The Design of

Intergenerational Housing

with WHO ICOPE Approach in Bantul

Pemodelan Arsitektur & Perkotaan

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Design of Intergenerational Housing with WHO ICOPE Approach in Bantul

Perancangan Intergenerational Housing dengan Pendekatan WHO ICOPE di Bantul

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Statement of Authenticity

I declare that all parts of this work are my own work, except the works mentioned by reference and that there is no assistance from other parties, either wholly or partially in the process of making it.

I also declare that there is no conflict of intellectual ownership of this work, so that all thoughts and writigns contained in this work are the main author and supervisor. The final results are submitted to the Department of Architecture, Universitas Islam Indonesia to be used for educational and publication purposes.

Sleman, November 17 2025

Raja Rayhan Zahri

Authentication Sheet

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Perancangan Intergenerational Housing dengan Pendekatan WHO ICOPE di Bantul

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Preface

Praise and gratitude are due to Allah SWT, along with prayers and salutations upon our Prophet Muhammad SAW, his family, and companions. By Their boundless mercy, I have been granted the strength and wisdom to complete the Final Architectural Design Studio titled "Design of Intergenerational Housing with WHO ICOPE Approach in Bantul" to the best of my abilities. This journey has been illuminated by the unwavering support and guidance to whom I owe my deepest appreciation:

- Allah SWT, whose infinite grace has been my guiding light, making the completion of this Bachelor's Final Project a reality.
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- My dear sibling, whose presence has been a source of motivation, inspiring me to be a dependable brother and strive for personal growth.
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For all the prayers, support, and assistance given, may it be rewarded by Allah SWT. I humbly acknowledge that this work is not perfect. I welcome constructive criticism and suggestions to further refine this project. It is my sincere hope that this work serves as a valuable resource, offering insights and inspiration to its readers, and stands as a testament to the collaborative spirit that has defined my academic journey.

Abstract

The rapid urbanization and demographic shifts in the Special Region of Yogyakarta present unique challenges and opportunities for urban planning. With a growing elderly population and increasing life expectancy, there is a pressing need to design urban environments that promote physical, social, and environmental well-being. This design explores the concept of Intergenerational Housing as a model for sustainable urban housing in Bantul, focusing on the integration of WHO ICOPE principles. By addressing issues such as access to healthcare, green infrastructure, walkability, and community engagement, this design aims to create neighborhoods that enhance the quality of life for all residents, particularly the elderly. Central to this design is the concept of aging in place, which ensures that the elderly can live independently and comfortably in their own homes and communities for as long as possible. Through thoughtful architectural design, this project seeks to transform Bantul into a model of healthy urban living that supports the well-being of its aging population while fostering a sustainable and inclusive community.

Key words: Intergenerational Housing, Elderly, Aging in Place.

Abstrak

Urbanisasi yang cepat dan pergeseran demografis di Daerah Istimewa Yogyakarta menciptakan tantangan dan peluang unik bagi perencanaan kota. Dengan populasi lansia yang terus bertambah dan harapan hidup yang meningkat, muncul kebutuhan mendesak untuk merancang lingkungan perkotaan yang mendukung kesejahteraan fisik, sosial, dan lingkungan. Desain ini mengeksplorasi konsep Intergenerational Hosuing sebagai model pengembangan permukiman berkelanjutan di Bantul, dengan fokus pada integrasi prinsip-prinsip WHO ICOPE dengan mengatasi masalah seperti akses ke layanan kesehatan, infrastruktur hijau, walkability, dan keterlibatan masyarakat. Desain ini bertujuan untuk menciptakan lingkungan permukiman yang meningkatkan kualitas hidup bagi semua warga, khususnya lansia. Konsep utama dalam desain ini adalah aging in place, yang memastikan lansia dapat hidup mandiri dan nyaman di rumah dan komunitas mereka sendiri selama mungkin. Melalui perancangan arsitektur, proyek ini berupaya mengubah Bantul menjadi model kehidupan urban yang sehat, mendukung kesejahteraan populasi lansia sekaligus menciptakan komunitas yang berkelanjutan dan inklusif.

Kata kunci: Intergenerational Hosuing, Lansia, Aging in Place.

| List of Content

01 Introduction 01

- Project Title 03
- Design Premise 04
- From Demographic Bonus to Potential Burden: Elderly Population Dynamics in DI Yogyakarta 05
- Urbanization and the Rise of Noncommunicable Diseases (NCDs) 07
- Political Initiative: Government Plans for Housing Development in Bantul, DI Yogyakarta 08
- Indonesia's 3 Million Housing Units Program 09
- Brian Lawson Matrix 11
- Force Based Design Framework 13
- Design Problems 15
- Design Goals 17
- Methodology 18
- Design Limitations 19
- Excellency, Originality & Novelty 21
- Early Figurative Design (Generated and rendered by AI) 22

02 Problem Study 23

- Study of Location, Site and Context 25
- Public-Private Partnership (PPP) Model and Implementation Strategy 33
- Study of Design Approach 34
- Study of Building Typology 41
- The Critical Role of Housing as Determinant of Healthy Ageing 43
- Design Study Preliminiary 45

03 Design Problem Solving 53

- Spatial Programming 55
- User Profiles 57
- Generative Process 61
- Galapagos Simulation 65
- The Human Touch 68

04 Analysis and Respond 69

- Design Framework 71
- Third Places Distribution 85
- Applied General Recommendations 93
- Types of Configuration 103

05 Design Description 105

- Block Plan 107
- Site Plan 108
- Floor Plans 109

Unit Allocation Plan 123
Elevation 125
Sections 127
Details 128
Units Axonemtry 129
Kitchen Details 130
Opening Details 131
Flooring Details 132
Structures Scheme 133
Accessibility 135
Ramp Details 140
Emergency Scheme 141
Plumbing Scheme 142
Foul Water Scheme 143
Electrical Scheme 145
Perspectives 147

06 Evaluation 151

Conclusion Review 153
Contextual Adjustment for Bantul, DIY 155
Rain Drops Management 157
Study on Elderly Movement 159
Study on Humidity for Elderly 161
Study on Social Interaction for Elderly 163
Design Brief Evaluation 167
Design Comprehensive Evaluation 172
Design Development Evaluation 174

07 Attachment 181

Poster 183
3D Printed Model 187
Turnitin 188
Bibliography 189

List of Figures

1.1	Man sitting on a bench	05
1.2	Intergenerational Contact	06
1.3	Woman mearing mask	07
1.4	Sri Sultan Hamengkubuwono X	08
1.5	President of Indonesia	09
1.6	Indonesian Households	10
1.7	Brian Lawson Matrix	11
1.8	Early AI Generative	22
2.1	Total Population, Elderly Population, Life Expectancy	25
2.2	Elderly Percentage in DI Yogyakarta	26
2.3	Education facilites map	27
2.4	Health facilites map	27
2.5	Uninhabitable house map	28
2.6	Total population map	28
2.7	Number of Nutritionists in community health centers map	28
2.8	Number of physiotherapists in community health centers map	28
2.9	Map of DI Yogyakarta	30
2.10	Map of Kabupaten Bantul	30
2.11	Map of Kecamatan Pajangan	30
2.12	Map of the choosen site	30
2.13	Sun-Path	31
2.14	Wind Rose	31
2.15	Wind Speed	31
2.16	Average temperatures and precipitation	32
2.17	Precipitation amounts	32
2.18	Maximum temperatures	32
2.19	Cloudy, sunny, and precipitation days	32
2.20	Contour Map - Interval: 2m	32
2.21	Land Coverage Map	32
2.22	ICOPE Care Pathway	34
2.23	Health Map	37
2.24	Constituents of Well-Being	38
2.25	The pathway from spatial planning decision to personal health and well-being	39
2.26	Well-being connections	39
2.27	Well-being connections	40
2.28	The Plinth	42
2.29	Greenery in Kampung Admiralty	45
2.30	Communal Space in Kampung Admiralty	45
2.31	Birds View of Kampung Admiralty	45
2.32	Section Kampung Admiralty	46
2.33	Plan of Kampung Admiralty	46
2.34	Facade of Kampung Admiralty	46
2.35	Birds View of Forest City Liuzhouy	47
2.36	Facade of Forest City Liuzhouy	48
2.37	Surrounding of Forest City Liuzhouy	48
2.38	Greenery of Forest City Liuzhouy	48
2.39	The Participatory Housing	49
2.40	Module The Participatory Housing	49

