

design of vertical urban kampung in karet tengsin, tanah abang

Reconciling COVID-19 with Slum Complexities through Adaptive Resilience Framework

Final Architectural Design Studio

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author's greeting

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The author is fully aware that this work has not been fully perfected. Therefore, all constructive criticism and suggestions for the perfection are highly expected. Hopefully this Final Architectural Design Studio can be useful for the author and everyone.

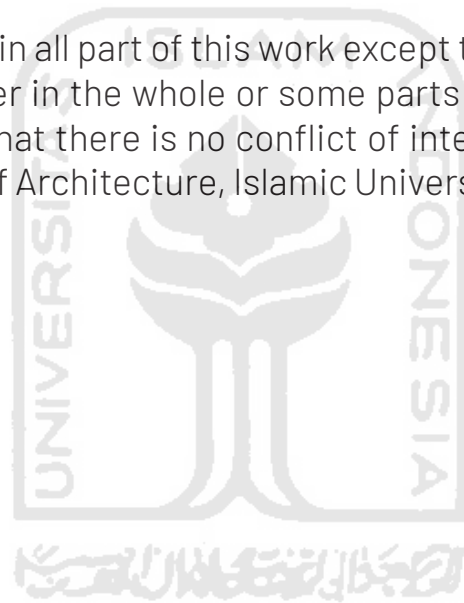
Yogyakarta, July 25th 2021
Author,



Avinsa Haykal

Statement of Originality

I, as the author of this book declare that in all part of this work except those mentioned in the references, there is no assistance from others either in the whole or some parts inthe process of making this Final Architectural Design Studio. I also say that there is no conflict of intellectual property right in this work and the submission to the Department of Architecture, Islamic University of Indonesia is to be used for an educational and publication purposes



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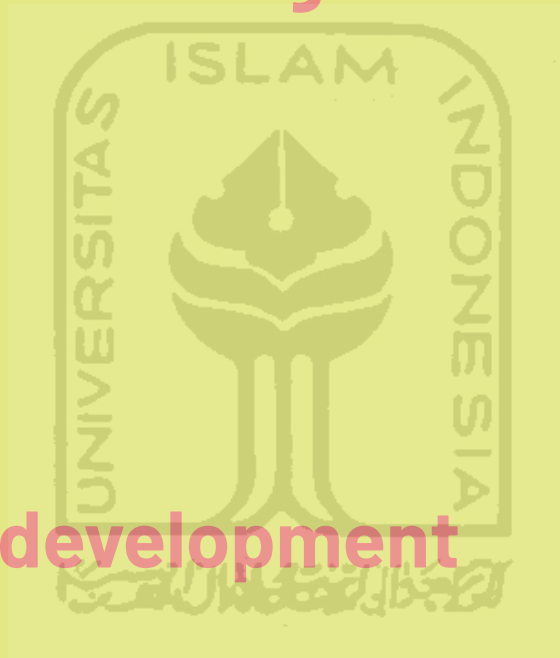
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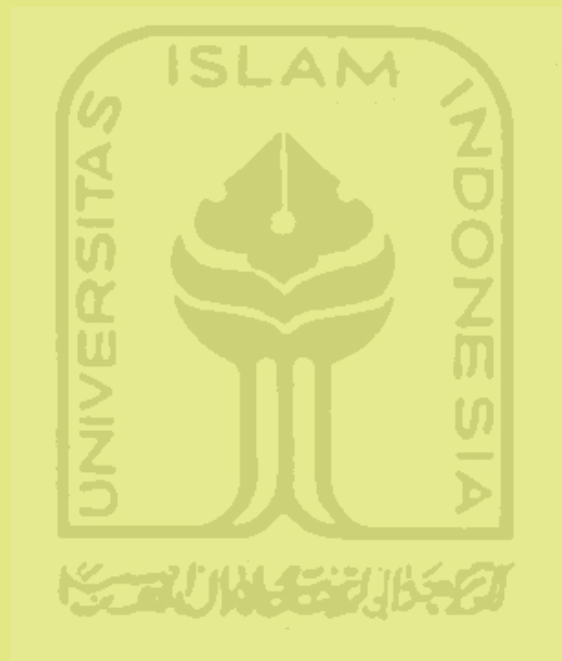
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CHAPTER 1 (Design Brief)

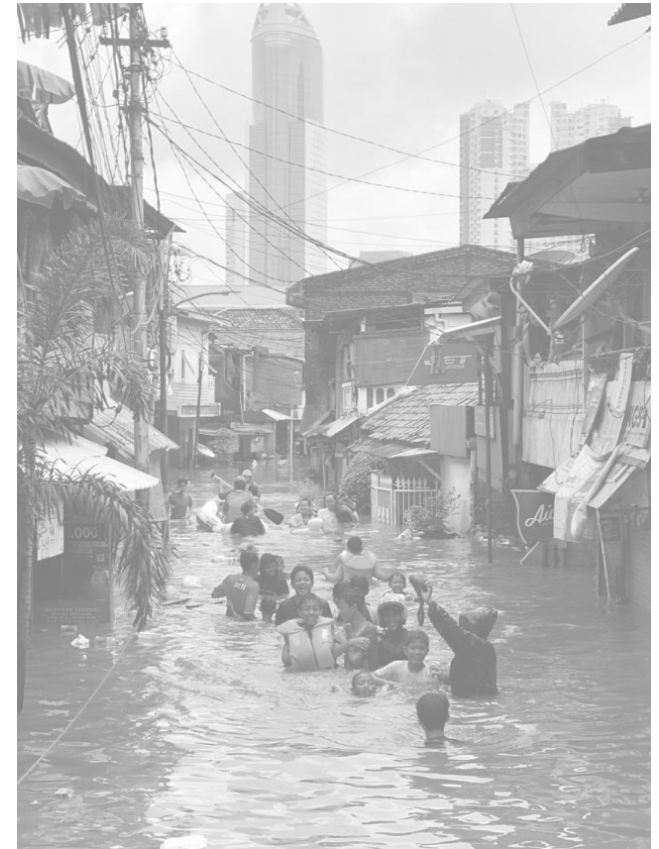
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1.1. design premise

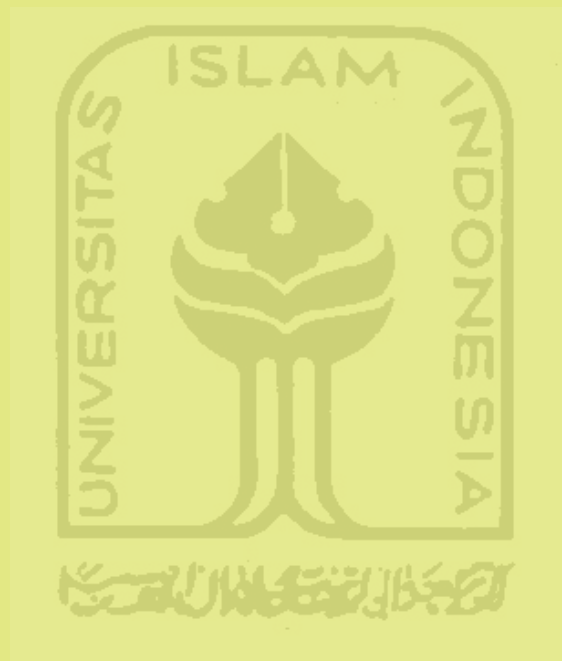
Vertical Urban Kampung in Tanah Abang, is an attempt to reconcile the novel COVID-19 pandemic spatial demand with the current urban kampung's existing problems. This new pandemic phenomenon forces horizontal spatial distancing for any occupants in almost any type of building, which cannot directly be adopted by everyone and every person in each social and economical situation. Aside from these new parameters, Karet Tengsin RW 7 has been through many spatial slum-related problems including flood threat from its adjacent Kali Krukut river, dense informal housing space, poor connectivity with its neighboring high-class commercial zone of Sudirman, and a threat of being swarmed & bought by a private developer that the threat is already visible on site. Through these multi-layered problems, the locals are facing multi-dimensional spatial pushing forces; horizontal outward from COVID-19, inward horizontal from its necessity of basic livelihood survival, and vertical from its housing problem. Thus, it shows an interesting and important design-as-solution urgency that not only can it solve and reconcile every parameter and become adaptively resilient, but also it can be an attempt to participate in positing a design prototype that can withstand current and future uncertainty. From COVID-19 we learn that the current rigid formalism of typology and spatial usage is prone to a sudden unpredicted occurrence. This may be the time for the design to face literal functional dynamic and adaptability. This raises the challenge of how such vertical kampung that tries to solve dense informal housing could also make its occupants adapt and be resilient towards COVID-19 and other future unpredictable milieu & phenomenons.



*Flood in Karet Tengsin, Tanah Abang
Raga Imam/Kumparan*



*Post-fire in Karet Tengsin's slum
Dian Dwi Saputra/Antara*



1.2. background

COVID-19 gives a significant impact on how people treat spaces around them, caused from the sudden, almost unprecedented entry and impact of the virus towards the built environment. Several prohibition and new regulation are created until this time by the government and policy maker in an attempt to stop the spreading chain and hamper the national case number. **One of the worldwide regulations of social-distancing and work-from-home culture, introduced a novel and sudden way of how people re-map their activities to other spaces from their past conventional location.** Thus, the restriction of work and commerce spaces, and the displacement of the work activity to individual housing spaces, demand an unforeseen new space for those. While middle and high-class portion of society bear little-to-no difficulty with this new adaptation, **it will be a much different story for the people that are living in poorly-designed houses from the first place such as dense informal settlements, slums, and scatters.**

The pandemic novel forcing demands of work-from-home and stay-at-home jargon, are hardly implemented on, and accepted by, people living in slum area and those who earn irregular amount of income, because savings can only be a dream for those that earn inadequate and irregular daily income (Olajide, 2015). Additionally, most livelihoods of slum area inhabitant are impossible to be replaced by the online remote working workflow. Thus, **the contradiction produces a type of paradox which forces the people to go back 'inward' to their homes, and to go 'outward' for their daily survival.**



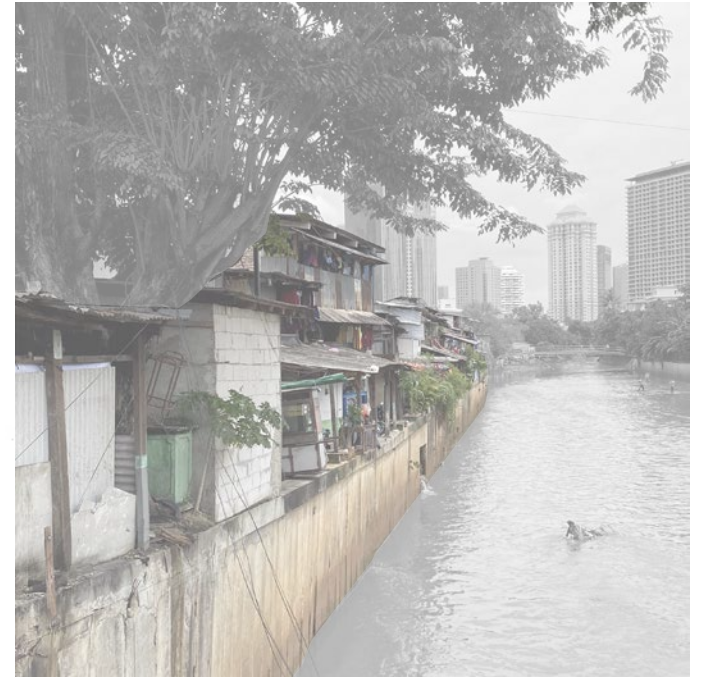
COVID-19 & ECONOMY & PARADOX

Above: COVID-19 in slum area (Yudha Baskoro)
Below: A local in Ciliwung River, Manggarai, Jakarta (Antara/M. Risyah Hidayat)

With Jakarta's increasing number of population affected by its economical growth and other attracting-parameters, slum area is inevitably swarming and emerging around and in-between the urbanized context of Jakarta. It may be caused from Jakarta's almost-100% annual urbanization flow, and the inadequate space for housing in the city (Suminar, Marsudi, and Handayani). This on-growing trend creates what would be categorized as urban kampung, spreaded throughout Jakarta.

While it is slightly differ with literal Kampung in other cities, Jakarta's Urban Kampung or "Kampung Kota" bears similar characteristics that are visible. Spatial and individual characteristics of informalities (Almira 2020), and not rarely illegal, are what Kampung Kota differ itself from common housing complex/cluster settlement in an urbanized city. It's informalities refer more into its dense housing pattern, mixed non-rigid functional zoning, and unique variety of local 'adaptation' in terms of building use, space use, and functions.

While not all Kampung Kota is illegal, but many possess threats that are incoming, which has been described earlier and will be analyzed more in the next pages. Jakarta Government has made several programs in the past, and today, to revitate the kampung area not merely for its illegal (whereas not all of them are), but for their worrying inadequate spatial, housing, sanitation, health, and flooding issues. But the novel and the new threat is COVID-19 pandemic that is going to be a new harder threat to be compromised in Jakarta's slum area. According to BPS DKI Jakarta, there are 445 RW in Jakarta that can be recognized as a 'slum' urban kampung, and almost all of them are having worrying numbers of infection rate.



*Karet Tengsin RW 7 riverbank situation
Taken by author*



*Informal and form richness in Karet Tengsin RW 7
Taken by author*

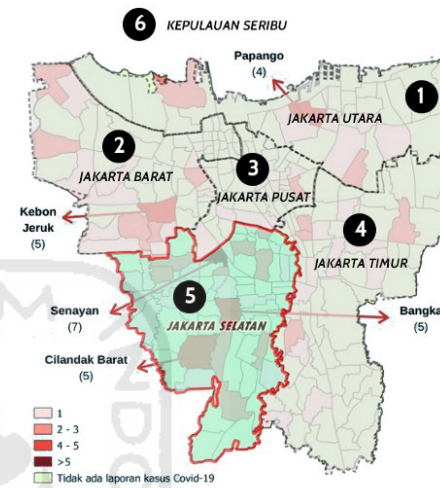
JAKARTA'S KAMPUNG KOTA

Dealing with COVID-19 in Jakarta’s slum area is hard because according to Jakarta’s Government and Jakarta’s Satgas COVID, various challenges exist in such location starting from its tough data-extraction, information distribution, clean water distribution, and poor quality of the housing architecture. The quality refers to the number of many houses in urban kampung that are still being inhabited by more than two families, and the kampung’s inevitable economical livelihood that forces them to venture out from their houses. This force to venture out easily contradicts the regulation to stay at home, which gives hopeless dilemma for those who need to sustain their inevitable daily activities. Blue collar worker for example, will absurdly adapt the generalized work-from-home culture as the work is impossible to be done remotely. Shop owner and street vendor need to move their transaction medium into an online platform, which not every one of them, or if according to the data, the majority of them will have certain conditions that hamper their chance to move to online shopping medium. This phenomenon shows how COVID-19 indirectly affect not only the health stance of people, but also economical stance, and possibly other part of their daily lives.

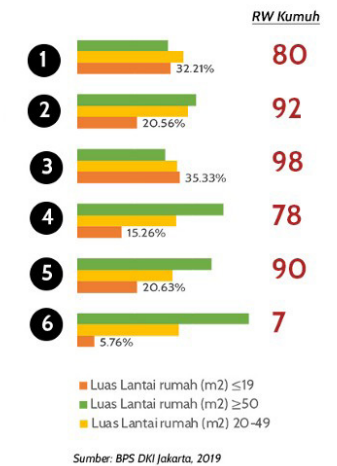
Government’s CAP (Community Action Plan) program on revitalizing a total amount of 56 RW slums are also disturbed because of COVID-19. In Rencana Pembangunan Jangka Menengah Daerah (RPJMD) Provinsi DKI Jakarta year 2018-2022 from Bappeda DKI Jakarta, it is stated that a total of 56 RW are categorized as slum in Jakarta, and the program of CAP is meant to uplift the areas by participating the locals, but because of COVID-19, a total of only 11 RWs that happened to be revitalized from 2020’s APBD that needs to share its portion for economical revival due to COVID-19. Though it still needs time to cover the whole RW list, government’s COVID response & concern are still mainly focused on these slums. One of the government’s representational Riza states in media that “by average, maybe it is caused by their limited knowledge and education”; a sharp and unfortunate public opinion that directly assume the COVID-19 problem in slum is mainly worsening because of the people’s ignorance.

Bicara Data di Jakarta

Peta Sebaran COVID-19, Data 20 Maret 2020



Persentase Luas Lantai Rumah Per Kota DKI Jakarta, 2019



Jumlah RW Kumuh DKI Jakarta, 2019 **445**

COVID-19 spreading map in Jakarta and the amount of slum RW in DKI Jakarta
Source: covid19.go.id & BPS DKI Jakarta 2019

FLOOD & INFORMAL

Aside from COVID-19, Jakarta's urban kampung has bear its current, previous unsolved problems that are complexly different to each areas. **Karet Tengsin RW 7 in Tanah Abang, Central Jakarta, has been facing with its flooding threat annually from its nature of the location by the riverbank area, dense and poorly-designed house architecture, sanitation issue, and inadequate spatial quality issues.** It is classified as a 'medium' slum by Central Jakarta Administration's Slum RW data, and is located directly side-by-side with Kali Krukut river; a branch of Kali Ciliwung river. While RW 7 is covered under one of the slum targets to be reorganized by the Governor's CAP program (Community Action Plan), the history and past previous government's act on solving the flood threat is being criticized for its inefficient approach of **Betonisasi—replacing the river's natural absorbing material with concrete—criticized by Ciliwung Institute, and analogized as 'Beton ini sama saja seperti kita buang sampah. Yang penting hilang dari hadapanku sampahnya. Pindah masalahnya'.**

Various informalities can be found in the site which acts as a hidden gem between skyscrapers. Located between Senayan, Sudirman, and Bendungan Hilir area, there is this urban kampung with its rich informal spaces, informal multi-zoning, and non-rigid threshold spaces. The RW has a steep land incline, dividing it into RTs with different elevations. The elevation changes are quite visible, and when a flood hits, it discriminates against the lowest point of the area. Alongside its varying elevation, the circulations are made of many small non-rigid roads that are connected to the main minor road. These roads are so small that these have a sense of intimacy; as if the anthropometrical sense was intentionally built for human-to-human interaction. Even though it can only be accessed with a motorcycle and walking, various informal spaces such as communal hanging out terrace, and spontaneous social spaces still have their places in-between these small connecting roads. It then rose the COVID-19 challenge into a whole new level because not only the space-between-houses is scarce, but also the distance-between-humans.



Informal Function (colored) in Threshold Space (red)
(Taken by author at location)

Below: Informal Terrace (colored) in Threshold Space (red) (Taken by author)

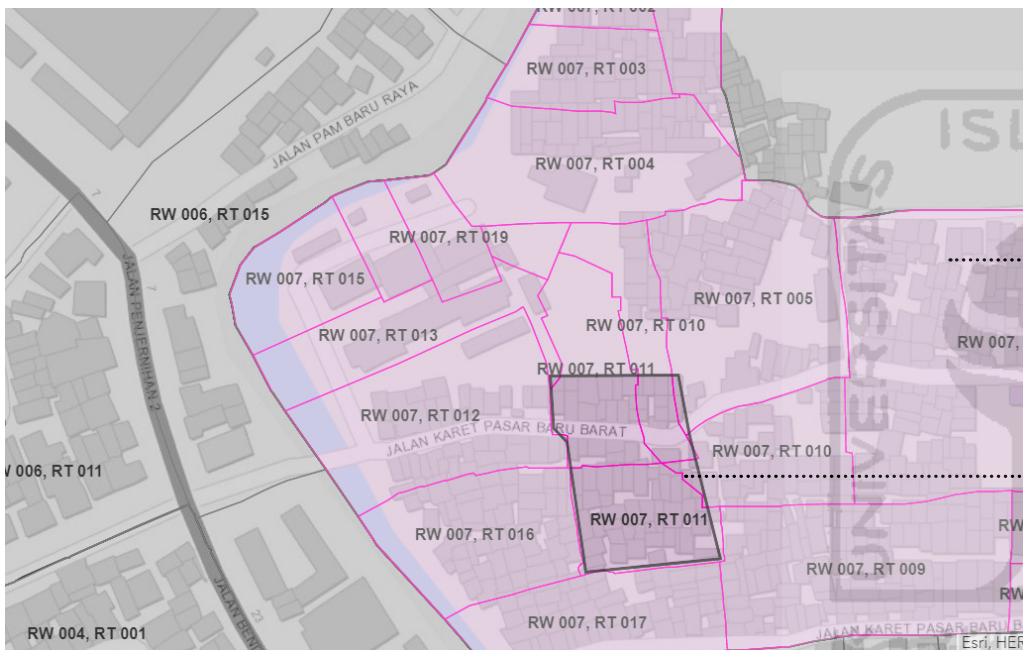


Informal Function (colored) in Threshold Space (red)
(Taken by author at location)

Below: Informal Terrace (colored) in Threshold Space (red) (Taken by author)



Country	: Indonesia
Province	: DKI Jakarta
City	: Jakarta Pusat
Kecamatan	: Tanah Abang
Kelurahan	: Karet Tengsin
RW	: 007
RT	: 011, 012
Block Code	: 02
Sub-block	: 003
Sub-zone	: R.7 Sub Zona Rumah Susun
TPZ	: Pusat Kegiatan Tersier
Zone	: Zona Perumahan Vertikal
KDB	: 55
KLB	: 3
KB	: 8
KDH	: 30
KTB	: 55

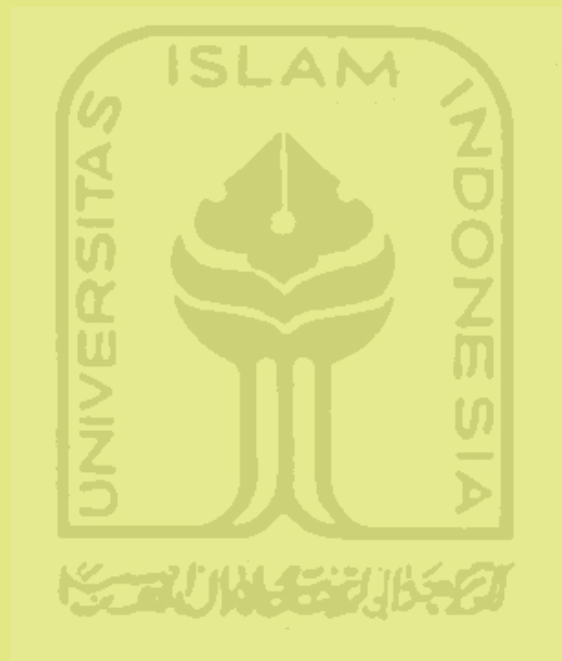


RW 7

RT 11 - 12

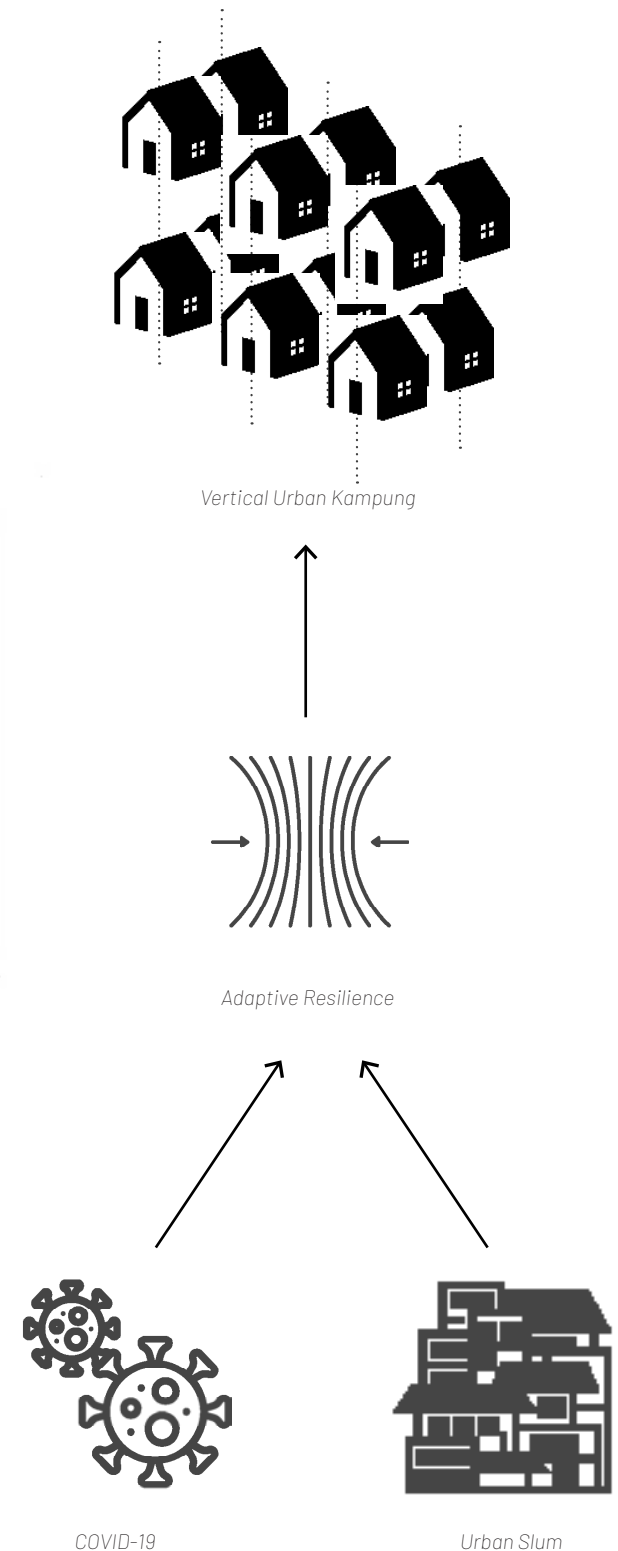
Located in Central Jakarta, Karet Tengsin is an urban area located in-between Sudirman central metropolitan commercial area, Bendungan Hilir's housing and settlement complex, and Petamburan. It also has access to neighbouring area such as Senayan and and Menteng. Located between skyscrapers, its RW 7 is still categorized as slum by the government. The RW sits around the riverbank area of Kali Krukut river, a branch of Ciliwung River. Though it is relatively close to Sudirman and other surrounding commercial area, the connectivity is scarce and bad, as its road access is slightly underdeveloped, and jammed with vehicles, giving hard connectivity from other areas. Karet Tengsin is mostly popular for its TPU Karet graveyard that is located on the northern side of RW 7. The graveyard spans almost the entire northern-side of Karet Tengsin, bearing a popular connotation for Jakarta's public graveyard.

From the initial survey and interview with the locals, not every RTs have heavy threats from floods. RT 11 and 12 are mainly the most vulnerable ones because its natural position is located on a more lower ground of the slope. The slope is quite significant and visible by naked eyes, so the flood that happens annually is not merely because of the existing slum drainage problems, but also because of its hard inability to deliver back the water to the city drainage. Thus it is chosen as the potential of the study and design location because it is the one who is crucially needing a solutive and design synthesis for that problem.



1.3. design theme

The design theme concerns the scope of COVID-19 post-pandemic housing, and existing urban slum problems. Through papers and researches, scholars and architects have begin developing the ideas, parameters, and novelties on housing design paradigm to tackle post-pandemic context and other inevitable circumstances. Aside from its general take on general housing, the COVID-19 theme would be much more important, challenging, and complex if the scope is narrowed into a dense, slum-related housing of middle to low class people. As Dejtiar, Kashdan, and Priday have predicted that the future of home design might change, the future of slum settlement would be placed in the most difficult situation as several studies have reported a direct connection between crowding and adverse health outcomes (Megahed and Ghoneium, 2020). WHO stated in 1988, emphasized again by Capolongo that high density could lead to unhygienic conditions, and the spread of diseases that came from the crowding. Crowding would increase the risk of infections, and droplet-transmitted infections. While at the same time, crowding, tight connectivity between individuals, and informal unpredicted flow of social activity in slums are inevitable, because it has been their characteristics and the consequences from its urban planning and architecture. Slum's narrow circulation and threshold spaces, inadequate house area design, and its mixed commercial-housing zoning, contrast current COVID-19's built environment parameters such as wider distance between individuals, more partitions between departments, wider corridors and circulations, and other new design strategies. This makes the author believe, that by targeting a slum area for a redesign on current post-pandemic context bear its main priority because their struggles between the economical needs and new regulations need to be channeled into a design solution that can reconcile both COVID-19 condition and its existing slum problems. The author believes that with proper and out-of-the-box approach and strategies, both contrasting problem groups could be solved at the same time, by seeking the in-between solution that benefits both parameters. As Capolongo and Wainwright have stated that flexible and adaptable spaces can make housing more sustainable, able to adapt to changing needs and to changing lifestyles (Capolongo et al., 2020; Wainwright, 2020), an approach to that 'sustainability' is needed. Thus, the author thinks this is the right time to explore, and dig the branches of Resilience theory, and architectural threshold space, as both theories directly and indirectly have tried to response unpredicted situations, and COVID-19 post-pandemic condition and slum spatial problems are fit below that criteria.



vertical urban kampung

Vertical Kampung term gains its popularity in contemporary time as one of the options to tackle housing problem in a dense settlement area. It can be perceived as a vertical housing that maintains its Kampung characteristics. Kampung can be defined as an informal settlement. By designing a vertical kampung, it translates the form of Kampung and its characteristics into vertical upward extension, as an attempt to provide more open space that can be used for other purposes or other housing lots. Vertical Kampung is derived from the conventional vertical housing or Rumah Susun, which in Indonesia tend to not always succeed in attracting the designated occupants to move from their previous problematic area.

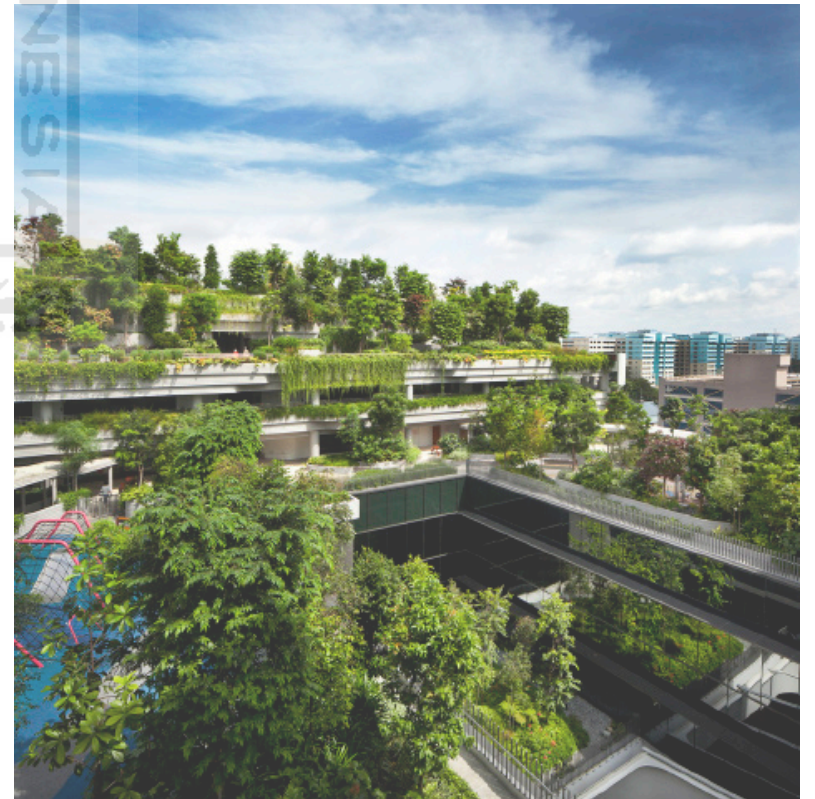
Talking about vertical kampung will have significant connection the term Kampung's Spirit, which is the intangible parameter that sticks to the conventional typology of Kampung. This Kampung's Spirit is what differs the vertical kampung with other conventional type of vertical housing. According to Jakarta Vertical Kampung masterclass, several characteristics can be identified in a spirit of Kampung which are:

1. Community
2. Informality
3. Affordability
4. Identity
5. Individuality
6. Efficiency
7. Diversity
8. Participatory
9. Linkage
10. Space Experience
11. Human-scale

These spirits will be brought into the design consideration, thus making the vertical kampung bears the same spirit which the people have taken in their mind. Yu Sing writes that a vertical kampung is a transformation of Kampung without removing its local character and its richness of form, color, material, volume, skyline, economic potential, locals creativity, et cetera (Yu Sing 2011). This approach then will be used to face the existing problems because by redesigning the kampung into a vertical kampung, one does not necessarily need to remove the people's memory of their home spatial sense. Memory is a very important thing to be considered, because as Gaston Bachelard writes in his book *The Poetics of Space*, that people day-dreams, and their house protects them. (Bachelard, 1958)



Kampung Deret in Pringgodani, Solo, Surakarta, Central Java
Source: kampungnesia.org



Kampung Admiralty in Singapore
Patrick Bingham-Hall

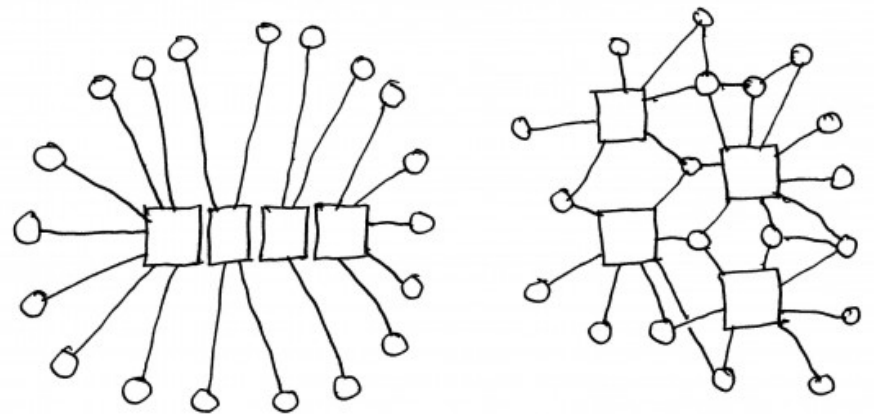
resilience architecture

To face and touch the contrasting problems in urban kampung, an approach that can be the guiding factor of the whole design and post-design process is needed. Resilience is an emerging word bandied by environmental designers today, and it threatens to displacing the word “sustainability” (Mehaffy and Salingaros, 2013). The framework of a resilience-oriented approach would be acknowledging the inability to design for all such unpredictable events, but we could make sure that our building are better be able to survive disruptions and the occupant could bounce back into their previous ‘normal’ afterwards. While the idea emerged initially from ecology and biology, the main concept between resilient and non-resilient systems, inter-connected elements, and multi-scale responses, are gradually be adapted into architectural design.

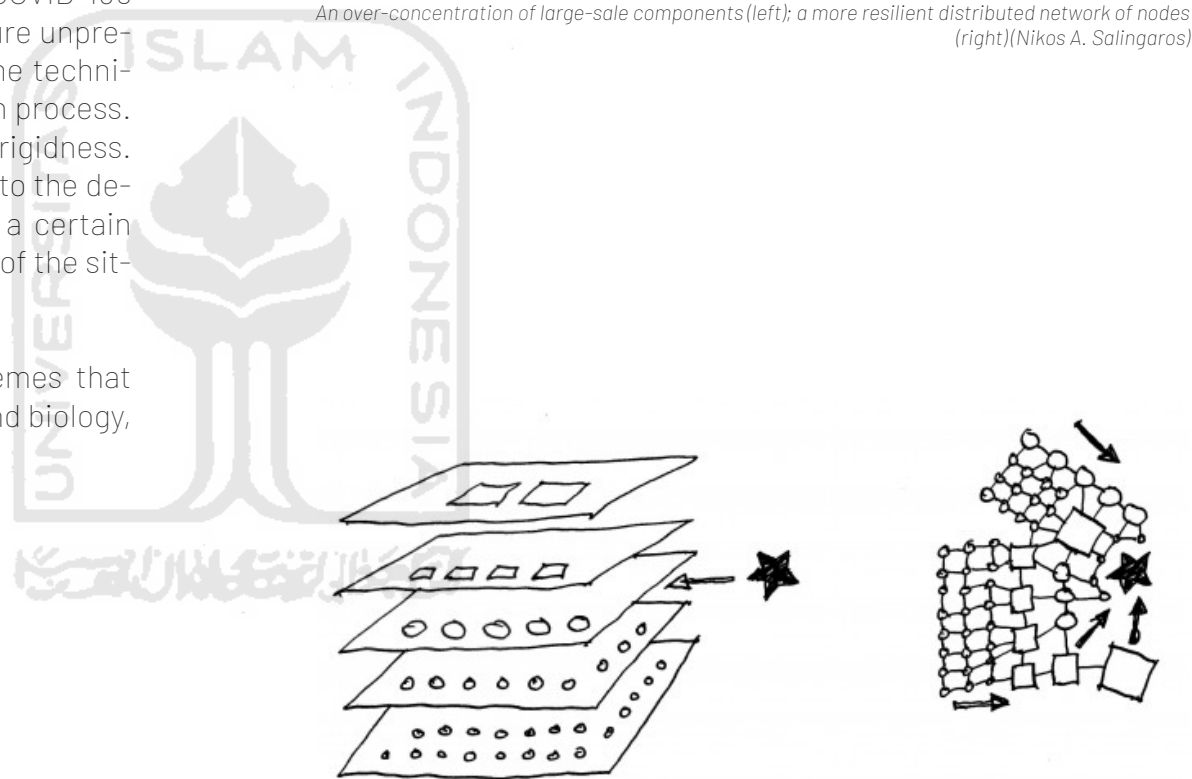
Resilient architecture shows its fitting modes to encounter COVID-19’s unpredictable indicators, slums’ existing problems, and future unpredictable phenomena because the term touches not only the technical aspect, but also the direction and structure of the design process. The motive walks perfectly with slum’s informalities and unrigidness. Thus, the author thinks that by adapting resilience theory into the design-as-synthesis in this context may appeal and achieve a certain condition and can reach closer into the maximum threshold of the situation.

According to Mehaffy and Salingaros, key conceptual themes that could be picked from existing resilience theory in ecology and biology, may be visible on these characteristics:

- They have inter-connected networks of pathways and relationships.
- They have diversity and redundancy of activities, types, objectives, and populations
- They have a wide distribution of scales of structure
- They can adapt and organize in response to changing needs on different spatial and temporal scales, and in response to each other.



An over-concentration of large-scale components (left); a more resilient distributed network of nodes (right) (Nikos A. Salingaros)



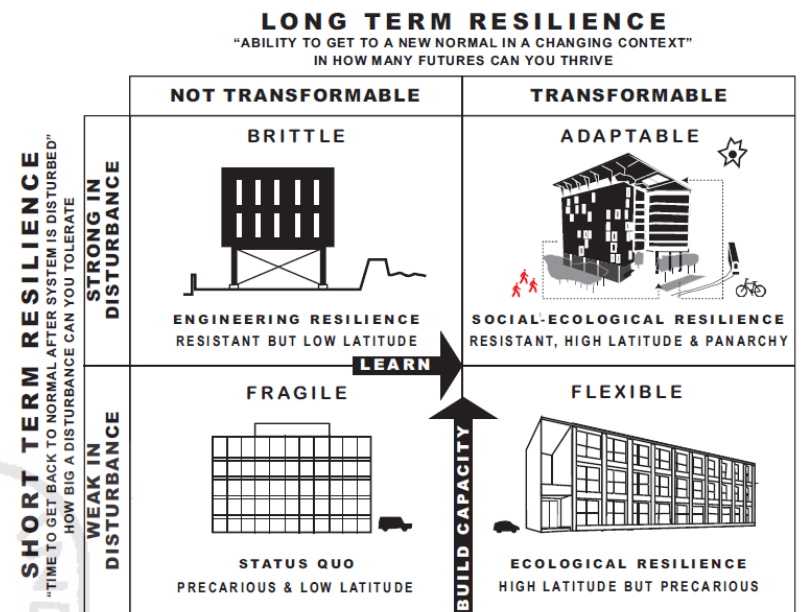
A complex resilient system coordinates its multi-scale response to a disturbance on any single scale. (Nikos A. Salingaros)

From the problems that exist in the slum, a specific approach of resiliency is crucially needed to give abilities for the occupants to recover the daily lives after an epoch. Though many framework of architectural resiliences exist, the Adaptive Resilience framework suit the case where multi-layered problems are occurring in almost the same time.

Translating resilience to architecture requires a thinkabout the interplay of resiliences in short-term and long-term frames (Laboy, Michelle, and Fannon 2016). From Laboy and Fannon's architectural resilience framework we could visualize the adaptive resilience's attributes into four main sections. The most preferred in multi-layered problems would be the transformable and flexible type of resilience; a social-ecological resilience that is resistant, high latitude and panarchy (equal hierarchy between spaces).

Short-term resilience provides the time and ability for the people to get back to normal after system is disturbed. Flood threat, and dense informal housing problem threats in the location, could be prepared by this attribute by bringing an engineering resilience; resistant but low latitude of change. Such idea of vertical kampung firstly came from this attribute; a reaction against the annual flood and shrinking housing spaces. But mere short-term resilience would not be enough for future unpredicted phenomenon and context/environmental change such as COVID-19 pandemic.

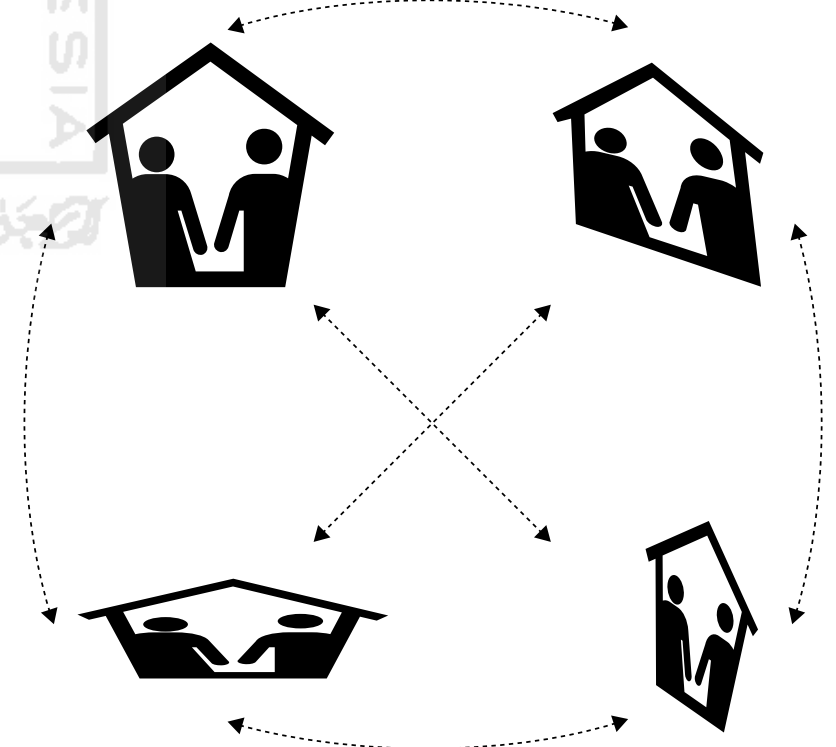
Long-term resilience will provide the ability to get to a new normal in a changing context. Current COVID-19 context marks the transition from the past non-COVID context into the novel previously-unpredicted phenomenon.



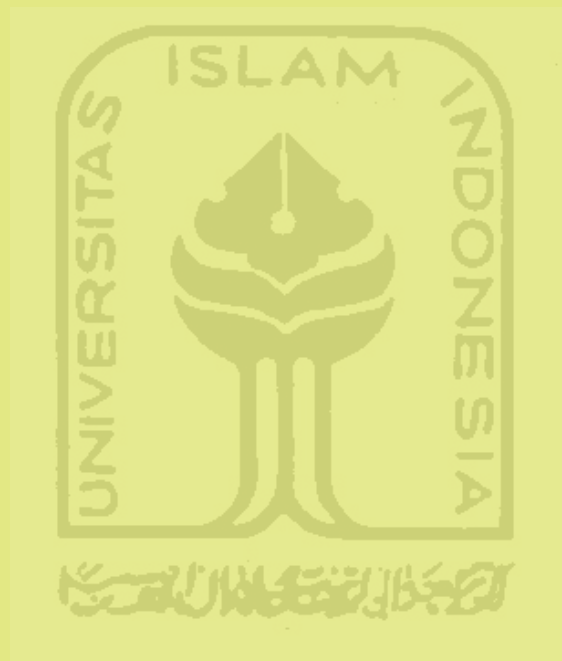
Adaptive resilience attributes, visualized by the chart (Laboy and Fanon, 2016)

Assessing and recognizing both the short term and long term resilience parameters are crucial in the initial phase, as it would directly affect how the design will be brought. Short term resilience plays between weak-in-disturbance and strong-in-disturbance, whereas the disturbance can be natural disturbances, or man-made disturbances. While it is expected to be relatively shorter in terms of its occurrence time than the long-term resilience parameter, some disturbances could be categorized into a longer period of time even though it is most likely hold the short-term characteristic. This subtle difference example is COVID-19 which needs a deeper analysis and reconsideration on which sub-category it falls. As COVID-19 generally will affect both short-term and long-term consequences (e.g temporary commercial space open time versus changes of daily activity in a house), it then should be seen from both perspectives. Short-term resilience will mostly talk about its rigidity or flexibility of the physical architecture, its durability and adaptability against an incoming physical disturbances that happen to be visible like natural disasters, or COVID-19's consequence of social distancing. While long-term resilience will tackle the changing context of the building, meaning that the indirect consequences will change the normal states in a span of a certain period. An example would be COVID-19's novel context that brings novelty in people's daily activity in long run; even though some individuals started to adapt the Work From Home culture in the initial phase of the pandemic, it is predicted that the remote-working style and culture could last longer even after the pandemic ends. This shows how the context that an environment occupy changes according to a particular phenomenon. It does not necessarily affect visible and tangible aspect of the building nor the architecture, but it includes intangible elements and things in the long run.

The take on changes will not only focus on the architecture, but also the occupants. As Macchi and Bellini argue, that the new architecture (that can provide a better flexibility for its occupant) must be (con)temporary: leading with people, adapting, and being resilience. The architecture will become a temporary structure and environment that could be a solution to emergencies, but it could also be seen as a solution of our temporary lives (Bellini & Macchi, 2016). The author agrees with the paradigm of temporality, meaning that the occupant will take part of the design process, giving away the information of their needs, so the design will be molded according to them. Because it is 'molded', the building could be re-molded if any new changes are necessary, making it a temporary and flexible medium.



Architecture that follow the occupants' flexibility, maintaining its pace to follow a changing flow of functional demand



1.4. precedent study

1

Project Name : Rusun Penjaringan, Jakarta Vertical
Kampung
Building Type : Residential
Location : Jakarta, Indonesia
Architect : Group 6 Jakarta Vertical Kampung, Yu
Sng & Ivan Nasution
Year : 2013

The vertical kampung in Penjaringan is a proposed design to revitalize the existing Rusun Penjaringan. Its existing 13 block of housing with 4-5 formal floors, the inhabitants are the victims of 1984's Kampung Penjaringan fire, which then began to be constructed as a vertical housing in 1986. After years of usage, the formal building was surprisingly evolved and adapted into the previous Kampung's lifestyle, and some of the spaces inside the newly built building have been transformed into more-informal kampung spaces. The design focused on several conditions, advantages, and disadvantages, and concerned more about the chance of incoming inhabitant raise and an increase of its density.

Dynamics in Threshold Space : Social nodes, New grounds, Street oriented

Resilience Tendency : Vertical circulation, Spatial flexibility, Grid system, Participatory development

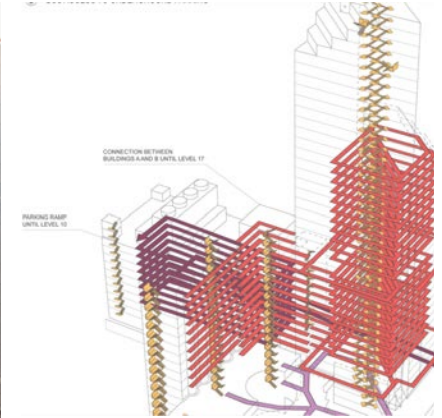


2

Project Name : Torre David Development
Building Type : Residential
Location : Caracas, Venezuela
Architect : U-TT & SuAT ETH Zürich
Year : 2012

Torre David is an unfinished skyscraper that has been adaptively reused by local slum community as their scattering house living. In 2007 it became the improvised home for a community of over 1,000 families living in an extra-legal and tenuous occupation that many called a vertical slum.

The community was neither a den of criminality, nor a romantic utopia. Rather, Torre David was a building that possessed the complexity of a city. It merged formal structure and informal adaptation to provide urgently needed solutions. In 2012, after a year of research, U-TT began to work with residents and a diverse team of collaborators to document the squatters' adaptive reuse of the existing structure, interview residents about their experience, and design proposals to retrofit the tower complex. In particular, the sustainable engineers of the SuAT Chair at ETH Zürich helped develop novel circulatory, electrical, and water infrastructure schemes. While striving to raise funds to implement some of these ideas, the documentary and design work was disseminated in a book, short film, lectures, and numerous exhibitions.



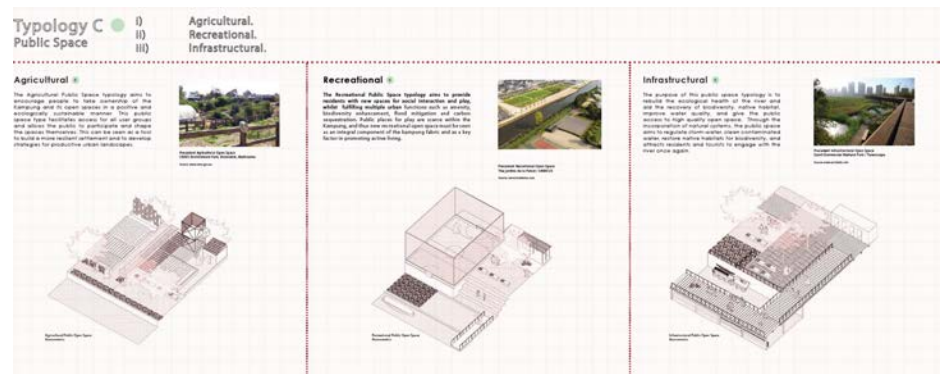
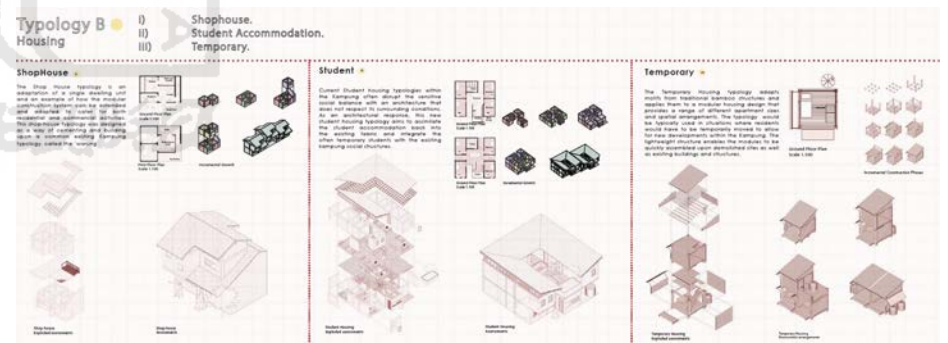
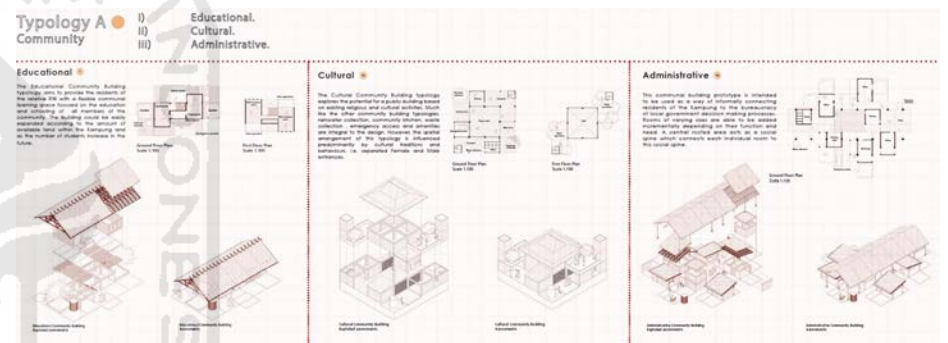
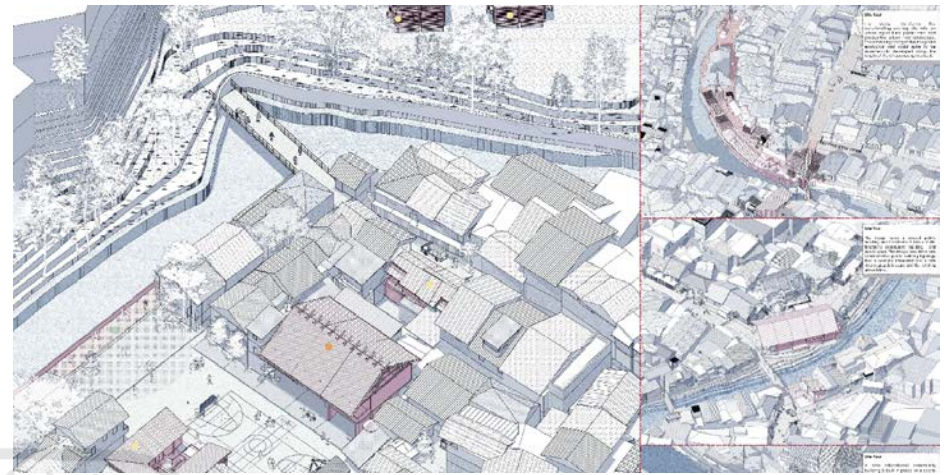
Dynamics in Threshold Space : Informal Adaptation,
Novel Circulatory, Public Space Nodes

Resilience Tendency : Electrical scheme, Water
scheme, Participatory development

3

Project Name : Kampung Value - Tamansari
 Building Type : Residential
 Location : Bandung, Jawa Barat, Indonesia
 Architect : James Connor & Tahj Rosmarin
 Year : Dencity 2016

Kampung Value project in Tamansari, Bandung, is an interesting take on tackling social and slum housing problem in Indonesia. The architects propose different categorization of design guideline function categories, and different typologies which then would be put into the masterplan of a slum revitalization. Interesting take is also concerned regarding the UN's definition of a slum, which the architects found it is hardly be juxtaposed with Tamansari's existing so-called 'slum', because the informalities that are created by the people is nearly unprecedented; can be interpreted as a normal city in different forms. The approach seeks out existing qualities and possibilities from the kampung, before translating them into a new typology for each categorization, to fulfill the spatial needs of the occupants.



Dynamics in Threshold Space : Temporality on function, flexible shophouses

Resilience Tendency : New housing type follow new conditions

4

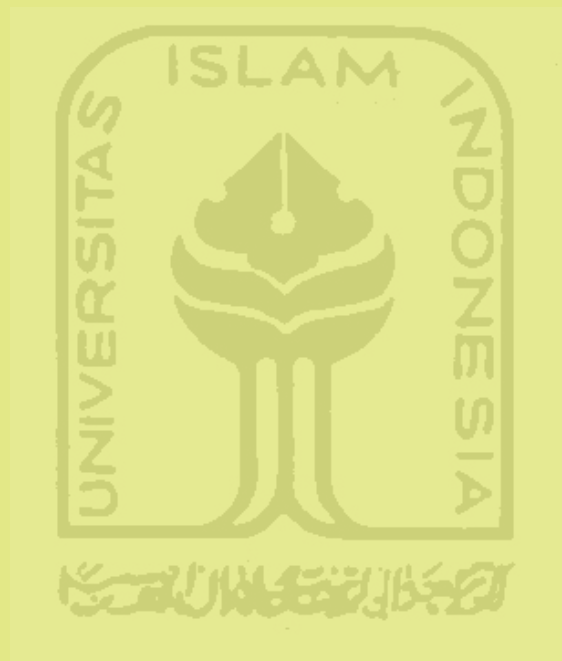
Project Name : Bronx Housing
Building Type : Residential
Location : Bronx, NY, USA
Architect : Makenzie Leukart & Charles El
Year : 2016

In reaction to the low social density and infrastructural isolation of the site, housing must take the form of a densifying matrix that promotes social interaction and community activity. This project focused on creating shared community programming at multiple scales as a way of providing the impetus for overlapping and dissimilar social networks. These ideas grew out of research into the formal structure and sociological importance of social networks. We used a hybrid structural system of prefabricated concrete units and an active steel frame to reinforce ideas of interdependence and social connectivity, as well as to provide stability for a series of cantilevered terraces along the Bronx side of the building.

Dynamics in Threshold Space : Dissimilar social network, Social connectivity

Resilience Tendency : Sociological, Hybrid structural system, Shared community programming





1.5. problem statement

General Problem

How to design a vertical urban kampung by adopting adaptive resiliency to reconcile COVID-19 and slum problems?

Specific Problems

1. COVID-19 new normal demands an extension towards horizontal direction from each spaces and individuals
2. Slum's inadequate space demands an extension towards vertical direction for incremental settlement
3. Slum's location beside Kali Krukut river brings up flood threat every raining season
4. Slum's indirect threat on being evicted by a swarm of privatization



Visible indirect threat on being evicted in near future



Dense and small narrow circulation on many alleyways



No visible direct intervention or responses in the area concerning COVID-19



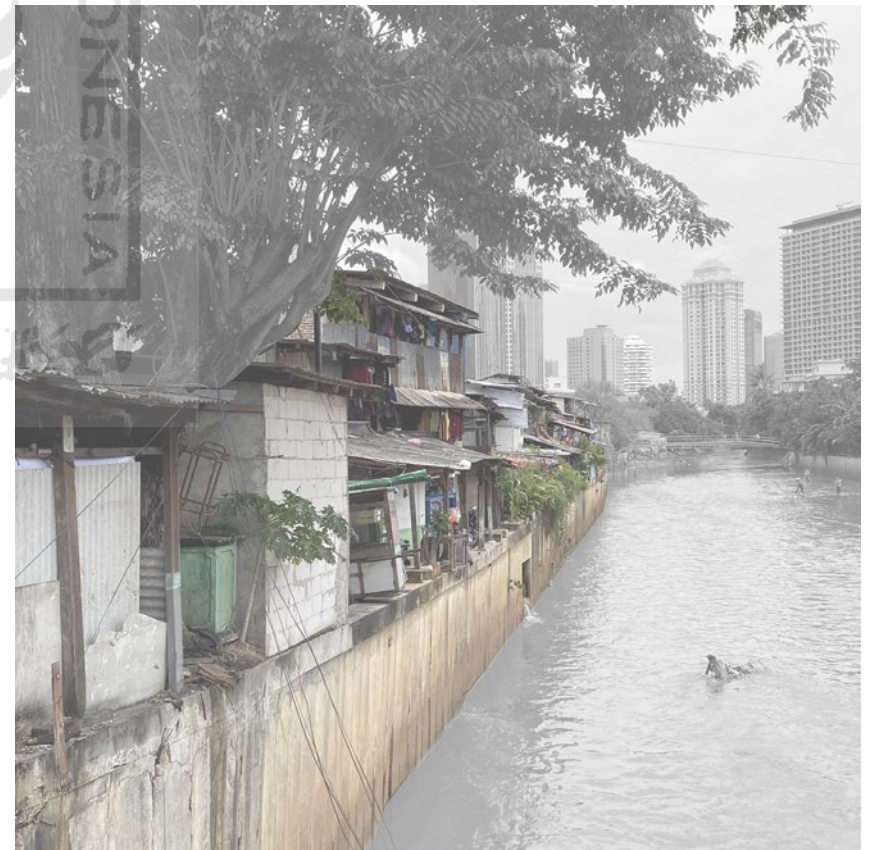
Location beside Kali Krukut's annual flooding threat

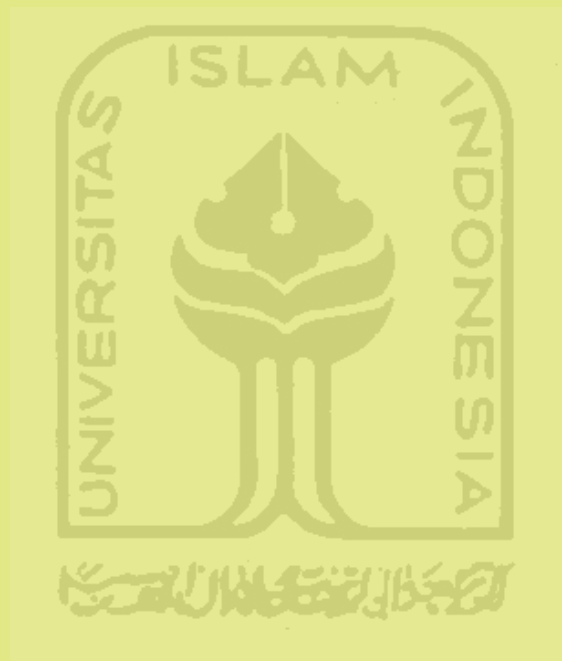
Goals

1. Recognizing the complex patterns of the multi-layered slum problem in Karet Tengsin
2. Designing a vertical urban kampung that can cover current and future threats and phenomenons

Objectives

1. Map the existing problems in the location
2. Recognize COVID-19 parameters for the built environment
3. Provide vertical urban kampung spaces to densify the neighborhood housing
4. Provide spaces for social, community, and economical activities
5. Create an adaptive resilient vertical urban kampung through adaptive resilience approach against COVID-19 and future conditions

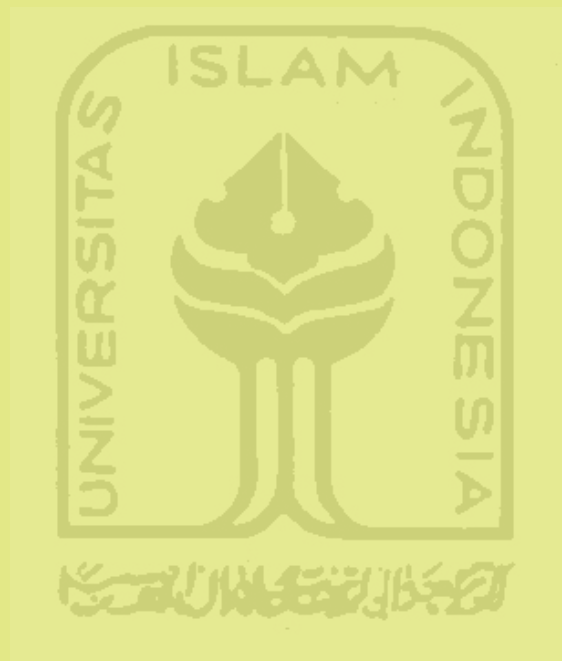




1.6. originality and novelty

Taking a look at published final graduation project from UII, several theme that specifically or indirectly use vertical kampung as its typology can be found. Though, the problem and focus of its project differs from one another, and from the author's proposed title. While most of the project are located in Yogyakarta, one project was designed and located in Jakarta, but the urban characteristic of its location (Manggarai) differs from the author's location of Karet Tengsin, where Karet Tengsin is located in-between metropolitan and skyscraper area of Sudirman and Senayan. Some projects concern about flexibility, while other topics are also exist like economical issue of the inhabitants, and flooding threat response. Thus, from this collection, the author's title topic of current and post COVID-19 problems in a slum through a vertical urban kampung has not been discussed and proposed before. The vertical urban kampung in particular, is meant to take a difference look according to the site's context, while holding slight differences with other non-urban mere 'vertical kampung'.

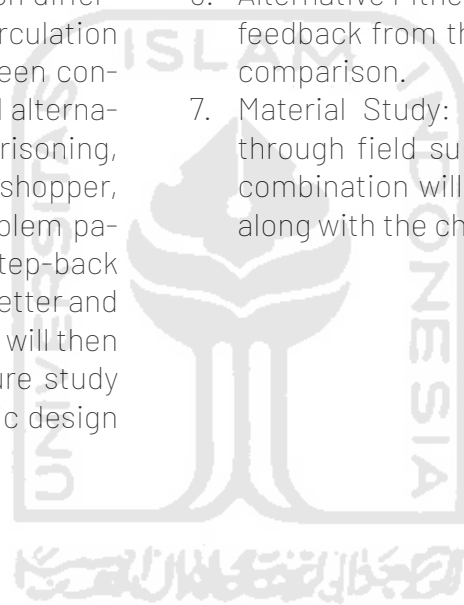
Existing Title in UII	Author	Problem and Focus
<i>Vertical Kampung in Manggarai, South Jakarta Based on Flexible Architectural Concepts</i>	Dini Agumsari	Limited land and housing demand, flexible architecture
<i>Kampung Vertikal in Code River, Yogyakarta: Implementation of M3K 'Munggah, Mundur, Madhep Kali' Concept as Strategy for Flood Disaster Management</i>	Yushna Septian Adyarta	Flood disaster and threat in riverbank area
<i>Perancangan Rumah Tinggal Vertikal Berbiaya Rendah di Ngampilan Yogyakarta dengan Pendekatan Fleksibilitas</i>	Muhammad Naufal Raga Pratama	Low-cost housing with flexibility
<i>Kampung Kebun Bersusun di Jogoyudan, Yogyakarta, dengan Pendekatan Open Building</i>	Nurhadi Firdaus	Locality, local economy, ecological aspect
<i>Kampung Vertikal Sebagai Sentra Industri Bakpia Pathuk Pathuk, di Purwodiningratan, Yogyakarta</i>	Amalia Khairunisa	Housing demand, and small-scale industry
<i>Rumah Susun Sebagai Kampung Vertikal di Bantaran Kali Code Jalan Mataram, Yogyakarta</i>	Zulhidayat	Vertical housing with water conservation on riverbank area

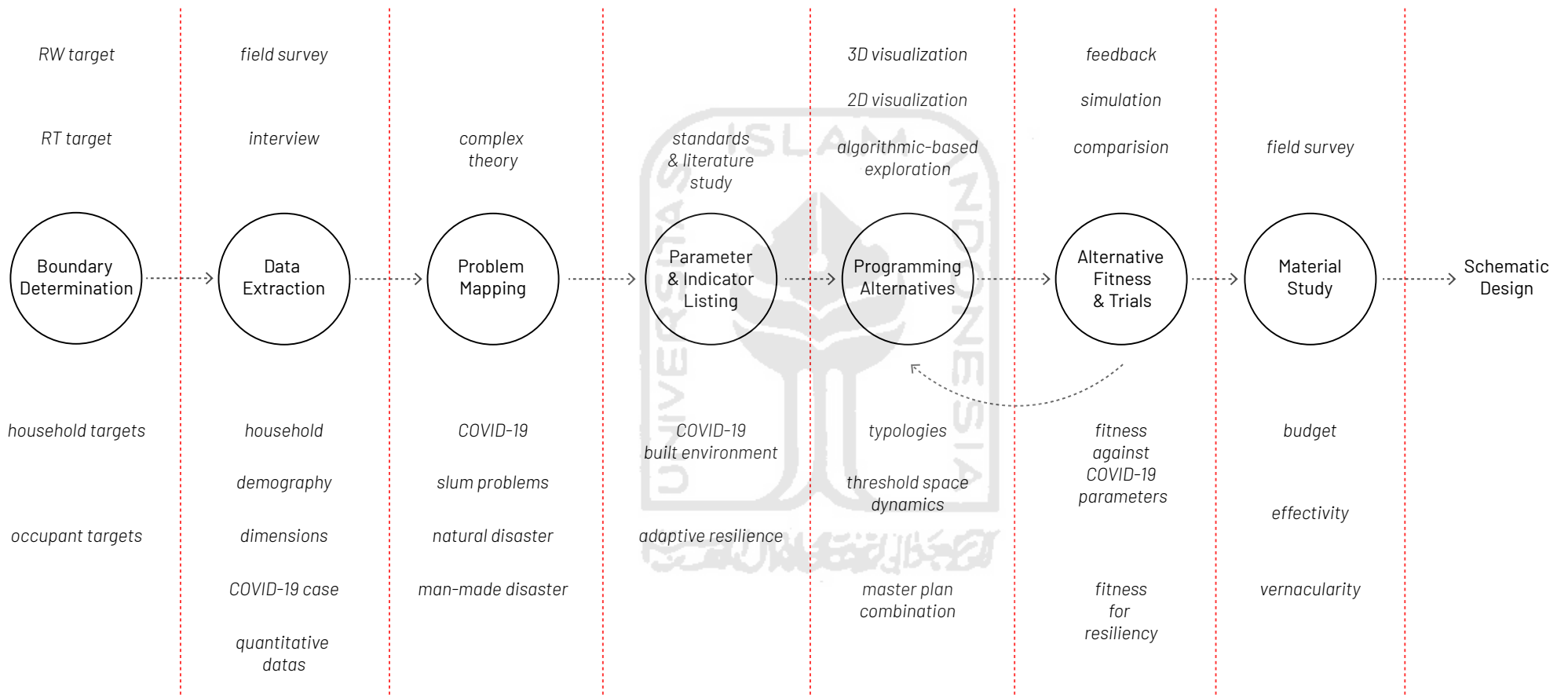


1.7. design process

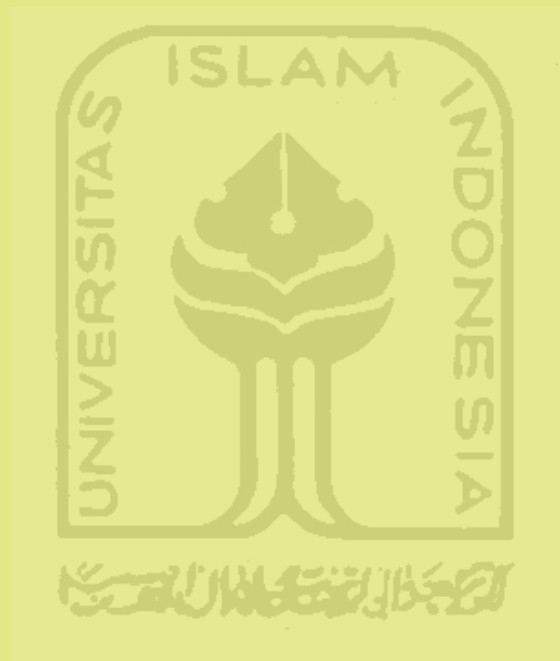
The design process will start by determining the boundary of which the initial proposed site will be designed. This initial phase will be conducted to measure how much household and occupant numbers to be considered into the next phase of the design. After the physical boundary has been determined, the phase will go into data extraction stage where the combination of field survey, interview, and secondary data seeking will be conducted to get essential datas, and also to uncover other datas that have not been listed to be sought. The next step which is to map the problems from both COVID-19 and slum parameters, is meant to decypher the complexity of problems that are happening in the area. A certain methodological approach of a complex theory would be eventually needed to give a clear sight of categorization on the overlapping and multi-layered problems. The phase then will continue to list parameters and indicators for the design from each perspective of problems that have been mapped, and it will be used as a guiding factor and direction for the programming phase. The programming will take the benefits from 3D - 2D visualization and algorithmic-based exploration to seek various alternatives on different sub-typology inside the vertical urban kampung, its circulation and threshold space design, and its master plan that has been constructed by modules of the former typologies. The proposed alternatives will be simulated and tested by direct feedback, comparing, and if necessary tested with a solver like Galapagos for Grasshopper, to maintain the fitness against the COVID-19 and slum problem parameters, and also for the adaptive resiliency parameters. A step-back from alternative trials to programming is expected to find a better and a more suitable options. The final suitable and likeable option will then be studied for its material options through various literature study and real-life survey, before being brought into the schematic design phase

1. Boundary Determination: Determining the boundary for the design site location, which also to determine the targeted number of households.
2. Data Extraction: Collecting quantitative and qualitative datas by conducting the second, third, and if necessary fourth field survey while also interviewing the locals and the head of RT RW relating the Kampung's characteristics, COVID-19 situation and condition, and what people have narrated in their mind about the Kampung.
3. Problem Mapping: Map the design's multi-layered and contrasting problems into a clear readable categories and maps, allowing the designer to seek for any direct and indirect correlation and crossings between each problems.
4. Parameter & Indicator Listing: Creating the parameter and indicator needed for the design from the previous step of problem analysis; parameters that are expected to reconcile from both COVID-19 and slum problems.
5. Programming Alternatives: Designing a parcel or block of typology alternatives according to the needs of the vertical kampung.
6. Alternative Fitness & Trials: Testing each alternatives by going through feedback from the future occupants, software-based simulation, and comparison.
7. Material Study: Studying the possibilities of material combination through field survey and novelty/technology study. The final material combination will be brought into the next phase of schematic design along with the chosen alternative.





