CAR PARK HOUSE SHARE

Luke Dodd
2018

CAR PARK HOUSE SHARE

RECLAIMING WELLINGTON'S CAR PARKING BUILDINGS

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LUKE DODD

ABSTRACT

This thesis anticipates that inner city car parking buildings will become vacant as new car ownership models, such as car sharing, reduce the number of cars parked in cities. “Collaborative consumption” is changing the way that consumers own goods to a shared method where ownership is outsourced and goods become cheaper and more efficient to use. Car sharing is one such service where technology provides the basis for it to operate. High demand for housing in the Wellington CBD and a current housing stock shortfall provides an opportunity to adaptively re-use this vacant infrastructure for time share housing for transient workers, using the collaborative consumption model.

This research proposes that the conversion of carparking buildings into shared housing schemes is valid, and

explores this by investigating what the consequences of car sharing might be on the city and how people interact with this infrastructure at a street scale. The thesis then explores the architectural possibility of how housing can make use of existing infrastructure for a new use. It explores the pedestrian reclamation of the parking building while acknowledging the architectural heritage of the car parking typology.

Fig.1 / Perspective view of the car share park house from the corner of Willeston and Victoria streets.

ACKNOWLEDGEMENTS

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INTRODUCTION

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INTRODUCTION

Research indicates that inner city car parking buildings will become vacant as car ownership declines as a result of increasing automation and shared ownership (Vincent n.p.). The rise of 'collaborative consumption' indicates that twenty first century consumers are challenging the traditional ownership structure of goods to a shared method where the ownership is outsourced to reduce costs. Car sharing is one of these developments as cars are becoming service-based and managed, similar to the steady uptake of other shared services like AirBNB and BookaBach. It can be expensive to own and maintain a vehicle to have it parked 95% of the time, but through technology, consumers are now equipped with services that provide the luxury of 'clicking, swiping and driving, and letting someone else take care of the parking permits and maintenance' (Rogério dos Santos Alves; Alex Soares de Souza n.p.; Phillip Boyle and Associates 3) .

The compact geography of the Wellington means that getting around doesn't necessarily need a car, so car share services such as Mevo and CityGo are already prevalent. Studies in Finland indicate that a shared vehicle system could reduce the number of cars in cities to as little as four percent of current numbers (Frykberg n.p.).

Another study in Sydney found that for every car share vehicle in the network there will be ten fewer privately owned vehicles in the municipality (Phillip Boyle and Associates 6). Vacant car infrastructure becomes available for other uses when the rate of car ownership declines as further development of collaborative consumption models and Wellington City Council supported car sharing services gain traction.

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Fig.2 / Aerial image of Wellington City locating site

RESEARCH AIMS AND OBJECTIVES

This research sets out to investigate the consequences of car sharing services on car parking architecture, with the end goal of testing an adaptive re-use solution for temporary living within a car parking building. Wellington city was chosen as a site to test the research aims because of the Wellington City Council's aims to increase densification, compact layout and its growing support for car sharing.

An existing car parking building in the CBD of Wellington is selected to test this research as a representative parking building because of its proximity to amenities and current car sharing services offering roundtrip cars. An exploration of possible consequences of car sharing services on city streetscapes provides an initial understanding of the infrastructural and pedestrian needs and a design intervention that might integrate the two. A second investigation looks to test how car sharing services can co-exist with a living arrangement in a car parking building. The third and final investigation tests an iteration of the previous two as an adaptive re-use solution addressing the consequences of car sharing services.

Λ Fig.3 / MEVO Car sharing car charging on Wellington's Waterfront

METHODOLOGY

The thesis tests the time share and collaborative consumption model for housing in a former car parking building through iterative design development. The design led research approach has been undertaken for this thesis by means of exploratory design alongside research that has constantly fed information into an evolving design solution, informed by the following stages:

- Literature / Review of collaborative consumption models, specifically carsharing services, as well as time share housing, parking infrastructure and parking policy requirements to determine key ideas and review apartment design guides to formulate a framework for the design.
- Case study analysis / Examines designs relevant to car parking, adaptive reuse, and apartment design. This identified design techniques and strategies relevant to the project and explored these ideas to determine the feasibility of the research proposition.
- Site analysis / Site analysis of 2-3 car park buildings in Wellington. A contextual understanding of the site evaluated opportunities and weaknesses resulting in the selection of one building to examine for the purposes of this research. A parking building's context is important for the use of car sharing and time share services, so analysis and selection of a building in close proximity to amenities is important.
- Testing design / Iterative design allows for refinement of each design exploration through evaluation and input of new design drivers along the way. This thesis uses this method to test research findings through drawing, and physical and digital modelling at varying scales to arrive at a design solution.

^ Fig.4 / The Design: a new atrium

THESIS STRUCTURE

Chapters 1 & 2 – Introduction and literature review

The first two chapters establish a theoretical background for the research, focusing on the history of parking, collaborative consumption and car sharing. This section provides a greater understanding of the research topic and formulates a basis for the case studies to be selected.

Chapter 3 – Case Studies

The third chapter analysis seven examples of automotive building adaptive re-use, new build car parking and a holiday home, which informed design development.

Chapter 4 – The Street preliminary design

This chapter is the first design investigation of the consequences of car sharing on the street, providing an understanding of what the consequences might be.

Chapter 5 – Site Analysis

A detailed site analysis is carried out to select a suitable building that the investigation can be tested on, and determine limitations to the scope of the project.

Chapter 6 – Concept Design

This chapter documents a concept design that explored the limitations of an adaptive re-use of a car parking building by testing the logistics of how car sharing might co-exist with a living arrangement.

Chapter 7 – Final Design

The design builds upon the previous chapters to formulate a design solution for an adaptive re-use of a car parking building into time share apartments. This phase concludes with the 75% final presentation and the design does not change after this point.

Chapter 8 - Conclusion

This chapter critically reflects upon the design outcomes that have been formulated throughout the research process.

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LITERATURE / CONTEXT

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THE CAR DOMINATED LANDSCAPE

The automobile has created its own typology and set of spaces since its introduction in the early twentieth century and transition from the horse and cart to the car dominated cityscapes of today. As communication technology continues to develop to support 'collaborative consumption' in this industry, inner city parking buildings will become vacant because car ownership will decline with automation and shared ownership methods gaining traction. Twenty first century consumers are moving from the traditional ownership structure of goods to a shared method where ownership is outsourced. This is called "collaborative

consumption", a collective sharing network that favours usefulness over ownership, community over selfishness, and sustainability over novelty (Botsman and Rogers 8). This research is interested in car sharing as a model of collaborative consumption, in which privately owned cars become service-based and managed. It provides an overview of how the car-dominated landscape came about and explores the literature on car sharing services, including its impact on existing parking infrastructure, and how changing technology and methods of ownership are forcing a rethink of the built environment of our cities.

A HISTORY OF THE CAR PARKING TYPOLOGY

The introduction of the automobile in the early 1900s brought new challenges and uses to existing road networks that differed slightly from the use of the horse and cart. Early automobiles became increasingly adopted by more people, replacing the horse and cart as the prime mode of transport and allowing greater distances to be travelled much faster. The inexpensive Ford motor car (Fig 5), didn't have the weather tightness of today's cars. They had open roofs and only windcreens, meaning that overnight parking had to be in enclosed garages (Jakle and Sculle 19). The automobile was similar in design to carriages and wagons, and it was assumed that horse barns and livery stables would suffice for overnight automobile storage, and that motor vehicles in use during the day would be accommodated at the curbside when the need arose. (Jakle and Sculle 19). There was no specific parking building typology designed for the automobile in its early years of popularity, nor was there an adaptive re-use of the horse barns to suit the new use (Jakle and Sculle 6).

As more people owned automobiles, the need to conveniently store cars when not in use arose, leading to the design of a new parking typology, the attached garage. John Jakle describes the attached garage as the expanded driveway of suburban housing, creating

private adjuncts to public rights-of-way. The streetscape now had intersections at every driveway, further extending the public highway into our living spaces. John Sculle describes the shift towards more women in the workforce, resulting in an additional car added to the household and cars enabling affordable access to further away jobs (Jakle and Sculle 4). As more cars were owned by households and densification occurred, parked cars spread onto the street, bringing about the need for regulation to limit congestion. The parking typology has dramatically morphed into its own set of public and private spaces within our built environment with little consideration for the efficient use of space when cars are not in use.

^ Fig.5 / Ford Model T in Christchurch in 1913 >
Steffano Francis Webb

THE STREET

The now heavy reliance on personal modes of transport poses a serious spatial problem for our cities. The automobile means that people can live further from their workplace, spreading from vast highway networks out of the city. We no longer need to live within walking distance of amenities because people can easily drive through the cityscape. Communities have become scattered and people are less likely to collaborate or talk with each other as we navigate the urban environment in the fast paced automobile (Jakle and Sculle 3). The automobile changed the way that streets functioned, while forming a barrier for pedestrians from the road, it restricted the space available for social interaction due to the vast amount of space that car parking takes up (Jakle and Sculle 3).

Streets provide space for vehicular and pedestrian transportation as well as infrastructure such as telephone lines, water and gas mains, sewers, drains, electricity and data services. They also provide space for practical infrastructure such as fire hydrants, letter boxes, rubbish bins, street lights, furnishings, and other social function, which are efficiently integrated so as not to interfere with vehicular movement (Jakle and Sculle 28). In some areas, too many infrastructural and vehicular systems can result in congestion and inefficient use of space.

A report in 2004 by Jan Gehl for the Wellington City Council noted that the high amount of parking available, combined with the unlimited levels of vehicle traffic allowed into the CBD, has resulted in the deterioration in the quality of both the street and pedestrian landscape (Gehl 11). Street layouts now tend to resemble urban motorways and do not allow straightforward access for active and public transportation (Gehl 11). The council response to the issue was the introduction of policy to discourage substantial public commuter parking in the central business area, and prioritising public transport and pedestrians (Wellington City Council, Wellington City Council Parking Policy September 2007, p17; Wellington City Council, Car Share Policy 2016). This policy has brought about dedicated bus lanes, cycle lanes and integration of car share services, however there is still a need to address social function within the street.

These sorts of interactions and inefficiencies pose the question of what can be done to ensure that these functions can all work together with the limited space that our cities have.

LANDSCAPE AND PARKING

John Jakle stresses the importance of the term “park” to hold “aesthetic leisure time” as he refers to the park as landscape and picturesque pleasure grounds, which are often protected and enclosed places (Jakle and Sculle 8). The park as a leisurely place lined with trees and grass contrasts the parking lot as a concrete strip down the side of a street and brings to light the irony and indifference that the parking lot and building has created for itself. Furthermore, widening and removal of trees along American streets following WWI to allow for more car parking spaces, reduced pedestrian social spaces on footpaths, and the addition of off-street parking created an expansive wasteland of allotted individual concrete parking spaces, further reversing the leisure park aesthetic (Jakle and Sculle 8). The irony today is that designers are bringing back the trees and landscape to the parking lot in order to bring vibrancy and leisure space by removing parking spaces through the merging functions of parks and car parking.

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Fig.6 / First parking meters being installed in Lower Hutt in 1956

REGULATION AND THE PARKING METER

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As cities became more congested with increasing traffic and parking, regulation became necessary to control how the city is used by the car. Unregulated streets led to congestion in cities, with the introduction of the parking meter, in conjunction with the white line to define the parking space. Free parking meant that people had the ability to park their cars on the street all the time, which is great for workers who can park their car outside all day long, but not so great for visitors to those places, who were forced to park far away from stores.

