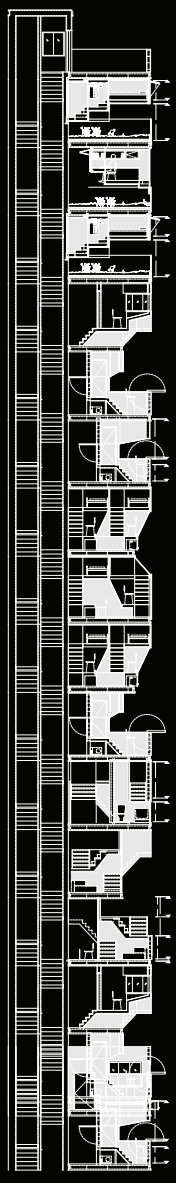

800mm LUXURY

PENCIL TOWER PHENOMENON IN HONG KONG, CHINA

MArch Thesis 2012

Hiu Lan (Kian) Yam

800mm LUXURY

PENCIL TOWER PHENOMENON IN HONG KONG, CHINA

by Hiu Lan (Kian) Yam
BA(A.S.) The University of Hong Kong, 2008

SUMMITTED TO THE DEPARTMENT OF ARCHITECTURE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARCHITECTURE
AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY
February 2012

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800MM LUXURY

Pencil Tower Phenomenon in Hong Kong

by Hiu Lan (Kian) Yam

Summitted to the Department of Architecture on February 1, 2012 in partial fufillment of the requirements for the degree of

MASTER OF ARCHITECTURE

ABSTRACT

150m² - 40m² - 60m³

Pencil Towers are slender pencil-like apartment buildings. They are commonly found in high-dense Asian cities such as Hong Kong, Tokyo and Singapore. Focusing on Hong Kong as the context of research, this thesis explored the causes, implications and possibilities of invention in this phenomenon.

Pencil Tower is a hyper-specific typology. Typically, the footprints of these buildings are exceptionally small that each floor of a Pencil Tower consists only of an apartment, an elevator lobby and a pair of scissor stairs. The usable floor area of such apartment ranges from 25m² to 40m². By means of negotiating with various building codes and economic realities, the act of building such slender apartments within any limited building plots in the city becomes very profitable for developers. The typology of Pencil Tower works well along with various external pressures (historical, economical and legal considerations) of the city. This thesis, therefore, understood Pencil Tower typology as a hyper-specific evolution of building type which is only feasible under these context-specific external pressures of Hong Kong.

However, architects are rejected by Pencil Towers. The main concern is that the concept of luxury is non-architectural in Hong Kong. For instance, if an apartment is furnished with high-end bathroom and kitchen furniture, top-rated floor and wall finishing, and an extravagant lighting system, it is called luxury. In an extreme case, architects spend most of their time on choosing which brand of bathtub or what type of finishing to use.

Therefore, the main design ambition of the thesis project is to promote an alternative understanding of "luxury living" in Pencil Tower. More importantly, this thesis tried to re-state architects' position in the construction industry of Hong Kong. Eight different apartment units were designed to demonstrate how 40m² luxurious living environments could be architecturally generated. In terms of a design exercise, the key challenge was to maintain feasibility within the harsh limits.

Thesis Supervisor:
Yung Ho Chang
Professor of Architecture

ACKNOWLEDGEMENT

I wish to thank, first and foremost, my thesis committee.
Yung Ho Chang, my advisor, whose advice was always inspiring. Thank you for encouraging me to explore this thesis topic beyond the existing agenda, and perhaps more importantly, believed that I could embrace it as a challenge to myself.

I have been fortunate to have the guidance from my reader, Marc Tsurumaki, whose acute insights were extremely inspirating. These advice made pivotal changes, which helped me to design in a more playfull and comprehensive way.

I would like to also thank Filip Tejchman, my second reader, whose critiques have been supportive and constructive throughout.

Furthermore, my thesis production would not have been possible without the support of many people. My fellows in the University of Hong Kong, Tsoi Wai Kuen and Leung Man Chung, for helping me digging out research material. Hokan Wong, my longtime friend from undergraduate study, for helping me intensively from time to time. And Gu Lik Hang, Tommy Gunawan, Hung Fai Tang, Cynthia Ting, and Ying Chee Chui, without whom my models would not be completed on time; and Cecilia Ho and George Lin for their cheerful support in producing wonderful images.

A big hearty thanks to Dennis Cheung, who has always being there cheering me up and stood by me through the good time and bad. I'm very fortunate to have his warm accompany, advice, caring and everything. Thank you for being there for me.

I will always be grateful to my fellows at MIT. In particular, Mavis and Otto who have been taking care of me since my first day at MIT. And my housemates, Sunnie, Fai and Li for their caring and understandings. Sungwoo, Curtis, Jae and Huang, whom in particular made thesis year fun and memorable. All in all, I'm thankful to be studying in this wonderful class in which I learnt a lot from all my fellows.

At last, I owe my deepest thanks to my family, for being supportive over the past six years; for believing me in pursuing my academic dream whole-heartedly; and for understanding my nomadic life over the past few years. Thank you very much.

Thanks,
Kian
Jan 2012

40m²

THE LUXURY TOWER

"Pencil Tower" refers to the slender pencil-like apartment buildings that are found commonly in Hong Kong. These buildings consist of one apartment with usable floor area as little as 40 square meters at each floor. The load-bearing structure of these towers are reinforced concrete. They are found all over the city, especially in the older parts of city fabric. In most cases, the floor plan takes up the maximum tolerance allowed by the building codes at each specific plot.

TABLE OF **CONTENT**

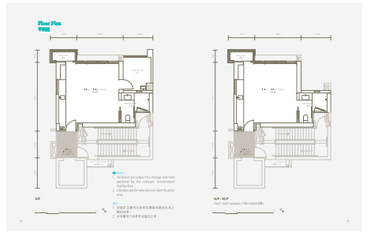
EMERGENCE OF 40m²

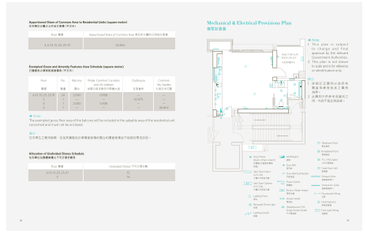
40m² LUXURY TOWER

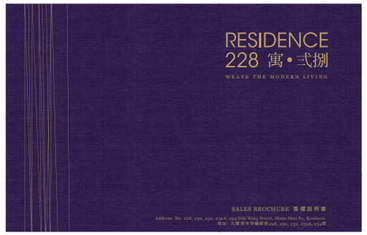
This thesis identified an typological phenomenon -Pencil Tower

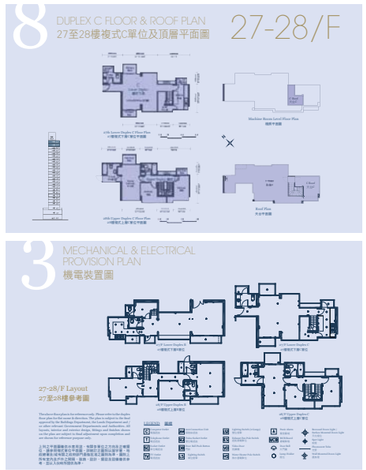
WHAT IS PENCIL TOWER?

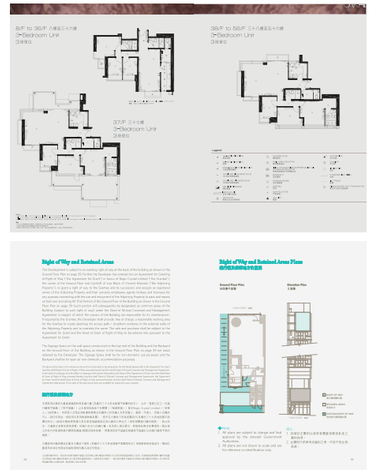
"Pencil Tower" refers to slender pencil-like apartment buildings that are found commonly in Hong Kong. On each floor, these buildings consist of one apartment with usable floor area as little as 40 square meters. The load-bearing structure of these towers are reinforced concrete. This type of building is found all over the city, especially in the older parts of city fabric. In most cases, the floor plan takes up the maximum tolerance allowed by building codes at each specific plot.





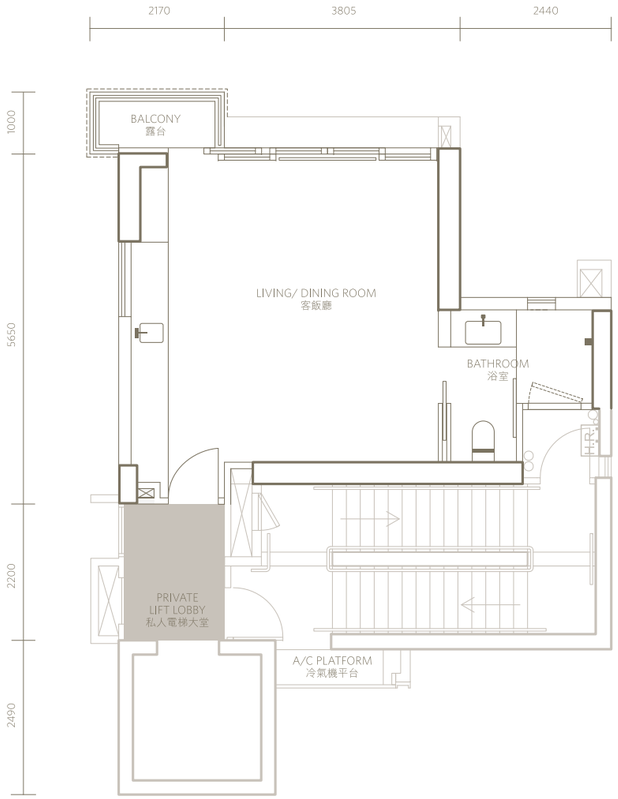






EXTRACTS FROM SALE BROCHURES OF RESIDENTIAL TOWERS

[1]5 Star Street, Sale Bounchure, Swire properities, Hong Kong, 2009



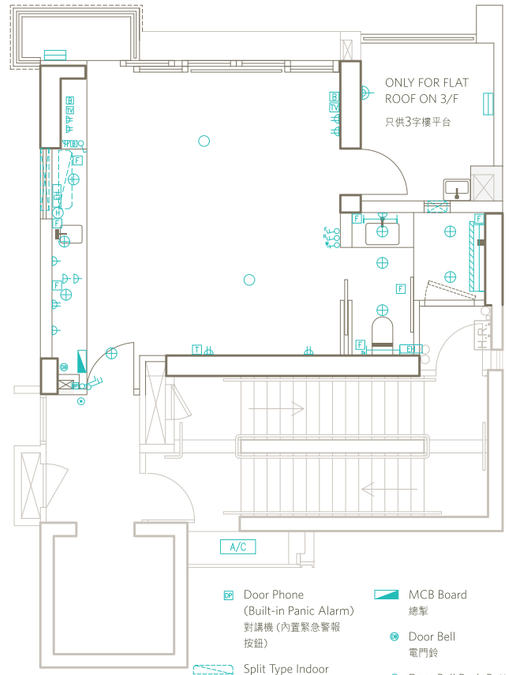
6/F – 31/F
(14/F, 24/F omitted) (不設14及24 字樓)

CONVENTIONAL FLOOR PLAN

Emergence of Pencil Towers is a cultural phenomenon ;more importantly, it is an architectural reaction. This phenomenon was an reaction towards the notion of "existenzminimum" in Asia (minimum housing prototype for affordable human habitat) in the early 60s.

[1]5 Star Street, Sale Bounchure, Swire properities, Hong Kong, 2009

Mechanical & Electrical Provisions Plan
機電裝置圖



- Door Phone (Built-in Panic Alarm) 對講機 (內置緊急警報按鈕)
- Split Type Indoor A/C Unit 分體式冷氣室內機
- A/C Split Type Outdoor A/C Unit 分體式冷氣室外機
- Lighting Point 燈位
- Recessed Down Light 射燈
- Lighting Switch 燈掣
- MCB Board 總掣
- Door Bell 電門鈴
- Door Bell Push Button 門鈴按鈕
- Power Switch 開關掣
- EH Electric Water Heater 電熱水爐
- Socket Outlet 電插座
- Weatherproof 13A Single Socket Outlet 戶外電插座
- T Telephone Point 電話插座
- B Broadband Point 寬頻插座
- TV TV / FM Outlet 公共天線插座
- F Fused Spur Unit 接線蘇
- Exhaust Grille 抽氣扇排風口
- Vertical Air Grille 抽氣扇抽風口
- Fluorescent Fitting 光管
- H Heat Detector 熱能感應器
- Foot Light Fitting 地腳燈

MINIMUM LIVING | MAXIMUM EFFICIENCY FLOOR PLAN

[con'd] Under this notion, how to achieve pleasant living environment with the use of minimum amount of instruments and space became an essential consideration while designing apartment units.

5 STAR STREET

A REFERENCE CASE OF PENCIL TOWER IN HONG KONG

5-STAR STREET［星街5號］

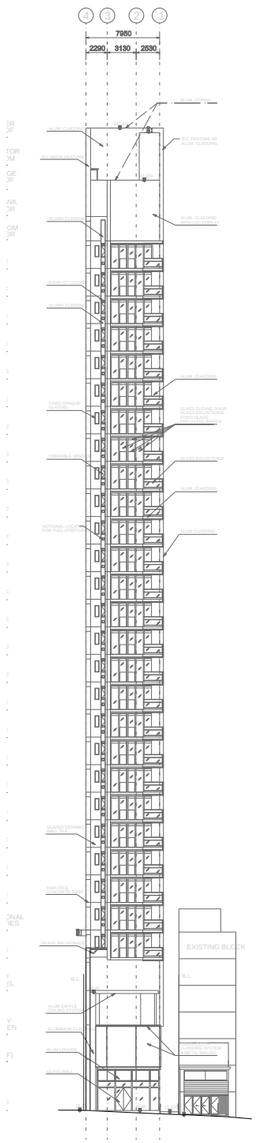
LOCATION: 5 Star Street, Wan Chai, Hong Kong

NO. OF STOREYS: 29 Storeys

NO. OF APARTMENT: 25

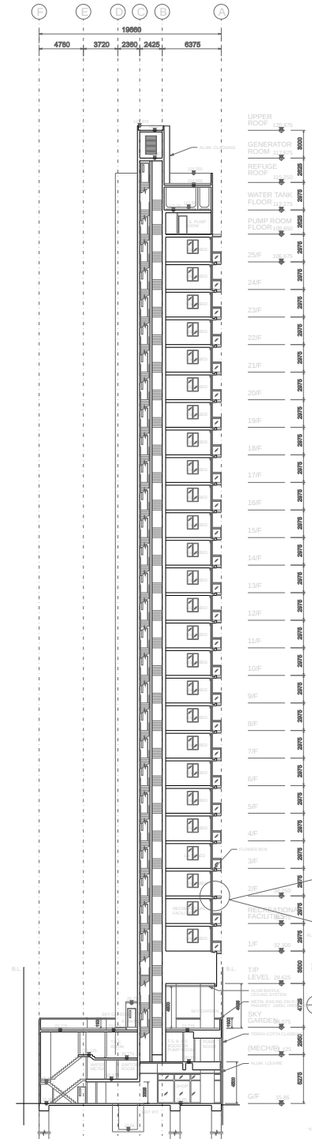
As a mathematical challenge, the real estate developers successfully manipulate with minimum dimensions of different domestic functions.

Typically, each floor of Pencil Tower consists of one apartment,an elevator lobby and a pair of scissor stairs. The usable floor area ranges from 25m² to 40m². Negotiating with various building codes and economic realites, it becomes profitable to build these slender apartments within small building plots. Marketed as a comtemporary way of living (referred as *Affordable Luxury in later Chapter)*, this building typology provided a new way of living for young middle-income group in Hong Kong.

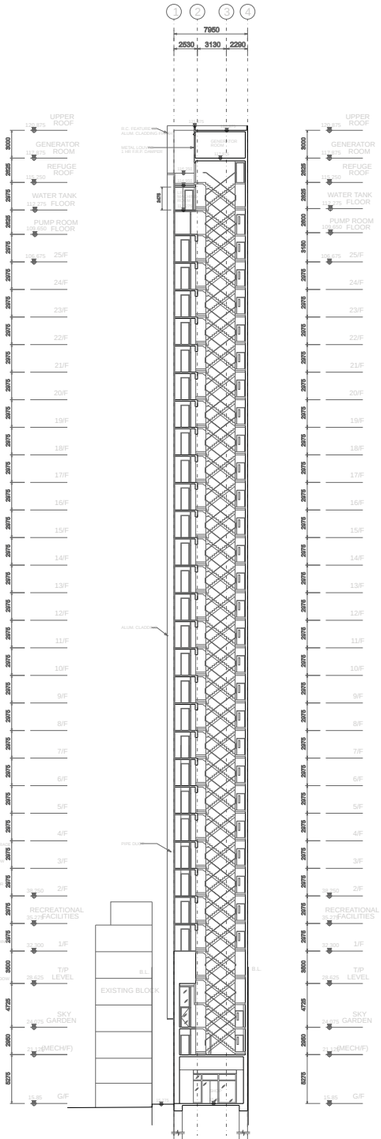


ELEVATION C

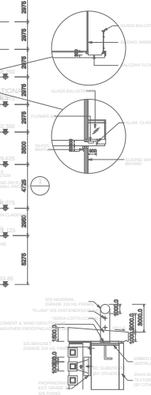
[1]5 Star Street, Sale Bounchure, Swire properities, Hong Kong, 2009



SECTION A-A



SECTION B-B



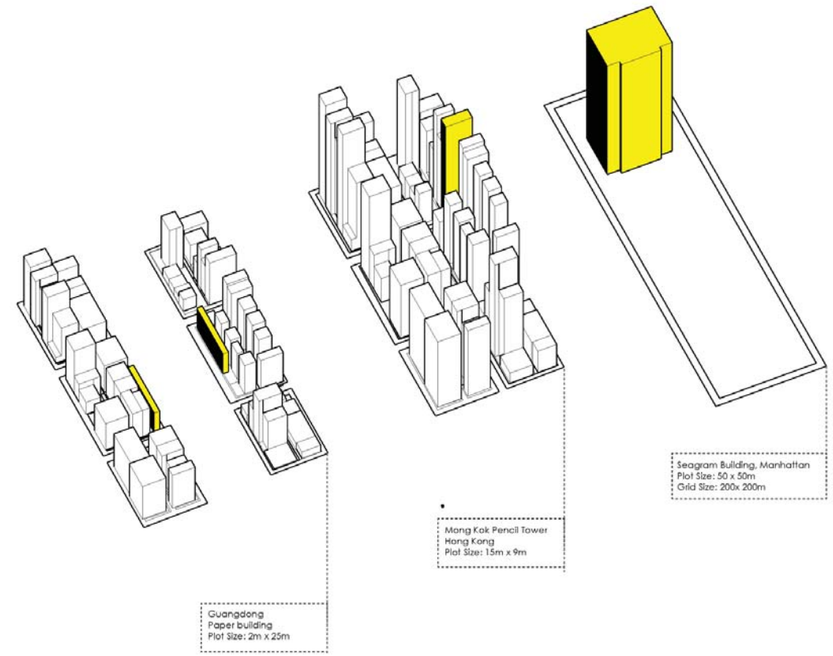
%%U METAL RAILING DETAIL
SCALE 1 : 10

MONG KOK, HONG KONG , 2011

MONGKOK, HONG KONG

PLOT SIZES: 15m X 10m

Mong Kok, a district in Hong Kong, reflects a typical pattern of city fabric formed during the Bristish Colonial ages. The district is organized by a grid system, within each grid it is further sub-divided into individual plots. Each plot is sized around 15m x 10m.



SCALE COMPARISON OF CITY FABRIC IN MANHATTAN AND HONG KONG

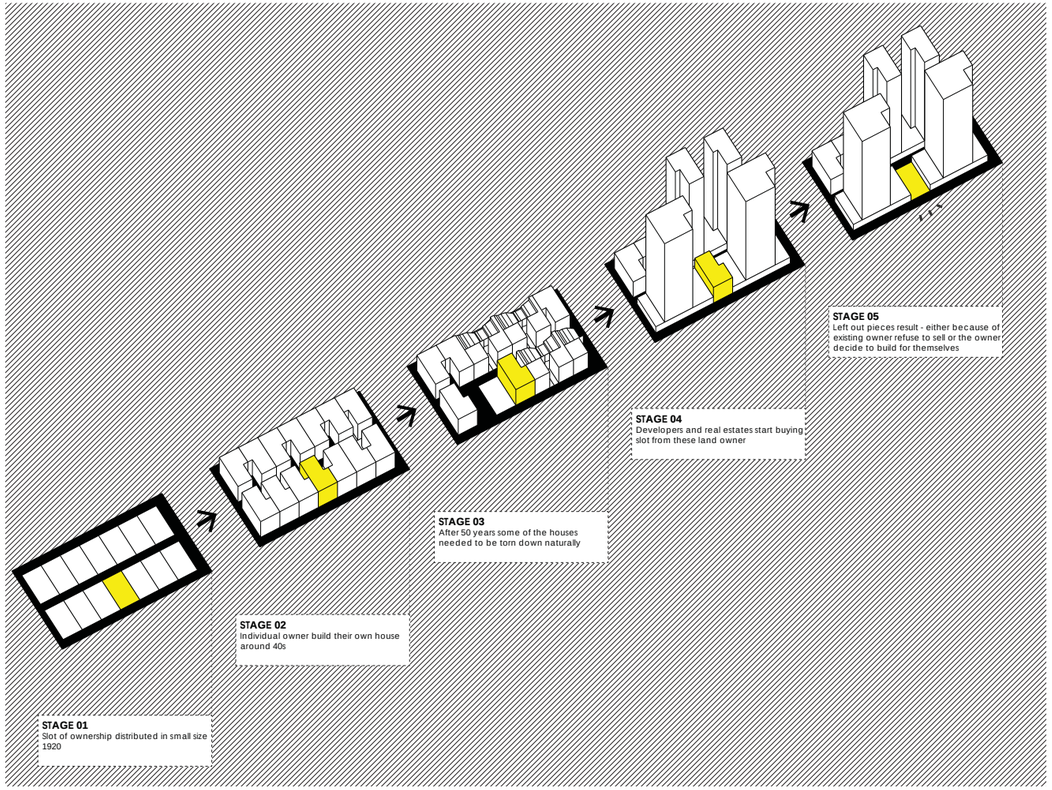
CAUSE OF EMERGENCE

UNEXPECTED FUTURE DEMAND OF SPACE

As mentioned, this plot size is set by the British Colonial government in the 1910s. It considered the common building types at the time of the early 1900s. These building types are averagely 2-3 storeys high, approximately 4m x 10m in area. They were, therefore, generous building plots at the time of 1900s.

At the early 1900s, it was unexpected that these rural areas like Mong Kok, would become today's urban city centres. Since the 1950s, there was a huge influx of population from the mainland China into Hong Kong. At the same time, Hong Kong's light industry has been dramatically expanding. In order to meet the rising demand of space in these urban centres, building taller buildings were necessary in order to meet the market's demand of space.

MONG KOK, HONG KONG , 2011

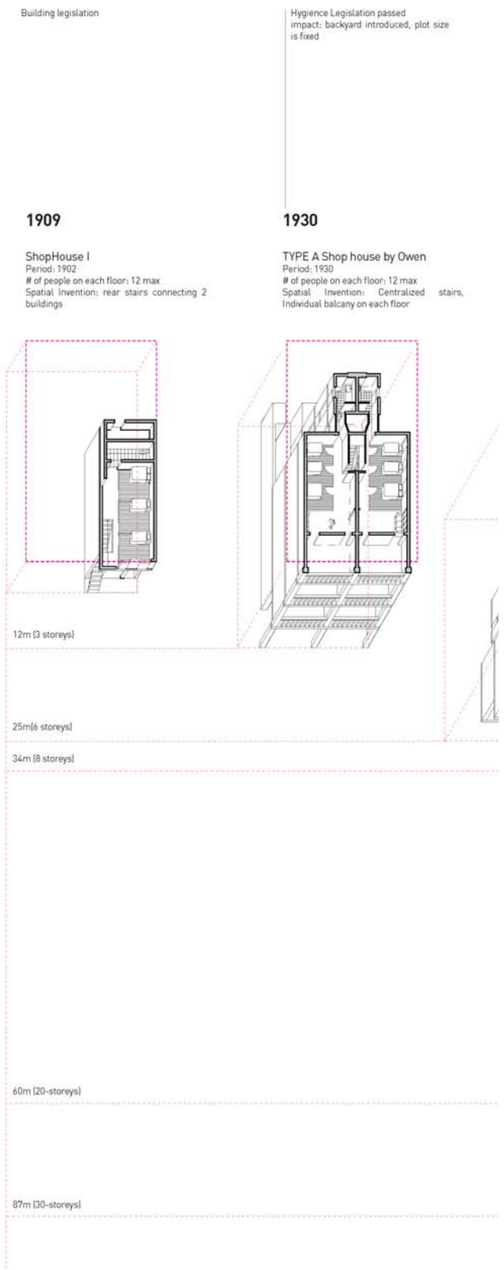


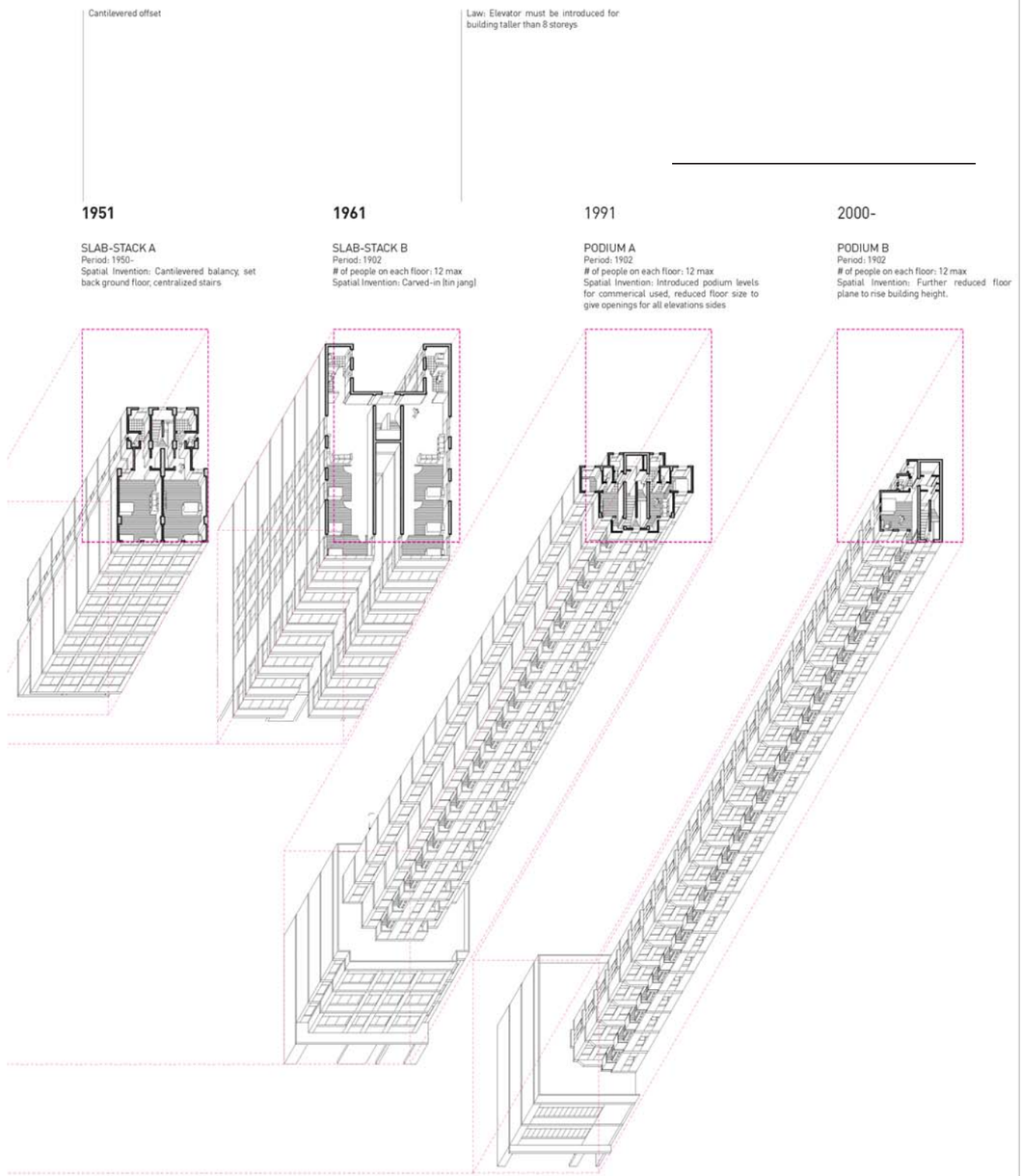
EVOLUTION OF SMALL PLOT SIZE

EVOLUTION OF TYPOLOGY

FROM TONG LAU TO SKYSCRAPER

The first generation of building mostly consists of 3-storeys Tong Lau. At that time, each building was occupying half of the footprint at each plot. However, with the expanding population and rapid development in Mongkok, these Tong Laus were replaced by towers with higher spatial capacity. As a result , in the late 1990s, Pencil Towers with over 25 storeys were already a well established building type in Hong Kong.





EVOLUTION OF TYPOLOGY II

CO-EXISTENCE OF 6 TYPES OF TOWER TYPOLOGY

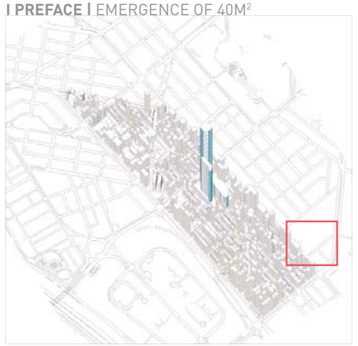
Building plots at old city fabric are owned by different landlords. The process of development was independent on each other. Therefore, the rate of development could varied a lot within the same area. It resulted a situation that different types of towers with different ages and typologies are coexisting adjacently along one street.

1 FLOOR / 1 SINGLE PLOT

Exisitng floor, room, furniture & plot size's relationship with typology

Vertical Public Circulation

Plot Perimeter



MONG KOK, HONG KONG, 2011

PENCIL TOWER AT MONG KOK

MARKET DISTRIBUTION AND REAL ESTATE VALUES

This study is looking at area around Shanghai Street and Soy Street at Mong Kok. Looking at these 122 buildings, 11 out of 122 buildings are Pencil Towers, 40 out of 122 buildings are buildings with height of 20 storeys or above.