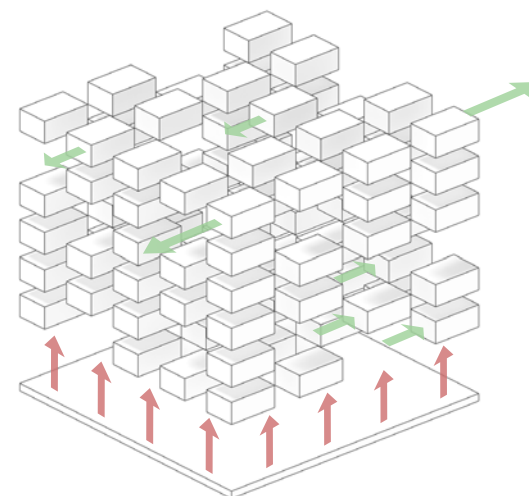
1.8. preliminary design hypothesis



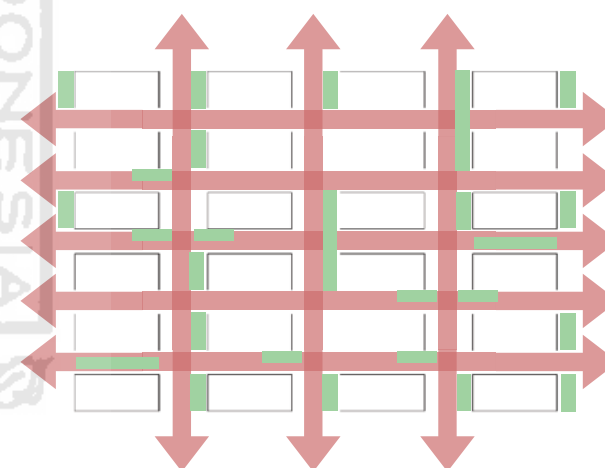
8. preliminary design hypothesis

The initial design hypothesis and approach would be a vertical urban kampung that possess the resiliency ability against current and post-COVID-19 disturbance, and the existing slum disturbances in Karet Tengsin. As COVID-19 products several new demand on the occupants' daily lives and normals, the architecture needs to be able to provide current new functional demands from COVID-19 while giving opportunities to be elastic towards incoming unpredictable future phenomenons. Adaptive resilience then would be taken as the guiding factor in the design process because the framework will be oriented towards uncertainty, and free from narrowed and too-specified disturbance category. It has been described in the earlier chapter that to provide such resiliency that can withstand both short-term and long-term disturbances, then approaches from both matrix should be adopted into the design consideration.

Short-term resiliency that will be considered into the vertical urban kampung includes the minimum safe distance on every designed-spaces in the building complex to avoid any potential COVID-19 infection spreading, that will be solved by a brittle design through engineering-resilient sub-category. Brittle which means immune to temporary disturbances like in this case the COVID-19 current on-going spread and cluster, and its new demand to avoid any direct physical contact for circulation and any types of activity. That can be achieved by reconsidering the threshold space design deeply, to maintain the connectivity between each spaces without having to increase the COVID-19's spreading risk in the area. This first category of short-term resilience will also be reconciled with the slum's flood threat problem, that demands a certain engineering aspect like uplifting and providing open spaces in the ground floor, to adapt the flooding culture. Then, those and other engineering possibilities will be compared, combined, and fused to generate a short-term synthesis that can cover from both COVID-19 and slum problem spectrum.



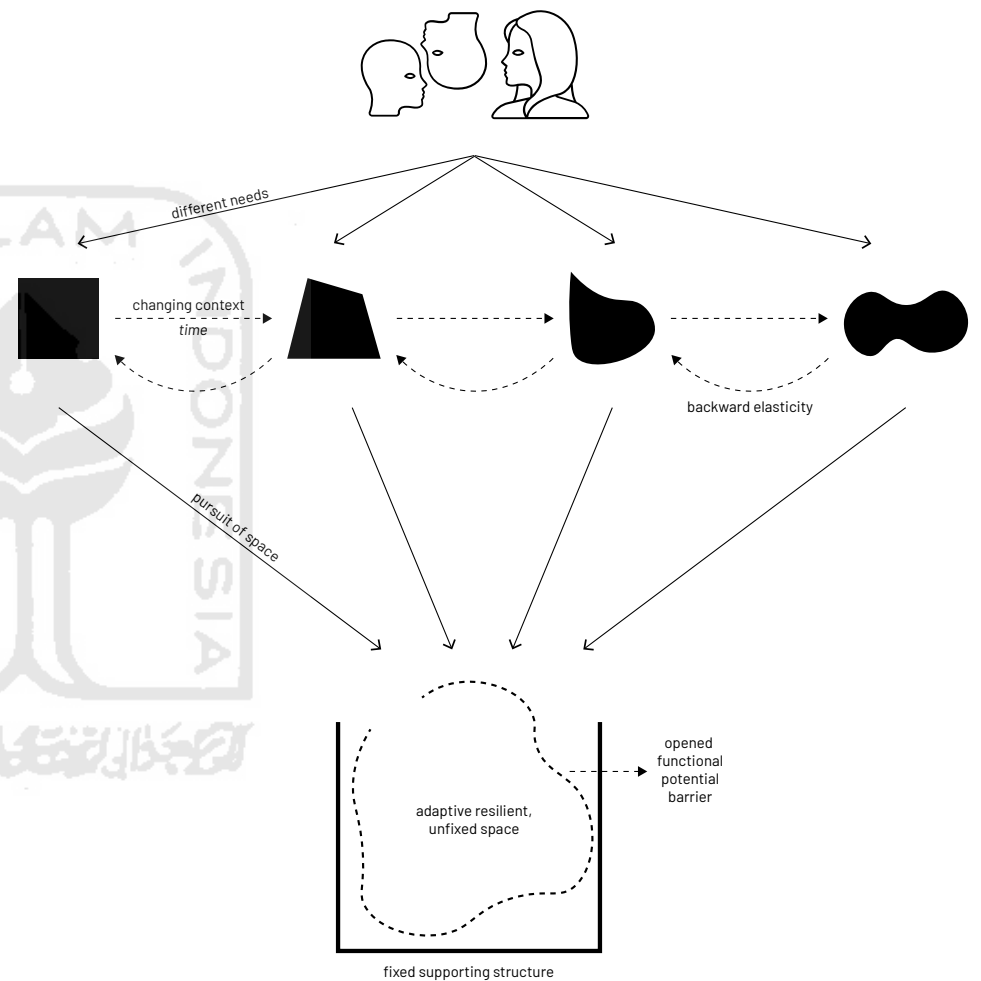
COVID-19's horizontal distancing demand and slum problem's vertical distancing demand visualized as the basic form placement of each houses in a vertical kampung



Top-down view of excessive spaces from the consequences of distancing; a potential to be used for incremental and flexible architecture

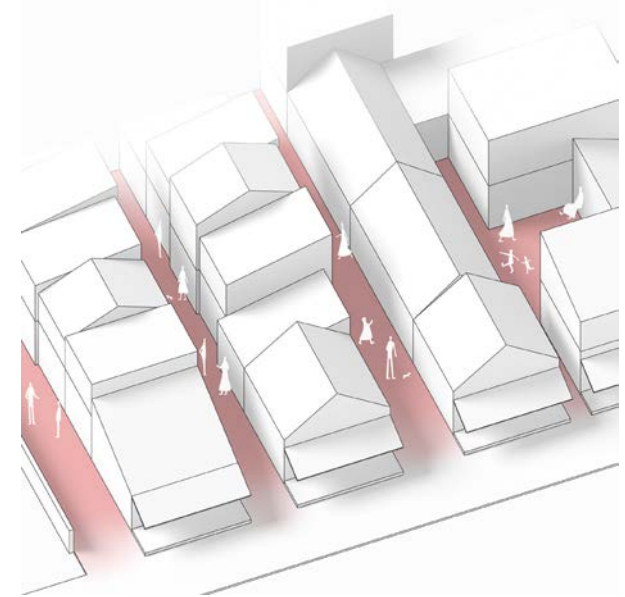
Long-term resiliency approach will then be adapted into the design through a transformable architecture. It will tackle mostly about the context of which the building resides, that is the novel normal of post-pandemic era. Various new culture such as work-from-home culture, and quarantine space demand, could be constructed in such a limited land of slum by adapting a kind of transformable partition so it will adapt into the actual need of the occupanats in a certain condition and time.

Because flexibility in various new and old functions are expected, such vertical urban kampung needs to be able to channel the transition of its people from the past context into a new normal context, that in this case would be from its previous indisturbed context pre-COVID towards the new COVID-19 and post-COVID-19 context. The context consequences will be mapped in its respective design process, in order to cover any potential options and needs that the locals in Karet Tengsin would eventually generate in future. To cover such vast range of possibilities (of new functions, typologies, building types, activities, et cetera), it seems impossible because it deals with something uncertain. Thus, an approach such as flexible, inclusive, and transformable architecture (that has been mentioned in the previous adaptive resilience spectrum in design theme chapter) are needed. The vertical urban kampung will not focused mainly on a specified type of demand, but it will face the uncertainty by providing quick and effective readjustment by its people. By opening up the architecture as a readjustable one, it is possible then to face any uncertainties and sudden needs that will emerge in time. This paradigm will be implemented starting from the most initial phase of the design, whereas it has connection with the author's previous research on how a new design paradigm could be potentially be adapted (especially in housing) towards COVID-19 new era. Past rigid categorization of functions, rooms, or typology need to be decyphered and crumbled into something more general as the initial prototype, then giving time and ever-changing condition to later on develop the prototype into a more specified form of the final image of the building. It resembles the adaptive resilience, as not only mere resilient, but a resiliency that can withstand various degrees of unprecedented and unpredictable circumstances in the future.

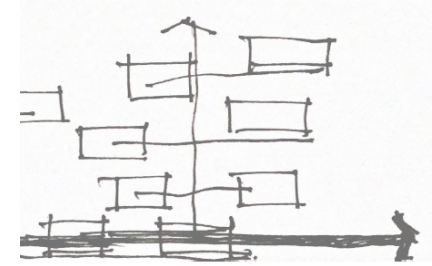


From the intangible aspect, the design should bring together the existing kampung's identity and culture. As it has been covered under the long-term resilience strategy of sustaining the location's previous identity, the characteristic of Kampung Kota in Jakarta, that is already sticking into Karet Tengsin, should be brought into the design. It is not merely an act of preserving the identity, but also as an option deciding-factor in what direction the block of typologies will be designed. Government's regulation that indirectly assume the majority of a city inhabitant could sustain their daily economic by working from home is hardly fit the kampung kota's context, because most people that live in kampung kota does not possess such adaptable livelihood; street vendors, warung owner, courier, constructor, and most blue collar workers are more common livelihoods in the area. Thus, providing an online remote work-from-home space in the housing scheme would be slightly inaccurate and could lead to redundancy. An interview and data extraction is then needed to measure the accuracy on various design options in the next phase. The design will optimally adapt into what needs the locals demand. It could most likely be, instead of a dedicated working space for remote online working environment, but it will be the same shophouses or cart-based commercial space that follow the COVID-19 parameters, so that the people can continue its previous economical activity while increasing its elasticity towards the disturbance.

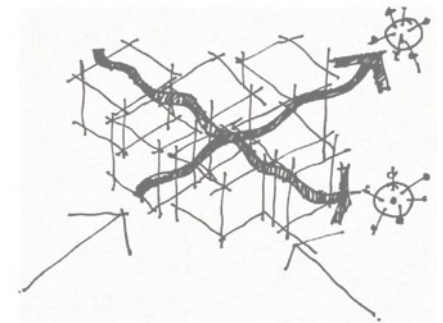
Those mentioned changes are important to remain elastic and resilience, meaning that when COVID-19 'normal' ends, the constructed new designed that was previously adapted into COVID-19 context should be able to transform back, or transform again, into the previous or another new normal state. To tackle this back and forth design motive, the transformable partition and non-structural element will take their roles in giving flexibility of functional changes by the people. It is directed towards multi-directional elasticity, so that the newly-designed novelty will not be left vacant or redundant if the specified new context has ended. This sums up the importance of taking the resiliency not under any very-specified category, leaving the barrier of the prototype potentials open to another context such as post-post-COVID-19 (after post-COVID) that is still an unpredictable situation from this time.



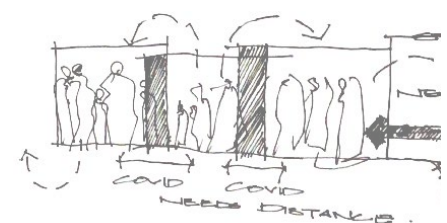
Kampung Kota's existing informalities, identity, and characteristics that need to be translated into the new design



Flood vertical extensions



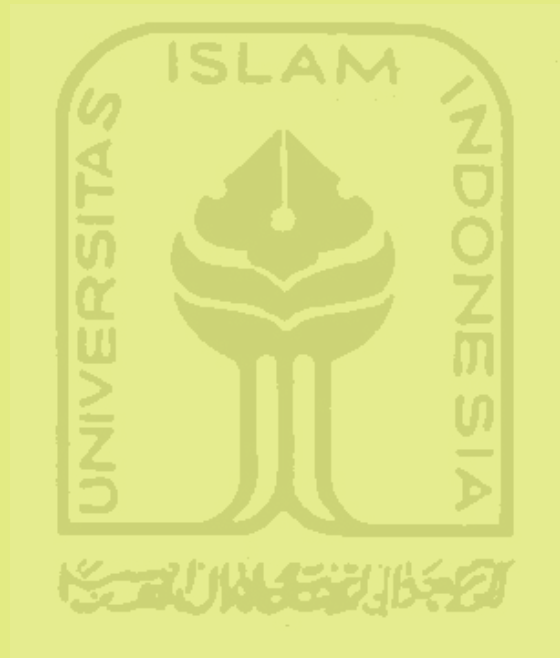
COVID-19 threat and space extension demand



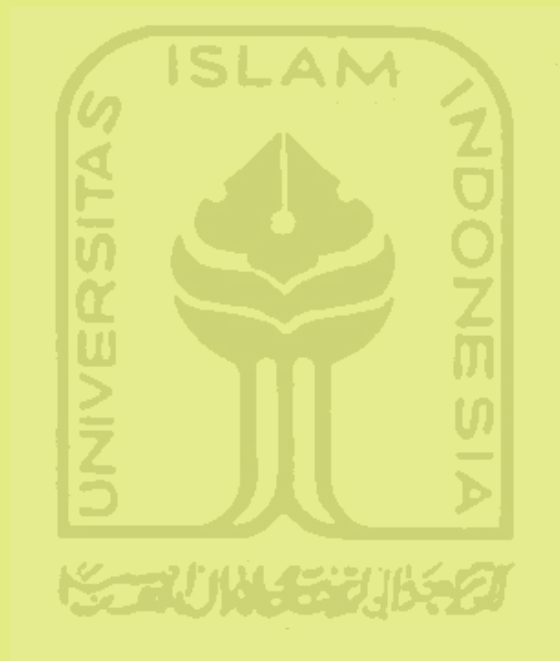
People's flexible needs and conditions

CHAPTER 2

1. Design Theme Study
2. Typology Study
3. Precedent Study
4. Location, Site, and Context Analysis
5. Architectural Programming
6. Design Exploration
7. Finalized Design
8. Reference



2.1. design theme study



1. Design Theme Study

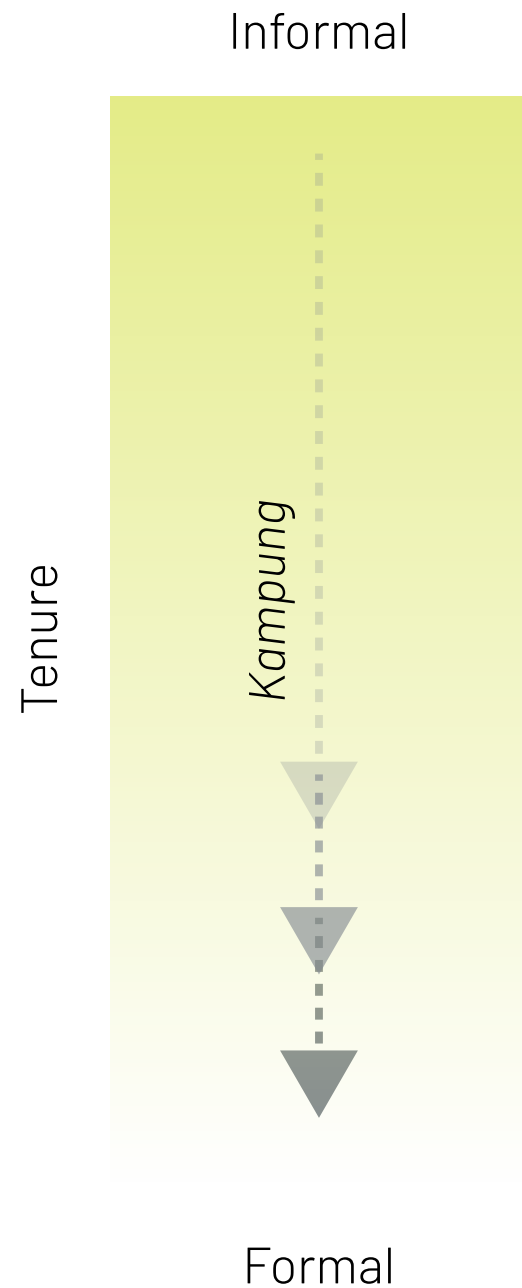
1.1. Kampung

Kampung is a word that is frequently spoken in almost every subject and field—daily, formal, and in scholastic environments—while holding various interpretations and contextual meanings. It is mostly associated with village, settlement, informal settlement, slum, scatter, community, and even the more analogously ‘marginal area’. If we take a look at KBBI (Indonesian main dictionary), it surprisingly provides four interrelated definitions that can be seen as slightly inclined into a negativity or underdevelop-ness. The first definition writes *kelompok rumah yang merupakan bagian kota (biasanya dihuni orang berpenghasilan rendah)* (A complex of houses that is a part of a city (most often being inhabited by people with low-income salaries)). From this first definition, it already shows a notion of settlement, or a complex of housings, and already its inclination towards underdevelop-ness is already visible by the last phrase inside the brackets. The second definition states that *Kampung* means *desa/dusun* which is a type of sub-district equivalent to *kelurahan* but they have more special privileges and are often exist in not fully-urbanized cities of Indonesia. If we take Jakarta for example, all of the sub-districts are already in the form of *kelurahan*, while *desa* can be found in cities that are not fully urbanized and modernized yet. *Desa* cannot be found in Jakarta, Bandung, or Surabaya for example, as eventually they are also examples of a modernized and urbanized cities in Indonesia. This inclination towards lower level of economical notion that is embedded in the term *Kampung* itself seems to contradict with what we can find in the real case, as there are countless *Kampung* or *Urban Kampung* in those urbanized cities. The fourth and the last definition provided by KBBI is much more surprising. *Terkebelakang (belum modern); berkaitan dengan kebiasaan di kampung; kolot.* (underdeveloped (not yet modern); relating to behaviours in the village; conservative;). It blatantly shows its aforementioned inclination towards the contradiction of the word modern. Thus it can be perceived that the word *Kampung* can be conversed in different contexts, as it can be used as an adjective that relates to the country’s conservatism, and also as the word to notate sub-district settlement of a city.



Above: A Kampung in Wonosobo, Central Java (NET Jateng)

Below: An urban kampung in the midst of Jakarta's skyscrapers (Arny Christika Putri)



But if we take a closer look into the contemporary discourse and physical data, the term Kampung is not merely, or fully, connected to any type of local conservatism, because many real life examples of Urban Kampung can be found in urbanized cities. For that case, several secondary looks are needed from researches and literatures to find a more appropriate and structural definition or perception about Kampung.

Kampung has a long history as informal settlements occupied by millions of people in the country (Rahardjo 2010). It can then be said that each kampung to each country could have different history of its formalization, while also noting that mostly the term kampung is used in the south-east asian region of Indonesia, Malaysia, and Singapore. Kampung is implemented as a slum-upgrading approach and a part of integration model (Hamidah et al 2017). This integration is one of the approaches to solve settlement and housing problems in Indonesia. It is an attempt to integrate between the formal and informal elements that will generate the by-product of such kampung. So from this perspective, kampung is a model of a slum upgrading that integrates formal and informal settlements. The author sees formal and informal notions as two main directions, first for the legality and tenure of the settlement, and secondly for its intangible characteristics such as the behaviour of people, the social bonds, social activities, and the shape grammar of its overall architectural form. Thus the merit of of a kampung is not always associated with informalities, but it is possible to act as a fusion between those two, or with the formality itself. This makes more sense if we take a look at this case's location in Jakarta whereas the targeted site location of Karet Tengsin is legally speaking, a formal secured tenured settlement that is not utterly a scatter. When talking about this kind of kampung, in the middle of a highly-urbanized area, it can be notioned more as an Urban Kampung or Kampung Kota, which its word kampung solely refer to its density, and its informal activities. It surpassed the scatter or tenure problem, but most often we see that it faces another stage of tenure-related problem, that is the threat of being evicted or privatized by a third organization, mainly private developers or the government itself.

*Representation for Kampung as a by-product from slum upgrading
(Author)*

Such bias and tendency has been mentioned and concerned by scholars, like Hawken (2017), whereas he argues that this kind of bias is unsubstantiated and that kampung needs to be reassessed as a deep heritage and a fundamental city making type of relevance to the future prosperity and resilience of emerging megacities. This notion of perceiving kampung as a slum habitat/settlement is criticized and rejected by many scholars. Silas (1998) has argued that “kampung is therefore not a slum nor a squatter”. Devas (1981) in his evaluation of Kampung Improvement Program (KIP) research concluded that not all kampung can be considered as slums. This criticisms are also supported by Santosa’s (2008) argument that kampung as an informal settlement, with minimum urban services and facilities, is being improved by its people gradually, so kampung cannot be considered as slums. Many papers have focused on the pathological aspect of kampung, and focused more into its poor infrastructure, poor spatial quality, degraded environment, et cetera, but few address the resilience of kampung (Hawken & Sunindijo 2018). Thus this discourse by the author is also an attempt to contribute to that particular unfilled hole of kampung conversation, because it is believed that the intrinsic values of kampung are very edible for resiliency and alternative urban solution to mentioned problems.

How kampung developed and emerged as a kind of its own entity from another urban settlement types has a long history. Hawken (2017) opines that it has correlation with the colonial and pre-colonial history of those Southeast Asian countries. When the first modern censuses were taken around 1900, the colonised countries of Southeast Asia were among the least urban in the world (Hawken 2017). The data shows that colonisation itself was responsible for the low numbers in Southeast Asia in the nineteenth and early-twentieth centuries. They were extractive and exclusive, making an anti-urban policy that resulted in locking out local population from income streams facilitated the parasitic extraction of primary resources without stimulating local industry (Miksic 1996). From this time, in the first time kampungs in that country initially possessed degraded spatial and environmental qualities, and gradually improved by the integration and improvement from its occupant themselves, and from the government. As it grows to be more adequate settlements, the intangible characteristics that kampung is known about, did not deattached, and remained as an important trait embedded into that particular urban settlement types. The development of urban kampungs in Indonesia can be categorized into pre-colonialism, colonialism, and post-colonialism (Raharjo 2010). Different eras have their own products and contribution to the contemporary today’s time kampung. The system of RWs and RTs that was initiated in the Japanese colonialism era in Indonesia is an example of how the kampung evolved unconsciously as to what will be fully adapted into today’s government. To see the picture and analyze the Indonesian urban kampung in post-colonialism era, the author refers to the study conducted by Ford in 1993 which then cited by Tunas (2008) in Model of Indonesian City Structure, arranged on table 2.3 based on its typology, location, density, and settlement characteristics by Huta-

Typology	Location	Density	Settlement Characteristics
Inner-city Kampung	Between the original colonial city and the new inland cores	High density (100.000 per square kilometre)	Share space in traditional rooming house (<i>pondok</i>)
Mid-city Kampung	Located in the middle of city	Between 20.000 and 40.000 people per square kilometre	Two story concrete structure
Rural Kampung	Far from city	Low density	Traditional building
Temporary Squatter Kampung	Scattered in Metropolitan area		Temporary building

Table 2.3 - Typology classification of Kampung in Indonesia
 Hutama 2019: Exploring the Sense of Place of an Urban Through the Daily Activities, Configuration of Space and Dweller’s Perception: Case Study of Kampung Code, Yogyakarta. As adapted from Ford 1993, Model of Indonesian City Structure.



Urban kampungs in Jakarta are mostly leaned towards the first typology of inner-city kampungs. The data from Jakarta Satu GIS and the government of Jakarta is parallel with the density column, that the typology will most often have a high density, around 100.000 person per square kilometer. The settlement characteristics of a shared space in traditional pondok is meant for the context of Yogyakarta and other cities around Central Java, but in the context of Jakarta, the shared space is also visible. Flexible spaces that are used for multi-purpose functionality, changing types and tenants of one single economical space, and the connectivity that differs from one to another, posit the same idea of a shared space. Journalism also shows the characteristic of a shared space in the housing level, whereas houses that are inhabited by more than 1 family are found in kampungs categorized as slum around Jakarta. This was taken as a spatial and health problem by the government, supported by the emerge of COVID-19 phenomenon. Thus, shared space idea is part of an urban kampung characteristic that happened to be born from its rich historical translation from informal to a more formal form of tenure. A more detailed and sophisticated kampung characteristics can be taken and learned from Shuji Funo's study of urban communities and towns in Southeast Asia, 1996. The characteristics may be outlined as follow:

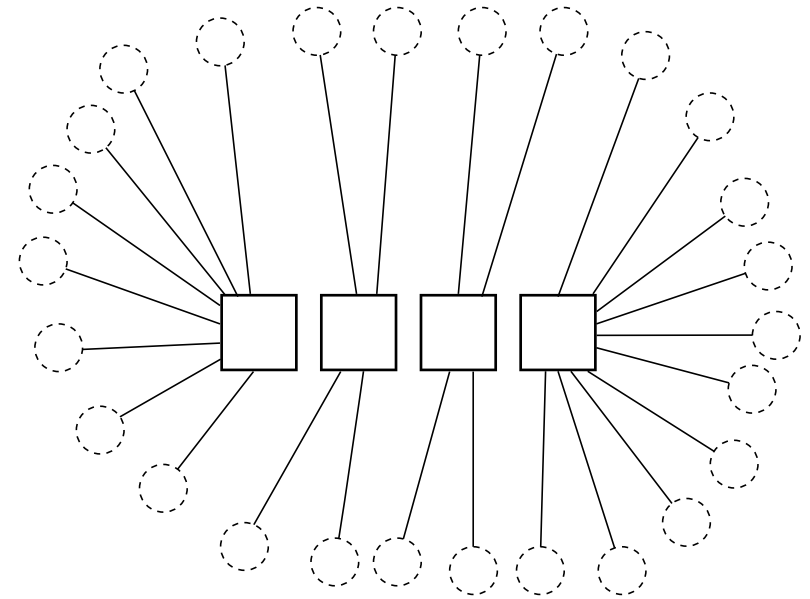
1. **Variety:** Each kampung has its own characteristics, which varies with its location (distance from the city center), constitution of income groups, migratory backgrounds of inhabitants or mobility of population, its history, its spatial pattern and so on. As there are certain difficulties to generalize kampung, they classify kampungs into urban kampung, fringe kampung, and rural kampung.
2. **Heterogeneity:** Kampung is not a homogeneous community. Rich people used to live next to poor people (as visible in the author's site location). Complexity of inhabitants is a characteristic of kampung. Rich people support the life of the poor even in poorest kampung (as also visible in the history of Karet Tengsin).
3. **Kampung as an Autonomous World:** Kampung is not only a residential area. Kampung has both functions of production and consumption. Circulation system of goods is not so simple but it is characteristics that the circle of production and consumption can be seen as a closed system within the kampung. Living place is very near to workplace.
4. **Kampung as a Highly Serviced Society—Rombong Culture:** Everybody can get almost all the kinds of foods and goods for daily life within the kampung.
5. **Mutual Aid System** - Gotong Royong
6. **Preservation of Traditional Culture:** Kampung should be considered to be a settlement that has its own vernacular values in Indonesia.
7. **Complexity of Ownership Relations:** Modern land laws introduced by Dutch and traditional laws (Adat) coexist in the kampung.

1.2. Adaptive Resilient

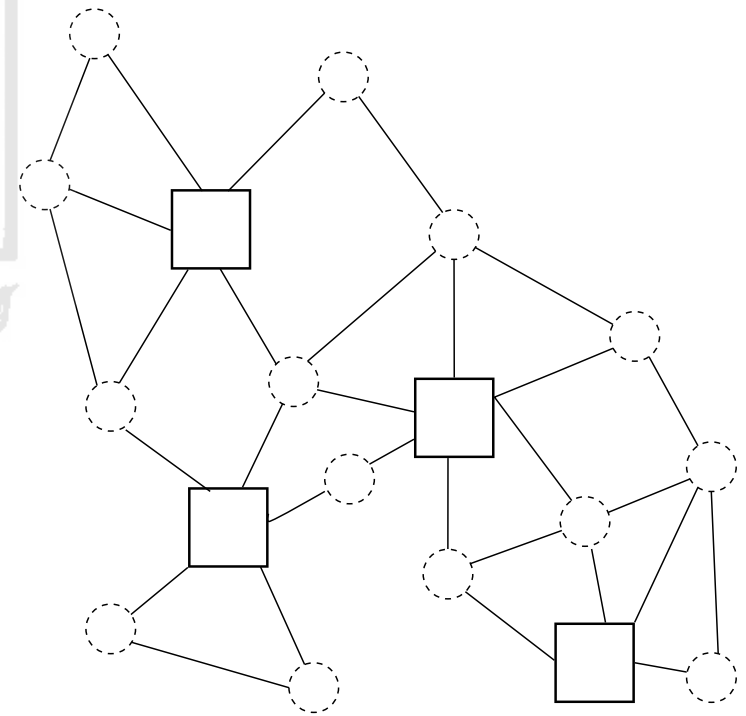
To dive and grab the resilient theory into practice, some profounding steps are crucial to be acknowledged firstly. In this sense, the author refers to the 5-volume essay titled *"Towards Resilient Architectures"* written by Michael Mehaffy and Nikos A. Salingaros as the conceptual initial phase to frame the general term and direction of a resilient system/architecture. The concept will be connected into this particular design project context, putting the existing datas into their fitting boxes that have been crafted beforewards from this chapter's discourse.

Resilient and non-resilient systems

To acknowledge and understand the difference between a resilient and non-resilient system will help to avoid any possible misguided path lead in the future. One can take modern technologies from today as the initial example of an 'engineered resilience' as how C. H. Holling called. Examples include power plants, building infrastructures, to aircrafts. These kind of technologies have been designed to their own parameterized 'stability', meaning that they are stable in their own system, but are often not resilient outside of their designed operating system. If a design product was designed with a "maximum effort" by the designer, it will often be considered as resilient and immune to most predictable problems. But according to adaptive resilient theory, these problems are only problems that are created or generated by the design's system itself. If the design is an aircraft and it has surpassed merely the engineered resiliency parameter (not yet to the adaptive benchmark), it will only be immune and adaptable to problems and disturbance created by the system of the aircraft itself. But further problems and disturbances that came from outside of its own system/context would most likely be uncalculated from the design process (e.g from natural disaster, or professional external hijacking scenario). Trouble comes with the unintended consequences that occur as "externalities", that often will cause disastrous aftermath (Mehaffy & Salingaros 2014). This scenario of design has an over-concentration of large-sale components, whereas the preferable system would be a more resilient, meaning that it has more distributed network of nodes. The nodes can be understood as context or (outside) system.



An over-concentration of network distribution towards each design with node cul-de-sac on each nodes
Source: Author's diagram



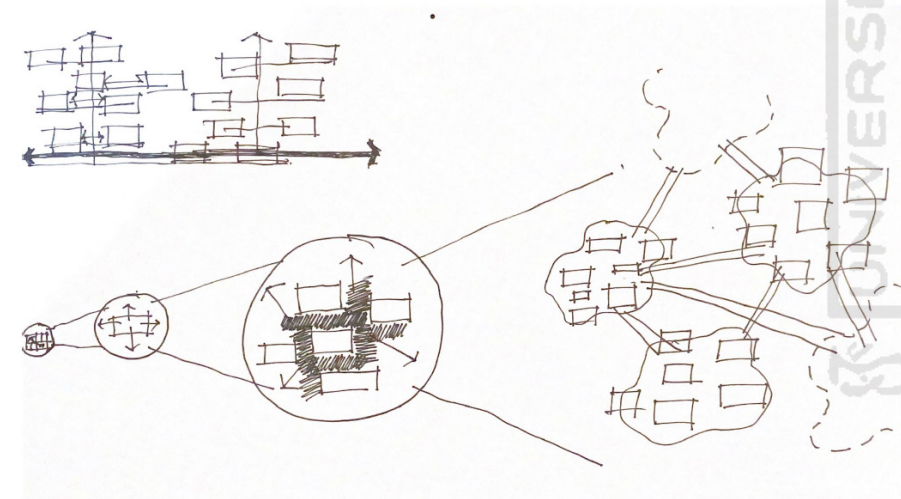
A more resilient distribution network of nodes, providing alternative pathway when disturbances are occurring
Source: Author's diagram



2011 Fukushima nuclear reactor incident, Japan.
Source: opensourceinvestigation.com

Real life example of a consequence from a over-concentrated component can be seen from the Fukushima nuclear reactor disaster in Japan, where the 'engineered resilience' design lacks of what Holling called "ecological resilience". The nuclear reactor had been running flawlessly before the 2010 earthquake and tsunami engulfed the plant, thus giving a disastrous nuclear accident. The earthquake and tsunami were from the outside of its design system, thus the design lose its tempo to response the disturbance as the design itself was over-concentrated, having no 'network' of nodes enough for that particular external system. The design dependent upon an electrical emergency cooling system, so when the electricity failed, the nuclear reactor became inoperative and the reactor melted. This is the example of an engineered resilient design that had not foresee the further step of ecological resilience (which will possess the adaptive resilience when both ecological and engineered characteristics are met). The reactor plant power production was centralized by putting six large nuclear reactors next to each other, while having that only aforementioned-cooling procedure.

By adapting the crucial points from its original biological resilient theory, it can be applied into resilient human designs aspect as such:



Parcels of distributed network.
Source: Author's sketch

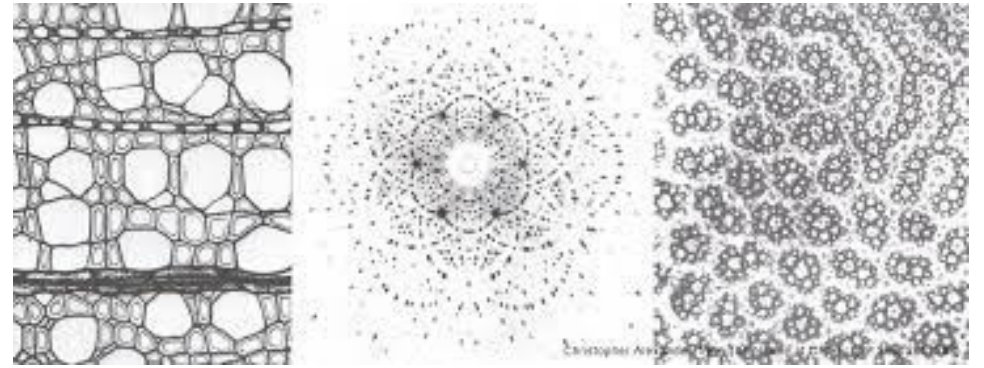
1. They have inter-connected networks of pathways and relationships
2. They have diversity and redundancy of activities, types, objectives, and populations
3. They have a wide distribution of scales of structure
4. They can adapt and organize in response to changing needs on different spatial and temporal scales, and in response to each other

Those four points are still in the general term of usage, which is the direct translation from biological-context of resiliency. While there is the direct architectural translation of those crucial points, the author sees it only as one of the possibility to perceive and translate it for architectural context. The translation by Mehaffy & Salingaros for example, is focused more into the context of architectural macro city, whereas it would really not compatible with other architectural scales (let's say a single RW in a kampung for this case). Thus, the translation and application of these points will be seen after the analysis stages in the next few chapters, in order to fully adapt the resilience theory appropriately.

The Geometry of Resilience

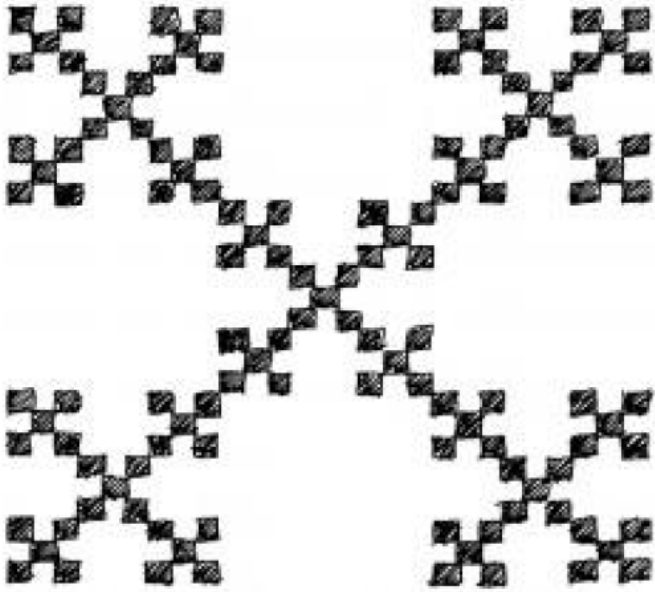
Desirable resilience characteristics that have been discussed do not exist as abstract entities. Rather, they are embodied in the physical geometries of our world—the relationship between elements in space (Mehaffy and Salingaros, 2013). They emphasize that these ‘geometry of resilience’ is the one that has the capacity for resilience in their own right. These geometries refer to the natural geometries that can be briefly spotted in the nature. These form of nature is not mechanical in the ‘modern’ sense, but more into a mechanical adaptivity, that uses the fundamental role of ‘adaptive morphogenesis’. The geometries of those natural structures “evolve in context,” as complex adaptive forms, through a process known as “adaptive morphogenesis”. They achieve great complexity and efficiency through their evolution, in the form of a perceivable deeper order (Salingaros 2013).

Why the geometry of nature is emphasized in the discourse of resiliency is followed by a new view of nature of environmental structure, aesthetics, and ornament that act as one of the ‘keys’ to be resilience; that is to compose different parts of geometry that locks together into larger functional wholes. They do this by forming symmetries across scales. The resulting structure will have an innate ability to transfer information among many different scales, and fine-grained adaptivity of design elements. This is what ‘distributed-network’ would also mean and understood more deeply, it is by having a network that make it possible to exchange and transfer information across different scales. The author sees that this ‘information’ can be perceived to architectural context as communication (as what Patrick Schumacher emphasizes as the replacement of the current architectural currency of ‘function’) across different ‘fields’ (replacing the term ‘space’). By having this kind of distributed networks, it allows alternative pathway finding for alternatives and gateways when a disturbance happens. There is an evidence from neuroscience and other fields that the aesthetic experience of this natural structures is not a superficial ‘psychological’ aspect, but rather a kind of cognitive ‘gateway’ allowing us to experience and react to this deeper order of our environment (Salingaros 2013). As the designer, our role is to enhance, express, and clarify that complex adaptive order. What characteristic these natural forms inhibit will be discussed in the next paragraph.



A more resilient distribution network of nodes, providing alternative pathway when disturbances are occurring
 Source: Mehaffy and Salingaros, 2013





A more resilient distribution network of nodes, providing alternative pathway when disturbances are occurring
Source: Mehaffy and Salingaros, 2013

In his lecture series “Algorithmic Sustainable Design - The Future of Architectural Theory”, Salingaros explained his arguments on how the contemporary industrial form language represented a catastrophic loss of the adaptive structural capacity, that can bring enormous negative consequences for the environment. The reasons lie behind a theoretical logics that have connection to the natural sequence of numbers, golden ratio, fibonacci sequence, and fractal scaling that have been proved to give a more resilience functionality and sustainability in nature. The adaptation of this anti-industrial form of geometry has been adapted firstly in technological fields, such as the design of a cell phone antenna that is designed with a fractal scalling, making it possible for the cell phone reception to work. It shows an important role of functionalism, contradicting what modernism movement has criticized on these kind of ‘repetitions’ or so-called ‘unnecessary’-ness bringing useless functionalities.

The study of this adaptive morphogenesis associated closely with certain geometries, has been written and studied deeply by Christopher Alexander in his 2.000 pages magnum opus book “The Nature of Order”. It will become apparent that these geometries are the counterparts of the four characteristics of resilience (diversity, web-network structure, distribution of scales, and the capacity to self-adapt), which are:

1. Geometries of differentiated symmetries
2. Geometries of web-networks
3. Geometries of fractal scaling
4. and Geometries of boundary groupings

These four geometries are associated with resilience because they provide greater capacity to adapt successfully to chaotic disruptions. The apparent examples can be seen in wood fiber. Their efficient fractal distribution, greatly enhances the structural resilience of the wood to resist stress from chaotic events (powerful windsortms, for example). It can also be seen in the dynamics of urban networks where large numbers of people within cities living well together, which then the network patterns will frequently recur across many eras and conditions. Scholars then would refer to such recurrent patterns as “attractors”, and the term is already frequently been used and discussed in urban planning discourses. Thus it shows that geometries of recurrent pattern are seen throughout the natural world, and fit for the architectural and urban designs.

1.2 COVID-19 Built Environment

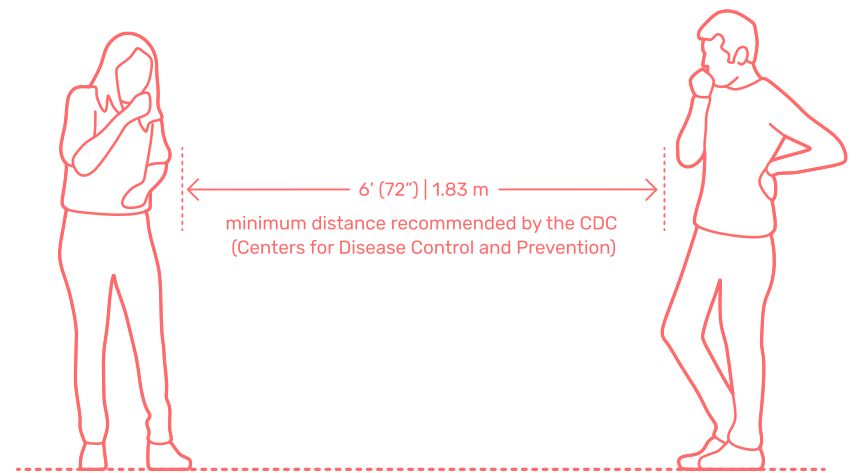
Many parts of the physical world get their own impact through COVID-19. Every physical space, thing, and element need to re-adjust themselves to help human's body decrease the risk of spreading and being infected by the virus. COVID-19 gives a significant impact on how people treat spaces around them, caused from the sudden, almost unprecedented entry and impact of the virus towards the built environment (Haykal 2021). In encountering this new context, various researches and approaches have been developed and written. To seek the general question of each field of architectural subject will be helpful to prioritize which topics to be concerned first. As Megahed and Ghoneim has written in their research paper "Antivirus-built environment: lessons learned from covid-19 pandemic", the research question on the topic of architectural housing would be "What is the future of our houses? Should they adapt to better accommodate work-spaces? Should they be self-sufficient? Should our terraces, balconies, and roofs be planted? More specifically, could COVID-19 be a catalyst for healthy housing and sustainable buildings?"

Notable aspects and parameters that are important for the housing problem in this situation also summarized by the same author by these points:

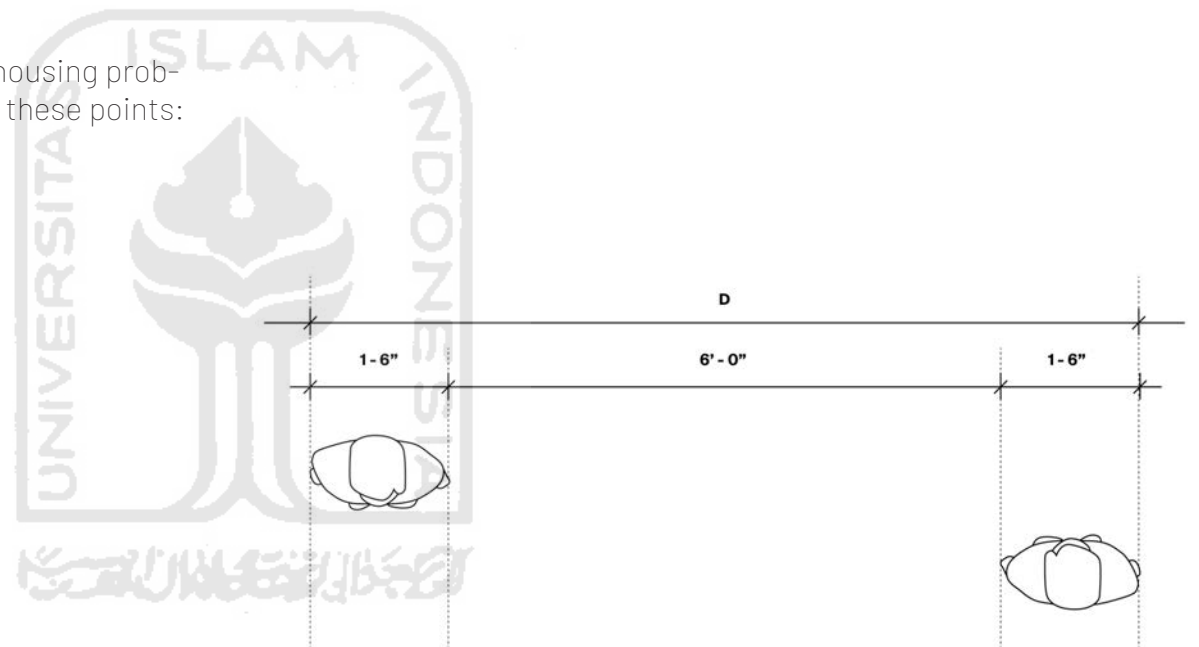
1. Housing layout
2. Space density
3. Shelter and safety
4. Indoor air quality

Housing layout

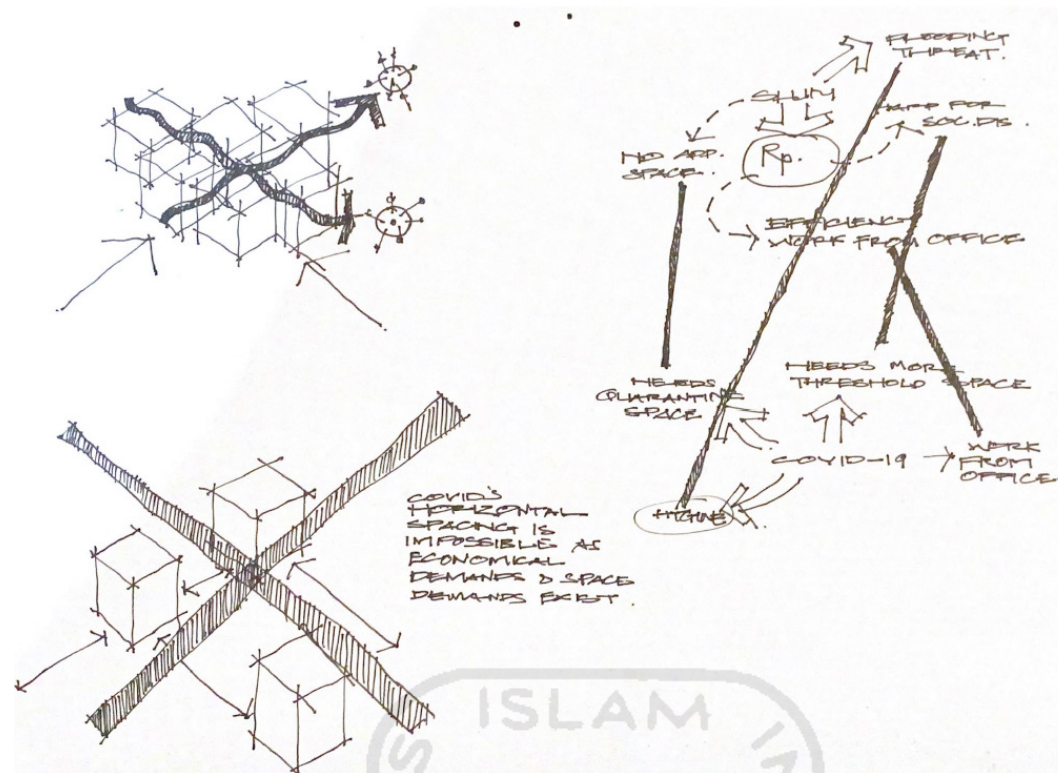
It is predicted that the future of house will change even in the post-COVID era (Dejtjar, 2020; Kashdan, 2020; Priday, 2020). It would be majorly from the consequence of the new work-from-home culture, alongside other factors which make people to move that certain activities right into their homes, and thus after one year or more of those repetitive space translation, it could become a new normal/habit. The future housing layout then will be questioned, as to how the future house can provide spatial needs for this new kind of adaptation, and for the future unpredicted changes. Many attempts on this design paradigm shift have been written, and it is also has been questioned by the author in my previous research which adapt Deleuze-Guattarian's Body without Organs philosophical theory into arch-



WHO's standardized social distancing minimum distance
Source: www.dimensions.com



Standardized minimum distance in imperial units.
Source: spatiometrics.com



COVID-19's impact on threshold spaces and circulation's spatial dimension
Source: Author's sketch

-itectural approach for such a literal flexible, adaptive house design scheme (Haykal 2021). A house that will not give any wasteful and redundant spaces when a disturbance occurs, will be much preferable, and in the same fashion of the initial adaptive resiliency spirit.

Space Density

Space density will tackle the minimum dimension from each person to another, the clear circulation for pathway, maximum targeted occupants in a space, and composition of stationary spaces like sitting area. Those parameters are meant to reduce the risk of spreading peer-to-peer infection given the mask parameter is ignored. It is like the analogous of the passive approach in reducing the spreading risk, before jumping into the active approaches. The raise of a new spatial distancing between each person of minimum 1 meter (WHO 2020), directly affect the dimension programming of the architectural spaces, and circulations. Past existing standards on dimension would then be adapted in order to fulfill this new parameters. The challenge would be on how to reconcile this stricting and 'disadvantaging' protocol with the slum's informal, high-density, and high-intensity daily activities including the daily, economical, and social activities.

Shelter and Safety

The environment or a parcel of vertical kampung needs to have a proper safety measure, meaning the transparency and clarity on the division between the unscreened and the screened individuals. It will include the necessity of having checkpoints for screening, the transition spaces between those two, and adequate isolation spaces for each houses. Maintaining how the need of this new isolation spaces in each houses without reducing the functionality of other pre-existing spaces need to properly analyzed and explored in order to keep the kampung's density and social activities running. It also needs to provide psychological aspect of safety, such as the feeling of safety for each occupants in the neighborhood from the threat of infection spreading for other strangers. It will then need to adapt active approach such as rigid but transparent boundary elements, and also a clear division and re-route of the circulation, especially in a high-density space such as the market, or commercial spaces.

Indoor Air Quality

The latest research shows that a room with proper and good indoor air ventilation has more significant reductions in the infection spreading risk (than employing strict social distancing from each person and mask-using). It is not to say that both later are not important, but it gives a new insight on how the virus would actually be more effectively spreaded. The need of a good indoor air circulation is then very crucial in both the houses and economical spaces. The use of HVAC and air conditioner needs to be properly designed so that the system will not cycle and introduce back again the 'infected' air flows. Also by the emerging of potential isolation spaces on each house, the output of its air flow also needs to be designed so that it will not bring the air flow from an infected person to other uninfected environment outside. This need of a good air circulation will easily follow the motive of providing a good natural air flow and introduction from the counterpart of adaptive resiliency and sustainability approach. It will give mutual benefit for both characteristics; reducing the number of infection risk while also participating in the design movement of giving a much more sustainable and more green design for the vertical kampung.

Strategy

From those points, a strategy needs to be prepared to get the best cross-work between the COVID-19 prevention, and the adaptive resiliency, while from the previous chapters it can be understood that adaptive resilience theory will very much support and fit the need of dealing with COVID-19 new parameters:

1. Use the existing four point-characteristics as the basis of the design approach
2. Cross-checking between COVID-19 parameters and adaptive resiliency parameters
3. Rough quantitative programming to calculate additional space and dimension needs on each room/space
4. Initial layout and typology alternative planning
5. Computational evaluation using spatio metrics COVID-19 analysis grasshopper plugin
6. Final alternative proposal for each block of mass and circulation

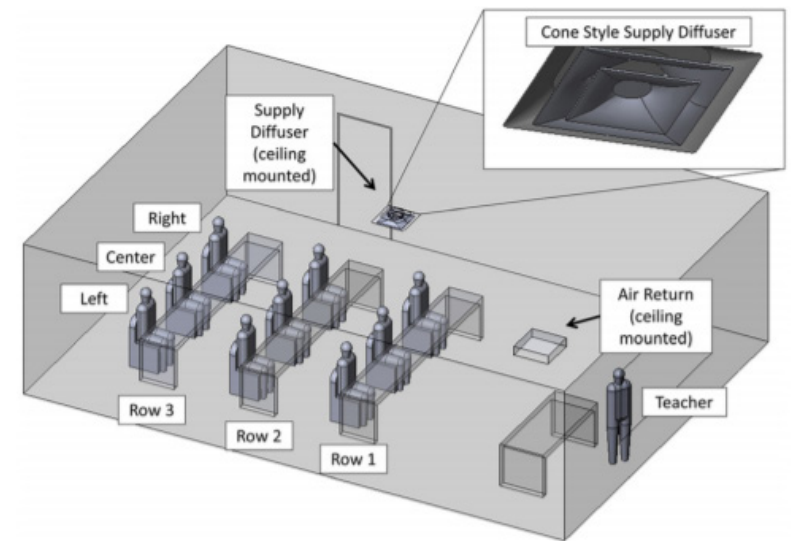


FIG. 2. CAD representation of a classroom.

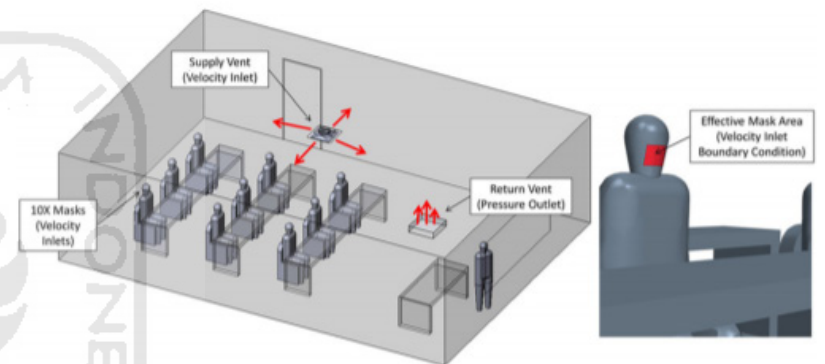
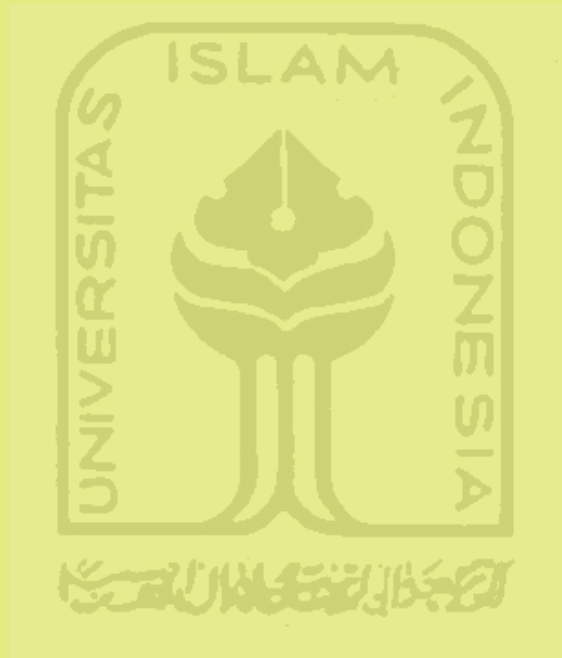


FIG. 3. Description of boundary conditions.

Fluid simulation and test on COVID-19
Source: University of Central Florida

2.2. typology study

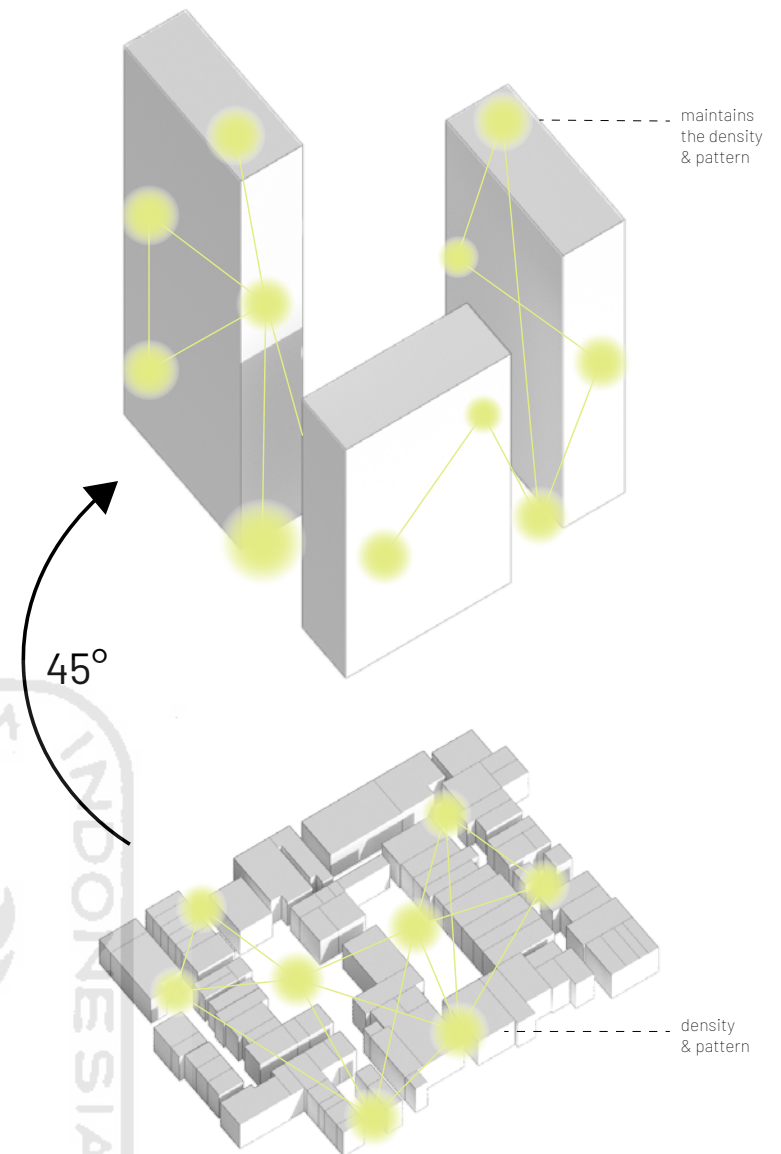


2. Typology Study

2.1. Definition of Vertical Kampung

The term Vertical Kampung is a new term that has raised in recent years and gained its popularity in practical and architectural scholars' conversations. Although this new concept still has miniscule amount of precedent and still lack of formal written definition and consensus, the informal definition could be easily be gotten from various practitioners and policy makers that have proposed such new typology in areas that are mostly suffering with overpopulation, lack-of-housing, and slum problems. It can also be narrowed down into the specific South-east Asia and East Asia where the conversations are mostly happening, though many architects from europe are also joining to participate in the discussion such as Berlage Institute of Research Studio's Superkampung and Daliana Surawinata's Superkampung Jakarta 2045 that consist of movement plans, discussion, and conventions, held and participated by various architects from different countries.

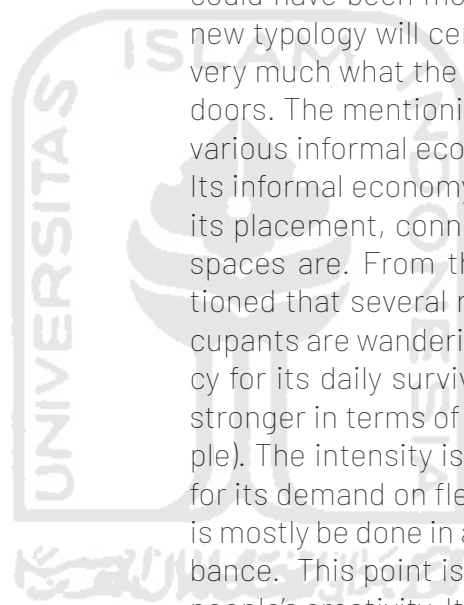
Vertical Kampung can be defined as the vertical physical translation of a Kampung, where the term Kampung itself is more than mere housing. The Kampung in this context could be perceived from its fullest definitional extent; an informal settlement that still bears its strong social bonds, culture, and informal functions that emerge and happen naturally, and uniquely from other kampung. Vertical Kampung is then the attempt to remold these characteristics into the vertical axis, in a way to preserve or improve its unique informalities while taking the advantage of vertical spaces in the purpose of saving horizontal spaces and thus reducing the consequences of lack of housing in that particular location. Frisca Susanto in 2014 argues that the local values of Kampung could be summarized in a multi-story building to produce not only dense (in a good way) building, but also functional and follows on what the occupant would need and expect (Susanto, 2014). The argument shows two key points. Firstly, it follows what Jane Jacobs had written about the misconception on the function of density in a building or city. In her magnum opus *The Death and Life of Great American Cities*, she argued that density is good because it will generate more social activities and bonds between people, that could lead to a better environment as a whole.



*Informality translation figurative imagining.
Source: Author's diagram*

Secondly, the multi-story building necessity can be understood as one of the answers to the modern lack-of-housing problem that occurs in big cities with high numbers of transmigration. The sudden demand to move towards vertical typology is justified by nothing more than the absolute need of horizontal space clearance. The clearance or the temporal redundant space will be used for either providing more houses to reach the demand number, or it can be used for other purposes that deserve its own separate discussion.

Another similar definition could also be looked from Yu Sing's design work on vertical kampung in Surabaya's river, where he defined vertical kampung as a transformation from the existing kampung without removing its local characteristic, form richness, color, material, volume, building skyline, economy potential, people's creativity, et cetera. In this term of definition, there is an extend to which it touches the intangible and economical aspect of the design. By mentioning the building skyline, it posits that the existing kampung's view to its outside neighboring areas are important and could have been molded into the locals' memory. Thus, translating into a new typology will certainly need to preserve this kind of memories that is very much what the people will get right after they stepped out from their doors. The mentioning of economy potential touches on the discussion of various informal economical activities that kampung kota is known about. Its informal economy is not merely about its type and form, but also about its placement, connection to other spaces, and how fluid and flexible the spaces are. From the preliminary theoretical review, it is already mentioned that several researches showed the majority of kampung kota occupants are wandering around mid to low-class people. Thus, the frequency for its daily survivality through economic activity is much intense and stronger in terms of its magnitude (compared to other class group of people). The intensity is not only from its sudden demand for money, but also for its demand on flexibility to change in a short period of time, because it is mostly be done in a context and an environment that are prone to disturbance. This point is connected to the last mentioned aspect which is the people's creativity. It forces them to dig and use their intuition and creativity to sustain their overall kampung's value. The creativity itself is one of the easiest characteristics that can be seen from direct survey, as the author also found several creativities right after the author entered the site (such as spontaneous communal hangout spaces across their homes)



2.2. Types of Vertical Kampung

2.2.1. Precedent from Other Similar Types

Because of its novelty and like from the previous chapter conclusion that there has not been a single agreed terms, guides, and regulation on vertical kampung, the term vertical kampung itself can be briefly said to be born from the existing rumah susun/vertical housing typology. As the term rumah susun has been for quite much more time, the basis for its initial form can be learned and taken from the existing literature or standards.

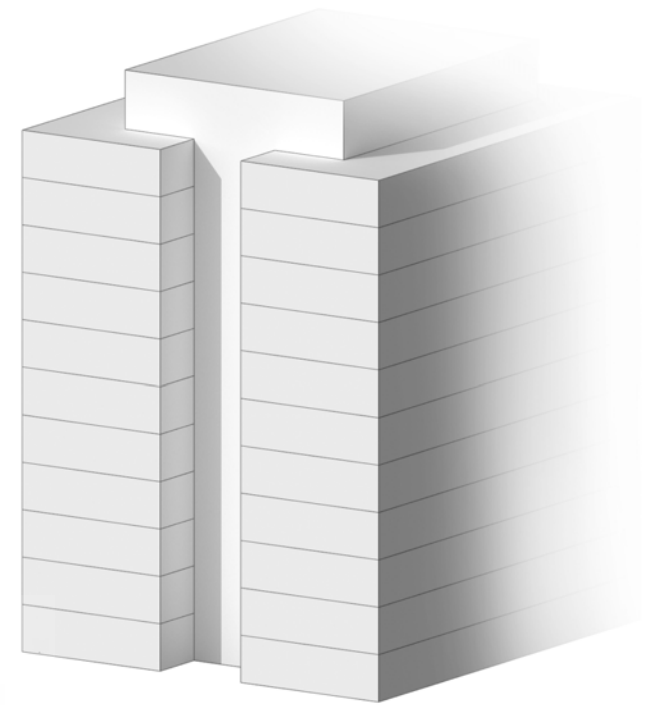
According to Time Saver Standards for Building Types, a vertical housing can be classified based on how to arrange it vertically, on its vertical transportation, and its circulation/access. This basic guidelines that have been established for a much longer time can be used as the basic guiding principles for designing a vertical kampung, while not avoiding any adaptation or future improvisation in accordance to a much different needs and conditional parameters.

2.2.1.1. Vertical Arrangement

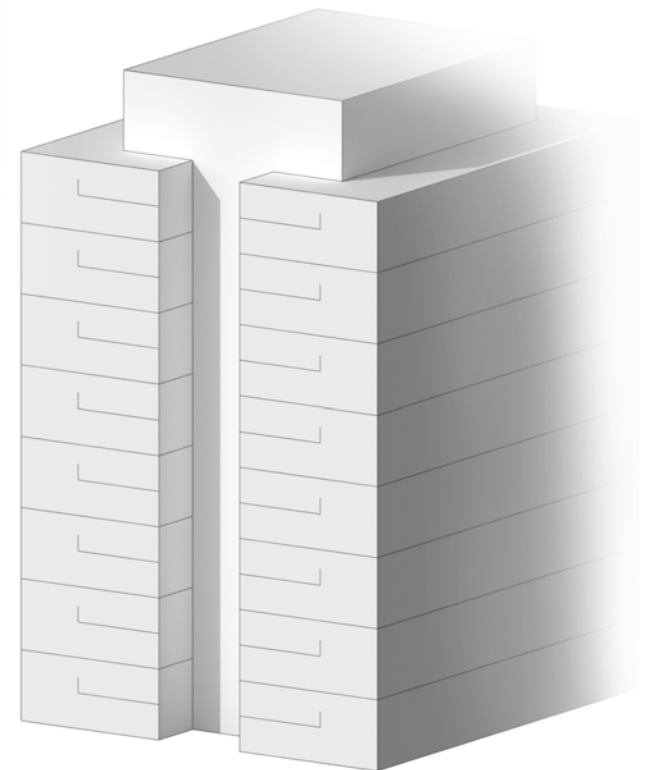
To classify it based on how one can arrange the mass vertically, it can be differentiated into three types of common arrangement, which are Simplex, Duplex, and Triplex arrangements. Simplex form arrangement means that each housing unit and its facilitating function will only need one floor of each units, with the communal centralized building infrastructure on the central or non-central core of the building. The Duplex has two floors for each housing units, making it a larger type in terms of its total volume on each units. And the Triplex will have 3 floors for each housing units, giving a much bigger space, bigger accommodation and bigger potential for a more diverse functions with the cost of a reduced total spaces to be used in the building plot, and more budget.

2.2.1.2. Vertical Transportation

According to its vertical transportation types which will directly or indirectly affect the whole form typology, it can be categorized into two types of transportation: Walk Up and Elevated.



Simplex vertical arrangement
Source: Author's diagram



Duplex vertical arrangement
Source: Author's diagram

Walk up vertical transportation type depends only on the passive non-mechanical transportation and access such as stairs and ramps. The addition of ramp is to make sure that inclusivity can still be managed even in a building without a mechanized elevator/lift. The stairs can be constructed both for the normal vertical access to different stories, and for an emergency situation purpose. Though these two functions of a stair will have their own constructions and structural types, there is a chance where both functions will be merged into one single stair system. That kind of case can be found in a building where the total area and story is not too high, where the emergency situation could still be handled with such singular system. This walk up method is much preferable for a building that is less or equal to 4 stories. Amount of stories more than 4 that uses this kind of type would give inefficiency and exceeding energy for the vertical transportation flow. Buildings with more than 4 stories are also unable to provide the safe standardized inclusive transportation for disabled people by mere ramps, because the energy and work that they need to give for moving up into the 5th or more floors are going to be too much through a ramp. Thus, buildings with more than 4 stories are preferred to adopt the second type which is the Elevated type.