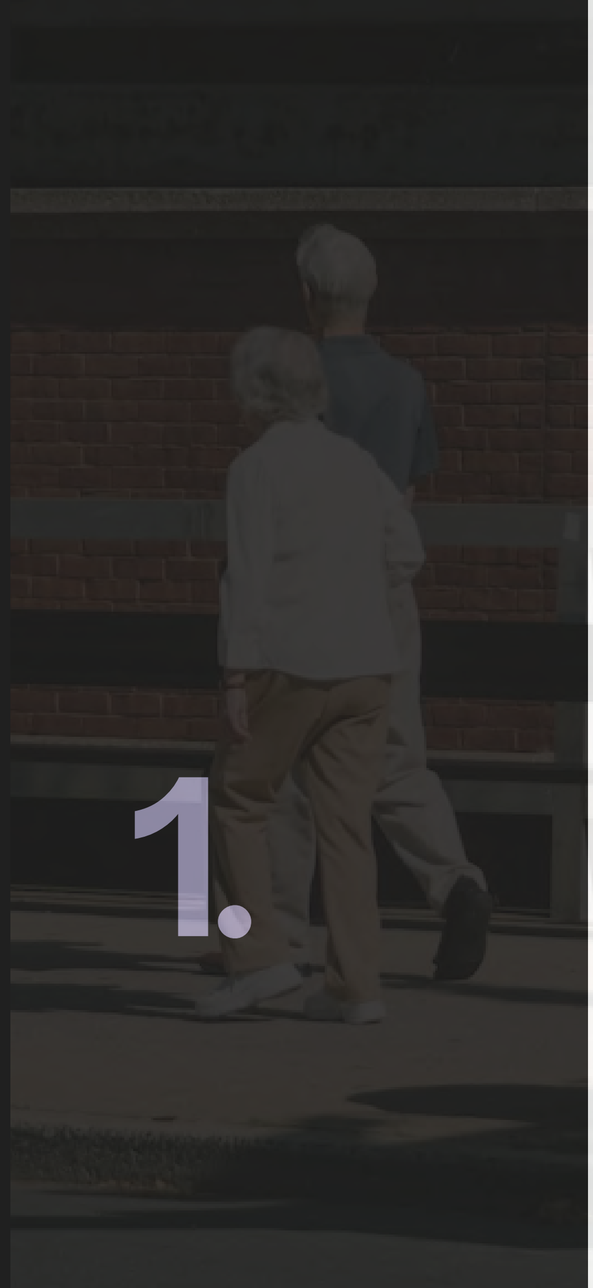
2.41	Module The Participatory Housing	49
2.42	The Participatory Housing Presentation Boar	50
2.43	Section of The Participatory Housing	50
2.44	Kampung Susun Kunir	51
2.45	Interior of Kampung Susun Kunir	52
3.1	Spatial Programming	55
3.2	Process of Generative Massing	61
3.3	3D Medical Imaging	62
3.4	Image Segmentation	62
3.5	Negative Volume Segmentation	62
3.6	Grasshopper Nodes	63
3.7	Galapagos	65
3.8	Mass Alternatives	66
3.9	Site Outdoor Solar MRT	67
3.10	The Human Touch	68
4.1	Circulation Plan	73
4.2	Social Area Plan	77
4.3	Communal Dining Perspective	80
4.4	Communal Farming Perspective	80
4.5	Contrast Interior	81
4.6	Loud Zone	82
4.7	Children’s Play Perspective	84
4.8	Multi Function Room Perspective	84
4.9	Lobby Perspective	85
4.10	Hydrotherapy Persspective	85
4.11	Reading Room Perspective	85
4.12	Floor Plan - 2nd	86
4.13	Children Play Zone Pers.	87
4.14	Family Breakout Room Perspective	87
4.15	Health Consultation Area Perspective	87
4.16	Floor Plan - 3rd	88
4.17	Multi Function Room - Communal Dining Perspective	89
4.18	Floor Plan - 4th	90
4.19	Gym Perspective	91
4.20	Outdoor Exercise Area Perspective	91
4.21	Communal Farming Perspective	91
4.22	Floor Plan - 5th	92
4.23	Site Contour	93
4.24	Wind Rose	93
4.25	Site Plan	93
4.26	Unit Modul	94
4.27	Galapagos	95
4.28	Site Outdoor Thermal	95
4.29	Unit Plan Opening	95
4.30	Sun Extreme Position	96
4.31	Detail Section	96
4.32	Shading	96

4.33	Unit Plan	*97*
4.34	Unit Plan	*98*
4.35	Unit Plan	*99*
4.36	Window Height	*100*
4.37	Unit Plan	*101*
4.38	Step Free Access	*101*
4.39	Situation Plan	*102*
4.40	Owned Unit Plan	*103*
4.41	Rental Unit Plan	*104*
5.1	Block Plan	*107*
5.2	Site Plan	*108*
5.3	Floor Plan - GF	*109*
5.4	Floor Plan - 1st	*111*
5.5	Floor Plan - 2nd	*113*
5.6	Floor Plan - 3rd	*115*
5.7	Floor Plan - 4th	*117*
5.8	Floor Plan - 5th	*119*
5.9	Floor Plan - 6th	*121*
5.10	Unit Allocation Plan	*123*
5.11	North Elevation	*125*
5.12	South Elevation	*125*
5.13	East Elevation	*126*
5.14	West Elevation	*126*
5.15	B-B Section	*127*
5.16	A-A Section	*127*
5.17	C-C Section	*127*
5.18	Section Details	*128*
5.19	Unit Axonometry	*129*
5.20	Kitchen Details	*130*
5.21	Opening Details	*131*
5.22	Flooring Details	*132*
5.23	Axonemetry - Structure	*133*
5.24	Foundation Details	*134*
5.25	Accesibility Plan - GF	*135*
5.26	Accesibility Plan - 1st	*136*
5.27	Accesibility Plan - 2nd	*137*
5.28	Accesibility Plan - 3rd	*138*
5.29	Accesibility Plan - 4th	*139*
5.30	Ramp Details	*140*
5.31	Emergency Scheme	*141*
5.32	Plumbing Scheme	*142*
5.33	Foul Water Scheme Plan	*143*
5.34	Foul Water Scheme	*144*
5.35	Electrical Scheme - Owned Unit	*145*
5.36	Electrical Scheme - Rental Unit	*146*
5.37	Facade Perspective	*147*
5.38	Rooftop Perspective	*147*

5.39	Building Vista	148
5.40	Birds Eye View	148
5.41	Shading on Facade	149
5.42	Living Area	150
5.43	Bedroom	150
6.1	Shading and Overhang	155
6.2	Communal Dining	156
6.3	Communal Farm	156
6.4	Corridor Section	157
6.5	Block Plan	158
6.6	Corridor Movement Standards	159
6.7	Wheelchair DImensions	160
6.8	Unit Plan	161
6.9	Floor Materials	162

List of Tables

1.1	Brian Lawson Matrix	12
1.2	Excellency, Originality & Novelty	21
2.1	ICOPE Care Pathway	35
2.2	ICOPE Assesment	36
3.1	User Profiles	60
5.1	Building Property	122
6.1	Conclusion Review	154
6.2	Scheduled Activities	165
6.3	Design Brief Evaluation - Examiner 1	167
6.4	Design Brief Evaluation - Examiner 2	171
6.5	Design Comprehensive Evaluation - Examiner 1	172
6.6	Design Comprehensive Evaluation - Examiner 2	173
6.7	Design Development Evaluation - Examiner 1	174
6.8	Design Development Evaluation - Examiner 2	179



1.

Introduction

Project Title

Intergenerational Housing

Intergenerational housing is a residential concept that integrates people of different age groups such as seniors, families, young professionals, and children within a shared living environment. It is designed to foster social interaction, mutual support, and community cohesion, addressing challenges like elderly isolation, housing affordability, and childcare support. hese housing models often include shared spaces, accessible design, and programs that encourage intergenerational engagement, such as communal gardens, activity centers, and co-living arrangements

Bantul

Bantul is a regency in the Yogyakarta Special Region of Indonesia, characterized by its blend of urban and rural areas, rich cultural heritage, and vulnerability to environmental hazards such as earthquakes and flooding. As the chosen study area, Bantul presents unique challenges and opportunities for implementing Intergenerational Housing principles. The region's rapid urbanization, informal settlements, and socio-economic conditions make it a relevant case Rstudy for assessing how healthy urban planning interventions can improve public health and environmental sustainability. Moreover, Bantul's local governance policies, community participation, and resilience strategies contribute to the feasibility and adaptation of health-oriented planning models in similar developing regions.

WHO ICOPE

WHO ICOPE stands for the Integrated Care for Older People approach. Launched by the World Health Organization (WHO), it is a set of evidence-based guidelines and tools designed to help health and social care workers support the aging population. The core philosophy of ICOPE is a shift away from simply treating diseases as they appear, towards a model of Healthy Ageing. It focuses on maintaining an older person's Functional Ability—allowing them to continue doing the things they value for as long as possible.

Design Premise

This project is rooted in the concept of creating healthy, inclusive, and sustainable urban environments that cater to the needs of an aging population while addressing the challenges of rapid urbanization. Bantul, as part of the Daerah Istimewa Yogyakarta (DIY), with its growing elderly population and unique socio-cultural context, serves as the ideal setting for implementing the Intergenerational Hosuing model. The project is guided by the principles of WHO ICOPE, which emphasizes on Healthy Ageing. It focuses on maintaining an older person's Functional Ability allowing them to continue doing the things they value for as long as possible.