A1																		
Bldg Name	德豐大廈		東成大廈	廣福大廈	廣興大廈	廣裕大廈	廣豐大廈	廣榮大廈										
Bldg Name	TAK FUNG BUILDING	**ON TAT BUILDING**	TUNG SHING MANSION	KWONG FOOK BUILDING	KWONG HING BUILDING	KWONG YU BUILDING	KWONG FUNG BUILDING	KWONG WING BUILDING										
Bldg Address	374-388 RECLAMATION	**976 CANTON ROAD**	9A SOY STREET	28-30 SHANTUNG STREET	7A-7B SOY STREET	37 KAM LAM STREET	3 KAM LAM STREET	18 SHANTUNG STREET										
Bldg Construct Date	Podium Type I	**Cantilevered Flatfront**	Corner Massive Block	Corner Massive Block	Corner Massive Block	Corner Massive Block	Corner Massive Block	Corner Massive Block										
Typology	11/1976	**11/1965** V		05/1964	05/1964	01/1966	10/1966	05/1971										
Total Number of Apt	55	**7**	5	96	94	235	234	110										
Number of Floor	19	**7**	5	12	12	13	13	9										
Number of Apt/Flr	3	**1**	1	9	9	19	19	25										
B1																		
Bldg Name	友榮大廈	**生輝大廈**	永福大樓	載福樓		甘芳閣	順昌大廈	**金鳳閣**	新萬利大廈	**富益閣**								
Bldg Name	YAU WING APARTMENTS	**SENG FAI BUILDING**	WING FOOK BUILDING	JOYE FOOK MANSION	12 SOY STREET	SCENERY COURT	SUN CHEONG BUILDING	**FAIR WIND COURT**	NEW MAN LEE BUILDING	**FULLIC COURT**								
Bldg Address	439-443 SHANGHAI	**451 SHANGHAI STREET**	320 RECLAMATION	468 SHANGHAI STREET	12 SOY STREET	28 KAM FONG STREET	57-59 MA TAU KOK ROAD	**70-80 TAK CHEONG**	5 KAM FONG STREET	**932 CANTON ROAD**								
Bldg Construct Date	01/1965	**05/1997**	03/1963	07/1966	1994	05/1996	12/1989	**04/1981**	07/1984	**1995**								
Total Number of Apt	36	**12**	24	26	144	48	26	**84**	126	**20**								
Number of Floor	9	**12**	8	9	14	24	13	**21**	21	**20**								
Number of Apt/Flr	4	**1**	3	3	8	2	2	**1**	6	**1**								
C1																		
Bldg Name	祥發大廈	永發大廈	海昇大廈	安蘭閣	順安大廈	萬安樓	寶亨大廈 A座	寶亨大廈 B座	富景洋樓	有利樓	東安樓	聯榮樓	東安閣	東興大廈	碧華大廈	碧街大廈	順豐大廈	
Bldg Name	WINNER BUILDING	WINNER BUILDING	SEASON MANSION	ORCHID COURT	SHUN ON BUILDING	MAN ON HOUSE	BLOCK A PO HANG	BLOCK B PO HANG	RICHVIEW MANSION	YAU LEE BUILDING	TUNG ON COURT	LUEN YIP BUILDING	TUNG ON COURT	TUNG HING BUILDING	PIK WAH BUILDING	PITT STREET MANSION	SHUN FUNG BUILDING	
Bldg Address	安英大廈	867-885 CANTON ROAD	46 TUNG ON STREET	38 TUNG ON STREET	16 TUNG ON STREET	2-4 TUNG ON STREET	登打士街2-8號		252 FERRY STREET	16 LEE YIP STREET	15 LEE YIP STREET	13 LEE YIP STREET	17-21 TUNG ON STREET	23-33 TUNG ON STREET	7A PITT STREET	7 PITT STREET	3 TUNG ON STREE	
Bldg Construct Date	02/1978	12/1984	10/1989	02/1997	08/1989	05/1986	01/1983	01/1983	07/1978	07/1972		11/1972	05/1986	10/1990	05/1964	02/1961	11/1992	
Total Number of Apt	132	114	63	69	96	15	139	139	78	88	32	10	34	48	48	28	92	
Number of Floor	23	15	21	23	24	5	24	24	26	22	8	5	17	24	6	7	23	
Number of Apt/Flr	6	8	3	3	4	3	6	6	3	4	4	2	2	2	8	4	4	
D1																		
Bldg Name	仁豐大樓	美邦大廈	永泰大廈	金華大廈	金堂大廈	旭威閣		**德昌閣**	德喜大廈									
Bldg Name	YEN FUNG MANSION	MAY PONT HOUSE	WING TAI BUILDING	KAM WAH BUILDING	KAM TONG BUILDING	PROFIT NICE MANSION		TAK CHEONG COURT	TAK HAY BUILDING									
Bldg Address	191B RECLAMATION	189B-191A RECLAMATION	802-812 CANTON ROAD	831K CANTON ROAD	1R WATERLOO ROAD	22 PITT STREET	16-18 PITT STREET	19 TAK CHEONG LANE	1-9 TAK CHEONG LANE									
Bldg Construct Date	07/1970	11/1977	1983	11/1972	07/1965	10/1999		08/1995	1978									
Total Number of Apt	24	26	44	168	136	34		48	92									
Number of Floor	8	13	22	21	15	17		24	23									
Number of Apt/Flr	3	2	2	8	2	2		2	4									
E1																		
Bldg Name	**高好樓**	源發大廈	新泰大廈															
Bldg Name	**1038 CANTON ROAD**	YUEN FAT BUILDING	SUN TAI MANSION															
Bldg Address	**1038 CANTON ROAD**	1-1E NELSON STREET	1-6 SHAMCHUN STREET															
Bldg Construct Date	**08/1971**	10/1965	05/1972															
Total Number of Apt	**5**	332	54															
Number of Floor	**5**	22	11															
Number of Apt/Flr	**1**	18	5															
F1																		
Bldg Name	黃金大廈	文華閣	嘉富大廈	家旺樓	鑽石樓	永輝大廈	**快富閣**	廣亞大廈	月圓大廈	福禧樓	啟運大廈	長旺雅菊	長旺大廈	長興大廈	長發大廈			
Bldg Name	GOLDEN MANSION	MANDARIN COURT	GARFULL BUILDING	KAR WONG BUILDING	DIAMOND BUILDING	WING FAI BUILDING	**FIFE COURT**	KWONG AH BUILDING	YUET YUEN BUILDING	FOOK HEI MANSION	KAI WAN MANSION	FLOURISH MANSION	CHEUNG WANG MANSION	CHEUNG HING MANSION	CHEUNG FAT MANSION			
Bldg Address	650 SHANGHAI STREET	647-651 SHANGHAI	482-488 RECLAMATION	645 SHANGHAI STREET	380-386 PORTLAND	29-31 ARGYLE STREET	**1096 CANTON ROAD**	17 ARGYLE STREET	19 MONG KOK ROAD	1091-1093 CANTON ROAD	1059 CANTON ROAD	9 CHEUNG WONG ROAD	17 CHEUNG WONG ROAD	15 CHEUNG WONG ROAD	19 CHEUNG WONG ROAD			
Bldg Construct Date	05/1965	03/2004	04/1978	07/1974	01/1965	10/1959	**03/1994**	09/1989	12/1967	01/1975	02/1970	2003	10/1970	10/1970	10/1970			
Total Number of Apt	73	36	39	36	52	30	**20**	20	60	14	70	94	233	240	127			
Number of Floor	15	9	13	9	9	5	**20**	10	1	5	14	26	13	13	13			
Number of Apt/Flr	5	4	3	4	6	6	**1**	2	6	3	5	4	21	21	12			
G1																		
Bldg Name	富華大樓	光榮大樓	嘉業大廈															
Bldg Name	FU WAH BUILDING	KWONG WING BUILDING	CARPRIO MANSION															
Bldg Address	319 PORTLAND STREET	331-335 PORTLAND	1 LAI CHI KOK ROAD															
Bldg Construct Date	02/1979	10/1958	02/1979															
Total Number of Apt	48	47	48															
Number of Floor	12	7	12															
Number of Apt/Flr	4	6	4															
H1																		
Bldg Name	MOD595	新利大廈	**碧華大廈**	廣蘭大樓	安蒙大廈	**兆豐大樓**	廣東大樓	**日昌樓**	榮光大廈	慕華樓	昌喜樓	**萬福樓**	嘉寶樓	嘉豐大廈	嘉豐大廈	太子大廈	雲峰樓	利盛大樓
Bldg Name	MOD595	SUN LEE BUILDING	**BUTE WAH MANSION**	KONG LAN HOUSE	ON YING MANSION	**SIU FUNG HOUSE**	CANTON BUILDING	**YAT CHEONG BUILDING**	WING KWONG BUILDING	MOR WAH HOUSE	CHEONG HEI BUILDING	**MAN FOOK BUILDING**	KA PO HOUSE	KA FUNG MANSION	LEE TAI BUILDING	PRINCE EDWARD	WAN FUNG BUILDING	LEE SHING BUILDING
Bldg Address	595 RECLAMATION	10-14 RECLAMATION	**565 RECLAMATION**	1154 CANTON ROAD	1136-1142 CANTON ROAD	**1150 CANTON ROAD**	21-23 BUTE STREET	**1130 CANTON ROAD**	711 SHANGHAI STREET	1186 CANTON ROAD	627 RECLAMATION	**1180 CANTON ROAD**	1176-1178 CANTON ROAD	109-111 PRINCE EDWARD	107 PRINCE EDWARD	233-235 PRINCE EDWARD	95 PRINCE EDWARD	87 PRINCE EDWARD
Bldg Construct Date	12/1987	08/2007	**01/1965**		05/1993	**03/1967**	12/1962	**06/1991**	04/1965	05/1967	12/1975	**02/1975**	09/1972	12/1963	03/1971	04/1959	07/1964	03/1964
Total Number of Apt	30	85	**8**	36	36	**8**	34	**4**	39	10	15	**5**	10	96	33	30	32	68
Number of Floor	15	29	**8**	9	18	**8**	11	**4**	13	5	5	**5**	5	14	11	5	11	14
Number of Apt/Flr	2	3	**1**	4	2	**1**	3	**1**	3	2	3	**1**	2	7	3	6	3	5
I1																		
Bldg Name	宏華大樓	慕宮大廈	寶豐大樓	麗寶大廈	德仁大廈	**五華樓**	慕塘大廈	慶年大樓										
Bldg Name	FEN HWA BUILDING	LAI CHI MANSION	PO FUNG BUILDING	LAI PO BUILDING	TAK YAN MANSION	**N9 WAH HOUSE**	LAI TONG BUILDING	HING LIN BUILDING										
Bldg Address	75-79 LAI CHI KOK ROAD	71 LAI CHI KOK ROAD	1233 CANTON ROAD	232 TONG MI ROAD	107 LAI CHI KOK ROAD	**111 LAI CHI KOK ROAD**	198F TONG MI ROAD	210 TONG MI ROAD										
Bldg Construct Date	12/1965	12/1963	09/1964	11/1980	01/1968	**02/1966**	10/1973	10/1966										
Total Number of Apt	68	30	26	26	55	**11**	181	117										
Number of Floor	18	13	9	13	14	**11**	14	13										
Number of Apt/Flr	5	3	3	2	4	**1**	3	9										

DATA RESEARCH ON MARKETING VALUE AND LOCATION DISTRIBUTION OF PENCIL TOWER IN MONGKOK ,2011

Target Market Demograhpic group
Middle-income group
Possibilty of dwelling use and frequency of occupancy

Single

Single

	Morning	Afternoon	Night
Individual A	work	work	home

Small Family

Family

	Morning	Afternoon	Night
Individual A	work	work	home
Individual B	home	home	home
Individual C	home	home	home

Single

	Morning	Afternoon	Night
Individual A	home	home	home

Couples/Shared

Couple

	Morning	Afternoon	Night
Individual A	work	work	home
Individual B	work	work	home

Couple

	Morning	Afternoon	Night
Individual A	work	work	home
Individual B	home	home	home

Shared Apartment

	Morning	Afternoon	Night
Individual A	work	work	home
Individual B	work	work	home

Family

	Morning	Afternoon	Night
Individual A	work	work	home
Individual B	home	home	home
Individual C	school	school	home

Family

	Morning	Afternoon	Night
Individual A	work	work	home
Individual B	work	work	home
Individual C	school/daycare	school/daycare	home

Single Family

	Morning	Afternoon	Night
Individual A	work	work	home
Individual B	school/daycare	school/daycare	home

Within individual living cells

AFFORDABLE LUXURY

MIDDLE INCOME GROUP|
MARKETING OF PENCIL TOWER

The marketing potential of Pencil Towers is situated in between deluxe private housing and low-income residential housing. Pencil Towers are marketing towards young middle income group. Part of the reason is that this group of people could afford living condition that is better than low-income public housing, but not yet able to purchase at deluxe private estates. The pencil towers, on the other hand, couldn't provide the generous space that the high-income group demands; as a result, marketing towards these young professional group becomes the best opportuntiy for developers to maximize their sale revenue.

Collective Dwelling Function

Target market
Demograhpic group - Middle-income group

BIOLOGICALFUNCTIONS

(Sleeping) (Bathroom) (kitchen) Waste treatment (Nature/ Landscape)

SOCIAL FUNCTIONS

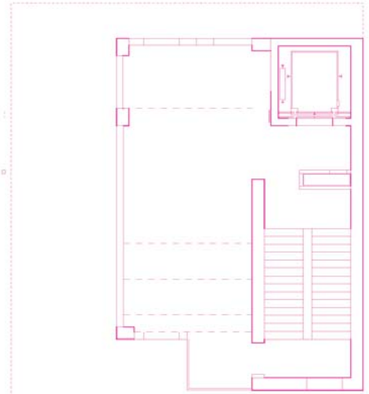
(Living Room) (Dining) (Guest Room) (Children's place) (Hobbies)

ECONOMICFUNCTIONS

Office (personallibary)

SERVICESFUNCTIONS

WasteTreatment Storage Servants'Room(Individual hired/collective hired)



PENCIL TOWERS **DOS & DON'TS**

HONG KONG BUILDING CODES FOR RESIDENTIAL TOWERS

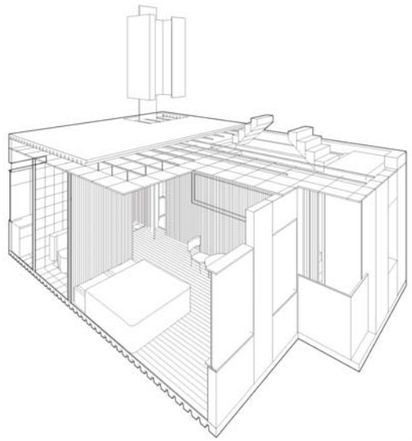
Pencil Towers are highly rationalized by external pressures specific to context. One of the most prominent factors is building codes. The table below includes building code related to apartment design in high-rise buildings.

ASPECT	ELEMENT	CODE AND ADVICES
Lift/elevator	Fireman's lift	C.5 Every building exceeding two storeys in height shall be provided with at least such number of fireman's lifts designed and installed to be used by firemen in the event of fire. This requirement is to ensure no part of the floors that the fireman's lifts serve are more than 60m from the lift. However, this regulation does not apply to a domestic building not exceeding a height of 30m. [Source: regulation 41B of the Building (Planning) Regulations (Cap. 123 subsidiary legislation)]
	Distance of travel	no part of the floors that the fireman's lifts serve are more than 60m from the lift.
	Elevator groups	For Office buildings, one elevator group can generally serve all floors in buildings up to 15 to 20 floors depending on the building population. When there are more than 20 floors, single grouping is not efficient and would normally result in long travel times and congestion in the elevator lobbies during peak periods. The passenger elevators for buildings with more than 20 floors (up to about 35 floors), should be separated into low rise service and high rise service.
	5-minute handling	Residential Apartments / buildings: 7 to 9%. Very high buildings require extra hoistway clearance to allow for additional construction tolerances.
	Intercahgen Floors	Frequently, interchange floors or main lobbies with public spaces above them (such as retail) will be better served by escalators, freeing the elevators for longer-distance travelers.
	Common Shafts and	We also recommend that multiple cars in a group with common shafts be separated by 'I' beams, which can allow the easy passage of air between individuals shafts. This would avoid the 'piston effect', and its consequent negative impact upon ride quality and noise in the lobbies.
	Hoistways Depth	Elevators in hoistways that are not solid to ground or have occupied space beneath them must be fitted with counterweight safety gears. This may also require up to 200mm increase in shaft depth.
	access	Clause B16.1 Every lift lobby should have access, without any obstruction and lockable door, to an exit route. Such access should be available at all times to any person who may come out from a lift car to the lift lobby. The provision of a direct intercom link connecting a lift lobby with management office of the building will be accepted as an adequate alternative.
	Liftwells	all liftwells, except for openings for doors and ventilation or openings between the liftwell and the machine or pulley room, should be separated from the rest of the building by fire barriers having an FRR of not less than 120/120/120; (a) have a clear width of not less than 1500mm and a clear headroom of not less than 2000mm; in the case of a single fireman's lift, it serves at least the alternate floors; in the case of multiple fireman's lifts within a common liftwell, the lifts may serve different zones of the building provided that the zones to be served are clearly indicated; in all cases, subject to Clause D8.1(d), the pattern of service should be uniform and regular, i.e. a lift serves either the odd floors, even floors or all floors; and Where refuge floors are provided, every such refuge floor should be served by at least one fireman's lift. The lift doors opening onto the refuge floors should comply with Clause B18.2(i).

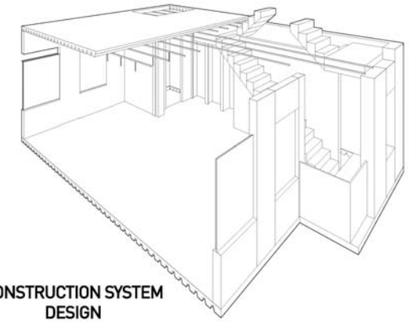
ASPECT	ELEMENT	CODE AND ADVICES
Stairscase	Fire travelling	No part of the floor served by a firefighting and rescue stairway should be more than 60m from the door of the lobby to the stairway measured along actual passages. If the internal layout is not known at the design stage or is not shown on plan, a direct line measurement of 45m may be used for design purposes, provided that the layout of the floor when occupied satisfies the 60m requirement.
	Stair lobby	have a floor area of not less than 5m² and not more than 10m² with a minimum dimension of 1.5m;
	Envelope	in storeys above ground storey, have an external wall as one of its enclosing walls;
	External walls	should have a total area of not less than 25% of the floor area of the lobby;
		should be situated as near the ceiling as is practicable and in no case should the top of such openings be less than 1.9m above the level of the lobby floor;
		should face directly into the external air which has a horizontal area of not less than 21m² and is vertically uncovered and unobstructed above. If it is enclosed on all sides, it should have an area of not less than 1m² per 1m height of the enclosing walls and have a minimum dimension of 1.5m;
		may be provided with windows which should be side hung, open outward a minimum of 30°, be openable from inside without the use of a key and be fitted with simple lever handles or rotary drives to simple rack or gear operated devices; and
	Enclosure	Every firefighting and rescue stairway should be enclosed by walls and these walls, the landings, flights, balustrades, partition walls and finishing, including wall and ceiling lining and floor finishing, in the stairway should be constructed of wholly non-combustible materials complying with Part E.
	Dimension	have a clear width of not less than 1050mm and a clear headroom of not less than 2000mm;
	Tread and Risers	be arranged in straight flights without winders and each flight should consist of not more than 16 risers nor less than 2 risers. Treads should be not less than 225mm wide, measured clear of nosings, and risers should be not more than 175mm high;
	Landings	be provided with landings at the top and bottom of each flight with a minimum dimension of not less than the width of the flight and no door should at any part of its swing reduce the effective width or effective radius of such landings; and
	Handrails	be provided with handrails on each side of the staircase at a height of not less than 850mm and not more than 1100mm above the steps or landings. The handrails should not project so as to reduce the clear width of the staircase by more than 90mm for each handrail and should be continuous throughout each flight of the staircase but need not be carried round a landing or half landing.
	Natural Ventilation	Pressurization designed at each storey above the ground storey, by openings in the external enclosure wall having a total area of not less than 15% of the internal area on plan of the access staircase. Such openings may be provided with windows which should be side hung, open outward a minimum of 30°, be openable from inside without the use of a key and be fitted with simple lever handles or rotary drives to simple rack or gear operated devices; and at it highest point, by a vent capable of being opened manually or automatically by a remote control switch and having an area of not less than 5% of the internal area on plan of the access staircase. The remote control switch should be situated in a conspicuous position at the fire service access point of the stairway at ground storey.
	Material Finishing	The internal surface of every kitchen to a height of at least 1.2m from floor level shall be faced with tiles, or rendered in cement mortar, not less than 12.5mm in thickness, or other non-absorbent material. [Source: regulation 45(2) of the Building (Planning) Regulations (Cap. 123 subsidiary legislation)]
Kitchen		Every domestic building, and unless exempted by the Building Authority2 any part of a domestic building which is intended to be separately let for dwelling purposes, shall be provided with kitchen accommodation. [Source: regulation 45(1) of the Building (Planning) Regulations (Cap. 123 subsidiary

ASPECT	ELEMENT	CODE AND ADVICES
Latines	Material Finishing	4.6 Every latrine, except a latrine fitted with a chemical closet fitment, shall be provided a self-closing door to the full height of the opening. The floor of every latrine shall be not less than 150mm above the level of the ground outside the latrine and shall be constructed of non-absorbent material and finished with a smooth surface. [Source: regulations 80 and 83 of the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (Cap. 123 subsidiary legislation)] The internal surface of every latrine to a height of at least 1.2m from the level of the floor of the latrine shall be (i) faced with tiles; or (ii) rendered in cement mortar, not less than 12.5mm thick, or other non-absorbent material. [Source: regulation 84 of the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (Cap. 123 subsidiary legislation)]
	Openings	In addition, every latrine shall be provided with an opening for natural lighting and ventilation. Every such opening shall (i) be not less in area than 0.2m2; (ii) be situated as near the ceiling of the latrine as practicable; (iii) communicate directly with the open air; and (iv) be covered with a metal or other approved mesh flyscreen. [Source: regulation 82 of the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (Cap. 123 subsidiary legislation)]
	Watercloset	In every domestic building, the number of watercloset fitments provided should not be less than the number specified in Table 1. [Source: regulation 4(1a) of the Building (Standards of Sanitary Fitments, Plumbing, Drainage Works and Latrines) Regulations (Cap. 123 subsidiary legislation)]
Floor Dimension	floor area3 per	BD adopts a general guide of 9m2 usable floor area3 per person in assessing the likely number of persons and population density within a domestic building. This basis of calculation is used to determine the required number of watercloset fitments, lavatory basins, and baths or showers to be provided in domestic buildings. This guide is also used to assess the provision of means of escape in case of fire.
	Height of Storeys	The law requires that every habitable room shall have a height of at least 2.5m measured from floor to ceiling. [Source: regulation 24(1) of the Building (Planning) Regulations (Cap. 123 subsidiary legislation)]
	Window	Every habitable room or a kitchen shall be provided with natural lighting and ventilation by means of one or more windows which shall be so constructed that (i) the aggregate superficial area of glass in the window or windows is not less than one-tenth of floor area of the room and
	Window	the windows can, to an extent at least equal in the aggregate to one-sixteenth of floor area of the room, be opened in such manner that the top of the opening of each window is at least 2m above the floor.
REFUGE FLOOR	REFUGE FLOOR	Different Hong Kong fire codes specify a need for refuge floors. First, they are required as [21.1] Refuge floors should be provided in all buildings exceeding 25 storeys in height above [21.5] Does not apply to a domestic building or a composite building not exceeding 40 [21.2] For every refuge floor, there [can be] no occupied accommodation or accessible Refuge floors are also called for under the Means of Access (MoA) code (Buildings [17.5] Every access staircase in a firefighting and rescue stairway passing through a refuge Under the requirements for Fire Resisting Construction (FRC FRC abbr. functional residual capacity see functional residual capacity.) in code (Buildings Department 1996b), paragraph 18 [18.1] The area for refuge on every refuge floor in a building should be separated from the FRP Fiberglass-Reinforced Plastic FRP Fiber Reinforced Polymer FRP Fibre Reinforced Polymer FRP Fleet Response Plan (US Navy)) of not less than 2 hours. Vertical shafts or ducts [18.2] Where the side of a refuge floor is required to be open, the open side should not a] the opposite side of a street; b] a common boundary with an adjoining site;

WHAT TO DESIGN
WHAT TO ADOPT?

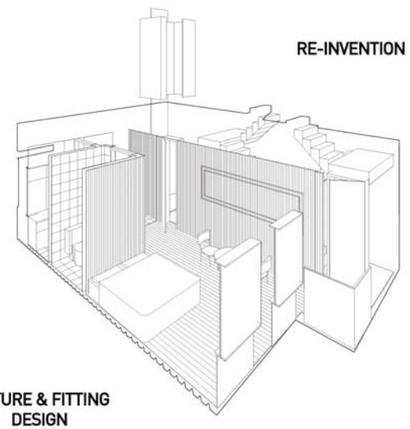


KEEPING PRINCIPLE



CONSTRUCTION SYSTEM
DESIGN
CONSTRAINT

RE-INVENTION



FIXTURE & FITTING
DESIGN
POTENTIAL

NATURE OF TYPOLOGY

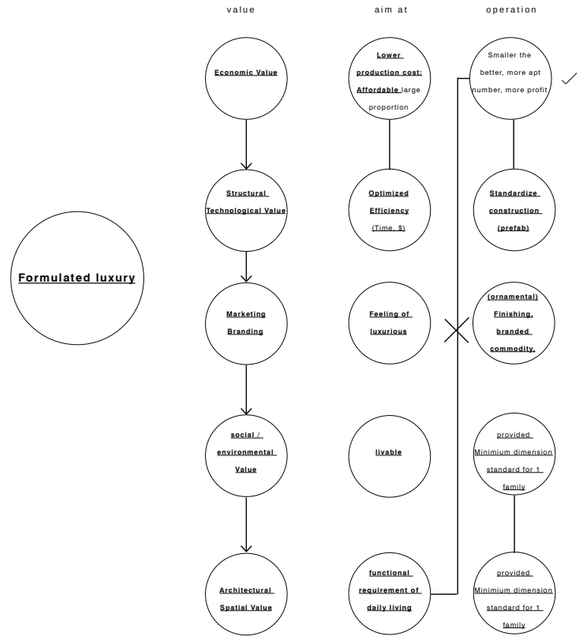
PENCIL TOWER IS A HYPER-SPECIFC TYPOLOGY

The nature of pencil tower is hyper-specific. This typology is specific to context which could only be economical valuable at the pre-set context in Hong Kong. It will not be equally profitable to build such building type in Manhattan or other high-dense city. One of the reason is that these areas don't have the extreme constraint of plot size in the first place.

A "SPECIFICALLY-NORMAL" PHENOMENON

General public in Hong Kong considers pencil-tower as a normal type of housing; while at a global housing context, this typology is considered as radical and unqiue. For the Hong Kongers, the tower is rational because it fulfils the rules set up by the city's spatial and economical demands. In a global context, this typology become radical because it has unnecessily pushed the living condition into extreme limits.

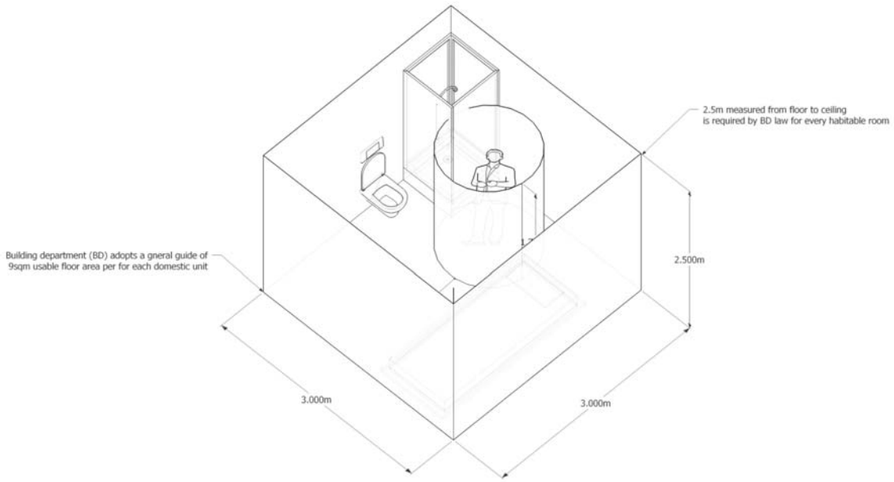
Priority of value of formulated Luxury



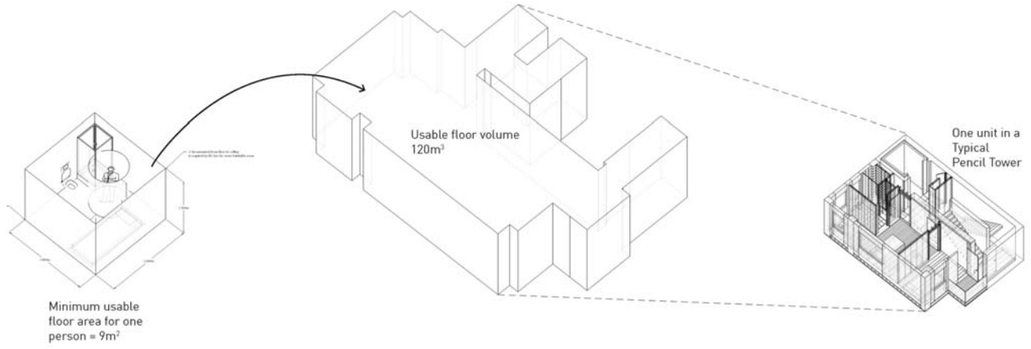
OBSOLETE
40m²

II INQUIRIES | Obsolete 40sqm

Surplus – Volume
Surplus – Usage
Surplus – Sensation
Rethinking the definition of luxury
Delicacy Vs. Extravagant



"4.11
BD adopts a general guide of 9m² usable floor area per person in assessing the likely number of persons and population density within a domestic building. This basis of calculation is used to determine the required number of watercloset fitments, lavatory basins, and baths or showers to be provided in domestic buildings."
Building Deparment, Hong Kong



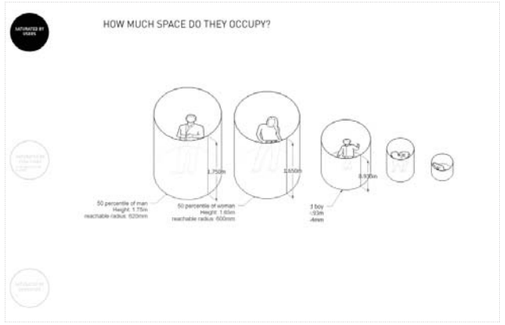
OBSERVATION

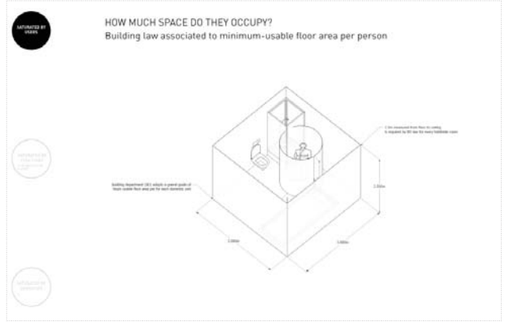
OBSOLETE PENCIL TOWER
Are current pencil-tower-units designed to utilize the maximum spatial potential of 40m²?

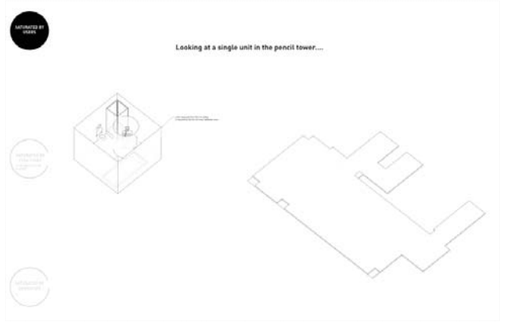
40sqm for 4
Advised by the Building Department, the minimum living area for one person is 9 square-metres. Given that each pencil tower apartment is sized as 40sqm, theoretically each apartment could fit in at least 4 people, which is a common family size in Hong Kong.
In other words, for a family, the space of these units is more than sufficient.

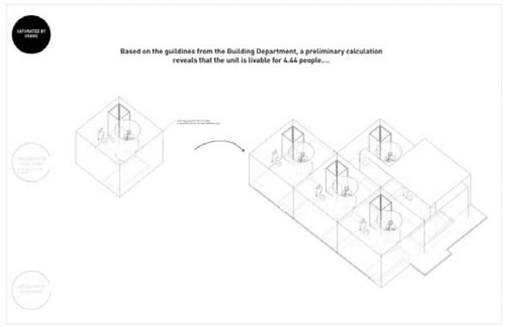
40sqm for 1
The selling trend of these units in Hong Kong reveals that not only young families are interested in these apartments, young singles or couples also makes up a large portion of sales market.

