

WELCOME TO HOME

date: 09.2022-12.2022
type: academic project
site location: Las Vegas, America
instructor email:xutong119@126.com

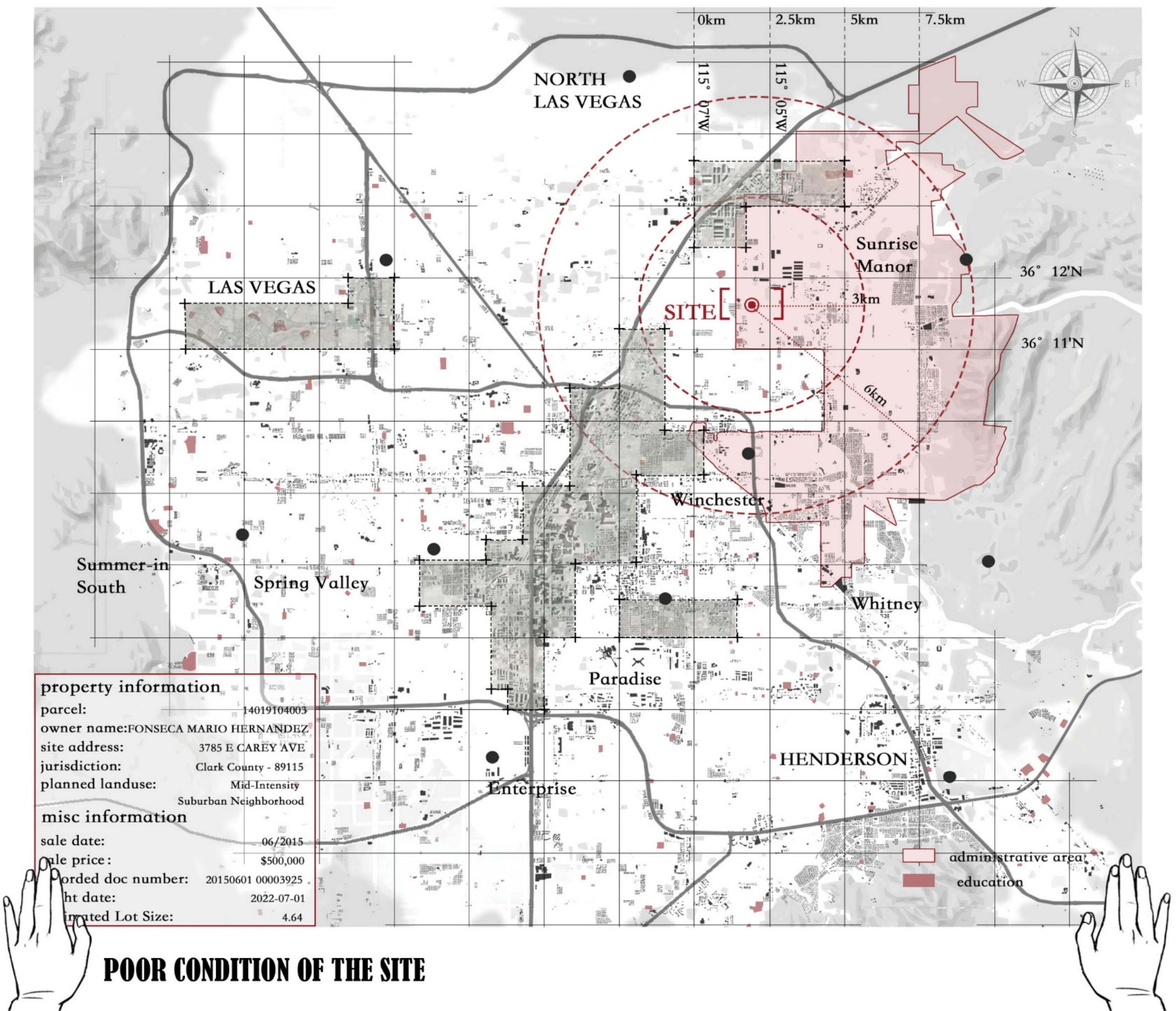
individual work

In this social housing development project in Las Vegas, I focus on the urban improvement of low-income residents' living environment from a comprehensive real estate operation, including planning, design, investment, and operation.

Las Vegas, Nevada, is a tourist city where gambling is the mainstay of the economy; with the most significant social inequity and disparity in development among US cities, **the housing supply shortage** has become the leading force for high crime and unemployment rates. The project aims to provide affordable housing for these groups and introduce public infrastructures in the housing community. Besides the spatial operation, I also applied **financial modeling** for calibrating the feasibility through financing structure analysis, cash flow, and IRR estimation to achieve an economic balance between **the government, developers, and individuals**. Furthermore, I improve the workforce and vitality of the community by introducing **training and supporting facilities**.

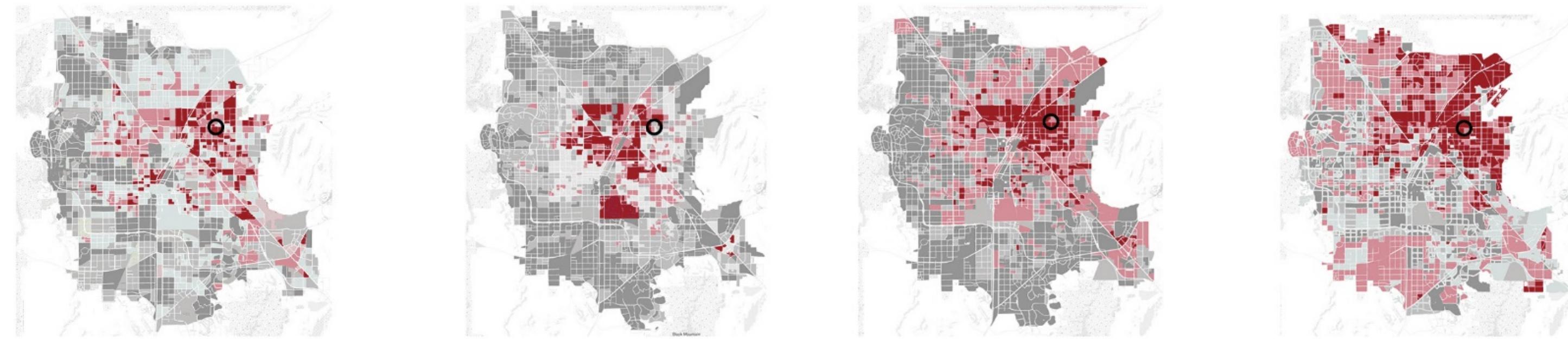


SITE LOCATION AND TRADING INFORMATION

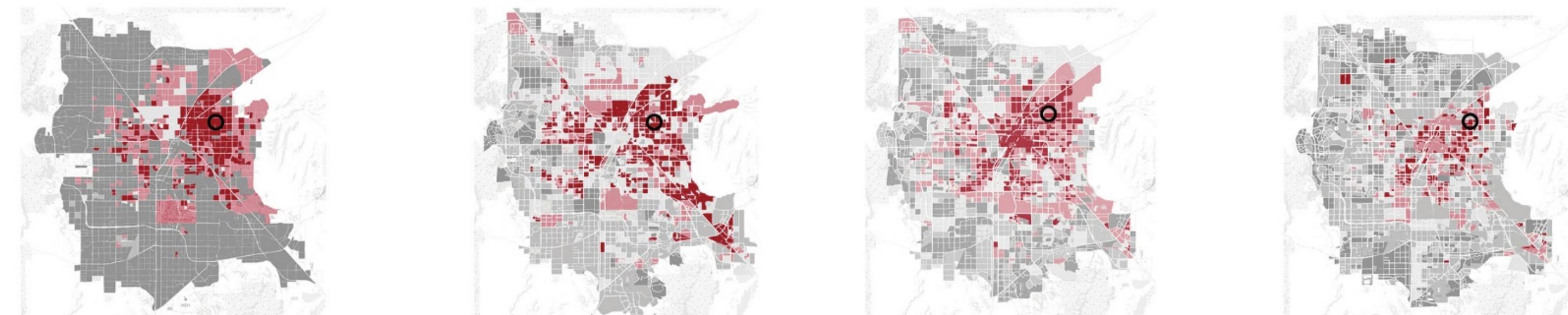


POOR CONDITION OF THE SITE

Unemployment rate building age education level household size



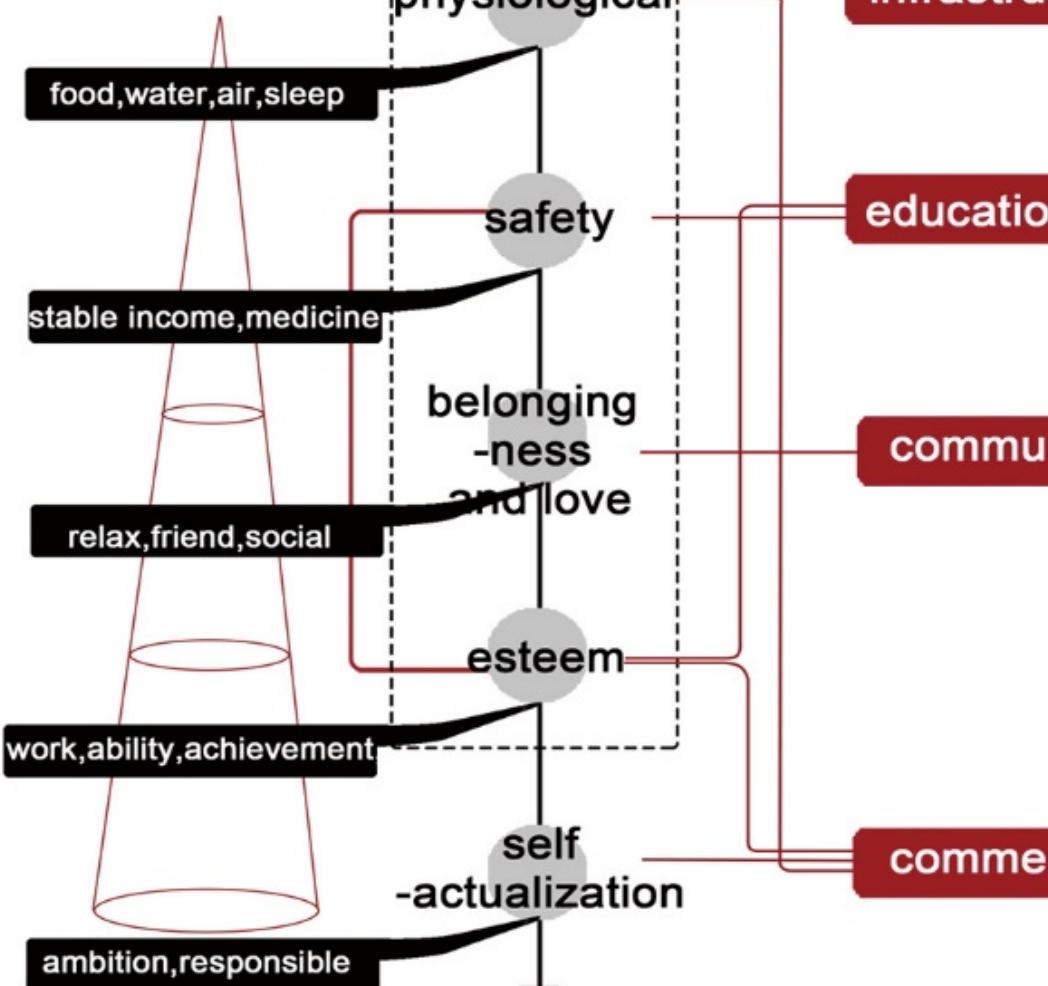
Ethnic distribution best neighbourhood household income House rentals



