

**AN URBAN REFUGE IN HONG KONG:
TRANSITIONAL HOUSING FOR DISPLACED INFORMAL SETTLEMENTS**

Wendy W Fan

A thesis submitted in partial fulfillment of the requirements for the degree of

Master of Architecture

University of Washington

2013

Committee:
Elizabeth Golden
Rick Mohler
Gundula Proksch

Program Authorized to Offer Degree:

Architecture

© Copyright 2013
Wendy W Fan

ACKNOWLEDGEMENTS

I would like to thank all the contributors who dedicated their time and support to motivate, guide, and inspire in my entire architecture education.

Thank you family, friends, peers, and thesis advisors.

University of Washington

ABSTRACT

AN URBAN REFUGE IN HONG KONG: TRANSITIONAL HOUSING FOR DISPLACED INFORMAL SETTLEMENTS

Wendy W Fan

Committee:
Elizabeth Golden
Rick Mohler
Gundula Proksch

Hong Kong is a densely populated city of currently 7.2 million people. With a geographical limitation that hinder access to developable land, Hong Kong's prolonging housing epidemic is severe as ever. The housing problem is linked to four major factors; imbalance of supply and demand for both public and private housing, deterioration of affordability, changing demographics, and lack of suitable land for differing types of housing. As a result, this creates the lack of adequate and affordable housing for low-income working class families who are most affected. For many, the deprivation forces continual dependency on informal settlements throughout the city. In a culture that strongly embraces, 'a roof over your head,' this form of housing is crucial to survival. Despite the HKSAR government's efforts to obliterate what they claim, 'unauthorized' and inadequate housing, the proliferation of informal urban settlements over the decades is inevitable. Yet, Hong Kong's ephemeral urban development pattern as demonstrated by active urban renewal strategies, jeopardizes this necessity and results in a negative

outcome, displacement of informal settlements. Occupants face negligence by the government in being provided immediate housing assistance upon eviction because of the complexity involved in the rehousing policy, and that results in an extensive resettlement process.

This thesis is a response to the current resettlement process of displaced informal settlements in Hong Kong, such that, regardless of social circumstances, occupants are guaranteed a 'roof over their heads' upon eviction. This thesis proposes transitional housing in Tai Kok Tsui neighborhood of Kowloon. The urban refuge is a mixed-used multi-story complex composed of community-oriented services, shared spaces and dwelling units, intended to:

1. improve quality of built environment for grassroots
 2. retain sense of community within settlements
 3. engage public awareness and convey presence in community
- inspire future sites/districts in the city as prototype

TABLE OF CONTENTS

	FIGURES	
CHAPTER 1	INTRODUCTION.....	09
CHAPTER 2	SCOPE.....	15
	2.1 Densification and Urbanization of Hong Kong	
	2.2 The Origins of Squatting in Hong Kong	
	2.3 High-rise High-density Development	
	2.4 Public Housing Development	
	2.5 Informal Urban Settlements	
	2.5.1 Case Study: Rooftop Settlements	
	2.5.2 Case Study: Rooftop Communities	
	2.5.3 Case Study: Torre David	
	2.6 Urban Renewal in Hong Kong	
	2.7 Complexity in Rehousing	
	2.8 HKSAR Future Housing Plans	
	2.9 Prioritizing through Architecture	
CHAPTER 3	METHODS.....	50
CHAPTER 4	PRELIMINARY FINDINGS.....	54
	4.1 Site and Context	
	4.2 Users and Needs	
	4.3 Building Program	
CHAPTER 5	DESIGN RESPONSE.....	70
	5.1 The Public Spaces	
	5.2 The Dwelling Units	
	5.3 The Communal Spaces	
CHAPTER 6	CONCLUSION.....	94
	ENDNOTES	
	IMAGE REFERENCES	

FIGURES

1 Four factors of Hong Kong's Housing Problem,	09
2 Historical Squatter Settlements	10
3 BANGLADESH. Kurigram District	12
4 Vision for Thesis, digital collage	13
5 Map of Hong Kong's density	14
6 Topography of Hong Kong	15
7 11 sqm room reenacted by Hong Kong History Museum	16
8a Maps of locations of fires	17
8b Maps of distribution of squatters in 1955 & 1957	18
9 1953 Shek Kip Mei fire	19
10 Tai Kok Tsui, Kowloon 2007	21
11 High Rise Density	22
12 Demolished vs New Shek Kip Mei Estate	23
13 Mark I Resettlement Block EST. 19650	24
14 Hong Kong's MTR Map	26
15 Housing Authority Public Rental Housing Distribution Map	27
16 Today's Informal Settlements	29
17 Cage home	30
18 Subdivided Flat from Above	31
19 "Luxurious" Subdivided Flat in Causeway Bay	32
20 Cubicle home in Tai Kok Tsui	33
21 Kowloon Walled City once the densest place on earth	34
22 Cover: <i>Portraits from Above</i> - Wu/Canham	35
23a Rooftop dwellings coexists with luxury apartments	36
23b Informal housing are prone to eviction without warning	36
24 Corridor	40
25 Laundry	40
26 The roof as recreational space	41
27 Torre David	42
28 Torre David	43
29 Building Program Diagram	43
30 Urban Renewal	44
31 URA Target Areas	45
32 Complexity in Rehousing	46
33 Long Term Housing Strategy	47
34 Site/Context	53
35 Historical Development	55
36 Neighborhood Characteristics	56
37 Olympia City 1999	57
38 Express Rail Link under construction	58

FIGURES (con't)

39 Map of existing amenities	58
40 Lack of Security	59
41 Vistor's view of TKT from Rosedale Hotel	59
42 Dwelling Typologies	60
43 Image of site	61
44 Context across the street	62
45 Site plan	63
46 Summary of program	69
47 Light, air, views	70
48 Pedestrian network	71
49 'Internal' alley	72
50 Circulation diagram	72
51 Ground level	73
52 Second level	75
53a View of ground level	76
53b View of Second level	77
54 Spatial studies from <i>Portraits from Above</i> - Wu/Canham	78
55 Elevation photo of model	79
56 Interlocking units	79
57 Study models of unit iterations	80
58 Spatial flexibility: collapsible furnishings	80
59 Floor plan of units	81
60 Section	82
61a Single's unit	83
61b Family's unit	84
61c Family's unit	85
62 3 varying floor plans	87
63 Longitudinal section	88
64 Upper levels + Communal spaces	90
65 View of upper levels	91
66 Facade construction + materials	92
67 Exterior view on Cherry St.	93

CHAPTER 1: INTRODUCTION

Informal urban settlements continue to be the most concerning and controversial dwelling typology in our 21st century urban environment. Cultivated by rapid densification and urbanization of our cities, they are spontaneous fragments sprawling around the world, even in the world's wealthiest cities. This type of housing is a layer of the city shrouded from tourists and wealthier residents. Despite being one of the Four Asian Tigers, Hong Kong is no different. Today, Hong Kong's prolonging housing epidemic is severe as ever. The housing problem is linked to four major factors¹ (Fig.1); imbalance of supply and demand for both public and private housing, deterioration of affordability, changing demographics, and lack of suitable land for differing types of housing. In fact, the perpetuating housing problem in the former British-ruled colony is historically linked to the development and evolution of its informal urban settlements.

Post-Japanese Occupation and the further heightening of influx of immigrants from the Chinese Cultural Revolution led to a severe housing shortage left many people with no choice but to construct squatter villages along the hillsides of Hong Kong (Fig.2). Several fires ravaged these unregulated shantytowns, where one massive fire in 1953 left 50,000 people homeless overnight. As a response,



Fig. 1 Four factors of Hong Kong's Housing Problem



1905 HONG KONG



1953 CHAI WAN



1953 SHEK KIP MEI



1962 TIU KENG LENG



1972 MT. DAVIS, KENNEDY TOWN



1973-1993 KOWLOON WALLED CITY (pop. 33,000)
3,000+ persons/sq. mi.



2001 WONG TAI SIN (approved THA)

Fig. 2 Historical Squatter Settlements

the government established a public housing authority to assist with the relocation of many squatters into public housing estates. Today, government assistance housing provides affordable housing for one-third of Hong Kong's population. Despite this, illegal squatter properties continue to host new immigrants and residents waiting to transition into public housing. These have transformed into multiple alternative forms of dwelling controlled by the gray market and heavily criticized for unhealthy living conditions. These settlements are unauthorized by the government and become illegal when identified by a government authority. Informal settlements are viewed by mainstream society and government as harmful anomalies, which need to be obliterated.

Obliteration of informal settlements due to rapid urban renewal and development unravel the inadequacy in the current rehousing process. The complexity of the situation and the lack of resources leave many occupants without direction and no place to relocate. Without immediate assistance, time constrained, and the lack of formal education on knowledge of other housing options, occupants are forced to revert to unhealthy living conditions. Thus, the pattern of informal urban settlements in Hong Kong persists. Their existence is inevitable, directly impacting social welfare and fueling political affairs.

This thesis is a response to the current resettlement process

of displaced informal settlements in Hong Kong, such that, regardless of social circumstances, occupants are guaranteed a 'roof over their heads'² (Fig.3) upon eviction. This thesis proposes transitional housing in Tai Kok Tsui neighborhood of Kowloon. The urban refuge is a mixed-used multi-story complex composed of community-oriented services, shared spaces, and dwelling units, intended to achieve four goals. First, improve quality of built environment for grassroots. Second, retain sense of community within settlements. Third, engage public awareness and convey presence in community and finally, inspire future sites/districts in the city as prototype.

This thesis engages a humanitarian design approach by addressing housing as a product of social conscience and the implications of its architecture to impose change in the urban environment. It examines the juxtaposition of the types of housing in the city and the lessons gained in the process to direct the final design. Important attributes of housing are subsequently identify, including; basic amenities and infrastructures.

The design investigates the site relative to its context of light, air, and views (Fig.4). Further, the design addresses multiple scales from, society to public interface of neighborhood to intimacy of dwelling. Additionally, issues of private and public are guided by spatial studies in



Fig. 3 BANGLADESH. Kurigram District, Jonas Bendiksen, 2010

the design. What is community? What does it mean to be a community? are questions relative to this renewed housing type.

The thesis begins by addressing the problems raised by densification and urbanization of Hong Kong and the linkage to the origins of squatting. It will then focus on the context of the city as a high-rise, high density development, examine the city's relationship to public housing development, inevitability of informal settlements, and the adverse affects of urban development and renewal. It also critiques the HKSAR government's unwillingness to regulate informal settlements throughout the city and the complexities of rehousing. Finally, it will describe the current housing plans of the HKSAR government and how transitional housing aligns with their aspirations and vision, "providing adequate and affordable housing for each and every family in Hong Kong."³

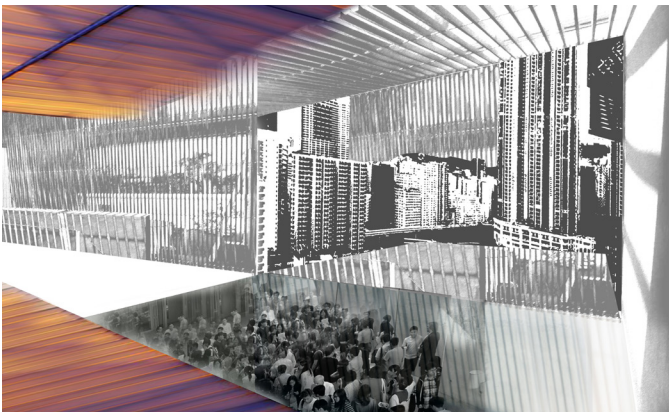


Fig. 4 Vision for thesis, digital collage

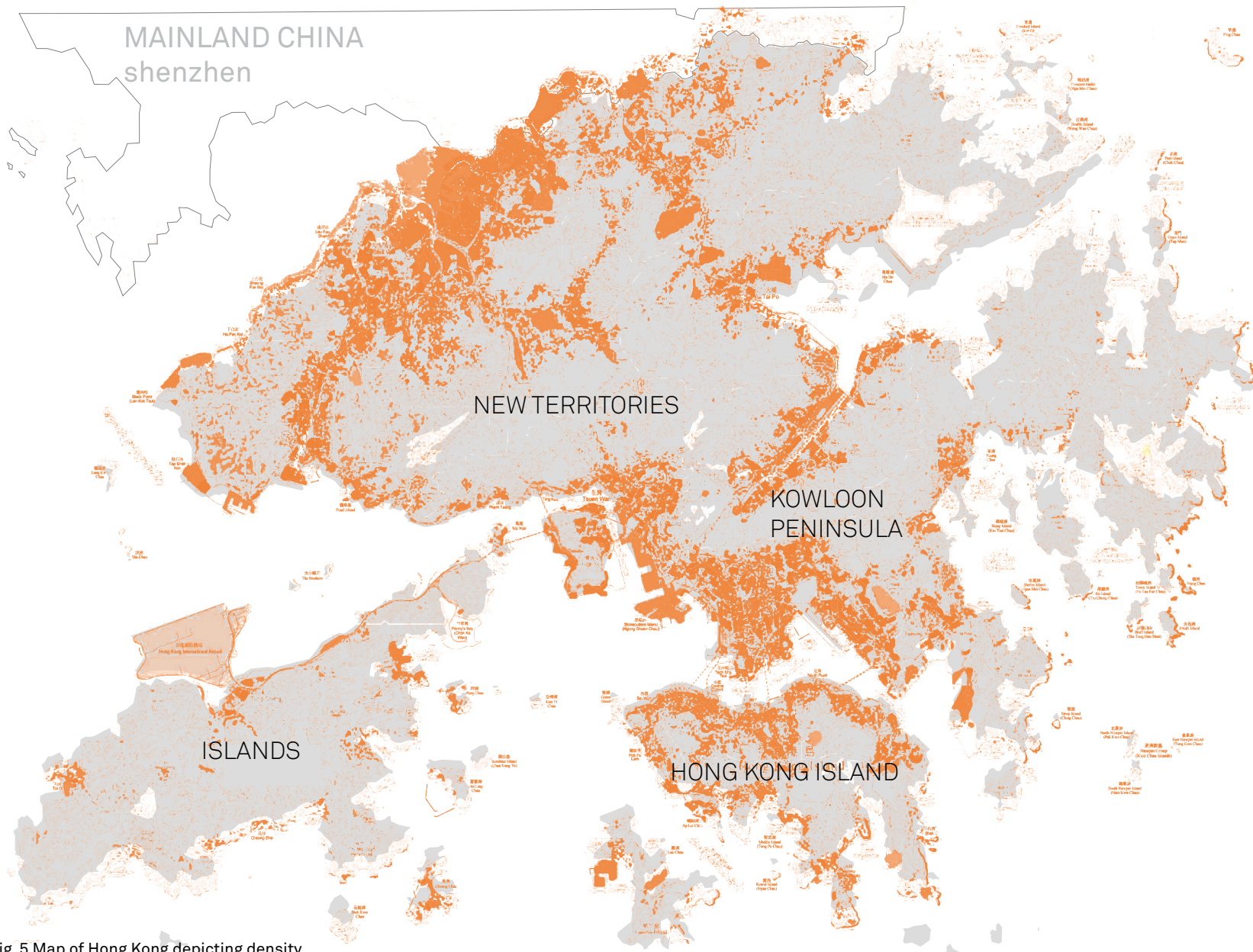


Fig. 5 Map of Hong Kong depicting density

CHAPTER 2: SCOPE

2.1 Densification and Urbanization of Hong Kong

Hong Kong is a 426 square-mile city-state located on the southeastern tip of China. The territory consists of immensely concentrated urban areas (Hong Kong Island, Kowloon Peninsula, and New Kowloon) and extended urban areas (New Territories and surrounding islands) (Fig.5). Among the sweeping skylines along the harbor with the backdrop of the mountainous terrain, the city has a current population of 7.2 million people⁴, and an urban density of 67,000 persons per square-mile.⁵ The population is expected to reach 8 million by the year 2030. Due to its natural landscape with a topography featuring over 75% of its land as hill slopes⁶, only 25% of land is habitable. This results in high-density development (Fig.6).

The high-density urban city developed during the late 1940s after the British regained control of the colony from Japanese occupation. Subsequently, The Chinese Cultural Revolution (1949-1962) compelled hundreds of thousands of people to flee from Mainland China's political unraveling, poverty, and famine to seek refuge in Hong Kong. The result was an immediate impact on the city's density, land use, and economy. This diversion of people gradually spurred industrialization stimulated mostly by textile exports. The population increased from 0.6 million

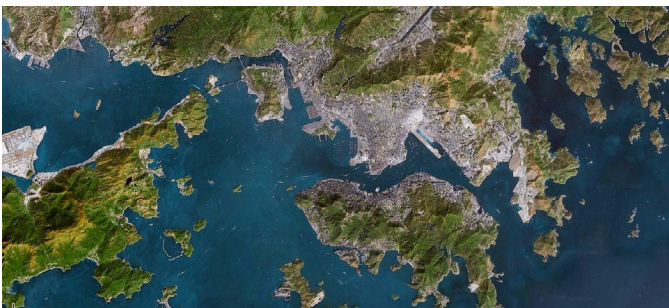


Fig. 6 Topography of Hong Kong

in 1945 to over 2 million in 1951.⁷ As a result, the rapid densification adversely affected Hong Kong's urbanization; its impact was particularly acute for housing. An insufficient supply to meet the demand further aggravated the existing housing stock, much of which was damaged during WWII. From the early population of 1945, one in 4 persons were identified as homeless; most of these were migrants from Mainland China. During a 20 year period after the end of WWII, the government hesitated to supply new building construction. This was because the HKSAR government had assumed the immigrant population would diminish after China regained stability. The private housing sector therefore disregarded the needs of the impoverished, and they suffered with expensive and harsh living conditions. Flats on many floors of buildings were partitioned into units, and units were subdivided into bed spaces. In some extreme cases, bed spaces were further controlled by a shift system shared among three different inhabitants (Fig.7).