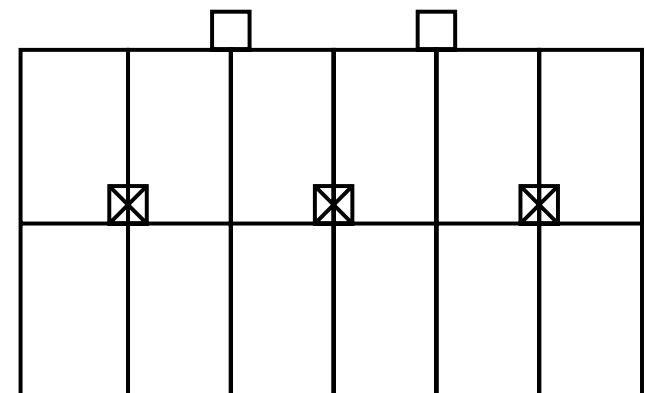
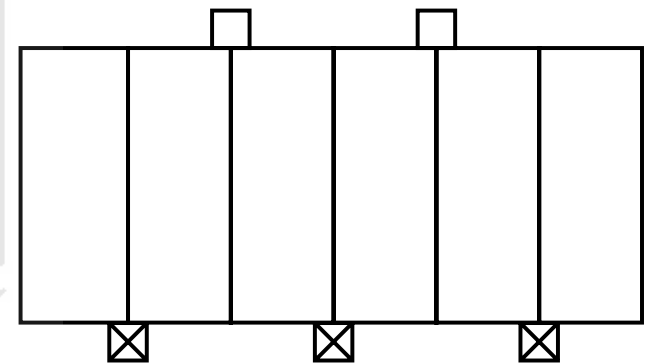
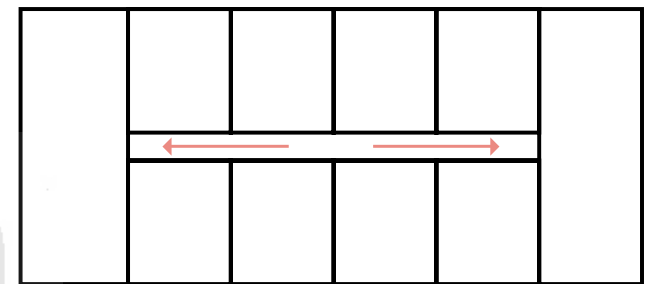
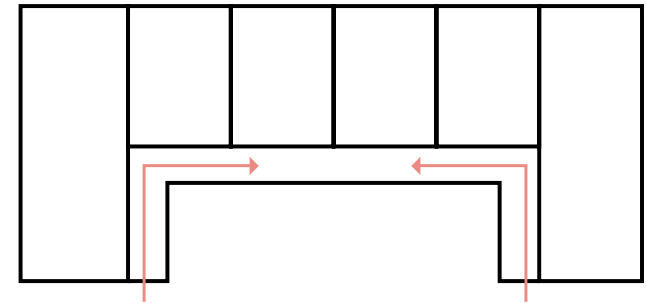
The Elevated type adopts the mechanized elevator or lift to provide ease-ness for any type of person to maneuver and move between each space and floors. The building will also construct the manual stair and/or ramp, so the usage rate of the elevator can be divided to reach its optimum usage per minutes. A calculation is needed to fully optimize the use of each elevator, so the budget and cost for its construction and maintenance can be managed and covered by the owner. Additional types of mechanized lift such as emergency lift or firefighter lift can be taken into consideration, depending on the building types, and regulations. In this novel context of COVID-19, the regulation and the design on how the lift should operate, is having a change to make sure that the close-distanced space in such type of transportation will not increase the infection risk and rate. Various approaches can be seen by architects that have thought and designed for this COVID-19 situation, such as dividing the entrance-exit circulation of the lift, the adaptation of touchless control for the users, and limiting the maximum number of persons in one single car lift.

2.2.1.3. Circulation/Access

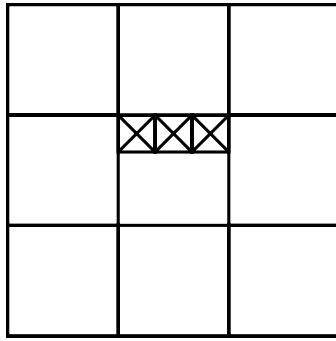
Vertical housing or apartments will deal mostly with how the total circulation would not decrease the total spatial efficiency for the owner's economical profit, and the space availability for literal function of the building. Thus, several types of circulation mode have been designed with their own pros and cons. The first type would be an Exterior Corridor where the access for all units are placed outside of the building, or in the exterior part of the building. It has the advantage of giving good natural lighting for each unit as all units will have equal and unobstructed direct access to the outside. The downside is that the budget needed for the circulation will be much more than other types of corridor such as the interior corridor type.

The Interior Corridor type puts all of the units access inside of the building, making the units circulating the centered span of corridor access. The service area is still similar to the exterior corridor type, that is located on the two different masses on each side of the whole building. It has the advantage of a reduced construction budget than the previous type, but it has a decreased natural lighting penetration if compared to the previous type, because each inward-facing sides of each unit will not be having direct outside exposures due to its spatial composition. Whereas in the previous type, both sides (front and back) of each unit have access to natural lighting from the outside.

There are the next types which are the Multiple Exterior and Multiple Interior corridor, that both do not adapt the long-spanned type of corridor but trim the corner of each unit for the communal direct access from the vertical transportation instead. The multiple exterior one will be placed in the exterior, and each mobile of transportation could give a direct access to two adjacent units, while the multiple interior one is located in the middle of the whole building, giving a potential of maximum four direct access units from one single transportation module. Both multiple exterior and multiple interior types have good privacy measures, with the exception of the former one that also has slightly better natural lighting exposure due to the fact that both front-back sides of each unit have direct outward exposure.

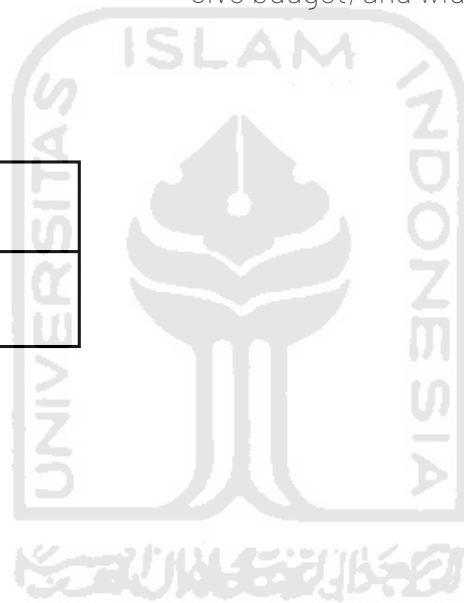
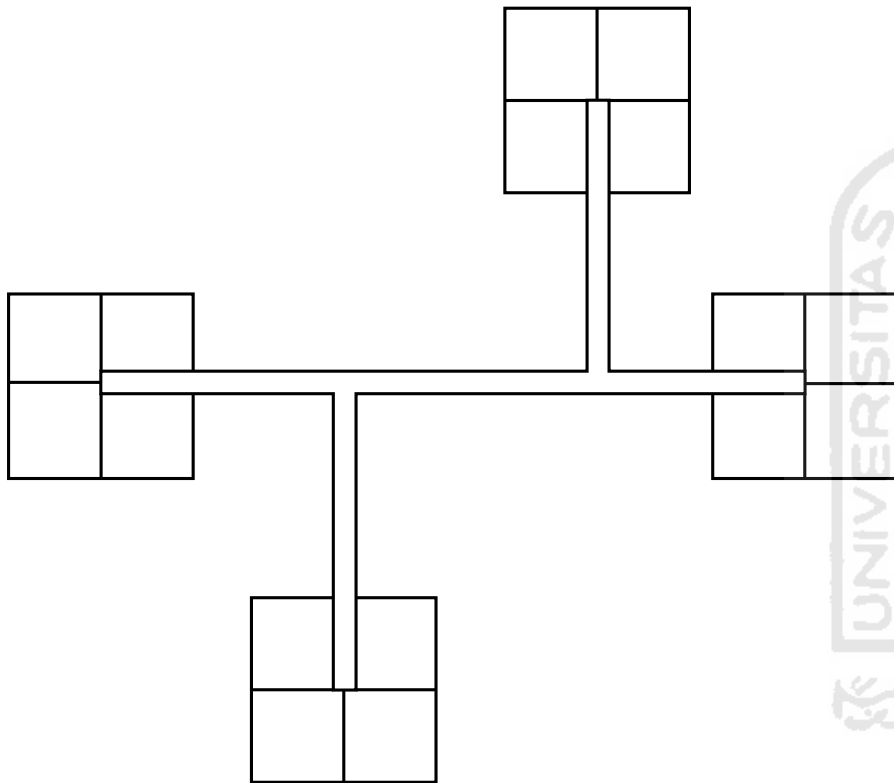


*Redraw of Time-saver's vertical housing arrangement.
Source; Author's diagram*



But both types also have their own disadvantages. Multiple exterior corridors have poor social value in terms of its neighbouring context, while the multiple interior lacks natural lighting due to its form composition and orientation.

The last type is the tower type, that locates all of the vertical transportation centered in the building, while also giving equal outward side exposure to all units. It has the advantage of better natural lighting for each unit, with the consequence of the closing of the middle central area, thus additional electrical lighting fixtures and air conditioning would be inevitable. The central space will act as the universal corridor that is almost as equal as the unit dimension. It is slightly different from the interior corridor type, because the service area is located in the center as well, merged with the vertical transportation. There is another hybrid form of this type which is the multi tower type that combines multiple towers, connected with long spanning corridor access. This type has even better lighting measures and the additional privacy bonus for each unit, with the cost of a more expensive budget, and wider land footprint usage.



Redraw of Time-saver's vertical housing arrangement.
Source: Author's diagram

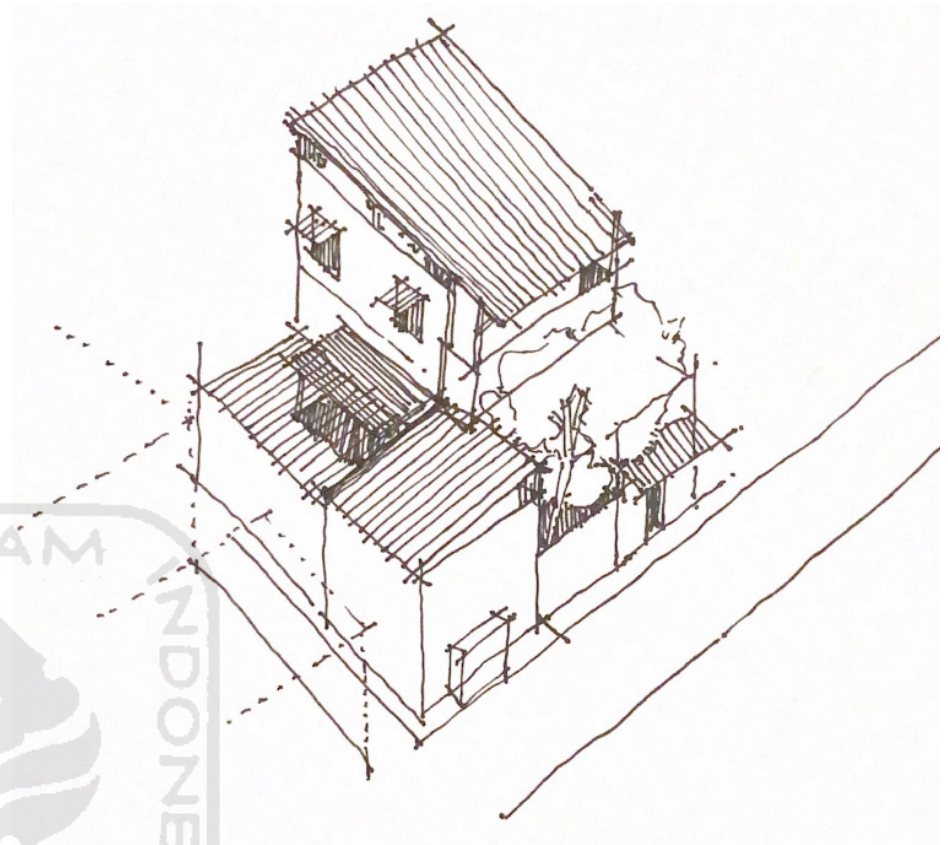
2.2.2. Characteristic From The Existing Kampung

2.2.2.1. Single - Double Story

The initial surveys show how the houses in the kampung tend to be built. Some characteristics are noticeably visible, and the others are not, like the aesthetic or the particular dominant style which is strenuous to be perceived because of Jakarta's urbanized context, and the diversity of its demographics. One of the most noticeable parameters is the average amount of story on each house. The house itself is vaguely divided into a pure-residential house, a shophouse-like house that has a dedicated shop on the first story, an improvised shophouse that forcibly adapt a shop to another existing space, and a combined house-boarding-house type that seems to be later constructed long after the original owner's house had been established. Without focusing on the type of the house, the house in the area can be recognized as a single or double story. This analysis takes part on the dominant and majority side, as a means to give initial information for the next design phase on deciding the typology options.

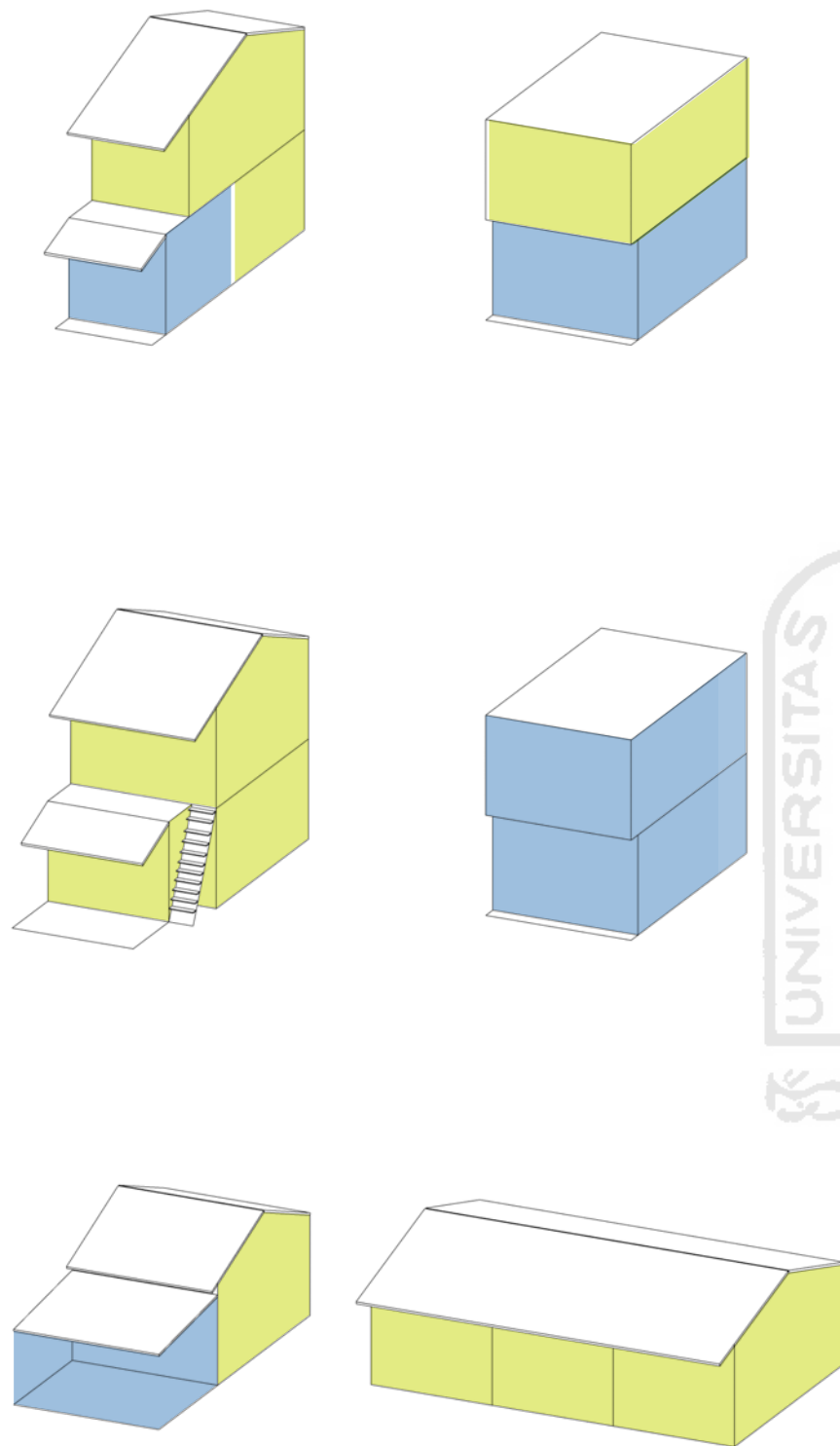
The single story house mainly consists of an extended form to its back or to its side, as representing a long narrowed house. The program of the house mainly consists of a merged living-guest room, two bedrooms, 1 bathroom, and 1 kitchen. Due to the limitation of space, the spatial dimension habitually fail to reach a certain standardized benchmark for the living quality. Another common case about two or more families living in this one single story house is also often found in Karet Tengsin, that it is mentioned by the government as one of the major hindering factors for Karet Tengsin's on-going and planned revitalization.

The double story house mostly be adapted by the shophouse, improvised shophouse, and boarding houses. But if one goes to the small alleys or gang sempit, most of the houses that cuddle the alley road are having a double story. Though it has two or even more stories, the scale from its elevation view cannot be compared to the standard adequate multi-story house, because it is not only lacking in the horizontal spatial length, but also vertically. In other words, its vertical extensions are subtly constructed for the sake of forced function/space additions.



*A sketch of a typical informal house form, seen in the location.
Source: Author's sketch*

*Parcels of distributed network.
Source: Author's sketch*

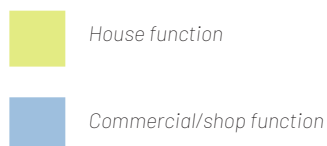


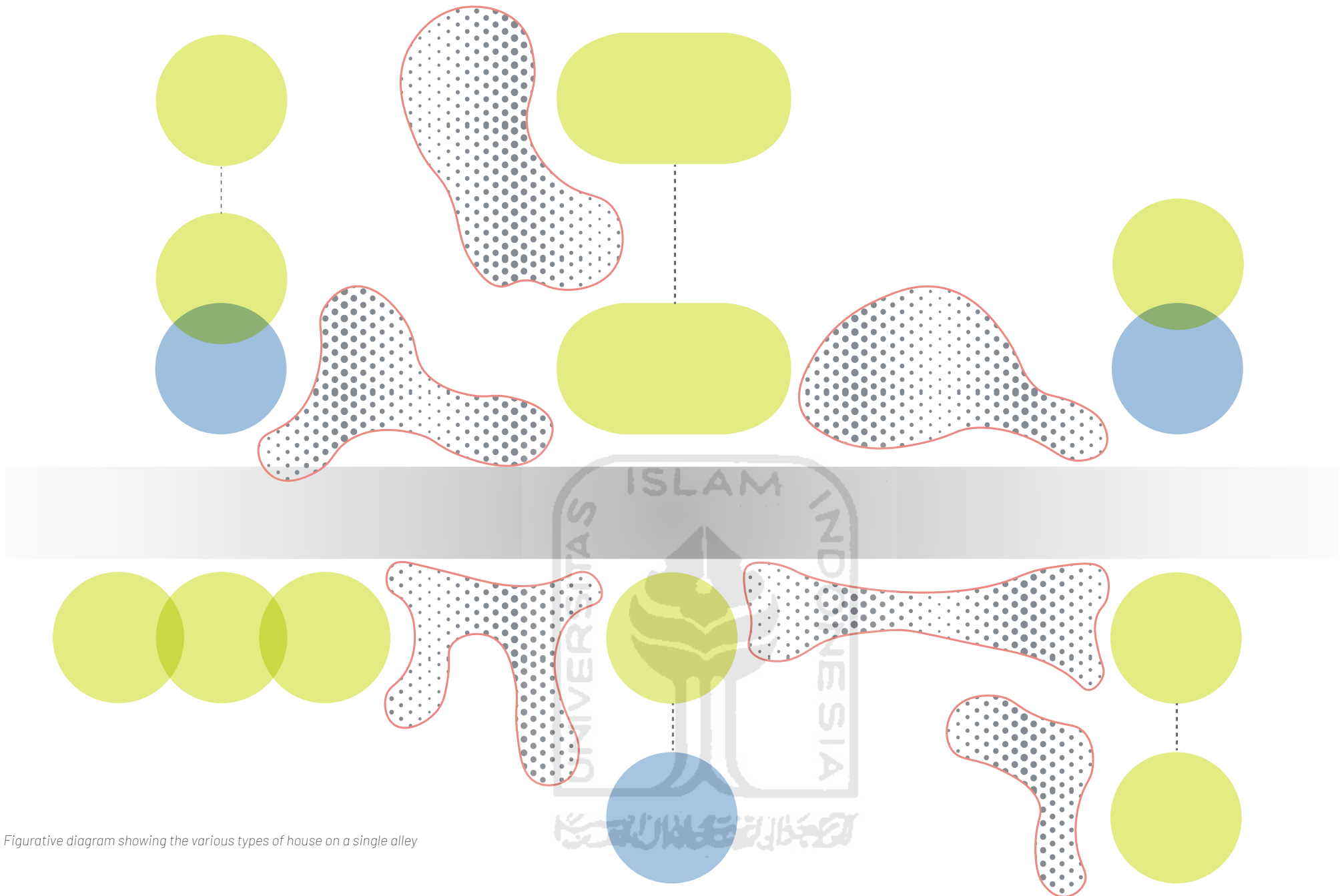
These additions of space can be for the family's economical activity to transform the first floor into a shop, or even for a simple new demand for a bedroom for the children. If we connect it to the children, this suffocating vertical extension is the clearest visual semiotics of a rapid population growth in a slowly-developing area.

2.2.1.4. House Typology

Some patterns can be seen from the majority of the single and double story houses in the area. The notable main mass differences would be for house function and commercial or shop function. The house function is mostly inhabited by one family, though in some findings, two or more families are found to be living under a single roof. This situation is already mentioned by the government to be one of the major factor in dealing with the slum condition in Karet Tengsin, as it produces an inadequate spatial quality and standard. The high frequency of findings of shop-commercial space blended with the house function marks as the semiotical nodes of the people's daily informal economical livelihood that cannot be separated by their daily activities. 'Personal' shops can be found to be adapted into their first story, their front porch balcony, and their extended front balcony (similar to Betawi traditional kebaya house, but the extended frontal space is used for a commercial purpose instead).

By looking at these typical house typology in the existing kampung area, one can see the red line on common pattern and semiotical node which will be useful for the typology translation process. While the new building will not use the adaptive reuse method, meaning that there will be no old structures to be reused. But to keep and maintain the social bond and the 'normal' states of people, the intangible pattern of how they live can and should be translated into the new building. The pattern here talks in the level of connections between house, commercial, and social spaces. How they connect, blend, and juxtapose those functions can be translated and adapted into the new vertical kampung without the need to stick to the old structural forms. The new design would ensure that the old granted patterns will still be glued into the kampung characteristic, while the tangible physical form will adapt itself into a new kind of form that follows the condition of the pre-determined and discussed-parameters of COVID-19 and adaptive reuse indicators.





Figurative diagram showing the various types of house on a single alley

























The house types are connected with a series of road circulations. In the alleyways area where the circulation is very narrow, the minor alley road can only be accessed by walk and motorcycle, making it an important social activity generator factors. The social activities not only found in threshold spaces in front of the people houses, or in threshold spaces at empty lots, but also scattered around those minor, narrow, intimate alleyways road. The informal social activities and spaces are hard to be figured whether they were built intentionally, or they were the consequences from their surrounding's masses. It is like the chicken and egg question, as it is hard to see. But one can see that it acts as a glue that sticks one space to another, as a filler in those threshold spaces, making it free from trauancies.

By looking at the simplified 2-dimensional diagram above, the main patterns can be analyzed and adapted into the next translation toward vertical typology. It shows a panarchy spaces, whereas absence of hierarchy is needed in a resilient spaces, making sure that the functions can be distributed and connected to one and another. By adapting this idea then, the designed housing modules can therefore be two or maybe more stories for each module, because maintaining the normal state of the people and reconfigure it slightly to make it much safer and resilient towards COVID-19 is the priority.

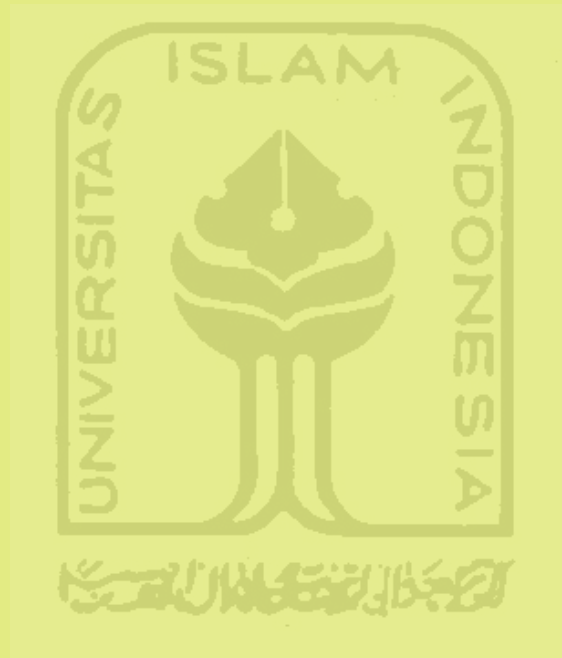
2.2.1.5. People's Activities

The site visit and observation shows various types of daily social activities in the location. By collecting, and archiving the list of activity patterns, the patterns can be used for the initial datas needed for the next programming phase of the design process.

There are various activities that can be seen. The activities mainly are divided into the time which they occur, and the difference could be quite significant. The morning time has a different general "picture" and "motion" of the people with the afternoon and evening time. Morning in the Karet Tengsin kampung relates closely to the blue collar-esque activities, commercial activities, market, transaction, traffic jam, logistics, preparatory, and morning markets. The morning signals the start of the kampung's living machinery period of running, marking the start and preparation for the whole one day ahead. Afternoon marks the core activities taken place in the Kampung. Various non-commercial activities start to be seen in this time, including people hanging around the node social points (posyandu, terrace, et cetera), lunch-eating, and children playing scattered around the circulation (depends on the day).

people's activity	6.00 - 9.00	9.00 - 12.00	12.00 - 15.00	15.00 - 18.00	18.00 - 21.00	21.00 - 00.00
transaction						
shop opening/closing						
logistics						
rush hour						
children play						
young adult - adult hang out						
neighbours converse						

2.3. precedent study



1



Rusun Penjaringan
Source: Jakarta Vertical Kampung

Project Name : Rusun Penjaringan, Jakarta Vertical
Kampung
Building Type : Residential
Location : Jakarta, Indonesia
Architect : Group 6 Jakarta Vertical Kampung, Yu
SIng & Ivan Nasution
Year : 2013

The vertical kampung in Penjaringan is a proposed design to revitalize the existing Rusun Penjaringan. Its existing 13 block of housing with 4-5 formal floors, the inhabitants are the victims of 1984's Kampung Penjaringan fire, which then began to be constructed as a vertical housing in 1986. After years of usage, the formal building was surprisingly evolved and adapted into the previous Kampung's lifestyle, and some of the spaces inside the newly built building have been transformed into more-informal kampung spaces. The design focused on several conditions, advantages, and disadvantages, and concerned more about the chance of incoming inhabitant raise and an increase of its density.

Dynamics in Threshold Space : Social nodes, New grounds, Street oriented

Resilience Tendency : Vertical circulation, Spatial flexibility, Grid system, Participatory development



Several key points can be learnt from the project:

1. The design provide 'land' in-between the main rigid structures, letting the users make their own preferred design inside of those main structures
2. The informal spirit of horizontal kampung's alleyway translated into the new design, perserving the diversity and structured randomness in its circulation
3. Ambiguous facade by avoiding uniform face of the units, giving a sense of openness to the neighbourhood and the people itself.



Rusun Penjaringan
Source: Jakarta Vertical Kampung

2

Project Name : Torre David Development
 Building Type : Residential
 Location : Caracas, Venezuela
 Architect : U-TT & SuAT ETH Zürich
 Year : 2012

Torre David is an unfinished skyscraper that has been adaptively reused by local slum community as their scattering house living. In 2007 it became the improvised home for a community of over 1,000 families living in an extra-legal and tenuous occupation that many called a vertical slum.

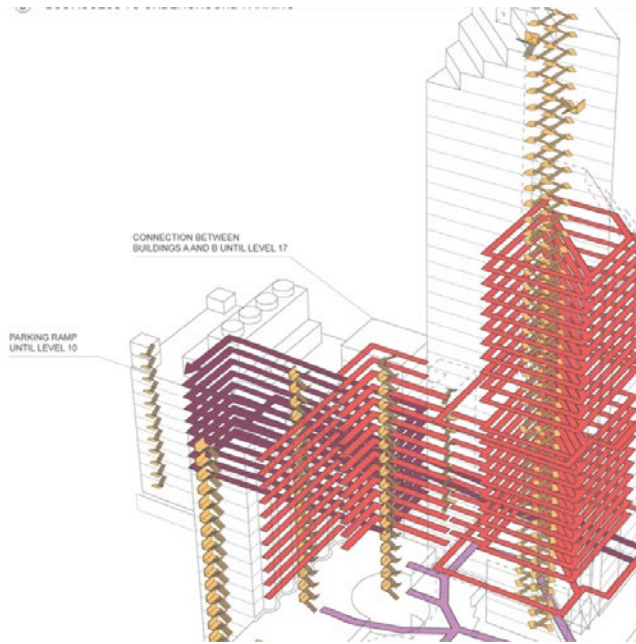
The community was neither a den of criminality, nor a romantic utopia. Rather, Torre David was a building that possessed the complexity of a city. It merged formal structure and informal adaptation to provide urgently needed solutions. In 2012, after a year of research, U-TT began to work with residents and a diverse team of collaborators to document the squatters' adaptive reuse of the existing structure, interview residents about their experience, and design proposals to retrofit the tower complex. In particular, the sustainable engineers of the SuAT Chair at ETH Zürich helped develop novel circulatory, electrical, and water infrastructure schemes. While striving to raise funds to implement some of these ideas, the documentary and design work was disseminated in a book, short film, lectures, and numerous exhibitions.



Torre David Project
 Source: Archdaily

Dynamics in Threshold Space : Informal Adaptation,
 Novel Circulatory, Public Space Nodes

Resilience Tendency : Electrical scheme, Water
 development scheme, Participatory development



Several key points can be learnt from the project:

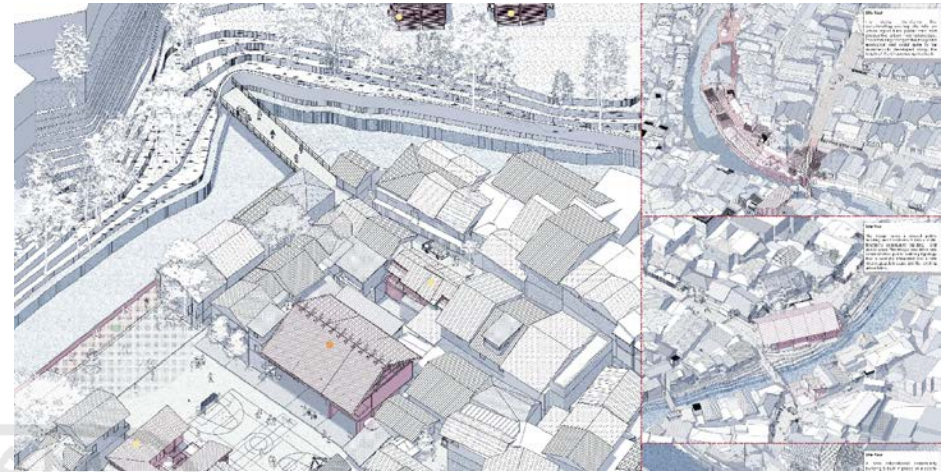
1. Community-driven and community-focused design approach
2. Merging formal structure and informal adaptation to provide urgent solutions
3. Collaboration between architects, planners, local community, and engineers
4. Translation of the previous characteristics into the new form and typology



3

Project Name : Kampung Value - Tamansari
Building Type : Residential
Location : Bandung, Jawa Barat, Indonesia
Architect : James Connor & Tahj Rosmarin
Year : Dencity 2016

Kampung Value project in Tamansari, Bandung, is an interesting take on tackling social and slum housing problem in Indonesia. The architects propose different categorization of design guideline function categories, and different typologies which then would be put into the masterplan of a slum revitalization. Interesting take is also concerned regarding the UN's definition of a slum, which the architects found it is hardly be juxtaposed with Tamansari's existing so-called 'slum', because the informalities that are created by the people is nearly unprecedented; can be interpreted as a normal city in different forms. The approach seeks out existing qualities and possibilities from the kampung, before translating them into a new typology for each categorization, to fulfill the spatial needs of the occupants.

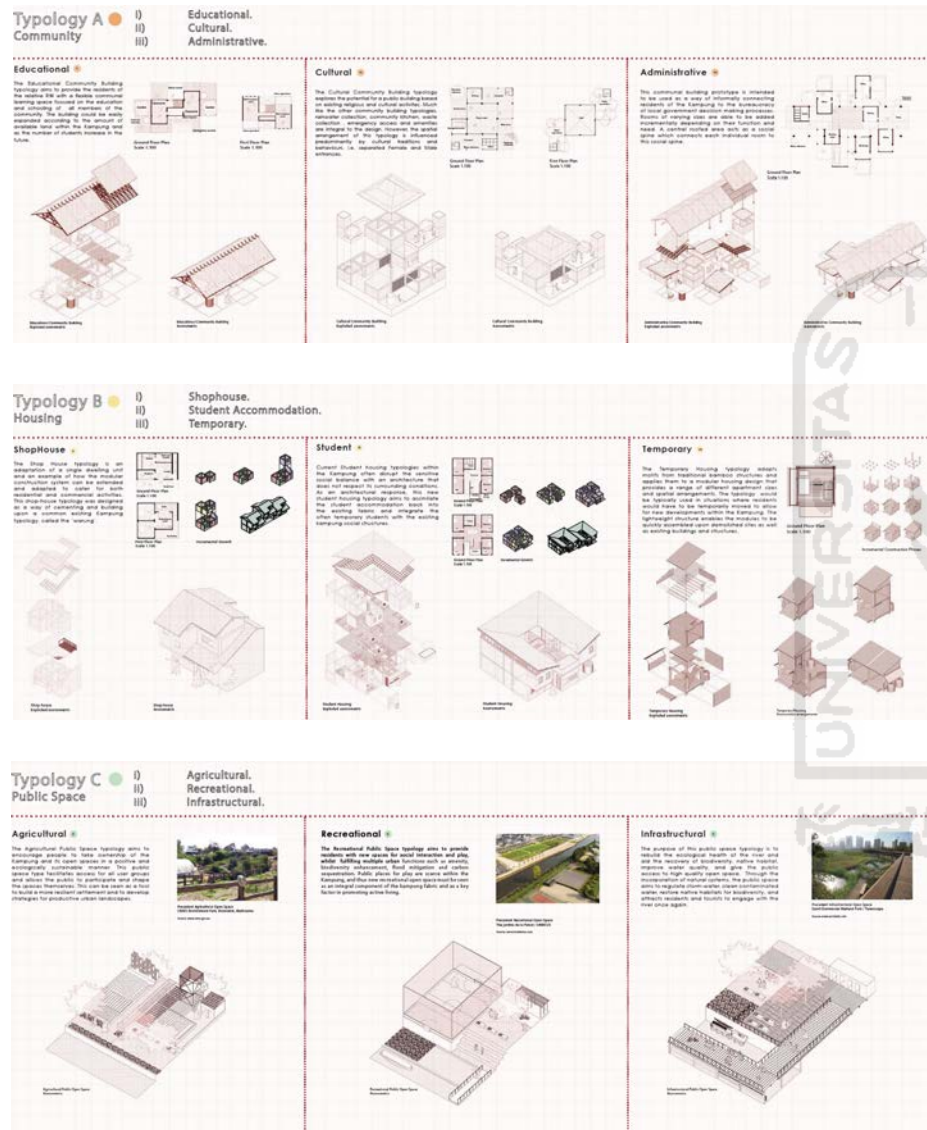


Kampung Value - Tamansari
Source: James Connor

Dynamics in Threshold Space : Temporality on
function, flexible
shophouses

Resilience Tendency : New housing type follow
new conditions





Several key points can be learnt from the project:

1. Seeking out existing qualities from the kampung, and translating them into the new typology.
2. Categorizes the typology into several groups that have their own alternative options to adapt the changing needs of the people.
3. Maintaining the vernacular form of the kampung's face, shown as the attempt to transitioning the intangible qualities and identity of its previous context.

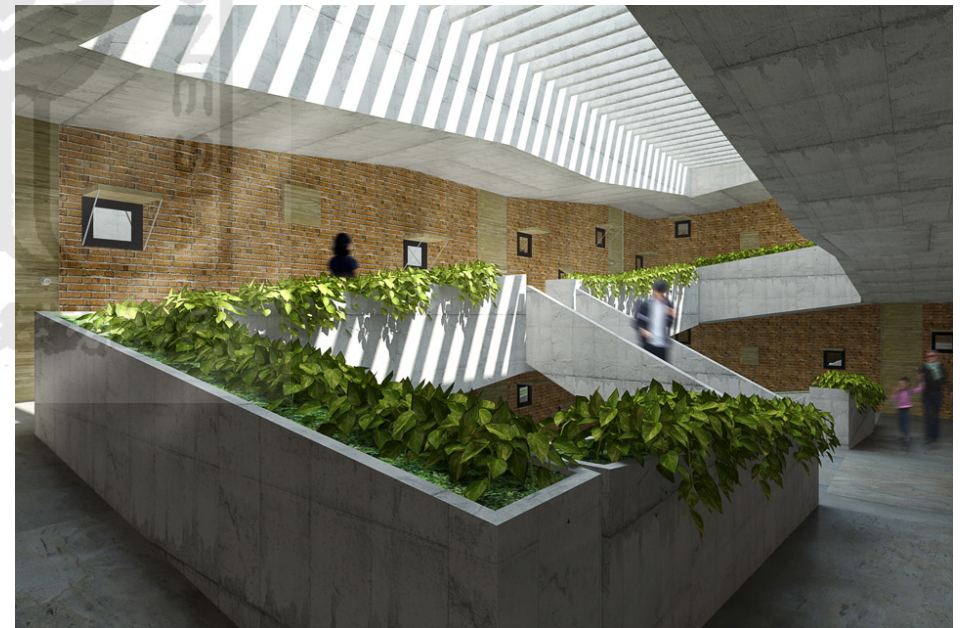
Kampung Value - Tamansari
Source: James Connor

4

Project Name	: Muara Angke Social Housing
Building Type	: Residential
Location	: Muara Angke, North Jakarta
Architect	: SHAU
Year	: 2013
Area	: 19000 sqm

The project constitutes the first of the total three phases of the social housing planned in Muara Angke and containing 660 units. At the base of the design stays the horizontal spatial organisation of a kampung which is divided in neighbourhoods stacked one on top of the other. In between the units, public amenities – such as playgrounds, kindergartens, musholas, primary schools and others – are inserted, contributing to the ‘vertical kampung’ concept.

The design also mixed the combination of locally-available materials, with the touch of contemporary-ness of concrete to seek the balance between the traditional and the modern. It gives an equilibrium for the eyes, not inclining too much into one of the sides. This gives a pleasing design that increases the overall dwelling quality as it indirectly affects the sense of placemaking for the people.

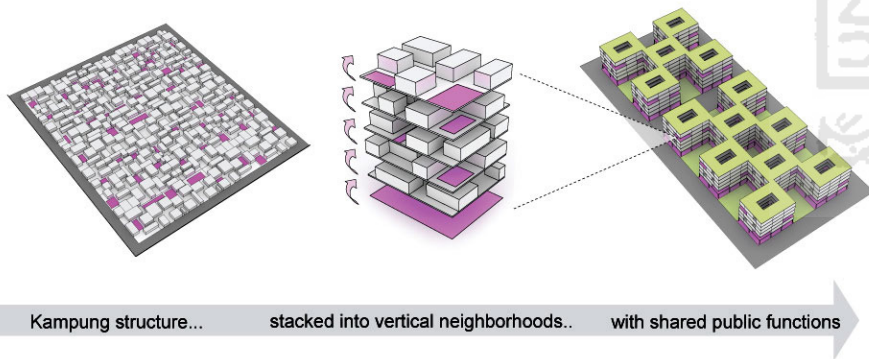


Muara Angke Social Housing Exterior and Interior
Source: SHAU



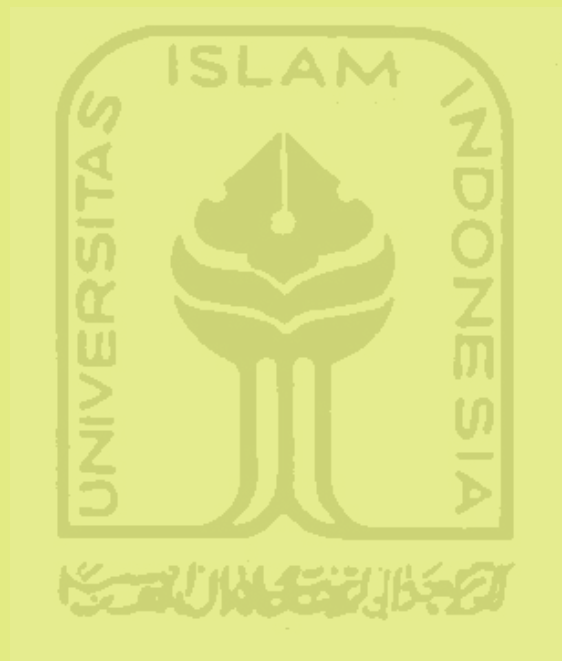
Several key points can be learnt from the project:

1. Shared public functions, that the complex of the units are also shared throughout the whole building scales.
2. Flexible but clear stacking through vertical axis.
3. Translating the characteristics and structure of the existing kampung into the new typology.
4. Integrating various standard public facilities into the building.



Interior Rendering and Parti Diagram
Source: SHAU

2.4. location, site, and context analysis

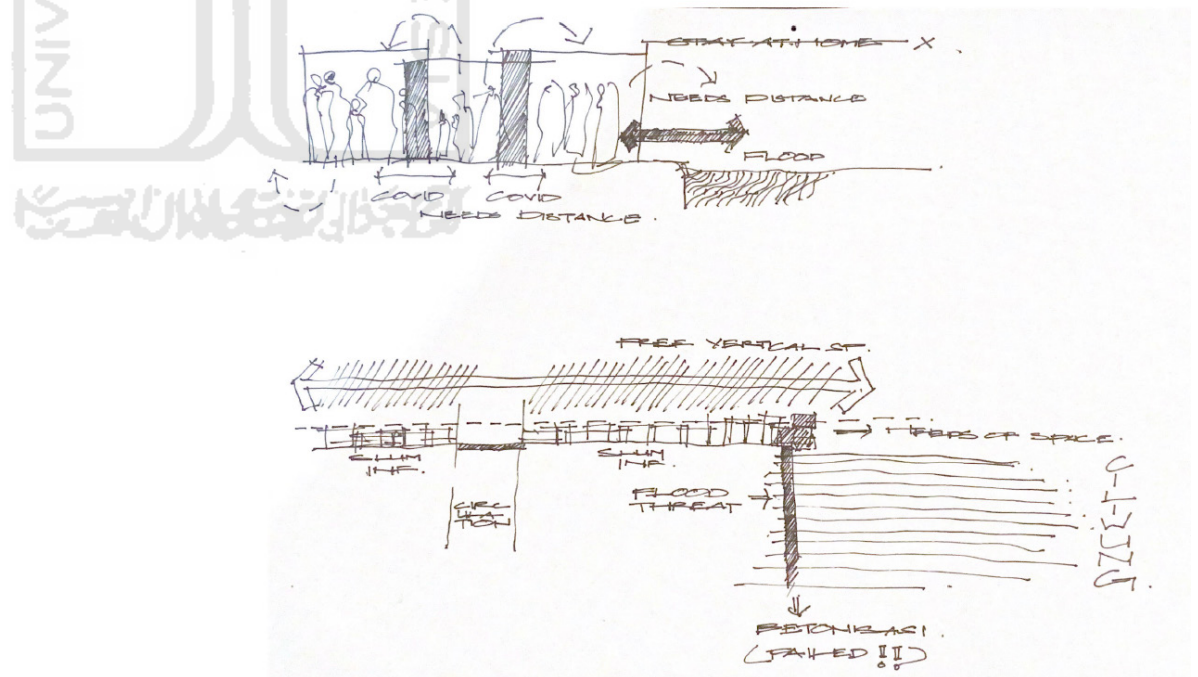


4. Location, Site, and Context Analysis

4.1. Site Description

Karet Tengsin is a sub-district located in Tanah Abang district of Central Jakarta. With a total rough area of 151 Hectare (151 sqkm), it is situated in-between Jakarta's skyscrapers, commercial, and metropolitan areas of Sudirman and Bendungan Hilir's housing and settlement area. Divided into 11 RWs (hamlets), the site's location in particular, is located under RW 7 area. It's central position gives the sub-district's diverse borders of Kebon Kacang and Kebon Melati in the northern side, Bendungan Hilir in the western side, Menteng in the eastern side, and Setia Budi in the southern side. This diversity of neighboring border is visible in each neighborhood sub-district's distinct zonings such as Bendungan Hilir that is mostly filled with settlement area, and Setia Budi which happens to be one of the central commercial and metropolitan districts in Jakarta.

While it has been mapped by the government's GIS and the local RT itself, the informalities of its alleyways and the massing composition are very visible. It is located in-between various important node points in the city that includes central downtown area, public cemetery, a big settlement area, and a river. This can be seen on the daily traffic jam on rush hours, happening in the artery road beside the RT that connects Bendungan Hilir and northern-side of Sudirman area.

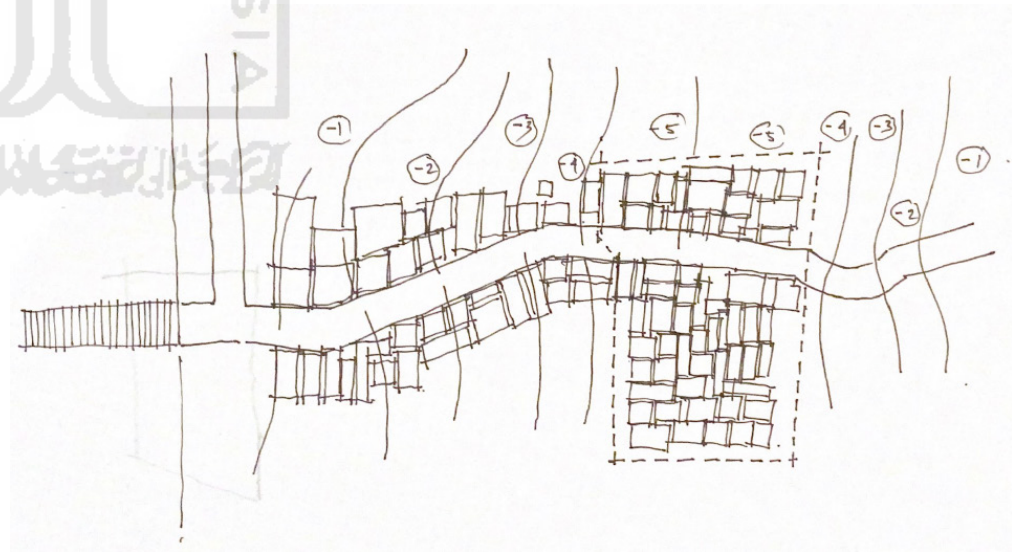


The kampung's location connection with the Krukut river.
Source: Author's sketch

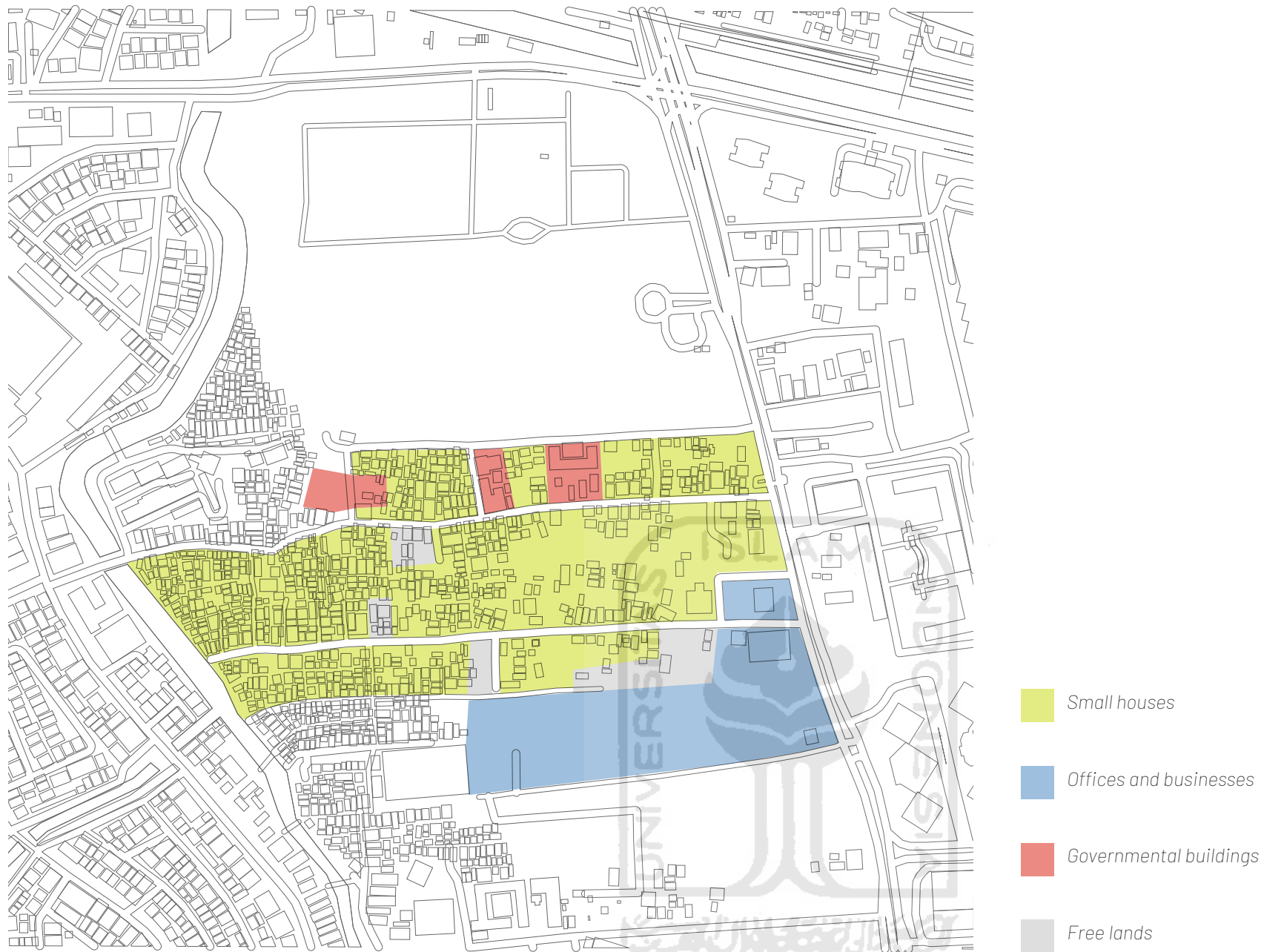


4.2. Physical Data

Area	: 8019 sqm
Total perimeter	: 379 m
Coordinate	: -6.206160807756664, 106.81265371909315
Address	: Jl. Karet Pasar Baru Barat II, Karet Tengsin, Tanah Abang, Jakarta Pusat, DKI Jakarta, Indonesia
Classification	: R.7 Vertical Housing Sub-zone
Existing Use informal use	: Housing, settlement, commercial space,



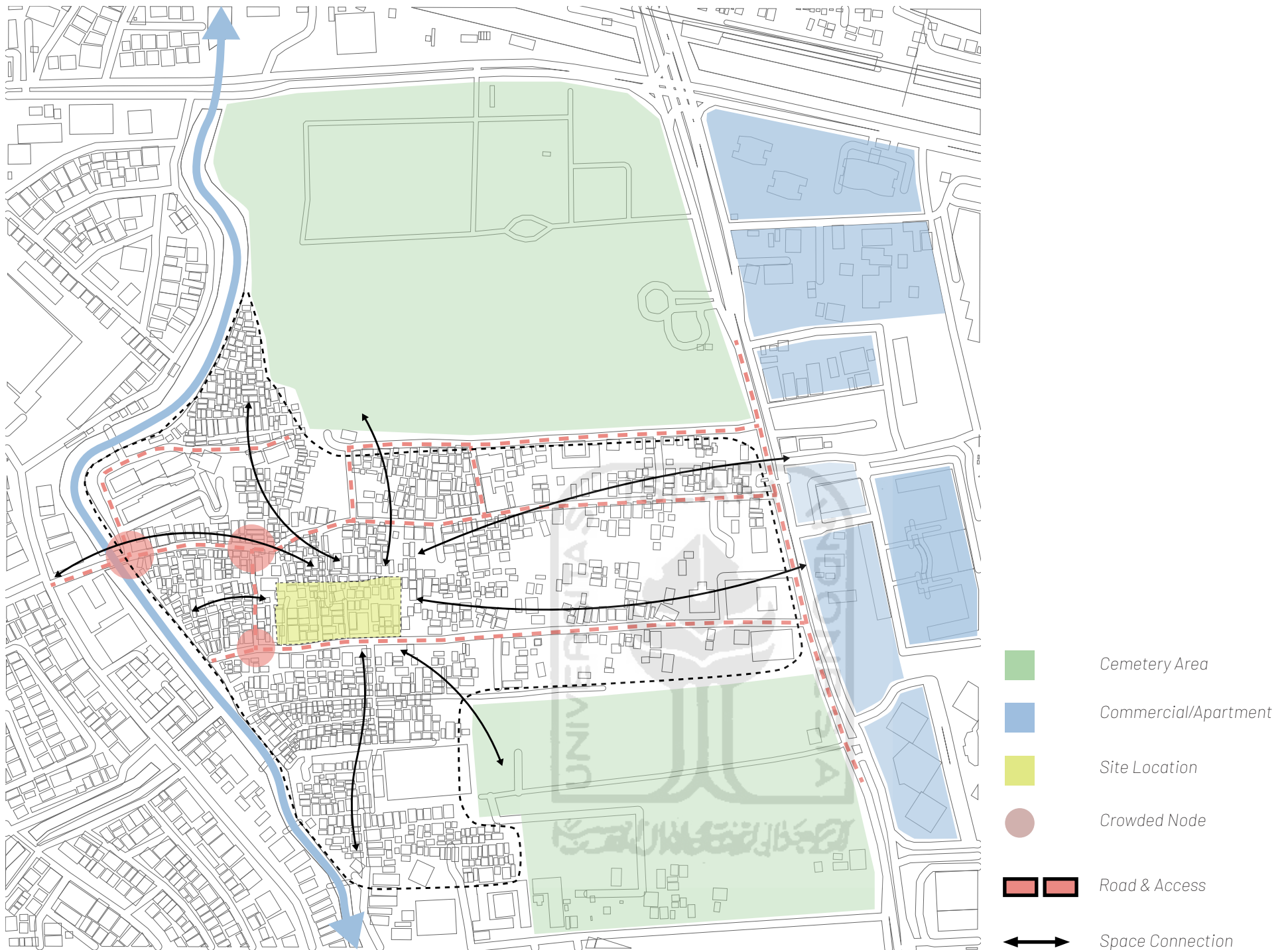
Location's descending contour figurative sketch.
Source: Author's sketch



4.3. Existing Land Use

The location is classified as R.7 zone which is the vertical housing sub-zone, or “Zona Perumahan Vertikal”. It indicates the possible alteration of the site from its current settlement setting into a new public vertical housing, like the one that has been constructed by the government in the north-ern-west area. The land is filled with a combination of houses, small shops, and other small business buildings. Because of the area’s informalities, these combinations are hardly separated visually because they are juxtaposed with each other; many houses are posing like the chinese shophouse; opening their own small shops or warung in the front space of their houses.

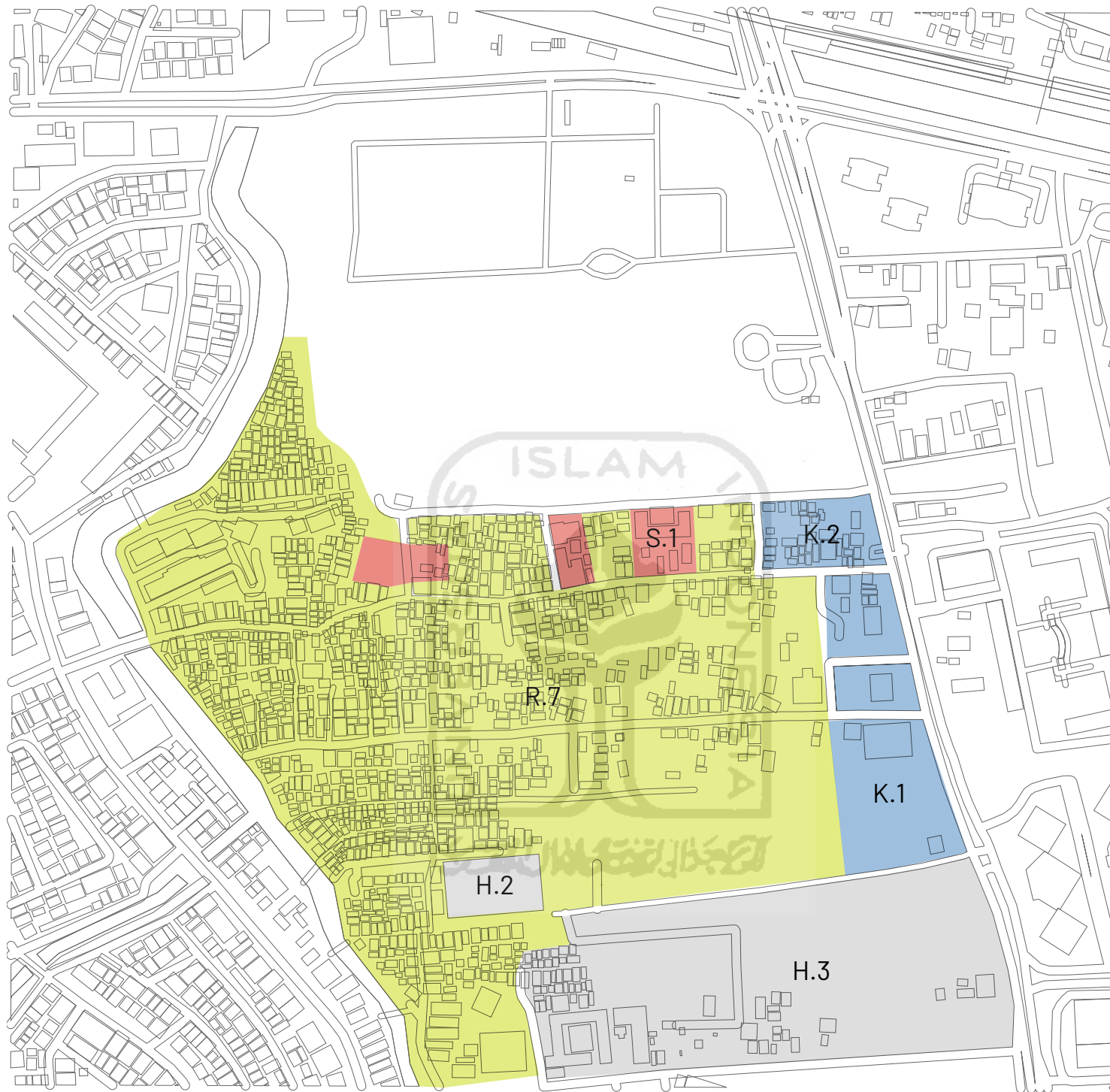
Beside the shops, several boarding houses exist in the area. From the observation of the author, it may have the correlation with the area’s own loca-tion that is close to Jakarta’s elite commercial area such as Sudirman, which may be built in their hopes of attracting blue-collar workers and other employees to rent there. A couple private universities are also reachable from the location, that also may contribute to the emergence of these board-ing houses. The boarding houses typology itself is blended vaguely with the owner’s or the people’s houses, showing that they might be constructed after the initial settlement had been established beforewards. Thus, these boarding houses can be incorporated into the consideration of the area’s functional existing diversity.



4.4. Site Connectivity

The proposed site is located in RT 9 of RW 9 Karet Tengsin in-between the Karet Tengsin public cemetery and Karet Bivak public cemetery. The whole kampung area of RW 7 has a strong impact on the connectivity between the main Sudirman road in the western side and Bendungan Hilir settlement in the eastern side of the site. It acts as the connector between those two areas, people mainly cross the crowded road in the southern side of the site to get quick shortcut to the northern Sudirman area marked in purple colors. Three main nodes can be seen in the red circles, which basically a crowded node junction of roads, thus taking a site near those three nodes with the combination of the direct riverbank access would be less preferable for a typology of vertical kampung/housing for the sake of its privacy and security. Although it is more into the central, the site still has connectivity to major sites and places around the neighborhood like the cemetery, the downtown area in the west, and Bendungan Hilir's main road.

Existing Building Zone Code



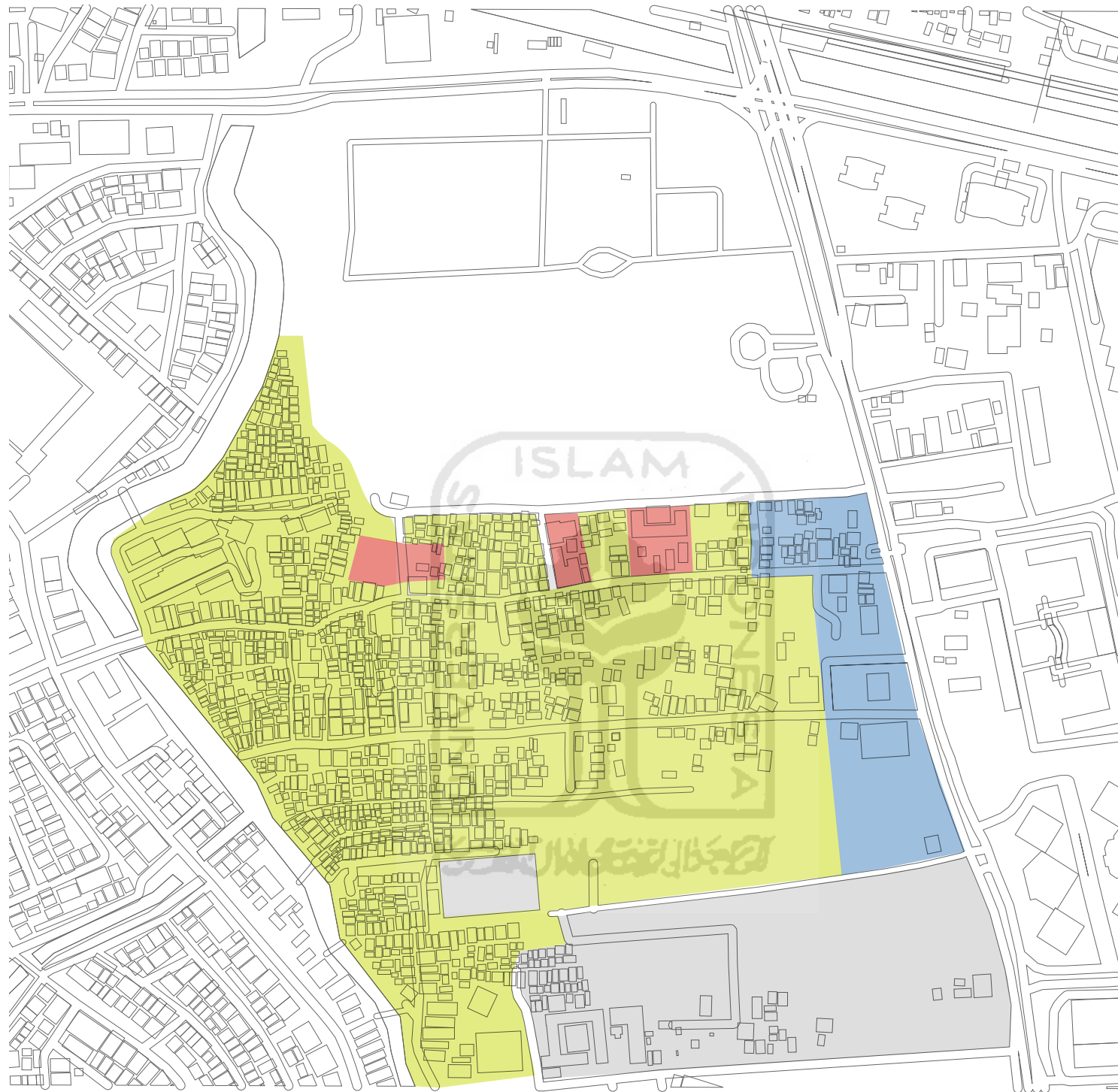
R.7 Vertical housing complex

K.1 Business area

S.1 Public service/government-owned

H.3 Public graveyard

2005's Detailed Spatial Planning

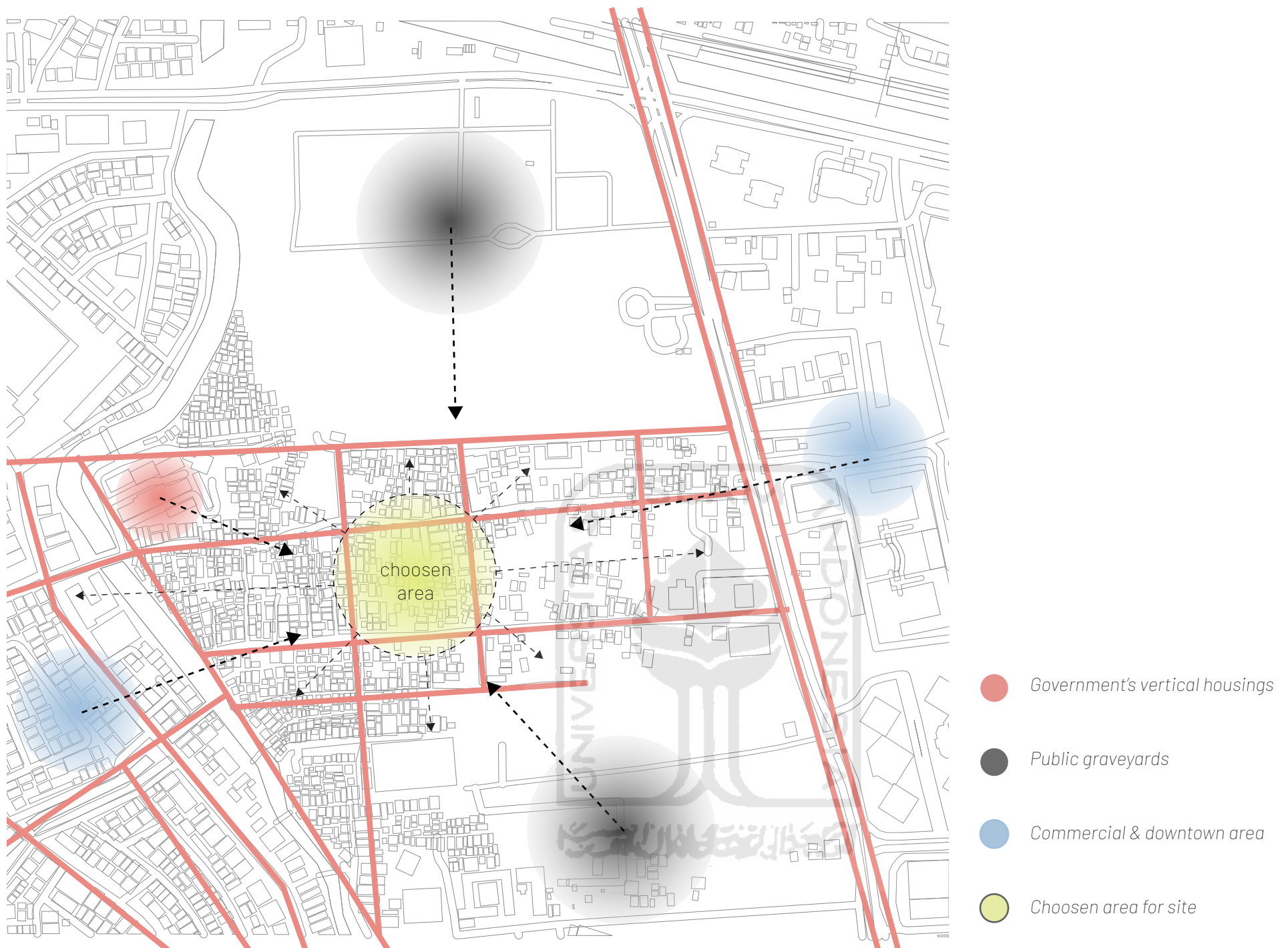


 Small houses

 Offices and businesses

 Governmental buildings

 Free lands

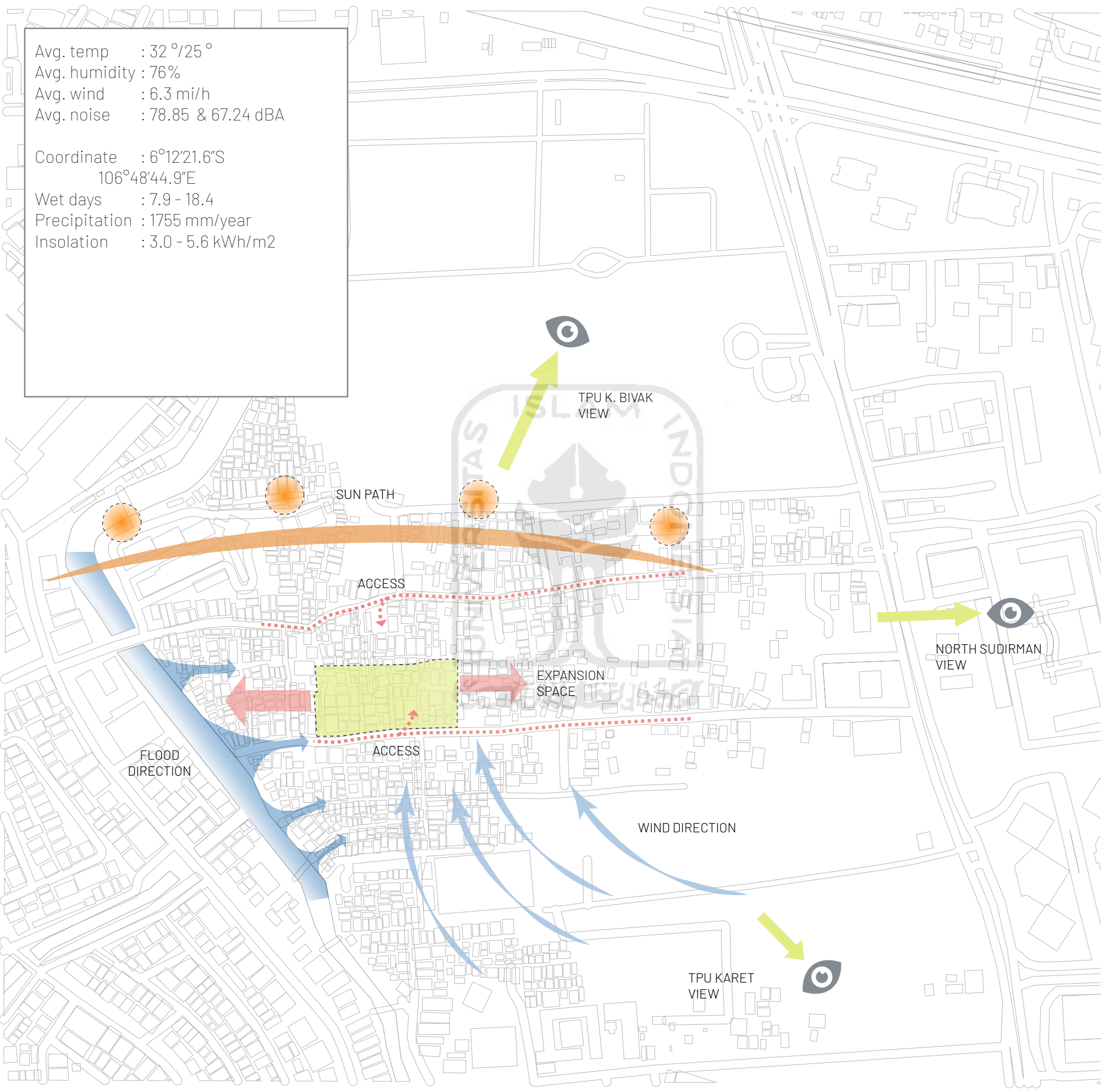


4.8. Site Analysis

Firstly, before going into the climatic analysis of the site, the spatial nodes on the whole area were analyzed to determine the chosen area. The site is located and chosen in RT 9 (yellow circle) as it is the one that has the most equalized distributed network with other important nodes around area. It includes the commercial and downtown area, the public graveyards, Karet Tengsin's local business area, government's existing vertical housings, and public buildings like school and puskesmas. The site can expand easily in future when the model has started to be adapted for the whole RW, because it's central coordinate can reach all of the whole RW gradually, and equally. It also holds important connection between Bendungan Hilir in the western side and Sudirman area in the eastern-side of the site. Thus, this geometrical symmetry and sound connection acts as the main reasoning to choose the starting point for the project development.