DESIGN THEORY AND FUNCTION



Maslow's hierarchy of needs

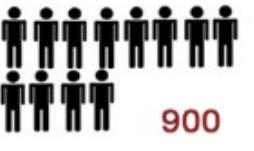


Function



Users

stable in-come



local residents



other workers



people needs help

unemployee



students



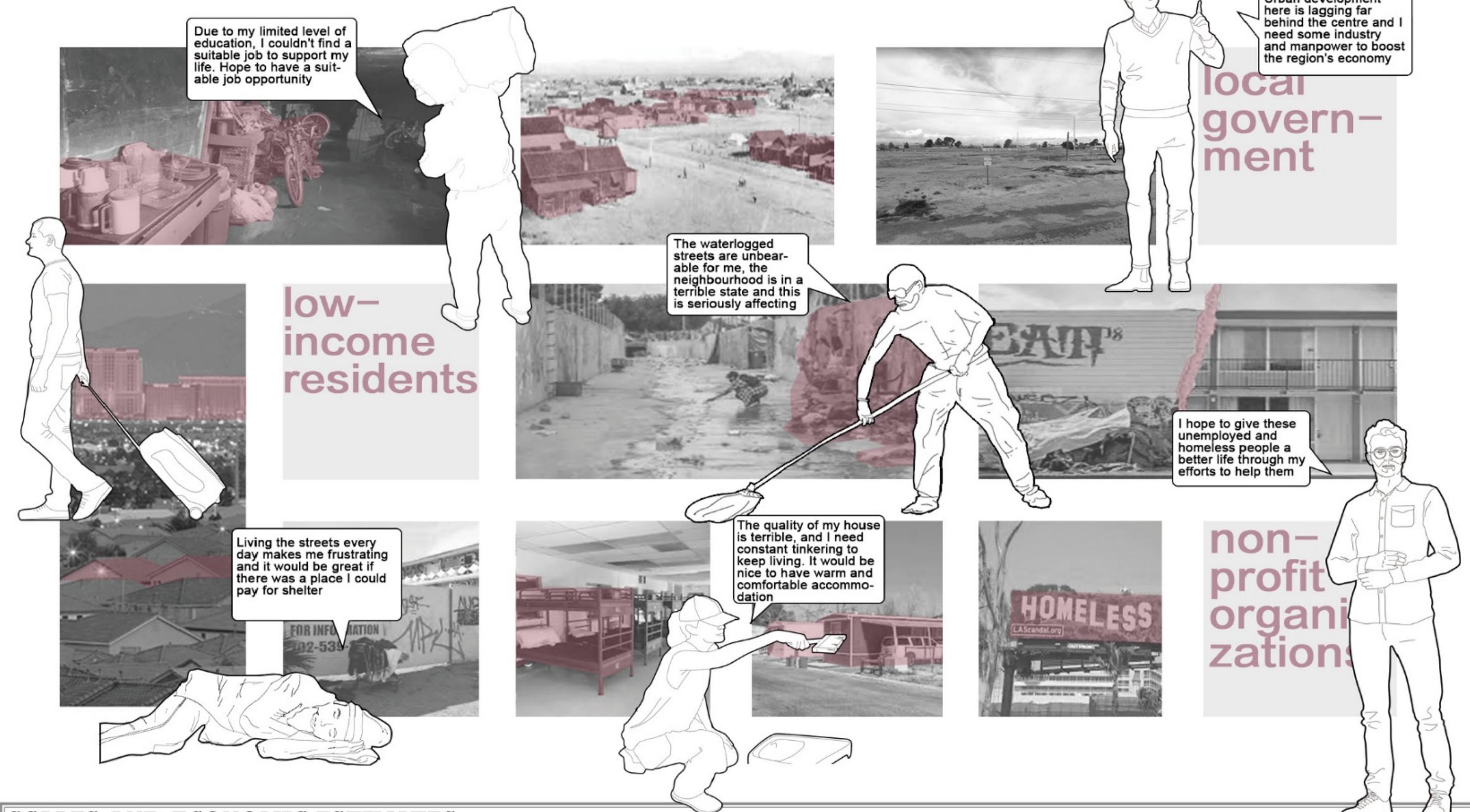
children



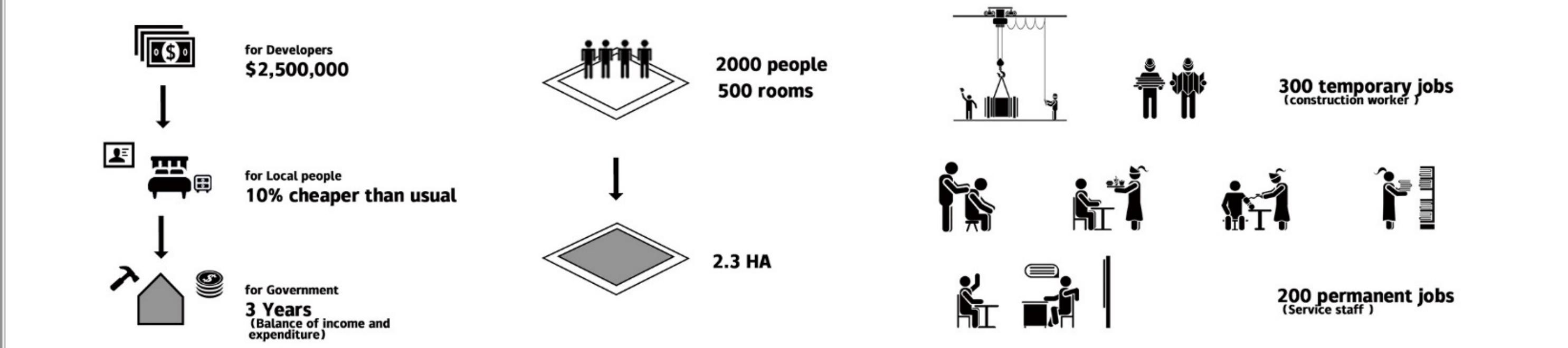
tramps



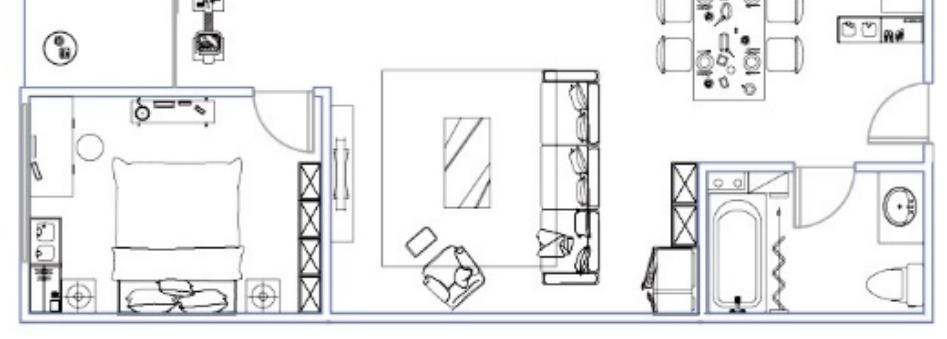
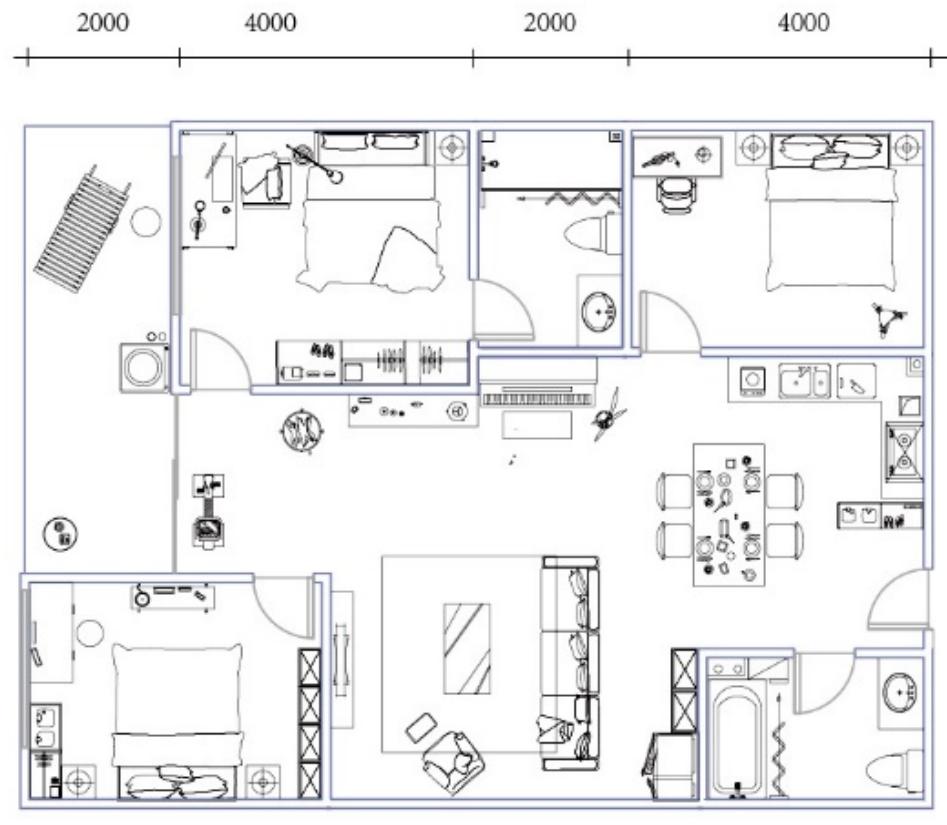
