INTERLOCKING: THE PHENOMENOLOGICAL APARTMENT

An exploration and enrichment of the spatial and bodily experience of urban apartments.

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ABSTRACT

New Zealand faces the need for more housing over the coming decades due to increasing population and a decreasing household size. An existing response is a trend of higher density apartment buildings within our inner cities. However these small standardized apartments have created a negative view toward urban apartments, commonly being described as 'shoe-boxes'. Can urban inner-city higher density housing be better designed? This becomes the focus of this research in regards to quality of space in small apartments. A critique of existing 'shoe-box' apartments is developed, proving they lack spatial quality, have lost a crucial connection with the dweller and are largely irrelevant to their site. The research seeks to remedy the 'shoe-box' apartment by applying principles from the theory of phenomenology and an interlocking typology. Phenomenology is introduced as a key theory to help develop a grounding in specificity and re-instill the notion of bodily experience in space. This theoretical position, based on Steven Holl's architectural interpretation of phenomenology, with

a bodily emphasis, is applied through four strategies to integrate a spatial experience. Typologically, interlocking apartments provide a precedent, where by their very nature, the interlocking produces an interesting relationship between spaces. This precedent analysis provides seven techniques which are coupled with the strategies from Holl, and applied to the design. The resulting design is a successful mixed-use urban solution, with a focus on the outcome of interlocking apartments.

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CHAPTER ONE: INTRODUCTION

Fig. 1.01. Soho Apartment building.



RESEARCH QUESTION

How can an exploration through a phenomenological lens influence the design of interlocking apartments providing an enrichment of spatial and bodily experience in inner city living?

PROBLEM

With a shift in the way the population is living, New Zealand is presented with an issue that questions the existing pattern of development of the built environment. This shift has the greatest presence on the city and wider urban metropolis, with the domestic home at the core of the problem. The decreasing average persons per house has developed due to the change in the makeup of the home. The nuclear family idealised in western society in the post-war period has begun to evolve into smaller families, couples without children, single parents and single person dwellers. These smaller households, combined with the increasing population of the country requires a significant amount of new housing stock. If provided at the traditional accustomed-to approach;

Fig. 1.02. Soho Apartment building. namely the stand-alone suburban house, it would result in significant pressure on the urban environment to sustain the demand of New Zealand's ingrained suburban dream.

The well documented issues of suburban sprawl form the basis of the initial step in this problem. The call for a greater focus on higher density housing especially in the form of high-rise buildings has occurred. As a response to this and the desire to live in the city, Wellington and Auckland has seen the construction of numerous apartment buildings, however many comprise largely of small standardized 'shoe-box' apartments. These apartments are simplistic in plan and rectangular in section, allowing straightforward replication and stacking. The buildings which consist purely of these small units provide the initial critical basis for this research.

THESIS STRUCTURE

This research looks at the apartment, but instead of the emphasis on quantity, it will focus on the greater quality of the apartment. Chapter Two; *The New*

Zealand Context and the Problem of the 'Shoebox', will begin to look at the context of New Zealand's apartments, focusing especially on the result of the first generation apartments which have developed in the last 20 years. A timeline presents a basic representation of the shift from the early 1920's purpose-built flats, fitted into inner city suburbs, to the rise of the apartment tower of the 1990's and the resultant products seen today. This will be highlighted by five recent examples of 'shoe-box' apartment developments which portray issues associated with the current approach.

The introduction of the theoretical study of architectural phenomenology will provide the basis for the grounding in site specificity and reconnect the notion of the body and a greater spatial experience in the architecture.¹ This is developed in Chapter Three; *Phenomenology & Holl Strategies* through a literature review of experiential strand of architectural phenomenology. The review looks at the influence of Maurice Merleau-Ponty on Steven Holl and Holl's interpretation of Merleau-Ponty's ideas into architecture. This is then used to develop four strategies which will be used in the design process;

- Anchoring and Intertwining
- Parallax
- Attention to Detail
- Hinged space + Void Space

Chapter Four; Interlocking Precedents: Analysis and Abstraction documents and analyses a range of precedents of the interlocking apartment which provide a shift from the 'shoe-box' type. These precedents by their very nature, create interlocking forms and produce an interesting relationship between spaces. The result of this analysis will provide a visual and text based list of techniques that can be applied to the design which will be tested and developed later in Chapter Six. These techniques are not specific, but rather a combination of 'ideas' which can be used in the design to create a greater quality of spatial experience.

Chapter Five; *Context and Site* creates the basis and sets the scene for the design. It includes site selection, site analysis, site abstraction and diagramming and the 'limited-idea' concept informed by the site.

Chapter Six; Design *Application and Discussion* looks at the final design of this research process. It illustrates the key design moves to achieve interlocking apartments through the phenomenological process. It looks at the building as an addition and a catalyst to the urban fabric of Victoria Street and also focuses on the resultant interlocking apartments themselves. This is followed by discussion of the design in reference to the aims of the research.

Chapter Seven; *Conclusion* provides a reflective account of the research, both the process and final outcome. It discusses how the research has met the intention providing a spatial experience to inner city residential apartments. Limitations of the design and further opportunities are discussed.

¹ The approach to this research is through a top-down method, which is based on existing literature, precedents and case study fieldwork. This approach tends to remove the public input of opinion and therefore acknowledges the critique of phenomenology of encapsulating only the architect's personal experiences and ideas.



CHAPTER TWO: THE NEW ZEALAND CONTEXT AND THE PROBLEM OF THE 'SHOEBOX'

Fig. 2.01. Elevate Apartment building under construction.



Fig. 2.02. Diagrammatic typical 'shoe-box' apartment isometric.

2.1 DEFINITION

'Shoe-box' Apartment

The term 'shoe-box' requires definition within the scope of the New Zealand context. The term can be seen as something that the New Zealand public intrinsically align with overcrowding, low quality and high density within Auckland and Wellington's city centres.² These references lie wholly in relation to floor area alone and resulting streetscape of same scaled units repeated within the building facade.

Though minimum standards for the two dimensional floor size is generally referred to when describing these apartments, size does not necessarily correlate to a 'shoe-box' apartment, as a small unit can be well designed and have spatial qualities which exclude it from this classification.³⁴ In terms of aspect, many 'shoe-box' apartments have only one exterior wall allowing light in, though multiple aspects is important and desired, some apartments with multiple aspects can still be described as 'shoeboxes'. Therefore use of 'shoe-box' within this research refers to apartments of repetitive attached rectangular ⁵ cellular construction.⁶

Bernard Orsman, "Shoe-box apartment rise tipped". New Zealand Herald 21 Feb. 2013.
 However greater floor area can help to mitigate

the 'shoe-box' deficiencies.The spaces that are created in the 'shoe-box'

⁴ The spaces that are created in the 'shoe-box' apartments, need not be repetitive and indistinct. Small spaces are not necessarily a bad thing, as they can be well created and provide efficient use of space. Chan describes the ability of "small residential spaces that turn constraints to an advantage" and create a "meaningful living experience derived from a logic of compactness, efficiency and discreteness". Yenna Chan, Small Environments: Contemporary Design in Detail (Gloucester: Rockport Publishers Inc, 2007), 8.

⁵ This simplistic construction described as rectangular includes parallelograms, and also shapes added to the basic rectangular form.

⁶ It is important to note that the extremity of the 'shoe-box' as seen in Asian centres such as Hong Kong or Singapore are by far more alarming, however they fall outside this line of research.



Compared to the 'shoe-box' apartment, where the relationship between apartments is simplistic and formed generally by a simple grid in section (fig. 1), the interlocking apartment looks to a more complex arrangement which involves apartment forms to be arranged in an irregular way in plan and in section, which results in spatial interest.

Interlocking apartments generally have at least two stories which provide greater spatial complexities through the conscience use of the third dimension. The interlocking nature also allows two opposite aspects of outlook which is not often seen in 'shoe-box' apartments. Therefore the use of term interlocking apartment within this research, looks to the shift from the regular form of the 'shoe-box' to an apartment which develops *complexity and variation* in *layout* and *spatial experience*.

Interlocking Apartment



Trend for new dwelling consents monthly in New Zealand. Adapted from Statistics New Zealand.



Fig. 2.05. Population of inner city apartment dwellers. Adapted from Statistics New Zealand.







2.2 INTRODUCTION AND PROBLEM

The social factors that are closely connected to housing in New Zealand was the initiation of this research. The statistics show that the projected increasing population is coupled with reduction in household size, which results in a demand for more homes. The population growth of New Zealand, and also the change in the makeup of the household, posed questions to how these extra people would be housed, and where and how these houses would be constructed (fig. 2.05-2.09). The average size of New Zealand households is projected to decrease from 2.6 people in 2001 to 2.4 people in 2021 resulting in the need for smaller houses, relevant to the process of intensification at the city centre.⁷ In New Zealand the perception created by 'shoe-box' apartments is negative and therefore any attempts by planning authorities to intensify areas are seen as unattractive and forced, as seen with the Auckland Unitary Plan.⁸ The term of intensification or high-density leads to Statistics New Zealand. Subnational Family

and Household Projections: 2001(base) – 2021 Update (27
October 2005).
8 Oliver Roberts. Busting 5 Myths on Apartments"

http://shapeauckland.co.nz/busting-5-myths-onapartments/ (accessed 16 June 2013).



2001 2021 PROJECTED

Fig. 2.08. Types of households in New Zealand. Adapted from Statistics New Zealand.



COUPLES
MULTI-PERSON HOUSEHOLDS
ONE PARENT FAMILIES

TWO PARENT FAMILIES

Fig. 2.09. Types of households in New Zealand as a proportion. Adapted from Statistics New Zealand. perceived connotations of lack of space, privacy and freedom of access to the outdoors. According to UN's 'Visions For Change' report, 34% of young New Zealanders fear of living in apartments, largely due to the "limited access to outdoor pursuits".⁹

However, despite this negative view of intensification there is still a demand for inner city apartments; the increasing number of people living in inner city apartments has risen in Wellington City from 1410 in 1996 to 12954 in 2013 (fig. 2.05). Recent consents for New Zealand apartments follow a similar increase to that of other non-apartment residential consents (stand-alone houses and terraced houses)(fig. 2.04). These statistics show that there is still a constant demand for inner city apartments. The 'shoe-box', however, is seen as undesirable¹⁰ and therefore this research will reject the 'shoe-box' by focusing on making an urban intensification an attractive option through the combination of a phenomenological process and the

United Nations Environment Programme, Task Force on Sustainable Lifestyles.
 Visions For Change: Country Papers (Paris: UNEP Division of Technology, Industry & Economics, 2011), 60.
 Cameron Brewer. Unitary Plan means

intensification is coming to you (accessed 19 May 2013).

typology of interlocking apartments. Therefore to begin this research, a review of New Zealand apartments is required to help understand the negative attributes that they hold.

2.3 NEW ZEALAND APARTMENT HISTORY

In this section, a visual timeline is created for the development of the apartment in New Zealand with some social, economic and political milestones which have shaped the change. The apartment building is not a new occurrence to the built environment of New Zealand's cities, but the quantity and scale is. New Zealand apartments have been constructed in the CBD fringe and inner suburbs throughout the 20th Century. Beginning as luxury flats along sought after streets such as Oriental Parade during the inter-war period, they developed into the modern tradition of tower in the park, seen in suburbs e.g. along The Terrace and Thorndon's Grant Road, and also 'slab tower' public housing exemplified by the Gordon Wilson Flats on The Terrace.

The inner city apartment however began to develop quickly only in the last 20 years. This development in the inner city also saw the reduction in size and quality of the apartment. Wellington saw the approach of converting aging office buildings into apartments at the low quality end, and at a higher quality end, the conversion of old warehouses (in the New York tradition). Also the development of rooftop apartments were carried out to allow feasible structural upgrade and interior re-fits of the host building.

This process of retrofitting and change of use occurred throughout the 1990's and only since the beginning of the 21st Century, purpose built apartment buildings have been developed to fill the demand of inner city dwellings.

The population growth of the inner city is sustaining the need for more inner city housing. Inner city population in Auckland, Wellington and Christchurch has "almost quadrupled, from 4,974 to 19,020" between 1996 and 2006.11 These extra 14,000 people are largely housed in apartment buildings that were constructed in a short period of time, were a product of economics, and not necessarily having a high architectural or urban quality importance. The reduced size and great number of apartments in one building permitted this population increase. The result, a large number of 'shoe-box' apartments, making up the first generation of inner city apartments.

Statistics New Zealand. Apartment Dwellers:
 2006 Census , (Wellington: Statistics New Zealand,
 2010), 2.







NVERLEITH' 306 ORIENTA



STRIPPED CLASSICISM FOLLOWING BEAUX ARTS TRADITION. TRADITION. 4-6 STORIES ON A SINGLE SITE 191 CORNER COURTVILLE 1-9 PARLIAMENT ST 1922 INVERLEITH 306 ORIENTAL PARADE 1923 BRAEMAR FLATS 32 THE TERRACE



20

MODERNE DECORATIVE 'ART DECO' FOLLOWED THE SAME SCALE AND APPROACH SCALE AND APPROACH 1937 BELEVEDERE APARTMENTS, MAJORIBANKS ST 1938 MCC PEOPLE HOUSE 136 THE TERRACE 1939 ANSCOMBE APARTMENTS 212 ORIENTAL PARADE

EARLY MODERN INFLUENCE 1935 CINTRA FLATS 7 WHITAKER PLACE 1936 248-252 WILLIS STREET 1940 'WINSLOW' ARO STREET



MODERN INFLUENCE 1956-7 DORSET ST FLATS

PRIVATE HOUSING





1965 HERBERT GARDENS 186 THE TERRACE 1965 JELLICOE TOWERS 189-191 THE TERRACE 1965 BIRCHINGTON COURT, 125 GRANT ROAD



PUBLIC HOUSING

1935 LABOUR GOVERNMENT HOUSING WELFARE POLICY

MODERNISM + SOCIAL HOUSING 1938-40 'CENTENNIAL' BERHAMPORE FLATS 1939-44 DIXON ST FLATS 1939-47 SYMONDS ST FLATS 1941-7 LOWER GREYS AVE FLATS







Fig. 2.10. Timeline of New Zealand apartments.



1953-54 GORDON WILSON FLATS, THE TERRACE 1955-58 UPPER GREYS AVE FLATS























INTRODUCTION OF UNIT TITLES AND COMPANY SHARE IN 1973

LOW RISE MEDIUM-HIGH DENSITY + THE SHIFT TO THE INNER SUBURBAN

970

RESPONSE TO HIGH RISE TOWER. ALLOWED FAMILIES AND WIDER ETHNIC, AGE + SOCIO-ECONOMIC MARKET 1970 MAJORIANKS ST FLATS 1973 4 THORNDON MEWS, PITARIJA ST 1983 HIGHWIC APARTINENTS, HOBSON ST 1974 PARK MEWS, 68 MOXHAM AVE



MIXED DEVELOPMENT MAYOR OF WELLINGTON; FRANK KITTS CONCERNED CITY LIVING FOR RICH

1961 HOBSON ST FLATS 1966-70 CENTRAL PARK FLATS

1973 OIL CRISIS

c1970 PUKEHINAU FLATS 1973-9 TE ARA HOU, CONSTABLE ST





DENSITY





18







1980'S COMMERCIAL BOOM PLOT RATIO BONUSES 1984 260 ORIENTAL PARADE 1986 326 ORIENTAL PARADE 1988 226 ORIENTAL PARADE 1988 13 MANNERS ST

1987 ECONOMIC CRASH 1987 IMMIGRATION ACT 1987 POLICY CHANGE FROM RACE TO QUALIFICATION BASIS, RESULTING IN INCREASE IN ASIAN IMMIGRATION

GENTRIFICATION + CONVERSION REDEVELOPMENT AND CONVERSION OF UNDERUSED WAREHOUSE AND COMMERCIAL BUILDINGS

COUNCIL EARTHQUAKE INCENTIVES

LARGE VICTORIAN VILLAS CONVERSION TO FLATS THE TERRACE BETWEEN BOULCOTT ST AND SALAMANCA ROAD







1912-13 BNZ TE ARO (BURGER KING) c1990 CONVERSION+ADDITION

1924 GEORGE COURT DEPT STORE, KARANGAHAPE ROAD c1990 CONVERSION+ADDITION

c1960 TERRACE TOWER 126 THE TERRACE c1990 CONVERSION+ADDITION

















QUEST ON THE TERRACE 120 THE TERRACE (CENTRE

DENTAL ASSOCIATION BUILDING WILLIS STREET c1990 CONVERSION+ADDITION C1990 CONVERSION+ADDITION 1895 QUEENS WHARF APARTMENTS c1994 CONVERSION HANNAHS FACTORY 14 LEEDS ST HANNAHS WAREHOUSE 13 LEEDS ST c 1990 CONVERSION

1998 PRINCES WHARF, QUAY ST 1939 HERD ST POST OFFICE 2007 CONVERSION+ADDITION







2008 ECONOMIC RECESSION

c1980 107 MANNERS ST 2013-4 CONVERSION

2008 ECONOMIC RECESSION OFFICE OVERSUPPLY + CONVERSION TO APARTMENTS c1980 QUANTUM APARTMENTS (FORMERLY DOC) 59 BOULCOTT ST 2008 CONVERSION 1988 CROWNERSION c1980 107 MANNERS ST







OFFICE OVERSUPPLY + CONVERSION TO STUDENT HALLS





1984 JOAN STEVENS HALL (FORMERLY CLAYTON FORD HOUSE) 132 THE TERRACE 2011 CONVERSION

1988 BOULCOTT HALL (FORMERLY MINISTRY OF INTERNAL AFFAIRS) 47 BOULCOTT ST 2012 CONVERSION

analyses five 'shoe-box' apartment buildings built or planned within the last five years.

Day, Christopher. Places of the Soul. (London: 12 The Aquarian Press, 1990), 76. 13 Smith, Norman. Small Space Living (Rockport: Rockport Publishers Inc, 1995), 5.



2.4 NEW ZEALAND 'SHOE-BOX' EXAMPLES

In Places of the Soul, Christopher Day is not specifically explaining the New Zealand apartment, however his comments are readily comparable to the current situation. He describes buildings having "rooms that are rectangular with hard smooth finishes" and "are indeed designed as boxes for storing people".12 This description is highly relevant to the 'shoe-box' apartment, where small spaces and their resultant basic rectangular shape, as seen in 'shoe-box' apartments, by their very nature "have function problems that are a direct result of their size" and also "often fail to satisfy their owner's visual, spatial and emotional needs".13 This section



Fig. 2.11a.



APARTMENT: 30-69m²









APARTMENT RECEIVES NATURAL LIGHT AND SUNLIGHT FROM SINGLE SOURCE AND DIRECTION. LIGHT RECEIVED IS SHELTERED BY UPPER APARTMENT DECK

NO DEFINITION OF PUBLIC OR PRIVATE WITHIN APARTMENTS. BEDROOMS AND BATHROOMS DIRECTLY OFF LIVING SPACES. INTERNAL CIRCULATION REDUCED TO MINIMUM FOR EFFICIENCY OF SPACE

Fig. 2.12.

23

ONE BEDROOM APARTMENTS HAVE AN INTERNAL BEDROOM WHICH REQUIRES SHARING OF NATURAL LIGHT WITH LIVING SPACE.

SINGLE LOADED CORRIDORS WITH OUTDOOR ASPECT PROVIDE LITTLE LIGHT TO INTERIOR OF APARTMENTS. LONG CORRIDORS LOOK MONOTONOUS WITH NO AREA FOR ACTIVITY OR ACTIVE EDGES.

ABRUPT TRANSITIONS FROM PUBLIC ABRUPT TRANSITIONS FROM PUBLIC TO PRIVATE VIA CIRCULATION. LIFTS —ARE DISTINCT SPACES WHERE PEOPLE ARE DUMPED ONTO CORRIDORS WHICH ARE STRICTLY SEMI-PUBLIC SPACES. THESE HAVE AN ABRUPT EDGE, DUE TO THE PRIVATE SPACE OF THE APARTMENT BEING LOCATED NEXT TO IT. DOORS ARE SOLID AND WINDOWS ARE DAISCE DUCUT TO DEVENT A RAISED HIGH TO PREVENT A ION OCCURING.

SUPPLIED IN APARTMENT. STORAGE IS NOT PROVIDED ELSEWHERE IN

BARELY HAVE DIAMETER TO 'SWING -CAT' (2.6m) ACCORDING

HAS EXTERNAL WINDOW, BUT OPENS ONTO EXTERNAL CORRIDOR WHICH CREATES PRIVACY AND SECURITY ISSUES RESULTING IN WINDOW OPENED AND HEAVILY SHADED BY CANOPY OF CORRIDOR

INTO LIVING AREA



KITCHEN RECEIVES LIGHT FROM LIVING AREA. REQUIRES SUPPLEMENTARY ARTIFICIAL LIGHT. REFER FIG 2.12C



TCHEN SPACE





DECK WITH OUTLOOK TO OTHER SOHO APARTMENTS Fig. 2.12c,d,e.

LEUSCHKE GROUP: SOHO URBAN APARTMENT TOWER

REPETITION OF SAME UNIT WHICH RESULTS IN WHICH RESULTS IN MONOTONOUS EXTERIOR APPEARANCE. THE INHABITANTS ARE THEREFORE SIMILAR USERS AND RESULT IN A BUILDING WITH LITTLE VARIATION IN HOUSEHOLD MAKE-UP.

111 IN THE BUILD MANA Í. Fig. 2.13a. DESIGNED IN PLAN, WITH SECTION SHOWING REPETITION OF SHOE-BOX CELL LIKE APARTMENTS. SITE PLAN 1:2000 APARTMENT: 33-58m² Fig. 2.13b. Fig. 2.13d. Fig. 2.13c. SECTION 1:500 ELEVATION 1:500 ARCHITECTURE +: ELEVATE

INTERNAL STAIRS AND LIFTS WITH DARK DOUBLE LOADED CORRIDOR

RANGE OF APARTMENTS (1,2, AND 3 BEDROOMS) ALLOWS A RANGE OF USER GROUPS/HOUSE-HOLDS.



TYPICAL FLOOR 1:500



Fig. 2.14.

URBAN APARTMENT TOWER

25

DIRECTION.



ABRUPT PRIVATE/PUBLIC THRESHOLD. SMALL CORRIDOR WITH FEW APARTMENTS OFF EACH CORRIDOR WOULD TRANSLATE INTO BETTER RELATIONSHIP WITH NEIGHBOUR

Fig. 2.14b.

ARCHITECTURE +: ELEVATE URBAN APARTMENT TOWER





 \bigcirc $\bigcirc \cup \cup$ \bigcirc \bigcirc 8 Ð Æ 6566 000 \odot n $\mathcal{O}^{\mathcal{O}}$ С 8 SITE PLAN 1:2000 APARTMENT: 46-85m² Fig. 2.15c.