Fig. 7 11 sqm room reenacted by Hong Kong History Museum

2.2 The Origins of Squatting in Hong Kong

The housing shortage crisis eventually led to the emergence of shanties, hillside squatter villages, street dwellers, and poor living environments raising safety and public health concerns (Fig.8). By 1950, 250,000 squatters accounted for 1/7 of the total population of Hong Kong.⁸ By the 1950s, the government tolerated squatting by providing licensed squatting areas. These areas were meant to prevent more squatter areas from dispersing. There was even access to common utilities, such as water and electricity. As a result, the amount of squatters doubled in 1963. Eventually, a series of fires devastated these settlements. This included the Shek Kip Mei fire in 1953 on Kowloon Peninsula, which destroyed 50,000 homes overnight (Fig.9). This event prompted the government to establish the Hong Kong Housing Authority (HKHA) that focused on the public housing sector by resettling victims of natural disasters, squatters, and aiding the low-income working class. The housing authority became the second formulated group in Hong Kong intended to address the city's housing problems. The first organization to address the issue of housing for victims of natural disasters and the underprivileged in Hong Kong was a non-profit group supported by the social welfare council, Hong Kong Housing Society (est. 1951). Today,



Fig.8a Map of Locations of Fires

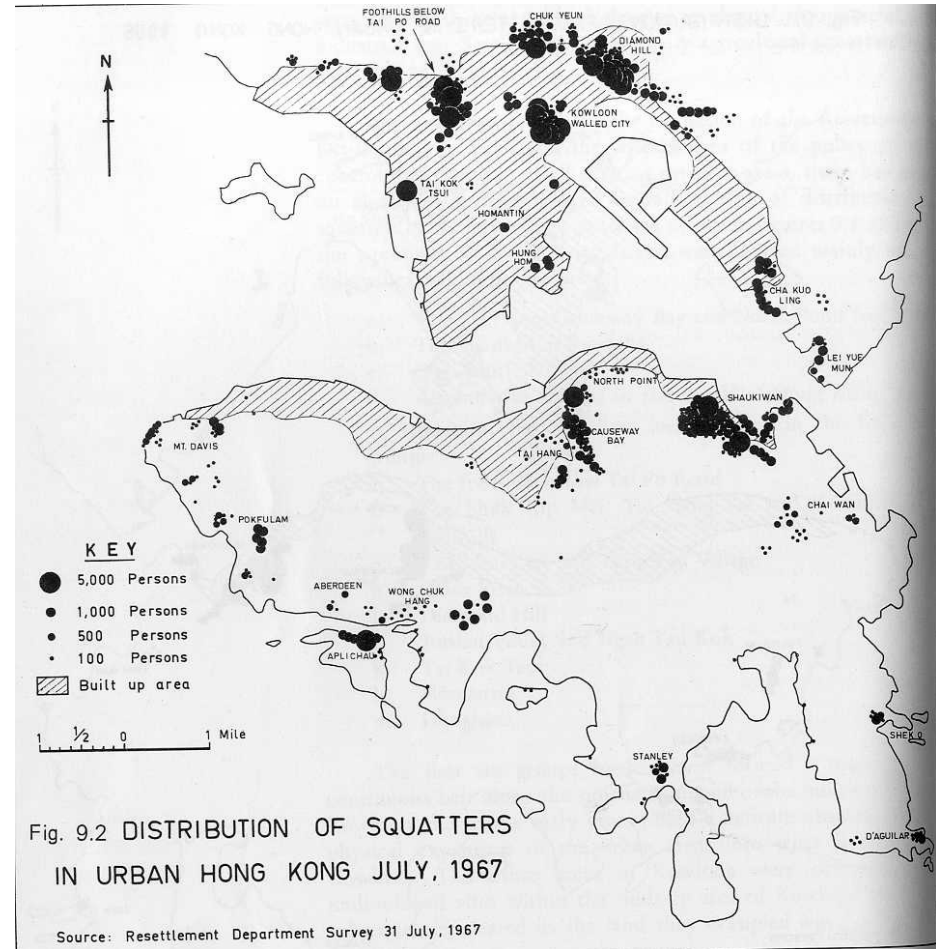
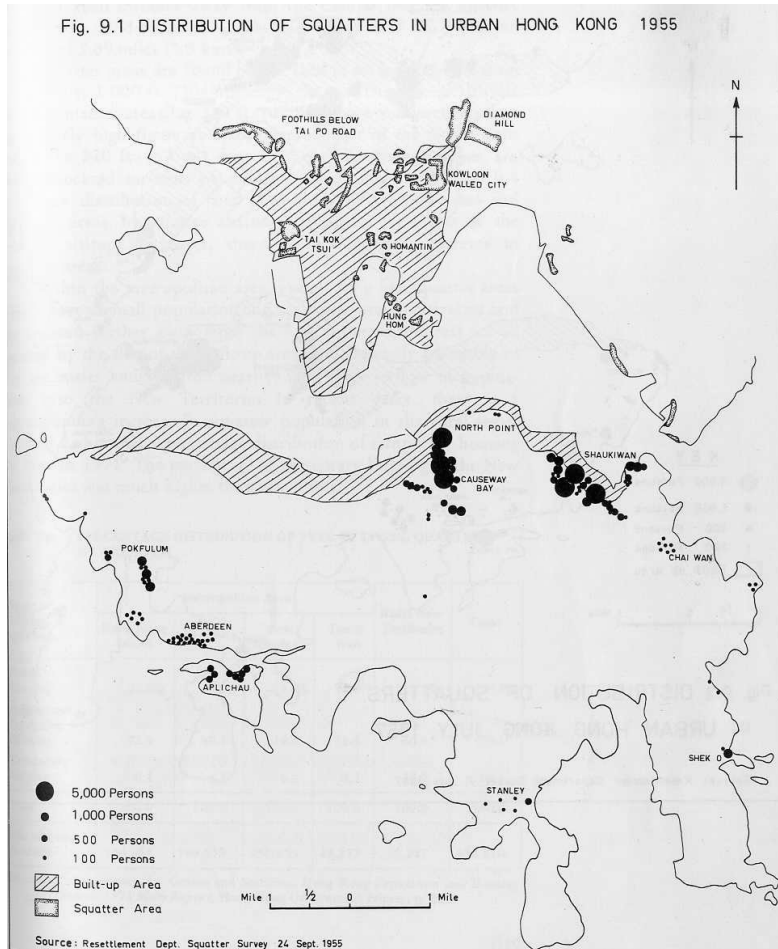


Fig.8b Maps of distribution of squatters in 1955 & 1957



Fig.9 1953 Shek Kip Mei Fire and aftermath



the public housing sector is overseen by the housing authority, while the housing society focuses on private housing development. Their historical commitment to improve Hong Kong's housing market provided a foundation for high-rise high-density development.

2.3 High-Rise High-Density Development

The combination of public housing estates and private sector housing development generated a series of evolutions to residential architecture in the urban fabric based on spatial assessment and financial revaluation. Early iterations consisted of 2-6 story buildings to 16 stories with lifts, and today, 60 story tall towers with every square footage of F.A.R maximized on each floor.

Hong Kong's local economy is now largely based on real estate and the housing market as a result to the HKSAR Government's shift in focus during the 1950's. Land policy also plays a major role in shaping the physical, social, and economic outcomes of the housing market. Since land ownership is under control of the government, the policy is very explicit. Land is subdivided before being leased to private developers through auction and tender. This controlled process generates high land prices and forces an increase of residential height and density (number of dwelling units), but employs a reduction in dwelling area

Fig.10 Tai Kok Tsui, Kowloon



to compensate and provide, 'affordability'. Even so, many residents struggle to find affordable housing close to the urban areas of the city, where employment and social opportunities are most abundant. Since centrally located housing is most desirable in the city, advanced technology in construction has allowed for taller high-rise buildings to meet this demand. As buildings get taller, so does the number of dwelling units with intention to intensify profit. Although the society has adapted to high-rise living, overcrowding is inevitably an issue for people living in poverty. Unfortunately, buildings in Hong Kong will only get taller and not wider (Fig.11).

2.4 Public Housing Development

There are two forms of government assisted housing in Hong Kong, Public Rental Housing (PRH) and Public Subsidized Housing. Public Rental Housing are government funded housing estates that provide discounted rate to residents' rent whose salaries do not meet the average income. While Public Subsidized Housing are flats for purchase at a discounted price from market value. One example program is the Home Ownership Scheme (HOS) for families with a monthly income under \$30,000 HKD. Qualify buyers are only obligated to pay a certain percentage based on their current income. Under this contract, buyers



Fig.11 High rise density

are restricted from reselling their homes for a set amount of years and are obligated to repay the government for the amount covered in their first transaction.

Public Rental Housing units account for 29.1% (766,000 units) of the total housing stock in Hong Kong.⁹ Hong Kong's modern day housing situations for its low-income population relative to public housing and informal urban settlements undeniably reflects its history concerning immigrant influx and housing development.

Hong Kong Housing Authority's first public housing project came as a response to the 1953 Shek Kip Mei fire. Their resettlement program constructed the current Shek Kip Mei Estates (Fig.12) to aid the victims. Seventeen blocks of housing accommodated 9,200 rental flats, 8,700 households, and 22,100 people total.¹⁰ The design for these estates set new standards for building codes which required elevators for buildings more than 10 stories tall and assured that living units must be directly accessible to a corridor for egress purposes. However, squatters, a majority of whom were immigrants, created the most substantial problem for the city. In response, both parties attempted to ease the squatting population by giving squatter resettlement priority to become the first public housing recipients. The Housing Authority's efforts focused on public health and public order, rather than actual design of floor plans.



Fig.12 Demolished vs New Shek Kip Mei Estate
taken by Nathan Tseng

Communal spaces and infrastructural integration with transportation was also less of a concern. This helped to generate controversy over the public housing sector's, "good intentions." Nevertheless by 1960, nearly 50,000 housing units were used for squatter resettlement.¹¹

(resettlement)...was not primarily to improve the living conditions of that section of the community which happened to be breaking the law...the task was to devise a rapid and practical method, at a cost at least less than prohibitive, of removing, in the interests of whole community, the fire risk and the threat to public health and public order presented by the worst squatter area (1954-1955)¹²

Li further summarizes,

...squatters are not resettled simply because they need...or deserve, hygienic and fireproof homes; they are resettled because the community can no longer afford to carry the fire risk, health risk, and threat to public order and prestige which the squatter areas represent and because the community needs the land of which they are in illegal occupation. (46)

Early design schemes of public housing complexes didn't solve the issue of overcrowding. They were described as, "basic concrete blocks with many cells"¹³ and averaged 24 sf/person (Fig.13). Overcrowding

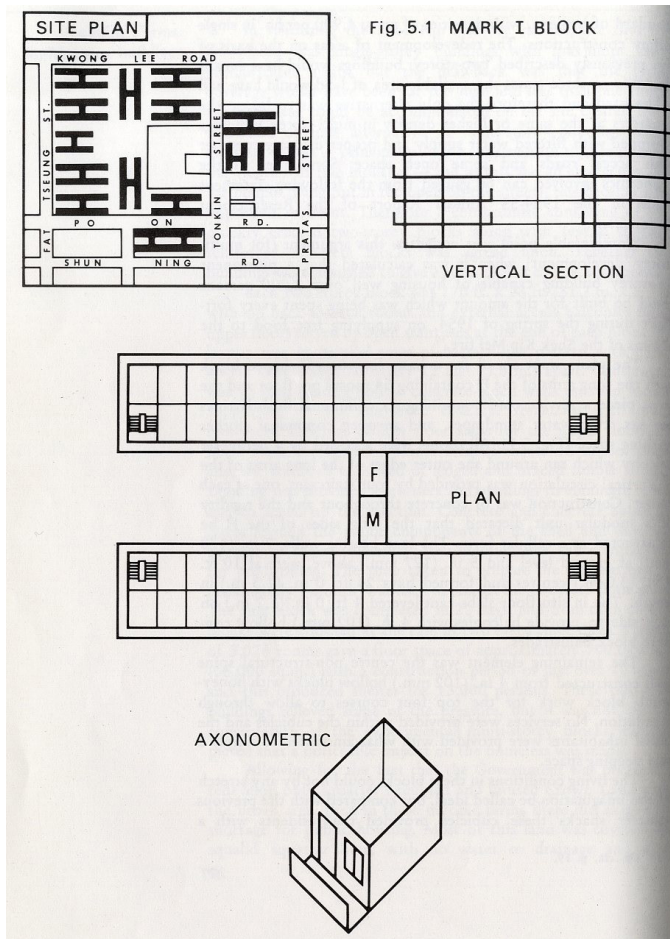


Fig. 5.1 MARK I BLOCK

Fig.13 Mark I Earliest Resettlement Block, 1950

continued in the 1970s; surveys indicated that 156,800 families were living at a density less than 35 sf/person, which is the minimum amount of space per person required by law. Furthermore, 69,436 of the surveyed 156,800 people only occupied 24 sf.

While interior conditions were problematic, matters were worse at an urban scale. As the scale of public housing projects increased, Hong Kong's urban areas became denser. This began to influence development towards the urban periphery, such as in New Kowloon and New Territories. Lack of infrastructure and amenities, increased transportation costs, and insufficient employment opportunities in these newer areas complicated matters for grassroots families.

The earliest example is Tsuen Wan, the first satellite new town in the New Territories developed in the 1950s. It became the first district in the New Territories to provide public housing with an application process that used newspaper clippings for people to apply. Without much knowledge of the place, many of its first settlers brought food and supplies along with their belongings. Early settlers would travel elsewhere to purchase goods. Even a phone call to Kowloon or Hong Kong would be considered long distance. Although Tsuen Wan has been considerably improved with an increasing amount of new developments, commuting to the New Territories from Hong Kong Island continues to

there are quite a few of requirements that applicants must meet. In order to acquire PRH, residents are required to have a permanent residency status. Recent immigrants and migrant workers, commonly from Mainland China, estimated 54,000 immigrants annually¹⁵ are most challenged because they must acquire permanent residency status before qualifying for PRH. Eligibility for permanent residency in Hong Kong is 7 years. In 2011, it was recorded that 2.6% of the total population were mainland residents who have resided in Hong Kong for less than 7 years. When a former recipient of subsidized public housing was finally granted his request, he reacted by stating, “It was like winning the lottery,”¹⁶. In fact, the previous system of assigning public housing estate relocation was determined by a lottery draw. During this transitional waiting period, there is a tendency to seek alternative forms of living such as cubicle homes, subdivided flats, cocklofts, bed spaces, cage homes, and rooftop houses. These temporary residence in informal urban settlements are affordable and readily located in the city’s center.



BED SPACES (1940s-)



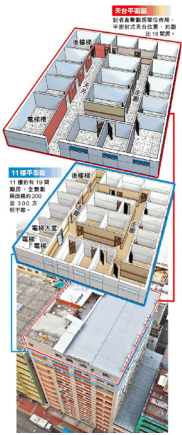
COCKLOFT (1940s-)



ROOFTOP DWELLINGS (1960s-)



CUBICLE HOMES (INDUSTRIAL BLDGS) (1960s-)



CAGE HOMES (1962-)



SUBDIVIDED FLATS (UNITS IN UNIT)

Fig.16 Today's informal settlements

2.5 Informal Urban Settlements

Informal settlements (Fig.16) form out of people's ability to adapt to their surrounding environment wherever space is available in the city. The process of control the sprawl is very difficult due to an overwhelming quantity and with most owners making an effort to shy away any unnecessary attention in a dense environment. Because of Hong Kong's density, physical boundaries dissipate, but social barriers have accentuated due to the densification. The persistent housing problem in Hong Kong has resulted in a, "divided society" and "aggravated class conflicts."¹⁷

Like most urban informal settlements, Hong Kong's urban informal settlements emerged as a result of squatter occupation of ungoverned areas in the city. The earliest informal settlements consisted of makeshift huts built by street dwellers. These were shelters at night and bundled during the day, like parcels. They gradually evolved into permanent physical forms of cubicle homes, cage homes, and rooftop houses that currently exist today. Single occupants tend to veer towards cage homes because of its spatial restrictions, while cubicle homes are catered towards families.

Cage homes (Fig.17) are literally cages stacked two tiers high with multiple cages in the same room of a flat. The lower bunk is typically



Fig.17 Cage home
taken by Brian Cassey

\$100/month, while the upper deck is \$150/month. The wire mesh of the cage is the only form of privacy for renters. A CNN interview¹⁸ in 2009 noted 19 cage dwellers had shared two bathrooms.

These dwellings are primarily concentrated on Kowloon Peninsula in mixed-used buildings. Many older high-rise buildings in the city have been converted from residential into mixed-used buildings as tenants gradually began to live-work over the years. Businesses are usually service-based, such as massage parlors, hair salons, and medical offices. Thus, it's common for flats housing cage dwellings to coexist with a doctor's office on the same floor.

Today, the most publicized and controversial informal urban settlement are subdivided flats (Fig.18) and the reason being that most are located in the city center inside existing residential buildings. Single flats are illegally converted into multi-bedroom units. The major concern again revolves around serious health and fire safety.¹⁹ Units are about 100 sqft and bathrooms are usually shared depending on their grade. Units with private bathrooms and or furnished are considered a luxurious unit. A unit of this type in the district of Causeway Bay for example cost \$600 per month (Fig.19). Rental price vary depending on the grade and quality of the unit. A 100-300 sf unit cost \$400/mo on average. In May 2013, HKSAR Transport and Housing Bureau estimated



Fig.18 Subdivided flat from Above



Fig.19 "Luxurious" 100 sf Subdivided Flat in Causeway Bay, HK

that around 67,000 subdivided flats are in 1,860 buildings aged 25 or above.

As flat renovation of subdivided flats became more concealed because of the legality of the issue, landlords began to seek abandoned industrial buildings in older neighborhoods of Hong Kong. Cubicle homes (Fig.20) are mostly situated in what were once active industrial buildings during the industrialization boom of the 1950s, but seized after factories relocated in China. Many abandoned industrial buildings, particularly on Kowloon Peninsula became a place for squatters and eventually, illegal construction operations that built 40 sf cubicle homes to occupy empty floors of these buildings.

In 1998, there were an estimated 9,000 informal settlement buildings in Hong Kong based on a survey conducted by HKSAR Fire Service. Recent tracking efforts have since been suspended due to their vastness in the dense urban environment making them difficult to track. However, in 2010, it was estimated that 100,000 people live in these various types of inadequate housing as described above.²⁰

To this day, the most successfully documented informal urban settlement in Hong Kong is the Kowloon Walled City (Fig.21). It was an unregulated settlement during the British colonization era for decades, but was eventually demolished by the HKSAR Government in 1993. Once



Fig.20 Cubicle home in Tai Kok Tsui

a walled fortress, it grew into 10-14 story high buildings. Five hundred buildings occupied 6.5 acres of land and was home to 50,000 people in the 1990. This was a massive increase from 700 inhabitants in 1898, when it consisted of barracks. The uncontrolled building began in 1973 with 10,000 inhabitants led by triad organizations that hosted illegal activities. However, the Walled City was also home to thousands of families with most operating a family business next door. Various types of commercial, service, and manufacturing businesses located within the Walled City served the rest of society due to the cheap labor there. The cultural and economic activities within the Walled City were well established, as well as its infrastructure of basic utilities. There were 77 wells inside the city, some as much as 300 feet distributed water to each household. Electric pumps delivered water to huge tanks on the rooftops and funneled down exposed narrow pipes. Electric wires were placed outdoors to prevent internal fires. The network of infrastructure is apparent in the narrow circulation alleys and the elevation of the buildings. In the *City of Darkness*, Peter Popham recognizes the Walled City as not only a massive informal settlement, but also for its ability to serve the occupants at a smaller scale.

What fascinates about the walled city, is that, for all its horrible shortcomings, its builders and residents succeeded in creating



Fig.21 Kowloon Walled City once the densest place on earth

what modern architects, with all their resources of money and expertise, have failed to: the city as organic megastructure, not set rigidly for a lifetime but continually responsive to the changing, requirements of its users, fulfilling every need from water supply to religion, yet providing also warmth and intimacy of a single huge household.²¹

Many residents of the Walled City resisted leaving their homes when eviction notices were given. The resettlement process of more than 50,000 residents remain unclear, but undoubtedly difficult.

2.5.1 Case Study: Rooftop Settlements

“The rooftop settlements are an urban legacy, telling the story of Hong Kong, of political upheavals in Mainland China, of urban development, of people’s hopes and their needs in the city” - *Portraits from Above*, 7

Rooftop housing (Fig.22) is a particular type of informal urban settlement that is specific to one of Asia’s most affluent cities, Hong Kong. In Hong Kong, these self-built structures have been present for decades and are home to thousands of low-income working-class and migrant families. A 100-300 sf unit is estimated \$300/mo. The



Fig.22 Cover: *Portraits from Above* - Wu/Canham



Fig.23a Rooftop dwellings coexists with luxury apartments
taken by Christopher DeWolf

settlements have occupied the rooftops of many aging buildings in the city over the past several decades, specifically in Tai Kok Tsui, Sham Shui Po and Kwun Tong areas of Kowloon Peninsula. They add to the identity of the city as a dense skyline while co-existing with new luxurious high-rise apartments in a single urban context (Fig. 23a). They are vaguely recognizable from the ground, but clearly visible from above. The HKSAR Government considers these self-built structures to be, “unauthorized building works,” because of their many problems with fire safety, sanitation, utilities, overcrowding, accessibility, property rights and so forth. Hence, these structures are subject to eviction and demolition at any time, either by the government or private developers. If evicted, occupants who qualify for public housing are resettled. Those who are not permanent residents are compensated an amount adequate for a full year of average rent in the city. This alternative is clearly not the most desirable for the temporary residents and thus, they attempt to relocate to other rooftops or other forms of informal housing.



Fig.23b Informal housing are prone to eviction without warning
taken by Christopher DeWolf

During a 7-year clearance program that started in 2001, 12,000 illegal rooftop structures were demolished (Fig. 23b) on 4,500 single-staircase buildings largely due to fire and structural safety concerns. Their existence raises important concerns relative to structural safety, fire safety, public health, security, overcrowding, and so forth. These

occupants were forced to adapt to unhealthy living conditions.

A few unsuccessful attempts have been made by the government to monitor these particular structures using Google Earth as a tool. However, tracking precise quantity and location is difficult due to the density and their ability to be easily relocated. The cheap ad hoc materials that these structures are constructed from encourages this practice. They are constantly changing the aerial landscape of the city with the palette of corrugated metal, wood, brick, and plastic materials. The most recent recording documents 1,554 households accommodating 3,962 rooftop dwellings.²² This is a major decrease from 2001 when there were 16,359 rooftop dwellings.

Rooftop settlements are still considered to be the best housing accommodation compared to other forms of informal settlements in Hong Kong, especially for families because of their increase of spatial freedom. Direct access to light, air, and views are also important elements of livability that attract people to accept such living situations. Even with the government's reluctance to recognize these structures, residents are provided with basic utilities of water and electricity in the same manner as any other households. Also, there is a very active relationship between these settlements and Hong Kong's high-rise vertical society. As long as buildings exist in the city, people will continue to inhabit the

most versatile space in the city- the rooftop.

Each dwelling can range from 100-300 sf with most being single-story, and some with a cockloft accessible by a ladder. A living density of 35 sf/person is the minimum amount of space required by law. However, rooftop occupants typically have more spatial flexibility, which can allow for 100 sf/person on average.

General rooftop dwellers are working families with young children to teenagers, single-parent families, single elderly male, and few elderly couples. While the majority of rooftop inhabitants are immigrants and migrant workers from Mainland China, 4.5% are ethnic minorities from other regions of Southeastern Asia including; India, Bangladesh, Pakistan, Nepal, Indonesia, and Philippines. In 2011, it was recorded that the number of ethnic minorities in Hong Kong have increased significantly by 31.2% over a 10 year period.²³ This indicator align very closely in general to the ethnicities of informal occupants throughout the city.

