behind, safety from vehicles, path ergonomics, shelter from weather etc, which are theoretical principles that can be understood in a diagrammatic-typological manner. Because they are in a diagrammatic form they can be easily developed into a standardised typological solution. For example *Figure 31* demonstrates the spatial principles for achieving a safe sheltered path alongside a 'vegetation bank typology'.

However in opposition to this, there are contextual qualities such as character, materiality, and 'sense of place', that occur because of a site's relationship to its surroundings over time. These spatial qualities are unique to each site and therefore cannot be simplified, explained, or categorised into standardised typological principles. When converting site into a typological medium, the spatial qualities that are unique to each site are filtered out immediately, and this causes standardised typological solutions to be un-responsive to the surrounding context.

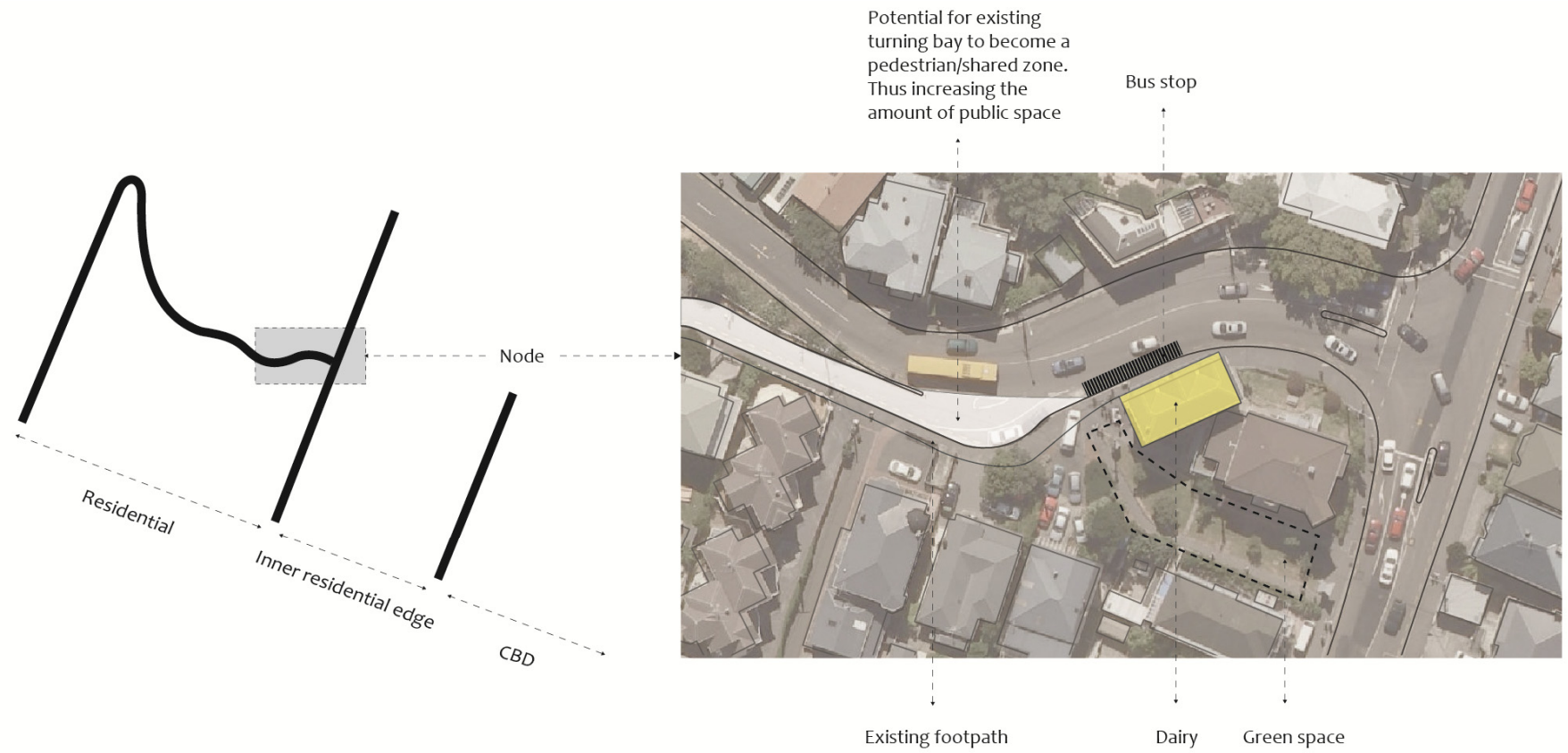


Figure 35: Diagram showing the site qualities of a node area that was observed to have strong public space potential

### *The Lost Opportunity for Releasing the Untapped Potential of Site*

In addition to typologies being un-related to context, the experiment revealed that opportunities to improve the quality of public space in the pedestrian network are lost when using a typological approach to design.

Throughout the experiment it was revealed that the designer's mind is constantly active; instinctively searching for 'low hanging fruit' within the surroundings that have potential to be transformed into something fantastic if given the necessary attention. As a result the following exciting observations were noticed on site irrespective of the typological method of analysis:

- *Figure 35* was an area identified at the Eastern end of site as having potential to be developed into a new public space area. This was because the area was located at the CBD end on Salamanca Rd, which, is along one of the main pedestrian routes from Victoria University to the CBD; has a dairy, small park area, bus stop; and space for the footpath to be widened. These site factors offer a diverse range of activities, and spatial variety to this area, and thus justify why it would be appropriate to develop it into a new public space.
- In a second example (*Figure 36*), an upper car park area that overlooked Salamanca Rd was also observed as having potential to become new public space, and also to provide a new access way up to the University. The site was significant for two reasons:

Firstly due to its location on a key edge that currently provided under-utilised access between the iconic University Hunter building and Salamanca Rd - the primary commuting corridor between 'residential catchment A' and Wellington Central.

Secondly, improving the existing run-down pedestrian connection that passed through the site would increase the number of pedestrian routes up to the university. This would allow the University to present a new face to the city, and subsequently could re activate this edge by drawing commuters travelling up from the CBD to the newly developed pathway.

At this point I came to the realisation that through analysing something as simple as how pedestrians move through the environment, a designer can achieve two things. Firstly not only can they influence pedestrians' perceptions towards walking, by relieving the most intense moments of *accessibility* barriers in the city. But secondly, through small interventions such as re-developing a run-down pathway, have the ability to be a catalyst for larger change within the urban environment by influencing the way the pedestrian network functions. With this realisation in mind, throughout the experiment it proved difficult to ignore these opportunities simply because they were not observed through the earlier typological method of analysis. This presented a problem, as these exciting opportunities could not be realised through using a standardised

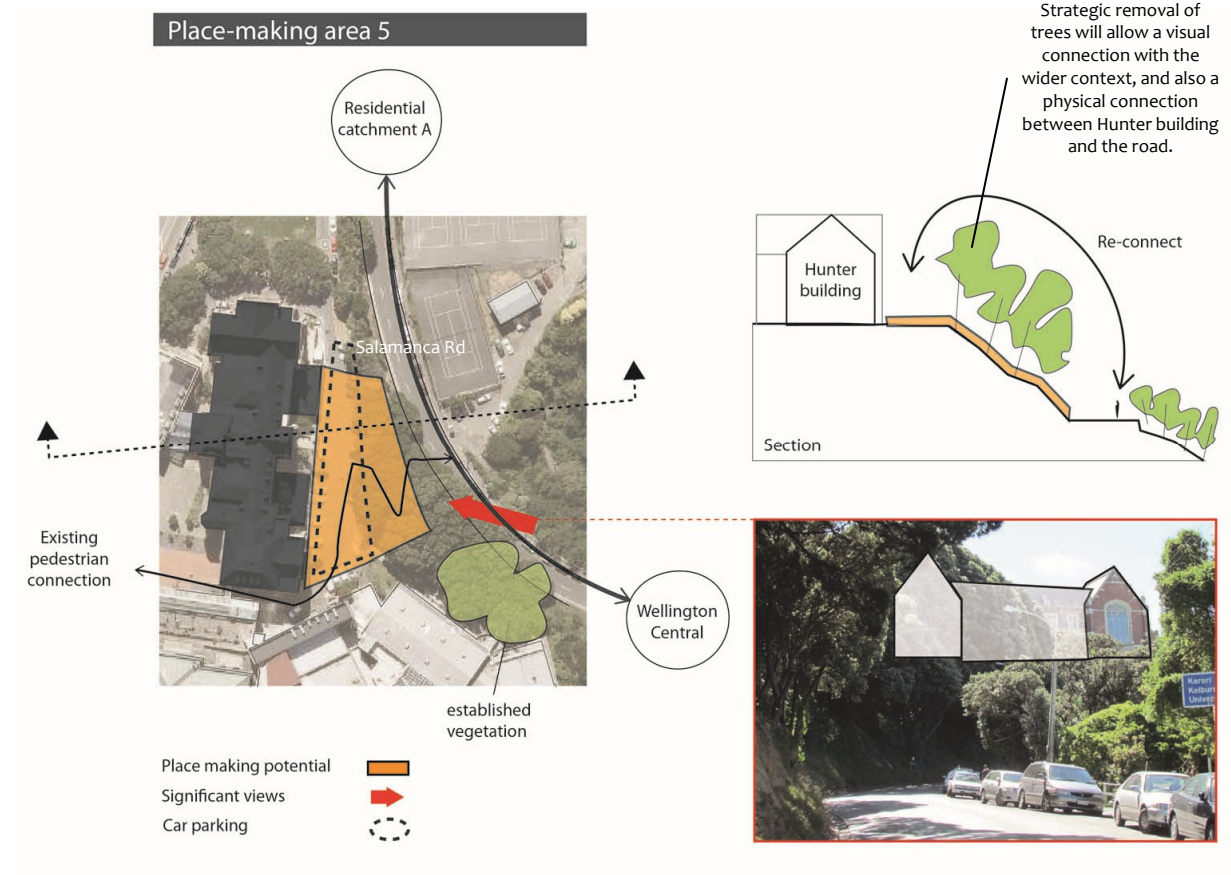


Figure 36: Qualities of the car park site that mediates between the University and Salamanca Rd

typological solution as each opportunity required a uniquely customised response. Therefore a dilemma arises here between resolving pedestrian barriers cost efficiently, using a standardised typological solution, which results in no aesthetic response to context or capitalisation on the unrealised place-making potential in site; versus improving pedestrian *accessibility* through a customised response, which can unlock the hidden

potential of a site and potentially influence something greater in the larger context. In reality the latter would make for better practice as the designer has an opportunity to improve the quality of a site in many ways.

In summary these criticisms highlight, firstly, that using a standardised typological method of designing in isolation is problematic when it is used

on sites that have significant potential. And secondly, that there are other considerations within a site besides pedestrian *accessibility* barriers that need to be accounted for when designing.

The next section will discuss the writings about 'place and place-making' by Peter Downton and Nick Beattie. Their writings are important as they outline the role of the designer in creating successful places, and best summarise the problems that this experiment has encountered in a search for a typological solution method.

### 5.1.3 Further direction: The Untapped Potential of Place

The previous design experiment highlighted two points:

- Firstly, there are conditions in the surrounding context that are not formally observed through a typological analysis.
- And secondly, that allowing for these qualities in a design solution can improve the solution's response to site. Thus when designing an intervention on site, it is wrong to ignore these wider environmental conditions of context.

As a designer reflecting on this experiment, the typological approach is failed on both these accounts. For example, in repeated circumstances, the design had potential to become something more than only a response to the *accessibility* barriers identified within site. Also, sometimes a

customised response was needed in the most neglected areas of site, as a responsive design intervention could have reinvigorated the area. So the experiment highlighted that in this situation the designer, as well as the research methodology, faces a problem.

- Firstly in terms of the designer - bearing in mind the main purpose for pedestrian infrastructural design is to improve pedestrian *accessibility*, to what extent should designs be responding to site in order to further create successful places?
- Secondly in terms of the research method - how can the methodology be adjusted so that the untapped potential of site is factored into the process of designing for pedestrian *accessibility*?

The following argument by Beattie and Downton about the role of the designer in creating successful places will be examined.

#### *Beattie and Downton on place-making*

Downton argues that the fundamental principle to successful place-making is an awareness of how people use the surrounding environment. In this sense Downton characterises a 'good' place as being a place of significance to the people who use it. A 'good place' therefore is characterised by having meaning to others (111). According to Downton place and meaning are interrelated processes that occur over time. Thus as processes, their temporal quality means they simply cannot be designed or inserted immediately into the environment (116-7).



*“architects within the normal spectrum of their professional activities cannot make places. Rather, they can intentionally make the making of places more, or less, difficult (Downton 112)”*

Downton argues therefore, that the role and authority of the designer in place-making is to,

*“work in the realm of potential place”... and to... “design settings that have the potential for becoming places (117)”.*

This argument is significant as it challenges a fundamental principle behind creating typological solutions, or designing only for the immediate problem at hand in a pursuit for cost efficiency.

Beattie’s argument further reiterates that it is important to recognise the untapped place-making potential hidden within site, by commenting on place-making in an urban context,

*“In some ways it appears that places, at least at this scale, are not created or made at all. Rather it may be seen that certain parts of the urban environment acquire a potential for becoming special through the existence of certain behaviour patterns... once in existence, its potential can be realised or enhanced by the designer (Beattie 25).”*

Beattie continues, a designer is inevitably...

*“...presented with opportunities to observe the existing situation... and decide on an appropriate environmental change that will:*

- 1. Reinforce or complete some existing positive trend in the surrounding area.*
- 2. Extend a network or system that exists nearby.*
- 3. Initiate the beginnings of a new network or system that may be continued in subsequent changes to the immediate environment.*
- 4. In general make a positive contribution to the sense of place in the urban area as well as the specific building project (25)”*

In conclusion, Downton’s and Beattie’s argument for creating successful places demonstrates there are responsibilities for a designer when making interventions within site. Their argument also reinforces the criticism identified in the earlier typological solution experiment; which is it is unlikely ‘successful places’ will be produced while the current design methodology used in this experiment for resolving *accessibility* barriers, relies so heavily on creating typological solutions. Subsequently, the new ‘New Pedestrian Design Strategy’ will be altered again after the final section of this chapter.

## 5.2 Conclusions of the Typology So Far

---

The conclusions made about the following two typological methods used in this thesis, which will now be discussed:

- Typological study of pedestrian *accessibility* in Central Wellington
- Standardised typological solutions

### *The Typological study of Pedestrian Accessibility*

Typologies are useful in the form of a typological study as they allow the designer to assess the real world environment through a specific theoretical lens. In this thesis the lens was *accessibility* of the pedestrian realm. In terms of the pedestrian design strategy being developed in this thesis, the typological study is useful because it allows the designer to understand spatially in the built environment how certain spatial conditions affect pedestrian *accessibility*. In this sense, typologies function as an educational tool that can be used to inform a designer of how certain arrangements of spaces, or objects in space, might create barriers to walking.

### *Standardised Typological Solutions*

When designing standardised typological solutions the research found there is a disconnection between ‘theoretical typologies’ and ‘real world typologies’. To elaborate on this, ‘theoretical typologies’ are simplified as

they operate in a realm without context or the complexities of the real world. Thus when a typology is created the diversity and uniqueness of the real world is lost.

For a designer approaching a complex problem on site for the first time, there is a seduction in the simplicity of the typology. Typologies seem easily transposable to the real world environment, partly because typologies are unique. They are a form of theory in a specialised medium, just like the real world built environment. This spatial similarity however, is what makes type so dangerous when designing. The fundamental principle that type is a ‘method of simplification’ makes type untransposable to the complex system of the real world; or at least not without having little response to the surrounding context. Pedestrian access typologies in the complexity of the pedestrian environment can only ever be a tool for understanding pedestrian *accessibility*, and also the spatial conditions in the environment that lead to *accessibility* barriers being created. The concept of a standardised typological solution will only ever be useful in resolving isolated problems on simple sites, if indeed these even exist. This is opposed to a customised intervention that responds to its surrounding context, explores possibilities for place-making opportunities to occur on site, and is an intervention that improves the wider urban contextual problems.



### 5.2.1 Further Direction

It was evident in 'Design Experiment 1 and 2' that the current design strategy needed to be adjusted for two reasons:

- Firstly, although a standardised typological approach still has some use due to it being much cheaper to implement, it cannot be used in a design that intends to respond to the qualities and conditions of site.
- Secondly, Beattie and Downton's argument highlights that the designer has a responsibility to ensure their interventions respond to the place-making potential that lies hidden within site.

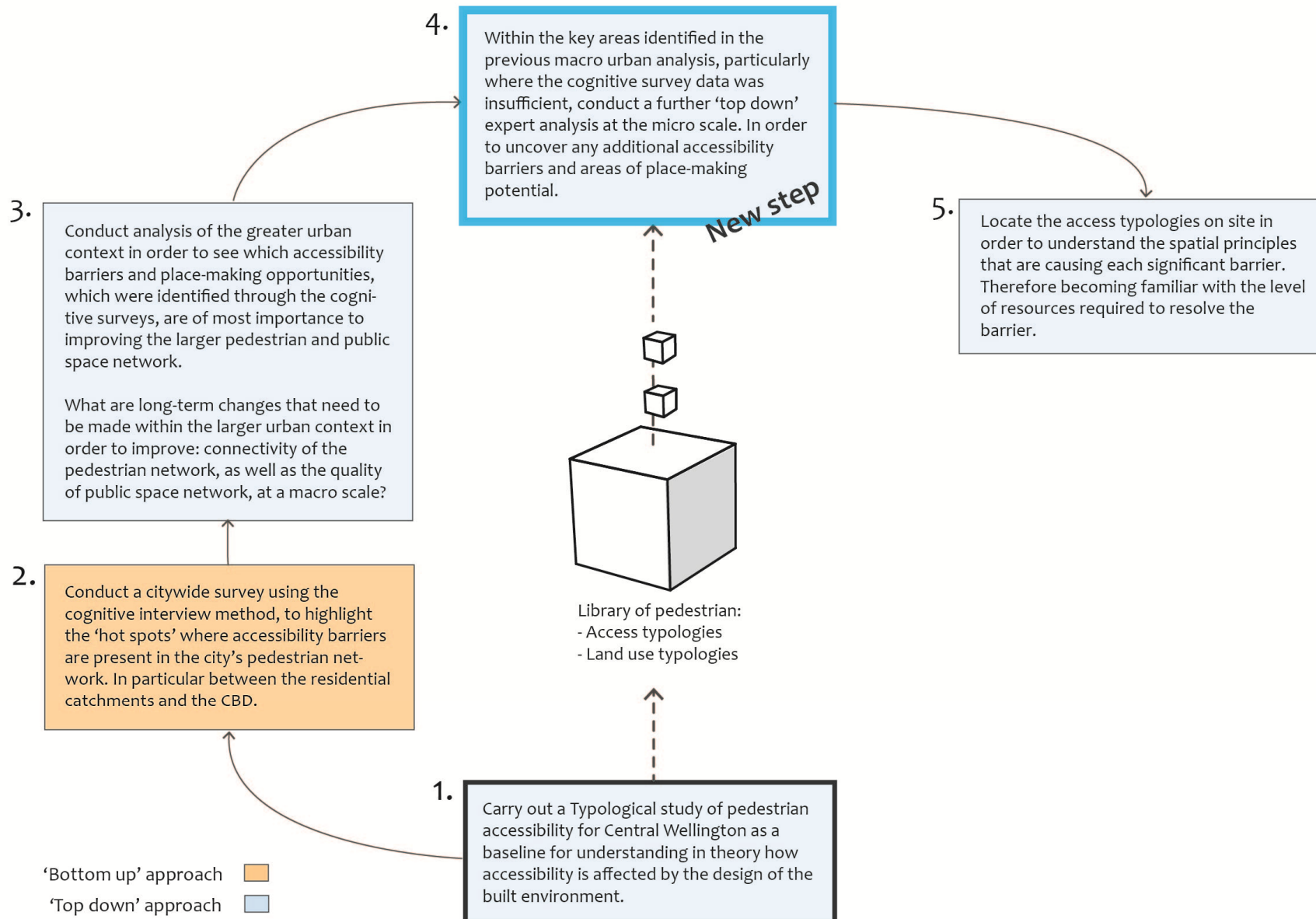
Therefore two amendments were made to the 'New Pedestrian Design Strategy' that acknowledge the following findings:

- Firstly, a designer must embrace the existing untapped potential within a site, and go beyond resolving pedestrian *accessibility* barriers.
- Secondly, a designer must contribute to the place-making process, whereby the quality of any design intervention should respond to the site's surroundings in a way that encourages places of significance to form.

With these new changes in place the next research experiment is aimed at addressing the following question:

?

How does a designer mediate between designing cost effective solutions that only address the *accessibility* barriers to walking on site, versus, designing to encourage place making and therefore new public spaces in the pedestrian realm?



### 5.3 Design Experiment 3: 'Place-making'

When designing in the pedestrian environment there are areas off the footpath that can influence the place-making qualities of sites within the pedestrian network. However these qualities are often hidden within sites and are yet to be developed in the public space network. The aim of this design experiment therefore was to examine:

- Firstly, how these areas of place-making potential within site could also be developed.
- Secondly, how to do so whilst continuing with the initial process of resolving pedestrian *accessibility* barriers.

Therefore as a result, this experiment aims to improve both the quality of public space, and pedestrian *accessibility* in the built environment, together through one design process.

#### 5.3.1 Method

The experiment used the same Salamanca Rd site 'accessibility barrier hot spot', as the previous experiment. This meant the same *accessibility* barrier problems applied as identified in *Figure 25 pg 85*. These were the:

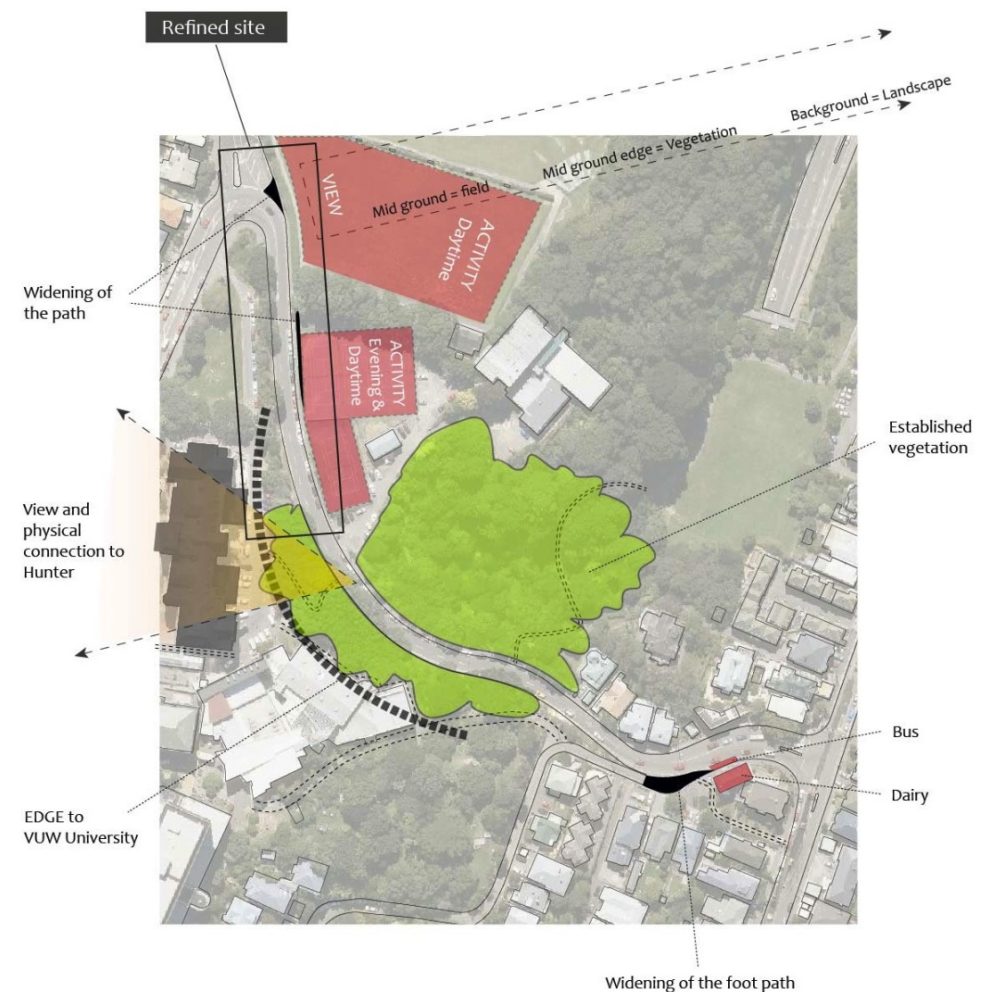
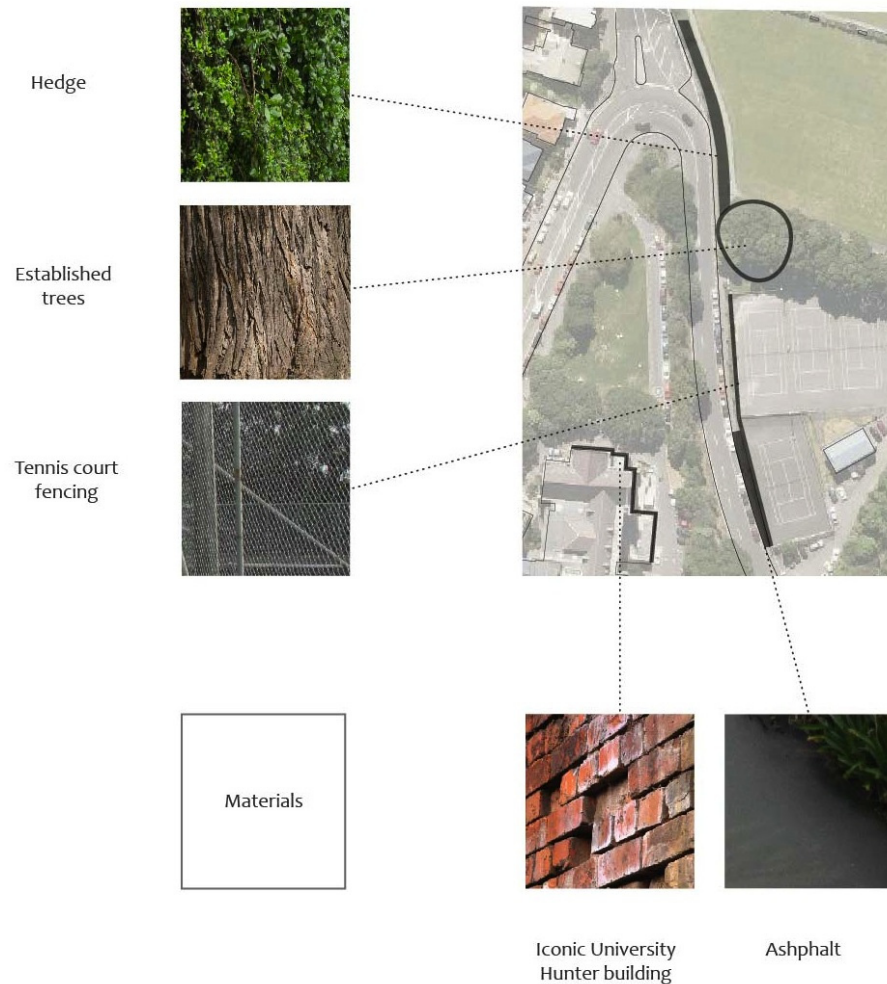


Figure 37: Areas of place-making potential within the Salamanca Rd site



1. Lack of shelter from weather
2. Lack of social safety in the evening
3. Lack of lighting in the evening

There are a couple of things to note in this experiment.

- Firstly, the second *accessibility* barrier will not be addressed as it requires investigation into wider macro scale factors that occur outside the site's boundary (later on in 'Design Experiment 4' this macro scale will be addressed).
- Secondly, for the purpose of this experiment, the site was reduced further to the area outlined in (Figure 37), and the design will focus on resolving specifically the 'lack of shelter from weather', *accessibility* barrier 1.

#### Step 1

To begin with, the attributes of site that had place-making potential were identified in the surrounding areas off the footpath. This was done using a 'top down' expert approach to site analysis (Figure 37). Note the same node consisting of a bus stop, dairy, and public space, which was identified in the previous experiment (Figure 35 pg101), would have been identified in this analysis if it was included in the new site boundary.

Figure 38: Material palette within the Salamanca Rd site

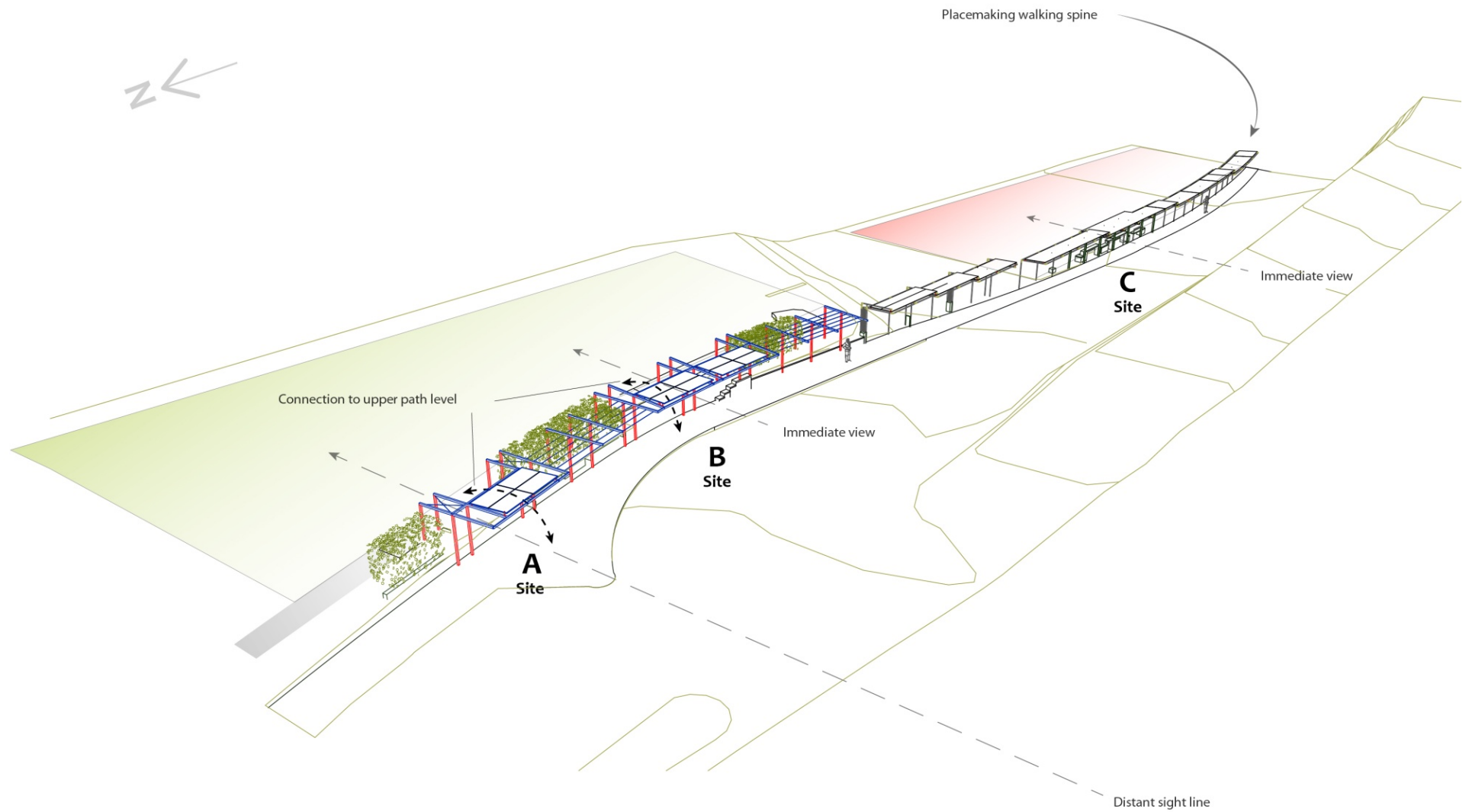


Figure 39: Design response - 'Lack of shelter from weather'



### Step 2

Following this, the contextual material qualities within site were noted (Figure 38). This was necessary to ensure any interventions designed later on were responsive aesthetically and formally to the surrounding context, which was a criticism of the previous typological design methodology. In response the design in (Figure 39) was created.

### 5.3.2 The design

In addition to the *accessibility* barriers present in the site, the 'top down expert' site analysis found that the existing hedge at sites A and B (see Figure 39 running North – South along the Eastern side of the rd) was causing three problems:

- Firstly, blocking sunlight onto the footpath during the morning through to lunchtime.
- Secondly, blocking views Eastward out to city, as well as views to the mid ground open green space area.
- Thirdly, it prevented access to an adjacent upper level path running next to a bowling green.

The following images demonstrate how through resolving the *accessibility* barrier of 'no shelter from weather', the additional place-making qualities of site could be incorporated into the design effectively:



Site A

Figure 40: Before -> After



Removing areas of the hedge frees up views to both the adjacent green space and city skyline.



Figure 41: Before -> After

*Site A*

The design's vegetation canopy shows responsiveness to the character of the surroundings through embracing the formal quality and materiality of the large hedge.







Figure 42: Before -> After

*Site B*

Integrating terraced seating under the canopy structure reconnects the upper level path with the road-side footpath.







**Figure 43: Before -> After**

#### *Site C*

By having an awareness of the place-making qualities of site, such as the frequently used sports courts adjacent to the footpath, a row of informal seating was easily integrated into the shelter solution.





### 5.3.3 Findings

The experiment highlighted that having awareness of the place-making qualities of site whilst resolving pedestrian *accessibility* barriers, clearly results in a much more effective design intervention that is responsive to its surrounding context, and only for a slight increase in cost. Furthermore, this increase in cost is negligible relative to the additional cost savings gained through the accuracy of the cognitive survey. Note that the cognitive survey technique can identify the key barriers affecting *accessibility* within a site, and thus prevent superfluous use of resources i.e. in this experiment re-surfacing the footpath or path widening which were not identified as *accessibility* barriers.

These findings are significant to the pedestrian design process in Central Wellington as it demonstrates that interventions to the pedestrian network can be more than just a solution to an *accessibility* barrier. In fact, by resolving *accessibility* barriers to walking, authorities are given a new opportunity to: identify areas in the pedestrian network that have place-making potential, develop these areas and improve the quality of the public space along a pedestrian route, and over time significantly improve the quality of the pedestrian environment. This widens the potential of small macro scale pedestrian infrastructural improvements to go beyond only addressing barriers to walking, which is currently not realised in

Central and Wellington local authorities' process for designing pedestrian infrastructure.

### 5.3.4 Further direction

So far two design approaches have been used in this thesis:

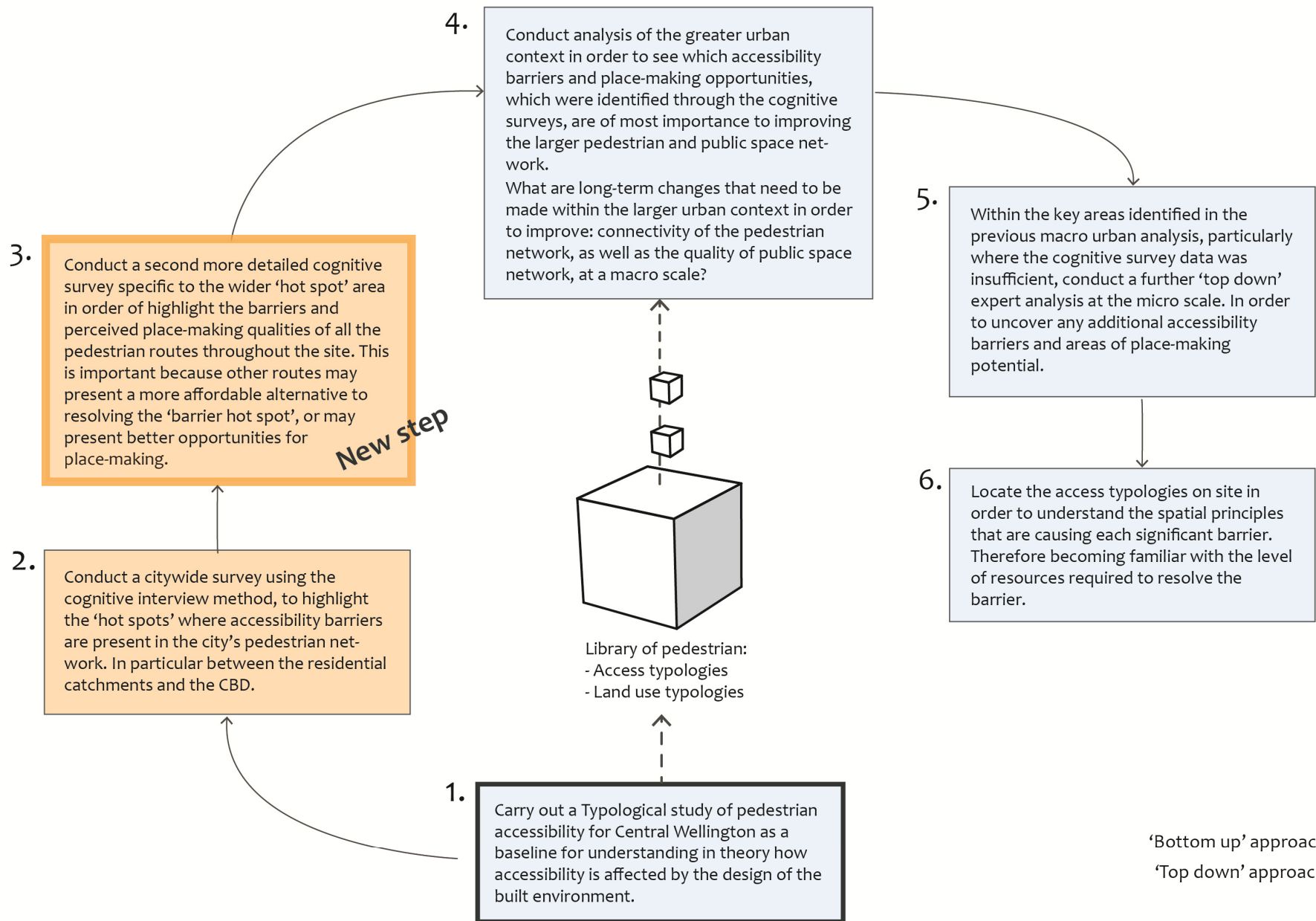
- **Design Experiment 2:** the standardised typological approach
- **Design Experiment 3:** the customised place-making approach,

Both however, have been limited to only improving *accessibility* and *place-making* at the micro scale within the 'barrier hot spot'. This is problematic because:

- Firstly, macro scale *accessibility* barriers such as *journey proximity* and *connectivity* cannot be resolved through a micro scale intervention alone as they require the wider macro context of site to be understood. For example, micro scale interventions can resolve some *accessibility* barriers on site, improve the relationship between the 'footpath' and the surrounding context, and as a result, encourage places throughout the pedestrian network to evolve over time into places of significance to pedestrian commuters. However, there is a limit as to how far *accessibility* and place-making in the wider context can be improved through this scale of intervention.

- Secondly, designing for the micro and macro scale together results in a more cost efficient process than focusing on the micro scale alone. This is because until a comprehensive understanding of the pedestrian *accessibility* in the wider context is known, a designer cannot be certain which barrier 'hot spot' is the most cost effective place to spend resources. As there may be other routes nearby that could be improved as an alternative but at a lower cost.

In conclusion this experiment highlighted that before any design interventions are inserted on a site, it is important to understand the larger context that the barrier hot spots sit within, and in particular, how *accessibility* is affected on the macro scale. As a result, the 'New Pedestrian Design Strategy' was altered accordingly.