		\square			
		\Box			
		\square			
		\Box			
		\square			

DESIGNED IN PLAN, WITH SECTION SHOWING REPETITION OF SHOE-BOX CELL LIKE APARTMENTS.

DESIGNED IN PLAN,

SECTION 1:500	

Fig. 2.15d.











Fig. 2.16.









Fig. 2.17b.

OUTDOOR GARDEN/LAWN FOR USE OF INHABITANTS. THIS SPACE IS HARD TO ACCESS FOR UPPER FLOOR APARTMENTS.

INTERNAL DOUBLE LOADED CORRIDOR WITH_ NO NATURAL LIGHT SOURCES, NOT EVEN AT ENDS.



TYPICAL FLOOR 1:500





Fig. 2.17e. ELEVATION 1:500

> T ARCHAUS **ARCHITECTS: INK** URBAN APARTMENT TOWER

OF OUTDOOR SPACES ATTACHED TO APARTMENTS. THE OUTDOOR GARDEN IS THE ONLY USABLE OUTDOOR SPACE. APARTMENTS DESIGNED AS DUAL-KEY APARTMENTS WHICH ALLOWS 2 WHICH ALLOWS 2 BEDROOMS 2 BATHROOMS OR A 1 BEDROOM AND STUDIO. MORE THAN LIKELY THEY WILL BE USED AS SEPARATE APARTMENTS DUE TO THE ECONOMIC GAINS FROM THE SEPARATE RENTAL PRICES. APARTMENT RECEIVES NATURAL LIGHT AND SUNLIGHT FROM SINGLE

KITCHEN RECEIVES LIGHT FROM LIVING AREA. REQUIRES SUPPLEMENTARY ARTIFICIAL LIGHT. SHARED ENTRANCE BETWEEN DUAL-KEY APARTMENTS PROVIDES A

TRANSITION SPACE, BUT IS DULL AND UNINVITING.

SOURCE AND DIRECTION.

NO PROVISION FOR DECKS



TYPICAL UNITS 1:200

Fig. 2.17.

THIS APARTMENT RECEIVES LITTLE LIGHT DUE TO RECESSED LOCATION.

Fig. 2.18a

STUDIO APARTMENT RECEIVES LIGHT THROUGH A VERY SMALL WINDOW WHICH HAS TO PROVIDE FOR A LARGE SPACE. SPACE AROUDN CORNER WOULD RECEIVED LITTLE LIGHT.



Fig. 2.18b.

MINIMAL STORAGE SUPPLIED IN APARTMENT. STORAGE IS NOT PROVIDED ELSEWHERE IN BUILDING.

MANY APARTMENTS HAVE INTERNAL BEDROOMS WHICH RELY ON THE LIGHT FROM THE LIVING SPACE.

STUDIO APARTMENT EQUIRE A FOLD-DOWN BED TO CREATE A FUNCTIONAL LIVING SPACE.

APARTMENTS FACING GHUZNEE STREET ONLY RECEIVE LIGHT FROM THE SOUTH, THEREFORE NO ACCESS TO ANY SUNLIGHT.

ARCHAUS **ARCHITECTS: INK** URBAN APARTMENT TOWER





APARTMENTS STACKED REPETITIVELY LIKE 'SHOE-BOXES'.	



SECTION 1:500 Fig. 2.19c.

McDONOUGH, MARSHALL-HARRINGTON

 (\mathbf{T})

ARCHITECTS: ZEST URBAN APARTMENT TOWER





TYPICAL PLAN 1:500

Fig. 2.20b.

Fig. 2.19.

EXTERNAL GALLERY CIRCULATION WITH MINIMUM WIDTH, NO SPACE FOR SOCIAL ACTIVITIES.







Fig. 2.20c-e.

McDONOUGH, MARSHALL-HARRINGTON **ARCHITECTS: ZEST** URBAN APARTMENT TOWER

2.5 ANALYSIS OF FINDINGS

The analysis of the 'shoe-box' apartments has provided visualisation of the issues associated with their design. These have been categorised into six issues which are explained and illustrated further in this section. The following findings are based directly on the five precedent 'shoe-box' apartment buildings. It is important to note that some of these findings can be attributed to design deficiencies with multi-storey apartment buildings in general, but nevertheless are extremely relevant to this research.

Design in plan.

One of the most salient issues is the way 'shoe-box' apartments are designed in plan. The rejection of designing in section means that all the apartments can be standardised and therefore simply stacked above or next to the neighbour. This simplistic design allows a regular structure and therefore economical construction. The resulting spaces are functional, however monotonous with a consistent stud height of 2.4m throughout the apartment. This process excludes floor and ceiling variety and results in little definition of space. Rooms are only achieved through vertical wall partitions to break the space.



Fig. 2.21. Design in plan.



The most common Soho apartment layout designed in plan, resulting in an intricate placement of rooms to maximise space in the smallest footprint. This intricacy is not developed in section and perspective.

Repetition.

The 'shoe-box' examples do show a range of apartment sizes which vary across one floor, however, the simplistic nature of the apartments allow them to be repeated numerous times vertically and horizontally (as seen in 'Soho'). The result of the repetition of the apartments is greatest on the exterior of the building which results in a negative urban facade. The building has the same module or grid repeated with no defining forms which break up the facade. The rather monolithic facades do not contribute to an exciting streetscape.







Fig. 2.24.

Repetition translated to the facade of the Zest building.



Fig. 2.25.

Section of Soho building showing repetition across all 16 residential floors, no consideration to differences toward the top or base of the building.

Lack of Access to Outdoors.

"High rise living takes people away from the ground, away from the casual, everyday society that occurs on sidewalks and streets. Formal and awkward, resulting in a tendency to stay home alone".¹⁴

In 'A Pattern Language', the importance to have residential apartments within four stories from the ground is stressed to reduce isolation simply due to the proximity. However this is not a practical solution due to the density required for inner city sites. The current approach to inner-city living has very little in terms of access to outdoor spaces. The verticality of the apartment building results in a large 'built' volume with little space left over for outdoor space or facilities. The very nature of 'shoe-box' apartments, being multiple stories up, results in the physical connection to the ground, wider city and outdoor landscape being greatly reduced by the elevation of the apartments. The apartment does not have a physical connection to

the ground and therefore, accessing the outdoors is a lengthy process which requires a conscious need or decision to go outdoors. The process to access outdoors, involves passing through common spaces of horizontal circulation (corridors) and vertical circulation (lifts or stairs). These provide distinct barriers to access the outdoors.

The most minimal requirement for access to outdoors would be visual connection with the events of the outside world and street life. The ability to connect with street life is greatly reduced above four stories, however these higher floors can achieve views of the harbour or hills and even sky. An outdoor space would be the next minimal requirement, however this is likely to be filled with a drying rack or bike which renders the view more unsightly. However the design of the 'Soho' resulted in a loss of almost all visual connection to the outside. The inward looking apartments, provide views from the living spaces and decks to the apartments in the opposite wing. The ability to access outdoors could

be achieved by a semi-private courtyard (as seen in 'Ink' Apartments) or a private deck or balcony where people can enjoy outdoor space. However some apartments have no personal private outdoor space at all. Some apartments in 'Elevate' have a narrow strip of deck (no more than 500mm deep) which allow larger sliding doors to be incorporated, however this strip cannot be counted as usable outdoor space. Three quarters of the apartments surveyed had access to a small deck or terrace which provided outdoor access at a minimal level. It is suggested an



outdoor space of at least "6 feet deep" (1.8m) be provided to allow a functional outdoor space.¹⁵ All apartments that had outdoor spaces were less than 1.8m deep. These outdoor spaces, as seen in 'Soho', are too small to place outdoor furniture. This private outdoor space, when provided, is often limited to one aspect, which reduces its possible use during the day as the sun moves from the outdoor space, leaving it shaded and unappealing.

15 Alexander, C., S. Ishikawa, M. Silverstein, M.

Jacobson, I. Fiksdahl-King, S. Angel.

A Pattern Language. (New York: Oxford University Press, 1977), 781.



Fig. 2.27. 500mm wide 'balconies' on some Elevate apartments

Alexander, C., S. Ishikawa, M. Silverstein, M.
 Jacobson, I. Fiksdahl-King, S. Angel.
 A Pattern Language. (New York: Oxford University Press, 1977), 116.

Single Aspect.

Many 'shoe-box' apartments have a single exterior face with a single aspect. Though not fundamental to the definition of a 'shoe-box', it contributes to the lack of spatial quality and feeling of confinement. The issue with aspect is the access to sun at multiple times of the day, cross ventilation and the feeling of being confined. It was found that some of the 'shoe-box' apartments surveyed had multiple aspects; corner apartments or apartments with rear bedrooms facing into light wells or onto open single-loaded corridors. These apartments still can be defined as 'shoebox', as these aspects provide little to the overall apartment.

Apartments which have a single aspect result in sun being received between a short period of time each day. The apartment would be cold and uninviting in the morning or afternoon depending on the orientation. Over half of the 'Ink' apartments faced south-east or south-west as their only aspect. Many living spaces are very deep (8m), with a single wall of natural lighting, and the kitchen is usually at the rear and resulting in a dark workspace. The reliance of mechanical ventilation and lighting to increase the quality of these spaces is common to all of the surveyed apartments.



Fig. 2.28. Single aspect.





Long single lit living spaces requiring artificial lighting to supplement natural lighting in a Soho apartment. The kitchen is placed at the end with no access to natural light.

Poor Common Circulation

The public circulation designed to access the apartments is long and monotonous. The long uninviting corridors, either double loaded in 'Ink' or parts 'Sugartree', or the exposed windswept single loaded corridor of the 'Soho', do not provide exciting spaces to transition from the public realm to the private realm of the personal apartments. The public circulation has abrupt spaces between outdoor and indoor which is enforced by the lobby, lift and corridor. These spaces are distinct and not gradual and do not provide for places of rest or allow activities to occur, resulting in empty unused circulation spaces. The abrupt threshold between the individual apartment and corridor reinforces the privacy of the interior of the apartment and removes any accidental social contact with neighbours.



Fig. 2.30. Common Circulation



Fig. 2.31.

Typical main bedroom in Zest apartments. Small window placed above eye height, to ensure privacy from passers-by on the external gallery outside. This results in a room with little amenity provided by the window.

Small Cellular Rooms

The 'warren' of small rooms in 'shoe-box' apartments adds to the confinement of the space. These small rooms are always separated by a traditional partition wall, which gives no sense of interest or ability to manipulate the boundaries of the space. These small rooms are connected via internal circulation with emphasis on singular function of each room. The ability to fit as many rooms into the apartment is a desirable economic outcome for the developer, but the ability to shift from the notion of 'room' to 'space' would be more effective for the overall apartment. Internal rooms with no access to natural ventilation or lighting are seen in all of the surveyed apartments. All of these apartments have internal bathrooms, but some also have internal bedrooms or 'studies' which rely on the sharing of light and ventilation from the main living space. These spaces are not desirable habitable spaces and the desire for light (resulting in internal windows) conflicts with any sense of privacy required with a bedroom.



Fig. 2.32. Internal rooms and small cellular rooms

2.6 ANALYSIS CONCLUSION

This chapter has looked at five 'shoebox' apartment buildings which highlight the issues of this type of apartment. The resulting diagrammed six issues provide a critique of the problem and therefore these issues can be consciously eliminated during the design process. It is interesting to note that building scientist Jessica Bennett also found six similar problems associated with the current apartments. ¹⁶ The problematic areas found in her study focus on functional and environmental conditions, however when coupled with the architectural issues explained in this chapter, all can be mitigated in the final design. Many of these issues relating to spatial deficiency may have a correlation to cost effectivity, this research recognises this, however looks to the examining the limits of architectural possibility, rather than being constrained by cost.

^{Bennett, Jessica. "How do Apartments Measure} Up? "Build", 117: 2010 April/May, 72.
-inadequate natural light
-poor noise control
-limited outdoor access
-inadequate ventilation
-small unit sizes
-inadequate storage provisions



CHAPTER THREE: PHENOMENOLOGY

Fig. 3.01. Detail by Steven Holl.

Phenomenology provides the theoretical grounding for the development of spatial experience to be applied to the design. The literature review looks closely at the wider scope of architectural phenomenology, before focussing on the phenomenological philosopher, Maurice Merleau-Ponty as influential to architectural phenomenologist Steven Holl. The architectural ideas of Holl are developed into four strategies which are applied to the design process of this research. The four strategies are; Anchoring & Intertwining, Parallax, Attention to Detail and Hinged space/Void Space. These are discussed at the conclusion of the literature review.

3.1 PHILOSOPHICAL PHENOMENOLOGY

Phenomenology developed during the early 20th Century as a response to the "crisis" of an excessive reliance upon scientific rationalism.¹⁷ Founder Edmund Husserl's 'modern' phenomenology provided a 'descriptive psychology' of a return to 'things themselves', forming a rejection of science.¹⁸

Philosophical phenomenology, by its very nature, defies the ability for it to be defined.¹⁹ However for use in this research, Neil Leach's description of phenomenology as the "study of how phenomena appear", being not limited to the visual sense, but rather "a receptivity to the full ontological potential of human experience", will be used as a definition to help to understand the application to architectural phenomenology.²⁰

E. Husserl, The Crisis of the European Sciences. Trans. D. Carr. (Evanston: Northwestern University Press, 1970), 9.

¹⁸ Maurice Merleau-Ponty. Phenomenology of Perception Trans. C. Smith. (New York: Routledge & Kegan Paul, 1962), vii.

¹⁹ Spiegelberg explains that phenomenology cannot be categorised as a school of thought, but rather a collective of philosophers who share a similar aim. Merleau-Ponty discusses this lack of definition in his preface in The Perception of Phenomenology, however O'Neill explains that this lack of categorisation has no "reproach", but rather a "characteristic of its style" where the phenomenology has an "openness" toward the observation of the world. H. Spiegelberg, The Phenomenological Movement: A Historical Introduction.3rdEdition.(Dordecht: Kluwer Academic Publishers, 1994), 24.

²⁰ N Leach. Rethinking Architecture. (London: Routledge, 1997), 83.

3.2 ARCHITECTURAL PHENOMENOLOGY

Phenomenology's call for a 'return to experience' was relevant for architectural thought following the Modern Movement, where the rationalist approach to functionality and form provided the basis of thinking. The increased reference to sciences and technical information dominated the discourse of western thinking in the early twentieth century and placed the experience of the human body in architectural space at a lower importance. Adam Sharr notes that, Heidegger "pleaded that the immediacies of human experience shouldn't be forgotten".²¹ Heidegger believed the purpose of the architect within this rational industry was to enforce the human experience.²² Similarly, Christian Norberg-Schulz argues that following decades of scientific theory, a "qualitative, phenomenological understanding of architecture" involving an interrelationship of the body, architecture and context, should be Adam Sharr. Heidegger for Architects. (New 21

York: Routledge, 2007), 2. 22 Adam Sharr. Heidegger for Architects. (New York: Routledge, 2007), 2. introduced. 23 Amongst other postmodern movements, architectural phenomenology creates a reaction in response to the rationality of modernism. This "re-injection" of human and contextual elements aimed to defuse this stronghold of the modernist agenda.24 The interdisciplinary nature of phenomenology relates well to architectural thinking. Phenomenology gives an intellectual legitimacy to spatiality which otherwise is not considered by other professions.²⁵ Jacques Benoit explains that phenomenology has the ability to connect "sensitivity and sensibility" to a resolved constructed building.²⁶

Architectural phenomenology can be described as a discourse, with individual researchers sharing a similar intention, but the range of investigation methods results in a range of outcomes.

Phenomenology." Environmental & Architectura Phenomenology. 23:3 Fall 2012, 8. Therefore phenomenology can be considered to be a process rather than a product. 27 28 M. Reza Shirazi explains that phenomenological discourse in architecture can be separated into two lineages of two philosophers; Martin Heidegger and Maurice Merleau-Ponty. Architectural phenomenology provides a tension between the two lines of thought; Heidegger's dwelling and place and Merleau-Ponty's dialogue with space and bodily experience.²⁹These two phenomenologists and their associated ideas provide the basis for an architectural interpretation of phenomenology.

Jorge Otero-Pailos categorises

the coherence of architectural

phenomenology into three strands;

experience, history, and theory.³⁰History

and theory can be seen to dominate

27 M. R. Shirazi. "On Phenomenological Discourse in Architecture". Environmental& Architectural Phenomenology 23:3 Fall 2012, 13.

28 Otero-Pailos also highlights the critique of this, where architectural phenomenologists were required to defend the uniqueness of the experience of the architect. Architecture's Historical Turn: Phenomenology and the Rise of Postmodernism. (Minneapolis: University of Minnesota Press, 2010), xxxi.

29 M. R. Shirazi. "On Phenomenological Discourse in Architecture". Environmental & Architectural Phenomenology 23:3 Fall 2012, 14.

J. Otero-Palios. Architecture's Historical
 Turn: Phenomenology and the Rise of Postmodernism.
 (Minneapolis: University of Minnesota Press, 2010), xxxiii.

the first generation of architectural phenomenologists, while experience has a greater influence in the second generation. Heidegger had a greater influence on this first generation of architectural phenomenologists who focused enquiry on the definition of place (Norberg-Schulz) and notions of dwelling and its constructivity(Charles Moore and Kenneth Frampton).^{31 32} These three architects concluded that sensory experience was the "timeless constant" and that architecture was an "elemental language of basic bodily experiences".³³ It is this sensory experience and its forced bodily interaction with the architecture that is created through "spatial richness".

<sup>C. Norberg-Schulz Genius Loci : Towards
a Phenomenology of Architecture. (New York: Rizzoli
Architectural Press, 1980), 5.
J. Wong. "The Script of Viscosity: the
Phenomenal Experience in Steven Holl's Museum
Architecture" The Journal of Architecture.17:2 2012, 273
J. Benoit. "The State of Architectural
Phenomenology." Environmental & Architectural
Phenomenology. 23:3 Fall 2012, 8.
J. Benoit. "The State of Architectural</sup>

J. Otero-Palios. Architecture's Historical Turn: Phenomenology and the Rise of Postmodernism. (Minneapolis: University of Minnesota Press, 2010), xxxiii.

³² The first generation of architectural phenomenologists, worked separately and resulted in separate areas of enquiry, however the outcome of their work was clearly phenomenological. The three strands were all interlaced within their works (Otero-Pailos xxxiii). Otero-Pailos names Labatut, Moore, Norberg-Schulz, and Frampton as the first generation of architectural phenomenologists. The notion of sensory experience and bodily experience became a combined understanding as the basis for architectural phenomenology. This can be read in the built of works of the second generation of architectural phenomenologists such as Steven Holl, Peter Zumthor, Tadao Ando and Caruso St John.

³³ J. Otero-Palios. Architecture's Historical Turn: Phenomenology and the Rise of Postmodernism. (Minneapolis: University of Minnesota Press, 2010), xxxii.

However the second generation of architectural phenomenological writers (e.g. Juhani Pallasmaa and Alberto Perez-Gomez) and architects (e.g. Peter Zumthor) have a greater understanding of both Heidegger and Merleau-Ponty. Second generation architect Steven Holl however, is largely grounded in Merleau-Ponty's thinking.³⁴ Merleau-Ponty's combination of existentialism and bodily experience in space over time is brought to the fore by Holl.³⁵

Heidegger placed emphasis on notions of dwelling and building. These two terms were interconnected in logic which differs from today's understanding of these concepts. 'Building' occurs through the presence of dwelling, not as a separate concept, but rather as a localised, smallscale application based on personal needs. 'Dwelling' and 'building' allowed Heidegger to emphasise inhabitation and experience over the priorities of aesthetics. 36 37 However phenomenology to Merleau-Ponty was the study of essences, and all the problems associated with these essences; essences of perception, essence of consciousness, etc. For Merleau-Ponty, the phenomenological approach of 'return to things' themselves provided the ability to create an understanding of man and world which allowed him to "put the essences back into existence".³⁸Developed from a range of intellectual disciplines, it was phenomenology that allowed for Merleau-Ponty's "account of perceptual experience" to be fully explored. ^{39 40} 36 Adam Sharr. Heidegger for Architects. (New

Adam Sharr. Heidegger for Architects. (New York: Routledge, 2007), 38.
 Heidegger's approach to phenomenology wa

37 Heidegger's approach to phenomenology was intrinsically associated with a genuine relationship with the world, a connection and 'belonging' to place and also the escape from inauthentic technologies, which ultimately placed his position in a romantic notion which resisted change and therefore turned away from a forward thinking . In addition, Pallasmaa notes that the Heidegger's cultural conservatism directs architecture backwards (Encounters 18). However, in contrast, Pallasmaa highlights that Merleau-Ponty's progressive approach "points my thought forward" (Encounters 18).
J. Pallasmaa . "Encounters". Encounters. (Helsinki:

J. Pallasmaa . "Encounters". Encounters. (Helsin RakennustietoOy, 2005), 18.

Concepts". Merleau-Ponty: Key Concepts. Ed. R. Diprose

Merleau-Ponty's influence on Pallasmaa is seen in his Pallasmaa's definition of architecture as an "existential metaphor".41Compared to Heidegger, Merleau-Ponty embraced change and "placed less emphasis on the historicity of experience", which partly explains why he was so influential for a second generation of architectural phenomenologists, including Steven Holl, who were less concerned with the questions of historiography and more interested in theory and experience. 42 Shirazi explains that Merleau-Ponty's thinking on perception, body and the "sensible dimension" of human experience allowed for application to architectural issues.43 Merleau-Ponty placed experience at the forefront of his writings and provides the basis for Holl's work. This review will now turn to focus on Merleau-Ponty and Holl in further detail.

3.3 MERLEAU-PONTY AND HOLL

Merleau-Ponty's writings created a shift from the initial Husserlian phenomenological thought. Merleau-Ponty developed the notion of experience and perception through phenomenology. According to Fred Evans, Merleau-Ponty used phenomenology as a 'bridge' between the dualism of subjects and objects and self and world. 44 The phenomenological body according to Merleau-Ponty is based on unity, rather than a dualism or single substance. ⁴⁵ He describes his perception as "not a sum" of senses, but rather perceives through a holistic whole being, which "speaks to all my senses at once".46

Merleau-Ponty described the body as the "vantage point" where objects were perceived. It is the "vehicle of my perception and movement in the world"; from this understanding, <u>spatiality and bodily motility could</u>

46 R. McCarter and J. Pallasmaa Understanding Architecture. (London: Phaidon Press, 2012), 15.

³⁴ Contrary to Holl's architectural phenomenological tendency, his architecture is free of the existentialist weight that is delicately articulated in Peter Zumthor's work.

<sup>G. Hartoonian. Architecture and Spectacle: A Critique.
(Farnham: Ashgate Publishing Limited, 2012), 229.
R. Diprose. "A Guide to Merleau-Ponty: Key Concepts". Merleau-Ponty: Key Concepts. Ed. R. Diprose and J. Reynolds. (Stocksfield: Acumen, 2008), 10.</sup>

³⁸ Maurice Merleau-Ponty. Phenomenology of Perception Trans. C. Smith. (New York: Routledge & Kegan Paul, 1962), vii.