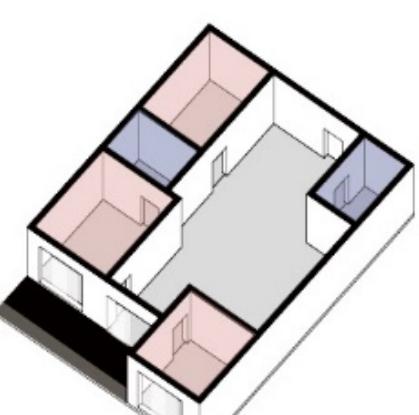
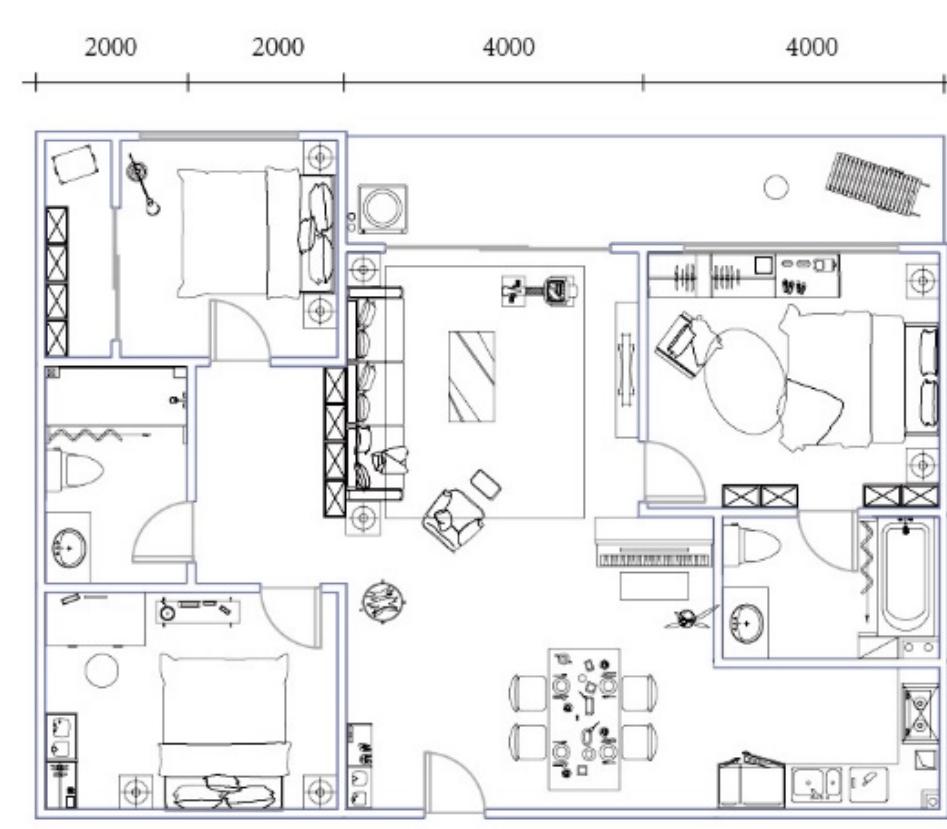
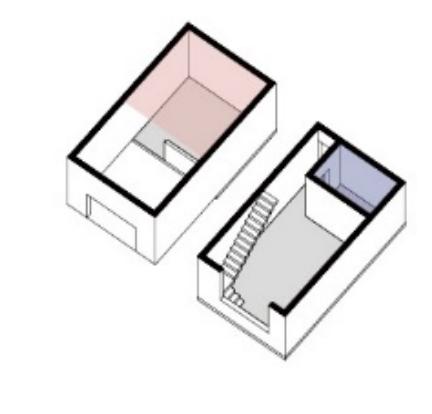
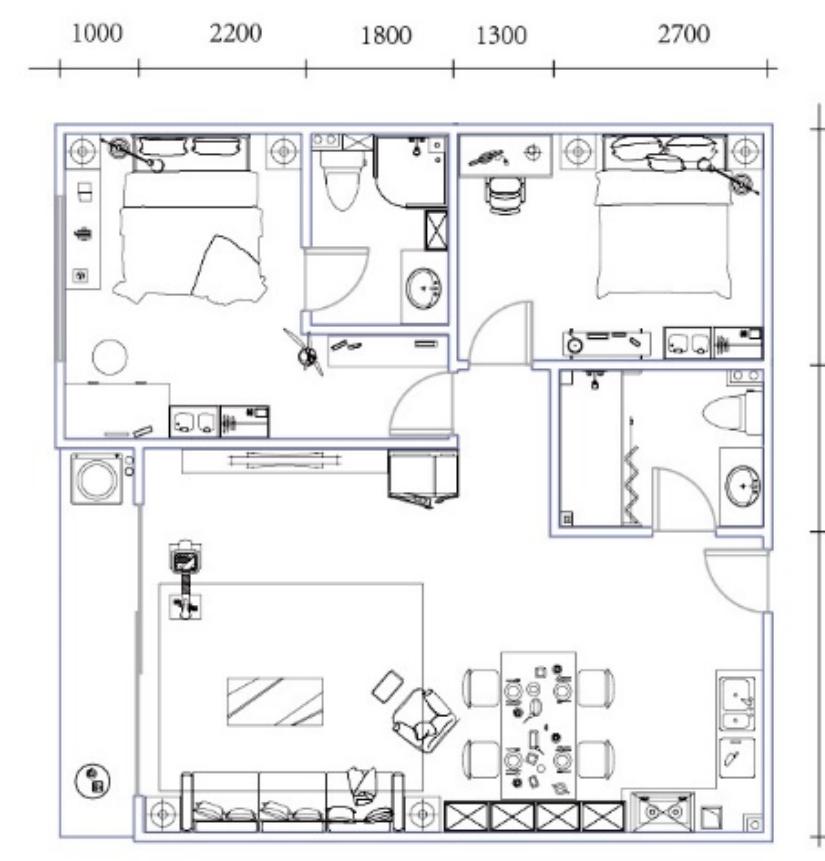
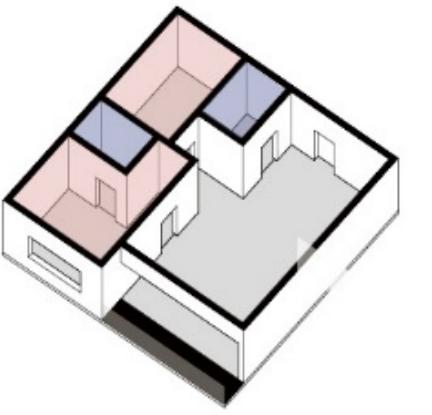
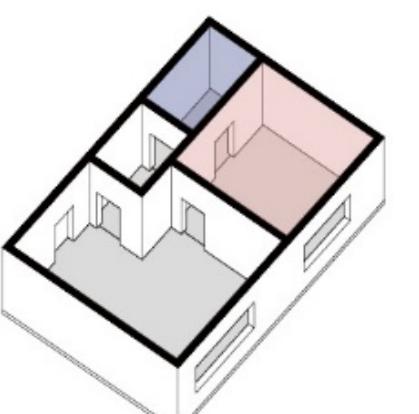
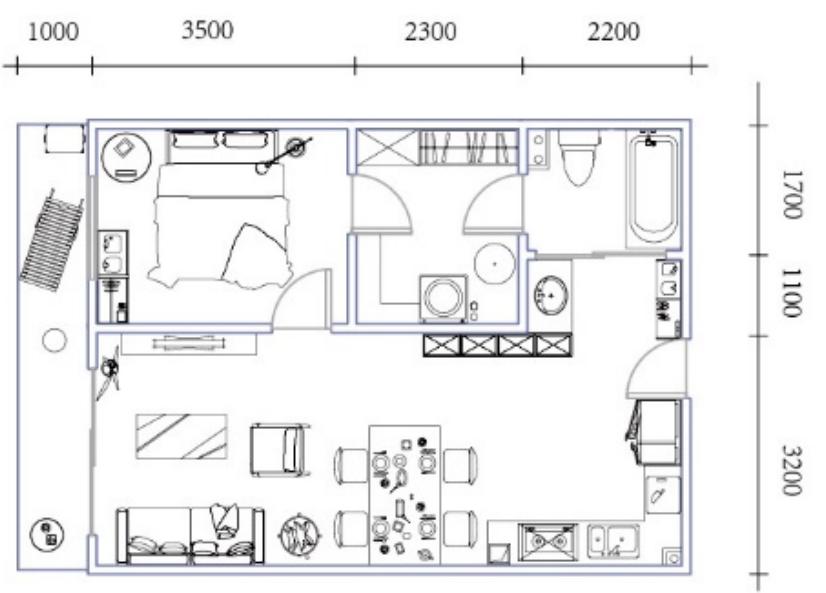
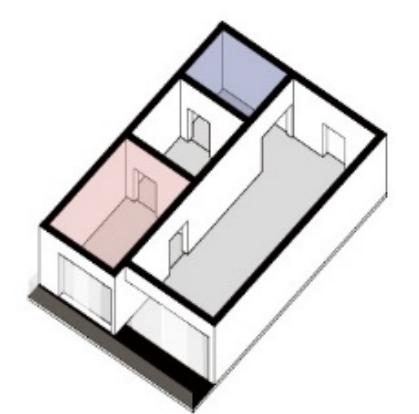
How people feel about this place ?