## 5.4 Design Experiment 4: 'Rethinking the Larger

### Pedestrian Network'

The purpose of the final design experiment was to create a long-term strategy for improving pedestrian *accessibility* at both the micro scale and macro scale. The experiment was broken into two parts:

- Firstly, to collate what was learnt in the previous design experiments into one multiple staged strategy for researching, designing, and implementing pedestrian infrastructure.
- Secondly, by analysing the larger urban context that the **Salamanca RD 'barrier hot spot'** sat within (*Figure 44*), the experiment tested how *accessibility* and place-making within the pedestrian network could be improved at both a micro scale, within the barrier hot spot, as well as at a macro scale in the wider urban context. This is significant as all of the previous experiments failed to consider the pedestrian network at this larger macro scale.

#### 5.4.1 Method

To begin with, more research was needed of the wider context surrounding the Salamanca Rd barrier 'hot spot', in order to understand



Figure 44: Site boundaries for 'Design Experiments' 2, 3, & 4

the nature of the *accessibility* barriers that were present, as well as the places that have place-making potential throughout the wider site. The research was carried out using a combination of 'bottom up' and 'top down' approaches, which will now be discussed.

## ‘Bottom up’ Qualitative Analysis: Survey Results

Unlike the previous cognitive survey in Design Experiment 2, which lacked depth as it covered the Central Wellington area broadly, the new *cognitive survey* was conducted over a much smaller site. The new site boundary was chosen specifically focusing around the main pedestrian routes that connect residential catchment ‘A’ to the city (*Figure 51 pg129*). The survey demographic interviewed was 1<sup>st</sup> year architecture students at Victoria University of Wellington. The demographic was chosen for two reasons:

- This user group were easy to access.
- The students regularly have classes at both Architecture and Kelburn University campuses and therefore often commute through the site area (*Figure 51 p129*).

In total 42 surveys were conducted and the results were overlaid together using a computer. See *Appendix F pg230* for an example of the survey.

### *Deciphering the Accessibility Barriers*

In the first stage of mapping, the results revealed a range of *accessibility* ‘barrier hot spots’ and areas considered as having place-making potential. These are the darker lines in *Figure 46* and *47* respectively (note the difference between the two figures is very subtle). The data, however, was less useful until it was sorted into *accessibility* categories, thus allowing

the most significant barriers to be highlighted (these are the barriers that were raised the most number of times in the survey). The sorting process was as follows:

- The barrier map was broken into hot spots specific to each *accessibility* sub category;
- Any barrier in the same area that was **raised less than 4 times** (this was %10 of the survey sample size)<sup>4</sup> was disregarded;
- Any barrier in the same area that was **raised 4-8 times** was labelled as a ‘**moderate barrier**’.
- And any barrier in the same area **raised 9+ times** was labelled as a ‘**significant barrier**’.

*Figure 48* shows the most problematic area was across zone A and B, which contains a combination of significant and moderate barriers over a length of 300-400m

---

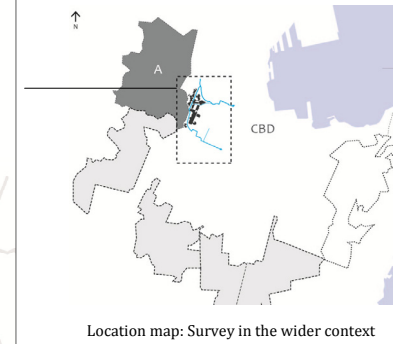
<sup>4</sup> Note, in practice, when the survey has a larger sample size the thresholds of the categories would be adjusted in order to control for the statistical margin of error for the chosen percentile confidence.

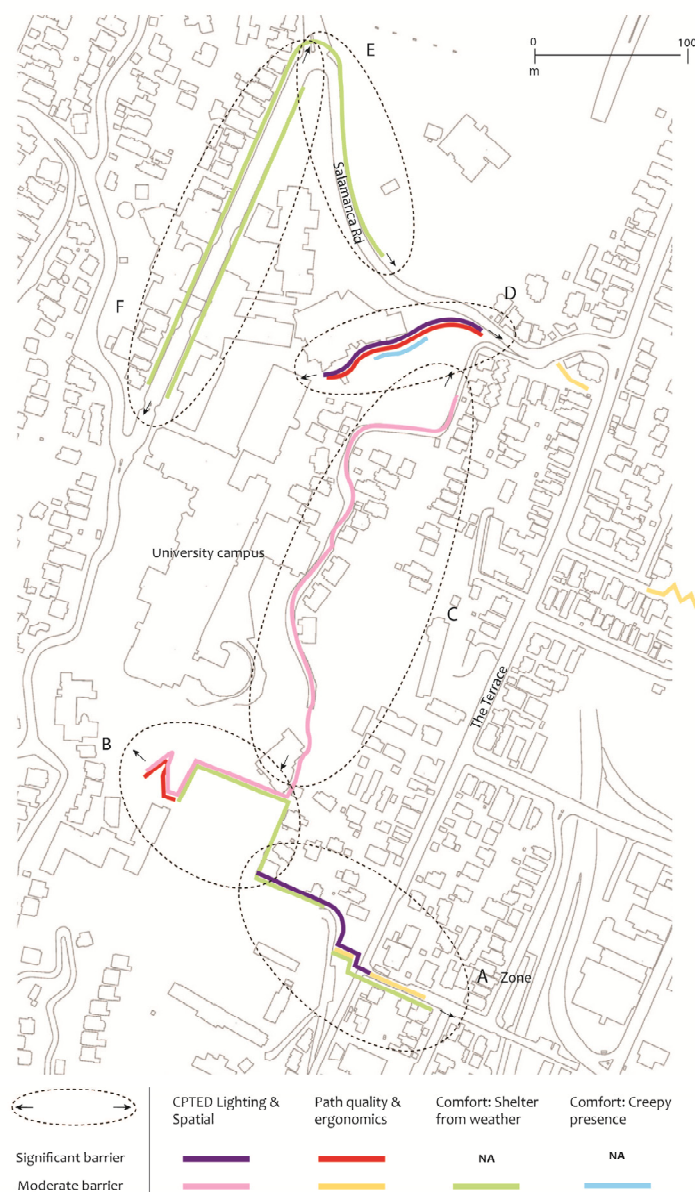


Figure 46: Overlay map of place making potential as perceived by the respondents



Figure 47: Overlay map of all accessibility barriers as perceived by the respondents





**Figure 48: Map of accessibility barrier hot spots**

### Place-making Potential

In the next step the place-making potential of site was established. The same method of sorting the raw survey data, which was used to highlight the significant barrier, was used again to isolate the significant areas of place-making potential (Figure 50). Listed below are the relevant spatial conditions within site that I considered to, embody place-making potential, and were unique to site in that they could not easily be re-created through inserting a new built intervention:

- Significant sun and shade
- External shelter from weather (provided by significant natural or man-made forms i.e. vegetation, typography, or existing buildings)
- Social interest from the presence of people or activity on nearby sites
- View shafts to areas of social, natural, or built interest
- Desirable vegetation

Figure 50 shows one particular area, Waiteata rd, was identified by the respondents as having moderate place-making potential due to 'significant views out over the city. In addition to this, the 'top down' analysis also noticed this area as having the strong place-making qualities (Figure 49) as it was:

- A relatively undeveloped site by the University,
- Located along a neglected pedestrian terrace that provided North South connections across the base of University campus.



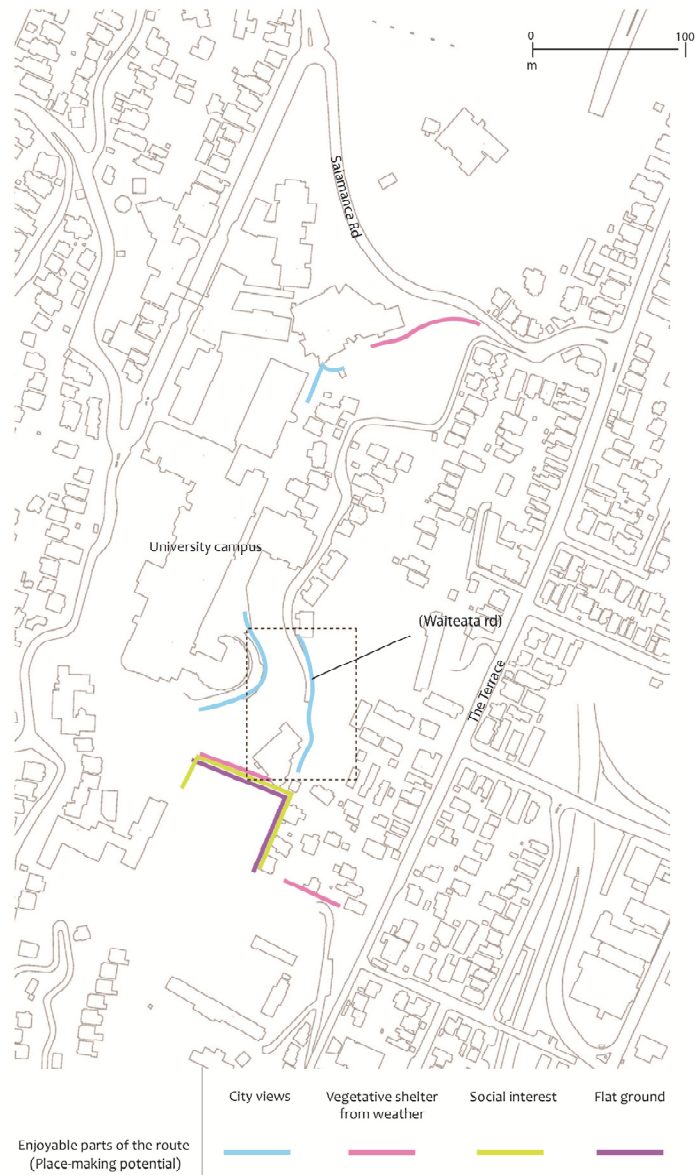


Figure 50: Map of areas of place making potential

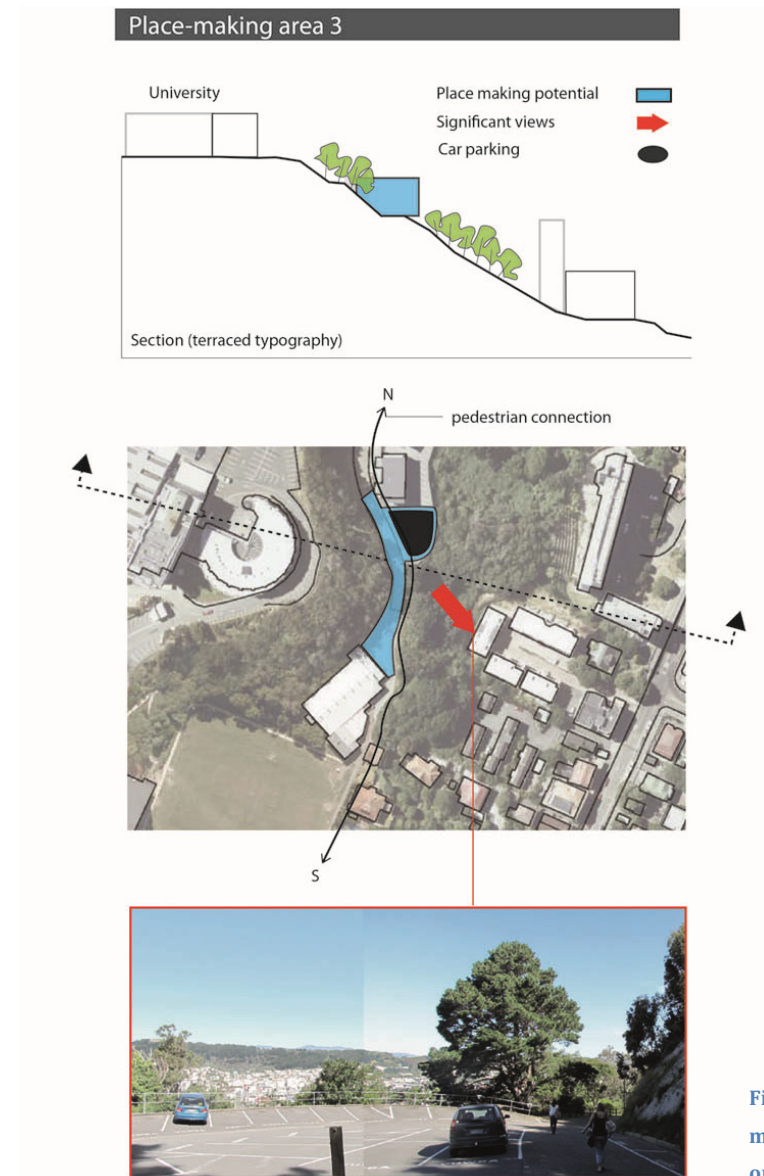


Figure 49: Place-making qualities on Waiteata rd

## 'Top down' expert analysis

Having used the 'bottom up' qualitative approach to identify a range of *accessibility* barriers and areas of place-making potential on site, the next step was to conduct a larger 'top down expert' urban analysis of the pedestrian network. This was for two reasons:

1. To understand how the significant barriers and place-making areas identified in the surveys at a micro scale, relate to *accessibility* and place-making within the wider pedestrian network at the macro scale.
2. To establish a hierarchy of 'implementation urgency' for the barriers and place-making areas within the site. This was to educate authorities on the order these areas should be addressed if they are to achieve maximum cost efficiency and effectiveness when implementing changes to the pedestrian network.

### (Macro scale) The Pedestrian Network in the greater urban context

#### Step 1

To begin with, the major pedestrian routes through site were identified using 2008 pedestrian count data supplied by Wellington City Council (*Appendix G pg233*) these were:

- The major pedestrian routes connecting Residential Catchments B, C, D, E, to Kelburn University (*Figure 51*).
- The main pedestrian route connecting Residential Catchment 'A' with the CBD (*Figure 51*).

Note the most direct route from Residential Catchments B, C, D, E, to the University is through the Southern end of site boundary. Thus this area of site has an important role in affecting *accessibility* on a macro scale for commuters walking from the Southern end of Wellington Central up to the University.

#### Step 2

Following this, the most underutilised and frequently used routes through site were highlighted using *Figure 52* (which was also derived using data from the Wellington City Council pedestrian counts *Appendix G pg233*). The site boundary for the macro scale analysis is shown in *Figure 51*. The observations from this analysis were:

- Firstly, of the two connections that were providing key access from Residential Catchment 'A', past the University Campus, and then on to the CBD; the Vivian St connection experiences significantly lower pedestrian volumes relative to the Salamanca Rd connection.
- Secondly, therefore, Salamanca Rd is the primary pedestrian connection linking Residential Catchment 'A' to the CBD.

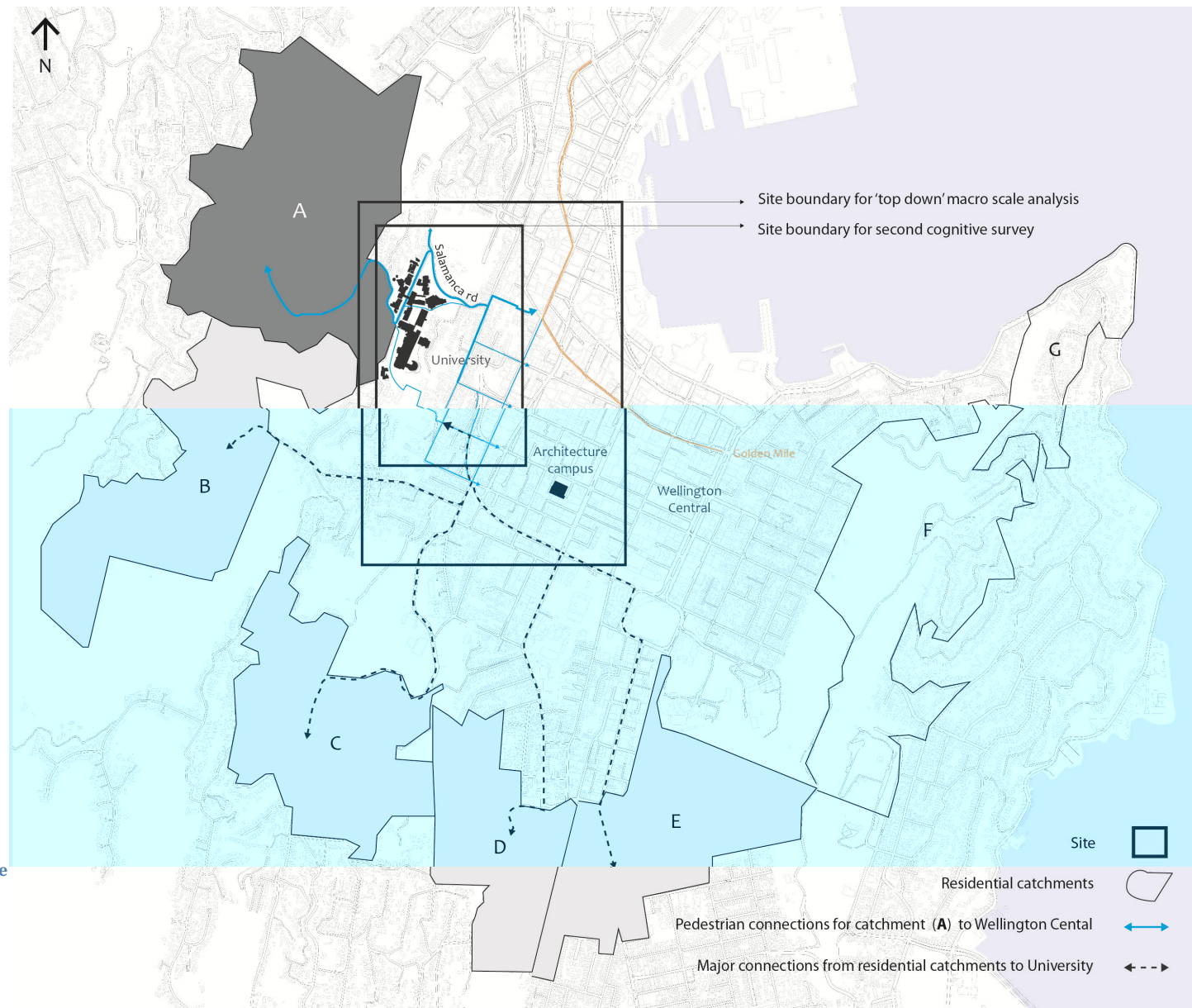


Figure 51: (Macro scale analysis) - Major pedestrian routes through site and beyond



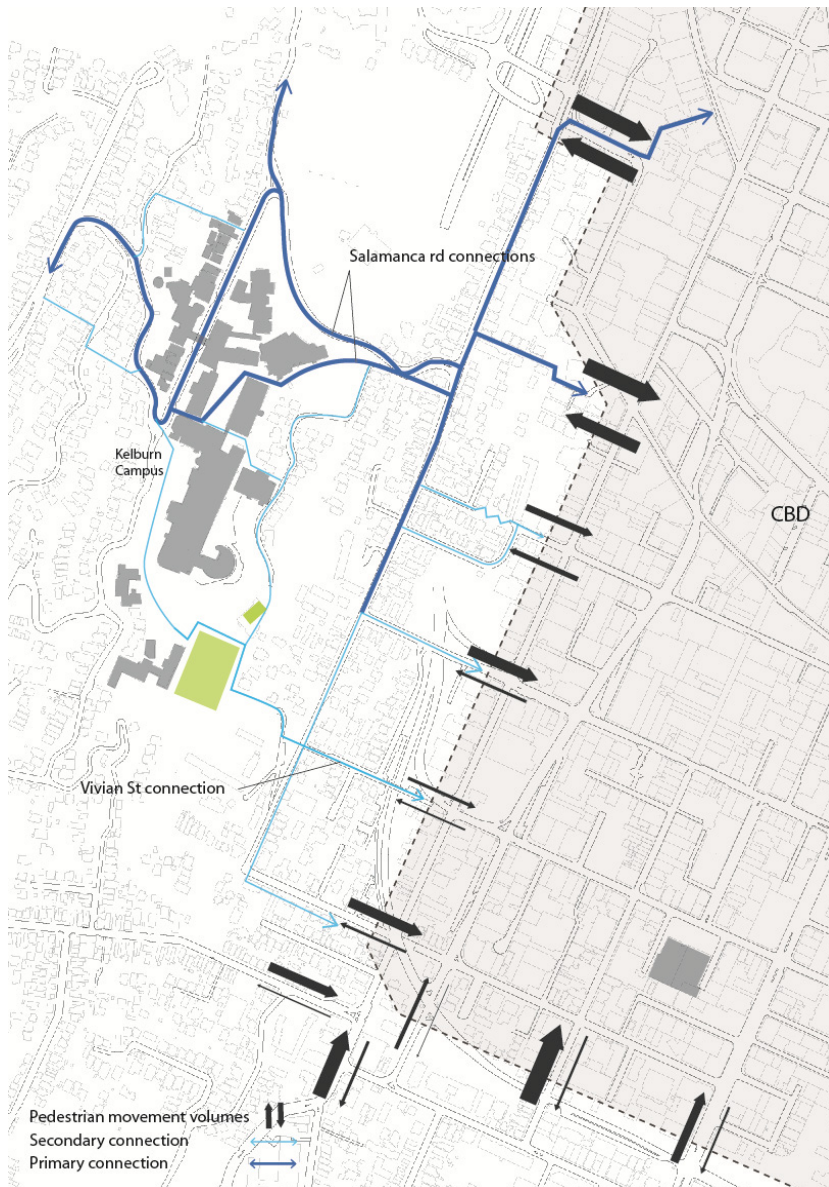


Figure 53: (Macro scale analysis) - Hierarchy of pedestrian volumes

There is an issue, however, with using the 2008 pedestrian counts, which are currently out of date, as there have been two significant changes affecting pedestrian volumes through site which need to be considered.

- Firstly, a high-density housing complex accommodating 374 University students (VUW), Te Puni Hostel, has been developed at the Western end of the Vivian St Connection (*Figure 53*).
- Secondly, first year Design and Architecture students now commute from Architecture Campus to Kelburn Campus for lectures multiple times per week (*Figure 53*).

These factors have raised the importance of the Vivian St connection as a significant route within the wider pedestrian network.

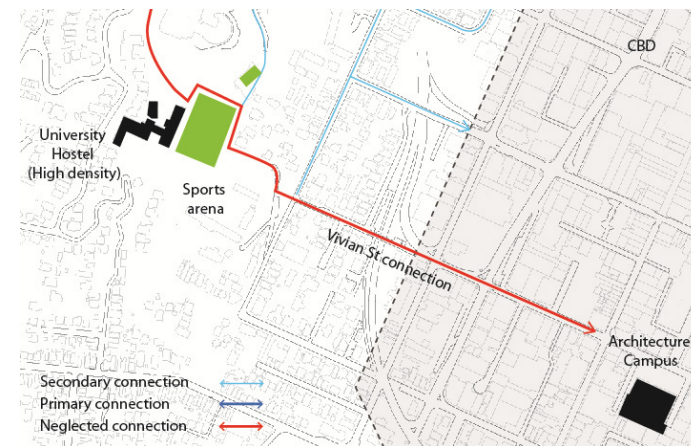


Figure 52: Neglected connection to CBD - Vivian St



### (Macro scale) The Public Space Network in the Greater Urban Context

#### Step 3

The next step of the macro scale analysis was to examine the distribution of public space through both the site and the adjacent CBD area. This was in order to see whether there were any notable relationships between the primary Vivian St and Salamanca Rd connections heading up to the University, and the public space network (Figure 54). The map highlights there is an absence of public space surrounding the Vivian St connection, which further reinforces that the Vivian St Connection is a neglected pedestrian route.

#### Step 4

The public space analysis was then compared with the previous analysis of pedestrian volumes. The analysis identified two key nodes where viable improvements to the public space network could be made; particularly as the nodes occurred at the meeting of two significant pedestrian routes (Figure 55). The nodes were:



Figure 54: (Macro scale analysis) - Public space and green space

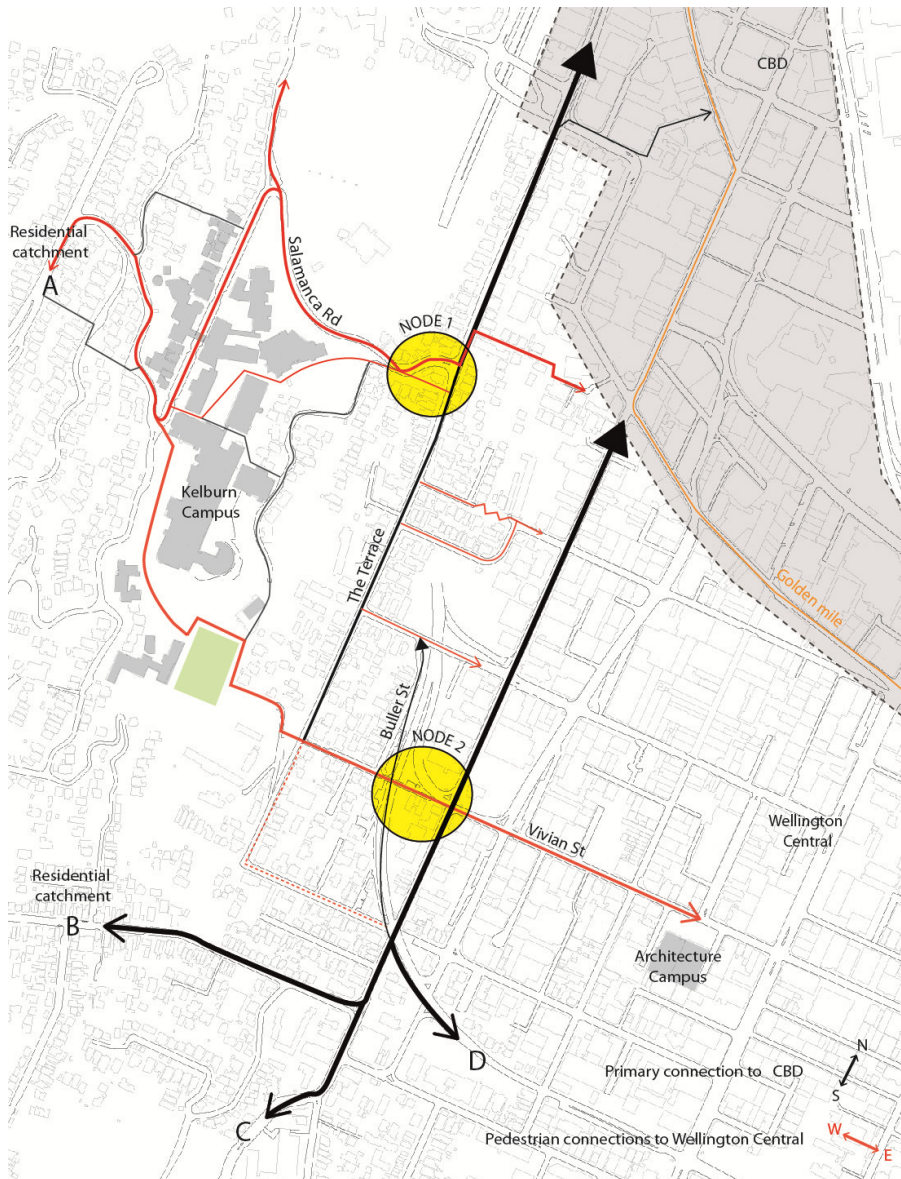


Figure 55: (Macro scale analysis) - Two key nodes in the pedestrian network

#### Node 1

Node 1 (Figure 56) is located on a key junction between the Vivian St connection, and the most direct route linking residential catchments B, C, and D, to the University. The site is important because:

- It is located in the centre of the public space void that was highlighted in Figure 54.
- The site marks the edge where residential land-use meets commercial land in the central city area, thus the site has natural surveillance from the surrounding houses. Also, the site is close to a variety of land use types, which means any public space development is more likely to be occupied throughout the day.
- Is at the end of a 'dead end st' which has low vehicle use, and is currently occupied by car parking space that receives significant sunlight hours (Figure 56). Thus there is the potential to develop the parking space into a green space which would revitalise the 'neglected public space area'.

Lastly, there is a vacant lot overlooking the site which has potential to be developed into a mixed use building. This would firstly, provide further residential surveillance overlooking the site. Secondly, a ground floor tenant, such as a dairy, could service the many students commuting between the two campuses.



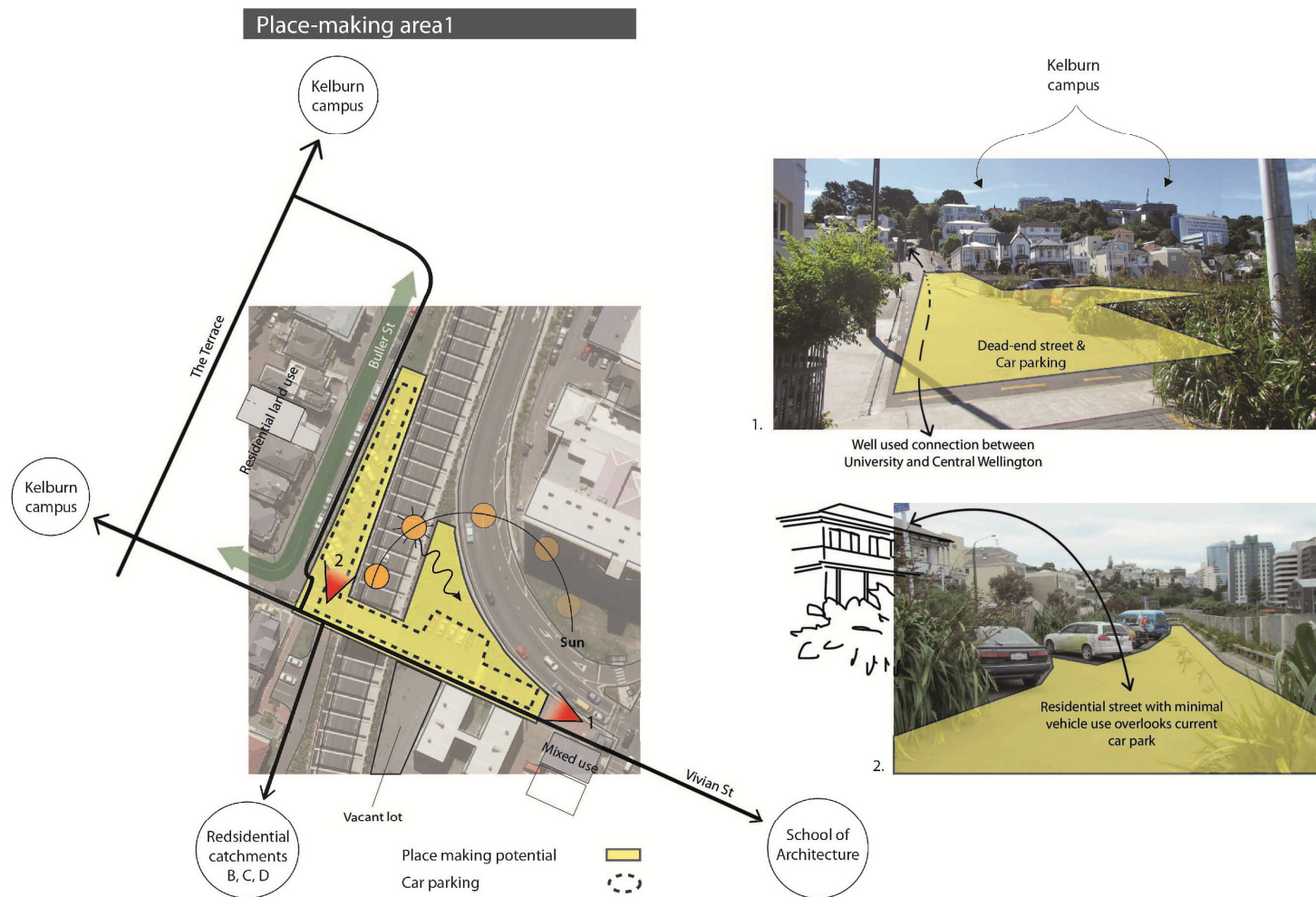


Figure 56: NODE 1 - Place-making qualities

## Node 2

Node 2 is located at the CBD end of Salamanca Rd where it intersects with the Terrace (Figure 54). Note the Terrace is a significant North South pedestrian and vehicle corridor along the Western edge of the CBD. Figure 57 shows the site is important because it:

- Has activity a range of activity from the bus stop, corner dairy, and potentially from surrounding residential houses;
- Receives long sunlight hours;
- Experiences a high volume of pedestrians whom commute to and from residential catchment 'A', the University Kelburn Campus, and the CBD;
- Has room to be developed as it is set back from the main road.

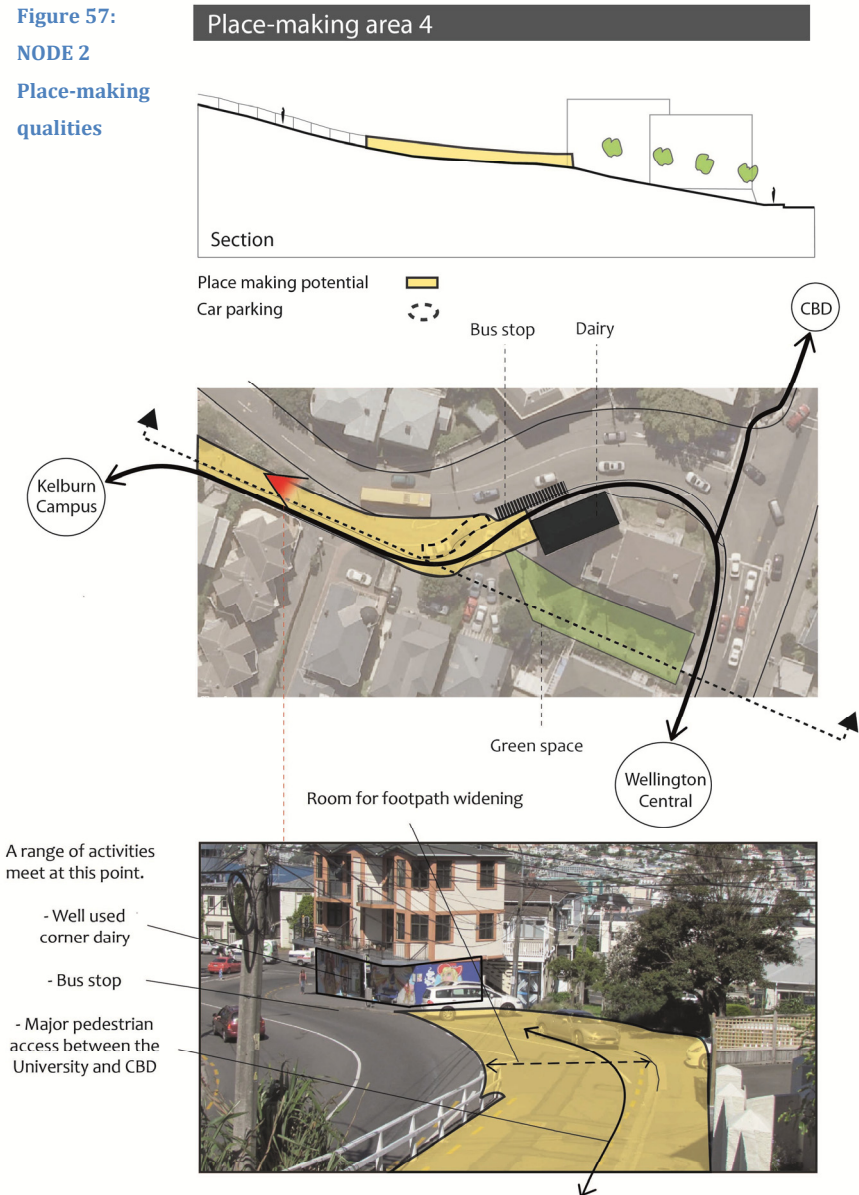


Figure 58: Sample artist impression of new public space

Figure 57:

## NODE 2

### Place-making qualities





### (Micro scale) Place-making analysis and barrier analysis

The macro scale analysis was useful in understanding how the site sat within the larger pedestrian network. The analysis identified Vivian St and Salamanca Rd as significant pedestrian connections in the pedestrian network, and also two key nodes (Nodes 1 and 2) as areas of place-making potential.

#### Step 4

For the final stage of the site analysis, a micro scale study was carried out to see if there were any areas of place-making potential within the major and minor barrier 'hot spots' A, B, C, D, E, F. The study revealed three new areas, these are highlighted in **orange** in Figure 59, which is a summary of all the barrier 'hot spots' and areas of place-making potential that were identified within site.

- **(Previously identified)**
  - *(Macro) scale 'top down' analysis of the wider urban context:* identified the two place-making NODES '1 & 2'
  - *(Micro)scale 'bottom up' cognitive surveys:* identified place-making area '3', and also Barrier Zones A,B,C,D,E,F
- **(Newly identified areas of place-making potential)**
  - *(Micro) scale 'top down' analysis of the barrier hot spots:* identified place-making sites, 'area 3, 5, & 6'. Note these three areas are discussed shortly.

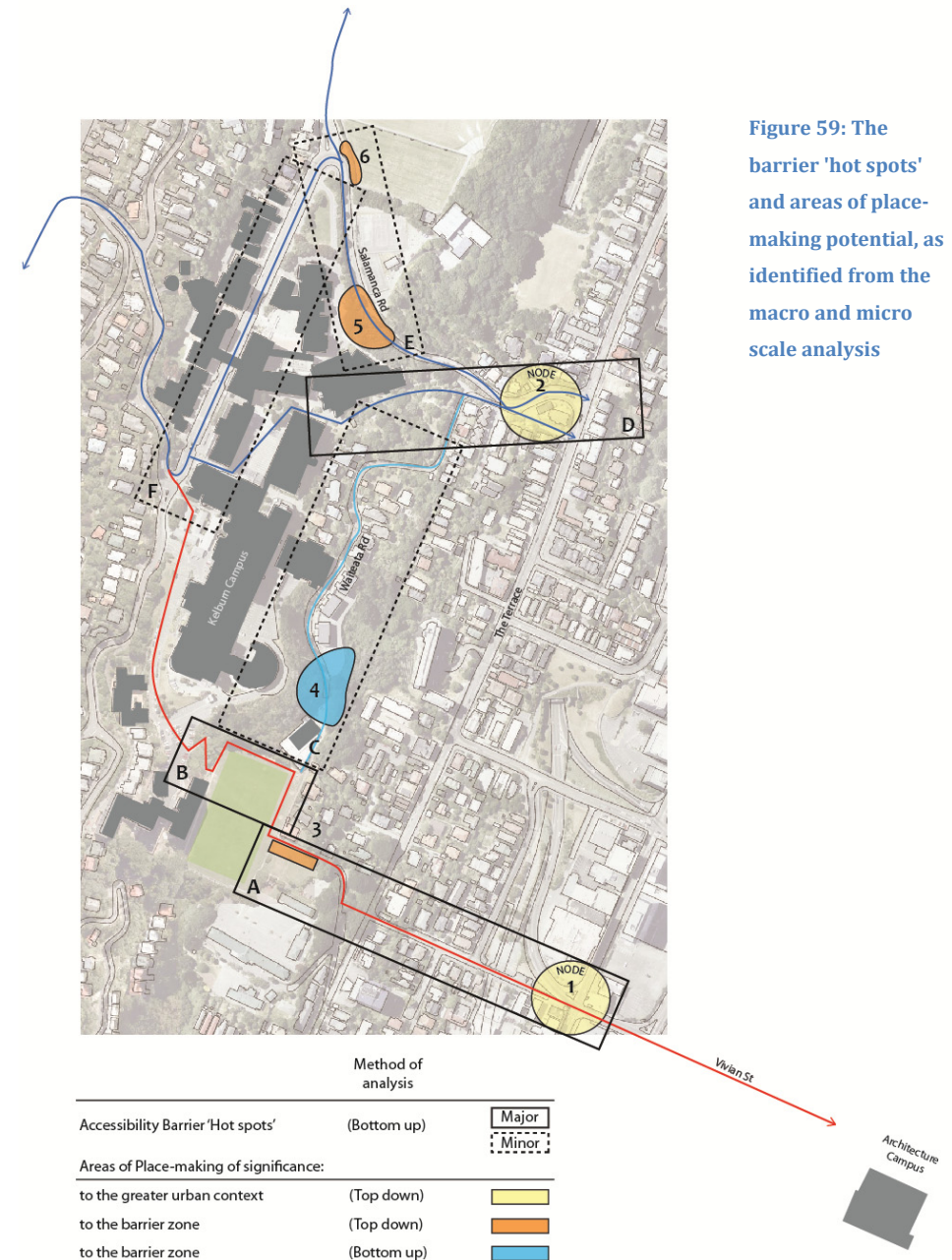


Figure 59: The barrier 'hot spots' and areas of place-making potential, as identified from the macro and micro scale analysis

## Forming a response to the site analysis

The purpose of this section was to trial the following two design approaches together as a cost efficient and effective approach for both resolving *accessibility* barriers, and developing areas of place-making within site:

- The 'customised place-making solution', which responds sensitively to the surrounding environment whilst capitalising on areas of untapped place-making potential;
- The 'standardised typological solution, which resolves the *accessibility* barrier in the most low cost and efficient manner,

## Forming a Cost Effective Strategy

A hierarchical framework (*Figure 60*) was designed to help ensure the design and implementation process, for resolving the *accessibility* barriers and developing the areas of place-making potential on site, was cost efficient. The framework was designed by ordering into a hierarchy of urgency the main scenarios that could arise when designing pedestrian infrastructure. This was done by ranking each scenario against the following key issues, which in order of importance were:

1. Cost;
2. Resolving pedestrian *accessibility* barriers;

3. Capitalising on areas of place-making significance in the pedestrian network.

The framework ranks each of the scenarios by their cost versus their urgency to be addressed (either Stage 1, 2, 3, or 4). This is significant, because it provides a system for implementing multiple pedestrian infrastructural improvements in a network, in the most cost efficient manner. The following example will explain how the framework works by reading across the first scenario in the table.