T. Toadvine "Phenomenology and Hyperreflection". Merleau-Ponty: Key Concepts. Ed. R. Diprose and J. Reynolds. (Stocksfield: Acumen, 2008), 17.
 R. Diprose. "A Guide to Merleau-Ponty: Key

<sup>and J. Reynolds. (Stocksfield: Acumen, 2008), 10.
41 J. Pallasmaa. "Stairways of the Mind".
Encounters. (Helsinki: RakennustietoOy, 2005), 59.
42 J. Otero-Palios. Architecture's Historical</sup> Turn: Phenomenology and the Rise of Postmodernism. (Minneapolis: University of Minnesota Press, 2010), 20.

⁴³ M. R. Shirazi. "On Phenomenological Discourse in Architecture". Environmental & Architectural Phenomenology 23:3 Fall 2012, 13.

⁴⁴ F. Evans. "Chiasm and Flesh". Merleau-Ponty: Key Concepts. Ed. R. Diprose and J. Reynolds . (Stocksfield: Acumen, 2008), 185.

⁴⁵ F. Evans. "Chiasm and Flesh". Merleau-Ponty: Key Concepts. Ed. R. Diprose and J. Reynolds . (Stocksfield: Acumen, 2008), 191.

be considered neither geometric nor discrete.⁴⁷Therefore Merleau-Ponty's phenomenal body is a both a "matrix of human existence" ⁴⁸ and a "sensory apparatus" in which "things" could be understood. ⁴⁹

Like Merleau-Ponty, Steven Holl's work is centred on the body. The body and its senses is the fundamental vehicle for bodily experience. Pallasmaa explains that the fundamental understanding of the body in making architecture is "grossly undervalued" in today's culture.⁵⁰ Described by Davide Scarso as "a Merleau-Pontian architect", ⁵¹ Holl's early career actually developed through a focus on typology as seen in his early houses and publications 'Pamphlet Architecture'. It was the reading of Merleau-Ponty that provided a shift in his production of architecture from a rational typological basis to

a process based phenomenology approach in 1984. At this point Holl began to develop a position in which a project could derive concepts from outside of architecture; these could be "used as a point of departure of architecture".⁵² Though this change resulted in a focus on phenomenology, (seen as a reactionary theory to modernism) Holl self proclaims, that his built works are not from the canons of modernism nor postmodernism.53 Joseph Masheck explains that this "freedom from the established clichés" allows him to create the spaces of his buildings.⁵⁴ It is this freedom of phenomenology that provides key characteristics salient to providing a solution in this research. ⁵⁵Shirazi explains that using a phenomenological lens to view architectural themes allows a deeper thought resulting in ideas, images and details to be evoked.⁵⁶

52 J. Kipnis. Steven Holl: Simmons Hall. Ed.
T. Gannon and M. Denison. (New York: Princeton Architectural Press, 2004), 53.
53 J. Masheck "Steven Holl" BOMB 79 http://

bombsite.com/issues/79/articles/2462.Spring 2002.
J. Masheck "Steven Holl" BOMB 79 http://
bombsite.com/issues/79/articles/2462.Spring 2002.
S. Holl, quoted in Steven Holl: Simmons Hall.
Ed. T. Gannon and M. Denison. (New York: Princeton Architectural Press, 2004), 53.

56 M. R. Shirazi. "On Phenomenological Discourse in Architecture". Environmental& Architectural Due to this influence, Holl's work shifts from the basic understanding of phenomenological sensory experience, to a deeper role with a full body experience of architecture. ⁵⁷ In *Intertwining*, Holl refers to Merleau-Pontian ideas with a direct shift to the application to architecture;

"Phenomenology concerns the study of essences; architecture has the potential to put essences back into existence. By weaving form, space, and light, architecture can elevate the experience of daily life through the various phenomena that emerge from specific sites, programs, and architectures. On one level, an idea-force drives architecture; on another, structure, material space, colour, light, and shadow intertwine in the fabrication of architecture." ⁵⁸

In *The Visible and the Invisible*, Merleau-Ponty develops the rejection of the subject-object dualism.⁵⁹ Instead the body is privileged and can be seen as

^{J. O'Neill Perception, Expression and History:} The Social Phenomenology of Maurice Merleau-Ponty. (Evanston: Northwestern University Press, 1970), 15.
J. O'Neill Perception, Expression and History: The Social Phenomenology of Maurice Merleau-Ponty. (Evanston: Northwestern University Press, 1970), 13.
S. Drake. "The Chiasm and the Experience of Space: Steven Holl's Museum of Contemporary Art, Helsinki". Journal of Architectural Education. 59:2, 54.
J. Pallasmaa. The Thinking Hand. (West Sussex: John Wiley & Sons Ltd 2009), 15.
D. Scarso. "Steven Holl: Architecture and

Phenomenology". Chiasmi International. 9 (21-24), 19.

Phenomenology 23:3 Fall 2012, 12.

⁵⁷ S. Drake "The Chiasm and the Experience of Space: Steven Holl's Museum of Contemporary Art, Helsinki." Journal of Architectural Education. (59:2), 53-4.
58 S. Holl. Intertwining. (New York: Princeton Architectural Press, 1996), 11.

⁵⁹ J. O 'Neill. Perception, Expression and History: The Social Phenomenology of Maurice Merleau-Ponty. (Evanston: Northwestern University Press, 1970), 14.



Kiasma Museum of Contemporary Art.



Kiasma Museum of Contemporary Art.

both subjective and objective.⁶⁰ The concept of Merleau-Ponty's flesh provides the ability to understand the intertwined condition of subject and object "between the visible and the interior armature which it manifests".61 This "fusion" of the subjective and objective creates the foundation for Holl's body experience with architecture. ⁶² According to Holl, the body is at the very essence of our being and our spatial perception.⁶³ Merleau-Ponty's writings on the tactile world in The Visible and Invisible, where two persons hands can have different experiences on the same surface⁶⁴ have been applied to architecture through the notion of geometrically crisscrossing two systems applied together. ⁶⁵ Holl then literally translates this term "interlocking" into form of the Kiasma Museum of Art, and also as an

intertwining of "visible" and "invisible". In terms of a sensory experience, the visible can be considered the visual sense, while the invisible can be seen as the non-visual senses. Holl develops this further to introduce the idea of a poetic architecture.

"If we consider the order (the idea) to be the outer perception and phenomena (the experience) to be the inner perception, then the physical construction, the outer perception and inner perception are intertwined"

The influence of Merleau-Ponty helped Holl develop his approach, which added the "fundamental notion of context".⁶⁶ Through a site survey (or reading of the site), Holl includes the cultural and historical context as well as the physical. It also includes his personal experience of observable phenomena which is the architecture's "physical and metaphysical foundation".⁶⁷ This mental-phenomenon (physical

67 S. Holl Anchoring. (New York: Princeton Architectural Press, 1991), 19.

and non-physical aspects) is vital to perceive a range of diverse experiences. ⁶⁸ Holl's reflection on the 'feel' and identity of the place is then condensed into watercolour sketches. ⁶⁹ According to Kourosh Mavash, the more comprehensive and inclusive this "perceptual immersion" is, the more the resulting design will be successful and engaging. ⁷⁰ Holl believes that the task today for architects and planners is to "awaken senses", and "rekindle a psychological realisation of space in people".⁷¹

3.4 CRITIQUE OF MERLEAU-PONTY AND HOLL

Merleau-Ponty's well read texts, heavily based on perception and the body, provide a great opportunity for critique by other theories, especially those opposed to phenomenology. Many commentators critique Merleau-

M. Benedikt. "Coming to Our Senses: 60 Architecture and the Non-Visual". Harvard Design Magazine. 26 (Spring/Summer 2007), 2. 61 M. Merleau-Pont. The Visible and the Invisible Ed. C. Lefort Trans. A. Lingis. (Evanston: Northwestern University Press), 149. 62 S. Holl Parallax. (New York: Princeton Architectural Press, 2000), 61. S. Holl Parallax. (New York: Princeton 63 Architectural Press, 2000), 13. M. Merleau-Pont. The Visible and the Invisible. 64 Ed. C. Lefort Trans. A. Lingis. (Evanston: Northwestern University Press), 133. S. Holl." The Crisscrossing" Chiasmi 65 International 9 2007, 21.

⁶⁶ D. Scarso . "Steven Holl: Architecture and Phenomenology". Chiasmi International 9, 19.

<sup>K. Mavash. "Site+Sound: Space". Resonance, Essays on the Intersection of Music and Architecture. (Illinois: Culciade Architectural Press, 2007), 56.
D. Scarso. "Steven Holl: Architecture and Phenomenology". Chiasmi International 9, 19.
K. Mavash. "Site+Sound: Space". Resonance, Essays on the Intersection of Music and Architecture. (Illinois: Culciade Architectural Press, 2007), 56.
S. Holl, quoted in Steven Holl: Simmons Hall. Ed. T. Gannon and M. Denison. (New York: Princeton Architectural Press, 2004), 19.</sup>

Ponty's failure to develop a definable system of thought, resulting in higher than usual range of interpretations of this thought.⁷²According to Olkowski, Luce Irigaray has the greatest impact on feminist interpretation and critique of Merleau-Ponty. Irigaray is concerned with body (and his gendered bias), chiasm, the privileging of visibility and subject/object dualism.⁷³

Holl's interpretation of Merleau-Ponty's work can be disputed as to being a poor reading of his work. Whether his interpretation is accurate or not, it highlights the issue of philosophy being translated to architecture. Even if the interpretation is truthful to the original works, it opens up new ideas and thinking architectural thought. This interpretation provides much discussion, as Gareth Griffiths questions the notion of a phenomenological architect, as building on the environment is a contradiction to phenomenology's D. Olkowski. "Introduction". Feminist Interpretations of Maurice Merleau-Ponty. Ed.Olkowski,

D and G. Weiss. (University Park: The Pennsylvania State University Press, 2006), 5. 73 D. Olkowski. "Introduction". Feminist Interpretations of Maurice Merleau-Ponty. Ed.Olkowski, D. and G. Wicke, University Park, The Proceedings State

D and G. Weiss. (University Park: The Pennsylvania State University Press, 2006), 5.

fundamental ideas. The construction of a "parasitic" building is in itself "devouring" of the host environment. Holl defends this explaining that the new building is "folded into the experience" and is additive to the environment.74 Patricia Locke questions Holl's interpretation of Mealeau-Ponty's 'visible' and 'invisible' with reference to the relationship between Holl's watercolours and the built buildings. Holl's use of watercolours as early ideas which "fuse intuition with concept" are critiqued as being an easy solution. Locke believes that the "intuitive" watercolours are too similar to the built building, explaining that the "selfconscious mind cuts off the eye to hand circuit, so one dare not think too much".⁷⁵ She further notes that Holl uses a rigorous mathematical proportion system, similar to the Golden Section, though the "body could never actually be in a position to experience this".⁷⁶ It is important to note that even Holl claims that "one grows from the

misuse of philosophy" and he had "definitely misused the philosophical territory".⁷⁷Rachel McCann sees Holl's 'limited-concepts' that inform his design as not the sole driver. McCann implies that his own creativity and talent play a role which are generally ignored in his text.⁷⁸ William Curtis critiques Steven Holl's practice of architecture as "smoke and mirrors", mesmerising his clients with popularised phenomenology.⁷⁹ However, Hartoonian alludes to Holl as a "stone diverting a flood" where his contemporary sculptural tectonics are standing against the global age of digital reproductivity.80

⁷⁴ G. Griffiths. "Steven Holl and His Critics". PTAH. 2006 1, 30.

⁷⁵ Locke quoted in G. Griffiths. "Steven Holl and His Critics". PTAH. 2006 1, 32.

⁷⁶ Locke quoted in G. Griffiths. "Steven Holl and His Critics". PTAH. 2006 1, 32.

S. Holl quoted in Arkkitehtuurikilpailuja : ARK1993 4/5 in G. Griffiths. "Steven Holl and His Critics".PTAH. 2006 1, 29.

⁷⁸ McCann quoted in G. Griffiths. "Steven Holl and His Critics". PTAH. 2006 1, 32.

⁷⁹ W. J. R. Curtis. "Glasgow Neighbours:

Mackintosh versus Steven Holl". Architectural Record. 199:2 Feb 2011, 27.

⁸⁰ G. Hartoonian. Architecture and Spectacle: A Critique. (Farnham: Ashgate Publishing Limited, 2012), 229.



Fig. 3.04. Berkowitz-Odgis House watercolour.



Berkowitz-Odgis House



Fig. 3.06. Berkowitz-Odgis House.

3.5 HOLL STRATEGIES

In this section, Holl has been analysed and four key strategies have been created, based on his writings and work, to be applied to the design. The approach of these 'Holl Strategies' can be used to develop bodily experience and spatial experience in the design. His phenomenological approach is closely related to the issues concerning the 'shoe-box' apartments. Holl's critique of common architecture, is similar to that of the 'shoe-box' apartment, and by applying Holl's approaches, this shift from the 'shoe-box' can occur. Though it can be argued every building has experiences and interaction (even the 'shoe-box') they are of low quality and repetitious. Holl stresses the role of architects today to reintroduce the "psychological realisation" of space in people.

Anchoring and Intertwining

Steven Holl's initial manifesto *Anchoring* provides the basis for his ideas of anchoring a building to its site. His second manifesto; *Intertwining*, develops the 'anchoring' idea and applies it to the design of the building resulting in a holistic product, having an "organic link between site, concept and form".81 To achieve this product, Holl carries out an intensive site analysis; historical, experimental and conceptual to create a 'limited concept'. This site derived limited concept is based on Holl's belief that architectural meaning is the "intertwining of site, phenomena and its idea", which is then pushed and applied to all elements in the design.82 Holl believes the importance of this design process is that the "conceptual structure is always different depending on the site, the situation and the programme", resulting in individual, unique buildings.83 This results in Holl's work defying a consistent architectural language due to his individual approach to each project. Instead his work consists of distinctive phenomenological qualities which are present throughout all buildings. Exemplified by the Berkowitz-Odgis House, the notions of 'anchoring' and 'intertwining' can be seen through S. Holl. Intertwining. (New York: Princeton 81 Architectural Press, 1996), 15. S. Holl. Intertwining. (New York: Princeton 82 Architectural Press, 1996), 15.

S. Holl quoted in "Steven Holl 1986-1996". El

Croquis: Steven Holl 1996-1999 78, 1996, 15.

83

the design concept, detailing and the construction method of the house. The history of the site, based on Native American tribes who inhabited the island of Martha's Vineyard, provided the driving idea. The tribes would use a whale skeleton found on the beach, where skins would be stretched over to provide shelter, transforming it into a house.⁸⁴ Holl's interpretation of this historical event, resulted in the use <u>of a skeletal ins</u>ide-out balloon frame ⁸⁴ S. Holl. Anchoring. (New York: Princeton Architectural Press, 1991), 75.



Berkowitz-Odgis House

construction with a rubber membrane stretched over the roof, mirroring the Native American shelter. The lightness of the exposed wooden structure of the veranda is experienced through the shadows it casts on the adjacent wooden volume.⁸⁵ The approach is applied to detailing e.g. pile foundations are used to not disturb the sand dunes and the skeletal frame is exposed and celebrated on both the interior and exterior. Anchoring and Intertwining provide a basis for the initiation of site analysis for this research and also the development of a limited-concept. This concept will be derived from the site, therefore will be unique and drive the design. The uniqueness of the concept will provide a key shift from the repetitious economic focused 'shoe-box' apartment. As the site analysis is based on experienced phenomena significant to the site, the subsequent concept will be intertwined, therefore relevant and 'anchored' to the site. This limitedconcept will inform the development of the design including the form, light,

materiality, detailing, and construction.⁸⁶ It is important to note that Holl believes that this intertwining of idea and phenomena only occurs when a building is realised.⁸⁷ Therefore, due to the nature of this research and the fact it is not a built building, the design will be an indication of the observable phenomenology.

Parallax

Parallax performs two tasks for Holl's architecture; first a design process and secondly, as a resultant experience for the user through the building. Holl introduces the concept of parallax as a design strategy to create a shift from the orthographic projections of plan and section. Holl explains parallax as the "change in the arrangement of surfaces that define space as a result of the change in the position of a viewer".⁸⁸ The inclusion of the body in this concept reinforces that the "body is at the very essence of our



Fig. 5.08. Kiasma Museum of Contemporary Art Watercolour parallax progression.



Kiasma Museum of Contemporary Art Watercolour parallax progression.



Kiasma Museum of Contemporary Art Watercolour parallax progression.

being and our spatial perception".⁸⁹ Parallax creates an enmeshed experience, which "emerges from the continuous unfolding of overlapping spaces, materials and details".⁹⁰ Holl relates this enmeshed experience as having the "all-encompassing qualities" of the cinema.⁹¹ The enmeshed experience or, merging of object and field, encapsulates the optic-haptic realm of material and detail in the connectivity of space which is perceptive to the fore, middle and backgrounds.⁹²

Holl's Helsinki Museum 'Kiasma' provides a salient example of designing using parallax which is translated into the built architecture. The building incorporates the intertwining of building and urban site, but also develops the circulation as a tool to create a bodily experience through the "parallax of unfolding spaces".⁹³ Though the galleries are similar in shape, the circulation to <u>access them is designed to allow for ⁸⁹ S. Holl. Parallax. (New York: Princeton Architectural Press, 2000), 13.</u>

93 S. Holl. Parallax. (New York: Princeton Architectural Press, 2000), 38.

⁸⁵ G. Hartoonian. Architecture and Spectacle: A Critique. (Farnham: Ashgate Publishing Limited, 2012), 217.

⁸⁶ For example, light can inform or be informed
by programme, ceiling height, change in levels, define space
and play on materials.
87 S. Holl. Anchoring. (New York: Princeton

Architectural Press, 1991),10. 88 S. Holl. Parallax. (New York: Princeton

Architectural Press, 2000), 26.

⁹⁰ S. Holl. Parallax. (New York: Princeton Architectural Press, 2000), 56.

⁹¹ S. Holl. Parallax. (New York: Princeton Architectural Press, 2000), 56.

⁹² S. Holl. Parallax. (New York: Princeton Architectural Press, 2000), 56.

slices of views with doors cut diagonally, broken open corners or pushed in walls. 94 95 In terms of this research, parallax will perform as both the design process and experiential journey of the user as seen in Holl's work. By using parallax as a driver in the design process, the third dimension of space will be included from the initiation of the design. This shift from plan based design, as seen in the planning of 'shoe-box' apartments, to having a greater emphasis and integrated consciousness of the third dimension will result in apartments of superior spatial quality. The form of the interlocking apartment, being interlocked complexly in both vertical and horizontal directions, requires this realisation of the three dimensions to occur throughout the design process. Perspective drawings will be used to form key moments and develop a sense of journey or narrative through the building. This will result in the experiential journey for the user as seen

in Kiasma.

These moments will occur in three different spheres; the public exterior and urban context, the semi-public spaces of the apartment building (circulation, outdoor gardens) and also internal spaces of the apartments.

Attention to Detail

Holl's attention to detail is prominent in all of his projects, however his smaller projects due to their size, show an in-depth articulation of architectural elements. The 'limited-concept' can be carried through and applied to small scale elements of the building, which exemplify his holistic approach. This level of refinement and design at a small scale results in an intense spatial experience. The apartments in this research will be at a size which will allow this closer detailing to occur on smaller elements. Holl undertook the Scarsdale Pool and Sculpture Studio with a "very free hand".96 This project provided Holl with "the idea that elements at a small scale could operate





Fig. 3.11. Stretto House. Attention to detail: kitchen pull.





Fig. 3.14. Attention to detail





Fig. 3.13 Berkowitz-Odgis House Attention to detail: door handle

S. Drake. "The Chiasm and the Experience 94 of Space: Steven Holl's Museum of Contemporary Art, Helsinki". Journal of Architectural Education. 59:2, 57. G. Hartoonian. Architecture and Spectacle: A 95 Critique. (Farnham: Ashgate Publishing Limited, 2012), 223.

⁹⁶ S. Holl quoted in J. Kipnis. Steven Holl: Simmons Hall.Ed. T. Gannon and M. Denison. (New York: Princeton Architectural Press, 2004), 16.

at a heightened material intensity".⁹⁷ The scale of the project being only 11 feet wide "does not work well as a space" and resulted in "a large, blank wall". Therefore Holl focussed on smaller elements including stained glass windows to increase the architectural experience of the space. According to Holl, "the result was an intensification of a certain area and a stirring blankness in others".⁹⁸ Similarly, in other projects, such as the kitchen door pulls at the Stretto House and the door latches at the Berkowitz-Odgis House, were designed specifically to align with the 'limited-concept' of the overall design. However, this approach can be detrimental also, where J. Kipnis critiques the St Ignatius Chapel, for the need to "touch every square inch" which took away from the design concept.⁹⁹ Holl agrees and noted that not every moment of a project has to be hyper-articulated to achieve this. ¹⁰⁰ S. Holl quoted in J. Kipnis. Steven Holl: Simmons Hall.Ed. T. Gannon and M. Denison. (New York: Princeton Architectural Press, 2004), 16. S. Holl quoted in J. Kipnis. Steven Holl: Simmons Hall.Ed. T. Gannon and M. Denison. (New York: Princeton Architectural Press, 2004), 16. J. Kipnis. Steven Holl: Simmons Hall. Ed. T. Gannon and M. Denison. (New York: Princeton Architectural Press, 2004), 17. J. Kipnis. Steven Holl: Simmons Hall. Ed. 100

It is important to understand how to control the use of detailing to provide the desired focus on certain areas, being contrasted with areas of less detail.

Hinged space/Void Space

Holl works using a combination of tectonics and phenomenology, which according to Hartoonian, is developed through cuts in surfaces, apertures, planar elements. This results in a play between light and dark and solid and void created by cuts which break down the relationship and threshold between inside and outside.¹⁰¹ Holl applies this to urban housing which are designed around the concepts of hinged space and void space. These two 'spaces' are developed in the Fukuoka Housing, where there is a "play" between the two.¹⁰² The interiors of the Fukuoka Housing revolve around the notion of 'hinged space', where two types of hinging occur. Diurnal hinging is over

the span of a day, where spaces can be changed from morning to night depending on the requirement, and also episodic hinging, which reflects the change in family makeup and requirements over years. Holl describes this shift from "room-by-room space to interactive space" as the ability to reorder domestic environments using "participating walls" to create "adjustable space".¹⁰³ The ability to change a space using hinging requires a physical contact and force with a hinged element. This creates a forced interaction with the architecture and therefore a bodily experience including the sense of touch is created. This interaction implies a sense of time, which is inherent in Holl's interpretation of perception of space. Void space, however, is a purposefully literal flooding of space to create a quiet, peaceful and uninhabitable space. Holl notes that the "perceptual spirit and metaphysical strength of architecture" are driven by the quality of light and shadow shaped by the solids and voids.104



Hinged Space. Fukuoka Housing.