The following key principles shape the design:

- Aging in Place: The design prioritizes enabling the elderly to live independently and comfortably in their own homes and communities for as long as possible. This includes creating barrier-free environments, age-friendly housing, and accessible public spaces that support the physical, social, and emotional needs of the elderly.
- Health-Promoting Infrastructure: The project integrates healthcare facilities, green spaces, and sustainable transportation systems to reduce the prevalence of non-communicable diseases (NCDs) and promote overall well-being. Walkable neighborhoods, cycling paths, and accessible public spaces are central to the design, encouraging active lifestyles and reducing health risks.
- Community-Oriented Spaces: The design fosters social interaction and community engagement by creating public spaces that encourage intergenerational activities. Parks, community centers, and recreational areas are designed to bring people together, reducing social isolation and promoting mental health.
- WHO ICOPE: The core philosophy of ICOPE is a shift away from simply treating diseases as they appear, towards a model of Healthy Ageing. It focuses on maintaining an older person's Functional Ability, allowing them to continue doing the things they value for as long as possible..

By combining these principles, this architecture design project aims to create a Intergenerational Housing that serves as a model for healthy urban living, addressing the challenges of an aging population while promoting sustainability and community well-being. The final design will be a holistic, human-centered solution that enhances the quality of life for all residents of Bantul and contributes to the broader vision of a healthy and inclusive Daerah Istimewa Yogyakarta.

| From Demographic Bonus to Potential Burden: Elderly Population Dynamics in DI Yogyakarta

The Special Region of Yogyakarta (Daerah Istimewa Yogyakarta, DIY) has experienced significant demographic transitions over recent decades, notably marked by a substantial increase in its elderly population. In 1990, individuals aged 60 years and above constituted 11.3% of the population, a figure that rose to 16,28% by 2024 making it the province with the highest share of elderly residents in Indonesia[1].

Figure 1.1
Man sitting on a bench
Source: ayoyogya.com

The Special Region of Yogyakarta has concurrently demonstrated significant progress in public health, evidenced by notable increases in life expectancy. From 1990 to 2023, life expectancy for males in the region rose from 62.5 years to 73.48 years, and for females, it increased from 65.7 years to 77.19 years[2]. These regional figures are superior to Indonesia's national averages, reflecting successes in local healthcare and living standards.

This demographic acceleration, occurring within Asia which already accounts for half of the world's elderly population, creates a complex scenario. While a growing, healthy elderly population offers a potential "second demographic bonus" through continued social and economic contribution, the failure to proactively manage this shift carries significant risks. Specifically, if this demographic potential is mismanaged, it can rapidly transform into a demographic burden, especially straining urban infrastructure such as public health systems. The heightened prevalence of chronic diseases among the elderly, such as diabetes, cancer, and stroke, often driven by sedentary or unhealthy lifestyles, risks elevating healthcare costs and severely diminishing the overall quality of urban life.

Figure 1.2
Intergenerational Contact
Source: unsplash.com

The concept of a "second demographic bonus" posits that a healthy and engaged elderly population can continue to provide economic and social contributions. Conversely, a lack of appropriate policies and programs tailored to the needs of older adults introduces the risk that this demographic group could instead become a significant societal burden, notably impacting the younger, productive segment of the population. Therefore, if the potential benefits associated with the rising elderly population in Yogyakarta are not effectively managed, this demographic shift may transform into a burden, particularly straining urban health infrastructure[3]. This outcome could result in elevated healthcare costs, overburdened services, and a decline in the quality of life for both older residents and the community at large. It is thus imperative to investigate strategies that capture the potential advantages of this demographic transition while simultaneously mitigating its associated risks.

| Urbanization and the Rise of Noncommunicable Diseases (NCDs)

Urbanization has been directly correlated with an increased incidence of Non-communicable Diseases (NCDs), encompassing conditions like heart disease, stroke, cancer, and respiratory illnesses. These NCDs constitute the leading causes of death worldwide and are expanding rapidly in developing nations[3].

The urban setting fundamentally shapes the primary risk factors for NCDs, which include tobacco use, alcohol consumption, inadequate diet, physical inactivity, chronic stress, and exposure to air pollution. Urban planning choices, such as transportation infrastructure design, the provision of recreational areas, and the accessibility of healthy food sources, directly influence these risks. For example, environments lacking safe spaces for walking and cycling or deficient in public transport options contribute to sedentary lifestyles and heighten exposure to air pollution, thereby accelerating the increase in NCDs.

Furthermore, the density and physical layout of urban spaces are critical to the transmission dynamics of infectious diseases. Overcrowded cities suffering from poor access to clean water, adequate sanitation, and hygiene facilities are frequent centers for infectious outbreaks. Due to factors like high population density, international travel, and migration, urban areas function as major hubs for the proliferation of infectious diseases. Consequently, urban planning must incorporate robust strategies for clean water provision, sanitation, and waste management to effectively control disease spread.

The health issues generated by urban environments carry considerable economic and social consequences. Non-communicable Diseases (NCDs) impose a significant economic burden due to heightened healthcare expenditures and reduced productivity. The mutual influence between urban planning and public health is clearly demonstrated by how city environments affect the proliferation and transmission of both infectious diseases and NCDs. Consequently, purposeful urban design and effective policy interventions are vital for lowering health risks and improving the quality of life within urban contexts. By proactively managing the structural and environmental factors that determine health, cities can cultivate settings that encourage well-being and decrease the overall impact of disease.

Figure 1.3
Woman mearing mask
Source: unsplash.com

| Political Initiative: Government Plans for Housing Development in Bantul, DI Yogyakarta.

Figure 1.4
Sri Sultan Hamengkubuwono X
Source: radarjogja.jawapos.com

The Special Region of Yogyakarta (DIY) is currently struggling with a significant rise in both land and housing prices, which increasingly complicates homeownership for many inhabitants. In response, the Governor of DIY, Sri Sultan Hamengku Buwono X, has proposed developing cost-effective housing to meet the growing need for well-planned, accessible residential areas. However, this initiative is still in its preliminary planning stage[5].

A central focus of this proposed initiative is the potential use of Sultan Ground (SG) for housing projects. To find alternative solutions, the Sultan has also put forward the idea of developing affordable residential units or rental rooms while ensuring high quality living standards. This proposal encompasses building modern, well-integrated housing solutions and exploring the possibility of establishing community housing on SG land. The southern region of Bantul is specifically considered for this development due to its relatively lower land acquisition costs.

| Indonesia's 3 Million Housing Units Program

The 3 Million Housing Program is an ambitious initiative launched under the administration of President Prabowo Subianto to address housing shortages in Indonesia, particularly for low-income communities. The program aims to construct 3 million housing units within five years, with a broader goal of delivering 15 million housing units for underprivileged households. The initiative is supported by the Ministry of Housing and Settlements (PKP) and is financed through the State Budget (APBN) to ensure accessibility for those in extreme poverty[6].

The program prioritizes rural and urban housing, with **2 million units designated for rural areas and 1 million units for urban development**. This allocation recognizes the need to improve housing conditions in both densely populated cities and remote communities, ensuring nationwide housing accessibility.

Figure 1.5
President of Indonesia
Source: indonesiadefense.com

Target Beneficiaries and Housing Specifications
Bonny Z. Minang underscored that the '3 Million Houses' initiative is exclusively designed for households experiencing extreme poverty. He noted that the eligibility criteria for beneficiaries are currently under development.

Preliminary criteria for potential beneficiaries include:

- Households within the lowest 20% income bracket.
- Individuals earning less than IDR 1 million per month.
- Residents subscribed to 450 kWh electricity plans.

Eligible beneficiaries will receive **Type 36 housing units, each situated on a 70-square-meter plot,** accompanied by a government subsidy of IDR 600,000 per month for a duration of 25 years. This initiative aims to standardize housing quality, ensuring consistent and sustainable infrastructure[4].

Figure 1.6
Indonesian Households
Source: kompasiana.com

A key aspect of the Three Million Housing Program is the potential implementation of a strata title system for certain developments, particularly in urban areas. According to Minister of Housing and Settlements (PKP) Maruarar Sirait the government is considering a **vertical housing model where buildings can be privately owned and traded, while the land remains state-owned**[7]. This approach allows for efficient land use in dense urban environments, aligning with the program's strategy of allocating 1 million housing units to urban areas.

The Three Million Homes program represents a significant effort by the Indonesian government to address housing shortages and improve living conditions for low-income families. While substantial financial resources have been allocated, effective implementation requires clear guidelines, coordinated efforts among stakeholders, and continuous monitoring to overcome existing challenges. However, beyond financial and policy aspects, the success of this program also relies on well-designed housing models that promote livability, accessibility, and long-term sustainability.

Brian Lawson Matrix

To further refine the design approach for Intergenerational Housing in Bantul, it is essential to apply a structured framework that encapsulates the complexities of urban health and well-being. Brian Lawson's Matrix of Design Problems provides a valuable tool for analyzing and categorizing design challenges based on their nature and constraints. By employing this matrix, the project can systematically address the interplay between functional requirements, environmental considerations, and socio-cultural dynamics. This approach allows for a nuanced exploration of solutions that align with the principles of Healthy Urban Planning, ensuring that the proposed design is not only aesthetically and structurally sound but also responsive to the diverse needs of the community, particularly the elderly population. Through this analytical lens, the Intergenerational Housing model can be further refined to foster sustainability, inclusivity, and resilience within the urban fabric of Bantul[8].