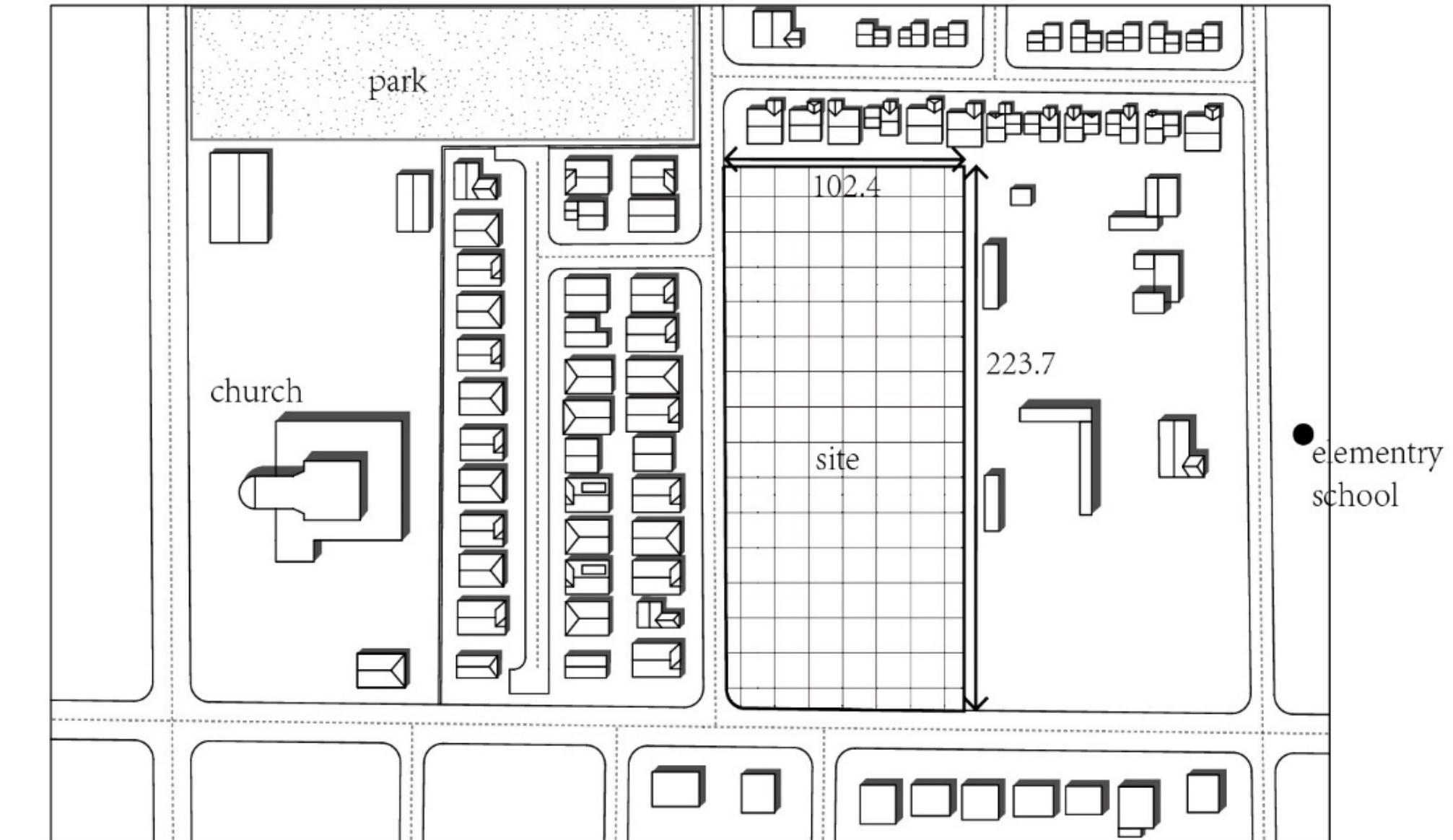
SCALES AND ECONOMIC ESTIMATES



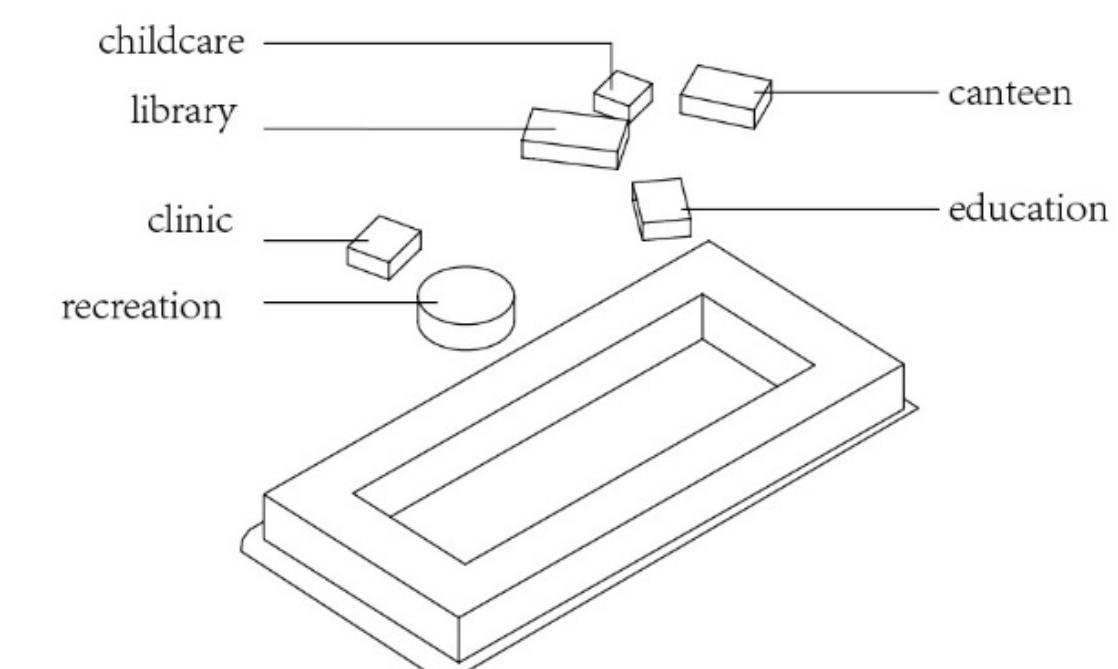
HOUSEHOLDS TYPE AND OCCUPANTS



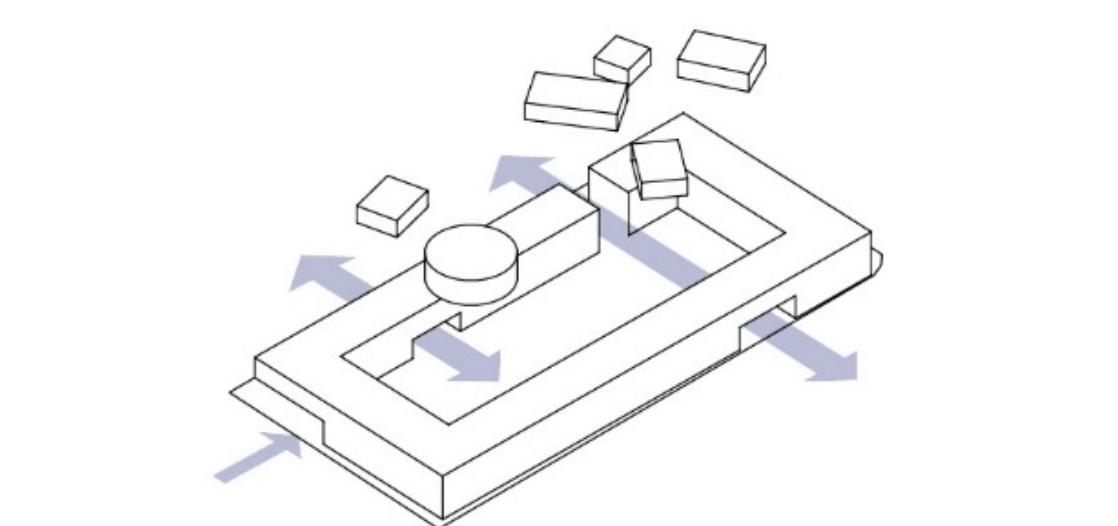
SURROUNDING



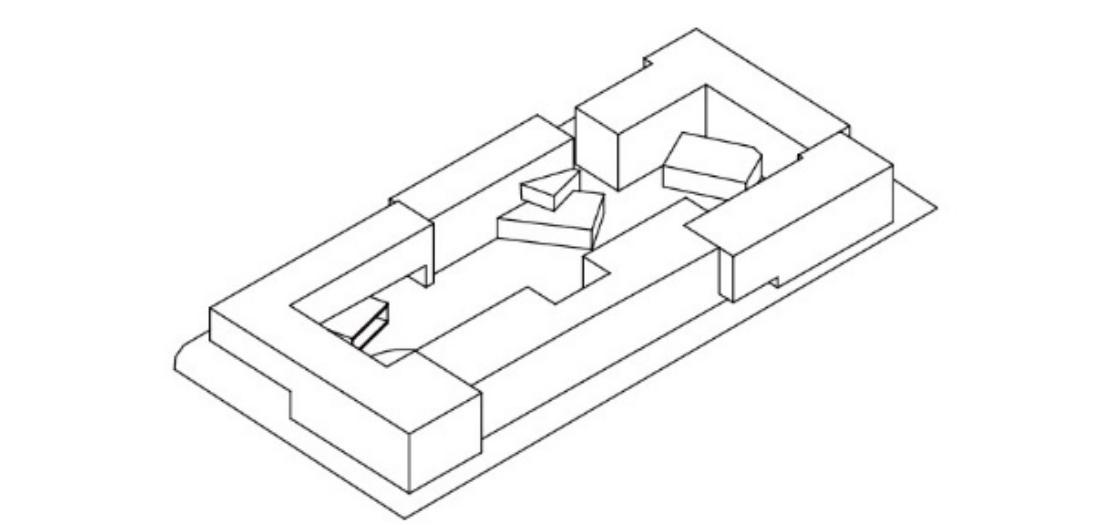
DESIGN CONCEPT



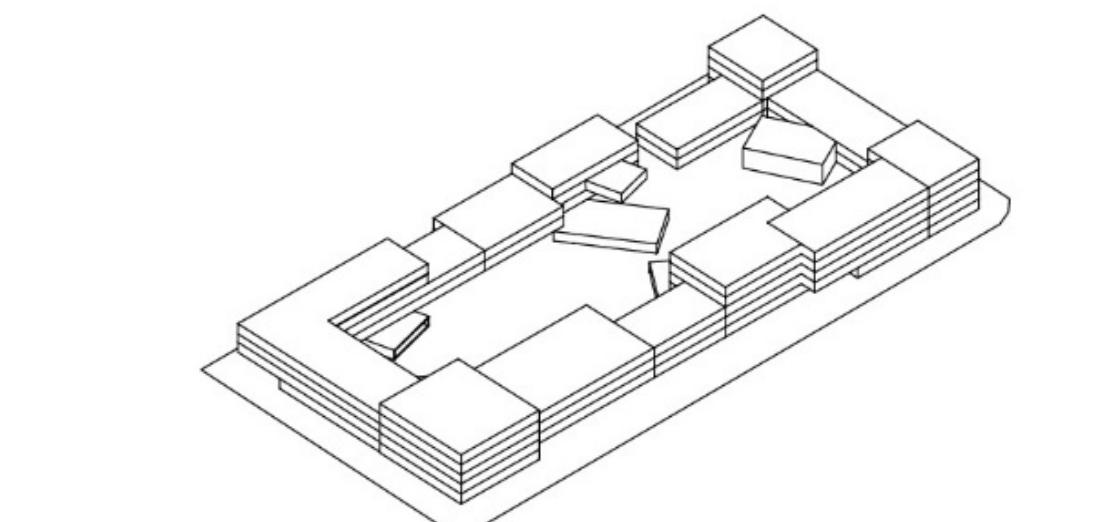
step 1 :
The outer facade is kept neat and tidy and the main residential part is designed as a square with the site boundaries. The inner side is provided with appropriate supporting service functions.