2.5.2 Case Study: Rooftop Communities

Informal settlements form out of people's ability to adapt to their surrounding environment wherever space is available in the city.

Almost none of us- certainly no urban dweller- have direct

access to the physical environment that sustains us. We do not grow our own food, build our own houses, make our own clothes, or even draw our own water. We are dependent upon others to perform these tasks for us and we offer other services in return. A rich web of social relationships is a pre-condition of our very existence. That interdependence creates a vast community.²⁴

Even if not directly, rooftop settlements embrace the same idea of interdependency as Hawley's thought on human ecology. It is a distinctive type of informal urban settlement in Hong Kong that cultivates a communal aspect more so than any other form of dwelling in the city, where people are not complete strangers. They do not reside with 20 strangers in the same flat. Contrastingly, greetings are exchanged in the corridors and names are recognized. People collaborate to maintain their flats to ensure it is not imposing safety hazards on other occupants. More often than not, an occupant has a construction, plumbing, electrical, and so forth background who helps with repairs in the settlements.

The spatial freedom of the roof also attracts a diverse demographic of households, and co-habitation of the rooftops generates exchange among the occupants. While there is sometimes conflict



Fig.24 Corridors as extension of living space
taken by Christopher DeWolf



Fig.25 "The roof is a maze of corridors, narrow passageways between huts built of sheet metal, wood, brick, and plastics" - Wu/Canham (*Portraits from Above*, 6)
taken by Christopher DeWolf

involving space or noise, people have generally supported each other's needs. The corridors (Fig.24) are very active extensions of the living space amongst the households. People hang their laundry, children play, and is a place of gathering (Fig.25) (Fig.26). It is the essential outdoor space exposed to light, views, better air quality, and away from the crowdedness of the streets below. A village in an urban setting would best describe the communal environment. Although many seek this type of accommodation as temporary housing, the majority end up staying. While a large number are rentals, a few are purchased through the black market. Plenty of elderly residents have lived on the rooftop all their lives with their home as their most prized possession. People have become attached to their homes by restoring, decorating, and repairing in the process of required self-maintenance. Especially due to its location high above ground, it is vulnerable to heavy rain, typhoons, and heat absorbent to Hong Kong's subtropical climate.

Hong Kong's subtropical climate means that people prefer to be in air-conditioned spaces during the hot and humid summers and under protection during typhoon season. Clearly, rooftop dwellings lack air-conditioning. Thus, being on the roof in general is not desirable, unless the spaces have some type of shading.

Rooftop communities share the building with flat tenants below.

They often share the same circulation, usually stairs or for the more fortunate, an elevator. Despite their physical connection to existing buildings in the city, the rooftops tend to be very exclusive spaces that are concealed from the general public. This has often created hostility towards rooftop dwellers.

From Stefan Canham and Rufia Wu's *Portraits from Above and Once Upon a Rooftop*²⁵, a documentary by Sybil Wendler, it is clear that rooftop dwellers are not particularly fond of their living situation. Most interviewees revealed a sense of embarrassment and some even admitted to concealing this fact from outsiders. Children are embarrassed to invite their classmates over to their home. Elderly parents would avoid to inviting family guests. They are most familiar with their living situations that are surrounded by health issues, cleanliness, undesirable drug users, and maintenance issues. One inhabitant described the ad-hoc materials of the structure as potential hazards during typhoon season as he witnessed materials flying off roofs like, "loose kites." Although, many people seek refuge on the rooftop as a way of escaping the dense reality of people and contents on ground, they want these spaces to be even more active and can accommodate various activities without disrupting the flow of circulation and overall safety.



Fig.26 The roof as a recreational space

2.5.3 Case Study: Torre David

Torre David (Tower of David) (Fig.27) in Caracas, Venezuela represents one of the most recent large-scale informal urban settlements developed from an abandoned unfinished skyscraper, after the developer passed and the 1994 collapse of Venezuelan financial sector. Originally designed to be a 45-story office tower by Venezuelan architect, Enrique Gómez, the building sat vacant for 13 years before being occupied by squatters. Currently, 3,000 residents occupy the building up to the 28th floor, in which 700 are families. Hence, communities emerge as a result of the self-sustained network, in which interdependence is essentially required. (Fig.28)

The residents of Torre David established a mixed-used building programmed with grocery stores, assembly space, gym terrace, textile workshop, and church (Fig.29). Yet, the network of infrastructure has not been abandoned. Occupants designated a space for garbage disposal and electrical circuit boards. Water supply proves to be the most difficult task. However, inhabitants have devised a system where, residents are able to acquire water with 500-liter jugs through a hose connection to the valves of the vertical supply pipe once a week.



Fig.27 Torre David



BUILDING PROGRAM

- SHOPS
- ① LARGE GROCERY STORES
- ADMINISTRATION
- ② COORDINATOR'S ASSEMBLY SPACE
- SPORTS
- ③ GYM TERRACE
- TEXTILE WORKSHOP
- RELIGIOUS
- ENTRANCE AREA
- ④ IDENTITY CHECK
- MAIN TRASH DUMP

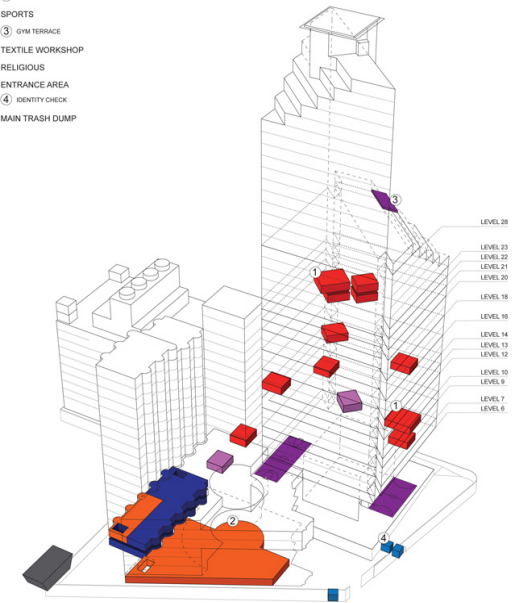


Fig.29 Building program diagram



Fig.28 Torre David

“Torre David should neither be romanticized nor scorned; it has provided us with valuable lessons, but it is not an object lesson”
 (Urban-Think Tank, 361)



Fig. 30 Urban Renewal taken by Christopher DeWolf

2.6 Urban Renewal in Hong Kong

Lack of care in buildings have led to serious problems of building dilapidation and urban decay in Hong Kong. As a result, health and safety of the general public are at risk. The Urban Renewal Authority (URA) manages the city's urban development and strategies. Their strategy includes; redevelopment, rehabilitation, preservation, and revitalization. Active urban development patterns have led to an ephemeral urban environment (Fig.30). Although the URA have sought to promote building rehabilitation rather than redevelopment, the urban fabric continues to be transformed. Residential buildings are often replaced by taller podium style luxury apartments. Urban renewal areas are identified all across the territories with New Territories and Kowloon Peninsula as the biggest targets (Fig.31).

The negative outcome of Hong Kong's urban renewal is often overlooked. Besides gentrification, the strategy directly affects informal settlements by displacement. Occupants of informal settlements sustain most impact because of the nature of unpredictability in these settlements. Landlords are hesitant leak any information that would jeopardize their illegal activities and in other words, "afraid of seeing the light."²⁶ Most evicted tenants unforeseen their future housing situations. Thus, the most essential and most difficult in displacement

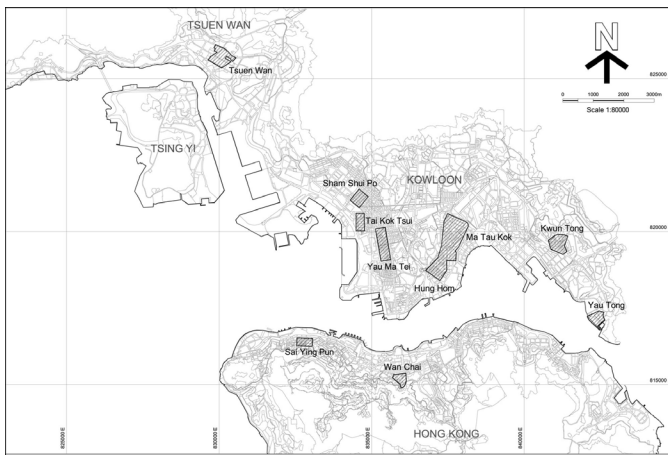


Fig. 31 URA Target Areas

is resettlement.

2.7 Complexity in Rehousing

Rehousing for informal settlements is an immense challenge. The issue is both financially and socially driven. Past interviews concluded that most informal occupants are accustomed to their current area with no desire to continue moving. Transportation is especially important and so relocating would compromise transportation costs and daily commutes. Moreover, HKSAR's criteria for rehousing are weakened by the lack of a comprehensive policy. Displaced households are dependent on the responses of the government and social workers. Lengthy application process for public housing intensify the problem. Hence, occupants face complexity in the rehousing process (Fig.32). In summary, no immediate housing assistance is provided without an extensive process.

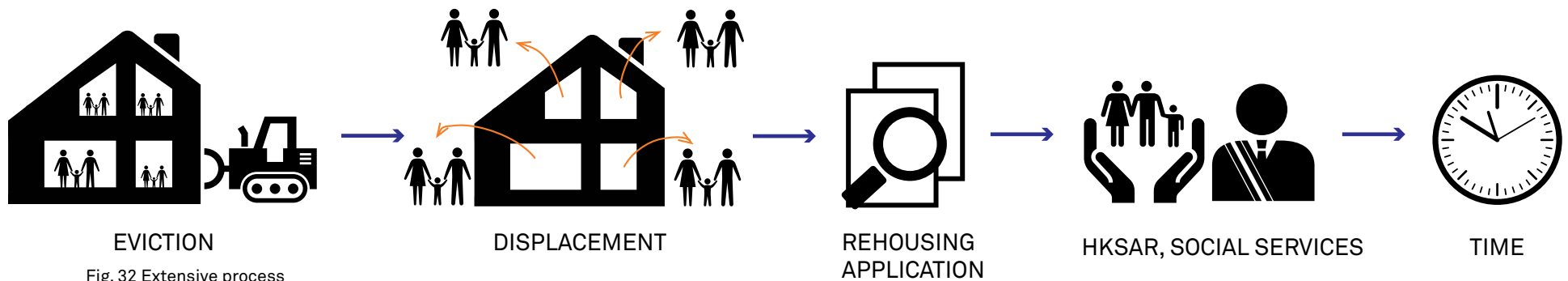


Fig. 32 Extensive process



Fig. 33 Long-Term Housing Strategy publication

2.8 HKSAR Future Housing Plans

In September 2013, HKSAR launched *Long-Term Housing Strategy* (Fig.33) aimed to address the city's current housing problem by revising and strategizing Hong Kong's future public and private housing development. The outline began by voicing the four major factors linked to the housing epidemic; imbalance of supply and demand for both public and private housing, deterioration of affordability, changing demographics, and lack of suitable land for differing types of housing. Inflation of property prices, disproportionality of household income to household expenses, population trends are influx, and topography are all contributing to the problem. The plan also suggested a 60:40 split between public and private housing development. Most optimism reside in their propose target for the next 10 years (2013-2013) to increase the total housing supply by building 470,000 housing units.

2.9 Prioritizing through Architecture

“Quality of housing in Hong Kong has a direct relationship with public health.”²⁷

Architecture has the ability to unify people, generate an intimacy, and bridge those individuals that are otherwise disconnected because

of their social and economic statuses. Architecture plays an important role in housing. As architects, we are responsible for providing quality living environments and especially for those who are financially disadvantaged. Founder of Auburn University's Rural Studio, Samuel Mockbee once stated, "The architectural profession has an ethical responsibility to help improve living conditions for the poor -making responsible environment and social change."²⁸ Our designs can impact the urban context over time and alleviate issues of density in cities. In a way, this is an urban humanitarian architecture project aimed to address the problems faced by displaced informal settlements.

Most of us in Hong Kong spend more than half of our income on our house, however, we do not always get a reasonable place with reasonable environment and living standard in return- it's always without air circulation, without sunlight, without view, without community, and neighborhood space- just like being in jail.²⁹

The primary goals for this project are to improve quality of built environment for grassroots while also improving the quality of Hong Kong's built environment. How can the designs provide 'healthier' living conditions and address concerns over public health of dense social housing?

The proposed architecture will also contribute to public

awareness of the current housing conditions in the city, similar to organizations like Society for Community Organization (SoCO) in Hong Kong. The non-profit organization has been working vigorously on exposing 'inadequate housing' situations in the city. Their voices are contributing to exhibitions through a variety of mediums on 'inadequate housing' situations all over the city. "SoCO's mission is to serve the most underprivileged in Hong Kong, including cage and cubicle dwellers, the single elderly, new immigrant women, children living in poverty, street-sleepers, people with mental illness, low-paid workers, refugees and ethnic minorities." Cage dwellers are the most extreme case of informal urban settlement and have gained the most media attention thus far. Mainstream society is aware of Hong Kong's housing problems and the existence of these informal settlements, but fails to clearly grasp all the issues from an outsider's point of view. Transitional housing readily located within the city have the most potential to attract people's attention, stemming from its visual appearance that can be seen from various directions in the city. Making a presence through architectural redesign of dense social housing tells a vital story from a dweller's perspective that will have a positive impact on the urban environment.

CHAPTER 3: METHODS

Identifying multiple urban conditions and scales in social housing is important to the design. The process began with making an appropriate site selection and devising the investigation in the following segments; district, neighborhood, and site in order to better understand contextual relationships. The neighborhood was chosen based on being an URA urban renewal target. This aspect was important such that, the neighborhood provided a rich history. Yet, it arrived at a point where residents were in need of redevelopment and building rehabilitation in terms of housing. The combination of the new and the old is an interesting urban condition beneficial to this thesis. Raising public awareness through architecture requires an in-between condition, where there is not only a mix of buildings, but also a diverse demographic. Successful social housing accommodates a location readily available to transit because accessibility to public transportation is a vital element to livability. Additionally, visiting the site made a tremendous impact by revealing social and urban conditions otherwise obscured in photographs. In fact, these details administered the ability to make connections to the city in greater depth.

Investigation into the design meant addressing many issues related to a simple dwelling. Any type of housing requires knowledge of

basic amenities, utilities, circulation, structure, construction/materials, and so forth. Precedent studies of social housing in southeast Asia and also, both existing formal housing and informal settlements of the city provided a framework for these attributes. Much of the strategy was determined by Hong Kong's subtropical climate. The climate being the influencing factor on materiality and construction. Emphasis on circulation and spatial planning are two other vital elements for this thesis. As fire safety was one of the main concerns in today's informal settlements and so the means of egress played a role in circulation design. The HKSAR Buildings Department's *Code of Practice for Fire Safety* supplied useful information for the building design.

Achieving dense social housing called for an examination into spatial planning and how spatial conditions addressed qualities of light, air, and views. Precedent studies offered consideration of efficiency in terms of maximizing the use of space in a dense environment. Existing social housing designs also informed adjacencies of program while maintaining a systematic structural organization. Canham and Wu's *Portraits from Above* presented thorough studies in informal rooftop settlements, which provided insight to the lives of informal occupants and living conditions. Their presentation informed the basic needs and desires that translated into the design of the dwelling units in the

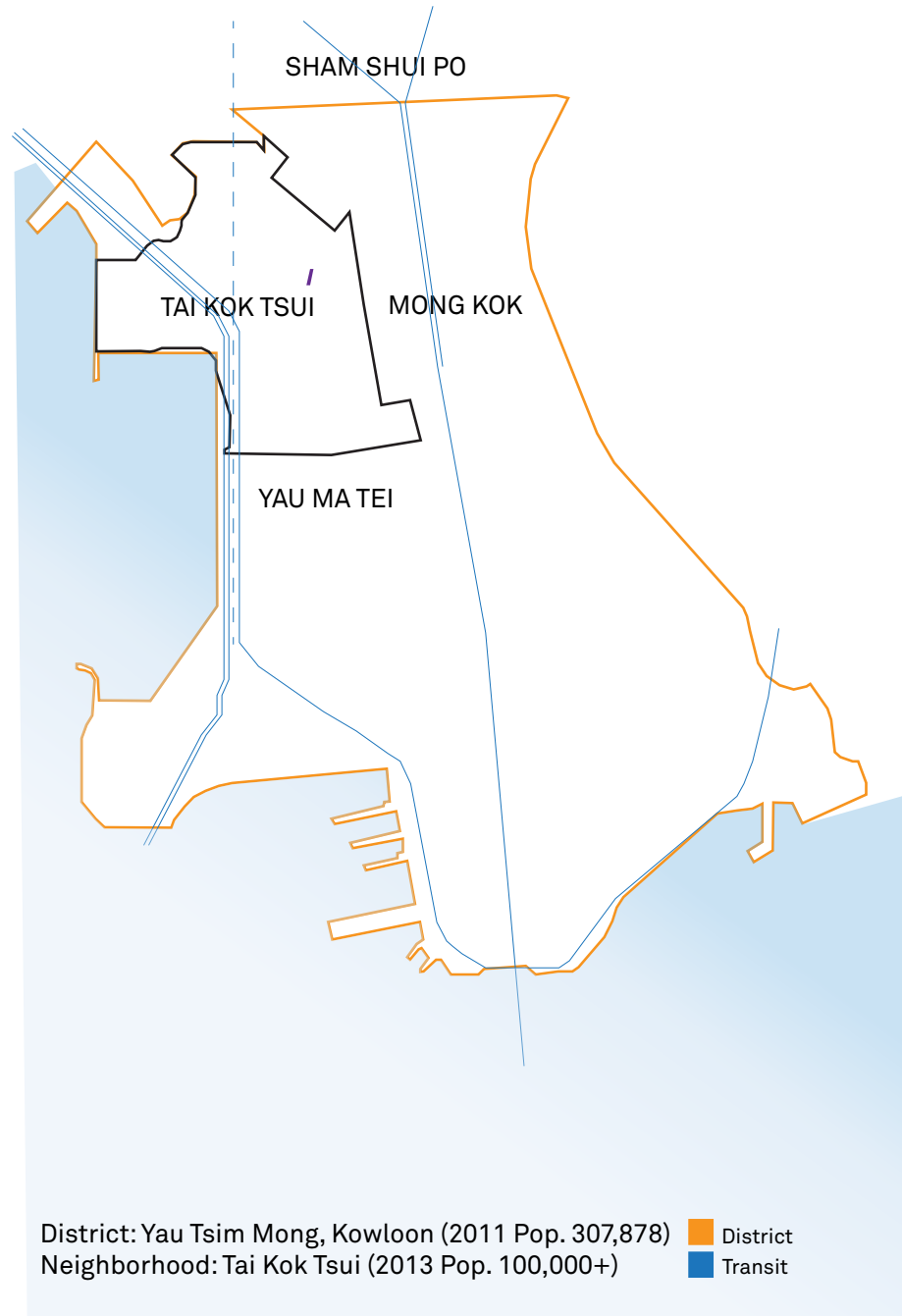
transitional housing. A key component of community in social housing is also expressed in transitional housing. The challenge was how could the notion of communal living persist without eliminating the existing characteristics informal occupants are accustomed to? The method consisted of introducing a mixed-used program. By integrating public amenities to the program, dwellers would become more active and possibly divert the segregation that currently exist between the general public and informal settlements.

The final goal for this thesis pertain to the architecture as an inspiration for future sites/districts in the city as a prototype. Thus, the architecture also becomes a form of education and a framework for future transitional housing. In particular, the issue of construction became valuable in this discussion. The approach included consideration of prefabricated dwelling units and their method of transportation for the future sustainability of transitional housing in the city.