Fig. 3.16. Hinged Space. Fukuoka Housing.



Voic Space. Fukuoka Housing.

T. Gannon and M. Denison. (New York: Princeton Architectural Press, 2004), 19.

¹⁰¹ G. Hartoonian. Architecture and Spectacle: A Critique. (Farnham: Ashgate Publishing Limited, 2012), 212.

¹⁰² K. Frampton. "Steven Holl 1986-1996". El Croquis: Steven Holl 1996-1999 78 1996, 35.

^{S. Holl. Parallax. (New York: Princeton} Architectural Press, 2000), 226.
Holl, S., J. Pallasmaa and A. Perez-Gomez, Questions of Perception (Tokyo : Eando Yu, 1994), 63.
3.6 CONCLUSION

Phenomenology has been introduced as a key theory in this research. The thread of phenomenology, outlined by philosopher Merleau-Ponty, which places greatest importance on bodily experience and spatial experience of space, has been focused on to initiate a shift within urban apartment architecture. The architectural interpretation of Merleau-Ponty's phenomenology outlined by the practicing architect Steven Holl resulted in emphasis being placed on Holl's theoretical writings. From these writings, four strategies (Anchoring & Intertwining, Parallax, Attention to Detail and Hinged & Void Space) have been created to focus the design process and give a measurable evaluative tool. The implementation of Holl's phenomenology will force a conscious shift when designing the resultant building of this research.



Fig. 4.01. Kanchanjunga Apartments.

CHAPTER FOUR: INTERLOCKING PRECEDENTS: ANALYSIS AND ABSTRACTION

4.1 ANALYSIS OF INTERLOCKING APARTMENT PRECEDENTS

The interlocking apartment provides a key precedent which develops a shift from the 'shoe-box' apartment. This chapter analyses precedents and develops a list of techniques, which can be applied to the design of the research. This chapter is a distinct research task; separate from the influence of Phenomenology, Steven Holl and the four strategies from Chapter Three, however they will overlap and create a relationship between them. The two strands, Steven Holl's interpretation of Phenomenology from Chapter Three, and this chapters typological interlocking apartments will be fused together in the final design in Chapter Six.



Fig. 4.02a.



Fig. 4.02b.



Fig. 4.02c.

SKYLIGHT TO ROOF RECK, LIGHT ALLOWED INTO LOWER SPACE. PROVIDES INTERESTING SIGHTLINES BETWEEN INSIDE AND OUTSIDE AND POTENTIALLY CREATES TENSION/AWARENESS BETWEEN ROOF DECK USERS AND APARTMENT USERS



ROOFTOP 1:500



DUE TO SUBURBAN CONTEXT, EACH APARTMENT HAS OWN ENTRANCE ON GROUND FLOOR

SAME FLOOR AND CEILING HEIGHT IS USED THROUGHOUT WITH NO VARIATION, EVEEN AROUND VERTICAL CIRCULATION STAIRS





1:1000

MORGER + DEGELO: IN DER HUB SUBURBAN HOUSING

Fig. 4.03.





ROOMS ARE STILL DESIGNED IN A TRADITIONAL SENSE, WITH SEPARATE ROOMS FOR EACH SPACE

LONG SIGHTLINES ACHEIVED ALONG STAIRCASES TO ALLOW LONG POINT-TO-POINT VIEW DISTANCES, MAKING SPACES APPEAR LARGER.



OVERLAPPING UNITS ALLOW GREATER ACCESS TO SUN WITH ACCESS TO ALL FOUR ORIENTATIONS

Fig. 4.03c.

MORGER + DEGELO: IN DER HUB SUBURBAN HOUSING



70







1:2000









DESIGNED AT A SUBURBAN SCALE, THESE ARE EFFECTIVELY ROTATED TOWNHOUSES, IN THIS FORM WITH ROOFTOPS, IT WOULD NOT BE APPLIED TO BE APPLIED TO A TALLER BUILDING WITH STACKING. HOWEVER WITHOUT ROOFTOPS, THIS CAN BE APPLIED TO A TALLER BUILDING, WITH SPECIAL EMPHASIS ON ACCESS AND CENTRAL VERTICAL CIRCULATION.

Fig. 4.05b.





Fig. 4.06b.

OVERSIZED OUTDOOR TERRACES ALLOW FOR BUILDING TO BROKEN UP INTO INTERMEDIATE SCALED ELEMENTS

DRIVING CONCEPT WAS BASED ON AN ENVIRONMENTAL APPROACH SEEN IN VERNACULAR INDIAN HOMES. THE IMPORTANCE OF CROSS-VENTILATION, VIEW TO COAST AND SHELTER FROM THE SUN AND MONSOON RAINS RESULTED IN THE DEEP APARTMENTS WITH OUTDOOR SPACES ON MULTIPLE FACES.

 $(\mathbf{\hat{N}})$

CHARLES CORREA:

KANCHANJUNGA

URBAN HIGH RISE TOWER

TOWER



TYPICAL FLOOR 2 1:500





MULTIPLE DECKS INCREASE OUTDOOR SPACE OF APARTMENT. DOUBLE HEIGHT MAIN DECK

TYPICAL FLOOR 1 1:500

1:1000



SITE PLAN 1:2000 APARTMENT: 195m²

SIGHTLINES INTO LARGE VOIDS VIA INTERIOR WINDOWS BREAKING THE PUBLIC/PRIVATE INTERFACE OF BEDROOM AND LIVING SPACE.

Fig. 4.06.

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TYPICAL FLOOR 4 1:500

IMPORTANT SPACES DEFINED BY CHANGE IN FLOOR OR CEILING HEIGHT



TYPICAL FLOOR 3 1:500

Fig. 4.07a.



Fig. 4.07b.

CHARLES CORREA: KANCHANJUNGA TOWER URBAN HIGH RISE TOWER



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CEILING HEIGHTS ARTICULATED BY GABLED FORMS





INTERESTING SIGHTLINES AROUND/THROUGH APARTMENTS DUE TO LAYOUT











DEVELOPED FROM A IDEA TO CREATE HOUSING THAT COULD SYMBOLISE THE CITY OF TOKYO AS HE EXPERIENCE IT. TRANSLATED INTO THE BUILDING BY USING SMALL ARTICULATED FORMS WHICH ARE ARCHETYPICAL GABLED-ROOF HOUSES STACKED, SOMEWHAT HAPHAZARDLY, LIKE THE DEVELOPMENT OF CITY OF TOKYO. THE STAGGERED UNITS CREATE A COMPLEX RELATIONSHIP WITH CONSTANTLY CHANGING VIEWS WHEN WALKING UP OR THROUGH THE BUILDING, THE FEELING OF WALKING THROUGH A CITY.







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SOU FUJIMOTO: **TOKYO APARTMENTS**

Fig. 4.10.

Fig. 4.11.

FLOOR HEIGHTS FLAT THROUGHOUT, HOWEVER ARE LINKED BETWEEN FLOORS IN INTERESTING WAYS VIA LADDERS AND STAIRS



UNITS STACKED PLAYFULLY WITH A SIMPLE GABLE HOUSE FORM TO ARTICULATE EACH AREA AND REDUCE MASS

Fig. 4.11a.



FORMS ARE STACKED ON ANGLES TO ACHEIVE AS MANY ORIENTATIONS AND ASPECTS AS POSSIBLE.

TINY SPACES REQUIRE MULTIPLE FUNCTIONS

PERSONAL AND ARTICULATED STAIRS-ONLY POSSIBLE IN LOW RISE DEVELOPMENT

O FLOOR 1:500

Fig. 4.11b.

Fig. 4.11c.

SOU FUJIMOTO: **TOKYO APARTMENTS**









INTERLOCKING NATURE OF APARTMENTS ALLOWS BOTH APARTMENTS TO HAVE WIDE FRONTAGE TO SOUTH FOR LIVING AND TWO NARROW FRONTAGES TO NORTH FOR BEDROOM AND ENTRANCE.



PLOT: VM APARTMENTS APARTMENT COMPLEX

HORIZONTAL CIRCULATION MORE EXCITING THAN UNITE: SINGLE LOADED AND OPEN TO OUTSIDE AND ALSO WITH WINDOWS INTO APARTMENTS BREAKING DOWN THE PUBLIC/PRIVATE DISTINCTION.

TWO STORIED APARTMENTS ALLOW FOR EXAGGERATION OF SPACE THROUGH VOIDS.





















TYPICAL LOWER FLOOR 1:500









DELUGAN MEISSL: CITY LOFTS

THESE RANGE IN CEILING HEIGHTS -ALLOW DEFINTION OF ACTIVITIES IN A LARGER SPACE.



DESIGNED IN RESPONSE TO THE SITE AND URBAN CONDITIONS. THE SITE HAS THREE FRONTAGES INCLUDING A BUSY AND LOUD BOULEVARD AND INTERSECTION. THE RESPONSE TO THIS UNATTRACTIVE FRONTAGE RESULTED IN THE DEVELOPMENT OF MULTIPLE INTERNAL TERRACES WHICH ALLOW FOR USE WITHOUT DISRUPTION FROM THE BOULEVARD. THE INWARD LOOKING NATURE OF THE APARTMENTS WITH THE HIGH LEVEL WINDOWS PROVIDES VISUAL AND AUDIBLE PRIVACY FROM THE BOULEVARD WHILE ALLOWING LIGHT AND SUN TO ENTER.



ARTICULATION OF EACH APARTMENT GIVES DEFINITION AND INDIVIDUALISATION TO EACH APARTMENT.













DELLEKAMP **ARQUITECTOS: ALFSONSO REYES 58** APARTMENTS

Fig. 4.17.





Fig. 4.17a.

DELLEKAMP **ARQUITECTOS: ALFSONSO REYES 58 APARTMENTS** APARTMENT COMPLEX





SITE PLAN 1:2000 APARTMENT: 94m²



Fig. 4.18b.









1:1000

Fig. 4.19.

ARTICULATED APARTMENTS —ALLOW FOR 3-4 ORIENTATIONS

UNITS STACKED PLAYFULLY _WITH A SIMPLE GABLE HOUSE FORM TO ARTICULATE EACH AREA AND REDUCE MASS

Fig. 4.19a.















Fig. 4.19b.





INTERLOCKING —FORM OF APARTMENTS ALLOWS FOR FACADE TO BROKEN UP INTO INTERMEDIATE ELEMENTS EMPPHASISING INTERLOCKING INTERLOCS.

Fig. 4.20a.



Fig. 4.20b.

SITE PLAN 1:2000 APARTMENT: 340m²



TYPICAL LOWER FLOOR 1:500



APARTMENT BLOCK IS SPLIT — INTO 3 TOWERS WHICH REVOLVE AROUND A SINGLE LIFT. THIS REMOVES THE NEED FOR BANAL HORIZONTAL CIRCULATION AND WASTE OF SPACE ON EACH FLOOR.

DIFFERENT TO THE SMALLER VM APARTMENTS, THE KATANA RESIDENCES HAVE A WIDE LIVINF FRONTAGE AND ALSO TWO SMALLER FRONTAGES TO BOTH WEST AND EAST. THE LONGER (RATHER THAN WIDE SITE IN VM) SITE ALLOWS ORIENTATION TO WEST AND EAST TO BE MORE BENEFICIAL TO ALL APARTMENTS.

 (\mathbf{T})

SCDA ARCHITECTS: KATANA RESIDENCES ROTATED APARTMENTS



SECTION 1:500



1:1000

Fig. 4.21a.

Fig. 4.21b.

SCDA ARCHITECTS: KATANA RESIDENCES ROTATED APARTMENTS

DESIGN USING A DUALITY OF VOID SPACE AND HINGED SPACE. THE NORTHERN ACTIVE VOIDS CONTRAST TO THE SOUTHERN VOIDS WHICH ARE FLOODED WITH WATER ABOVE RETAIL HEIGHT. HEIGHT. HINGING OCCURS INSIDE WITH HINGING PARTITIONS, WALLS AND DOORS WHICH CAN BE MOVED BASED ON OCCUPANT DESIRE, OVER TEH DAY OR YEAR. JAN .





'H TP 10 œ۳, F רָ קר ור Þυ TYPICAL UPPER FLOOR PLAN 1:500



TYPICAL LOWER FLOOR PLAN 1:500



1:1000





SIMPLE CONCRETE FORMS HIDE THE ARTICULATE AND COMPLEX NATURE OF THE INTERLOCKING APARTMENTS

WHICH ARE ALL UNIQUE.



Fig. 4.23a.

INTERLOCKING OCCURS WITH APARTMENTS ENTERING ON THE SAME FLOOR. ONE APARTMENT GOES UP, WHILE THE OTHER DROPS UNDERNEATH. THIS SHIFT IN LEVELS ALLOWS A RANGE OF CEILING AND FLOOR HEIGHTS,





INTERNAL HINGED SPACE ALLOWS TRADITIONAL BEDROOMS TO BEDROOMS TO BECOME LIVING SPACES DURING THE DAY WHEN THE SPACE IS NEEDED.





4.2 INTERLOCKING TECHNIQUES 4.2.1

Range of Ceiling and Floor Heights. This technique sets up the shift from the salient approach of design in plan as seen in 'shoe-box' apartments. By shifting the dominance of plan to section and perspective, it gives emphasis to the horizontal planes that make up the apartment; the floor and ceiling. This ultimately allows the space to be visualised in terms of all three dimensions and prevents the design of repetitive cellular rooms. The nature of the vertical interlocking immediately creates a more interesting section.¹⁰⁵ The introduction of a range of floor and ceiling heights, results in split levels, shorter stairs and allows multiple views that connect spaces better, all greatly relating with the Holl Strategies of Parallax and Void Space. This creates internal sightlines where the perception of space is increased by using geometry (further discussed in 4.2.2).



Fig. 4.24. Technique One: Range of ceiling and floor heights developed through section/perspective.



Fig. 4.25.

The 'Kanchanjunga Apartments' are salient in showing this shift to design in section and perspective, resulting in range of different floor and ceiling heights. Here Correa "pushed his capacity for ingenious cellular planning to the limit", the result, interlocking types of apartments which range from three to six bedrooms.









Fig. 4.26-9. Kanchanjunga Apartments with the range of ceiling and floor heights with results in internal and external overlooking.



Fig. 4.30.

The 'City Lofts' (above) were developed in section with a mix of 2.3m (private bedrooms) and 3.3m stud height (semipublic living spaces) spaces to allow for a greater number of spaces inside each apartment, ultimately adding more floors to the area with the lower stud height. The resulting split inside the apartments allow for a reduction of circulation spaces allowing an intensification of activity in the corridor. The range of ceiling heights also relates to 'A Pattern Language', where Alexander et al explains that "a building which the ceiling heights are all the same is virtually incapable of making people comfortable''. The 'City Lofts' follows this, where low ceilings imply intimacy (bedrooms) and high imply formality (living spaces).



Fig. 4.31.

The 'VM Apartments' are developed from the 'Unite D'Habitation's' vertical 'L' shaped apartments. The 'Katana Apartments' are in turn are a larger version of the 'VM Apartments'. These three vertical 'L' shapes apartments automatically allow for double height spaces, voids and mezzanine areas.

¹⁰⁵ The 'shoe-box' apartment is designed in one plane, a 2D apartment, where the third dimension is ignored, spaces are designed with a consistent 2.4m stud height which ignores the spatial requirement of the space. Closets, sleeping areas through to large living spaces and corridors all have the same ceiling height.

4.2.2 Internal Sightlines.

The ability to introduce a greater perception of space can be created using geometry and internal voids. Using simple Euclidian geometry, where the hypotenuse is the longest dimension, spaces can feel larger or longer than they physically are. Circulation using the hypotenuse, or visual sightlines from corner to opposite corner allows this dramatised effect to occur. Predictably, this technique works in the third dimension, when used in conjunction with the two-dimension, the hypotenuse increases the feeling of space again. The use of voids is important to provide the perception of the third dimension and intrigue to space. These internal sightlines allow spaces to be shared to imply a greater sense of overall space.





Technique Two: Internal sightlines; perception of space increased using geometry and internal voids.



Fig. 4.33. Technique Two: Internal sightlines; perception of space increased using geometry and internal voids.



Fig. 4.34. Technique Two: Internal sightlines; perception of space increased using geometry and internal voids.



Fig. 4.35. Double height spaces in Katana Residences results in the perception of greater space.



Fig. 4.36.

Morger + Delgelo's 'In Der Hub', are designed to split over lower apartment, where the internal sightline is dramatically increased when looking up the stair void.



Fig. 4.37. Villa Overgooi, when standing in centre, one can see in four directions.



Fig. 4.38.

The use of long spaces which connect to other spaces gives the notion of greater space using the hypotenuse. Looking through an outdoor terrace increases this notion.



Fig. 4.39. Kanchanjunga Apartments internal sightlines.

4.2.3 Shared Views.

This technique shifts from the interior parameters of 'Internal Sightlines' to an approach which involves shared views and common spaces between apartments. The use of horizontal and vertical voids allows shared light and views to add to the apartments internal space. This integration of voids for this technique implies a relationship with the Holl Strategy of Void Space. Light wells and voids which are external to the apartment envelope allow views to be shared, which increases potential for openings, uninterrupted sightlines to courtyards, and contribute to having an apartment with 'multiple aspects', as described in 4.2.6. However, this technique, requires an awareness for privacy between apartments. Privacy implications must be ensured with these shared voids.



Fig. 4.40.

Technique Three: Shared Views; shared light and views between apartments using horizontal and vertical voids.



Fig. 4.41.



Fig. 4.42-3.

The articulated forms of the "Tokyo Apartments' result in apartments which have exciting view shafts and internal spaces derived from the external form. The connection between the different articulated forms require stairs and ladders to provide innovative spatial experiences. The negative spaces created by the gable roofs allow views through the building to the outside, which otherwise would not be seen if conventionally designed.

Technique Three: Shared Views; shared light and views between apartments using horizontal and vertical voids.

4.2.4 External Sightlines + Range of Outdoor Spaces.

This technique shifts again to a full external parameter, where view shafts are created in the external space in combination with a range of private outdoor spaces. Access to the outdoors is an important aspect of higher density living, which the 'shoe-box' apartments fail to provide successfully. One issue, as highlighted in Chapter Two, is the "fear of living" in apartments due to "limited access to outdoors".¹⁰⁶ The outdoor spaces are an asset for dense housing,¹⁰⁷ according to P. Ebner et al, the "green room" is most desirable, where the lack of such exterior space has the most lasting influence on dissatisfaction with an apartment".¹⁰⁸ In combination with the recommendation of outdoor spaces being a minimum of 6 feet (1.8m) deep,¹⁰⁹ and the ability to

have informal outdoor interactions,¹¹⁰ J. Bay et al explains the positive effects of the "provision of semi-open forecourts and balconies",¹¹¹ having a range of outdoor spaces, semi-public circulation sky streets, semi-private forecourts and private decks and courtyards is necessary. This reduces the notion of being attached to adjoining apartments, in turn reducing the strong interiority/ exteriority duality attached to 'shoebox' apartments. Outdoor spaces such as forecourts can result in a threshold, a transition of public to private, which can vary based on the conditions desired by the users. According to A. Forster, outdoor spaces must be suited to various activities including "dining, relaxation, children's games, sunbathing, socialising and an additional living room in summer".¹¹² This is explained further in 4.2.5.



Fig. 4.44. Technique Four: External sightlines and range of outdoor spaces.



Technique Four: External sightlines and range of outdoor spaces.



¹⁰⁶ United Nations Environment Programme, Task Force on Sustainable Lifestyles. Visions For Change: Country Papers (Paris: UNEP Division

of Technology, Industry & Economics, 2011), 60.

¹⁰⁷P. Ebner. Typology +. trans. S. Lindberg].(Basel: Birkhäuser, 2010), 16.108P. Ebner. Typology +. trans. S. Lindberg].(Basel: Birkhäuser, 2010), 244.

¹⁰⁹ Alexander, C., S. Ishikawa, M. Silverstein, M. Jacobson, I. Fiksdahl-King, S. Angel.

A Pattern Language. (New York: Oxford University Press, 1977), 781.

<sup>Alexander, C., S. Ishikawa, M. Silverstein, M.
Jacobson, I. Fiksdahl-King, S. Angel.
A Pattern Language. (New York: Oxford University Press, 1977), 116.
J.Bay and B. Ong. Tropical Sustainable
Architecture (Oxford: Elsevier Ltd,2006), 63.
A. Forster. Detail 46 no 3 2006, 156.</sup>



Fig. 4.46-8.

The terraces of 'Alfonso Reyes 58' are designed as dividers between apartments, acting almost as courtyards, doubling as light wells and allowing living spaces to open up on multiple faces, rather than apartment having one external face and surrounded by party walls.



moves".

The unique, articulated forms of the 'Tokyo Apartments' results in voids in both plan and section, which allows slithers of up to three aspects for a low rise development. According to Kuranishi, this "subtle staggering" of differing sized apartments, results in a different narrative approach to them . The staggering results in voids and in turn gives a sense of parallax to the journey; "the gaps between them mean that the view changes every time one



Fig. 4.45

The 'Kanchanjunga Apartments' provide in excess of five outdoor spaces for each apartment allowing for a range of uses in different times of day and weather conditions. A large double height exterior space is supplemented by smaller private terraces which are accessed off bedrooms and the kitchen. The large double height terrace includes space for plantings to reduce the perception of high-rise living.



Fig. 4.51.

Roof terraces are used in 'In der Hub' (pictured) and 'Villa Overgooi' to supplement lower decks.



Fig. 4.52. Tokyo Apartments parallax like journey.

4.2.5 Threshold between Inside + Outside and Public + Private.

This technique looks at the threshold between public and privacy in the apartment building. This focuses primarily on the relationship between the common circulation and the interior of the apartments. This threshold in 'shoe-box' apartments has a sharp definitive threshold. This poor threshold is the result of maximising space, by placing the apartment's private spaces against the common circulation to condense space; ¹¹³ the threshold is privatised to stop looking into the apartment. Coupled with a cost-effective narrow hallway,¹¹⁴ this harsh edge results in no informal interaction between neighbours resulting in poor perception of security and a space no-one lingers in. However, these circulation spaces can act as positive spaces of interaction, where according 113 In interiors of buildings, interaction areas

among apartments are likewise generally reduced to the minimum degree necessary, in stairwells and corridors.
Floor space is typically dedicated to achieve a maximum of pure dwelling-unit floor space" (from Schneider Floor plan manual 3rd Ed p40). check book.
P. Ebner. Typology +. trans. S. Lindberg].