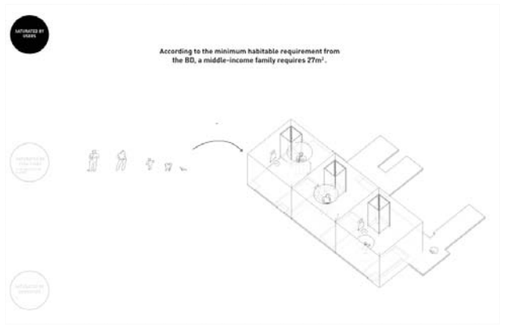
1 person = 9m² | **31m²** in surplus
2 people = 18 m²| **22m²** in surplus
4 people = 32 m²| **8 m²** in surplus

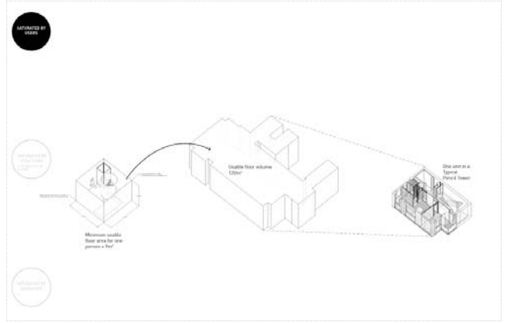


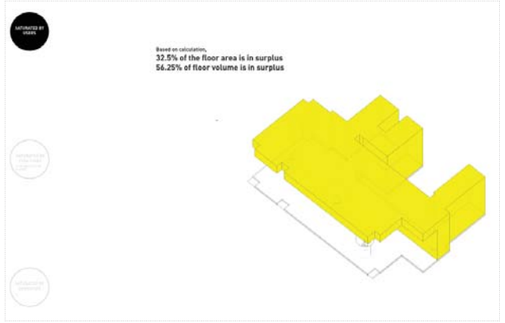




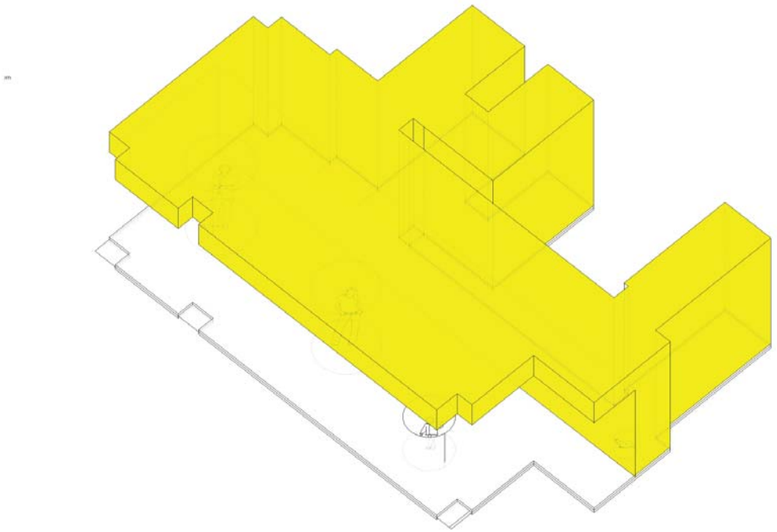








Based on calculation,
32.5% of the floor area is in surplus
56.25% of floor volume is in surplus



OBSERVATION

OBSOLETE PENCIL TOWER

Is the typical pencil-tower-unit designed to utilize the maximum spatial potential of th 40m²?

40sqm for 4

Advised by the Building Department, the minimum living area for one single person should at least 9 square-metre. Given that each pencil tower apartment sized as 40sqm, theoretically each apartment could fit in at least 4 people - a common small size in Hong Kong. In another word, for a single family, the size of these units are actually more than sufficient.

40sqm for 1

The selling trend of these unit in Hong Kong reveal that not only young families are interested in thse unit, young singles or couples also makes up large portions of sales market.

1 person = 9m² | **31m²** in surplus
2 people = 18 m²| **22m²** in surplus
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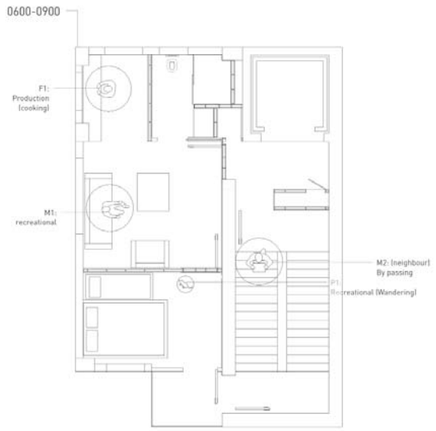
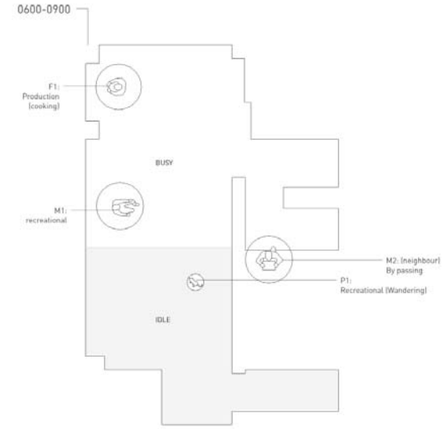
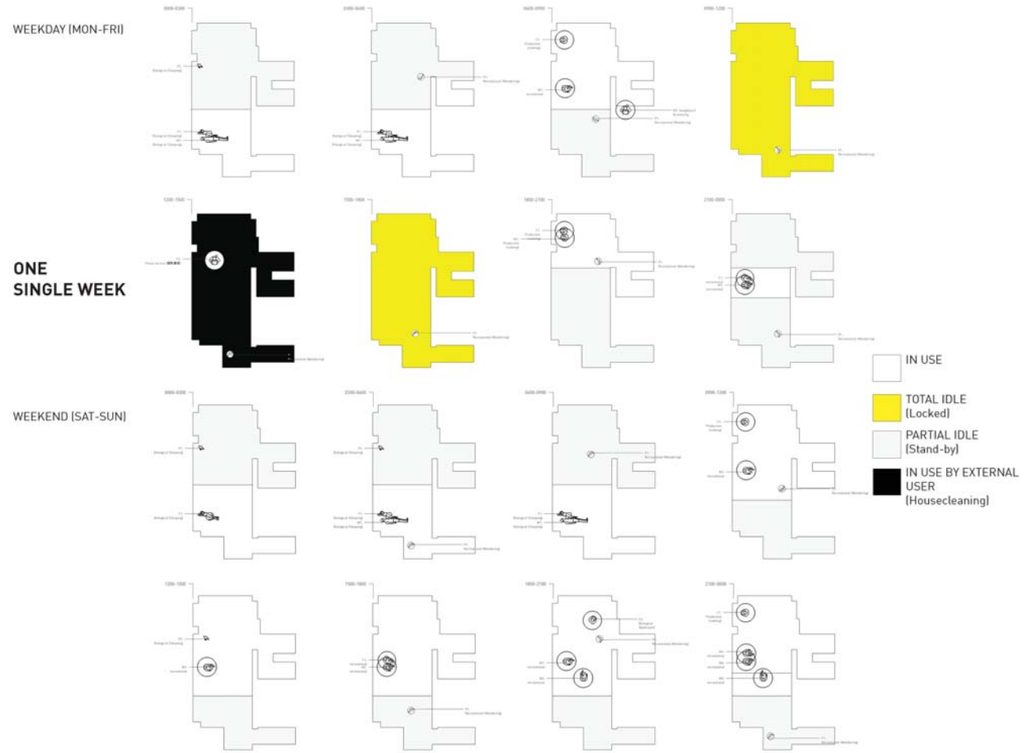




OBSERVATION

HOW OFTEN IS THE APARTMENT LEFT IDLE?

Pencil Towers are marketing for middle income group which includes, working family, singles and couples; these population are the active working class at society. To understand the freqency of usage, this simulation study is identifying the frequency of use within a Pencil-Tower Apartment at different duration of time.



FREQUENCY OF USAGE / ONE WEEK

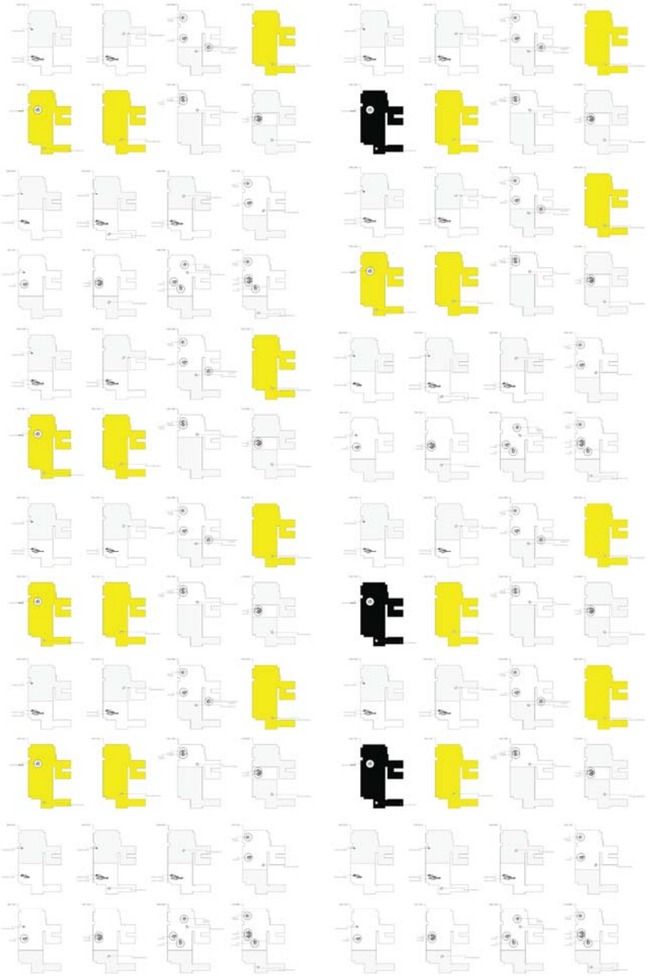
Totally Idle = 30 hrs

Used by external Users = 15 hrs

In one week, there are 45 hours out of 168 hours that the apartment is not in use.

Based on calculation,

32.5% of the floor area is in surplus
56.25% of floor volume is in surplus

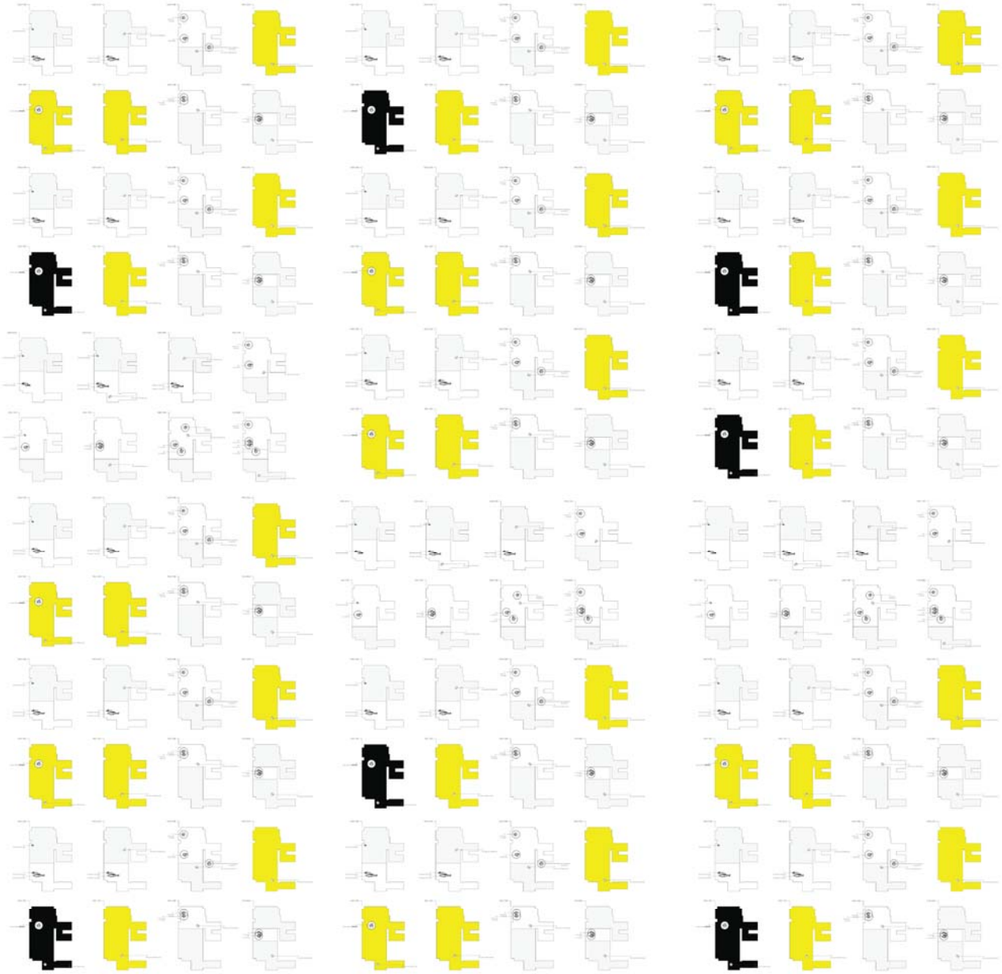


IN USE

TOTAL IDLE (locked)

PARTIAL IDLE (Stand-by)

IN USE BY EXTERNAL USER (Housecleaning)



FREQUENCY OF USAGE / 4 WEEKS

Totally Idle = 120 hrs

Used by External Users = 60 hrs

In one month, there are 180 hours out of 672 hours that the apartment is not in used.

THERE ARE 27% OF TIME, WHICH AN APARTMENT IS NOT IN USED.

SIGNIFICANT
800mm

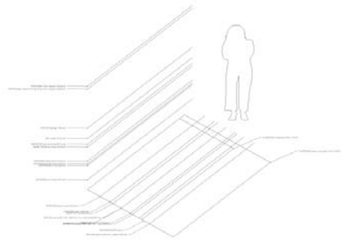
IV DESIGN TACTICS | How to maximize usable area?

800mm module (Body width)
800mm – as a tool to maximize usable area
Material thickness VS 800mm
Sectional possibility VS 800mm

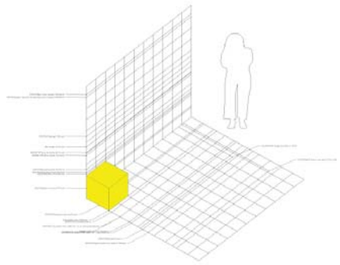
800mm...

800mm at plan = minimum circulation width
800mm at section = Worktop height (desk)
800/2 mm= seating height
800/4 c= stair (max.) riser height
800 x 2 = minimum. stair-head clearnace
etc.,...

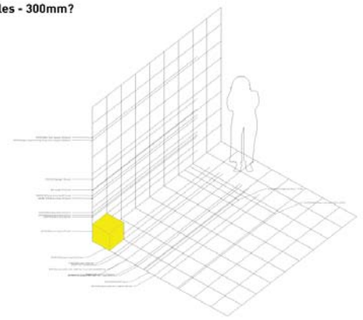
Important domestic heights



Looking for modules 400mm?



Looking for modules - 300mm?



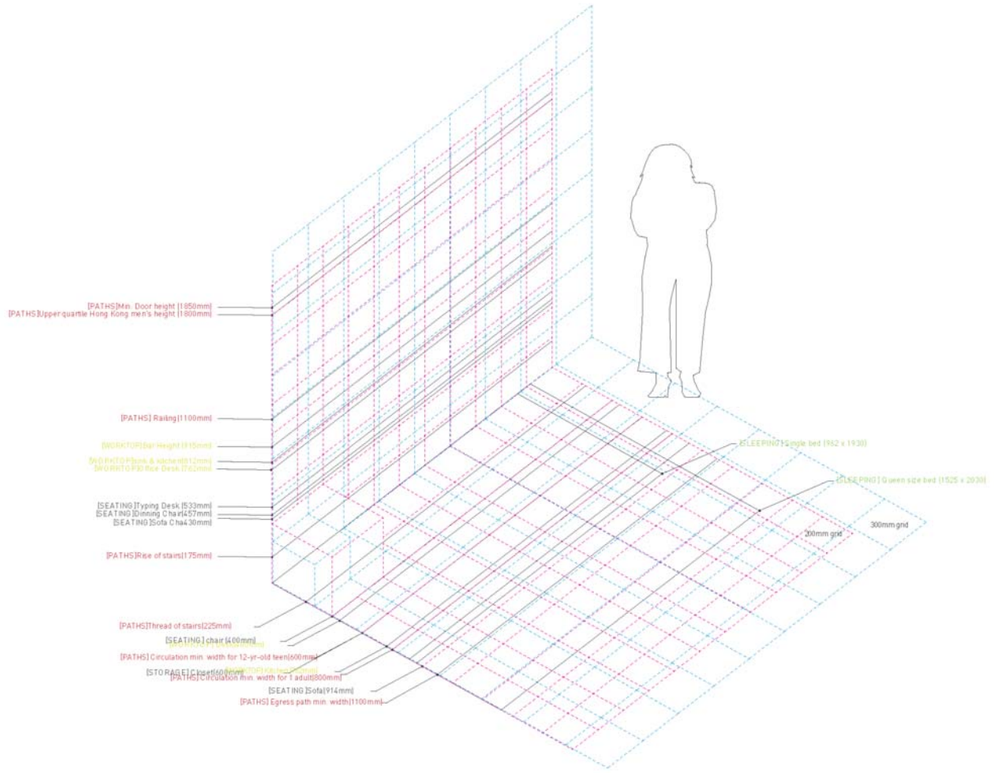
800mm/ 400mm/600mm/300mm

IDENTIFYING DESIGN MODULES

300mm -good for sectional division (3000/300)

400mm - seating levels, multiples of working top height

600mm - Worktop height



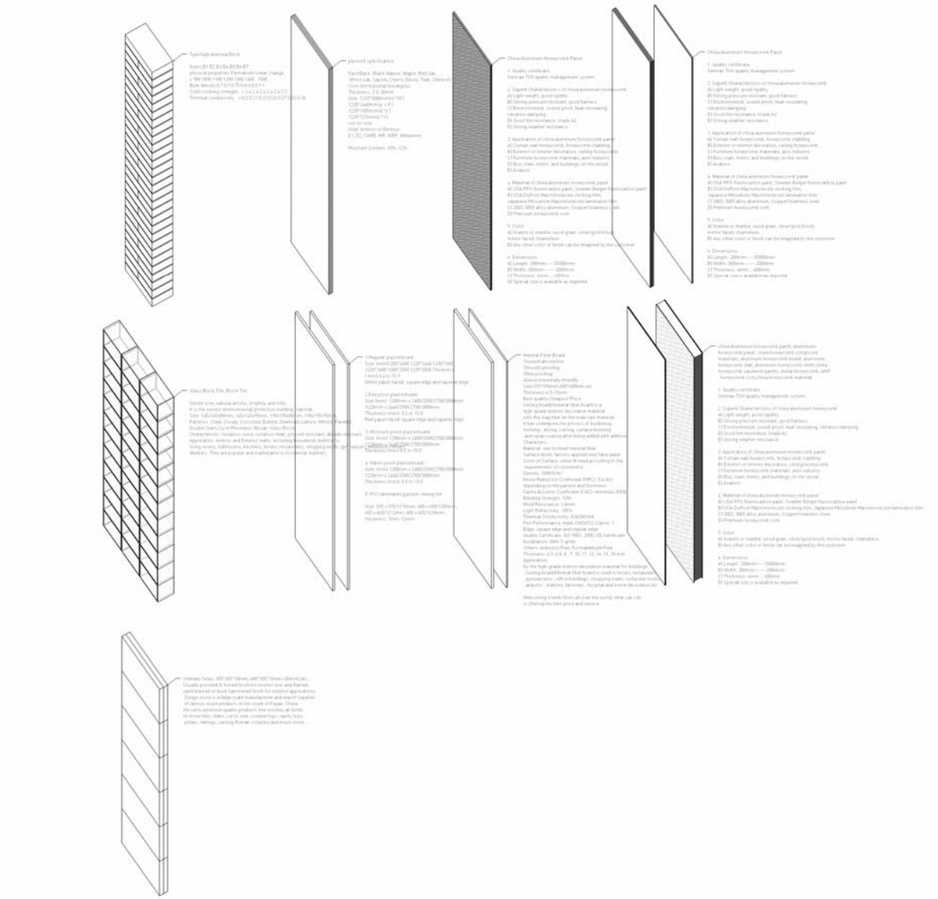
800mm VS **DOMESTIC ACTIVITIES**

IDENTIFYING VARIOUS DOMESTIC ACTIVITIES WITH 800MM

[PATH] = Domestic activities that demand routes or trajectories

[SEAT/WORK/SLEEP] = Working, seating etc, which involve habitant's participation but stationery

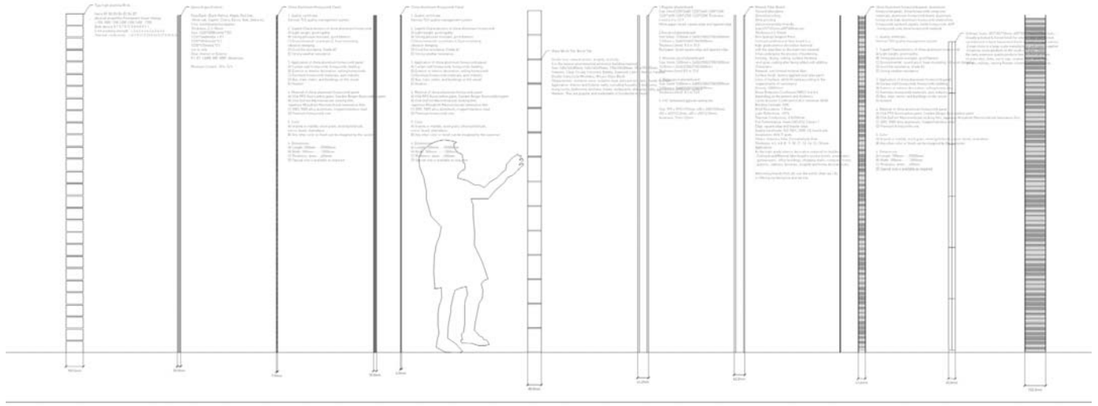
[STORAGE] = Object-oriented functions



800MM VS **MATERIALITY**

IDENTIFYING COMMONLY USED INTERIOR MATERIALS

[OPAQUE] Brick Wall, Cement Board, Plywood, Gypsum Board
[TRANSLUCENT] Glass Blocks, Glass Panel, Vinyl Screen
[TRANSPARENT] Glass
[OTHERS] Sound proofing Foam, Corrugated Board
[FINISHING] Ceramic Tiles, Hardwood Finishing



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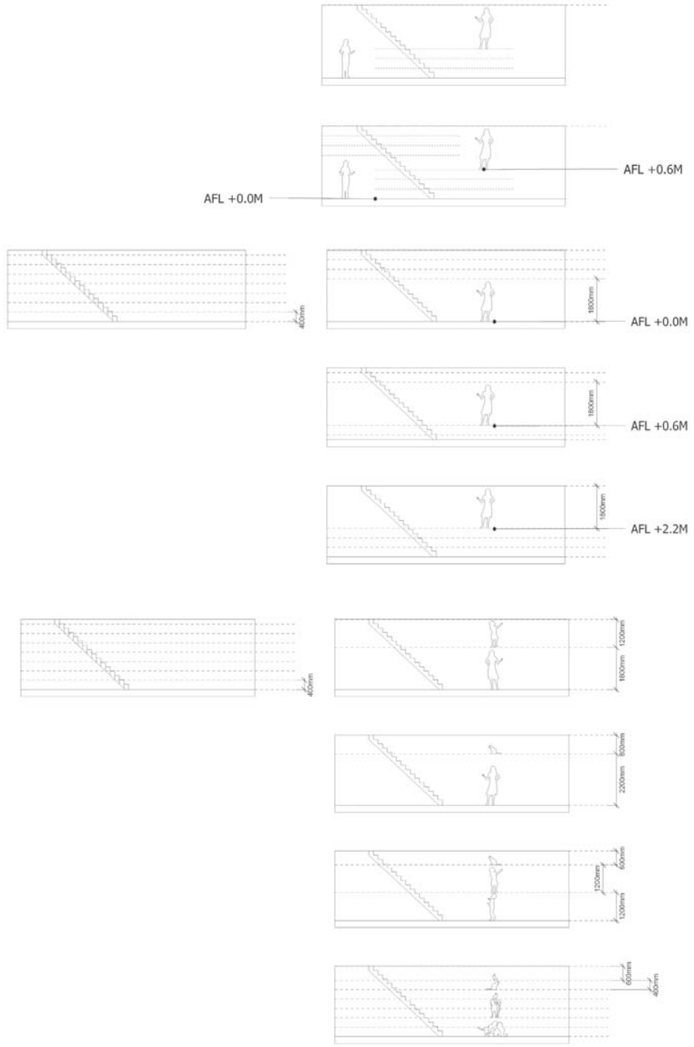

800MM VS **FLOOR HEIGHT**

HOW TO ACHIEVE SECTIONAL VARIATION BY 800mm?

MAIN ACTIVE LEVEL : +0mm - 1400mm headroom

+400mm - 1000mm headroom unreachable

+800mm - 600mm headroom unreachable

SATURATING 40m²

III DESIGN AGENDA | Saturating 40sqm

Hypothesis – fitting 90 luxury programs into 40sqm
Design inquires - is pencil tower luxury?
Design inquires - architects rejected by pencil towers
Design agenda – Floor area VS Floor usable area
Design agenda – Implicit VS Explicit way of organizing 40sqm

NECESSARY-NECESSITY

Baby changing tables
Cots
Children's beds
Sinks and taps
Shower
Wash-basins
Bathroom mirrors
Toilet
Beds
Laundary baskets
Bathroom storage
Bookcases
Desks & tables
Office chairs
Hobs
Worktops
Sidetables
Bookcases
Shelving units
DVD CD furinture
Wall shelves
Cabinets
Bedside tables
Wardrodes
Chests of drawers
Bedside tables
Kitchen cabinets
Cable management
Shelving
Mailbox
Garbage
Hanging clothes area
Tables up to 4 seats
Pet's sleeping area
Mini sofa
Oven
Fridge
High capacity fridge

=

LUXURIOUS-NECESSITY

Baby changing tables
Cots
Children's beds
Sinks and taps
Shower
Wash-basins
Bathroom mirrors
Toilet
Beds
Laundary baskets
Bathroom storage
Bookcases
Desks & tables
Office chairs
Hobs
Worktops
Sidetables
Bookcases
Shelving units
DVD CD furinture
Wall shelves
Cabinets
Bedside tables
Wardrodes
Chests of drawers
Bedside tables
Kitchen cabinets
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Shelving
Mailbox
Garbage
Hanging clothes area
Tables up to 4 seats
Pet's sleeping area
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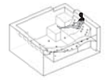
Fridge
High capacity fridge



NECESSARY-LUXURY

Highchairs
Kitchen island / trolleys
Tub
Guest beds
Loft beds
Dinning storage
Curtain
Small pot growing (tomato)
Small animal raising (chicken)
Goldfishing
Landscaping
Maid storage
Maid Bed
Baby toys
Tables up to 6 seats
Tables up to 8seats
Bar tables
Café funiture
Toys & play
TV
Mirror
Birds/ parrots
Pet's playing area
Pet's bathroom
Chaise lounges
Armcharis
Footstools
Gym
Mini-golf route
Darts route
Yoga circle / Taichi circle
Stepping/ fitness tools

LUXURIOUS-LUXURY

Garden lounge
Walk-in-closet
Wine cellar
Mini-theatre
BBQ
Jacuzzi
Sauna
Swimming pool
Pool table
Sun deck
Large music instrument
Small music instrucment
Mahjong

AFTER ALL, THE DEGREE OF LUXURY IN PENCIL TOWER IS ESTABLISHED MOSTLY BY BRANDED OBJECTS INSTEAD OF ARCHITECTURAL DELICACY.

INQUIRIES

IS PENCIL TOWER A LUXURIOUS?

AFFORDABLE LUXURY | Targeting the middle-income group

Currently in the real estate market of Hong Kong, there are two major types of luxury private housing, namely the luxury estates and the luxury towers. The first type consists of mega-luxurious-housing complexes built on enormous area near city centres. The other type consists of individual towers built within existing city fabric. In many cases, the first type of housing is targeting towards the high-middle income group while the second type is marketing towards the low-middle income group.

Pencil Tower falls into the category of affordable-luxury towers.
There are two very distinct marketing strategies for the two types of private housing. For mega-private complexes, these housing attract higher-income group by providing a vibrant range of mixed-use programs within estate complexes. These programs include shopping mall, offices, cultural centers and well-established transport systems, which are all essential to fulfill the desire of luxury living of higher-income group.

While marketing strategy of mega-estates is programs-oriented, that of the affordable luxury tower is product-oriented. For affordable luxury housing like Pencil Towers, there is a limitation on the amount of land which developers could purchase at one time. Hence, it is not feasible for developers to construct a mixed-use mega-complex. At the same time, the construction capacity for high-rise building constrained the floor slab area of each floor. Therefore, without a generous apartment size and attractive supporting facilities, in what way could developers of pencil tower market their buildings as luxury housing?

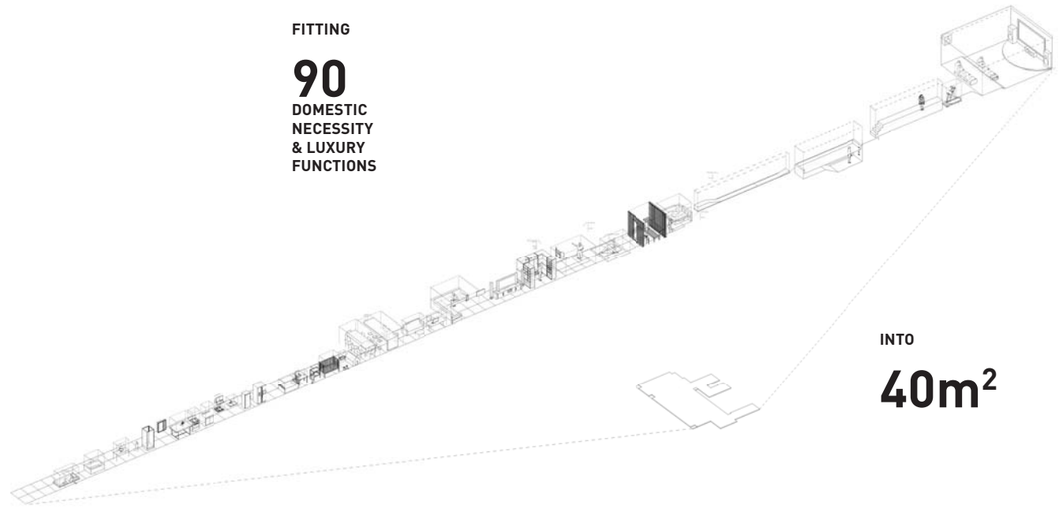
In order to create the impression of luxury living, in many cases, Pencil Tower apartments are equipped with high-end bathroom and kitchen furniture, top-rated floor and wall finishing. Ironically, the spatial design of each apartment is almost neglected to minimize construction cost.

After all, the degree of luxury in pencil tower is established mostly by branded objects instead of architectural delicacy.