Urban Renewal Areas
 Major Tourist Nodes

Fig. 34 Site/Context



CHAPTER 4: PRELIMINARY FINDINGS

4.1 Site/Context

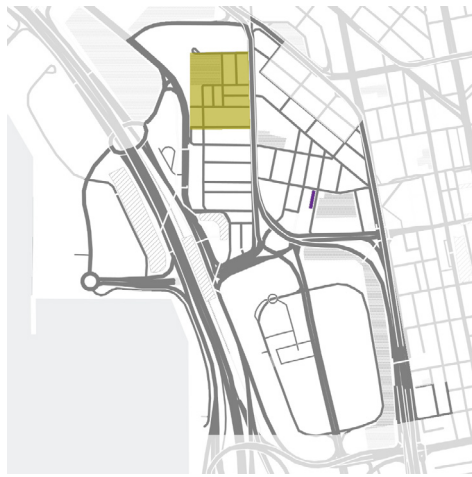
The site is located in Tai Kok Tsui neighborhood of Yau Tsim Mong district on Kowloon Peninsula (Fig.34). Yau Tsim Mong district is the urban core of Kowloon along the Victoria Harbor and the third densest district on the peninsula with a population of over 300,000 people.³⁰

Tai Kok Tsui neighborhood (Fig.35) is located north within the district and borders Sham Shui Po district, an area also targeted for urban renewal and known for informal settlements. Tai Kok Tsui accounts for one-third of the district's population (est. 100,000) and has been an urban renewal area undergoing redevelopment for the past 20 years. The neighborhood was once an active shipyard with heavy industries until the government decided to increase the land supply for development by reclamation that dramatically transformed the original shoreline of the Victoria Harbor. Today, it is a mixed industrial and residential neighborhood with an increasing number of private housing estates sparked by its location and accessibility to public transportation. (Fig.36)

A major urban expansion in Tai Kok Tsui emerged from Olympian City (Fig.37), a massive residential and commercial development complex devised in 1999. The new linkage to the MTR railway system



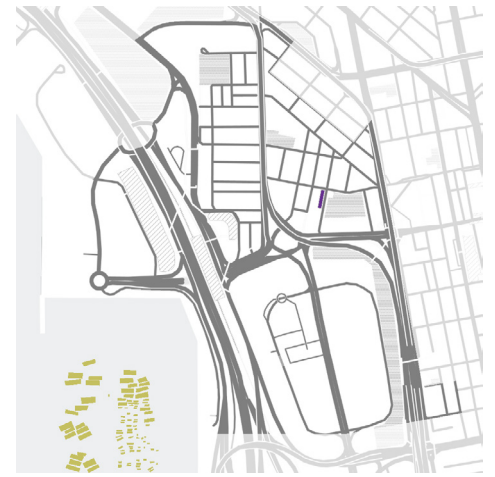
SHIPPING PORT
1940s



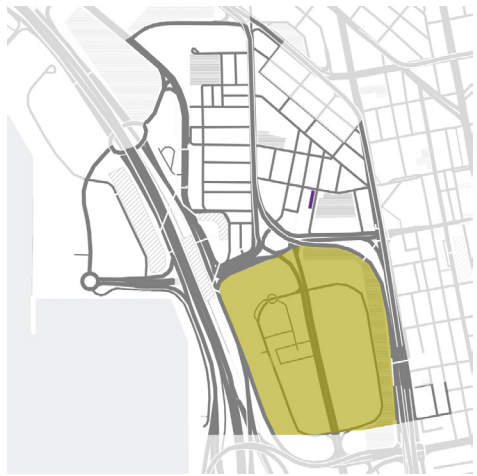
INDUSTRIAL WAREHOUSES
1950s



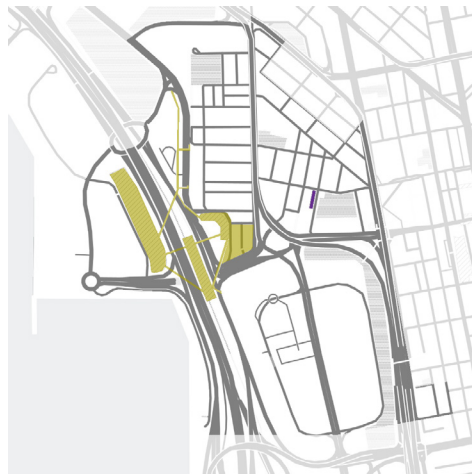
OLD TENEMENTS
1960s



TYPHOON SHELTER
1992



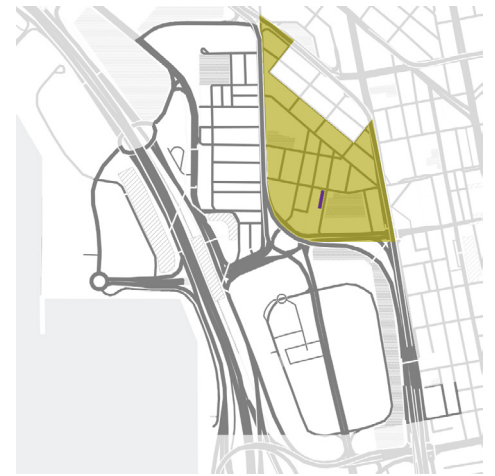
PUBLIC HOUSING
1990s-2000s



OLYMPIAN CITY
1999



LUXURY APARTMENTS
2009-



MIXED REDEVELOPMENT
2011

Fig. 35 Historical development



Fig. 36 Neighborhood characteristics



Fig. 37 Olympic City constructed, 1999 (*City Without Ground*), site located on left



Fig. 38 Express Rail Link under construction

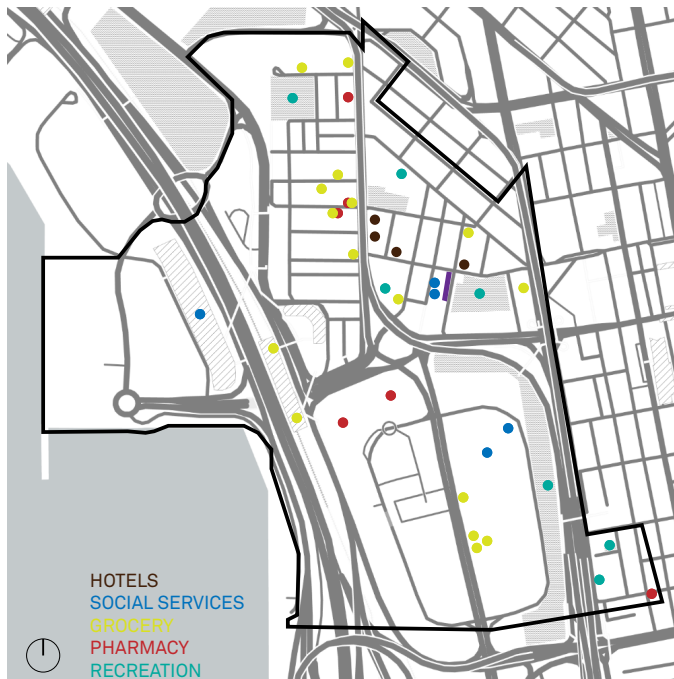


Fig. 39 Map of existing amenities

marked a turning point for the area. The superimposed shopping center has 800,000 sqft of retail space with an estimated of 300 businesses. Tai Kok Tsui will also serve as a major transportation infrastructure hub for Guangzhou-ShenZhen-Hong Kong Express Rail Link currently underway. (Fig.38)

Although the neighborhood is targeted for gentrification with the influx of the younger generation returning from overseas replacing the traditional population of senior residents, senior housing remains a popular business in the area. Many storefronts are industrial driven by automobile repair shops or manufacturing shops. However, small eateries and bars are on the raise with a diverse selection to cater towards the younger and foreign luxury service apartment occupants nearby. The neighborhood is also known for its hotel business in providing affordable accommodations to budgeted tourists (Fig.39). Despite the progress, the site continues to host 50 year old buildings yet to be redeveloped. The area west of the West Kowloon Corridor is less redeveloped with more vacant industrial buildings. Private and public residential estates lack elevators and security gates (Fig.40). Rooftop dwellings on some of these older buildings are still visible from aerial views. Luxury apartment occupants, hotels and tourist accommodations in the area continues to be exposed to views of these informal settlements (Fig.41)



Fig. 40 Lack of security



Fig. 41 Visitor's view of TKT from Rosedale Hotel



PUBLIC



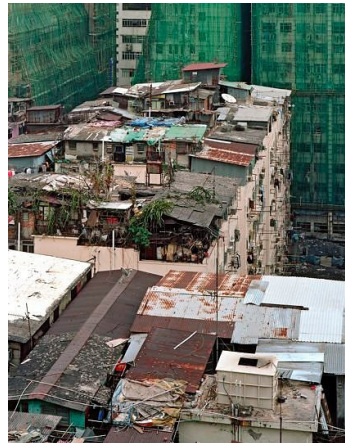
PRIVATE



HOTEL



SENIOR HOUSING



INFORMAL



TRANSITIONAL

Fig. 42 Dwelling typologies in neighborhood

SITE

LOT = ~13,800 sqft. (230'x60')

F.A.R. = 7.5



Fig. 43 Image of Site



hote). Residents consider them to be devaluing the surrounding context of new developments.

The richness in the neighborhood's context is strengthened by the variety of dwelling typologies (Fig.42). They range from private housing, public housing, hotel accommodations, senior housing, and informal settlements. However, transitional housing is absent. This thesis adds a new type of housing to the neighborhood.

The proposed parcel (Fig.43) is an elongated corner lot (230'x60', 13,800 sf) that faces a public park, Anchor Street Playground and private luxury apartments across the field (Fig.44). The block is located within what is classified as Cherry Area with a population of 12,730 (HKSAR Census & Statistics 2011). The building on the lot is a 1962 tenement style private residential building expected to be redeveloped within the next year. HKSAR Department of Planning have assigned Kowloon Peninsula as Residential Zone 1, which implies a set domestic plot ratio/ F.A.R of 7.5. There are no height restrictions.



Existing rooftops with rooftop dwellings have accommodated 30 households more or less. In order to accommodate a dense number of displaced occupants by assuming the largest population, at least 200 dwelling units are required. Hence, this thesis have the ability to respond to more than six informal displaced settlements. Units will be

Fig. 44 Context across the street

half divided into single occupants and family households, assuming a family of four to five people. Since there are no restrictions, the number of floors is flexible. However, a high rise structure typically more than 20 stories is not recommended. (Fig.45)

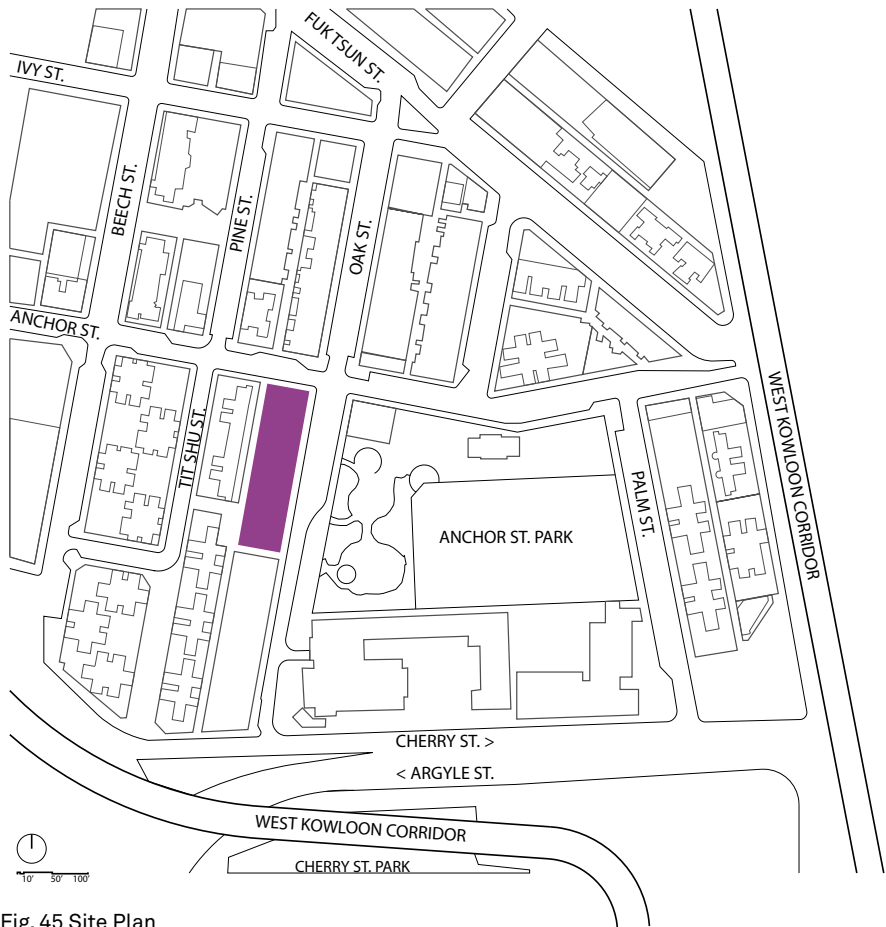


Fig. 45 Site Plan

4.2 Users and Needs

This thesis serve two major user groups, the public and displaced occupants. Based on observation, most residents in the neighborhood are elderly single-males and couples. Many elderly residents are accustomed to their neighborhood and refuse to relocate. However, due to gentrification, the younger generations are on the rise. In fact, the HKSAR Census & Statistics Department population survey in 2011 indicated most residents are 30-44 of age.

Likewise, demographic studies of existing informal settlements informs potential users that transitional housing responds to. Based on studies of the types of households, users are primarily; working families with children, elderly couples, and single individuals. They further define two fundamental types of dwelling units; family unit, and single unit.

Although, current informal settlements have adapted shared amenities, such as shared washrooms and in some cases, shared kitchens, this thesis is a reform to existing living conditions. Shared washrooms are perceived degradable to one's lifestyle. Culturally, shared kitchens are undesirable by typical Chinese communities. Therefore, each dwelling unit is designed to accommodate all the basic housing amenities; washroom, bedroom, living/dining, and kitchen. Family households typically desire private amenities of bathroom and kitchen

for more spatial freedom and convenience. While single-occupants demand simpler spaces and that, requires less maintenance and moving around the house. Multi-story units are less desirable for the elderly, although the majority still have the ability to climb stairs given that their current residences are typically situated within buildings lacking elevators. Also, they are more concerned with privacy and noise. However, public spaces are important to the elderly because most like to gather with other elderly to play mahjong, chess, and exercise Tai-Chi. They currently occupy the public parks in the city as a relief to their living situations.

Storage is also an essential element within the units. Informal settlements often face spatial restrictions. The confinement results in unsanitary conditions, which associates to public health. Lack of space affect organization and eventually, privacy. Privacy is an issue in existing informal settlements and is an issue that is addressed in this thesis by movable partitions.

Current informal settlements contain passageways and corridors that provide the residents with an extension of their living space as a place for gathering and playing. There is a need to maintain communal spaces when displaced settlements transition into transitional housing. Various communal spaces are needed not only for adults and elderly. The

children typically need space to do their homework verses an enlarged living space for family entertainment considering their financial status. Children need play space outside of their homes and often seek corridors as their outlets. Despite that, the building's communal spaces are meant to support daily domestic activities; such as play, laundry, and work. Flexibility is intended within these spaces rather than replicating space already offered by the park and other outdoor facilities in the neighborhood.

4.3 Building Program

The program includes two components, dwellings and shared spaces. A total of 208 dwelling units accommodate for various everyday activities such as, sleeping (bed), dining/living, hygiene (toilet and shower), and cooking (kitchen). Every unit has access to light, ventilation, view and access corridor. Single units (104 total) occupy 273 sf each with 200 sf occupiable interior space. Family units (104 total) occupy 433 sf with 338 sf occupiable interior space. The units achieves similar spatial needs to the most luxurious informal housing type (rooftop housing). Yet, the purpose is to proceed the existing conditions by doubling the amount of overall square footage for both the single occupant and family units. Family dwellings are expanded twice as much compared to a

single dwellings to accommodate for more people and household items. Single units includes two bed spaces, while family units accommodates five bed spaces.

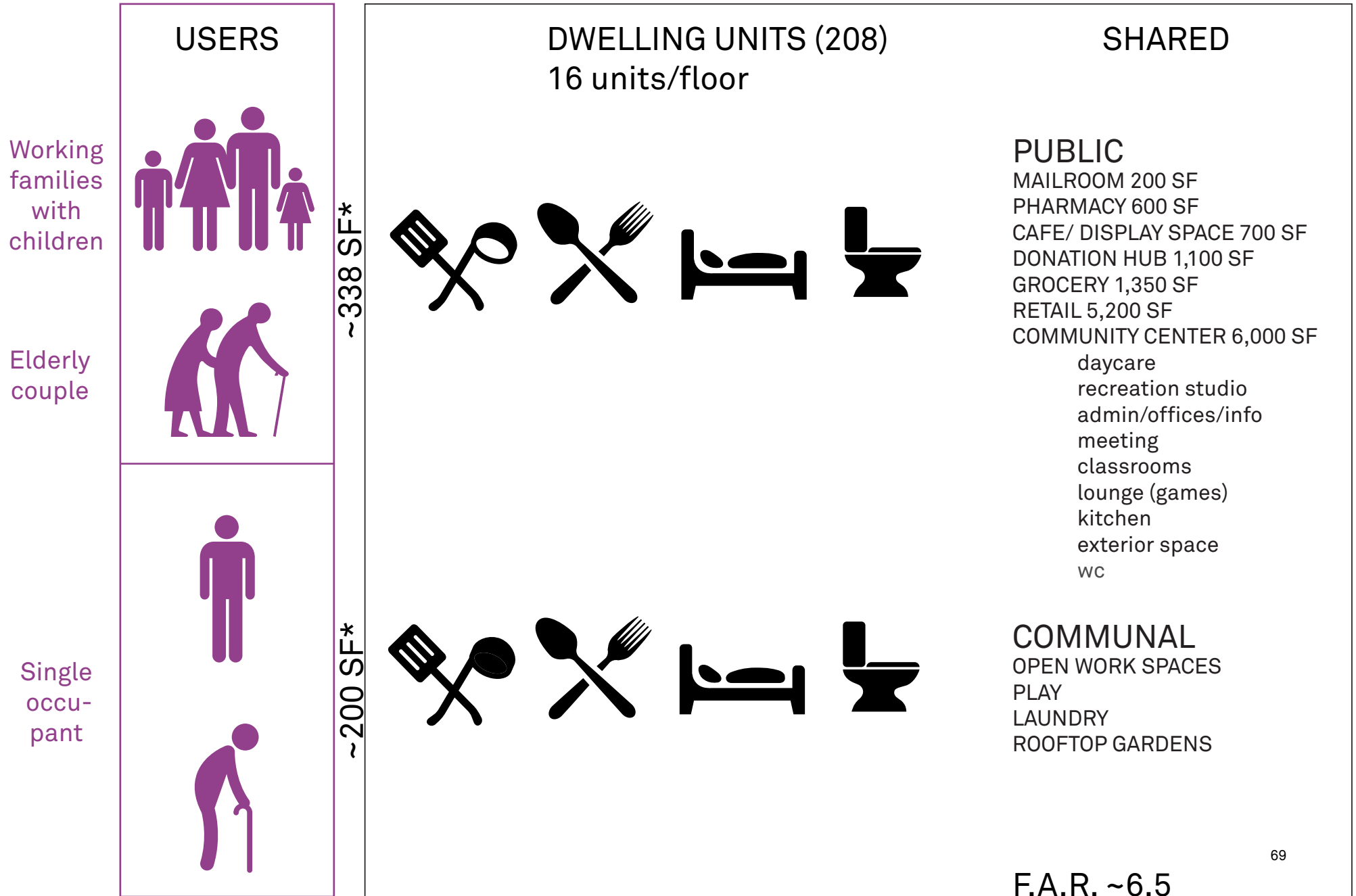
Shared elements are divided by public spaces and communal spaces. Public spaces are located on the lower and ground levels and accessible by both the residents and neighborhood. The public programs are a response to the existing amenities (Fig.39) in the neighborhood. Their importance is reflected by the immediate needs of the residents. Enough density can support the same amenity at multiple locations in close proximity. This thesis recognize the need to reinforce the most frequent and important amenities at this site. The program includes; mailroom (200 sf), pharmacy (600 sf), cafe w/ display space (700 sf), donation hub (1,100 sf), grocery (1,350 sf), retail (5,200 sf), and a community center (6,000 sf). The community center facilitates a daycare, recreation studio, administration, meetings, classrooms, youth lounge, shared kitchen, and exterior rooftop garden. Support spaces such as, utilities, storage, and washrooms are also provided.

Retail development is the driver of the public portion of the proposed transitional housing. They provide density and financial benefits for the building. However, the community center is the physical and social linkage between the neighborhood and transitional residents.

It is also a place that offers meditation and assistance to potential rehoused residents. Other specialized spaces within the complex are the ground level display gallery space integrated with the cafe and donation hub. These are places of opportunity for exchange between the greater community and transitional residents.

On the other hand, communal spaces are shared spaces among the residents. They are designated 20'x20' atypical spaces between the dwelling units on the upper levels of the complex. The main circulation path smoothly transitions into communal spaces and are essentially, expansions of the corridors. Communal spaces accommodate various gathering activities and serve as the meeting and gathering point for the dwellers. Infrastructure within these communal spaces are intended to support primary community activities of; play/exercise, laundry, and work. Vertical greenery and garden beds are meant to encourage urban agriculture alike. (Fig.46)

Fig. 46 Summary of program



F.A.R. ~6.5

CHAPTER 5: DESIGN RESPONSE

“The effects of density are affected by design, layout, open space, degree of sharing, traffic, and community facilities of exterior and personal space.”- *Yuen & Yeh, 11*

Creating dense social housing to support density is an overarching argument for this thesis. The challenge of the design is to maximize the amount of light, air, and views within the dense environment. Open air access and circulation throughout the entire complex is a response to this premise and also encouraged by Hong Kong’s subtropical climate (Fig.47). As mentioned, multiple scales of overall site response and dwelling response pertains to this thesis. Therefore, the design consists of three major components; public spaces, dwelling units, and communal spaces that form a comprehensive strategy to creating successful social housing.