Avg. temp : 32 °/25 °
Avg. humidity : 76%
Avg. wind : 6.3 mi/h
Avg. noise : 78.85 & 67.24 dBA

Coordinate : 6°12'21.6"S
106°48'44.9"E
Wet days : 7.9 - 18.4
Precipitation : 1755 mm/year
Insolation : 3.0 - 5.6 kWh/m2



4.5. Neighborhood and Culture

The settlement is quite a melting pot. A large group of javanese is reported to mostly live and fill up as the majority of the kampung's population. The Javanese group is also divided into the newly 'immigrant' and the old one. The new comer mostly came to the city as a group of dealers, street food vendors, and workers that are working not far from Karet Tengsin. From the author's observation and quick interview with the locals, most street vendor carts are being pooled in Karet Tengsin. The vendors themselves mostly live there, and they will push the carts from Karet Tengsin to Bendungan Hilir in dusk or afternoon depending on their types of food and/or drink. The street foods are then swarmed and scattered along Jl. Bendungan Hilir main road, connecting the southern checkpoint of Sudirman with the northern checkpoint of Tanah Abang; it makes the benhil road famous for its street food delicacy.

Aside of that, the root betawi culture is still strong that it may have influenced people that moved there from outside of Jakarta. Not only from the intangible aspects and characteristics like their language accent and lifestyle but also from the visible tangible evidence of a preserved traditional betawi house in the central area of RT 9. The preserved house signals the existence of the native culture of that area, and bears important node point for its small urban context. Various cultural aspects of Betawi can be found in the area including the legendary food Ketoprak Betawi that is very popular among Jakarta residents and has opened since the 70s. Also from the author's observation, other types of cultural fixtures are also visible in-between the people, such as many strolling kids playing while wearing traditional betawi uniforms/clothes.

While being known for its Betawi and Javanese majority, an interesting point can be looked from Karet Tengsin's history of its name as it came from a highly-respected chinese philanthropist that owned a vast land of rubber farm in that location. According to Ridwan Saidi's Lexicografi Sejarah dan Manusia Betawi IV book, Karet Tengsin was a rubber farm with the total area roughly around 300 hectare, owned by a chinese-descendant named Tieng Shin. He was famous in his area for its kindness and its willingness to give helps to his neighbours. After the eviction of the rubber farm due to Gelora Bung Karno's stadium complex construction, the chinese man Tieng Shin and his -



A young boy wearing a traditional betawi clothes in Karet Tengsin

family stayed for a while in their house in today's Karet Tengsin before completely being evicted. People payed much respect for his kindness in helping his neighborhood financially, by calling the area Karet Tengsin, which came from the word Karet (rubber in Indonesian) and Tengsin (the Betawi accent to the chinese name's Tengshin).

4.6. Kampung Characteristic

Several attempts have been made by the government to eradicate the slum aspects in Karet Tengsin and rejuvenate the local occupants into new settlement environments with more adequate spatial qualities. It can be seen from the amount of Rumah Susun or vertical housing that has been created in the area which there are 3 blocks already constructed; Karet Tengsin 1, 2 and 3. It was from Tanah Abang's government in Rencana Rinci Tata Ruang Wilayah DKI Jakarta Kecamatan Tanah Abang tahun 2005 (Detailed Spatial Plan for DKI Jakarta, Tanah Abang District, 2005) that slum areas that are in heavy priority will be fully focused to be taken for action. In that case, Karet Tengsin RW 5 was the first in line, and thus produced the first vertical housing. It is then restated in Instruksi Presiden No. 5 Tahun 1990 tentang Peremajaan Permukiman Kumuh di Atas Tanah Negara (Presidential Instruction No. 5 1990 regarding Rejuvenation of Slum Settlements on State Land) that those revitalitations are meant to increase the occupant's life and dignity quality in a slum settlement, especially for the group of a lower-class economy people. Today, Karet Tengsin RW 05 is not listed in the government's contemporary program of CAP (Community Action Plan), which is a revitalization program focused more in the participatory design aspects. Instead its neighboring RW 07 gets its time to be queued in the schedule, but unfortunately the government stated that the progress will eventually be stuck due to COVID-19

RW 7 itself is located in a much lower land, and has direct access to the riverbank. The flood is an annual problem, and an analysis to seek the cause of its flood is needed in order to find the right approach towards them. The first prejudice and prediction by the author was going to be the slum's cliché on drainage problem caused by the massive influx of trash and waste, but the initial survey showed that the neighborhood is actually pretty clean and free from any bulk of trash in places that we would have expected to see. From a quick survey, I asked



Karet Tengsin rubber farm photo in the 20th century

some locals regarding their frequency in facing floods and what would be the cause, and the answer matches with what Governor Anies Baswedan has once said to Tempo journalist that Jakarta's insufficient drainage capacity on holding the massive water from both high-frequency rain and banjir kiriman or a body of water that is being delivered from Jakarta's neighboring city like Bogor.

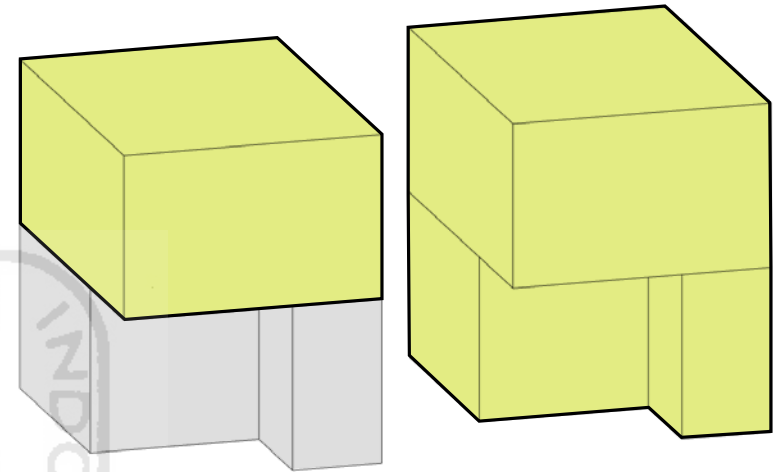
This problems are also concerned by institution like Ciliwung Institute, saying that the reduction of natural soil drainage due to massive pavement and construction, along with paving the side of rivers by concrete, have had direct impacts to the flood in Jakarta. Thus, the waste problem would not be the priority for the design approach as the problem can be considered inevitable, so instead the design should make the people be adaptive with the flood without disturbing their normal state of daily activities.

COVID-19 | Housing Layout

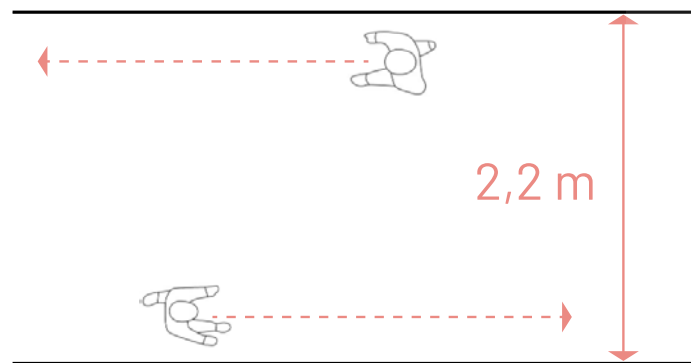
Flexible spaces that can be adjusted by the users



1 free story below each main house for shop/kiosk/additional room

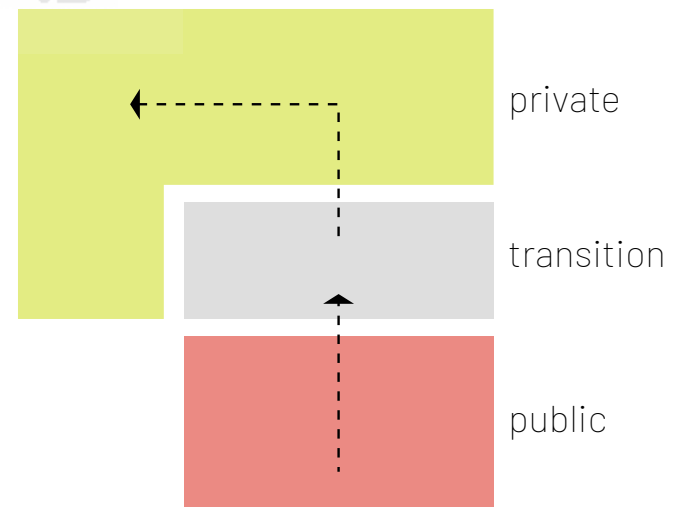


Clear, if possible, one-way circulation



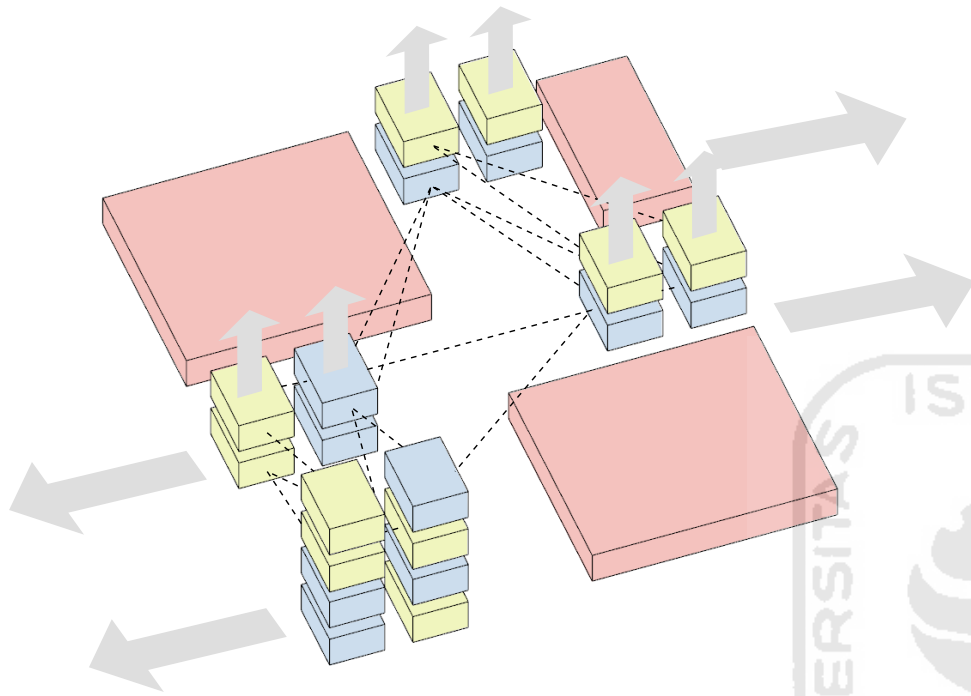
Standardized minimum threshold dimensions

Separation between public-private threshold space

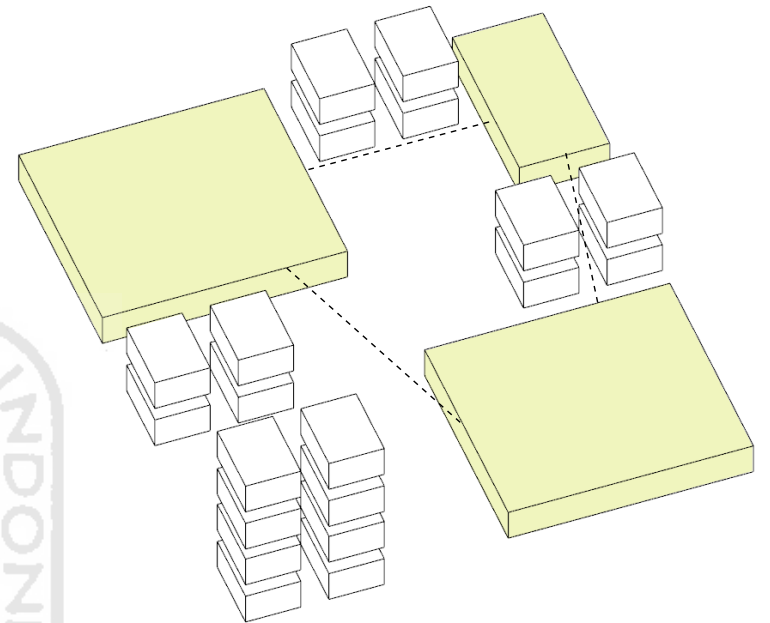


Space Density

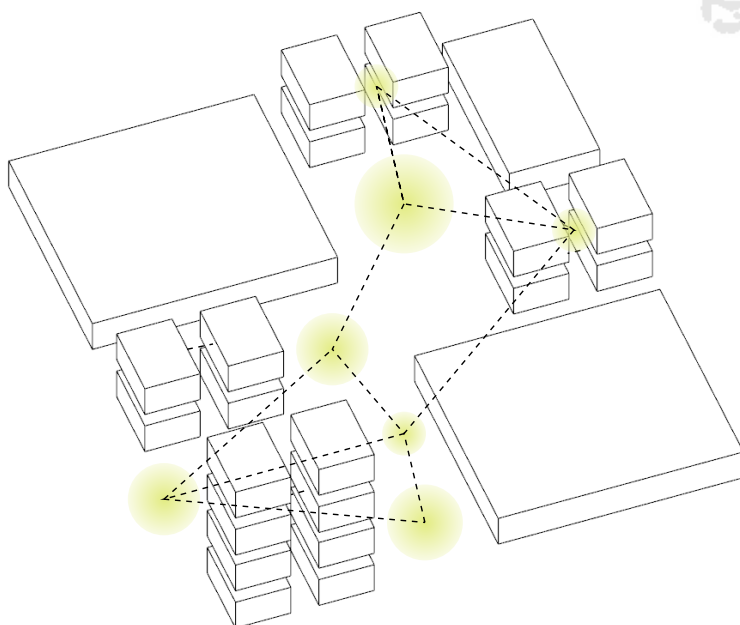
(Adaptive resilience) Distributed zoning for resiliency & dispersing crowds



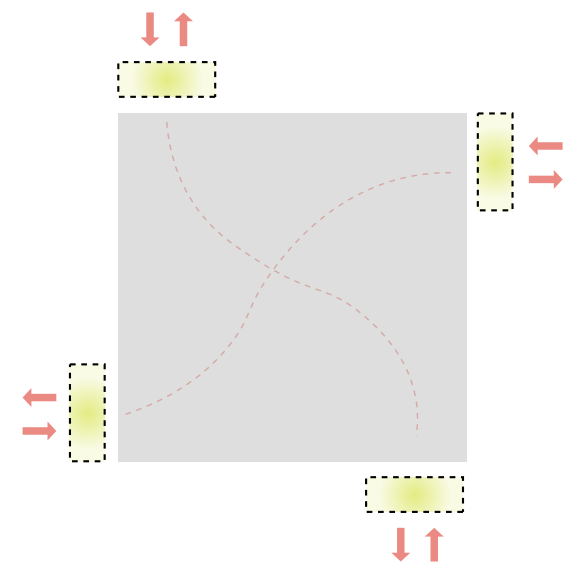
Decentralized open green area



Decentralized social space



Distributed entrance & exit to avoid walk-jam

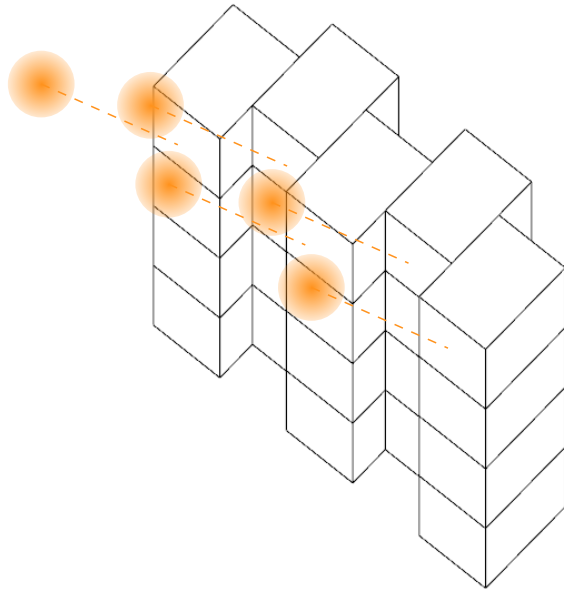


Screening area at each entrance

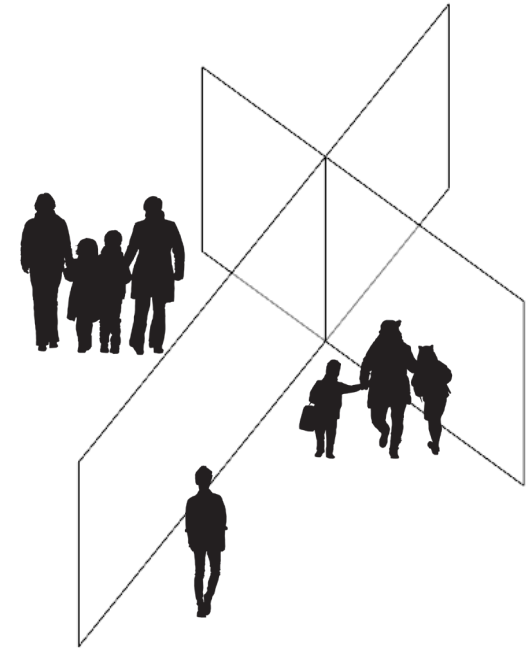


Shelter and Safety

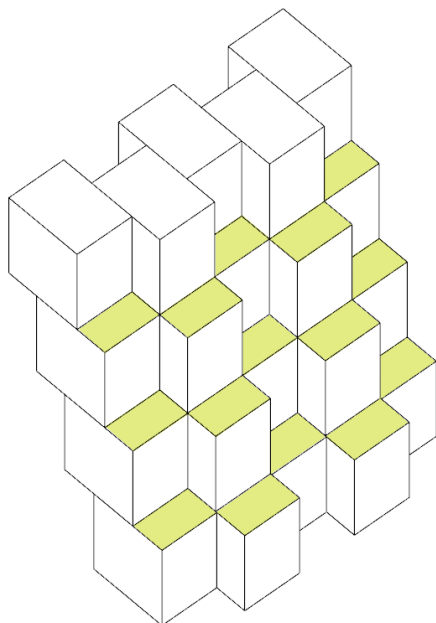
Access to direct sunlight for all house



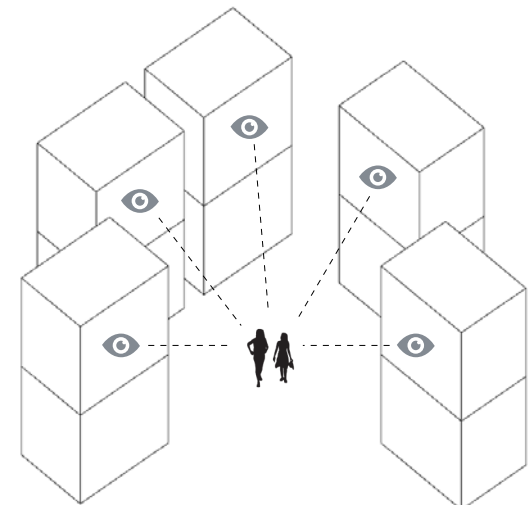
Clear physical barrier on contact points



Private open rooftop/green balcony

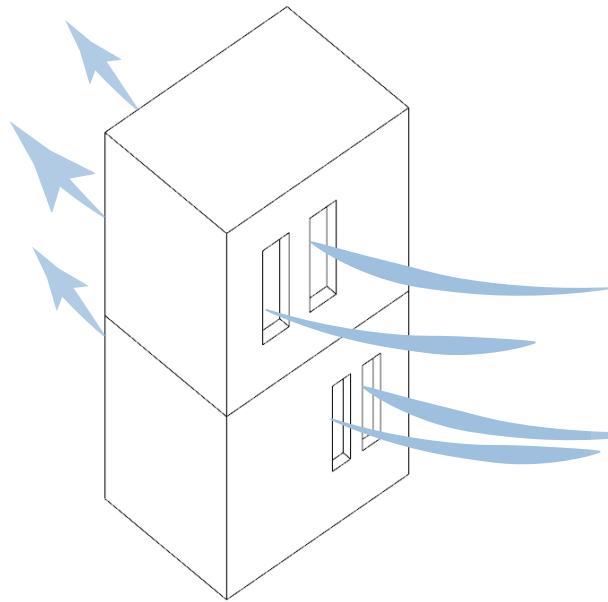


Communal public eyes surveillance

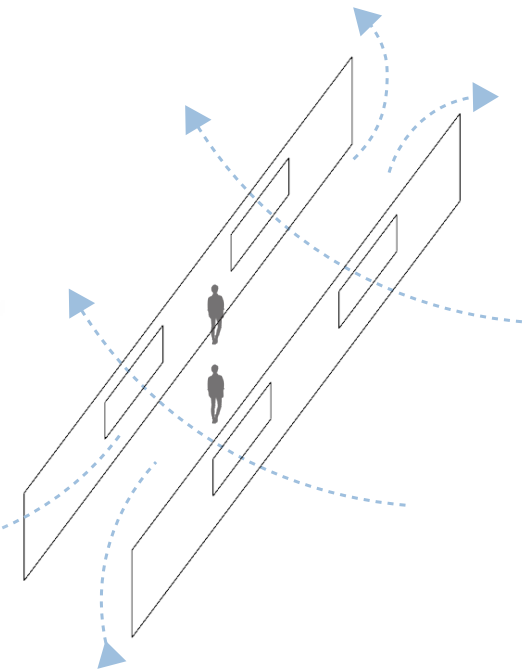


Indoor Air Quality

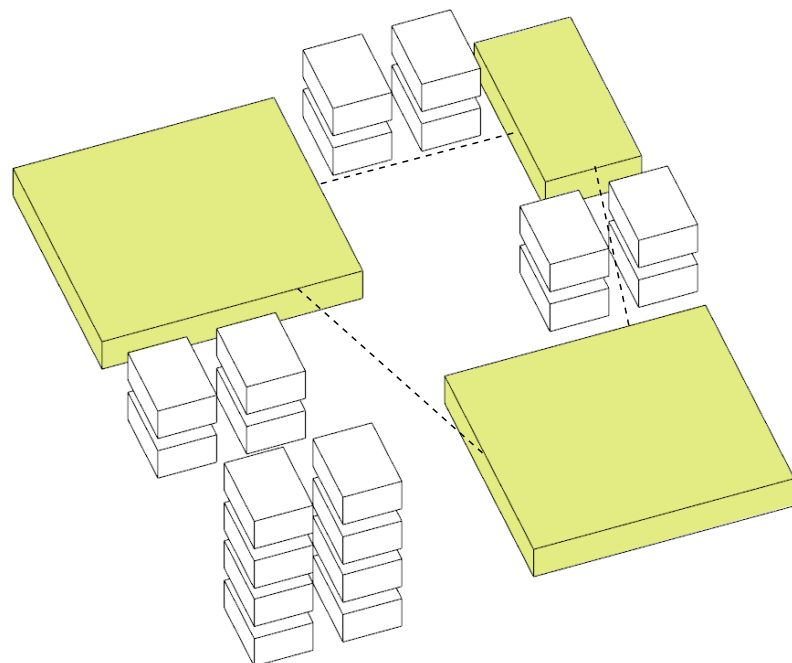
Adequate air circulation without HVAC on each house



Adequate air circulation on important node-spaces



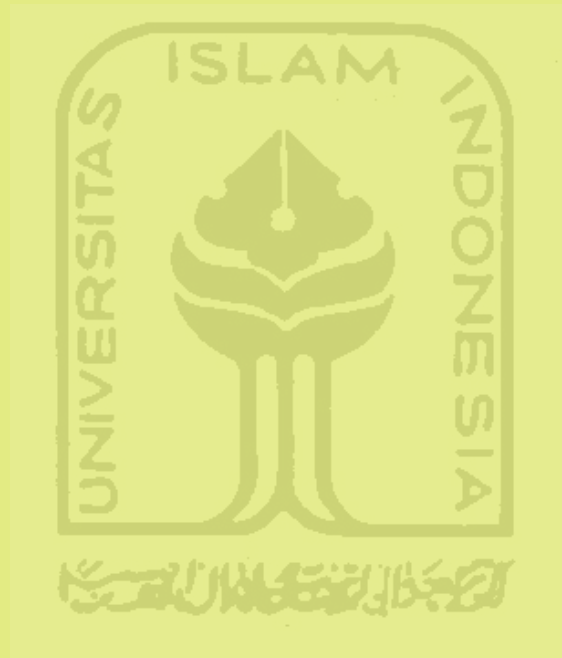
Distributed network of open green area



Walk-based, bicycle-friendly, and separated vehicle parking & access



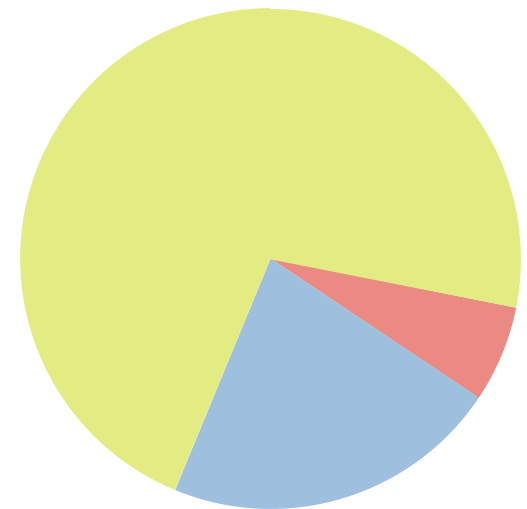
2.5. architectural programming



A portion of
RT 9 + **RT 8**
77 KK + **70 KK**

150 households (assumed)
 600 occupants
 51.39% male
 48.61% female
 15125 persons/sqm

6.3%
Boarding House 10
 71.9%
Single-house 115
 21.9%
Double-house 35



Frequency Impact	6.00 - 9.00	9.00 - 12.00	12.00 - 15.00	15.00 - 18.00	18.00 - 21.00	21.00 - 00.00
Regular	transaction	transaction	transaction	transaction		
	shop opening/closing	shop opening/closing			shop opening/closing	shop opening/closing
	logistics	logistics		logistics	logistics	logistics
	rush hour	rush hour		rush hour	rush hour	
Dynamic			children play	children play	children play	
		neighbours converse		young adult - adult hang out	young adult - adult hang out	young adult - adult hang out
				neighbours converse		

5. Architectural Programming

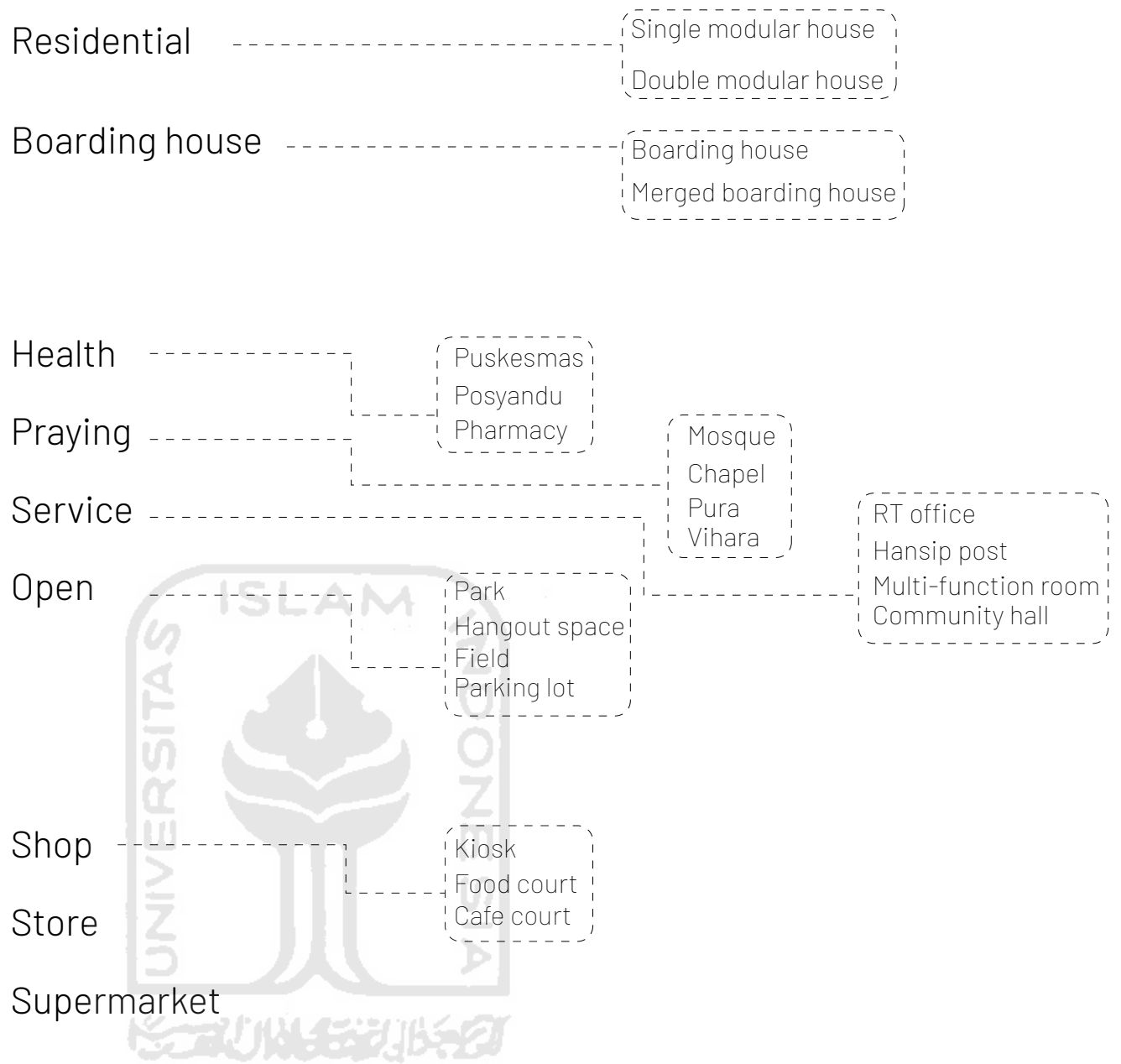
5.1. Occupant Analysis

The site touches the whole RT 9 and a portion of its neighbouring RT. From the government-published census digital data "Tanah Abang dalam Angka", it can then be assumed that the total households for the future potential inhabitants would be around 150 households, with the total of 600 occupants of the housing. The statistics from 2020 shows the equilibrium between two genres. It may be taken into the consideration also, that the density of 15.125 persons per square-meter is a mediocre to high density, thus the direction is to persevere, maintain, and improve this density so that the new design can bring an uplifting and upcycling towards the common spatial qualities. The activities that will be noted into how the circulation and spatial nodes will be designed include seven activities that can be seen in the table. Those activities are divided into regular, and dynamic frequency impact, meaning that the dynamic one can be happening not on a regular basis. These major focal activities are what make up the whole 'machine' and 'soul' of the analysed kampung.

House 60%

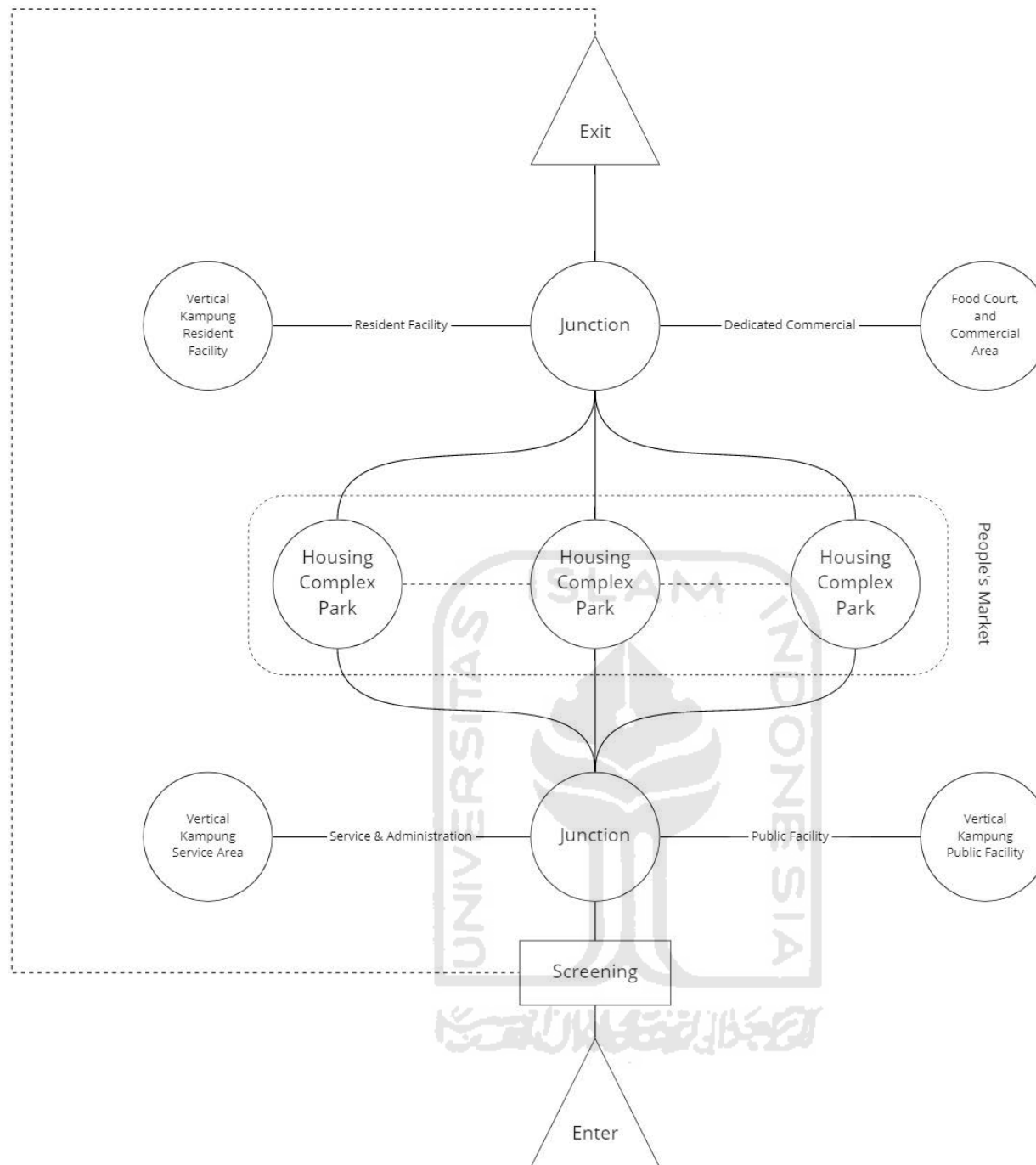
Facility 25%

Dedicated Commercial 15%



5.2. Spatial Needs

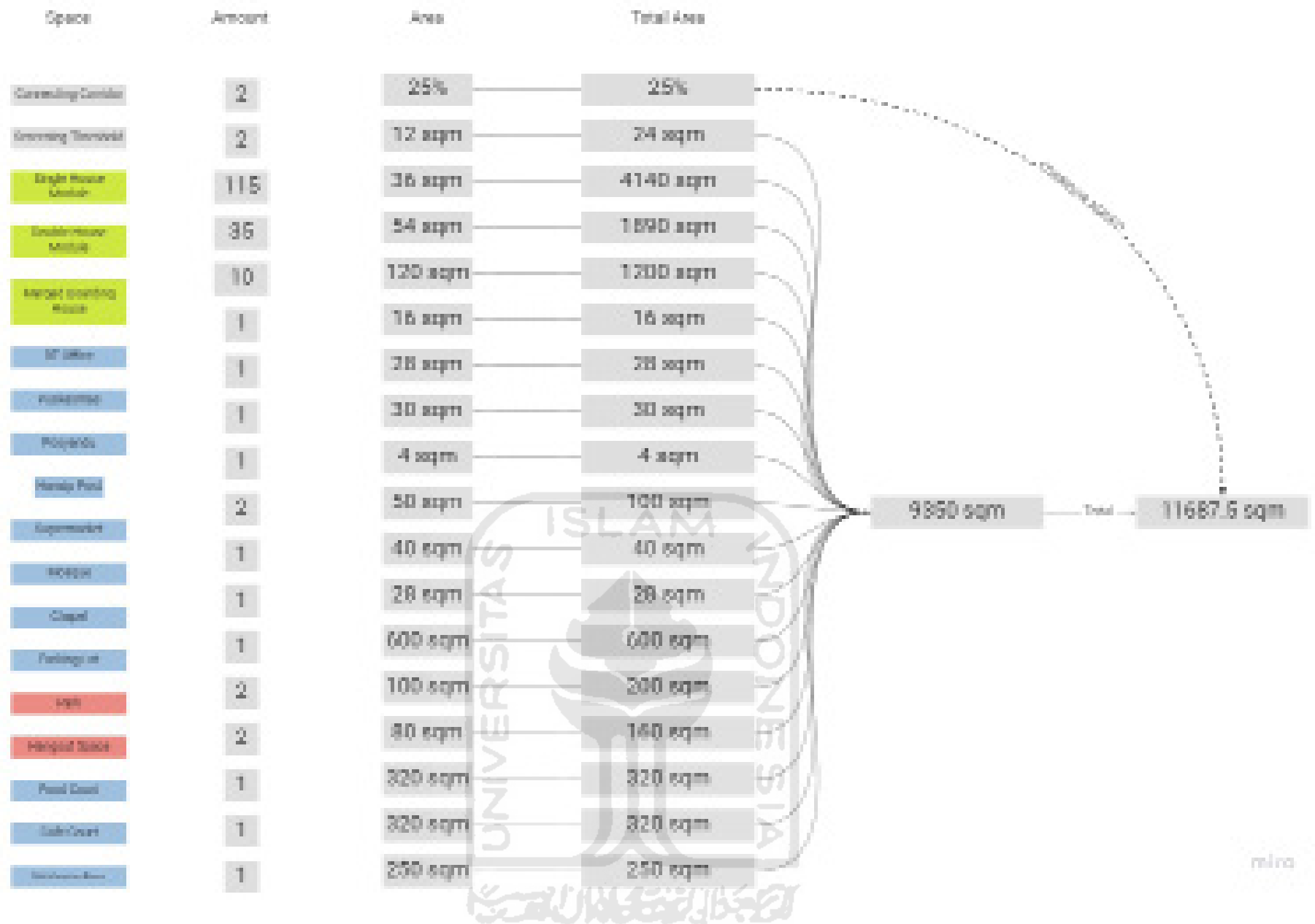
From the initial datas, the next step is to decide the spatial usage percentage and portion for three main groups. The house will take 60-65% of the total available floor area, 25% will go to public and communal facilities, and the rest will be for services and dedicated commercial. The house is divided into two main types (adapting from the previous existing kampung's typology study): residential and boarding house. The residential will be designed into single module house, and double module house, representing the visible diversity between single-story and double-story houses complexity. These two simplification into two types of module can cover the whole housing needs of the people. The facility includes health, praying, service, and open spaces that are referenced back from SNI 03-7013-2004 about "Tata Cara Perencanaan Fasilitas Lingkungan Rumah Susun Sederhana" (simple vertical housing facility planning guideline). These mandatory spaces will be injected into the built environment, and used collectively both for private and public sides. The dedicated commercial is then provided for non-occupant of the vertical kampung, so that the connection between the kampung's and the outside world's economy will not be threatened.



miro

5.3. Spatial Relationship Idea

The exploration of spatial relationship shows the first tangible COVID-19 parameters, that is to provide threshold space of screening spaces, and the clear one-way rotating circulation for the pathway. As the design will emphasize the walk-based environment, the entrance will directly be facing the screening threshold space. It then leads the visitor towards various junction and clear space 'group'. The groups are the housing complex (that also being fragmented into three to five smaller complex in accordance with the adaptive resiliency's geometrical fractal theory), the public facility area, service area, resident's facility, and the dedicated commercial area. The exit will also be passing another screening area, to solve the existing kampung's problem of lack of data monitoring throughout the COVID-19 season.

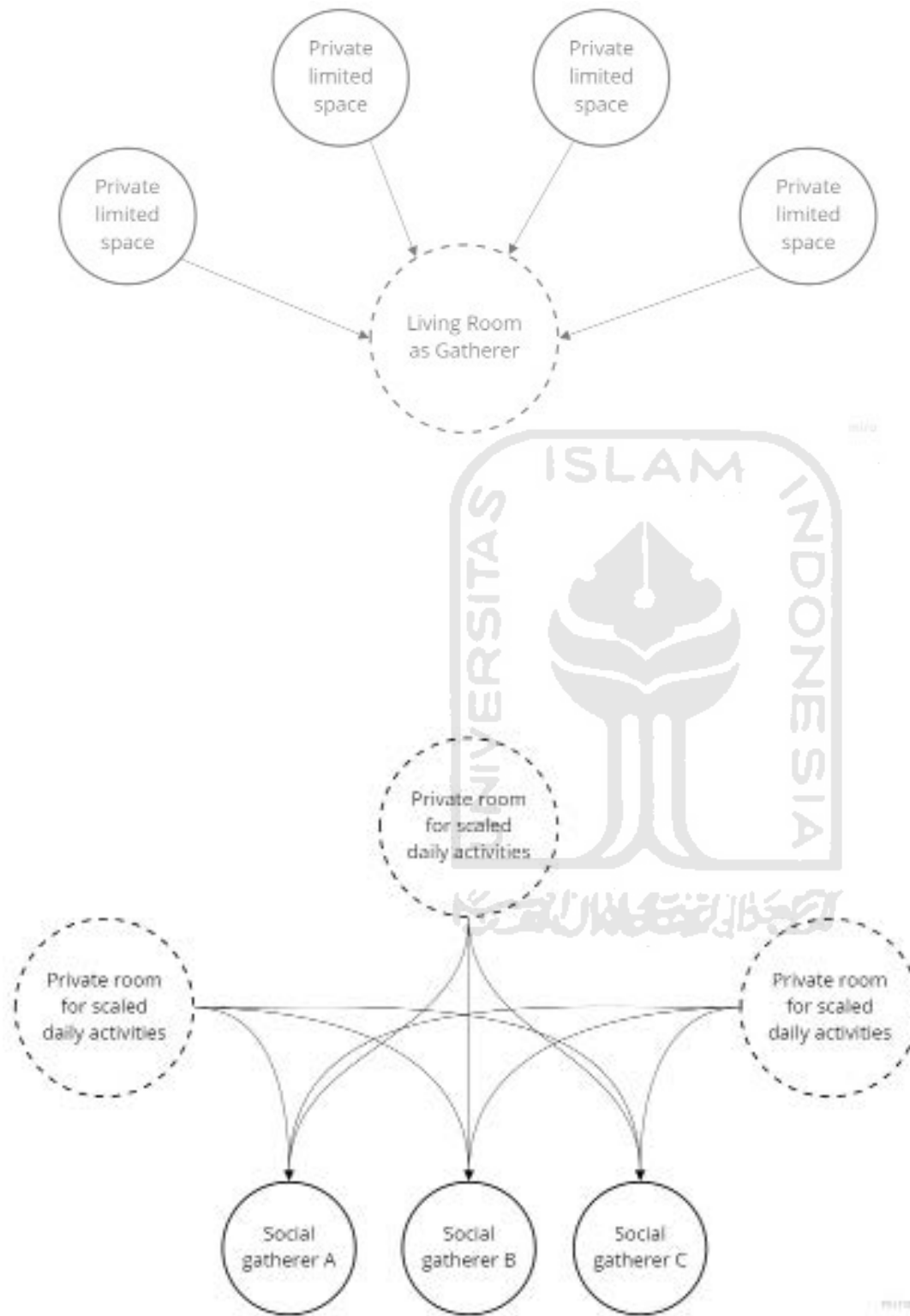


5.3. Area Needs & Standards

The main goal here is to achieve an uplifting-standard that can not only bring the previous spatial dimension into the agreed standards, but also to provide resiliency towards various discussed-phenomenons. COVID-19 phenomenon forces the people to bring back their secondary-space activities into their primary-space of home, meaning that the home should have been prepared for sudden new demands like this. The exceeded spaces are not meant for redundancy or vacancy. It is then the role of the design to maintain this; avoiding any spatial redundancy and vacancy by providing a design that can be flexible and adaptable on various situations and conditions. The 'exceeding' home area of 50-60 square meter means that the additional space can be used for commercial or any other types of activity of the occupant when it is not used for any other emergency usage. The integration of personal shop/commercial area in each home follows back the adaptive resiliency's small-scale distributed network, opposing the modernist's previous rigid commercial-housing-industrial zoning in an urban context, because it does not fit the adapted theory for facing uncertainties.

small-scale distributed network

OLD CONFIG

NEW CONFIG
for COVID-19

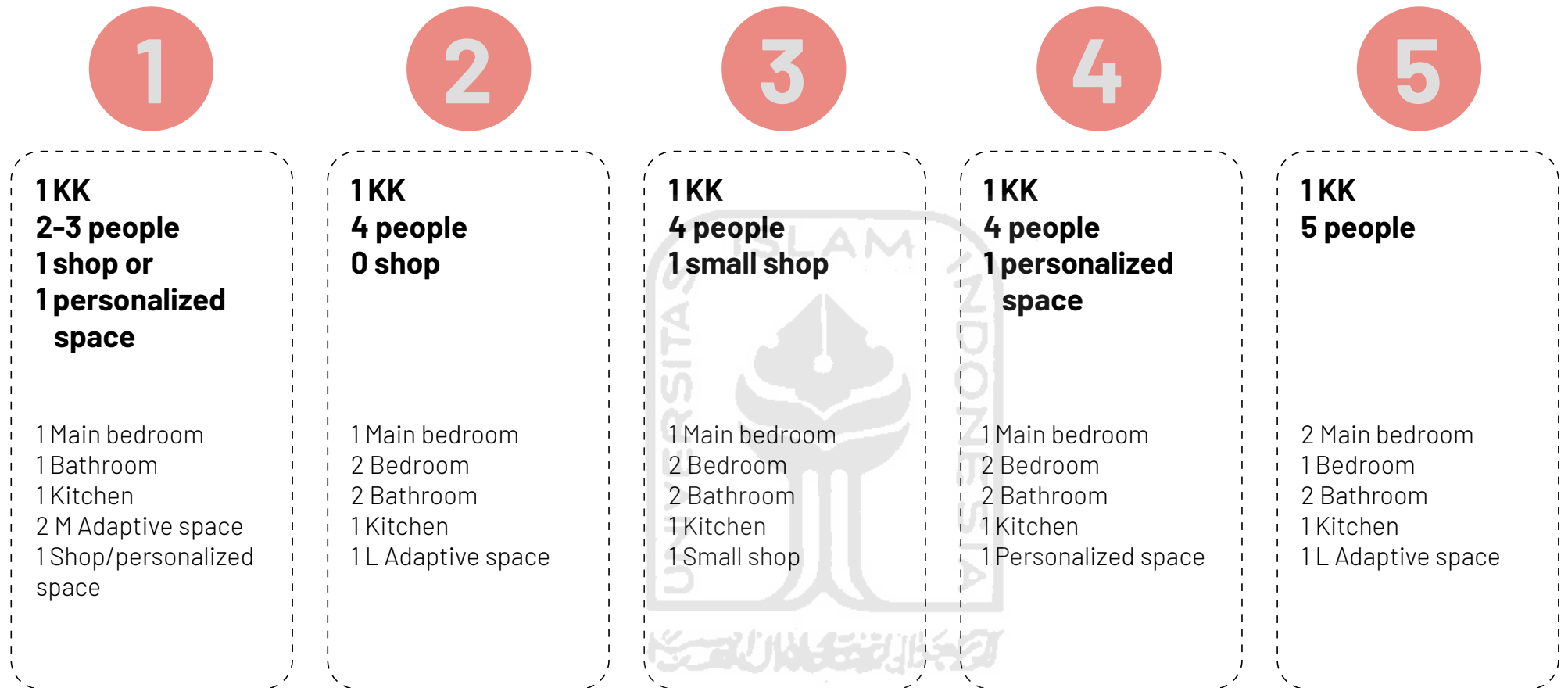
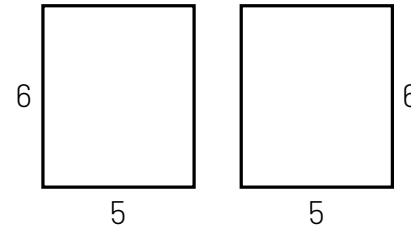
The old existing contemporary house configuration in a dense/slum area depends on a very centralized living room. Each private room has inadequate capacity to provide various activities such as work-from-home culture, and other self-induced and self-creativity activities.

The proposed new adapted configuration for COVID-19 context disperses the centralized social gathering, improving the private rooms to provide daily activities for each occupant in their rooms

1. Each bedroom has its own capacity for work-from-home and school-from-home
2. Redundant living room is transformed into Flexible Space. Can be used for any necessity of the occupants, or for the isolation area.
3. Social gathering space is dispersed into various points such as the outdoor space, open rooftop,, or through online dimension

Single House Module

5000x6000x2
2 stories
60 sqm
5 flex. options



5.4. Single House Module Flexibility

The use of a single module house that makes possible for potential flexibilities. Five different options can be adapted, whilst profoundly it can be evolved into another iteration. The key is to provide the adequate rigid structure dimension, and the interior elements can be adjusted following all of its possible potentials. The house module will be a vertical-module, it has two stories that compliment each other and directly connected. The upper level will be used as the main dwelling space for the family, while the lower first level acts as the unrigid potential of various usages. Starting from a direct connected shop (translated from the vernacularity of traditional shophouse), personalized space, or even for additional dwelling space for more members. The identical dimensions between both ensure the easeness for the infrastructure, building service, and its application towards the greater main structure that holds all of the units.

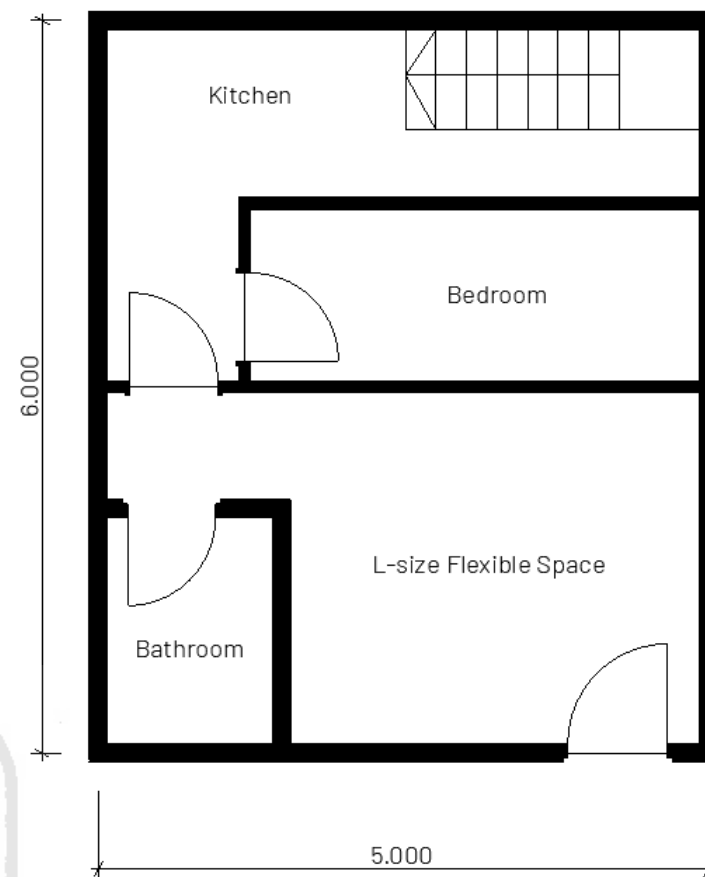
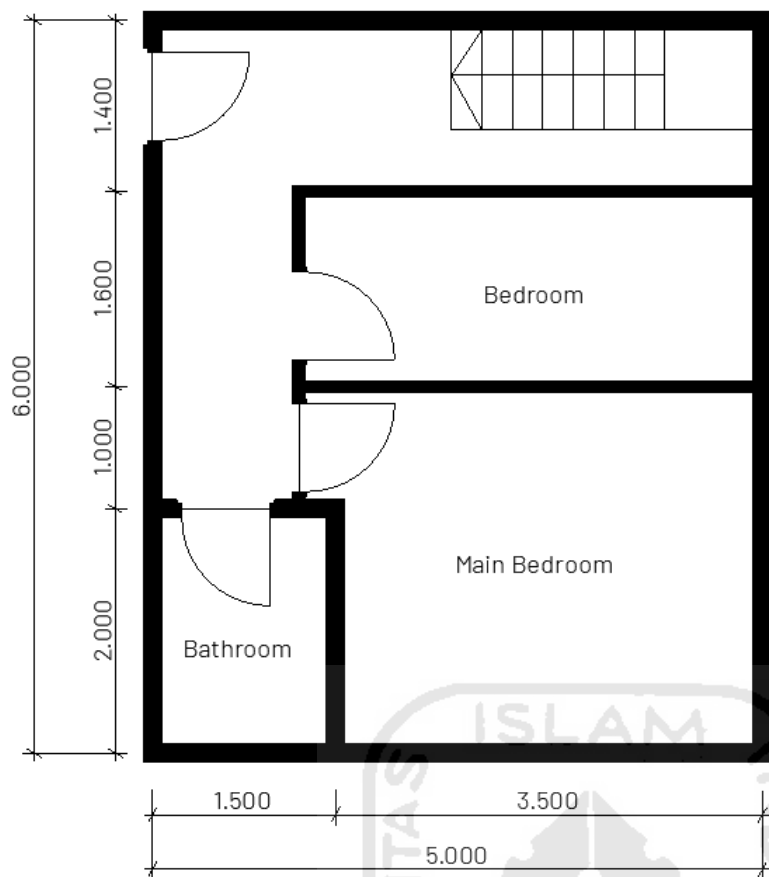
1

2-3 people, 1 shop or 1 personalized space



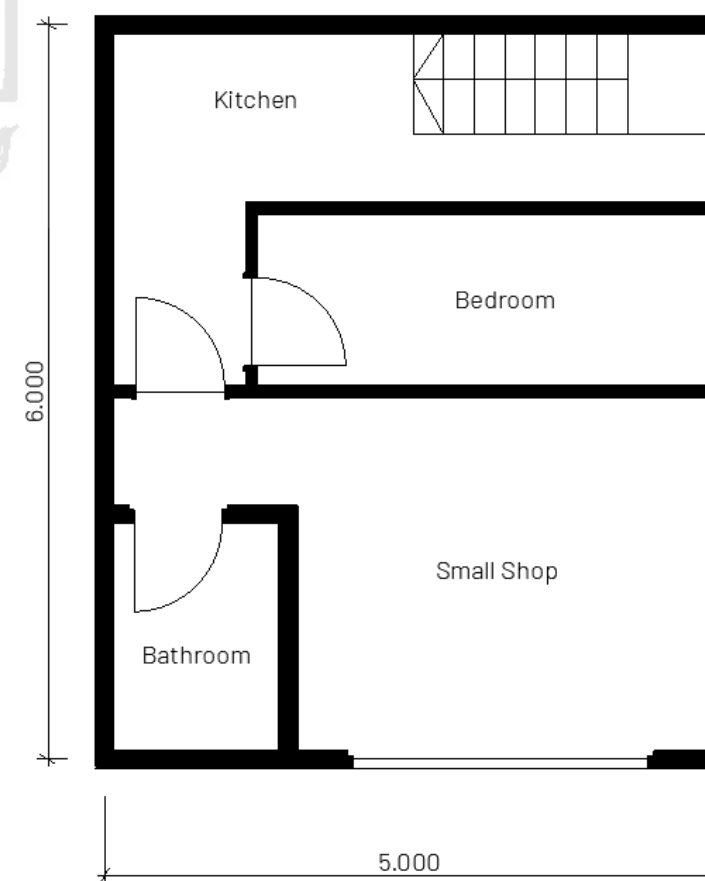
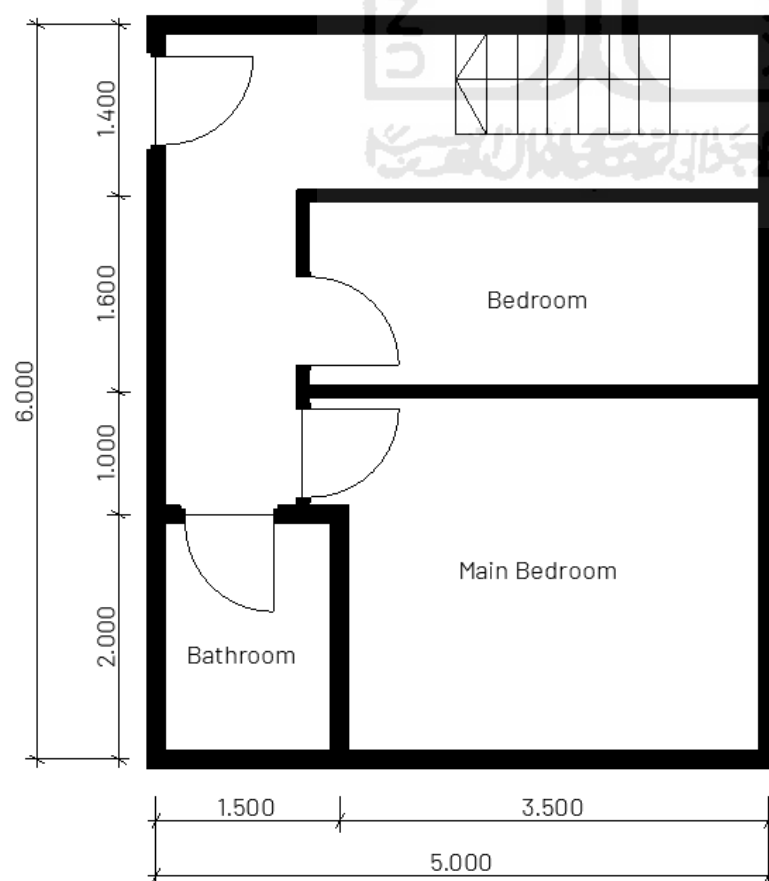
2

4 people,
0 shop



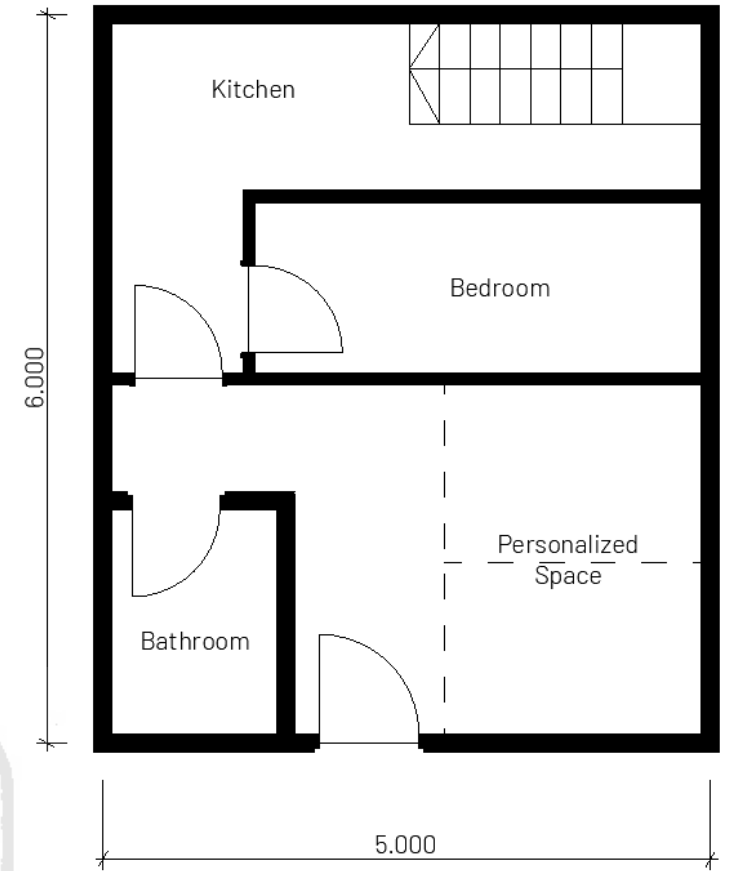
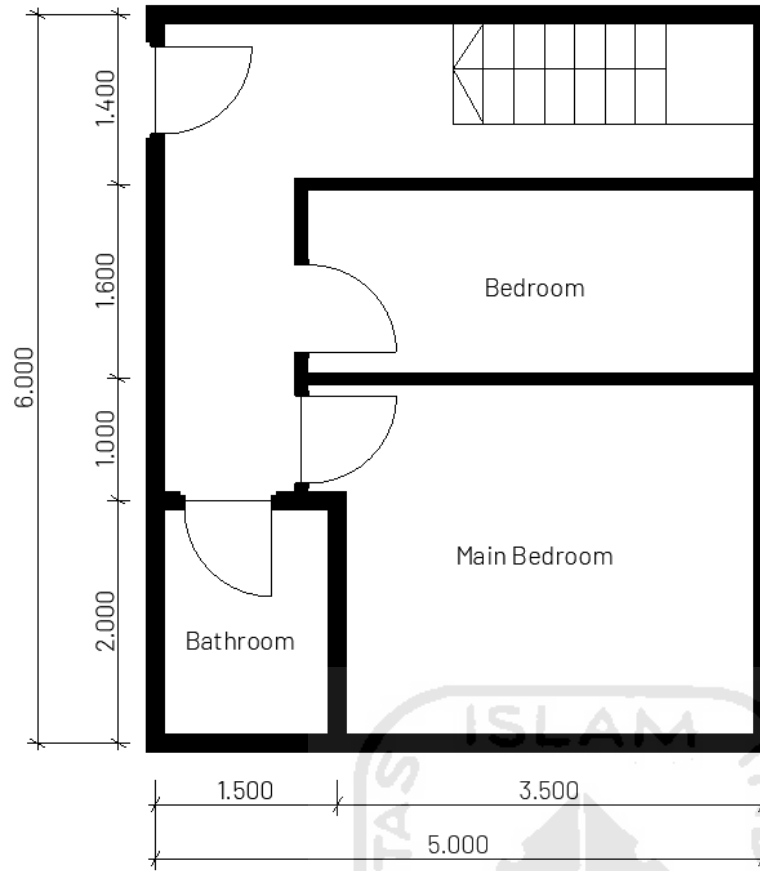
3

4 people,
1 small shop



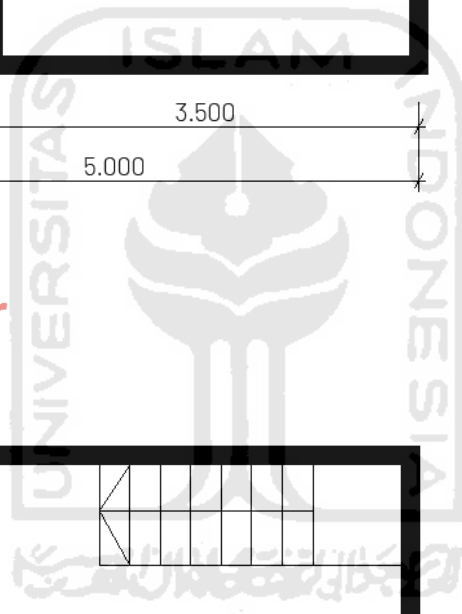
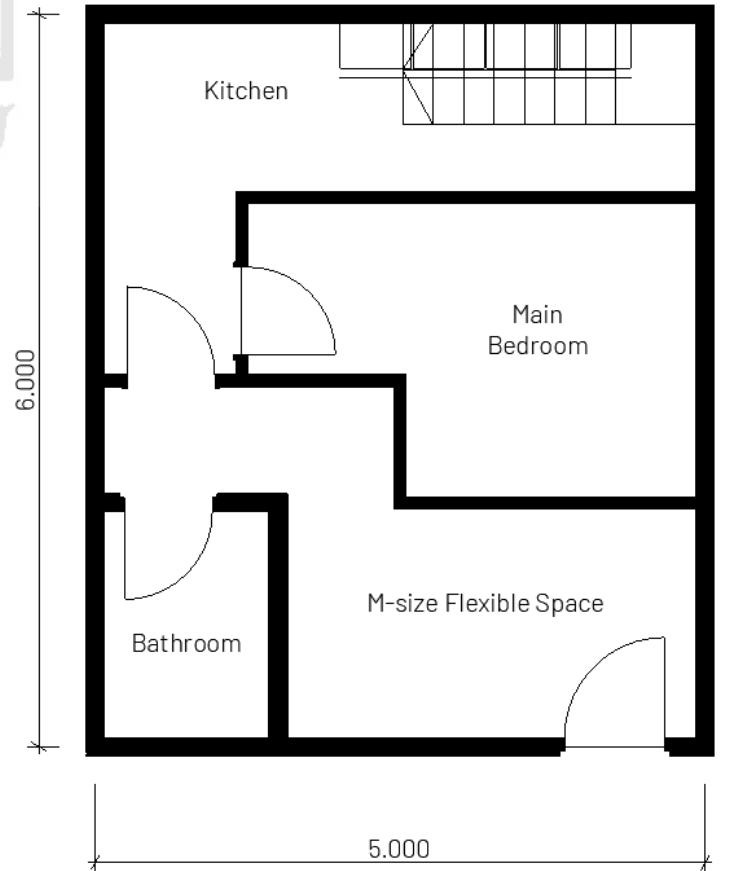
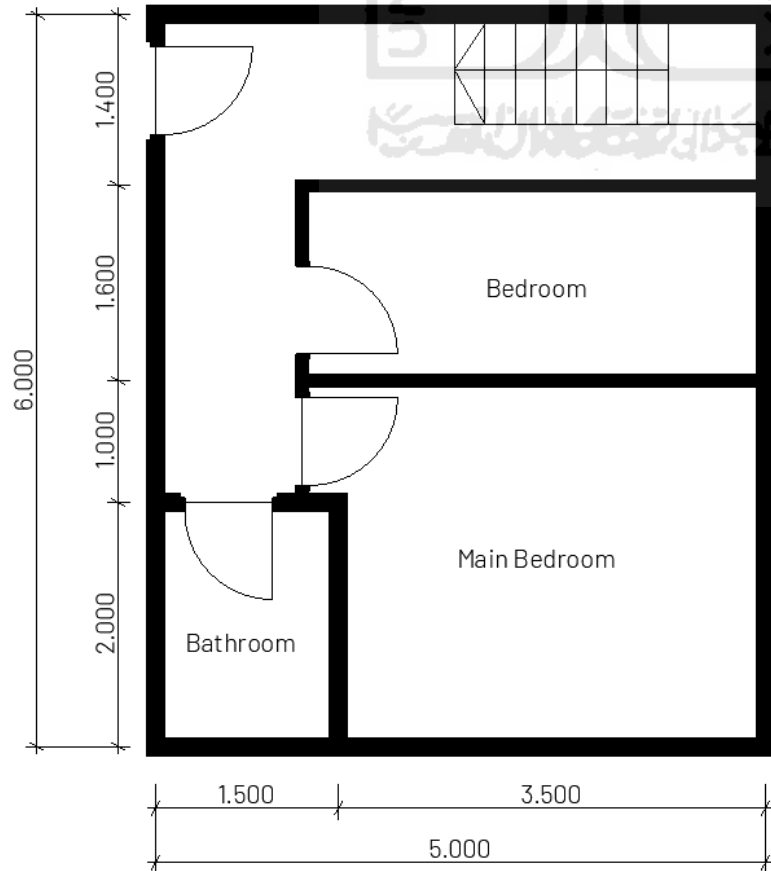
4

4 people,
1 personalized
space



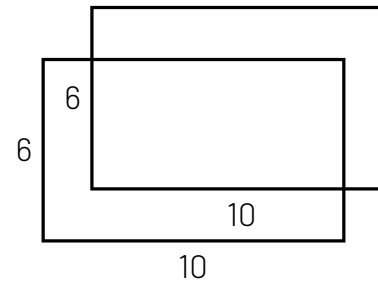
5

5 people



Double House Module

10000x6000x2
2 stories
120 sqm
5 flex. options



1

2

1 KK
6-7 people
1 XL shop

2 Main bedroom
2 Bedroom
2 Bathroom
1 Kitchen
2 Flexible space
1 Shop/personalized
space

1 KK
6-7 people
3 flexible spaces

2 Main bedroom
2 Bedroom
2 Bathroom
1 Kitchen
3 Flexible spaces

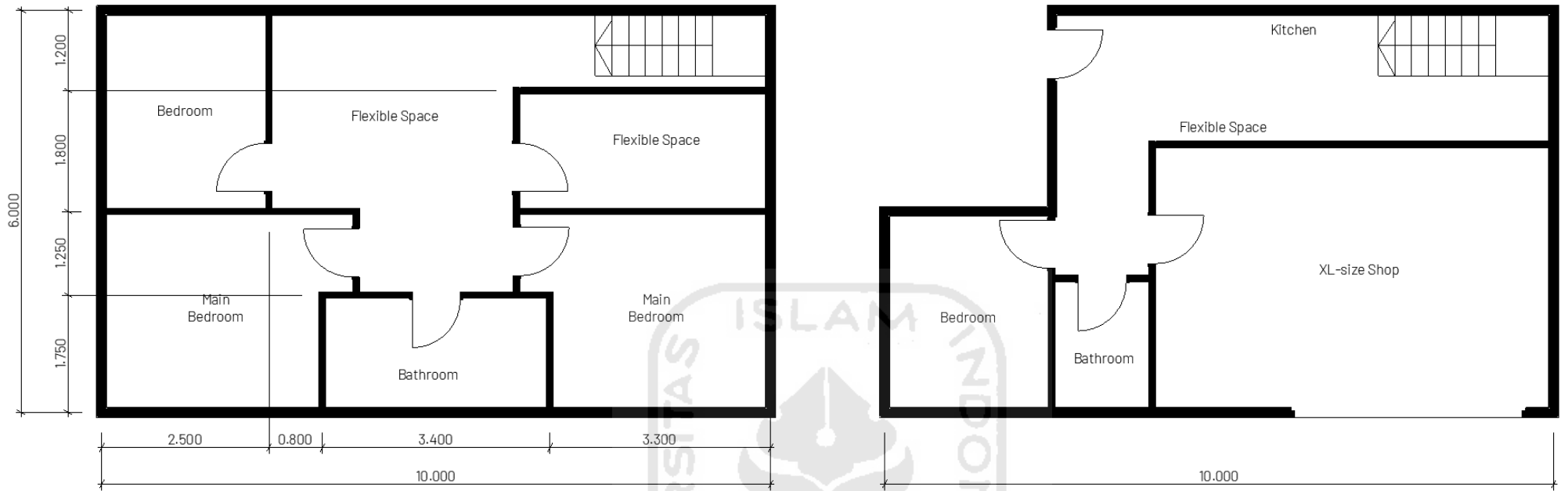
5.4. Double House Module Flexibility

Similar to its single-module counterpart, the double-module unit aims to provide a much larger dimension for a specific situation in future such as a household with more members, or regular household that has had stuffs done in a larger space back when they were still in the old horizontal kampung. The important indicator is to follow the structural grid and module coefficient for the dimension of its column, so that it will lead to a kind of plug-and-play type of flexibility. By adjusting its dimension to the whole general module coefficient, there will be no redundancy if it is not longer needed, and making it easier to construct, demolish, or transform it back to the old single-module house unit. This unit has the same two-story level, with the main dwelling area located in the upper second level. The first floor provides much larger space possible for an XL-sized shop or kiosk. It can also be used as the transformation towards boarding/porch house, that is occasionally be spotted in the old previous horizontal kampung's typology catalogue.