If a site has been identified as having a **significant** *accessibility* barrier present, as well as **place-making potential**; there are two possible design options authorities can implement.

1. If the site is of **stage 1- (high) urgency** to address. In this scenario the proposed 'temporary solution' has a lower cost; however, as a consequence there is no improvement to the quality of public space.
2. Alternatively, if the site is graded of **stage 2- (mid-high) urgency** to address. In this scenario using the proposed long-term solution has a slightly larger cost; however, it results in a high level of improvement to the quality of public space.

There are two things to note about this framework:







Assessment of the site →		Urgency to be addressed →		Possible design options		
What level of accessibility barrier is present on the site?	Does the site have place-making potential of significance to the surrounding context?	Urgency	Stage	Cost \$	Permanency of the solution	Level of improvement to public space
Significant	Y	HIGH	 → 1	●	Temporary	NIL
Significant	N	HIGH	 → 1	●	Long term	NIL
Significant	Y	MID - HIGH	 → 2	●	Long term	HIGH
Minor	N	MEDIUM	 → 3	●	Temporary	NIL
Minor	N	MEDIUM	 → 3	●	Long term	NIL
Minor	Y	MEDIUM	 → 3	●	Long term	HIGH
The wider site was identified through a macro scale analysis as being of significance to pedestrian accessibility and place-making within the macro urban context.		LOW	 → 4	●	Long term	HIGH

Figure 60: Hierarchical framework for implementing pedestrian infrastructure. Cross referencing – Site conditions / Cost / and Urgency

- Firstly, in principle the solution for a design that resolves a **minor** barrier is considered to cost less than a solution that resolves a **significant** barrier, when neither design ‘incorporate place-making’. This is because it is assumed that resolving minor barriers require a less drastic response to site and therefore can be done at a lower cost.
- Secondly, this framework is only a guide, as in practice the cost of the solution will vary between the type of barrier and the amount of resources required for the intervention. For example re-paving an entire walkway may cost more than adding more lighting.

## Designing the Interventions

Note for the remainder of this chapter the fold out the leaflet attached to the inside of the back cover will be referred to.

Using the new hierarchical framework (*Figure 60*), this section will now explain the process that was undergone to:

- Resolve each of the minor and major 'barrier hot spots' within the sites 'Barrier Zones A, B, C, D, E, F' (foldout leaflet).
- Whist also capitalise on the six areas of site that were identified as having place-making potential (areas 1, 2, 3, 4, 5, 6, on the foldout leaflet).

### Barrier 'Hot Spot' Zone (A): Eastern end

#### *Site Analysis*

*Figure 61* identifies that the cognitive surveys highlighted two *accessibility* barriers along the Eastern end of 'Barrier Zone A'. These were relating to:

- *Comfort* = no shelter from weather
- *Path Quality* = steep gradient, and slippery footpath surface.

These barriers were spread across two access typologies, the '*Pedestrian over bridge*' and '*Park Field*' (*Appendix A, pg204 and 307*), and also one land use typology '*Urban Residential St*' (*Figure 15 p 57*). Note here that the area identified within site as a *Path Field* currently is a car park; however it has been labelled as a *Park Field* because it was identified in

*Figure 55 pg132* as a key node with the potential to become a new park space.

To begin with, the typological analysis was applied to site to identify the significant spatial conditions of each *accessibility* barrier typology that needed to be considered when designing a barrier response. These spatial conditions were:

#### *Urban Residential St*

- The design must avoid creating visual obstacles that prevent eyes on the street, and block the views to interesting houses. Objects such as high property fences/planting can prevent interaction between pedestrians and neighbouring properties.

#### *Over Bridge*

- The design should avoid creating tall balustrades/bridge walls as they cause users on elevated bridges to be hidden from view.

#### *Park Field*

- The design should avoid creating built or landscaping vegetative features that cause hidden and potentially dangerous secluded areas.
- The design should be mindful that poor drainage on grass areas can cause footpaths to be flooded under extreme weather.

As a result the concept *Figure 62* was designed.



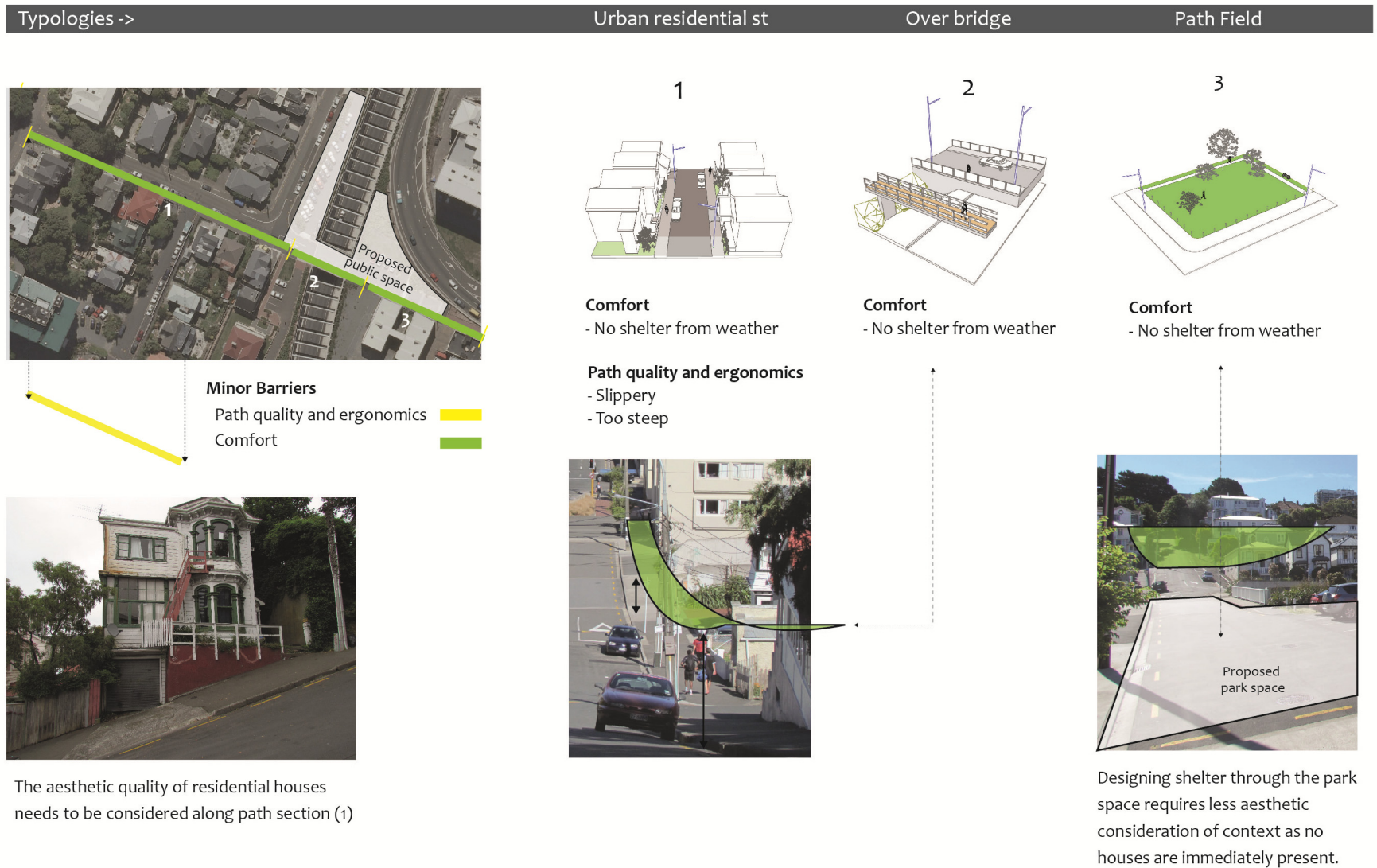


Figure 61: Barrier Zone 'A' accessibility barriers and consideration – Eastern end



Figure 62: Barrier Zone (A) - Eastern end New - design proposal

### Design Response

The design provides a low cost solution to the lack of shelter problem and is achieved mainly by a planted vegetation canopy. It is important to note that although the vegetation canopy from the 'New Trees' (Figure 62) would take many years to grow, and would never be totally affective at providing shelter; this, however, is an acceptable solution when you consider the overall hierarchical framework (Figure 60). The framework rates **Path area 1** in the design as 'stage 3 urgency' because the 'lack of shelter' problem was only identified in the surveys as a minor barrier with having no place-making potential. This is significant in the context of the limited resources available for implementing pedestrian infrastructure in Central Wellington, as more funding can be spent on other sites, such as developing areas of place-making potential.



### Barrier 'Hot Spot' Zone (A): Western end

#### *Site Analysis*

To begin with the typological analysis was used to understand more about the *accessibility* barriers present at the Western end of 'Barrier Zone A'. The minor barriers present in this area of site were (Figure 63):

- *Comfort* = No shelter from weather
- *Path Quality* = Slippery footpath surface
- 

The significant barriers present were (Figure 64):

- *CPTED* =
  - Insufficient lighting
  - Enclosed space
  - Hidden pockets off the footpath
  - No eyes on the street

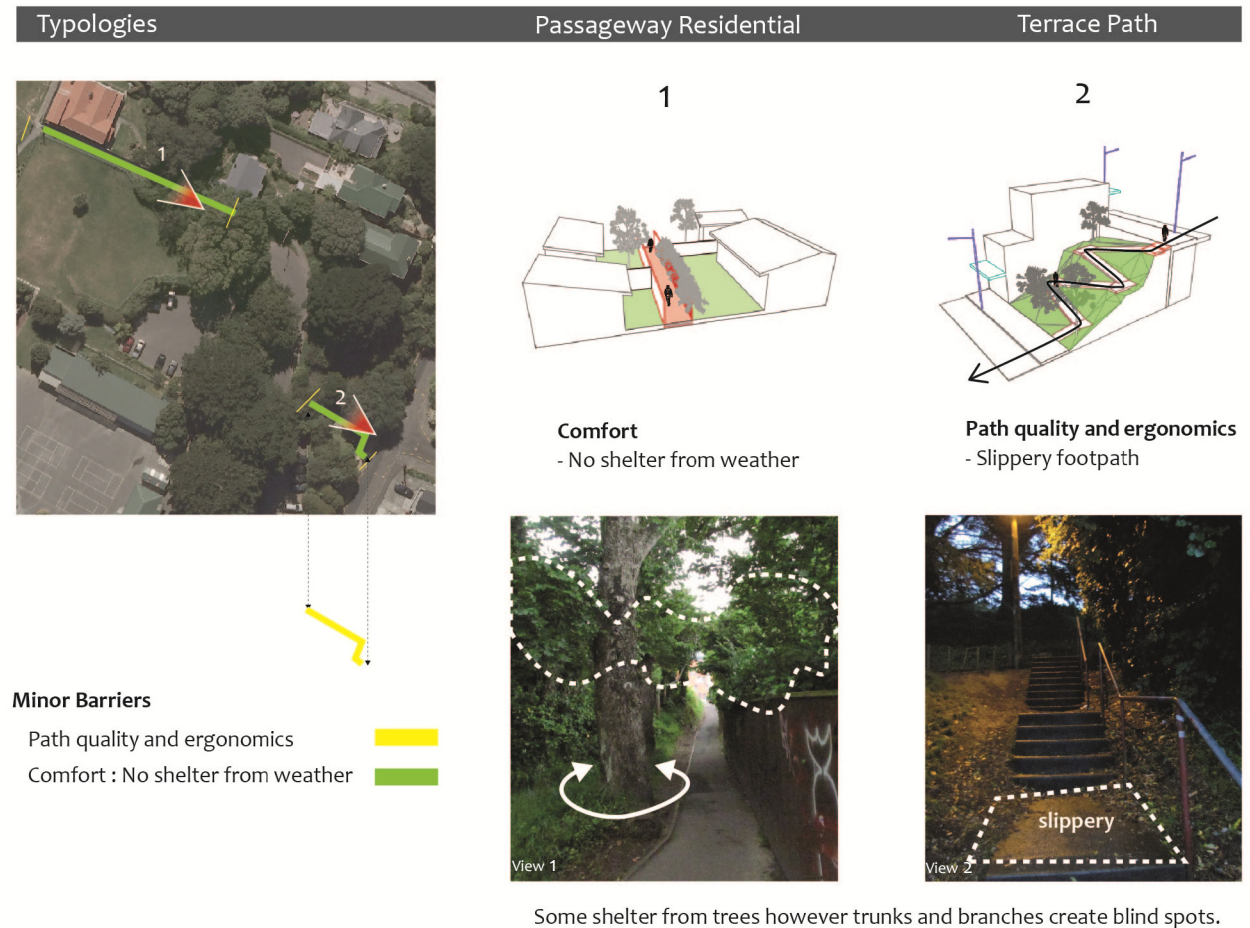


Figure 63: Barrier Zone (A) Western end - Minor *accessibility* barriers and considerations



Figure 64: Barrier Zone (A) Western end – Significant barriers and considerations

Next the typological study was used to identify the important spatial conditions, which were associated with each barrier typology on site, that need to be considered in the design response. This was to prevent the design response from accidentally creating new barriers. The additional spatial conditions were:

- 1. *Passageway Residential typology (Figure 14 pg56)*
  - Bends along the path and impressions in the fence walls can create secluded alcoves.
  - Narrow and single entry exit points offer few escape routes.
  - High hedges and fences can prevent 'eyes on the street'
- 2. *Vegetation Gully typology (Appendix pg212)*
  - Dense foliage creates hidden areas off the path, and can also be a visual barrier preventing surveillance from the surrounding buildings.
  - Large changes in typography can also interrupt surveillance from surrounding buildings.
- 3. *Terrace path typology (Appendix pg196)*
  - Users can become hidden from the view of the main street, particularly if dense vegetation is prominent. Then when on the path, bends and vegetation can create hidden blind corners further ahead.

In addition to these barriers, one area of place-making potential, 'Place-making area 3', was identified within 'Barrier Zone A' (*see Figure 65*). The place-making qualities of the area were:

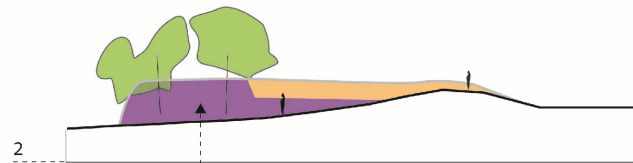
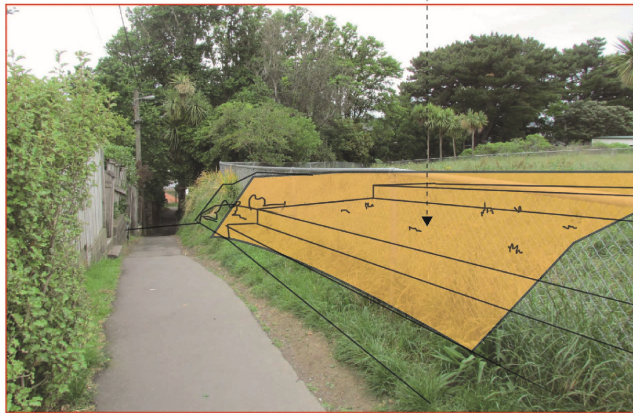
- Receives long sunlight hours,
- Is located off a well used pedestrian thoroughfare, for students walking between Kelburn University campus and Architecture campus.
- Is close to the university sports centre and Te Puni hostel.
- The site required significant changes as there were a number of barriers present within it. Thus there is an opportunity to easily integrate a public space design into the new changes.

In response to these points the concept shown in *Figures 66-67* was designed:

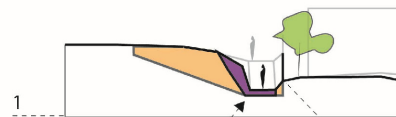
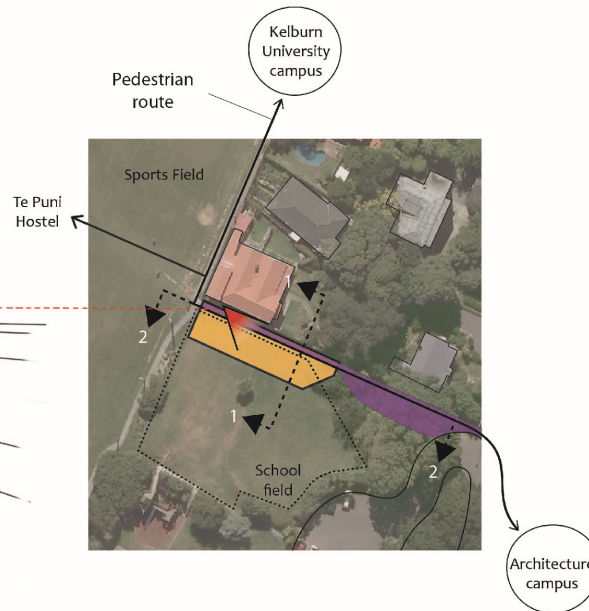
### Place-making area 3

Place making potential  
Significant CPTED barrier

The North facing bank offers a possibility for informal grass terrace seating to be developed



Section  
High bank CPTED barrier



Narrow path CPTED barrier  
High fence causing no surveillance



An opportunity for place-making is created due to the significant changes that are required to excavate the narrow the passageway in order to resolve the CPTED barriers

Major route through to the University sports fields

Figure 65: Place-making area (3) accessibility barrier considerations





**Figure 66: Barrier Zone (A) - Western end - Proposed solution**

### *Design Response*

The design successfully resolves the major CPTED barriers by:

- Addressing the 'hidden areas off the footpath', and 'lack of lighting', through a new lighting strategy that illuminates areas both off and on the footpath (Image A).
- Providing clear safety sightlines between major entry and exit points (Image B).
- Identifying a key vacant site to be developed into residential land use, this as a long-term strategy will generate more surveillance through improved 'eyes on the street'. Note such developments could be fast tracked through incentives funded by the Local or Central government i.e. reduced property rates (Image C).

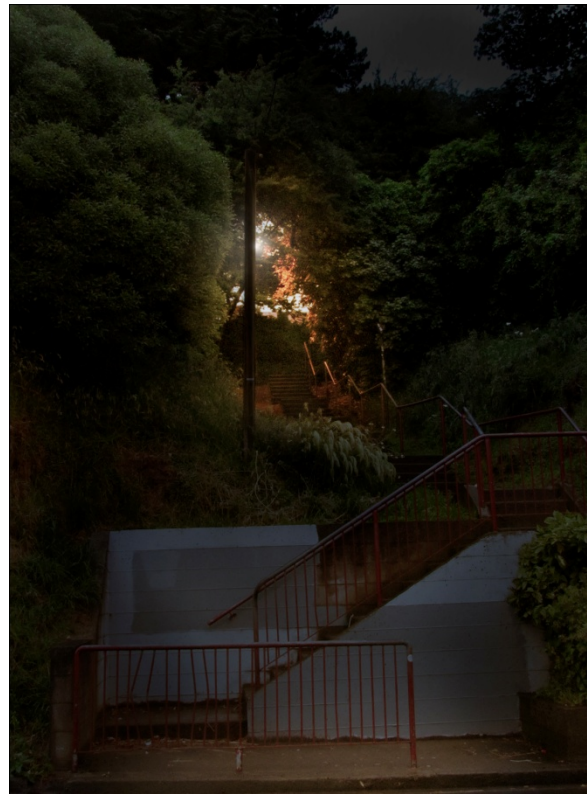


Image A



Figure 67: Artist impressions before -> afters



Image B



<- Before



After ->

Image C



In terms of the new public space design's contribution to place-making in the pedestrian network, the design offers a North facing terraced lawn that could allow for informal grass seating. This is an activity that the other adjacent fields cannot provide because the primary school field is occupied by the school most days of the week, and the University playing field is less appropriate to sit on because the artificial rubber surface becomes heated during the direct sunlight, and the field is often fully occupied for sports training.

Regarding the minor barriers of 'no shelter from weather' and 'slippery path surface', these barriers are of 'stage 3 urgency' in the overall hierarchical framework (*Figure 60 p137*), thus do not need to be addressed immediately. Therefore if not enough resources were available to implement the permanent solution proposed in **Image A**, a lower cost temporary solution could be to:

- Address the minor barrier of 'slippery path surface' simply by attaching a metal grate/grip to the stair treads.
- Add more lighting and cut back or remove the dense overgrown vegetation, as a way of resolving the major CPTED barriers of 'lack of lighting on the footpath' and 'lack of visibility off the path.
- Delay implementing even a temporary solution for the minor 'lack of shelter' barrier until there is enough funding to build a permanent solution. This is considering the cost of providing evening a temporary shelter could be expensive.

### **Barrier 'Hot Spot' Zone B**

#### *Site Analysis*

*Figure 68* shows that the cognitive surveys highlighted two *accessibility* barriers in 'Barrier Zone B'. The major barrier was:

- *Path Quality and Ergonomics* = Puddling, and Slippery surface.

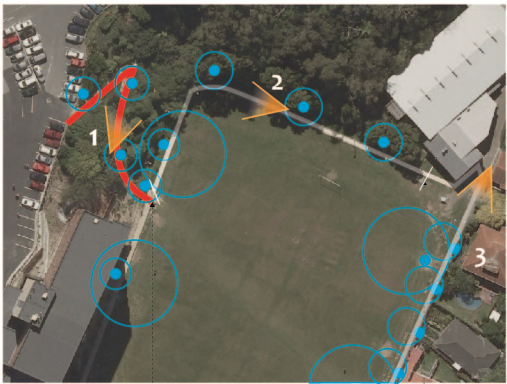
And the minor barriers were:

- *CPTED* = Lack of lighting causing dark areas off the footpath
- *Comfort* = No shelter from weather

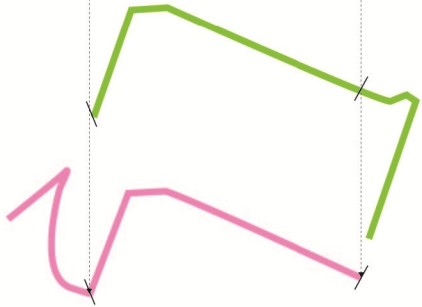
In terms of the typological study, the relevant spatial conditions of each barrier typology that needed to be considered in the design response were:

- *1&2. Bush thoroughfare*
  - The design intervention should be respectful towards the strong presence of natural vegetation.
- *2&3. Thoroughfare Field*
  - Built landscaping features, and dense vegetation can create hidden or secluded areas.

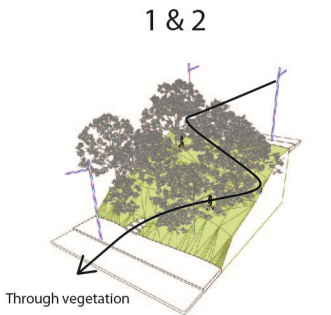
*Figures 69 and 70* show the proposed design response.



Lighting  
- Existing lighting

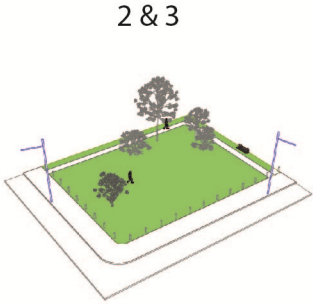
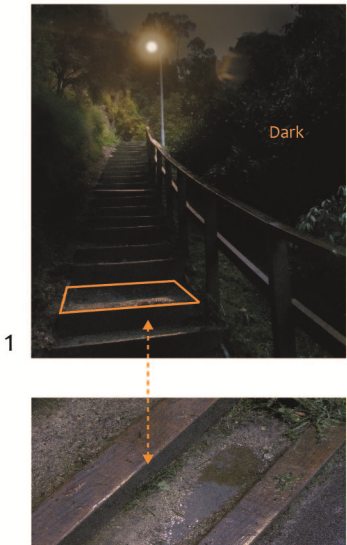


- Major
- Minor
- Path quality Ergonomics  
- Puddling and slippery surface
- Comfort  
- No shelter from weather
- CPTED Lighting & Spatial  
- Dark areas off the path



CPTED Lighting & Spatial  
- Dark areas off the path

Path quality / Ergonomics  
- Puddling and Slippery surface



Comfort  
- No shelter from weather

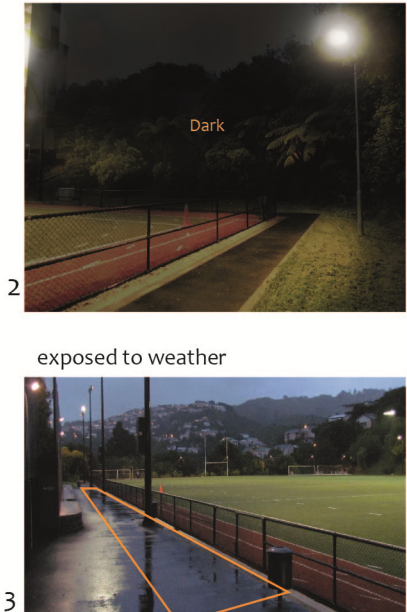


Figure 68: Barrier Zone (B) - Minor & Major accessibility barriers and considerations



## Solution for slippery surface and puddling

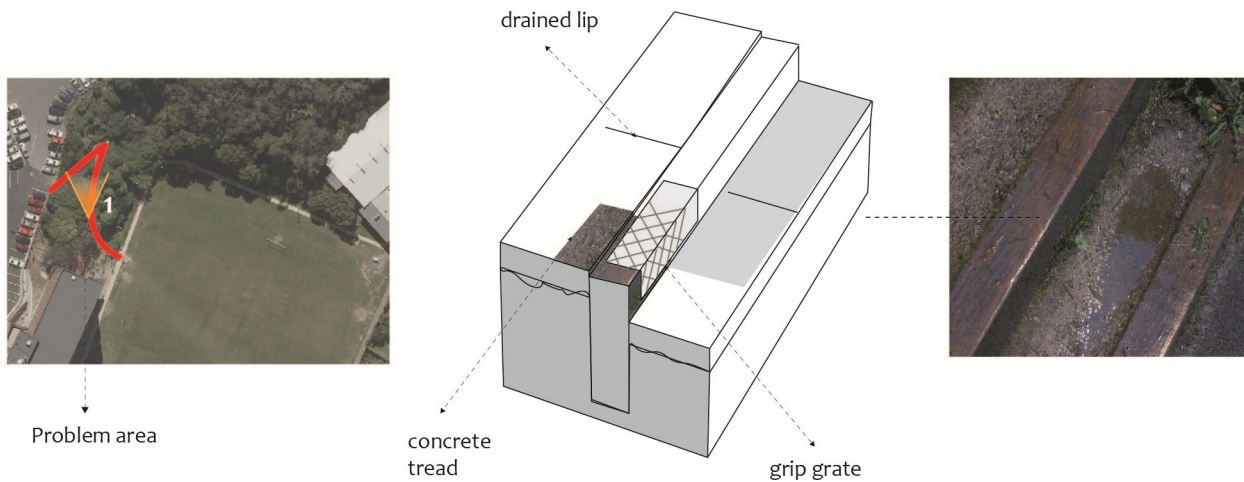


Figure 69: Barrier zone (B) Retrofit to existing stair treads



<- Before After ->



## Design Response

In the design intervention the major barriers of 'puddling' and 'slippery footpath surface' were resolved by retrofitting the existing aggregate stairs treads with concrete (Figure 69). This is a response that could easily become a standardised typological solution to this typology's problem.

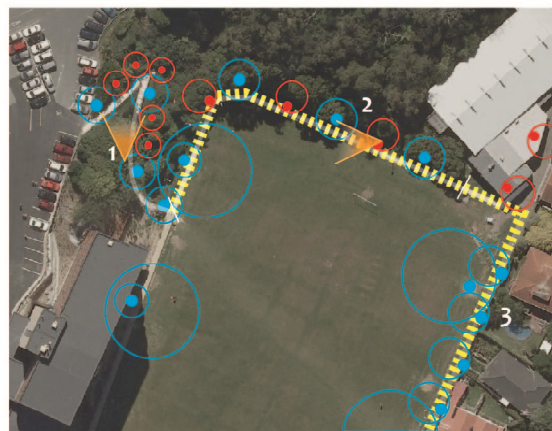
The minor barriers of 'insufficient lighting off the footpath' and 'no shelter from weather' were resolved through the standardised typological solutions for a canopy shelter, and vegetation lighting (Figure 70). Note the decision to use a typological solution for the canopy was because there were no significant place-making characteristics in the surrounding context that needed to be considered; apart from the frequent activity on the sports field that raised the possibility of integrating a small seating area in to the design (View point 2).



# Standardised typological solutions :

## Lighting improvements

## Shelter improvements



### Lighting

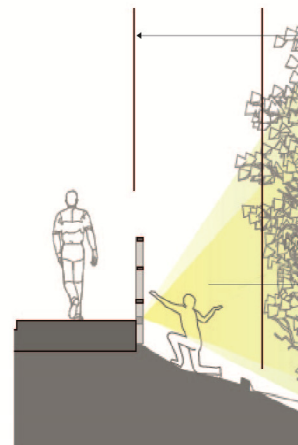
Existing  
Proposed additional



New shelter



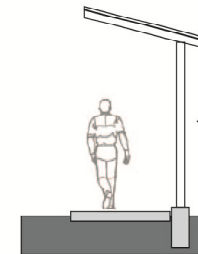
1 & 2



Safety buffer  
created by clearing  
vegetation away  
from path edge

Flood lighting into  
vegetation to  
lighten dark  
unseen areas

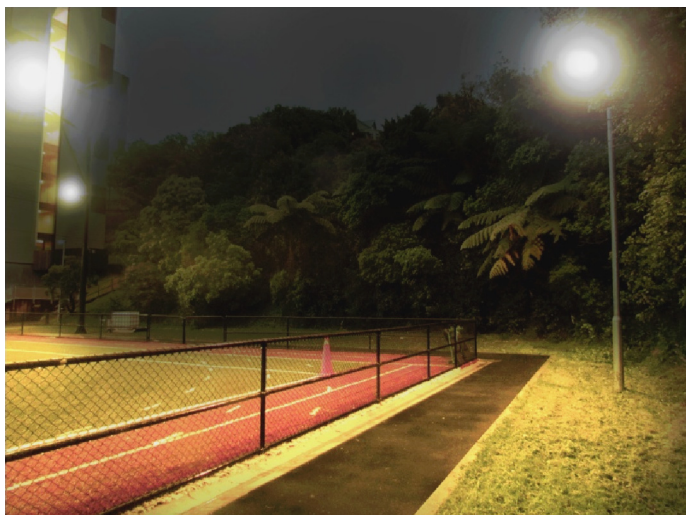
2 & 3



Steel materiality  
from existing  
site lighting and  
fences is applied  
to the shelter  
intervention.



Figure 70: Barrier zone (B) - Standardised typological lighting and shelter improvements



<- Before After ->

View  
point 2



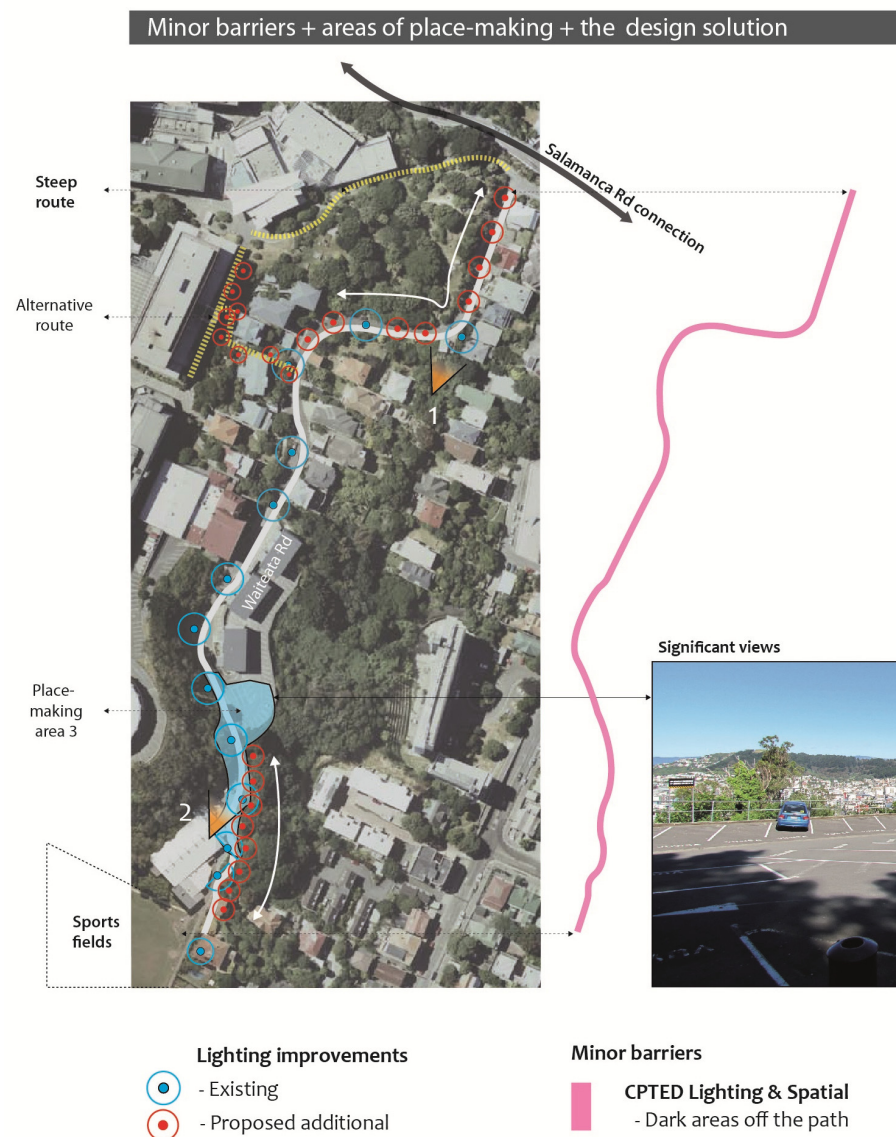
### **Barrier 'Hot Spot' Zone C: Waiteata Rd**

Figure 71 shows the cognitive surveys highlighted one **minor accessibility** barrier in 'Barrier Zone C', this was:

- *CPTED* = Lack of lighting causing dark areas off the footpath (see for further detail including the design response).

Despite only having a minor barrier, the site was identified in additional 'top down expert' site analysis as being significant for three reasons.

- Firstly, the only area of place-making potential that was identified in the cognitive surveys, 'Place-making Area 4', is along this route (see foldout leaflet). Therefore if the place-making site were to be developed this would increase the reason to improve *accessibility* along this route in the long term.
- Secondly, the route is one of only two North South connections running across the university; however this route is important because it provides access between the Salamanca Rd Connection and the University sports fields (see Figure 71).
- The connection links Salamanca Rd (North end) to the university sport fields (Southern end) which are used regularly after hours.
- Thirdly, the Northern end of the site provides an 'alternative less steep' route up to the university from Salamanca Rd (see Figure 71), the relevance of this point will be explained next when 'Barrier 'Hot Spot' Zone D' is examined.

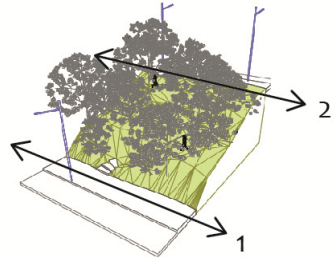


**Figure 71: Barrier Zone (C) - minor accessibility barriers and considerations**



Vegetation bank/gully

1 & 2



1



2



Dark areas off path

Before -> After

### Barrier Zone D and E

Figure 73 shows the cognitive surveys identified two major *accessibility* barriers in 'Barrier Zone D', these were:

- *Path Quality and Ergonomics* = Slippery surface and Steep gradient.
- *CPTED* = Lack of lighting, and dark hidden areas off the footpath.

As well as two minor accessibility barriers, these were:

- *Comfort* = uneasiness/creepy presence walking past a graveyard
- *Path Quality and Ergonomics* = Steep gradient, however this barrier was in another area of site to the other barriers,

### Design Response (D)

The CPTED barrier of 'insufficient lighting' could be resolved simply through a lighting strategy using a standardised typological solution which illuminated the vegetation off the path (see Figure 72). However, the solution for the 'steep path gradient' barrier and the 'comfort' barrier, which was caused by views into the nearby graveyard, was more complicated due to the following reasons.

- The duration of the 'steep path gradient' barrier was for 100-150m, thus excavating a flatter path requires a very high costs.
- The path had no additional opportunities for place-making that could be integrated into any of the solutions to the barriers along this route.