The design begins with responding to the site by recognizing the vibrant pedestrian activity in the area. The network of alleyways (10’ width typ.) enhance this urban experience in spite of the density in the city. Active alleyways provides residents with shortcuts and connections throughout the tall maze-like city (Fig.48). Thus, the site splits longitudinally down the center to create an ‘internal street’ running north and south (Fig.49). The central space continues vertically

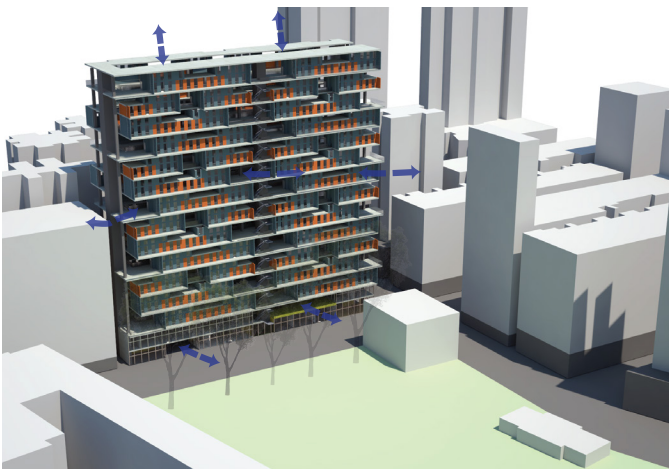


Fig. 47 Light, air, views

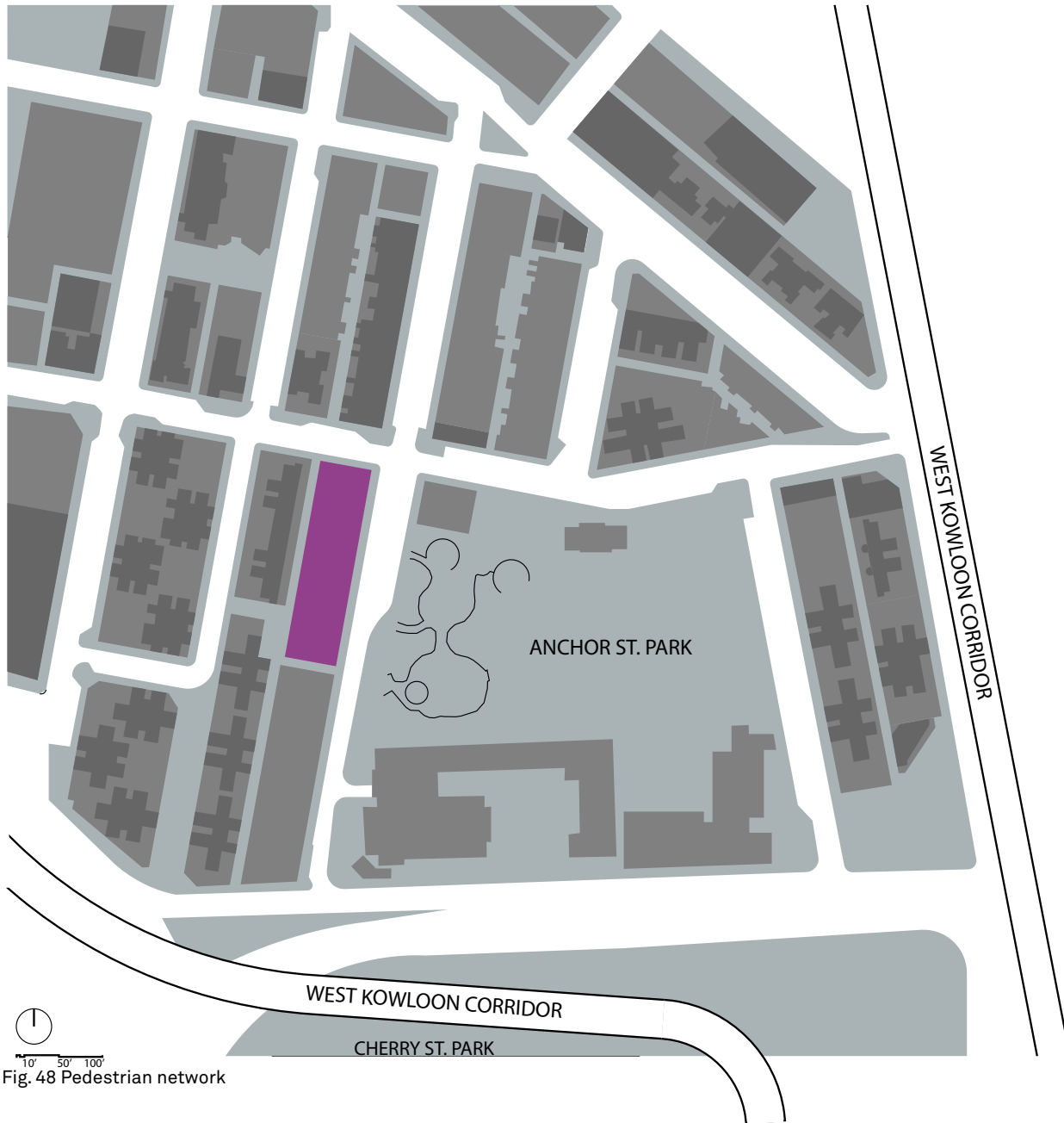


Fig. 48 Pedestrian network



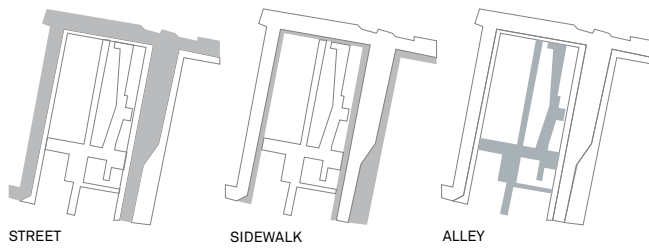


Fig. 49 'Internal' alley

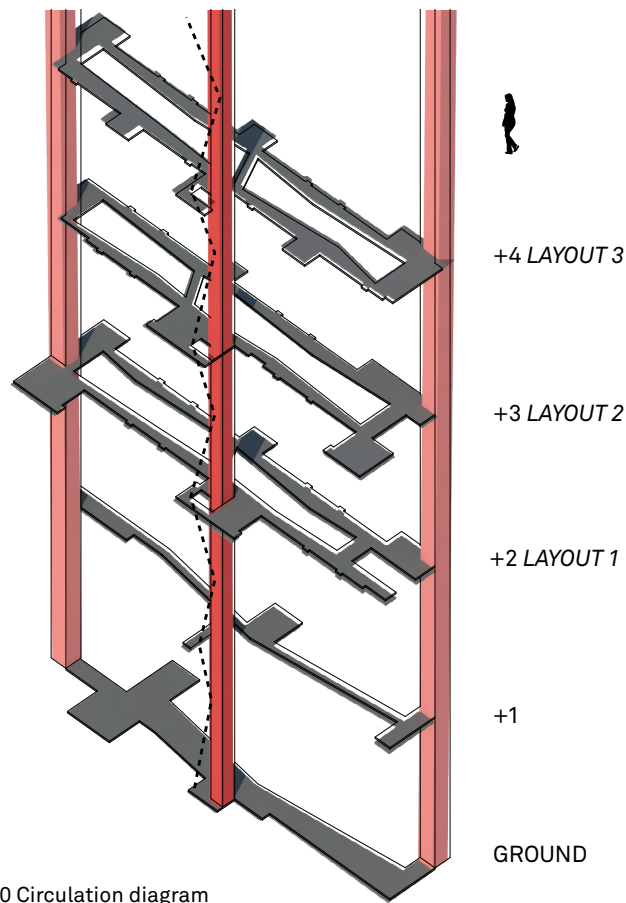


Fig. 50 Circulation diagram

to create an open air atrium. The condition of the site as a long and narrow bar demands to be split in the north-south direction. Splitting the site longitudinally allows natural light to penetrate throughout the entire building as there is an existing (150') building directly adjacent to the south of the site that act as a barrier to south facing sunlight. Users circulate by the main elevator and stairwell located at the center of the building. Fire egress cores located at the opposing ends of the site provide the means of escape (Fig.50). On the upper dwelling levels, humble bridges provide an additional and efficient path around the building.

5.1 The Public Spaces

The 'internal street' activate the public components of the program on the first two levels. There are three designated thresholds from the streets and alleyways onto the site. Users have direct access to the site from the adjacent alley (Fig.51).

The design emphasis on transparency compose a dialogue between the public and users of the building. Active retail and commercial spaces defines public interface of the ground level, while programs that need more wall space moves closer to the alley. However, the facade along the alley frequent the use of glass as well to allow for

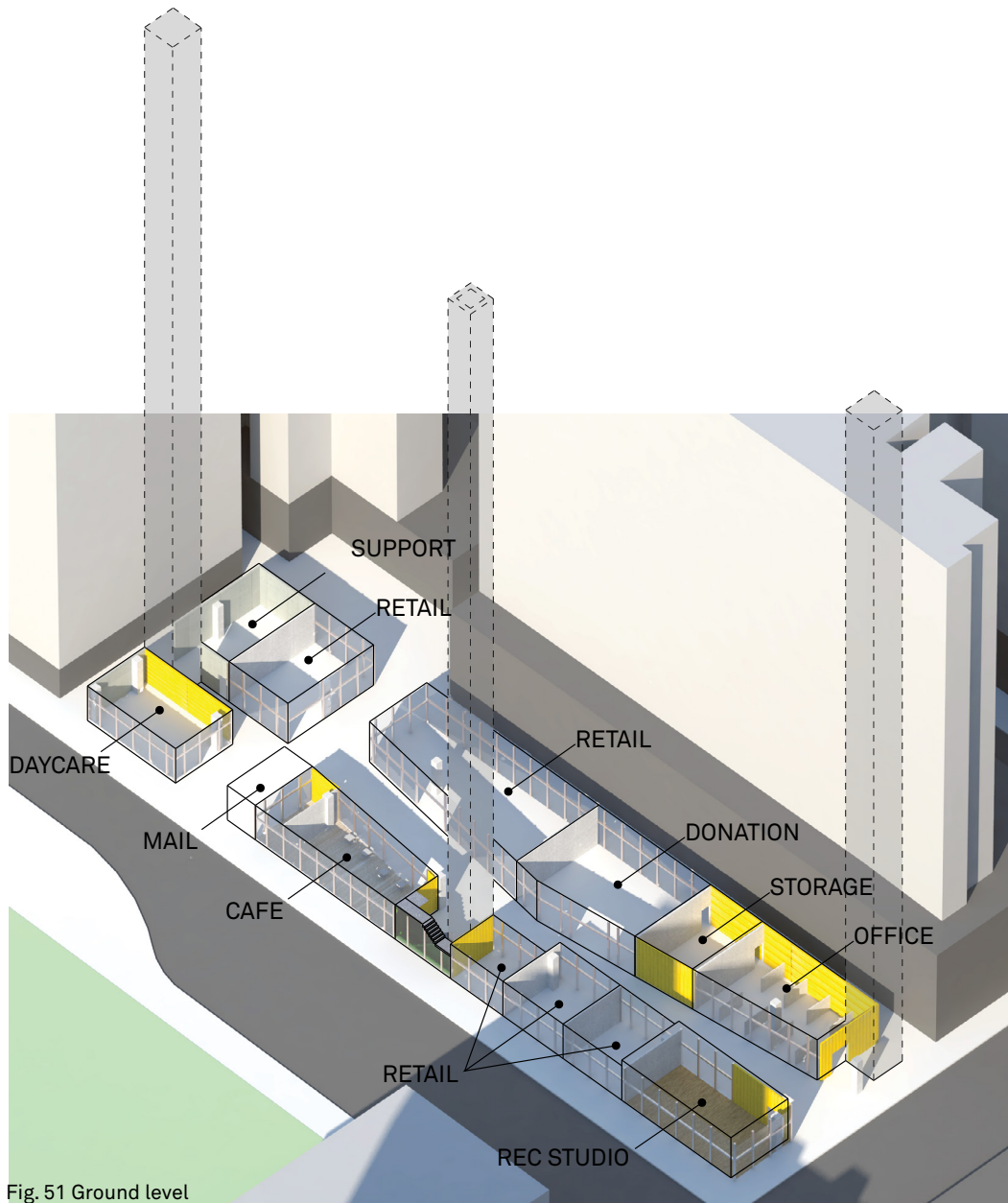
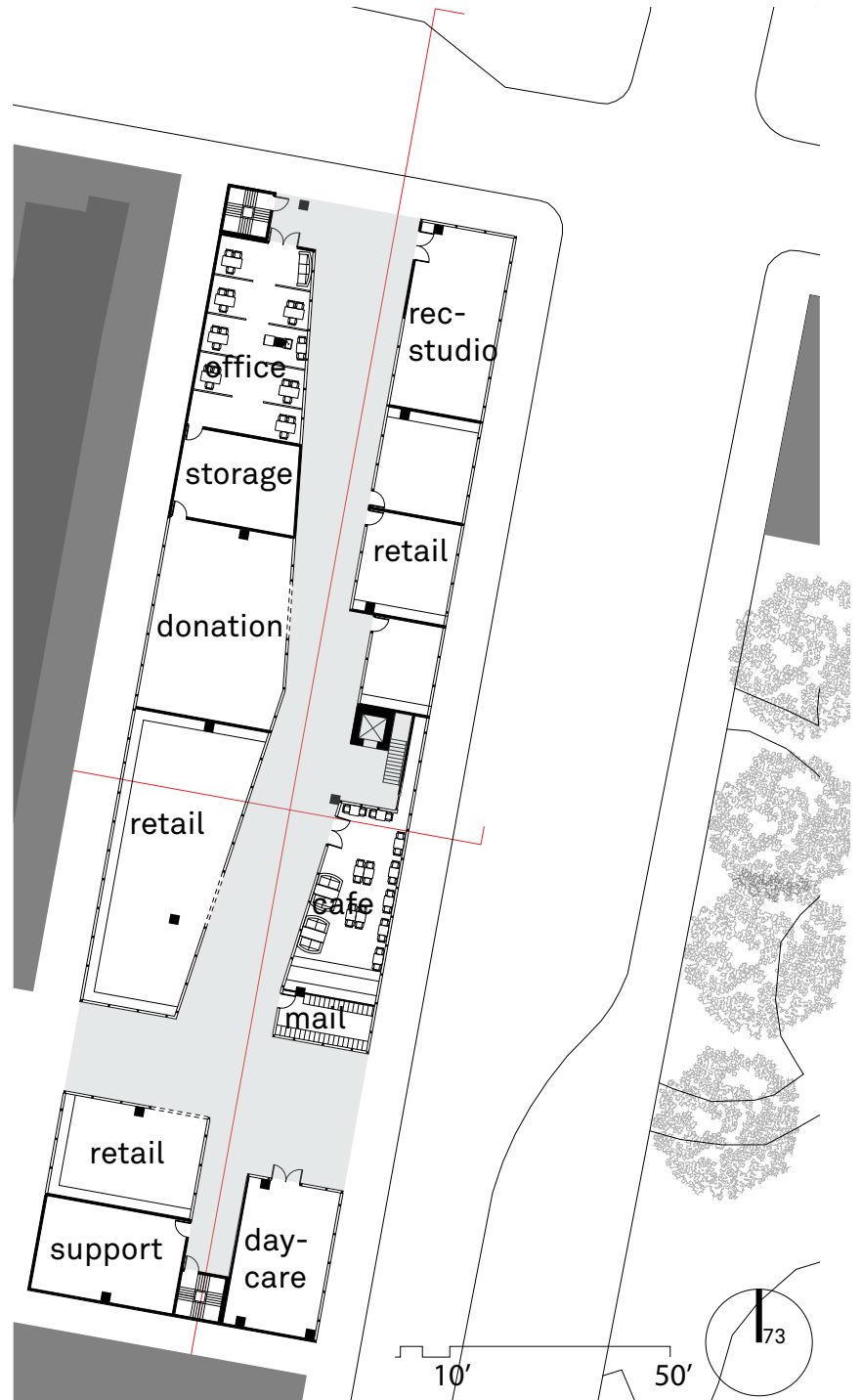


Fig. 51 Ground level



visual connection from the street through the alley. It is also to address the issue of safety and security.

The community center is where the neighborhood and transitional residents connect and come together to interact. Emphasis is placed on the recreation studio located at the corner of the site acting as a threshold into the central 'internal street' from the north. The higher floor to ceiling space offer transparency when classes in activities like, yoga and dance are in session. Presence of the people and building is further acknowledged by the central display space that is integrated with the cafe. Located next to the central circulation elevator and stairs, the space is designated as a temporary gallery as a visual attraction. Culturally, crowds are attracted to visually compelling or extraordinary activities in an urban environment. The community center continues onto the second level (Fig.52). On the second level, the rooftop garden opens up the building's mass and opens onto the park absorbing light and allowing the penetration of light. This space also function as exterior space for the shared kitchen that is directly adjacent to it. By implementing public spaces on both inside and out establishes a focus into the central atrium. The activity generated on the ground level provide a sense of security for the residents on the upper levels.