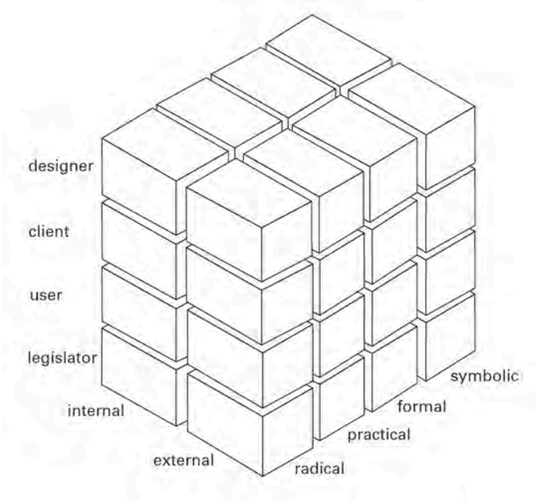


Figure 1.7
Brian Lawson Matrix
Source: How Designer Thinks - Bryan Lawson

Table 1.1
Brian Lawson Matrix
Source: Author

	Formal	Practical	Symbolic	Radical
Legislator - Government - World Health Organization (WHO)	**RTRW Kab. Bantul** **RTRW DI Yogyakarta** Policies and strategies for land use, zoning regulations, and the development of infrastructure.	**PP RI No.14 Tahun 2016** Regulation that outlines the administration of housing and residential areas in Indonesia	**3 Million Housing Program** Government initiative aiming to construct 3 million housing units annually.	**WHO ICOPE** A set of evidence-based guidelines and tools designed to help health and social care workers support the aging population.
User Households	**Aging in Place** Recognition of elderly rights, accessibility standards, and healthcare access.	**Accessibility** Ease of mobility, safety in public spaces, and access to daily services.	**Intergenerational** Community Social identity, belonging, and community.	**Healthcare** Experimental urban models integrating housing, healthcare, and mobility.
Client - Ministry of Housing and Settlements (PKP) - Private Sector Partner	**Healthy Urban** Compliance with urban planning guidelines	**Integrated Development**	**Modular** Pre-fabricated modules for design flexibility, sustainibility and efficiency.	**Adaptive** Adjust spatial configurations to meet the diverse needs of occupants.
Designer Architect	**City at Eye Level** Human scale, pedestrian interactions, and vibrancy of urban spaces.	**Universal Design** Designing walkable, inclusive, and adaptable spaces for various physical needs.	**Healthy Urban Living** Environments that promote the physical, mental, and social well-being.	**Internet of Things** Adoption of smart technology, AI-driven health monitoring, and community-based care

| Force Based Design Framework

Context & Priority → **Formal Response** ↔ **Refine** ↔ **Parts to Whole** → **Proposal**

Demographic, Health and Social Force
Addresses the needs of an aging population, multigenerational living, and community engagement through integrated public spaces, healthcare access, and participatory planning. The goal is to create an environment that supports the elderly while fostering social cohesion and inclusivity.

Political and Regulatory Forces
Complies with Indonesia's 3 Million Housing Program, WHO Healthy Cities guidelines, and local building codes. Ensures alignment with urban planning policies, zoning regulations, and infrastructure development standards.

Economic Forces
Aligns with government subsidies and private-sector investments in social housing. Ensures financial feasibility while maintaining affordability for elderly residents and low-income families.

Exploratory Thinking ↔ **Evaluative Thinking**

- Explore the specific needs of Bantul's aging population, including healthcare access, mobility, and social isolation.
- Investigate how intergenerational housing can address these needs while promoting community cohesion.

- Evaluate the financial viability of the project, considering government subsidies, private investments, and long-term maintenance costs.

Exploratory Thinking

- Integrated Development

Explore the practicality of integrating healthcare facilities, green spaces, and public transportation into the design.

- City at Eye Level

Create vibrant, human-scale environments that encourage community interaction and engagement by applying ciry at eye level principles.

Evaluative Thinking

- Ensure the project aligns with local and national policies, including the 3 Million Housing Program and WHO Healthy Cities guidelines.
- Explore modular and prefabricated construction techniques to reduce costs and construction time..

Exploratory Thinking ↔ **Evaluative Thinking**

- Investigate the use of smart technologies (e.g., IoT, AI-driven health monitoring) to support aging in place and improve the quality of life for elderly residents.

- Ensure the project aligns with Healthy Urban Planning Checklist

Social Housing

The final design proposal for Generational Housing will integrate the findings from exploratory and evaluative thinking to create a health-centered, sustainable, and inclusive housing model that supports all age groups. The proposal will include:

- Modular Housing Units: Flexible and adaptable designs to accommodate multigenerational families and evolving needs over time.
- Green Infrastructure: Parks, community gardens, playgrounds, and pedestrian-friendly pathways to promote physical activity, mental well-being, and environmental sustainability.
- Intergenerational Community Spaces: Shared kitchens, activity centers, and public plazas to foster social interaction, collaboration, and mutual support across generations.
- Smart Technologies: IoT-enabled health monitoring, energy-efficient systems, and smart home features to enhance quality of life and sustainability.

By combining these elements, Generational Housing will serve as a model for healthy urban living, addressing the challenges of multigenerational living while promoting sustainability, inclusivity, and community well-being.

Design Problems

Architectural and Typological

Vertical Living Challenges

The thesis identifies the inherent difficulty of vertical living for the elderly. Relying solely on elevators or having steep ramps (1:12) presents barriers. The design problem is how to create a "ground-level" experience or fully accessible vertical transition that supports independent mobility.

Barriers to Mobility

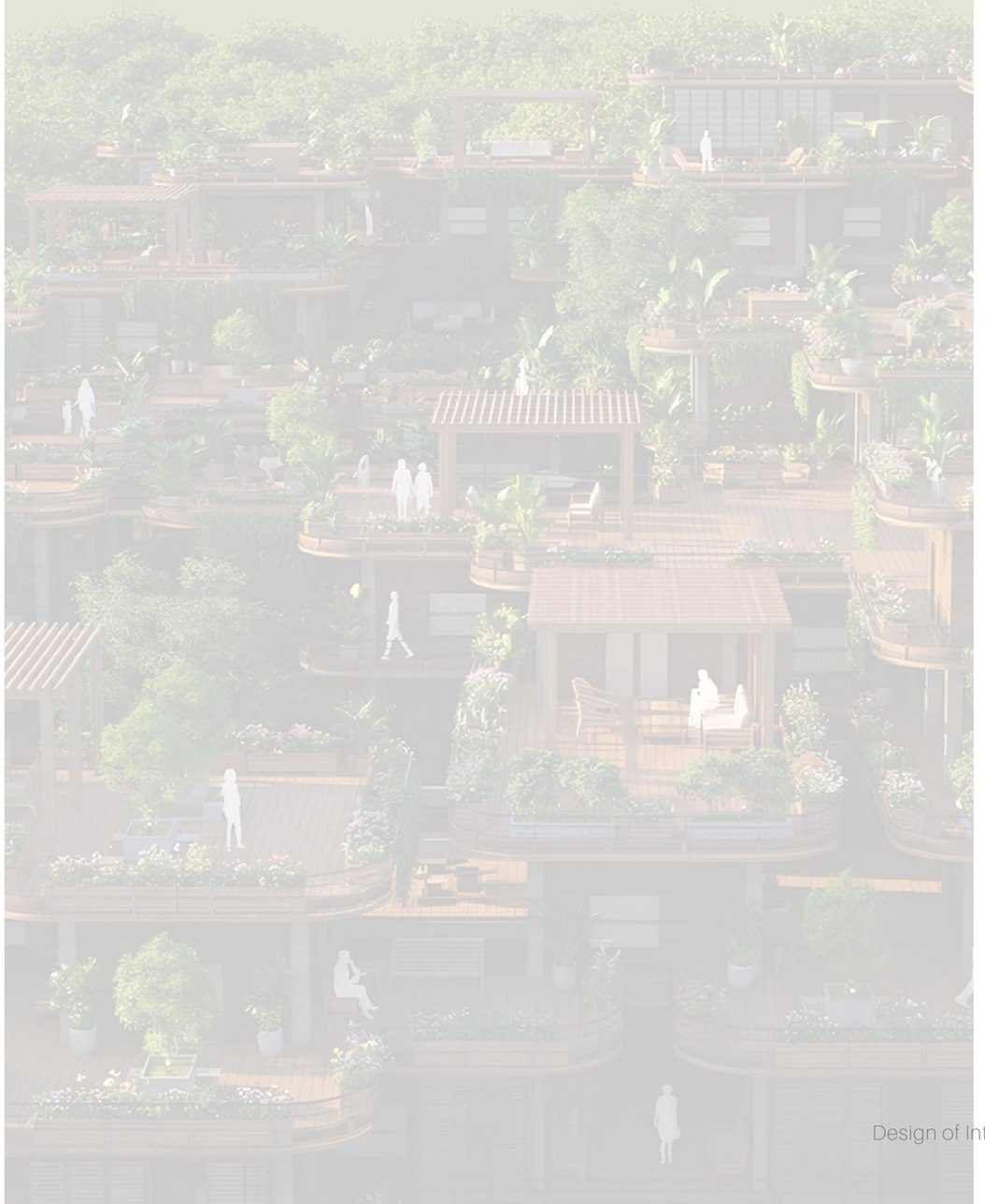
Standard architectural details often fail older adults. Common problems include thresholds that cause tripping, corridors that are too narrow for two-way traffic with mobility aids, and heavy doors that are difficult to operate.