Parking meters were first introduced in America in downtown Oklahoma City in 1935 in a bid to bring order to the hustle and bustle of finding a parking space, and the restricted space of car parks. They were adopted rapidly, with 85 cities in 26 states having adopted 24,000 meters by the end of 1938, which spread internationally to 87 countries by 1960 (Jakle and Sculle 38). The introduction of metering machines meant that people would have time limits at that space and be charged for their use to ensure better turnover in the limited number of parking spaces (Shoup 379). Jakle, Sculle and Shoup agree that “wherever parking causes a net loss to the public good, then there should be limitation” (Jakle and Sculle 39; Shoup 28).

Traditionally one meter serviced each parking space, however technological change nowadays allows one machine to monitor 20-30 spaces on street, or up to 500 in a parking building. Further developments in parking meter operation now allows you to pay for parking via your mobile device. This reduces the need for parking meter infrastructure altogether, saving space on the street, making trips more convenient as people don't have to carry specific coins and walk to a machine. The introduction of electric or hybrid cars brings electric charging ports to the street, which effectively replace the same space allocation as the meters used to. People now have the freedom to park for varied amounts of time and come and go more efficiently, making metering infrastructure better as a control mechanism while allowing information to be collected electronically for the council to be informed about consumer parking habits.

Parking regulation occurs in a number of ways to control how cities deal with the number of parked vehicles. The use of the parking meter supported by time limit signage and parking wardens worked initially, later with the support of parking policy and requirements. Over the course of the twentieth century, planning systems

in several countries have found the need to introduce minimum parking requirements for on and off-street car parking.

Minimum parking requirements allow local councils to set a number of parking spaces that developments must provide. One method is the creation of parking spaces off the street to free up space on the street, increase roading efficiency (Still and Simmonds 293). Cars spend 95% of their time parked or stored, and the addition of off-street parking buildings satisfies this high amount of storage, even though the spaces in cities are charged at high costs (Phillip Boyle and Associates 3). Car sharing as a service can help to reduce these costs as the home base for a car share vehicle is free to park in. Donald Shoup describes the physical and regulatory vastness of the parking lot as often taking up more land area than the actual destination itself (Shoup 368). Without space to park your car, driving becomes one of the most inconvenient activities and counter to the premise of owning your own vehicle in order to provide the convenience of driving anywhere, anytime.

There are a number of ways that policy can influence public behaviour to make driving a car within our cities more or less attractive, and able to reduce parking and congestion in the city (Coles 9). Some include decreasing the number of parking spaces and increasing

the attractiveness of public or shared transport, better education about the environmental impacts of car and public transport use, and by making owning a car more or less expensive (Schade and Schlag 157).

The huge amount of time that cars spend stationary in parking structures, such as garages, buildings and streets, contributes to congestion and take up valuable space within our cities. This historical overview shows how policy and regulation has supported car use and ownership in the twentieth century, however as twenty-first century councils begin to change and implement new policy, with sustainability and shared transport at the forefront, these spaces and infrastructure will likely become vacant.

OWNERSHIP CHANGING INFRASTRUCTURE: COLLABORATIVE CONSUMPTION

Twenty first century consumers are moving from the traditional ownership structure of goods to a shared method where ownership is outsourced. This is called “collaborative consumption”, a collective sharing network that favours usefulness over ownership, community over selfishness, and sustainability over novelty (Botsman and Rogers 8).

Privately owned goods spend a lot of time redundant. As noted earlier, the private car spends 95% of the time parked. Sharing these goods when not in use can make for more efficient use. People have been sharing small assets like books, tools and small appliances since the beginning of civilisation, but technology and the internet now provide a framework for the sharing of larger assets among a wider network of people. Businesses such as AirBNB (2008) couch surfing for short term house sharing, and Mevo (2016) for short term vehicle sharing, are examples that serve this new market and are created to simplify the logistics of collective use via the internet. Traditional models of individual ownership incur a number of costs to the owner. For example car ownership costs include maintenance, fuel, insurance, road taxes and parking which can be a huge amount for the individual owner. When someone switches to a services ownership model (when they use a car owned by a company, rather than an individual), they only need to pay a small fraction of the costs per vehicle because

others use the same car. This also means that the shared car can be used for a greater amount of time. Martin and Shaheen have estimated this use to be up to 80% of the time, rather than the traditional 5% that a private car owner would use it, creating less need for off-site and kerb-side parking (Martin and Shaheen 6).

The traditional ownership of a house incurs similar high costs, such as maintenance, insurance, electricity and rates. A shared ownership method would mean that these costs can be shared among a group of people, with technology providing the basis to do so. An example of shared ownership in housing is time share housing, whereby a group of say five people can split the costs, and each owner can use the house for one fifth of the year. Furthermore in shared housing, the costs of services such as laundries, rubbish storage and outdoor leisure spaces, can be shared among users and the space used can be communally located rather than taking up valuable space in each apartment.

As people recognise the benefits that shared ownership has for the our built environment, opportunities arise architecturally for new ways of catering for the leftover space that car sharing or house sharing users create.

WELLINGTON CAR SHARE LOCATIONS

- MEVO CARS
- PLANNED MEVO CARS
- CITYHOP CARS
- PLANNED CITYHOP CARS

The current Wellington car share fleet consists of 14 cars as at December 2017.

10 Mevo Cars

4 Cityhop Cars

All information taken from Mevo.co.nz and Cityhop.co.nz

CAR SHARING AND INFRASTRUCTURE

This research is particularly interested in the architectural ramifications of collaborative consumption as services like car sharing create leftover space because cars spend less time stationary/parked.

Car sharing reduces the amount of parking needed in car parking buildings. Studies in Australia show that making one shared car available for residents in an apartment building leads 10 people to sell their car or withhold from buying cars (Shoup 266; Phillip Boyle and Associates 6). An extreme example of this concept is the Nightingale Scheme in Melbourne where the apartment buildings do not have car parking at all. Instead residents use car sharing services, with small numbers of parked cars in close proximity to the apartment building. This saves the developer money on the parking infrastructure, and the tenants, who save the cost of buying and owning a car, without eliminating anyone's ability to use a car when needed. (Shoup 267). The Wellington City Council shows its support for car sharing services through offering more transport options for city dwellers by allocating up to 100 car sharing-only parking spaces within the city (Wellington City Council, Car Share Policy 2016 4).

The collaborative consumption shared-ownership model has a number of positive effects on the built environment through a more spatially efficient use of cars within the city. Car sharing means that one car can be used by thousands of people, ownership costs are outsourced, and that same car can be used for as much as 80% of the time, compared to an individually owned car that one person pays for only for the car to spend 95% of the time parked. With fewer cars circling the city, and less time spent parked, car parking infrastructure becomes vacant. This thesis proposes what do with the leftover space.

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Fig.8 / Image of a MEVO car share vehicle showing required infrastructure. Image of a MEVO car share vehicle showing required infrastructure.

TYPES OF CAR SHARING

A - A

Commonly known as ‘back to base’ or ‘Round Trip’. Users pick up and drop off a vehicle at the same station. This is the method that the Wellington City Council currently supports in its Car Share Policy.

A - B

Commonly known as ‘one way’. This is a service in which users can drop off the vehicle at a different designated carsharing station to the one it was picked up from. Parking is more of a ‘free-floating’ approach and the technology to run systems for this are harder to develop. Studies have shown that fleet redistribution in one-way systems can constitute up to 40 percent of the total operating costs (Lane 27).

ZONAL

Commonly known as ‘within specific areas’. This is a variation on the A-B service where a car is free floating in a specific area and users can pick up and drop off the vehicle to and from anywhere within that zone, rather than a specific station.

SCOPE

The scope of this research project focuses on the ‘A-A’ type car sharing due to its current prevalence in Wellington City, and its support by the WCC. The infrastructure and business systems for other methods is not currently in place here and would warrant the need for a different set of variables and parking spaces altogether. Round trip car sharing is better understood, whereas one-way carsharing provides limited evidence of its impacts.

Λ Fig.9 / Mevo reserved parking at Clyde Quay Wharf

✓ Fig.10 / Infrastructure enforcing car share use only

MEVO WELLINGTON

- < Fig.11 / Mevo reserved parking at Clyde Quay Wharf showing electric charging infrastructure
- ^ Fig.12 / Mevo reserved parking at Clyde Quay Wharf

ADAPTIVE REUSE FOR HOUSING

As people recognise the benefits that shared ownership has for themselves and our city, and uptake of car sharing will likely increase, and vacant parking infrastructure will become available for other uses as fewer cars are used more and spend less time parked. This research is concerned with what to do with this leftover space within the realms of our general shift toward digitisation, outsourcing and mobility.

The Wellington CBD will continue to be the main employment centre of the region with at least 20,000 more jobs expected in the next 30 years (Let's Get Wellington Moving 13). With the highest employment density in New Zealand, Wellington City Council is planning for almost 50,000 more people to live in the city in the same time period, with approximately

15,000 of these living in the CBD (Let's get Wellington Moving 13). The city's current housing stock is facing a shortfall by about 3,900 homes with a further 37,000 homes needed to meet population growth by 2043 (Devlin, "Wellington City Council 'Pursuing Housing as a Matter of Urgency'" n.p.). The demand for housing in the CBD is high because of its proximity to jobs, and the council recognises this, urging developers to convert inner city buildings into housing (Devlin, "Council Asks Developers to Convert Inner-City Buildings" n.p.). This would also be great for the community of the city because the reduced car parking in the city can actually result in increased residents housing, restaurants, stores and offices – the very uses that make people want to come there in the first place (Mulley and Ison 375).

The opportunity to adapt our existing infrastructure raises the question of why we let cars occupy our valuable inner city buildings for the day time, only to leave them empty at night. Why can't people occupy them? The idea of adaptive reuse historically of the horse barn into garages for the automobile, albeit with a lot less infrastructure change, shows how the barn that housed animals was converted to store the automobile, and now that could be reversed to house people.

Recent earthquakes in Wellington have seen one inner city car parking building demolished for structural concerns, and two others closed until they are strengthened. With policy forecasting a reduction in car usage in the CBD and the need to strengthen the buildings anyway, the suggestion to convert them into housing instead of demolish comes at the right time.

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Fig.13 / Parking deck at the chosen site

DESIGNING TIME SHARE

The collaborative consumption model suggests that the design solution needs to be simple so conflict between ease of use and expression of individuality is managed, while keeping construction costs at an efficient amount. The collaborative consumption model can be applied to short term housing, where technology provides the platform for it to operate, while allowing a basis for personalisation of dwellings. Wellington is the perfect place for short stay housing because of the large number of public servants and politicians who live semi-transient lifestyles and need to be in close proximity to parliament, but also because the city is compact and very easy to get around and to be right in the heart of the CBD for events.

Designing for a short term but repeat clientele means that apartments need to be easily adaptable or personalized to ensure that the user can feel at home. Standardisation across the apartments design is essential to make the development cost effective. However too much repetitive design could result in the building being less attractive or disorientating to users. For example, this was for example understood in the design of railway housing for train workers in New Zealand in the 1920s where standardisation meant that employee's belongings would always be suitable, no matter which dwelling they were in, as all were the same (Campbell and Kelly 86). Standardisation today still works for apartment design, however people are demanding that the quality of the design and finishes are of more upscale and durable, with interesting textures and finishes in a bid to contrast

the simplicity of the standard design. These elements, combined with strategic accents and artwork, avoid clutter to feature a few really good pieces enabling the user to enjoy the space more and make the apartment feel more like home than a hotel room (Scoviak n.p.). Scoviak adds that large storage compartments are essential to enable the user to customise the space in their own personal manner by hiding away unnecessary belongings or items within.