(Basel: Birkhäuser, 2010), 20.

to Ebner et al, Jane Jacobs explains that "access and circulation could serve as a place for social interaction".¹¹⁵ The notion of being isolated by living above the fourth storey as explained by Alexander et al,¹¹⁶ is backed up by Ebner et al, where apartment buildings can "contribute significantly to making people feel alone" due to their "hotel character", which are not suitable for residential form.¹¹⁷As explained in 4.2.4, an outdoor space, such as a forecourt which is semi-private allows activity to occur along the circulation space. Bay et al explains that the visual connectivity with a sky street contributes to a high level of social interaction resulting in casual encounters and daily activities which promotes a sense of community.¹¹⁸ A forecourt of minimum two metres in width connected to a 1.4m sky street provides these results.¹¹⁹

Alexander, C., S. Ishikawa, M. Silverstein, M.
 Jacobson, I. Fiksdahl-King, S. Angel.
 A Pattern Language. (New York: Oxford University Press, 1977), 115.

117 P. Ebner. Typology +. trans. S. Lindberg]. (Basel: Birkhäuser, 2010), 24.
118 IBay and B. Ong. Tropical Sustainable

 J.Bay and B. Ong. Tropical Sustainable Architecture (Oxford: Elsevier Ltd,2006), 67.
 J.Bay and B. Ong. Tropical Sustainable Architecture (Oxford: Elsevier Ltd,2006), 78. The outcome from these precedents hint toward a type of external gallery circulation or a variation on this. These types of access have been implemented before, with varying results. Ebner et al explains the critiques of the external gallery and the desire to form communities using this approach. There are many factors which determine the success, including width, situation relative to exterior, orientation and number of floors.120 Ebner et al continues to stress the importance of wide galleries, where interaction and transitions can occur, otherwise a narrow gallery results in a closed edge due to privacy with "above eye-level windows, executed with transom-type openings", somewhat similar to an interior corridor.^{121 122}





A parallax-like journey is set up in the Tokyo Apartments.

¹¹⁵ P. Ebner. Typology +. trans. S. Lindberg]. (Basel: Birkhäuser, 2010), 20.

¹²⁰P. Ebner. Typology +. trans. S. Lindberg].(Basel: Birkhäuser, 2010), 22.121P. Ebner. Typology +. trans. S. Lindberg].(Basel: Birkhäuser, 2010), 26.122P. Ebner. Typology +. trans. S. Lindberg].(Basel: Birkhäuser, 2010), 21.





Fig. 4.55. Technique Five : Threshold between inside & outside and threshold between public and private.



Fig. 4.56. Technique Five : Threshold between inside & outside and threshold between public and private.





Fig. 4.57-8.

'Tokyo Apartments', due to its low rise structure, allows for individual external staircases. Not feasible for application for this larger building, but can provide hints to other applications.

4.2.6 Multiple Aspects.

'Shoe-box' apartments generally have one (sometimes two for end or corner units) external faces which are possible for natural lighting, ventilation and outlook. It is more advantageous for multiple aspects allowing sun to enter the apartment for a larger part of the day, resulting in more light, wider views and a reduced 'feeling' of urban enclosure.

The ideas developed in 4.2.3 'Shared Views', through the use of voids will be able to maximise the number of aspects. This will result in an increase in access to view and light.



Fig. 4.59. Technique Six: Mutliple aspects.







The simple 'L' interlock; seen at the City Lofts, VM Apartments and Unite d'Habitation provide two aspects

(front and back) (a-c) A second approach is wrapping the apartment around the central service core, 'Kanchanjunga Apartments' are designed to have half a floor each, resulting in each apartments having three aspects (d).

By developing the 'L' and also the single service core approaches, the 'Katana Apartments, a mix of these two provides all apartments with four aspects , where east and west are privileged (e).







The'Alfonso Reyes 58' apartments having internal terraces and courtyards, resulting the the number of aspects being increased (f).

In der Hub (g) allows apartments across all three floors, with a wing in each corner allowing four aspects.

Villa Overgooi's (h) rotated terrace approach gives all units four aspects whilst maintaining a clear structure.

4.2.7 Integrate Internal Circulation + Double Duty.

This technique looks at the celebrating and making the most of each space. By integrating circulation into the designed space, this otherwise functional and mundane space can give additional spaces for living. Staircases and halls can be inhabited, turning them into studies, sitting spaces or galleries. Stairs can become features of spaces, where they can act as a divider removing the need for an impenetrable wall. The stair can allow inhabitation, allow light to filter through to below and be integrated into the design aesthetic.

These ideas introduce the idea of 'double duty', where other rooms can be used as multiple spaces, e.g. a bedroom could be a study, office, bedroom, toys room, TV room etc. This use of double duty relates directly with the Holl Strategy of Hinged Space.



Fig. 4.61. Technique Seven: Integrate internal circulation.



Fig. 4.62-3. Technique Seven: Double duty spaces and convertible furniture.





Fig. 4.64-5.

Fukuoka Housing providing hinged elements allowing different activities to occur over the day. This convertible space is essential in small apartments.



Fig. 4.66. Katana Residences makes a feature of the stair, creating a distinctive spiral connecting two spaces.

4.3 HIERARCHY OF VISUAL MODULES

A residential building "speaks" to its surroundings through its facade.¹²³ Therefore the effect of the interlocking apartment on the façade can be used to create façade which shifts from the repetitious 'shoe-box' façade. 'Shoebox' apartment buildings generally have two element sizes; the individual apartment module and overall building form, with no intermediate scaled elements in between. This lack of mediation between the two (e.g. Zest Apartments, refer fig 2.19a) results in the highly repetitive and bland facade. The effect of interlocking apartment modules, provides a higher likeliness to produce allows a wider range of visual modules. This can be exploited on the exterior and results in a range of sized elements which can break up the building mass, provide greater visual interest and result in the integration of the building positively into the immediate context more successfully.

4.4 CONCLUSION

These seven InterlockingTechniques have been extracted from the precedent analysis to allow spatial opportunities to emerge to provide alternative approaches to urban apartments. The abstracted techniques are explored through diagrams and are discussed to offer positive implications for the design process in this research. Though the Interlocking Techniques are standalone from the Holl Strategies, the relationships between the two are already clear. The emphasis on the body in space from Holl, can be seen in the focus of the typological Interlocking Techniques which emphasise a range of spaces, movement and ability to perceive space. The Interlocking Techniques may also create a means to help concretely understand the conceptual ideas of Holl. However, as the techniques and strategies support each other, conflict may arise between them also, requiring areas of compromise.



Fig. 4.67.

The Katana Residences L' shape apartments are exaggerated on the exterior give a two different module sizes; the glazed L' element and the timber clad element.

¹²³ P. Ebner. Typology +. trans. S. Lindberg]. (Basel: Birkhäuser, 2010), 16.



Fig. 5.01 79 Dixon/ 161 Victoria Street. 1:100 000

CHAPTER FIVE: CONTEXT AND SITE



79 Dixon/ 161 Victoria Street. 1:5 000



Fig. 5.03 79 Dixon/ 161 Victoria Street. 1:1 000

5.1 INTRODUCTION

This chapter provides a brief and the physical siting for the resolved outcome. It explains the development of a 'limited-concept' which, based on Steven Holl's approach to 'anchoring' architecture, is used to drive the design in the following chapter.

5.2 DESIGN BRIEF, PROGRAMME AND CLIENT

The programme for the building is implicit to this research, urban apartments. However for an urban building to be successful, it requires a mixed used approach to the programme. The building will include parking for apartments, ground floor retail and also office space. The introduction of office space on the first floor gives an advantage to the apartments, this 'buffer' zone distances the apartments from the traffic of Victoria Street. However, only one floor of office space would still retain the sense of connection with the street. To attract a range of residents, a range of apartments are to be designed. A mix of one, two and three bedroom apartments will result in a variation of households.













5.3 AMALGAMATION

Victoria Street, an addition to the urban grid, was designed as a south bound street to relieve traffic from nearby Willis Street, allowing Willis to become the one way north bound street. The design of the street, an amalgamation of a range of unaligned smaller lanes and streets, had a focus on traffic flow requirements. The removal of built fabric to allow for the alignment of the smaller streets resulted in an over scaled street with a number of vacant building spaces and triangular parking spaces. The buildings built since its construction contribute to the inconsistent built fabric (refer Fig. 5.05-7).¹²⁴

The chosen site; 79 Dixon Street /161 Victoria Street, is a consequence of this urban amalgamation. The site has been carved in half, to allow for Victoria Street, resulting in a 'left-over' triangular shaped site. The 'left-over' site has not been built on since the amalgamation and is still currently used as a car park. To activate this corner, a building is required to redefine the edges of the site. In the same approach as Holl's 'anchoring', 'amalgamation' becomes ¹²⁴ Wellington City Council.WGTN 2040: Reshaping Wellington's Future. (February 2011), 50.

Fig. 5.04 Victoria Street developed through amalgamation of smaller streets and lanes from 1842-2007. 1:10 000 the 'limited-concept' for this site and architecture. This concept, an essence derived from site, will be 'intertwined' through the architecture, resulting in a building which explains the site it is built on.







Fig. 5.05-7 Victoria Street between Dixon and Ghuznee Streets.

5.4 SITE SELECTION + PROCESS

The selection was limited to Wellington's city centre to determine an appropriate site, where many of the 'shoe-box' apartments analysed are located. The selection process is explained over three different scales of diagrams, Wellington CBD, Upper Victoria Street and finally the final site. The process of site selection began by analysing the central city area through the existing amenity provided (refer Figures 5.10-18). Different areas of the central city were highlighted for having an abundance of amenity which justified residential development in these locations; Victoria Street was one of these. In parallel, identification of Victoria Street as a key focus area of the city by the WGTN2040 framework helped to determine this precinct as the focus.

The WGTN2040 framework, develops Wellington City Council's planning ideas and visualises their goals for the central city within the next 30 years. This 'spatial structure plan' forms the direction of development with a focus on attractive streets, improved green spaces, vibrant shopping areas and smoother traffic flows.¹²⁵ Victoria Street is outlined by the framework as an important street due to its current urban condition and also location, allowing it to be of great potential for future residential development.

Due to the position of Victoria Street, it is described as an "ideal position" near business and entertainment areas, walking distance to important institutions and above the low lying flood-prone areas of the Te Aro flat. The framework emphasises its importance as a possible high quality residential precinct. The framework explains that a realignment of the carriageway, review of building controls and development incentives, is required to initialise development on the street. ¹²⁶



Fig. 5.08 Recent construction of apartment buildings within Wellingon CBD. 1:50 000



¹²⁵ Wellington City Council. WGTN 2040: Reshaping
Wellington's Future. (February 2011), 3.
126 Wellington City Council. WGTN 2040: Reshaping
Wellington's Future. (February 2011), 50.





Fig. 5.09 Recent construction of apartment buildings within Te Aro Grid. 1:25 000

The development of apartment buildings within the Wellington CBD area has followed a clear pattern. A number of buildings have been built along the waterfront with view in mind. However most of the other buildings have been built along the narrow lanes and streets of eastern Te Aro clustered around Tory Street. This is due to the close proximity to Courtenay Place and Moore Wilsons supermarket, but are located in quiet streets without the effect of the noise from Courtenay Place. Few buildings are built on the wide boulevards of Kent/Cambridge Terrace, Taranaki Street and Victoria Street, possibly due to traffic volumes. However these wider streets allow a greater outlook, lack of enclosure and chance for greater street planting.



Fig. 5.10 CBD Amenity Diagraming: Figures 5.11-18 overlaid to form a composite diagram. 1:20 000 HIGHEST AMENITY AREAS WERE LOCATED IN A CLOSE PROXIMITY OF THE GOLDEN MILE AND THE WATERFRONT.

STUDY BOUNDARY OF WELLINGTON CBD SITE ANALYSIS



EDUCATION





Fig. 5.11-14 CBD Amenity Diagraming. 1:40 000



RELIGIOUS BUILDINGS



120



CBD AMENITY DIAGRAMMING



GOLDEN MILE SHOPPING



RESERVES AND OPEN SPACES

Fig. 5.15-18 CBD Amenity Diagraming. 1:40 000



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TRANSPORT BUS ROUTES

BUS ROUTE PARK EDUCATION FOOD RELIGIOUS BUILDING SHOPPING WATERFRONT 1:40 000

CBD AMENITY DIAGRAMMING

COMBINED LAYERS

5.5 VICTORIA STREET ANALYSIS









PROPOSED NARROWED AND REALIGNED — BOUNDARY OF VICTORIA STREET.



Fig. 5.20 Upper Victoria Street. Existing and proposed WGTN2040 boundary adjustments. 1:5 000

Victoria Street Transect, with possible intervention sites. 1:7 500

JPPER VICTORIA STREE







Fig. 5.21 Upper Victoria Street. Topography. 1:7500

Fig. 5.22 Upper Victoria Street. Maori Occupation.







Fig. 5.23 Upper Victoria Street. Hydrology. 1:7500





Fig. 5.25 Upper Victoria Street. Building Age. 1:7500





Fig. 5.26 Upper Victoria Street. Building Height. 1:7500



Fig. 5.27 Upper Victoria Street. Typology. 1:7500

Fig. 5.28 Upper Victoria Street. Interstitial Space. 1:7500

Fig. 5.29 Upper Victoria Street. Setbacks and Overhangs. 1:7500



Fig. 5.30 Upper Victoria Street. Culture and Instutions. 1:7500





Fig. 5.31 Upper Victoria Street. Vegetation. 1:7500

OTHER THAN THE CIVI SQUARE AND GLOVER PARK, THE GREEN SPACES ARE CONSTRAINED TO 1 EET. OVEP: SPACES ; A KEY



5.6 THE SITE

The site chosen to demonstrate this research on is 79 Dixon Street/161 Victoria Street, on the corner of Dixon and Victoria Streets. One block back from the Golden Mile on Manners Street, this site is located very close to a range of amenities (refer Fig. 5.10-18). The site is currently 651m², however following the WGTN 2040 guidelines, the site increases in size, reducing the effect of the narrow triangular shape. The site is flat, narrow and runs length ways north-south providing the possibility to achieve east and west aspects to the apartments. Dixon Street runs along the small northern boundary and Victoria Street along the long western boundary. Currently a car park is on the eastern boundary however, both sites have the same height restriction of 43.8m, ¹²⁷ therefore potentially a tall building will be built here in the future. The southern boundary is bordered by an earthquake prone two-storied car parking building used by the Farmers Department store, which again has an uncertain future. Therefore the potential for new buildings to be built on these two boundaries is likely within the future decades.

127 Wellington City Council. District Plan Map 32.



Fig. 5.32

Farmers Department store carparking building providing a southern edge to 79 Dixon Street (opposite).

Fig. 5.33a-f

Site sketches. Extraction of site information in an initial attempt for looking for a 'limited-concept'.





Fig. 5.35 79 Dixon/ 161 Victoria Street. Existing boundaries. 1:2 000



Fig. 5.36 79 Dixon/ 161 Victoria Street. WGTN2040 boundaries. 1:2 000

Fig. 5.34 Farmers Department store carparking building providing a southern edge to 79 Dixon Street/ 161 Victoria Street. Fig. 5.37 79 Dixon Street/ 161 Victoria Street looking from corner (overleaf).




CHAPTER SIX: DESIGN CASE STUDY

Fig. 6.01 Interlocking apartment.

6.0 INTRODUCTION

Chapter Six: *Design Case Study* presents the design outcome of this research. The design tests a number of the strategies and techniques identified in Chapters Three and Four. The chapter concludes with a detailed evaluation of the design, focusing on the effectiveness of these strategies.

The design, including the process, is described in 6.1 Design, where the building is introduced and explained through drawings and text. 6.2 Strategy & Technique Discussion, discusses the application and relevance of the four Holl Strategies and seven Interlocking Techniques in a format which highlights their relationships. 6.3 Design Critique looks at the overall process of the research critically, evaluating each chapter topic including 'shoe-boxes', phenomenology, Steven Holl and interlocking apartments. This section also provides a feasibility study for the design outcome and a cost comparison to a 'shoe-box' design for the same site. 6.4 Key Findings discusses the three key findings of this research:

1. Voids allowed the Strategies and the Techniques to be implemented effortlessly.

2. The Intermediate Module produced an articulated and controlled urban facade.

3. The Intermediate Module allowed Voids and Structure to be integrated without compromise.

6.1 DESIGN DESCRIPTION DESIGN PROCESS

The process of the design had four key stages of iterations, with smaller iterations within each stage. The process initially focused on the development and design of the



Iteration A.

The first design stage looked at a single apartment design which interlocked with adjacent apartments, but was duplicated across the entire building. The design of these apartments resulted in interesting interiors, views and met many of the interlocking techniques, however this approach resulted in the same unit module replicated twenty times, resulting in a repetitious facade, which was an attribute of 'shoe-box' apartment, which was to be avoided. This approach was developed with four different apartment layouts, with different approaches to interlocking (refer A1-A8 in Appendix One). apartment itself with an emphasis on the interior. After this was determined, the interior was developed simultaneously with the exterior of the building (refer Appendix One).



Fig. 6.02b Iteration B.

This approach resulted in the design of all the apartments being different and interlocking in a variety of ways. Having all apartments unique was an economic feasibility issue and also planning issue which resulted in a less resolved building. The result of the uniqueness was read on the external form, which is highly articulate, but lacked consistency or order.



Fig. 6.02c Iteration C.

The third iteration involved a reduction in the variety of apartments, resulting in the design of a module.

The module was tested with five, then four and finally three floors which was then replicated vertically. It was also decided to have two distinct modules (north and south separated by a 14 storey atrium) which allowed for four larger apartments in the north and six smaller apartments in the south module. These two modules were repeated vertically four times resulting in 40 apartments. The variety of interlocking was reduced and restrained to within the boundaries of the modules giving spatial experience within a controlled overall space. Vertical and horizontal circulation was excluded from the modules and located to the rear via circulation decks at every third floor.



Fig. 6.02d Iteration D.

Developing from the last design, the circulation decks were removed and inserted into the modules. This resulted in the three circulation voids in the final design, which in turn split the two north and south modules in half again to become more porous. Iteration D resulted in the final design.







Fig. 6.03 Process sketches of the overall building.



Fig. 6.04 Process sketches of interlocking apartments.

DESIGN MOVES











1.

The current approved envelope of the site. The site is extruded up to the Wellington City Council's District Plans height restriction of 43.8m.

2.

The site is widened to the WGTN 2040 plan.

3.

The building mass is focused on the street edges and corner to create a strong urban edge and emphasise the corner. To achieve double aspect apartments (east and west) of 11m, the mass is removed from the back. The ground and first floor use the footprint of the entire site.

4. Three circulation voids are inserted to allow access to

the apartments, and give the apartments three or four aspects.

5.

Vertical circulation is introduced into the circulation voids for the apartments and the office entrance. This is located in the centre of the building to provide minimal disruption to the apartments. The multiple circulation cores allow separate entrances for each tower on Victoria Street and also an office entrance on Dixon Street. Egress stairs are located opposite each the lift shafts.

Fig. 6.05 Design moves diagram.

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6.

The horizontal circulation is introduced at every third floor (the central floor of each three story module). The horizontal circulation is a small terrace between the lift and stairs and extends to the entrances of each apartment. This is broken up with semi-private outdoor sitting areas.





7 & 8.

A roof form and a floor form which houses the basement is introduced which reduces the perceived regular form of the building. The terraced roof planes introduce a stepping in height which is lowest at the southern boundary and highest at the corner. This emphasises the corner and also is more considerate to the southern neighbour. This emphasised corner breaks through the height restriction at the corner, but steps down to below the restriction at the southern boundary.



9. The introduction of the eight modules.

Fig. 6.06 Design moves diagram.



10. Final building with interlocking apartments inserted into the modules.







SECOND, FIFTH, EIGHTH, ELEVENTH FLOOR PLANS × DALD × // ____ 6 7 в

Fig. 6.09-10 First floor plan (opposite). Second, fifth, eighth and eleventh floor plans. в 🕨









Fig. 6.11-12 Third, sixth, ninth and twelfth floor plans (opposite). Fourth, seventh, tenth and thirteenth floor plans.









<u>0 1 2 3 4 5</u> 1:200



Fig. 6.15 Section BB.



0 1 2 3 4 5 1:250





Fig. 6.16 Perspective from corner of Victoria and Dixon Streets.



Fig. 6.17 Perspective from Victoria Street looking south.



Fig. 6.18 Perspective from Dixon Street.



Fig. 6.19 Perspective from Victoria Street looking north.





Fig. 6.20-21 External circulation void (opposite). Rooftop.









Fig. 6.22-24 Entrance Lobby (opposite). Office space. Retail space.

MODULE EXPLODED





Fig. 6.26 External visual modules diagram.

To control the complexity of the interlocking, intermediate modules was introduced (Figure 6.25, opposite). The final design module is three stories high, spanning the length of the building with 10 unique apartments. This is replicated four times vertically. The exploded module below highlights the intricacy of the interlocking between the apartments. Figure 6.26 highlights the resultant facade treatment due to the use of the intermediate module.

Fig. 6.25 Module diagram.



6.1.1 APARTMENT ONE







Apartment One

Interior Area 110.66m² Deck Area 31.88m²

• This apartment enters on its upper floor, down two steps from the circulation void, and into an outdoor area serving as a threshold between the private space within. This terrace overlooks the west terrace below.

•Two bedrooms with two bathrooms are served from the upper circulation before the stairs lead down to the living space. This unfolding of spaces along the circulation provides drama and illusion of greater space within the apartment.

•The main internal void and the external void open up as you descend the stairs, where you pass an informal north facing sitting nook on the landing overlooking Dixon Street.

•The living space opens up at the foot of the stair with the living area to the right and the double-height north-east terrace to the left.

•The dining and kitchen space are down two steps. These spaces are separated by a folding screen which hinges to give distinction the spaces.

•The dining and living space open to the west terrace which overlooks Victoria Street.

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Fig. 6.28 Apartment One sectional perspective.

Fig. 6.27 Apartment One floor plans.





6.1.1 APARTMENT ONE



Fig. 6.30-31 Apartment One ensuite. Apartment One terrace sectional perspective (opposite).





6.1.2 APARTMENT TWO





Apartment Two

Interior Area 78.34m² Deck Area 20.24m²

•An external stair rises from the circulation void to a small sitting terrace which overlooks the circulation void. From here you enter the apartment.

•The entrances opens into a small space, before opening into the kitchen and dining area.

•The kitchen and dining overlook the circulation void to the south and extend to a deck which overlooks Victoria Street to the west. The kitchen and dining have a four metre stud.

•The living space is half a level higher, which acts as snug with a lower ceiling height. Its location on the corner gives it north and west aspects and also hinged doors allow the space to be connected or disconnected from the lower dining and kitchen.

•The two bedrooms and two bathrooms are located on this higher floor, served by a second stair. These bedrooms are both on corners where they face north east and south east.







LOWER FLOOR

Fig. 6.32 Apartment Two floor plans.



6.1.3 APARTMENT THREE





Apartment Three

Interior Area 139.71m² Deck Area 26.18m²

•This apartment enters into an entrance lobby from the circulation void. From here, to the right is a large double height terrace which faces to the west and back toward the circulation void. Inside to the left is the large living area and the stair to the upper floor.