Sensory and Cognitive Disorientation

Uniform, institutional environments can lead to stress and confusion. A key design problem is the lack of "wayfinding" cues. Complex layouts, repetitive corridors, and a lack of visual distinction make navigation difficult for those with cognitive decline.

Inadequate Indoor Environmental Quality

Poor ventilation and lighting exacerbate health issues. Older adults require higher lighting levels than younger people. A design problem is ensuring adequate lux levels and proper contrast without causing glare, which can obscure vision and increase fall risks



Systemic and Contextual

Fragmented Care Delivery

Current housing often lacks the infrastructure to support the "Stepped-Care Model" of ICOPE. The design problem is how to spatially integrate health services (screening rooms, consultation spaces) into a residential setting without making it feel like a hospital

Economic Constraints vs. Quality

The project operates under significant financial constraints. The design problem is balancing low construction costs with the need for high-quality, durable, and safe materials necessary for an aging population

Social-Behavioral

Inability to Guarantee Social Interaction

Architecture can facilitate cohesion but cannot guarantee it. The design problem lies in creating a framework of shared spaces such as courtyards, community gardens, and activity centers that encourage organic, rather than forced, intergenerational connection.

Social Isolation and Loneliness

Despite high-density living, older adults often face isolation. The design must address the lack of "collision points" where natural social interaction can occur, particularly for those with limited mobility who cannot travel far to socialize.

Design Goals

1. To design an enabling physical and social environment that specifically addresses Yogyakarta's demographic imperative for aging, supporting the maintenance of intrinsic capacity to reduce, delay, or prevent care-dependency among the region's high number of elderly residents.
2. To implement a resilient, modular structural system derived from computational optimization that enables high spatial adaptability while balancing minimized environmental load, specifically by achieving optimal performance in solar reduction and outdoor thermal comfort suitable for the tropical Bantul climate.

Methodology

WHO ICOPE Approach

The Integrated Care for Older People (ICOPE) approach is a strategic framework developed by the World Health Organization (WHO) aimed at optimizing the health and well-being of older adults. It shifts the focus from treating individual diseases to maintaining and improving the individual's ability to function and thrive independently[10].

The WHO ICOPE approach will be utilized as the central methodological framework in this design. It dictates the design process by linking architectural solutions directly to public health outcomes, moving beyond standard accessibility toward enhancing residents' capabilities.

Data Collection Method

Primary Data

Primary data is collected through direct site observation, focusing on the existing urban environment, infrastructure, walkability, accessibility, and public space usage. This involves documenting physical conditions, spatial layouts, and environmental quality to assess how well the current urban setting supports health and inclusivity, particularly for the elderly.

Secondary Data

Secondary data is gathered from government reports, urban planning regulations, academic research, and statistical data related to WHO ICOPE and Intergenerational Housing. This includes information on demographic trends, healthcare accessibility, land use policies, and environmental conditions, providing a broader context to support site analysis and design decisions.

Design Approach Method

The design approach is developed based on observations and literature review, which identify key design problems. The project applies a typological and thematic approach in formulating the Intergenerational Housing design, ensuring a structured and contextually responsive solution. This design includes:

- WHO ICOPE

Implement guidelines and tools designed to help health and social care workers support the aging population.

- Modular and Adaptive Housing

Develop flexible housing solutions that accommodate aging in place and evolving user needs.
Integrate mixed-use development to enhance accessibility between residential, healthcare, and community spaces.

- Intergenerational and Community-Centered Design

Create public spaces and pedestrian-friendly environments that encourage interaction across different age groups.

Design Limitations

This architectural design proposal, while comprehensive in its approach, is subject to a number of limitations inherent in its context, scope, and implementation strategy. These limitations are acknowledged as areas requiring further research, validation, and real-world testing.

1. Contextual and Regulatory Limitations

- Dependency on Preliminary Government Initiatives: The project's premise is linked to a proposed government initiative for affordable housing in Yogyakarta which, as of the research date, remains in the preliminary planning stage and has not yet been realized.
- Uniqueness of Sultan Ground: The project is sited on Sultan Ground, which is governed by the specific authority of the Keraton Yogyakarta. Navigating the cultural and administrative complexities of developing this land presents a significant procedural limitation that is beyond the scope of this architectural study.
- Local Building Code Restrictions: The design must adhere to the Bantul Regency's building regulations, including specified limits on Building Coverage Ratio (KDB), building height, and setbacks. These regulations inherently limit the achievable density and architectural forms on the site.
- Geological Site Conditions: The Bantul region is known for its vulnerability to environmental hazards, including earthquakes. While the design can incorporate resilient strategies, the inherent geological risk of the location remains a fundamental limitation.

2. Socio-Behavioral Limitations

- Limited Community Consultation: The project is limited by the absence of a comprehensive, wide-scale participatory design process involving the broader elderly community. Design decisions are therefore based on academic research and partner insights rather than extensive, direct input from a diverse range of potential future residents. The social and cultural nuances captured in the design are consequently limited by this scope.

- Inability to Guarantee Social Interaction: The design strategically provides a framework of shared spaces—such as courtyards, community gardens, and activity centers to encourage intergenerational connection. However, architecture can only facilitate social cohesion; it cannot guarantee it. The success of these spaces is highly dependent on community management, programming, and the residents' willingness to engage.

- Mitigation of Inter-Age Conflicts: The design attempts to mitigate potential conflicts between different age groups (e.g., noise from children's play areas affecting seniors' rest) through strategic zoning. The effectiveness of this spatial separation is a behavioral variable that cannot be fully predicted or controlled by design alone.

3. Economic and Implementation Limitations

The project operates under significant financial constraints inherent to its social housing mission. The need to remain affordable for low-income households limits the budget for construction, materials, and long-term maintenance. The proposed
Public-Private Partnership (PPP) model , while a viable strategy for funding, introduces its own limitation by requiring the design to balance its primary social goals with the commercial needs of a private investor, who would need to recoup their investment through revenue-generating components. This creates a fundamental tension between social value and commercial viability.

4. Architectural and Typological Limitations

- Inherent Challenges of Vertical Living for the Elderly: While the design is fully committed to barrier-free principles with elevators and 1:12 ramps, vertical housing still presents inherent mobility and psychological challenges for some elderly residents compared to single-story living. The reliance on elevators, for example, creates a dependency on technology and maintenance.
- Scope of the Generative Design Process: The use of a generative design process (Grasshopper, Galapagos, Ladybug) optimizes the building layout based on quantifiable metrics like solar radiation. This methodology is limited in its ability to optimize for qualitative, culturally specific, or nuanced socio-spatial factors, which still required significant qualitative design judgment.