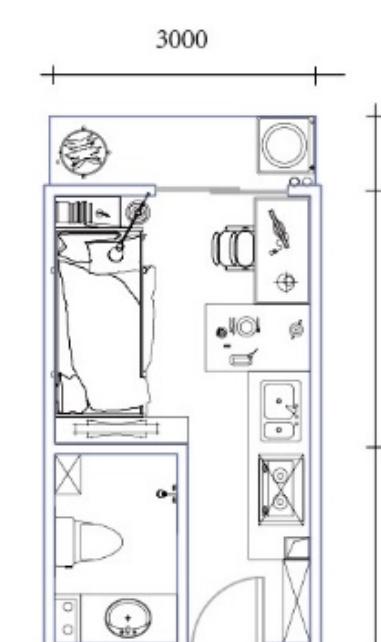
step 2 :
The square-shaped part has entrances and exits according to the connection with the traffic on the outside of the site. The inner circle of services and facilities has a flexible building form and appropriate angles according to the functional requirements and flow lines.



step 3 :
Set up a 3D grid at 3m intervals to determine the building dimensions. Set the height and the location and number of storeys of services according to the different needs and number of inhabitants.

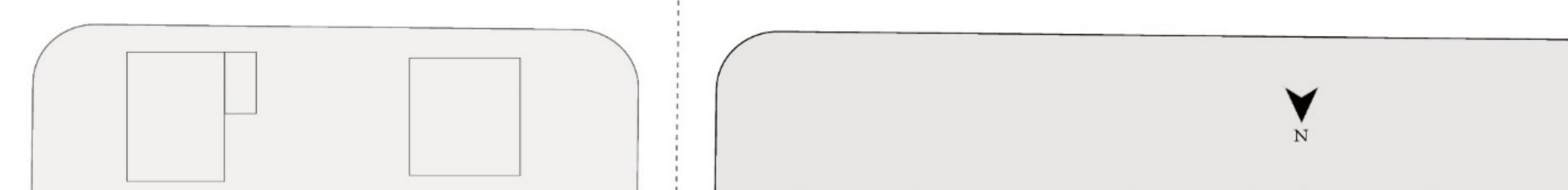


step 4 :
Adjust the size and position to divide the different floors. Calculate the economic budget, occupants and working arrangements to be undertaken by each section. On this basis rationalise the details of rooms, facilities, staircases, etc.



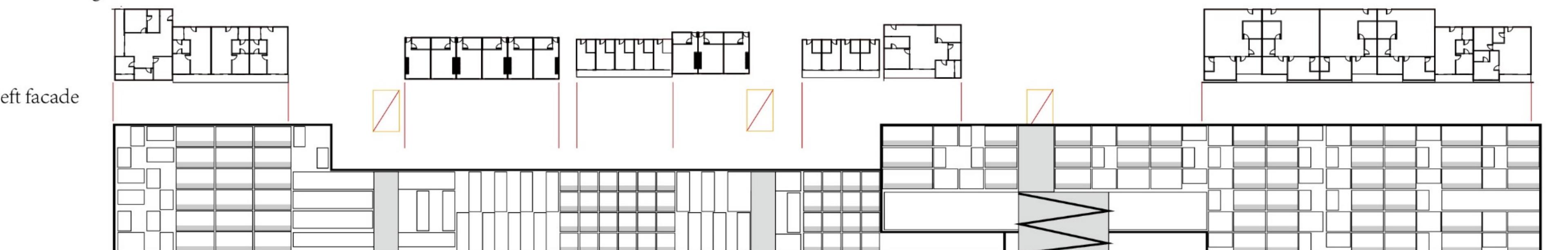
Area: 193.75sq. ft
Bedroom: 1
Bathroom: 1
Balcony: 1