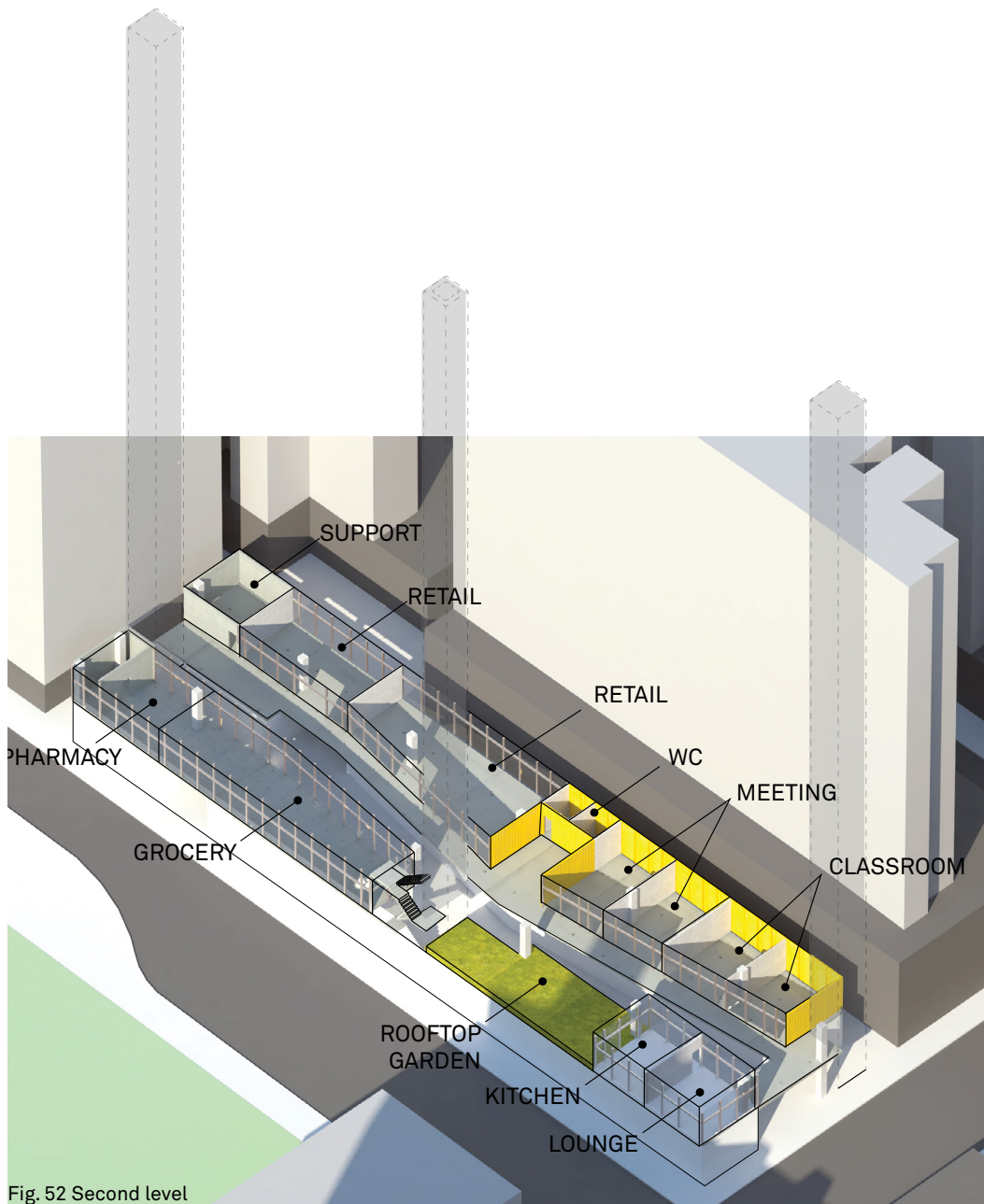


Fig. 52 Second level

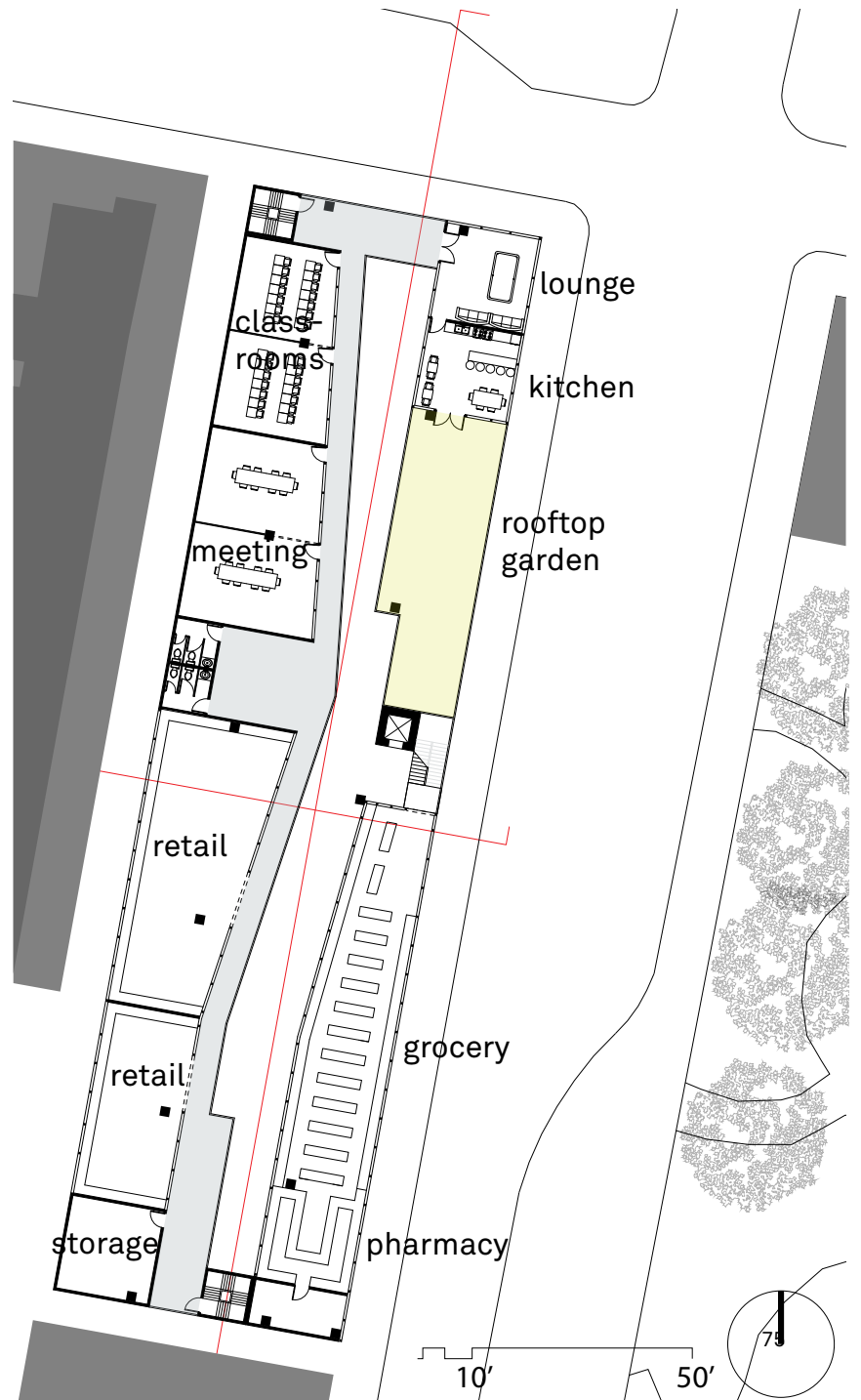
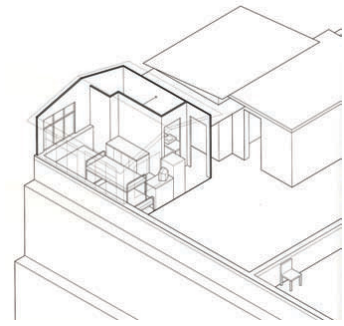




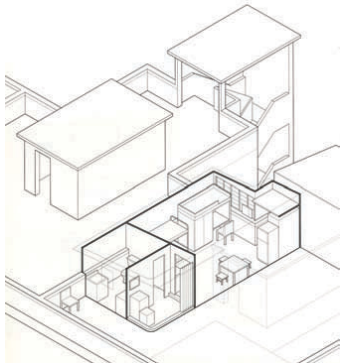
Fig.53a Ground level view



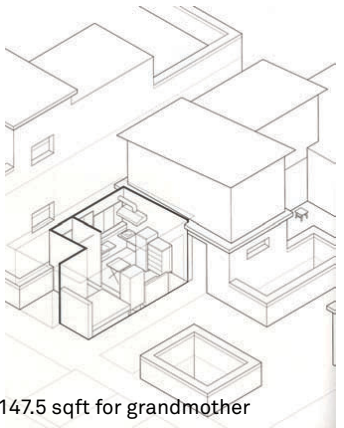
Fig.53b Second level view



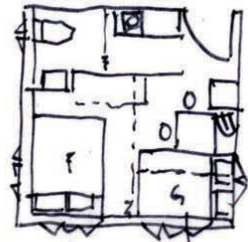
182 sqft. for couple



269 sqft. for family w/ 9 year son

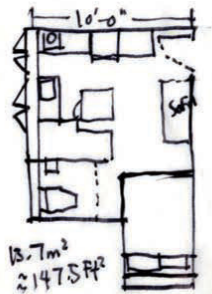
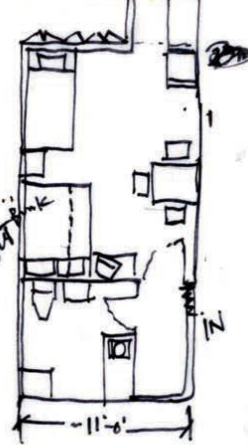


147.5 sqft for grandmother



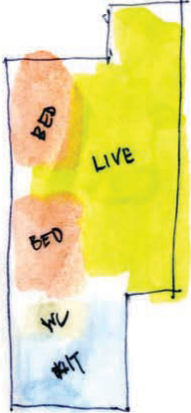
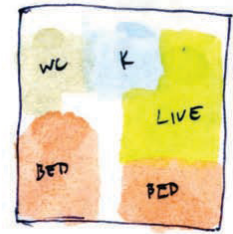
66.9m² ~ 722ft² Bunk

25m² ~ 269ft² ps.59



13.7m² ~ 147.5ft² ps.168

6' 1' 1' 1' 3m



Orthographic drawings by Rufina Wu, Images by Stefan Canham / Portraits from Above

Fig.54 Spatial studies from *Portraits of Above: Hong Kong's Informal Rooftop Communities* (Wu/Canham)



Fig.55 Elevation photo of model

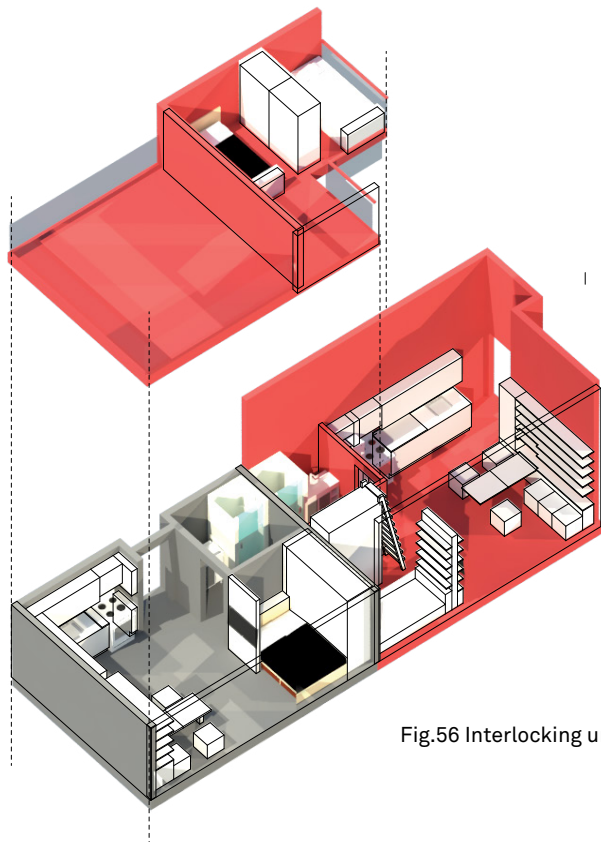


Fig.56 Interlocking units

5.2 The Dwelling Units

Several case studies in Canham and Wu's *Portraits of Above: Hong Kong's Informal Rooftop Communities* (Fig.54) was informative for spatial studies. It also became clear to what was the tolerable amount of space needed to dwell for family and single households with the exception that many cases depicted uncomfortable living environments. These studies served as a guide of improvements and elements to avoid in the design of dwelling units.

The elongated site and splitting condition resulted in 40'x20' structural bays that serve as the foundation for 20'x15' units and suggest laying out the units longitudinally to maximize the amount of light per unit (Fig.55). Family and single units interlock as prefabricated units to encourage an integration of unit types rather than segregation. Family units interlock with single units below by a vertical L-shape form (Fig.56). They are mirrored to share an utility wall. The top portion of the family unit are lofted spaces for sleeping. Family units offers five bed spaces with one bed on the lower level for ADA purposes and a ladder for the loft above. As a result, the unit is double-height with a floor to ceiling of 14'-6".

Rather than designing rooms with enclosed sleeping spaces, typical of a normal house, walls are limited and flexible. Movable

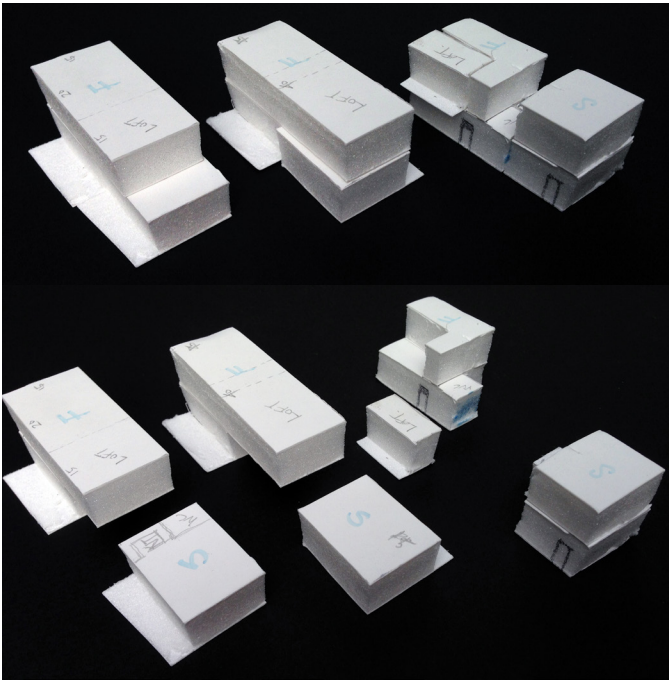


Fig.57 study models of unit iterations

partitions offer privacy but also service as storage compartments. Spatial flexibility is supplemented by collapsible furnishings. For instance, the wall shelving attaches to a foldable table for work or dining. The seats are modular pieces that become a couch when joined or chairs when separated (Fig.58).

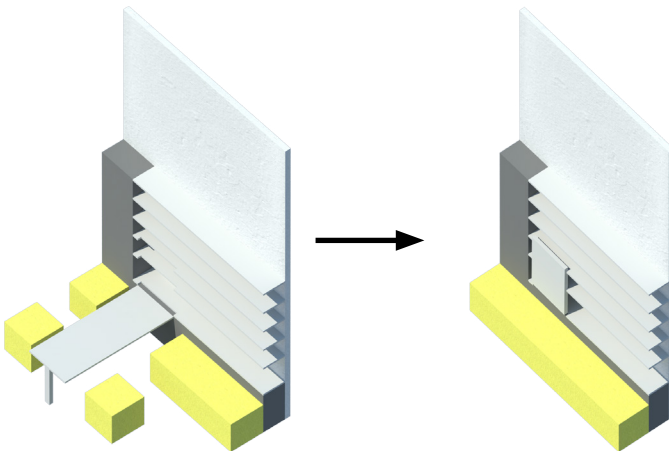


Fig.58 Spatial flexibility: collapsible furnishings

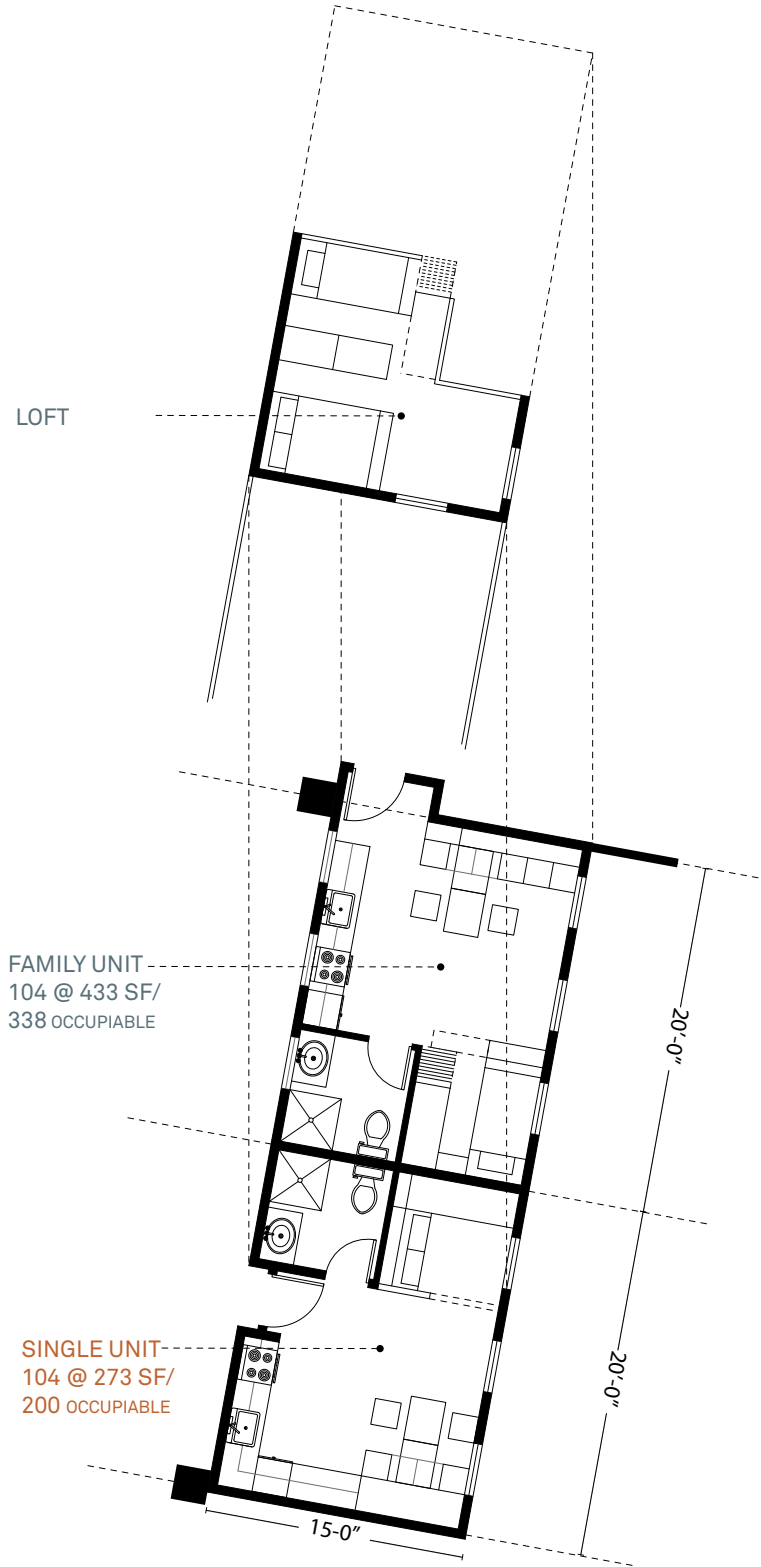


Fig.59 Floor plan of units



Fig.60 Section



Fig.61a Single's Unit



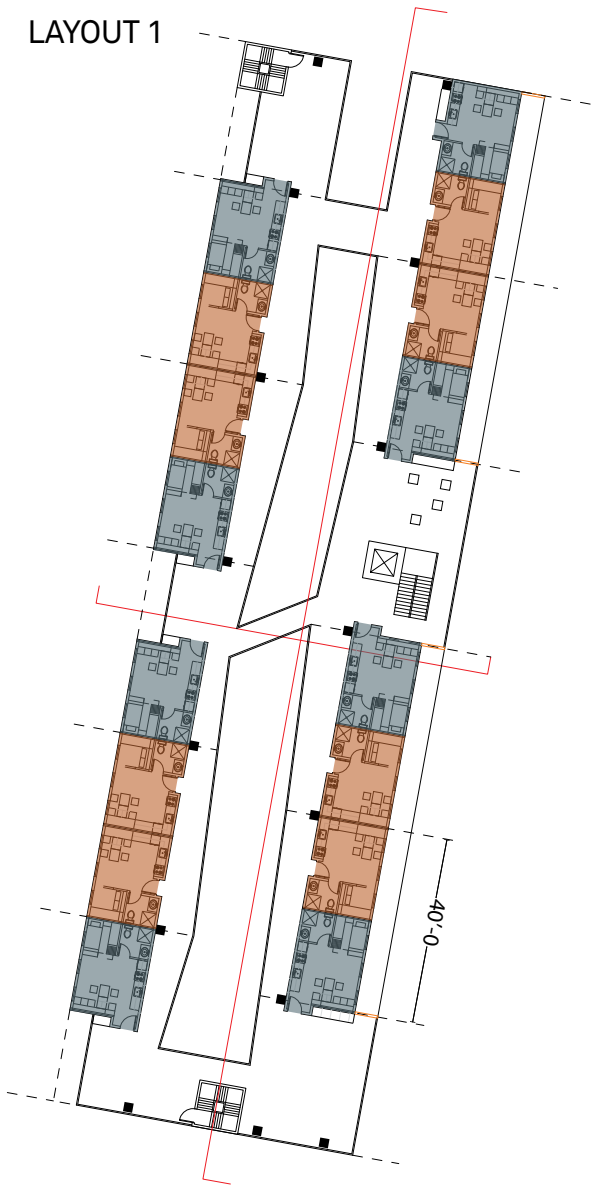
Fig.61b Family's unit



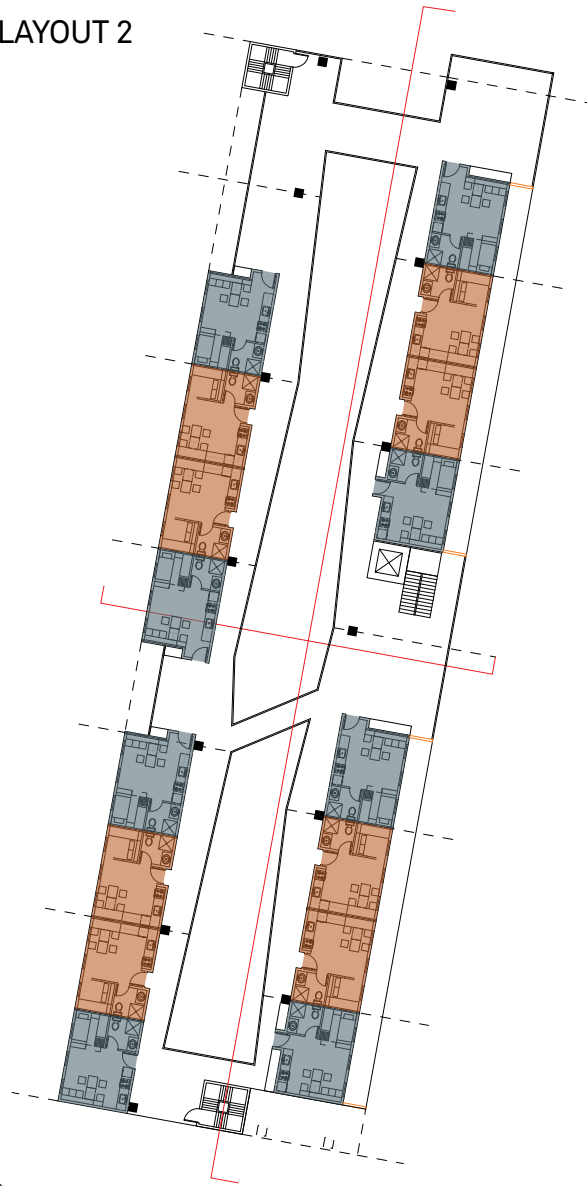
Fig.61c Family's unit

Furthermore, the pair of interlocking units are coupled in groups of four. There are 16 units per floor on 13 floors and the linking units shift according to the structural grid in three different layout configurations (Fig.62). The three layouts repeat vertically in the same order. The blue color represents family units, while the orange marks single units. Access to the units are connected by an internal facing single-loaded corridor and floor slabs undulate to form points of gathering or stasis. The composition of linked units on multiple floors create openings to allow air flow and natural light to penetrate throughout the entire building.