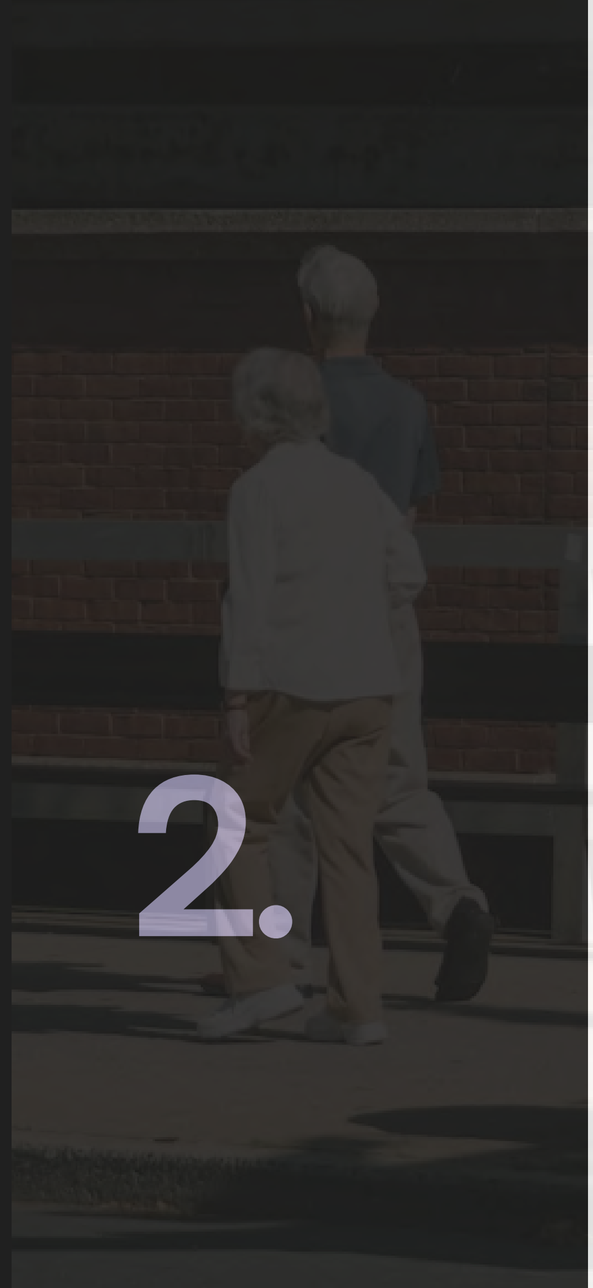
| Excellency, Originality & Novelty

Project Title	Lesson Learned	Difference
DESIGN OF LOW-COST RUSUNAWA AND RETAIL FOR LOW-INCOME COMMUNITIES WITH AN EMPHASIS ON CONSTRUCTION AND APPROPIATE SITE DEVELOPMENT IN THE CITY OF PURWOKERTO	Integration of low-cost housing (rusunawa) with retail spaces to support low-income communities. Use of modular construction for cost efficiency and sustainability.	Focus on rented social housing (rusunawa) combined with retail spaces to address urban density and economic needs. Different Site Location
THE DESIGN OF RENTAL FLATS FOR LOW-INCOME PEOPLE IN THE AREA ALONG THE RIVER CODE ABOVE THE REVITALIZATION OF THE YOGYAKARTA TERBAN MARKET WITH A HEALTHY BUILDING APPROACH	Integration of vertical housing (Rusunawa) with a revitalized traditional market to address both housing and economic needs. Use of healthy building principles to ensure proper ventilation, natural lighting, and sanitation, addressing the health concerns of residents.	The project combines affordable housing with market revitalization in a single development. Focus on rented social housing (rusunawa).
DESIGN OF INTEGRATED FLAT HOUSE WITH PATUK MARKET IN YOGYAKARTA BASED ON STAKEHOLDER ASPIRATION	The project addresses urban challenges in Yogyakarta by combining economic revitalization (through the traditional market) with affordable housing. The project considers government subsidies for low-cost housing and public infrastructure (e.g., water, electricity, and sanitation).	The project uses a mixed-use building concept, which combines residential and commercial functions in one structure. It focuses on economic revitalization (through the traditional market) with affordable housing.

| Early Figurative Design (Generated and rendered by AI)

Figure 1.8
Early AI Generative
Source: Author

Table 1.2
Excellency, Originality & Novelty
Source: Author



2.

Problem Study

Elderly Population in Special Region of Yogyakarta

The elderly population in Bantul is the highest in Daerah Istimewa Yogyakarta, with 170,388 elderly residents. However, despite this large elderly demographic, Bantul has the lowest life expectancy at 73.94 years, compared to other regions like Sleman (75.08 years) and Kulon Progo (75.29 years) [8].

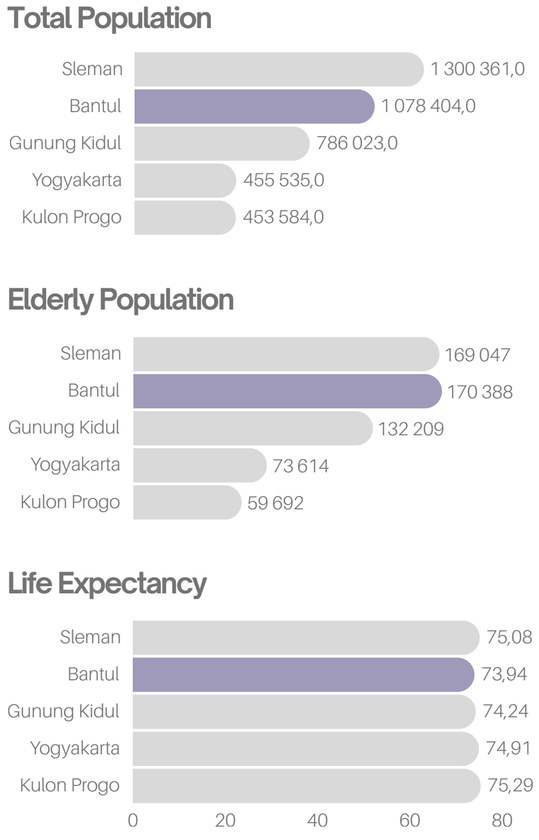


Figure 2.1
Total Population, Elderly Population, Life Expectancy
Source: Author

Elderly Percentage in DI Yogyakarta

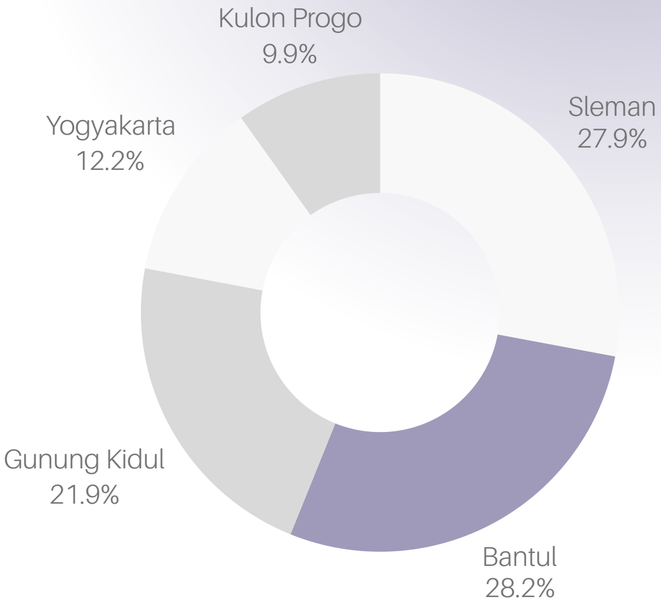


Figure 2.2
Elderly Percentage in DI Yogyakarta
Source: Author

This contrast highlights a critical health and urban planning issue. While many elderly residents live in Bantul, their overall health outcomes and longevity are lower than in other areas. Factors such as access to healthcare, environmental quality, infrastructure, and social support systems may contribute to this disparity.

Site Location

Kembang Putihan Raya St.
Pringgading
Guwosari
Pajangan
Bantul Regency
Special Region of Yogyakarta

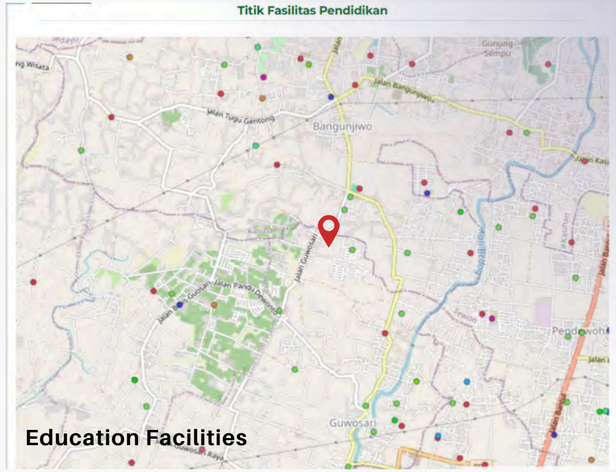
Building Codes

Perda Kabupaten Bantul No. 33 Tahun 2008
tentang Rencana Detail Tata Ruang Kawasan

1. Building Coverage Ratio: 60%
2. Floor Area Ratio: 4x BCR
3. Building Height: 20m
4. GSB: 4m

Analysis

Based on the statistics presented, the proposed site has relatively lower quantity of health services and lower quality of housing.