The technological customisation of apartments is a continuously innovating industry that provides the user with an ability to have the apartment set up how they like it, before they even step through the door. Users can use their phone or computer to customise how the apartment functions in terms of lighting, curtains, TV

and sound settings so that they instantly feel more at home and store the settings. This works in the same way as a modern car share car system which can sense the user and adjust the mirrors, seat and steering position, radio stations and various other settings to the preset user's specification.

These ideas of personalisation in a portable and sharing context are essential to enabling the user to settle into any apartment, no matter where in the building they are located.

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LITERATURE REVIEW CONCLUSION

Research into the history of the car parking typology showed its development into a parking structure from the attached garage, paving way for the extended roadways into our houses. Growth in the use of the automobile and suburban sprawl meant that regulatory measures had to be imposed to control supply and demand of car parking in the city. Excessive supply of parking spaces, as a result of street expansion for transportation and infrastructure, reduced pedestrian space and may result in vacant or under-utilised infrastructure as collaborative/communal ownership methods change to a reduction in individual car usage. Adaptive re-use of these car parking buildings to satisfy a housing shortage in Wellington and is one solution that this research will explore.

The literature review summarises these ideas as issues of adaptive re-use, land and infrastructure use as a result of regulatory measures and the special implications of the automobile's use in our cities as ownership methods change.

The literature review examined the development of car parking in cities that has contributed to the inefficient use of this space. The following chapter examines relevant case studies in order to understand how issues around adaptive re-use and the combination of the automobile and living spaces and how a design solution could be formulated.

Fig.14 / Aerial photograph of Wellington City

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CASE STUDIES

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CASE STUDIES

INTRODUCTION

The literature review outlined the historical development of car parking as a spatiotemporal phenomenon and identified issues of land and infrastructure use as a result of regulatory measures and the spatial implications for the automobile's use in cities as ownership methods change. To further understand the implications of these ideas and issues, the case study section consequently examines examples of adaptive re-use of car parking buildings and other relevant precedents.

An analysis of these case studies provides an opportunity to identify specific design strategies and techniques for adaptive re-use of a car parking building, understand the formal limitations of car parking buildings and the contrast between the scale of car parking circulation and conventional apartment circulation.

1111 LINCOLN ROAD / MIAMI BEACH

Architect / Herzog & de Meuron

New build mixed use Car Park

P34

PARKHOUSE CARSTADT / AMSTERDAM

Architect / NL Architects

Conceptual new build mixed use Car Park

P38

PECKHAM LEVELS / LONDON

Architect / Carl Turner Architects

Adaptive re-use of existing Car Park

P42

WELBECK STREET CAR PARK / LONDON

Architect / JAA Architects

Adaptive re-use of existing Car Park

P48

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WELBECK STREET CAR PARK / LONDON

Designer / Colin Wharry

Adaptive re-use of existing Car Park

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FIAT FACTORY / LINGOTTO

Architect / Matteo Trucco + Renzo Piano

Adaptive re-use of Car Factory

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SLOW HOUSE / LONG ISLAND

Architect / Diller & Scofidio

Conceptual holiday house

P56

1111 LINCOLN ROAD / MIAMI BEACH / USA

1111 LINCOLN ROAD / MIAMI BEACH

Architect / Herzog & de Meuron

New build mixed use Car Park

Year / 2010

^ Fig.15 / Urban map of Miami Beach > *Google Maps*

^ Fig.16 / Urban close-up map of the car park in Miami Beach > *Google Maps*

This is an example of elegant mixed use car parking building in Miami Beach where the architects explored ideas of the car park as a figure of the city through sculptural means, steering away from the traditional dark and grungy parking buildings which, are typically scattered through cities.

Built in 2010, this design creates an integrated and welcoming building in the built environment. The form contrasts historical parking structures by providing open and light filled spaces as opposed to compact and dark spaces with low ceiling heights. The design is a car parking building with a range of floor to floor heights that allows light and other functions to be introduced in contrast to the traditional space allocation of the car. These functions include relaxing and enjoying the views of Miami Beach, and it is said that people are getting married there and having cocktail parties (Chin n.p.)(Fig 20). The developer, Robert Burle Marx chose Herzog & de Meuron to develop and upgrade the site

↘

Fig.17 / Perspective of the car park from the opposite corner

↗

Fig.18 / Differing concrete structure from the first floor

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of an old office building into a more civically orientated space with a variety of retail and hospitality spaces that contribute to a new cultural destination and central gathering space (Chin n.p.).

The building structure is sculptural, and casts different shadows through the vast open spaces, adding a sense of theatre to the facade as the shadow, vehicular and pedestrian movement passes throughout (Structure Fig 19) (Herzog de Meuron n.p.). The circulation spaces are open and exposed so that there is clear visual connectivity to help users distinguish the parking and pedestrian entry and exit, while also contributing to the overall form of the building (Fig 20).

Because this car parking building is a new build, rather than an adaptive re-use, elements such as the varied floor heights are harder to replicate in an adaptive reuse situation without extensive modification. This project offers design strategies such as structure as

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sculpture and how light can interact with internal spaces, and how pedestrian and vehicular circulation are used sculpturally to create mixed use spaces for the community.

Fig.19 / Circulation as sculpture

Fig.20 / Community gathering for activities

PARKHOUSE/CARSTADT / AMSTERDAM / THE NETHERLANDS

PARKHOUSE CARSTADT / AMSTERDAM

Architect / NL Architects

Conceptual new build mixed use Car Park

Year / 1995

^ Fig.21 / Urban map of Amsterdam > *Google Maps*

^ Fig.22 / Urban close-up map of the car park in
Amsterdam Central > *Google Maps*

The Parkhouse Carstadt is a 1995 study by NL Architects in Amsterdam of a hybrid structure that examines the relationship between cars and the city in the historic city context of Amsterdam. The unbuilt study explores the idea that the car has led to dispersal and the need for inner city parking, but is a solution that combines urban programme and cars (NL Architects n.p.).

The architects explore the creation of a new parking typology that integrates mixed use infrastructure with car parking. The building form uses the ramp as an extension of the road that wraps around itself, defined by the site boundary while making use of the spaces in-between and underneath, similar to that of the Fiat car Factory (Fig 23). This allows space to integrate social functions such as housing, retail, restaurants, offices and a convention centre, all in combination with the car park. The ramp doubles as parking space and circulation roadways, inclining to reach the city height limit and then ramping back down to the street level,

Fig.23 / Folded form of the building compared to spread out

so it is literally an extension of the street, bringing the automobile and the pedestrian together in the building by merging the two pathways that meet at the same destination. This contrasts traditional car parking as a flat surface with allotted parking spaces with a ramp taking cars to the next level and in doing so creates a typology that caters for future adaptive re-use without still looking like a car parking building.

The building is described as having no front or rear as an orientation to the street frontage, as the building overlaps itself and covers traditionally dead facade space in valuable advertising or shop display frontage, creating diversity and activity in the façade (Fig 24). This can also be seen as a wayfinding mechanism as you have clear visual communication of where things are located within the building.

This innovative precedent provides a good understanding of the potential relationship between

< Fig.24 / Building form with advertising on facades

> Fig.25 / Floor plans concepts 1 thru 4

∨ Fig.26 / Site and roof plan

the car and the building in a city and how rethinking the circulation of the core user can provide a new mixed use typology. Circulation within the building is seen to provide an efficient extension of the street that allows the 'off-ramp' or parking spaces to be a destination function. Finally, the case study provides insight in how to make use of the façade as a promotional tool or wayfinding mechanism.

PECKHAM LEVELS / LONDON / ENGLAND

PECKHAM LEVELS / LONDON

Architect / Carl Turner Architects

Type / Adaptive re-use of existing Car Park

Year / 2017

^ Fig.27 / Urban map of London > *Google Maps*

^ Fig.28 / Urban close-up map of the car park in London Central > *Google Maps*

This case study is a project by Carl Turner Architects for the adaptive re-use of an existing car parking building in London into affordable studio spaces for creative people. The building is located in Peckham, London where new development is predominantly focused on housing rather than creative work spaces.

The aim of turning the building into a space that is more permeable than a specifically art-centric building is achieved through the insertion of around 30 private studio spaces, each the size of a normal car parking space, with larger circulation spaces (Wood n.p.). The use of the parking space dimensions demonstrates the ability of this module to facilitate a new use. Turner plans to convert the ground level of the building into a public market for fresh produce, and levels 1 to 4 for the private studios, with 20 shared studios containing co-working spaces and offices that require a more controlled environment (Wood n.p.). The adaptive reuse began in March 2016 and was opened

in December 2017, showing the amount of time that a conversion like this can take.

The benefit of designing the modular insertions to be the same size as a traditional car parking space meant that the small and lightweight design of the interventions could be used as a framework and then be replicated in almost any other parking buildings, although contextual restrictions such as light and floor heights may result in slight adaptation of the modules in other buildings (Carl Turner Architects n.p.). The modular partitions are constructed of cheap and lightweight timbers that are designed to be able to handle all kinds of art and enable exhibition in the spaces. The use of cheap materials and simple modular approach supports individuality and personalization, mass production and

Fig.29 / Section of proposed conversion into creative workspaces

can be easily reverted back to the original state for a new user. The existing building remains largely untouched, with only the lightweight timber structures constructed inside, and windows inserted from the inside, removing the need for external scaffolding to limit the natural resources used in the transformation (Tucker n.p.). The architect states that he likes that the building is still going to look like a car parking building so that it doesn't lose the sense of mystique that it has, so keeping the heritage and fundamental form of the building is important to the reuse (Tucker n.p.).

Turner plans to convert the inner central spaces of the building, where natural light is limited, into programmes that don't require natural light, such as workshop facilities, photographic and CNC labs, and a kiln room. The creative spaces that require natural light and air are located around the perimeter of the building, adding vibrancy to the facade through the windows.

^ Fig.30 / Render of proposed internal communal spaces

^ Fig.31 / Render of proposed internal circulation spaces

With a car parking building, the specific lighting and structural qualities can dramatically restrict the spatial arrangement of the programme in an adaptive re-use situation. This case study provides a good

understanding of a modular system for adaptive reuse and the minimal intervention needed to provide transformed spaces for the community. It shows that even the use of cheap construction materials can allow for a quick transformation that can be easily replaced in the future if the creative spaces need to be changed. The mass produced modular approach suits a time share context as it allows for standardisation across all units and allows the user to feel familiar even if they are allocated a different apartment to the one they are used to.

- ↙ Fig.32 / Section of proposed modular creative studio spaces
- ↗ Fig.33 / Section of creative studio spaces and workshop at ground level

WELBECK CAR PARK I & II / LONDON / ENGLAND

WELBECK STREET CAR PARK I / LONDON

Architect / JAA Architects

Adaptive re-use of existing Car Park

Year / 2017

P59

WELBECK STREET CAR PARK II / LONDON

Designer / Colin Wharry

Adaptive re-use of existing Car Park

Year / 2009

P62

^ Fig.34 / Urban map of London > Google Maps

^ Fig.35 / Urban close-up map of the car park in London Central > Google Maps

Located in central London is the well-known Brutalist Welbeck Car park building, designed by Michael Blomfield and Partners in 1971. It features 360 parking spaces over eight split levels. Shiva Hotels, the new owners of the building, plan to demolish and build a new 10 storey hotel on the site because they say that the low floor heights are not suitable for an adaptive re-use (Frearson n.p.). There are two adaptive reuse case studies that have been proposed for this carpark: the first that proposes a hotel solution instead of demolition, and a second that proposes an adaptive re-use to a childcare facility.