LAYOUT 1



LAYOUT 2



LAYOUT 3

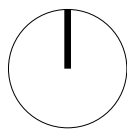
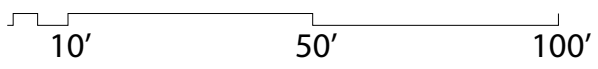
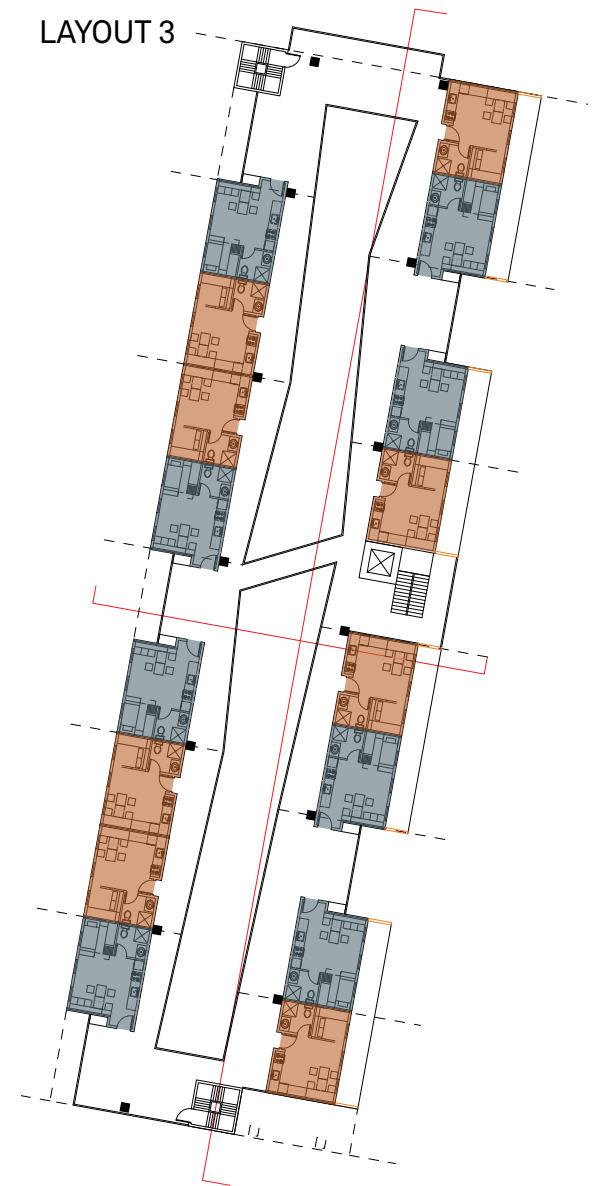
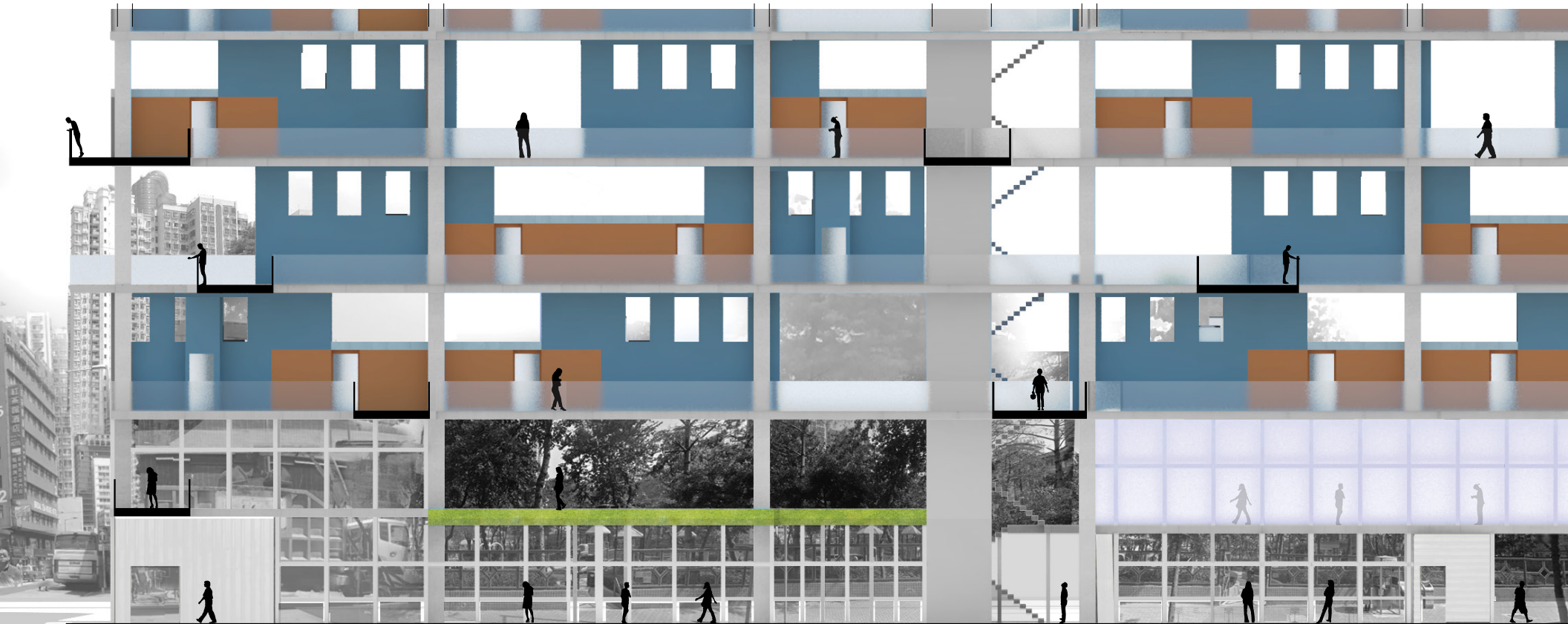


Fig.62 3 varying floor plans

Fig.63 Longitudinal section



0 5' 10'

5.3 The Communal Spaces

The groups of interlocking units are separated by an in-between space that serve as communal spaces. These spaces provide a place for residents to gather and facilitate three major activities; play, laundry, and work. From the main circulation corridor, residents can smoothly transition into these spaces without jeopardizing the flow of traffic of the circulation path. Built-in infrastructure support the functions of the three major activities within the spaces. Moving furnishings continue the language of the dwelling units to create flexibility. When the furnishings are stored away, the space opens up for play and exercise. Additionally, Hong Kong's laundry culture disregard the use of dryers, so clothing are hung to dry where space is available. In this situation, the activity is extended into the communal spaces to avoid clutter in the interior spaces. Finally, the built-in infrastructure and movable furnishings allows for a space to work with computers and desk space. This feature would most likely attend to children and young adults.

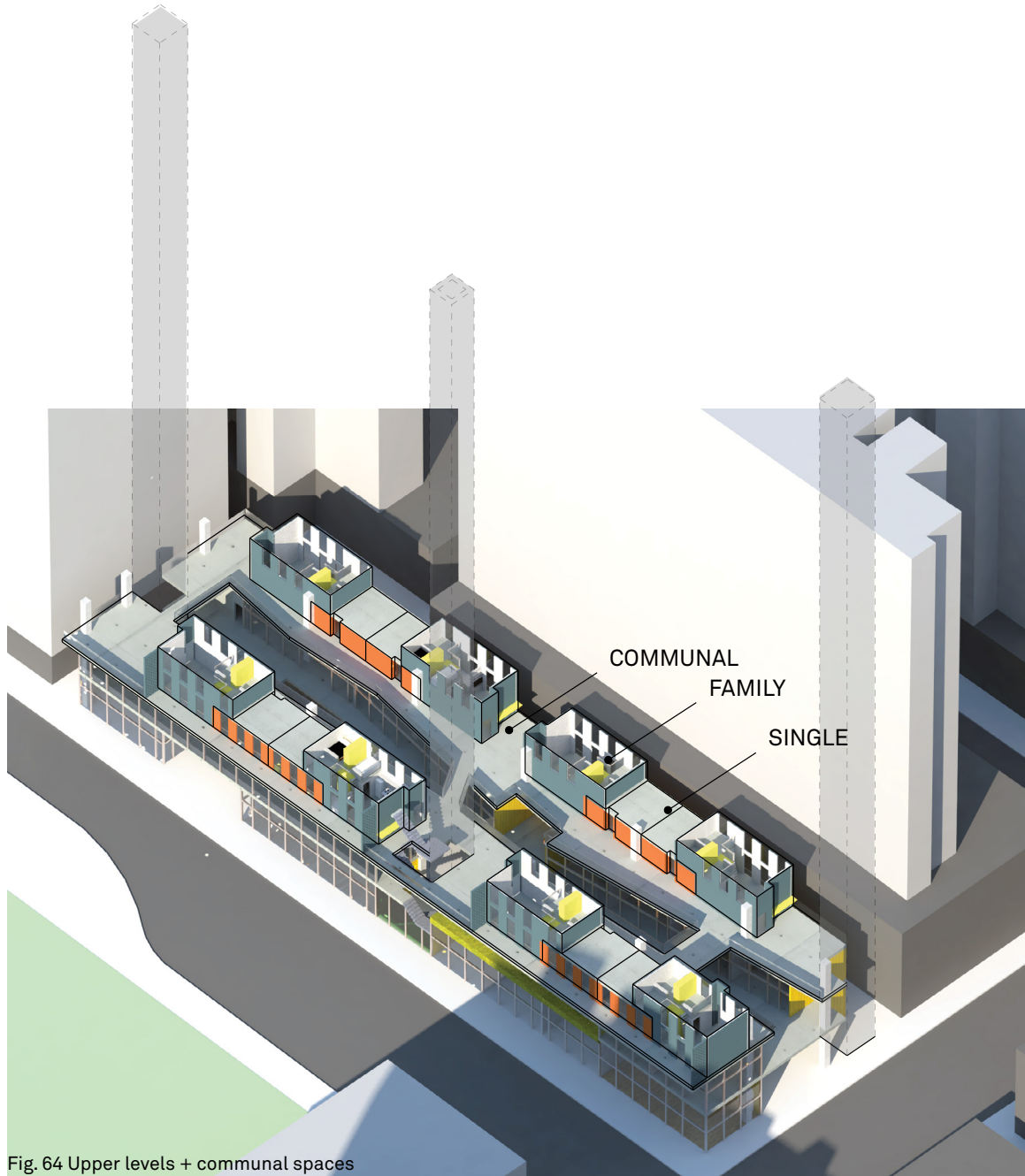


Fig. 64 Upper levels + communal spaces

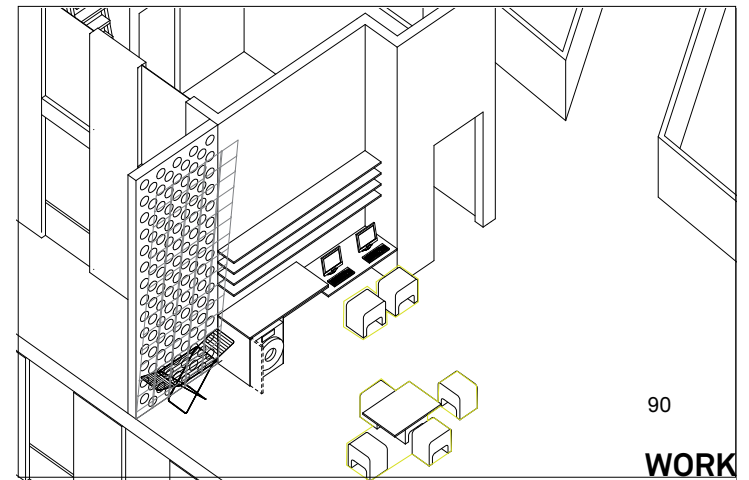
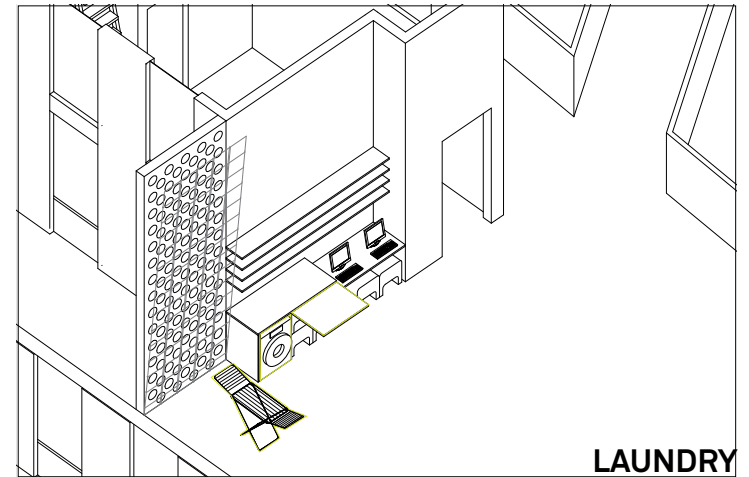
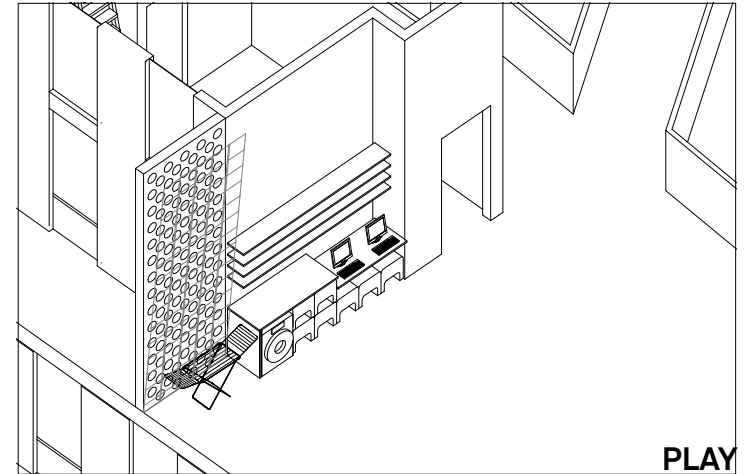


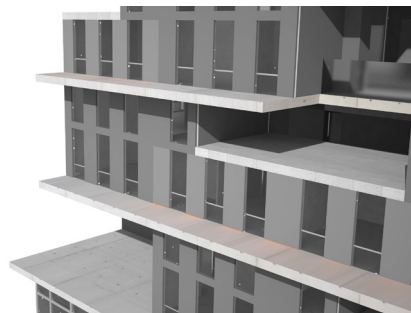


Fig. 65 Upper levels view

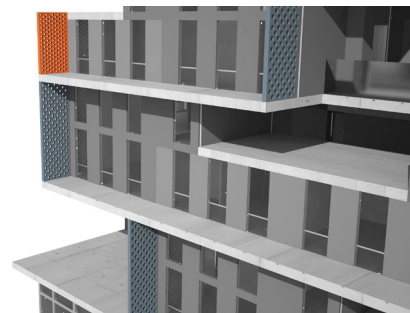
The design concludes with the features of the facade and materiality. Concrete floor slabs extend five feet outward above the sidewalk to serve as shading for the units facing east. In the process, the facade is given a simplified and clean appearance. Next, perforated metal screens are vertically situated at the ends of the grouped units. They serve three purposes; as divisions between the dwelling units and communal spaces, as well as to better frame the linked units visually. Additionally, as a space to promote urban agriculture with vertical greenery. Lastly, the prefabricated units are constructed by colored composite panels; blue as family, orange as single for an aesthetic appeal in the neighborhood (Fig.66).



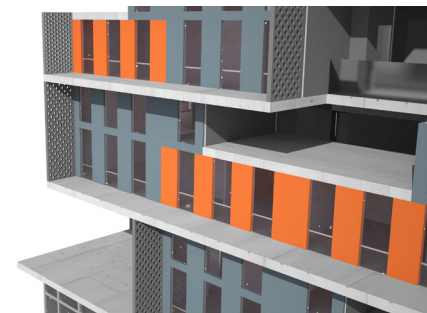
FACADE



SHADE, Extension of concrete floor



FRAME, Perforated metal screens



AESTHETICS , Colored composite metal panels

Fig. 66 Facade materials + construction



Fig. 67 Exterior view on Cherry St.

CHAPTER 6: CONCLUSION

COMMUNAL

FAMILY UNIT

RETAIL

FAMILY UNIT

SINGLE UNIT

GROCERY

CAFE



The thesis is a response to Hong Kong's prolonging housing epidemic and in particular, to the current resettlement process of displaced informal settlements. Transitional housing as a proposition to the urgency of immediate housing assistance is potentially one strategy to address the lack of adequate and affordable housing for grassroots families in the city. Overall, the urban refuge is an inquiry on four underlying issues that architecture has the potential to address in social housing. This thesis is a narration on composing architecture that vocalizes the need to improve social housing conditions in the city and its urban qualities for the public.

MEANING OF TRANSITIONAL - The investigation began with an attempt that deciphered an informal dweller's cultural, sociological and daily needs through the study of existing informal settlements. The basis of informality relied upon an unsophisticated self-managed, self-maintained, and forced lifestyle. While the acceptability is questionable, informal dwellers have grown accustomed to their living situation as a community. Therefore, a tabula rasa approach would not have been appropriate. The thesis obtained a challenge to maintain the positive attributes of existing informal housing into the new proposition, which became an exploration on making improvements rather than preserving all aspects by simply recreation. More importantly, transitional housing

asks if the plausibility of achieving balance between informality and formality in social housing is if at all possible to satisfy society as a whole.

BALANCE WITHIN DENSITY - Often in western cultures, urban density is perceived with negative connotations suggested by negative impacts on the environment. Issues of pollution, sustainability, personal space, access to public transportation and so forth are many factors influenced by density, and housing as being one of the major concerns. Yet, Hong Kong's economic and social patterns are supported by its urban density. This thesis is also an attempt to answer whether balance can be strike within density that can be achieve through thoughtful architectural design. What exists now in the city's public housing system reflects a dehumanization of housing and shelter in order to control density. This aspect is reflected in the multi-story pancake stacked super high-rise towers. This specific design of dense transitional housing in central neighborhoods of the city can achieve both density and basic living standards in social housing often neglected in the process. Access to light, air, and views are once again paramount to adequate housing. Furthermore, there are more opportunities to further densify the design to better satisfy efficiency and financial feasibility of the proposition.

FLEXIBILITY - The program attends to diverse users and user

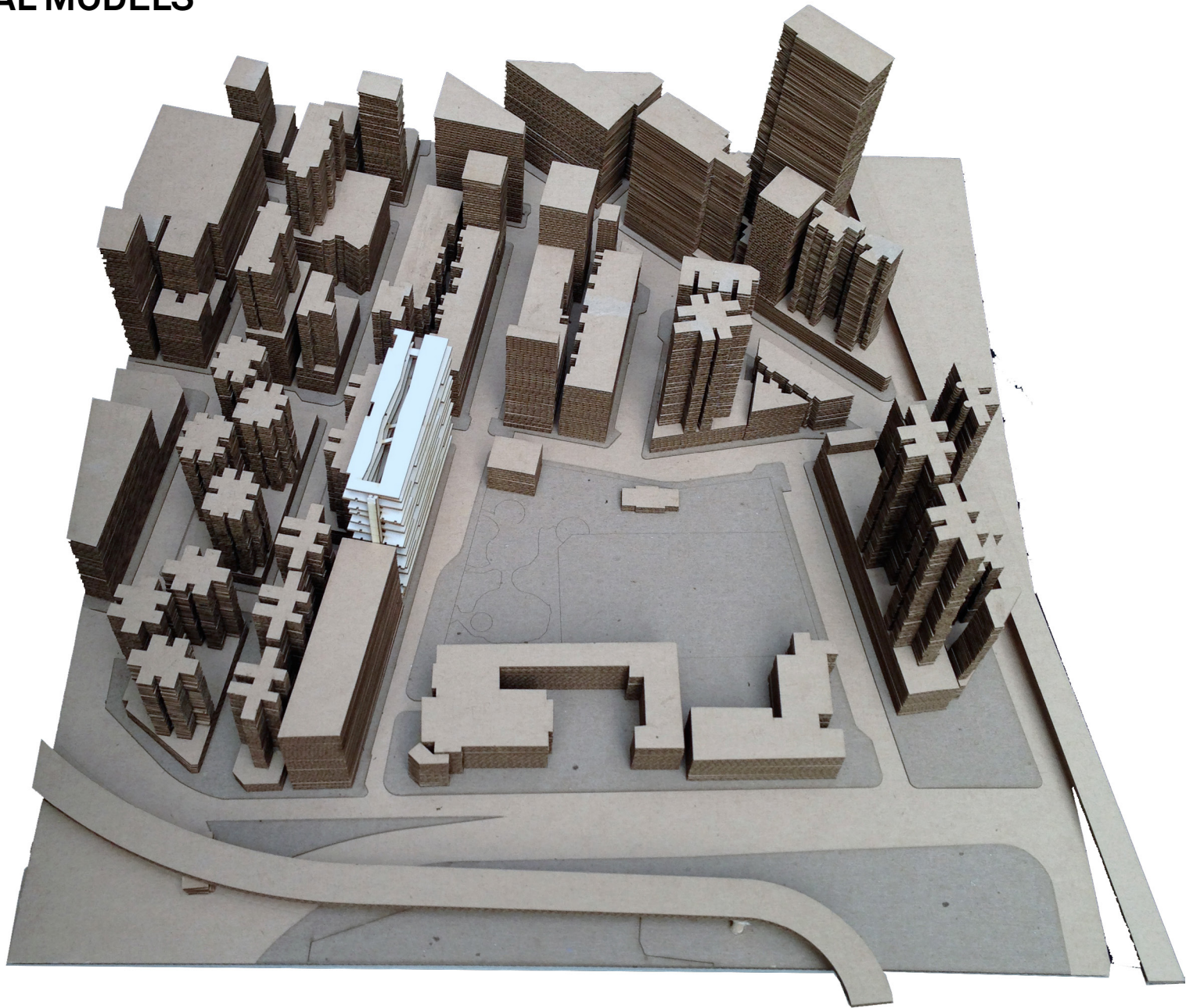
groups that demands the need for flexibility. There are two types of flexibility in question; designing for spatial flexibility and the building as a flexible entity. Single spaces with flexible uses are reflected in the designs of the dwelling units and communal spaces. The idea of prefabricated units starts to suggest that the building can be flexible, but has the opportunity to be even more so. Can the entirety of the structure be converted into other future uses? or simply be expanded.