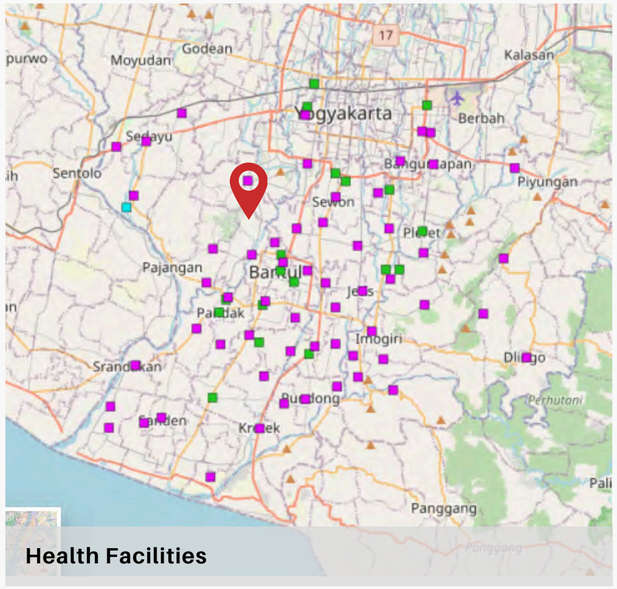


Figure 2.3
Education facilites map

Figure 2.4
Health facilites map

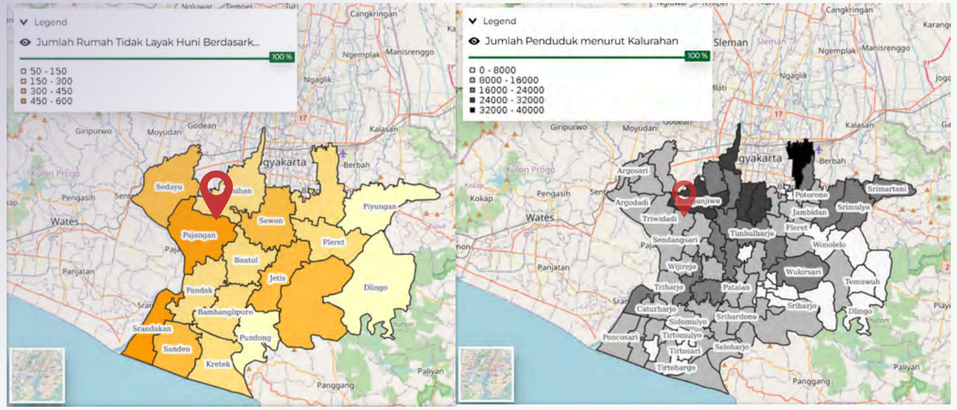


Figure 2.5
Uninhabitable house map

Figure 2.6
Total population map

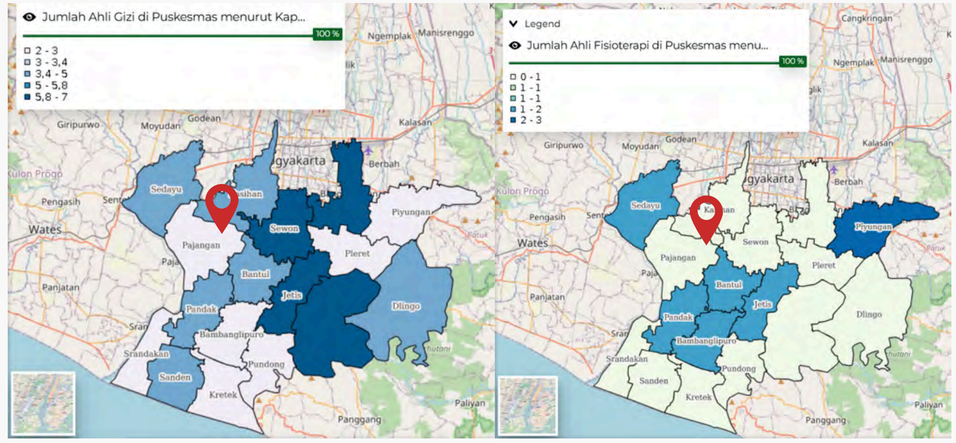


Figure 2.7
Number of nutritionists in community health centers map

Figure 2.8
Number of physiotherapists in community health centers map

Site Choice Justification

The selection of the project site, located on Kembang Putihan Raya St. Pringgading, Guwosari, Pajangan, Bantul Regency, Special Region of Yogyakarta, was driven by a multi-criteria approach that integrates critical demographic challenges with environmental suitability.

Here is the strategic justification for the site choice:

1. Addressing the Demographic Imperative

The primary social criterion for site selection was the pressing demographic paradox within the region:

- Bantul's Elderly Population: Bantul Regency reports the highest share of elderly residents in Daerah Istimewa Yogyakarta (DIY).
- Health Disparity: Despite this large elderly demographic, Bantul paradoxically registers the lowest life expectancy compared to other regions in DIY.
- Strategic Impact: Locating the Housing project in Bantul directly targets the region facing the most acute need for proactive, health-supportive residential environments for older adults.

2. Site Feasibility and Land Context

The selection was intentionally tied to the local land and policy context:

- Sultan Ground (SG) Utilization: The chosen land is designated as Sultan Ground, aligning the project with the Governor's initiative to utilize SG for developing cost-effective, well-integrated housing solutions.
- Development Potential: The specific location was chosen due to its identification as the largest available Sultan Ground area found in public documentation, providing the necessary scale for an ambitious intergenerational housing and community complex.

3. Environmental and Walkability Advantages

The site's suburban character and physical features directly mitigate urban stressors, supporting the project's goal of promoting active and healthy aging:

- Suburban Zoning and Connectivity: Situated in a suburban area relatively close to the central Yogyakarta city, the site balances accessibility with tranquility. This location facilitates engagement with the broader urban context while avoiding central urban density.
- Environmental Quality and Safety: The site is characterized by a low volume of traffic and abundant greenery and landscaping, offering significant environmental benefits:
  - Reduced Stressors: Lower traffic density results in reduced noise pollution and lower exposure to airborne contaminants.
  - Safety and Mobility: The low-busy roads create a safer environment for walking and cycling, directly encouraging the physical activity necessary to combat sedentary lifestyles and maintain mobility among older residents.

In summary, the site at Kembang Putihan Raya St. Pringgading was selected as the optimal location where critical demographic need converges with the necessary governmental context (Sultan Ground) and a supportive, tranquil suburban microclimate conducive to promoting health and well-being.

DI Yogyakarta

Figure 2.9
Map of DI Yogyakarta
Source: Google Maps

Kab. Bantul

Figure 2.10
Map of Kabupaten Bantul
Source: Google Maps

Kec. Pajangan

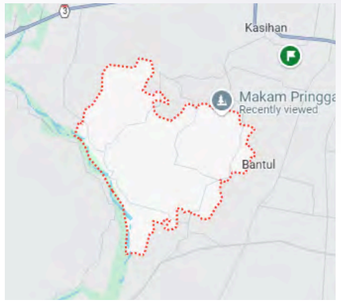
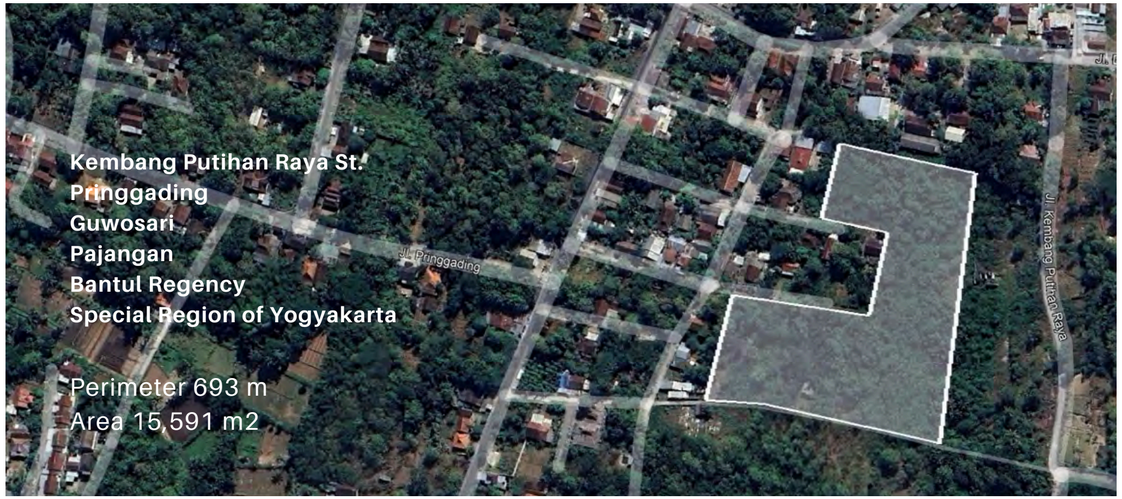


Figure 2.11
Map of Kecamatan Pajangan
Source: Google Maps



The chosen site for the Kampung Sehat project will be located on Sultan Ground, land owned by the Sultanate of Yogyakarta. Sultan Ground (Tanah Sultanate) refers to land controlled by the Kraton (Sultan's Palace), which is historically managed for public and communal use.