•The secondary living space, dining and kitchen occur at the top of this stair. The stair runs along the east wall allowing light into the both floors. The upper living spaces have a four metre stud. These spaces face west to Victoria Street, north and east overlooking the lower terrace and also to the south into another circulation void, giving all four aspects.

•The master bedroom and ensuite open off the living space with the same tall stud, but is able to be fully opened and transformed into an extension of the living space.

•Two extra bedrooms and a second bathroom are up half a floor. which overlook the lower terrace and lower living room.



Fig. 6.36 Apartment Three sectional perspective.

Fig. 6.35 Apartment Three floor plans.

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6.1.4 APARTMENT FOUR







Fig. 6.38 Apartment Four floor plans.



Apartment Four

Interior Area 150.63m² Deck Area 28.14m²

•This apartment enters from the middle circulation void, via a stepped down outdoor terrace providing a public/private threshold.

•The entrance overlooks the living area below and serves the master bedroom and ensuite.

•The stair leads down the south and east walls with a grand three storey space which allow light to filter in.

•On the lower level the kitchen, dining and living open up facing west and east, and also filtered views to the south. To the north lies an internal courtyard which is surrounded by living space and the two secondary bedrooms, bathroom.

•This courtyard can be split up with hinged screens or used as one large space. A secondary double height terrace faces directly on Victoria Street.

•Two small push outs provide small sitting spaces facing east and west. These have an intimate two metre stud height.









Apartment Four sectional perspective.

6.1.5 APARTMENT FIVE



UPPER FLOOR



LOWER FLOOR



Apartment Five

Interior Area 125.22m² Deck Area 18.01m²

•This apartment wraps around Apartment Six on the entrance floor, initially with an outdoor sitting threshold space, before entering into another sitting space which can be opened fully to the entrance.

•Up two steps is the living space, which wraps round to the kitchen and dining providing all four aspects in one space.

•Hinged doors allow the space to separated if desired.

• A double storey terrace opens off the dining space which faces north west to the circulation void and Victoria Street.

•Up half a floor lies a private living space or childrens play area which overlooks the terrace. The master bedroom and ensuite open off this space.

•Up another half floor lies two other bedrooms and a bathroom. One bedroom opens up over the dining space providing a two storied dining area below.



Fig. 6.42 Apartment Five sectional perspective.

Fig. 6.41 Apartment Five floor plans.





6.1.6 APARTMENT SIX





LOWER FLOOR

Fig. 6.44 Apartment Six floor plans.



Apartment Six

Interior Area 71.56m² Deck Area 19.04m²

•This apartment enters into a small entrance, which descends downstairs surrounded by internal voids giving sense of greater space to the one bedroom apartment.

•The living space is at the foot of the stair facing east with a outdoor terrace which opened up by a three storey void slice above.

•The bedroom and bathroom open up off a small hall from the living space facing north east.

•The kitchen and dining space are separate to the north west with a west facing terrace. This separation gives a greater sense of space and revelation. This separation allows the living to be separated over the greatest hypotenuse of the apartment.

•The bedroom also opens from the dining to give flexibility for a different use during the day.



Fig. 6.45 Apartment Six sectional perspective.



6.1.7 APARTMENT SEVEN







Apartment Seven

Interior Area 75.92m² Deck Area 17.64m²

• This apartment enters on the middle floor before descending stairs to the main apartment. Alongside the stair and entrance is the double height courtyard, which is overlooked when descending the stairs. This gives a greater spatial boundary to the space and intergrates a narrative of views whilst descending the stairs.

•The living space opens off the bottom of the stair, where the courtyard is accessed. A second external balcony faces Victoria Street.

•A single bedroom and bathroom look to the west and to this courtyard also.



LOWER FLOOR

Fig. 6.47 Apartment Seven floor plans. Fig. 6.48 Apartment Seven entrance hall.





6.1.8 APARTMENT EIGHT





Apartment Eight

Interior Area 92.51m² Deck Area 11.80m²

•This apartment enters into a double height space which then makes way for the stair up to the living area.

•On the entrance floor, down a private hall is one bedroom and bathroom.

•Upstairs the living space opens up to all four aspects. It includes a large kitchen and west facing balcony. The length of the apartment opens to a void giving less distinction to the boundaries of the space.



Fig. 6.50 Apartment Eigth floor plans













UPPER FLOOR

LOWER FLOOR

Fig. 6.53 Apartment Nine floor plans. Apartment Nine

Interior Area 72.54m² Deck Area 11.82m²

•This apartment is accessed by descending a flight of stairs before entering at the interior of the apartment at the lower level.

•Here it opens up onto the living space, terrace and dining/kitchen area, which face north, south and west.

•Two bedrooms are separated at the rear by the circulation void and are served by two bathrooms. The hall has a strong axial view down the circulation void back to Victoria Street.






6.1.10 APARTMENT TEN







Fig. 6.56 Apartment Ten floor plans.



Apartment Ten

Interior Area 111.73m² Deck Area 15.04m²

•This apartment enters through a small threshold sitting space, before entering the dining area. The kitchen and living then open up toward the west and also to the south looking down Victoria Street due to its corner location. A double storey terrace opens off the living space.

•Upstairs is three bedrooms and two bathrooms.

•The front bedroom acts as a mezzanine, overlooking the double height dining space below.

•The rear bedrooms face north east and south east .



Fig. 6.57 Apartment Ten sectional perspective. 6.1.10 APARTMENT TEN





Fig. 6.58 Apartment Ten sectional perspective.

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6.2 STRATEGY & TECHNIQUE DISCUSSION

6.2.1 INTRODUCTION

The strategies and techniques are listed again to reinforce their importance:

Holl Strategies.

- Anchoring & Intertwining
- Parallax
- Attention to Detail
- Hinged Space & Void Space

Precedent Techniques

- Range of Ceiling and Floor Heights
- Internal Sightlines
- Shared Views
- External Sightlines & Range of Outdoor Spaces
- Threshold between Inside & Outside and Public & Private
- Multiple Aspects
- Integrated Internal Circulation & Double Duty

The use of strategies and techniques provided an analytical, measurable way of developing the design. The comprehensive number of strategies and techniques (four Holl and seven interlocking) resulted in large number of ideas or elements to integrate into the design. Some of the Holl Strategies and Interlocking Techniques overlapped which resulted in emergence of stronger ideas which had a greater emphasis in the research. These ideas became primary to the design, whilst other techniques and strategies became secondary to the research or even additive to the design. This overlap of techniques and strategies proved their importance, even though they are not intrinsic to each other and emerged from two quite separate studies (an interpretation of Holl's theory-led phenomenological design or from a typological precedent approach), but ultimately shared a concern for spatiality and bodily experience. Therefore it can be suggested that the link between the Holl Strategies and the Interlocking Techniques were strong due to this overlap. The following sections are developed from the overlapping strategies and techniques, grouped together under a (mostly) new common

theme. All of these sections highlight the strength of the overlap of the strategies and techniques, as tools in developing the design. However 6.2.4 *'Anchoring and Intertwining and application through Attention to Detail'* additionally looks toward how building elements integrate the 'limited-concept'. Their order also provides a hierarchy of importance when reflecting on the design. Each of the following sections explain the extent of the success of Holl Strategies and Interlocking Techniques;

- Interstitial Space
- Spatial Complexity
- Anchoring & Intertwining and
- application through Attention to Detail
- Integrated Internal Circulation
- & Double Duty
- Outdoor Space
- Hinged Space

6.2.2 INTERSTITUAL SPACE

Void space from the strategy of 'Hinged Space & Void Space' has become a primary technique, creating interstitial space, which has resulted in meeting most of the aims of the research. The internal voids are closely related to the interlocking techniques of 'Range of Floor and Ceiling Heights' and 'Internal Sightlines'. Externally, the three circulation voids have become a defining structure in the design. The external circulation voids have allowed the techniques of 'Multiple Aspects', 'Shared Views' and 'External Sightlines' to be easily applied.

Internal Voids:

The use of voids internally have allowed a 'Range of Floor and Ceiling Heights' and 'Internal Sightlines'. A range of ceiling heights that stagger in combination with the floor heights allow greater sightlines which introduce the notion of space. The hypotenuse has been used to help maximise the perception of space inside an apartment, especially through mezzanine spaces that share sightlines with spaces below and create a dialogue between the two (refer Figure 6.60a).

External Voids.

The external circulation is located within the three external circulation voids to create a parallax experience when using the lift or stairs. The framed views to the east and west are designed to be part of the narrative as you ascend the building, with the different altitude comes a different view or perspective (refer Figure 6.59). The twelve storey voids act as an extension to the interstitial space of the internal voids and external terrace voids. In the external circulation voids, the interlocking is seen, where apartments overlap each other penetrating in or recessing out from the external void. Here the interlocking is integral with the circulation. The external circulation voids act as interstitial space, which replace the need for solid, impenetrable party walls with adjacent apartments. This is beneficial to the spatial experience of the apartments and allow the apartments to have multiple aspects letting light filter in.

Due to the lack of these party walls and replacement with penetrable external voids, 'Shared Views' is easily achieved. The voids allow these sightlines, which

Fig. 6.59 External circulation void landing level with a framed view out to Victoria Street.



are designed to extend the notion of space within the apartment, externally to a mutual space shared by others, but otherwise inhabitable. However, this introduces issues with privacy, therefore controllable hinged screens have been introduced to minimise this. The staggering of floors, and the introducing of half floors helped to reduce this problem also (refer Figure 6.60b). The use of openings to the voids have also been designed to be slots at floor height or at ceiling height in private bedroom spaces to eliminate overlooking. Though the external circulation voids have been successful allowing this condition to be achieved, the use of horizontal voids, highlighted in the technique in Chapter Four, have not been developed enough and applied to give a successful result.

A key design step was reducing the building mass, by the creation of a narrow building on a north-south axis to allow all apartments to be dual eastwest aspect. This gives all apartments sun at different times of the day and promotes cross ventilation. In addition,



Internal sightline diagram.



External circulation void.

the external circulation voids are located at short intervals, allowing the apartments to have multiple external corners allowing access to the north and/or south giving all apartments three or four aspects successfully achieving the technique of 'Multiple Aspects' (refer Figure 6.61).



Fig. 6.61 Diagram showing multiple aspects

6.2.3 SPATIAL COMPLEXITY

Spatial complexity is primarily created through the strategy of **'Parallax'**, however the overlap of techniques including; **'Range of Ceiling Heights and Floor Heights'** and **'Internal Sightlines'** are incorporated here too.

Parallax is used by Steven Holl simultaneously as a design tool and also as a method to create a narrative or journey through a building. Parallax was very useful as a design tool to help provide an understanding of the complex interlocking space. In addition to this achieved spatial complexity, bodily engagement was created through the ability to create a journey within the building.

Parallax as Design Tool

The interlocking typology enforces an interesting relationship between spaces, however using parallax as a design process helped to integrate spatial complexity, allowing the third dimension to be intrinsic to the design. The requirement to consistently consider the third dimension gives

Fig. 6.62-5 Apartment One showing a range of ceiling and floor heights.









ease to designing interlocking space which has created dynamic interlocking conditions (through techniques such as 'Range of Ceiling Heights and Floor Heights'. This link between the interlocking typology and parallax as a design tool has been salient in developing and understanding the design intimately. This has been exploited in the apartments to allow a minor change in stud height to form spatial boundaries without the requirement for walls, and allowed to scale the space suited to the use or type of room¹²⁸. The bathrooms are designed to have low ceilings due to the importance of the room, size and imply intimacy. Likewise bedrooms are designed generally to have low ceiling to imply intimacy, privacy and comfort and generally feature on the quiet eastern side of the building. While living spaces are design to have a range of heights, from the low sitting spaces, medium dining spaces or grand double height living spaces (refer Figure 6.62-5).

This relationship of scaled spaces is

developed from the scale of the body, giving the body a range of different interior spatial experiences. These are translated into the outdoor terraces, which range from single to double height, allowing for occupancy based on the dwellers use. The strategy intrinsically introduces double height and void spaces which allows the exploitation of internal sightlines, developed through the design process of parallax. This strategy reintegrates the human relationship with architecture. Proving spaces are designed for people, for different comfort, different uses, and are not just a container for living in, stacked up repetitiously.

This approach to space has resulted in a reliance on the three dimensional sectional perspective to help understand not only the interior spaces, but also how they interlock and relate to their neighbours. However, the complexity of the interlocking forced a consideration of the plan more than initially expected, giving the plan similar importance to the perspective . This approach

¹²⁸ Alexander, C., S. Ishikawa, M. Silverstein, M. Jacobson, I. Fiksdahl-King, S. Angel. A Pattern Language. (New York: Oxford University Press, 1977), 876.

was beneficial, however against Holl's repression of the plan, due to a conscious concern for the planning of the building. An initial perspective sketch of a space helped to describe the space that is to be created, but required a consistent circular method back to plan to see if the planning can incorporate this change, especially with the resulting effect on a neighbouring interlocking apartment. Therefore, as a compromise, the iterative design was performed as a process of perspectivesection-plan occurring repetitiously, which allowed a consideration of planning whilst still having the focus on the three dimensional perspective(refer Figure 6.66).

The process of design was found to be largely interior focused due to the parallax emphasis. The design of the apartments planning, interiors, and modules was fundamental to the design, and therefore the exterior appearance and urban relationship came secondary. This interior-out design resulted in the interior spaces influencing the exterior facade. The controlled complexity within the structured and ordered modules was key to organising the exterior. However, the focus on the interior can be seen as a fault, where a compromise could have been introduced to create a dialogue between the two conditions.



Fig. 6.66 Process diagram showing perspective, section and plan.

Parallax as Narrative

The consistent application of three dimensional drawings reintegrates the crucial connection with the dweller, which is lacking in 'shoe-box' apartments. This human relationship with the architecture gave back a bodily experience, which through the design, the perspective of the dweller is of primary concern, as it is what they experience through their sight. This emphasis on dwelling implies movement, time and therefore a sense of journey and narrative into the interior and exterior of the apartments (refer Figure 6.67a-k). Therefore this strategy has become primary in developing the design (refer Appendix One). It is to be noted that the effect of parallax on the urban design and exterior was beneficial to the design, where it can be compared to Gordon Cullen's Serial Vision. 129 Parallax as a narrative helped to give circulation a greater role, more than just functional. Parallax introduced bodily experiences, where views are

designed as one ascends or descends, applying Holl's notion of the changing fore, middle and backgrounds. As noted in Chapter Three: *Phenomenology*, that only a built building can allow these phenomenological experiences to occur, a critique of this research is that the images presented are purely a representation of the experienced phenomena. Parallax can also be criticised to be privileging the visual sense through this drawing approach. This is reinforced by the form of the representation in this research.

¹²⁹ G. Cullen. Concise Townscape. (London: Architectural Press, 1971), 17.



View heading south on Victoria Street.

Underneath corner of building at street level.



Outside a ground floor entrance lobby.

Fig. 6.67a-d Parallax series from street to living space of Apartment One.



Inside a ground floor entrance lobby.



Exiting the lift on the third floor landing.

Looking into the entrance threshold space outside Apartment One.

Inside Apartment One's entrance, looking down the hall.

Fig. 6.67e-g xxx Parallax series from street to living space of Apartment One.







Walking down the stairs to the living space.

Entering the kitchen area.



Looking toward the dining area from the kitchen.

Fig. 6.67b-k Parallax series from street to living space of Apartment One.



The living space looking toward the west terrace.

6.2.4 ANCHORING & INTERTWINING AND THE APPLICATION THROUGH ATTENTION TO DETAIL

The two Holl Strategies of **'Anchoring & Intertwining'** and **'Attention to Detail'** are fused together to create the holistic approach of the site specific 'limitedconcept'.

This research forms a 'limitedconcept' from the amalgamation of sites and small streets to create today's Victoria Street .One of the resultant left-over sites from this amalgamation, is the chosen site for the design; 79 Dixon Street/161 Victoria Street. The 'amalgamation' is then translated throughout the design of the whole building including the interlocking apartments. This strategy implies a built empathy with the site, where the building is relevant to the site, something that 'shoe-box' apartment buildings do not consider. The disregard to the four cardinal points in 'shoe-box' apartments is avoided and the different conditions of the four aspects is acknowledged in this

case study design.

This term amalgamation was used to develop structure, construction, the façade and interior details. This metaphorically intertwines the site and Victoria Street's history into the design, which is where the architecture is created¹³⁰. The amalgamation acts as an organising idea that is a "hidden thread, tying disparate architectural elements into a larger whole".¹³¹ The metaphorical meaning of this strategy, helped drive key decisions in the design, including the design of the structure and creation of the modules which are intrinsic to the design success. As the research found, this strategy is closely linked to 'Attention to Detail'. 'Attention to Detail' provides the means to develop the smaller details in the design allowing the amalgamation to be intertwined. Many of these details are purely additive to the design and can be deemed as superficial. However, it is these details, that reinforce the amalgamation and exaggerate the interlocking, resulting in a holistic design.







Fig. 6.68a-c Series showing internal hinged screens.

S. Holl. Intertwining. (New York: Princeton Architectural Press, 1996), 15.
 S. Holl. Intertwining. (New York: Princeton Architectural Press, 1996), 15.

External screens

External screens are used to develop the idea of hinged space to incorporate dualistic notions of light/dark, enclosure/exposure and privacy/ publicity which the dweller can control. The external screens are located on the exterior of all four sides of the design. The screens are designed to be suited to specific conditions of that external elevation.

West and East screens

The eastern elevation requires shading from the morning sun, but more importantly has to respond to the future eastern neighbour. Until the eastern neighbour is built, the facade is highly visible from the Cuba Street precinct and therefore must be designed acknowledging this. However, once the future building is built, the facade must provide privacy to the interlocking apartments as it is unclear if overlooking will occur from the neighbour. The western elevation, however, requires shading from the intense afternoon sun and from the street. A timber screen system is introduced to these two elevations





Fig. 6.69a-b Series showing external east and west screen's ability to be altered to suit.

to resolve these issues. Vertical and horizontal timber slats are overlapped to create a porous screen to control views and sun. These slats are independent from each other allowing the dweller total control of the screen. This gives another tactile experience which gives the dweller control of their spatial experience. The screens allow the interior and exterior to be blurred when open, or defined the spaces when closed. The individual vertical and horizontal slats of the screens allow a gradient of open to closed to be achieved, the extremities of light and dark (when open or shut respectively) and allows privacy to be controlled. The screens can also be completely hinged up, creating an awning like pergola on the exterior, adding interest to the street edge. This is a positive effect for the urban experience, where the position influences the façade's impact on the street environment. This consistently changing façade makes the building exciting and gives it spectacle qualities from the street (refer Figure 6.69a-b and 6.70a-c).







Fig. 6.70a-c Series showing vertically hinged external screens

North and South condition

The encasing skin of the north and south elevations are combined with the roof to create a unitary outer surface that contrasts the delicacy of the eastern and western facades and the fissurelike external circulation voids. This encasing element forms a large form, which aggregates the modules within. This screening facade allows the north elevation to allow privacy from the office building directly across Dixon Street and also give the south elevation an articulate form, which is highly visible heading south down Victoria Street due to the recessed neighbouring buildings (refer Figure 6.16-9).

Structure

The structure was a key element in the architecture to be 'amalgamated'. The apartment floors are constructed of moment resisting steel frames which provide seismic resistance. However the columns from this frame would interrupt the office and retail spaces on the ground and first floors, therefore reinforced concrete shear walls are used instead on these two floors. The structural forces from the apartment floors are 'amalgamated' together using an one metre deep transfer beam above the office floor. This transfer of forces from the moment resisting frame to the reinforced concrete shear walls allows the office and retail spaces to be free of columns. The shear walls are designed along the south and east boundaries and also placed as dividers between retail units with minimal impact on the leasable space, whilst giving a the building a large centre of resistance.

The structure of the apartments is developed in relation to the intermediate apartment modules. As each module is three stories high, a



mega-frame is used for each three-storey module, therefore the three floors act as a single structural element (refer Figure 6.71). If conventionally designed where each floor was a concrete floor diaphragm, the large number of voids would have weakened the strength of the diaphragms. Therefore by making every third floor a strong diaphragm, the two middle floors could be lightweight timber construction connected to the structure with pin joints, allowing flexibility to where the voids are placed within the module. 'Amalgamation' is designed into the structure detailing also. The columns and beams are designed to express the individual steel sheets that create the column or beam. These columns and beams have been designed to be exposed, integrated into the interior design, creating an amalgamated spatial experience.

Fig. 6.71 Exploded structural diagram.

Non-apartment Amalgamation

The same aesthetic and palette of materials has been applied to the nonapartment spaces of the building; the office, retail and vertical circulation cores (refer Figure 6.72-3).



The balustrades and stair treads of the interior stairs are designed to be amalgamated into one element. The painted black steel materiality similar to the structural columns and beams is used on the stairs to make a consistent interior aesthetic. The balustrade is formed from the same piece of steel of the tread, simply folded vertically (refer Figure 6.74). The open riser stairs allow the treads and balustrade to be read as one amalgamated element expressed with a small gap between each piece riser of steel.





Fig. 6.72-4 Non-apartment amalgamation: office space. Non-apartment amalgamation: retail space. Internal stairs.

Doors and Door Handles

The timber doors are designed specifically in combination with the door handles. Phenomenologically, "the door handle is the handshake of the building",¹³² a key sensorial connection, and therefore intertwined into the design to create a bodily interaction with the architecture. The design of the black steel door handle itself is amalgamated into the door, where the handle only functions with the design of the door (refer Figure 6.75). The black steel lever handle is designed to be flush with door surface and to rotate 90 degrees clockwise. Therefore the door is notched to create a negative detail for the handle rotate in. This notch is continued across the whole door to exaggerate this detail.

Kitchen cabinetry

The doors to the kitchen cabinetry are designed to match the other interior doors with the same door handles (refer Figure 6.76). The kitchen islands are designed to be amalgamated into the design of the wider interior space. The timber floor of the living spaces is wrapped up the side and over the island bench top, amalgamating and anchoring the island into the floor through the use of materiality.



Fig. 6.75 Door and door handle.



Fig. 6.76 Kitchen cabinetry.

¹³² J. Pallasmaa. Eyes of the Skin : Architecture and the Senses. (London : Academy Editions, 1996), 56.

Shelving & Built-ins

Storage is an important component in apartments due to the small interiors with no external garaging. Therefore a storage locker is provided for each apartment on the ground floor. However inside the interior of the apartment, shelving is built into the design to maximise storage space. Shelving is amalgamated with the exposed structural columns and underneath the open rise stair treads (refer Figure 6.77), using the same painted black steel aesthetic. These built-ins allow for additive traditional loose furniture to be minimised giving the impression of greater open space.

Bathroom vanity units

The bathroom vanity units are designed to show 'amalgamation' using varnished laminated timber construction (refer Figure 6.78). The basin is carved from layered timber veneers to create a sufficient depth. The curved 'bowl' shows each layer of timber expressing the amalgamation of fusing the layers together.