PLAN



FACADE DESIGN

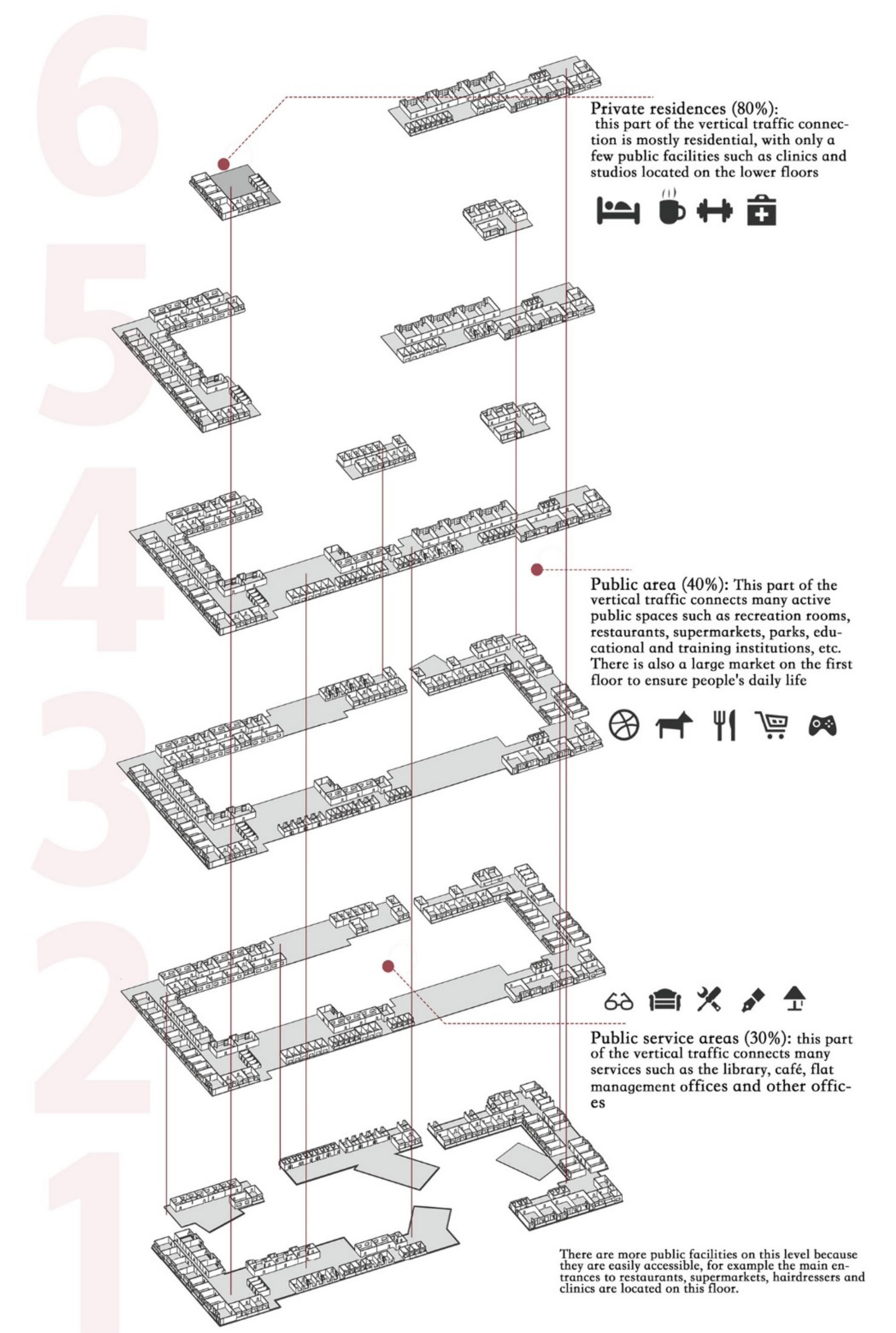
room arrangements



left facade

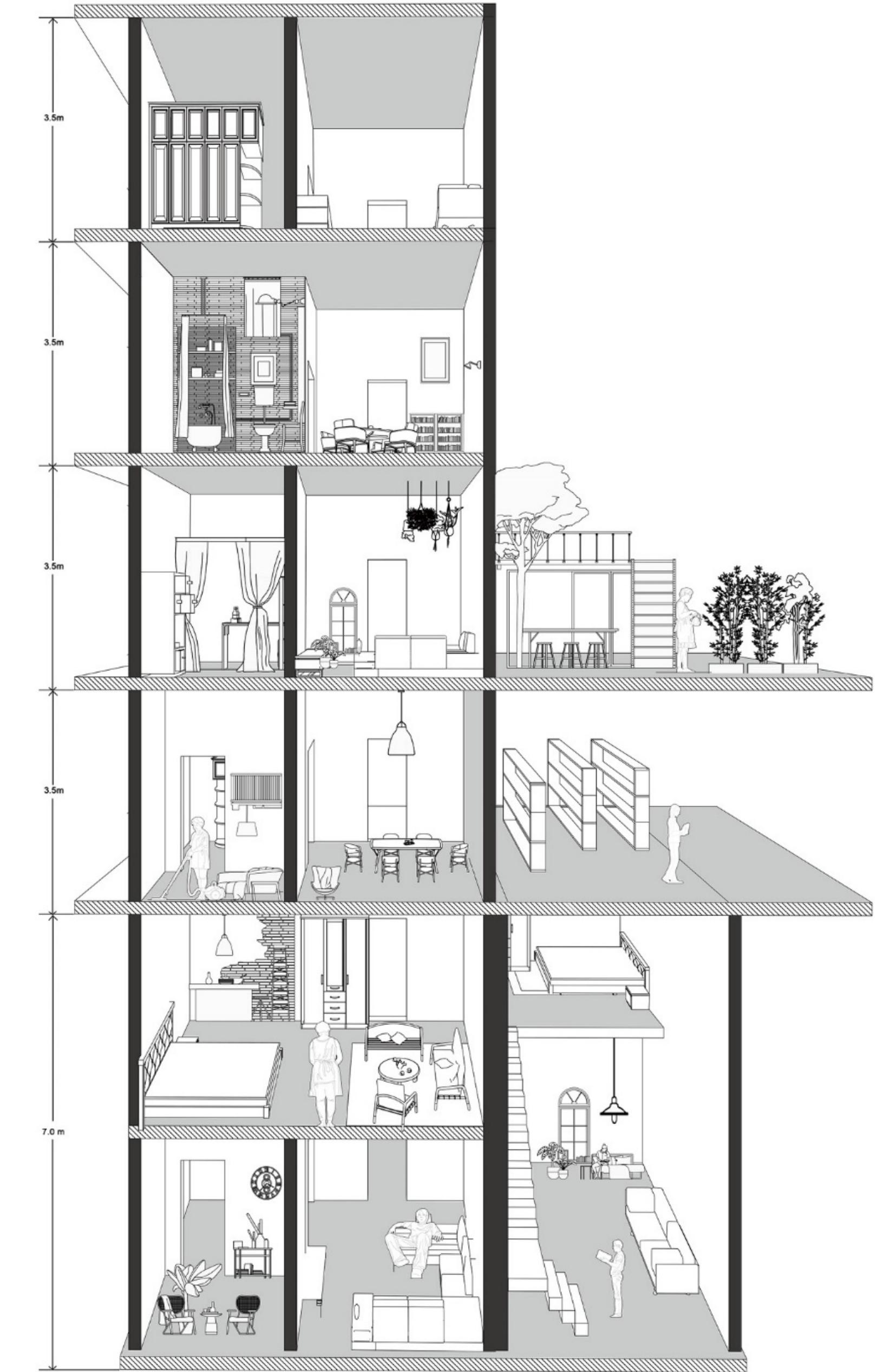
back facade

EXPLODED VIEW

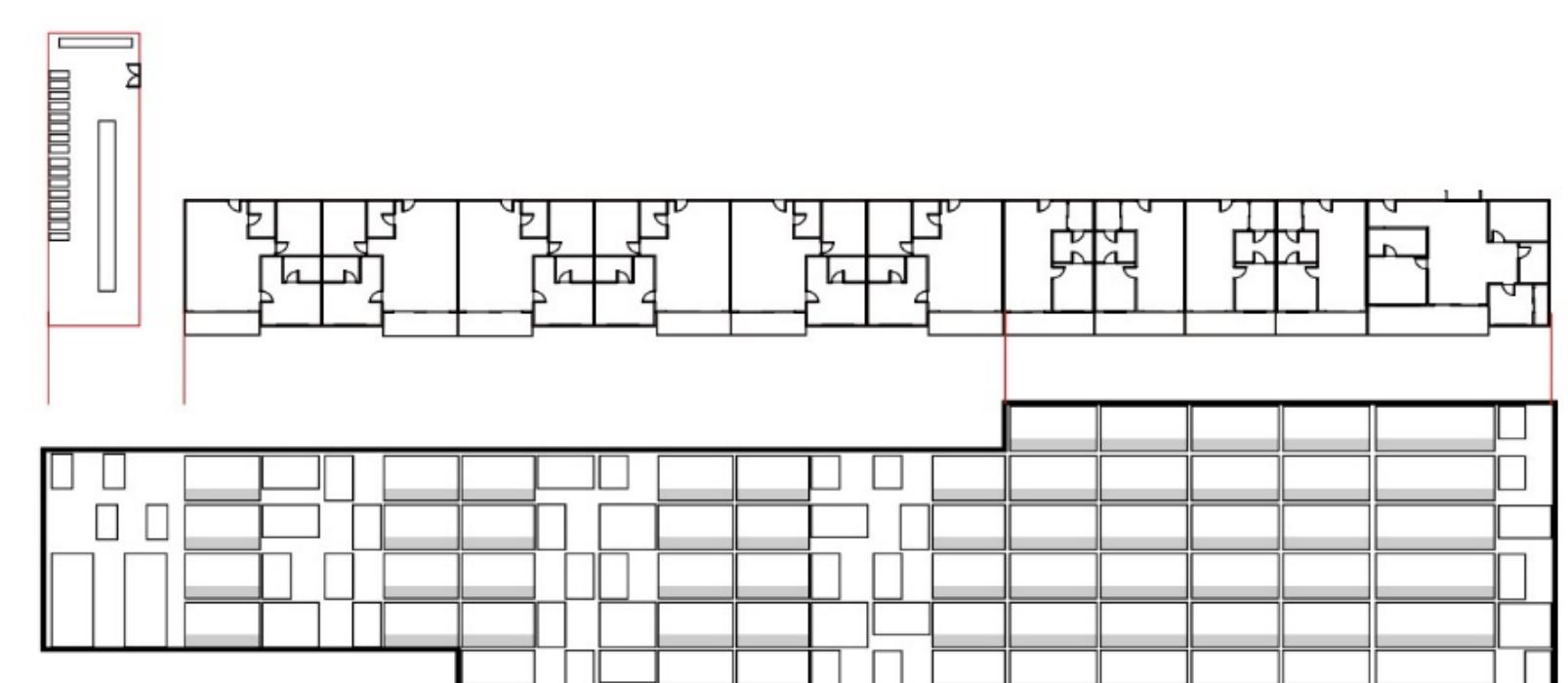


Functional zoning for quick access to destinations and less interference with each other.

A-A SECTION



Residents have a variety of floor plans to meet their residential needs, while also having easy access to other public areas for other needs. A small section of the building is shown in the diagram. We can see that the residents have easy access to the outdoors as well as to the shopping mall and so on.



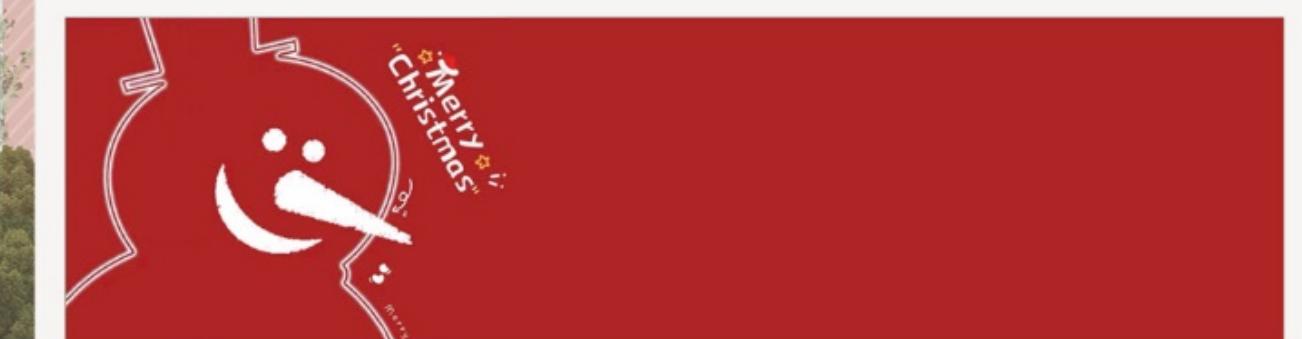
LIFE IS GETTING BETTER

NO.1 25th DECEMBER



If you are still struggling to find an affordable and comfortable home, just contact with us

Once you have decided to move in, there is no need to worry too much about your income, we can also provide you with some job opportunities to ensure your livelihood. We wish you have a wonderful Christmas holiday!

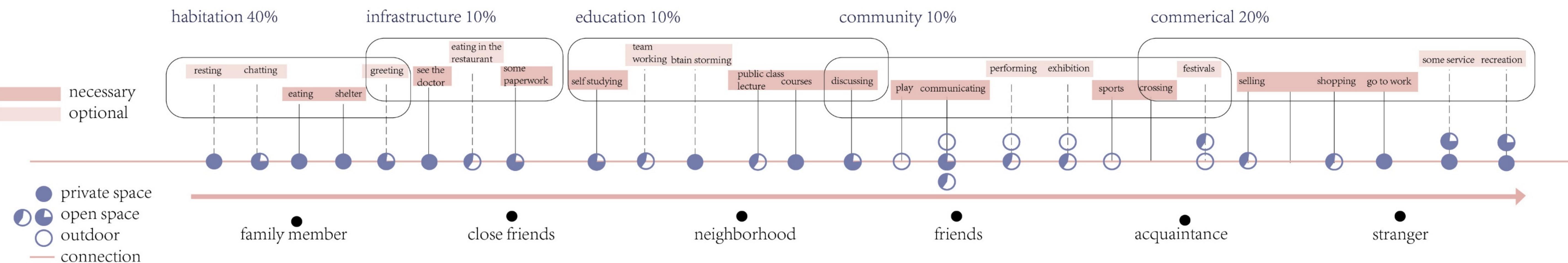


On Sale ! ! !

Whether renting or buying, we can offer you the best prices ever!