FITTING

90

DOMESTIC NECESSITY & LUXURY FUNCTIONS



INTO

40m²

INQUIRIES

PENCIL TOWERS ARE REJECTING ARCHITECTS

Mentioned earlier, the degree of luxury in pencil tower is established mostly by branded objects instead of architectural delicacy.

Indeed, architects are rejected by Pencil Towers. The main concern is that the concept of luxury is non-architectural in Hong Kong. For instance, if an apartment is furnished with high-end bathroom and kitchen furniture, top-rated floor and wall finishing, and an extravagant lighting system, it is called luxury. In an extreme case, architects spend most of their time on choosing which brand of bathtub or what type of finishing to use.

INQUIRIES

RE-BRANDING ARCHITECTS IN PENCIL TOWER MARKET

Undoubtedly, the responsibility of architects in designing towers in Hong Kong is diminishing. At a structural scope, the construction systems of high-rise residential towers are confined to a few typical types based on price and time. For programmatic arrangement, the circulation system is dictated by a pair of scissor stair running through the tower based on spatial efficiency. In a spatial aspect, each floor is standardized in every dimension for the ease of pre-fabrication. Under these circumstances, the importance of architectural design is placed at a very low priority. As a result, architects spend most of their time on choosing which brand of bathtub or what type of finishing to use on façade.

Therefore, the design ambition of this thesis project is to promote an alternative understanding of "luxury living" in Pencil Towers. More importantly, this thesis tried to re-state architects' position in the construction industry of Hong Kong. Eight different apartment units were designed to demonstrate how 40m2 luxurious living environments could be architecturally generated. In terms of a design exercise, the key challenge was to maintain feasibility within the harsh limits.

HOW

3 ASPECTS TO MAKE A 70m² MORE LUXURIOUS

SATURATED BY USERS

I.e. the unit should always be busy serving habitants

AIM:
Allowing more and more occupants to use one unit at a certain period of time (say..1 month).

Why a fixed period of time instead of one moment?
A unit may not be able to cater 100 people at one time, but it may if they are occupying it at 100 different moments.

SATURATED BY FUNCTIONS

I.e. No space in the unit is wasted

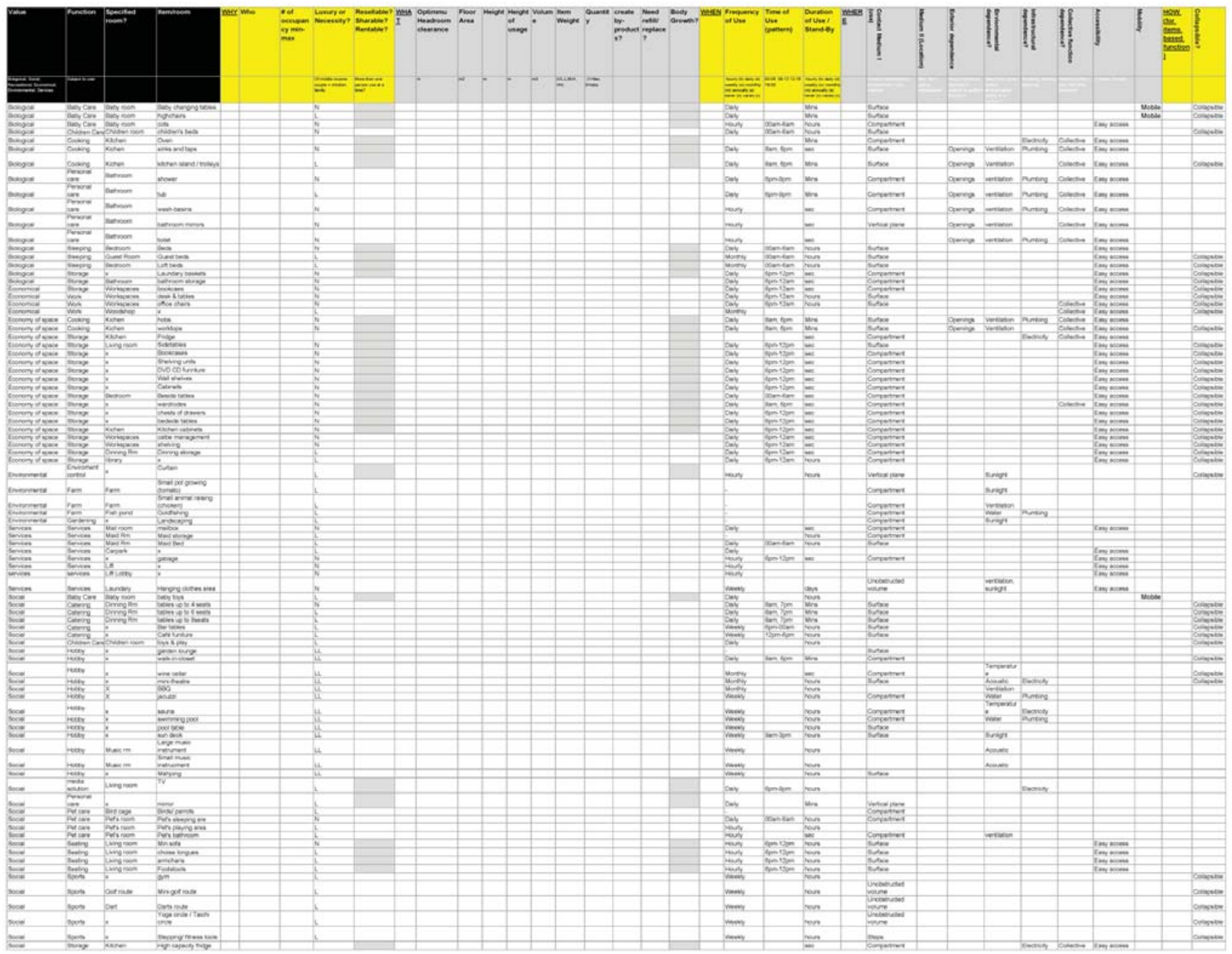
AIM:
Adding more and more luxurious programs till an individual can no longer absorb.

SATURATED BY SENSATION

I.e. ...

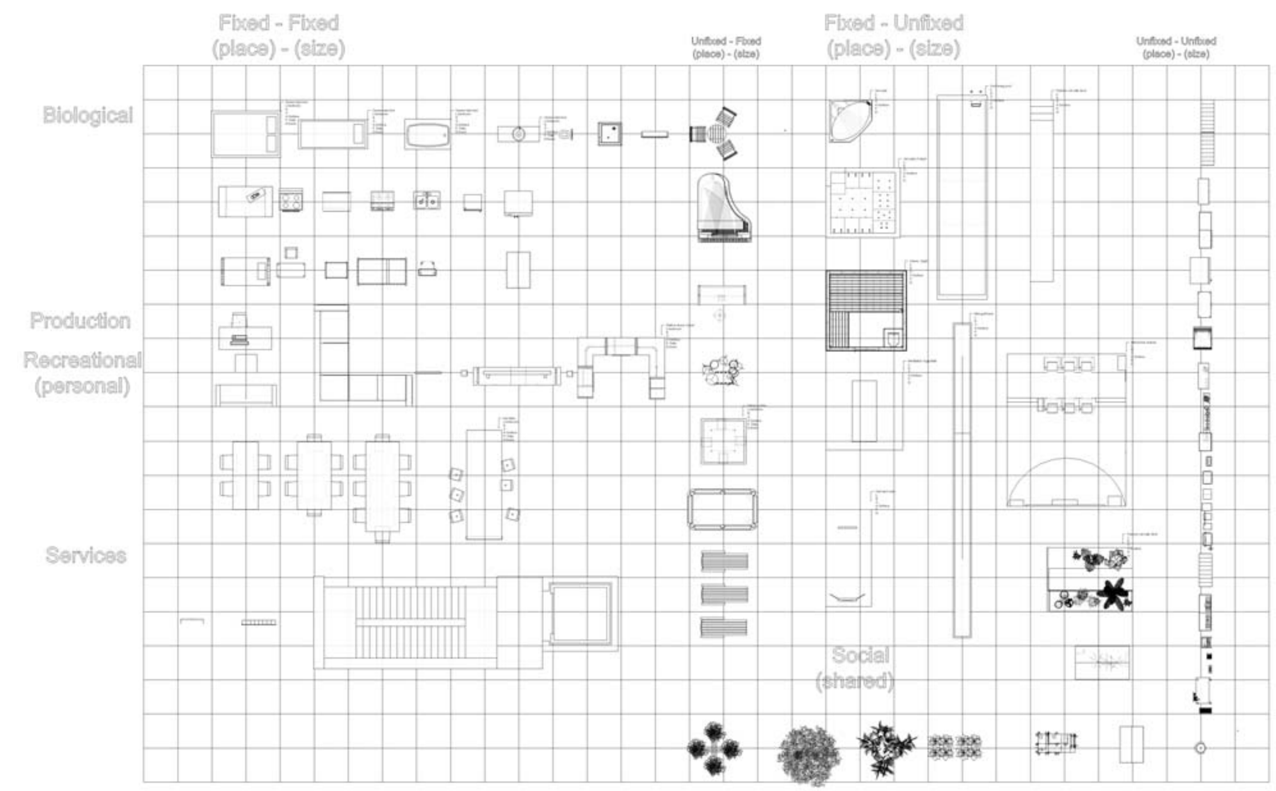
AIM:
Maximizing the environmental pleasure enjoyed through the function of each units.

e.g.
If natural light and view is a pleasing environmental factor, every unit requires maximum natural lighting.



NEW DEFINTION OF FLOOR AREA CONCEPT

FLOOR SLAB AREA ≠ FLOOR USABLE SURFACE AREA



INQUIRIES

TWO MAJOR ARCHITECTURAL SPATIAL CHALLENGES

First of all, one of the major design challenge is how to provide more usable floor area. When designing how 40m^2 luxurious living environments could be architecturally generated, these solutions should consider how to provide developers with better alternatives without compromising their economic interests. In most cases, the economic value of Hong Kong's apartment is based on Usable Floor Area[1]. Hence, one of the key aspects of design proposals is to provide more Usable floor Area for each apartment in order to maintain the economic feasibility.

floor slab area = floor usable surface area.

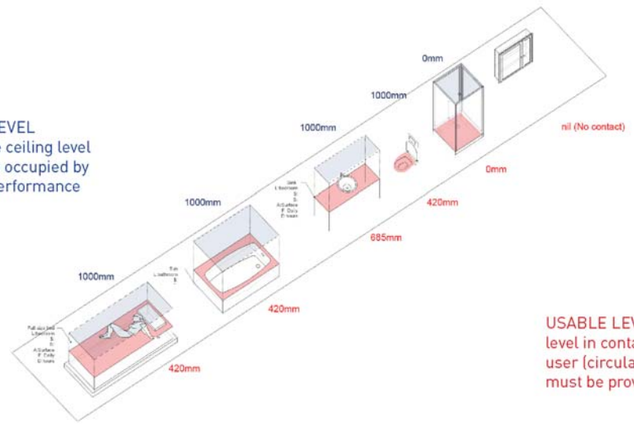
The second design challenge is the performance of apartment. While the proposals should spatially densify the apartment, these designs should, at the same time, maintain practicability based on domestic-ergonomic considerations.

[1]Defined by the Building Department in Hong Kong, The usable floor area is defined as the aggregate of the areas of the floor or floors in a storey or building excluding any staircases, public circulation space, lift landings, lavatories, water-closets, kitchens, and any space occupied by machinery for any lift, air-conditioning system or similar service provided for the building.

Observation III. TWO IMPORTANT LEVELS

e.g.
Usable level = level in contact with users (circulation must be provided)
Headroom clearance level = Determines the ceiling level

HEADROOM
CLEARANCE LEVEL
Determines the ceiling level
and the volume occupied by
its functional performance



USABLE LEVEL
level in contact with
user (circulation
must be provided)

THESIS **PARAMETER I**

BODY : DIMENSION AND PERFORMANCE

SECTIONAL DIMENSION:
[Headroom Clearnace Level]
-determines the minimum ceiling level of specific programs for functions to perform effectively

[Usable Level]
-the level where users perform certain functions comfortably and effectively

HEADROOM
CLEARANCE LEVEL
Determines the ceiling level
and the volume occupied by
its functional performance

USABLE LEVEL
level in contact with
user (circulation
must be provided)

BODY : DIMENSION AND PERFORMANCE

SECTIONAL DIMENSION:
[Headroom Clearnace Level]
Which determines the minimum ceiling level of specific programs and functions to perform effectively

[Usable Level]
Which is the level that user perform certain functions comfortably and effectively

Observation II. Functions that are dependent on architecture
e.g.
Dart boards are placed against the walls,
mirrors are hung vertically,
sauna rooms requires a complete enclosure
etc.

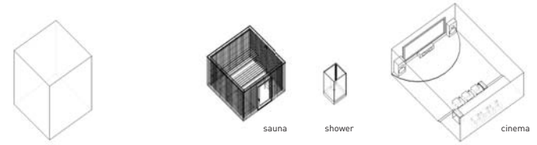
SURFACE-DEPENDENT FUNCTIONS
e.g. mini golf track

swimming pool

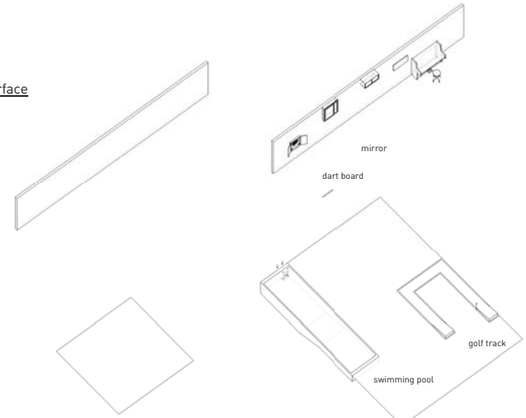
SURFACE-INDEPENDENT FUNCTIONS
e.g. fridge

bed, hods

volume



vertical surface



ground

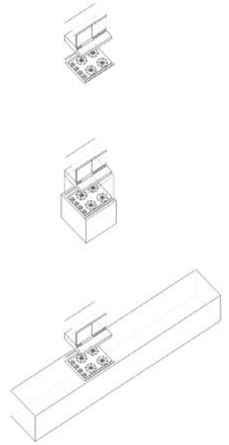
THESIS **PARAMETER II**

TECTONIC OF DOMESTIC FUNCTIONS

[Volume] - functions that require enclosure, either because of environmental condition, privacy or defined sizes.
[Surface] - functions which consist of instructments adhering on vertical surfaces
[Ground] - Functions that define their own territory of ground, the definition is context specific

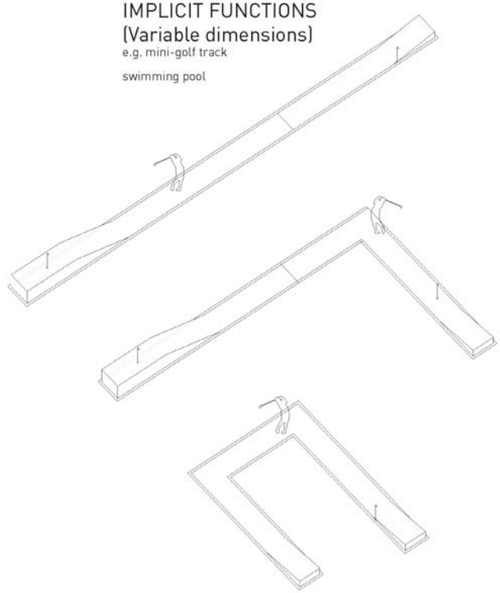
EXPLICIT FUNCTIONS
(Standard dimensions)
e.g. fridge

bed, hods



IMPLICIT FUNCTIONS
(Variable dimensions)
e.g. mini-golf track

swimming pool



THESIS **PARAMETER III**

TECTONIC OF DOMESTIC FUNCTIONS

[Explicit Functions] Functions that usually come will definite objects, like oven, stove, hi-fi set etc. These functions are independent with the architecture. They adhere on it.

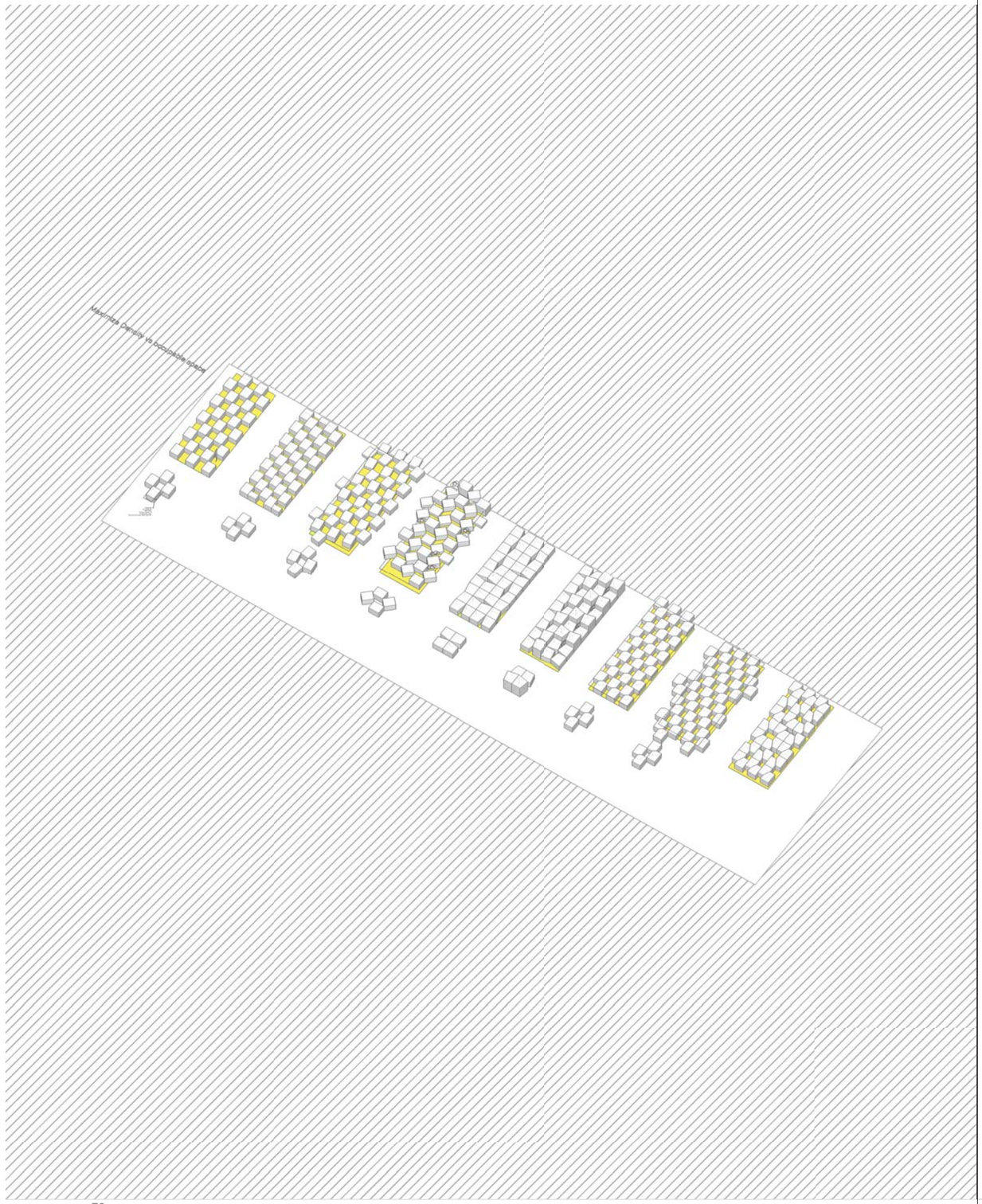
[Implicit Functions] They are formally flexible functions. These functions work well in various kinds of typologies. These functions could suggest formal operations. It also react to specific need of context.

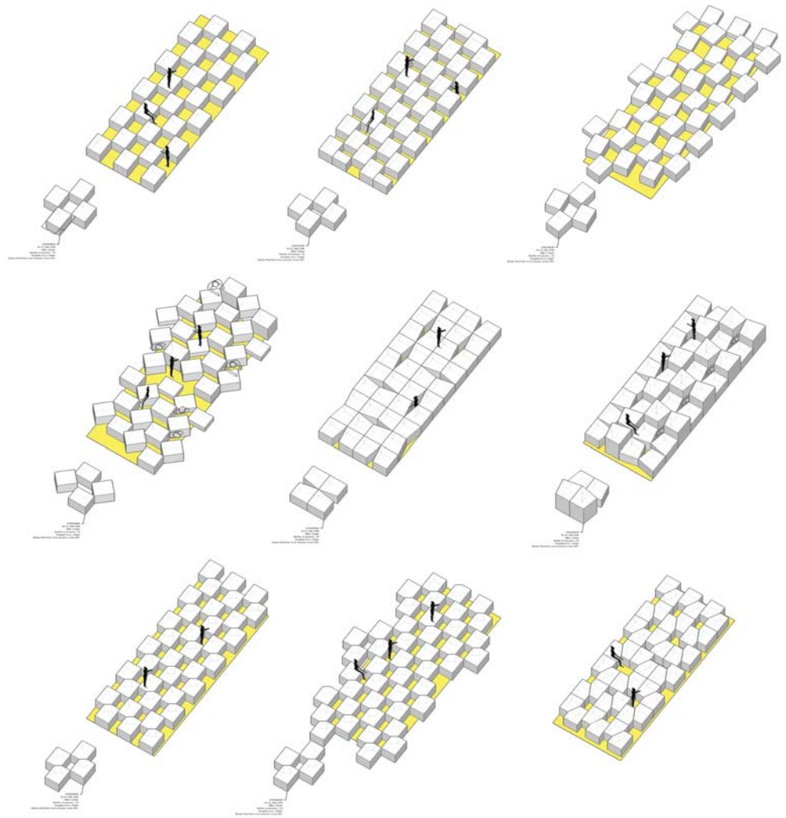
OPPORTUNISTIC

800mm

V ELEMENT DESIGN | Rethinking Domestic Furnitures

800mm Shelves
800mm Stairs
800mm Windows
800mm Scissor Stairs
800mm Lofts
800mm Ceilings





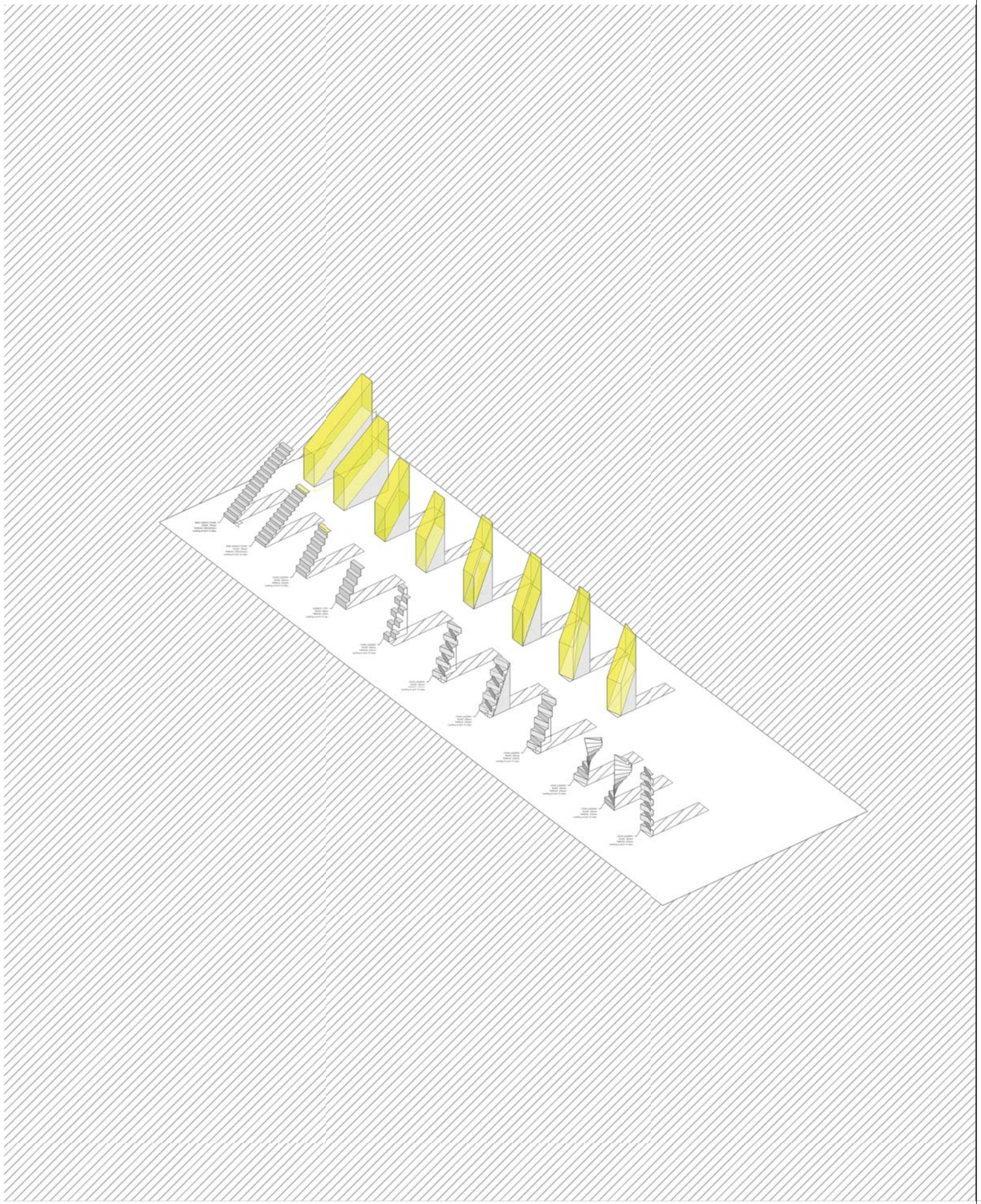
RETHINKING
DOMESTIC
ELEMENTS

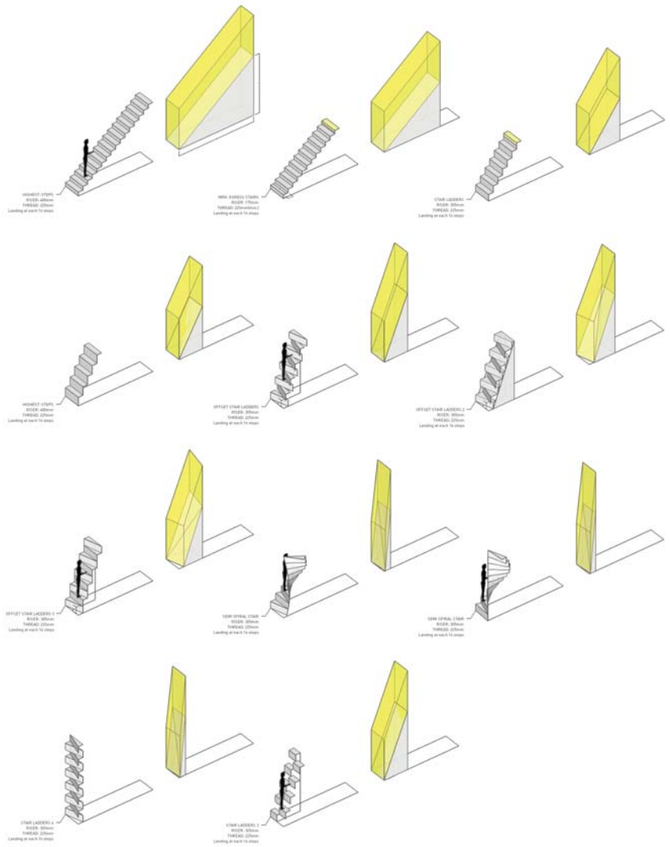
800mm SHELVES

Rethinking
Domestic Elements :
Containers

Spatial Elements:
Volume
Area gained:
1.5
Performance:
-Worktop
-Steps
-Compartments
-Rooms
-Shelves

This exercise explored various ways in organizing forty 800mm x 800mm boxes within one apartment. This study evaluated how people could inhabit within these configurations.





RETHINKING
DOMESTIC
ELEMENTS

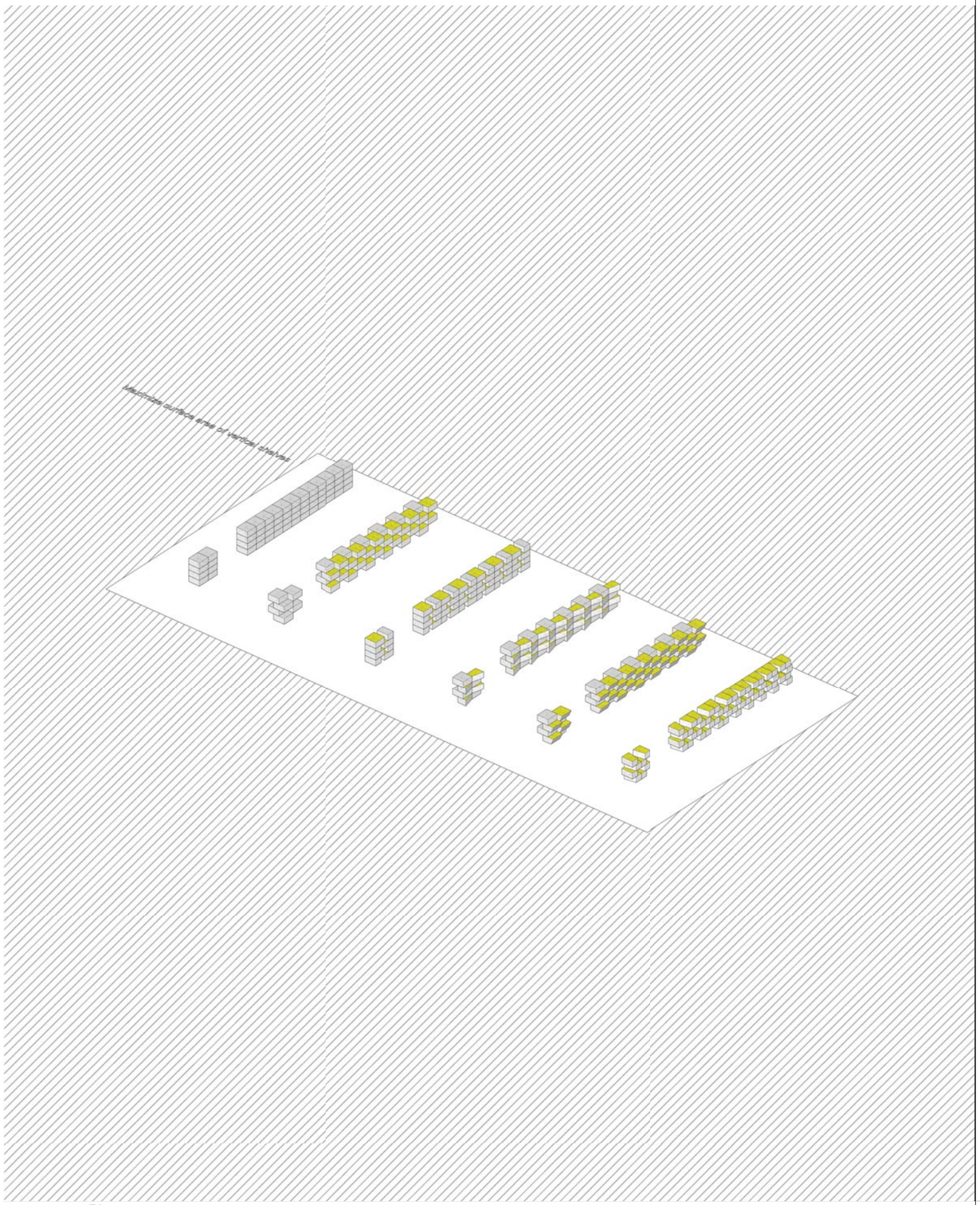
800mm STAIRS

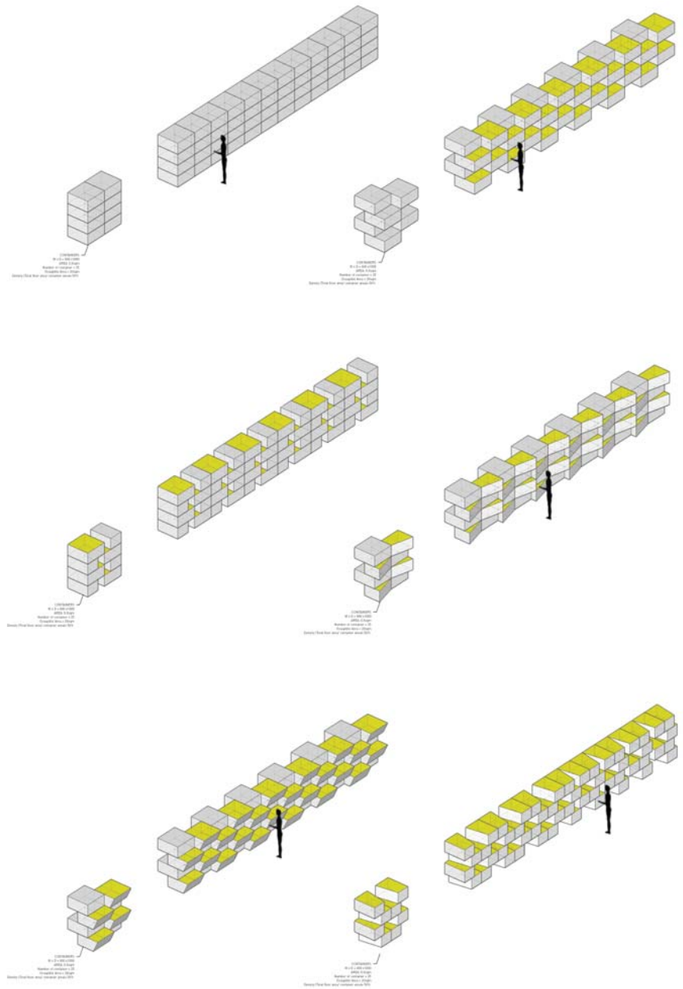
Rethinking
Domestic Elements :
Stairs
Spatial Elements:
Inclined Surface

Area gained:
(to minimize)

Performance:
-Stairs
-Worktops
-Shelves
-Ladders
-Walls

Stairs allow sectional movement, yet the acute volume generated under stairs are difficult to be programed. This exercise studied various ways in organizing stairs . Then, it also studied how the residue volumes could be utilized effectively.