Shelving and built-ins.



Fig. 6.78 Bathroom vanity units.

6.2.5 INTEGRATED INTERNAL CIRCULATION & DOUBLE DUTY

'Internal Circulation & Double Duty' act alone as one technique, however provide key ideas for the small spaces of apartments.

Internal circulation, due to the use of parallax, resulted in a heightened importance in the design. Circulation became integrated into the movement of the dweller. The insertion of wider pocket spaces into the circulation allow dwellers a place to sit or work, giving circulation a second use. Apartments were given oversized landings or hallways with designated space for sitting areas or workspaces. A key circulation element; the stair, gained a role in the interior as a statement and a space divider. The stair became a feature of the room. The open risers allowed the stair to divide a space visually whilst still allowing a spatial dialogue to occur (refer Figure 6.79).



Apartment showing stair as space divider.

Double Duty is required due to the restricted amount of interior space in the apartments. The ability for one space to perform two functions gives the space added value. This was achieved through multipurpose rooms, which can act as secondary living spaces, bedrooms and offices. The hinged bookcases, allowed an otherwise simple pivoting wall to gain added function, with the ability to display or store books. Convertible furniture or hinged furniture allowed this to occur, providing an overlap with 'Hinged Space' and 'Attention to Detail'.

6.2.6 HINGED SPACE

Hinged Space looks at the effect of movable elements in creating a range of spatial conditions, It includes 'Void Space & Hinged Space', 'Integrated Internal Circulation & Double Duty', 'Internal Sightlines' and 'Parallax'.

Hinged Space has been developed primarily on diurnal hinging which occurs over a day, or the need to change the spatial condition for a specific function of a space. The notion of 'hinging' was taken less literally where the 'hinging' ultimately resulted in the ability to change the space dependent on the desired use, with movements such as hinging, sliding or folding.

Internally, Hinged Space is set up by partitions. Internal partitions which can hinge or pivot are designed into living spaces to allow the large area to be divided into smaller spaces. This could allow a living space to be closed off from the kitchen turning it into a TV room. In some cases, the hinged partitions are developed with book cases to achieve added storage to the apartment by exploiting the hinged elements (refer Figure 6.80a-c).The



Fig. 6.80a-c Internal screens hinging space.

ability to change a space through moving a partition allows the use of the interlocking technique 'Double Duty' to be greatly enhanced. A tactile relationship with the dweller and the architecture is created using the notion of hinged space. This interaction with the participating elements requires a physical contact and force to adjust the space, resulting in a bodily interaction with the space they control and create. It also introduces the sense of time which is related to the perception and movement through space.

Externally, the threshold is primarily set up by the external screens (as explained earlier, refer Figure 6.69a-b and 6.70a-c) which allow for controllable conditions to be achieved. Salient to the design, these screens allow the dwellers to create semi-private or semi-public spaces depending on the desired situation (refer Figure 6.81). This layering of screens gives a transition between the extremes of interior and exterior and public and private, unlike the abrupt boundaries of the 'shoe-box' apartment.



Fig. 6.81 External circulation voids acting as penetrable boundaries to apartments.

6.2.7 OUTDOOR SPACE

'External Sightlines + Range of Outdoor Spaces' and 'Threshold between Inside + Outside and Public + Private' overlap to extend the apartments interiors to the exterior.

All the apartments have access to a range of outdoor living spaces. These are designed to allow greater flexibility for the users, as different spaces can be used for different functions and different times during the day. Most apartments have at least one private living space which can allow outdoor dining. Access to outdoor space was a key factor in the negative perception of inner city living.¹³³

The private terraces are also designed to blur the interior and exterior dualism to provide the perception of added interior space. This is achieved through a continuous use material inside and out with a flush surface (figure 6.83). Rooftop gardens have been implemented to give all apartments a further choice of outdoor spaces.





Fig. 6.82a-b Range of outdoor spaces.



Outdoor space blending to indoor space with a flush consistent floor.

The Level 14 rooftop and Level Two rooftop are semi-public spaces, where only residents of the building can access it. The Level 14 rooftop gives a larger outdoor space with plantings, grassed area and a community garden which the residents can share. This is to promote play and also a community atmosphere (refer Figure 6.82a). The outdoor sitting spaces at the entrance to the apartments create a threshold between the semi-public circulation core and the private interior of the apartment (refer Figure 6.82b). The spaces are also a blurring of interior and exterior due to their covered and enclosed quality. These outdoor sitting spaces at the entrance to the apartment are separated by two steps to give definition and implied ownership to the space, signaling a boundary to other users. As an extension, the external circulation stairs directly outside the apartments provide a small localised space which allows children to play within watch of adults inside of from these threshold sitting spaces. This has resulted in the circulation acting as a social space, more than its functional use.

6.3 DESIGN CRITIQUE

Repetition was a critique of 'shoebox' apartments in Chapter Two. However the final case study design repeats the modules four times. This can be argued as a failure, but rather it is an acknowledgment that each apartment within the building cannot be different for feasibility reasons. The introduction of four intermediate sized modules vertically is less noticeable and detrimental to the urban face compared to 40 identical apartments repeated vertically and horizontally. The use of the intermediate module prevented both excessive variation and excessive repetition in apartment type, which in turn had a positive effect on the exterior facade.

A building with a range of scaled elements is much more effective than a single small element repeated endlessly. The modules provide an intermediate sized element which contain a range of smaller scaled elements which help to break up the bulk of the facade. This has been a result of the interlocking apartments and their double height spaces being observed from the outside.

^{United Nations Environment Programme, Task} Force on Sustainable Lifestyles.
Visions For Change: Country Papers (Paris: UNEP Division of Technology, Industry & Economics, 2011), 60.

This approach of controlling the complexity of the design (rather than a completely repeated, or a completely unique approach with every apartment different) coupled with the interlocking typology of the apartments has had a positive effect on the urban facade of the building. (refer Figure 6.86)

The iterative design process was more convoluted than expected with two distinct phases; the first with different options or approaches with an emphasis on reflection (outlined by concepts A1-8, then the decision to focus on one approach; concept C)(Refer Appendix One: Design Process), which was then followed by the iterative process of developing the design in regards to all strategies and techniques. These approaches focused primarily on the apartment, but this design required a concern for the whole building, including parking, retail, office, roof etc which was ignored early on. This separation of the apartments and the other elements resulted in the office spaces and retails space being less developed, especially in articulating the idea of 'amalgamation'.

The boundary realignment of Victoria Street, as designed in the WGTN2040 plan, would result in many buildings needing to be altered with respect to their new street boundary. Considering the significant amount of development to occur, this design acts a catalyst design for the new buildings. Therefore the design becomes the context for future development, freeing it from scale of the existing buildings. The height, scale, modules and intermediately scales elements that are introduced within the design set the context for these future developments (refer Figure 6.85-7). It also sets up an urban edge and places greater emphasis on the corner. The building tower mass, designed to give all apartments a dual east-west aspect also resulted in a the development of an urban edge to define the adjusted Victoria Street boundary. This definition is hoped to be continued on other new buildings on the street. The placement of the tower mass on the Victoria Street edge also resulted in the greatest possible space on the eastern boundary. This was beneficial as it gave flexibility to the neighbouring site, when it is developed.

As a result of the focus on the interiors of the apartments, resulting in the desired spatial quality, the voids had a an effect on the functional layout of the structural columns. The detailed level of structural design suffered, resulting in larger columns in staircases (reducing the width in half), or small spaces where columns are encountered due to the generous use of voids reducing usable floor area. It has been acknowledged that designing simple rectangular spaces and repeating them is much easier than irregular spaces with angles which require an greater emphasis on furniture planning and greater space designated for circulation, reducing efficiency. A result of this is some apartments have disproportionate spaces. Apartment Eight has one of the largest kitchens, however is only a one bedroom apartment.

The excessive use of voids in the design is a key factor in its success. In comparison to a 'shoe-box' apartment where every available floor area is used to saleable or usable floor area, the use of voids have resulted in an overall more spatiality exciting environment for the dwellers. The internal and external voids have helped to achieve many of the strategies and techniques outlined in the earlier chapters. It is important to note, that the use of external voids has resulted in apartments which appear to be less confined by connected neighbours, boundaries and party walls, but has ultimately increased the cost due to the significant extra area of external walls. The added external surface, including extensive use of glass and additional screening has contributed to the added cost premium, making the design less feasible. The light condition of these voids, especially at the bottom can be questioned. Without a roof, the higher floors facing the voids receive light well, however further down, the light loses its intensity and is dependent on light to penetrate from the sides. The external circulation voids would unquestionably work successfully with a smaller number of levels, however for twelve stories deep the effect is less effective for every apartment.

Comparable Design and Economic Feasibility

Assisting as a tool for evaluating the design, a second design has been created. Conventional in design, it is an example of what could be built on the same site with apartments comparable to the 'shoe-box' apartments seen in Chapter 2. The interlocking design and the 'shoe-box' design is tested through a construction cost plan (refer Appendix Two) and then translated into a development feasibility study. The nature of the comparable design has a greater saleable floor area in relation to overall construction costs due to the lack of voids, external areas and more compact apartments. These apartments are single storey, served by an external gallery and generally have one predominant aspect (west) unlike the interlocking design.

The resulting 'shoe-box' apartments (refer Figure 6.84) are smaller, simpler and repeated across the whole building. It includes 60 two bedroom and ten four bedroom apartments across ten floors with four floors of retail/office and one floor of basement parking. This is comparison to the twelve floors of interlocking apartments (40 apartments), two floors of retail/office and a car stacker.

The arrangements are more conventional allowing more units to be built, hence the 'shoe-box' sale price is much lower which can be seen in the feasibility study. The 'shoe-box' and interlocking design cost \$37.8m and \$51.5m respectively, however neither design returns a profit for the development. It was assumed that the 'shoe-box' apartment would be profitable, however it is not and suggests further research is required to finalise this cost otherwise it could be assumed that the current market cannot produce a profitable inner city development. The resultant construction cost premium of the interlocking design is 37% over the 'shoe-box' design. This premium is very high and would need to be lowered to around 15% to make the interlocking design feasible and attractive to purchasers. The extra elevators, rooftop gardens, extensive surface screens and car stacker are all added costs which make this design more expensive.

Fig. 6.84 'Shoe-box' apartment building design for 79 Dixon Street/161 Victoria Street.



2 BED APARTMENT INTERIOR 48.14m DECK 8.70m² TOTAL 56.84m

56.84m²

4 BED APARTMENT INTERIOR 95.34m² DECK 10.08m² DECK TOTAL 105.42m



 (\mathbf{T})

'SHOE-BOX' APARTMENT DEVELOPMENT

Land Cost Lot 1 DP 82741 651m² Construction

\$1.5 Million¹³⁴ 2013 NZD \$30.40 Million¹³⁵ 2014 NZD

SUB-TOTAL \$31.90 Million

Professional Fees	10% of construction co	ost	\$ 3.04	Million ¹³⁶
		SUB-TOTAL	\$34.94	Million
Holding Costs 3.5% of	of construction costs		\$1.06 N	Aillion
Legal/Consents etc (fi	(xed)		\$ 1.8	Million

SUB-TOTAL \$ 37.80 Million

Apartment Sales	60x 2 bedroom apartments @ \$350,000 10x 4 bedroom apartments @ \$600,000	\$ 21.00 Million \$ 6.00 Million
Retail Income 770 m ²	net Wellington Fringe CBD @ \$500/m ²	\$ 385,000/pa ¹³⁷
Office Income 2250 m	² net Wellington Fringe CBD @ \$180/m ²	\$ 405,000/pa ¹³⁸

Sales Income					\$27.00 Million
Annual Incon	ne				\$790,000/pa
Gross Profit	Sales Income			\$27.00 M	illion
	Building Cost			- \$37.80 Mi	illion
		SUB-TOTAL	-	\$10.8 Mil	lion
	Rental Income for 10 y	years		+ \$7.90 Mill	lion
		TOTAL	-	\$2.09 Mi	llion

134 Wellington City Council. Pre WGTN2040 adjustment.

Rawlinsons. Rawlinsons New Zealand Construction Handbook. (Auckland: Rawlinsons Media Limited 2013), 624. 136

138 Rawlinsons. Rawlinsons New Zealand Construction Handbook. (Auckland: Rawlinsons Media Limited 2013), 563.

INTERLOCKING APARTMENT DEVELOPMENT

Land Cost	Lot 1 DP 82741	651m ²
Construction		

Professional Fees 10% of construction

Holding Costs 3.5% of construction cost Legal/Consents etc (fixed)

Apartment Sales	Type 1x4 2 bedroom apartments @ \$1,000,000	\$ 4.00	Million
	Type 2x4 2 bedroom apartments @ \$800,000	\$ 3.20	Million
	Type 3x4 3 bedroom apartments @ \$1,300,00	\$ 5.20	Million
	Type 4x4 3 bedroom apartments @ \$1,300,00	\$ 5.20	Million
	Type 5x4 3 bedroom apartments @ \$1,300,000	\$ 5.20	Million
	Type 6x4 1 bedroom apartments @ \$600,000	\$ 2.40	Million
	Type 7x4 1 bedroom apartments @ \$600,000	\$ 2.40	Million
	Type 8x4 1 bedroom apartments @ \$600,000	\$ 2.40	Million
	Type 9x4 2 bedroom apartments @ \$800,000	\$ 3.20	Million
	Type 10x4 2 bedroom apartments @ \$800,000	\$ 3.20	Million
Retail Income 400	m² net Wellington Fringe CBD @ \$500/m²	\$ 200,0	000/pa ¹⁴²
Office Income 480	m² net Wellington Fringe CBD @ \$180/m²	\$ 86,4	$00/pa^{143}$

\$1.5 Million¹³⁹ 2013 NZD \$42.48 Million¹⁴⁰ 2014 NZD

SUB-TOTAL \$43.98 Million

on o	cost	\$ 4.24	Million ¹⁴¹
	SUB-TOTAL	\$48.22	Million
ts		\$1.48	Million
		\$ 1.8	Million

SUB-TOTAL \$51.50 Million

Wellington City Council. Property Search. http://wellington.govt.nz/services/rates-and-property/property-search. 135 Refer Appendix Two

¹³⁷ Rawlinsons. Rawlinsons New Zealand Construction Handbook. (Auckland: Rawlinsons Media Limited 2013), 563.

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6.4 KEY FINDINGS

1. Voids allowed the Strategies and the Techniques to be implemented effortlessly.

The use of voids, the internal, the external and the external circulation voids, all contributed to the success of achieving the strategies and techniques. The use of voids allowed the objectives to be accommodated to result in apartments with three or four aspects, double height spaces, shared views and develop a narrative to the space. The result of not closepacking the interlocking apartments allowed room for the voids to break up spaces internally and externally, where traditional impenetrable party walls would be used. This traditional definition to apartment boundaries is blurred, where these voids act as buffers between apartment dwellers.

Annual Income \$286,400/pa Gross Profit Sales Income \$36.40 Million Building Cost - \$51.50 Million SUB-TOTAL - \$15.10 Million Rental Income for 10 years + \$2.864 Million TOTAL - \$12.24 Million

\$36.40 Million

Sales Income

2. The Intermediate Module produced an articulated and controlled urban facade.

A simple system for controlling the interlocking of the apartments resulted in the development of the use of modules. Developed neither specifically from phenomenology of interlocking, but rather as a result of the design process. This intermediate scale (between single unit and whole building) resulted in a positive outcome for the street frontage and facade of the building. The ability to articulate the intermediate scaled elements automatically results in a breaking up a mass of a large building, which is a pleasing outcome for an urban building of this scale. The intermediate module helped to prevent both excessive variation and excessive repetition in apartment type. Visually, the intermediate module could be read as the greatest form of amalgamation, acting as the connection between the single unit and whole building.

3. The Intermediate Module allowed Voids and Structure to be integrated without compromise.

The use of an intermediate module allowed all these voids to be integrated easily without compromising the structural integrity of the building. Derived from the 'amalgamation' limited-concept', the structure was developed simultaneously with the modules, where a moment resisting steel structure encases each three storey module. This resulted in only the outer floors of the modules to be reinforced concrete, allowing the two internal floors to be lightweight timber construction. This allowed the freedom to introduce the voids which are intrinsic to the interlocking apartments without weakening the what would otherwise be reinforced concrete diaphragms.



Regulating lines for future development on Victoria Street based on this catalystic design.



The final case study design facade compared to a 'shoebox' facade with endless repetition.



Fig. 6.87 Facade broken down into scaled elements emphasising the intermediate scale.



CHAPTER SEVEN: CONCLUSION

This research looked toward the theoretical and typological studies of architecture to help provide a solution to the existing mundane, quantitative approach to urban apartments. The research into these two distinct areas of architecture led to the design of an apartment building which hope to break down perceptions of urban apartments. The following concluding comments highlight the success of this research and also the limitations it produces.

Process

The introduction of a theoretical framework helped to shift from a highly analytical and measured approach with a great concern for typology to an approach which dealt greatly with the body and spatial experiences. Phenomenology as this theoretical framework, was successful in adapting with typology and shifting the approach to a holistic design. However, as discovered through the research of phenomenology, its interpretations vary greatly and can be applied whimsically if not controlled. The ability to restrain phenomenology to the ideas and built works of Steven Holl helped to analytically process the theory.

Reflecting on Holl, who has a grounding in practice and theory, was key to help understand phenomenology. By using his interpretation of phenomenology to drive one part of the research, it gave a clear structure and critical understanding of the wider theory of phenomenology. However it can be discussed that another theory may have been just as successful and relevant when applied to the research e.g. Affect, which is also intrinsically associated with the body. Secondly, the parallel frameworks of the interlocking typology and phenomenology, each having a shared interest, but ideologically different, allowed a greater and more compelling influence on the situation of urban apartments. The two parallel ideas also offered a greater grasp on the details of the design and legitimatised the application of phenomenology to urban apartments, an uncommon fusion, especially in the context of New Zealand.

Key Findings

1. Voids allowed the Strategies and the Techniques to be implemented effortlessly.

2. The Intermediate Module produced an articulated and controlled urban facade.

3. The Intermediate Module allowed Voids and Structure to be integrated without compromise.

The three key findings highlights the success of the case study design, resulting in findings which are developed from the problem of integrating all the strategies and techniques together. The key findings, especially the introduction of the intermediate module , proved a defining role in the success of the design and meeting the objectives. The use of voids highlights the positive role they can play when used correctly, especially when space is scarce. Though, the use of voids may seem counterproductive when space is limited and when maximising saleable floor space takes priority, their use can result in a higher quality space proving their success in a design.

Comments & Limitations

The findings presented could provide interest to a wide range of individuals, including developers, planners and also urban dwellers. The design provides a more attractive and positive approach to urban apartments which would be positive to developers and planners promoting inner-city or higher density living. The design also provides a catalyst design for the redevelopment of Victoria Street based on the WGTN2040 plan, providing ideas for planners in the future.

This research was not driven by cost (but rather used as a check), however further research could look into the techniques to allow this type of construction to be cost effective and also profitable for a developer. This may include research into application to a different city (New Zealand or elsewhere), economies of

scale, a different structural system, different materials, or a reduction in the interstitial space to improve spatial efficiency. It may be applied to smaller and larger developments also. Due to the use of intermediate modules, a single module may be used in a smaller development, or more modules may be used in multiple towers or taller towers elsewhere. The module itself can be altered in terms of number of floors or width or length also. This research could also provide the basis of further research which look into the current stock and approach to urban apartments in New Zealand. This would give greater emphasis to this area of study and help to prove the results of this research.

This research was a good test for the future of urban apartments at this density within the context of New Zealand. It proves that apartments do not have to be mundane and repetitive. They do not have to be the result of poor design with little access to the environmental qualities that standalone houses achieve. The design fundamentally gives a catalytic basis for the future development of urban apartments in the city and ultimately the country. It gives apartment living many positive qualities, which in turn hope diminish today's reservations and concerns for inner-city living.

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-	Images by Author.	~	Image by Author.

nd west screens ability to be altered to suit.

l external screens.

: office space.

: retail space.

ace divider.

ng as penetrable boundaries to apartments.

loor space.

design for 79 Dixon Street/161 Victoria Street.

opment based on this catalystic design.

rade compared to a 'shoe-box' facade with more

ed elements emphasising the intermediate scale.

stepped floors and ceilings close packed.

Figure 8.02	A1. Two interlocking 'L's with stepped floors and ceilings close packed.	Figure 8.22	A5. Boomerang iteration.
	Image by Author.		Image by Author.
Figure 8.03	A1. Two interlocking 'L's with stepped floors and ceilings close packed.	Figure 8.23	A5. Boomerang iteration.
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Figure 8.04	A2. Infinite sectional 'Z' apartments stacking close packed.	Figure 8.24	A5. Boomerang iteration.
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Figure 8.07	A3. Two interlocking 'Z's in section and plan, wrapping over each other resulting in	Figure 8.27	Concept 'A5'
	four aspects.		Image by Author.
	Image by Author.	Figure 8.28	Concept 'A5'
Figure 8.08	A3. Two interlocking 'Z's in section and plan, wrapping over each other resulting in		Image by Author.
	four aspects.	Figure 8.29	Concept 'A5'
	Image by Author.		Image by Author.
Figure 8.09	A3. Two interlocking 'Z's in section and plan, wrapping over each other resulting in	Figure 8.30	Concept 'A6'
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	Image by Author.	Figure 8.32	Concept 'A6'
Figure 8.11	A4. Two rectangle spaces (one E-W and one N-S) stacked to achieve four aspects.		Image by Author.
	Image by Author.	Figure 8.33	Concept 'A6'
Figure 8.12	A4. Two rectangle spaces (one E-W and one N-S) stacked to achieve four aspects.		Image by Author.
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Figure 8.13	Form 'A1' from previous page:'L' shaped apartments on a podium.		Image by Author.
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0	Image by Author.	Figure 8.40	Concept 'C'.
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-9	Image by Author.	Figure 8.42	Sketch plans
	07	1 19410 0.12	Image by Author

Figure 8.43	Sketch plans.	Figure 8.65	Section through C4.
_	Image by Author.	-	Image by Author.
Figure 8.44	Parallax progression of Apartment One	Figure 8.66	Section through C4.
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	Image by Author.		Image by Author.
Figure 8.46	Parallax progression of Apartment Two.	Figure 8.68	Apartment Six sectional perspec
	Image by Author.		Image by Author.
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	Image by Author.		Image by Author.
Figure 8.49	Parallax progression of Apartment Three.	Figure 8.71	Physical model of site and surro
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Figure 8.52	Parallax progression of Apartment Five.	Figure 8.74	Physical model of each module.
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	Image by Author.		Image by Author.
Figure 8.54	Parallax progression of Apartment Six.	Figure 8.76	Front and rear of modules place
	Image by Author.		Image by Author.
Figure 8.55	Parallax progression of Apartment Six.	Figure 8.77	Front and rear of modules place
	Image by Author.		Image by Author.
Figure 8.56	Parallax progression of Apartment Seven.		
	Image by Author.		
Figure 8.57	Five apartment module (left) and seven apartment module.		
	Image by Author.		