PHASING FOR THE FUTURE - The final goal for this thesis pertains to the architecture as an inspiration for future sites/districts in the city as a prototype. Thus, the architecture also becomes a form of education and a framework for future transitional housing. While architecture may not directly resolve all the present issues, there is an opportunity to utilize phasing as a strategy to demonstrate the sustainability of transitional housing over time. The strategy of phasing aligns with many of the government's comprehensive plans to urbanism in the future. In fact, the goal is not only to compose beautiful architecture but also, propose social change.

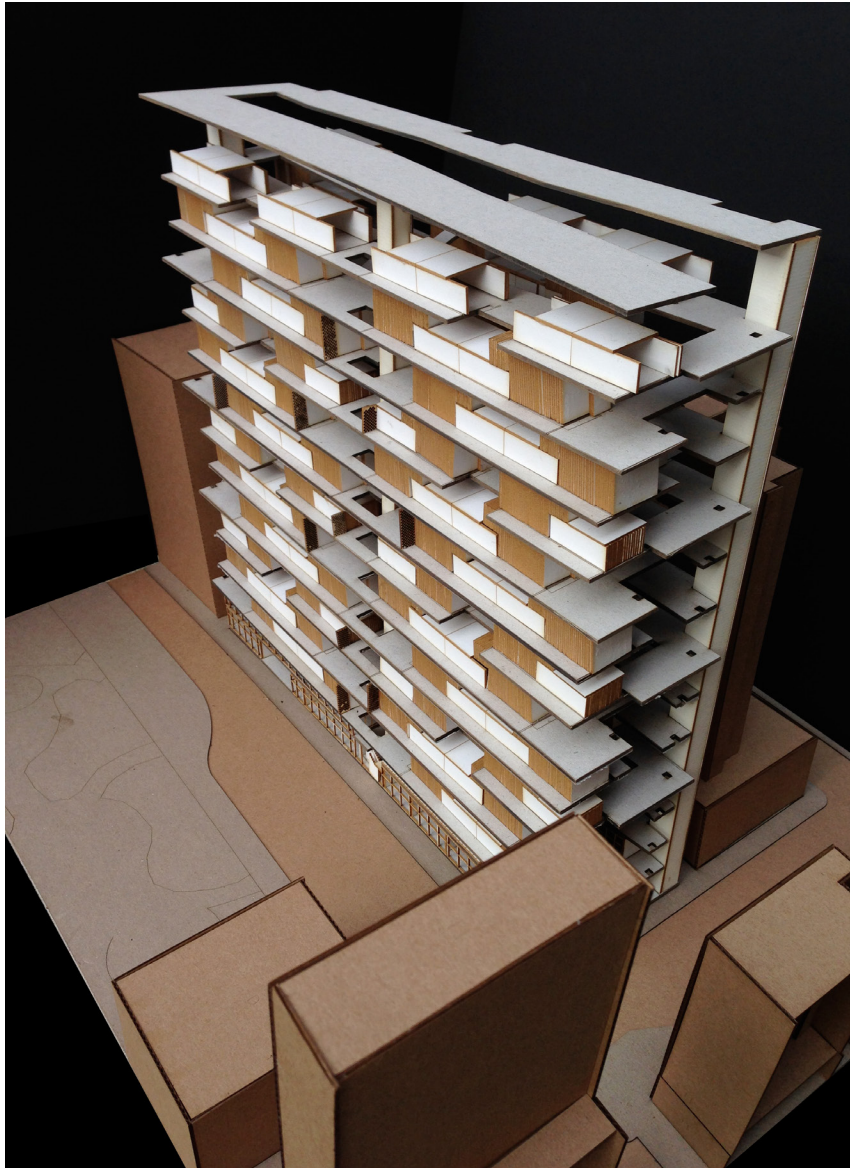
As an advocate of humanitarian design civic leader Samuel Mockbee's "goodness is more important than greatness,"³¹ I believe humanitarian design can serve the underserved. There is no other place like Hong Kong. Even with my personal attachment as home and

the amazing experiences this city has to offer, the housing situation desperately needs help, and not only in quantity, but substantially, the quality. Architecture has the ability to address living conditions and social inequalities surrounding informal settlements. Architecture can empower grassroots to convey a presence in Hong Kong's quick to judge society.

FINAL MODELS



FINAL MODELS



FINAL MODELS





ENDNOTES

- 1 “Building Census, Building Homes.” Long Term Housing Strategy (2013): XX-XX. Hong Kong Transport and Housing Bureau. <http://www.thb.gov.hk/eng/policy/housing/policy/lths/index.htm>. Web. 1 Sep 2013. <n The article can be viewed at http://www.thb.gov.hk/eng/policy/housing/policy/lths/lthb_consultation_doc_201309.pdf>.
- 2 A common saying in Chinese culture to reference a safe home/shelter.
- 3 Professor Anthony Cheung, Chairman, LTHS Steering Committee, vii
- 4 “HK Monthly Digest of Statistics August 2013” HKSAR Census and Statistics Department, 2013. <http://www.censtatd.gov.hk/hkstat/sub/bbs.jsp>. Web. 1 Sep 2013. <n The article can be viewed at <http://www.statistics.gov.hk/pub/B10100022013MM08B0100.pdf>>.
- 5 “Demographia World Urban Areas 2012.” Demographia World Urban Areas 2012. <http://www.newgeography.com/content/002808-world-urban-areas-population-and-density-a-2012-update>. Web. 18 Apr 2013. <n The article can be viewed at <http://www.demographia.com/db-worldua.pdf> >.
- 6 Yuen, Belinda K. P, and Anthony G. O. Yeh. High-rise Living in Asian Cities. Dordrecht: Springer, 2011. Print. Pp. 4
- 7 Yuen & Yeh, 4
- 8 Li, William D. H. Housing in Taiwan: Agency and Structure? Aldershot, Hants, UK: Ashgate, 1998. Print. Pp.46
- 9 “HK Housing in Figures 2013 Edition” HKSAR Census and Statistics Department, 2013. <http://www.censtatd.gov.hk/hkstat/sub/bbs.jsp>. Web. 29 June 2013. <n The article can be viewed at <http://www.statistics.gov.hk/pub/B10100062013AN13E0100.pdf> >.
- 10 Wong, Luke S. K. Housing in Hong Kong: A Multi-Disciplinary Study. Hong Kong: Heinemann Educational Books (Asia, 1978. Print. Pp. 96
- 11 Li, 48
- 12 Li, Hopkins, 46
- 13 Li, 48
- 14 “Hong Kong: The Facts.” HKSAR Transport and Housing Bureau, Sept. 2012. <http://www.thb.gov.hk/eng/policy/housing/policy/lths/index.htm>. Web. 10 Apr 2013. <n The article can be viewed at <http://www.gov.hk/en/about/abouthk/factsheets/docs/housing.pdf> >.
- 15 Wu, Rufina, and Stefan Canham. Portraits from above : Hong Kong’s informal rooftop communities. Hong Kong: Peperoni Books, 2009. Print. Pp. 113
- 16 Hutcheon, Robin. High-rise Society: The First 50 Years of the Hong Kong Housing Society. Hong Kong: Chinese University Press, 1998. Print. Pp. 13
- 17 Chung, iii
- 18 Hong Kong: Cage Dwellers. Youtube.com. CNN, 1 Feb. 2010. Web. 1 Apr. 2013. <<http://youtu.be/HU4jJdRzy3w>>.
- 19 “Subdivided Flats in Hong Kong” Legislative Council Secretariat, 2012-2013. <http://legco.gov.hk>. Web. 1 Sept 2013. <n The article can be viewed at <http://www.legco.gov.hk/yr12-13/english/sec/library/1213in22-e.pdf> >.
- 20 “Hong Kong ArtWalk 2012.” Hong Kong ArtWalk 2012. Society for Community Organization, n.d. Web. 13 Dec. 2013. <<http://www.soco.org.hk/artwalk2012/index.htm>>.
- 21 Girard, Greg, and Ian Lambot. City of Darkness: Life in Kowloon Walled City. Chiddingfold: Watermark, 1993. Print. Pp.13
- 22 Wu & Canham, 246
- 23 Wu & Canham, 246
- 24 Hawley, A.H. Human Ecology: A theoretical essay. Chicago: University of Chicago Press. 1986.
- 25 Once Upon a Rooftop. Dir. Sybil Wendler. CAAM. PBS, 27 Feb. 2012. Web. 10 Apr. 2013. <http://youtu.be/ioT6pdX6o18>
- 26 [Te shou she li yi shu song] [videorecording] ; [Dajiaozui [tang] fang hu] / zhi xing jian zhi Liu Lanchang ; bian dao Zhang Minsi ; Ya Zhou dian shi xin wen ji gong gong shi wu bu zhi zuo. News Magazine. ATV Home, 03 Mar. 2012. DVD.
- 27 “Urban Renewal in Hong Kong: A Community Aspiration Study.” Surveying & Built Environment 21.1 (2011): 63-77. Hong Kong Institute of Surveyors.

ENDNOTES (con't)

- 28 [Http://www.hkis.org.hk/en/publication_journal.php](http://www.hkis.org.hk/en/publication_journal.php). Web. 27 July 2013. <n The article can be viewed at http://www.hkis.org.hk/ufiles/HKIS_IE.pdf>. Dean, Andrea O, and Timothy Hursley. Rural Studio: Samuel Mockbee and an Architecture of Decency. New York: Princeton Architectural Press, 2002. Print. Pp. 1
- 29 Woo, Mathias. Hong Kong Style. Hong Kong: Zuni Icosahedron E+E, 2012. Print. Pp.63.
- 30 “2011 Population Census - Fact Sheet for Yau Tsim Mong District Council District” HKSAR Census and Statistics Department, 2011. <http://www.censtatd.gov.hk/hkstat/sub/bbs.jsp>. Web. 29 June 2013. <n The article can be viewed at http://www.census2011.gov.hk/pdf/fact_sheets/DC/E00e.pdf>.
- 31 Dean & Hursley, 3

IMAGE REFERENCES

1 Four factors of Hong Kong's Housing Problem, thenounproject.org

2 Historical Squatter Settlements Cameron, Nigel. An Illustrated History of Hong Kong. Hong Kong: Oxford University Press, 1991. Print., <http://www.baptist-church.org.hk/Theme/intro/1953ChaiWan.jpg>, http://favelaissues.files.wordpress.com/2010/11/img_2444.jpg, <http://hkclweb.hkpl.gov.hk/hkclr2/object?svc=objrtv&src=CM&itemid=KMBMDNL6GOTKQ%24S7&pid=1&mime=image/jpeg>, http://farm4.staticflickr.com/3165/2966723037_cd62b47afa_b.jpg, <http://1.bp.blogspot.com/-pPzJVC69ZDo/T06rVXJAI-I/AAAAAAAAAMI/1YellUeYMU4/s1600/kowloon-walled-city21.jpg>, <http://www.post76.com/x2/forum.php?mod=attachment&aid=MjQyMTg4fDliNTdlOWExfDEzODI4NTQ3ODN8MHw4NTMwNg%3D%3D¬humb=yes>

3 BANGLADESH. Kurigram District, Jonas Bendiksen, 2010

http://25.media.tumblr.com/2fa7fc7bec2c03e626793b47f7dc2c87/tumblr_mhz44baBMI1qzt15co1_1280.jpg

4 Vision for Thesis, digital collage

5 Hong Kong Density Map adapted from HKSAR Department of Planning

6 Topography of Hong Kong, <http://favelaissues.files.wordpress.com/2010/11/hong-kong-overall.jpg>

7 11 sqm room reenacted by Hong Kong History Museum, http://favelaissues.files.wordpress.com/2010/11/img_2452.jpg

8a Maps of locations of fires Smart, Alan. The Shek Kip Mei Myth: Squatters, Fires and Colonial Rule in Hong Kong, 1950-1963. Hong Kong: Hong Kong University Press, 2005. Print. pp60

8b Maps of distribution of squatters in 1955 & 1957, Wong, Luke S. K. Housing in Hong Kong: A Multi-Disciplinary Study. Hong Kong: Heinemann Educational Books (Asia, 1978. Print. pp209-210

9 1953 Shek Kip Mei fire http://favelaissues.files.wordpress.com/2010/11/img_2448.jpg, http://i.discuss.com.hk/d/attachments/day_130405/20130405_35f7aab1a40cd05499d8MGbtRmh9e1Qa.jpg, <http://www.hkartclub.com/photo/photo1.jpg>, http://i.discuss.com.hk/d/attachments/day_130405/20130405_c1dec5697e634818ec516J14dbffYdOx.jpg

10 Tai Kok Tsui, Kowloon 2007 http://upload.wikimedia.org/wikipedia/commons/0/0a/HK_Tai_Kok_Tsui_2007.jpg

11 High Rise Density <http://static.panoramio.com/photos/original/25431786.jpg>

12 Demolished vs New Shek Kip Mei Estate, Nathan Tseng, 2009

13 Mark I Resettlement Block EST. 19650 Wong, Luke S. K. Housing in Hong Kong: A Multi-Disciplinary Study. Hong Kong: Heinemann Educational Books (Asia, 1978. Print.

14 Hong Kong's MTR Map, <http://www.urbanrail.net/as/cn/hong/hong-kong-map.png>

15 Housing Authority Public Rental Housing Distribution Map, http://www.housingauthority.gov.hk/mini-site/haar1112/en/common/pdf/14-Prh_Portfolio.pdf

16 Today's Informal Settlements, http://www.soco.org.hk/artwalk2012/img/image_5.jpg, http://www.soco.org.hk/artwalk2012/img/image_2.jpg, http://farm5.staticflickr.com/4020/4715849883_2892eeb1c4_b.jpg, http://www.soco.org.hk/artwalk2012/img/image_6.jpg, <http://futurehdb.files.wordpress.com/2010/04/caged-homes.jpg>, http://www.fastcodesign.com/multisite_files/codesign/imagecache/slideshow-large/slideshow/2013/02/1671933-slide-soco4.jpg

17 Cage home, Brian Cassey, 2011, <http://www.briancasseyphotographer.com/wp-content/uploads/2011/07/HongKongCageHome1.jpg>

18 Subdivided Flat from Above, http://www.fastcodesign.com/multisite_files/codesign/imagecache/slideshow-large/slideshow/2013/02/1671933-slide-soco4.jpg

19 "Luxurious" Subdivided Flat in Causeway Bay, 2013

20 Cubicle home in Tai Kok Tsui, http://www.soco.org.hk/artwalk2012/img/image_6.jpg

21 Kowloon Walled City once the densest place on earth, <http://1.bp.blogspot.com/-pPzJVC69ZDo/T06rVXJAI-I/AAAAAAAAAMI/1YellUeYMU4/s1600/kowloon-walled-city21.jpg>

22 Cover: Portraits from Above - Wu/Canham, Wu, Rufina, and Stefan Canham. Portraits from above : Hong Kong's informal rooftop communities. Hong Kong: Peperoni Books, 2009. Print.

IMAGE REFERENCES (con't)

- 23a **Rooftop dwellings coexists with luxury apartments**, Christopher DeWolf, http://farm5.staticflickr.com/4032/4716488910_b295df5f5c_b.jpg
- 23b **Informal housing are prone to eviction without warning**, Christopher DeWolf, http://farm5.staticflickr.com/4065/4716492764_02248290bf_o.jpg
- 24 **Corridor**, Christopher DeWolf, http://farm5.staticflickr.com/4065/4715846241_0a19e178ee_o_d.jpg
- 25 **Laundry**, Christopher DeWolf, http://farm5.staticflickr.com/4025/4716489856_a3c4fe19ef_b.jpg
- 26 **The roof as recreational space**, Once Upon a Rooftop. Dir. Sybil Wendler. CAAM. PBS, 27 Feb. 2012. Web. 10 Apr. 2013.
- 27 **Torre David**, <http://thefunambulistdotnet.files.wordpress.com/2011/07/torre-de-david-carracas4.jpg?w=510>
- 28 **Torre David**, Baan, Iwan, Alfredo Brillembourg, and Hubert Klumpner. Torre David: Informal Vertical Communities. Zürich: Lars Müller, 2013. Print.
- 29 **Building Program Diagram**, Baan, Iwan, Alfredo Brillembourg, and Hubert Klumpner. Torre David: Informal Vertical Communities. Zürich: Lars Müller, 2013. Print.
- 30 **Urban Renewal**, Christopher DeWolf, http://farm8.staticflickr.com/7004/6531201737_e41b00d636_o_d.jpg
- 31 **URA Target Areas**, http://www.pland.gov.hk/pland_en/p_study/comp_s/metroplan/metro_finalreport/images/Fig7_3.jpg
- 32 **Complexity in Rehousing**, <http://thenounproject.org>
- 33 **Long Term Housing Strategy**, http://www.thb.gov.hk/eng/policy/housing/policy/lths/lthb_con_doc_image.jpg
- 34 **Site/Context**, author
- 35 **Historical Development**, author
- 36 **Neighborhood Characteristics**, author
- 37 **Olympia City 1999**, Frampton, Adam, Clara Wong, and Jonathan Solomon. Cities Without Ground: A Hong Kong Guidebook. Rafael, Calif.: Oro editions, 2012. Print.
- 38 **Express Rail Link under construction**, author
- 39 **Map of existing amenities**, author
- 40 **Lack of Security**, author
- 41 **Vistor's view of TKT from Rosedale Hotel**, rosedale-hotel-kowloon5-13TripAdvisor.jpg
- 42 **Dwelling Typologies**, rosedale-hotel-kowloon4-13TripAdvisor.jpg
- 43 **Image of site**, <http://www.luxehomes.com.hk/sites/default/files/styles/property-gallery-crop/public/583566-1.jpg>
- 44 **Context across the street**, author, http://www.squarefoot.com.hk/admin/app/webroot/img/Image/2851/p_12207728_1.jpg
- 45 **Site plan**, author
- 46 **Summary of program**, author
- 47 **Light, air, views**, author
- 48 **Pedestrian network**, author
- 49 **'Internal' alley**, author
- 50 **Circulation diagram**, author
- 51 **Ground level**, author
- 52 **Second level**, author
- 53a **View of ground level**, author
- 53b **View of Second level**, author
- 54 **Spatial studies from Portraits from Above - Wu/Canham**, author, Wu, Rufina, and Stefan Canham. Portraits from above : Hong Kong's informal rooftop communities. Hong Kong: Peperoni Books, 2009. Print.
- 55 **Elevation photo of model**, author
- 56 **Interlocking units**, author
- 57 **Study models of unit iterations**, author

IMAGE REFERENCES (con't)

58 Spatial flexibility: collapsible furnishings, author

59 Floor plan of units, author

60 Section, author

61a Single's unit, author

61b Family's unit, author

61c Family's unit, author

62 3 varying floor plans, author

63 Longitudinal section, author

64 Upper levels + Communal spaces, author

65 View of upper levels, author

66 Facade construction + materials, author

67 Exterior view on Cherry St., author