RETHINKING
DOMESTIC
ELEMENTS

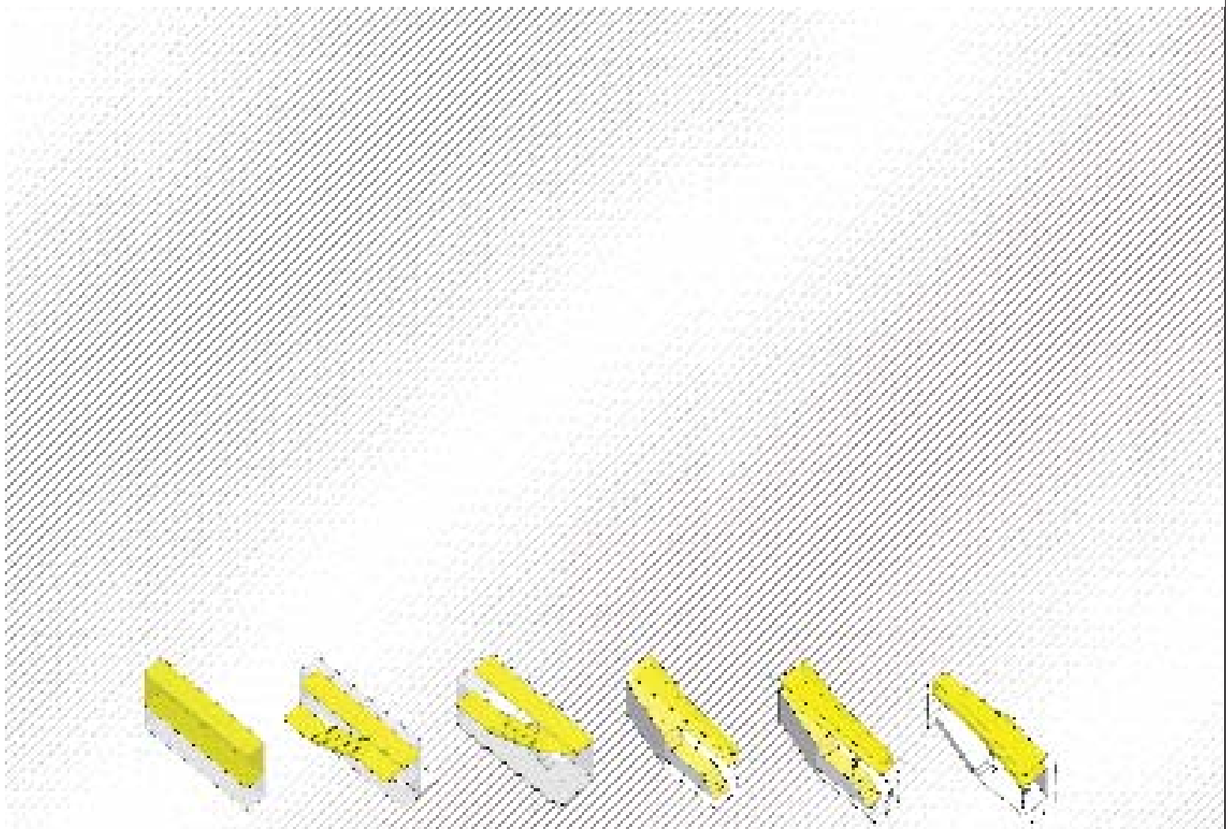
800mm
SHELVES 2

Rethinking
Domestic Elements :
Wall Shelving

Spatial Elements:
Volume/ Wall
Area gained:
1.5

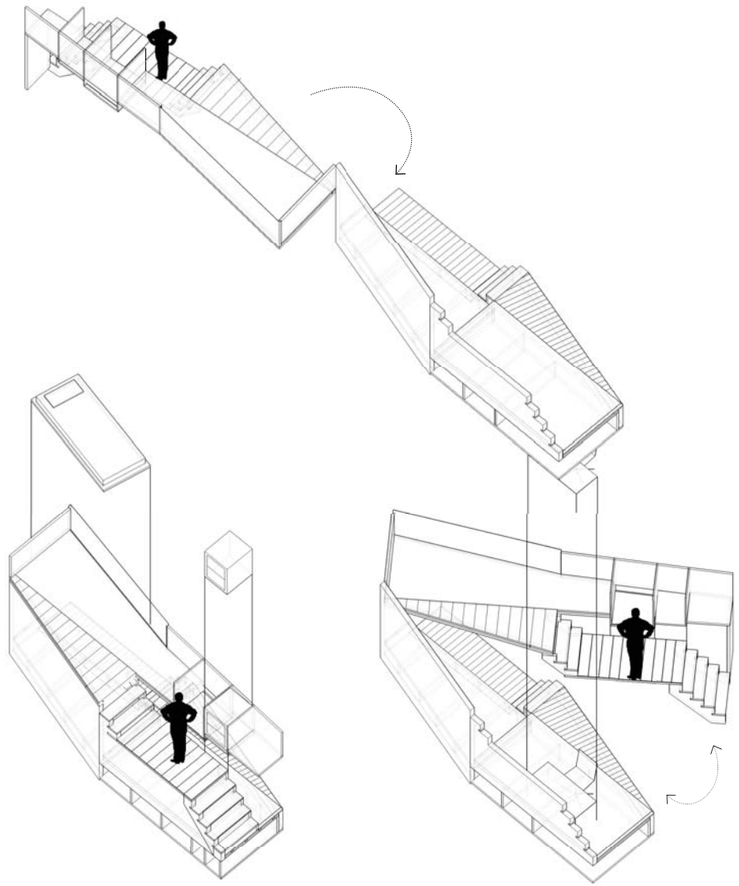
Performance:
-Steps
-Compartment
-Shelves
-Envelope

In Hong Kong, walls are not only designed to partition volumes, they are also embedded with shelves and storage units. This exercise studied different ways to configure these shelving-units, so that they could perform as effective facade units for better natural lighting, ventilation and views.



EVOLUTION OF 800mm BUNK BED

Axonometric Illustration of 800mm Bunk Bed Design



Axonometric Illustration of 800mm Bunk Bed Design

RETHINKING
DOMESTIC
ELEMENTS

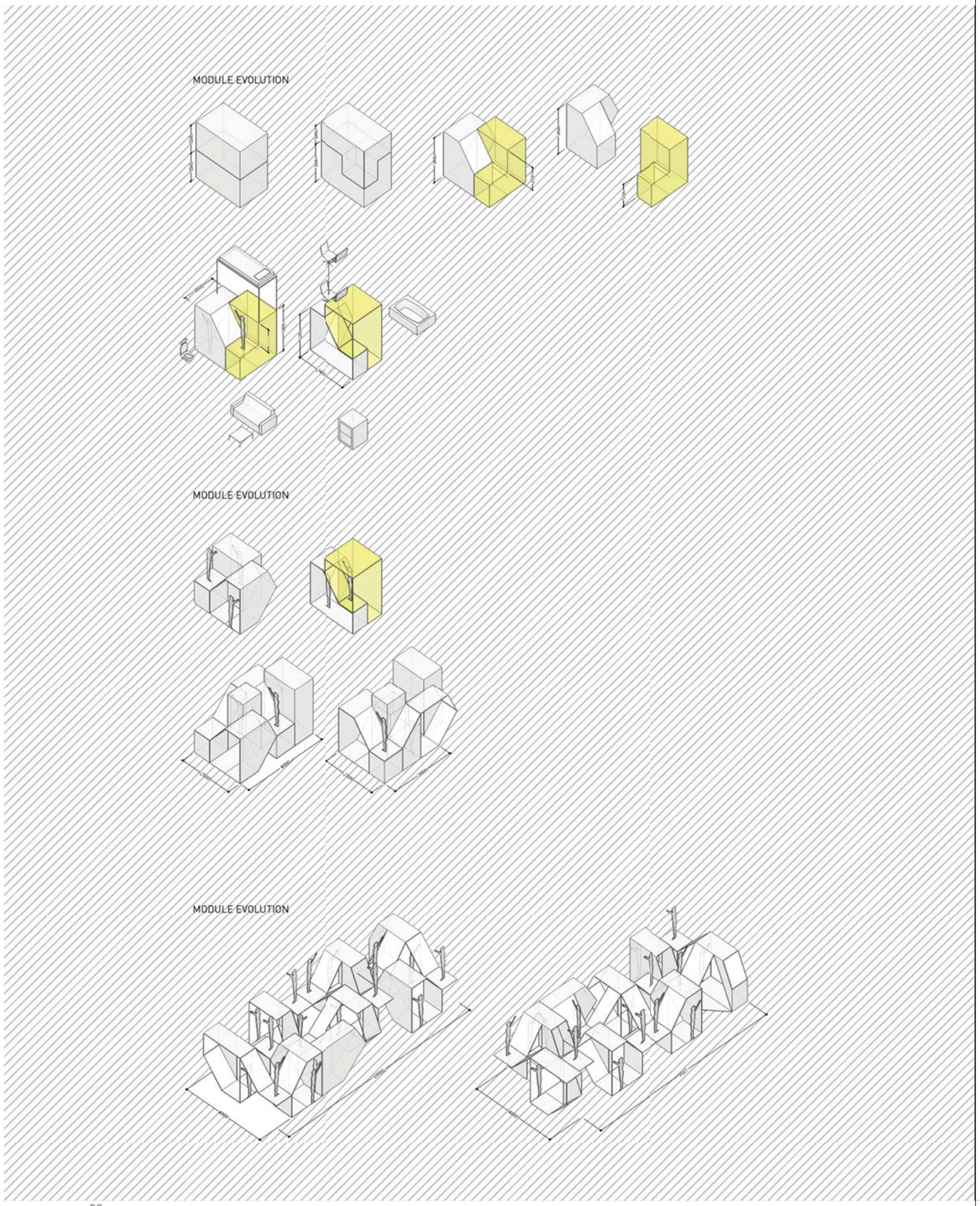
800mm
BUNK BEDS

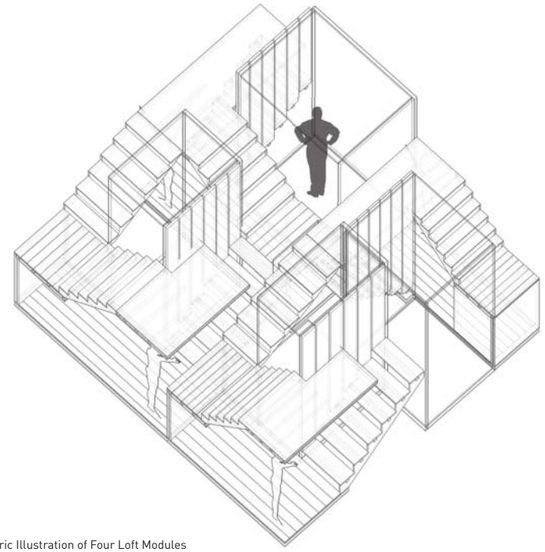
Rethinking
Domestic Elements :
bunk beds

Spatial Elements:
Volume + Stairs
Area gained:
2.0

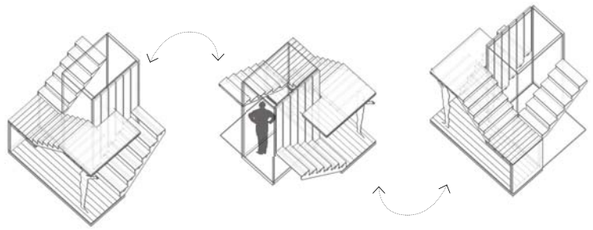
Performance:
-Worktop
-Steps
-Compartment
-Rooms
-Shelves

Bunk bed is commonly used to save space for sleeping and working. Similarly, the design of this module is based on the idea of a bunk bed. Three slices of vertical volumes are generated:
Top: (Headroom 800m)
-Suitable for sleeping
Mid: (Headroom 1800mm)
-Suitable for working and main circulation
Bottom: (Headroom 2200mm)
-Suitable for storage, seating





Axonometric Illustration of Four Loft Modules



Axonometric Illustration of One Loft Modules

RETHINKING
DOMESTIC
ELEMENTS

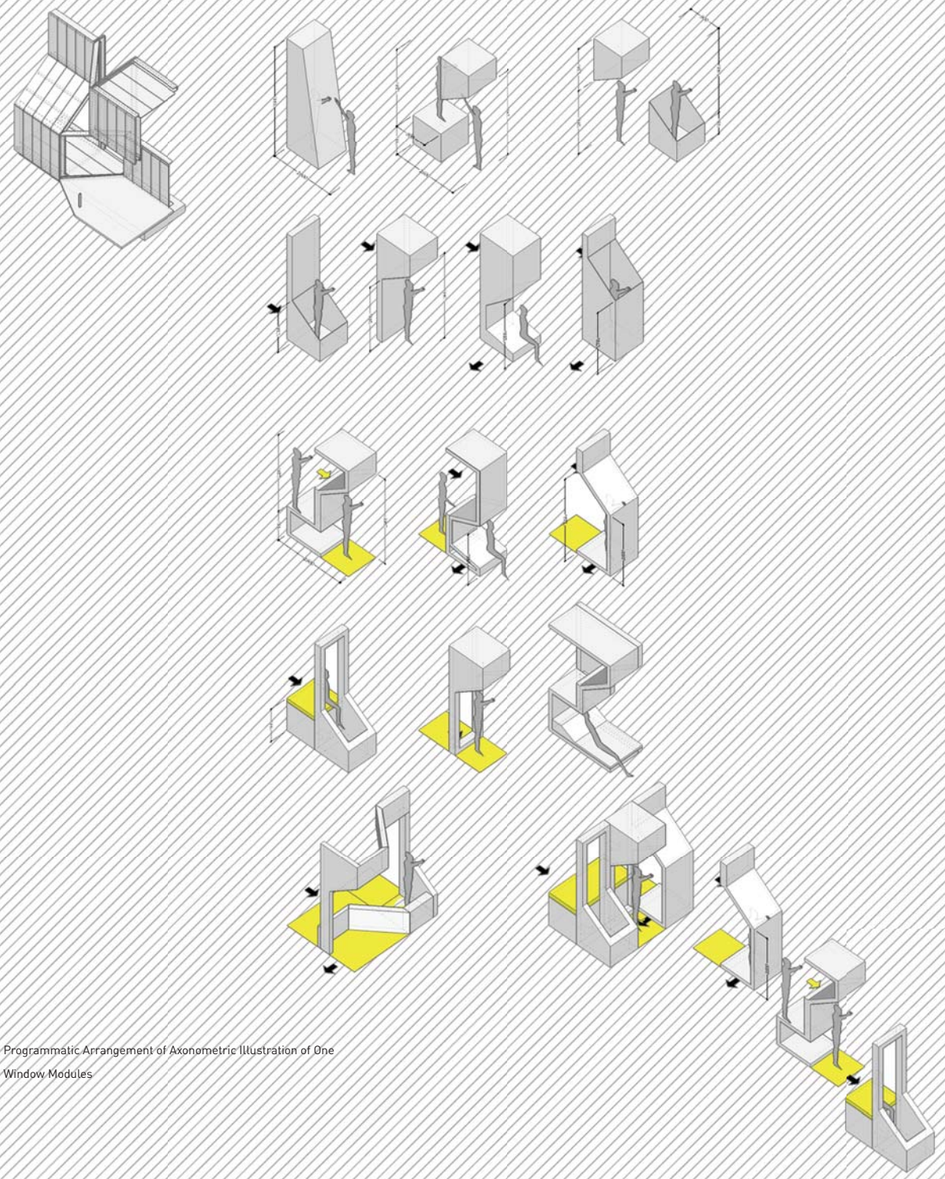
800mm
LOFTS

Rethinking
Domestic Elements :
Lofts

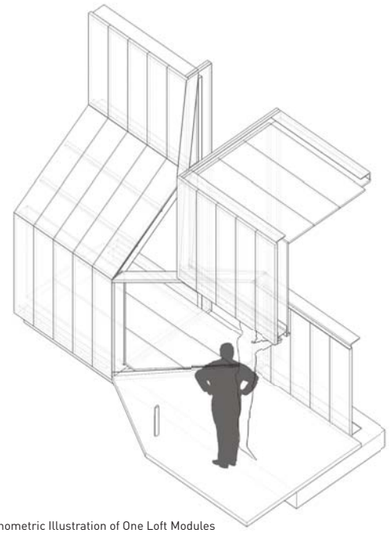
Spatial Elements:
Volume + Stairs
Area gained:
2.0

Performance:
-Worktop
-Steps
-Compartment
-Rooms
-Shelves

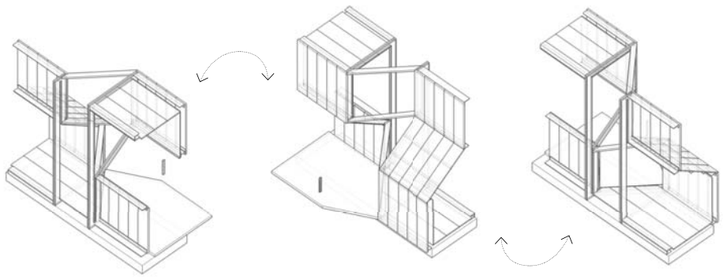
In this module, rooms and internal volumes are defined by steps. Owner could enjoy loft-like space which interlock throughout the apartment. The maze-like spatial experience is dynamic. The configuration also generates different degree of privacy within an apartment.



Programmatic Arrangement of Axonometric Illustration of One Window Modules



Axonometric Illustration of One Loft Modules



Axonometric Illustration of One Loft Modules

RETHINKING
DOMESTIC
ELEMENTS

800mm WINDOW

Rethinking
Domestic Elements :
Window Bay

Spatial Elements:
Wall, Openings
Area gained:
1.5

Performance:
-Worktop
-Steps
-Compartments
-Rooms
-Shelves

In Hong Kong, window bays are often thickened to accomodate services like air-conditors and plumbings. Similarily, the design of this module is based on converting these window bays into human occupiable space.

FOUR NEW WAYS TO LIVE..

>40m²

VI APARTMENT PROPOSAL | Hyper-Luxurious Units

60 m² - Luxurious Window 1.0
65 m² - Luxurious Wall 1.0
75 m² - Luxurious Shelves 1.0
80m² - Luxurious Balcony 1.0
80m² - Luxurious Window 2.0
85m² - Luxurious Stairs 1.0
90m² - Luxurious Scissor Stairs 2.0
100m² - Luxurious Ceiling 1.0
Conclusion - Rethinking domestic ways of living

DESIGN PROPOSALS

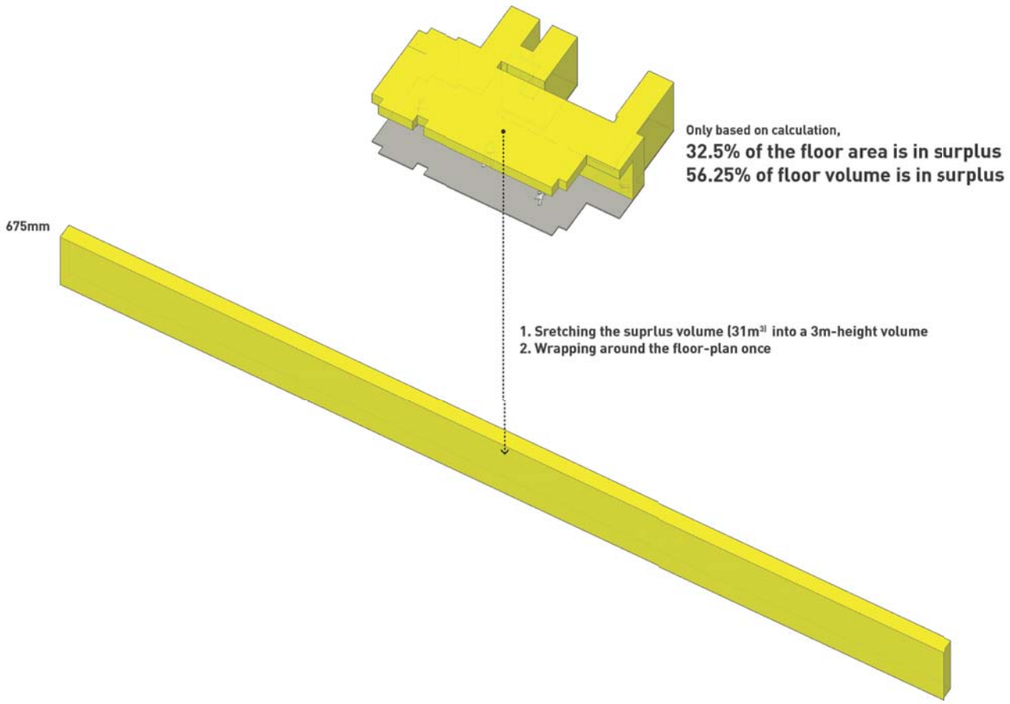
HYPER-LUXURIOUS APARTMENTS

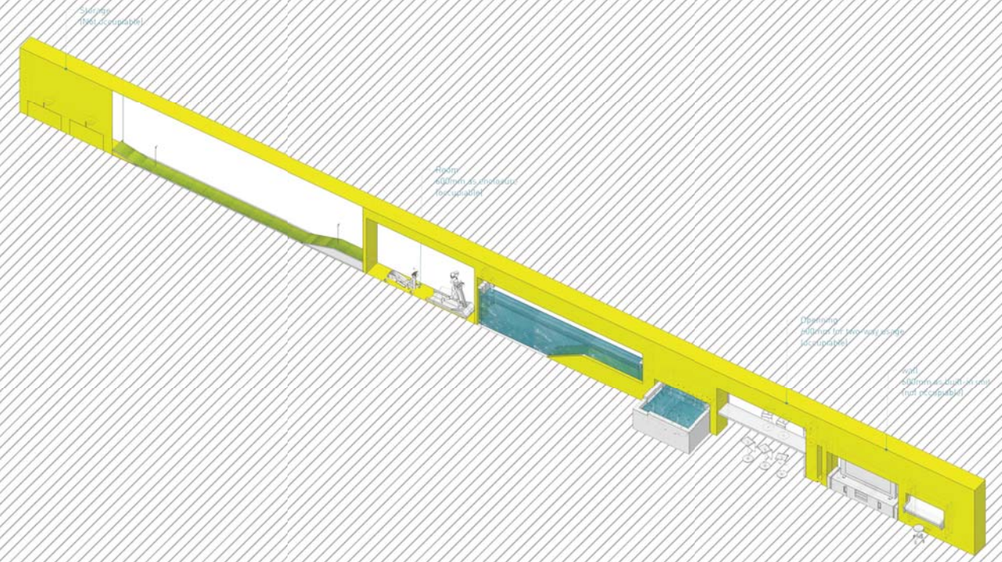
In the second phase of design project, a series of hyper-luxurious apartment units are invented. A hyper-luxurious unit is designed not only to maintain the economic interest of developers; it should promote an alternate reading of luxurious living in Hong Kong. For instance, how could we maximize outdoor experience in a small unit? How could we enjoy maximum privacy if the apartment is shared among strangers?

This chapter is a documentation of design evolution. The first part of the chapter includes massing studies, which follows with a series of initial schematic drafts.

The second part of the chapter documented four finalized proposals. These proposals are chosen as they revealed most radical ways of contemporary living. They are sequenced according to the degree of usable living area generated within each unit.

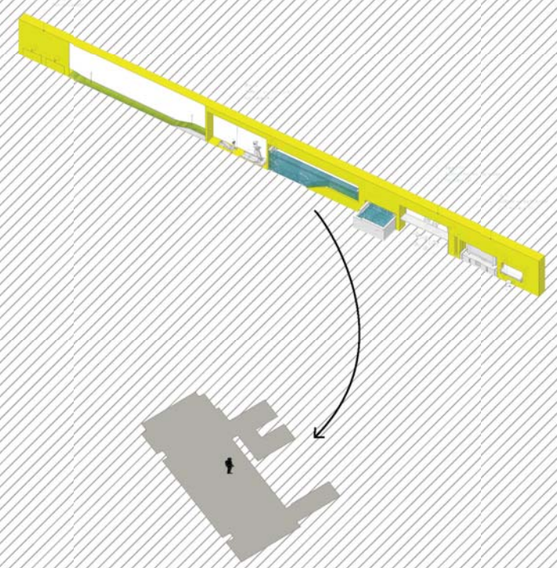
Finally, a comprehensive set of architectural drawings are constructed to demonstrate the effect of living at an all-rounded perspective.





DESIGN OBJECTIVE

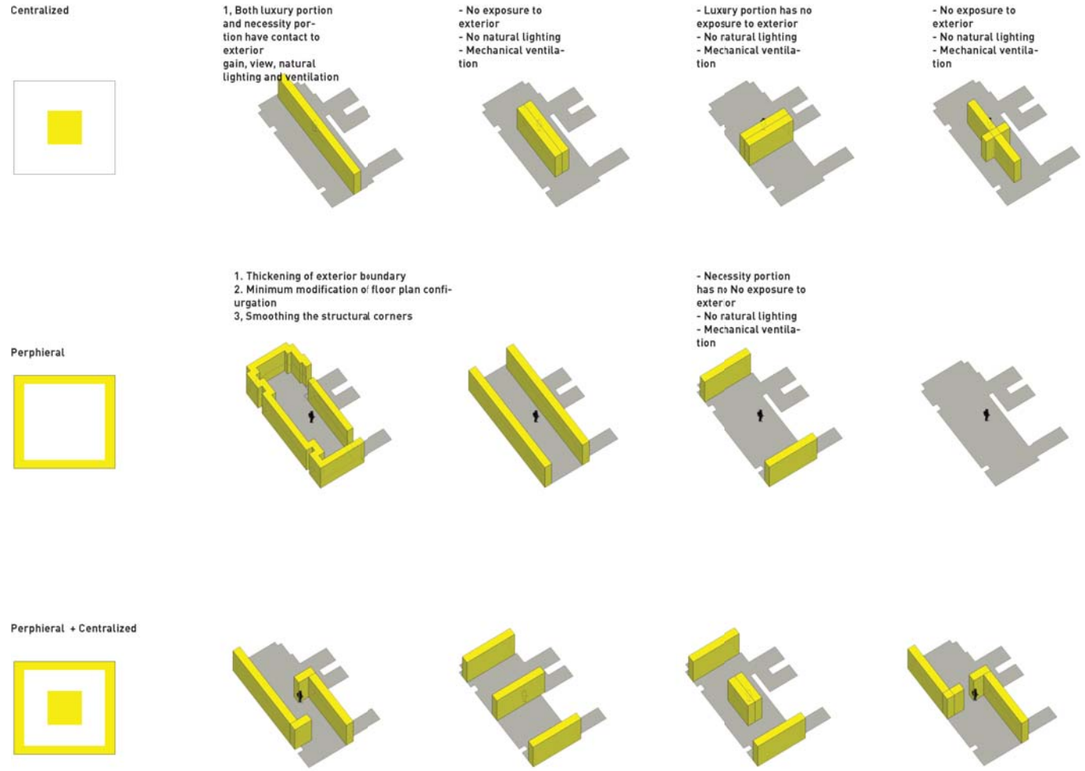
TOWARDS AN ALTERNATIVE LUXIOUS LIVING



MASSING STUDY

TYPOLOGY WITHIN APARTMENT

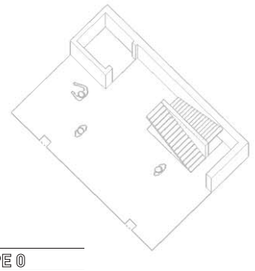
Design process began by identifying various types of massing configurations. Showing in the diagram below, the yellow massing are volume designated for luxurious functions.



OVERVIEW

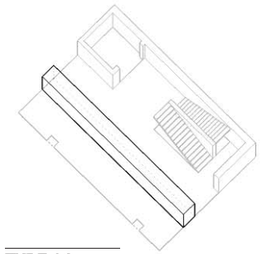
OVERVIEW OF TYPES

When evaluating the design process, I considered the usable surface area of each unit as the first set of elimination parameters. The reason is that, in developers' perspective, the more usable luxurious area an apartment consists, the more sales revenue it worth. In this case, types that could bring about larger amount of usable (surface) area are continued to develop in the second round.