Fig.36 / Original building computer rendered > JAA Architects

Fig.37 / Concept design for adaptive reuse into a hotel > JAA Architects

WELBECK CAR PARK I / LONDON

JAA ARCHITECTS

The first proposal by JAA is described by the architects as a celebration of the Brutalist car park. They say that the building could be adapted to contain a new hotel within the existing fabric, however their design experimentation found that the existing low ceiling heights and down-stand beams wouldn't be fit for purpose. Their proposal moves the floor levels up or down behind the precast concrete facade, as this was the original reason from the developers for demolition (JAA n.p.). By repositioning the floor levels to align them with openings in the façade, larger floors at ground level and in the middle of the building are created for restaurant spaces (Fig 39). Adding extra floors onto the top of the building, that are set back from the façade, doesn't diminish the existing beauty of the facade. The rooftop addition borrows design elements such as rhythm and materiality from the

^ Fig.38 / Elevation along Welbeck St of concept design for adaptive reuse into a hotel by JAA Architects > JAA Architects

existing facade below to contextually embed itself in the building. The addition is proposed to make the building more visible in terms of commercial ambitions and allows for this part to be exactly suitable for the new use (JAA n.p.).

The architects describe the romanticism and quirkiness of how a hotel in a car park building might appeal to visitors and how the right marketing would create a place that houses the memory of the automobile and its house within the city (JAA n.p.) This case study shows that an adaptive re-use solution for temporary living within low floor heights can be achieved through altering the floor heights slightly to create more comfortable living spaces and meet code requirements, as well as larger communal spaces where the floors don't align with the façade panels. The design also shows how

a stepped back rooftop addition can contribute to the celebration of the beautiful Brutalist façade below.

Fig.39 / Section diagrams showing proposed movement of floors and its effects > JAA Architects

Fig.40 / Process diagrams of conversion process > JAA Architects

WELBECK CAR PARK II / LONDON

COLIN WHARRY

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The second adaptive reuse proposal for Welbeck Car Park is an award-winning project that explores a speculative position about re-use and education, and the duality between the qualities of the existing structure and the fragility of a child. Designed by Colin Wharry in 2009, the university student project may have been conceived without knowledge of the proposed demolition of the building it is based in.

The building's Brutalist design is symbolic of the carbon driven economy and the designer has set about keeping the heritage value by enhancing the way it is presented to the street. The design explores ideas of wrapping the building in an opaque skin that attempts to adjust the focus of the occupants, while still exhibiting the interwoven Brutalist facade panels. The secondary purpose of the facade skin is to allow for free spatial arrangement in terms of pressure and release of internal spaces in relation to the city. The building has proposed very low floor to ceiling heights of 2150mm, so the programme of a children's education facility fits well in the scale of the building's spaces. Larger volumes are created by cutting into floor plates to allow light and air to enter in entry spaces, providing better atmospheric quality spaces for busy spaces, and more intimate

^ Fig.41 / Physical model image of interior parking deck
> Colin Wharry

^ Fig.42 / Perspective view of the physical model from
the street

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education spaces are located in the lower height parts (Wharry n.p.).

Though born out of curiosity, rather than necessity to save the building from demolition, this design results in a more sustainable solution than the hotel re-use because it finds a function for the building that fits the structural constraints instead of dramatically altering the building.

Overall, the two adaptive reuse proposals for the Welbeck Car Park address the primary design problem of the low floor to ceiling heights in different ways, by either moving the floor plates or finding a suitable building user. The first has the budget to alter the building drastically and the second opting for a solution with less alteration, while both schemes accept and embrace the historic identity of the car park building through preservation of the Brutalist façade design and designing new additions that use similar rhythm and materiality.

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Fig.43 / Section and elevation showing low ceiling heights

Fig.44 / Elevations showing before and after of facade intervention

Fig.45 / Physical model image of interior ground floor
> Colin Wharry

FIAT FACTORY / LINGOTTO TURIN / ITALY

FIAT FACTORY / LINGOTTO

Architect / Matte Trucco + Renzo Piano

Adaptive re-use of Car Factory

Year / 1985

^ Fig.46 / Urban map of Lingotto, Turin > *Google Maps*

^ Fig.47 / Urban close-up map of the Fiat Factory in Lingotto > *Google Maps*

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A car factory can provide an understanding of the way that a car might interact with a building's interior circulation spaces by looking at how a car moves through the building. The Fiat factory was a multi-storey production line in Lingotto, Turin which opened its doors in 1923 as the world's largest car factory. It was the birthplace of over one million cars until its closure in 1982 as the factory had outgrown itself (Walters n.p.). The stacked assembly line meant that the building could take up less ground area than a conventional car factory, creating interesting circulation spaces as the line weaved through the building. This case study is examined to learn from its use of a large atrium space to bring light deep into the middle of the building, and how the building is an extension of the street through to what once was the end of the production process, the rooftop race track.

The design of the vertical assembly line means that the track curves backwards at each end towards the

start, ramping up to the floor above, instead of a traditional flat production line. The production line process finishes on the rooftop, where there was a one kilometre long testing race track for the cars (Walters n.p.). The space in-between the assembly line is used as a central outdoor atrium space that provides light and airy outdoor courtyard relaxation, with an internal atrium around the ramps. The circulation ramps curve up and around to the next floor, supported by a lattice of sculptural concrete structure visible from underneath. This creates an exhibition space where the cars are on show as they weave through the elegant circulation system. This space could have been filled in with floor space to maximise the production line floor space, but by exposing the structure and ramps in the form of the atrium, light is introduced right down to the ground floor, providing better visual connectivity throughout. The sculptural structure also contrasts

Λ Fig.48 / Rooftop racetrack and internal courtyard

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the rigidity of the building with the fluid form of the circulation spaces. The building is a clear representation of a car manufacturer using the currency of modern architecture as a method to promote their brand by creating a landmark (Bell 101).

After the factory was decommissioned, architect Renzo Piano was approached in 1985 to convert the building into a large public space for the city. The once efficient vehicular production line was turned into a focal public building containing retail, hotels, theatres, with the most striking exterior feature being a meeting room in a glass bubble attached to a helipad on the rooftop. The conversion was extensive in altering the interior of the building to fit the new programme, and the long and narrow form meant that it was easy to divide up the spaces, resembling the production line process as the car moved from section to section. The retention of the spiraling ramps allows people to walk at a more leisurely and eventful pace throughout the building while harking back to the historical context of the building.

This case study provides an understanding of how the use of circulation as function, supported by

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sculptural structure, can provide an efficient means of moving through a building that accommodates the scale of the automobile. The spaces in-between can be used for pragmatics, such as services, light and air to be circulated, in an elegant and visually connecting manner. The adaptive nature of the car production line as it changes with technology over time provides a good foundation for the future adaptive re-use into a mixed use building, and preservation of the building form allows for the history and brand of the building to be kept.

Fig.49 / Internal circulation ramps as sculpture

Fig.50 / Aerial view of the Fiat Factory

Fig.51 / Section or Renzo Piano conversion

SLOW HOUSE / LONG ISLAND / USA

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SLOW HOUSE / LONG ISLAND

Architect / Diller & Scofidio

Conceptual holiday house

Year / 1989

^ Fig.52 / Urban map of Long Island > *Google Maps*

^ Fig.53 / Floor plans of the Slow House

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The Slow House is a holiday house designed in 1989 by Elizabeth Diller and Ricardo Scofidio that explores ideas of travel and arrival, the passage of escape from the busy world we live in, and the relationship between the windscreen and the television screen as communication systems.

Its design, a curve in plan, provides a windscreen vision, a continuously delayed promise of another view, another angle (Colomina 36). The arrangement of the house enacts the spatial transition from the car at arrival to the singular entry door, a narrow threshold where you are confronted with two pathways, one that takes you to the sleeping quarters and the other that moves upstairs to the living and kitchen areas. The split is important in continuing the familiar choice of travel between the highway and off-ramp until the final destination is reached, while also providing visual communication in all internal spaces and distinguishing between public and private spaces. The final point in the travel and escape from the city, where the windscreen view returns in the form of large windows showing the horizon, and the television screen in front, acts as a means of slowing down speed for optical desire (Forman 8). The television sits in front of the long panoramic windows, juxtaposed

^

Fig.54 / Physical model of the slow house showing the change of view from the automobile through the house to the landscape view > Diller & Scofidio

like the rear view mirror in front of the windshield. You can see the past (news) or the future, like you look at yourself in the mirror. The change from your screen, in today's terms: the phone screen, your computer screen, from your car windscreen, to the apartment wind screen (Colomina 25).

As a holiday home the Slow House is occupied for short periods of time, but it can also conceptually be described as an extended time period of inhabitation where the video view takes you back to the past, or future (Forman 48). Automotive qualities such as the windscreen and the ritual of escape and arrival are adapted into architectural qualities to slow you down as you enter the building, while also changing your focus from where you have come from in the busy world, to a more relaxing and self-focused environment.

The Slow House's use of the single entry threshold, as a method of exaggerating the sense of arrival at the holiday home, creates a focal transition point from work to holiday. Architectural elements such as the split and curve in the floor plan work to simplify the process and ritual of arrival at the holiday home.

^ Fig.55 / Physical model of the slow house showing the change of view from the automobile through the house to the landscape view > Diller & Scofidio

CASE STUDIES CONCLUSION

The case studies offer an understanding of design objectives and principles supporting ideas of adaptive re-use of a car-parking building, the formal limitations of car parking buildings and the contrast between the scale of car parking circulation and conventional apartment circulation.

The adaptive re-use examples show that the introduction of an open or closed central atrium space can allow for a better quality of movement through the building. Herzog and de Meuron's new build car park and the Fiat Factory show that the atrium space can also be used to house services and facilitate circulation spaces to create visual connectivity throughout the building. They also use structure and circulation to create interesting, sculptural and fluid spaces within the rigidity of the parking building, and the car factory re-use uses this technique and introduces functions to ensure efficiency of use within the building.

The Peckham and Welbeck adaptive re-use projects outline how to address the typically low ceiling heights of parking buildings. The least sustainable strategy is to move the floor plates within the building to suit the new programme, while keeping the façade as a celebration

of the history and memory of the building. To make the conversion more sustainable, parts of the building taken out such as floors or ramps could be used on the rooftop to allow for more programme and less wastage. The second outcome suggests finding a programme that suits the low ceiling heights such as a childcare facility, however in the case of this research where housing is to be the function, less frequently used spaces can be located in areas with unaltered lower ceiling heights.

The Slow House provides an understanding of how to architecturally create and exaggerate the sense of arrival in a housing context. The use of a single point of entry along the façade and simple articulation of the floor plan helps to orientate the focus of the user towards the final stage of arrival and relaxation. This contribution to the re-use of a car parking building highlights the importance of how the user enters and finishes their journey within the internal living spaces of the building.

4

THE STREET

\ 61

ON-STREET PARKING

PARALLEL

30° ANGLE

45° ANGLE

The street provides a space for transportation by means of buses, trucks, cars, bicycles and pedestrians. However also supplying the necessary associated infrastructure and parking, while allowing space for these modes to move freely throughout our cities, can be a complex task. This chapter analyses on-street parking allotments to consider the consequences and ramifications of car sharing services on the street.

PARALLEL

+ / -

PARALLEL

ADVANTAGES

Least impediment to the orderly and regular flow of traffic along a road.