Figure 72: Barrier zone (D) - Lighting strategy Before -> After

Because of these reasons the most effective option to resolving the barriers was to upgrade an alternative route through site. One route in particular through 'place-making area 5', which was inside '**Barrier Zone E**' (see figure 73), seemed most appropriate. This was because the route:



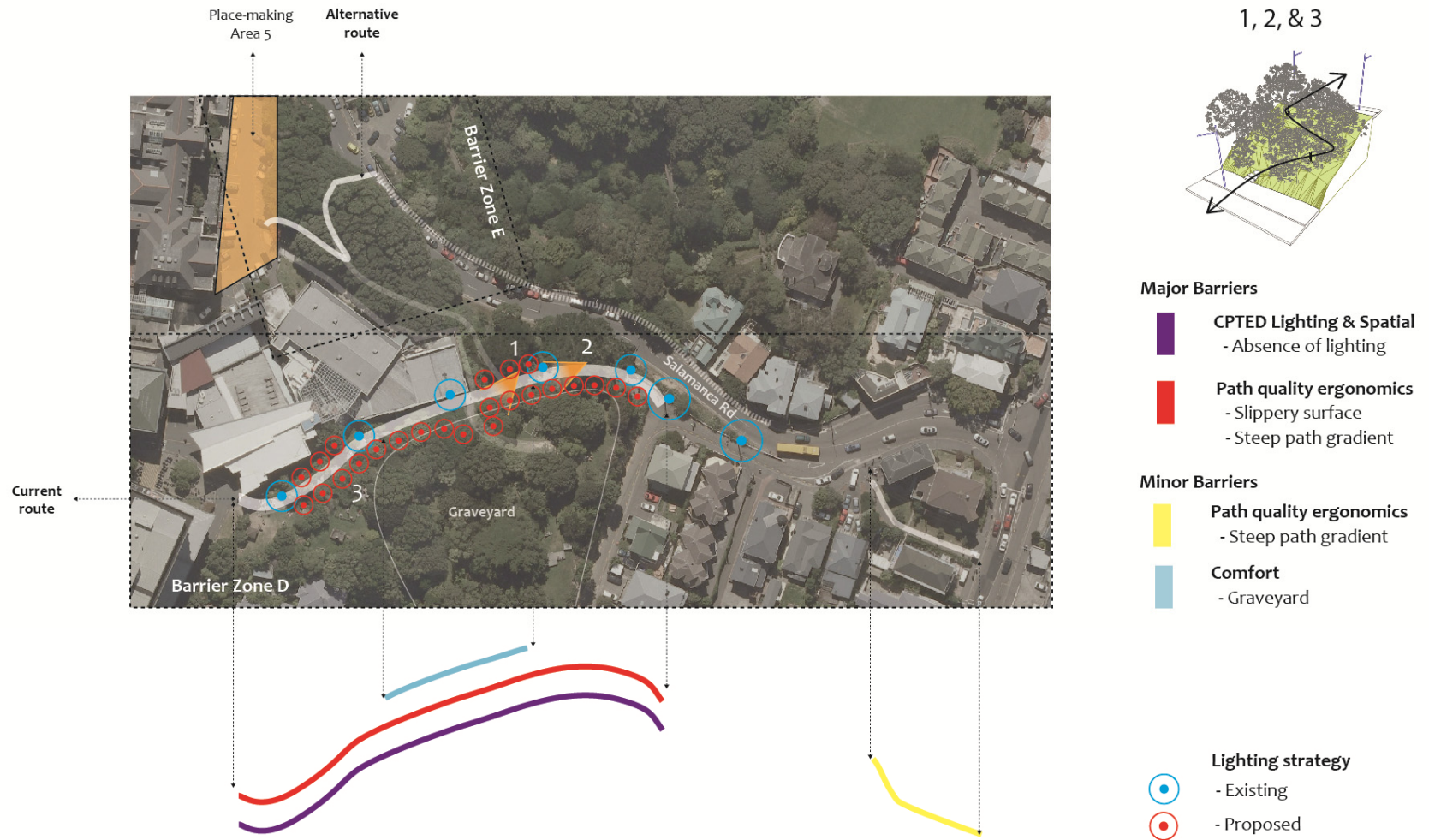
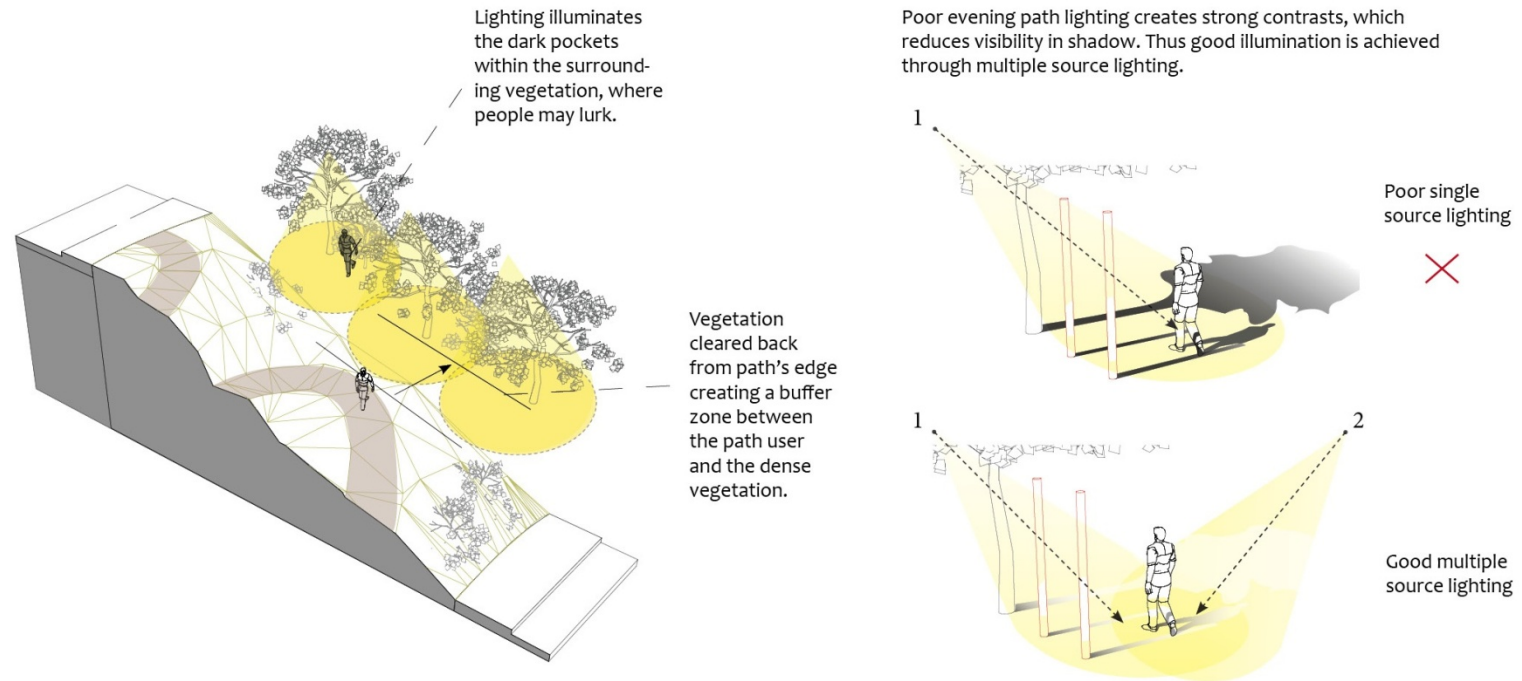


Figure 73: Barrier Zone (D) &amp; (E) accessibility barriers and proposed solution

**Figure 74:**  
'Thoroughfare bush  
typology' CPTED lighting  
design guidelines



- Bypassed the graveyard; and was over a flatter gradient than the current route;
- The route passed through place-making 'Area 5', which was identified as having significant place-making potential (*Figure 36 p103*).
- Was on a key edge mediating access between to an iconic University Hunter building, and a major commuting corridor (Salamanca Rd) between 'Residential Catchment A' and the CBD.

Note the solution for this alternative route of proving safe access between Salamanca and University was designed with guidance from the 'thoroughfare bush' typological study (*Figure 74 & 75*).



Figure 75: 'Thoroughfare bush typology' CPTED spatial design guidelines

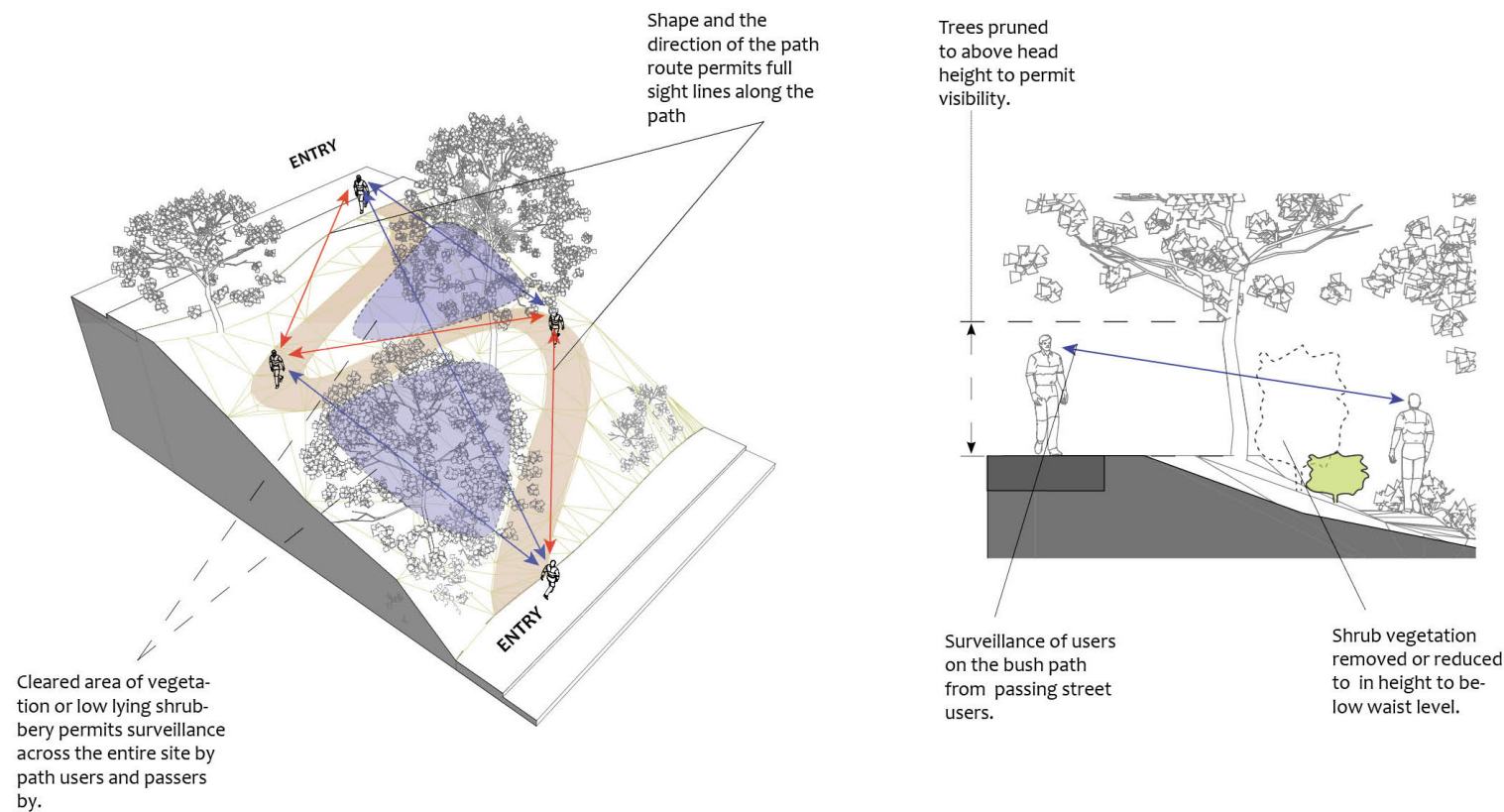


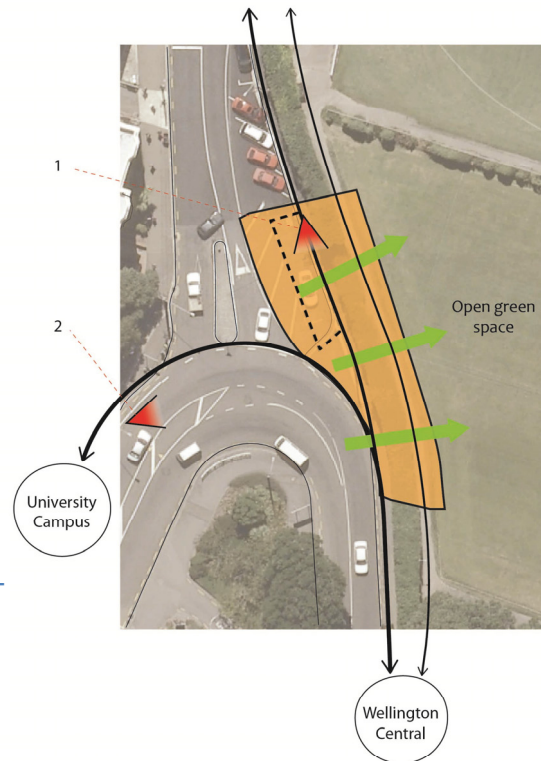


Figure 76: Barrier Zone (E) - Existing hidden path up to the University - Before -> After

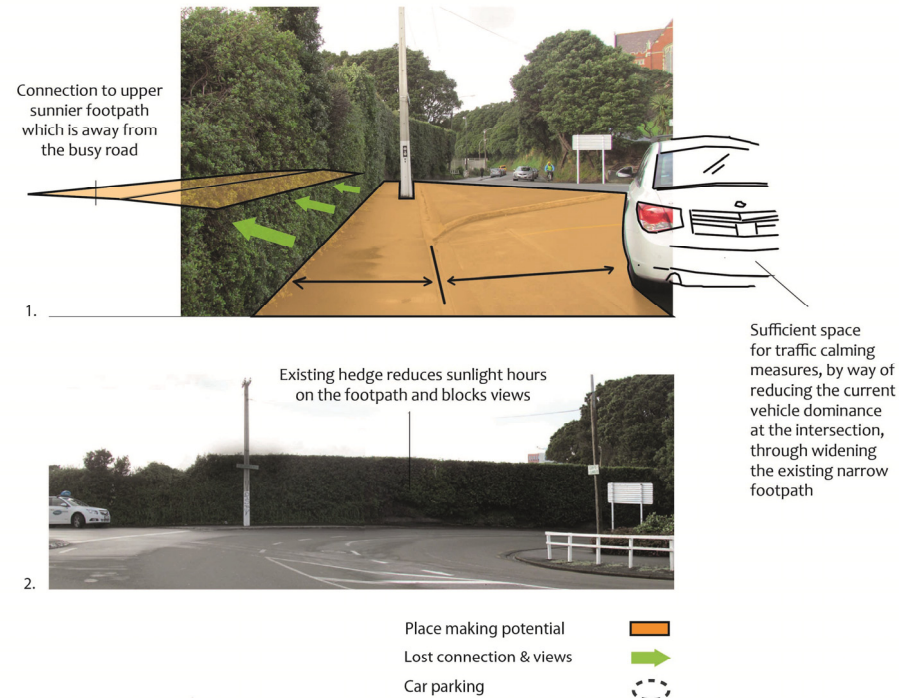




## Place-making area 6



**Figure 77: 'Place-making area (6) - Place-making qualities**



### *Design Response (E)*

The one minor barrier identified in 'Barrier Zone E' was the 'lack of shelter' present along Salamanca Rd (*Figure 48 p126*). The area was also identified as having place-making potential due to the potential for views

across a large green space towards the city beyond, whilst also reconnecting the main footpath with an upper adjacent footpath *Figure 77*. The design response was produced previously in Chapter 6.3 'Design Experiment 3' (*refer to Figure 39 p111*).

## **Barrier Zone F**

### *Site Analysis*

In the last barrier zone, 'Zone 'F' (see back fold out leaflet), one minor *accessibility* barrier was identified, this was:

- *Comfort* = No shelter from weather (*Figure 79*).

The relevant spatial conditions of each barrier typology that need to be considered in the design were:

- *Urban residential*
  - The design intervention should be considerate to the visual character of the houses. For 'Barrier Zone F' this was a row of Victorian buildings on the Western footpath (*Figure 79*).
- *Vegetation*
  - The built landscaping features, and dense vegetation can create hidden or secluded areas.

### *Design Response*

In response to these points the concept (*Figure 80*) was designed. The design resolves the barrier of 'no shelter from weather' by providing a mixture of vegetation canopies and built canopies which create one main covered route along Kelburn rise. The design is successful in a two ways:

1. By having the canopy running along the Eastern footpath of Kelburn rise Rd, the aesthetic presence of the character buildings along the Western footpath is retained.
2. The design is cost effective because the proposed canopy requires little intervention:
  - The existing trees along the Eastern footpath already provide the majority of cover, thus only some additional canopy tree planting is needed.
  - Where it is not feasible to plant a vegetation canopy, i.e. because of limited footpath space, the proposed design resolves the lack of shelter efficiently by using a standardised typological canopy solution (*Figure 81*), this solution was developed previously in 'Design Experiment 2' (*Figure 27 p89*).

As one final comment, although the vegetation canopy along the Eastern footpath would take a long time to mature, and even then would not grantee complete shelter from weather; this is justified considering:

- The barrier on site was only a minor barrier with no place-making potential;
- The barrier was considered as 'Stage 3' in the hierarchical framework (*Figure 60 p137*) and therefore it is only of medium urgency to implement.

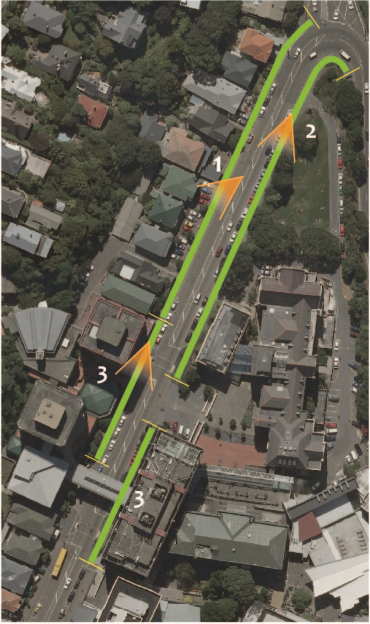
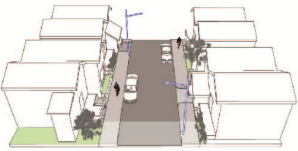

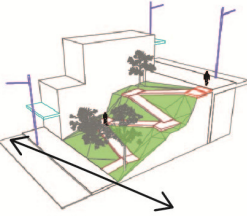

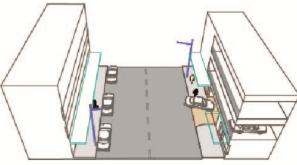

Typologies ->	Urban residential	Vegetation	Commercial back st
 <p><b>Comfort</b> - No shelter from weather</p>	<p>1</p>  <p><b>Comfort</b> - No shelter from weather</p>  <p>Cars tuning into off st car parking logistically make it difficult to build canopies along the footpath.</p>	<p>2</p>  <p><b>Comfort</b> - No shelter from weather</p>  <p>Partially developed tree canopy provides some shelter.</p>	<p>3</p>  <p><b>Comfort</b> - No shelter from weather</p>  <p>Canopies can easily be built in front of blank walls or retrofitted to them.</p>

Figure 79: Barrier Zone (F) - accessibility barriers and additional considerations





**Figure 80: Barrier zone (F) - Proposed shelter intervention**



**Figure 81: View point '3' artist impression of standardised typological canopy**



**Figure 82: View point '2' artist impression of vegetation canopy**

## 5.4.2 Results

A number of observations can be made about the ‘combined methodology’ used in Design Experiment 4, in particular how successful it was as a method for researching, designing, and implementing pedestrian infrastructure. These observations will be discussed in the following sections:

### 1. The Cognitive Survey Process

- Developments made in the cognitive survey method of analysis.
- The limitations of using the cognitive survey as a standalone method of site analysis.

### 2. The Emerging Design Themes in the ‘New Pedestrian Design Strategy’

- The tension between design standardisation and design customisation.
- The role of the ‘expert’ in the pedestrian design process.

## 1. The Cognitive Survey Process

### Developments Made in the Cognitive Survey Method of Analysis

Having completed two separate cognitive surveys in this thesis, the first in ‘Design Experiment 2, and the second in this experiment, three

observations can be made about how well they performed as a method of identifying *accessibility* barriers on site.

### 1

Firstly, the survey in ‘Design Experiment 4’ was more efficient than the survey used in ‘Design Experiment 2’ despite interviewing a larger sample size. This was because the experiment found that multiple surveys could in fact be conducted, in groups of up to four people at a time, whilst still maintaining quality in the respondents’ answers. The advantage of this was more surveys could be carried out, which subsequently led to a more cost efficient survey process.

### 2

Secondly, compared to the cognitive survey in ‘Design Experiment 2’, in Design Experiment 4’s survey there was an increase in the level of detail respondents were recalling about the site. This resulted in the respondents identifying more precisely the location of and areas of place-making potential on the survey map. I argue that this improvement in detail was because ‘Design Experiment 4’s survey focused on a much smaller area than the survey in ‘Design Experiment 2’, which survey boundary covered the whole Central Wellington area. The advantage of ‘Design Experiment 4’s’ survey was that it focused on a smaller area of the city but in greater detail; and also that a larger survey map was used for the respondents draw on. This meant more of the respondent’s interview

time was spent examining the site. And as a result the detail of the respondents' answers improved

This notable improvement in detail was significant for two reasons regarding researching *accessibility* barriers on site:

- Firstly, when the surveys were collated it led to a more accurate map of where and what the *accessibility* barriers were on site.
- Secondly, it confirmed after that more information could be learnt about the *accessibility* barriers in a specific area of site when a second cognitive survey is carried out for each 'barrier hot spot' that was identified in the first survey.

3

Thirdly, the larger survey sample size in 'Design Experiment 4' caused new *accessibility* barriers to emerge that had not been raised in the *accessibility* literature. An example of this was the unsettling presence that the respondents raised numerous times from walking past the graveyard in 'Barrier Zone D'. As a result a new kind of *accessibility* sub category was identified, I have called this the 'psychological atmosphere' of a place. This finding is significant as it demonstrates that the *accessibility* barriers people react to in the built environment are unique to every site, and therefore why the public needs to be consulted with in order to understand what pedestrian *accessibility* barriers affect their travel behaviour.

### Limitations of The Cognitive Survey (deciphering the data)

In 'Design Experiment 4' the cognitive survey data was to identify the areas of moderate and major *accessibility* barriers, as well as areas of place-making potential in a site. In this process the level each area was graded depended on the number of comments it received by the respondents in the surveys. This, however, caused a problem as it limited the extent *accessibility* was understood on site.

For example, when zero respondents walk through an area of site, thus causing no *accessibility* barriers to be raised, the cognitive survey analysis presents an illusion that there is no *accessibility* barriers present in the area. This caused the problem of how to identify pedestrian barriers in areas of site where few respondents have been; and also, how to predict what barriers would be present when new pedestrian routes were developed through unused sites.

Note these same problems also apply when researching the place-making potential in a site. For example in 'Design Experiment 4' the cognitive survey results suggested that there were very few areas of site that were considered to have place-making potential. However, arguably this could have been because the survey respondents were yet to experience all areas of site.

These finding are significant because they highlight that it is important to accompany a 'bottom up' cognitive survey with a 'top down expert'

method of site analysis i.e. the typological study of pedestrian *accessibility*, when researching *accessibility* barriers and place-making within a site. This is because an additional method of site analysis will give design professionals an insight into what kinds of barriers pedestrians are likely to encounter in unfamiliar sites, and therefore what barriers need to be addressed in their design intervention.

## 2. Two Emerging Design Themes in the ‘New Pedestrian Design Strategy’

### (Theme 1): Design standardisation versus Design customisation

The first emerging theme in this research is around the question,

?

What is the role of the design ‘expert’ in a pedestrian design process which aims to achieve two contrasting ideologies - cost efficiency through design standardisation; and responsiveness to context through design customisation?

One of the successes of the ‘New Pedestrian Design Strategy’ is that it combined two design approaches, from the previous design experiments 2 and 3, into a new approach for designing pedestrian infrastructure. These approaches were:

- Standardised typological approach
- Customised place-making approach

In reflection of ‘Design Experiment 4’, this thesis argues role of the ‘expert’ is to ensure there is a balance between design standardisation, and customisation when implementing pedestrian infrastructure. However, this balance creates a tension between a standardised design, which is economically efficient, versus a customised design that improves the quality of the surrounding environment by being responsive to context.

This thesis acknowledges that design customisation has obvious benefits over standardisation in terms of how it responds contextually to the surrounding environment; for example, there are areas of place-making potential hidden within site that can only be realised through a customised design process which allows them to be identified. However on the other hand, little acknowledgement has been made towards the benefits of design standardisation. These benefits are:

- Commonality and therefore improved legibility in terms of pedestrian way finding,

- Cost efficiency through mass production, modularity of the design, and one off design authorship, thus reducing the amount of resources required for the design. This can be seen in the Wellington example of the Adshel bus shelter (*Figure 23 pg 83*).

Furthermore, because of these low cost benefits, one could even argue the standardisation process is good for improving overall pedestrian *accessibility* in a site as it enables a wider scope of projects to be completed.

However, despite the cost benefits, the consequence of standardisation is a reduction in the quality of the urban environment, as standardised typological solutions lack response to context. This is significant as it has implications on the role of how pedestrian *access* and *land use typologies* are used in the pedestrian design process. For example, until now the purpose of the typological study was to be a library of information explaining the spatial principles of how the design of the built environment affects pedestrian *accessibility*. In this sense the typologies have provided a useful way of simplifying the complex real world environment through a theoretical lens, which was pedestrian *accessibility*. 'Design Experiment 4' exposed that standardised typological solutions as a design approach can still be used effectively if done in the right manner. However, they require an additional stage of development. Each typology in the study needs to have a diagrammatic explanation of the spatial principles that have to be considered in order to maintain a

high level of *accessibility*. *Figure 75 p157* is an example of how the 'Bush thoroughfare typology' could be developed further and become more useful. This improvement to the typology library is significant because it can help the design customisation process become more efficient in two ways:

- Firstly, it would make it easier for design professionals to include designing for pedestrian *accessibility* in their interventions;
- Secondly, it would give pedestrian design practice in Central Wellington a theoretical spatial guideline of how pedestrian *accessibility* is affected by each typology in the built environment.

## (Theme 2): The Role of the Expert Designer

In addition to this, 'Design Experiment 4' has shown that within a long-term strategy, the role of the design 'expert' also varies between micro and macro scale levels of intervention. At a micro scale the 'experts' role is to ensure a design is responsive to its immediate context. This means the designer must be:

- Aware of areas within a site that have place-making potential;
- Conscious of contextual qualities like materiality and form;
- Responsive to the activities that occur in the surrounding environment outside of the foot path.



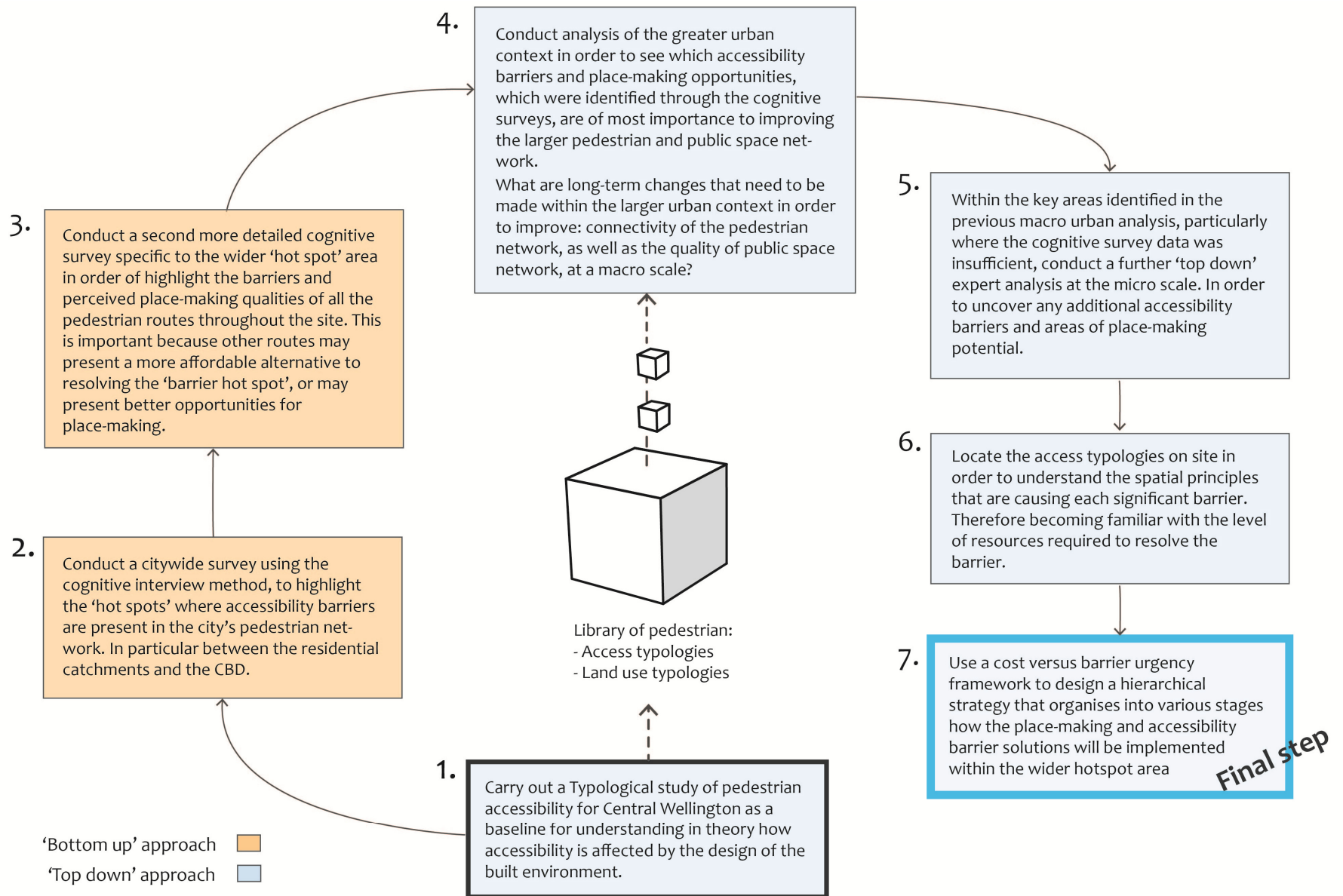
In contrast to this, at a macro scale the expert has the ability to influence pedestrian *accessibility* within the wider pedestrian network. Thus at the macro scale the designer's role is instead to understand:

- How the greater *accessibility* and place-making systems function within the wider urban context;
- What are the major and minor pedestrian barriers affecting *accessibility* in the wider urban context.
- And therefore, what barriers of the site are of greater urgency to resolve than others.

As a final point this thesis argues that the role of the 'expert' designer is also to be conscious of the design standardisation versus design customisation payoff, in that both solutions should be used together under one strategy for designing pedestrian infrastructure at a micro and macro scale. This is because if the designer is familiar with the minor and major *accessibility* barriers within site, as well as the areas of place-making potential, the designer can identify within site where it is most appropriate to use standardised typological solutions, or customised site-specific solutions. Therefore by understanding all these attributes of site, the designer can plan how to address pedestrian *accessibility* and place making through one effective strategy at both the micro and macro scales.

### 5.4.3 Further Direction

The previous findings required the 'New Pedestrian Design Strategy' to be altered again:



## Chapter 6 – Discussion:

The ‘New Pedestrian Design Strategy’ and Contributions to  
Contemporary Theory and Practice

---

The nature of this thesis is multidisciplinary, drawing theory from areas of behavioural psychology, geography, policy, urban design and architecture. The contribution of this thesis, therefore, is relevant across a range of disciplines. In particular this thesis has demonstrated how these disciplines, together, can improve the way in which pedestrian infrastructure is researched, understood, and designed by authorities and professionals. This chapter will discuss the contributions of this thesis to contemporary practice. The chapter will be discussed in two parts:

1. Why using a combined ‘Top down’ and ‘Bottom up’ approach to researching, designing, and implementing pedestrian infrastructure can improve pedestrian design practice in Central Wellington.
2. How typologies can be applied to the professions of architecture and urban design.

### (Part 1) 6.1 Improving Pedestrian Design Practice in Central Wellington:

The purpose of the initial ‘Hypothesis Pedestrian Design Strategy’ was to develop an understanding of how people perceive pedestrian *accessibility* in the built environment. In particular, how people’s walking behaviour could be influenced intentionally through the design of the built

environment. This thesis adopted a four-paradigm framework, which was developed by Taylor, Zube and Sell in order to remove unwanted variability in perception research. This framework was applied to the initial 'Hypothesis Pedestrian Design Strategy' as a way of ensuring a thorough investigation of Wellington's travel behavioural walking problem. Over four design experiments, the initial 'Hypothesis Pedestrian Design Strategy' was developed further into a 'New Pedestrian Design Strategy'. In the final design experiment, 'Experiment 4', the 'New Pedestrian Design Strategy' demonstrated that using a combined 'top down expert' and 'bottom up qualitative' approach, at both a micro and macro scale, could improve the cost efficiency and quality of the design outcome, when researching, designing, and implementing pedestrian infrastructure.

Using the findings from the design experiments, the following argument will explain how the current processes Wellington local authorities use to implement pedestrian infrastructure could be improved if a multi paradigm approach was adopted. The argument will start by re-capping the three main issues with Wellington's current process, and then close by explaining how this process could be improved by adopting the new strategy developed in this thesis.

## The Problems with Wellington's Current Pedestrian Design Process:

### *Problem 1: The Techniques Used to Identify Pedestrian Accessibility Barriers*

The first problem is regarding the techniques used to research pedestrian *accessibility* barriers in Central Wellington. Currently there are two kinds of processes used by Wellington authorities for this, and both are subject to criticism. These processes are:

- The 'top down' expert master-plan - The City to Sea Waterfront study by Jan Gehl,
- The 'bottom up' NZTA Community Street Audit,

#### 'Top down' Expert Master-Plan

Jan Gehl's 'top down' approach is problematic because it fails to identify three key issues:

- Firstly, because Gehl's approach is not qualitative, and instead uses expert analysis to make educated judgments of where pedestrian barriers are in the city, his approach fails to identify:
  - What pedestrians' perceive to be the most significant barriers to walking in the built environment,
  - Where these barriers are located in the built environment,

- The specific spatial conditions that have led the barriers to occur in the first place.

Gehl's designs lack focus in addressing the pedestrian *accessibility* barriers that are of greatest public concern. This causes Gehl's design interventions to be less cost efficient and effective.

- Secondly, Gehl's approach is beneficial in providing an overall framework of direction, by offering general principles towards improving the quality of the pedestrian environment. These guidelines and principles, however, lack detail and specificity to Central Wellington, and thus do not provide a complete solution to Wellington's *accessibility* problems.
- Thirdly, Gehl's approach is limited in its scope as it only addresses the CBD area. As a result it leaves the highly important areas between the residential catchments surrounding the CBD, neglected. Note that these areas fall outside the intentions of Gehl's study and this exposes large areas within Wellington's planning initiatives that need to be attended to, in order to improve *accessibility* across the wider pedestrian network.

#### The 'bottom up' NZTA Community Street Audit

The second approach is the 'bottom up' and qualitative 'Community Street Audit', which is used by the NZTA to identify barriers to walking in the

built environment. This approach is problematic for two reasons:

- Firstly, the 'on site walkthrough' method requires significant organisation of the survey participants, is time consuming, resource heavy, and limited to small-scale analysis. This is a significant problem as the method is therefore inappropriate for identifying barriers on a large city-wide area as the survey group and site area would be too large.
- Secondly, the survey technique used to question the respondents is flawed in the following ways:
  1. The survey questions are prescriptive in that they force participants to answer a range of prescribed questions. As a result, participants are not given the opportunity to highlight the barriers they consider most significant, therefore causing the technique to be less accurate.
  2. The 'on site walk-through' technique is also problematic as it puts emphasis on respondents' using observation to identify the barriers they perceived in the surrounding environment. This makes it difficult to prevent respondents from over searching the surroundings, and identifying carelessly any objects/spaces as *accessibility* barriers, just because they were present at the time of the interviews. This also reduces the level respondents will refer to their mental representation of the environment to recall barriers, which is significant



considering behavioural theory states that people's travel decisions are reactions to their mental representation of the environment.

- Thirdly, because the walk through technique operates within the context of the footpath, the technique is limited to only improving *accessibility* at the micro scale. For example improving the quality of the footpath surface, and road crossings etc. As a result it cannot be used to improve *accessibility* at the larger macro scale.

***Problem 2: The Limited Recognition of Accessibility in the Documents Used to Design Pedestrian Infrastructure in Central Wellington.***

The second issue is with the main documents used to design pedestrian infrastructure in Central Wellington. These are:

- **Wellington Walking Policy**  
(WCC Wellington Walking Policy)
- **The Pedestrian Planning and Design Guide**  
(NZTA)
- **Wellington District Plan Guidelines**  
(WCC Wellington City Council District Plan)

The documents demonstrate a poor understanding of how pedestrian *accessibility* is affected by the built environment. This is evident in:

- The limited variety of pedestrian access typologies recognised in

the documents;

- Secondly, when assessing how each pedestrian typology affects accessibility, the documents fail to recognise all of the criteria that make up *accessibility* from the travel behavioural theory.

I argue that this is significant because it reduces how effective current improvements to the pedestrian network are towards increasing pedestrian *accessibility*.

***Problem 3: Pedestrian Infrastructural Design and Public Space Design as two Separate Agendas.***

The third problem with the current pedestrian process is that pedestrian infrastructural improvements and public space improvements are addressed as two separate agendas, rather than together under one strategy. The benefits of addressing the two areas together are highlighted in 'Design Experiments 3 and 4'. These are:

- New place-making opportunities arise to implement public spaces in the pedestrian network;
- Cost efficiency and the effectiveness of the design response increases. This is because resources are streamlined when pedestrian infrastructural improvements are researched, planned, and implemented, together with public space improvements.

## The 'New Pedestrian Design Strategy': How it can Improve the Problems With Pedestrian Design Practice in Central Wellington.

This section is broken into two parts:

1. Firstly, a recap on how the New Pedestrian Design Strategy' was developed in this thesis.
2. Secondly, how this new strategy could improve current pedestrian design practice in Central Wellington, if it was adopted by authorities.

### 1. Developing the 'New Pedestrian Design Strategy'

The initial 'Hypothesis Pedestrian Design Strategy' was designed to address the three problems, outlined in the previous section, regarding Central Wellington's pedestrian design process. These problems were:

1. The techniques used to identify pedestrian *accessibility* barriers.
2. Limited recognition of *accessibility* in the documents used to design pedestrian infrastructure in Central Wellington.
3. That currently both pedestrian infrastructure and public space improvements of the built environment are addressed under two separate agendas.

The 'New Pedestrian Design Strategy' is the subsequent outcome of pursuing these problems over the course of the four design experiments

carried out in this thesis. Below is a brief outline of how the 'New Pedestrian Design Strategy' evolved through the design experiments.

### Typological study and cognitive mapping technique

- To begin with a 'top down' typological analysis of pedestrian *accessibility* in Wellington Central was carried out. Also at the same time, a new 'bottom up' cognitive survey method was developed for identifying *accessibility* barriers in the pedestrian network.
- Both techniques were combined into one 'top down' expert and 'bottom up' qualitative approach for researching *accessibility* barriers on site.

### Design Experiment 1

- Experiment 1 tested how the typological study could be used as a method of understanding why *accessibility* barriers occur within the built environment.
- The experiment highlighted that pedestrian *accessibility* barriers cannot be totally understood through a typological analysis, as the typologies are limited to only understanding *accessibility* at the micro scale.
- As a result the need for further accompanying 'top down expert' macro scale site analysis was highlighted, in order to understand *accessibility* in the greater urban environment.

### Design experiment 2

- 'Experiment 2' tested to see if a standardised typological approach could be used to efficiently (at a low cost) design and resolve *accessibility* barriers on site. The experiment found two limitations when using a typological approach to designing:

Firstly, the designer needs to be familiar with more than just each *accessibility* barrier and its accompanying typology within a 'barrier hot spot'. Instead the designer must be familiar with the wider surrounding area, in particular the *accessibility* barriers along the other possible routes through the site. This is because sometimes it was more effective to spend resources on an alternative route through the site, rather than the original barrier hot spot, as it had, fewer, and more easily resolved *accessibility* barriers.

Secondly, the standardised typological method of designing failed to recognise the potential pedestrian design interventions have for place-making in the urban environment. This is because typologies fail to respond to the surrounding context, and are isolated simplifications of complex real world problems. As a result opportunities were lost to improve the quality of public space in the built environment, thus highlighting the consequence of using typological solutions.