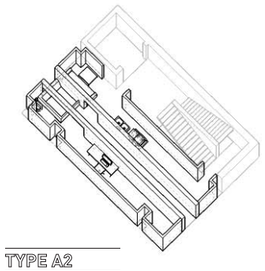
TYPE 0

Typology: Nil
Area Increased: -
Usable Floor area-



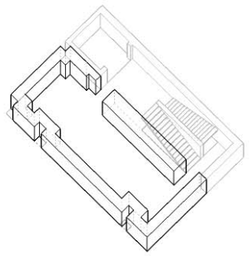
TYPE A1

Typology: Centralized
Area gained: 20m²
Balcany area: 5m²



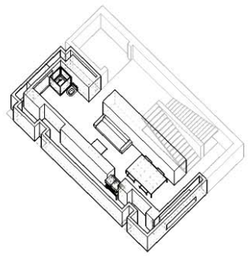
TYPE A2

Typology: Centralized
Area gained: 20m²
Balcany area: 5m²



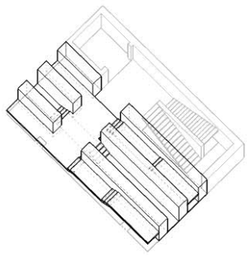
TYPE B1

Typology: Peripherial
Area gained: 40m²
Balcany area: 5m²



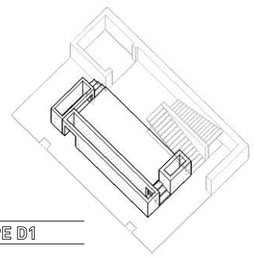
TYPE B2

Typology: Peripherial
Area gained: 40m²
Balcany area: 5m²



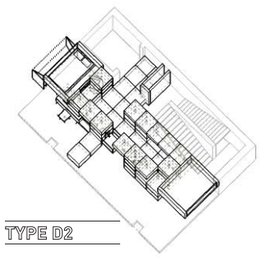
TYPE C1

Typology: Wall
Area gained: 40m²
Balcany area: 10m²



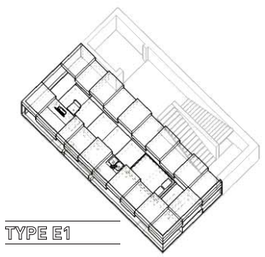
TYPE D1

Typology: Centralized
Area gained: 20m²
Balcany area: 5m²



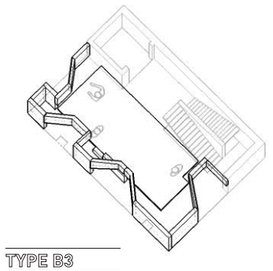
TYPE D2

Typology: Centralized
Area gained: 20m²
Balcany area: 5m²



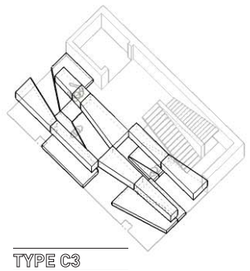
TYPE E1

Typology: dispersed
Area gained: 40m²
Balcany area: 10m²



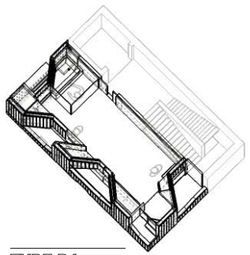
TYPE B3

Typology: Peripherial
Area gained: 40m²
Balcany area: 5m²



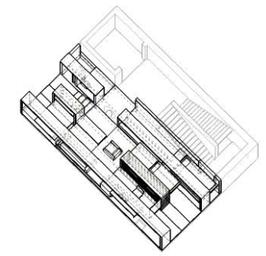
TYPE C3

Typology: Wall
Area gained: 40m²
Balcany area: 10m²



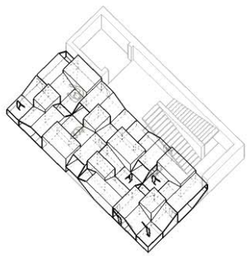
TYPE B4

Typology: Peripherial
Area gained: 45m²
Balcany area: 5m²



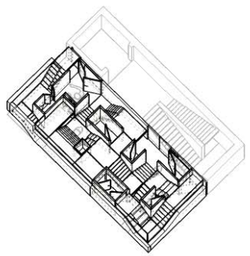
TYPE C2

Typology: Wall
Area gained: 40m²
Balcany area: 10m²



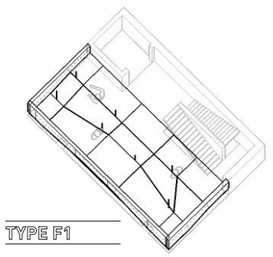
TYPE G1

Typology:dispersed
Area gained: 40m²
Balcany area: 10m²



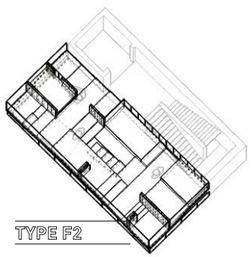
TYPE G2

Typology:dispersed
Area gained: 50m²
Balcany area: 5m²



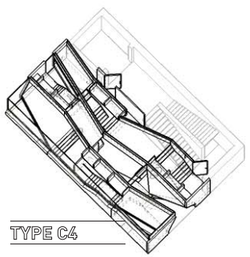
TYPE F1

Typology: ground
Area gained: 40m²
Balcany area: 10m²



TYPE F2

Typology: ground
Area gained: 45m²
Balcany area: 10m²



TYPE C4

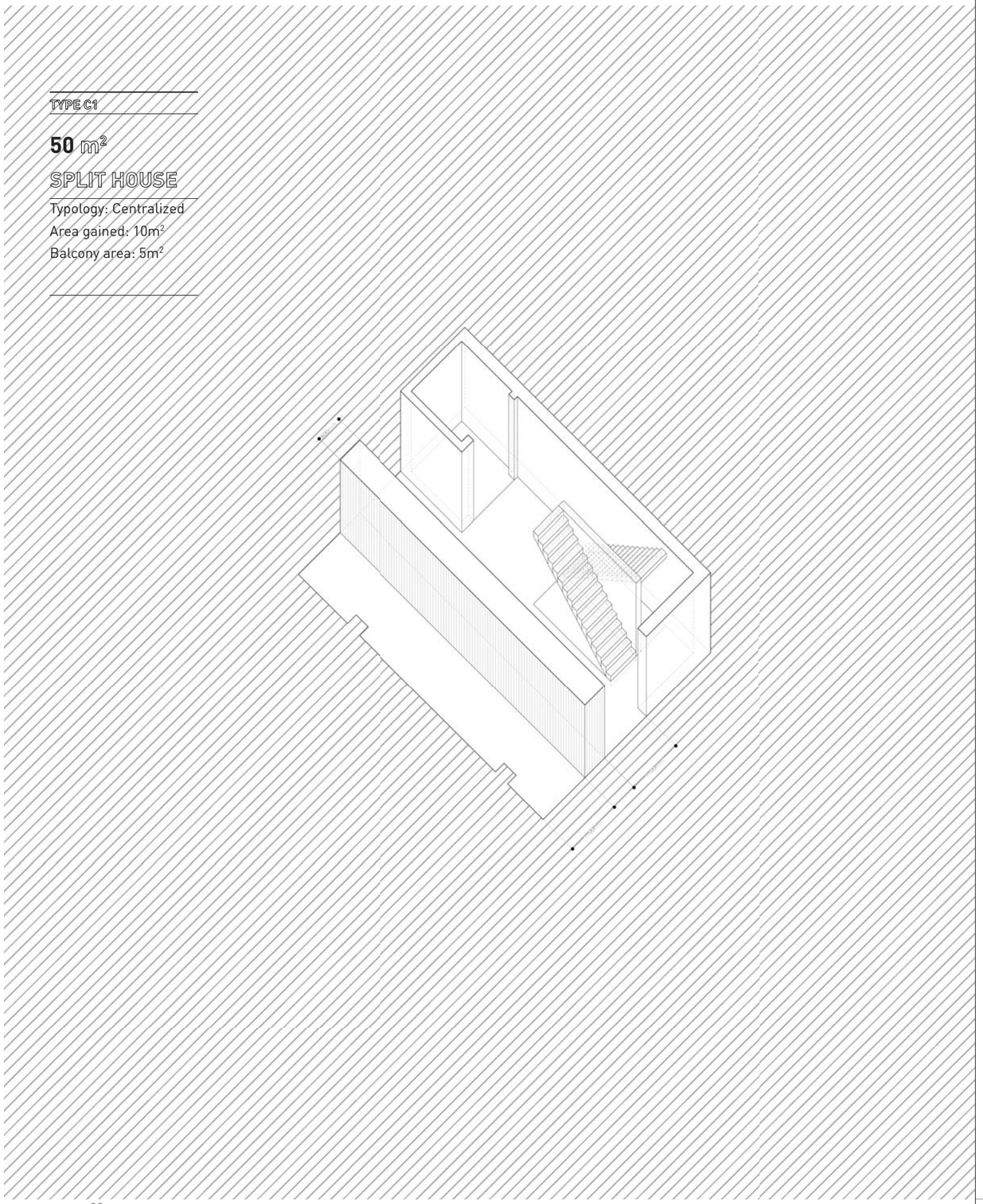
Typology: Wall
Area gained: 45m²
Balcany area: 7m²

TYPE C1

50 m²

SPLIT HOUSE

Typology: Centralized
Area gained: 10m²
Balcony area: 5m²



TYPE C1

50 m²

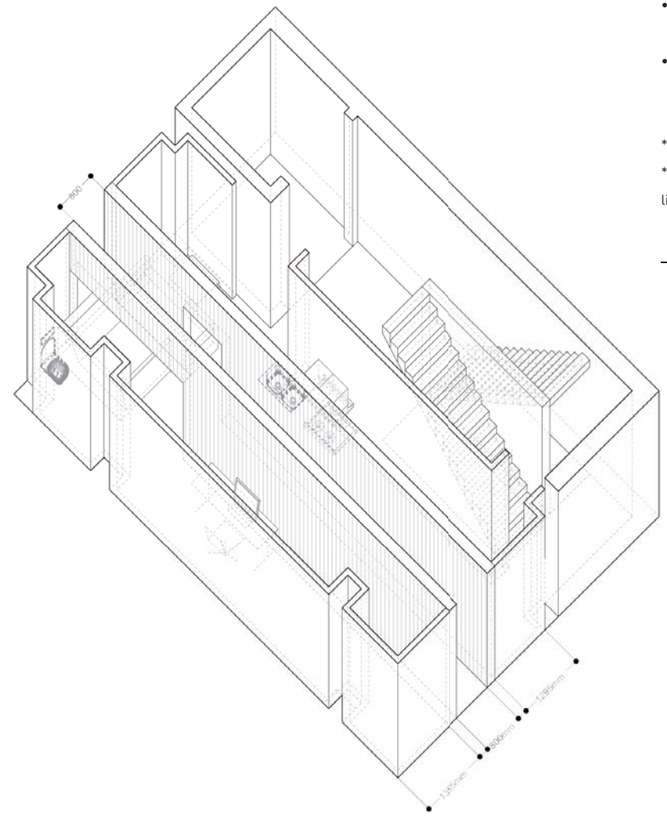
SPLIT HOUSE

Typology: Centralized
Area gained: 10m²
Balcony area: 5m²

SPATIALLY GAINED...

- Two segregate interior volumes
- Central spine embedded with luxury programs

*Lack of sectional differences
*Do not suggest clear natural lighting performance

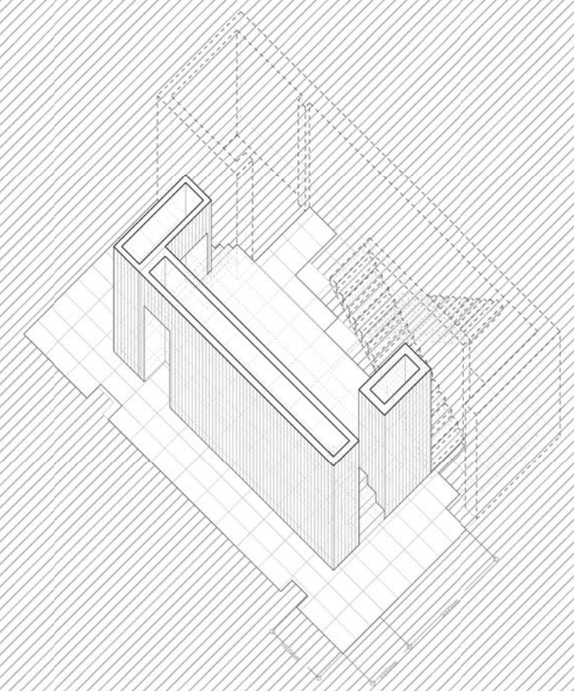


TYPE D1

60m²

CORE HOUSE

Typology: Centralized
Area gained: 20m²
Balcony area: 15m²



TYPE D1

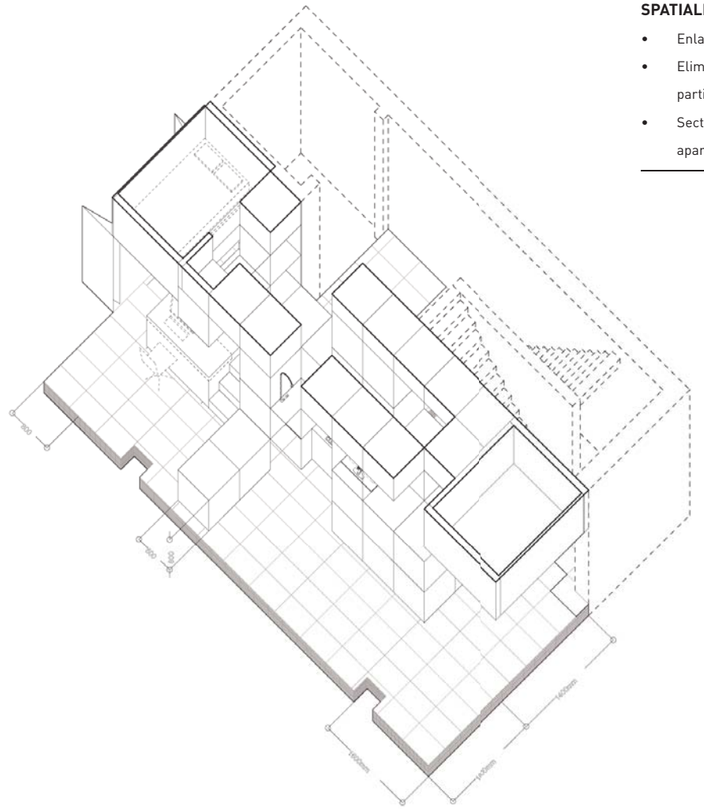
60m²

CORE HOUSE

Typology: Centralized
Area gained: 20m²
Balcony area: 15m²

SPATIALLY GAINED...

- Enlarged Balcony
- Eliminated interior partitions
- Sectional Variation witin apartment

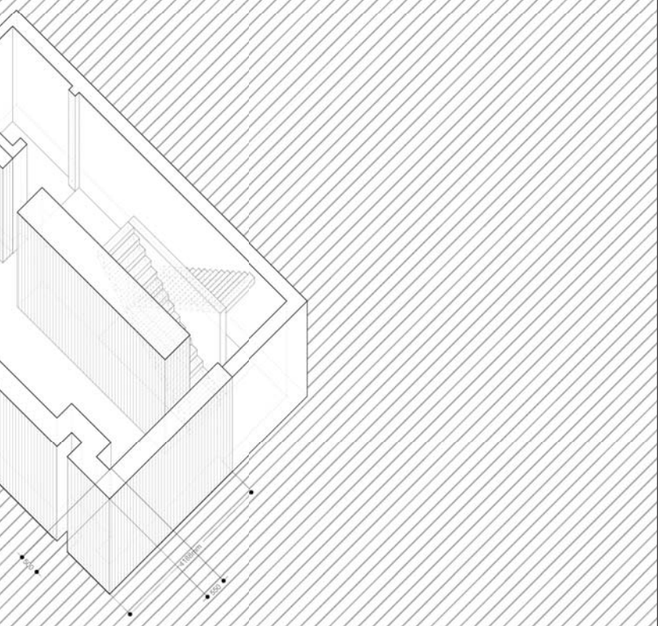


TYPE C1

65m²

SKIN HOUSE

Typology: Peripheral
Area gained: 35m²
Balcony area: 5m²



TYPE C1

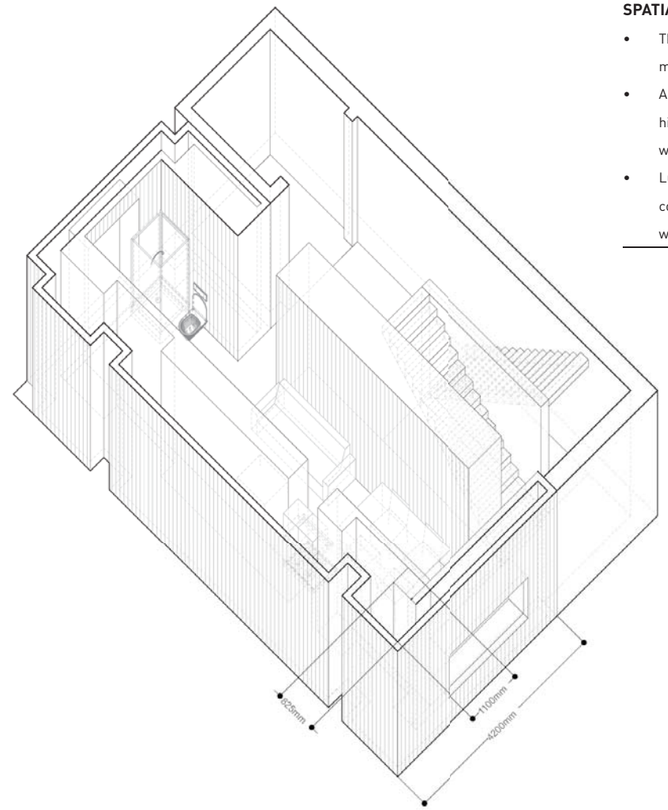
65m²

SKIN HOUSE

Typology: Peripheral
Area gained: 35m²
Balcony area: 5m²

SPATIALLY GAINED...

- The interior is maximally remained
- All services could be hidden at the exterior wall
- Luxurious programs could be embedded within the wall

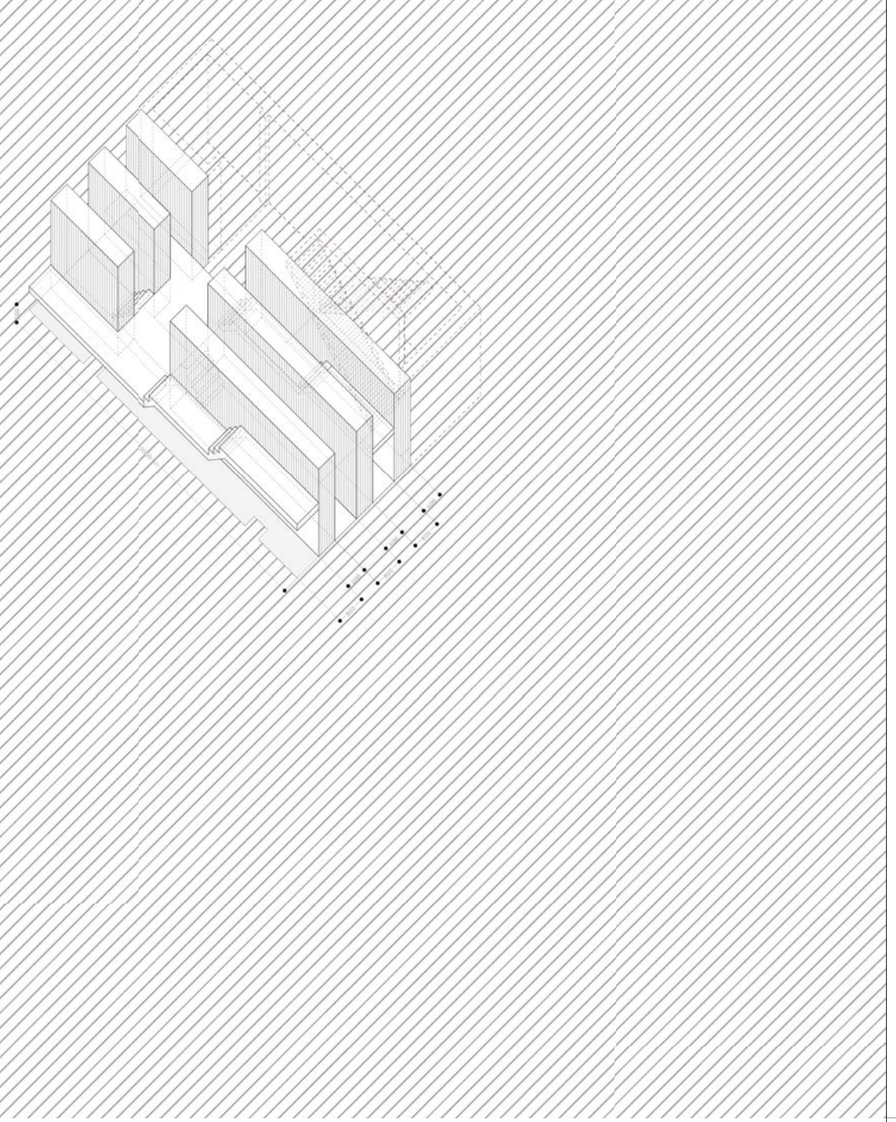


TYPE C1

75m²

SHELVES HOUSE

Typology: Layered
Area gained: 35m²
Balcony area: 10m²



TYPE C1

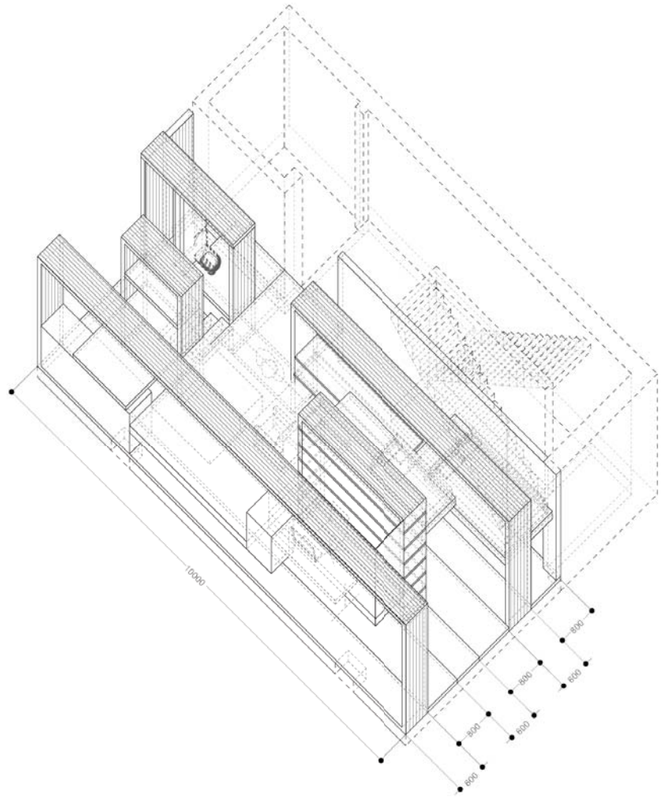
75m²

SHELVES HOUSE

Typology: Layered
Area gained: 35m²
Balcony area: 10m²

SPATIALLY GAINED...

- Numerous semi-private area
- Shelves functions as shared community space
- Shelves functions as internal partitions
- Shelves functions as storage, worktop
- Generous natural lighting within each bay
- Sectional variations along each bay

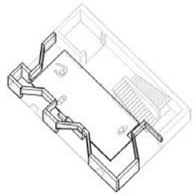


HYPER-LUXURIOUS AT USABLE AREA...

>>>40m²

VI APARTMENT PROPOSAL | Hyper-luxurious unit

60 m² - Luxurious Window 1.0
65 m² - Luxurious Wall 1.0
75 m² - Luxurious Shelves 1.0
80m² - Luxurious Balcony 1.0
80m² - Luxurious Window 2.0
85m² - Luxurious Stairs 1.0
90m² - Luxurious Scissor Stairs 2.0
100m² - Luxurious Ceiling 1.0
Conclusion - Rethinking domestic ways of living



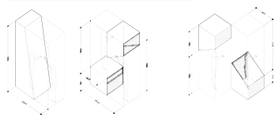
TYPE A1

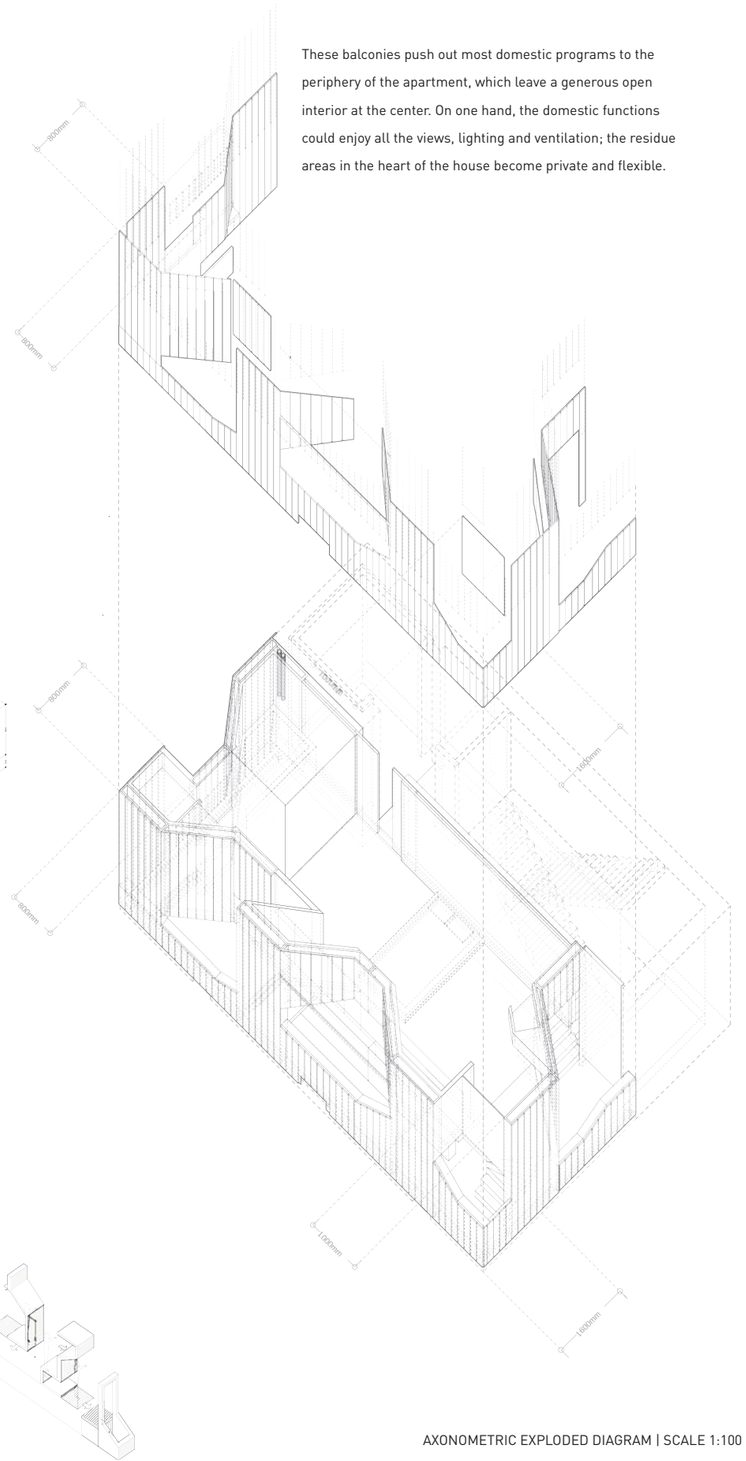
80 m²

WINDOW HOUSE

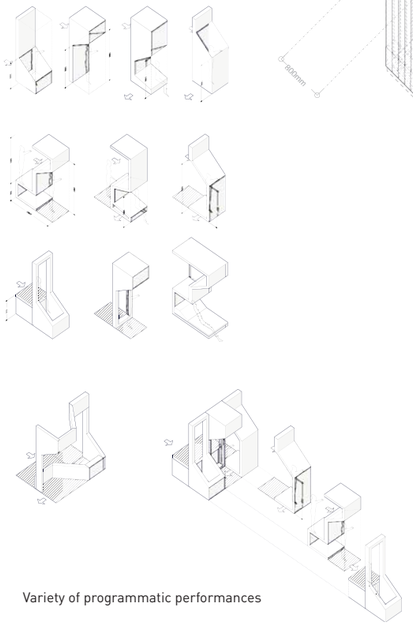
Typology: Envelope
Area gained: 40 m²
Balcony area: 40 m²

Formal Operation:
The façade of apartment is thickened. This ring of volume engulfed different domestic programs.





These balconies push out most domestic programs to the periphery of the apartment, which leave a generous open interior at the center. On one hand, the domestic functions could enjoy all the views, lighting and ventilation; the residue areas in the heart of the house become private and flexible.



Variety of programmatic performances

AXONOMETRIC EXPLODED DIAGRAM | SCALE 1:100

INTERIOR RENDERING OF ONE FACADE

Three types of balcony-like space are generated.

Open Balcony:
Open Balcony:
These balconies are connecting the interior to the exterior volume, all domestic functions could enjoy better view, air and natural lighting.

Object Balcony:
Object Balcony:
These balconies are specifically design to fit different type of domestic furniture for use, such as clothes rack for drying laundry.

Service Balcony:
Service Balcony:
Undesirable service components such as air-conditioner, exhaust fans are fitted at these balconies, they are hidden from sight.

TYPE B1

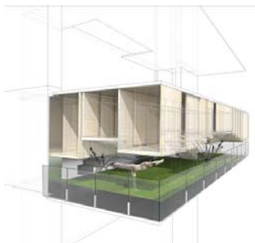
90m²

SUSPENDING HOUSE

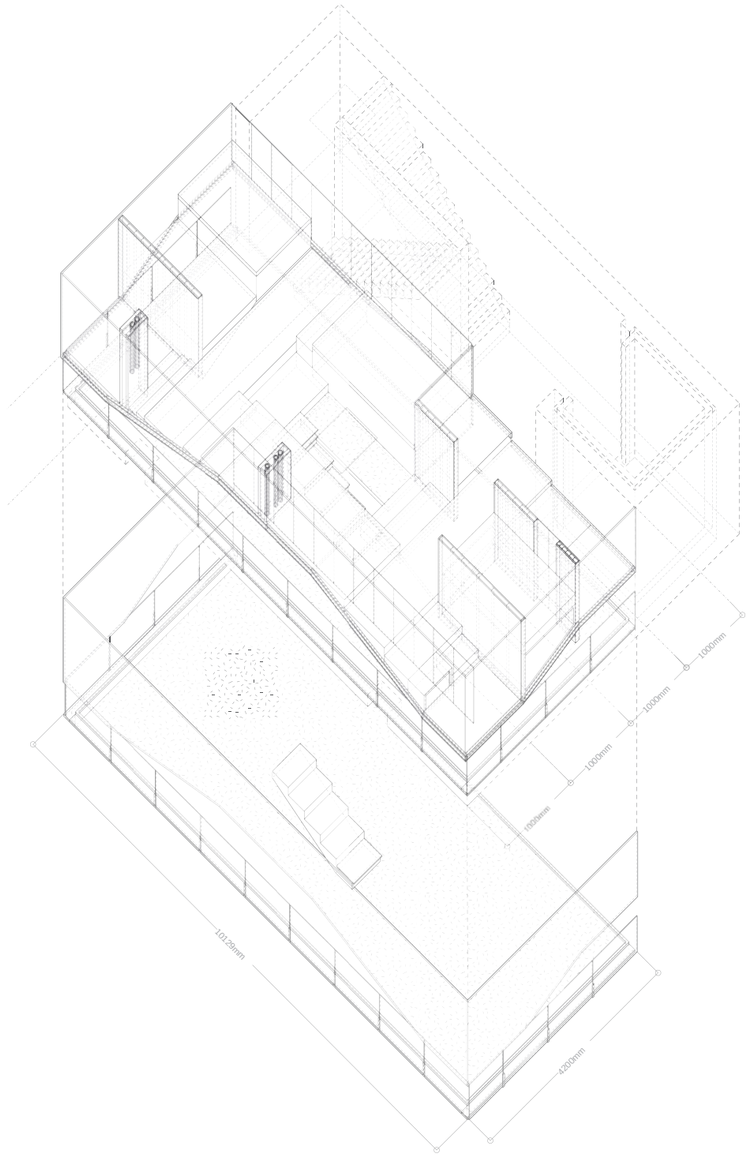
Typology: Suspending
Area gained: 50m²
Balcony area: 40m²

Formal Operation:
Taking the idea of suspended ceilings, rooms are suspended from the ceiling at different heights. Whole ground is free up for exterior use.
In this case, owners could enjoy a whole floor of garden/ swimming pool/ any other outdoor functions.