Minimises accidents associated with parking and unparking manoeuvres compared to angled parking.

Best system for use where parking must be provided and street capacity must be kept to a maximum as it requires less road width for parking and manoeuvring.

DISADVANTAGES

Cannot accommodate as many spaces as angle parking

Some cyclists may ride into an opening car door

Note: All information taken from table 5.1 of AS 2890.5:1993

60° ANGLE

90° ANGLE

ANGLED

+ / -

30° ANGLE

ADVANTAGES

The parking manoeuvre is generally more easy than parallel parking

90° is the only angle other than parallel parking that can be accessed from both approach directions.

DISADVANTAGES

A wide roadway is needed to accommodate spaces

Unused space at the end of each space

Depending on the angle, it may be difficult for drivers parked to enter the traffic stream

Not suitable next to cycle lanes unless there is extra clearance for parking manoeuvres

OTHER CONSTRAINTS

KERBSTOPS

Kerbstops must be between 90-100mm in height and at least 2m in length, 600mm from the kerb.

Kerbstops must be used in angle or front in parking when the footpath is less than 2m in width, AS 2890.5 Clause 3.3

GRADIENTS

Fall not exceeding 1:40 in any direction of parking. Or 1:33 if the surface has a bituminous seal.

Measured parallel to the angle of parking. 1:20. 5%
Measured in any other direction, 1:6 1 in 6. 6.25%

Minimum gradient for drainage: 1 in 100 (1%) for outdoor, and 1 in 200 (0.5%) for covered

HEADROOM

Minimum height from floor to obstruction above is to be a minimum of 2200mm. This includes consideration for vehicle heights and person heights

CAR SHARE INFRASTRUCTURE

Charge ports: The Audi A3 e-tron uses a compact wall mounted charger that is capable of using either 120V or 240V electrical source. The charge port on the car is located on the front of the car behind the Audi circles badge in the front grille. This means that the charger is best located directly in front of the car to keep charge cable length at a minimum.

Kerbstops or paintings on the ground mark out the reserved space for car share vehicles only.

- ^ Fig.56 / Mevo car share parking space in use showing charging infrastructure and unused floor space at the front
- < Fig.57 / Charging port on the front of each Mevo car

SPACE LEFTOVER

PARALLEL

30° ANGLE

45° ANGLE

60° ANGLE

90° ANGLE

The yellow in the diagrams above highlight the large amount of leftover space that on street parking leaves even when a car is parked in the space*. The parallel and perpendicular arrangements result in the least amount of leftover and the angled arrangements have the most. Granted that some of this space is needed for getting in and out and loading of the vehicle, parts at the front and back are excessively large for the 30° arrangement.

This poses the question of what can be done with this leftover space when the car is parked, while also making use of the space when the car is not parked?

*The car used to assume the space taken up is Mevo's Audi A3 hatchback. Please see appendix A1 for specific dimensions.

Λ

Fig.58 / Typical parking arrangements used in the streets of Wellington showing space leftover when a car is parked

THE STREET INTERVENTION

The street has been taken over by the car as a transportation thoroughfare as well as a storage place while the car is not used. Given the ability of the street in our bustling and compact city to be shared, the inefficiency of the parking space in the street is explored in this phase to make the best use of street spaces for both the car share car and the pedestrian.

Realising that the street is a void between buildings that only uses the ground plane for occupation, the opportunity to increase the space for the pedestrian is explored here by creating a platform above the parking space. The raised ground plane provides space for activity above the street, while covering the busy road below where cars are parked and infrastructure is located. This

provides better access light penetration to social spaces in the street, however doesn't address what is done to the parking spaces when the cars are not occupying them.

<

Fig.59 / Sketch plan of Cuba Street closed off to cars other than car share vehicles provides more space for social function.

^

Fig.60 / Sketches of a raised platform above the street for car share cars to be driven and parked below

working zone

Car (shop) park

On foot park

pubs park

Style Park

CUBA ST

1:200
1:500

Shopping day

Passing

15 low
show cars

WILLIS ST

1:500

- ^ Fig.61 / Previous Pages / Sketch experimentations of interventions in Cuba and Willis streets. These experiments look to integrate a combination of car sharing services and social function.
- ✓ Fig.62 / Sketches exploring removing car parking at street level and stacking at one end to provide more space for social function.
- > Fig.63 / Sketch of stacked car parking structure with integrated social function on Wakefield St
- ✓ Fig.64 / The Gantry, Silo Park in Auckland

The Gantry, located in Silo Park in Auckland is a steel framed structure that provides elevated space for people to populate above Silo Park. The nine metre height of the structure provides elevated platforms for better views of the Auckland waterfront and city and a basis for events.

The above sketch explores the combination of a stacked car sharing system and viewing platform in Wakefield street above existing parking spaces.

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FILLING THE STREET

The steel framed structure as a street intervention is explored as a siteless physical model using a modular structure as the basis for slotting programme in where applicable. A steel grid system of 1 metre cubes is constructed out of wire in a concrete base and then using photography and sketching to superimpose concepts of program such as car share parking, bicycle parking, cafe, bench seating, game spaces, reading spaces, community

gardens, advertising, rain and solar collection systems, that could be slotted into the system, and how parts could be removed for a larger occupiable void could be created. The yellow accents represent advertising platforms, or colour can introduce vibrancy to the steel structure and potentially parts of the city that lack good light.

^ Fig.65 / Foundation Making: The mold for the concrete base (road) is cast and a sheet of acrylic with holes for yellow taped bunged nails slot in to form the foundations of the steel structure.

CONCLUDING THE STREET

I began the research by exploring the collaborative consumption model of car sharing, at street level through an urban design lens. The purpose of this was to design and test solutions for the space leftover by car sharing services, seeking opportunity for intervention that also provide better public spaces for the pedestrian in the car dominated landscape. I began designing upward, filling the street voids between buildings with industrial style modular structure (PT street sketches), stacking parked cars and introducing social function where I could.

From these studies, I found that the street was always going to be used as a busy network for transportation and moving around, and that the real waste of space was where cars are parked in buildings. The design tests were creating more obstruction to the flow of pedestrians,

cyclists and vehicles than intended. The consequences of car sharing services were in the buildings rather than the parking spaces on the street. This led to the next stage, the exploration of an adaptive reuse solution to a car parking building into apartments.

<

Fig.66 / Locating Wellington City on a map of New Zealand

5

SITE ANALYSIS

\ 85

WELLINGTON LOCALE

As the population increases in Wellington, the capital city of New Zealand and densification occurs, there will be a greater housing shortage than we are facing right now and more jobs created and vacated. This means that there will also be a need for housing in the CBD so that people can be near these jobs and other events that occur in the city. Being the capital city means that the city is filled with politicians, many of whom primarily reside elsewhere in the country, but spend a lot of time away from home, for short stays, or for longer stays too. Our city is the perfect place for short stay housing as it is compact and very easy to get around, for politicians to get to parliament, or for other visitors to be right in the heart of the CBD for events.

The following pages locate and evaluate three parking buildings in the CBD, located on Stout St, Victoria St, and Bond St, to determine a chosen site to test the research on.

> Fig.67 / Satellite imagery highlighting Wellington City >
Google Maps

CAR PARK SITE(S)

A

B

C

9 - 13 STOUT ST

4 WILLESTON ST

28 BOND ST

9 - 13 STOUT + BALANCE ST CORNER

KEY STATS

type	/	split level
floor - ceiling height	/	3m approx max. 2.5m min
floors	/	12
car parks per floor	/	28
total car parks approx	/	336 car parks
vehicle circulation points	/	2 x sections of ramps
pedestrian circulation	/	2 x stairwells in opposing diagonal corners. 1 with a lift

High ceilings
 Good pedestrian circulation
 Facade differentiation and irregular
 Good lighting to all parts of building
 No walls between split levels lets light and viewshafts through.
 Good access to public transport
 Retail levels below for amenity
 Good North facing sunlight absorption
 Linear floor plan good for reuse
 Proximity to parliament

Floor decks on an angle
 High 1.1m balustrades surrounding exterior
 Retail below can detract from overall building design
 No extra site coverage for external services

- Fig.68 / Google street view image of the building at street level
- Fig.69 / Authors own context images inside the car park building

4 WILLESTON + VICTORIA ST CORNER

KEY STATS

type	/	split level
floor - ceiling height	/	2.4m approx max
floors	/	13
car parks per floor	/	33
total car parks approx	/	444 car parks
vehicle circulation points	/	2 x sections of ramps
pedestrian circulation	/	1 x stairwells in opposing diagonal corners. 1 with 2 lifts

Floor decks flat
 Facade simplicity
 Low 0.9m balustrades surrounding exterior
 Good lighting to all parts of building
 Street level potential for retail level or other amenity
 Linear floor plan good for reuse

Low ceilings but meets code
 Average pedestrian circulation
 Facade regularity and boring
 Walls between split levels blocks light and viewshafts through.
 Little North facing sunlight absorption
 Less access to public transport
 Tall surrounding buildings block sunlight
 No extra site coverage for external services

/\ Fig.70 / Google street view image of the building at street level

> Fig.71 / Authors own context images inside the car park building

28 BOND + LOMBARD ST CORNER

KEY STATS

type	/	split level
floor - ceiling height	/	2.2m approx max
floors	/	13
car parks per floor	/	23-27
total car parks approx	/	316 car parks
vehicle circulation points	/	2 x sections of ramps
pedestrian circulation	/	1 x central stairwell with 1 x lift

Floor decks flat
 Good central pedestrian circulation
 Facade simplicity
 Low 0.9m balustrades surrounding exterior
 Good lighting to all parts of building
 Good North facing sunlight absorption
 Good access to public transport
 Street level potential for retail level or other amenity
 Good extra site coverage for external services

Low ceilings
 Facade regularity and boring
 Walls between split levels blocks light and viewshafts through.
 Non-linear angular floor plan bad for reuse
 Curved vehicle ramps bad for reuse

- Fig.72 / Google street view image of the building at street level
- Fig.73 / Authors own context images inside the car park building

CHOSEN BUILDING

Building B is located on the corner of Willeston and Victoria Street. Wellington has 14 parking buildings in use, and 2 that are not. They all have similar concrete column and beam constructions with similar, very low ceiling heights and a general lack of daylight entering the middle sections of the building (daylighting studies can be found in appendix 3 on pp240). This particular building is chosen to test the design response as a representative for other parking buildings, and is chosen for its CDB location, proximity to transport, amenities and businesses, where car sharing is in high demand. Physical qualities such as its symmetrical plan and good light penetration around the perimeter, as well as its low ceiling heights which are low but meet code for living in and are representative of most car parking buildings.

- ^ Fig.74 / Authors own image of the building from street level
- > Fig.75 / Perspective diagram of the split level building

SITE PLANS

KEY NOTES ~

11 - 21 VICTORIA ST
ACCESS OFF WILLESTON ST
444 CAR PARKS
BUILT 1982

1.5M ABOVE SEA LEVEL
50 L x 33 W x 20 H APPROX
1650 m² APPROX SITE AREA
6 SPLIT FLOOR LEVELS

EXISTING SITE PLAN

EXISTING FLOOR PLANS

GROUND FLOOR PLAN

TYPICAL PARKING LEVEL FLOOR PLAN

ROOFTOP FLOOR PLAN

SECTIONS

SECTION DD PARKING DECKS

SECTION EE CIRCULATION

SECTION AA PEDESTRIAN CIRCULATION

SECTION BB SHEAR WALL

SECTION CC VEHICULAR CIRCULATION

WEST

EXISTING E
SOU

ELEVATIONS

UTH

EAST

0m 2m 10m 20m

6

CONCEPT DESIGN

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CONCEPT DESIGN

The concept design phase for this research proposes an adaptive re-use of the selected car parking building into apartments. It explores ideas of modular infill and how car sharing services might co-exist with a living arrangement through the assumption that the car can drive by themselves.