### Design Experiment 3

- In response to 'Design Experiment 2', 'Design Experiment 3' introduced that designing for place-making was important as it improved the 'sense of place' qualities of the urban environment. The experiment found that new areas of place-making potential could be discovered and developed during the process of resolving *accessibility* barriers in the pedestrian network.
- And in addition to this uncovered the problem that pedestrian *accessibility* across the wider pedestrian network cannot be resolved entirely through intervening at a micro scale in the 'barrier hot spot' alone. Instead *accessibility* and place-making needs to be considered in the macro scale within the wider context.

### Design experiment 4 (The final design process)

- 'Design Experiment 4' combined what was learnt in the previous three design experiments into one complete strategy for researching, designing, and implementing pedestrian infrastructure. Importantly, it also used an additional analysis of the wider urban context to ensure pedestrian *accessibility* and place-making improvements being made at the micro scale were going in the same direction as of the larger macro scale agenda.

The experiments found that 'New Pedestrian Design Strategy' used in 'Design Experiment 4' was the most effective and efficient approach for implementing pedestrian infrastructure. This is because the strategy successfully applies a range of 'top down' and 'bottom up' approaches, therefore creating a stronger more efficient method for understanding and resolving behavioural problems, particular in a limited funding economic environment.

## 2. Improving the Current Pedestrian Design Process in Central Wellington.

The following points will briefly outline how the 'New Pedestrian Design Strategy' could improve current pedestrian design practice in Central Wellington, if it was adopted by authorities.

### *Success 1: The Combination of Standardisation and Customisation in the Design Process.*

The 'New Pedestrian Design Strategy' achieves the right balance between design standardisation and design customisation. In turn this allows pedestrian *accessibility* solutions to be implemented in the built environment in a cost efficient manner, whilst also exercising the principles of place-making, by being responsive to the surrounding context. For example, this proved most successful in 'Design Experiment 4'. By being aware of the place-making areas throughout site, and whether

there was a requirement for an intervention in these areas to be responsive to their surroundings, the design process could employ a customised design in response. On the other hand, this allowed for standardised typological solutions to be applied to the remaining areas of site cost efficiently, as it had been established there was no consequence in inserting a standardised design that was not responsive to its context.

### *Success 2: Designing for Accessibility and Place-making Under one Framework*

In 'Design Experiment 4' the 'New Pedestrian Design Strategy' demonstrated that researching, designing, and planning for both:

- Pedestrian *accessibility* in the built environment,
- And the place-making qualities of public space in the built environment,

could be made more cost efficient if they were combined together under one strategy; thus allowing both agendas to be addressed at the same time through one solution. This approach therefore is successful in two ways:

- Firstly a combined design response is more effective in improving place-making in the pedestrian network. This is because new opportunities arise for developing areas of place-making into the built environment when both issues are addressed together. For example the canopy shelter intervention in 'Design Experiment 3' *pg109*.

- Secondly, there is an economic benefit because time and resources are streamlined from two separate areas into one. This was evident in 'Design Experiment 4' when planning the overall framework for addressing both, the *accessibility* barriers, and place-making areas on site. When these agendas were addressed together the framework ensured the designs did not conflict, but instead benefited from one another. The strongest example of this was when a proposal for a new public space area was strategically planned to be developed along a well used but amenity neglected pedestrian route (Vivian St connection *Figure 53 pg130*). The planning of this intervention was successful as the new development was also able to fill a large public space void in that area of the public space network (*Figure 50 p127*).
- Thirdly, addressing both agendas simultaneously makes it easy to develop a long-term framework for implementing both cost efficiently. This was demonstrated in 'Design Experiment 4' which used the hierarchical framework (*Figure 60 p137*) as a guide specifying the level of urgency for each design to be implemented. This kind of framework was successful because it was responsive to whether the overarching urgency was on:
  - Resolving the *accessibility* barriers in order of barrier significance or,
  - Cost efficiency, in terms of having the most affect by using the least amount of resources.

### *Success 3: The Combination of 'Top Down' Expert and 'Bottom up' Qualitative Approaches to Site Analysis.*

The new strategy uses a combination of 'top down' expert and 'bottom up' qualitative approaches to carry out site analysis, because of this; it has significant advantages over using either approach in isolation.

On one hand the 'bottom up' approach to site analysis has two benefits:

- Firstly, it allows authorities and design professionals to learn how members of the public perceive walking in the built environment. This improves both cost efficiency and effectiveness of the design response, as resources can be used more accurately when designers know where the most significant *accessibility* barriers are in the pedestrian network, and what needs to be addressed.
- Secondly, the same benefit as above applies in terms of identifying areas of place-making potential in the pedestrian network.

However, despite these benefits, the 'bottom up' process is problematic when used as a stand-alone approach. This is because the results from the cognitive survey are not entirely representative of the problems within site. There are number of reasons for this:

- Firstly, the survey is refined to a limited site and thus loses sight of other larger urban factors. This means some areas identified by the cognitive surveys, that seem in urgent need of attention, may



turn out to be less significant when placed in context among larger site systems, or alternatively a city's long-term strategic plan.

- Secondly, the findings are subject to the limitations of the survey method. For the cognitive survey method this limitation is that the surveys can only be used to identify *accessibility* barriers in areas of site where the respondents have walked through previously. There is a consequence for this when the data is processed in that some areas of site look as though they have no barriers. However this is incorrect, as it only appears this way because fewer respondents had in fact experienced walking through that area.

However, the above problems are then resolved in the 'New Pedestrian Design Strategy' because three additional 'top down' expert techniques to site analysis are included alongside the 'bottom up' cognitive survey method. These are:

- The typological study of pedestrian *accessibility*.
- An analysis of place-making at the micro and macro scale.
- An analysis of the overarching macro scale *accessibility* conditions in the greater pedestrian network.

The 'New Pedestrian Design Strategy' uses these 'top down' expert techniques in combination with the 'bottom up' cognitive surveys, and thus is successful for the following two reasons:

- Firstly, the typological study of pedestrian *accessibility* can be applied to areas of site where the cognitive surveys could not be used. These are the new or underused areas of site which fewer people have experienced walking through. The typological study is useful because it can be used to highlight the *accessibility* barriers that are likely to present in these areas, and as a result which barriers a designer needs to consider in their design response.
- Secondly, when researching site, the combination of micro scale and macro scale analysis allows the 'expert designer' to understand how *barrier hotspots* at a micro scale, such as the areas of *place-making* potential within the 'hot spot', sit within the larger macro scale environment. This is important when trying to improve the overall pedestrian network for two reasons:
  - It ensures all the micro scale interventions are integrated into the broader macro scale framework.
  - It allows the designer to be aware of the other *accessibility* barriers present through site. Therefore when designing a response, this allows the designer to select the route which is most effective.

As a final point this section has highlighted that using a multiple combined approach of a:

- 'Top down' expert and 'bottom up' qualitative approaches to site

analysis at both a micro and macro scale.

- Standardised typological design approach with a customised design approach.
- Designing for pedestrian *accessibility* at the same time as developing opportunities for place-making;

makes for a successful strategy for designing researching and implementing pedestrian infrastructure.

## (Part 2) 6.2 Typologies and the Architecture and Urban Design Professions; and Other Contributions to Contemporary Practice

The second contribution of this thesis to the architecture and urban design professions is in highlighting the benefits and limitations of using typological models to understand and resolve complex environmental problems.

### *Limitations*

This thesis found that when researching and designing complex environmental problems, a typological approach could not be used as a stand-alone method. This is because typologies are an abstract simplification of a spatial problem, which makes them disconnected from the complex matrix of interrelated spatial problems that exist in the real world environment. The process of simplification behind a typological approach is problematic in two ways:

- On one hand simplification makes a typological approach to site analysis a useful theoretical tool for understanding, in isolation, the spatial principles behind a real world problem. However, the consequence of simplification is that it dissolves the complexity of a spatial problem. Simplification through a typology is a process of finding commonality by stripping away the unique contextual qualities of a problem or site. As a result simplification makes the

typological method problematic as a method of site analysis, because it is unable to explain complex real world environments without an overarching traditional form of site analysis.

- Secondly, regarding standardised typological solutions as a method of designing, the initial simplification of a typology causes the subsequent typological solution to have little response formally, or aesthetically, to the surrounding environment. For example in 'Design Experiment 2', this is clearly demonstrated by the difference between the standardised typological interventions produced on *pg89*; in comparison to the place-making designs in 'Design Experiment 3' *pg113*, that were responsive aesthetically and formally to their surroundings. In a real world example, this is also evident with Wellington's Adshell bus shelters (*Figure 23 pg83*), whereby the same modular steel and glass design is transplanted in the context of the residential suburbs, as well as the CBD.

As a consequence this thesis argues 'standardised typological solutions' should not be used for resolving *accessibility* problems in places where the following spatial characteristics can under no circumstances be compromised:

- Character areas, where formal and aesthetic response to site is important.
- Complex areas, where many additional spatial problems

are present in the immediate surroundings.

- Place-making areas, where a customised design that responds to the needs of the unique place-making conditions, is required.

These characteristics should not be compromised as they are the most valuable/valued qualities of the site.

### *Benefits*

Despite the previous criticisms this thesis demonstrates that there are benefits in using a typological approach as a method of researching and designing pedestrian infrastructure.

- Firstly, typologies are a spatial medium that bridges between theory, in a transcript medium, and real world practice in a spatial medium.
- Secondly as a method of analysis they offer a useful technique for interpreting complex spatial environments through a specific theoretical lens. This was evident in this thesis through the typological study of pedestrian *accessibility* (*Appendix A pg194*), which played an important part in understanding the spatial conditions that were causing the *accessibility* barriers to occur in areas of site where the cognitive survey could not. Therefore, typologies in the form of a typological study are significant to pedestrian design practice, because authorities can use them to learn how the public understand pedestrian *accessibility* in the

built environment. This **must** be achieved by developing a typological study based on the public's perceptions of *accessibility* barriers in the built environment.

- Thirdly, standardised typological solutions are an efficient and low cost method of designing. This is because a standardised solution results in a design that has multiple applications yet requires fewer design resources. 'Design Experiment 4' demonstrated this by resolving a range of pedestrian *accessibility* problems on site, simply by inserting a standardised typological design without requiring much further customising of the design.
- Fourthly, typologies are a useful way of understanding the abstract principles governing a complex environment, however they are not a blueprint solution to a problem. The criticisms and benefits of using typologies as a method of designing highlight a tension between design standardisation and customisation. On one hand typologies are a method of standardisation that offer efficiency benefits through the possibility of re-applying one design solution multiple times. But as a result, typologies are limited in their application as they are inappropriate for resolving sites that have highly valued qualities, and complex spatial problems, which are of vital significance to the *accessibility* and place-making in the area, and thus cannot be compromised.

In terms of the contemporary theory this thesis has:

- Affirmed Taylor, Zube, and Sell's argument that a multi paradigm 'top down' and 'bottom up' approach for researching and resolving behavioural problems is most effective.
- Provided more insight into the use of typological approaches, as a way of researching through using a 'typological study'; and designing, through using standardised typological solutions.
- Made insightful developments into the use of cognitive survey mapping as a technique for carrying out qualitative perception research of a select survey group, 18-30 year olds. Thus further proving that the cognitive survey method is more cost efficient and effective than the 'on-site' walkthrough Community Street Audit, which is currently used by the New Zealand Transport Agency.

As a final point, this thesis has suggested a whole new way of looking at a precinct. Through analysing something as simple as how pedestrians move through the environment, a designer can achieve two things. Firstly not only can they influence pedestrians' perceptions towards walking, by relieving the most intense moments of *accessibility* barriers in the city. But secondly, through small interventions such as re-developing a run-down pathway, have the ability to be a catalyst for larger change within the urban environment by influencing the way the pedestrian network functions.

## Conclusion

---

The aim of this thesis was to improve the current process that Wellington City Council and the Central Government use to design pedestrian infrastructure in Central Wellington. This goal was to be achieved in two parts:

1. By improving authorities' understanding of how pedestrian *accessibility* is affected by the design of built environment.
2. By demonstrating that new interventions to the pedestrian network, which respond to their surrounding context, create new opportunities for place-making in the built environment. This in turn, can improve the quality of public spaces in the urban environment.

In addition to these goals one further concern of the research was to remain conscious of the limited economic environment that is the reality of pedestrian infrastructural spending in New Zealand.

### *Recommendations for Authorities*

Having completed four design experiments, each inquiring into an aspect of the thesis aim, multiple conclusions can be made as to how current pedestrian infrastructural design practice in Central Wellington can be



improved. The new 'Pedestrian Design Strategy' outlined on *page 169* reflects these improvements but are listed here as well in two parts:

## 1

In order to improve authorities' understanding of how pedestrian *accessibility* is affected by the design of the built environment, authorities need to:

- Develop from the public's perceptions of pedestrian *accessibility*, an extensive typological library of pedestrian *accessibility* in the built environment which consists of both, *pedestrian access*, and *land use typologies*.
- Adopt a combined approach of using 'qualitative' cognitive surveys in parallel with an 'expert' site analysis of the wider urban context. Firstly, to uncover how pedestrian *accessibility* barrier 'hotspots', which are identified through the cognitive surveys, have an effect on the larger pedestrian network. Secondly, to educate designers on what parts of the built environment are causing *accessibility* barriers in new or unused areas of site, where the cognitive surveys cannot be used.

## 2

In order to improve the way authorities design and implement pedestrian infrastructure in Central Wellington, authorities need to:

- Bring the processes of researching, planning, and designing,

pedestrian infrastructure and public space, together as one agenda. There are considerable advantages of this in terms of improving:

- The quality of public space within the pedestrian network, as public space improvements are able to be integrated into pedestrian infrastructural improvements;
  - Cost efficiency through streamlined design and build implementation.
- Use a combination of 'qualitative' cognitive surveys and 'Top-Down expert' site analysis, at both a micro and macro scale, to locate places within the pedestrian network that require place-making and *accessibility* improvements on the macro scale; in order to ensure micro scale improvements contribute to the overall macro scale direction.
  - Design where appropriate using both standardised typological solutions, which are derived from the typological study of pedestrian *accessibility*, and also unique customised solutions that are responsive to the surrounding context.
  - Use a cost versus barrier urgency framework, such as the one developed in 'Design Experiment 4' (*Figure 60 p137*), to organise into a hierarchical strategy the various stages that the place-making and *accessibility* barrier solutions should be implemented within the pedestrian network.

### *Last Words*

In conclusion, this thesis has demonstrated how the current methodology for designing pedestrian infrastructure in Central Wellington could be made more effective and cost efficient. In doing so, this thesis has developed a 'New Pedestrian Design Strategy' for researching, designing and implementing, pedestrian infrastructure in the built environment. This strategy is successful because it:

- Overtime will improve Central Government and Wellington local authority's understanding of how pedestrian *accessibility* it affected by the design of the built environment,
- Provides authorities a cost efficient process for resolving pedestrian *accessibility* barriers within the pedestrian network, whilst also improving the quality of public space in the built environment.

There are however, a number of limitations to this proposed new strategy:

- Firstly, the typological analysis of pedestrian *accessibility* was not derived through consultation with members of the public. Therefore this thesis cannot inform authorities of how this process should be carried out in practice.
- Secondly, in order to get maximum cost benefits from the cognitive mapping survey technique, further work is required to eliminate the task of having to manually input the paper surveys into the computer. Developing a computer program is important

because it would allow the respondents to draw their cognitive maps directly into the computer and the maps would be automatically organised.

As a final point the title of this thesis asks,

*“What does a footpath do?”*

Fundamentally walking is a key part of our daily lives as it is the primary way we as people move through the city. Bearing in mind that the budget for pedestrian upgrades in Central Wellington is extremely low, this thesis suggests a more cost efficient and effective process that not only resolves *accessibility* barriers to walking, but also acts as a catalyst for the planning and creation of new public spaces within the network. This process will significantly improve the quality of public space within the built environment and make walking a more desirable way of commuting in the city.

End

## Bibliography

- 
- Alfonzo, Mariela A. "To Walk or Not to Walk? The Hierarchy of Walking Needs." Environment and Behavior 37.6 (2005): 808-836.
  - Appleyard, Donald. "Notes on Urban Perception and Knowledge." Downs, M Roger and David Stea. Image and the Environment Cognitive mapping and Spatial Behavior. Ed. M Roger Downs and David Stea. Chicago: Aldine Publishing Company, 1973. 109-114.
  - ARRB Group. Pedestrian cyclist conflict minimisation on shared paths and footpaths. Research rep for Australian Bicycle Council. Queensland: Austroads Inc, 2006.
  - Auckland City of Cars. Dir. Michael Tritt. Perf. Jan Gehl and Newman. n.d.
  - Austroads. Guide to traffic engineering practice: Part 10: Local area traffic management. Austroads Inc, n.d.
  - Bean, Catherine, Robin Kearns and Damian Collins. "Exploring Social Mobilities: Narratives of walking and driving in New Zealand." Urban studies Journal Limited 45.13 (2008): 2829-2848.
  - Beattie, Nick. "Urban Placemaking." Place and Placemaking. Melbourne: People and Physical Environment Research, 1985. 13-26.
  - Bechtel, Robert B. "The Ubiquitous World of Paper and Pencil Tests." Bechtel, Robert B, Robert W Marans and William Michelson. Methods in Environmental and Behavioral Research. New York: Van Nostrand Reinhold Company, 1987. 82-119.
  - Cao, Xinyu and Patricia L, Handy Susan L Mokhtarian. "Do Changes in Neighbourhood Characteristics Lead to Changes in Travel Behavior? A Structural Equations Modeling Approach." Journal of Transportation 34.5 (2007): 535-556.
  - Carter, Harold. The Study of Urban Geography. 3rd Edition. London: Edward Arnold Publishers Ltd, 1981.
  - Connolly, Peter. Technique: Landscape Architecture Graduate Design Research. Ed. Rene Vander Velde and Peter Connolly. Melbourne: RMIT University press, 2002. 20-32.
  - Crane, Randall. "The Influence of Urban Form on Travel: An Interpretive Review." Journal of Planning and Literature 3.25 (2000).
  - Downs, Rogern M and David Stea. Image and the Environment Cognitive mapping and Spatial Behavior. Chicago: Aldine Publishing Company, 1973.
  - Downton, Peter. "Knowledge production and transmission." Downton, Peter. Design Research. Melbourne: RMIT publishing, 2004. 71-90.
  - Feimer, Nikolaus R. "Environmental Perception: The effect of media, evaluative context, and observer sample." Journal of Environmental Psychology 4.1 (1984): 61-80.

- Gehl Associates. City to Waterfront Study. Wellington City Council. Wellington: Wellington City Council, 2004.
- Gehl, Jan. "Three Types of Outdoor Activities and Life Between Buildings." The Urban Design Reader. Ed. Michael Larice and Elizabeth Macdonald. New York: Routledge, 2007. 364-370.
- Gold, John R. An introduction to Behavioral Geogrpahy. New York: Oxford University Press, 1980.
- Golledge, Reginald G. Spatial Behavior A Geographic Perspective. New York: The Gilford Press, 1997.
- GWRC Greater Wellington Regional Council;. "Walking and Cycling Regional Walking Plan." Regional Plan. Wellington: Greater Wellington Regional Council, November 2008.
- Hannes, Els, Davy Janssens and Geert Wets. "Does Space Matter?: Travel Mode Scripts in Daily Activity Travel." Environment and Behavior 41.1 (2008): 75-100.
- Hans L, Westerman. Cities for tomorrow. Sydney: Austroads Inc, 1999.
- Hart, Roger A and Gary T Moore. "The development of Spatial Cognition." Image and Environment. Ed. Roger M Downs and David Stea. Chicago: Aldine Publishing Company, 1973. 246-288.
- Hillman, Mayer. "In favor of the compact city." Jenks, Mike. The Compact City: A sustainable urban form? London: Routledge, 1998. 36-45.
- Huitt, W. Maslow's hierarchy of needs. 2007. Valdosta State University. 7 Feburary 2012  
<<http://www.edpsycinteractive.org/topics/conation/maslow.html>>.
- Joint Technical Committe LG/2 Road Lighting. "AS/NZS 1158.3.1: 1999,." Road lighting - pedestrian area (Category P) lighting - Performance and installation design requirements. Australian/New Zealand Standards., 1999.
- Kaplan, Stephen. "Cognitive Maps in Perception and Thought." Downs, Roger M and David Stea. Image and the Environment. Chicago: Aldine publishing company, 1973. 63-79.
- Kearns, Robin A. "Knowing Seeing? Undertaking Observational Research." Hay, Iain. Qualitative Research Methods In Human Geography. Melbourne: Oxford UP, 2005. 192-206.
- Limanond, Thirayoot and Debbie A Niemeier. "Accessibility and Mode-destination Choice Decisions: Exploring Travel in Three Neighbourhoods in Puget Sound. WA." Jounral of Environment and Planning B: Planning and Design 30 (2003): 219-238.
- Litman, Alexander Todd. "Economic Value of Walkability." Research paper for Victoria Transport Policy Institute. 2011.

- Lynch, Kevin. Image of the city. Cambridge: Massachusetts Institute of Technology, 1960.
- Marans, Robert W. "Survey Research." Bechtel, Robert B, Robert W Marans and William Michelson. Methods in Environmental and Behavioral Research. New York: Van Nostrand Reinhold Company, 1987. 41-81.
- Mees, Paul and Jago Dodson. "Backtracking Auckland: Bureaucratic rationality and public preferences in transport planning." 2006. Griffith University. 2 August 2010  
<<[<http://www.griffith.edu.au/dspace/handle/10072/12666](http://www.griffith.edu.au/dspace/handle/10072/12666)>>.
- Mees, Paul and Jago Dodson. "The American Heresy: Half a Century of Transport Planning in Auckland." NZ Geographical Society/ Aust Inst of Geographers Conference. Dunedin: University of Otago, 2001. 170.
- Mehta, Vikas. "Walkable streets: pedestrian behavior, perceptions, and attitudes." Journal of Urbanism 1.3 (2008): 217-245.
- Miller, L Keith. Principles of Everyday Behavior Analysis. 4th. Victoria: The Thompson Corporation, 2006.
- Ministry of Transport, New Zealand. "How New Zealanders Travel: Trends in how New Zealanders travel." Jun 2009. 6 August 2011  
<<http://www.transport.govt.nz/research/Documents/How%20New%20Zealanders%20travel%20web.pdf>>.
- Ministry of Justice. "National Guidelines for Crime Prevention Through Environmental Design." National guidelines. Wellington: Ministry of Justice, November 2005.
- Mondschein, Andrew, Evelyn Blumenberg and Brian Taylor. "Accessibility and Cognition: The Effect of Transport Mode on Spatial Knowledge." Urban Studies 47.4 (2009): 845-866.
- Naess, Peter. "Accessibility, Activity participation and location of activities: Exploring the links between residential location and travel behavior." Journal of Urban Studies 43.3 (2006): 627-652.
- Nevid, Jeffrey S. Essentials of Psychology: Concepts and Applications. 3d Edition. California: Wadsworth, 2009.
- NZTA New Zealand Transport Agency. "The Pedestrian Planning and Design Guide." Wellington: New Zealand Transport Agency, October 2009.
- Pucher, John. "Rural mobility and mode choice: Evidence from the 2001 National Household Travel Survey." Journal of Transportation 32.2 (2005): 165-186.
- Ramsay, Anthony. "Planning urban networks for walking." Tolley, Rodney. The Greening of Urban Transport. Ed. Rodney Tolley. London: Belhaven Press, 1990. 159-171.



- Schlossberg, Marc, et al. "School Trips: Effects of Urban Form and Distance on Travel Mode." American Planning Association: Journal of the American Planning Association 72.3 (2006): 337.
- Snellen, Danielle, Borgers Aloys and Harry Timmermans. "Urban form, road network type, and mode choice for frequently conducted activities: a Multilevel Analysis using Quasi-experimental design data." Journal of Environment and Planning A 34.7 (2002): 1207-1220.
- Soltani, Ali, et al. "Design For Movement: Linking Non-work Travel and Activity Level to Local Urban Design Dimensions." Urban Design International 11.3-4 (2006): 173-186.
- Southworth, Michael. "Designing the Walkable city." Journal of transportation engineering 131.4 (2005): 246-257.
- Statistics New Zealand. "Commuting Patterns in New Zealand: 1996–2006. Main means of travel to work." October 1998. Statistics New Zealand. 11 August 2010  
<[http://www.stats.govt.nz/browse\\_for\\_stats/people\\_and\\_communities/geographic-areas/commuting-patterns-in-nz-1996-2006/car-bus-bike-or-train.aspx](http://www.stats.govt.nz/browse_for_stats/people_and_communities/geographic-areas/commuting-patterns-in-nz-1996-2006/car-bus-bike-or-train.aspx)>.
- Taylor, Jonathan G, Ervin H Zube and James L Sell. "Landscape Assessment and Perception Research Methods." Bechtel, Robert B, Robert W Marans and William Michelson. Methods in Environmental and Behavioral Research. New York: Van Nostrand Reinhold Company, 1987. 361-393.
- Thill, Jean-Claude and Marim Kim. "Trp making, induced travel demand, and accessibility." Journal of Geographical Systems 7.2 (2005): 229-248.
- VUW, Victoria University Wellington,. Student Life All Shiny and New. 2009. 28 December 2011  
<<http://www.tepunivillage.co.nz/news/11/student-life-all-shiny-and-new.aspx>>.
- WCC Wellington City Council. "District Plan." Te Ara Haukawaakawaka Design Guide. Wellington.
- WCC Wellington City Council. "Walking Times from CBD using Footpath Network." 2008.
- WCC Wellington City Council. "Wellington Walking Policy." Local Government Policy. Wellington: Wellington City Council, November 2008.
- WCC. "Wellington Walking Policy." Local Government Policy. Wellington: Wellington City Council, November 2008.
- Weiten, Wayne. Psychology: Themes and variations. 7th Edition. California: Thomson Wadsworth, 2007.

- Zacharias, John. "Pedestrian Behavior and Perception in Urban Walking Enviornments." Journal of Planning Literature 16.1 (2001): 3-18.

## List of Figures

Figure 1: NLTF spending on walking and cycling since 2002 (NZTA 49) .....	8
Figure 2: (GWRC Short trip active mode research 12).....	9
Figure 3: Pedestrian catchments (WCC Walking Times Using Footpath Network)10	
Figure 4: Example of a Reinforcer (Weiten 226) .....	16
Figure 5: Map summarising how the design of the built environment affects travel behaviour.....	23
Figure 6: Hierarchy of Walking Needs (Alfonzo 825).....	30
Figure 7: New Framework for Pedestrian Accessibility .....	34
Figure 8: How Southworth, Alfonzo, and Metah's, walking models are distributed in the new framework for pedestrian <i>accessibility</i> in Figure 7.....	35
Figure 9: Summarised Table of Southworth, Alfonzo, and Metah's, walking Models. .....	35
Figure 10: Representational diagram showing the scope of various pedestrian design theory and guidelines in Central Wellington. ....	36
Figure 11: Benefits and Weaknesses of Taylor, Zube, and Sell's, four paradigms for perception research. ....	45
Figure 12: The four Research Paradigms ordered into 'bottom up' and 'top down' approaches.....	46
Figure 13: Initial 'Hypothesis Pedestrian Design Strategy' .....	50
Figure 14: (Access typology) example .....	56
Figure 15: (Land use typology) example .....	57
Figure 16: Two scenarios of a 'residential passageway' typology .....	58
Figure 17: Run down or Character? Some <i>accessibility</i> spatial qualities are conflicting.....	59
Figure 18: Map showing the outer residential catchments surrounding the CBD (not to scale).....	68
Figure 19: Map showing the main ' <i>accessibility</i> barriers hot spot' after overlapping all the respondents survey data.....	70
Figure 20: Sample of mapping analysis searching for patterns between respondents' perceptions of <i>accessibility</i> barriers, and the typologies present within site.....	72
Figure 21: Some different ways in which 'eyes on the street' can be obstructed for a 'urban residential street' typology .....	74
Figure 22: Diagram showing a person engaging with typologies on the adjacent footpath .....	77
Figure 23: Adshel's standardised bus shelter design .....	83
Figure 24: Typologies within barrier 'hot spot' site.....	84
Figure 25: Mapping the pedestrian <i>accessibility</i> barriers vs. typologies - for the Salamanca Rd barrier 'hot spot' .....	85
Figure 26: Land use typology and associated <i>accessibility</i> barriers identified on site .....	88
Figure 27: Standardised typological canopy shelter solution for the 'urban residential St' typology. ....	89
Figure 28: Standardised typological canopy solution for 'bank wall' typology .....	90
Figure 29: Before and after - canopy typological solution for 'Urban residential st' typology.....	91
Figure 30: land use typology and associated <i>accessibility</i> barriers identified on site .....	93
Figure 31: Standardised typological shelter solution.....	94
Figure 32: Standardised (CPTED) typological solution for the junction where a side path meets the footpath .....	95
Figure 33: Before and after - canopy typological solution for 'vegetation' typology .....	96
Figure 34: Diagram showing two different options for introducing shelter along a street.....	99

Figure 35: Diagram showing the site qualities of a node area that was observed to have strong public space potential .....	101
Figure 36: Qualities of the car park site that mediates between the University and Salamanca Rd .....	103
Figure 37: Areas of place-making potential within the Salamanca Rd site .....	109
Figure 38: Material palette within the Salamanca Rd site .....	110
Figure 39: Design response - 'Lack of shelter from weather' .....	111
Figure 40: Before -> After .....	112
Figure 41: Before -> After .....	114
Figure 42: Before -> After .....	116
Figure 43: Before -> After .....	118
Figure 44: Site boundaries for 'Design Experiments' 2, 3, & 4.....	123
Figure 45: Design experiment site boundaries.....	123
Figure 46: Overlay map of place making potential as perceived by the respondents .....	125
Figure 47: Overlay map of all accessibility barriers as perceived by the respondents.....	125
Figure 48: Map of <i>accessibility</i> barrier hot spots .....	126
Figure 49: Place-making qualities on Waiteata rd .....	127
Figure 50: Map of areas of place making potential .....	127
Figure 51: (Macro scale analysis) - Major pedestrian routes through site and beyond.....	129
Figure 53: Neglected connection to CBD - Vivian St.....	130
Figure 52: (Macro scale analysis) - Hierarchy of pedestrian volumes.....	130
Figure 54: (Macro scale analysis) - Public space and green space .....	131
Figure 55: (Macro scale analysis) - Two key nodes in the pedestrian network ....	132
Figure 56: NODE 1 - Place-making qualities.....	133
Figure 57: NODE 2 Place-making qualities.....	134
Figure 58: Sample artist impression of new public space.....	134

Figure 59: The barrier 'hot spots' and areas of place-making potential, as identified from the macro and micro scale analysis .....	135
Figure 60: Hierarchical framework for implementing pedestrian infrastructure. Cross referencing – Site conditions / Cost / and Urgency.....	137
Figure 61: Barrier Zone 'A' <i>accessibility</i> barriers and consideration – Eastern end .....	139
Figure 62: Barrier Zone (A) – Eastern end New - design proposal.....	140
Figure 63: Barrier Zone (A) Western end - Minor <i>accessibility</i> barriers and considerations .....	141
Figure 64: Barrier Zone (A) Western end – Major barriers and considerations...	142
Figure 65: Place-making area (3) <i>accessibility</i> barrier considerations .....	144
Figure 66: Barrier Zone (A) – Western end - Proposed solution .....	145
Figure 67: Artist impressions before -> afters.....	146
Figure 68: Barrier Zone (B) - Minor & Major <i>accessibility</i> barriers and considerations .....	149
Figure 69: Barrier zone (B) Retrofit to existing stair treads .....	150
Figure 70: Barrier zone (B) - Standardised typological lighting and shelter improvements.....	151
Figure 71: Barrier Zone (C) - minor <i>accessibility</i> barriers and considerations.....	152
Figure 72: Barrier zone (D) - Lighting strategy Before -> After .....	154
Figure 73: Barrier Zone (D) & (E) <i>accessibility</i> barriers and proposed solution...	155
Figure 74: 'Thoroughfare bush typology' CPTED lighting design guidelines .....	156
Figure 75: 'Thoroughfare bush typology' CPTED spatial design guidelines .....	157
Figure 76: Barrier Zone (E) - Existing hidden path up to the University - Before -> After .....	158
Figure 77: 'Place-making area (6) - Place-making qualities.....	160
Figure 78: Place-making qualities of site .....	160
Figure 79: Barrier Zone (F) - <i>accessibility</i> barriers and additional considerations .....	162
Figure 80: View point '3' artist impression of standardised typological canopy..	163
Figure 82: Barrier zone (F) - Proposed shelter intervention.....	163
Figure 81: View point '2' artist impression of vegetation canopy .....	163

<b>A</b> = Typological study	
- <i>Access types</i>	194
- Hybrid ( <i>Access</i> and <i>Land use</i> ) types	205
- <i>Land use types</i>	210
<b>B</b> = Cognitive survey pilot test	219
<b>C</b> = Cognitive survey 1 questionnaire	220
<b>D</b> = Wellington road hierarchy (obtained from Wellington City Council 2012)	224
<b>E</b> = Table review of pedestrian design practise in Central Wellington	226
<b>F</b> = Cognitive survey 2 questioner	230
<b>G</b> = Pedestrian count data (obtained from Wellington City Council 2008)	233

## Appendix (A): Typological study

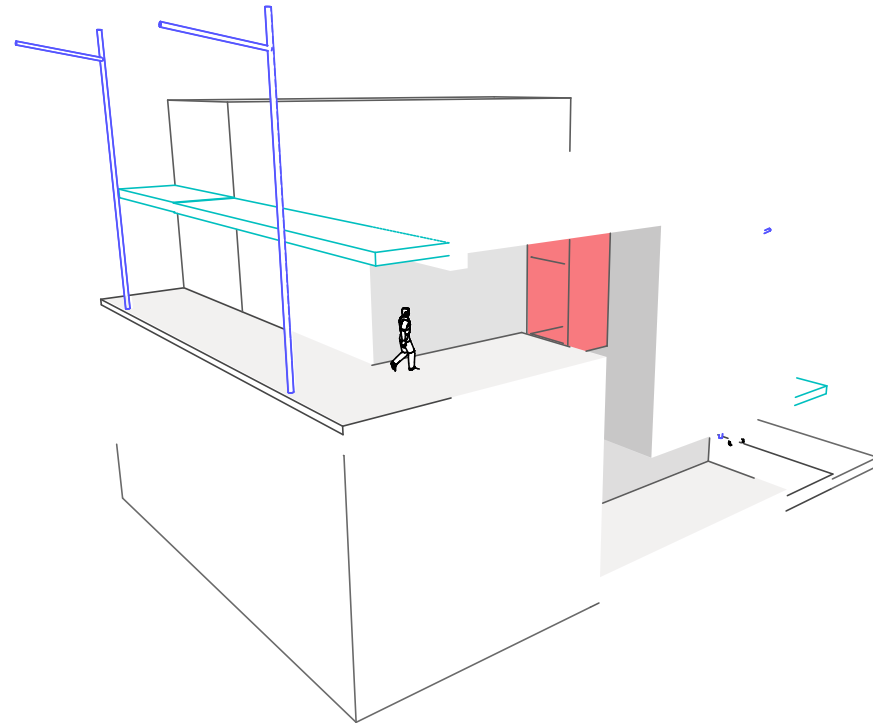
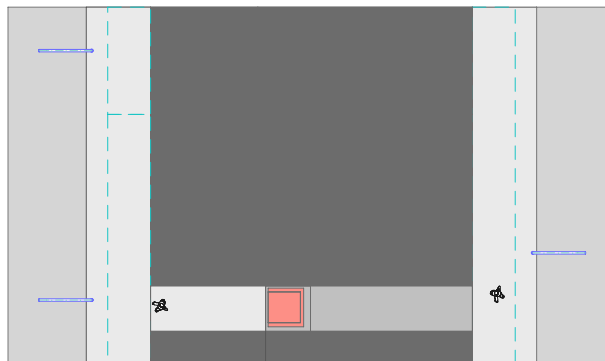
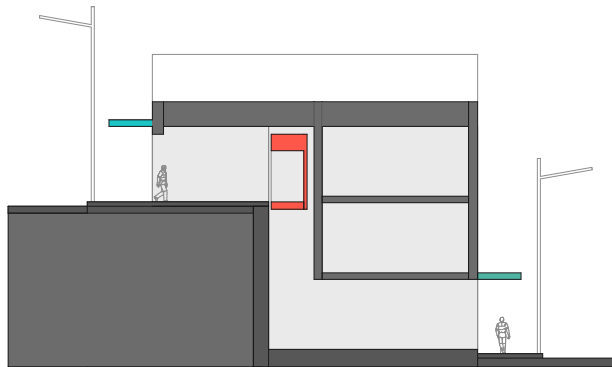
*(Access typologies)*



## Thoroughfare - Internal

### Description

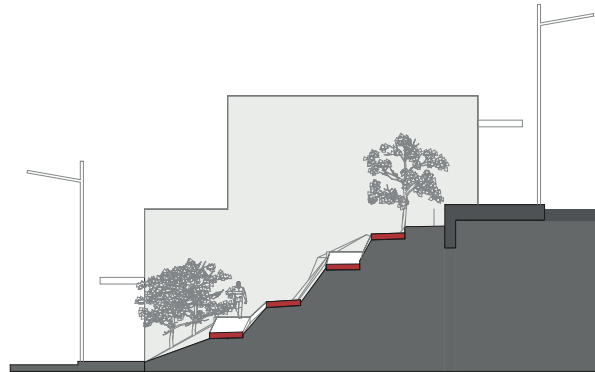
- A pedestrian thoroughfare that is achieved by passing through a privately owned building. Whereby linking together other access routes on the grid.



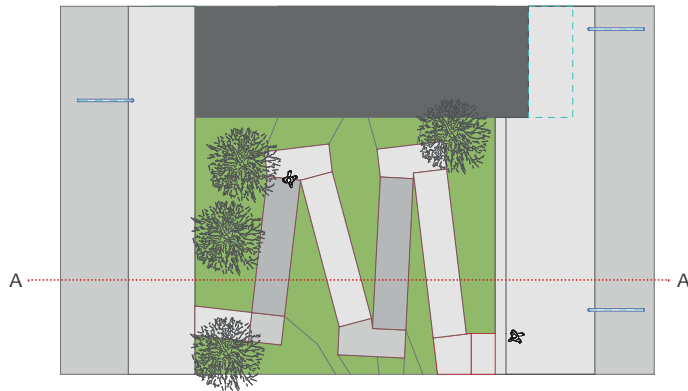
## Path - Terrace

### Description

- A pedestrian only pathway that is achieved by transitioning between two different street levels. Generally the route calves through uneven terrain, and is a minor route between the larger street grid.



Section AA



Plan

### Safety (CPTED)

**- Social safety**  
Relies on the path providing visibility or access to residential houses. Passive surveillance is much more likely in this case than if the path acts as a thoroughfare only.

**- Evening Lighting**  
There is often insufficient lighting that creates safety barriers to users in the evening. Additional footpath lighting other than from the main street is essential.

**- Spatial design**  
It is important to ensure there are clear sight lines between exit and entry points, and also that users are not hidden from view from the main street. However, this can become an issue if large vegetation is prominent, or bends along the path create poor sight lines.

### Proximity & legibility

**- Route continuity**  
Path quality and steepness often become a barrier to less mobile people. Also safety factors in the evening can become barriers to public users.

**- Route Proximity**  
A range of CPTED issues (see safety category) can make these paths unusable during the evening.

**- Legibility**  
Routes must be sign posted at street level and be featured on maps in order to inform users of where the path leads to. This is important when exit/entry points along the path are not visible.

### Connectivity (Macro)

**- Characteristics of the land use pattern**  
N/A

**- Treatment of significant pedestrian barriers**  
It allows pedestrians access through steep sights that have large height differences between streets at either end.

**- Connectedness between paths within the network**  
The paths increase connectivity by adding fineness to the street network. Particularly when multiple paths link together between buildings and houses to create a fine network of paths.