1

2nd floor

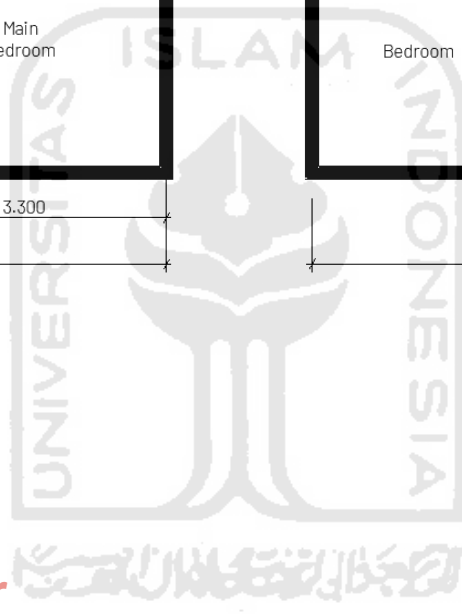
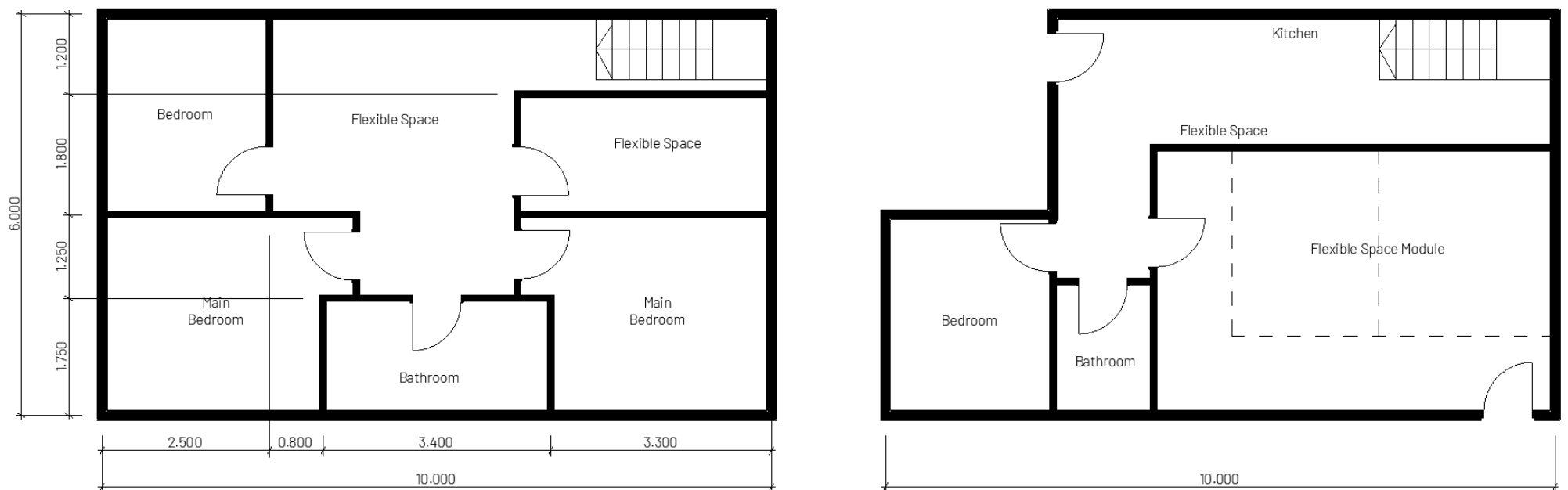
1st floor

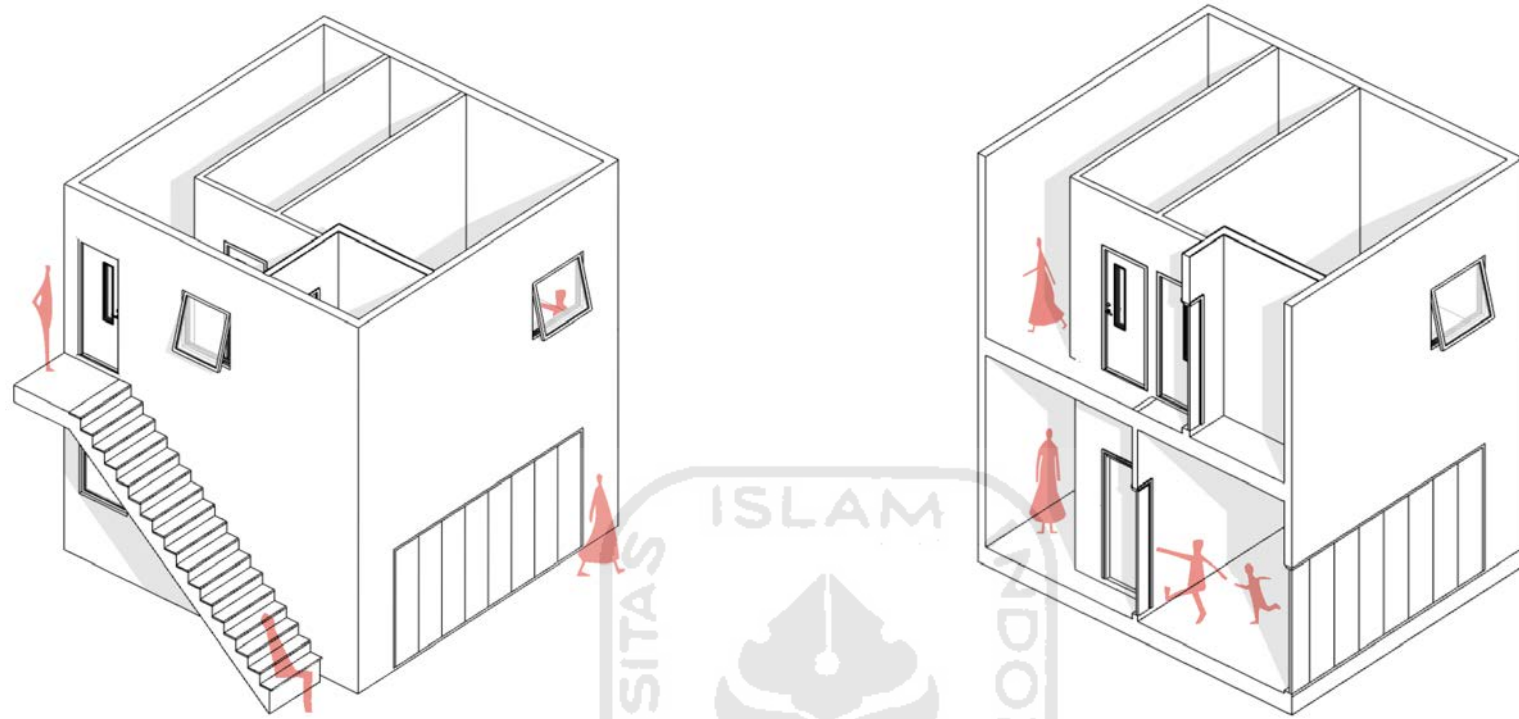


2

2nd floor

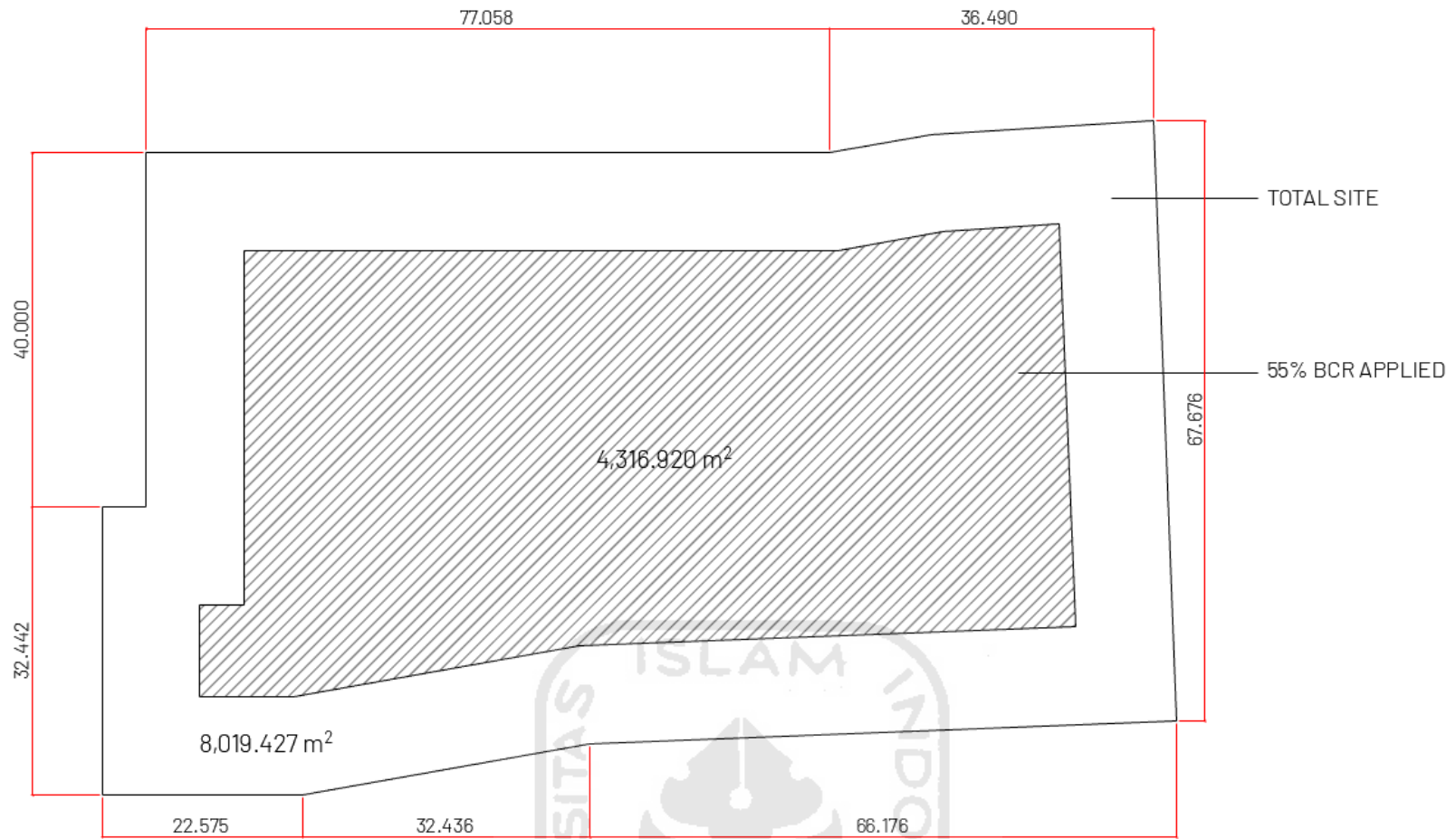
1st floor





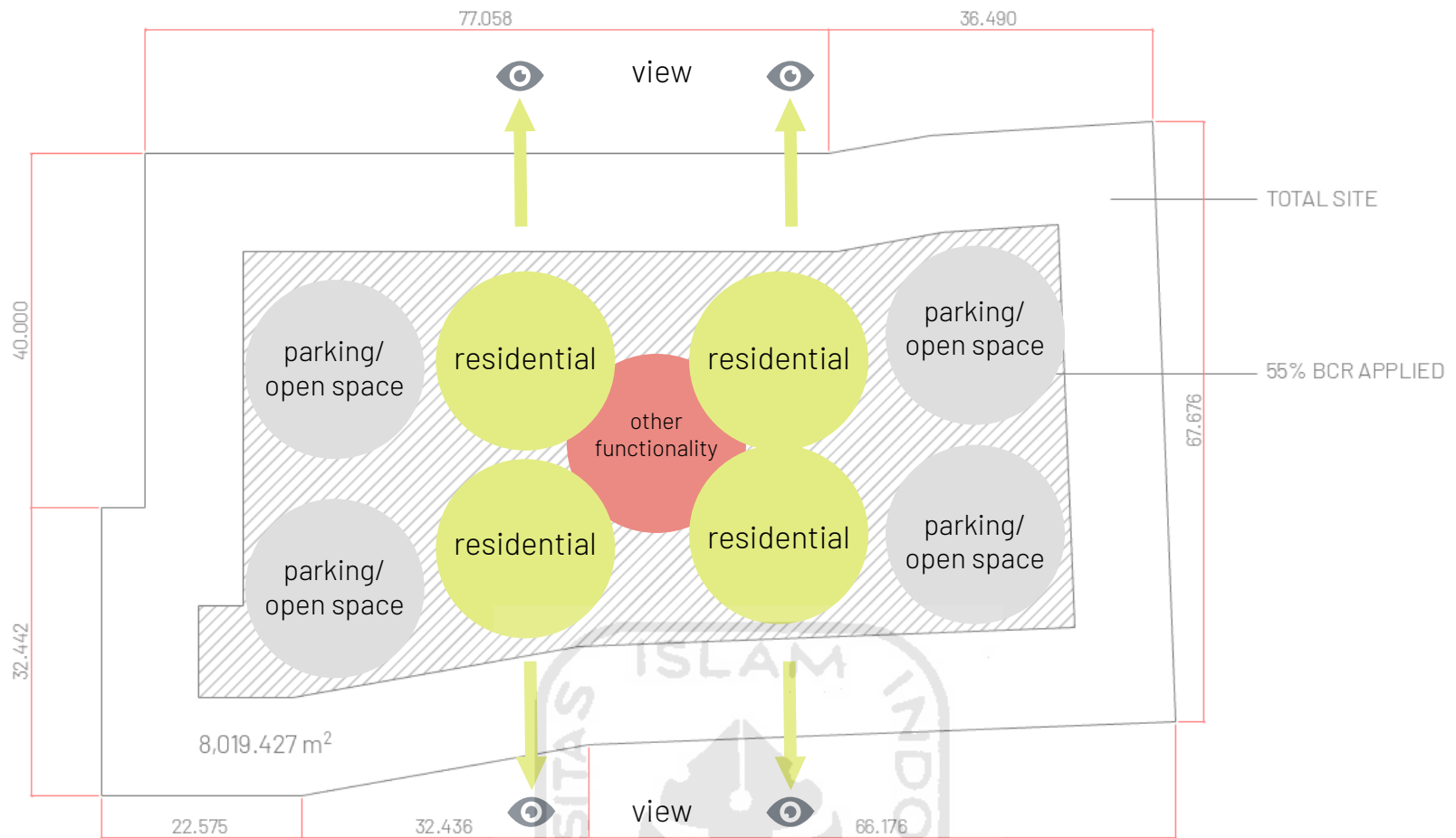
Dwelling space in the second floor, accessible by the private stair on each side of the unit. First-level story as shops/personalized space can be directly be accessed from the facade. Types of fixture and opening follows the needed space configuration type chosen by the unit owner.

First-level story is accessible from the interior, through a stair on the back of the unit. It gives a sense of more security as the owner can go to the first story or in the sense to a 'other unit' without having to go out into the outside environment.

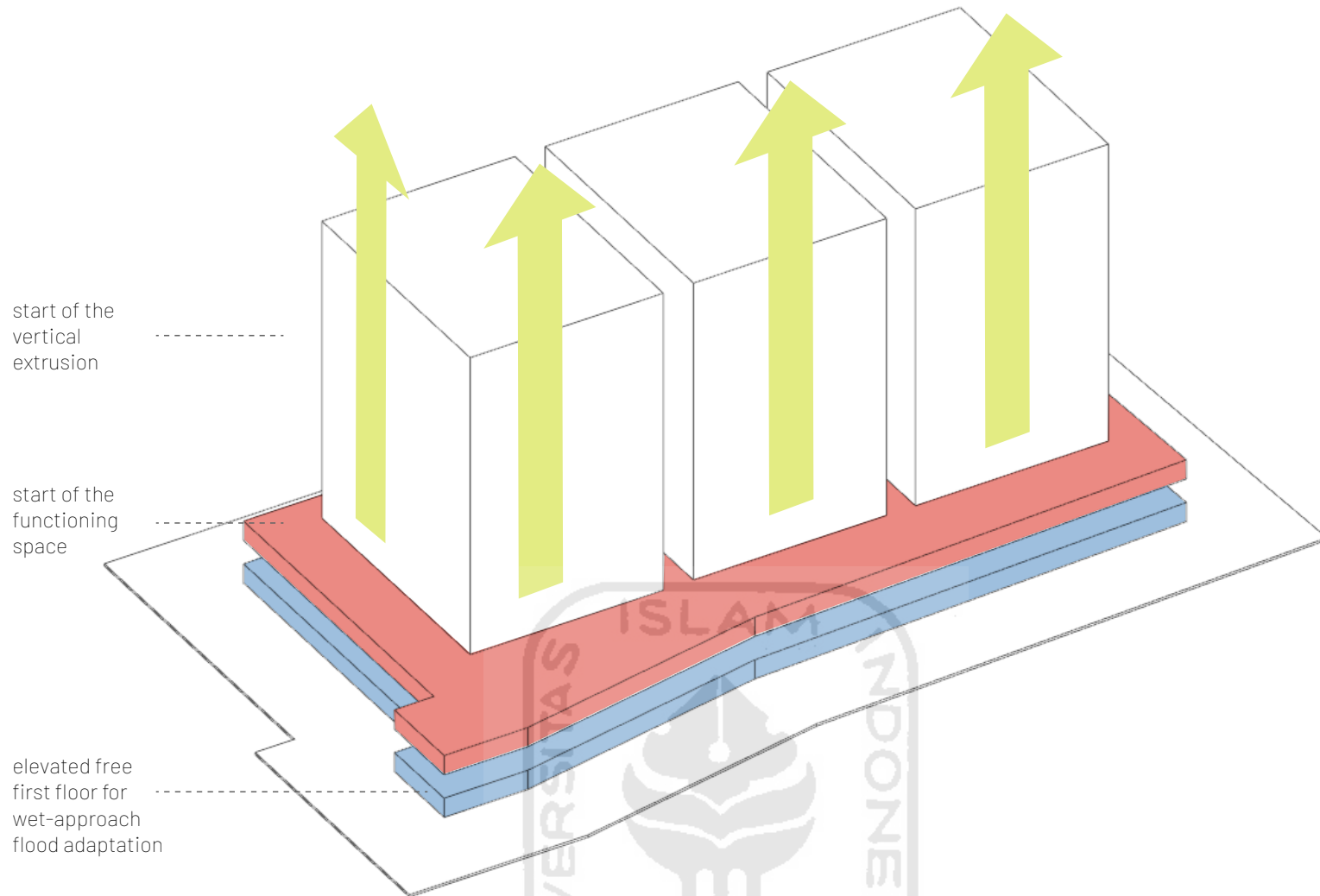


5.5. Site Exploration

When the 55% of Building Coverage Ratio is applied, it gives the total usable building blueprint area of 4.317 square meter, from the total site area of approximately 8.000 square meter. As the only direct access of the site is from the road Jl. Pasar Karet Baru II in the southern boundary of the site, the access will be designed from that direction. The rest three boundaries directly meet the neighbouring kampung in Karet Tengsin, mainly the RT 8 and RT 11 area. It can be brought into the design consideration, as to the facade design and the boundary design, if any expansion is expected in the future and it can translate and swarm flawlessly.

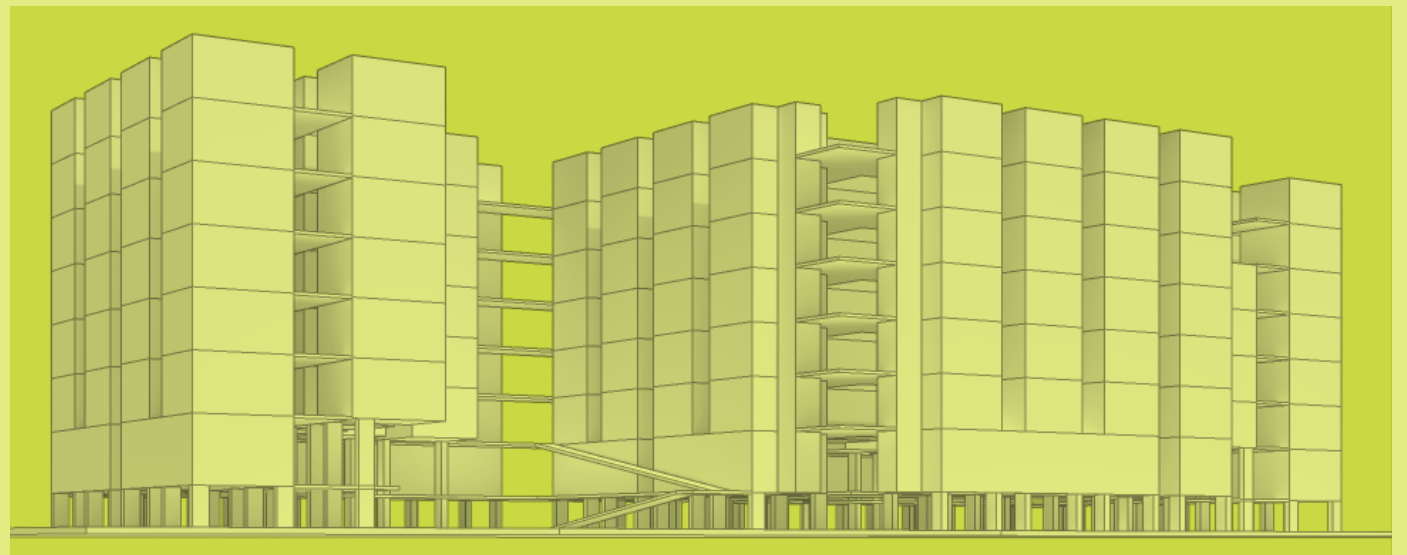
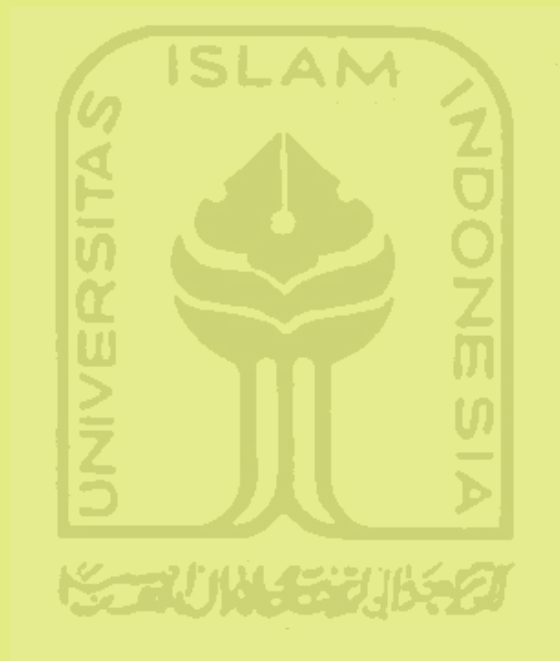


Four main zones that fit for the residential use can be seen in the green circles as it has the most percentage of open view towards both TPU Karet Bivak and TPU Karet (southbound and northbound). It is analyzed that designing the parcel of house-commercial complexes would be better on these four circles while it should not have always follow the rigid symmetry. Because expansions and generations of the vertical kampung is expected towards its surrounding neighbour, it is much preferred to design spaces that are open and does not need enclosed space like parking lot, or any other type of opened space. This to make sure that there will be no explicit rigid boundary that separates the vertical kampung with the neighbouring horizontal kampung surrounding the site. Other functionality such as public facility and resident facility zones can follow the flow of the composition. It only needs to ensure that the circulation from the access to all of those spaces can be easily reached with the most efficient percentage.

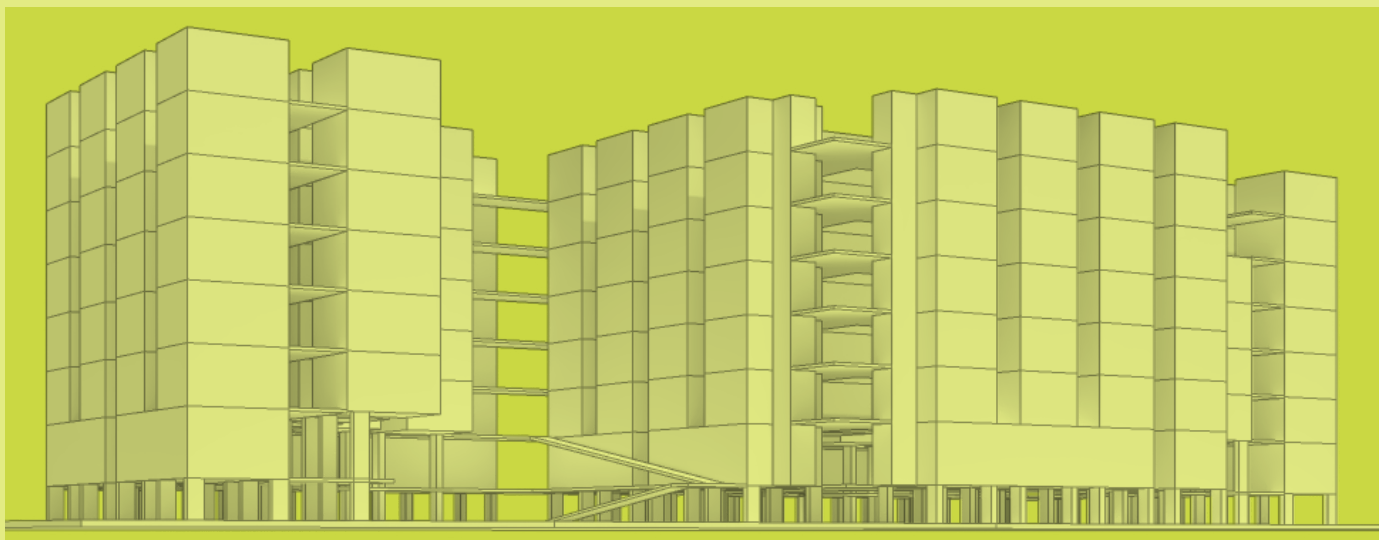
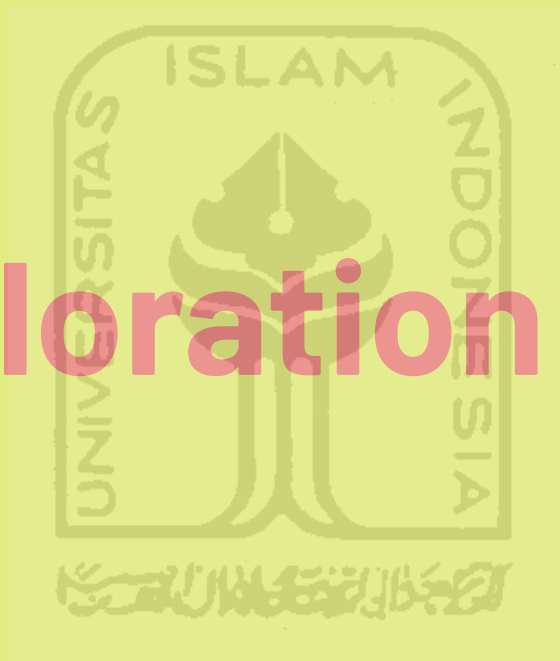


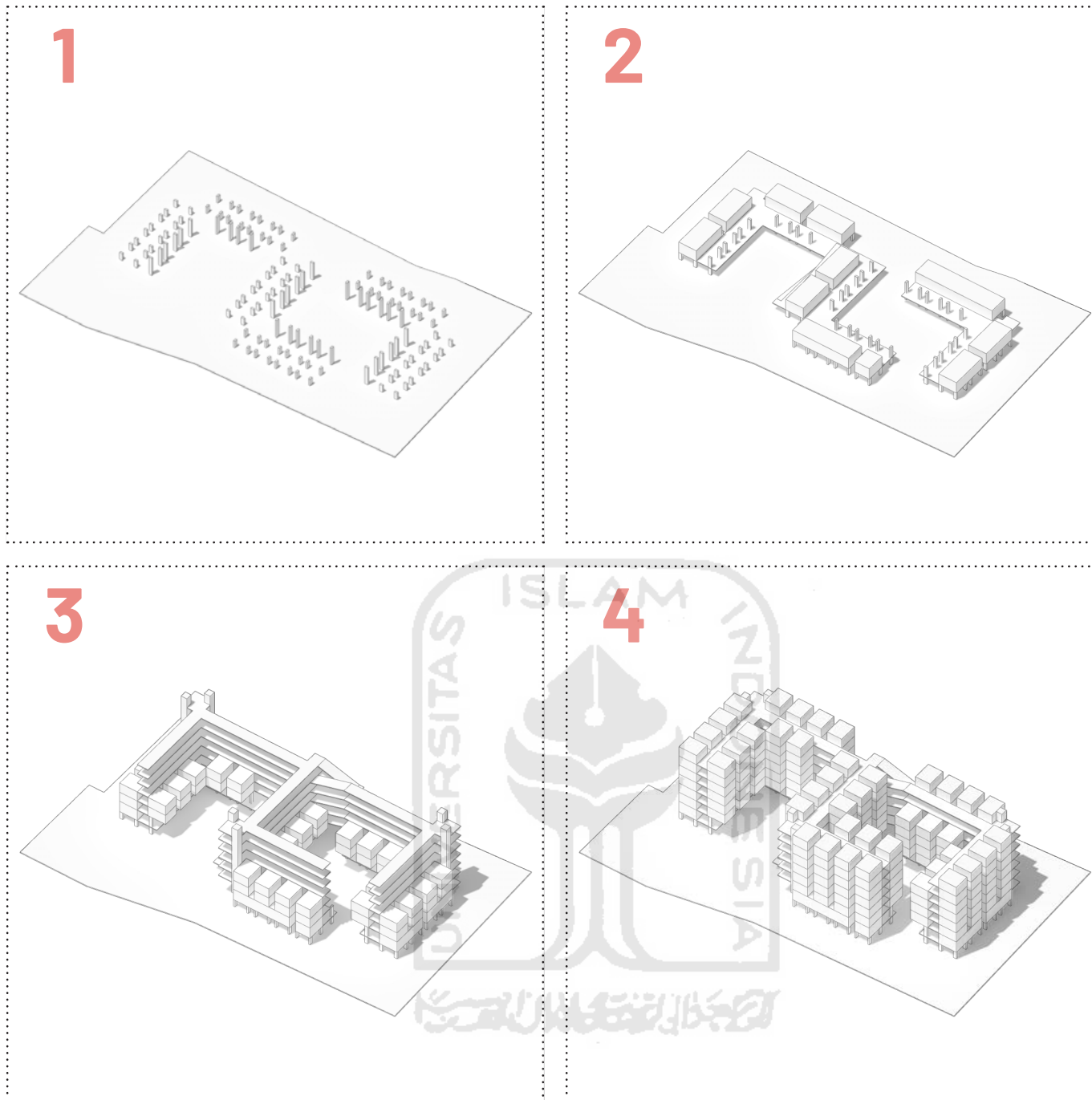
The survey shows that the annual flood in the area is inevitably caused from the city's inadequate space to hold the body of water, added with the delivered flood mainly from Bogor. No causes or problems came from sanitary or trash problem, which shows that the kampung's low inclined location is what makes the flood happens every year. Thus, the design should make the people adapt to the flood without disturbing their daily normal and activities. The first attempt is to make the first story elevated and free from any significant functionality, and start the functioning spaces from the second story. By this, it helps maintaining the kampung's cog of daily activities working from one of the main threat in the location.

2.6. design exploration



exploration 1



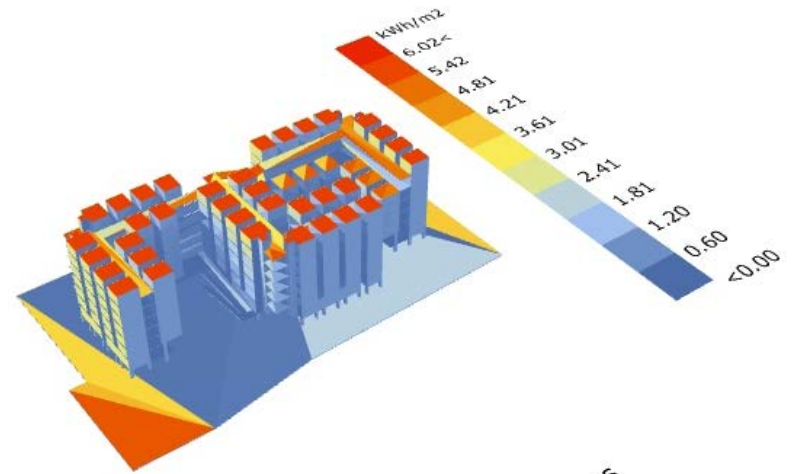


Parti Diagram & Massing Steps

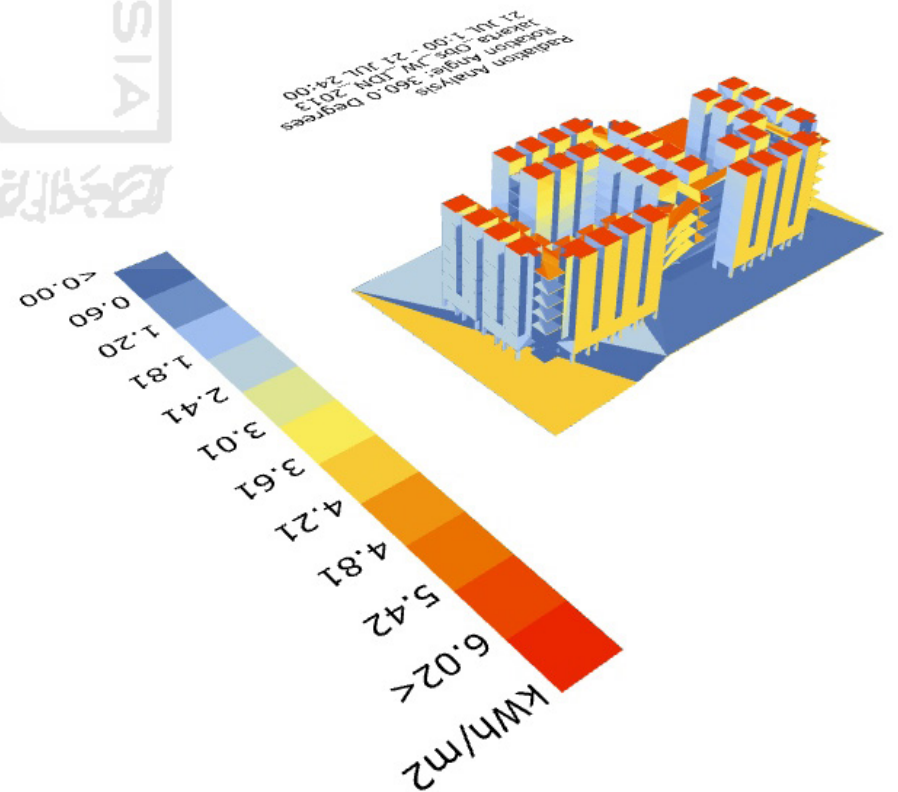
1. Main structural column as the basis, elevated one level to provide wet-solution flood adaptation.
2. First story after the elevated flood story acts as the service, and public facility zone.
3. Circulation including the standardized COVID-19 corridors, skywalk, stairs, and ramp, connected throughout the whole housing-shop complex.
4. Vertical multiplication of the housing units upwards, imitating the informalities of kampung's shop alley, and streets.

Radiation and Dry Bulb Temperature Analysis

1. Sun radiation simulation done through grasshopper-ladybug software, showing the kWh/m² on each mesh surface from the hottest point of the year. False-color study can be seen from the figure, showing that this first composition can be considered as safe, and quite comfort for the housing units because no significant false color is visible on the house unit surfaces. Red color that indicates +5 kWh/m² only visible on the roof-top area, and orange color is shown at the highest story as the shading has not been designed.
2. Simulation result, viewed from the northern-side of the building. Major light orange-yellow mesh surfaces are visible on some units. While it reaches the yellow false color, it is much less worrying than the second exploration's higher average yellow-orange false color. To be noted that this radiation will be tackled further in the facade design and the material selections.



Dry bulb radiation analysis using Rhino-Grasshopper-Ladybug

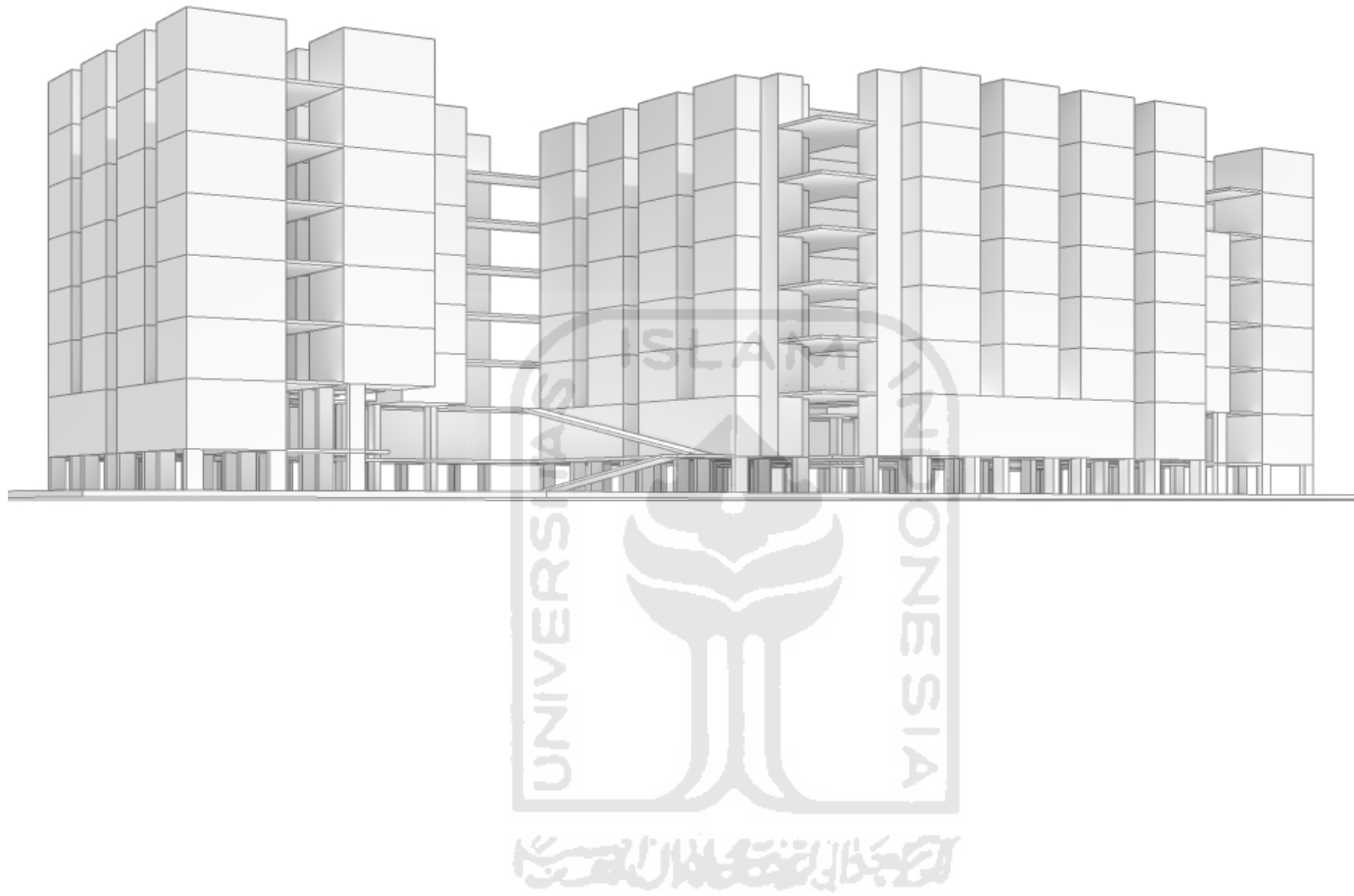


Dry bulb radiation analysis using Rhino-Grasshopper-Ladybug



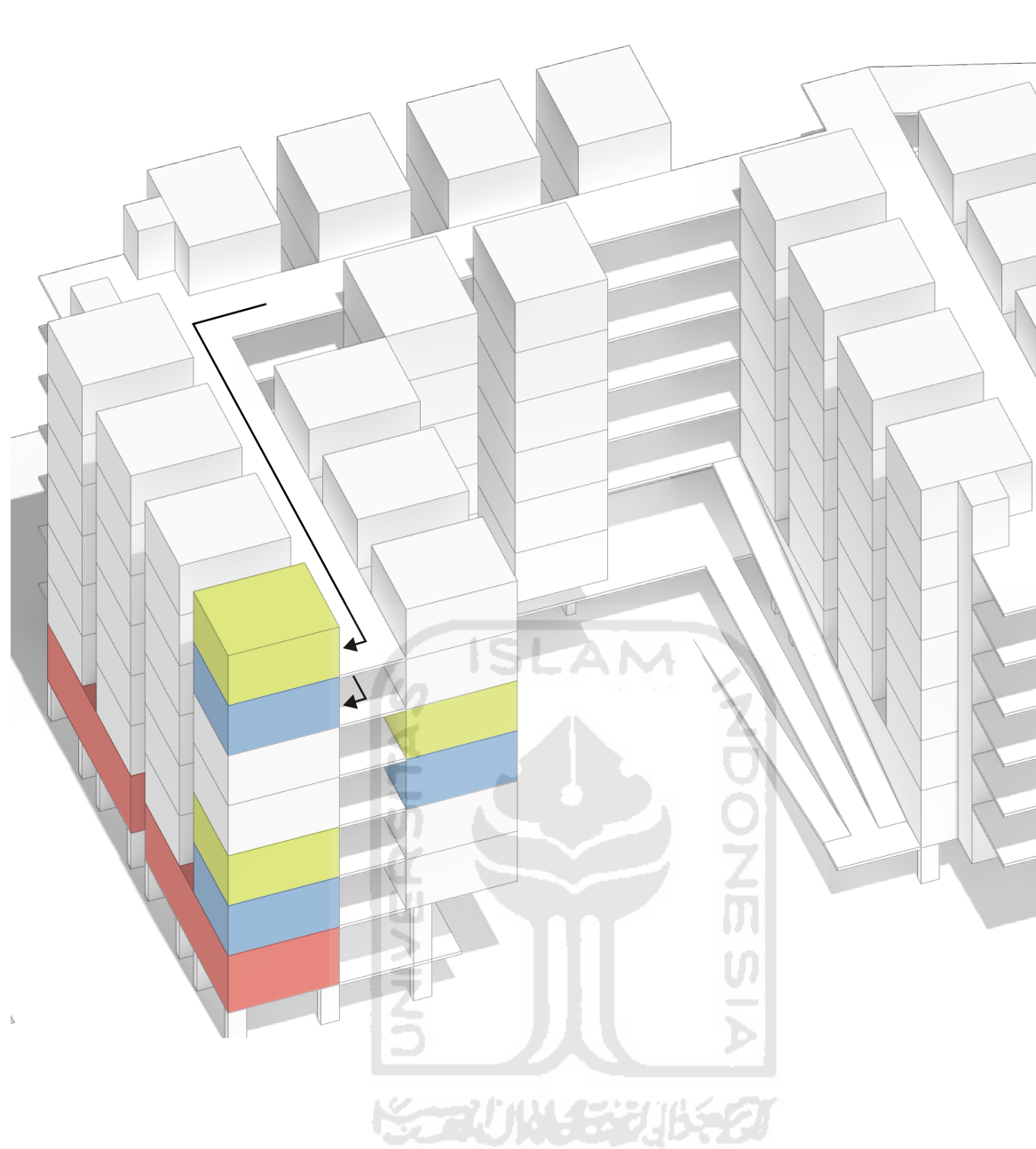
Distributed Housing Complex

House complexes are spread into six main complex. The house complex touches the smaller scale of distributed network theory, that mixes both the housing and local small shop complex. It generates a mixed housing-local commercial space, in an attempt to give adaptive resiliency against COVID-19's cluster threats. When one of the complex transformed into a COVID-19 cluster, the whole commercial activity in the building can still operate because the node network is distributed through the whole building.



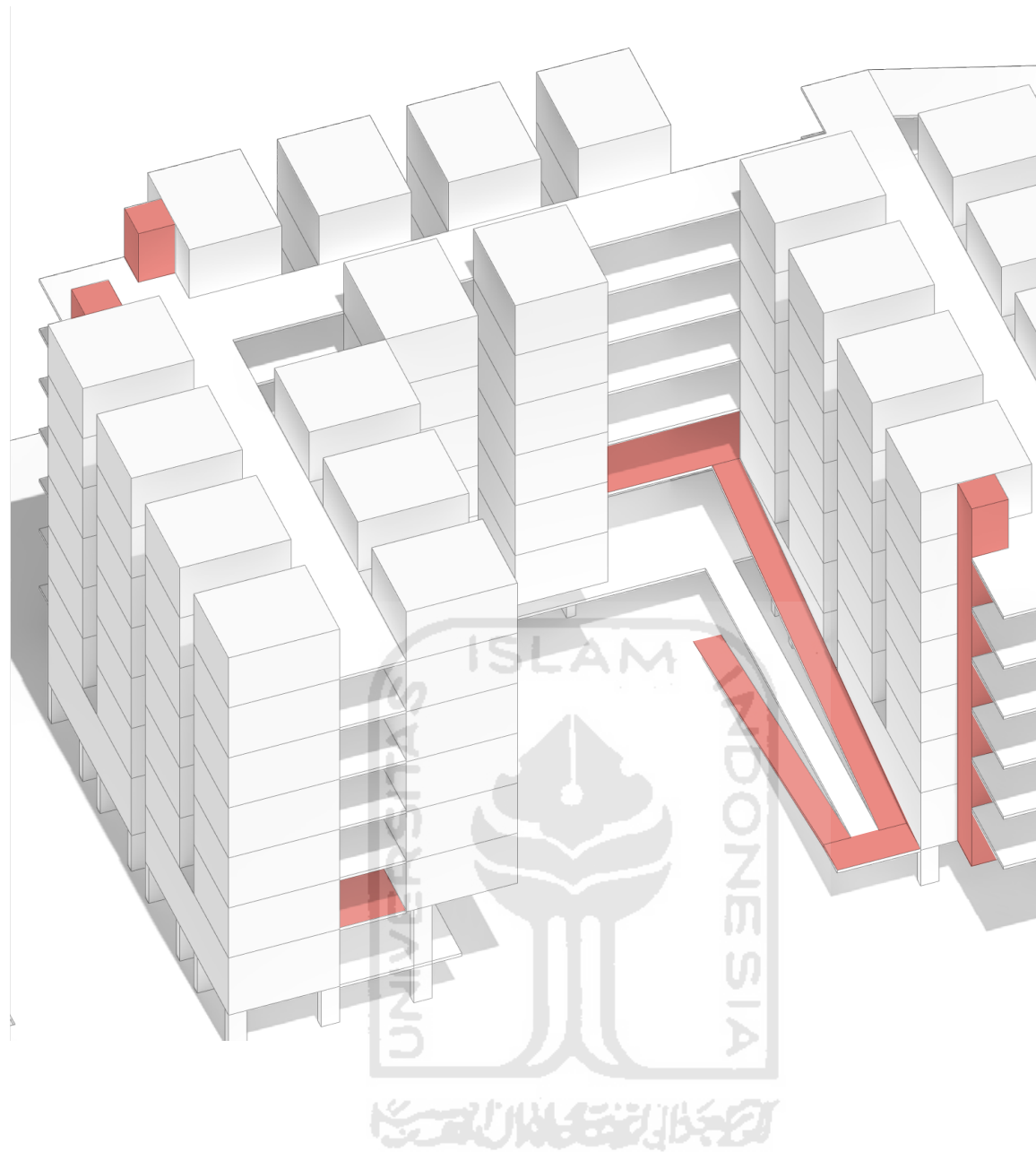
Ambiguous Facade

The complexes are designed to have panarchy facade, giving a sense of a vertical settlement like its previous kampung identity instead of a rigid formalized vertical housing.



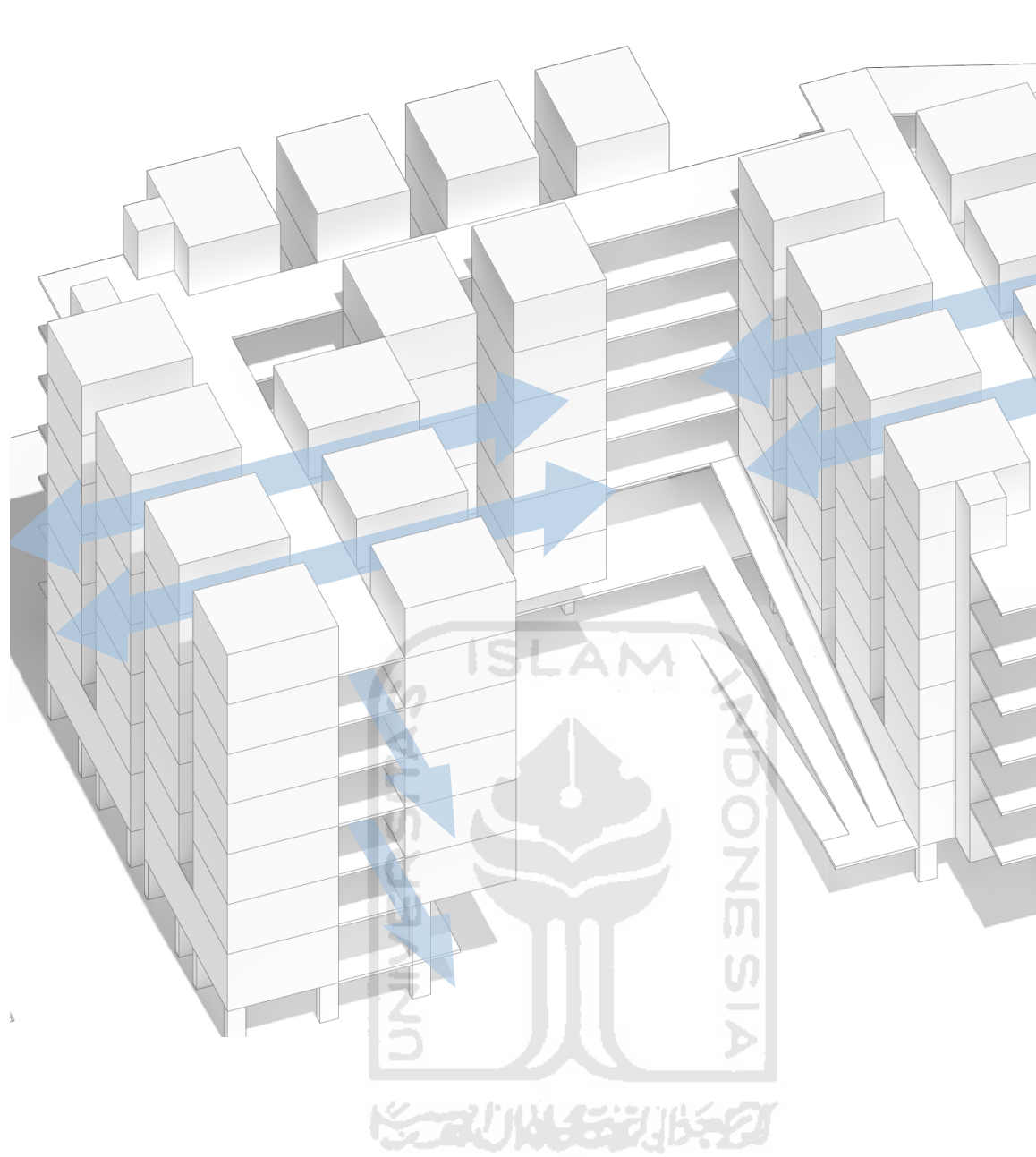
Mixed Zoning

One unit of house consists of a two-level stories that are splitted into two floors. The main dwelling space takes the upper level, whilst the lower level follows the need of the occupant, as it can be used for shops, or other intended functionality.



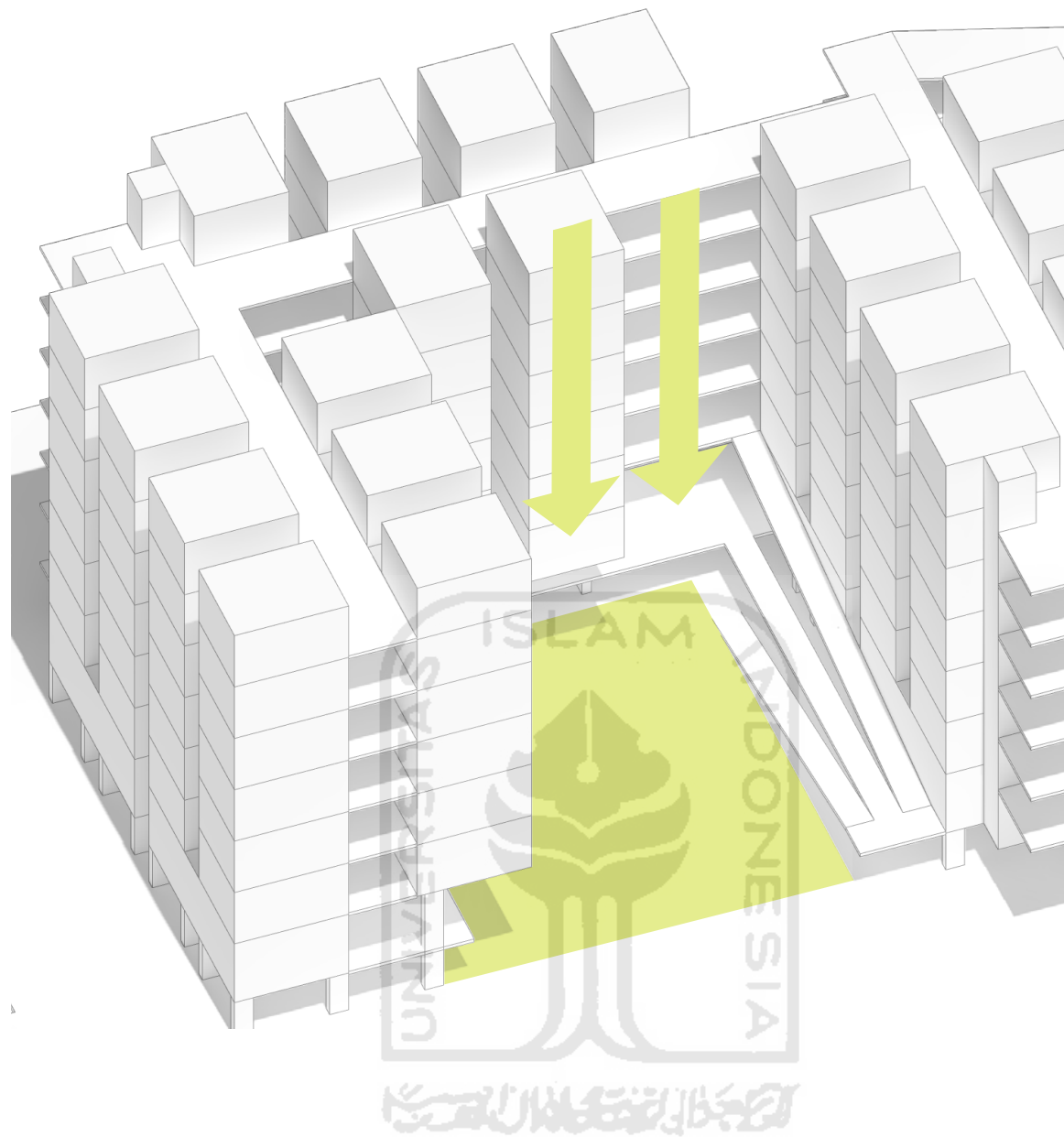
Seamless Corridor & Circulation

Seamless corridor adapts the concept of the kampung's informal threshold space and narrow alleyway connections. But the 'alley' is standardized into the COVID-19's social distancing measure, providing inclusive access that can be safe and reduce the risk of the virus spreading.



Unobstructed Air Ventilation

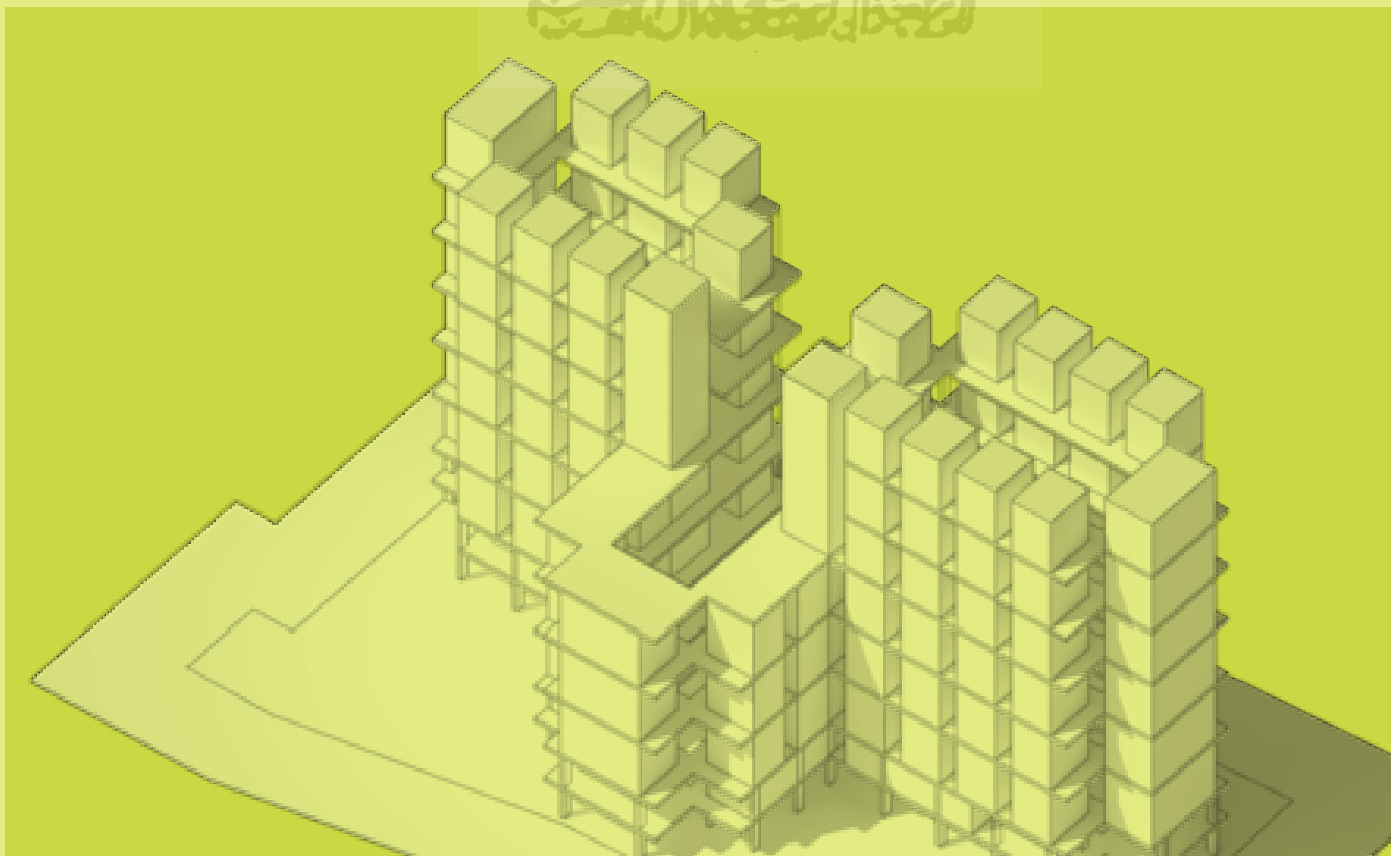
Gaps between each unit provides two functions. First, it allows the air to be let through, providing better air circulation on each hall of each story. Secondly it gives better sense of security and privacy for each unit as it is separated physically with their neighbours, especially in times like COVID-19 context.

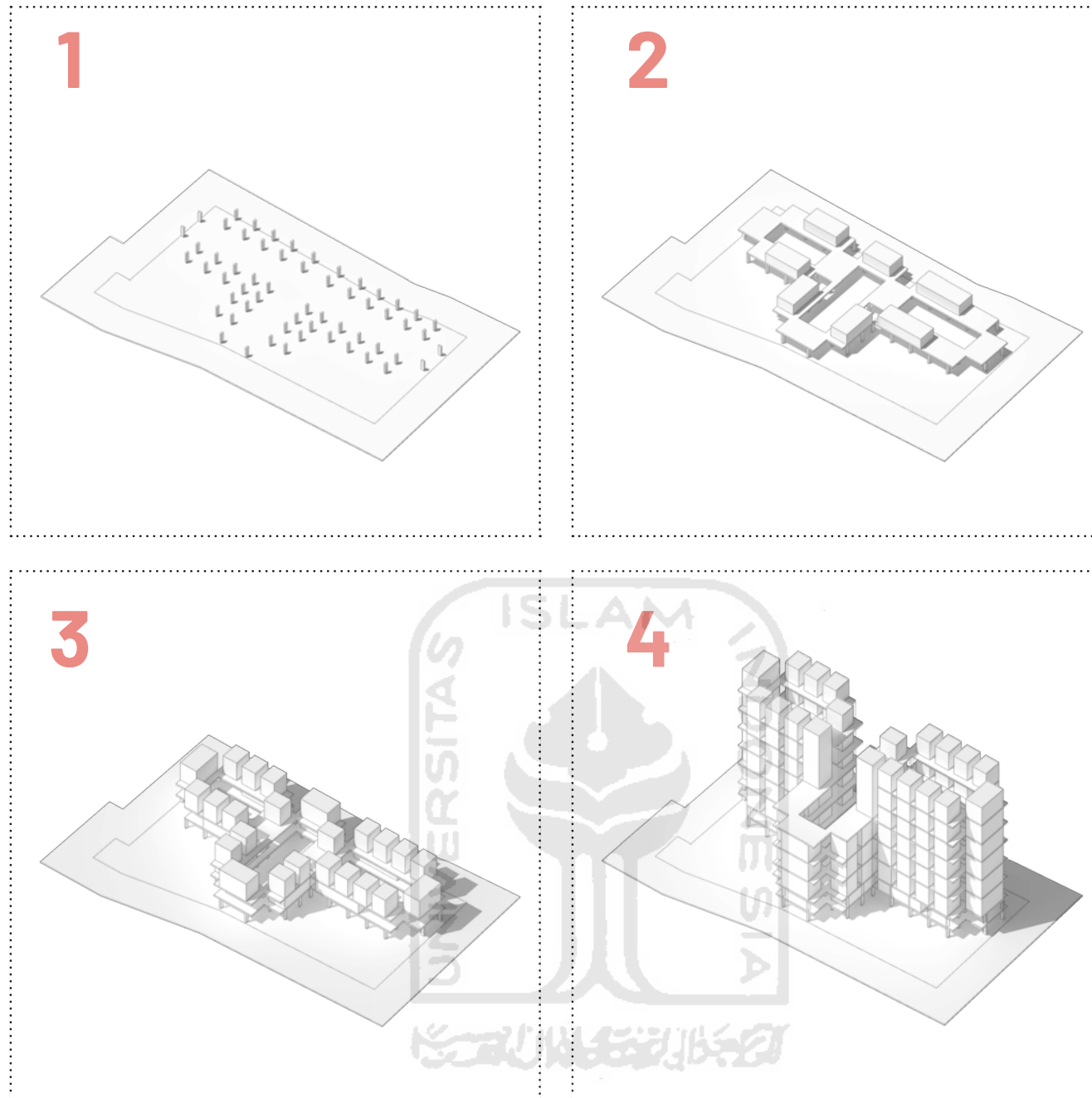


Distributed-but-centralized Green Area

Green park area that can be enjoyed and used by each complex to promote the openness, green-based design to increase the overall environmental and physical health for the occupants and visitors.

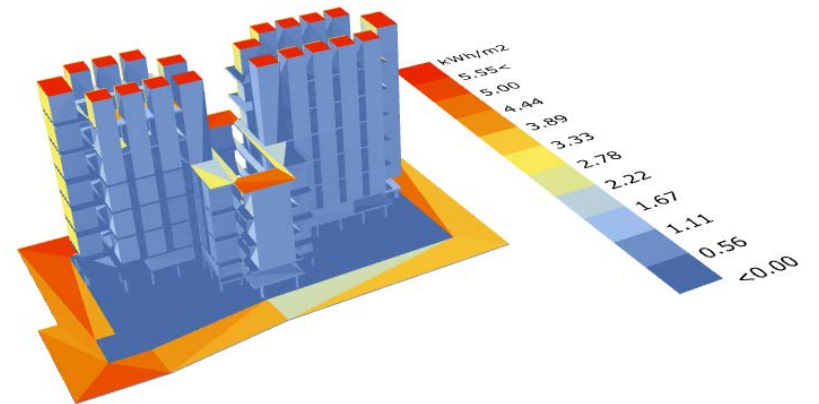
exploration 2





Parti Diagram & Massing Steps

1. Main structural column as the basis, elevated one level to provide wet-solution flood adaptation.
2. First story after the elevated flood story acts as the service, and public facility zone.
3. The same module of housing units are placed directly on top of each existing mass
4. Next-floor units are placed directly on top of each units, making the second-story dwelling space can only be access by private stairs that are located between each units.

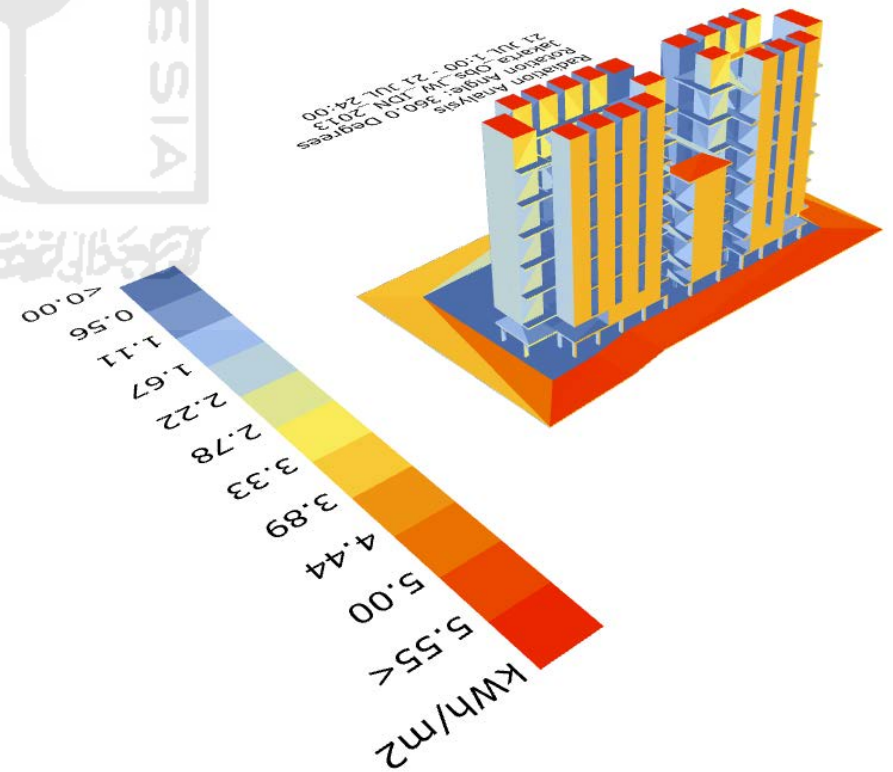


Radiation and Dry Bulb Temperature Analysis

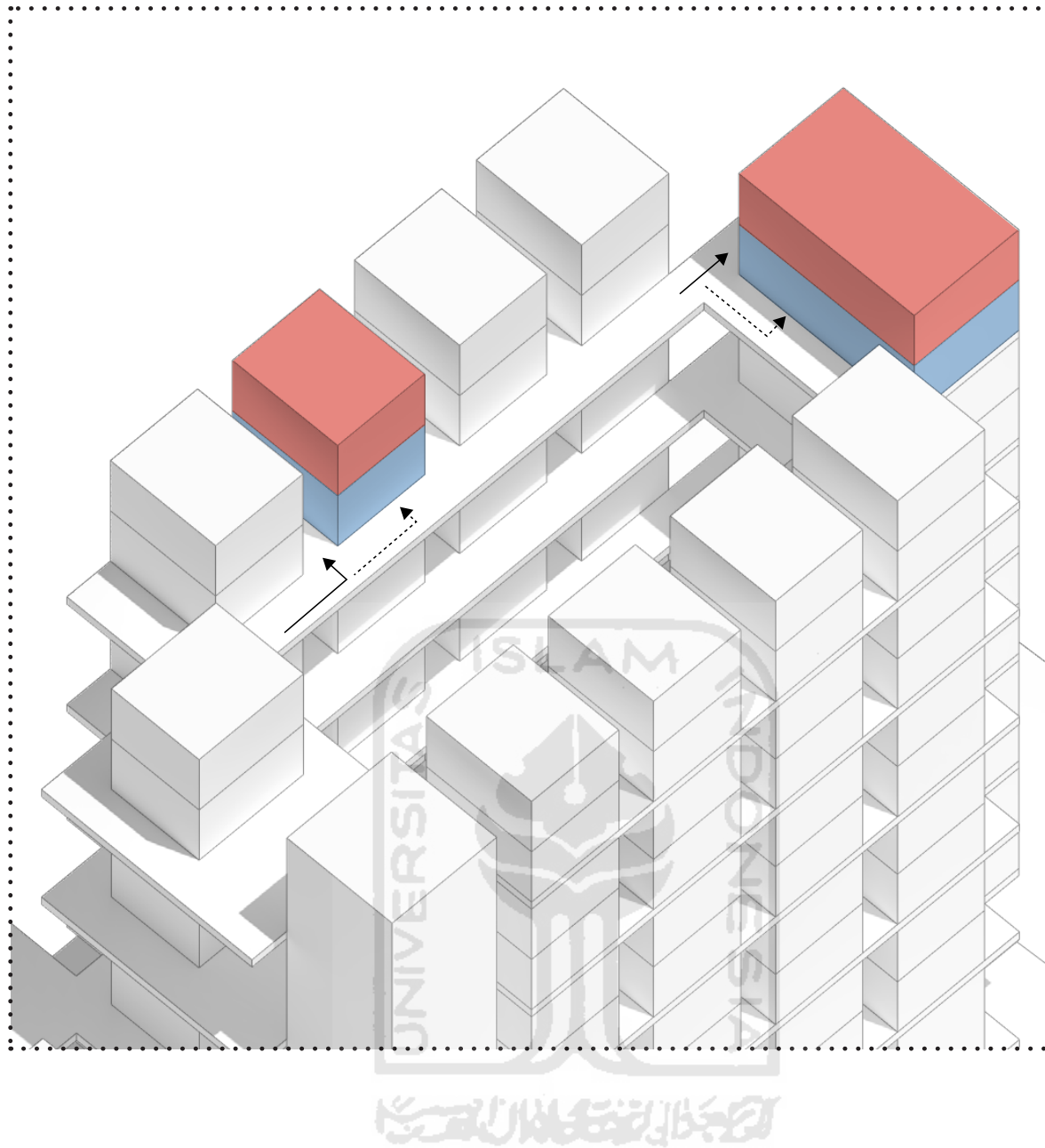
1. Sun radiation simulation done through grasshopper-ladybug software, showing the kWh/m² on each mesh surface from the hottest point of the year. False-color study can be seen from the figure, showing that this second composition has slightly higher average radiation from the orange false color on the northern side.
2. Simulation result, viewed from the northern-side of the building. Major light orange mesh surfaces are visible on some units. It hits the 4 kWh/m² average mark for the northern side, making the first alternative much preferable in terms of its passive composition.