All images in this chapter were submitted as part of the 75% assessment.

>

Fig.76 / Perspective diagram of the split level building

GROUND FLOOR PLAN

The ground floor of the car parking building remains within the same building footprint and retains the raised level one section (highlighted grey in plan). Car share cars keep the same one-way route as the existing building, however as there are no drivers in the vehicle beyond entry foyer one, from then onwards the car drives itself up towards its parking space. Pedestrian and cyclist visitors enter to the center of the building and take the newly inserted southern lift or stairs to their apartment.

7 Fig.77 / Typical ground floor plan

TYPICAL APARTMENT LEVEL FLOOR PLAN

The typical apartment levels contain six apartments on each split level and are mirrored onto the higher raised split level (highlighted in grey on the plan). Car parking allocation for four cars on each level and one space for communal activity is located near the ramps and features natural light and ventilation. The middle apartments on each level contain a 'car corridor' through the living portion of each apartment where the autonomous car share cars drive themselves through to reach their parking spaces. These doors then close off afterwards to secure the apartment (a detailed explanation of the 'car corridor' is located on page 120). The car ramps have been shortened in width to allow pedestrian circulation to be added beside them.

7

Fig.78 / Typical apartment level floor plan

NORTH APARTMENT

The entry into the two bedroom apartment is through a raised floor that hides essential services and ventilation pipes. High level windows around bedroom and living areas attempts to bring light deep into the apartment.

KEY NOTES ~
FLOOR AREA ~ 50m²
BEDROOMS ~ 2

NORTH APARTMENT

NORTH APARTMENT FLOOR PLAN

NORTH APARTMENT LONG SECTION

NORTH APARTMENT SHORT SECTION

SOUTH APARTMENTS

Entry to the three bedroom apartments through a raised floor that hides essential services and ventilation pipes, then step back down into the living areas. High level windows around bedroom and living areas attempts to bring light deep into the apartment.

KEY NOTES ~

1.
FLOOR AREA ~ 80m²
BEDROOMS ~ 3
2.
FLOOR AREA ~ 83m²
BEDROOMS ~ 2

SOUTH APARTMENTS

SOUTH APARTMENTS FLOOR PLAN

SOUTH APARTMENTS LONG SECTION

SOUTH APARTMENTS SHORT SECTION

MIDDLE APARTMENTS

Entry to the apartments through from the back corridor and are greeted with a hallway view towards the facade and view. High level windows around bedroom and living areas attempts to bring light deep into the apartment. Car corridor opens and closes to allow cars to drive themselves through (further explained on following pages).

KEY NOTES ~

- 1.
FLOOR AREA ~ 104m²
BEDROOMS ~ 3
- 2.
FLOOR AREA ~ 63m²
BEDROOMS ~ 2

MIDDLE APARTMENTS

MIDDLE APARTMENTS FLOOR PLAN

MIDDLE APARTMENTS LONG SECTION

MIDDLE APARTMENTS SHORT SECTION

CAR SHARE DRIVE THRU

As the car autonomously drives through the apartment to its parking space, The doors along the corridor close to let the car through, securing the apartment from other apartments. Immediately after the car passes through, the doors open for use by the apartment, securing it off from other apartments.

Social pragmatics limit this design because there is something not so nice about a car driving through your apartment right when you need to use the bathroom. There are no pollutants from the car itself as they are electric, however the car's tyres may leave remnants in the corridor when it drives through. For this design to be successful, there needs to be further development of the warning systems, pollution and other social pragmatics.

- Fig.79 / Middle apartments floor plan showing the path taken by car share cars in order to park in the building
- Fig.80 / Typical apartment levels floor plan showing the path taken by car share cars in order to park in the building
- Fig.81 / Apartment doors open in the 'living arrangement' to secure each apartment off from each other
- Fig.82 / Apartment doors closed in the 'car hallway arrangement' to secure allow the car share cars to drive through, while securing the apartment
- Fig.83 / View from the hallway back towards the living spaces with the doors in the 'living arrangement'

7:00 AM ~ 25/12/2016

CIRCULATION

The swinging doors could be seen as an inefficient use of space for living because it is primarily designed for use by the car to drive through, however when the doors are open for the apartment, the corridor space is just empty. Here an experimentation of doors with added function is explored through the addition of cupboards, shelves, tables or windows to make better use of this space.

Fig.84 / Functional door experimentations combined to show how each one might interact with the other

Fig.85 / Functional door experimentations individually separated

APARTMENT LIVING

CAR HALLWAY

- Fig.86 / Functional door experimentations combined in the 'living arrangement', closing off the car hallway and securing each apartment from the other
- ⋈ Fig.87 / Functional door experimentations combined in the 'car hallway arrangement', closing off the apartments and securely allowing the car share car to drive itself through
- ↗ Fig.88 / This Page > Functional door experimentations individually separated

<

Fig.89 / Circulation diagram showing the relationship between pedestrian circulation in the stairs and lifts and how the car share car moves through the building

SECTION CC VEHICULAR CIRCULATION

SECTION DD ALL CIRCULATION

- < Fig.90 / Far Left > Render showing apartment access corridor from South lift and stair access. The corridor's central position means that there is no natural light reaching these spaces
- < Fig.91 / Render showing visual connectivity back towards the South lift and stair access.
- < Fig.92 / Render showing visual connectivity between the split levels along the corridor
- > Fig.93 / Top > Section of corridor showing split level and visual connectivity portholes. Bottom > Key floor plan showing location of renders

ROOFTOP CONCEPT

- V Fig.94 / Sketch highlighting the viewshafts from the rooftop of the car parking building
- > Fig.95 / Sketch of possible programme for the rooftop

Rudolf M. Plan. ①

 

CONCEPT DESIGN CONCLUSION

The concept design phase set out to explore how a residential adaptive re-use solution for a car parking building might work as a result of the consequences of car sharing services.

The design process for this phase consisted of iteratively sketching ideas around modular infill that fit within the typical parking space and structural grids, and then digital modelling to further refine the planning in plan and section. This process worked well to determine the finer details of how the re-use solution can be slotted into the existing building, however it was hard to explore what the qualities of light might be in the interior spaces in CAD, and physically modelling may have made this process easier.

Issues that arose through the development and refinement of the floor plan are as follows:

Light not getting into the back bedrooms of the apartment.

Car corridor and its social pragmatics needs refinement and will be shelved for the final design.

Hard to locate services in the building without a large corridor or riser for them to follow.

Pedestrian circulation has a rabbit warren quality to it.

7

FINAL DESIGN

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DEVELOPED DESIGN

Through testing the workings of an adaptive re-use of 4 Willeston St into apartments in the concept phase, a number of design issues were identified. These were: issues surrounding the quality of light within the building, integration of services and better circulation throughout the building have been highlighted.

The concept design phase proposed a transitional concept where parking for car share cars is coexisted with a residential function. The idea is exciting but would need further development to become a system that works socially.

The final design took its lead from the site analysis and begins by testing the light qualities of the building

through location sun studies of the building and its surrounding buildings at various times of the year, prompting changes to the form of the building that set out to successfully integrate services and circulation. Development of the ground floor and rooftop communal spaces using ideas of collaborative consumption are explored to contribute to the experience of using time share housing.

SUNLIGHT STUDY

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The aim of commencing design with a focus on sunlight is to bring light into the centre of the building right down to ground level, not necessarily to bring sunlight to the ground, but natural daylight. The concept design did not achieve this and bedrooms were 16m away from the nearest natural light source.

Taking inspiration from the Fiat Factory, and cutting a huge atrium down the middle of the building, removes the main structural system of the existing building, namely the shear wall that spans longitudinally down the building and the shorter latitudinal shear wall is removed. To provide structure for this, the building is split into two buildings with their own structural systems. This works well as the building is split level and has different masses. Connections between the two are seismically jointed.

A central atrium allows light to access the elevations of the atrium the same as it does on the East and West

facades. The ground level of the building will provide for circulation, visual connectivity and services distribution throughout the building.

Fig.96 / Image showing the internal circulation of the Fiat Factory and how light enters deep into the building in the atrium

Fig.97 / Rooftop view of the Fiat Factory race track and internal atrium courtyard

PM / WEST

EAST / AM

SUMMER SOLSTICE 22/12/2016

PM / WEST

EAST / AM

WINTER SOLSTICE 22/06/2016

SUMMER SOLSTICE 22/12/2016

WINTER SOLSTICE 22/06/2016

COMBINED WITH ATRIUM

FLOOR PLANS

> Fig.98 / Design solution floor plans >
Close-up and labelled floor plans are
on the following pages

GROUND FLOOR PLAN
P144

TYPICAL APARTMENT LEVEL FLOOR PLAN

P146

ROOFTOP FLOOR PLAN

P148

GROUND FLOOR PLAN

The ground floor of the building provides two main points of entry: one on Victoria St (highlighted in yellow) for pedestrians and one on Willeston St for cyclists (also highlighted in yellow). Pedestrian visitors enter the foyer and are presented with the split to the left for the bike shop of cafe, the center for a quick pathway to their apartment, or the ramp to the right for a more scenic journey to their apartment or the rooftop. Cyclists enter and exit on the existing car ramp and venture straight up to their destination. A car share parking centre is located on the street corner of the building where two car share cars can be parked. This space is used as an educational tool for new car share users.

7 Fig.99 / Typical ground floor plan

TYPICAL APARTMENT LEVEL FLOOR PLAN

A typical apartment level floorplan consists of 12 mirrored apartments. The apartments are mirrored rather than configured differently to allow for enough differentiability to enjoy the same space in a different way, but not too different so that when you are allocated different apartments you are not disorientated. The introduction of the central atrium most importantly light to enter to the bedroom spaces, circulation spaces as well as services to move throughout the building.

A typical apartment is highlighted yellow and is explored in detail on page 154.

7 Fig.100 / Typical apartment floor plan

LEVELS 11 + 12 ROOFTOP FLOOR PLAN

The rooftop is set back from the edges of the building below to ensure that it does not detract from the strong facade design. The circulation ramps end at the rooftop where you can continue onto the viewing platform to take in the beautiful views of the Wellington Harbour, or relax in the indoor/outdoor gardens or BBQ areas. This space was initially designed to be a public space for anyone to use, however concerns about the privacy for residents along the circulation well has restricted access to this part of the building to tenants only. Further development of this could result in the creation of a public extension of the street to the rooftop.

7 Fig.101 / Typical rooftop floor plan

SECTIONS

Neighbouring building

SECTION AA

0m 1m 5m 10m

LEGEND /

- 1 Main Entry
- 2 Cafe
- 3 Rubbish Room
- 4 Living 2 / Bedroom 3
- 5 Kitchen / Dining
- 6 Living
- 7 Indoor Garden
- 8 Bike Parking
- 9 Viewing Deck

SECTION BB

APARTMENT FLOOR PLAN

The building contains 50 apartments, all the same floor plan, but mirrored. It was iteratively derived and aligned to a grid. It makes use of the grid, because that is how we read the city, and the grid of the parking building, a sense of organisation, but with the fluidity represented by the car or pedestrian as they move through the space to soften the experience of arrival. The collaborative

consumption model means that you may not stay in the same apartment that you did the last time you stayed. The spatial arrangement is mirrored in each structural grid, in a way that won't disorientate the user if they are put in a different apartment to one they're normally in.