### Path quality & comfort

**- Footpath quality**  
The steepness of the path and stairs creates a barriers for less mobile users.

**- Comfort**  
Routes are removed from the noise of a vehicle heavy street.

**- Shelter from weather**  
Dependant on tall vegetation and closeness of buildings.

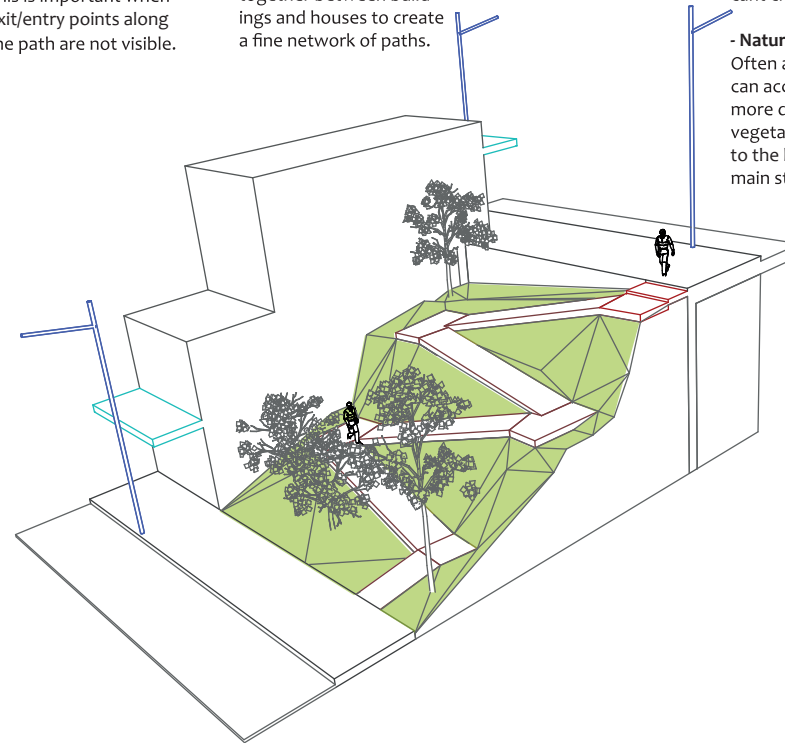
### Interest

**- Engagement with surrounding context**  
The path provides a much greater connection with the sites typography than the main street.

**- Social interest**  
Pedestrian volumes are dependant on the paths location within the pedestrian network at a larger scale

**- Built interest**  
The path offers an interesting shift in space scale to that of the main street network. Also, some paths may have a significant character presence.

**- Natural scenery**  
Often areas off the path can accommodate a more diverse range of vegetation compared to the large trees on the main street.



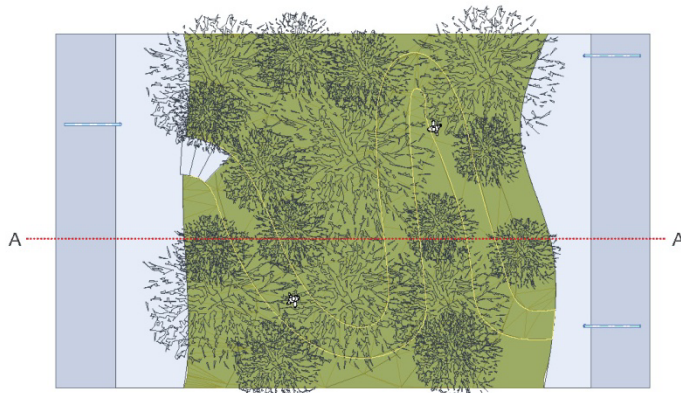
# Thoroughfare-Bush

## Description

A pedestrian only typically dirt/earth track that pass through areas of dense vegetation and trees.



Section AA



Plan

## Proximity & legibility

**- Route continuity**  
The path can become barrier particularly to less mobile users due to:  
The uneven track surface;  
A number of safety factors after hours;  
During sufficiently wet weather particularly as dirt paths become slippery.

**- Route Proximity**  
The path provides direct pedestrian access through dense vegetation areas where the main street cannot.

**- Legibility**  
Relies heavily on being locatable on a public map, as well as being signposted to inform the public where the path leads.

## Safety (CPTED)

**- Social safety**  
Generally after hours unless the path is part of a major pedestrian thoroughfare route, users become socially isolated.

**- Evening Lighting**  
Rarely lit making navigation of the path and visual awareness of others dim.

**- Spatial design**  
Dense foliage creates many hidden areas, and causes users to become hidden from view from the main street. Narrow paths widths and the number of path intersections offer limited escape options

## Path quality & comfort

**- Footpath quality**  
Dirt tracks have uneven surfaces, are often steep, and become slippery when wet.

**- Comfort**  
Can be pleasant due to the full presence of natural surroundings. However users can feel isolate from the surveillance of the main street.

**- Shelter from weather**  
Natural canopies offer shelter from the rain in places, and dense vegetation shields the wind.

## Connectivity (Macro)

**- Characteristics of the land use pattern:**

**- Density**  
NA

**- Building land use**  
NA

**- Treatment of significant barriers**  
Allows access through large vegetation areas such as the town belt, banks, gullies etc.

**- Linkages**  
The thoroughfare can connect the surrounding St network by providing access through the physical barrier of the dense vegetation.

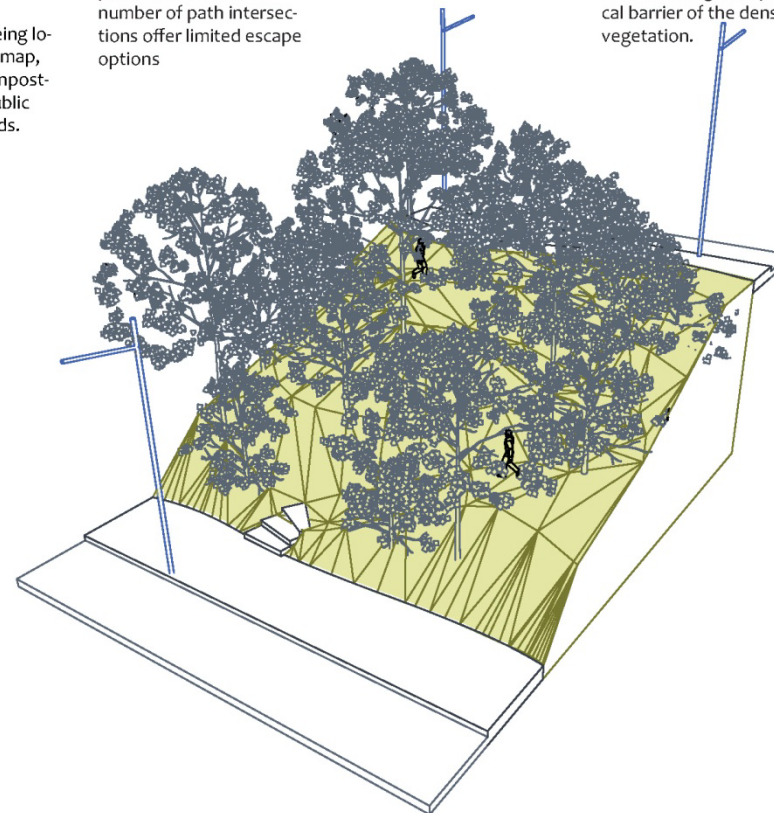
## Interest

**- Engagement with surrounding context**  
Very high physical engagement with the natural surroundings. However the density of vegetation can reduce visual connectedness with the greater surroundings.

**- Social interest**  
Low, as interaction only occurs with other thoroughfare uses. Also frequency of use will depend on whether the path forms part of a key pedestrian thoroughfare.

**- Built interest**  
Only in the case of views through the vegetation. No buildings/structures are present.

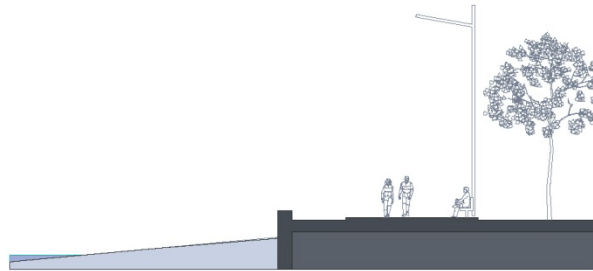
**- Natural scenery**  
High as users are completely immersed in the natural vegetation surroundings.



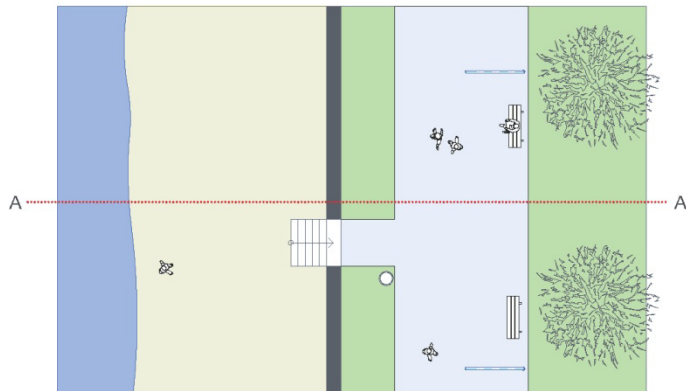
# Promenade

## Description

A public pedestrian walkway typically running along a waterfront harbour, coastal, lake, or river's edge. The path offers high engagement with the natural surroundings.



Section AA



Plan

## Safety (CPTED)

### - Social safety

The presence of people can vary dramatically under poor weather conditions if the promenade is a destination for leisure activity. On the other hand when the path becomes disconnected from the main street or a major pedestrian thoroughfare, users can become isolated after hours.

### - Evening Lighting

Can become a barrier on less used parts of the promenade or parts where the path is separated from the main pedestrian thoroughfare; as lighting is less prominent.

### - Spatial design

Landscaping features and changes in typography can cause users to become hidden from view from the main st

## Proximity & legibility

### - Path Continuity

Its use is subject to weather extremes as the path is completely exposed. But also whether it is a key commuting corridor or leisure spot within the greater pedestrian network; as after hours safety relies on the presence of other promenade users.

### - Route Proximity

Promenades may provide an indirect longer route for the user. Thus the scenic interest qualities of a promenade present a trade off to the user against a more direct non-scenic inner city route.

### - Legibility

Dependant on the visibility of the promenade from nearby areas of the street network. And also good street signage including materiality definition to indicate to users how to get to the promenade.

## Path quality & comfort

### - Footpath quality

Narrow path widths can become hazardous during high use when cyclists, runners, and walkers all shear the footpath.

### - Comfort

Can be unpleasant under overcrowding when the path width is narrow and the space is shared with cyclists, skate boarders, and runners.

### - Shelter from weather

None due to the absence of building canopies.

### - Noise and air quality

The promenade is most successful when the footpath well separated from fast moving and heavy vehicular traffic.

## Connectivity (Macro)

### - Characteristics of the land use pattern

- Density  
NA

- Land use  
NA

### - Linkages

If a promenade has potential to become a commuting corridor that draws from, carries, and feeds pedestrians into other areas of the city. It is important that the promenade establishes good linkages by providing multiple access points to key destinations, town centres or other pedestrian transport corridors.

## Interest

### - Engagement with surrounding context

Very high as users have free reign, especially where path access allows freedom to roam and physically interact with the waters edge.

### - Social interest

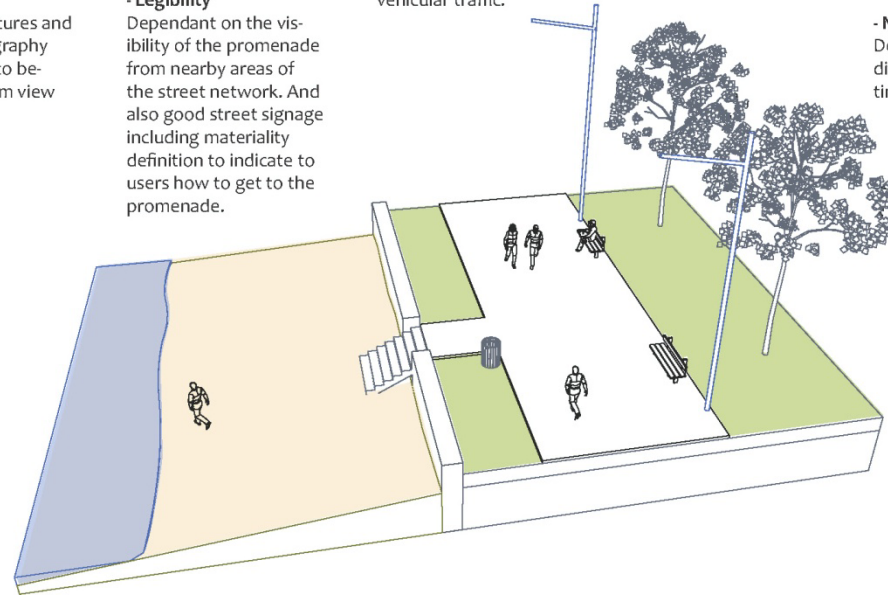
High, under the presence of leisure activities, particularly if the pathway width promotes a variety of informal activity and sitting to take place.

### - Built interest

Subject to the design of the promenade, presence of sculpture, landscaping, and surrounding architectural features of buildings.

### - Natural scenery

Dependant on views and diversity of the path setting.

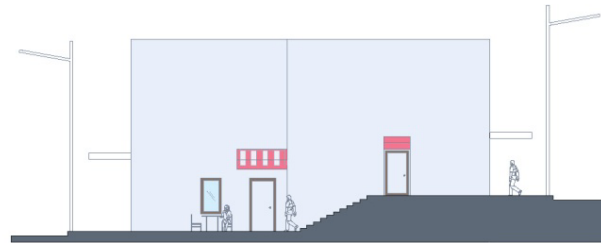




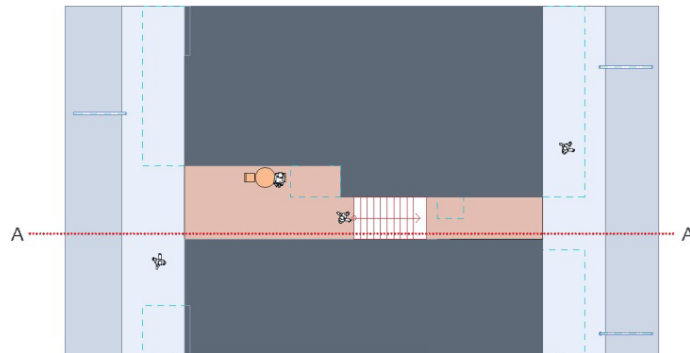
# Laneway - Urban

## Description

- A secondary pedestrian pathway that passes narrowly between two building structures. Characterised by having building/store entrances that open out onto the lane way.



Section AA



Plan

## Path quality & comfort

- **Footpath quality**  
NA

- **Comfort**  
Pleasant walking environment due to the space being more personal than the main street particularly due to the absence of vehicles.

- **Shelter from weather**  
No canopies provide shelter from the rain, however some shelter is offered from the buildings either side of the lane which are closer together.

## Safety (CPTED)

- **Social safety**  
If the surrounding buildings are not mixed use, as in the case with retail only tenants, laneways will lose the presence of social safety after hours.

- **Evening Lighting**  
Lighting is present however the extent can depend on secondary light received from stores.

- **Spatial design**  
After hours, undulations in storefront walls and diversions along the path can create hidden areas.

## Connectivity (Macro)

- **Characteristics of the and use pattern**  
- **Building land use**  
NA

- **Density**  
NA

- **Treatment of significant barriers**  
Reduces block sizes.

- **Connectedness between paths within the network**  
Networks of laneways improve connectivity by offer permeability through the building fabric.

## Proximity & legibility

- **Route continuity**  
In the absence of mixed use, laneways can become safety barriers to the public when ground floor shops close. As no residential surveillance will be present.

- **Route Proximity**  
Offers a finer route to that of the larger street network. Thus can create shorter routes.

- **Legibility**  
When visibility between each end is not possible. Laneways must be sign posted to tell users where the path leads.

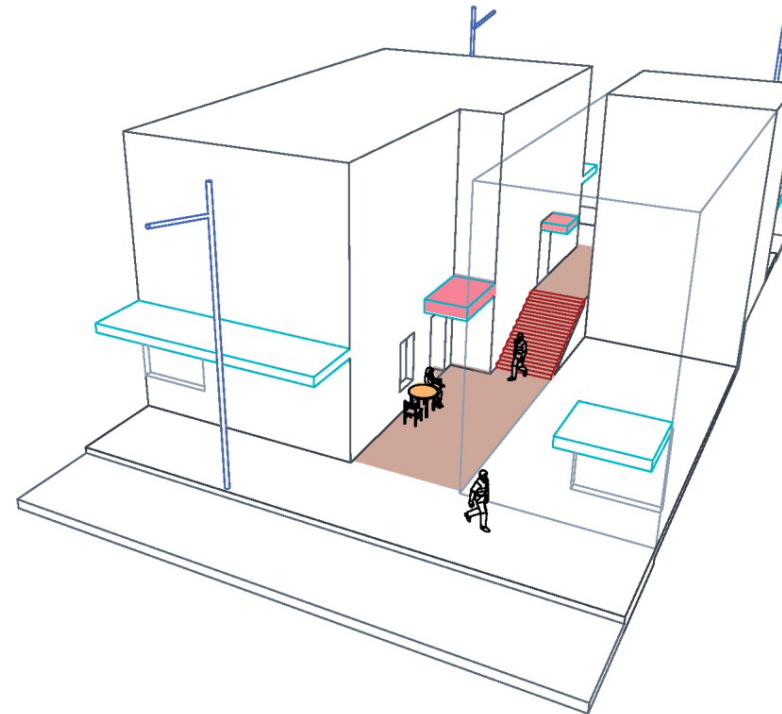
## Interest

- **Engagement with surrounding context**  
The absence of vehicles areas physically allows the users freedom to navigate the path.

- **Social interest**  
Dependant on: the frequency of shop entrances, the transparency of shop walls promoting interaction with building tenants. Whether shop activity spills out into the laneway.

- **Built interest**  
Interest is offered due to laneways differing spatially in intimacy, and often in the variety of building tenants, compared to the main street.

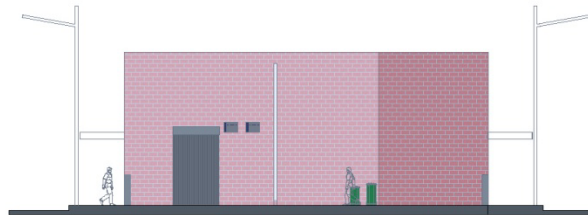
- **Natural scenery**  
In the most part is subject to landscaping and planted vegetation.



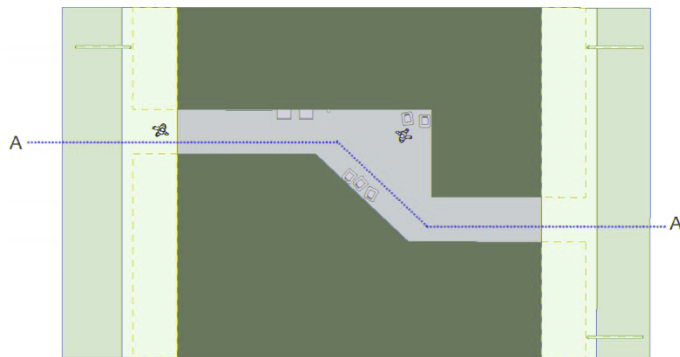
# Alleyway - Urban

## Description

A narrow path passing between or around the back or sides of buildings. There are no building entrances fronting the alleyway, however the occasional back entrance might be evident.



Section AA



Plan

## Path quality & comfort

### - Footpath quality

Less maintained than the main street. Thus can become hazardous if waste for example is poorly maintained.

### - Comfort

Spaces feel dirtier due to the presence of waste, mechanical services, and also poorly maintained building walls. Also spatially unpleasant due to the narrow space facing the less appealing edges of the surrounding buildings, with limited views offered into buildings.

### - Shelter from weather

No canopies present, however some shelter is offered from the building walls either side. This depends on the alleyway width and building height.

## Safety (CPTED)

### - Social safety

Is likely to be a barrier due to absence of active building frontages. However any social presence depends on the location of the alleyway as a well-used thoroughfare within the wider pedestrian network.

### - Evening Lighting

Low, generally insufficiently lit if responsibility resides with the building owner.

### - Spatial design

Bends along the path and impressions in the building walls can create secluded hidden alcoves. Also single entry and exit points offer limited escape routes.

## Connectivity (Macro)

### - Frequency

More opportunities in high density areas where building lots span the whole depth of the section, and the block figure ground is fine.

### - Linkages

Increases the permeability of the building fabric thus improving the connection and route variety between streets.

## Proximity & legibility

### - Route continuity

Safety conditions make urban alleyways less desirable to use, and subsequently less functional, during the evening.

### - Route Proximity

Allows direct movement between the buildings at a finer scale than the larger street network. However, this is lost after hours as alleyways are often closed off for CPTED reasons.

### - Legibility

Routes are locally known, not always located on a map, and infrequently sign posted.

## Interest

### - Engagement with surrounding context

Limited socially and physically due to the presence of blank walls offering no interaction with the building occupants, and typical narrowness of the alleyway.

### - Social interest

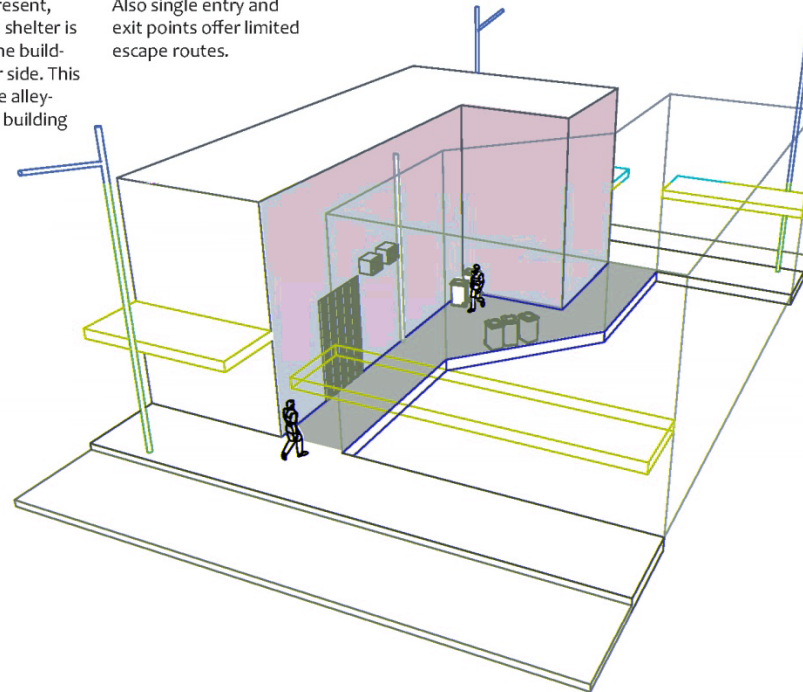
None due to absence of buildings, and therefore social activity, opening onto the alleyway.

### - Visual interest

Appeals to some user groups as is subject to architectural expression of the building façade and character. Street art through graffiti and materiality such as old aged brickwork may appeal to some user groups.

### - Natural scenery

Only views above to the sky.





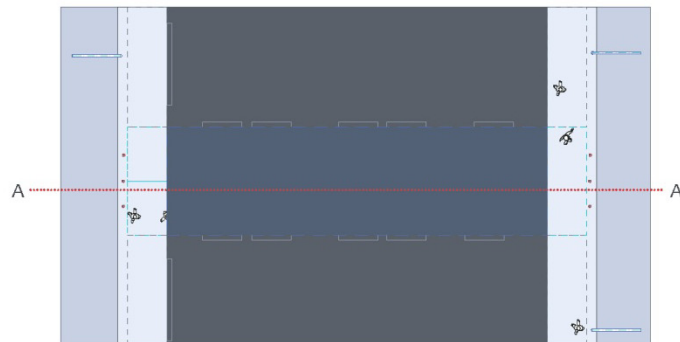
# Mall-Internal

## Description

An internal pedestrian street that permits thoroughfare and is typically lined with retail and hospitality tenants. Subject to strict opening hours.

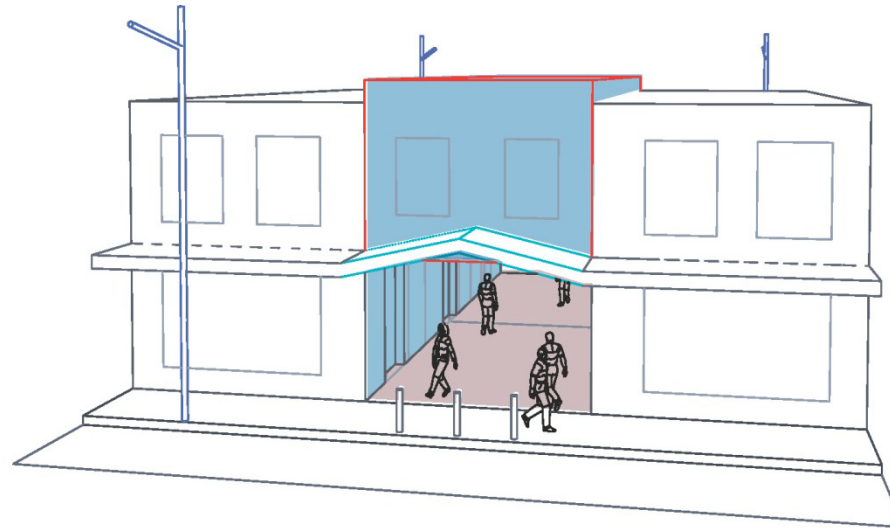


Section AA



Plan

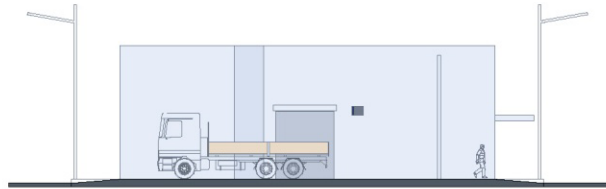
Path quality & comfort	Safety (CPTED)	Connectivity (Macro)	Proximity & legibility	Interest
<ul style="list-style-type: none"> <li>- <b>Footpath quality</b> Very high as the thoroughfare is internal. Also ramps and stairs etc, are more functional due to being subject to interior building standards.</li> <li>- <b>Shelter from weather</b> Complete shelter due to the mall being internal.</li> <li>- <b>Buffering from vehicles</b> User comfort is low when the parking lot is busy due to the lack of pedestrian right of way, and the danger / unpredictability of manoeuvring vehicles.</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Social safety</b> High during mall opening hours due to the presence of store workers and shoppers.</li> <li>- <b>Evening Lighting</b> Highly lit during opening hours.</li> <li>- <b>Spatial design</b> After hours, the building is completely closed off and cannot be used. Thus safety depends on the street alternatively used by the pedestrian.</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Characteristics of the land use pattern:</b> <ul style="list-style-type: none"> <li>- <b>Density</b> NA</li> </ul> </li> <li>- <b>Building land use</b> NA</li> <li>- <b>Treatment of significant barriers</b> Reduces block sizes, and offers a highly safe and sheltered route.</li> <li>- <b>Linkages</b> NA</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Route continuity</b> Access is subject to opening hours due to internal malls being governed by one larger tenancy.</li> <li>- <b>Route Proximity</b> Offers a finer route to that of the larger street network. Thus creates shorter routes.</li> <li>- <b>Legibility</b> If the path through the mall is complex or less obvious, it can be difficult to identifying that there is a thoroughfare route through the building.</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Engagement with surrounding context</b> The absence of external views and architectural sensitivity to the surrounding built form, lend internal malls to form their own context-less environment, with no engagement with the outside.</li> <li>- <b>Social interest</b> Varies with popularity of the retail/hospitality stores, and also with the ease of 'store user' to 'passer buy' interaction (which depends on transparency of store walls, and number of store entrances etc).</li> <li>- <b>Built interest</b> Depends on the architectural expression of the interior. Visual interest is high when store windows are largely glazed and displays are present.</li> <li>- <b>Natural scenery</b> Only in the form of planter boxes.</li> </ul>



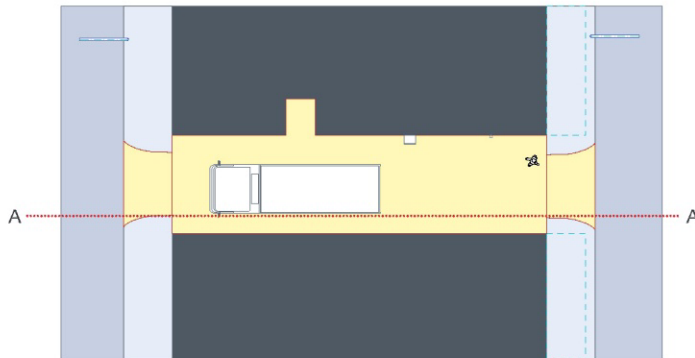
## Service Lane

### Description

- A lane, passing between buildings/sections within a street block, which provides vehicle access to the sides/back of buildings. Typically the space is used for unloading and loading goods onto vehicles.



Section AA



Plan

### Proximity & legibility

#### - Route continuity

Pedestrian barriers can be created through lack of comfort and visual interest due to poor maintenance and the presence of obstacles such as unloading vehicles and waste. And also due to multiple safety factors especially after hours.

#### - Perception of Proximity

NA

#### - Legibility

Relies heavily on being locatable on a public map, as well as being signposted to inform the public where the path leads.

### Safety (CPTED)

#### - Social safety

Low due to absence of people particularly after hours as little natural surveillance as offered due to buildings having no openings facing the service lane.

#### - Evening Lighting

Low, generally insufficiently lit if responsibility resides with the building owner.

#### - Spatial design

Obstacles along the path and impressions in building walls can create secluded alcoves. Also single entry and exit points offer limited escape routes.

### Path quality & comfort

#### - Footpath quality

Generally low due to poor maintenance and cleanliness as servicing residing with the building owner.

#### - Comfort

Low due to presence of waste, and mechanical services such as air conditioning units. Also there is a high vehicle priority due to absence of a footpath.

#### - Shelter from weather

No shelter given from verandas/canopies. However some shelter is possible depending on the surrounding building height and closeness to the pathway.

### Connectivity (Macro)

#### - Characteristics of the land use pattern:

- Density  
NA

- Building land use  
NA

#### - Treatment of significant barriers

Reduces bloc sizes

#### - Linkages

Increases the permeability of the building fabric thus improving the connections between streets allowing a shorter route to be achieved.

### Interest

#### - Engagement with surrounding context

Physically, the absence of defined pedestrian and vehicle areas allows freedom to navigate the space. However socially engagement is limited due to the absence of wall openings giving no connection to the internal activity of the surrounding buildings

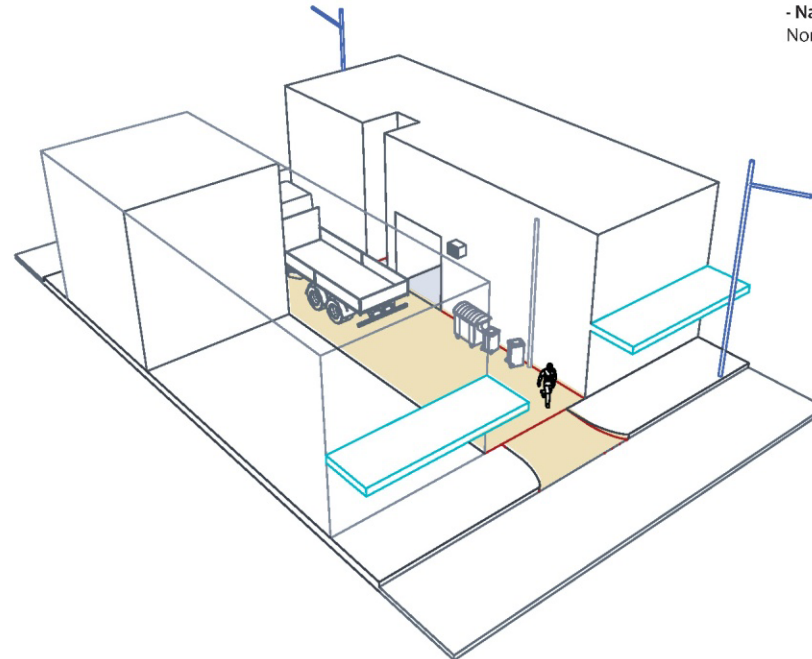
#### - Social interest

Only in the case of people unloading vehicles.

#### - Built interest

Little, however some building facades can be appealing such as significantly old and deteriorating brick work.

- Natural scenery  
None.



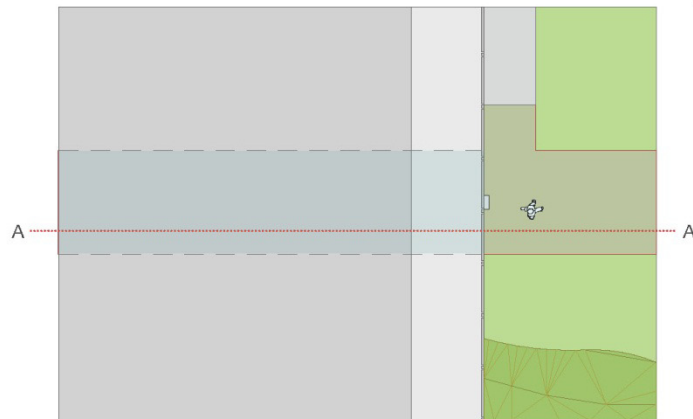
# Tunnel

## Description

- A completely enclosed pedestrian pathway that passes through or under a physical barrier such as a road or building.

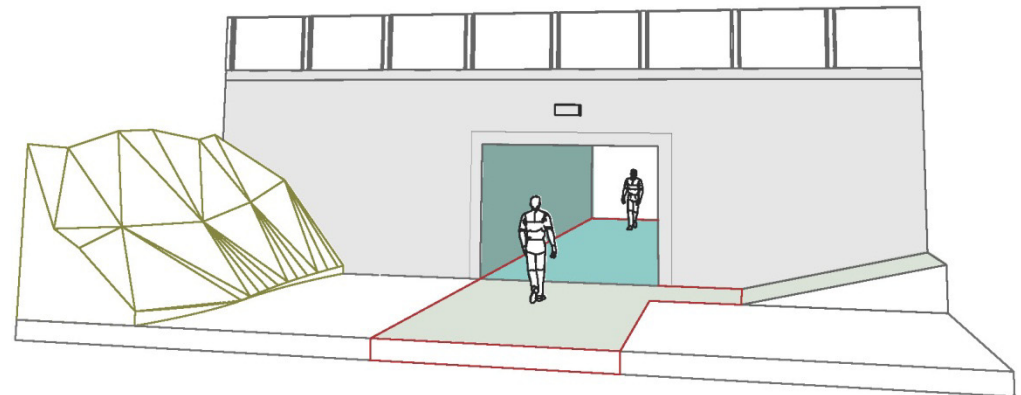


Section AA



Plan

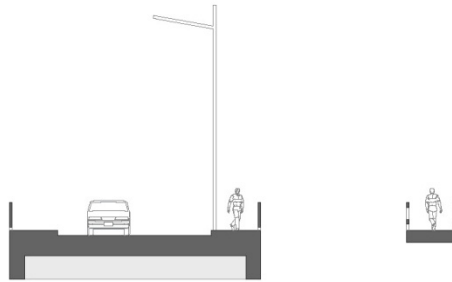
Proximity & legibility	Safety (CPTED)	Path quality & comfort	Connectivity (Macro)	Interest
<p><b>- Route continuity</b> Tunnels are claustrophobic spaces, and can become psychological barriers to users. This is particularly evident after hours, or where the path becomes isolated and has diverged from the main pedestrian route.</p> <p><b>- Proximity</b> Travel times can be reduced where tunnels pass under and avoid major roadways, or building. However conversely poorly located tunnels cause pedestrians to walk inconvenient longer routes</p> <p><b>- Legibility</b> Located on a map, however at street level signage is important especially where the tunnel veers off from the main pedestrian route.</p>	<p><b>- Social safety</b> Unless the tunnel forms part of a significant pedestrian route, the only people present are other tunnel users.</p> <p><b>- Evening Lighting</b> Generous lighting in the tunnel is essential for both walking safety and reducing psychological barriers.</p> <p><b>- Spatial design</b> The tunnel can be completely isolated if the path is hidden from the main street. I.e. if the tunnel level changes relative to the main street. Also single entry and exit points offer limited escape routes.</p>	<p><b>- Footpath quality</b> NA</p> <p><b>- Comfort</b> Quality and cleanliness, as well as lighting and 'tunnel width to length ratio', are important in improving the typically low comfort.</p> <p><b>- Shelter from weather</b> Completely sheltered.</p>	<p><b>- Characteristics of the land use pattern:</b></p> <p><b>- Density</b> NA</p> <p><b>- Building land use</b> NA</p> <p><b>- Treatment of significant barriers</b> Allows access under major roads, highways, hills, which in some cases form the connection between townships separated by these significant barriers.</p> <p><b>- Linkages</b> Continue path continuity by allowing physical access through major obstructions.</p>	<p><b>- Engagement with surrounding context</b> None as the tunnel avoids interaction with the surroundings.</p> <p><b>- Social interest</b> Only other tunnel users.</p> <p><b>- Built interest</b> Subject to the architecture and aesthetic of the tunnel walls.</p> <p><b>- Natural scenery</b> None.</p>



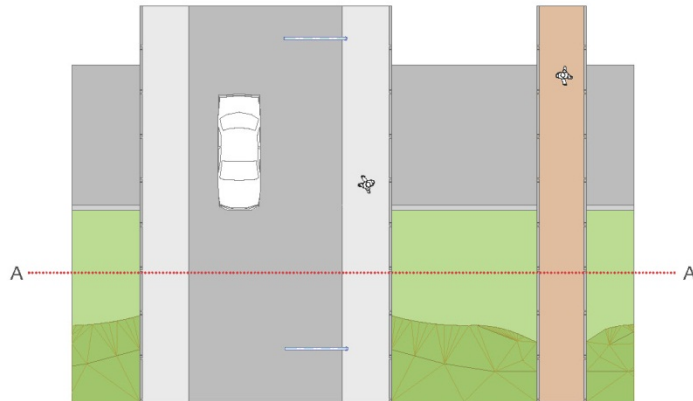
# Overbridge

## Description

A footpath that passes over a significant pedestrian barrier, i.e. motorway or deep valley, which is exposed due to the absence of buildings being located between the footpath and bridge edge.



Section AA



Plan

## Safety (CPTED)

### - Social safety

Unless the over bridge forms part of a significant pedestrian thoroughfare, no people or social activity are around due to the absence of buildings off the footpath. This is worse on pedestrian only bridges where there are no passing vehicles.

### - Evening Lighting

Can be totally absent when: the bridge is pedestrian only, if the path is infrequently used, or isolated from the main pedestrian thoroughfare.

### - Spatial design

Narrow path widths offer few escape points. Tall balustrades/ walls can cause users on elevated bridges to be hidden from view. Also undersides of bridges are places where people can linger.

## Proximity & legibility

### - Route continuity

Over bridges can become a barrier under extreme weather conditions as they are totally exposed.

### - Perception of Proximity

Pedestrian bridges over roads have to be raised high off ground level. This causes a problem when providing wheel chair access as consequently the ramp requirements create a much longer zigzagging route.

### - Legibility

Overbridges are noticeable from various places at street level due to their height.

## Path quality & comfort

### - Footpath quality

NA

### - Comfort

Path users are completely exposed. However noise is reduced along the elevated path.

### - Shelter from weather

None as the footpath has no covering or buildings either side.

## Connectivity (Macro)

### - Characteristics of the land use pattern:

#### - Density

NA

#### - Building land use

NA

### - Treatment of significant barriers

Allows access over major roads, highways, rivers, valley, which in some cases form the connection between townships separated by these significant barriers.

### - Linkages

Continue path continuity by allowing physical access through major obstructions.