Radiation Analysis
Rotation Angle: 360.0 Degrees
Jakarta_Obs_JW_IDN_2013
21 JUL 1:00 - 21 JUL 24:00

Dry bulb radiation analysis using Rhino-Grasshopper-Ladybug

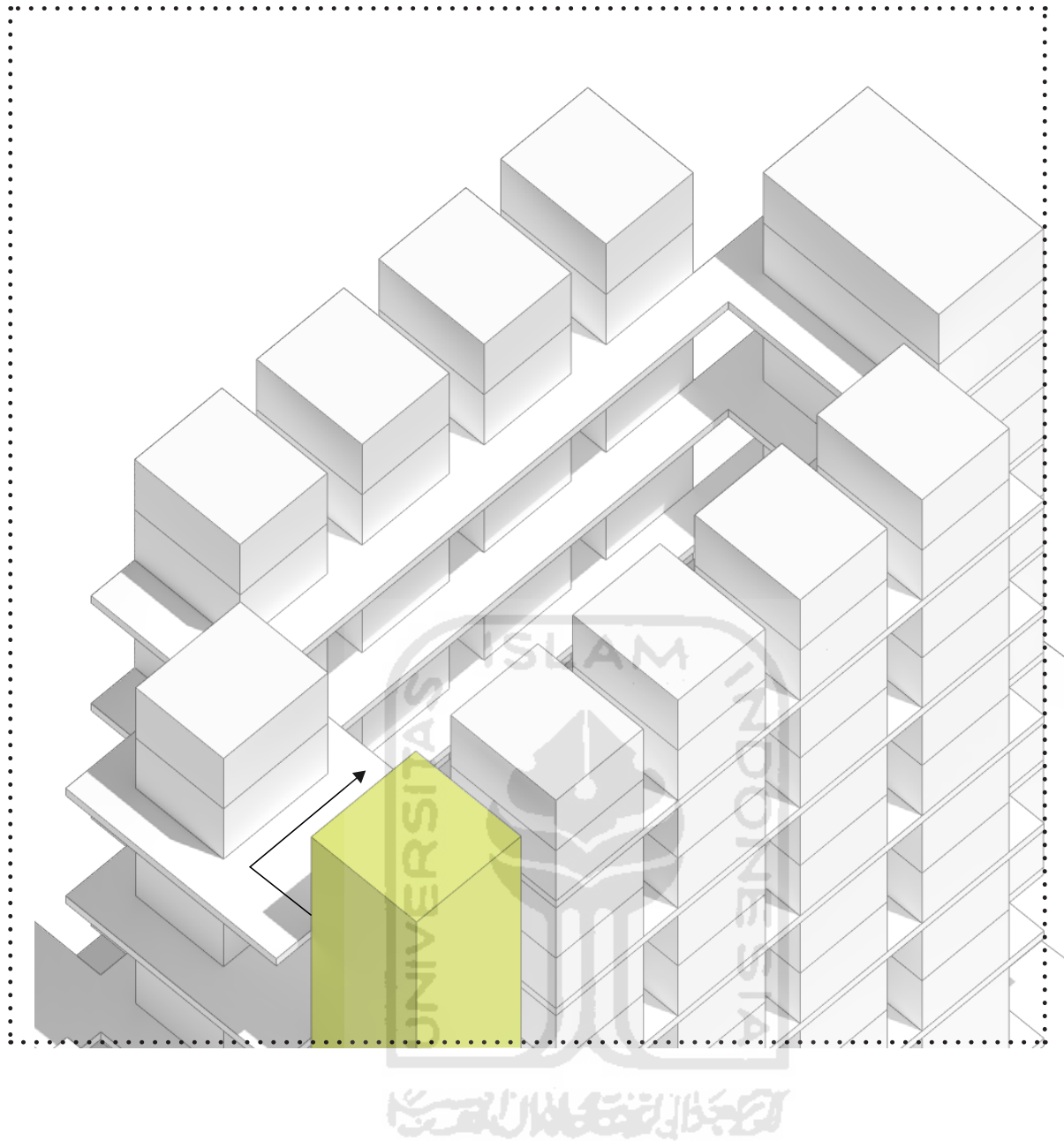


Dry bulb radiation analysis using Rhino-Grasshopper-Ladybug



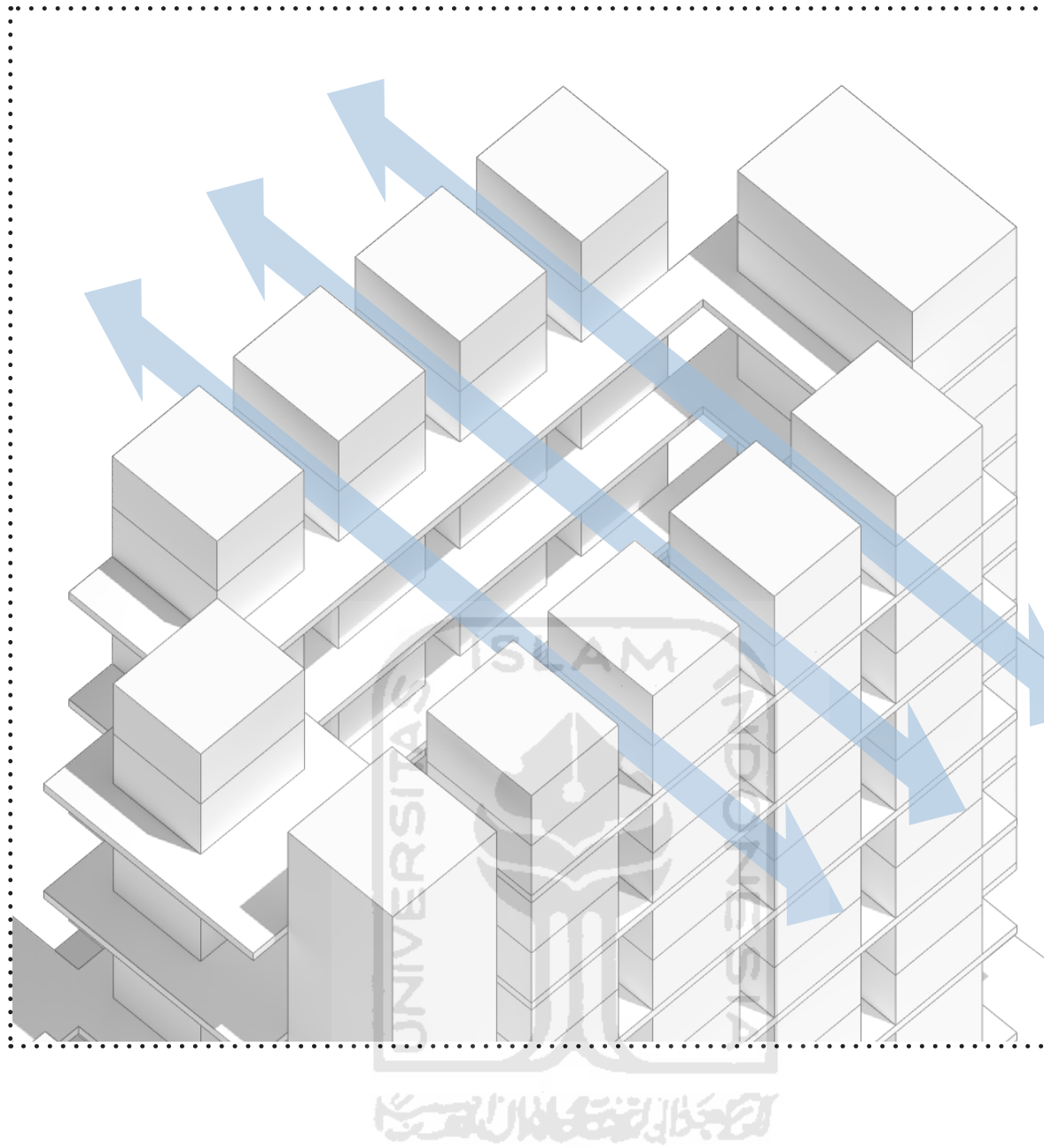
Elevated Dwelling Space

While it has the same module of housing units, the access can only be accessed with private stairs beside each unit. The main corridor can only access the lower-level story of shops and personalized space. Each occupant can go downstairs through their units' interior stair.



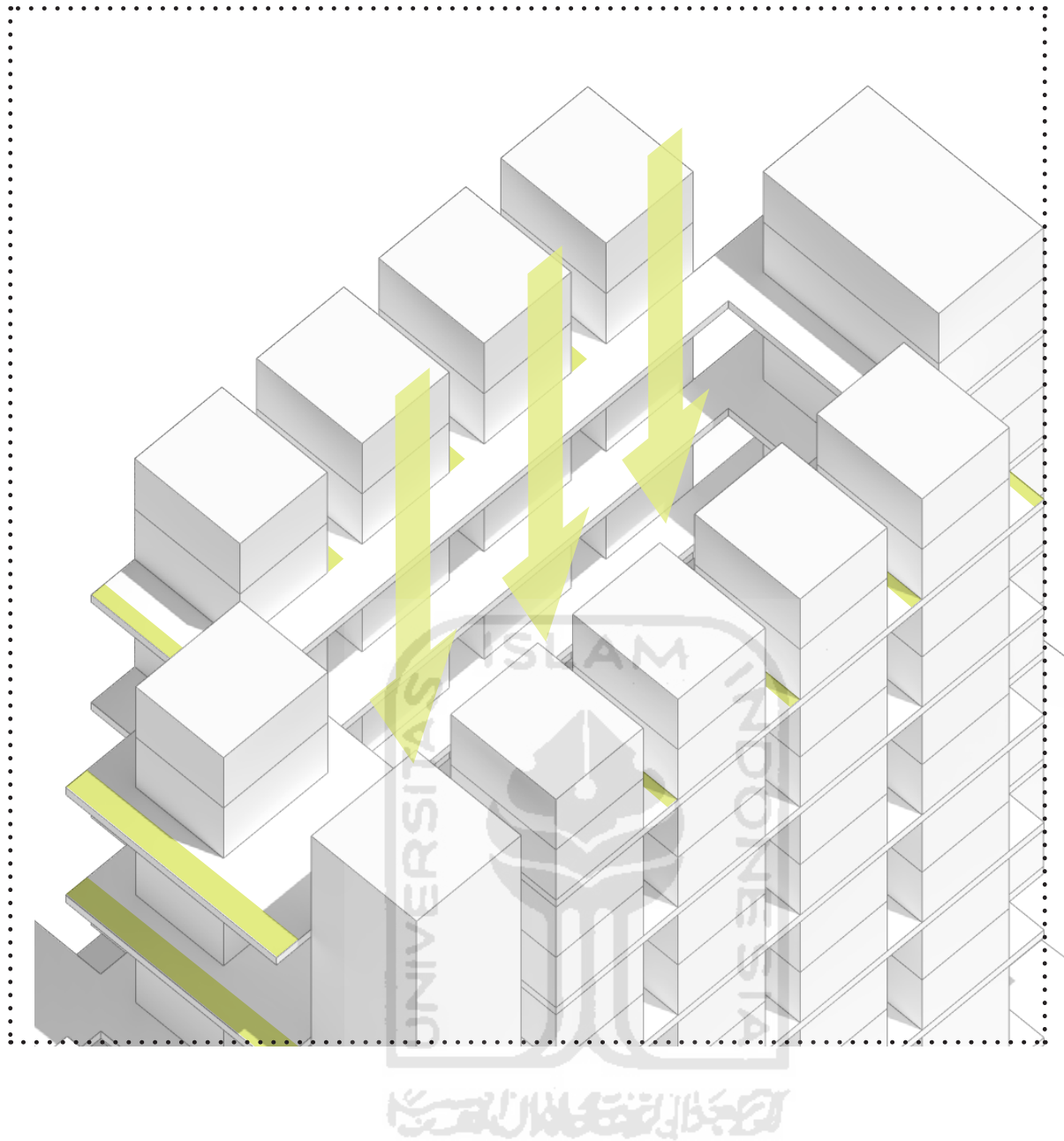
Connected Corridors and Vertical Transportation

Connected circulation and vertical transportation, maintaining the inclusivity and connectivity throughout the whole vertical kampung.



Gaps in-between Units

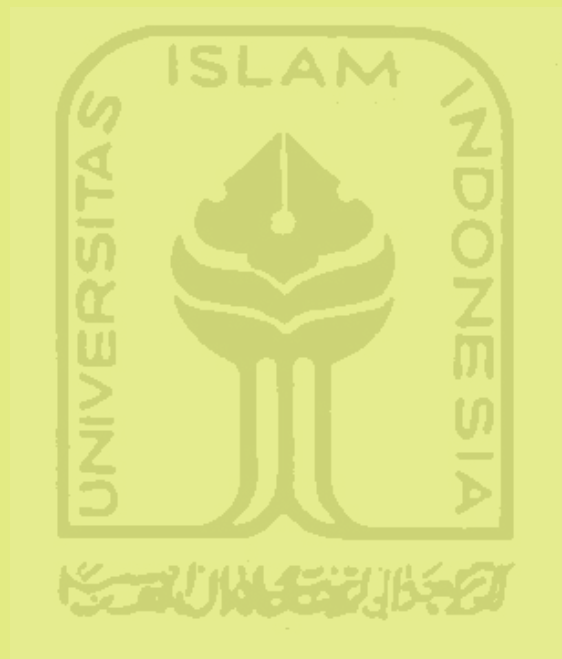
The same gaps between each unit, letting the natural air go through, and increasing the sense of security and privacy. It also acts as the space for each private access stair to each dwelling unit on the second floor of the unit.



Distributed-but-centralized Green Area

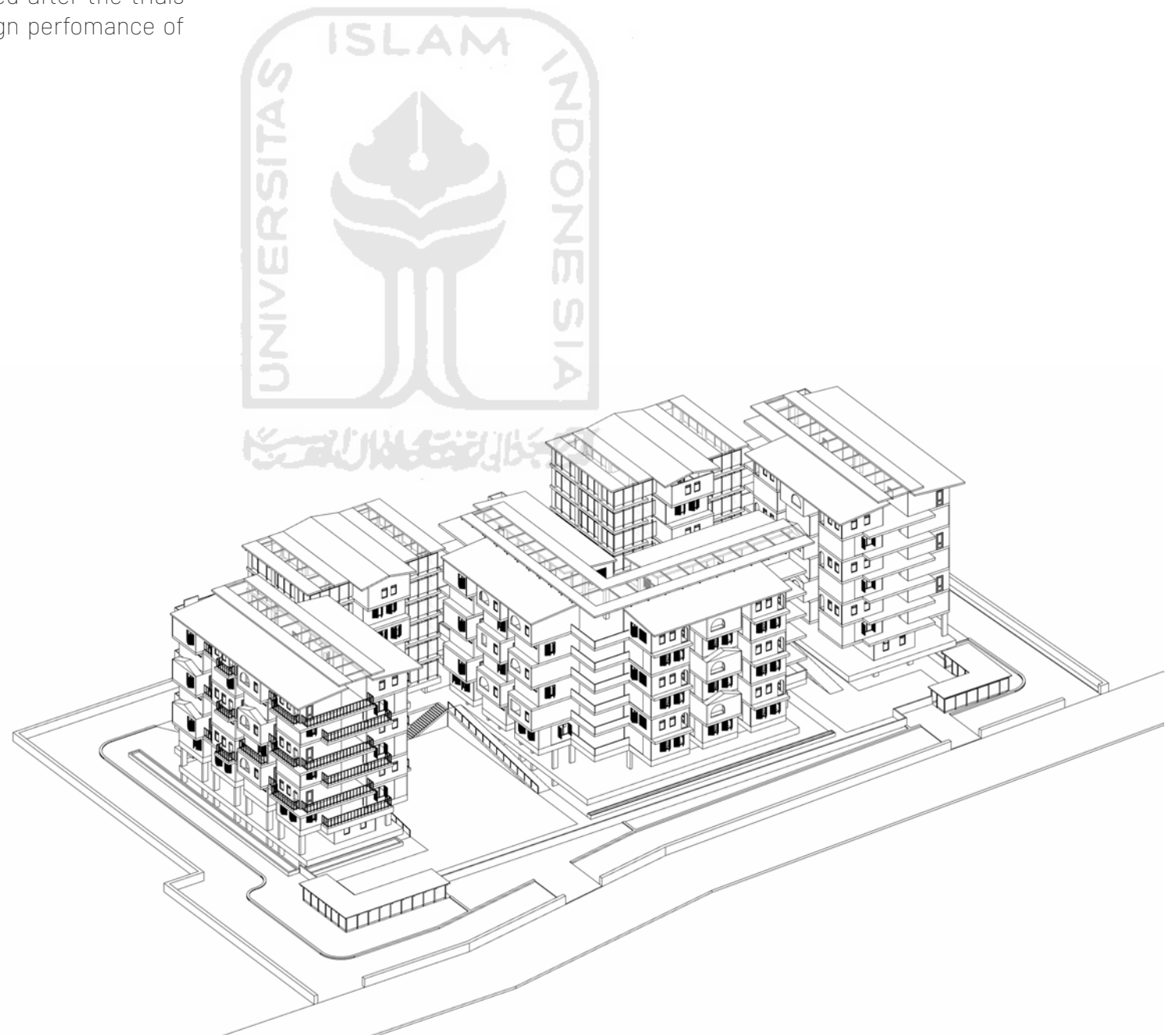
Open green park circled by the housing complex to promote the healthy environment and physical health in general. Can be enjoyed by all of the units through the visual medium as the reliever of this new-normal culture that depends mainly on electronic screen.

2.7. finalized schematic



Finalized Form

The finalized schematic used the first exploration alternative because the testing shows a more promising and better score overall. The design used the basic massing while implementing the connected gable roofs throughout the units, to give shading function while at the same time, acts as the aesthetical part for the building. The material uses everyday's material that the local people often meet in their previous horizontal kampung, including red bricks, concrete, and timber for opening frames. The vegetation connects the spaces, and the spaces are connected by alleys and corridors of vegetation throughout the whole site. The schematic design will then be tested with various simulation including the hermit crab-grasshopper workflow to assess the COVID-19 spatial parameters in the design directly. In future, adapting changes are expected after the trials and tests to improve the overall design performance of the vertical kampung.



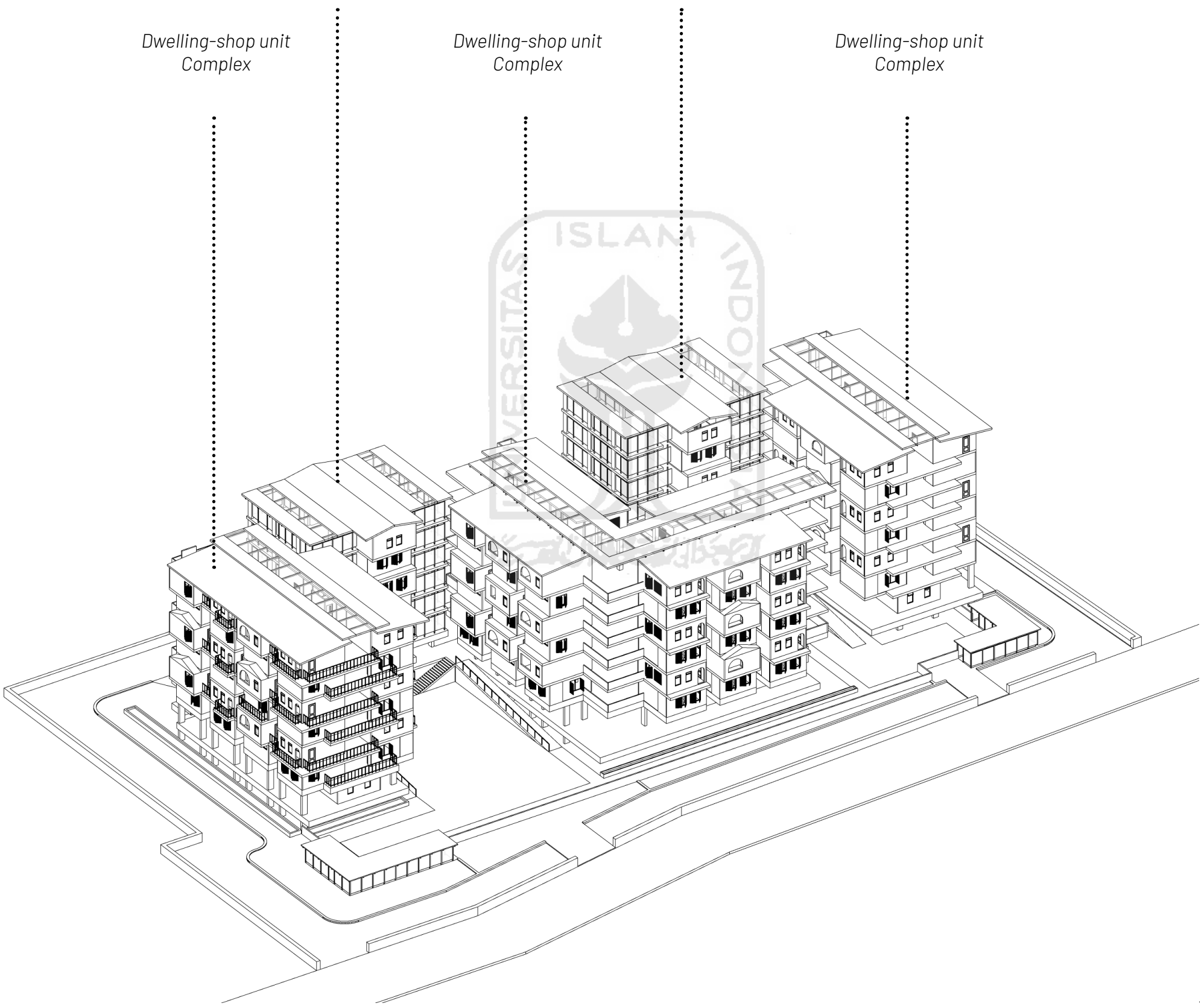
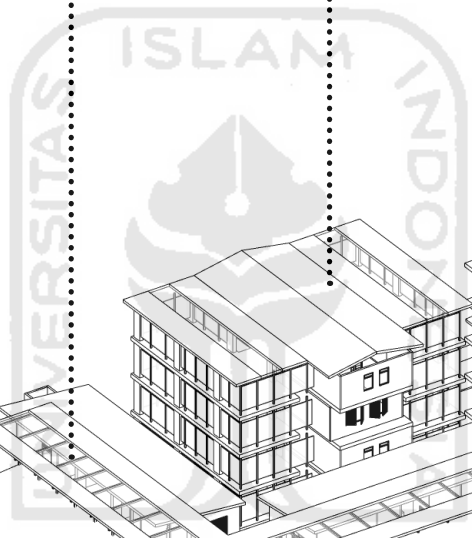
*Dwelling-only unit
& UMKM Complex*

*Dwelling-only unit
& UMKM Complex*

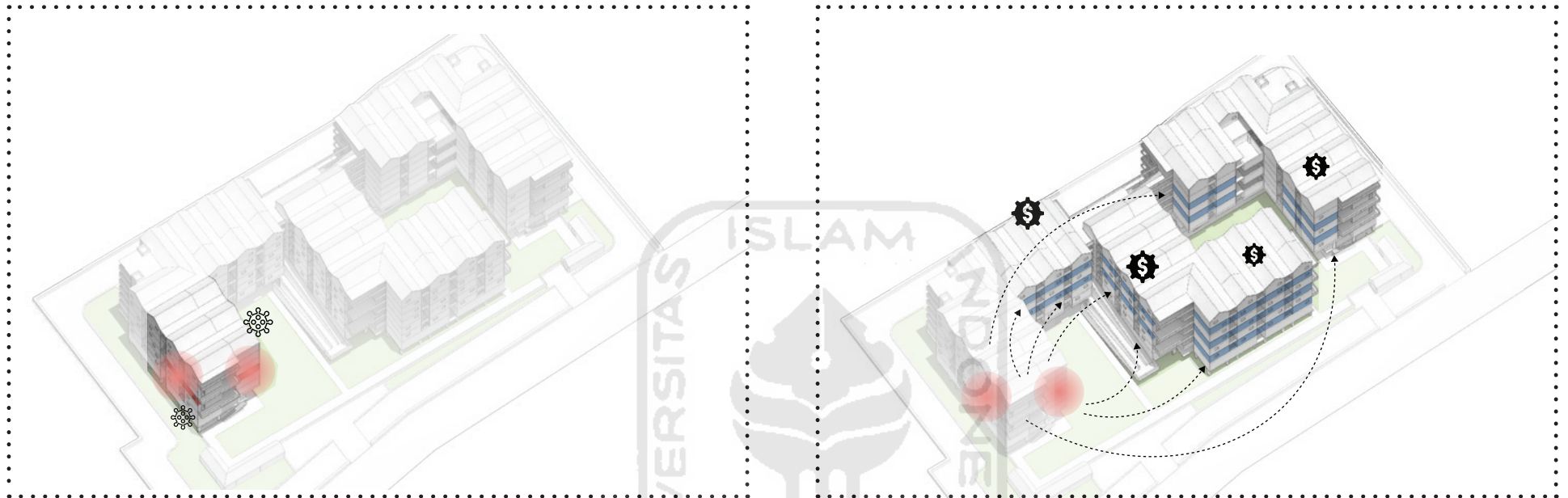
*Dwelling-shop unit
Complex*

*Dwelling-shop unit
Complex*

*Dwelling-shop unit
Complex*



COVID-19 Economy Scenario Example



1

The distributed network concept is applied from the theory into the distribution of the space zoning. Because the commercial and housing zones are distributed throughout the whole building floors and coordinates, it acts as an alternative node for solution in such disturbance of COVID-19. This first step of scenario example shows when a cluster of COVID-19 happens in one of the region of commercial and shop areas on the building, forcing the occupants and sellers on that region to isolate to their home, and postpone the economical activity.

2

By separating and spreading the commercial zone into a couple parcels, those can ensure that the economical activity still run in the midst of a disturbance. From the first stage of COVID-19 cluster, firstly the disturbance will not disturb other parcels' normal state of daily activity. Secondly, the postponed economical actors in the area can find another alternative space to do their enquiries as another alternative economical spaces are provided in the building. This is one of the attempt example in providing intangible adaptive resiliency for the people, that can be applied to other type of disturbance also.

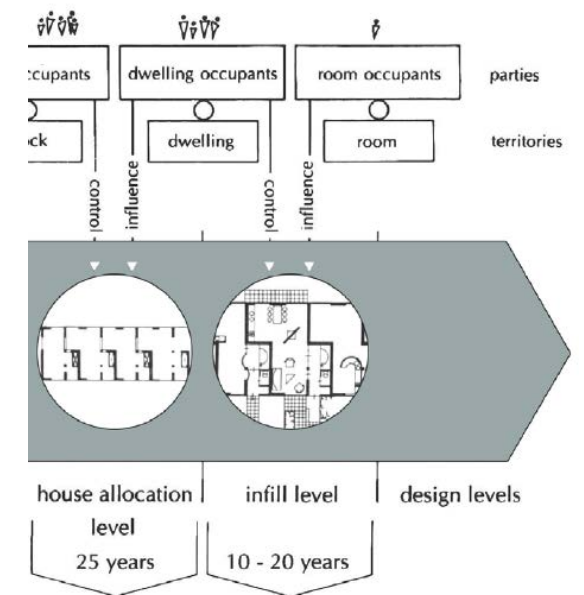
Separation of Outside-Inside Screening



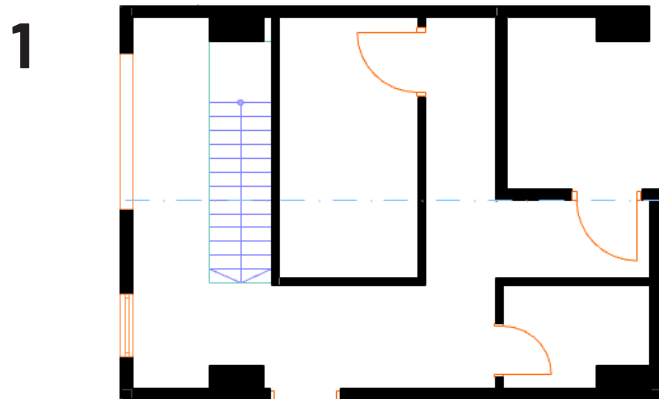
Every entrance toward the site is halted with transitioning buildings acting as the threshold space to screen and help the data-collecting purpose in times of COVID-19. Reflecting back to the past kampung's hurdle in collecting data regarding COVID-19, this attempt tries to make it more clear and sound for the task force to archive and collect the data. If the context changes (when COVID-19 has gone), the building can be reused for other purposes like the security post, or posyandu, provided by the space's ambiguity and unnarrowed into a certain type and function.

Semi-open-building Infills

Semi-open building means giving the allocation and infill spaces to the occupants need, while the existing support level structure has been provided. Varieties in infill level is possible, with the mere limitation of each unit area. This would also affect the overall vertical kampung's facade because the occupants have freedom in choosing the materials used for the fixtures. Most of the case would also be about upcycling their old opening frames from the previous horizontal kampung. Example of variety of infill space can be seen on below's second-story dwelling space option and the first-story multi-purposed space.

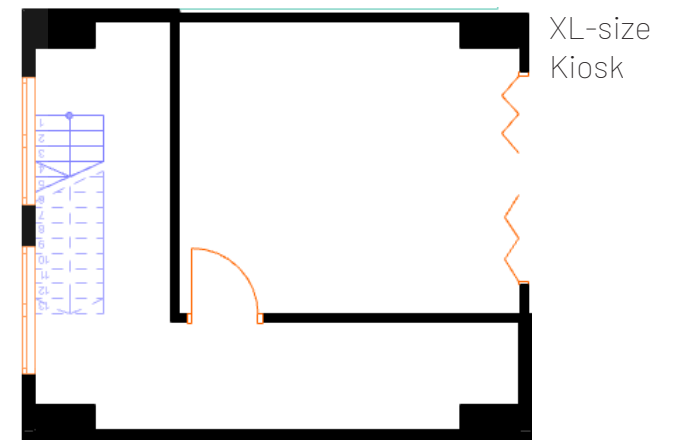


Dwelling space option (second floor)

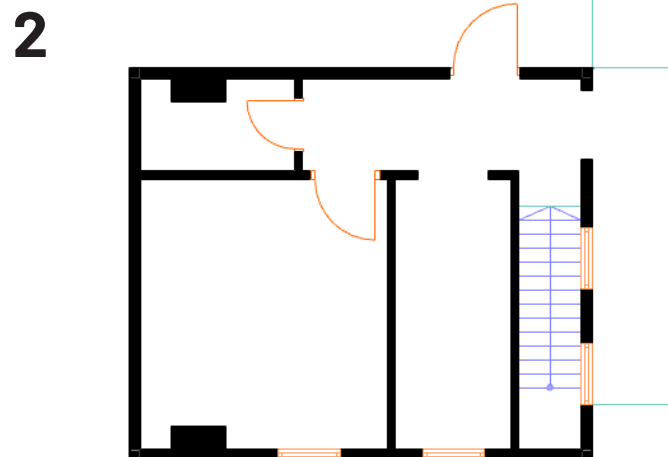


One master bedroom with one elongated workspace and terrace

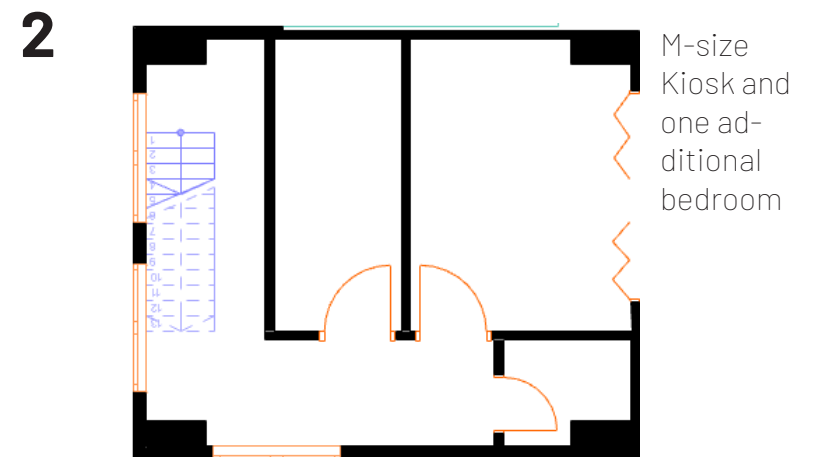
Commercial space option (first floor)



XL-size Kiosk



2 Bedroom with additional balcony



M-size Kiosk and one additional bedroom



Render 1

Integrated pedestrian pathway and separated from the vehicle parking lot, giving direct access to the screening facilities. The screening can be easily adaptive-reused for other purposes in post-covid era.

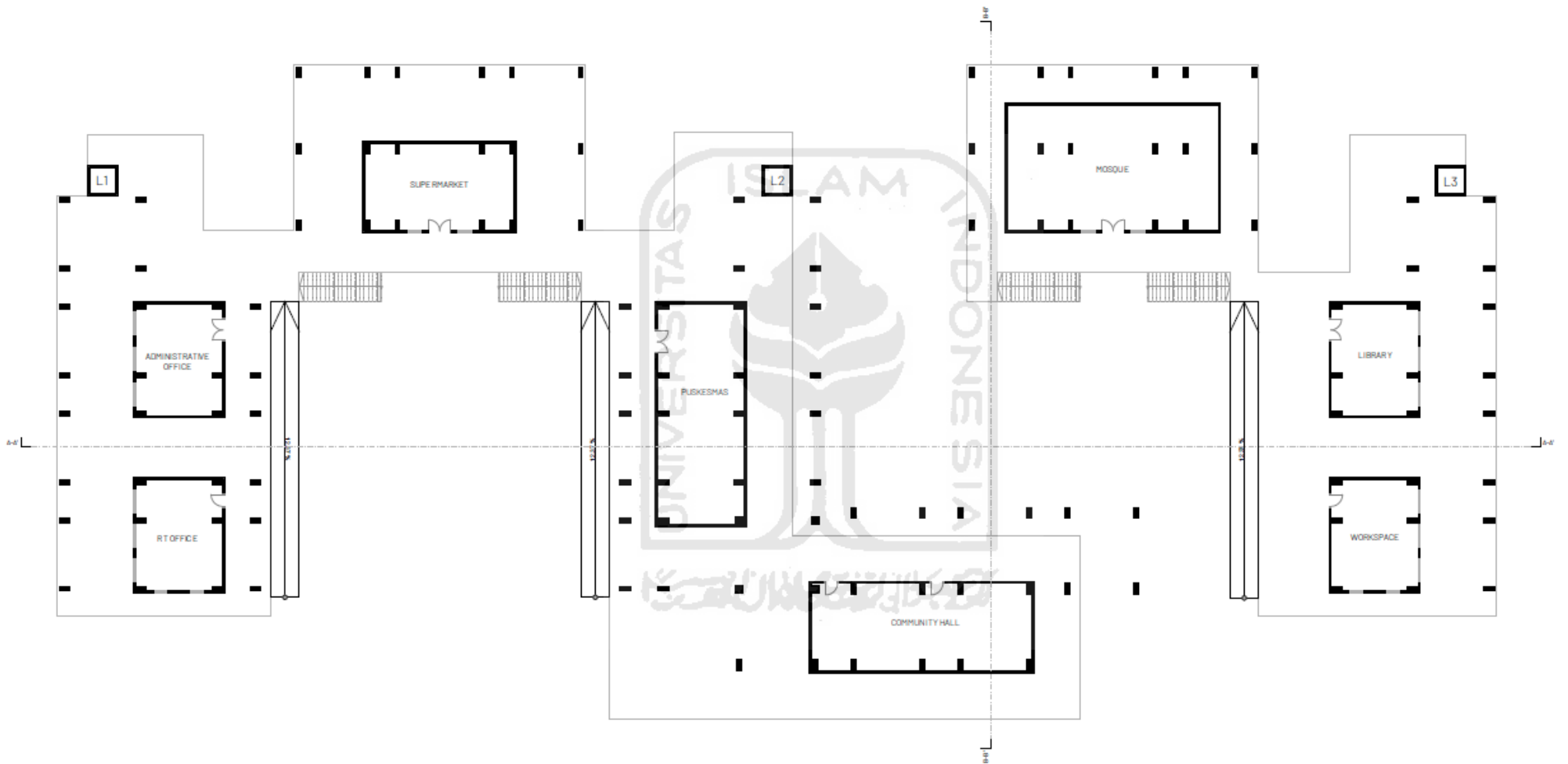


Render 2

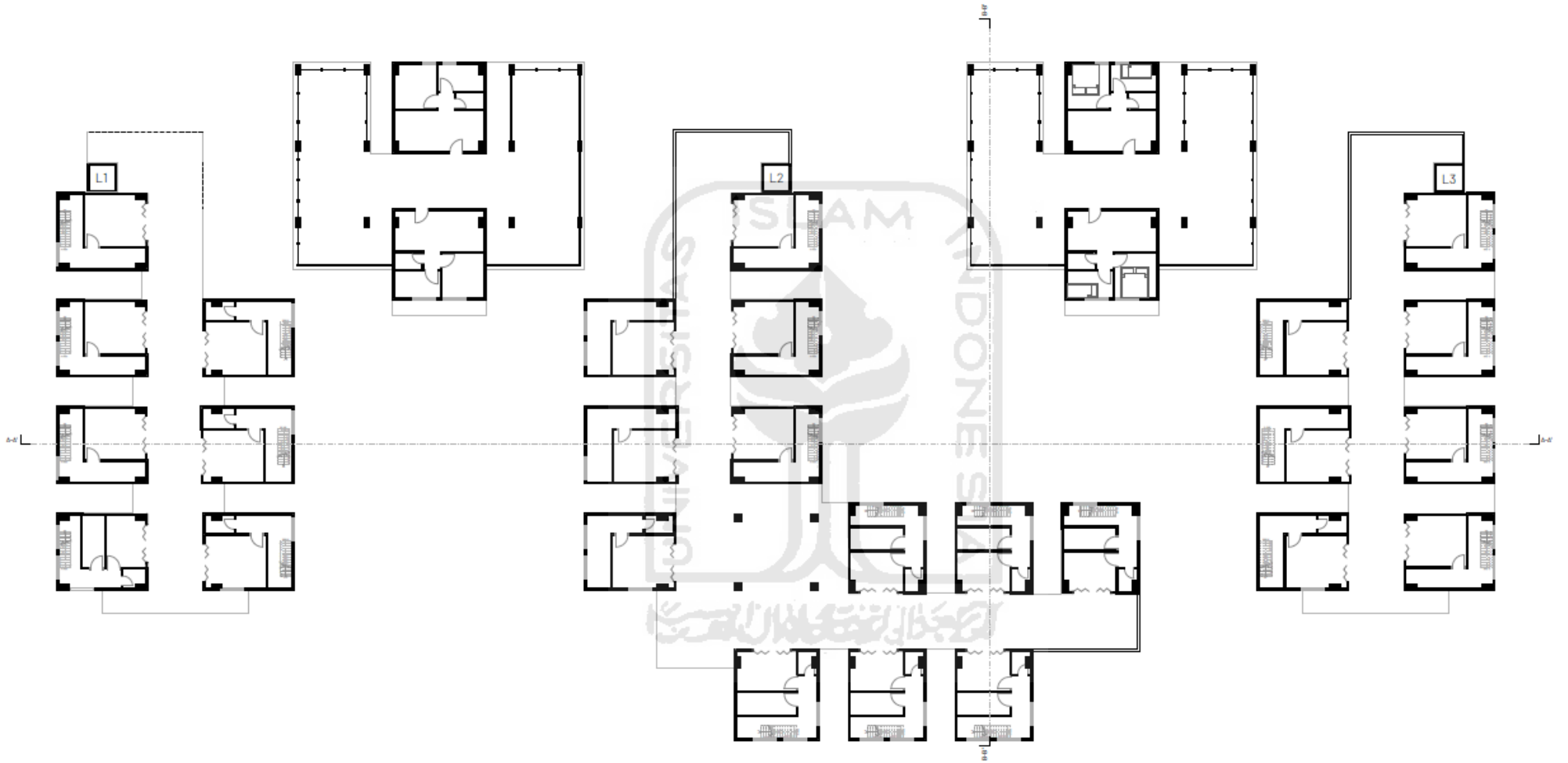
Semi-open building means giving the allocation and infill spaces to the occupants need, while the existing support level structure has been provided. Varieties in infill level is possible, with the mere limitation of each unit area.



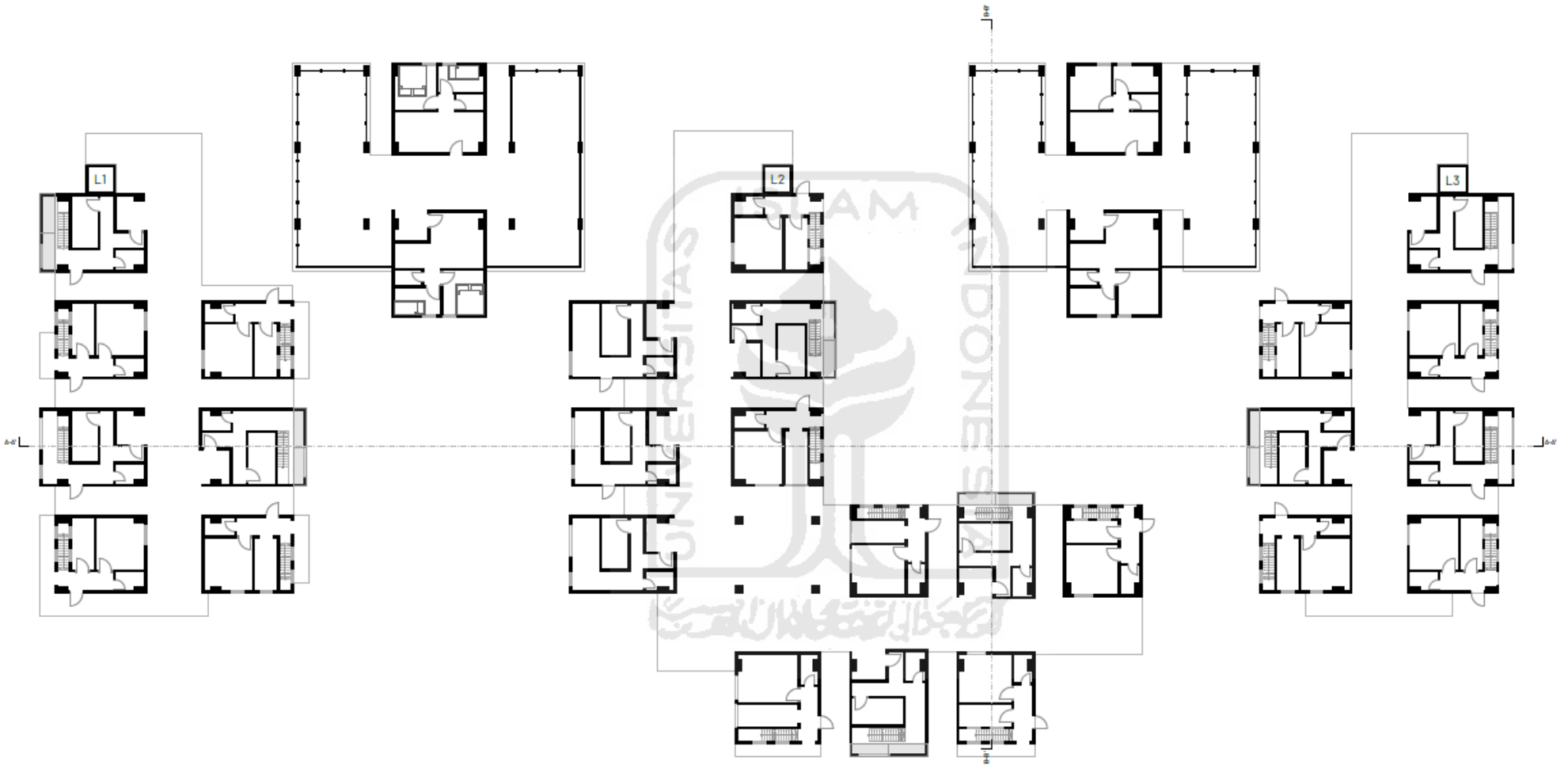
Perspective Section



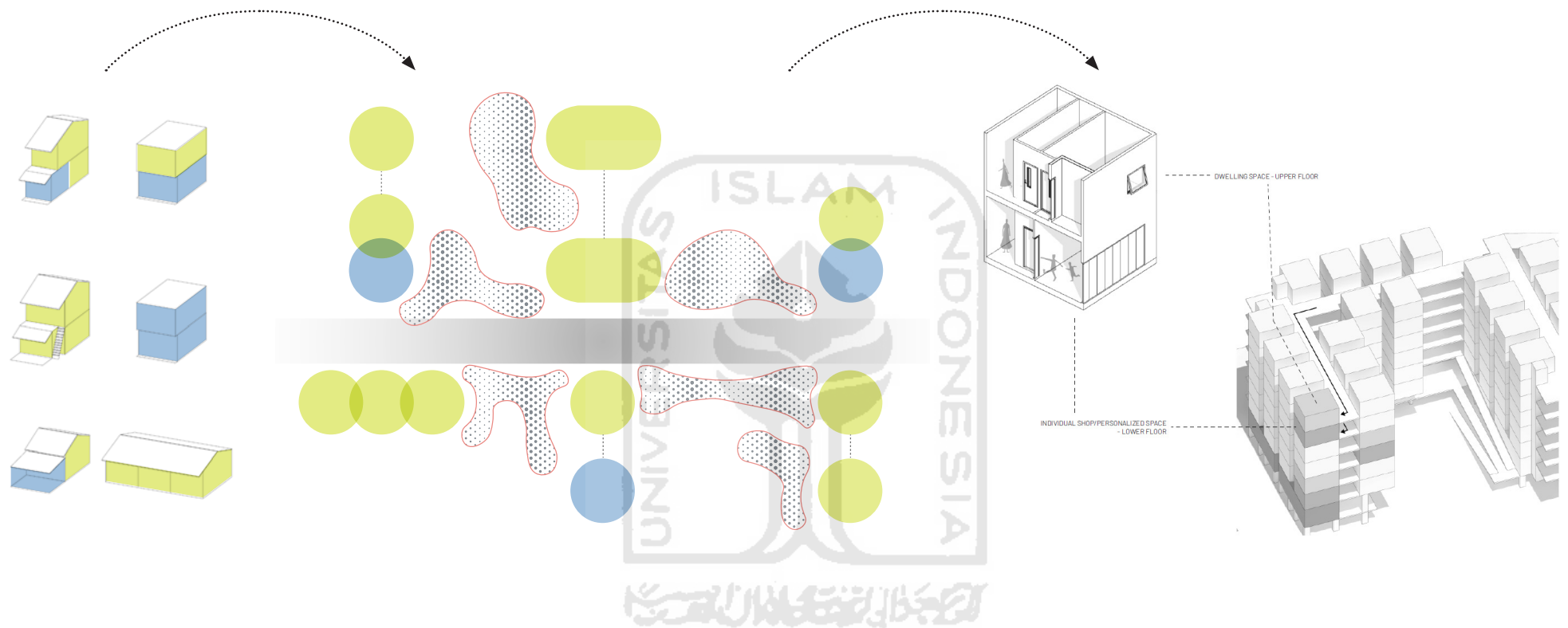
1st Story Floor Plan (Public Facility & Office)



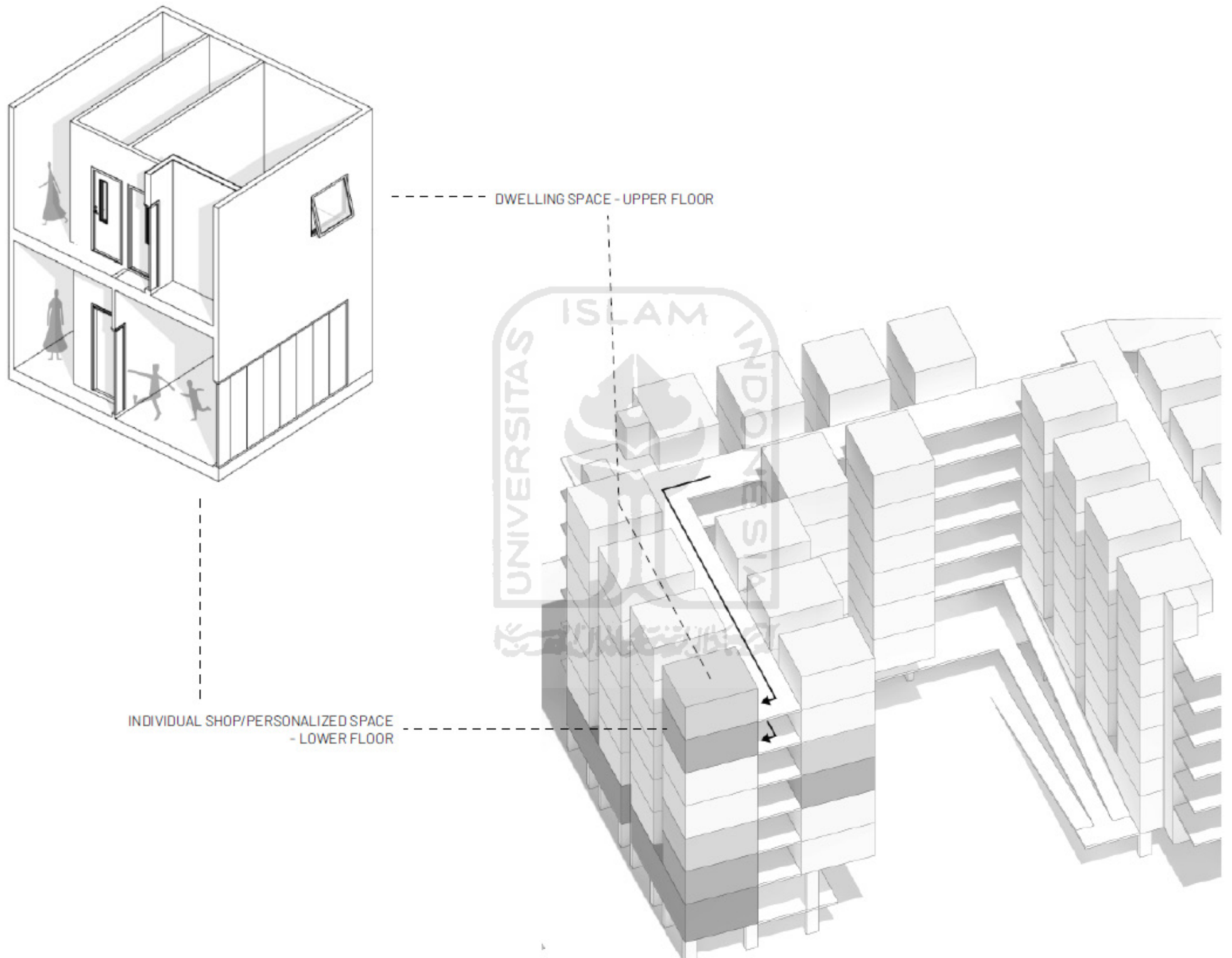
Even Story Floor Plan (Shop + Personalized Space)



Odd-Story Floor Plan (Dwelling Space, Upper Level House)



Design steps showing from the existing pattern study, to the pattern figurative conceptualization, and the adaption to the new design. Using the local commonality and preferred common typology as it fits the adaptive resilience's small-distributed network scheme and the COVID-19 parameters of providing functional private spaces, juxtaposed commercial space to each house, and safer circulations and boundary between each unit.



Residential Unit Module Concept
Source: Author

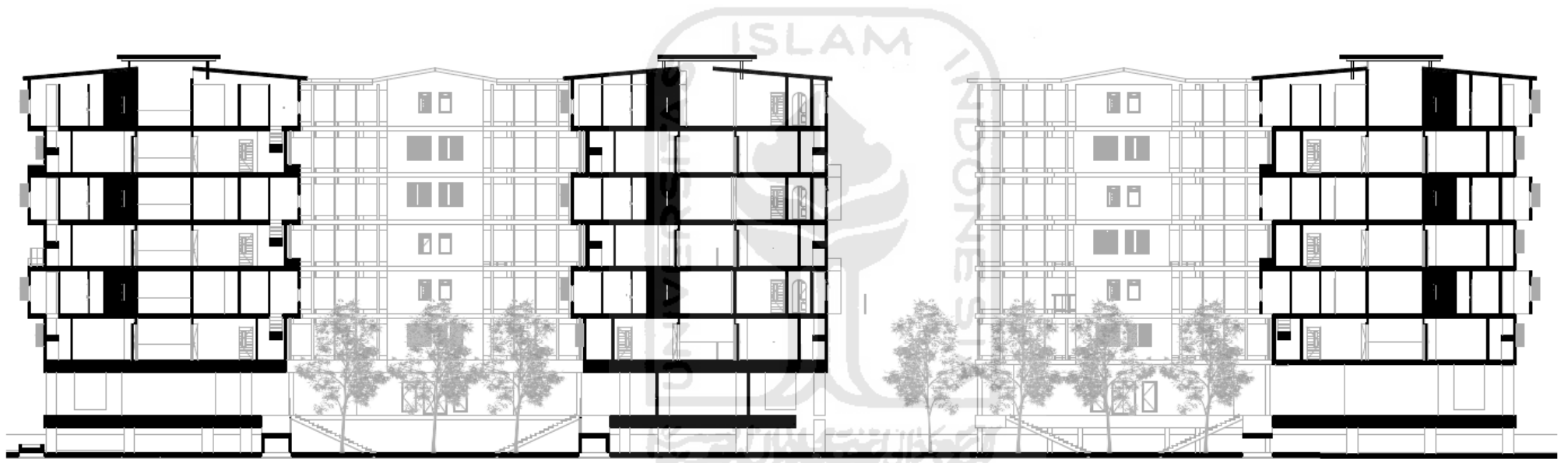
North & West Elevation

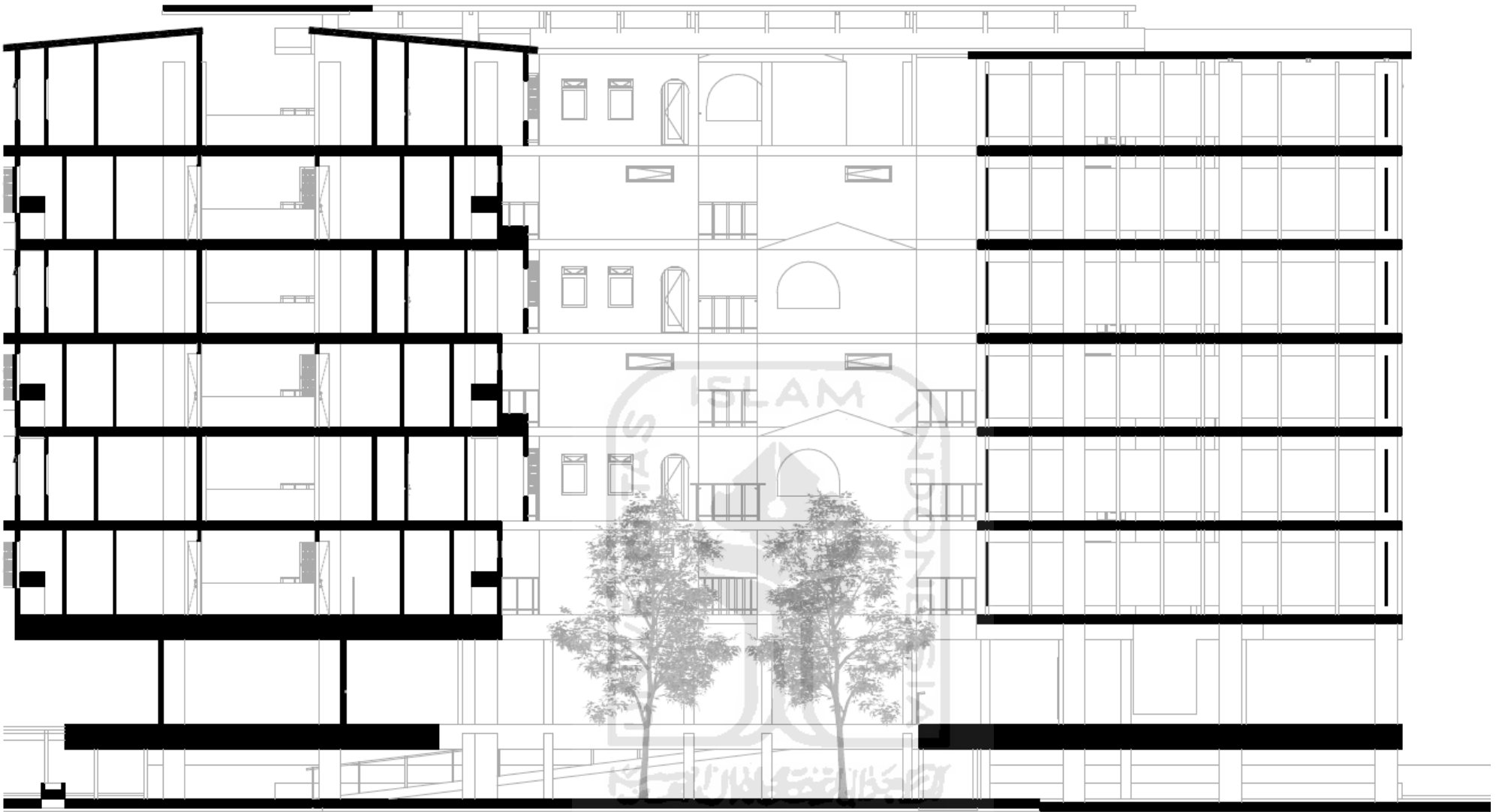


South & East Elevation



Section A-A'



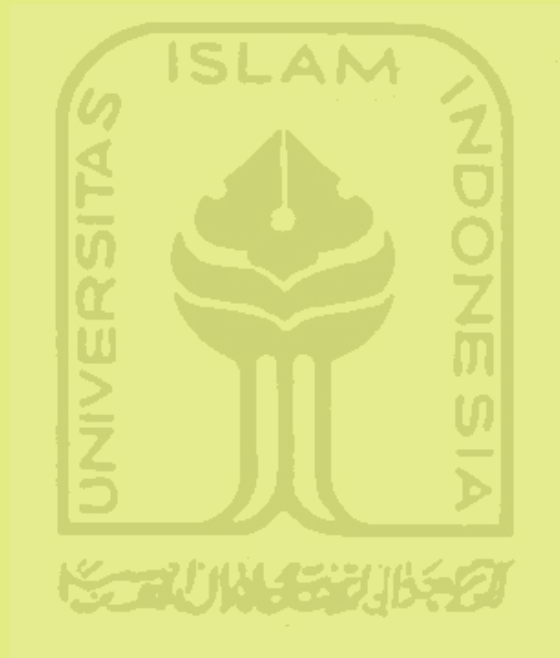


Section B-B'

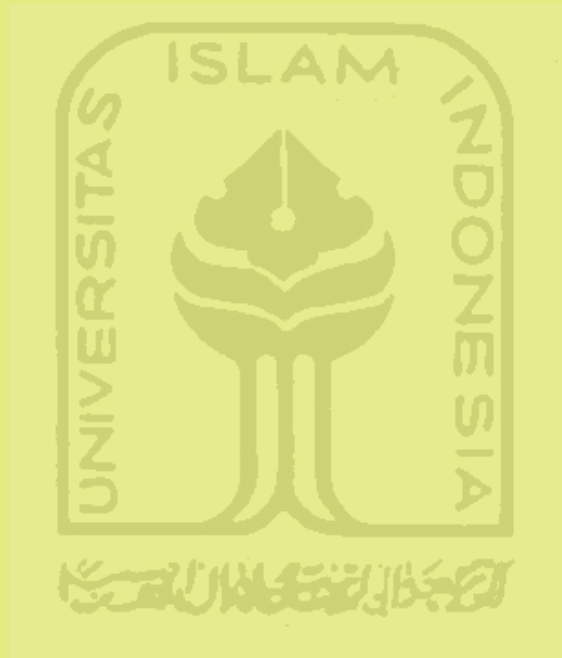
CHAPTER 3

design development

1. Design Result
2. Design Evaluation
3. Conclusion



3.1. design result



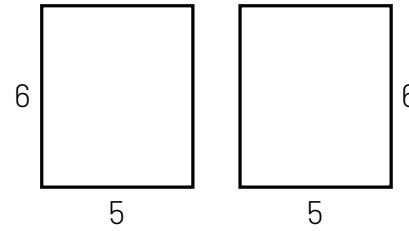
1. Property Size

The size of each room is determined by its spatial needs, and any equipment and/or furniture that will be put in the room. Below is the table showing the dimension of each room and the typical complex percentage regarding to its division between residential unit and dedicated commercial space. Aside from residential unit and dedicated commercial space, there is also the non-rentable spaces that are designed specifically for this typology such as the office for the head of the Kampung, and other communally-used function such as Puskesmas, community hall, and mosque.