Fig.102 / Sketch development of the apartment floor plan

Fig.103 / Top left: OMA's Maison A Bordeaux ground floor plan. Right Clockwise: Elizabeth Diller & Ricardo Scofidio's Slow House showing transition from the car journey to the house and sense of arrival.

APARTMENT FLOOR PLAN

The apartment floor plan is aligned to a grid of 3m around the perimeter and 4m through the centre. This arrangement is used to easily define spaces rigidly, like that of a car parking building, while allowing elements of fluidity to be introduced around corners to aid in softening the experience of reaching your desired location. You enter from the atrium circulation and are presented with the relaxation spaces at the end of the view down the hallway, where the view outside is visible. Along the way are the bedrooms, bathroom and kitchen with clear visual connection.

LEGEND /

- 1 Living
- 2 Kitchen / Dining
- 3 Deck
- 4 Study
- 5 Bathroom
- 6 Bedroom
- 7 Living 2 / Bedroom 3
- 8 Ensuite

7 Fig.104 / Typical apartment floor plan

> Fig.105 / Typical apartment section

ELEVATION

The building's current facade is one that evokes a strong sense of streamlined horizontal lines along the whole building. The sense of speed within the rigid structure is now downplayed and contrasted with the fluidity of the tighter atrium space. The sense of slowing down is now experienced on the exterior, like that of the entrance to the apartments, by breaking the long facade panels up. They now frame the glazing of the apartment in a way that feels like stopping and sitting in the window at a diner or service station on a long journey. The entrances are framed by overhead canopys to provide clear identification of where to enter in the repetitive facade.

>

Fig.106 / Sketch development of the elevation of the building seeking to emphasise the entranceways

The entrance is
on the right side of the building.

to add the big chimney
right above the ground level.

- 1 Fig.107 / Basic section detail of the facade framing panels surrounding the precast concrete facade panels
- > Fig.108 / Render of the Southern corner of the building showing the decking and facade framing

- Proportionately breaking up the elevation's strong horizontal lines into subtle vertical volumes that fade into the sky.

- Stepping back the rooftop additions to keep the buildings' proportions

- Stepping back the ground level to create shelter and invite people in

- Creating strong foundations for the building to look like the large weight above is resting on something strong, while also signifying the entrances

VATIONS

UTH

EAST

0m 2m 10m 20m

- Entry threshold is enhanced through the canopy channelling you into the building and signifying the entry point

- Rigidity of the facade and the city is broken up at the point of entry with smooth curves to allow better flow into and out of the building

- Coffee shop window signifies quick movement past

Fig.109 / Main entry and exit for pedestrians. Entry to the bike shop shown to the left.

Fig.110 / Cycleway entry and exit ramps make use of the old car exit ramps. Both entrances are signified by the yellow overhead canopy

- The slowest arrival method through to the cafe space which provides strong visual connection to the rest of the building

- The split, evident in the Slow House, gives the user the choice of arrival

- New atrium brings light right down to ground level

- The fast arrival method up the stairs or lift

- Beginning of the elevated ground plane. The slow arrival journey

^ Fig.111 / Arrival in the entrance foyer presents you with the split: You choose to veer left to the cafe, go straight for the lift and stairs or right to the slow paced ramps, a technique borrowed from the slow house

- Circulation ramps and lift shaft as sculpture that brings light deep into the building

- Fluidity in the rigid production process and journey, as evident in the Fiat Factory

- Curved ramps reminiscent of the existing car parking typology

^ Fig.112 / Render looking up to the roof from ground level at the lift shaft and ramps as circulation as sculpture while allowing light to enter deep into the building

> Fig.113 / View of the atrium showing the visual connection between the ground floor and the rooftop. This space now has sunlight penetration right to ground level

- Circulation and structure as sculpture like Herzog & de Meuron case study

- Entry threshold compresses you into the apartment as the ceiling lowers for structure, and services weave in between

- Strong visual connectivity throughout the building. You can see the start and end and the stopping bays along the elevated highway

- Sunlight in a previously unlit part of the building

Fig.114 / A man strolls towards his apartment entrance. This view of the atrium shows the visual connectivity between the ground floor and the rooftop. This space now has sunlight penetration right to ground level.

- Entry hall is narrow, funnelling you through to your arrival point

- Light infill timbers contrast the hard concrete shell of the original building

- The rear view mirror in front of the new wind screen - Slow house

- Rigid hard corners softened by curve in plan, and creates more visual connectivity

Fig.115 / Entry to the apartment greets you with a view down the hallway towards the living quarters

Fig.116 / The kitchen provides a central point of visual connectivity to the whole apartment

- Rigid hard corners softened by curve in plan, and creates more visual connectivity

- Entry hall is narrow, funnelling you through to your arrival point

- Focal point of the apartment where you can see all options for the next journey

- Services weave through the building in an infilled manner and also show connectivity to the working parts of the apartment, also for wayfinding

- Light timbers contrast the hard concrete shell of the building, also framing an enclave or interpretation of the human scale parking bay

➤ Fig.117 / Looking back towards the kitchen and bedroom quarters

⋈ Fig.118 / Typical apartment floor plan

• Exhaust vents exit at the top of the atrium beside mechanical services room

• The end of the elevated highway is experienced on the viewing platform looking out over the harbour

^ Fig.119 / Rooftop viewing platform looking towards the harbour

∟ Fig.120 / Two men admire the rooftop gardens

> Fig.121 / Car Park House (Share) from State Tower

Wind screens
to shelter
gardens and
relaxation spaces
on the exposed
rooftop

Entry threshold is
enhanced through
the canopy
channelling you
into the building
and signifying the
entry point

 

FINAL DESIGN CONCLUSION

Car Park House Share is the design outcome of this research by design that is both an architectural solution and part design tool as a framework. The research and design process in this chapter helped to solve issues specific to an adaptive re-use of car parking buildings, such as iterative development of spatial planning. This continuous development helped to refine each design decision and test how they work within the overall building constraints. This process was made easy with the use of digital modelling because of its accuracy and ability to easily see in plan, section or 3D how each small design change effects the rest of the design.

Analysis of case studies provided an understanding of how light, material choice, circulation and techniques of adaptive re-use can be applied to a car parking building. It is evident through these case studies that the physical constraints of the building itself restricts new use from occurring, but that living quality in low ceiling car parking buildings can be achieved through careful consideration of spatial layout and material choice.

The apartments spaces are generously sized and offer standardisation for the collaborative consumption model, though considering that they are spaces of residence, the low ceiling heights could do with further

development to explore the effects of materiality in the living spaces to make spaces feel larger than they are. The control of light is an important change in the final design from the concept design, however in doing so, visual privacy in the bedrooms that look out into the atrium is another issue that could be further developed as time limited this aspect of the design to be explored.

8

CONCLUSION

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CONCLUSION

The first three chapters establish a theoretical background focused on aspects of the automobile and architecture, particularly car parking, car share parking, adaptive re-use and “collaborative consumption” ownership models. Ideas and design drivers found in the case study section for the adaptive re-use of car parking buildings are used to test a design response to the ramifications of car sharing, particularly through modular interior insertions constructed of cheap materials that take form units that follow car parking space or parking bay dimensions. Other ideas such as introducing light wells within the building and creating sculptural circulation spaces fed into the design framework and were used to iteratively test design solutions for adaptive re-use of a car parking building in Wellington City.

The design phase began with testing how car sharing services operate on the street to determine the consequences of the use of this parking method. Sketch design experiments in this phase found that the street would always be needed as a space for manoeuvring the cityscape, and that the consequences resulted in vacant parking buildings. Sketch and overlay drawing and modelling techniques in this phase allowed for quick experimentation of ideas without being too formal as this phase was intended to determine consequences for the next design phase. The next two design phases

focused on the adaptive re-use of a car parking building into apartments, with the first experiment seeking to cater to the needs of an apartment building while parking is still a necessity for car sharing, albeit to a significantly lesser degree than at present. The second and final design experiment focused on adaptive re-use of the same building for time share housing in a context where parking inside buildings is not needed anymore.

The research and design process highlighted specific issues such as insufficient light and very low ceiling heights that exist within the adaptive re-use of the car parking building typology specifically. The design proposes a solution to these issues that could be implemented with further research in other locations as the consequences of car sharing services become evident.

RESEARCH SCOPE / FURTHER DEVELOPMENT

As a response to the consequences of car sharing services on the city, an adaptive re-use to apartments proposes a rethink of how to use these becoming vacant spaces. The scope and focus for this research is initially limited to an analysis of two Wellington city streets to establish the consequences of car sharing services. Once the consequences were figured out, the scope expanded to an investigation of the relationship between car sharing and a car parking in a building context, and finally an adaptive re-use solution to time share apartments.

The design research was initially not intended to be limited to one specific building, but to develop a non-site-specific framework for a design that could be implemented on many parking buildings. The scope narrowed while conducting design experimentations using the design techniques identified in the case studies on one building found that the design solution had to be quite site specific in order to work for residential use, especially what happens on the ground floor and rooftop. Further development of the ground floor and rooftop that can architecturally provide better public circulation and relaxation spaces that is secure from apartments would ensure that the building contributes socially to the community. A detailed experimentation of the complex workings of the café, bike store, gym and office arrangements is needed to determine if these spaces will

contribute socially to the overall use of the building. The scope of this research is restricted to central Wellington because of the uptake of car sharing services and the city council's support for car sharing services, meaning that there is a higher chance of parking buildings becoming vacant in the future. Further experimentation and development could see this design solution developed into a modular design that could be implemented into many parking buildings around the country as car sharing gains traction, responding to a different set of contextual variables.

Critical to the feasibility of this design proposal is a detailed structural analysis of the building to further understand the ability for this design to be put into place. Structure is briefly considered in the final design in a meeting with the author of 'Seismic Design for Architects' by Andrew Charleson to ensure that the solution with the new atrium can be achieved. The results of this meeting reinforced the introduction of the central atrium by spitting the building into two structural systems due to its' split level construction. This level of understanding with added orthogonal structure is sufficient for the design proposed in this research, however could be taken further to fully understand this aspect of adaptive re-use of a car parking building.

9

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SOURCES OF FIGURES

Figure 1 / Perspective view of the car share park house from the corner of Willeston and Victoria streets.
Source: Authors

Figure 2 / Aerial image of Wellington City locating site
Source: Authors

Figure 3 / MEVO Car sharing car charging on Wellington's Waterfront
Source: Authors

Figure 4 / The Design: a new atrium
Source: Authors

Figure 5 / Ford Motel T in Christchurch in 1913
Source: Webb, Steffano Francis. "Model T Ford." 1913. Web. 11 Jan. 2018.

Figure 6 / First parking meters being installed in Lower Hutt in 1956
Source: "Parking Meters Being Erected in the Hutt Valley." *Evening Post* 1956. Web. 23 Jan. 2018.

Figure 7 / Aerial view of Wellington showing location of car share services
Source: Google Maps. "Map of Wellington City." 2017. Web. 20 Apr. 2017.

Figure 8 / Image of a MEVO car share vehicle showing required infrastructure. Image of a MEVO car share vehicle showing required infrastructure.
Source: Authors

Figure 9 / Mevo reserved parking at Clyde Quay Wharf
Source: Authors

Figure 10 / Infrastructure enforcing car share use only
Source: Authors

Figure 11 / Mevo reserved parking at Clyde Quay Wharf showing electric charging infrastructure
Source: Authors

Figure 12 / Mevo reserved parking at Clyde Quay Wharf

Source: Authors

Figure 13 / Parking deck at the chosen site

Source: Authors

Figure 14 / Aerial photograph of Wellington City

Source: jbworx. "Wellington Daily Photo: #3333 ... From above." n.p., 2018. Web. 8 Sept. 2017.