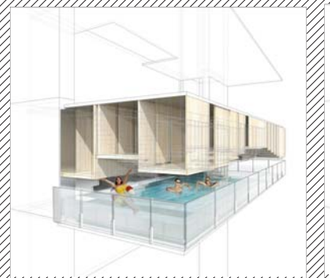
OPTION 1: PRIVATE POOL



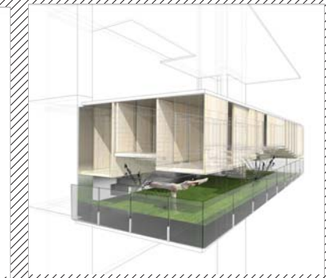
OPTION 2: GARDEN



AXONOMETRIC EXPLODED DIAGRAM | SCALE 1:100

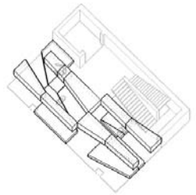


OPTION 1: PRIVATE POOL



OPTION 2: GARDEN

INTERIOR RENDERING OF BALCONY



TYPE C1

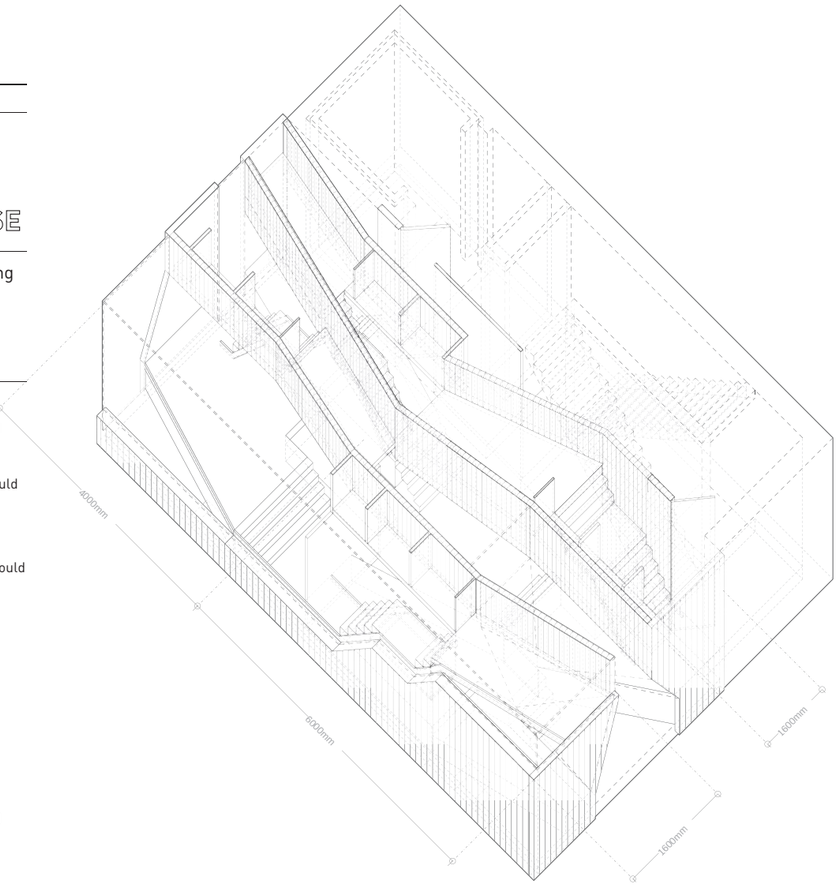
95 m²

SCISSOR STAIR HOUSE

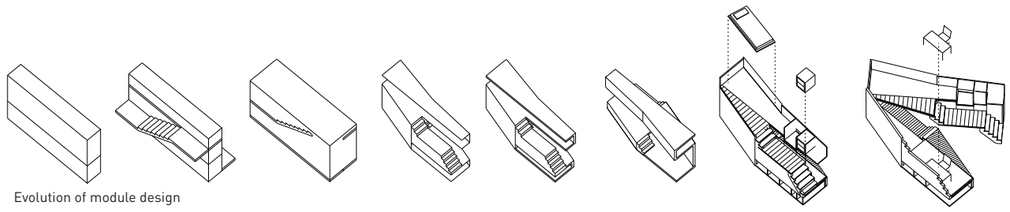
Typology: interlocking
Area gained: 55m²
Balcony area: 20m²

Formal Operation:
Each module is developed from the idea of scissor stairs. Each apartment could fit in four modules. Each module works like a pair scissor stairs which one could enter from the two sides assending to the volume above and below.

Three slices of vertical volumes are generated:
Top: (Headroom 800m)
-Suitable for sleeping
Mid: (Headroom 1800mm)
-Suitable for working and main circulation
Bottom: (Headroom 2200mm)
-Suitable for storage, seating



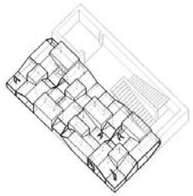
AXONOMETRIC DIAGRAM | SCALE 1:100



Evolution of module design

Three slice of vertical volume are generated:
Top: (Headroom 800m) -Suitable for sleeping
Mid: (Headroom 1800mm) -Suitable for working and main circulation
Bottom: (Headroom 2200mm) -Suitable for storage, seating services

INTERIOR RENDERING OF ONE MODULE



TYPE D1

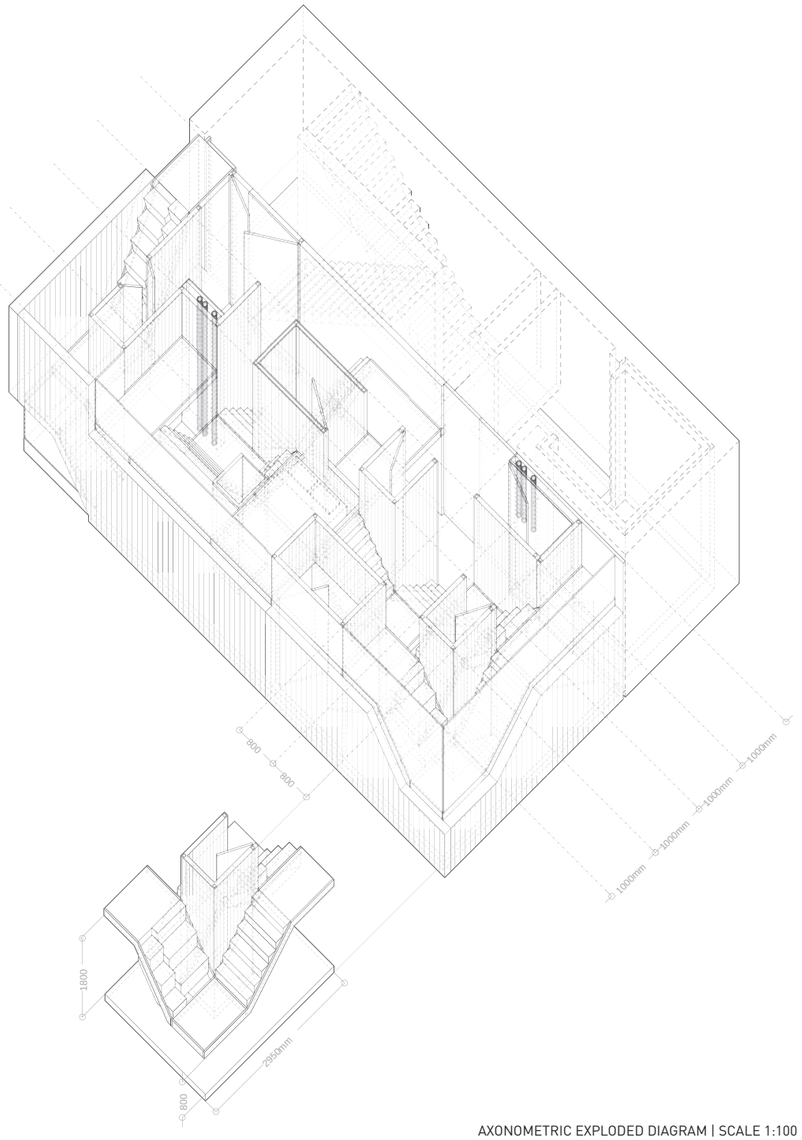
100m²

LOFT HOUSE

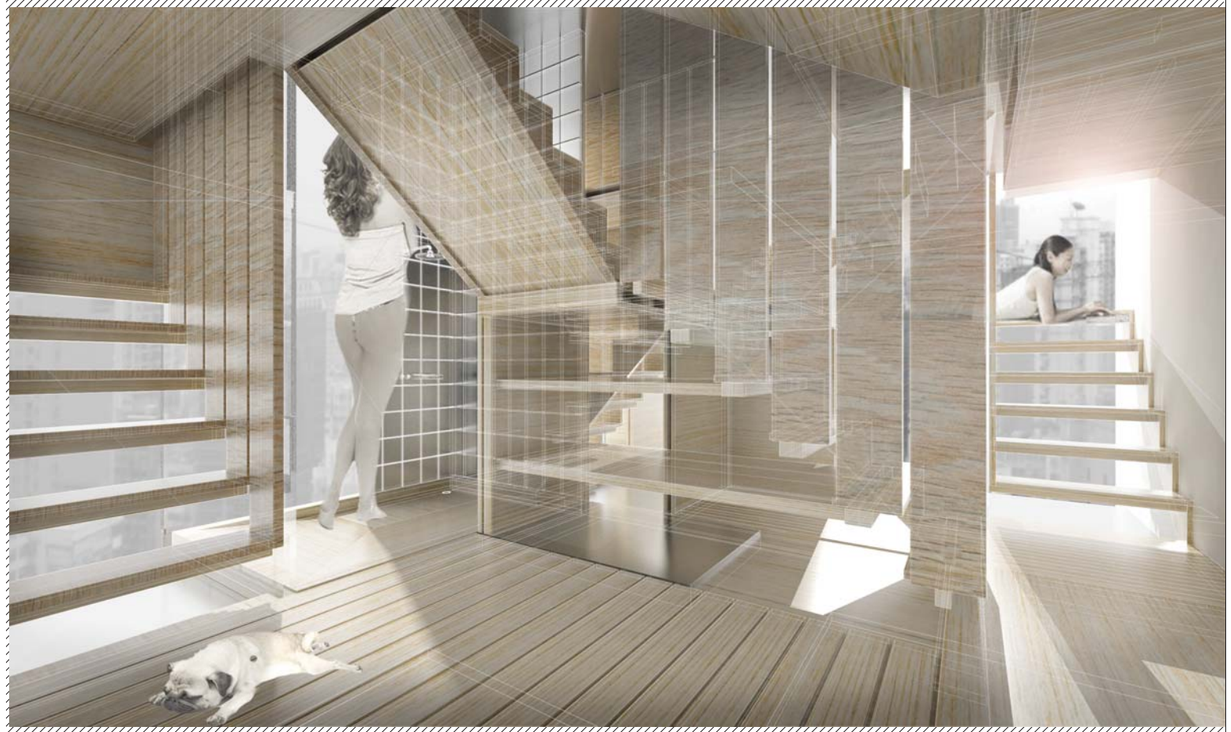
Typology: interlocking
Area gained: 60m²
Balcony area: 20m²

Formal Operation:
Rooms and internal volumes are defined by steps. Owner could enjoy loft-like space which interlock throughout the apartment.The maze-like spatial experience is dynamic. The configuration also generates different degree of privacy within an apartment.

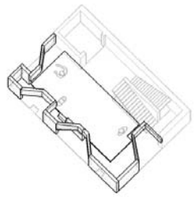
Evolution of module design



AXONOMETRIC EXPLODED DIAGRAM | SCALE 1:100



INTERIOR RENDERING OF ONE MODULE



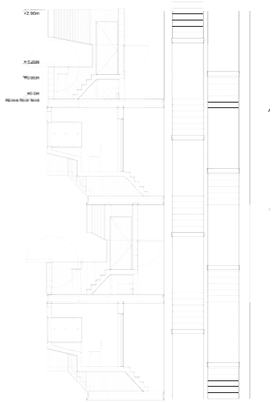
TYPE A1

80 m²

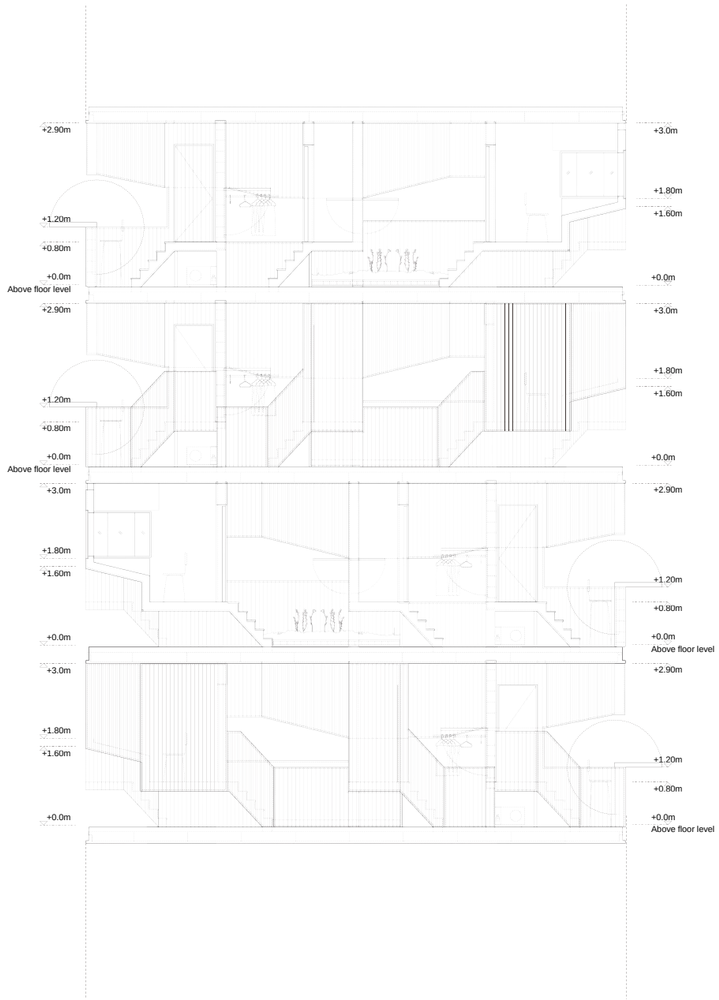
WINDOW HOUSE

Typology: Envelope
Area gained: 40 m²
Balcony area: 40 m²

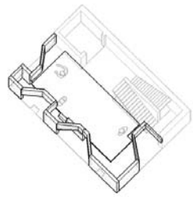
Formal Operation:
The façade of apartment is thickened. This ring of volume engulfed different domestic programs.



SECTIONS BB SCALE 1:200



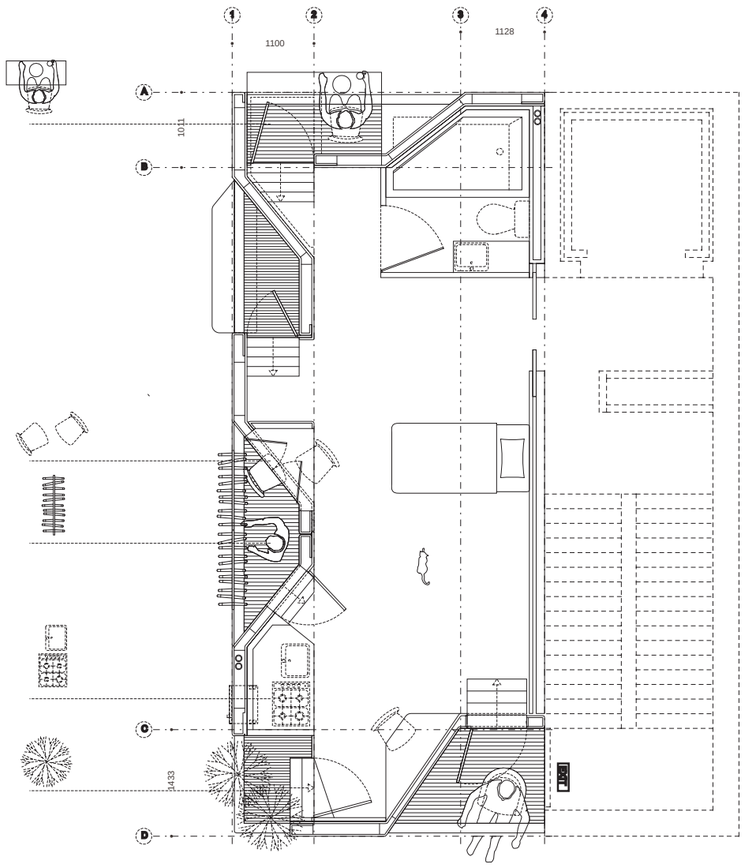
SECTIONS AA SCALE 1:100



TYPE A1

80 m²

WINDOW HOUSE



PLAN 1:100

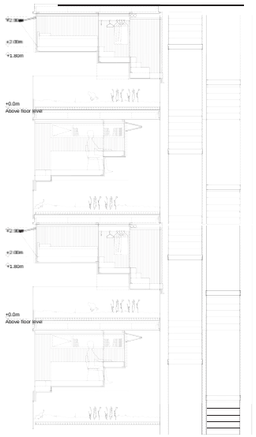
TYPE B1

90m²

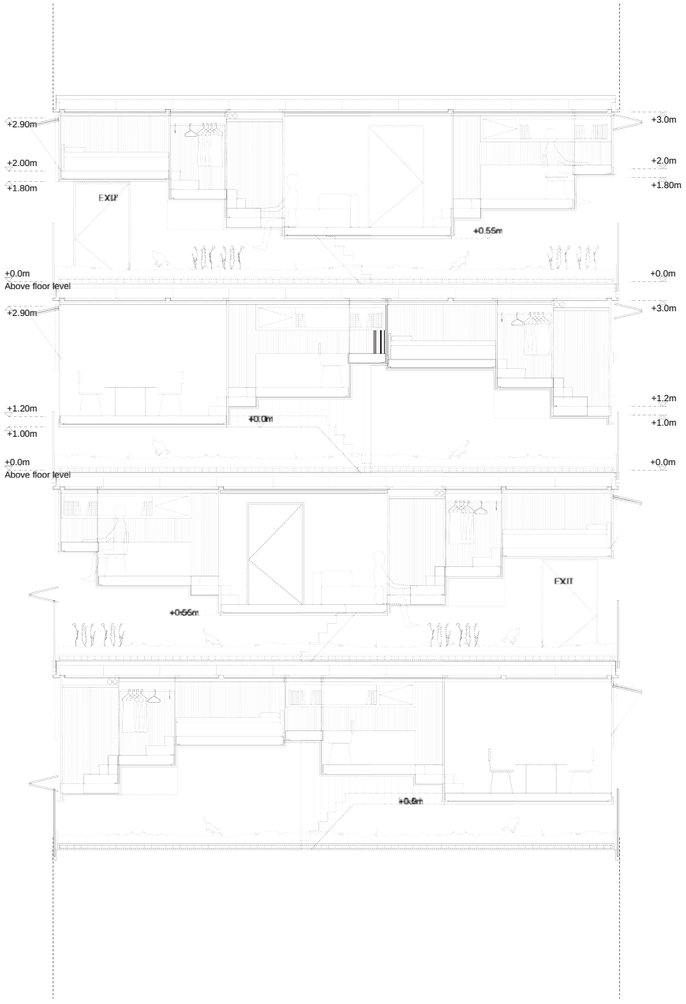
SUSPENDING HOUSE

Typology: Suspending
Area gained: 50m²
Balcony area: 40m²

Formal Operation:
Taking the idea of suspended ceilings, rooms are suspended from the ceiling at different heights. Whole ground is free up for exterior use.
In this case, owners could enjoy a whole floor of garden/ swimming pool/ any other outdoor functions.



SECTIONS BB SCALE 1:200

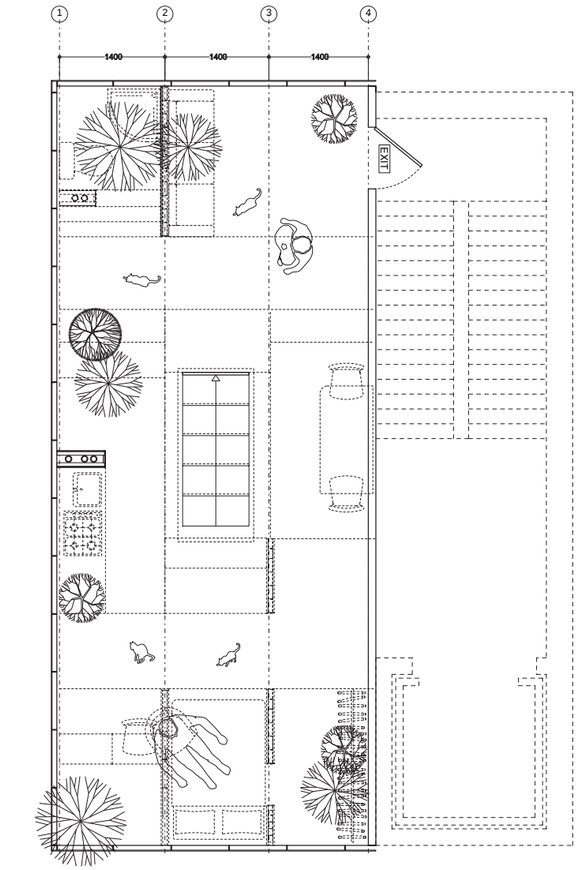


SECTIONS AA SCALE 1:100

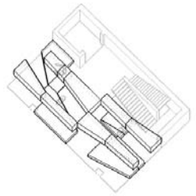
TYPE B1

90m²

SUSPENDING HOUSE



PLAN 1:100



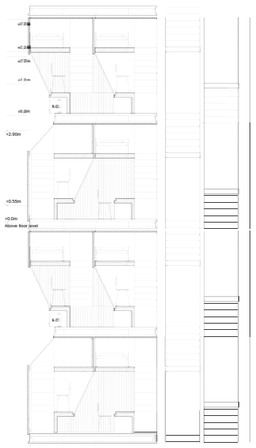
TYPE C1

95 m²

SCISSOR
STAIR HOUSE

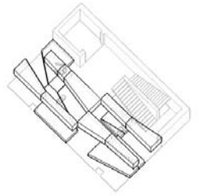
Typology: interlocking
Area gained: 55m²
Balcony area: 20m²

Formal Operation:
Each module is developed from the idea of scissor stairs. Each apartment could fit in four modules. Each module works like a pair scissor stairs which one could enter from the two sides assending to the volumes above and below.



SECTIONS BB SCALE 1:200

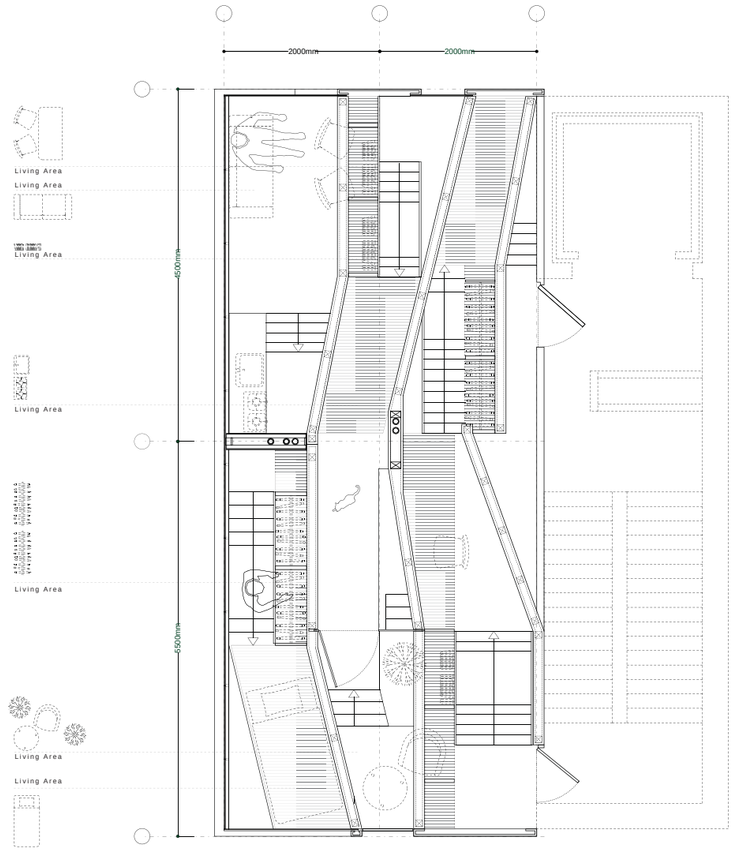
SECTIONS AA SCALE 1:100



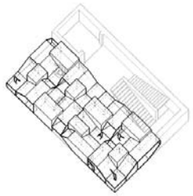
TYPE C1

95 m²

SCISSOR
STAIR HOUSE



PLAN 1:100



TYPE D1

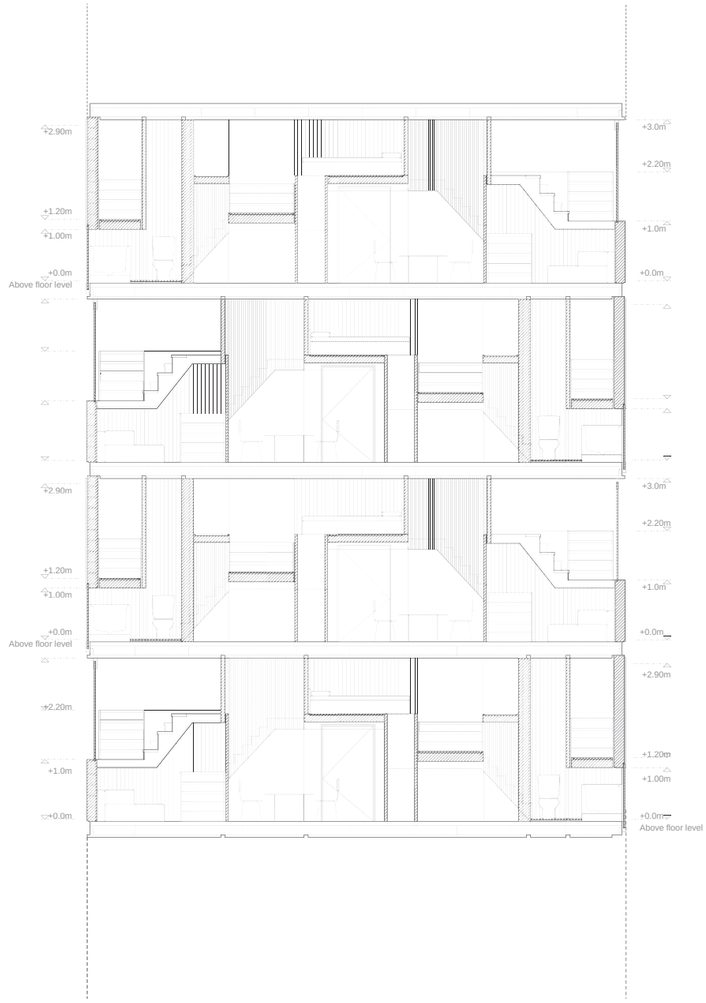
100m²

LOFT HOUSE

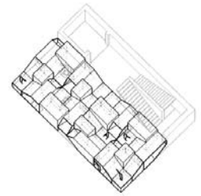
Typology: interlocking
Area gained: 60m²
Balcony area: 20m²

Formal Operation:
Rooms and internal volume are defined by steps. Owner could enjoy loft-like space which interlock throughout the apartment. The maze-like spatial experience is dynamic, and creates different degree of privacy within an apartment