Communal	RT Office	42 sqm	1	42 sqm		
	Administrative Office	42 sqm	1	42 sqm		
	Puskesmas	84 sqm	1	84 sqm		
	Community Hall	56 sqm	1	56 sqm	608 sqm	9%
	Musholla	42 sqm	1	42 sqm		
	Chapel	42 sqm	1	42 sqm		
	Green Rooftop	100 sqm	3	300 sqm		
Unit	2-story Residential Unit	60 sqm	25	1500 sqm		
	Single Residential Unit	30 sqm	60	1800 sqm		
	Dedicated Commercial Unit	30 sqm	22	660 sqm	4590 sqm	66%
	Street Vendor Space	35 sqm	18	630 sqm		
Service	Roof Water Tank Room	40 sqm	1	40 sqm		
	Roof Water Pump Room	40 sqm	1	40 sqm		
	Water Pump Room	60 sqm	1	60 sqm		
	MDP Room	25 sqm	1	25 sqm	357 sqm	5%
	Trafo Room	30 sqm	1	30 sqm		
	SDP Room	9 sqm	18	162 sqm		
				5555 sqm		
	Functional Space Total	1386 sqm	1	1386 sqm	1386 sqm	20%
Green					6941 sqm	100%
	Space Usage Total & Percentage					

Single House Module

5000x6000x2
 2 stories
 60 sqm
 5 flex. options



1

1 KK
2-3 people
1 shop or
1 personalized
space

1 Main bedroom
 1 Bathroom
 1 Kitchen
 2 M Adaptive space
 1 Shop/personalized
 space

2

1 KK
4 people
0 shop

1 Main bedroom
 2 Bedroom
 2 Bathroom
 1 Kitchen
 1 L Adaptive space

3

1 KK
4 people
1 small shop

1 Main bedroom
 2 Bedroom
 2 Bathroom
 1 Kitchen
 1 Small shop

4

1 KK
4 people
1 personalized
space

1 Main bedroom
 2 Bedroom
 2 Bathroom
 1 Kitchen
 1 Personalized space

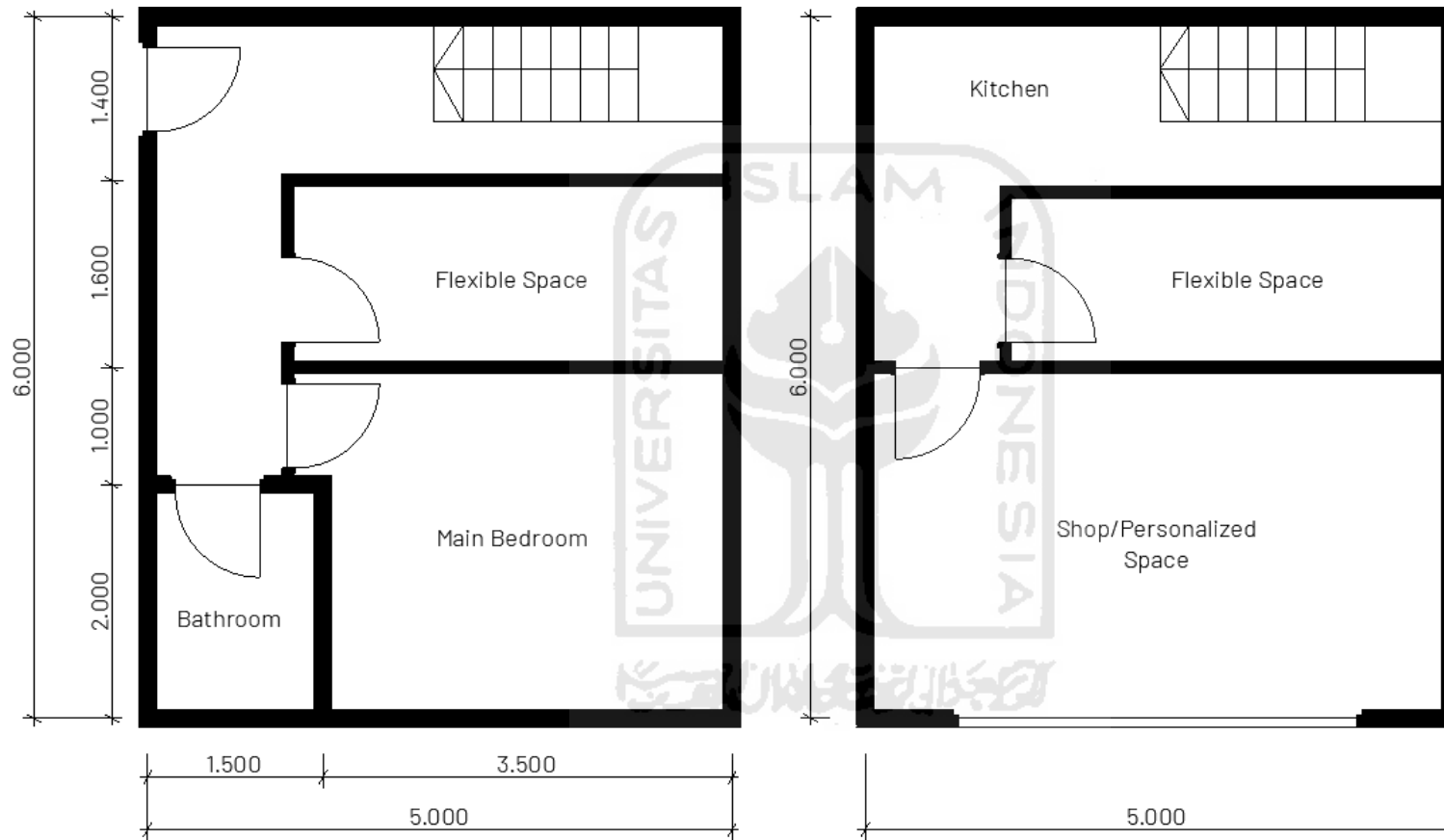
5

1 KK
5 people

2 Main bedroom
 1 Bedroom
 2 Bathroom
 1 Kitchen
 1 L Adaptive space

1

2-3 people, 1 shop or 1 personalized space

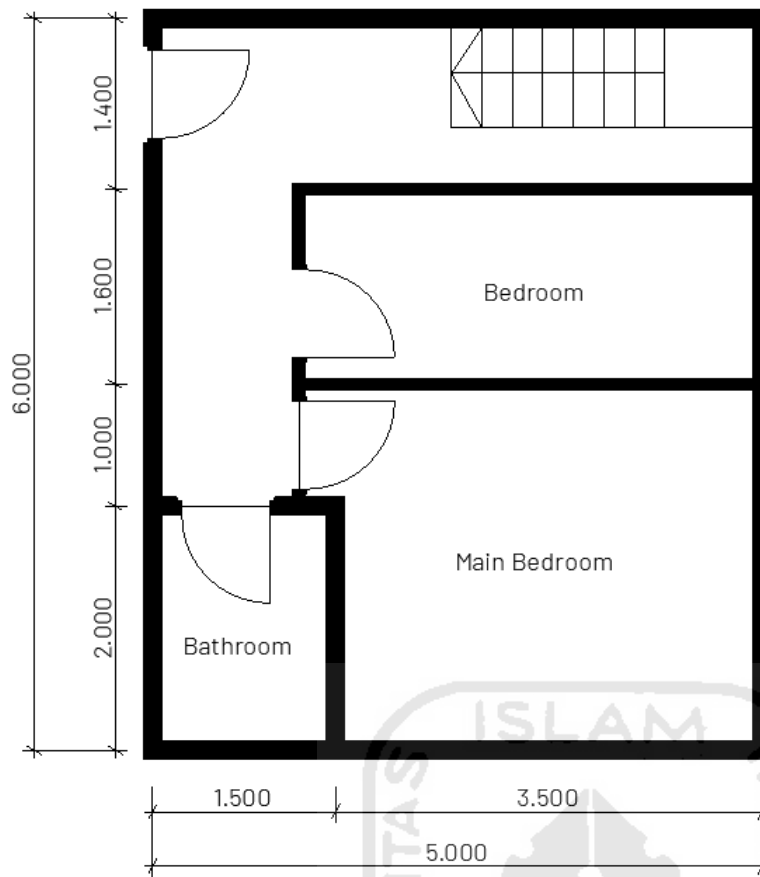


2nd floor

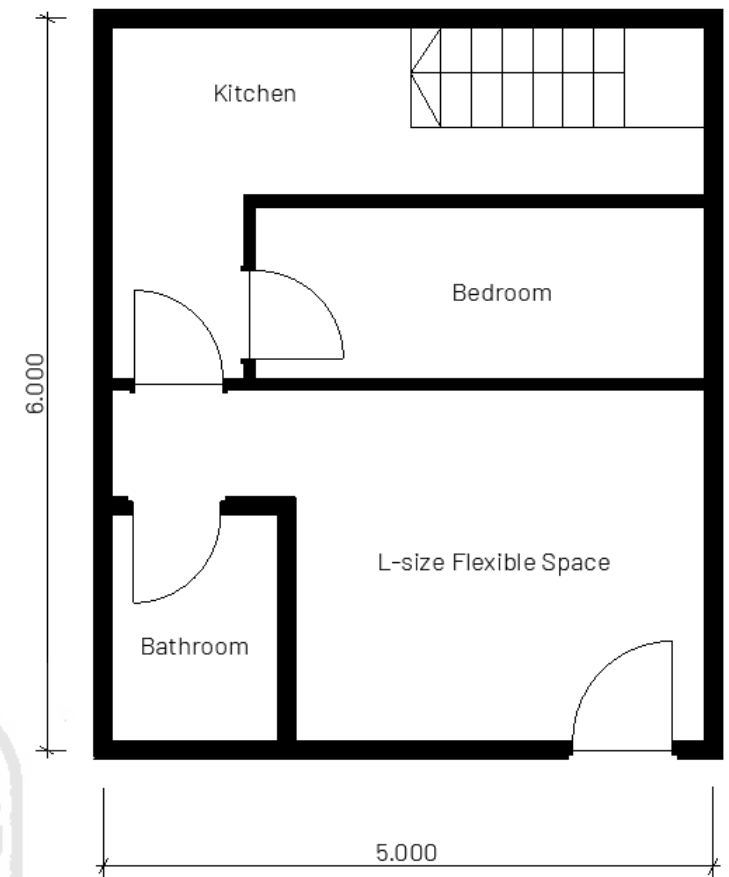
1st floor

2

4 people,
0 shop



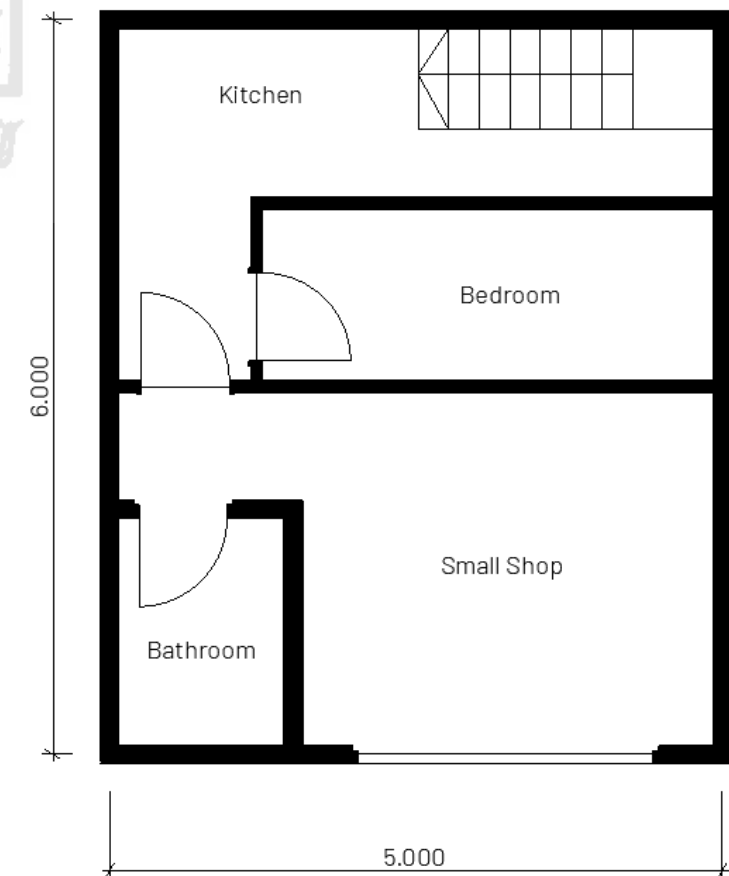
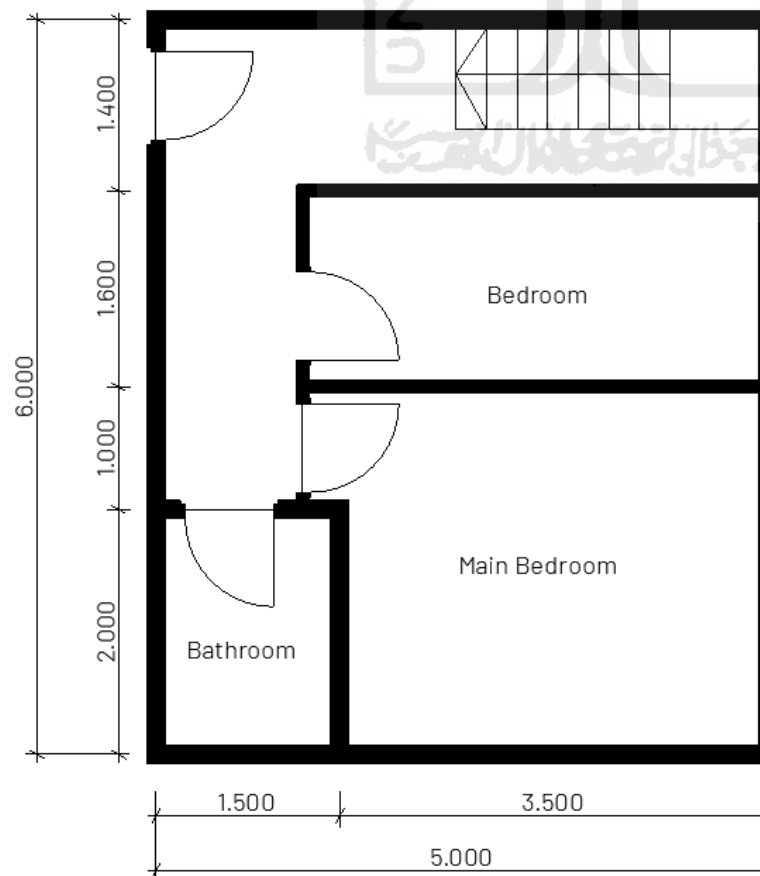
2nd floor



1st floor

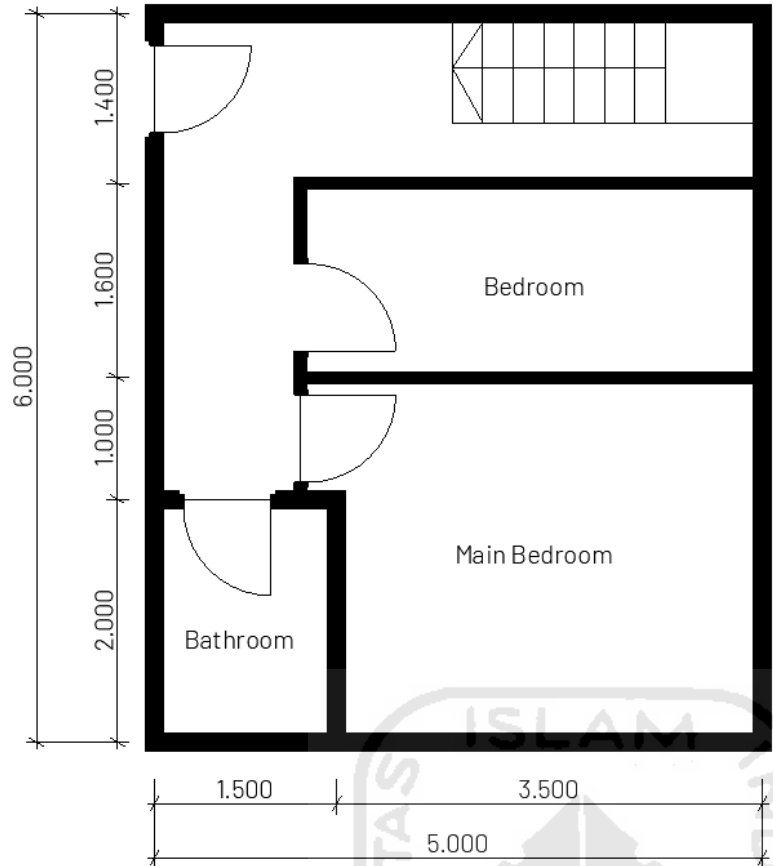
3

4 people,
1 small shop

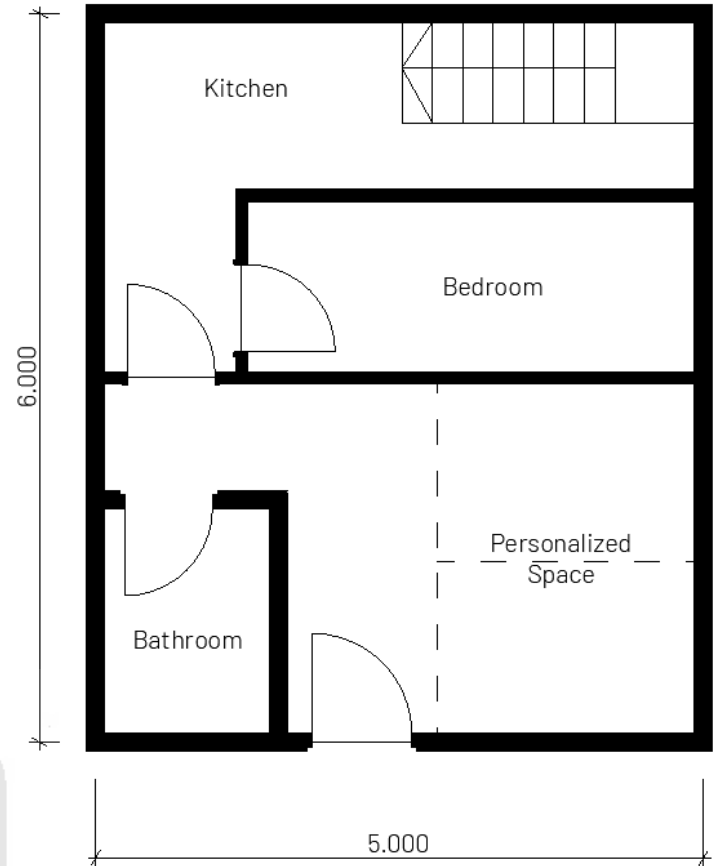


4

4 people,
1 personalized
space



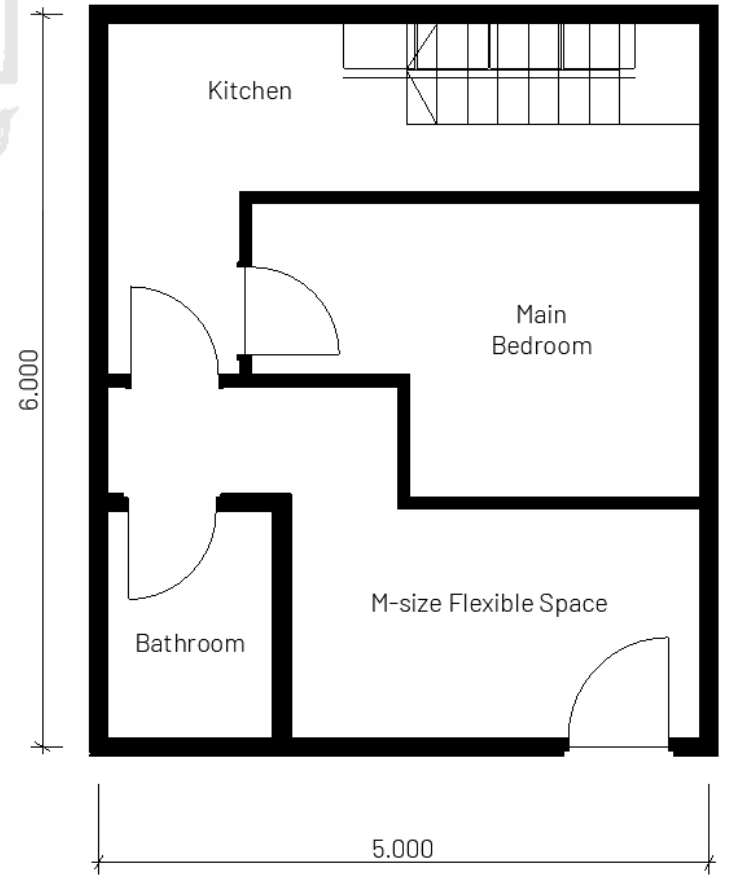
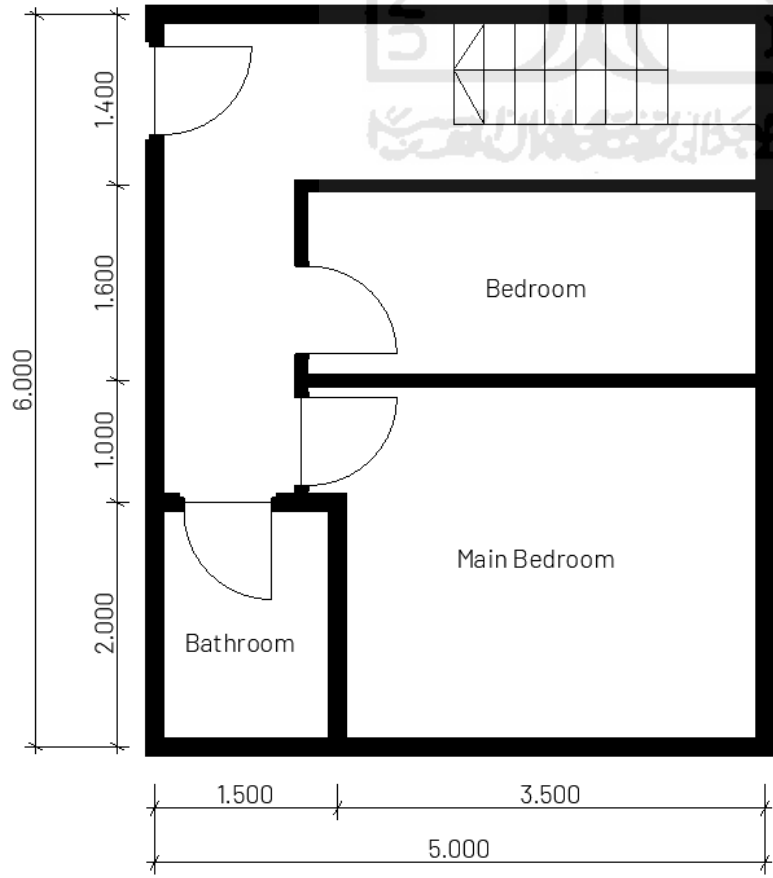
2nd floor



1st floor

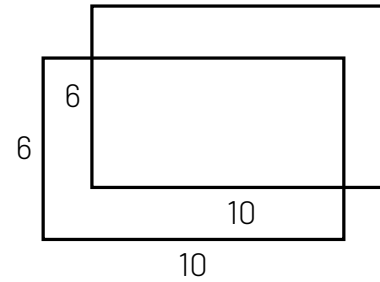
5

5 people



Double House Module

10000x6000x2
 2 stories
 120 sqm
 5 flex. options



1

1 KK
6-7 people
1 XL shop

2 Main bedroom
 2 Bedroom
 2 Bathroom
 1 Kitchen
 2 Flexible space
 1 Shop/personalized
 space

2

1 KK
6-7 people
3 flexible spaces

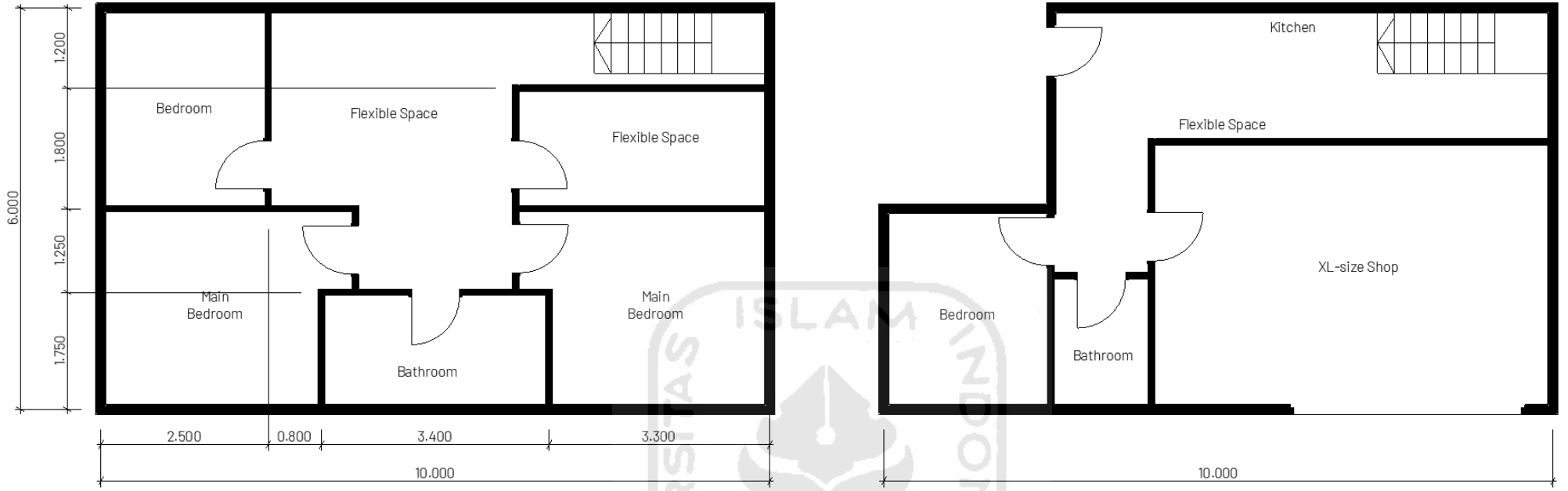
2 Main bedroom
 2 Bedroom
 2 Bathroom
 1 Kitchen
 3 Flexible spaces

Similar to its single-module counterpart, the double-module unit aims to provide a much larger dimension for a specific situation in future such as a household with more members, or regular household that has had stuffs done in a larger space back when they were still in the old horizontal kampung. The important indicator is to follow the structural grid and module coefficient for the dimension of its column, so that it will lead to a kind of plug-and-play type of flexibility. By adjusting its dimension to the whole general module coefficient, there will be no redundancy if it is not longer needed, and making it easier to construct, demolish, or transform it back to the old single-module house unit. This unit has the same two-story level, with the main dwelling area located in the upper second level. The first floor provides much larger space possible for an XL-sized shop or kiosk. It can also be used as the transformation towards boarding/porch house, that is occasionally be spotted in the old previous horizontal kampung's typology catalogue.

1

2nd floor

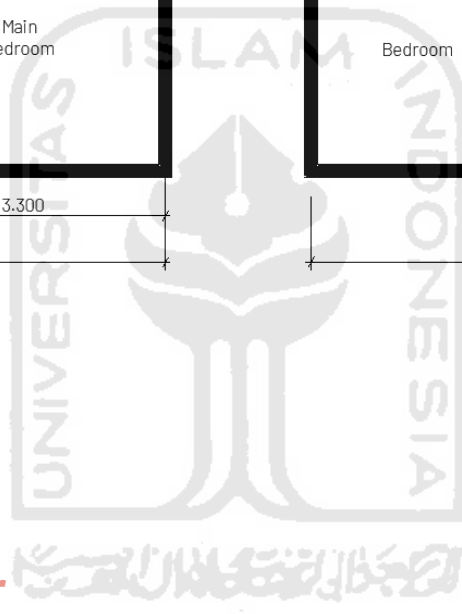
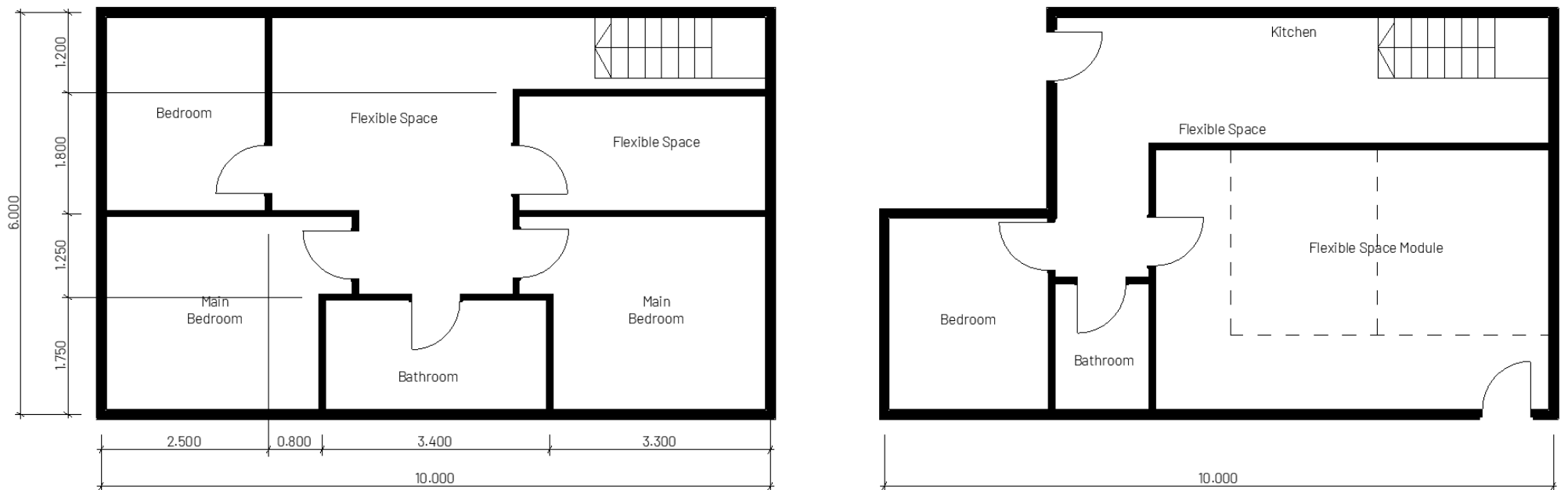
1st floor

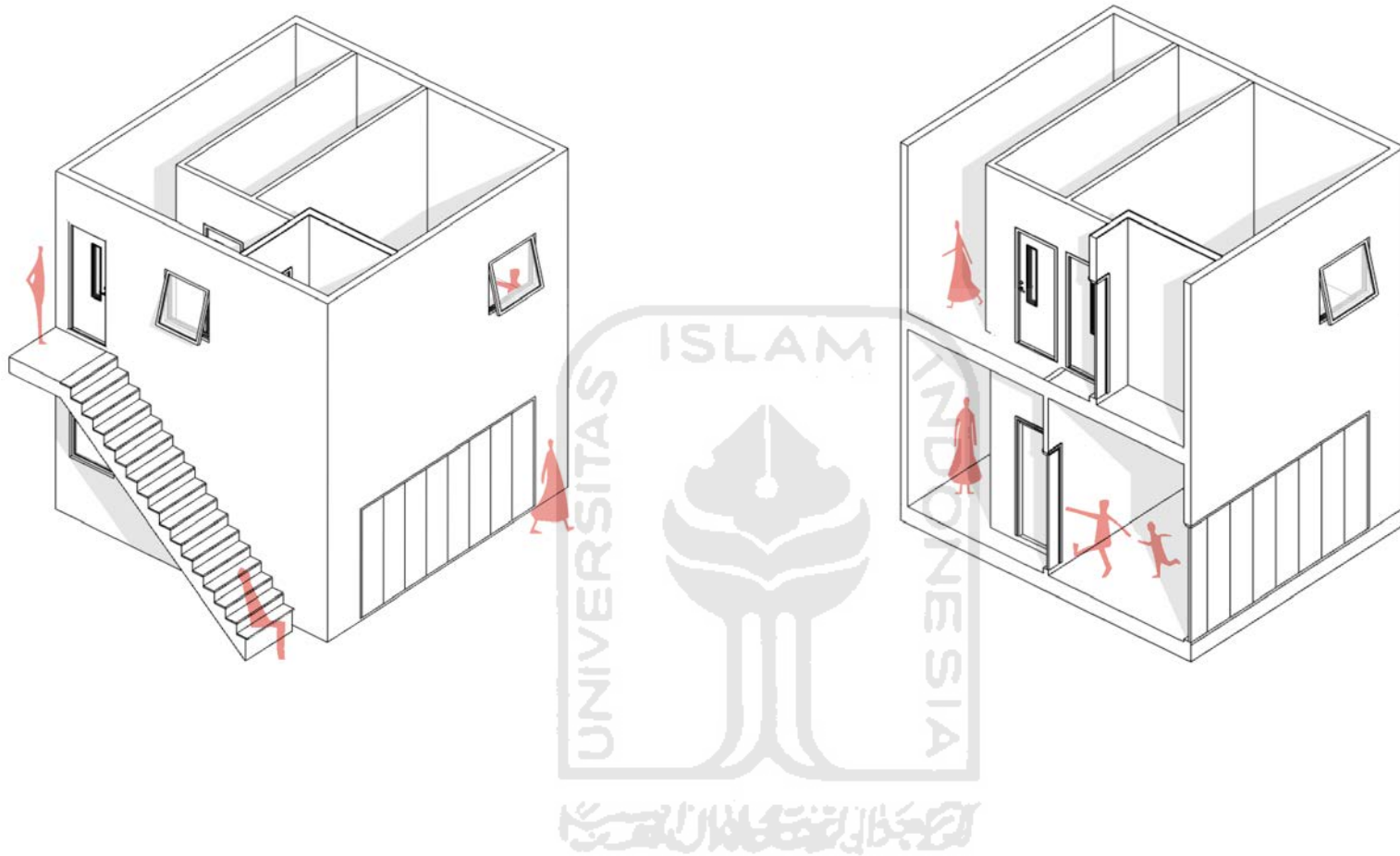


2

2nd floor

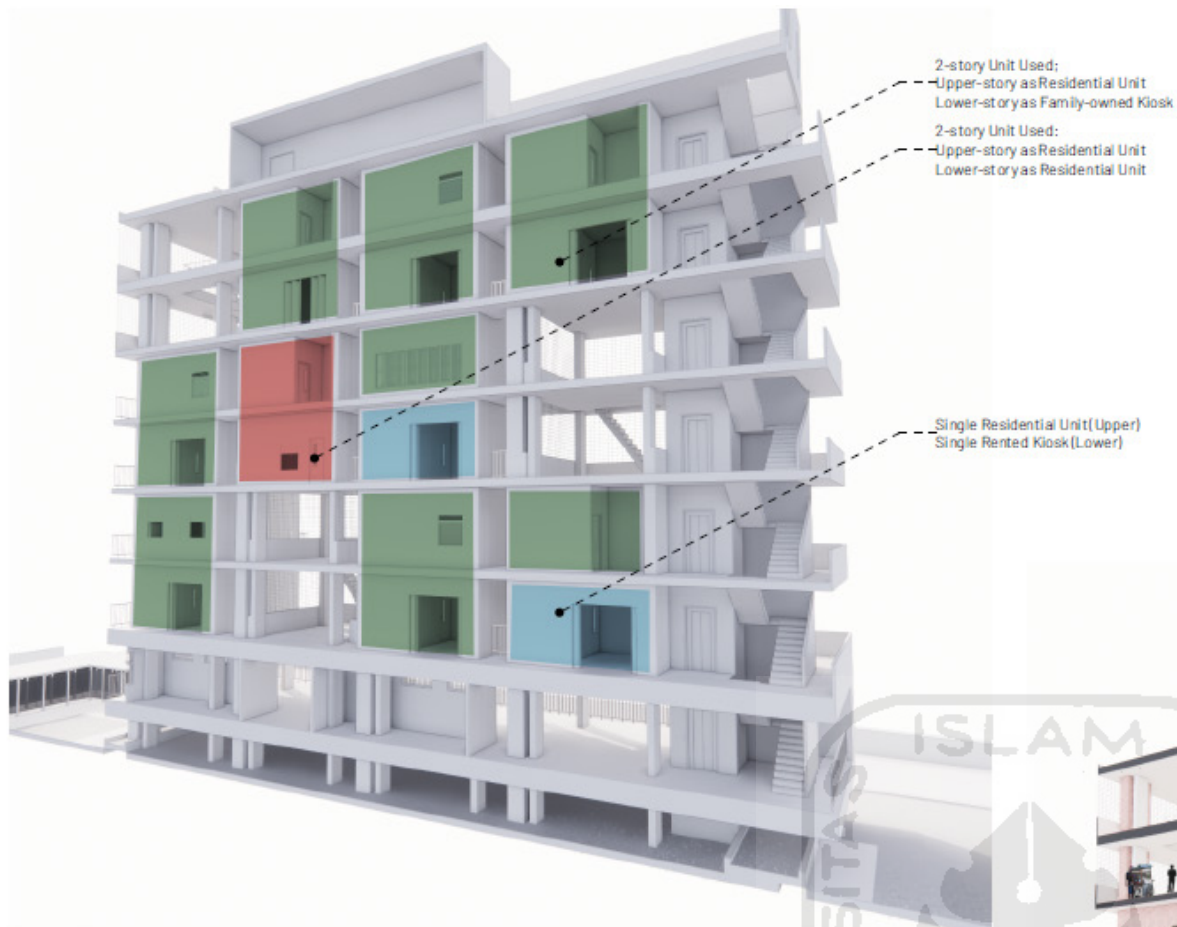
1st floor





Dwelling space in the second floor, accessible by the private stair on each side of the unit. First-level story as shops/personalized space can be directly be accessed from the facade. Types of fixture and opening follows the needed space configuration type chosen by the unit owner.

First-level story is accessible from the interior, through a stair on the back of the unit. It gives a sense of more security as the owner can go to the first story or in the sense to a 'other unit' without having to go out into the outside environment.



The first distribution of network happens in the larger scale, that in the design's context is the function or the type of function of each modules. A rigid, centralized and segregated distribution are avoided because it contradicts the adaptive resilience framework. Follow the framework, the network of elements that are crucial of the system (in this case, the Function) should be distributed throughout the system, giving alternative pathway of network. Thus, the first physical implementation is the combination of the model of a two-story residential unit with one multi-purpose main room on the lower-level story. By combining this type of units, and placing it also in a distributed zoning complex of units, it will create a wholly distributed architectural spaces.

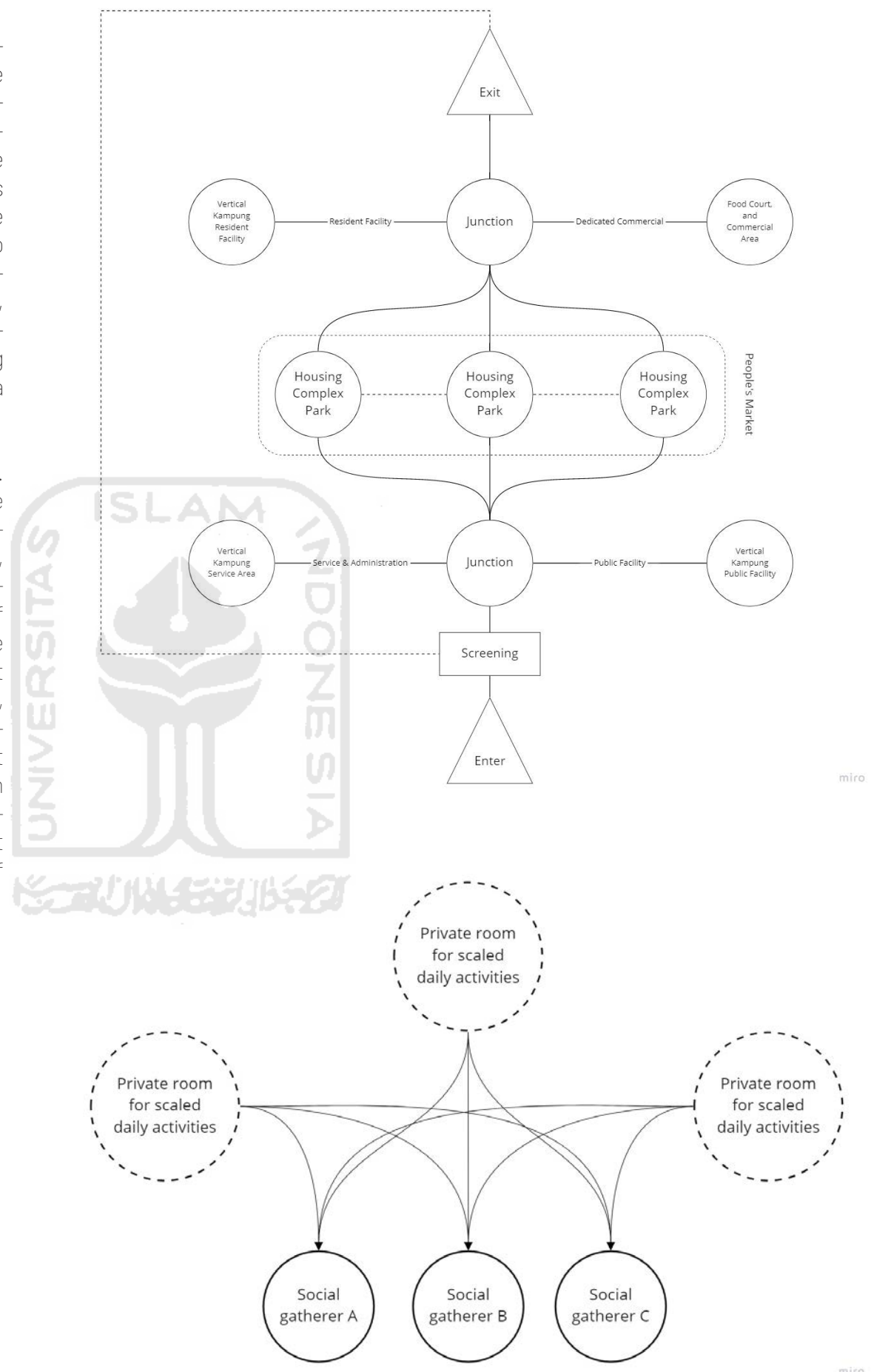


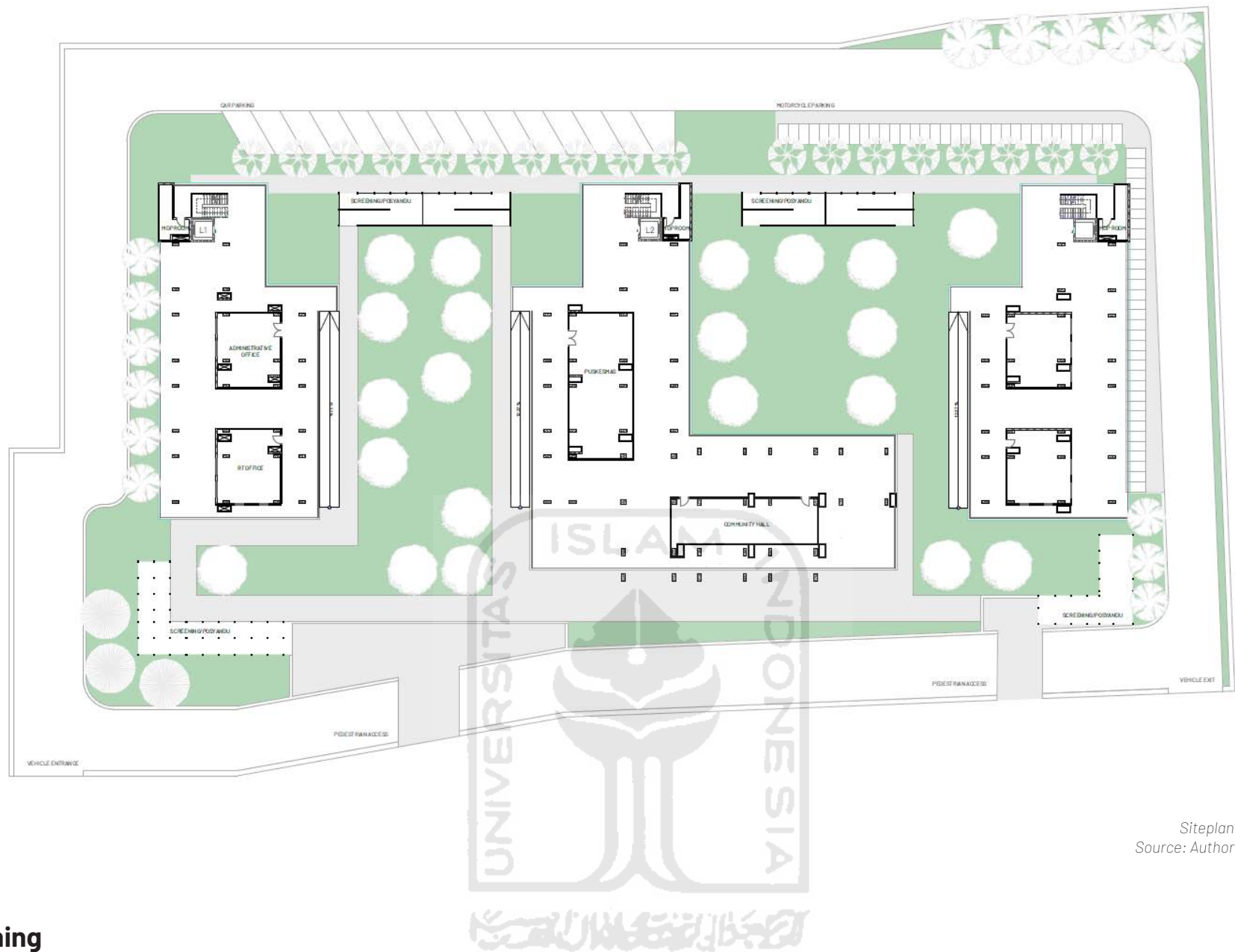
Flexibility Option Example
Source: Author

2. Room Programming

The exploration of spatial relationship shows the first tangible COVID-19 parameters, that is to provide threshold space of screening spaces, and the clear one-way rotating circulation for the pathway. As the design will emphasize the walk-based environment, the entrance will directly be facing the screening threshold space. It then leads the visitor towards various junction and clear space 'group'. The groups are the housing complex (that also being fragmented into three to five smaller complex in accordance with the adaptive resiliency's geometrical fractal theory), the public facility area, service area, resident's facility, and the dedicated commercial area. The exit will also be passing another screening area, to solve the existing kampung's problem of lack of data monitoring throughout the COVID-19 season.

The junction is translated into a form of connecting corridors. These corridors are seamlessly connected throughout the whole location of the vertical kampung. Because the seamless-ness is necessary, the additional inclusive ramp, stairs, and vertical elevator are provided to achieve this benchmark. The corridor acts as the branch to various sectors of the building. One of the most important sector is the three to four housing complex, distributed throughout the site that are connected through a datum and node of open green park, circled by the housing complex itself. It is the form of Salingaros' distributed network resiliency application, meaning that the design bears distributed network of nodes and spaces in a scaled structure. Scaled structure means that the distribution does not stop merely on the level of the complex, but also continues to the smaller scale of the house unit itself which will be discussed in the next couple pages.

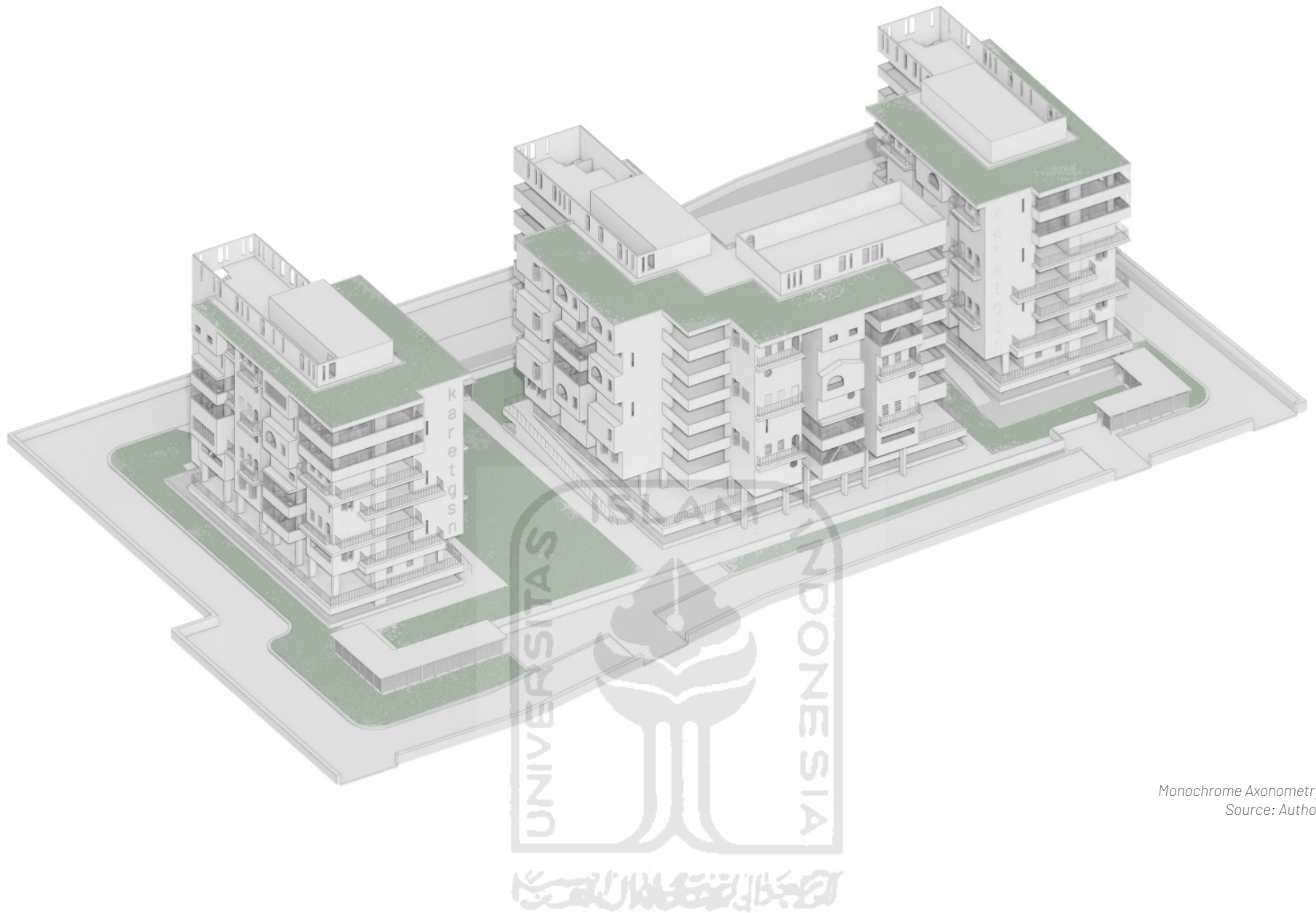




Siteplan
Source: Author

3. Site Planning

The site is planned and designed around the centered focus of the pedestrian walk, and the green space area. As one of the main problem in slum is the congested and heavy traffic jam filled with various type of vehicles, the design emphasizes the necessity to be a walk-oriented building. The vehicle and the pedestrian entrance are both provided and separated, while making the pedestrian entrance the central attractor from the street. The two big green space areas are centralized in-between the building complex, functioning as a buffer zone, central social activity generator, and to provide natural drainage area for the flood. While the green and sustainability spirit are strong, the reality of vehicle transport need is not ignored. To become realistic, the vehicle circulation is still provided, circulating the site and having access to the parking lot and dropping zone. The necessity of vehicle access is in fact supporting the inevitable needs for the people's market and local shops to get contacts with their suppliers. The open green areas provide chances for the people to grow the vegetation and trees in the long run, and thus envisioning a whole green-packed vertical kampung in the future. Aside from that, there are four main entrances spreaded throughout the site. These type of entrances that are not completely 'free' to accessed or 'directly' accessed are to support the fact that an adaptive resilient approach is needed for tackling COVID-19's problem in slum, which one of them is the difficulty of the authority on monitoring and collecting datas related to the pandemic. The spaces or the screening spaces can be used as another function in future, because it is designed as a aflexible space that can be transformed easily to another typology of structure.



Monochrome Axonometry
Source: Author

4. Building Design

The finalized design is the improved version of the previous version of the building. It ran through several redesign steps that touched the lack of Kampung's diversity, and flexibility. The facade's flexibility was reconceptualized to become more flexible, by providing some hollow space on the outer wall on each unit, so the occupant can freely choose and decide the elements to be put on the void space. The landscape was redesigned to fulfill the need of natural flood drainage, surrounding local street vendors, and the connected open green area. The building complexes also have distributed communal multi-functional spaces that can be used for various types of activity. It is supposed to mimic the redundant space in horizontal kampung that tend to attract and become an impromptu social space consisting of street vendors. That spaces are distributed throughout the rows of 'alley' or 'gang', in-between the units. The units act as the pot to catch and mold themselves according to the need of the occupant (as have been described in the previous and the next sub-chapter). The design shows a typological transition from horizontal to vertical direction while still grabbing the memories, characteristics, and the diversities from their previous Kampung. It is flexibly designed as a module-oriented structure, so that surrounding other RTs and RWs can replicate with the same idea but different literal form in the future, providing adaptive resiliency for the people.



The facade was designed to represent no specific group, but instead projecting the diversity and the informalities of a Kampung. This can be done by choosing the material that is commonly used by the vernacular community, and passively design the form in an unrigid attempt. The attempt then combined with the flexible infill by the occupants, and also the activities happening in the building, that will produce various types of small faces spread throughout the facade surface. It also tried to have ambiguous 'entrance' facade, meaning that the facade's priority was equalized on all four sides of direction. This is to imply that the building happily greets the surrounding horizontal kampung that has not been transitioned to the new typology, while not destroying the whole larger macro-level neighbourhood of the whole RW (a collection of RTs).

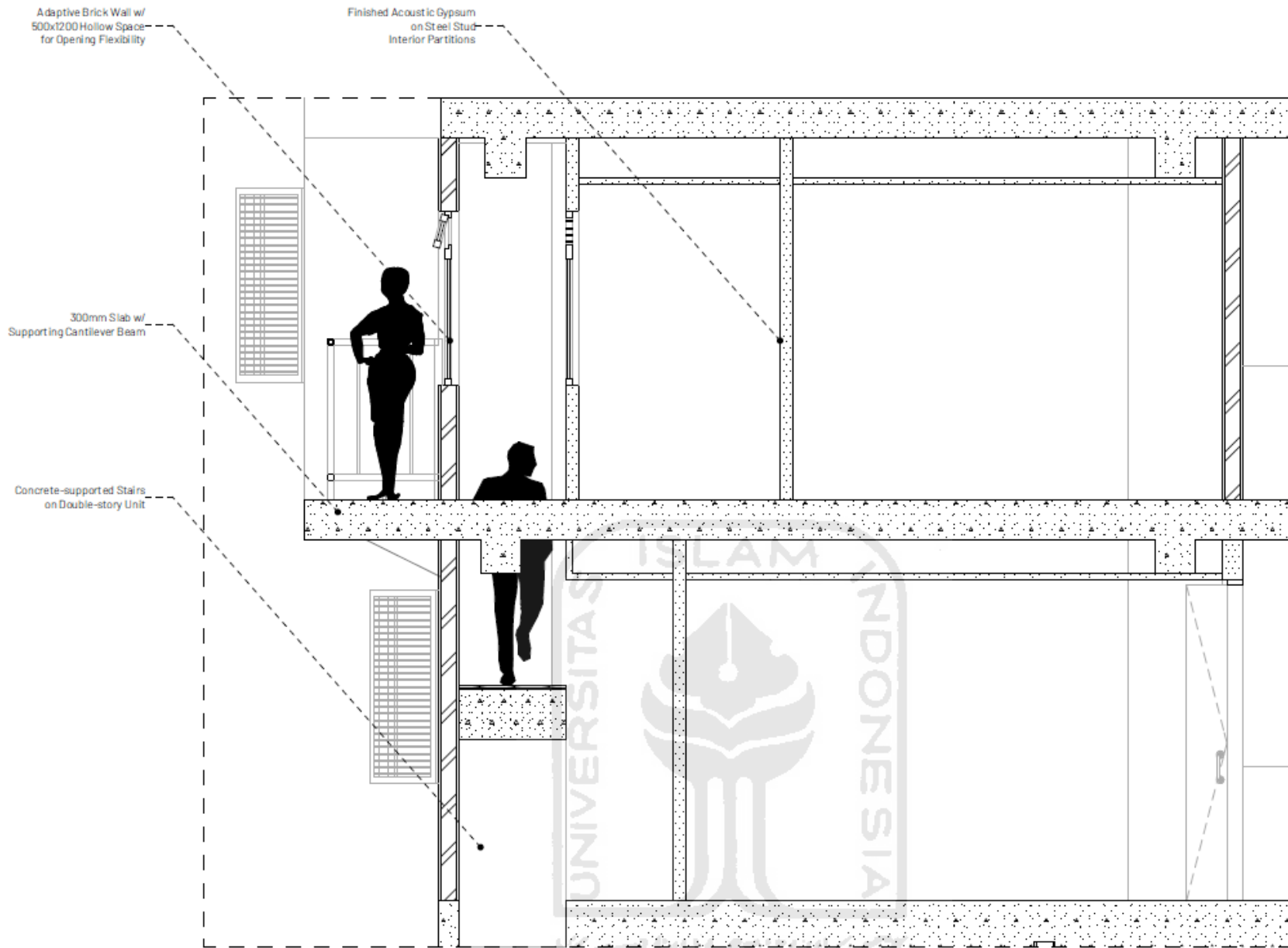


Exterior Renderings
Source: Author



Exterior rendering showing the variety of facade
Source: Author

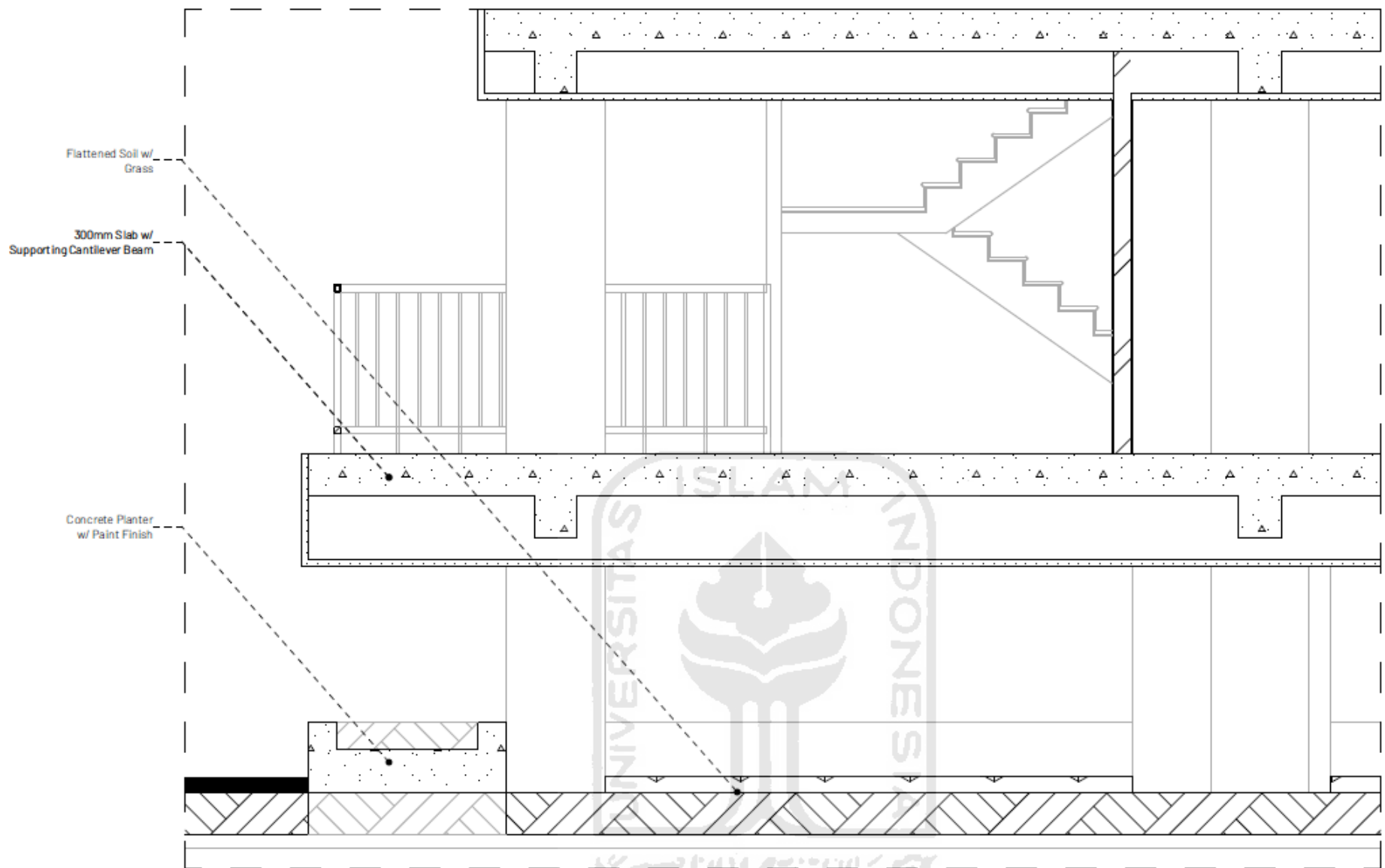
The various informal faces visible on each side of the facade represents the informalities of the people. But as it is also believed that repeated informalities or repeated unrigidness will also ended up as a rigid thing, some elements like the multi-functional spaces (shown by the white-painted square of mass with void steelrod grid partition) are juxtaposed with the brick materials. This also to give a sense of progression in terms of its aesthetics, redeveloping the identity with a slightly new nuance on the final goal of creating a building that can enhance the people with adaptive resiliency on various genres.



Residential unit partial section
Source: Author

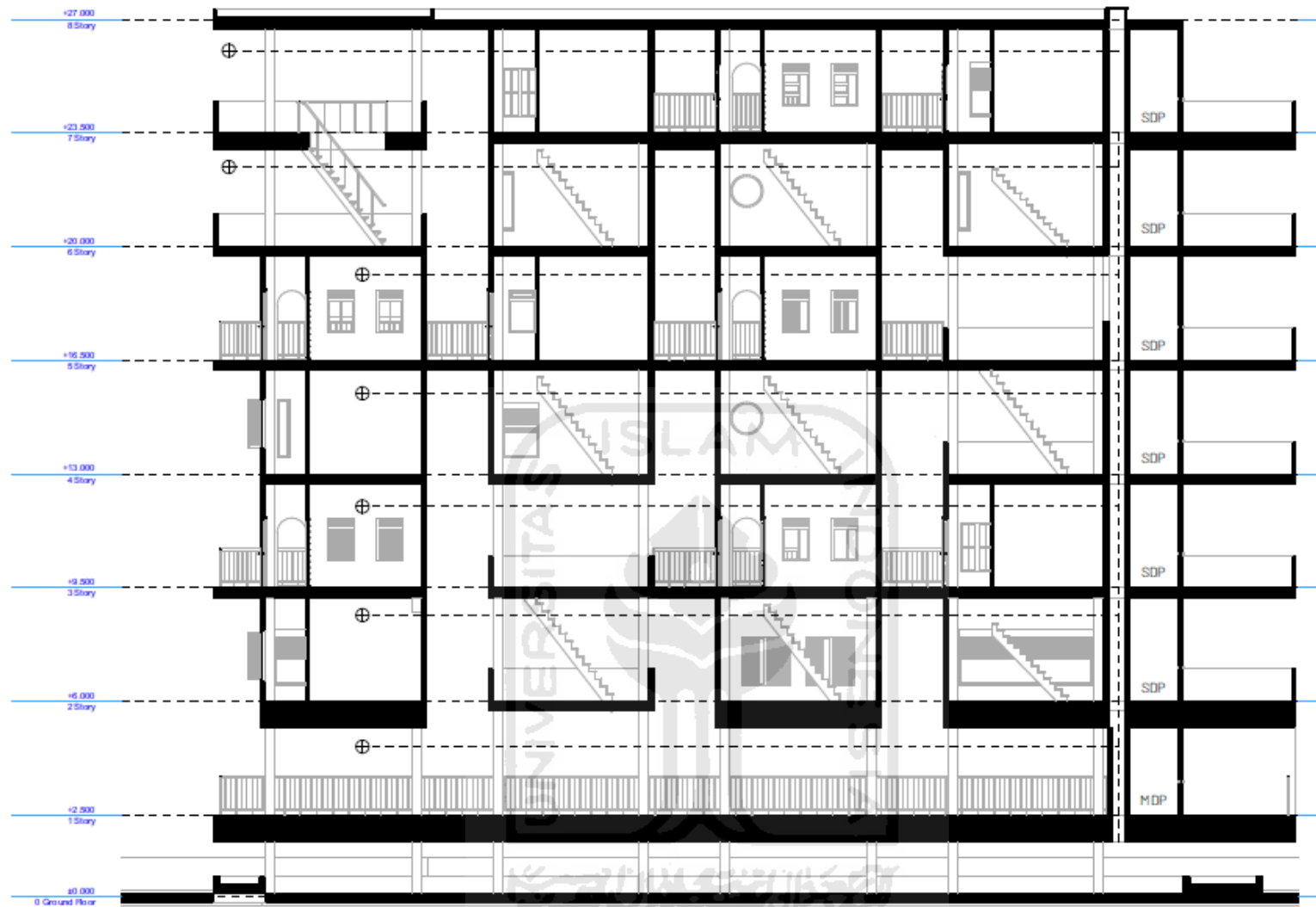
5. Building Engineering Concept

The shading of each balcony is made from the passive design approach of getting mutual benefits from the other balcony. The offset design and slight variation on its extension outward, contributes not only to the aesthetics of the building but also to the passive shading element for each and other unit. The interior and the exterior partition materials are chosen according to its necessary parameters. Most interior partitions are made with lightweight structure and material that can be easily assembled and reconfigured, such as acoustically-performing gypsum partition on hollow steel stud, and wooden partition at some areas. The exterior wall is mainly done with the combination of exposed brick to show the honesty of the kampung material, and the pain-finished brick wall on the service and communal mass. Bricks will definitely fit Jakarta's hot temperature and weather, while still providing unique tactile experience from its honest bump and texture of the exposed bricks.



1st floor partial section
Source: Author

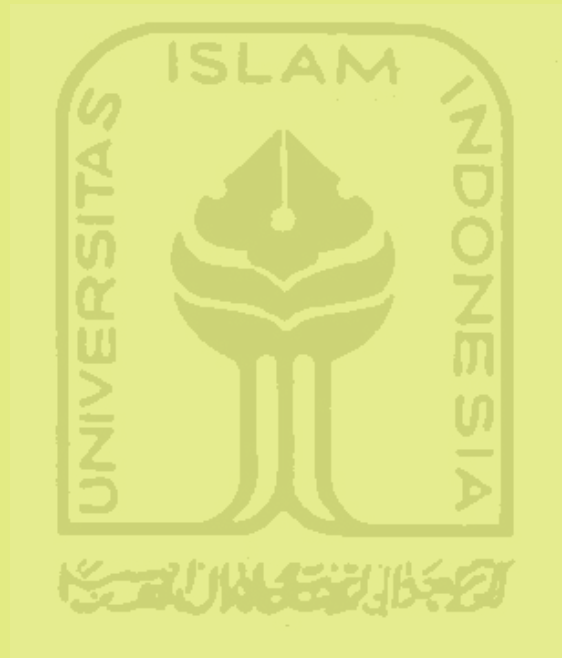
The building structure consists of the main reinforced concrete structural frame that holds the module of each units and spaces. Using the common reinforced concrete column and beam to ensure that the construction process could easily be done and joined by local workers without any prior need of excessive or additional knowledge. The extensions are then become cantilevers, varying on their dimensions, they are supported with cantilever support beam on various degree to ensure that the varying extension of balconies and walls can be realised. Another important building engineering concept is the ground floor that is elevated by two and a half meter up from the ground, inspired from the traditional Indonesian vernacular architecture of Rumah Panggung. It functions both as to adapt the people and the normal state with the slum's inevitable flood, and to let air flows and circulates throughout the low area. From the research (presented in the previous chapter) it shows that good air ventilation and circulation is much more important with this new period and variant of COVID-19 than to emphasize more on the social distancing, and other physical-related regulation.



7. Building Infrastructure

Every unit has their own single-loaded small service shaft from the consequence of the design's gap between each unit. The water supply and drainage system is then centralized at the bottom service area while originated from the roof water tank at the rooftop area. While the electrical system follows the apartment and vertical housing standard, meaning that it is centralized from the MDP and SDP room through one central shaft, then distributed through each circulation ceilings. This inevitable system is needed because to give single electrical unit on each room would be much more difficult to control, and the system would prone more into disturbances that could happen.

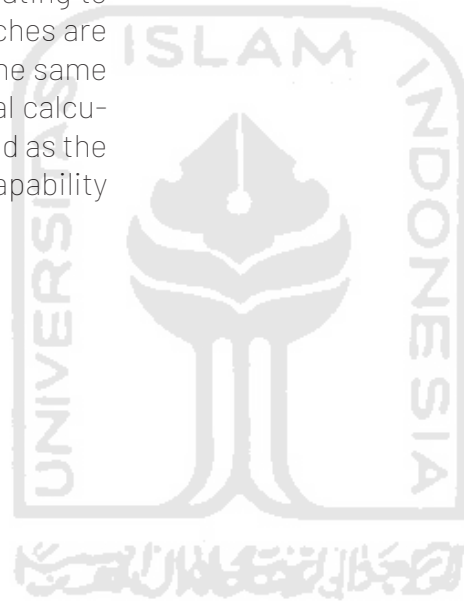
3.2. design evaluation



Design Evaluation

1. COVID-19 Evaluation

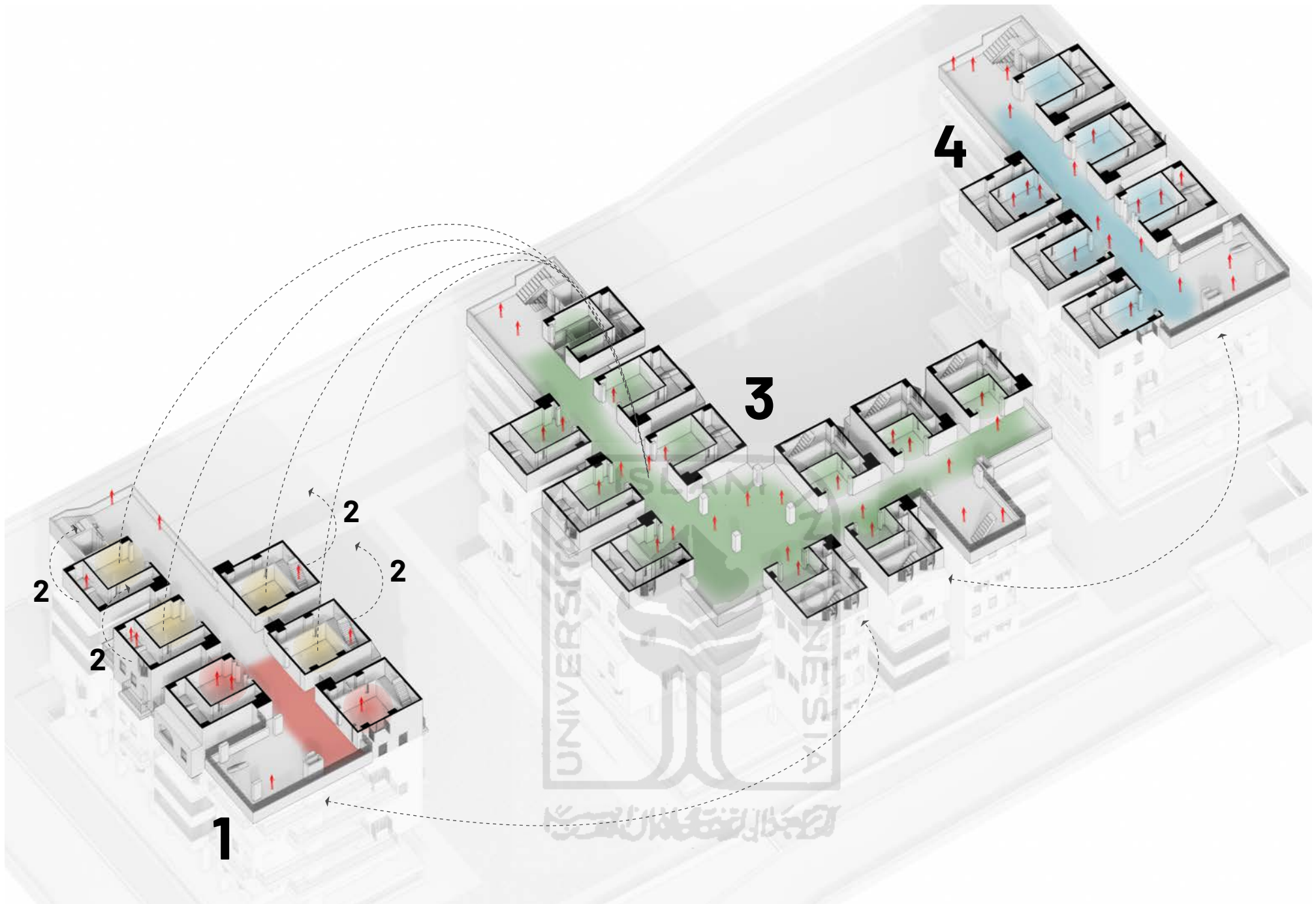
The first and one of the most important design parameters that need to be evaluated and simulated is the COVID-19 parameter which reflects itself to the specified standards published by the WHO and other organization. The standards consist of standard dimension, procedure, and other design aspects of a built environment meant to be resilient and preventive to current pandemic and other future disturbances. The steps and stages are divided into seven stages, starting from the circulation safe dimension, COVID-19 cluster disturbance toward people's economics, COVID-19 cluster towards occupant safety, residence flexibility, open green area & distribution of function, zoning & activity distribution, and entrance, screening and data-monitoring aspects. The stages are proposed in accordance to the important points gathered from previous chapters. Some points like the second, third, fifth, and the sixth stages are correlating to the adaptive resiliency indicators; meaning that the approaches are mostly taken out from the later theory because they are in the same track and goal with the pandemic prevention fashion. Manual calculation, software-simulated, and case-based study will be used as the infographic communication to clearly present the design's capability on each stage.





1.1. Circulation Safe Dimension

Dimension of the corridor adapts the COVID-19 minimum safe distance of 1.83 meter per person as stated and created by WHO. The corridor width gives each person a safe distance to wander and do activities in the design, without reducing the effective amount of occupant per space. Each residential units are provided with vestibule area to give safe space between the private and the public (corridor) areas. Residential gap is also provided, shines as one of the main features in the design, as an attempt to give clear boundary separation between each residential units. Separated units are meant to give more flexibility following the adaptive resiliency principle, giving each unit independent axis of development according to each occupants' needs, without interfering other coliding units. Those combined, the dimensional gap and the residential gaps, reconciles both the COVID-19 disturbance and the slum's inability to maintain local activities when the disturbance happens because they need to close several spaces when the disease becomes a cluster.

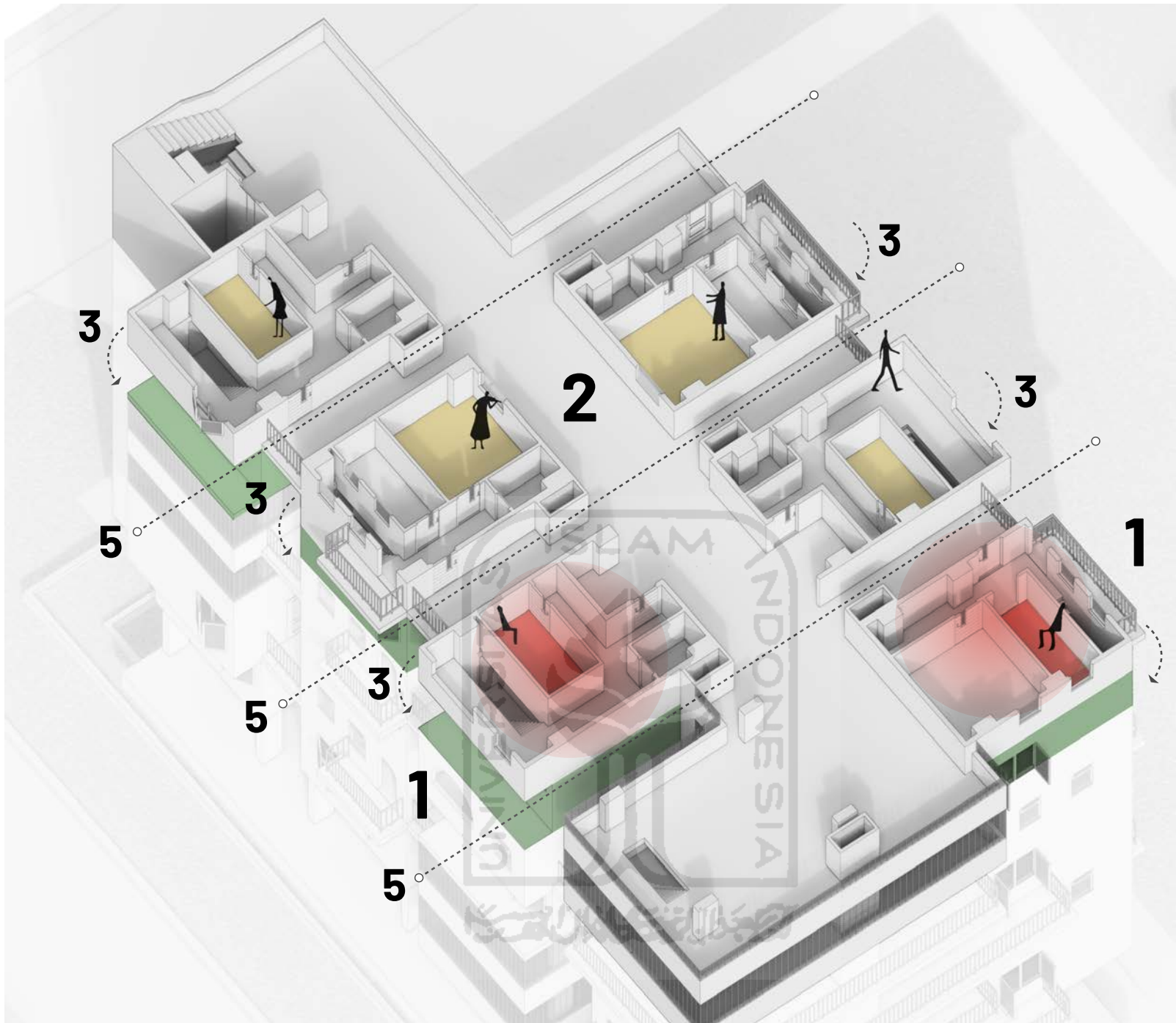


1.2. Adaptive Resilience: COVID-19 Cluster Disturbance towards Economics

A case can be studied and be seen as the example when a cluster of COVID-19 happens and affect the commercial complex of the people:

1. A small cluster of COVID-19 emerges in one of the commercial complex parcel, forcing the affected stores to be inactivated
2. Each residential units are consist of two stories, the upper residential story and lower commercial/multi-purpose story. Neighbouring stores' owners move spatially to their upper-floor residential units to make a distance with the cluster area, continuing the daily activities on the separated floor.
3. Other complex of commercial areas continue their activity with a strict protocols as the spaces are separated and not juxtaposed from the affected cluster area.
4. The most-far commercial complex continues their economical activities and hosts the unoccupied spaces for the continuity from the cluster-neighbour needs of opening their shops.