Figure 15 / Urban map of Miami Beach

Source: Google Maps. "Map of Miami Beach." 2017. Web. 20 Dec. 2017.

Figure 16 / Urban close-up map of the car park in Miami Beach

Source: Google Maps. "Map of Miami Beach." 2017. Web. 20 Dec. 2017.

Figure 17 / Perspective of the car park from the opposite corner

Source: Baan, Iwan. "1111 Lincoln Road, Miami – Herzog de Meuron – Iwan Baan." n.p., n.d. Web. 8 Jan. 2018.

Figure 18 / Differing concrete structure from the first floor

Source: Baan, Iwan. "1111 Lincoln Road, Miami – Herzog de Meuron – Iwan Baan." n.p., n.d. Web. 8 Jan. 2018.

Figure 19 / Circulation as sculpture

Source: Baan, Iwan. "1111 Lincoln Road, Miami – Herzog de Meuron – Iwan Baan." n.p., n.d. Web. 8 Jan. 2018.

Figure 20 / Community gathering for activities

Source: Baan, Iwan. "1111 Lincoln Road, Miami – Herzog de Meuron – Iwan Baan." n.p., n.d. Web. 8 Jan. 2018.

Figure 21 / Urban map of Amsterdam

Source: Google Maps. "Map of Amsterdam." 2017. Web. 20 Dec. 2017.

Figure 22 / Urban close-up map of the car park in Amsterdam Central

Source: Google Maps. "Map of Amsterdam." 2017. Web. 20 Dec. 2017.

Figure 23 / Folded form of the building compared to spread out

Source: NL Architects. "Parkhouse/Carstadt: NL Architects." n.p., 1995. Web. 2 Apr. 2017.

Figure 24 / Building form with advertising on facades

Source: NL Architects. "Parkhouse/Carstadt: NL Architects." n.p., 1995. Web. 2 Apr. 2017.

Figure 25 / Floor plans concepts 1 thru 4

Source: NL Architects. "Parkhouse/Carstadt: NL Architects." n.p., 1995. Web. 2 Apr. 2017.

Figure 26 / Site and roof plan

Source: NL Architects. "Parkhouse/Carstadt: NL Architects." n.p., 1995. Web. 2 Apr. 2017.

Figure 27 / Urban map of Amsterdam

Source: Google Maps. "Map of London." 2017. Web. 20 Dec. 2017.

Figure 28 / Urban close-up map of the car park in Amsterdam Central

Source: Google Maps. "Map of London." 2017. Web. 20 Dec. 2017.

Figure 29 / Section of proposed conversion into creative workspaces

Source: Carl Turner Architects. "Peckham Levels | Carl Turner Architects." n.p., 2017. Web. 5 Dec. 2017.

Figure 30 / Render of proposed internal communal spaces

Source: Carl Turner Architects. "Peckham Levels | Carl Turner Architects." n.p., 2017. Web. 5 Dec. 2017.

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Source: Carl Turner Architects. "Peckham Levels | Carl Turner Architects." n.p., 2017. Web. 5 Dec. 2017.

Figure 32 / Section of proposed modular creative studio spaces

Source: Carl Turner Architects. "Peckham Levels | Carl Turner Architects." n.p., 2017. Web. 5 Dec. 2017.

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Source: Carl Turner Architects. "Peckham Levels | Carl Turner Architects." n.p., 2017. Web. 5 Dec. 2017.

Figure 34 / Urban map of London

Source: Google Maps. "Map of London City." 2017. Web. 20 Dec. 2017.

Figure 35 / Urban close-up map of the car park in London Central

Source: Google Maps. "Map of London City." 2017. Web. 20 Dec. 2017.

Figure 36 / Original building computer rendered

Source: JAA. “Welbeck Street – JAA.” n.p., 2017. Web. 5 Dec. 2017.

Figure 37 / Concept design for adaptive reuse into a hotel

Source: JAA. “Welbeck Street – JAA.” n.p., 2017. Web. 5 Dec. 2017.

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Source: JAA. “Welbeck Street – JAA.” n.p., 2017. Web. 5 Dec. 2017.

Figure 39 / Section diagrams showing proposed movement of floors and its effects

Source: JAA. “Welbeck Street – JAA.” n.p., 2017. Web. 5 Dec. 2017.

Figure 40 / Process diagrams of conversion process

Source: JAA. “Welbeck Street – JAA.” n.p., 2017. Web. 5 Dec. 2017.

Figure 41 / Physical model image of interior parking deck

Source: Wharry, Colin. “From Car Park to School, A Proposal for Adaptive Re-Use.” *RIBA*. n.p., 2009. Web. 9 Apr. 2017.

Figure 42 / Perspective view of the physical model from the street

Source: Wharry, Colin. “From Car Park to School, A Proposal for Adaptive Re-Use.” *RIBA*. n.p., 2009. Web. 9 Apr. 2017.

Figure 43 / Section and elevation showing low ceiling heights

Source: Wharry, Colin. “From Car Park to School, A Proposal for Adaptive Re-Use.” *RIBA*. n.p., 2009. Web. 9 Apr. 2017.

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Source: Wharry, Colin. “From Car Park to School, A Proposal for Adaptive Re-Use.” *RIBA*. n.p., 2009. Web. 9 Apr. 2017.

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Source: Wharry, Colin. “From Car Park to School, A Proposal for Adaptive Re-Use.” *RIBA*. n.p., 2009. Web. 9 Apr. 2017.

Figure 46 / Urban map of Lingotto

Source: Google Maps. "Map of Turin." 2017. Web. 20 Dec. 2017.

Figure 47 / Urban close-up map of the Fiat Factory in Lingotto

Source: Google Maps. "Map of Turin." 2017. Web. 20 Dec. 2017.

Figure 48 / Rooftop racetrack and internal courtyard

Source: Vack, Pete. "A Visit to Fiat's Remarkable Lingotto." n.p., 2014. Web. 6 Dec. 2017.

Figure 49 / Internal circulation ramps as sculpture

Source: Vack, Pete. "A Visit to Fiat's Remarkable Lingotto." n.p., 2014. Web. 6 Dec. 2017.

Figure 50 / Aerial view of the Fiat Factory

Source: Vack, Pete. "A Visit to Fiat's Remarkable Lingotto." n.p., 2014. Web. 6 Dec. 2017.

Figure 51 / Section or Renzo Piano conversion

Source: Piano, Renzo. "RPBW - Lingotto Factory Conversion." n.p., n.d. Web. 8 Jan. 2018.

Figure 52 / Urban map of Long Island

Source: Google Maps. "Map of Long Beach" 2017. Web. 20 Dec. 2017.

Figure 53 / Floor plans of the Slow House

Source: Diller, Elizabeth, and Ricardo Scofidio. "Slow House - DS+R." n.p., 1991. Web. 3 Nov. 2017.

Figure 54 / Physical model of the slow house showing the change of view from the automobile through the house to the landscape view

Source: Diller, Elizabeth, and Ricardo Scofidio. "Slow House - DS+R." n.p., 1991. Web. 3 Nov. 2017.

Figure 55 / Physical model of the slow house showing the change of view from the automobile through the house to the landscape view

Source: Diller, Elizabeth, and Ricardo Scofidio. "Slow House - DS+R." n.p., 1991. Web. 3 Nov. 2017.

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Source: Authors

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Source: Authors

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Source: Authors

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Source: Authors

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Source: Authors

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Source: Authors

Figure 63 / Sketch of stacked car parking structure with integrated social function on Wakefield St

Source: Authors

Figure 64 / The Gantry, Silo Park in Auckland

Source: Anja. "Auckland In Rainbow Colours | Travel Photography and Social Media for Photographers - Ae.i." n.p., n.d. Web. 13 Nov. 2017.

Figure 65 / Foundation Making: The mold for the concrete base (road) is cast and a sheet of acrylic with holes for yellow taped bunged nails slot in to form the foundations of the steel structure.

Source: Authors

Figure 66 / Locating Wellington City on a map of New Zealand

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Figure 67 / Satellite imagery highlighting Wellington City
Source: Google Maps. "Map of Wellington City." 2017. Web. 13 Jun. 2017.

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Source: Google Maps. "Google Street View." 2017. Web. 13 Jun. 2017.

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Figure 70 / Google street view image of the building at street level
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Figure 85 / Functional door experimentations individually separated
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Source: Authors

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Source: Authors

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Figure 94 / Sketch highlighting the viewshafts from the rooftop of the car parking building

Source: Authors

Figure 95 / Sketch of possible programme for the rooftop

Source: Authors

Figure 96 / Image showing the internal circulation of the Fiat Factory and how light enters deep into the building in the atrium

Source: Matte-Trucco, Giacomo. "Fiat Lingotto Factory | Architectuul." n.p., n.d. Web. 6 Sept. 2017.

Figure 97 / Rooftop view of the Fiat Factory race track and internal atrium courtyard

Source: Matte-Trucco, Giacomo. "Fiat Lingotto Factory | Architectuul." n.p., n.d. Web. 6 Sept. 2017.

Figure 98 / Design solution floor plans > Close-up and labelled floor plans are on the following pages

Source: Authors

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Source: Authors

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Source: Authors

Figure 103 / Top left: OMA's Maison A Bordeaux ground floor plan. Right Clockwise: Elizabeth Diller & Ricardo Scofidio's Slow House showing transition from the car journey to the house and sense of arrival.

Source: OMA. "Maison À Bordeaux." n.p., 1998. Web. 6 Jan. 2018.

Source: Diller, Elizabeth, and Ricardo Scofidio. "Slow House - DS+R." n.p., 1991. Web. 3 Nov. 2017.

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Source: Authors

Figure 105 / Typical apartment section

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Source: Authors

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Source: Authors

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Source: Authors

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Source: Authors

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Source: Authors

Figure 113 / View of the atrium showing the visual connection between the ground floor and the rooftop. This space now has sunlight penetration right to the ground level.

Source: Authors

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Source: Authors

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Source: Authors

Figure 121 / Car Park House (Share) from State Tower

Source: Authors

Figure 122 / Audi A3 E-Tron Dimensions

Source: Audi AG. "2017 Audi A3 Sportback E-Tron - Dimensions | HD Wallpaper #29." n.p., 2016. Web. 19 Apr. 2017.

Figure 123 / Screenshots from Apple Maps 3D view showing the car parking building nestled in the surrounding site

Source: Apple Maps. "3D View of Wellington City." 2017. Web. 22 Jun. 2017.

APPENDICES

A1 / MEVO CAR SHARE AUDI A3 DIMENSIONS

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^ Audi A3 E-Tron Dimensions

A2 / SURROUNDING CONTEXT AND ROOFTOP VIEWS

^ Screenshots from Apple Maps 3D view showing the car parking building nestled in the surrounding site

A3 / SUNLIGHT STUDIES

9 am

9 am

12 pm

12 pm

3 pm

3 pm

SUMMER SOLSTICE 22/12/2016

WINTER SOLSTICE 22/06/2016

9 am

1 pm

10 am

2 pm

11 am

3 pm

12 pm

4 pm

SUMMER SOLSTICE 22/12/2016

SUMMER SOLSTICE 22/12/2016

WINTER SOLSTICE 22/06/2016

TY.