Five apartment module (above) and seven apartment module.

Figure 8.58

Figure 8.59

Figure 8.60

Figure 8.61

Figure 8.62

Figure 8.63

Figure 8.64

Image by Author. Exterior of iteration C3.

Image by Author.

Section from C3. Image by Author.

Image by Author.

Image by Author.

Image by Author.

External perspective Image by Author.

External circulation gallery.

4 + 6 module axonometric.

External circulation gallery.

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APPENDIX ONE: DESIGN PROCESS

ITERATION A - THE INDIVIDUAL APARTMENT MODULE

Iteration 'A' consisted of initial card modelling, which resulted in the development of A5 'Boomerang'. 'A5' was further tested with Concepts 'A6', 'A7' and 'A8' which had different typologies, however were concerned with the approach of the single



apartment interlocking with its neighbours.

Please note, Iterations 'A', 'B', 'C' and 'D' are consistent with Section 6.1 Design Process.



A1. Two interlocking 'L's with stepped floors and ceilings close packed.









A2. Infinite sectional 'Z' apartments stacking close packed.









Fig. 8.10-12

A4. Two rectangle spaces (one E-W and one N-S) stacked to achieve four aspects.





Fig. 8.13-15 Form 'A1' from previous page: 'L' shaped apartments on a podium.







Fig. 8.16-18 Form 'A4' from previous page.







Fig. 8.19-21 Facade testing and introduction of 'slits' for added light.



Fig. 8.22-24 A5. Boomerang iteration.

Lower floor 'V' facing south, while upper floor 'V' faces north. Results in a number of different aspects and views and slits between each neighbouring apartment (residual space). The overlap of each 'V' resulted in a double height space which allows a third 'half' floor. This was developed into the final Concept 'A' on the following pages.





EXTERNAL PERSPECTIVE





Fig. 8.26 Concept 'A5'

LIVING, DINING, KITCHEN SPACE WITH ENTRANCE ABOVE

KITCHEN, DINING, LIVING SPACE

LARGE OUTDOOR SPACES ARE PROVIDED. RANGING FROM OPEN AT THE EDGES TRANSISTIONING TO AN INTERNAL SPACE IN THE MIDDLE. THE MULTIPLE SPACES ALLOW FOR DIFFERENT TIMES OF THE DAY. THE SCALE OF THE SPACE ALLOWS FOR CHILDREN TO PLAY COMPARED TO 'SHOE-BOX' APARTMENT OUTDOOR SPACES.

THIS TRANSITION BETWEEN INTERNALISED OUTDOOR SPACE AND 'OPEN' OUTSIDE SPACE ON THE TERRACE AND THE FULL INTERNALISED INTERIOR BEGINS TO DEVELOP A SENSE OF THRESHOLDS BETWEEN INSIDE AND OUTSIDE AS HIGHLIGHTED IN THE TOOLBOX. HOWEVER THIS RANGE IS PROVIDED, THE PROGRESSION IS LESS CLEAR.



PRIVATE EXTERIOR SPACE



LIVING/BEDROOM/OFFICE







Fig. 8.27 Concept 'A5'

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SECTION B

SECTION C

.



Fig. 8.29 Concept 'A5'

THE RECESS BETWEEN EACH THE RECESS BETWEEN EACH UNIT ACTS AS A LIGHT WELL AND ALSO GIVES DEFINITION TO EACH UNIT. THE KITCHEN RECEIVES LIGHT FROM THE EAST, BUT ALSO WEST THROUGH THIS WINDOW

OUTDOOR TERRACE IS A MIX OF SINGLE STOREY AND DOUBLE STOREY SPACE. SIMILAR TO THE LAST CONCEPT, THE TERRACE RUNS FROM EAST TO WEST TO PROVIDE MULTIPLE OUTDOOR SPACES DURING THE DAY.

Fig. 8.31

Concept 'A6'



VICTORIA STREET ELEVATION

BUILDING BEHIND.



A DOUBLE HEIGHT OPEN AREA IS INSERTED IN THE NORTH EAST CORNER TO BREAK DOWN THE PODIUM DOMINANCE. THIS WOULD ACT AS A SECONDARY OUTDOOR SPACE FOR RESIDENTS.



CORNER PERSPECTIVE

Fig. 8.30 Concept 'A6'



每

LIVING

4.

KITCHEN DINING



KITCHEN LOOKING TOWARD LIVING SPACE







KITCHEN DINING LOOKING TOWARD UPPER LIVING SPACE



1.8



Fig. 8.34b Concept 'A7'

1

Fig. 8.34a Concept 'A7'

2

UNITS ARE DEVELOPED TO SHARE EXTERNAL VOID SPACES. THE VERTICAL AND HORIZONTAL MIRRORING OF UNITS ALLOWS THIS TO OCCUR. HERE THE UPPER UNIT LOOKS OUT OVER THE LOWER UNITS OUTODOR LIVING VOID. THIS ALLOWS FOR GREATER QUALITY OF SPACE, HOWEVER PRIVACY IS REDUCED. THIS IDEA WAS DEVELOPED FROM THE KANCHANJUNGA APARTMENTS, HOWEVER THE EXTERNAL VOIDS ARE OVERLOOKED BY THE UPPER FLOOR OF THE SAME UNIT IN THE PRECEDENT, THEREFORE NOT LOSING PRIVACY.

3D AXONOMETRIC

CROSS SECTION



Fig. 8.35 Concept 'A7'









Fig. 8.36b Concept 'A8'

Fig. 8.36a Concept 'A8' UPPER LIVING BETWEEN OUTDOOR TERRACE AND LOWER LIVING/BEDROOM MEZZANINE

OUTDOOR TERRACE



KITCHEN LOOKING UP TO UPPER LIVING AND OUTDOOR TERRACE



CROSS SECTION

Fig. 8.37a Concept 'A8'





Fig. 8.37b Concept 'A8'

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LEVEL 1 +0.000

ITERATION B - EVERY APARTMENT UNIQUE

Following Iteration A and its focus on the single apartment repeated, iteration B looks toward every apartment being unique.





Fig. 8.38a Iteration B section. Fig. 8.38b Iteration B perspective.

ITERATION C1 - THE 5 APARTMENT MODULE

Following Iteration B where every apartment was unique, iteration C looks to compromise both A and B, by introducing an intermediate scaled module. Here a five apartment module is developed which is repeated six times. And This reduces repetition, but allows the design to be managed feasibly. The modules are split by a full height atrium void over spanning 13 stories.

lenn

depretue

properties.

Fig. 8.39a Sketch plans



INTERNAL VOIDS ARE USED TO SHARED LIGHT BETWEEN APARTMENTS, THESE CREATE INTERESTING SIGHTLINES FROM INSIDE THE APARTMENTS AND INCREASE THE AMENITY OF THE SPACES.

THE INTELOCKING NATURE OF THE APARTMENTS WITHIN THE MODULE ALLOW OF SPACES TO BE SPLIT OVER FLOORS RESULTING IN INTERNAL COURTYARDS, BALCONIES ETC.

OUTDOOR

Fig. 8.39b Concept 'C'











Fig. 8.41 Concept 'C'

1

4

1

THE INTRODUCTION OF AN ATRIUM WHICH IS EXTENDS THE HEIGHT OF THE BUILDING ALLOWS FOR AN INTERNAL VIEW WHICH ALLOWS FOR PLANNING TO BE ACHEVED. UNITS CAN HAVE A MIX OF EXTERNAL VIEWS OR ATRIUM VIEWS, RESULTING IN ALL UNITS BEING CORNER UNITS WITH THREE ASPECTS. THIS IS MORE DESIRABLE THAN HAVING MANY PARTY WALLS.

THIS APPROACH TO THE BUILDING RESULTS IN THE ABILITY TO REDUCE ABILITY TO REDUCE REPETITION OF UNITS AS SEEN IN 'SHOE-BOX' APARTMENTS AND ALSO THE EARLIER CONCEPTS. INSTEAD THE LARGER MODULE IS REPEATED SIX TIMES. THIS RESULTS IN A MIX OF SMALL MIX OF SMALL, INTERMEDIATE AND LARGER SCALED MODULES WHICH CONTRIBUTE TO A MORE EXCITING URBAN BUILDING.

THS APPROACH TO THE DESIGN ALSO ALLOWS FOR SHIFT FROM THE FOCUS ON THE INDIVIDUAL UNIT TO A GREATER HOLISITIC APPROACH WHICH INCLUDES THE WHOLE BUILDING, INCLUDING MIXED USE SPACES ON THE GROUND FLOOR.

THE DESIGN RESULTS IN APPROX 30 APARTMENTS WHICH IS GREATER THAN EARLIER CONCEPTS. THIS APPROACH IS BENEFICIAL AS A SECOND MODULE COULD BE DESIGNED TO INCORPORATE SMALLER UNITS TO INCREASE THE TOTAL NUMBER.

ROOF TERRACES TO BE INTEGRATED TO PROVIDE ANOTHER SEMI-PUBLIC OUTDOOR SPACE FOR THE APARTMENTS.



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ITERATION C2 - THE 7 APARTMENT MODULE

Iteration C2 involved the shift from a four storey, five apartment module, to a five storey, seven apartment module. This was conceived to reduce the number of external circulation of galleries on the rear of the building.

of front doors on each gallery, increasing activity. A shift from physical modelling to a parallax perspective journey is introduced as a design generator.





Fig. 8.43 Sketch plans.

mine interit @ Scele rescen freddle party -











Fig. 8.45 Parallax progression of Apartment One

Fig. 8.44 Parallax progression of Apartment One



















Fig. 8.47 Parallax progression of Apartment Two.

Fig. 8.46 Parallax progression of Apartment Two.

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Fig. 8.48 Parallax progression of Apartment Three. Fig. 8.49 Parallax progression of Apartment Three.













Fig. 8.50 Parallax progression of Apartment Four. Fig. 8.51 Parallax progression of Apartment Four.















Fig. 8.53 Parallax progression of Apartment Five.

Fig. 8.52 Parallax progression of Apartment Five.











Fig. 8.54 Parallax progression of Apartment Six. Fig. 8.55 Parallax progression of Apartment Six.









50.

Fig. 8.56 Parallax progression of Apartment Seven.

ITERATION C3 - THE 5 + 7 APARTMENT MODULES

Iteration C3 involved the design of a second module which housed seven smaller apartments. This resulted in the a triple stack of the five-apartment module and a triple stack of the sevenapartment module. This resulted in a larger range of apartment sizes.

5	7	
5	7	
5	7	







Fig. 8.58 Five apartment module (above) and seven apartment module.

Fig. 8.57 Five apartment module (left) and seven apartment module.





Fig. 8.60 Section from C3



Fig. 8.61 External circulation gallery.

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ITERATION C4 - THE 4 + 6 APARTMENT MODULES

Iteration C4 reduced the module height from 5 stories, down to three. This resulted in less apartments in each module, but allowed an extra two repetitions, resulting in 40 apartments. The key reason for this change was apartments being up to three stories tall, resulting a large use of interior space for circulation and disconnected spaces.

4	6
4	6
4	6
4	6



Fig. 8.63 External perspective







Fig. 8.64 External circulation gallery

Fig. 8.62 4 + 6 module axonometric.





Fig. 8.65 Section through C4 Fig. 8.66 Section through C4



Fig. 8.67





Fig. 8.69 External screens.

Fig. 8.68 Apartment Six sectional perspective.






Fig. 8.70-2 Physical model of site and surrounding buildings.



Model of each apartment.







Fig. 8.74-5 Physical model of each module.





Fig. 8.76-7 Front and rear of modules placed together.

Following iteration C4, Iteration D formed the final design. Iteration D removed the reliance on the external galleries and the dominance of the central atrium void. Instead the two modules were divided into four which are serviced by smaller circulation void cores which break up the building mass. Here the void and circulation are intertwined and essential to the design, which is last iteration.

APPENDIX TWO: ECONOMIC ANALYSIS

SHOEBOX ECONOMIC ANALYSIS BREAKDOWN

Element	Sub Element	Elemental Unit Rate	Quantity c	Description	Total Cost of Element
Site Preparation					
	Site Clearance	\$10.00/m²	651m²	Lowest Floor Area	\$6,510.00
	Bulk Excavation	\$33.20/m³	2456m³	Lowest Floor Area x depth	\$81,048
Substructure					
	Piling	\$1130.00/m	200m	Depth x quantity	\$226,000.00
	Foundation Beams	\$1330.00/m	114m	Perimeter	\$151,620
	Floor Slab on Grade	\$181.00/m²	560m²	Lowest Floor Area	\$101,360.00
	Lift Pits	\$4700.00/#	1	Number	\$4,700.00
	Tanking and Protection and Drainage	\$30.50/m²	560m²	Lowest Floor Area	\$17,080.00
Frame					
	Columns	\$1040.00/m	1260m	Length	\$1,310,400.00
	Beams	\$406.00/m	2520m	Length	\$1,023,120.00
Structural Walls					
	Concrete Walls	\$388/m²	3780m ²	Structural Wall Area	\$1,466,640.00
Upper Floors					
	Timber Floors	\$113.00/m²	n/a	Sum of Upper Floor Area	
	Suspended Concrete Floors	\$231.00/m²	7280m²	Sum of Upper Floor Area	\$1,681,680.00
Roof					
	Concrete Roof Slabs	\$205.00/m ²	560m²	Roof Area	\$114,800.00
	Waterproof Membrane Roofing	\$168.00/m²	560m²	Roof Area	\$94,080.00
	Eaves Gutters	\$58.00/m	114m	Roof Perimeter	\$6,612.00
Exterior Walls & Exterior Finish					
	Timber Framed Walls	\$300.00/m ²	5880m²	Exterior Wall Area	\$1,764,000.00
Windows and Exterior Doors		\$732.00/m²	1663m²	Window/Door Area	\$1,217,316.00
Stairs and Balustrades					
	Precast concrete	\$2520.00/m rise	42m	Rise per Metre	\$105,840.00
	Pine Stairs	\$940.00/m rise	n/a	Rise per Metre	I
	Handrails	\$400.00/m	72m	Length	\$28,800.00
Interior Walls		\$140/m²	3263m2	Interior Wall Area	\$45,682.00

Assumption

00 150m m deep, disposal of surplus at completion 48 Light soil or sand

00 900mm dia, in soil 20 30MPa concrete, 00 300mm thick .00 For 2200mm x 1800mm lift shaft, .00 Gripset® 51 bitumen rubber liquid membrane

.00 310UC137 00 410UB54

.00 Concrete Precast Walls, 200mm

Particle Board Floors and Timber Framing, 300mm x 50mm joists, @ 600crs .00 150mm thick

00 100mm thick .00 comprising 1.5mm black butyl rubber with Quartz chip finish .00 Fascia/Concealed Gutter System,

00 150mm x 50mm/ .00 Double glazed opening

00 Flights with one intermediate landing 1000m precast concrete Pine stringers with MDF treads

Interior Doors

	Regular Doors	\$1000.00/#	854	Number	\$854,000.00
	Fire Doors	\$1490.00/#	126	Number	\$187,740.00
Floor Finishes		\$110.00/m²	7056m²	Finish Floor Area	\$776,160.00
Wall Finishes		\$72.00/m²	7263m²	Interior Wall Area	\$522,936.00
Ceiling Finishes		\$50.00/m²	7056m²	Ceiling Finish Area	\$352,800.00
Fittings & Fixtures		\$15000/#	84	Number of Kitchens	\$1,260,000.00
Sanitary Plumbing		\$15000/#	96	Number of Bathrooms	\$1,440,000.00
Heating & Ventilation		\$204.00/m²	7840m²	Gross Floor Area	\$1,599,360.00
Fire Services		\$68.00/m²	7840m²	Gross Floor Area	\$533,120.00
Electrical Services		\$113.00/m²	7840m²	Gross Floor Area	\$885,920.00
Vertical Transportation					
	Office Lift	\$94,000/#	n/a	Number of Lifts	
	Residental Lift	\$483,000/#	1	Number of Lifts	\$483,000.00
Special Services					
	Roof Gardens		n/a	Roof Area	
External Works		\$82.00/m²	91m²	Net Site Area	\$7,462.00
Sundries		\$2.00/m²	7840m²	Gross Floor Area	\$15,680.00
SUBTOTAL					\$18,379,458.00
Preliminaries				13%	\$2,389,239.54
Margins				5%	\$918,972.90
Contract Contingencies				15%	\$2,756,918.70
TOTAL excl GST					\$24,444,589.14
TOTAL incl GST				15%	\$28,111,277.51
TOTAL 2014 NZD				4% per year	\$30,405,157.76

Stadnard hollow core 30 minute rating

GIB toughline 13mm thick F4 finish Medium quality kitchen Medium quality bathroom

INTERLOCKING ECONOMIC ANALYSIS BREAKDOWN

Element	Sub Element	Elemental Unit Rate	Quantity c	Description	Total Cost of Element Assum
Site Preparation					
·	Site Clearance	\$10.00/m ²	651m²	Lowest Floor Area	\$6,510,00 150m n
	Bulk Excavation	\$33.20/m ³	543m ³	Lowest Floor Area x depth	\$18 028 Light so
Substructure	Buik Exouvation	\$00.20m	04011		\$10,020 Eight 30
oubstructure	Diling	\$1130.00/m	200m	Dopth x quantity	\$226 000 00 000mm
	Filling Foundation Boomo	\$1130.00/m	200m	Depirit A quantity	\$220,000.00 900mm
		\$1330.00/11	13011	Peninelei	\$172,900 SUMPA
	Floor Slab on Grade	\$181.00/m ²	651m²	Lowest Floor Area	\$117,831.00 300mm
	Lift Pits	\$4700.00/#	4	Number	\$18,800.00 For 220
	Tanking and Protection and Drainage	\$30.50/m²	651m²	Lowest Floor Area	\$19,855.50 Gripset
Frame					
	Columns	\$1040.00/m	1440m	Length	\$1,497,600.00 310UC
	Beams	\$406.00/m	2880m	Length	\$1,169,280.00 410UB
Structural Walls				·	
	Concrete Walls	\$388/m ²	660m²	Structural Wall Area	\$256.080.00 Concre
Lipper Floors		<i>QUOUNN</i>	ooom		\$200,000.00 001010
	Timbor Floors	\$113 00/m ²	3840m ²	Sum of Linner Floor Area	\$433.020.00 Particle
		¢004.00/m²	304011		\$433,920.00 Faille
	Suspended Concrete Floors	\$231.00/m²	3980m-	Sum of Opper Floor Area	\$919,380.00 150mm
Roof					
	Concrete Roof Slabs	\$205.00/m²	573m²	Roof Area	\$117,465.00 100mm
	Waterproof Membrane Roofing	\$168.00/m²	573m²	Roof Area	\$96,264.00 compris
	Eaves Gutters	\$58.00/m	218m	Roof Perimeter	\$12,644.00 Fascia/
Exterior Walls & Exterior Finish					
	Timber Framed Walls	\$300.00/m ²	9120m²	Exterior Wall Area	\$2.736.000.00 150mm
Windows and Exterior Doors		\$732 00/m ²	6220m ²	Window/Door Area	\$4 553 040 00 Double
Stairs and Balustrades		\$10 <u>2</u> .00	0220111		
	Procest concrete	\$2520.00/m rico	126m	Disa par Matra	\$317 520 00 Elights
	Piecasi concrete	\$2320.00/11115e	12011	Rise per Metre	\$317,520.00 T lights
	Pine Stairs	\$940.00/m rise	120m	Rise per Metre	\$112,800.00 Pine sti
	Handrails	\$400.00/m	562m	Length	\$224,800.00
Interior Walls		\$140/m²	2267m²	Interior Wall Area	\$31,738.00
Interior Doors					
	Regular Doors	\$1000.00/#	296	Number	\$296,000.00 Stadna
	Fire Doors	\$1490.00/#	54	Number	\$80,460.00 30 minu
Floor Finishes		\$110.00/m ²	7820m²	Finish Floor Area	\$860,200.00
Wall Finishes		\$72.00/m ²	5893m ²	Interior Wall Area	\$424,296,00 GIB tou
Ceiling Finishes		\$50.00/m ²	7820m ²	Ceiling Finish Area	\$391,000,00,13mm
Fittings & Fixtures		\$25000/#	1020111	Number of Kitchens	\$1,050,000,00 High g
Sonitony Dlumbing		\$25000/# \$25000/#	42	Number of Rethroome	\$1,000,000.00 High qu
		\$25000/#	00003		
Heating & Ventilation		\$204.00/m²	9020m²	Gross Floor Area	\$1,840,080.00
Fire Services		\$68.00/m²	9020m²	Gross Floor Area	\$613,360.00
Electrical Services		\$113.00/m²	9020m²	Gross Floor Area	\$1,019,260.00
Vertical Transportation					
	Office Lift	\$94,000/#	1	Number of Lifts	\$94,000.00
	Residental Lift	\$483,000/#	3	Number of Lifts	\$1,449,000.00
Special Services					
	Roof Gardens	\$1000/m ²	573m ²	Roof Area	\$573,000,00
	Car Stackor	\$500000 PC/#	1	Number	\$500,000,00
		\$300000 FC/#	0120m2		\$300,000.00 \$1,824,000,00
Desires	External Screens	\$200/III- \$100.00/w	912011	Exterior Wall Area	\$1,824,000.00
Drainage		\$132.00/m	106m²	Drainage Run Length	\$13,992.00
External Works		\$82.00/m²	0	Net Site Area	\$0.00
Sundries		\$2.00/m²	9020m²	Gross Floor Area	\$18,040.00
SUBTOTAL					\$25,680,143.10
Preliminaries				13	% \$3,338,418.59
Margins				5	% \$1.284.007.15
Contract Contingencies				15	% \$3 852 021 45
				15	\$34 154 500 20
				4.51	404,104,030.23 M \$20,077,770,50
				15	/0 \$39, <u>211,118.50</u>
TOTAL 2014 NZD	360			4% per year	\$42,482,845 <i>3</i> 43

Assumption

150m m deep, disposal of surplus at completion B Light soil or sand

900mm dia, in soil 30MPa concrete, 300mm thick For 2200mm x 1800mm lift shaft, Gripset® 51 bitumen rubber liquid membrane

310UC137 410UB54

Concrete Precast Walls, 200mm

Particle Board Floors and Timber Framing, 300mm x 50mm joists, @ 600crs 150mm thick

100mm thick comprising 1.5mm black butyl rubber with Quartz chip finish Fascia/Concealed Gutter System,

150mm x 50mm/ Double glazed opening

Flights with one intermediate landing 1000m precast concrete Pine stringers with MDF treads

Stadnard hollow core 30 minute rating

GIB toughline 13mm thick F4 finish) High quality kitchen High quality bathroom