## Interest

### - Engagement with surrounding context

Offers an elevated view-point of the surroundings environment.

### - Social interest

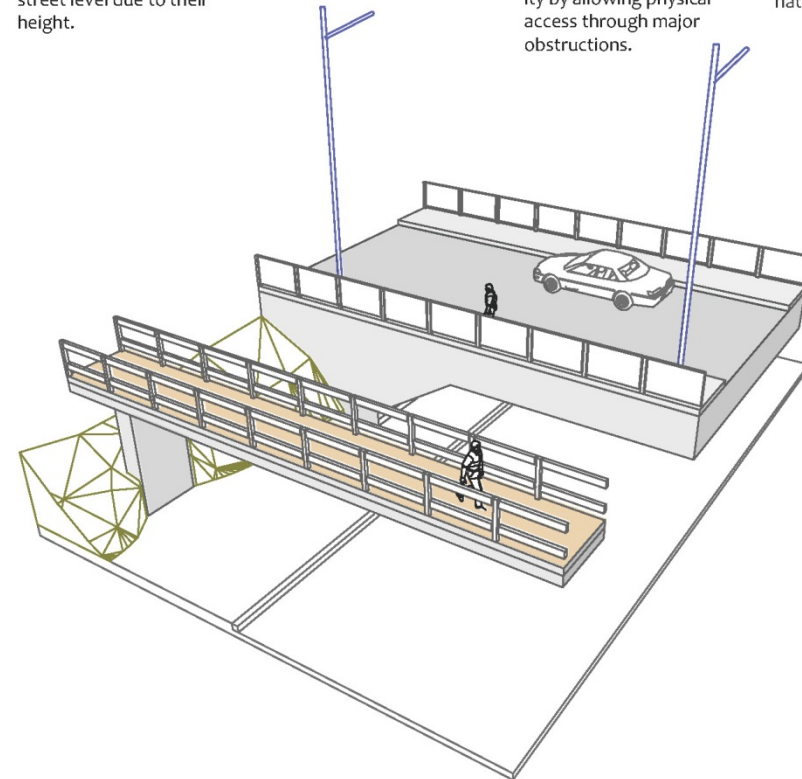
Little unless the path is frequently used, or offers unique views into/over areas of social activity.

### - Built interest

Subject to the design of the over bridge and surrounding buildings.

### - Natural scenery

Is dependent on whether views are offered to the natural surroundings.



### (Hybrid typologies)

These fit into the description of both *Access* and  
*Land use typologies*



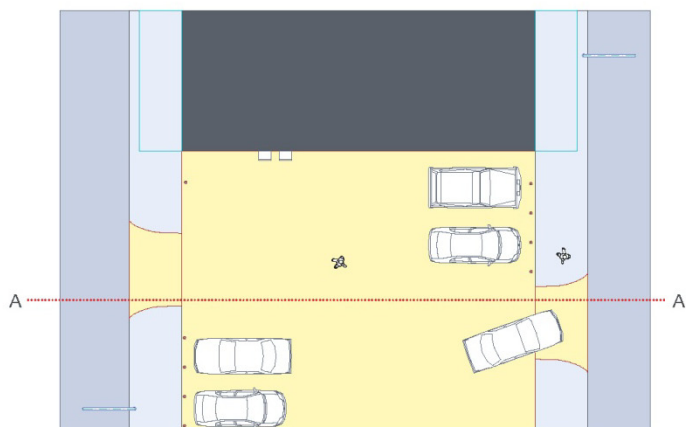
# Thoroughfare-Parkinglot

## Description

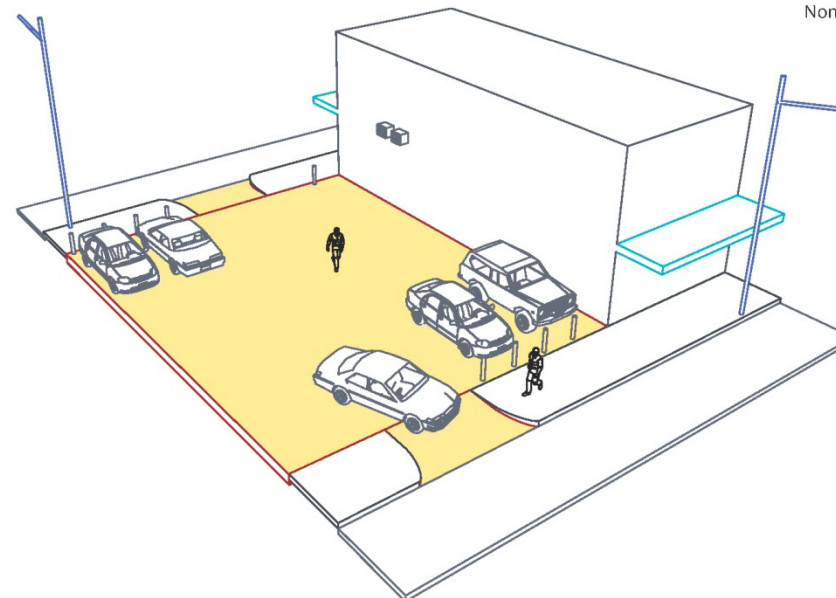
An outdoor thoroughfare that passes through an exposed parking lot, functioning specifically for vehicle use.



Section AA



Plan



Path quality & comfort	Safety (CPTED)	Connectivity (Macro)	Proximity & legibility	Interest
<p><b>- Footpath quality</b> Varies as maintenance is subject to the parking lot owner. However curbs and objects used to divide up parking slot can become obstacles that disrupt pedestrians.</p> <p><b>- Shelter from weather</b> There is no shelter for users along the footpath street edge where no verandas/canopies are present, as well as when passing directly across the exposed car parking lot.</p> <p><b>- Buffering from vehicles</b> User comfort is low when the parking lot is busy due to the lack of pedestrian right of way, and the danger / unpredictability of manoeuvring vehicles.</p>	<p><b>- Social safety</b> After hours the social presence may only be interaction with other car park users. Depending on the size of the car park, users can become isolated as they diverge away from the street.</p> <p><b>- Evening Lighting</b> Lighting varies greatly is subject to the parking lot owner.</p> <p><b>- Spatial design</b> During busy hours a hazardous environment for pedestrian users exists due to the absence of clear pedestrian routes. This forces users to navigate among manoeuvring vehicles.</p>	<p><b>- Characteristics of the land use pattern:</b></p> <ul style="list-style-type: none"> <li>- Density NA</li> <li>- Building land use NA</li> <li>- Treatment of significant barriers Reduces block sizes by allowing access between streets.</li> <li>- Linkages NA</li> </ul>	<p><b>- Route continuity</b> Lack of shelter can disrupt thoroughfare use under extreme weather conditions.</p> <p><b>- Route Proximity</b> A direct route can be achieved by navigating freely across the open lot. However this depending on the number of cars acting as obstacles.</p> <p><b>- Legibility</b> Access through the site is not always identifiable on a map, however at street level a short cut may be much more obvious.</p>	<p><b>- Engagement with surrounding context</b> Varies with types of users and business of the parking lot. For example engagement is higher at a supermarket compared to an empty lot, as when busy there is more frequent interaction with manoeuvring vehicles and shoppers loading and unloading.</p> <p><b>- Social interest</b> Interest in the form of other car park users, however the level depends on busyness of the car park.</p> <p><b>- Built interest</b> Interest through the variety of car types when the parking lot is occupied.</p> <p><b>- Natural scenery</b> None.</p>



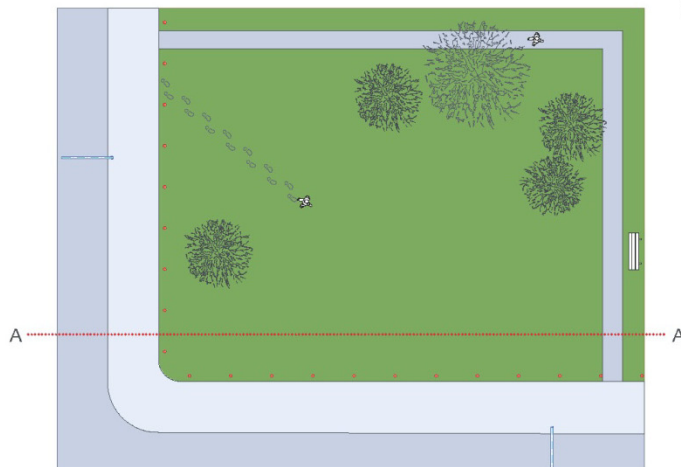
## Path-Field

### Description

- An outdoor space on publicly accessible land ranging from being an exposed field, to having sufficient landscaping, planting and trees. The route can vary from having no pathway, in which navigation is at the discretion of the user, to being completely controlled through landscaping.



Section AA



Plan

### Proximity & legibility

#### - Route continuity

Lack of shelter can limit usability under: Extreme weather conditions; especially where no path is present and fields become saturated for a period of time. And also because of safety concerns due to limit use after hours.

#### - Route proximity

Depending of the landscape and placement of footpaths, users can short cut through the site therefore instead of being refined to the street network.

#### - Legibility

Routes are located on a map. However the park/field can be heavily planted, and have a complex network of paths making it difficult to judge route distances, and where paths start and finish.

### Path quality & comfort

#### - Footpath quality

Is reduced significantly in the case of an open field where no path exists.

#### - Shelter from weather

Is dependant on whether the tenants have covered walkways throughout the site. This is only useful if the tenants are comfortable with members of the public using their facilities.

#### - Comfort

Users may feel out of place and uncomfortable if there is a degree of interaction with the land tenants.

#### - Noise/air quality

High due to separation from the road and users are emersed in the natural surroundings.

### Safety (CPTED)

#### - Social safety

Routes are located on a map. However the park/field can be heavily planted, and have a complex network of paths making it difficult to judge route distances, and where paths start and finish.

#### - Evening Lighting

Lighting is only on selected paths, and generally paths are insufficiently lit.

#### - Spatial design

Built landscaping features, and dense vegetation, and typography can create hidden and secluded areas.

### Connectivity (Macro)

#### - Characteristics of the land use pattern:

- Density  
NA

- Building land use  
NA

#### - Treatment of significant barriers

Allows movement between the street network.

#### - Connectedness between paths within the network

A significant feature to the pedestrian network can be created if connects between a series of park/field, within close proximity to each other, link together to form a network of parks.

### Interest

#### - Engagement with surrounding context

In large parks/fields users are given free reign to explore and interact within the setting.

#### - Social interest

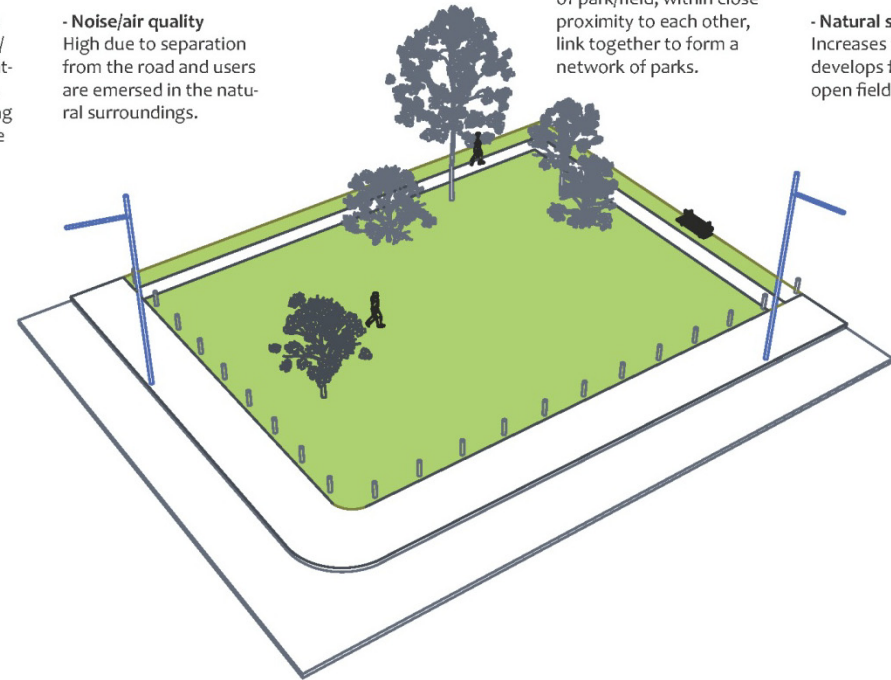
Is weather permitting, but can be very high if the setting is a popular leisure setting/sports fields, or a well used thoroughfare.

#### - Visual interest

Varies with the variety and amount of vegetation/landscaping as large fields can be mundane for some.

#### - Natural scenery

Increases when the space develops further than an open field.



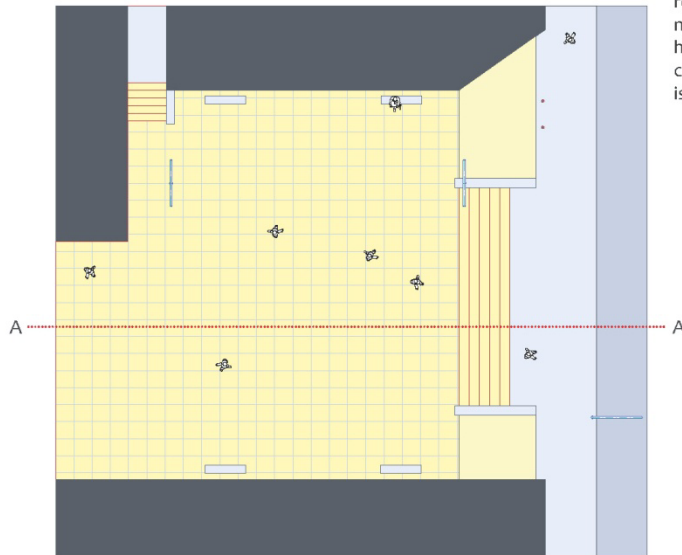
# Courtyard/Square

## Description

A large outdoor and informal pedestrian space that permits pedestrian thoroughfare. Typically it is of a paved surface and surrounded by perimeter buildings on most sides.



Section AA



Plan

## Safety (CPTED)

### - Social safety

Varies between daytime and nighttime, and with the level of attractiveness the square/courtyard has towards people as a destination. And also with the type of building uses of the surrounding buildings overlooking the site.

### - Evening Lighting

A barrier is created if a clear route is not lit through the square.

### - Spatial design

Design features and obstacles can create hidden areas, as well as few entry and exit points offer limited escape routes. Also, if the courtyard is located away from the main street, and surrounding buildings have no people present after hours, the courtyard can become completely isolated.

## Proximity & legibility

### - Route continuity

Can become a barrier under harsh weather conditions, as the pedestrian user is completely exposed.

### - Perception of Proximity

More direct routes can be achieved as space allow access through the building fabric.

### - Legibility

Are located on a public map, and often serve as a landmark or places of significance to the community.

## Path quality & comfort

### - Footpath quality

Is very wide and well paved.

### - Comfort

High, under desirable weather conditions, particularly being a pedestrian only space with the absence of vehicle dominance. Also less noise is present due to the location of the square/courtyard often being set back from the road.

### - Shelter from weather

No shelter is provided when passing across the square/courtyard.

## Connectivity (Macro)

### - Characteristics of the land use pattern:

- Density  
NA

- Building land use  
NA

- Treatment of significant barriers  
Reduces block sizes

### - Linkages

Being large paved urban informal spaces, squares/courtyard can connect and increase the diversity of spaces within the pedestrian network.

## Interest

### - Engagement with surrounding context

Physically high, as users are given free reign to navigate through and interact within the setting.

### - Social interest

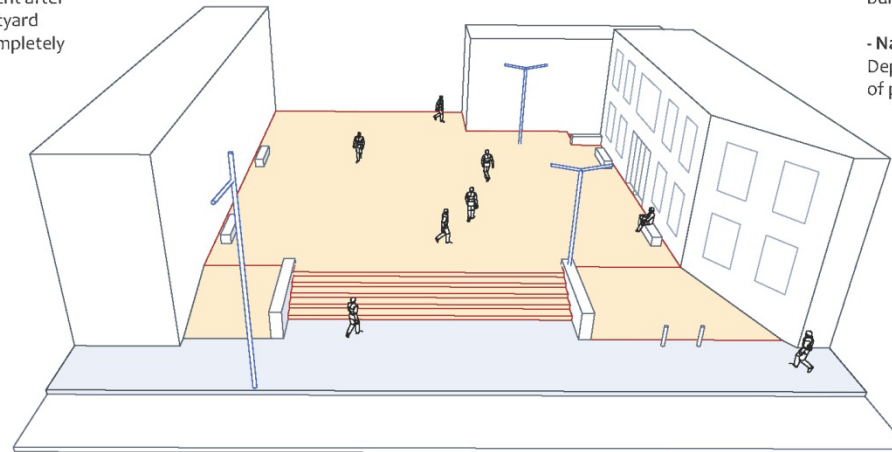
Is weather permitting, but can be very high if the setting is a popular leisure place, well used thoroughfare, or if activity from perimeter buildings interact with the square/courtyard. Also the informality of the space often permits street entertainment and culture and community activity.

### - Built interest

Varies with the variety of landscaping, art, architectural aesthetic of the surrounding perimeter buildings.

### - Natural scenery

Dependant on the degree of planting/landscaping.



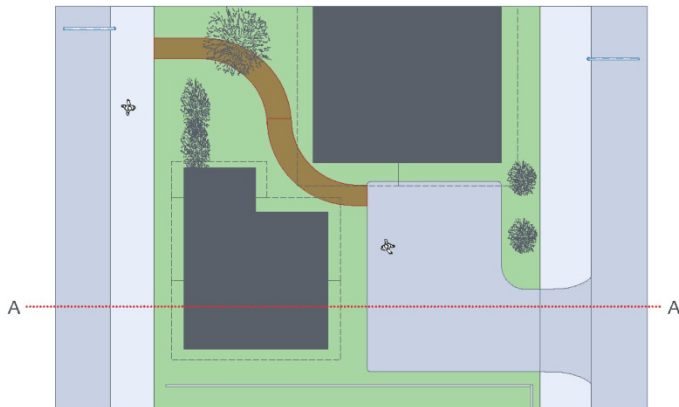
# Thoroughfare - Surrogate

## Description

- A thoroughfare that is created by passing through privately owned land such as a school or housing complex.



Section AA



Plan

## Proximity & legibility

**- Route continuity**  
Is reduced greatly in the evening due to the absence of people around; and also in some cases when the building or land is occupied by the tenants, such as a school where it is inappropriate to trespass during school hours.

**- Route proximity**  
Improves journey proximity by allowing direct thoroughfare between streets. Essentially adding fineness to the street network thus reducing block sizes.

**- Legibility**  
Routes are local and not located on a map or are signposted.

## Safety (CPTED)

**- Social safety**  
Is a barrier when the building or land tenants have closed for the day, as no people are around.

**- Evening Lighting**  
Lighting relies entirely on the private tenant.

**- Spatial design**  
If the thoroughfare user is required to navigate between and around buildings/obstacles, the spatial layout creates opportunities for alcoves. Thus the user can become hidden from the main street and thus during after hours the route becomes dangerous.

## Connectivity (Macro)

**- Characteristics of the land use pattern:**  
**- Density**  
NA

**- Building land use**  
NA

**- Treatment of significant barriers**  
Reduces block sizes.

**- Connectedness between paths within the network**  
Improve the linkages between streets in the footpath network.

## Path quality & comfort

**- Footpath quality**  
Quality relies on the private tenant.

**- Shelter from weather**  
Is dependant on whether the tenants have covered walkways throughout the site. This is only useful if the tenants are comfortable with members of the public using their facilities.

**- Comfort**  
Users may feel out of place and uncomfortable if there is a degree of interaction with the land tenants.

**- Noise/air quality**  
Improves as the user moves away from the road.

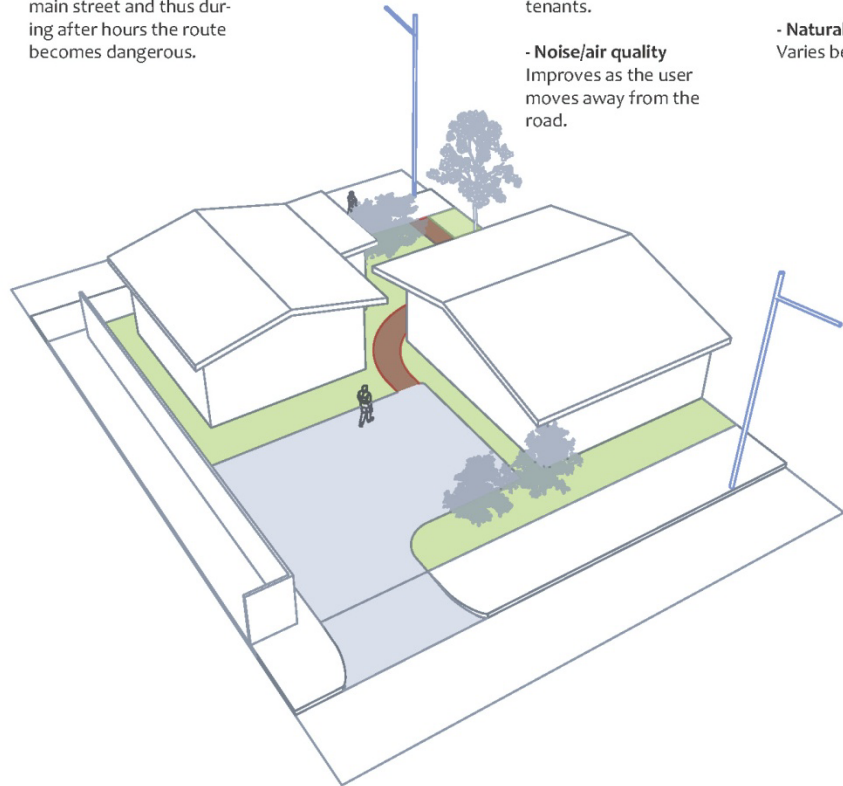
## Interest

**- Engagement with surrounding context**  
Engagement is limited if users is restricted to the edge of property to avoid interaction with building tenants. However after hours users can navigate freely through the site.

**- Social interest**  
None due to absence of social activity.

**- Visual interest**  
Depends whether the route through site allows interaction with the tenants.

**- Natural scenery**  
Varies between sites.



*(Land use typologies)*



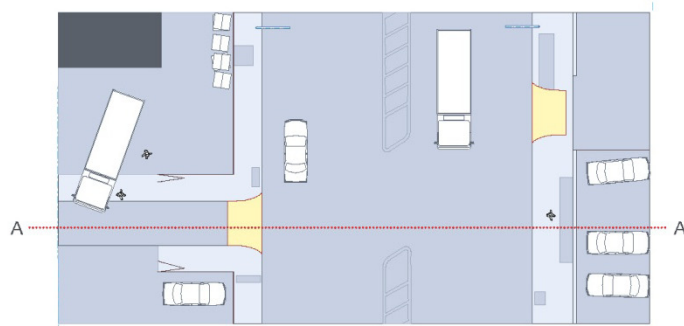
## Street - Heavy Industrial

### Description

A street permitting pedestrian and vehicle use, but is overtly vehicular orientated due to the high volume of industrial related activity such as courtering / storage of goods. Characterised by large sections and warehouse type buildings that hold mass storage of goods.



Section AA



Plan

### Proximity & legibility

**- Route continuity**  
After hours the street can become unused when the buildings are absent of evening activity, and road vehicles use is low. Also disruption in poor weather as there is no shelter.

**- Route proximity**  
The big scale of the large sections, roads, and typically warehouse buildings, are less appropriate for the pedestrian scale users. Psychologically this causes walking to feel slower.

**- Legibility**  
N/A

### Safety (CPTED)

**- Social safety**  
All activity is absent after hours in the surrounding buildings, thus social safety is only in the form of passing road users.

**- Evening Lighting**  
Only street lighting after hours.

**- Spatial design**  
The large lots, which are broken up by fences and building structures, create many secluded areas off the footpath edge at night. Also, the footpath is frequently interrupted by vehicle access ramps that are dangerous to pedestrians when vehicles exit and enter properties.

### Path quality & comfort

**- Path quality**  
Can be poor, the footpath is intermittently maintained causing the surface to be patchy and uneven. Also users are interrupted frequently by vehicle access ways.

**- Comfort**  
If the street is part of a significant arterial road, noise from trucks and heavy road use, as well as passing vehicle speed is unpleasant. Pedestrian comfort is also reduced due to the lack of amenities such as vegetation, rubbish bins, quality paving

**Shelter from weather**  
None as no canopies are present, and buildings are setback far from the footpath.

### Connectivity (Macro)

**- Characteristics of the land use pattern:**

**- Density**  
The land sections required for the industrial type land use is problematic as it creates less walkable environments. Large single use building and sections means there is fewer variety of land use taking place within a walkable area. This results in increased travel distances to alternative land uses.

**- Building land use**

**- Treatment of significant barriers**  
NA

**- Linkages**  
NA

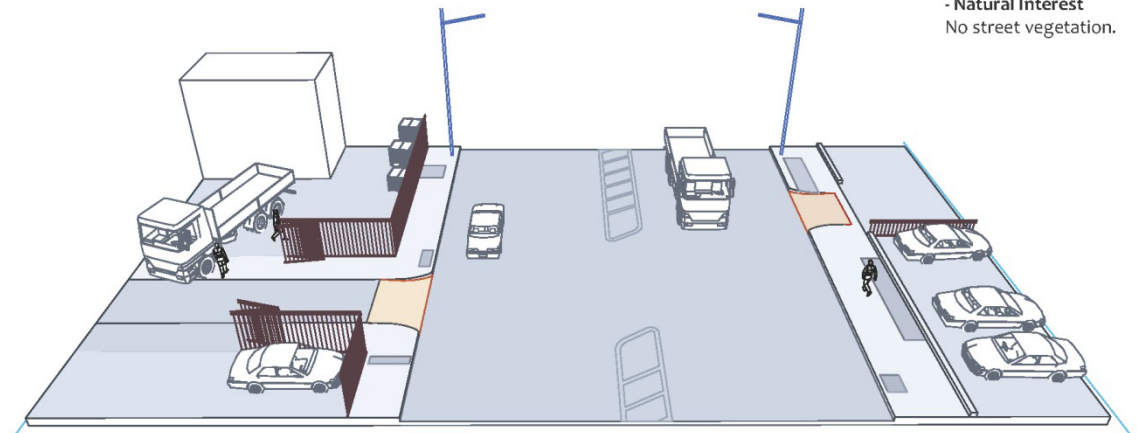
### Interest

**- Engagement with the surrounding context**  
Deep building set backs, parking lots separating the footpath and the building, and typically few building openings to the street, limit physical and social interaction with activities in the buildings.

**- Social interest**  
Relies on buildings having openings that are visible from the street exposing internal activity for example a workshop.

**- Built interest**  
Buildings often have large blank facades, which can be perceived as being dull or boring. However some interest could be offered if merchandise is stored at the front of the section.

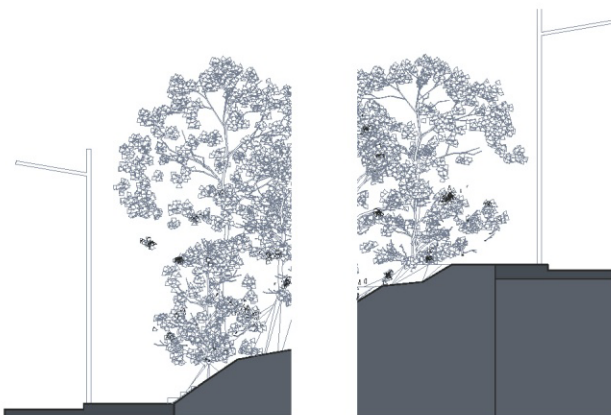
**- Natural Interest**  
No street vegetation.



## Vegetation-Bank/Gully

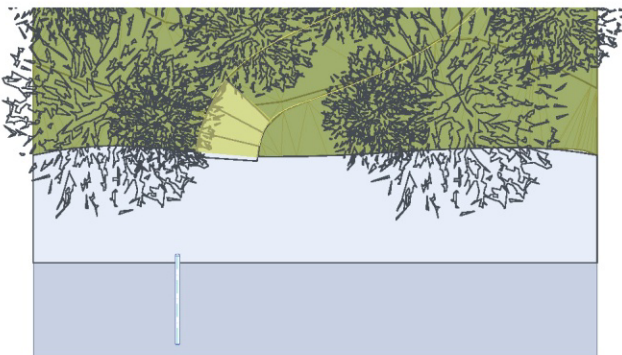
### Description

- Dense vegetation that runs adjacent to the footpath. It can be further distinguished by being on either a bank or gully.

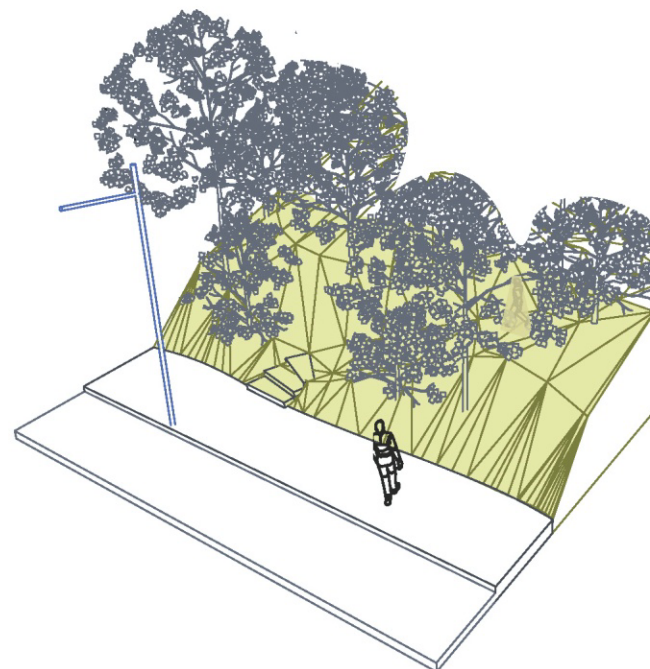


Section Bank

Section Gully



Plan



### Proximity & legibility

- **Route continuity**  
A range of CPTED problems can cause walking past vegetation in the nighttime to become a barrier.

- **Route Proximity**  
NA

- **Perception of Proximity**  
Some types of vegetation can cause a high level of interest and therefore can reduce the perception of distances.

- **Legibility**  
NA

### Safety (CPTED)

- **Social safety**  
NA

- **Evening Lighting**  
Large vegetation dramatically darkens the footpath which is dangerous for two reasons: The lack of visibility of the footpath surface in terms of pedestrians potentially tripping over; and also visibility into the vegetation where people could linger.

- **Spatial design**  
Dense foliage creates hidden areas off the footpath where people could linger.

### Path quality & comfort

- **Footpath quality**  
Poorly maintained vegetation can encroach onto the footpath which is problematic because it can: Reduce the width of the footpath; cause potential trip hazardous; fallen leaves can become slippery when wet.

- **Comfort**  
The presence of the vegetation contributes to a sensuously pleasing setting, and also improves air quality.

- **Shelter from weather**  
Large vegetation in the form of natural canopies can offer shelter from the rain in places, and dense vegetation shields the wind.

### Connectivity

- **Characteristics of the and use pattern**  
NA

- **Treatment of significant pedestrian barriers**  
Significant vegetation can greatly reduce the affect of extreme weather.

- **Connectedness between paths within the network**  
NA

### Interest

- **Engagement with surrounding context**  
Engagement with the natural surroundings depends on how close the vegetation encroaches to the footpaths edge. However dense vegetation can prevent views into the properties behind.

- **Social interest**  
NA

- **Built interest**  
NA

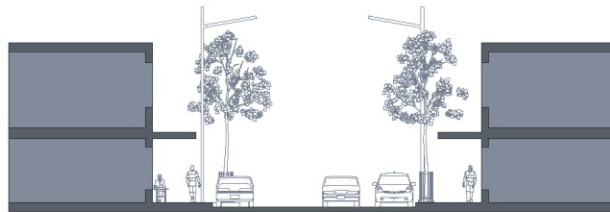
- **Natural scenery**  
High as users are immersed in the natural vegetation surroundings.



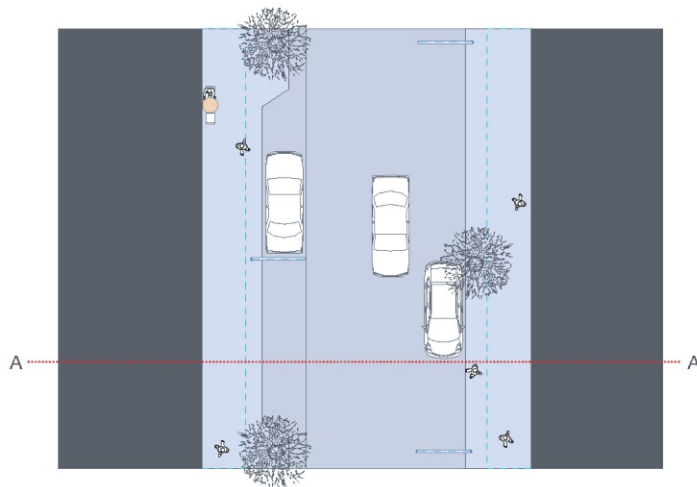
## Street - Retail/Hospitality

### Description

A pedestrian and vehicle street characterised by having retail/hospitality stores at ground level. Typically there is a high presence of pedestrian amenities and roadside parking to access the stores.



Section AA



Plan

### Safety (CPTED)

#### - Social safety

In the case of retail stores social activities at ground floor dissipate after hours, with the exception of passing vehicles, thus 'eyes on the street' is crucial for maintaining a sense of safety. This is reliant on either, Mixed Use developments, residential, ENTE activities being present at ground floor or above floor levels.

#### - Evening Lighting

Relies on a combination of pole street lighting, secondary lighting from ground floor window displays, and underside lighting from the veranda.

#### - Spatial design

NA

### Proximity & legibility

#### - Route continuity

Afterhours the street can become unused if there is an absence of building uses that proved evening activity.

#### - Proximity

More direct routes can Although it may not be the most direct route users may travel further to experience the high presence of social activity and interest that a shopping street offers. This particularly after hours if the street offers evening activity and a sense of social safety. Also this high level of interest reduces journey perceptions of walking lengths.

#### - Legibility

NA

### Path quality & comfort

#### - Footpath quality

NA

#### - Comfort

There is a greater presence of amenities such as rubbish bins, seating, vegetation etc.

#### - Shelter from weather

High due to the presence of canopies and verandas.

#### - Safety from vehicles

Relies on buffering from on street parking, planting, and traffic calming measures to reduce the speed/noise from passing vehicles.

### Connectivity (Macro)

#### - Characteristics of the land use pattern:

##### - Density

NA

##### - Building land use

Walkability and social safety improves if buildings are mixed use. This is because people can live closer to needed shops, and also provide eye's on the street due to the residential on the floors above.

##### - Treatment of significant barriers

NA

##### - Linkages

NA

### Interest

#### - Engagement with surrounding context

Physically, the width of the path limits its informal use i.e. for standing, talking etc, particularly under high use. Socially engagement can exist when stores spill out and occupy the street space.

#### - Social interest

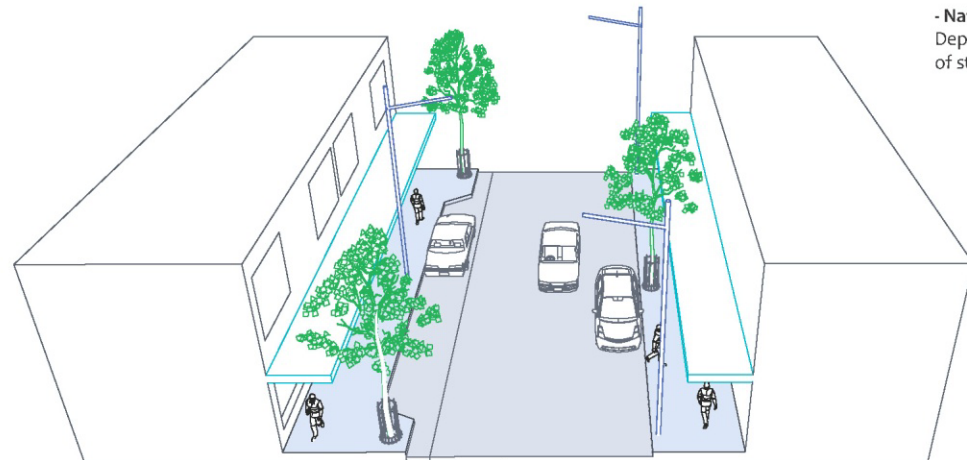
Social activity is high during opening hours due to the localization of consumer activities attracting people to the street, whilst transparency of ground floor windows permitting views into stores users.

#### - Built interest

Window displays, store interior fit outs, and architectural appeal of the surroundings buildings offer visual interest.

#### - Natural scenery

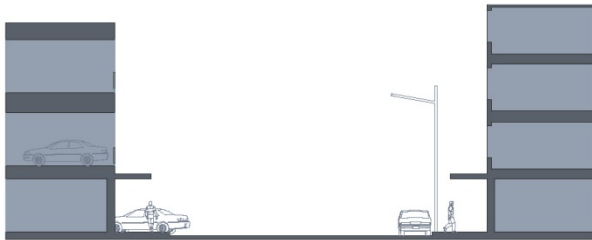
Dependant on the extent of street planting.



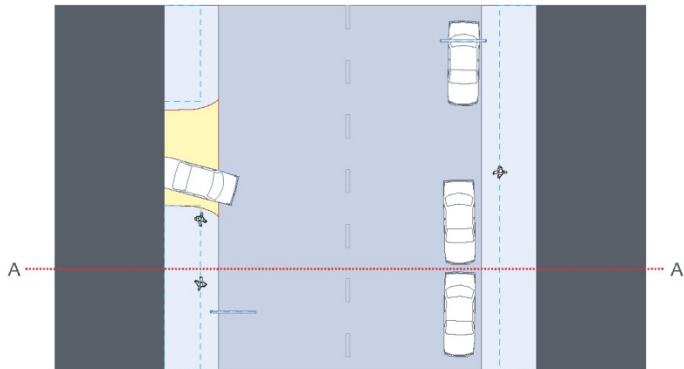
## Back Street - Commercial

### Description

A pedestrian and vehicle street characterised by having secondary frontages of commercial/office type land use. Because of their location away from, or at the rear of, the main hospitality and retail frontages, Commercial Back Streets have fewer pedestrian amenities and activity open to the ground floor than Shopping Streets.



Section AA



Plan

### Safety

#### - Social safety

In the case of commercial/office building use, unless there are hospitality tenants at ground floor, social safety is only in the form of passing vehicles.

#### - Evening Lighting

A combination of street lighting, and where ground floor retail is present, the secondary lighting from window displays.

#### - Spatial design

Vehicles using back entrance ramps to buildings and car parks are hazardous for pedestrians. Also blank ground floor facades, and absence of residential apartments, remove possibilities of ENTE (evening night time economy) activities and thus eyes on the street.

### Proximity & legibility

#### - Route continuity

After hours the absence of building activity at ground floor can become a safety barrier to pedestrians.

#### - Perception of proximity

When blank ground floor walls are present at the footpath edge, i.e. at the rear of the site or in with building uses such as car parking buildings. Lack of interest can psychologically lengthen walking distances for pedestrians.

#### - Legibility

N/A

### Path quality & comfort

#### - Path quality

NA

#### - Buffering from vehicles

Frequent car parking entrances are dangerous and disruptive to pedestrians on the footpath.

#### - Shelter from weather

Relies on canopies present on the sides and backs of building facades.

#### - Noise and Air quality

Significant vegetation, amenities, and interest, is needed to counter the poorer quality pedestrian environment due to high presence of vehicles.

### Connectivity

#### - Characteristics of the land use pattern:

##### - Density and NA

##### - Building land use NA

##### - Treatment of significant barriers NA

##### - Linkages NA

### Interest

#### - Engagement with the surrounding context

Blank walled ground floor facades, and the absence of ground floor activities prevent interaction between pedestrians and building activities.