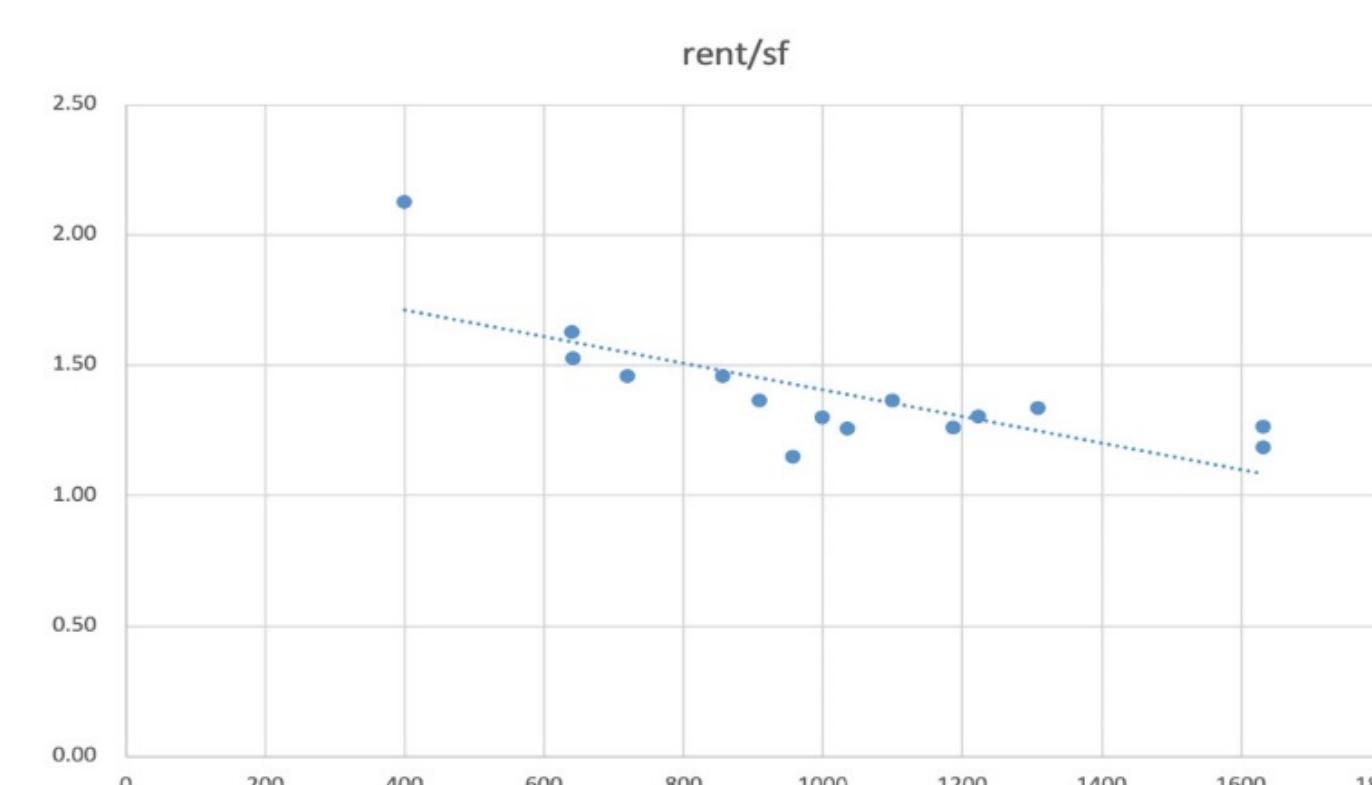
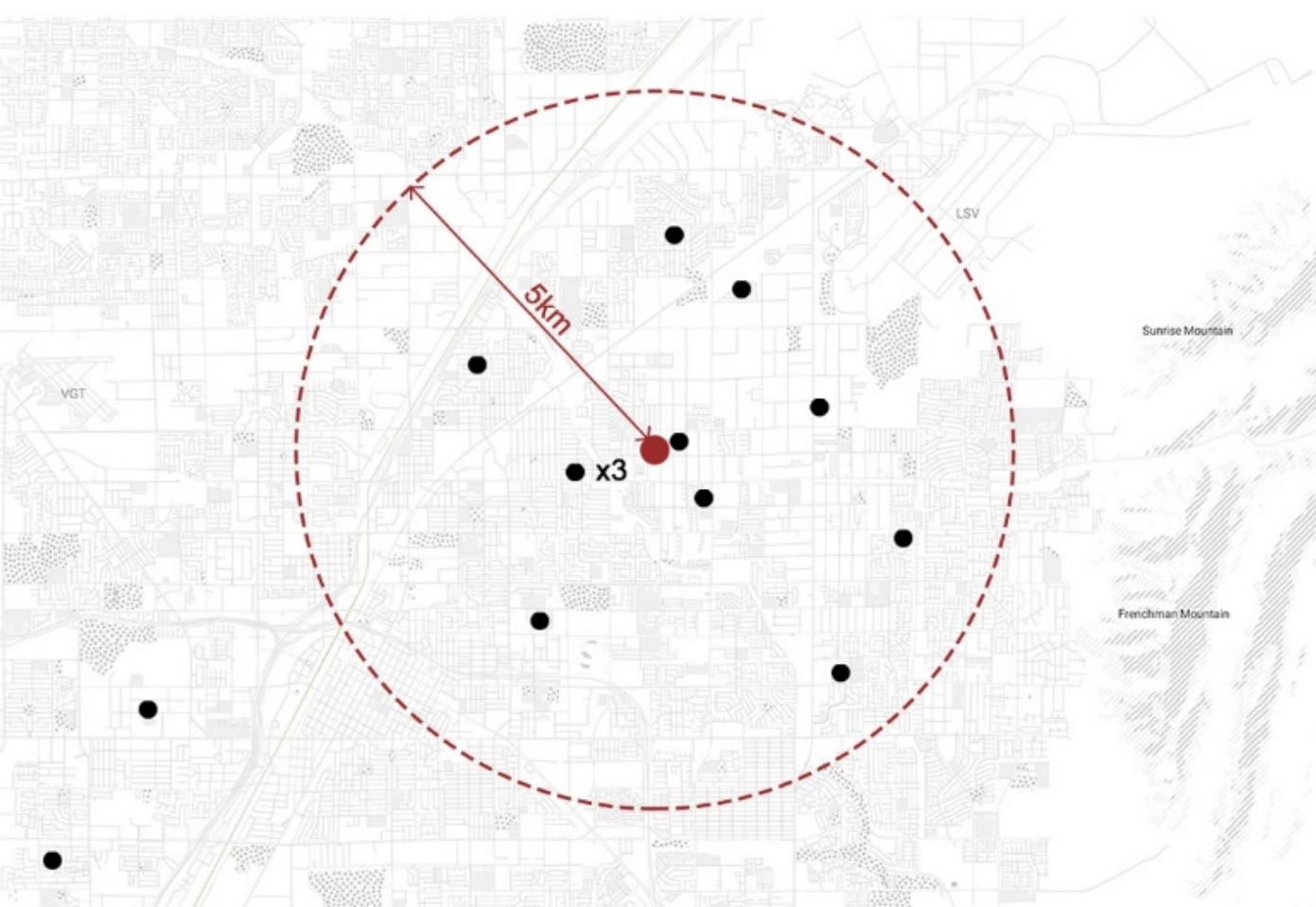
Ms. Lee has thoughtfully taken all your concerns into consideration as the designer. If you are concerned that your stay will not be as good as you expect, we can offer you a short term rental for a week to check out the accommodation and help you decide whether to choose this place. If you are concerned that this is not the most affordable option in the neighbourhood, we can ensure that we offer the cheapest price for the same quality of accommodation within a 20 mile radius. We also offer easy access to the city, a full range of services and a pleasant living environment. If you require further information, please scan the QR code below.