SECTIONS BB SCALE 1:200



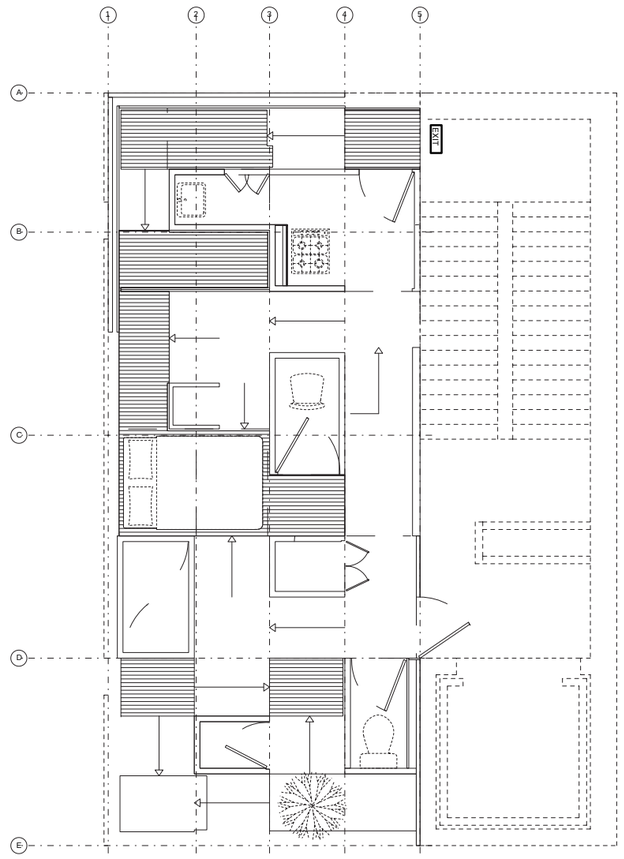
SECTIONS AA SCALE 1:100



TYPE D1

100m²

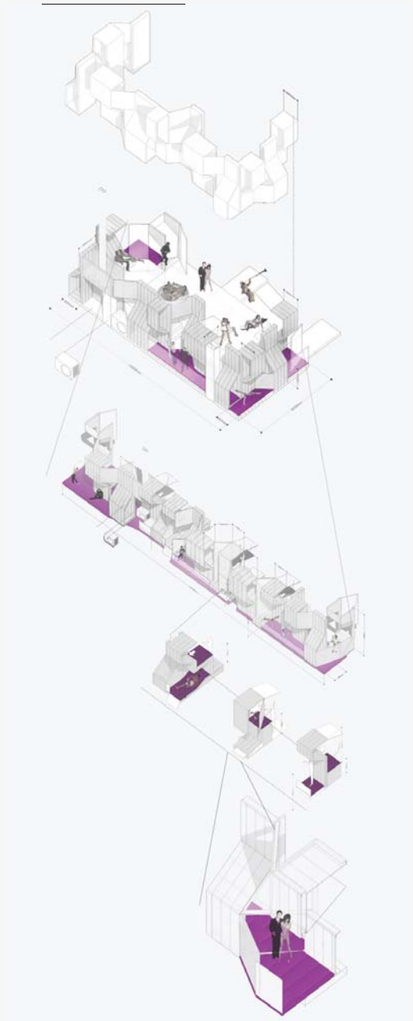
LOFT HOUSE



TYPE A1

80 m²

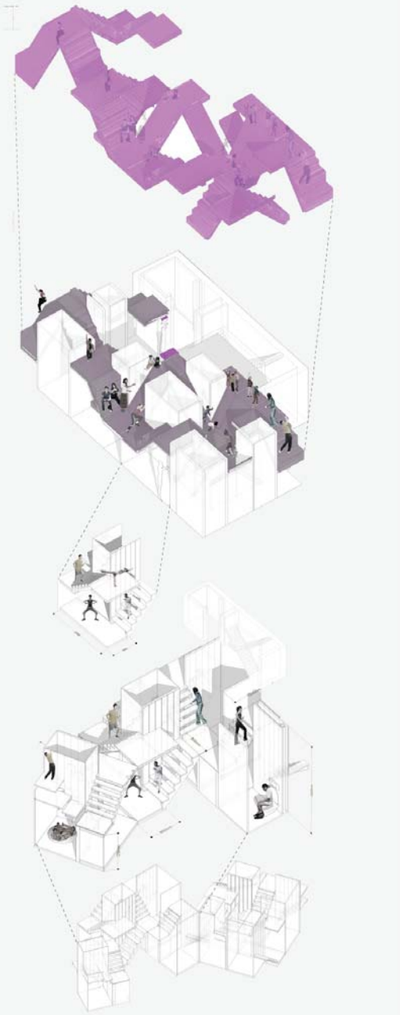
WINDOW HOUSE



TYPE D1

100m²

LOFT HOUSE

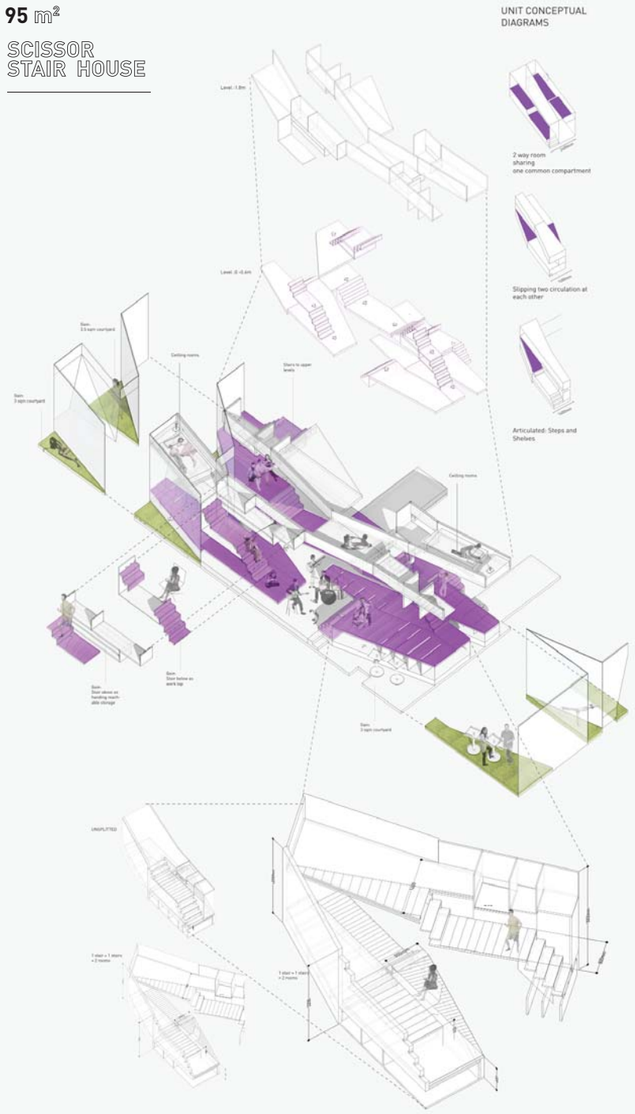


118

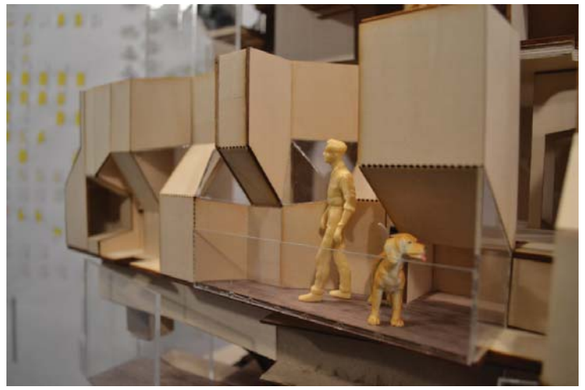
TYPE C1

95 m²

SCISSOR STAIR HOUSE



119



FINAL PRESENTATION MODEL 1:25

FINAL PRESENTATION MODEL 1:25

C I T Y

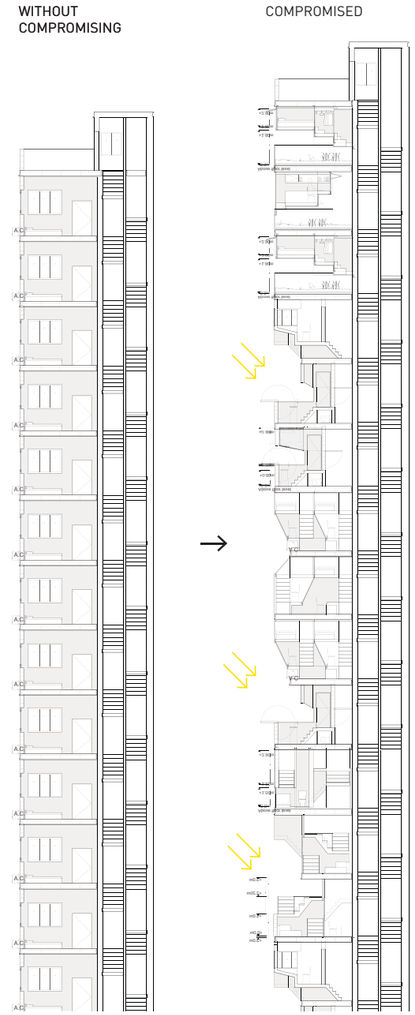
IMPLICATIONS

SCOPE | TOWER SCALE

This chapter acknowledges the implications of design at a tower-scale.

Imagining architects and developers are taking a new mentality in designing each apartment, the design of each Pencil Tower will change. Thus the cityscape will not be comprised of homogeneous units.

In this chapter, three prominent impacts are identified – the freeing up of elevations, the shifting of floor levels and the emergence of a new city image.

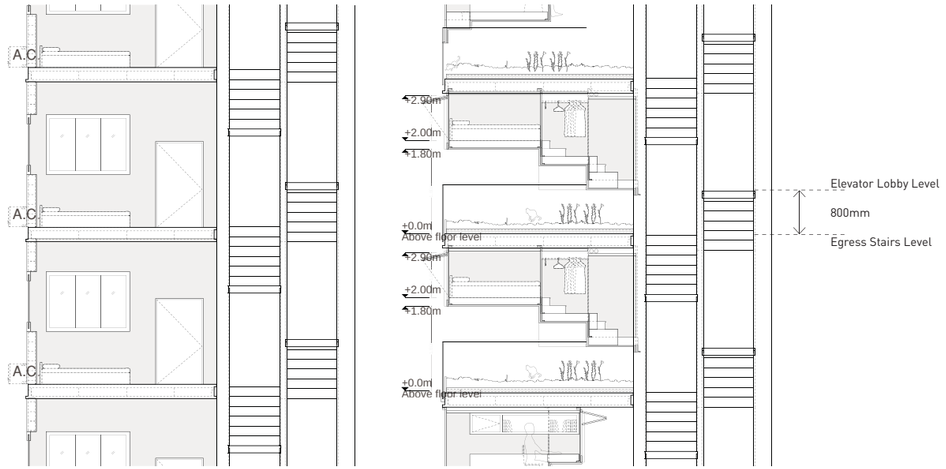


IMPACT 01: FREE UP ELEVATIONS

MUTUAL BENEFIT BETWEEN FLOORS

Conventionally, the design of every floor is standardized. As a result, the environmental performance, such as natural lighting and ventilation, is not responding to the context around it.

Alternatively, designing each unit specifically allows a more context-responsive design. Architects of adjacent floors could work hand-in-hand, thus, this way of co-operation facilitates design proposals that benefit both units. For instance, façade geometry of neighboring units could be compromised, so that both units are enjoying better views, lighting and ventilation performance.



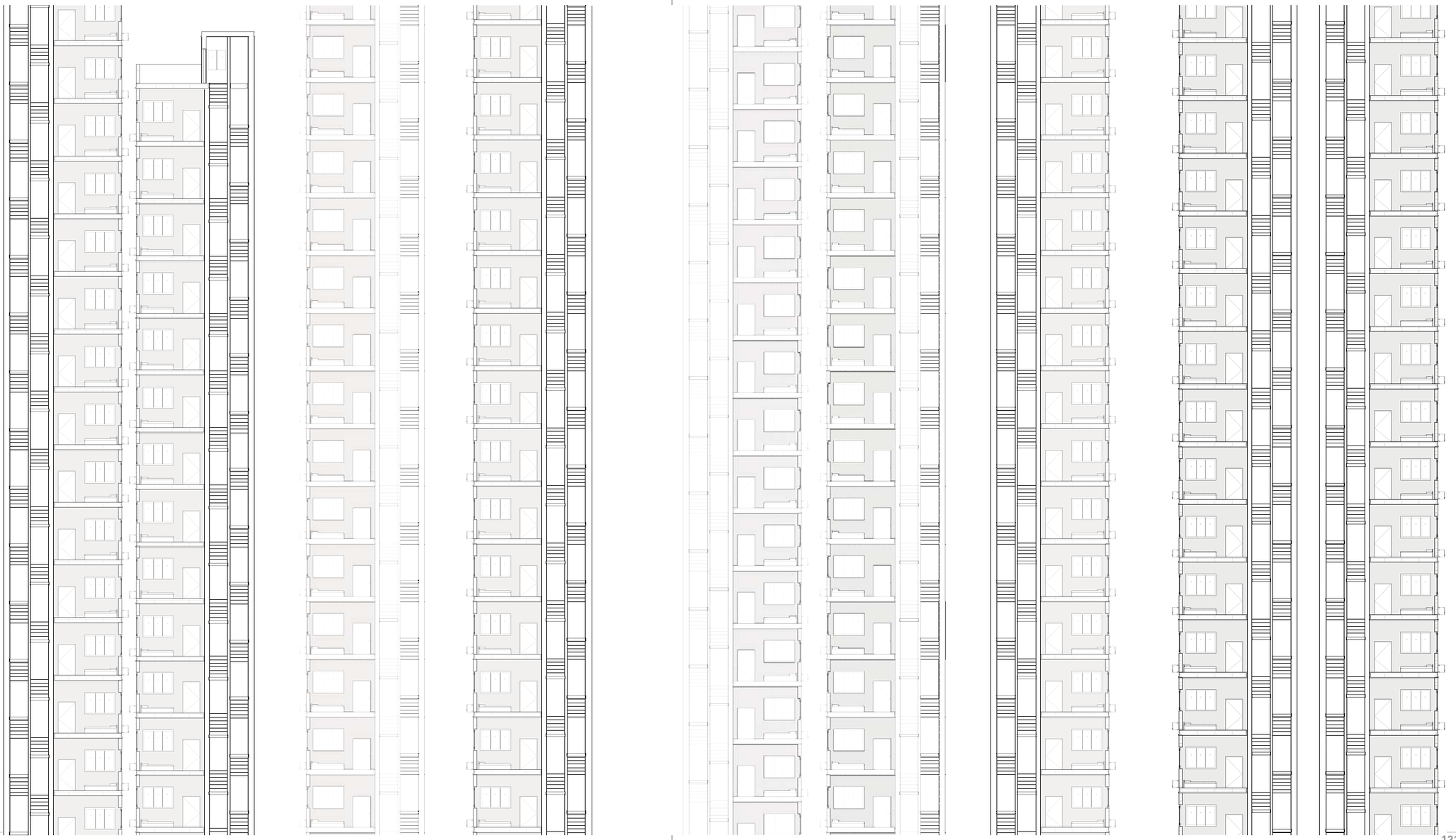
IMPLICATION 2: FLEXIBLE ENTRANCE LEVELS

FREEING UP LIFT LOBBY ENTRANCES

Sections of the conventional Pencil Tower are monotonous. It is common that the landings of egress stairs determine the floor levels of each unit. Then, these levels suggest where elevator is landing accordingly. As a result, lift lobbies and stair entrances confine each apartment at the same floor level.

In fact, where the elevator arrives is not necessary to be where the egress stair lands. By freeing up the lift lobby from the stair, it could allow a generous sectional variation within each apartment. In most of the design proposals, the lift lobbies are raised 800mm above their stair lobbies. Inspite of the fact that 800mm is as subtle as four rises of steps, this move facilitates a dynamic sectional experience within the tower.

SECTIONAL SIMULATION OF TWO BLOCKS OF CITY FABRICS

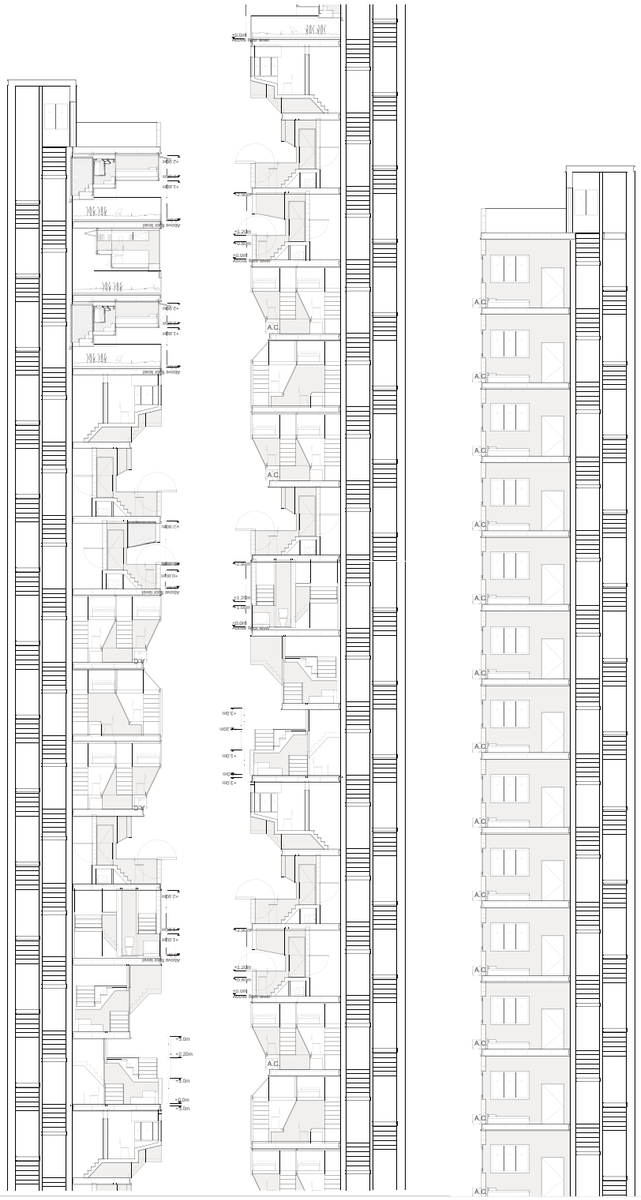


CONCLUSION | AN URBAN VISION

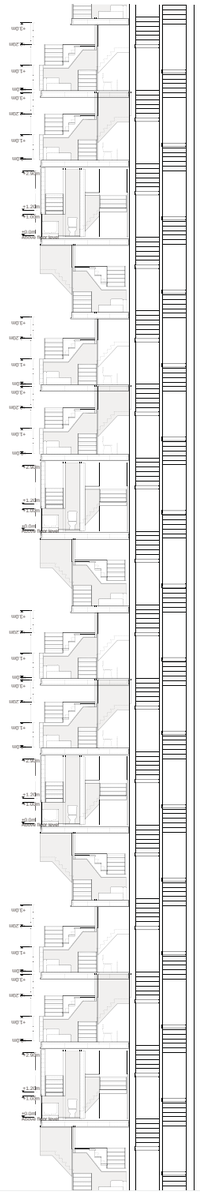
In order to maximize the design efficiency and economic value of the residential projects, developers of Hong Kong have created lots of Pencil Towers with little variations. As these buildings are built on small land parcels that are commonly found in the old neighborhood, they often exist in close proximity. The monotonous elevations of the cookie-cutter buildings thus create an expected mundane cityscape.

...THE NEW PENCIL TOWERS WILL HELP SHAPING A MIXED CITYSCAPE THAT ELABORATES THE HETEROGENEOUS QUALITY OF THE CITY.

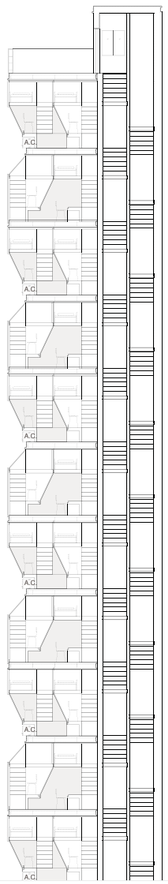
SECTIONAL SIMULATION OF TWO BLOCKS OF CITY FABRICS



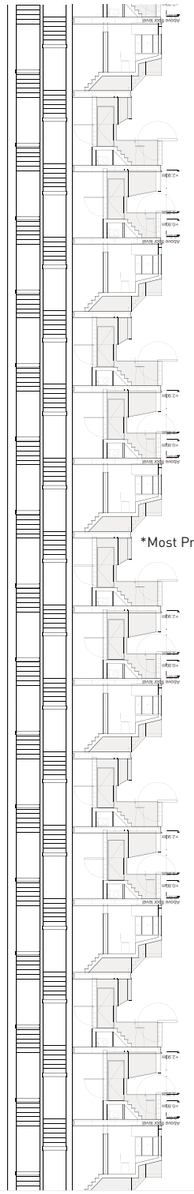
Designer A



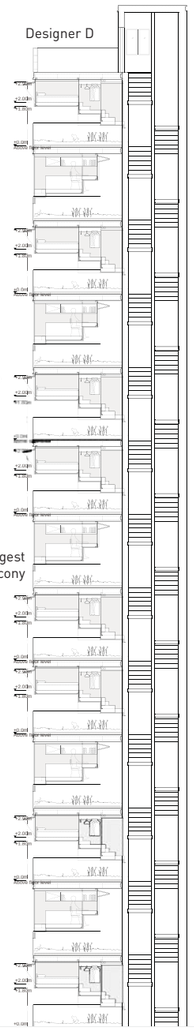
Designer B



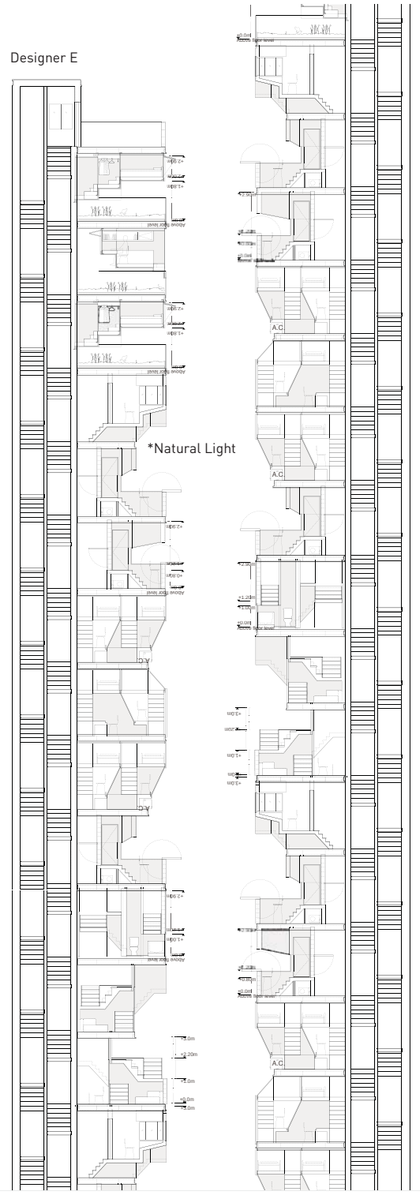
Designer C



Designer D



Designer E



CONCLUSION | AN URBAN VISION

However, with the new design mentality explored, the eight design proposals proved that Pencil Towers with better environmental performances and living pleasures can be achieved. These solutions provide the developers with better alternatives without compromising their economic interests. The city will project an unprecedented image. With the new design direction, not only the residents' presence are individually reflected at each floor, the agglomeration of different design units will create a diverse facade that is unique within the neighbourhood. Finally, the new Pencil Towers will help shaping a mixed cityscape that elaborates the heterogeneous quality of the city.

ARCHIVES

ARCHIVES | Model Documentation

134

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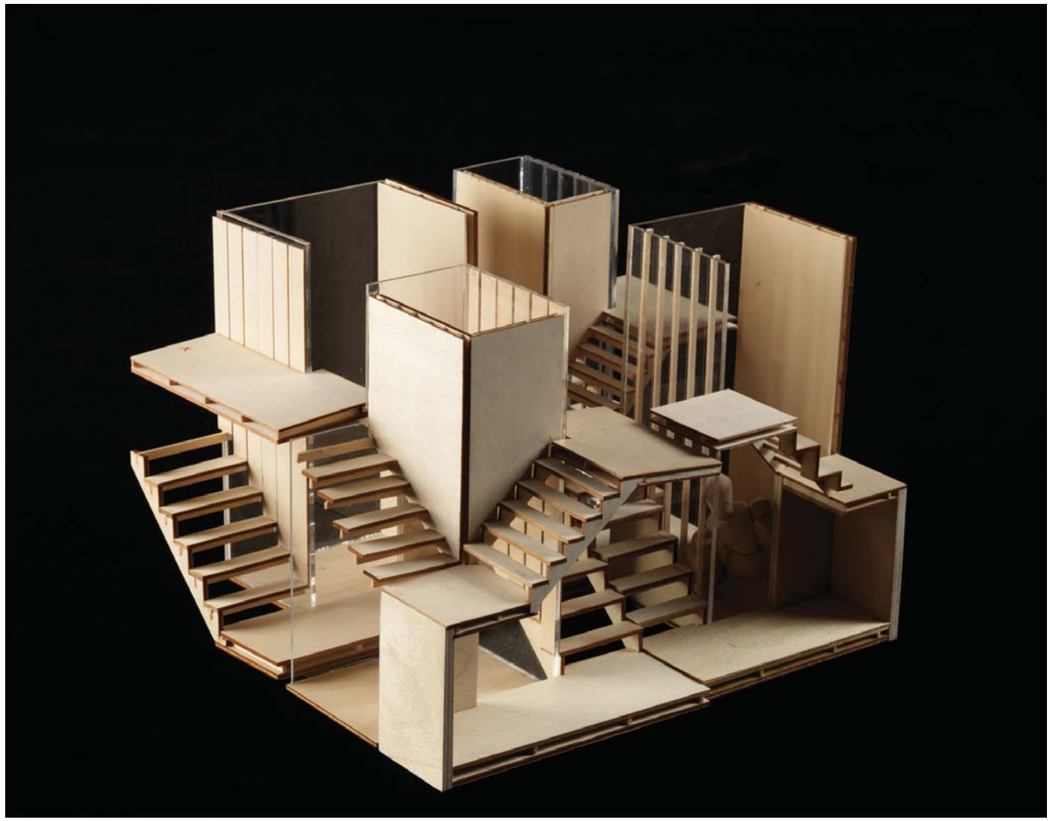
MODEL ARCHIVES

MODULE TYPE: LOFT HOUSE

SCALE : 1:10

NO. OF MODULES: 4

The total footprint of this model is equal to half of the floor area at one Pencil Tower apartment



1 | Overall View 1

2

3

4

5

1 | OVERALL VIEW 1
2 | INTERIOR TOP VIEW
3 | ELEVATION VIEW OF MODULES
4 | ELEVATION VIEW
5 | OVERALL VIEW 2

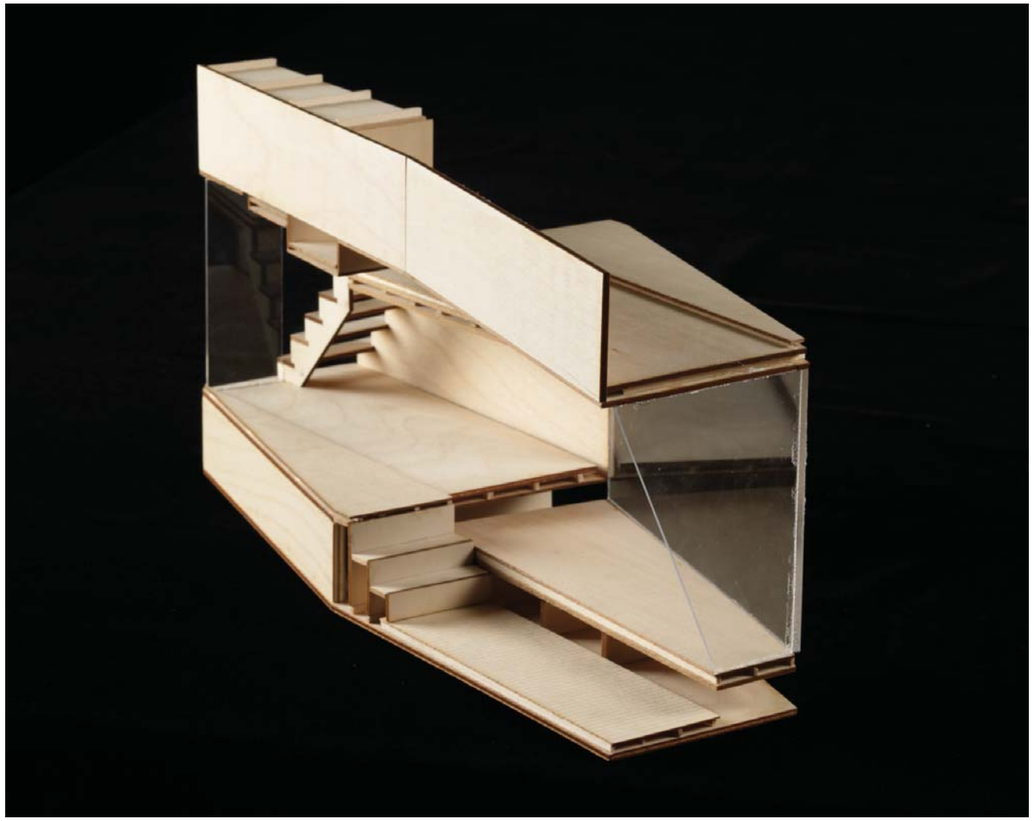
MODEL ARCHIVES

MODULE TYPE: SCISSOR ROOM

SCALE : 1:10

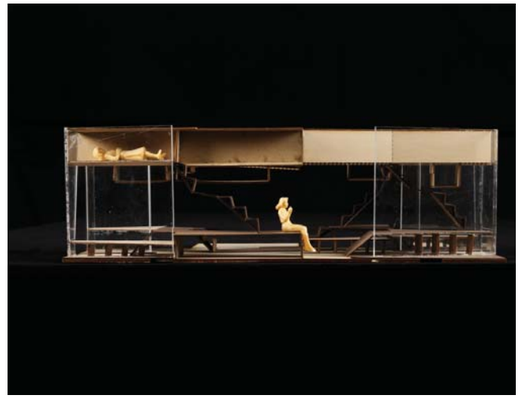
NO. OF MODULES: 4

The total footprint of this model is equal to one-forth of the floor area at one Pencil Tower apartment.



1 | Overall View 1

2



3

4

5

1 | OVERALL VIEW 1 | SCALE 1:10

2 | ELEVATION VIEW | SCALE 1:10

3 | APARTMENT TOP VIEW | SCALE 1:25

4 | ELEVATION VIEW | SCALE 1:25

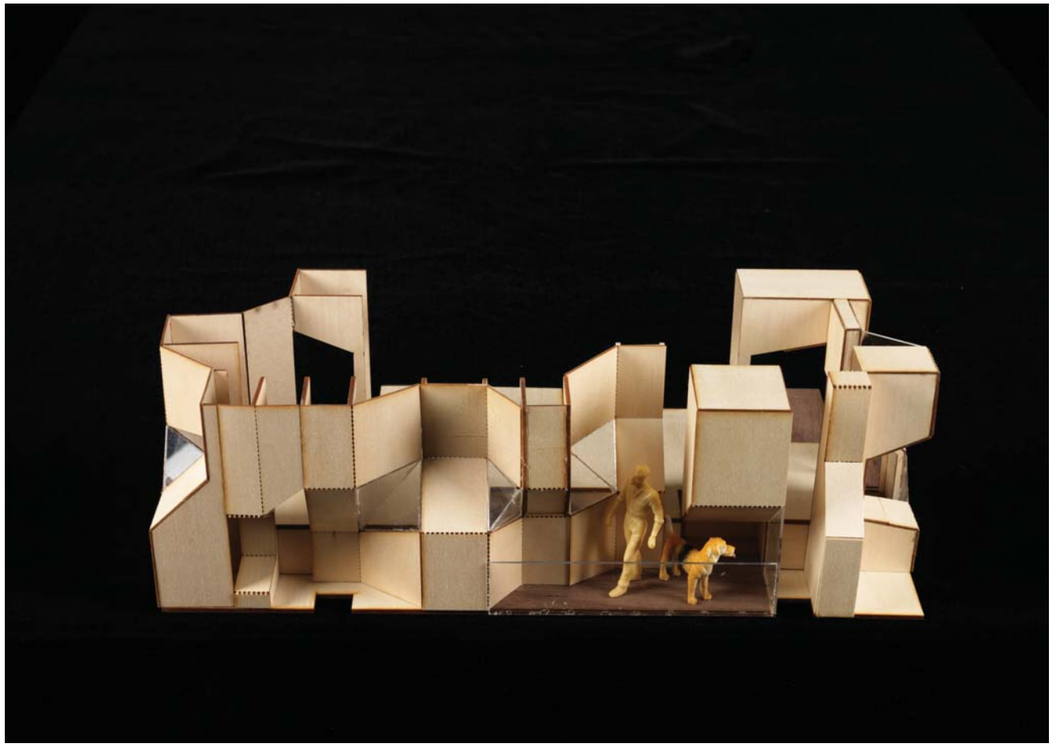
5 | OVERALL VIEW 2 | SCALE 1:10

MODEL ARCHIVES

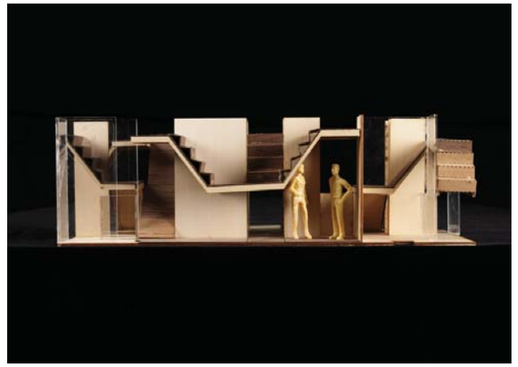
UNIT VARIATIONS

SCALE : 1:25

Models are built at full apartment size (10m x 4m). Services core, lobby and egress stairs are excluded .

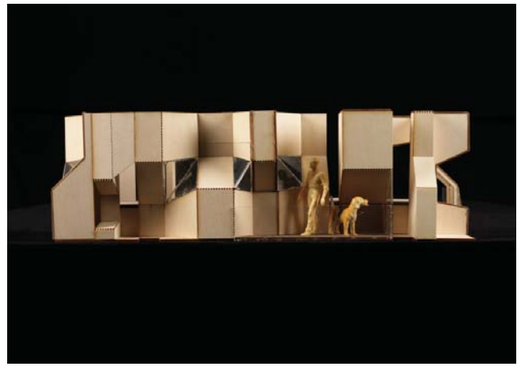


1 SKIN HOUSE | TOP VIEW | SCALE 1:25



2

3



4

5

2 | LOFT HOUSE | SECTIONAL VIEW | SCALE 1:25
3 | CEILING HOUSE | SECTIONAL VIEW | SCALE 1:25
4 | SKIN HOUSE | ELEVATION VIEW | SCALE 1:25
5 | SCISSOR HOUSE | SECTIONAL VIEW | SCALE 1:25

FINAL PRESENTATION MODEL | TOWER WITH PLUG-IN UNITS

FINAL PRESENTATION MODEL | ELEVATION VIEW | TOWER WITH PLUG-IN UNITS

PUBLIC PRESENTATION PANEL | | MEDIA LAB,MIT, CAMBRIDGE| DEC 15, 2011

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