#### - Social interest

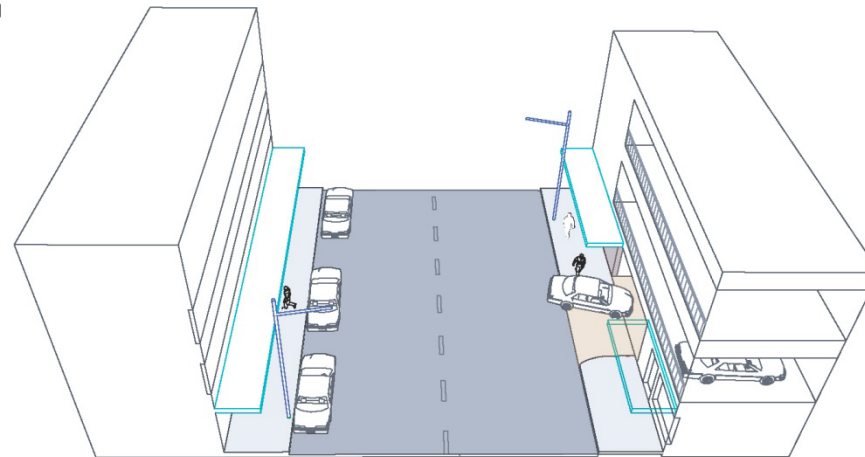
Views of social activity depend on the transparency and frequency of buildings windows that are visible from the street thus exposing internal activity.

#### - Built interest

Interest offered through architectural aesthetic of building facades, and where ground floor window displays exist.

#### - Natural Interest

Little street vegetation.



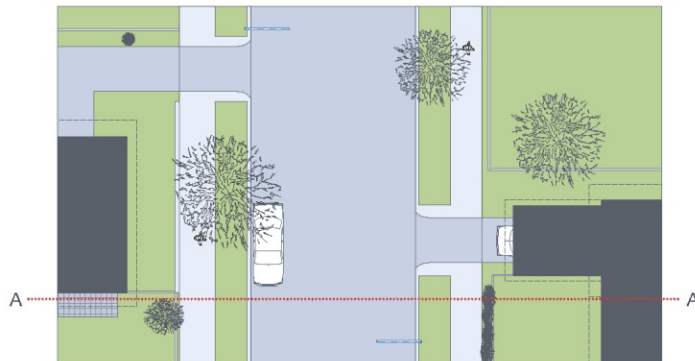
## Street- Residential Suburban

### Description

A street permitting pedestrian and vehicle use. Land use characterized by having low density residential housing properties set back on generous open sections. Pedestrians are separated from vehicles due to wide footpaths and street planting/grass verges.



Section AA



Plan

### Proximity & legibility

#### - Route continuity

Although people are present in the houses after hours, safety concerns i.e. users feeling they are not visible whilst on the footpath can become walking barriers to pedestrians. Another barrier also being the absence of shelter from weather.

#### - Perception of proximity

Tall and blank boundary fences that block views into properties, as well as wide sections, can psychologically lengthen walking distances for pedestrians.

#### - Legibility

N/A

### Safety (CPTED)

#### - Social safety

Residential social activity is present after hours in the houses.

#### - Evening Lighting

Street lighting only after hours, however large trees can block light from the street lamps thus creating dark and concealed areas.

#### - Spatial design

'Eyes on the street' can be reduced significantly if houses are setback deep in to sections, tall fences/hedges and dense vegetation block views into properties, and footpath lighting is inadequate. Also regarding safety from passing vehicles, grass verges provide a vehicle buffer to the road users.

### Path quality & comfort

#### - Path quality

NA

#### - Buffering from vehicles

Street trees and grass give a sense of safety and separation away from passing cars.

#### - Shelter from weather

No shelter from the weather, unless street trees are dense and frequently planted.

#### - Noise and Air quality

Unless on along side a well used vehicle thoroughfare, the greater presence of vegetation and wider footpaths buffering from the road, offers pleasant noise and air quality.

### Connectivity (Macro)

#### - Characteristics of the land use pattern:

##### - Density and building land use

Walkable connections between a variety of land uses, relies on the disbursement of town centers within residential suburbs existing more frequently. Thus in low density suburban developments, town centers require larger catchment areas in order to meet their demands. Which intern increases walking trip distances.

##### - Treatment of significant barriers

NA

##### - Linkages

NA

### Interest

#### - Engagement with the surrounding context

Obstacles such as high property fences and deep building set backs, prevent interaction between pedestrians and neighboring properties.

##### - Social interest

Relies on buildings having openings that are visible from the street exposing internal activity for example a workshop.

##### - Social interest

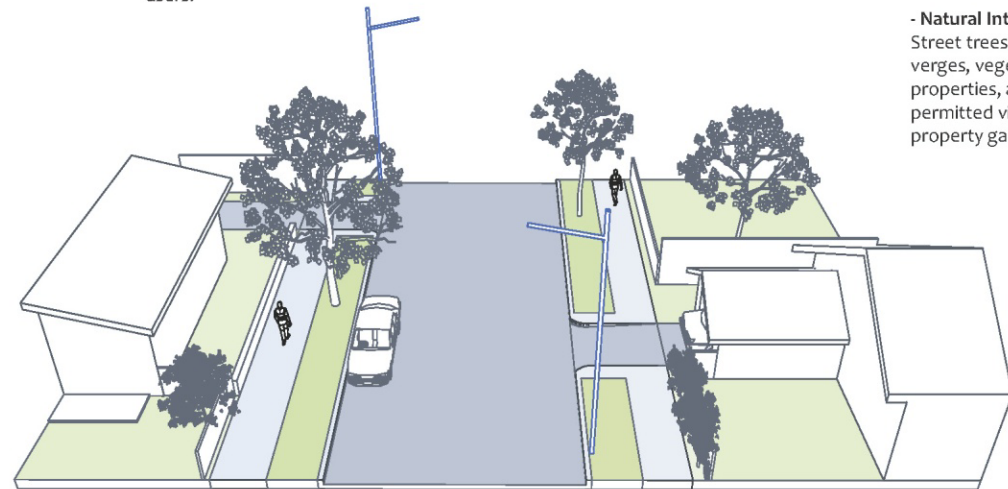
Relies on buildings and properties having openings that are visible from the street thus exposing residential activity.

##### - Built interest

Interest offered through the variety of housing and garden types.

##### - Natural Interest

Street trees, grass verges, vegetation from properties, and where permitted views into property gardens.





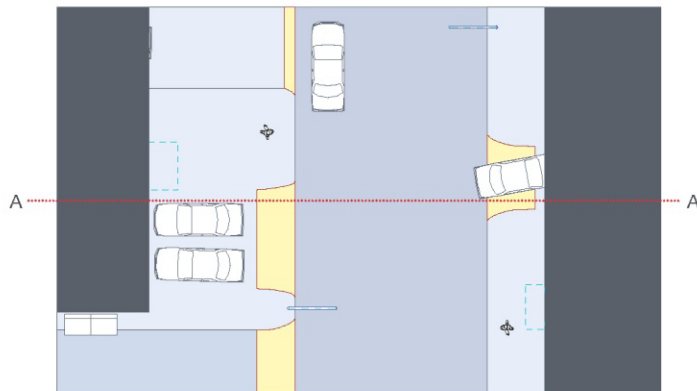
## Street - Light Industrial

### Description

A street permitting pedestrian and vehicle use, but is vehicle orientated due to the high volume of couriering and vehicle related activity that accompanies light industrial activity i.e. auto repair stores. Sites are characterised by having much smaller sections than heavy industrial sites such as garage and single unit /store workshops at ground level.



Section AA



Plan

### Safety (CPTED)

**- Social safety**  
All social activity is absent after hours in the surrounding buildings, thus social safety is only in the form of passing road users.

**- Evening Lighting**  
Only street lighting only after hours.

**- Spatial design**  
Building setbacks such as front parking lots, can create places for people to linger after hours. Also the footpath is frequently interrupted by vehicle access that is dangerous to pedestrians when vehicles exit and enter properties.

### Proximity & legibility

**- Route continuity**  
After hours the street can become unused when the buildings are absent of evening activity, and road vehicles use is low. Also users receive no shelter from weather.

**- Proximity**  
If buildings are significantly set back from the footpath edge, psychologically this causes walking to feel slower.

**- Legibility**  
NA

### Path quality & comfort

**- Footpath quality**  
Users are interrupted frequently by vehicle access ways.

**- Comfort**  
Pedestrian comfort is reduced due to the lack of amenities such as vegetation, rubbish bins, quality paving.

**- Shelter from weather**  
No canopies present.

**- Safety from vehicles**  
The high presence of vehicles on or around the footpath can be unpleasant.

### Connectivity (Macro)

**- Characteristics of the land use pattern:**  
**- Density**  
NA

**- Building land use**  
Because industrial is considered an undesirable land use to be near residential developments, when in large clusters they can create voids of residential land use. This can contribute to creating a less walkable environment.

**- Treatment of significant barriers**  
NA

**- Linkages**  
NA

### Interest

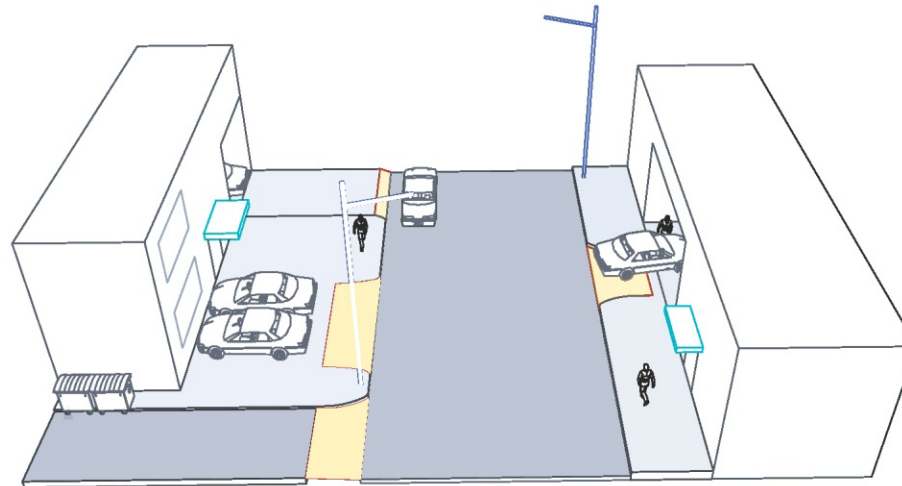
**- Engagement with surrounding context**  
Physically, is limited by building setbacks and parking lots separating the footpath users from the buildings. Whilst social engagement limited by whether the location of building openings, and the building setbacks, permits interaction between the footpath user and building user.

**- Social interest**  
Relies on buildings exposing internal activity, for example workshop activity, which can be seen from the street.

**- Built interest**  
Window displays, store interior fit outs, and architectural appeal of the surroundings buildings offer visual interest.

**- Built interest**  
Interest is offered through views into the building exposing the associated tools/merchandise/storage etc, of the space requirements of the building tenant.

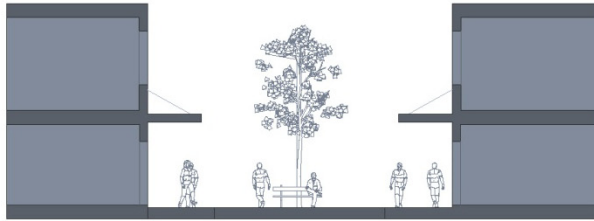
**- Natural scenery**  
No street vegetation



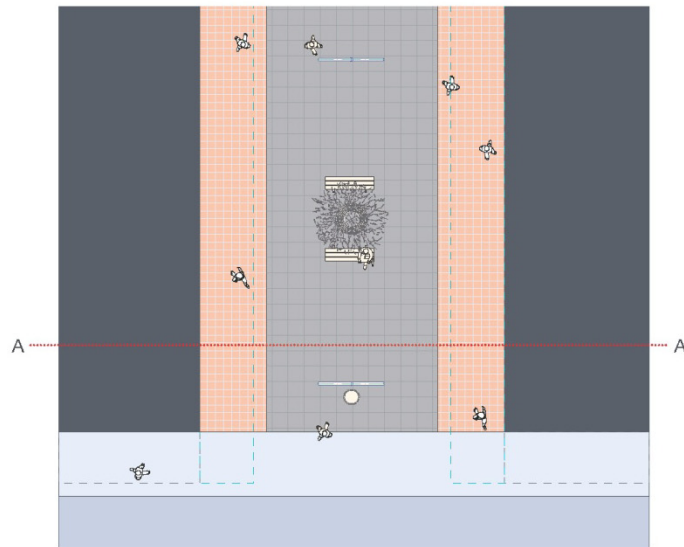
## Mall - External

### Description

A pedestrian only street with consumer related tenancy at ground floor level.



Section AA



Plan

### Safety (CPTED)

**- Social safety**  
In the case of retail stores, social activities at ground floor dissipate after hours thus 'eyes on the street' is crucial for maintaining a sense of safety. This is reliant on either, Mixed Use developments, residential, or late night hospitality activities being present at ground floor and also the above floor levels.

**- Evening Lighting**  
Lighting relies on a combination of pole street lighting, secondary lighting from ground floor window displays, and underside lighting from the veranda.

**- Spatial design**  
NA

### Proximity & legibility

**- Route continuity**  
A CPTED barrier can occur after hours when the street becomes unused. This is due to the combination of an absence of vehicles alongside the reduction of ground floor activity when the stores close. This is less of a problem if the buildings are mixed use with the above stories being residential.

**- Perception of Proximity**  
Groundfloor spaces offer a high level of interest which can reduce the users perception of the length of their journey.

**- Legibility**  
NA

### Path quality & comfort

**- Footpath quality**  
NA

**- Comfort**  
The space offers a high quality pedestrian environment. Users are sheltered from weather; there is a high presence of interest from stores during opening hours; the street is quieter being away from vehicular traffic.

**- Shelter from weather**  
Relies on building canopies.

### Connectivity (Macro)

**- Characteristics of the land use pattern:**

**- Density**  
Mall complexes/ clusters of shops can become problematic. As they draw shop tenants from other town centres throughout the city making walking to some shops not possible.

**- Building land use**  
Social safety, and walkability improves if shops are mixed use with residential above.

**- Treatment of significant barriers**  
NA

**- Linkages**  
NA

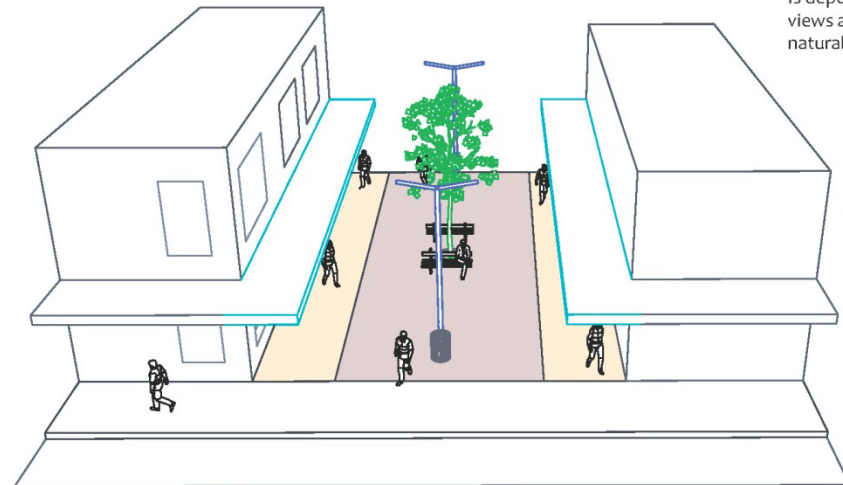
### Interest

**- Engagement with surrounding context**  
Physically, because the space is pedestrian only, this allows users the freedom to navigate and occupy the space as they please. Socially a high level of interaction can exist when stores spill out and occupy the street space.

**- Social interest**  
Little unless the path is frequently used, or offers unique views into/over areas of social activity.

**- Built interest**  
Subject to the design of the over bridge and surrounding buildings.

**- Natural scenery**  
Is dependent on whether views are offered to the natural surroundings.







## Appendix (B): Cognitive survey pilot test

### (Pilot test) Walking in Central Wellington

#### Interviewers Question Schedule

1)

Locate on the map of Central Wellington:

- The location of residency within 30m approximately.
- The most distant location you would feel comfortable walking to on a daily basis.
- Maximum comfortable duration you would walk?
- Two *necessary activity* destinations you would normally drive to, but you think are of a 'walkable' distance?
  - Why do you drive to these destinations as oppose to walk?

2)

During any weather condition, time of day, or under any circumstance, would you not walk to any of the destinations above? (i.e. rain, in the dark, heavy vehicle traffic, crowding, after hours, Saturday nights due to presence of drunk people etc)

3)

What routes would you take during the daytime under calm weather if you had to walk rather than drive to the destinations you stated in question 2?

- Think about the route you chose, as best you can describe:
  - Why you choose to walk down certain streets over others?
  - Where you crossed the roads you encountered:
  - How do you cross each road? i.e. J walk, or use the crossing
  - Which places to cross are most desirable and why?
  - Which places to cross are least desirable and why?

4)

If you had to walk rather than drive to the destinations in question 2, draw on the map the route or routes you would take during nighttime under calm weather.

- Think about the route you chose, as best you can describe:
  - Why you choose to walk down certain streets over others?
  - Where you crossed the roads you encountered?
  - How do you cross each road? i.e. J walk, or use the crossing
  - Which places to cross are most desirable and why?
  - Which places to cross are least desirable and why?

5)

If you had to walk rather than drive to the destinations in question 2, draw on the map draw the route you would take during the daytime under extreme weather conditions.

- Think about the route you chose, as best you can describe:
  - Why you choose to walk down certain streets over others?
  - Where you crossed the roads you encountered:
    - How do you cross each road? i.e. J walk, or use the crossing
    - Which places to cross are most desirable and why?
    - Which places to cross are least desirable and why?

6)

If you had to walk rather than drive to the destinations in question 2, draw on the map draw the route you would take during the nighttime under extreme weather conditions.

- Think about the route you chose, as best you can describe:
  - Why you choose to walk down certain streets over others?
    - Which streets are most desirable and why?
    - Which streets are least desirable and why?
  - Where you crossed the roads you encountered:
    - How do you cross each road? i.e. J walk, or use the crossing
    - Which places to cross are most desirable and why?
    - Which places to cross are least desirable and why?

## **Appendix (C):** Cognitive survey 1 questionnaire



SCHOOL OF ARCHITECTURE Te Kōwhiri Whakairo  
FACULTY OF ARCHITECTURE & DESIGN Te Kōwhiri Whakairo-Whakapapa  
VICTORIA UNIVERSITY OF WELLINGTON Te Kōwhiri Whakairo-Whakapapa  
Phone +64 (0) 4 463 9460 Fax +64 (0) 4 463 9461 Email [architect@vuw.ac.nz](mailto:architect@vuw.ac.nz) Web [www.vuw.ac.nz/architect](http://www.vuw.ac.nz/architect)

Should you feel the need to withdraw from the project, you may do so without question within three days following the signing of the consent form in which your consent is documented. Just contact me Michael Lowe.

#### Use and storage of information

Your responses will be used to help professionals further understand the relationship between the quality of walking in Central Wellington, and the design of the pedestrian environment. Participation in this research will be confidential and the results will be aggregated and reported so that participants are non-identifiable.

- Electronic information will be stored in a password access file.
- Physical information will be stored in a locked file with access restricted to myself, and my supervisor Penny Allan.
- All raw information/data will be deleted at the conclusion of the research.

If you have any questions about the project please contact me.

**Michael Lowe**  
ph: 0273587985  
email: [cchannel\\_z@hotmail.com](mailto:cchannel_z@hotmail.com)

**Penny Allan:** Associate Professor Landscape Architecture  
ph: 04 463 9460  
email: [penny.allan@vuw.ac.nz](mailto:penny.allan@vuw.ac.nz)



SCHOOL OF ARCHITECTURE Te Kōwhiri Whakairo  
FACULTY OF ARCHITECTURE & DESIGN Te Kōwhiri Whakairo-Whakapapa  
VICTORIA UNIVERSITY OF WELLINGTON Te Kōwhiri Whakairo-Whakapapa  
Phone +64 (0) 4 463 9460 Fax +64 (0) 4 463 9461 Email [architect@vuw.ac.nz](mailto:architect@vuw.ac.nz) Web [www.vuw.ac.nz/architect](http://www.vuw.ac.nz/architect)

## Information Sheet

### Research Project: The 'Walking for Driving' project

Investigator: Michael Lowe ph: 0273587985 email: [cchannel\\_z@hotmail.com](mailto:cchannel_z@hotmail.com)  
Supervisor: Penny Allan ph: 04 463 9460 email: [penny.allan@vuw.ac.nz](mailto:penny.allan@vuw.ac.nz)

### Participant information sheet for a study of Walking Perceptions

As part of a Victoria University Wellington (VUW) Masters of Architecture Thesis, I am undertaking research that involves interviewing members of the public about their walking experiences in Central Wellington. I have been granted ethics approval by VUW to use the interviews and information in a Masters level thesis that will be publicly available electronically. The criteria for participation is:

- Live in Central Wellington and are of age between 20-23 years.
- Drive in Central Wellington on average a minimum of twice a week.
- Own or have access to a car.

The research is important towards understanding more about the way pedestrian infrastructure design is carried out in the built environment. Involvement in this research requires you to be interviewed about your experiences and view towards walking in Wellington. If you take part in this research you will be required to be available for two interviews, and the extent of your participation would be:

- One 20 minute interview, at a location of your choice, where you will be required to:
  - o Locate on a map approximately (within 20m) your home.
  - o Locate on a map the journeys that you consider to be of walkable distance, which you currently drive in Central Wellington.
  - o Locate on a map the journeys you currently walk in Central Wellington.
  - o Have a discussion so I can understand more about your experiences of walking in Wellington.
- One 20 minute follow up interview and discussion two-three months later in which I present to you a series of designs for an improved walking experience in Wellington.



SCHOOL OF ARCHITECTURE "A Place Challenge"  
FACULTY OF ARCHITECTURE & DESIGN To Whangarei Whangarei  
VICTORIA UNIVERSITY OF WELLINGTON PO Box 600 Wellington 6140, New Zealand  
Phone: +64 (0)4 463 9460 Fax: +64 (0)4 463 9464 Email: [architect@vuw.ac.nz](mailto:architect@vuw.ac.nz) Web: [www.vuw.ac.nz/architect](http://www.vuw.ac.nz/architect)

## Consent Form

### Research Project: The 'Walking for Driving' project

Investigator: Michael Lowe ph: 027 358 7885 email: [channel\\_2@hotmail.com](mailto:channel_2@hotmail.com)  
Supervisor: Penny Allan ph: 04 463 9460 email: [penny.allan@vuw.ac.nz](mailto:penny.allan@vuw.ac.nz)

By signing this consent form I understand that:

- "I have been provided with adequate information of, and understand, the nature and intent of the research project."
- "I can withdraw from the project without reason up to three days post the signing of this consent form, and any data/information I have provided will not be used and will be deleted immediately."
- "Any information or opinions I provide will be kept confidential and reported only in an aggregated/non-attributable form"
- "Participation requires me to be present at two 20 minute interviews."
- "The interview will be voice recorded, and I will be given the opportunity to review the transcript before it is documented in the thesis."
- "All electronic information will be stored in a password accessible, with access restricted to Michael Lowe only (the primary investigator)."
- "All physical information will be stored in a locked file with access restricted to Michael Lowe only (the primary investigator), and his thesis supervisor Penny Allan."
- "Only the primary investigator (Michael Lowe) will hold my contact information secure in a password folder for the duration of the research project."
- "At the completion of the project, all raw data/information will be deleted."
- "The interview information gained from the surveys will be used as research in a VUW thesis project. The research will be published in a thesis hard copy in the VUW Library, and subsequent academic or professional journals, or professional conferences."

- ☐ I would like to review the audio of the voice-recorded interview.
- ☐ I would like to receive a summary of the survey information at a later date.

Address for emailing/post:

---

---



SCHOOL OF ARCHITECTURE "A Place Challenge"  
FACULTY OF ARCHITECTURE & DESIGN To Whangarei Whangarei  
VICTORIA UNIVERSITY OF WELLINGTON PO Box 600 Wellington 6140, New Zealand  
Phone: +64 (0)4 463 9460 Fax: +64 (0)4 463 9464 Email: [architect@vuw.ac.nz](mailto:architect@vuw.ac.nz) Web: [www.vuw.ac.nz/architect](http://www.vuw.ac.nz/architect)

## Interviewers Question Schedule

### Research Project: The 'Walking for Driving' project

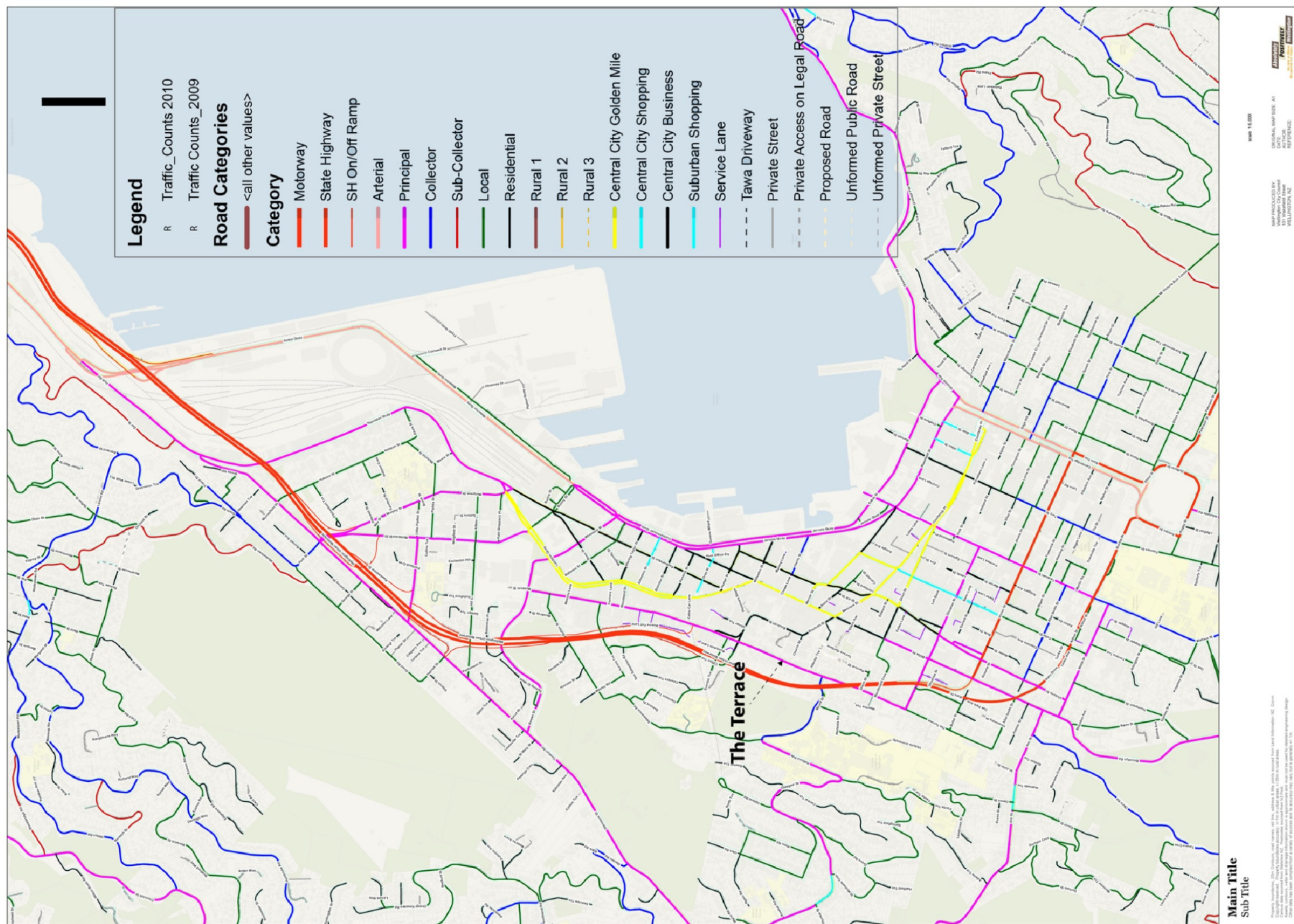
Investigator: Michael Lowe ph: 027 358 7885 email: [channel\\_2@hotmail.com](mailto:channel_2@hotmail.com)  
Supervisor: Penny Allan ph: 04 463 9460 email: [penny.allan@vuw.ac.nz](mailto:penny.allan@vuw.ac.nz)

- 1) Generally, when performing a necessary activity on a fine day:
  - a. What is the maximum comfortable distance you would walk for before you decided you would rather drive?
  - b. If possible draw on the map (attached) two necessary activity destinations that are of the greatest distance you would walk to.
- 2) For a necessary activity, locate in the area allocated on the map (attached) the destinations you would normally drive to, but you think of a 'walkable' distance? (a necessary activity is an activity one carries out on a day to day basis that 'must' be completed, i.e. going to Work, University, picking child up from school, etc.)
- 3) Are there reasons why you drive to these destinations as opposed to walk?
- 4) During any weather condition, time of day, or under any circumstances, have you not walked to any of the destinations above? (i.e. rain, in the dark, heavy vehicle traffic, crowding, after hours, Saturday nights due to drunk youth etc.)
- 5) Hypothetically if you had to walk rather than drive to the destinations you stated in question 2, draw on the map the route or routes you would take on a sunny day
  - a. Think about the route you chose.
  - i. As best you can, explain why you choose to walk down certain streets over others?

- 223



**Appendix (D):** Wellington road hierarchy (obtained from Wellington City Council 2012)



**Appendix (E):** Table review of pedestrian design practise in Central Wellington



	Amenities	Public transport shelter								R						R	√	√	R							
		Street furniture	Yes			R							√		√	√	√						R			
		Path Landscaping			R								R	√		√							R		R	
		Lighting		3.			R	R									R	R								
District plan	Access	Connections to the city															R		R							
		Moving through the city									R						R		R							
		Routes through buildings																					R		R	
		Way finding								R	R															
		Public space													R				√				R		R	
		Streets																	R				R			
		Squares								√				R				√					R		R	
		Parks																					R		R	
										R		R							R		R	R	R	R		
People Spaces Places : A Design guide for Urban NZ	City form	Urban structure								R			R						R		R	R	R	R		
		Development zones								R			R									R	R		R	
		Streets				R									R	R							R			

√= The document comprehensively **demonstrates** an awareness of the accessibility criteria

R = The document only **states** an awareness of the accessibility criteria.

### **List of referral documents**

1.

- Guide to traffic engineering practice, part 10: Local area traffic management (Austroads)
- Sharing the main street and Cities for tomorrow: better practice guide, (Hans L part C-5)

2.

- Australian Bicycle Council: Pedestrian- cyclist conflict minimisation on shared paths and footpaths (ARRB Group)

3.

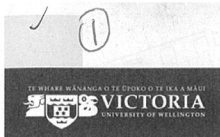
- AS/NZS 1158.3.1: 1999, Road Lighting – Pedestrian area (Category P) lighting – Performance and installation design requirements (Joint Technical Committee LG/2 Road Lighting)

4.

- National Guidelines for Crime Prevention Through Environmental Design. (Ministry of Justice)



**Appendix (F):** Cognitive survey 2 questioner (front and back)



## Information Sheet

### Research Project: The 'Walking for Driving' project

**Investigator:** Michael Lowe ph: 0273587985 email: channel\_z@hotmail.com  
**Supervisor:** Penny Allan ph: 04 463 9460 email: penny.allan@vuw.ac.nz

### Participant information sheet for a study of Walking Perceptions

As part of a Victoria University Wellington (VUW) Masters of Architecture Thesis, I am undertaking research that involves interviewing members of the public about their walking experiences in Central Wellington. I have been granted ethics approval by VUW to use the interviews and information in a Masters level thesis that will be publicly available electronically. The criteria for participation are:

- Live in Central Wellington and are of age between 18-25 years.

The research is important towards understanding more about the way pedestrian infrastructural design is carried out in the built environment. Involvement in this research requires you to be interviewed about your experiences and view towards walking in Wellington.

### Use and storage of information

Your responses will be used to help professionals further understand the relationship between the quality of walking in Central Wellington, and the design of the pedestrian environment. Participation in this research will be confidential and the results will be aggregated and reported so that participants are non-identifiable:

- Electronic information will be stored in a password access file.
- Physical information will be stored in a locked file with access restricted to myself, and my supervisor Penny Allan.
- All raw information/data will be deleted at the conclusion of the research.

If you have any questions about the project please contact me.

**Michael Lowe**  
ph: 0273587985  
email: channel\_z@hotmail.com

**Penny Allan:** Associate Professor Landscape Architecture  
ph: 04 463 9460  
email: penny.allan@vuw.ac.nz

### Consent Form

By signing this consent form "I understand that:

- "I have been provided with adequate information of, and understand, the nature and intent of the research project."
- "Any information or opinions I provide will be kept confidential and reported only in an aggregated/non-attributable form"
- "All electronic information will be stored in a password access file, with access restricted to **Michael Lowe** only (the primary investigator)."
- "All physical information will be stored in a locked file with access restricted to **Michael Lowe** only (the primary investigator), and his thesis supervisor Penny Allan."
- At the completion of the project, all raw data/information will be deleted."
- "The interview information gained from the surveys will be used as research in a VUW thesis project. The research will be published in a thesis hard copy in the VUW Library, and subsequent academic or professional journals, or professional conferences."

Date	Name	Signature

## Question Schedule

When you walk between Kelburn and Te Aro campus during the following time and weather circumstances below. Drawn on the attached map of VUW Kelburn campus, the route you would take through the university.

- (1) Using the line style below draw your route during the **daytime** under **calm** weather conditions.  
i. Locate on the map the places along the route you dislike the most, and explain why?

style | ① dislike - The hill going up to UNI is too steep.

- ii. Locate on the map the places along the route you enjoy the most, and explain why?

① like - That's the spot where I can see the city.

- (2) Using the line style below draw your route during the **daytime** under **extreme** weather.  
i. Locate on the map the places along the route you dislike the most, and explain why?

style | ② dislike - when i'm waiting for the bus, the wind can be pretty strong & cold.

- ii. Locate on the map the places along the route you enjoy the most, and explain why?

③ like - That's the point where I almost reach the destination. I real guess I really like it because that the end of that extreme weather.

- (3) Using the line style below draw your route during the **night time** under **calm** weather.  
i. Locate on the map the places along the route you dislike the most, and explain why?

style | ③ dislike - It's creepy there.

- ii. Locate on the map the places along the route you enjoy the most, and explain why?

③ like - Night view of the city - Fantastic!

- (4) Using the line style below draw your route during the **night time** under **extreme** weather.  
i. Locate on the map the places along the route you dislike the most, and explain why?

style |

- ii. Locate on the map the places along the route you enjoy the most, and explain why?

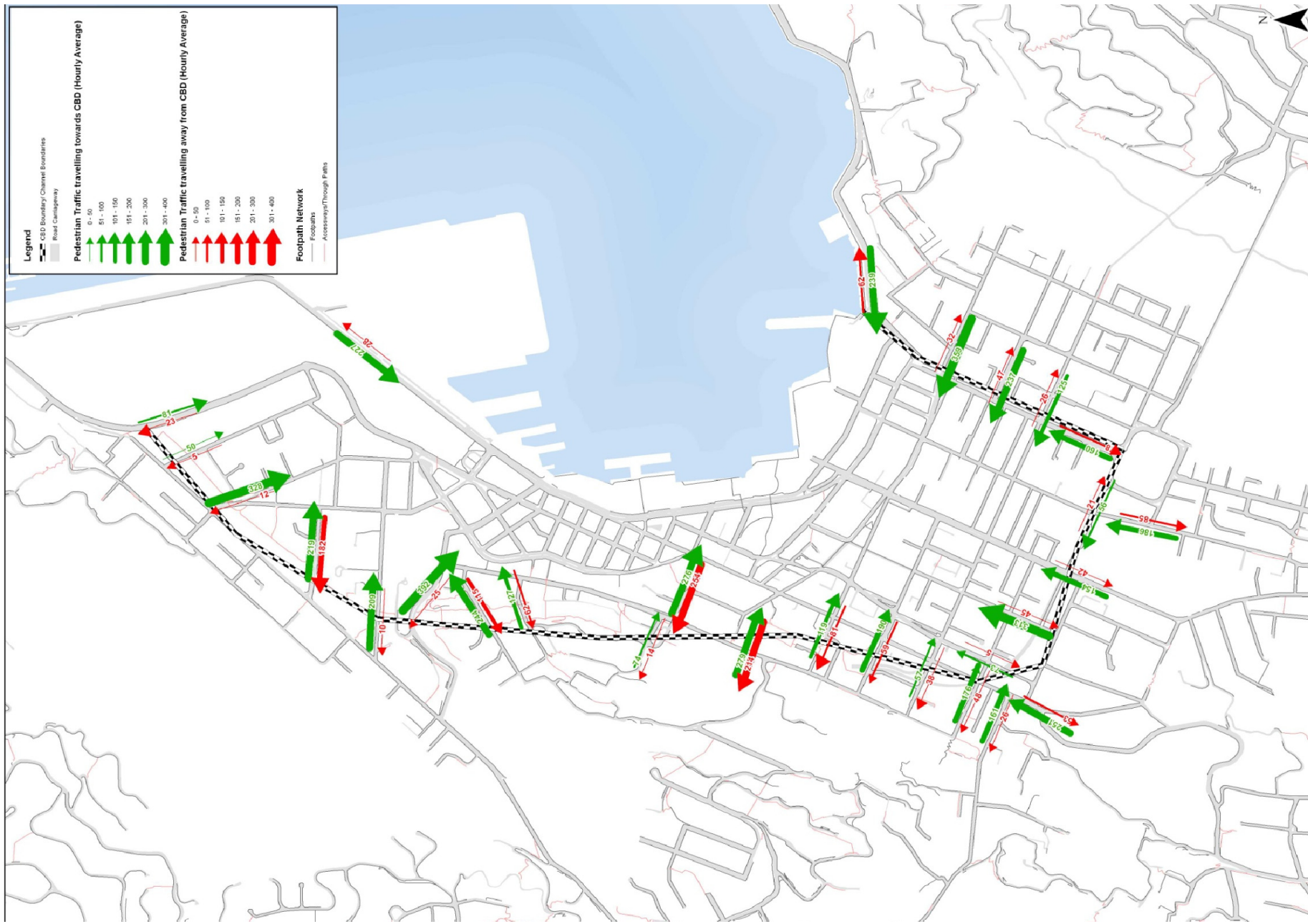


SCHOOL OF ARCHITECTURE Te Kura Waihangā  
FACULTY OF ARCHITECTURE & DESIGN Te Wāhanga Waihangā-Hoahoa  
VICTORIA UNIVERSITY OF WELLINGTON, PO Box 600, Wellington 6140, New Zealand  
Phone + 64-4-463 6200 Fax +64-4-463 6204 Email [architecture@vuw.ac.nz](mailto:architecture@vuw.ac.nz) Web [www.victoria.ac.nz/architecture](http://www.victoria.ac.nz/architecture)



**Appendix (G):** Pedestrian count data (obtained from Wellington City Council 2008)





Other data has been compiled from a number of sources and its accuracy may vary.

Any contour displayed are only approximate and should not be used for detailed engineering design.

Colour Orthorectification 1:500  
 Wellington City Council

**Absolutely Positively**  
 Wellington  
 Date: 14/05/2008  
 Author: petrov2n

File: Z:\New\_dms\_journals\B031\_Petrov\B031\_2\_Strategic\_Management\_Map7\_CityWalking-conditions\_andVolumes.mxd