SPACE AND FUNCTION



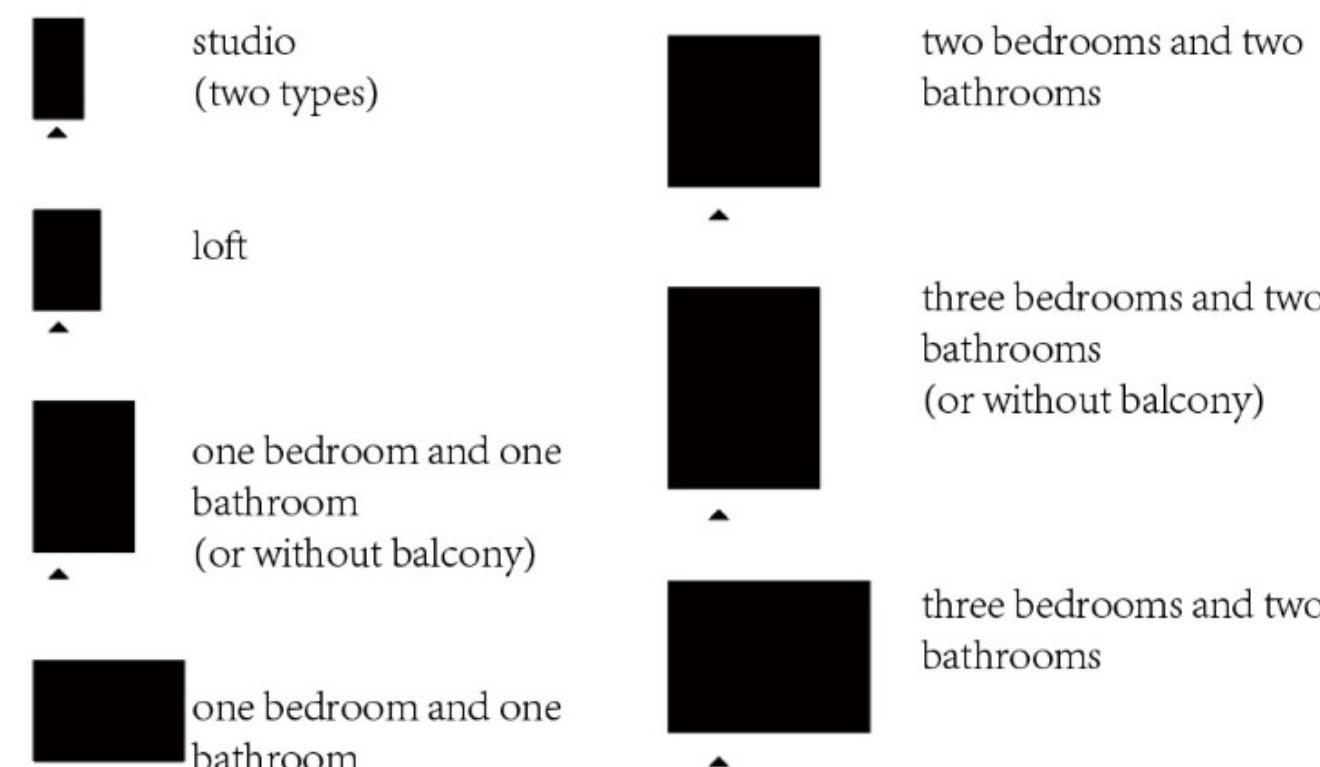
MARKET RESEARCH AND SET A PRICE

Statistics on rental pricing of nearby houses

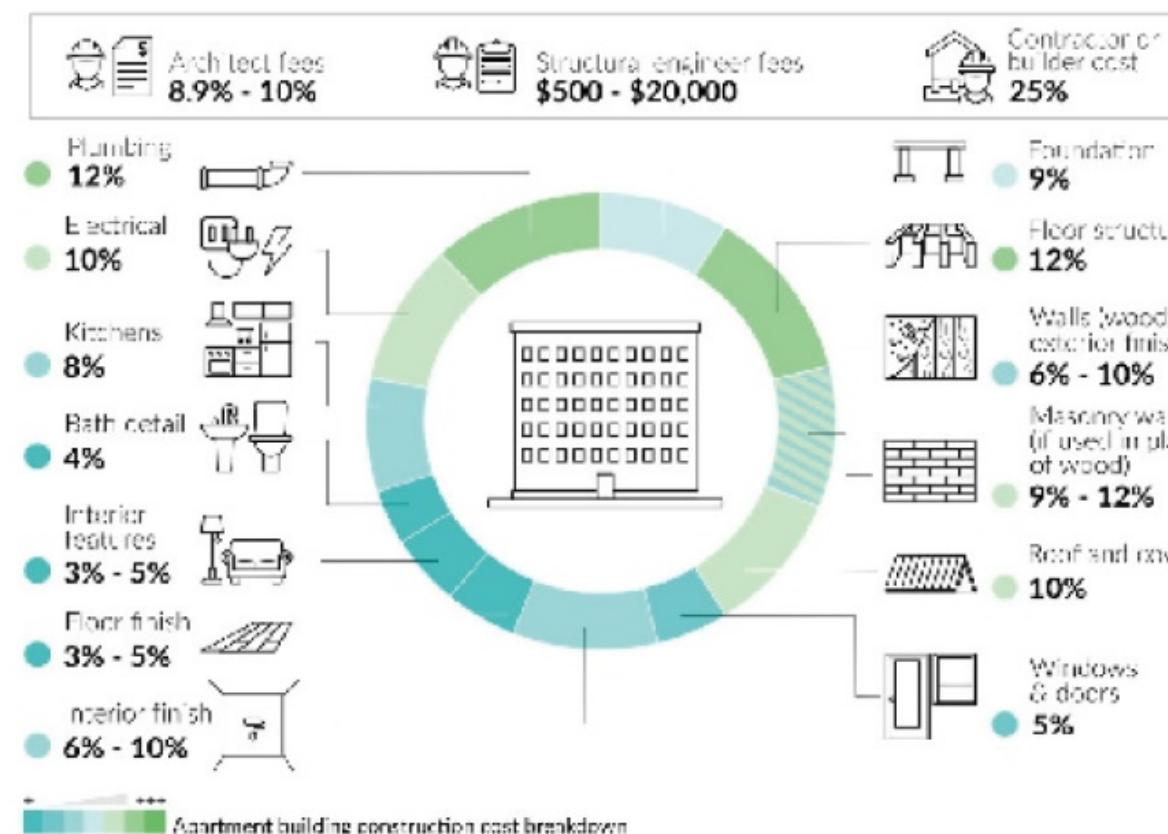


After a functional calculation, a formula is obtained regarding the relationship between area and rent per foot: $y = -0.0005x + 1.9142$

Household type and rental income



Various components of expenses



CONSTRUCTION EXPENDITURE

floor	block 1 (m ²)	block 2 (m ²)	block 3 (m ²)	block 4 (m ²)	total (m ²)
F1	3718	4902	1958	1032	11610
F2	13005				13005
F3	13259				13259
F4	662	662	8242		9566
F5	3386	662	2648		6696
F6	1214	2648			3862
					50106

Construction Spending

area (sqf)	cost	price (min)	price (max)	cost
539336	175-250	94383800	134834000	67417000

Construction costs are based on Las Vegas build prices, which fluctuate between 175 and 250 per foot. The middle of this range is taken to calculate the total cost of construction. Square footage is based on the outline of the building facade.

Monthly Rental price

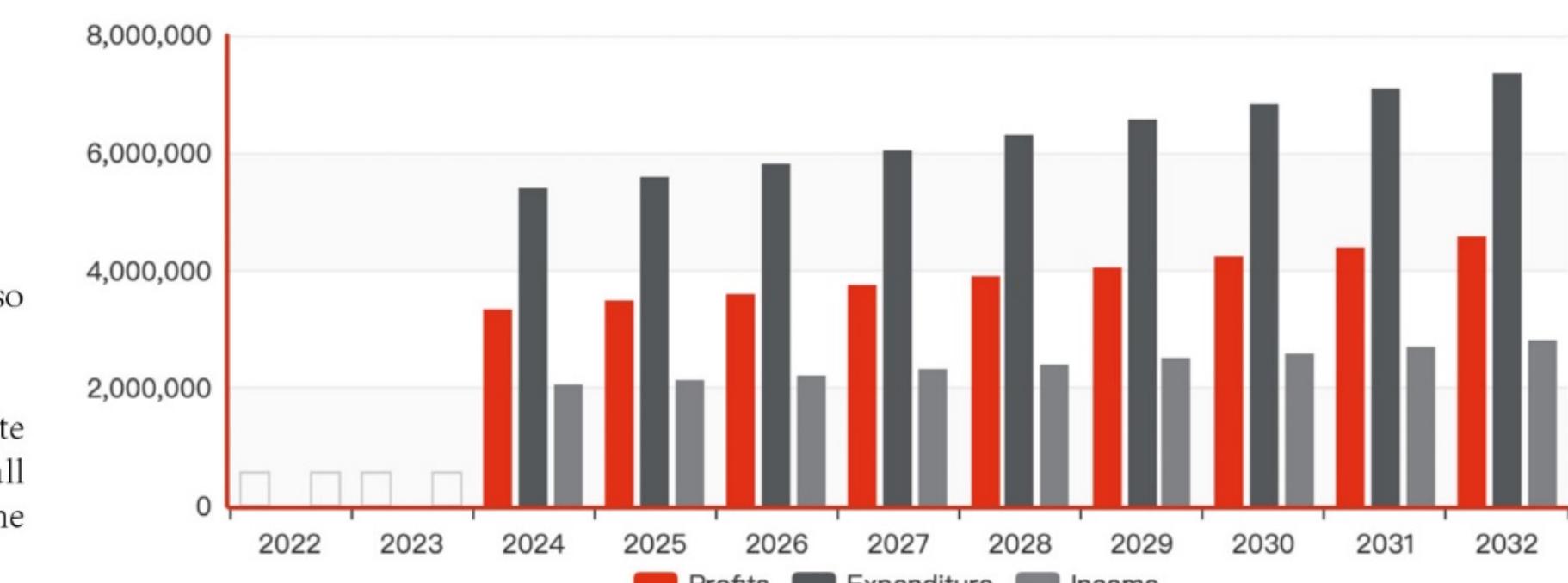
types	Length and width	Area	rent/sf	price	Number of rooms	total
studio	3x6	193.75	1.8173	352	8	2816
			with balcony	400	78	31200
loft	4x6	258.33	1.785	461	119	54859
		581.25	1.6236	944	63	59472
1b1b	6x9		with balcony	1000	159	159000
		871.88	1.4783	1289	58	74762
2b2b	9x9	1162.5	1.3329	1549	20	30980
			with balcony	1600	53	84800

Annual income of Rental price

Monthly income	Annual income	Occupancy rate	total incom
497889	12	5974668	90%

CASH FLOW

	1	2	3	4	5	6	7	8	9	10	11
Income			5377201.2	5592289.25	5815980.82	6048620.05	6290564.85	6542187.45	6803874.94	7076029.94	7359071.14
Expenditure	57304450	57304450	2043336.46	2125069.91	2210072.71	2298475.62	2390414.64	2486031.23	2585472.48	2688891.38	2796447.033
Profits	-57304450	-57304450	3333864.74	3467219.33	3605908.11	3750144.43	3900150.21	4056156.22	4218402.47	4387138.56	4562624.107
sale											114065602.7
IRR	0.03143343										



INVESTMENT CAPITAL STRUCTURE AND EARNINGS SIMULATION

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Revenue											
Rental Income			5377201.2	5592289.248	5815980.818	6048620.051	6290564.853	6542187.447	6803874.945	7076029.942	7359071.14
Operating Expenses (-)			2043336.456	2125069.914	2210072.711	2298475.619	2390414.644	2486031.23	2585472.479	2688891.378	2796447.033
NOI			3333864.744	3467219.334	3605908.107	3750144.431	3900150.209	4056156.217	4218402.466	4387138.564	4562624.107
Leasing Cost (-)			107544.024	111845.785	116319.6164	120972.401	125811.2971	130843.7489	136077.4989	141520.5988	147181.4228
Sale Price (+)											101391646.8
Loan (+)	40113115										
Capital Expenditure (-)	28652225	28652225									
Unlevered Net Cash Flow	-28652225	-28652225	3226320.72	3355373.549	3489588.491	3629172.03	3774338.912	3925312.468	4082324.967	4245617.965	105807089.5
Debt Service (-)	2733094.261	2733094.261	2733094.261	2733094.261	2733094.261	2733094.261	2733094.261	2733094.261	2733094.261	32726239.23	
Levered Net Cash Flow	-11328761.76	-11328761.76	493226.4592	622279.288	756494.2299	896077.7696	1041244.651	1192218.207	1349230.706	1512523.705	7308050.27
DCF	-11328761.76	-10789296.92	447370.938	537548.2458	622369.6751	702100.3796	776992.7901	847287.2213	913212.4503	974986.266	44865302.56
NPV	28569111.85										

IRR Unlevered	0.109140604
IRR Levered	0.151919403
Exit Cap Rate	0.045
Rental Increaseament	0.04
Construction Period	2 Years
Operation Period	9 Years
Bank Loan	40113115
Construction Cost	57304450
Discounted Rate	0.05

The first two years are construction time, so only expenditure. In the tenth year, the ownership of the site was sold to the government. Recover all proceeds and pay off all loans (if any) in one go.