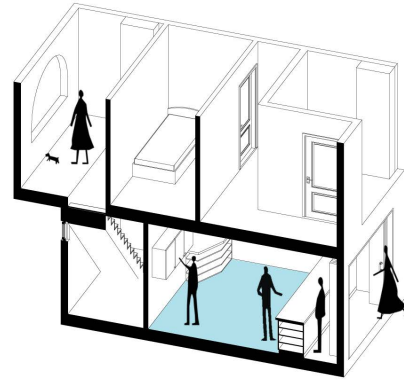
In short, the distribution functional complex gives an adaptive resilient perks for the design, because the whole activities can still be continued under a certain condition when a disturbance happens.



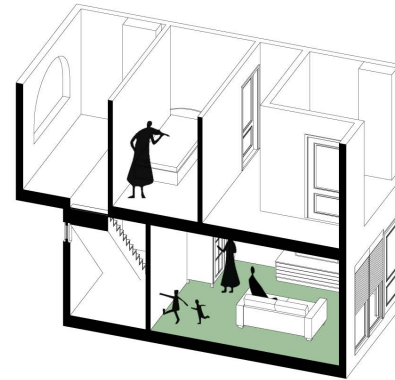
1.3. Adaptive Resilience: COVID-19 Cluster towards Occupant Safety

The separation of each residential units acts as a safety measures and a more private sense to create such resilient housing. The adaptive resilient characteristics are meant for unpredictable disturbances, and changing of contexts of the building. By separating the units, it gives a chance for further expansion for each unit, and a more flexibility that can be adjusted by the occupants' needs. The gap itself provides a threshold space to spatially separate between the private and the clustered or affected areas of COVID-19. It also ensures that the separation will not in any measure degrades the social activity, residential activity, or commercial activity of the people. It instead improves the overall flow of activities as it provides bigger space on each units, thus more freedom and choices for the occupants on deciding what functions that they want or need to construct on each provided flexible/multi-functional space (on each of their lower-level stories).

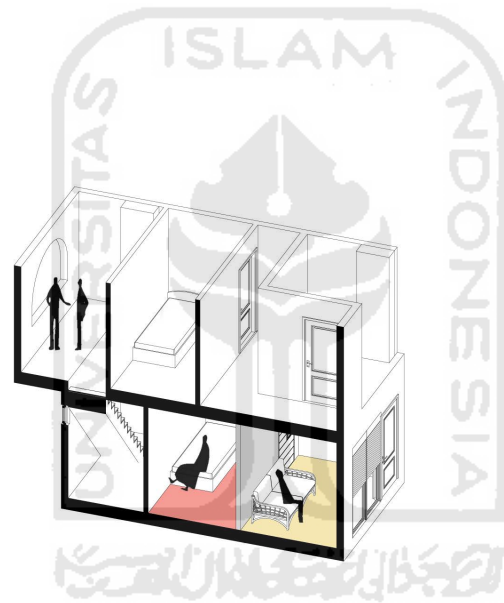
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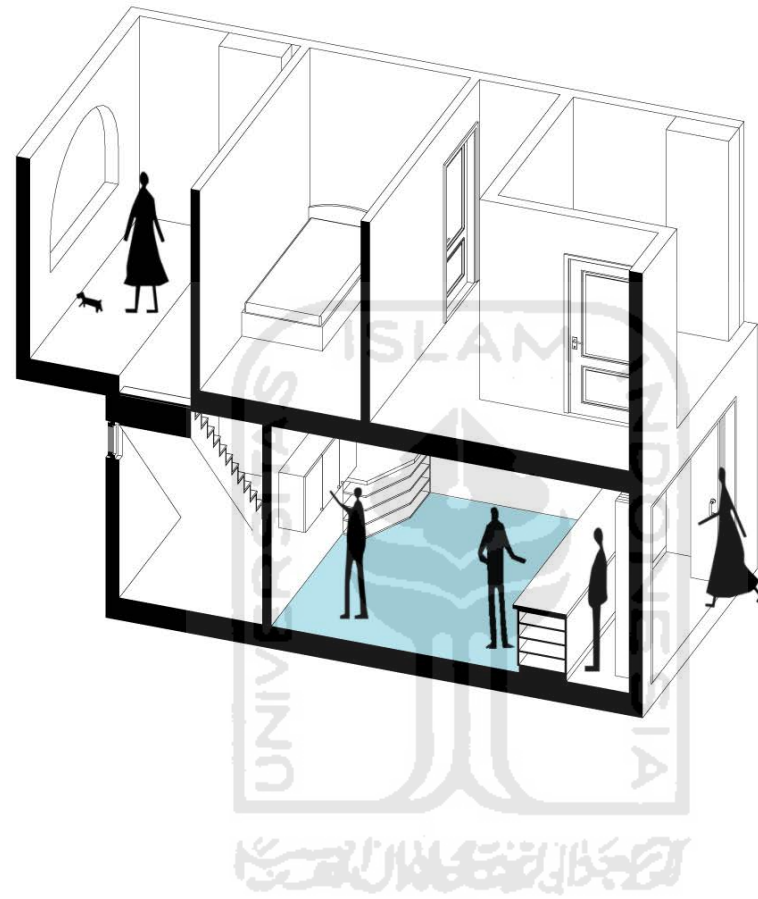


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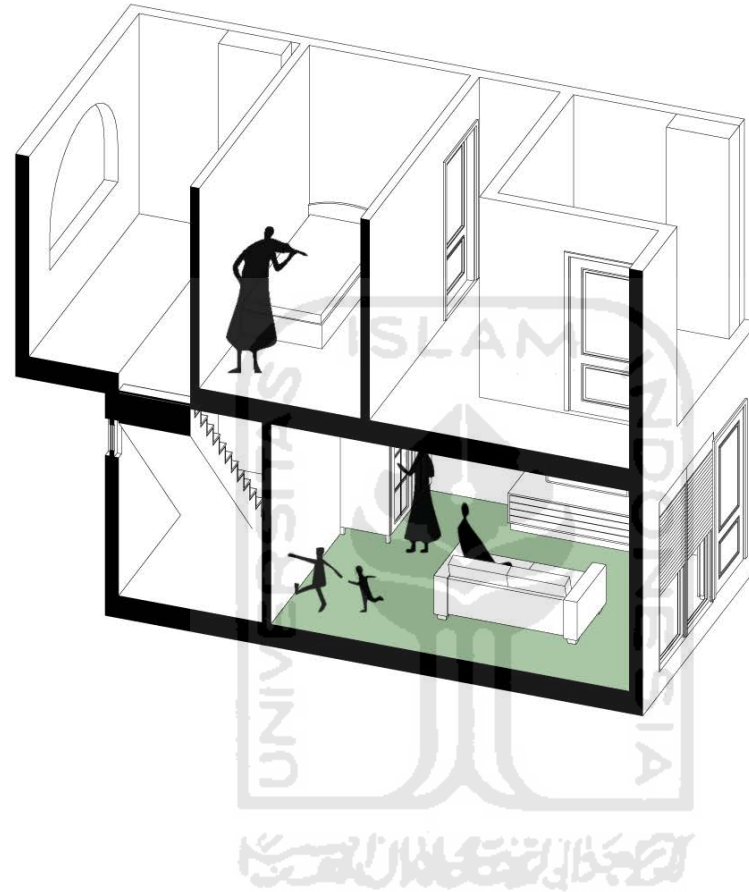
1.4. Residence Flexibility - Lower-level Story

For the two-story residential unit, the lower-level story is designed to be flexible. The flexible comes down to the level of adjustable multi-purpose space, following the needs of the occupant. While it is entirely possible for any function, the recommended and guided choices are brought down into three main functional choices. The first choice acts as the commercial or shop that will be owned by the resident, or it can also be a rented commercial space for somebody else. The second option gives the resident a chance to transform it into another residential-related space such as living room, or additional bedroom. The last choice focuses more to the COVID-19 or generally speaking, a space where it will be needed when a pandemic or a cluster of disturbance happen in the area. In this case, an isolation room can be risen up when one of the residents is infected with COVID-19. The isolation will still be separated with the main residential unit at the upper-level story, still giving a safety space for the uninfected member of the residential units.



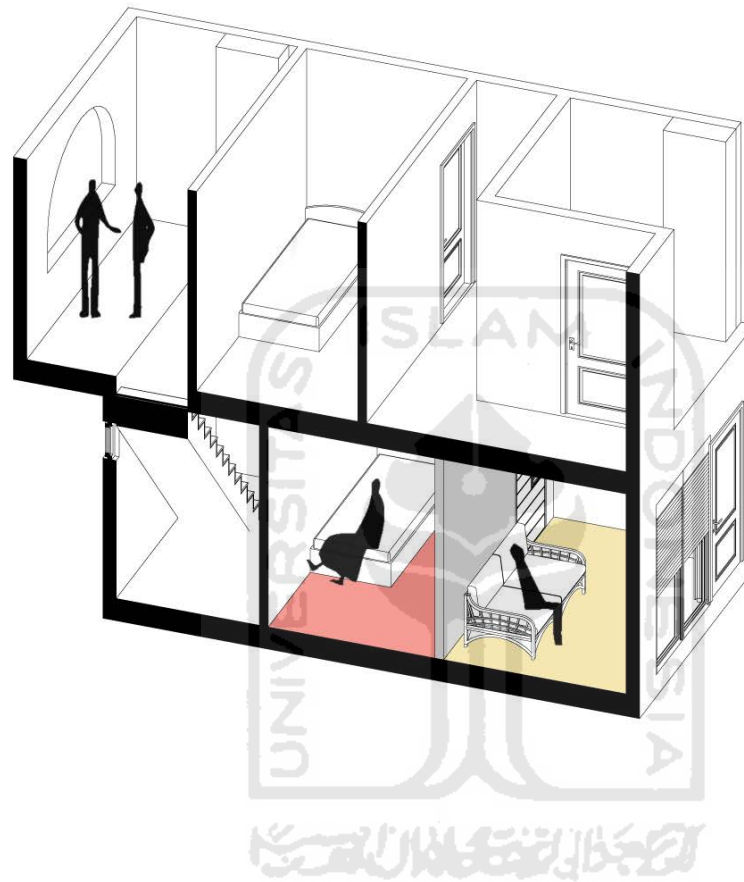
1.4.1. Commercial Use

From the previous analysis, the frequency of local residents having their own small shops underneath the houses is quite high. Thus, this first choice of flexibility is meant to connect back the previous kampung's memory and ambience of 'diverse, moving, and intimate' rows of shops to the new vertical kampung typology. The multi-functional space follows the standard dimension of the conventional store/shop, or even bigger in terms of its anthropometrical sense. Various types of shop could be opened and functioned in the space, including the most frequent one like warung, item-specified shop, electrical shop, vegetable shop, small eating shop, retail shop, et cetera. Because the residents are free to choose whether they will use the space as a shop or not, a diverse distribution of shop rows/zoning will naturally grow throughout the whole building. The chance for it to have a very rigid centralized zone of shops is very small. This naturally-grown distribution of functional zoning will fall under one of adaptive resiliency's indicator.



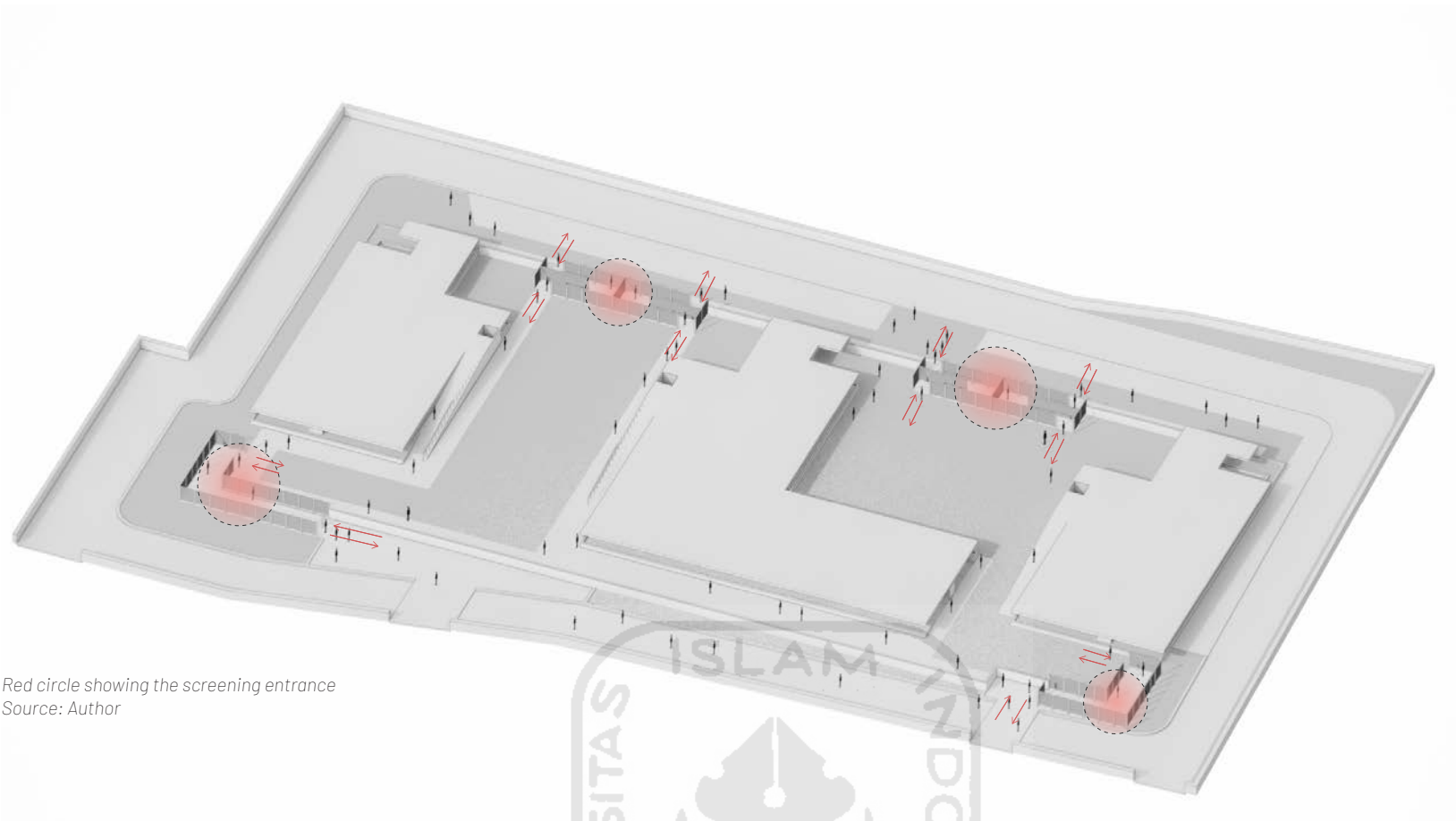
1.4.2. Additional Residential Use

A choice is also provided for residents that do not own any shops or planning to open one in the future. The multi-functional space can be used as an additional residential function instead, such as living room, bigger dining room, or other distribution that will act as a function for living. To give a chance for the resident to flexibly change the function to residential use, the facade of the unit will also be constructed with a modular hollow material that can be plugged with various types of openings. As in this case of function choice in the multi-functional room, an example of a door and two adjacent big windows can be installed into the modular void, to give a more representation of a front side of a house (or a residential unit) instead of a commercial building. But for other choice of function, this hollow facade can be installed with other types and combinations of opening that suit more with the function inside. This possibility gives the unit rooms to grow following the resident's ability to grow in terms of its member number.



1.4.3. Additional Bedroom or Quarantine Zone

One of the main intention of freeing the lower-level story is to provide the resiliency approach in dealing with unpredicted disturbances such as COVID-19. The space can be used as a module of separated isolation rooms for the infected or isolated suspects. Not only from that, but it is integrated passively through the unit module design by separating the main residential floor to the upper-level story, so the family members can still continue their daily activities with a safer and more relieve feeling. The detailed material of the isolation room differs to the budget and the needs, which gives the place for local authorities or the creativity of the people to decide what kind of materials and semi-construction technique for the partitions. One of the example is to use the simplest form of recycled light steel frameworks, applied with a combination of transparent and opaque plastic-based sheets. Other possibilities may arise, as long as it fits the dimension and place the design provides.



Red circle showing the screening entrance
Source: Author

1.5. Screening, and Data Monitoring on COVID-19

The design's location of an urban slum area in Jakarta possesses a higher risk of the spread of COVID-19. As numerous studies have shown, that population living in these areas is particularly vulnerable to infectious diseases (Friesen and Pelz, 2020). Various factors affect that statement, like the high-density living quarters, large number of persons per dwelling, and lack of building infrastructure that all can hamper down the work on containing the COVID-19 in such areas. Not only that, the work on collecting datas related to the disease needs to face a much bigger challenges and obstacles in such areas, that mostly ended towards the lack of data on the number of infected person, their living conditions, and their needs. Thus, the design should also prioritize on providing easy access to any external authorities in gaining datas related to anything that needs to be processed through a kind of survey or census-kind of work, while at the same time maintaining the privacy of the people.

One of the difficulties on collecting and monitoring datas in a slum area is its natural diversity and rapid flow of activities. Thus, the first step is to provide a clear threshold space in-between the outside and the inside of the complex, marking every influx flow of visitors. The threshold space acts as the 'checkpoint' to narrow down the diverse and wild path of movement, into a clearer trajectory of walks. The threshold spaces then will be distributed to various points around the boundary of the complex, in order to disperse these influx-narrowing attempts so that a pedestrian walk traffic jam will still be avoided. The distribution needs to be as equal as possible around the site, in order to find the right balance between the narrow of the influx (better monitoring of visitors, clearer walk trajectory) and the easeness to enter and exit (better walk traffic and social distancing). These threshold spaces are physically designed as a flexible and lightweight structure equipped with easy-to-assemble transparent partition. The lightweight structure gives the opportunity to reuse the location as another type of function if the monitoring activity is not really necessary anymore, and the transparent partition means to give a sense of unobstructed view for everyone trying to enter the site, and giving a faster and safer way to communicate visual cues.

1.6. Green Open Space Distribution

The distribution of green open space areas around the building complex has three main functions. First, as a COVID-19 strategy on increasing recreational rate for the isolated suspects and the people under lockdown situation. Second, for the general urban-related design strategy in providing unobstructed green land. Third, as the main drainage and absorption surface on dealing with slum's flood threat.

1.6.1. COVID-19

The distribution of green open space around the site means to provide a recreational element and psychological relieve for both the isolated suspects, and the non-infected people dealing with a lockdown situation. [put research here]. The boredom, depressed ambience, and other psyche-related disturbance are reported frequently from people dealing under a strict lockdown procedure. Thus, green open area is one of the best element to give particular amount of relievers for those down situations. The usage of vegetation and green-related objects to improve the life quality and condition of person in treatment has been proved to be beneficial long ago before COVID-19 context arised. Not only the oxygen supply and its natural characteristics that can bring the reliever, but also the commonly-known fact of the color green and its impact towards someone's physiological and psychological state [PUT RESEARCH HERE COLOR GREEN]. For the people under the state of lockdown, the green area is proved to attract more recreational activity rate around the green area. It is hoped that the informal activities from the previous Kampung can still be preserved, attracted, and generated with the new restricting protocols and regulations. The open space acts as the unobstructed visual connectors for those activities such as daily late afternoon kampung activities, street vendor transactions, children playing, and young-adult late-afternoon refreshing activities, circulating the green open area while following the safe protocols.

1.6.2. General Design Strategy

Apart from all the various approaches used for COVID-19 and slum complexities, the green open spaces are meant to provide general activity attractor, good buffer zone, and vegetation for the whole design complex. The green area buffers out anything related to motorized component such as pollution, promoting the walk-oriented and bike-oriented micro traffic in the site.

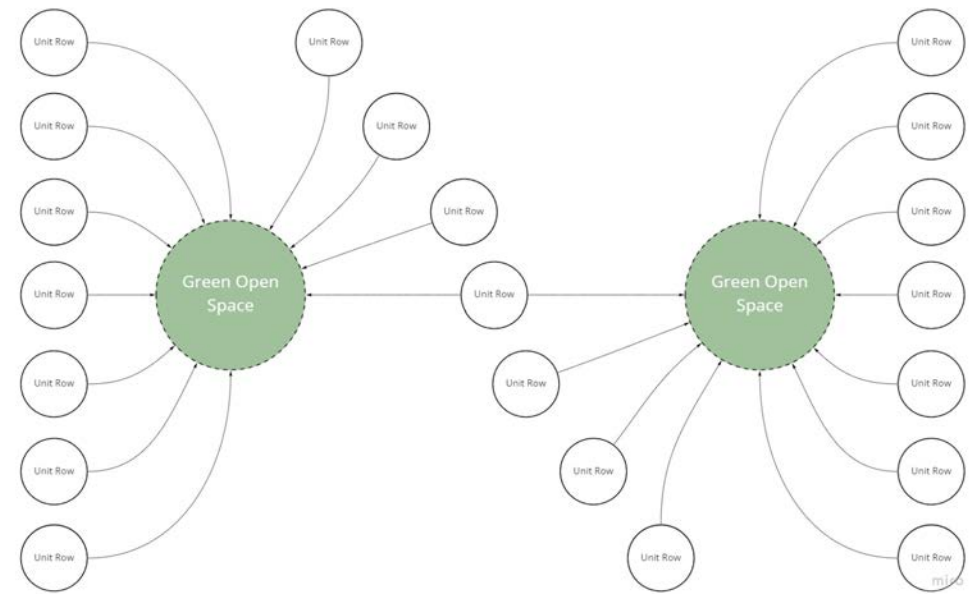


Diagram showing the connection of the green open space
Source: Author



Axonometric section showing the Panggung structure
Source: Author

By spreading potential trees around the site, it can buffer out the air, providing a much clearer air for the visitor and the occupant. Apart from that, it follows the local regulation and building code to provide some parts of the whole site for an unobstructed green area as written in the Perda of DKI Jakarta province. The dedicated open green area is meant to be the natural drainage surface (that connects with the next third purpose).

1.6.3. Flood Response & Prevention

The slum's main threat of flood needs to be reconciled with the design by adapting the design's typology. The typology of the design's free and open first floor area (ground floor below the main first floor of used functional space) is opened throughout the hollow void, filled with only grass soil, perforated pavement block, grass block, plantation block, and service shafts and/or plumbings. The design's main strategy on adapting the design and the people itself with the flood by letting the literal first floor being filled with flood water is meant as the optimal adaptive resilient approach, because it will not obstruct the whole system or normal of the people. The problem of the main flood source itself is on outside of the design scope. It's problematic, complex, and politically-related problem is going to be solved by the affiliated authority. The design's mere ability is to make the people adapt to it and continue the normal flow of everyday's activity, as it is seen and chosen as the better approach.

According to Kodoatie and Sugiyanto, flood can be either caused by natural causes or caused by human actions. In the case of this design, both categories take part as the causes, but it has already been in a stage where dealing with the root problem of the flood is unreachable from the design phase. Thus, the adaptation for such flood-friendly architecture takes many of its inspiration from traditional and vernacular architecture of Indonesia. As it has been researched by Nuryanto, Surasetja, and Ahdiat in 2019, the general concept of a flood-friendly house can be taken from vernacular architecture like Sundanecse community's house architecture. The stage houses (panggung) inspiration gives two main functions for the clear opened underneath stage area: good for air circulation; and as a pond for water traffic during floods. Not only will it reconcile daily activity with flood, but it will also give a benefit in terms of the first floor (above ground) air circulation and quality.

1.7. Large-scale Distribution of Function

The first distribution of network happens in the larger scale, that in the design's context is the function or the type of function of each modules. A rigid, centralized and segregated distribution are avoided because it contradicts the adaptive resilience framework. Follow the framework, the network of elements that are crucial of the system (in this case, the Function) should be distributed throughout the system, giving alternative pathway of network. Thus, the first physical implementation is the combination of the model of a two-story residential unit with one multi-purpose main room on the lower-level story. By combining this type of units, and placing it also in a distributed zoning complex of units, it will create a wholly distributed architectural spaces.

The intention and the purpose of this approach is to give resiliency for the occupant in the time of a disturbance. Not only COVID-19, but any disturbance that happens and consequently force the people to have horizontal/vertical spatial distancing (as been discussed in the previous early chapters) will not cut off the occupant's normal state because of this interconnected distribution of elements. The real example of this slightly abstract concept can be examined from the design's COVID-19 case example starting from the page 144. Not only that, but any possibility of 'normal state emergency' case can be imagined and be predicted a lot better if the design falls down under this framework of Adaptive Resiliency. The design focuses on responding a change of context and state, not merely a change of small disturbance (such as narrowed and categorized disturbance like 'flood', 'disease', or 'poverty'). Every small disturbance will fall and be covered under this notion of 'context' because they all will eventually change the context of the occupant at some point.



Red circle: residential unit; Green circle: Multi-functional area; Blue circle: Kiosk or commercial space
Source: Author





Communal multi-functional space interior
Source: Author

1.8. Small-scale Distribution of Zoning & Activity

The smaller scale of the network distribution approach in the design tackles the small, fragmented, and diverse informal activities happening in the kampung. The approach tries to bring back the memories, as well as the ambience from the previous kampung into the new typology by spreading the activities throughout the alleys of units. Because the functional zoning has been distributed by the previous larger-scale distribution step, the informal activities will be distributed in-between these units, around the threshold spaces perceived as alleys in the building complex. The threshold spaces are intentionally created first as the additional liminal space for various activity and to follow the COVID-19 guideline on giving minimum safe distance for mobility. The first image as can be seen above shows one of the communal social spaces in one of the corners of the building. Various activity can emerge as the people will dictate and adapt themselves on using the provided space. But to gain these attractors of functional emerging, the design of the space needs to bear a certain interesting elements, such as the semi-opened partitions of recycled lightweight wire rods, acting to not only dispersing the wind, but as the base surface for hanging hydroponic plantation and crawling vines. Also, it has direct access to its upper-floor with an opened central void, continuing the wind circulation from the opened partition to each floors. These openness in visual cues will hopefully provide a sense of comfort, 'adequate of space', and 'room to breathe' in the midst of such depressing context of COVID-19 disturbance.



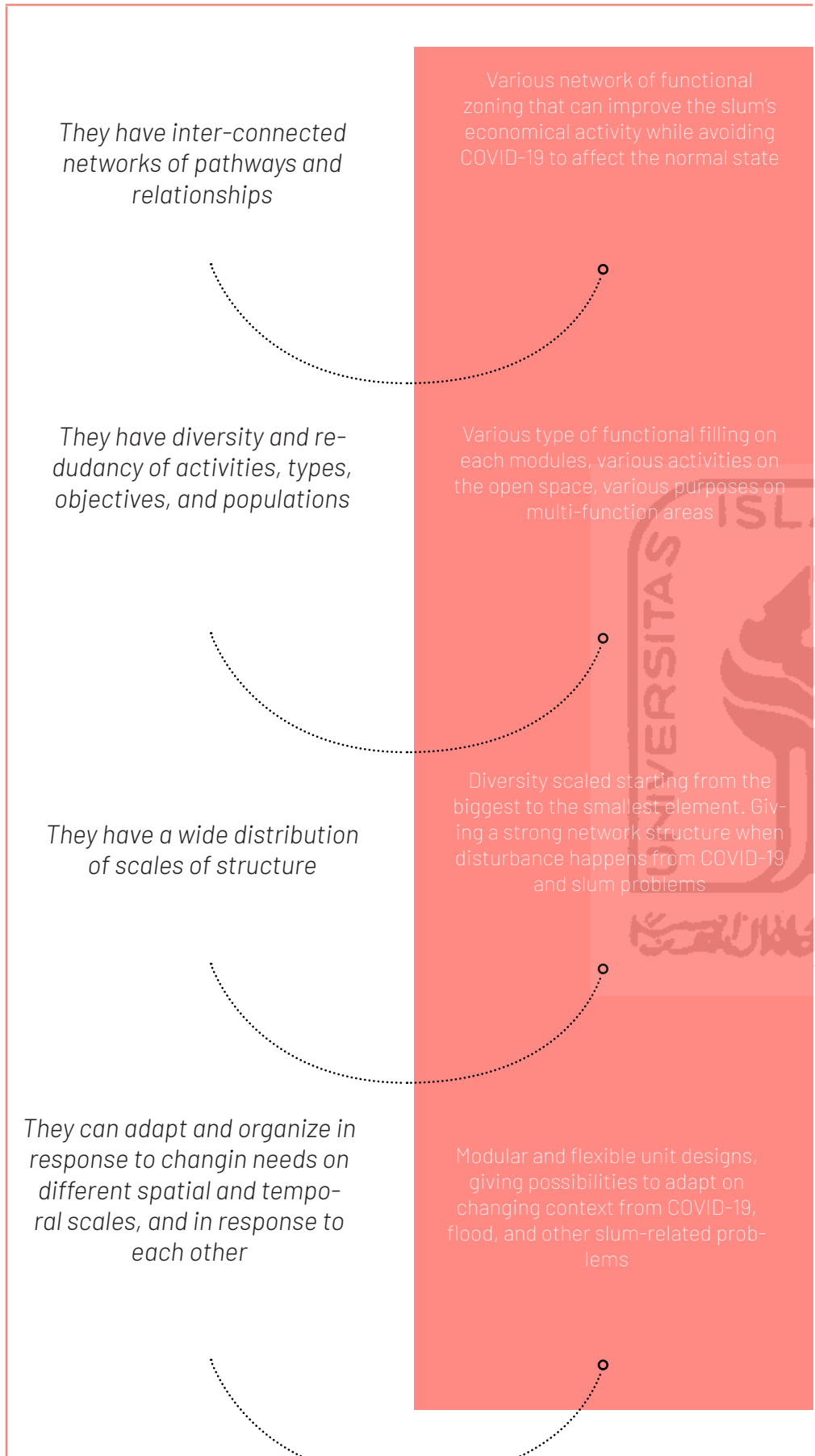
Kiosks Alley and Corridor
Source: Author



Aside from the communal social spaces at several corners in the building complex, the alleys that circulate all units in the whole design, mimicks the feeling of the previous kampung's diverse small alleyway ambience. From the analysis on earlier chapter, the alleyway acts as the connecting threshold space that houses various activities, and can be perceived as the outer casing in which the inner kampung Machine would operate at the specified period of time. The corridor's overall dimension is slightly exaggerated from the conventional, stricting standard because it needs to follow the the pandemic guideline. By largening the overall dimension, it directly reconcile the COVID-19 and the slum's necessity by providing reducing the risk of direct disease spreading and giving a much bigger space for the slum community to express and operate their daily Machine of activities. Thus, one of the factor needs to be burdened in order to provide such uplifting design, and in this context, the constructional fee from the government, but if we analyze it, the choice on expanding the dimension will give a much better and more resilient design for the whole community, and for others to replicate. The distribution of small-scale network is also still be applied in this location, because each occupant has their own freedom on using their lower-story level. It can be used as family-owned shops, family-owned business, rented business, or additional residential functions instead. Thus, a diversity will be generated, and the slum's diversity will ensure that this type of iteration will not result a kind of non-diverse distribution of the space usage.

AR

CVD + SLM



2. Adaptive Resilience Framework Measurement

The adaptive resiliency of the design can be evaluated by passing through several design aspects into the four points of main adaptive resilience idea that have been formulated in the earlier chapter. They are the inter-connected networks of relationships, diversity of activities, wide distribution of scales of structure, and its response to changing needs on different spatial and temporal scales. When assessing these points, it will also show whether the design elements have reconciled both the COVID-19/ changing-context aspect with the slum complexity aspect. To find such relationship and mutual coverage from both aspects are the most important part as the design's main fundamental goal is to make any type of current and future disturbance fit through the frame of the slum's existing condition without interfering the normal state of the people.



3. Kampung Transformation Measurement

The last measurement that needs to be assessed is the transformation from its previous horizontal kampung typology, to this newly-designed vertical typology of Kampung. From the earlier chapters, several main keypoints and characteristics of Kampung can be taken as the guideline to see whether the transformation left out an aspect or two from the previous one. This step is crucial because the memory of the people is considered as one of the most important elements attached to the daily lives. As Gaston Bachelard wrote in his book *The Poetry of Space*, we can manage to analyze and see the glimpse of the soul of the people through its space and poetical memory, or topoanalysis approach (seeing how the built environment of each person reflects the way they perceive and act in real life). The characteristics are: variety; heterogeneity; kampung as an autonomous world; kampung as a highly serviced society—rombong culture; mutual aid system; preservation of traditional culture; and complexity of ownership relations.

KPG

DESIGN

Variety

Variety in aesthetics, form, and informalities

Heterogeneity

Various multi-purpose and multi-function space

Kampung as an Autonomous World

Infusing local commercial space and other function in-between residence

Kampung as a Highly Serviced Society

Sustaining everyday's needs and goods from the kampung itself (local shops) & rooftop hidroponic farm

Mutual Aid System

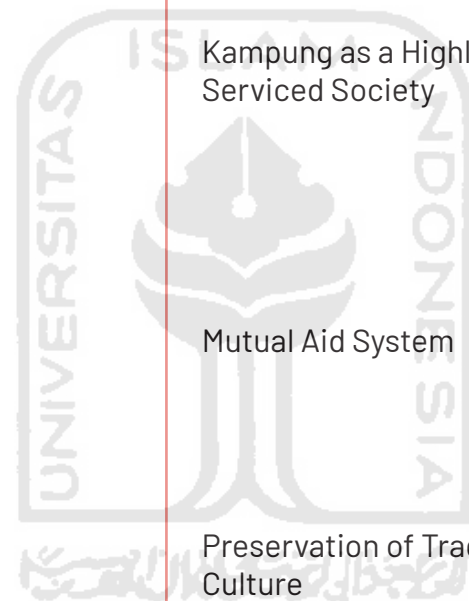
Close connection between each units, and social spaces

Preservation of Traditional Culture

Supporting Kampung's social activity by providing open space

Complexity of Ownership Relations

Various types of ownership type, and unit model



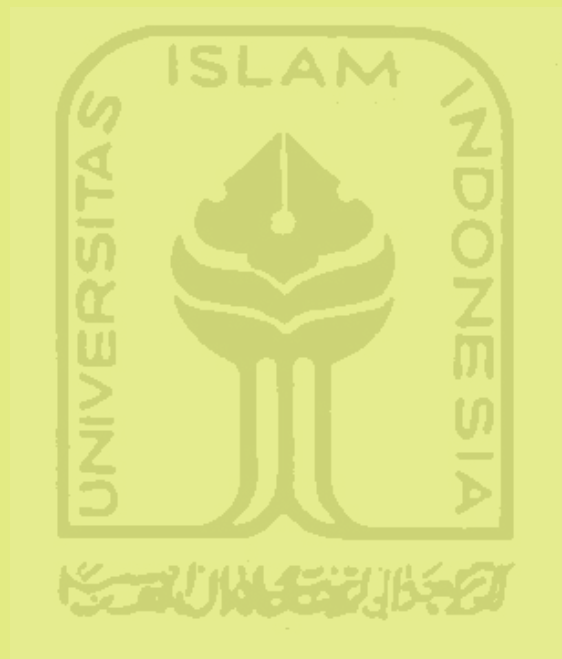


Rooftop Rendering
Source: Author



Interior Rendering, Living Room Example
Source: Author

3.3. conclusion & remarks



With all of its complexity, a Kampung is one word that possess various meanings, stories, interpretations, cultures, and people. With being one of the most diverse community, reconciling them with novel disturbances such as COVID-19 needs wide range of approach, perspective, and consideration. Adaptive Resiliency, being one of the design frameworks developed to empower the system and the people towards various unpredictable future, is infused and adapted into the design process that produced Kampung Vertikal Karet Tengsin. Multi-spectrum of reasons lay the foundation of the consideration on choosing vertical typology. Housing problem in urban slum, flood threat, and COVID-19; the red line that crosses all of the parameters is what Vertical Kampung is being hoped for.

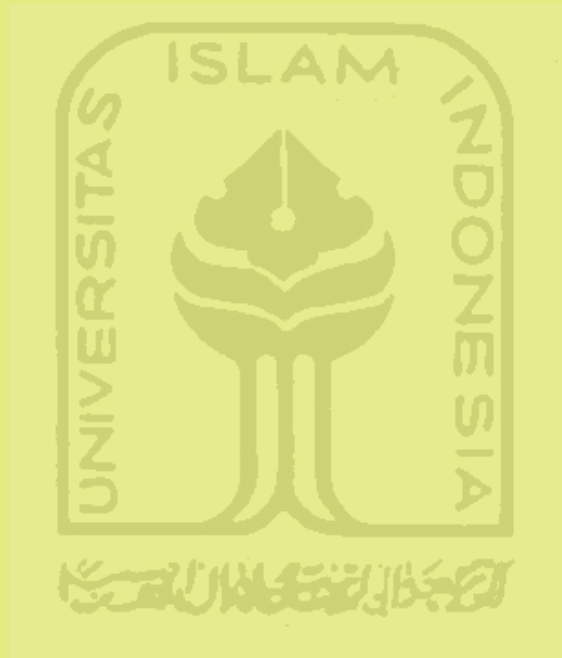




From this experiment, design process, and study, it is truly hoped that this design can spark another similar ideas on tackling similar issues circling around slum-related space. The adaptive resilience framework and ideas shows a very promising alternative on approaching complex problems, positing a different perspective on perceiving the fundamental way of how such a system or a design is being crafted. It pulls up the point of view, stancing itself from a more far vision, and working from the very first thing that is much more basic.

Becoming resilient means the people become elastic towards various interference and disturbance. The people could go back into their normal state, despite of whatever struck the community. And It is hopefully can be achieved by designing such Kampung that provides all of the tools and the spaces that they need to be on the right track towards that final goal.

4. design reflection



Semi Open Building Scheme Reflection

Reflecting from the final evaluation, the semi open building that is believed to be the good architectural scheme in tackling the design issues, can be further explained and presented step by step in a more clear information. As to how will the construction scheme be done, and its connection between the authority, constructor, and the future occupants, can be reclarified so that the construction stages, or the 'history' of how the final building made up to that final form could be easily understood.

In the existing work, it is designed so that the occupants and future occupants have the ability to choose what types of openings they want. This choice can be possible by first providing the void or hollow space on the partition on the initial construction stage. The constructor will only rise up plain partition wall and let a designated length and height of a hollow space to be filled by the occupant's choice of openings. They also have an option to fill it and enclose the hollow instead with the existing built material (that in this case, is exposed brick). What the design missed was that there could be the possibility for the occupants to also choose the finishing materials and the partition materials themselves. This adaptive preference and selection could have been greatly contributed to the design's concept on generating diversity as reflected from the horizontal kampung characteristics. Not only to the concept, but it can refine the design's intention on recreating informalities on the general facades. But while it is a possible alternative, there is also still some constraints if the mentioned innovation will be implemented. The first is that it contradicts the 'semi open building' scheme because it is leaning more and closely to the fully open building concept, and it has been discussed on the previous early chapters that a fully open building concept could have been slightly difficult on trying to reconcile the COVID-19 with the slum complexities because a certain amount of control by the construction or the owner of the complex is definitely needed in order to provide clearance and easeness of controlling information flows regarding COVID-19. Not only to control the monitoring information, but also on controlling the complex diversity and the spreadness of the functions on the design.

Initial Construction

Main structural element, sub structure, and super structure are constructed along with the hollow-void unit exterior partition and the balcony slab



Default Facade Combination Option

A catalog of facade combination option is provided by the owner/authority in case the occupant needs a reference to choose the infill



Occupant Candidate Consideration

Occupant candidate decide which option that suits their need, or prefer other combination and/or using their previously-owned opening elements



Final Construction

Final construction of installing and filling the facade void depending the selected facade combination option



Maintenance and Future Flexibility

Ensuring that the materials can be easily maintained, and easily be replaced and/or upgraded as the context/owner of the unit changes

If the construction scheme can be reconstructed and revisited into the clearer steps, it can be described first as like on this following description:

As the building adapts the semi open-building scheme that gives a particular amount of freedom to the occupant and the future occupant in constructing each of their units. The scheme can be explained and separated into the steps below. The step also ensures the simplest yet effective way on dealing with the portion of who-owns-what and who-designs-what category of elements. The full open building scheme was not adapted because several constraints from the design problem and the slum's condition are not really objected as the problems that could be solve easily with a fully open-building typology.

1. The authority of the building complex constructs the bare structure that includes the outer boundary exterior wall partition, with unfilled opening frames
2. The exterior wall that are facing the open view will be left as a void hollow space
3. Each balcony slab is also constructed at the first step for another option by the occupant's decision
4. Occupant firstly can decide what type of openings to be put inside the hollow void space.
5. The balcony slab can be used as a literal balcony or it can be extended and enclosed as the extension for the interior room space
6. The finishing can follow the general option provided by the authority or the occupant can choose the type of finishing for the partition walls
7. The inside-partition can be built after the initial function of the unit has been decided by the occupants by constructing them with lightweight partition structure



Hollow Space at Partition and Balcony Slab shown by the red color



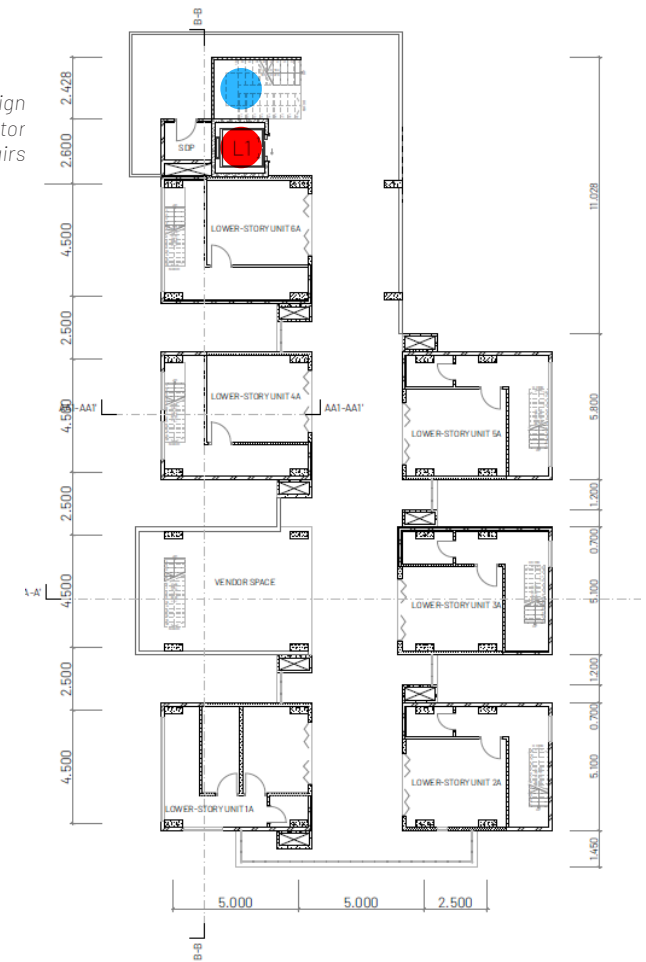
Generated example of a filled final partition voids and some extension of the balconies

Circulation Reflection

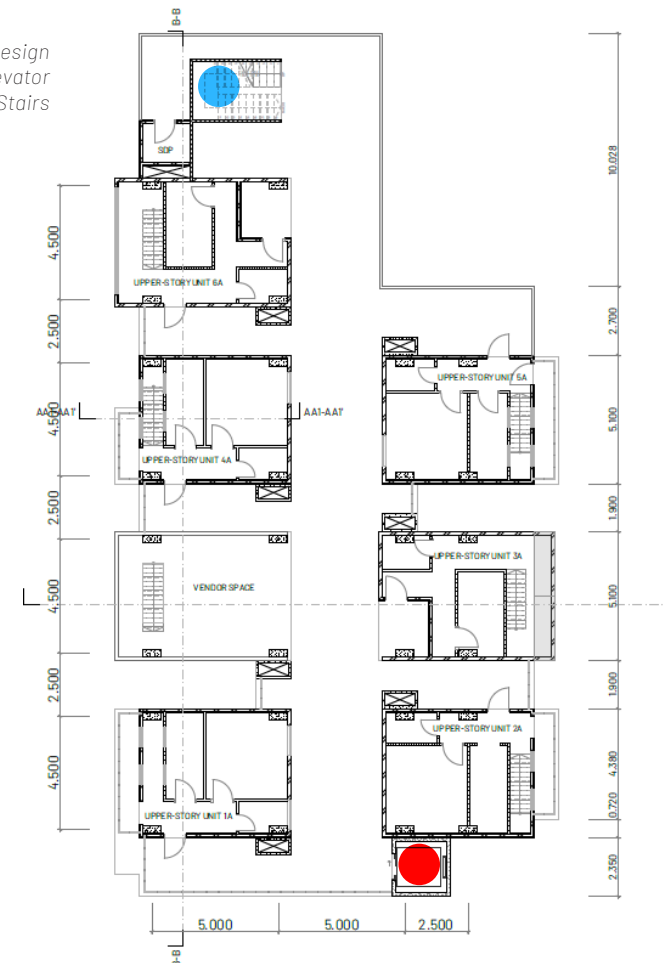
One of the main concern in dealing with COVID-19 and other infectious disturbance is the circulation, or how the architecture will separate, lead, and manage the flow of the movement. Several steps has been attempted in the design in providing a much safer and resilient circulation, such as the largening of the overall circulation coefficient and dimension. It is visible by the quite wide length of the corridor circulationg and connecting each units. Not only the corridor and the alleyways, but also other types of circulation that are exist on the design. Though that passive approach could have been providing the desired safety measure, it is still not enough on providing the completely safe and resilient circulation.

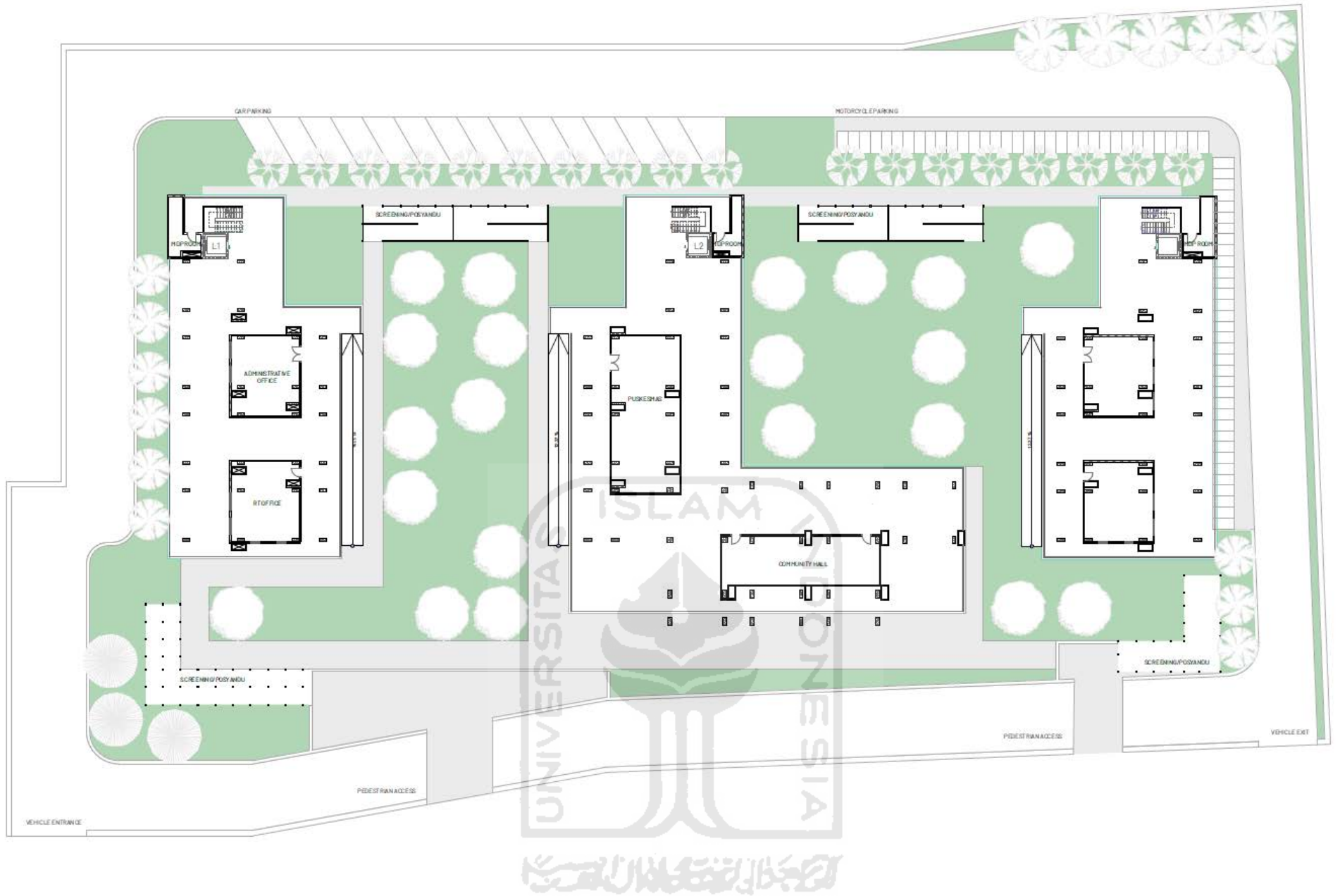
The missed point that could have been implemented to the circulation is the separation of the circulation. The separation is not for particular group of people, but more into making the circulation into several parts or branches that are separated from each other. This division of circulation is actually vital for the design's problem, because some example cases can be brought up to see how important it is to have separate circulation whether for an infected person or other necessity that needs separate circulation from the 'other public'. The implementation can be done by moving the elevator position to the other side of the building corner, separating it from the stair vertical circulation. By doing so, there will be two completely separated circulations that can be used accordingly. Not only in COVID-19, but it can also be used as the dispersion for the crowdness. Because the building is elongated, two circulation with two emergency exits are going to be much more preferable because it will avoid any jams and overcrowdness on the entry space around the vertical circulation. The elevator can be placed at the southern part of the building corner, and it will still maintain the general facade idea of the building's southern elevation face. The only downside is that additional cost may be need as the vertical stair will need its own structural support, whilst on the combined form, it can channel some of its force through the elevavtor's structural core.

Circulation on the old design
Red: Elevator
Blue: Stairs



Circulation on the new design
Red: Elevator
Blue: Stairs





Siteplan Reflection

A much more proper siteplan is needed in order to fulfill the standardized technical drawings. A confusion was made in the early designing stage due to the fact that the design has a sub-ground level below the first floor that acts as the natural drainage space for the flood. The siteplan will consist of the first floor instead (that can actually show the first usable rooms and spaces) combined with the siteplan elements like the site boundary, hardscapes, softscapes, and vegetation. The overall siteplan design can also be improved generally from the ground floor's critique and from the fact that there is still many potential on the vegetation aspect. Aside from the perforated pathwalk that can also drain the water body, some spaces on the corner can be designed as a decorated and a more attractive landscape spot. Such example could be by adding more outdoor furniture, like outdoor gym and benches, and other essential outdoor furniture often found in a well-designed landscape space.

Materiality of The Building Reflection

If the construction scheme can be reconstructed and revisited into the clearer steps, it can be described first as like on this following description:

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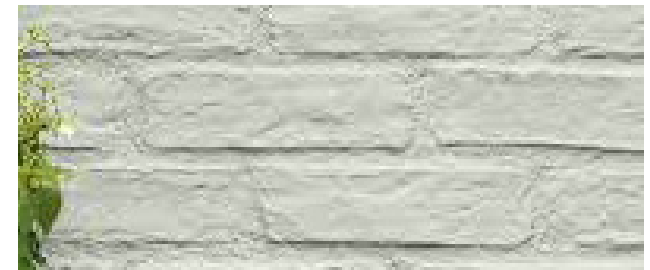
The current design's exterior finishing material of an exposed brick wall



Optional material exploration:
Exposed lightweight brick



Optional material exploration:
Painted masonry brick



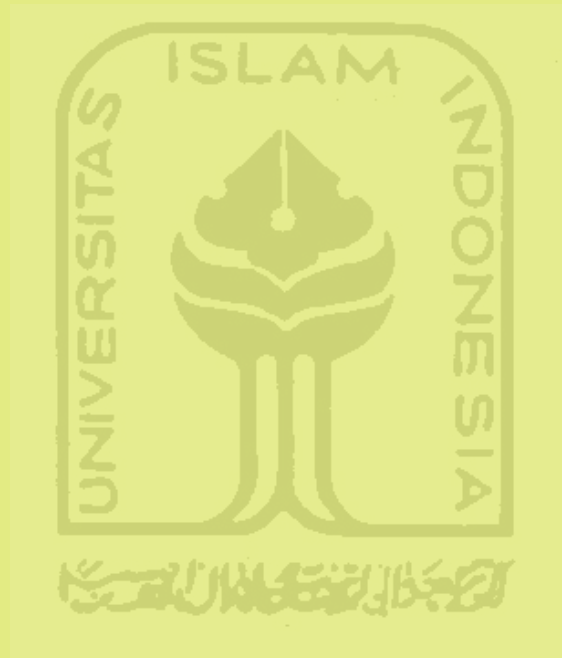
Optional material exploration:
Exposed concrete wall



Optional material exploration:
Painted finished brick wall



5. reference

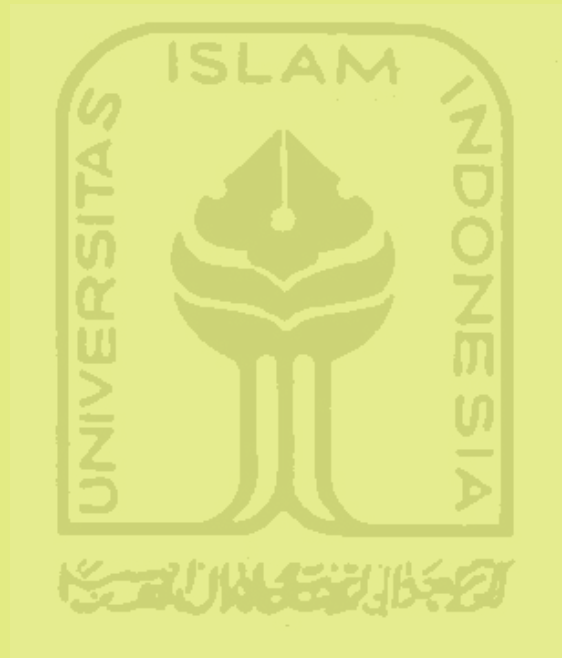


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6. attachment

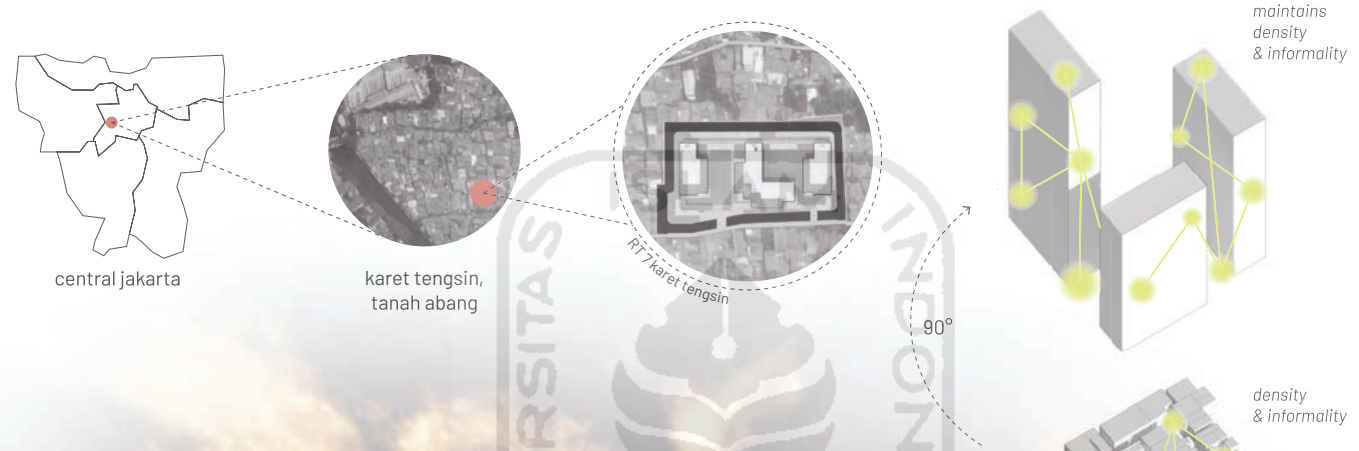
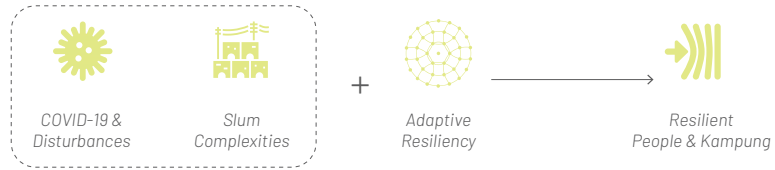


kampung vertikal karet tengsin

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Heterogeneity of People Variety, Mutual Aid, and Autonomous World Complexity of Ownership Relations Social Bonds, Threshold Spaces

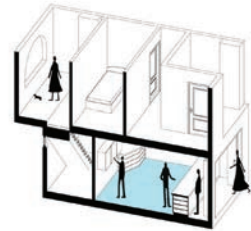
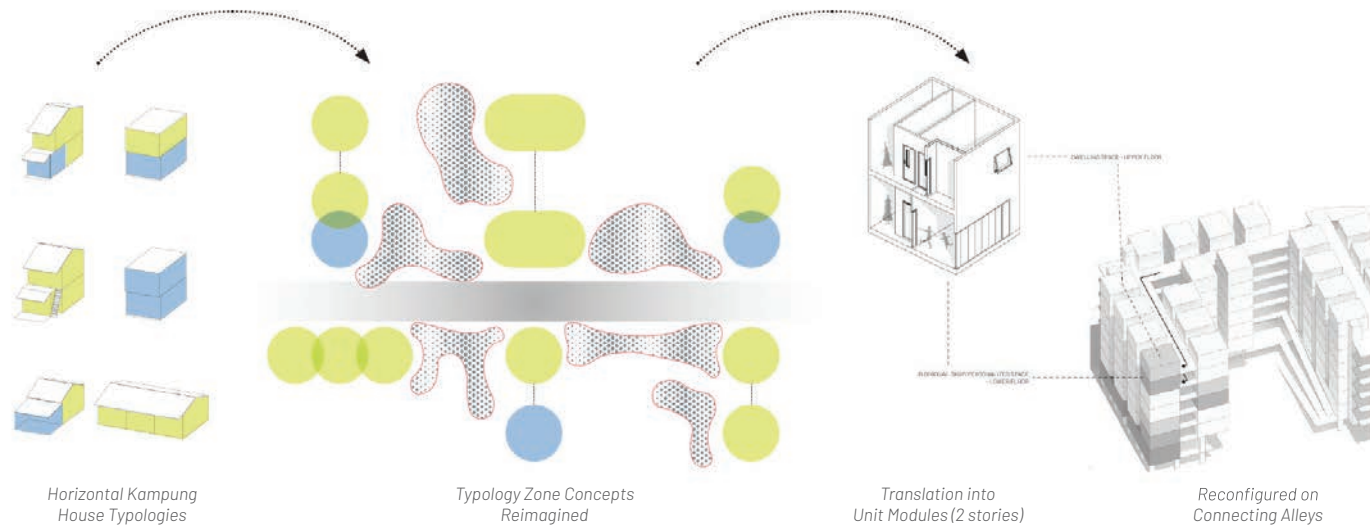


final architectural
design studio

Name & Student ID
Avinsa Haykal 17512014
PAP Lab

Supervisor
Ir. Wiryono Raharjo, M.Arch, Ph.D





Kiosk Usage

From the previous analysis, the frequency of local residents having their own small shops underneath the houses is quite high. Thus, this first choice of flexibility is meant to connect back the previous kampung's memory and ambience of diverse, moving, and intimate rows of shops to the new vertical kampung typology. The multi-functional space follows the standard dimension of the conventional store/shop, or even bigger in terms of its anthropometrical sense. Various types of shop could be opened and functioned in the space, including the most frequent one like warung, item-specified shop, electrical shop, vegetable shop, small eating shop, retail shop, et cetera. Because the residents are free to choose whether they will use the space as a shop or not, a diverse distribution of shop rows/zoning will naturally grow throughout the whole building.



Additional Residential Usage

A choice is also provided for residents that do not own any shops or planning to open one in the future. The multi-functional space can be used as an additional residential function instead, such as living room, bigger dining room, or other distribution that will act as a function for living. To give a chance for the resident to flexibly change the function to residential use, the facade of the unit will also be constructed with a modular hollow material that can be plugged with various types of openings. As in this case of function choice in the multi-functional room, an example of a door and two adjacent big windows can be installed into the modular void, to give a more representation of a front side of a house (or a residential unit) instead of a commercial building.



Other Function Usage

One of the main intention of freeing the lower-level story is to provide the resiliency approach in dealing with unpredictable disturbances such as COVID-19. The space can be used as a module of separated isolation rooms for the infected or isolated suspects. Not only from that, but it is integrated passively through the unit module design by separating the main residential floor to the upper-level story, so the family members can still continue their daily activities with a safer and more relieve feeling. The detailed material of the isolation room differs to the budget and the needs, which gives the place for local authorities or the creativity of the people to decide what kind of materials and semi-construction technique for the partitions.



Exterior Rendered View



final architectural
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PAP Lab

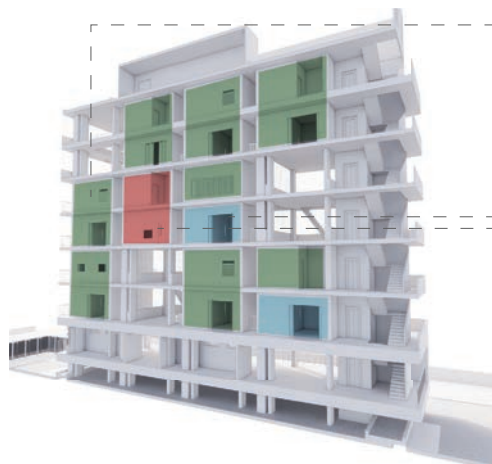
Supervisor
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Distribution of Function

The first distribution of network happens in the larger scale, that in the design's context is the function or the type of function for each module. A rigid, centralized and segregated distribution area voided because it contradicts the adaptive resilience framework. Following the framework, the network elements that are crucial of the system (in this case, the function) should be distributed throughout the system, giving alternative pathway of network. Thus, the first physical implementation is the combination of the model of a two-story residential unit with the multi-purpose main room on the lower-level story. By combining this type of units, and placing it in a distributed and complex architectural spaces.



2-story Unit Used:
Upper as Residential Unit
Lower as Family-owned Kiosk

2-story Unit Used:
Upper as Residential Unit
Lower as Residential Unit

Single Residential Unit (Upper)
Single Kiosk Unit (Lower)



Possible Flexibility
Option Result



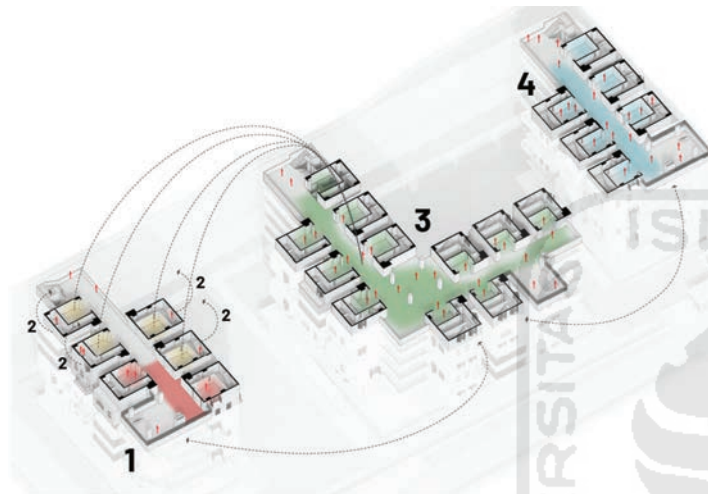
COVID-19 & Slum Complexity & Adaptive Resiliency

The first and one of the most important design parameters that need to be evaluated and simulated is the COVID-19 parameter which reflects itself to the specified standards published by the WHO and other organization. The standards consist of standard dimension, procedure, and other design aspects for a built environment meant to be resilient and prevent a current pandemic and other future disturbances. The steps and stages are divided into seven stages, starting from the circulation safe dimension. COVID-19 cluster disturbance towards people's economics, COVID-19 cluster towards occupant safety, residence flexibility, open green area & distribution of function, zoning & activity distribution, and entrance, screening and data-monitoring aspects. These stages are proposed in accordance with the important points gathered from previous chapters. Some points like the second, third, fifth, and the sixth stages are correlating to the adaptive resiliency indicators; meaning that the approaches are mostly taken out from the later theory because they are not the same track and goal with the epidemic prevention fashion. Manual calculation, software-simulated, and case-based study will be used as their infographic communication to clearly present the design's capability on each stage.

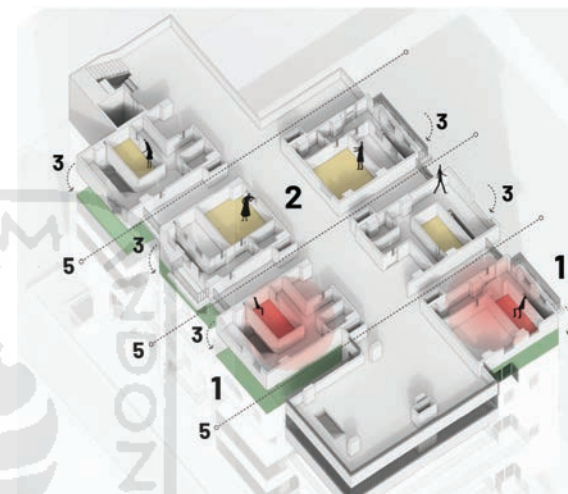
Circulation Safe Dimension



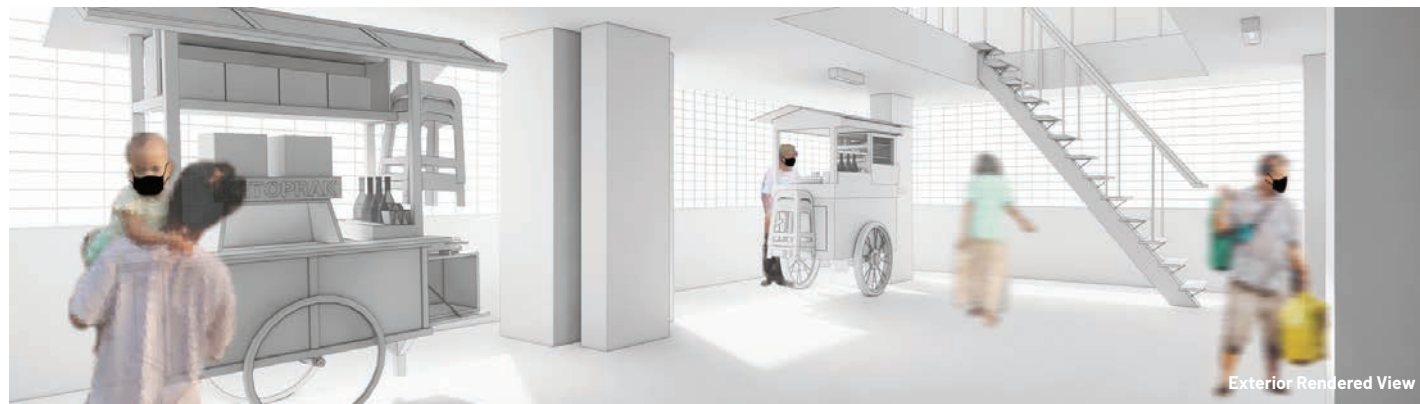
COVID-19 Cluster Disturbance towards Economics



COVID-19 Cluster towards Occupant Safety



Exterior Rendered View



Exterior Rendered View

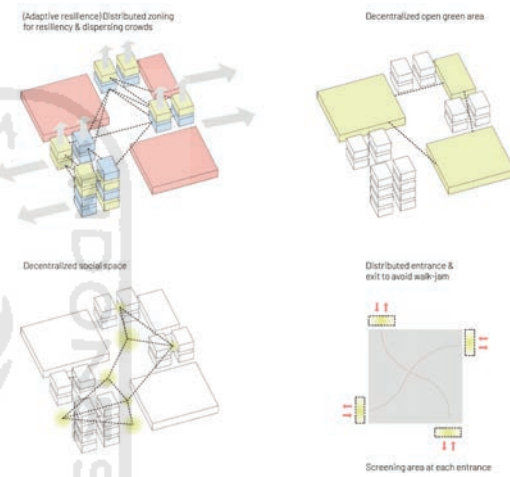


From this experimental design process and study, it is truly hoped that this design can spark other similar ideas on tackling similar issues in rural and urban-related space. The adaptive resilience framework and ideas shows a very promising alternative on approaching complex problems, posing a different perspective on perceiving the fundamental ways of how such systems are designed. It pulls up the point of view, distancing itself from a more far vision, and working from the very first thing that is much more basic.

Becoming resilient means the people become elastic towards various interference and disturbance. They could go back into their normal state, despite of whatever struck the community. And it is hopefully can be achieved by designing such Kampung that provides all of the tools and the spaces that they need to be on their right track towards that final goal.

Inevitable Flood Threat Response

The slum's main threat of flood needs to be reconciled with the design by adapting the design's typology. The typology of the design's free and open first floor area (ground floor below the main first floor of used functional space) is opened throughout the hollow void, filled with only grass soil, perforated pavement block, grass block, plantation block, and service shafts and/or plumbings. The design's main strategy on adapting the design and the people itself with the flood by letting the literal first floor being filled with flood water is meant as the optimal adaptive resilient approach, because it will not obstruct the hole system or normal of the people. The problem of the main flood source itself is on outside of the design scope. It's problematic, complex, and politically-related problem is going to be solved by the affiliated authority. The design's mere ability is to make the people adapt to it and continue the normal flow of everyday's activity, as it is seen and chosen as the better approach.





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**design of
vertical urban kampung
in karet tengsin,
tanah abang**

Reconciling COVID-19
with Slum Complexities
through Adaptive
Resilience Framework

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