Figure 2.12
Map of the choosen site
Source: Google Earth

Climate Datas

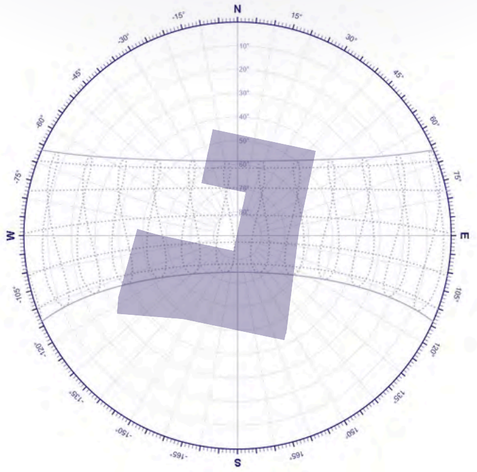


Figure 2.13
Sun-Path
Source: andrewmarsh.com

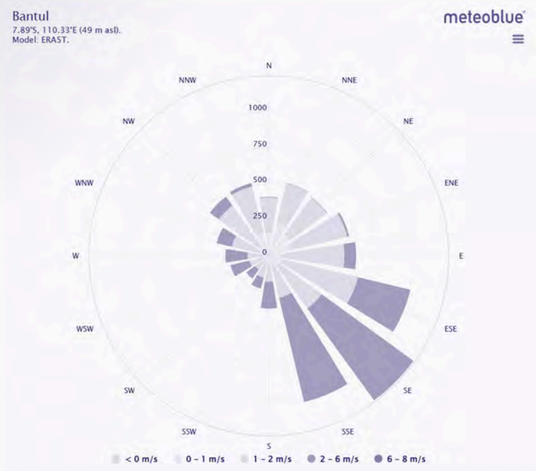


Figure 2.14
Wind Rose
Source: meteoblue.com

Figure 2.15
Wind Speed
Source: meteoblue.com

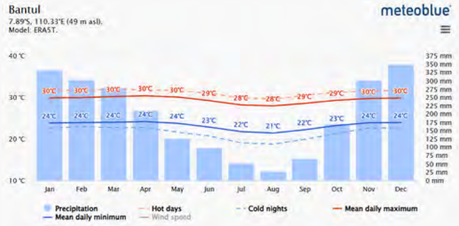


Figure 2.16
Average temperatures and precipitation
Source: meteoblue.com

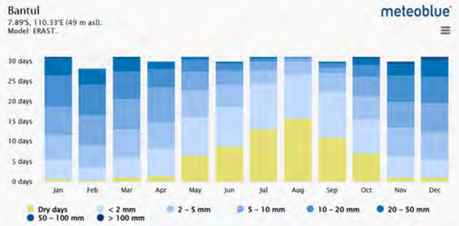


Figure 2.17
Precipitation amounts
Source: meteoblue.com

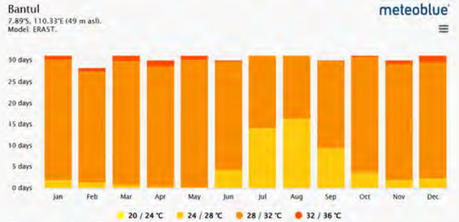


Figure 2.18
Maximum temperatures
Source: meteoblue.com

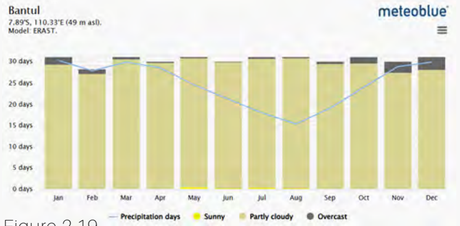


Figure 2.19
Cloudy, sunny, and precipitation days
Source: meteoblue.com

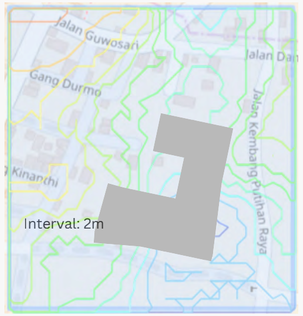


Figure 2.20
Contour Map - Interval: 2m
Source: cadmapper.com

Figure 2.21
Land Coverage Map

| Public-Private Partnership (PPP) Model and Implementation Strategy

To ensure the viability and long-term impact of the Intergenerational Housing project, a hybrid Public-Private Partnership (PPP) model is proposed. This approach balances the public sector's mission to provide housing for low-income groups with the private sector's need for return on investment, allowing the development to serve both social and economic functions. The project is planned to be built on Sultan Ground, land historically reserved for communal benefit and development under the authority of the Kraton Yogyakarta, offering strong potential for sustainable, community-oriented use.

In this structure, the **Ministry of Housing and Settlements (Kementerian PKP)** acts as the commissioning body, supporting the development as part of the 3 Million Housing Program a national initiative targeting the provision of livable, affordable housing for low-income communities. The private sector partner, such as **PT. Ingria Pratama Capitalindo Tbk (GRIA)**, would act as the developer and operator, responsible for financing, constructing, and managing certain aspects of the project.

A Modified Build-Operate-Transfer (BOT) scheme is proposed:
GRIA would finance, build, and operate the entire complex over a fixed period (e.g., 20–30 years), managing both non-profit and profit-generating components.

A portion of the residential units would be allocated as subsidized housing for low-income residents, in alignment with national housing targets.
Commercial and service components, such as an integrated health facility, retail spaces, and services would be operated for revenue, allowing the private partner to recoup investment while offering essential services to residents and the surrounding community.

At the end of the operating period, the housing units dedicated to public use would be transferred to the government, ensuring long-term affordability and ownership, while GRIA may retain operational rights over commercial elements under extended lease or partnership agreements.

This PPP model creates a framework that is financially sustainable, socially inclusive, and functionally responsive to urban and demographic challenges. The architectural design of Intergenerational Housing reflects this balance by combining universal, elderly-friendly design, shared community spaces, and flexible facilities that foster intergenerational interaction and health-focused living. The health component not only supports the vision of a Healthy City but also offers a viable monetization path for private sector engagement, ensuring the project's broader sustainability.

| Study of Design Approach

WHO ICOPE

The integrated care for older people approach, referred to as ICOPE, aims to facilitate the reorientation of health and social services towards more person-centred and coordinated care that supports the optimization of intrinsic capacity and functional ability for older people. ICOPE is WHO's approach to support the delivery of integrated care for older people within the context of a PHC-oriented health system[9].

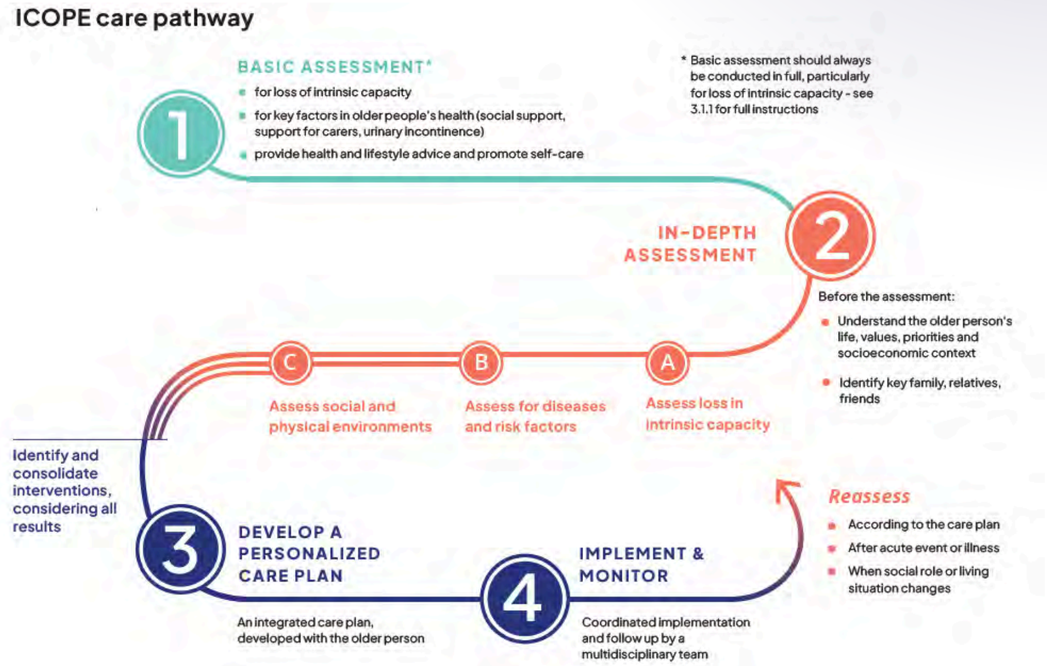


Figure 2.22
ICOPE Care Pathway
Source: ICOPE Handbook

The Core Concept: Intrinsic Capacity

ICOPE is built around monitoring and maintaining Intrinsic Capacity. This is the composite of all the physical and mental capacities of an individual [3].

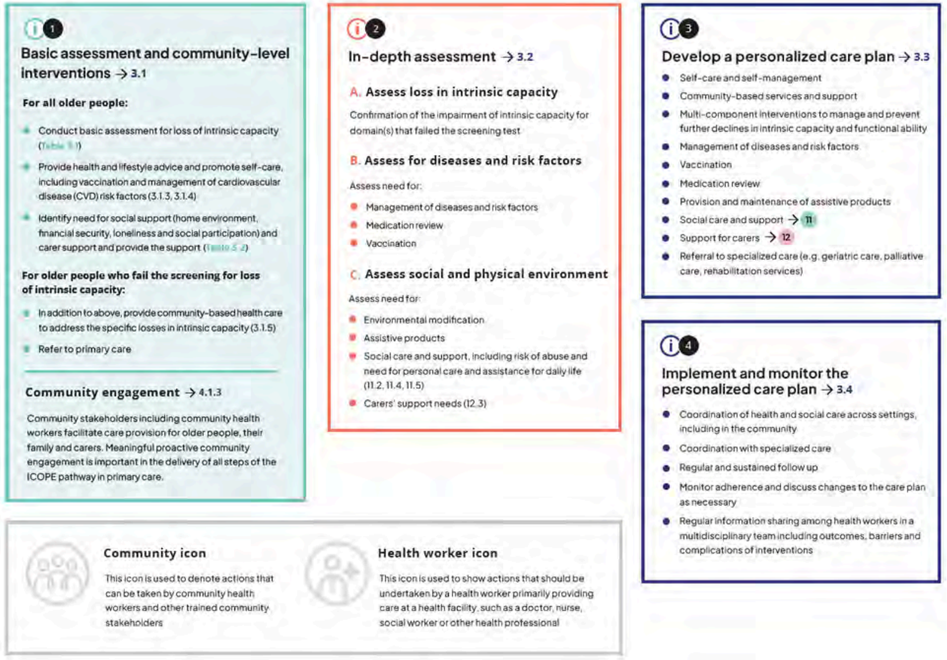
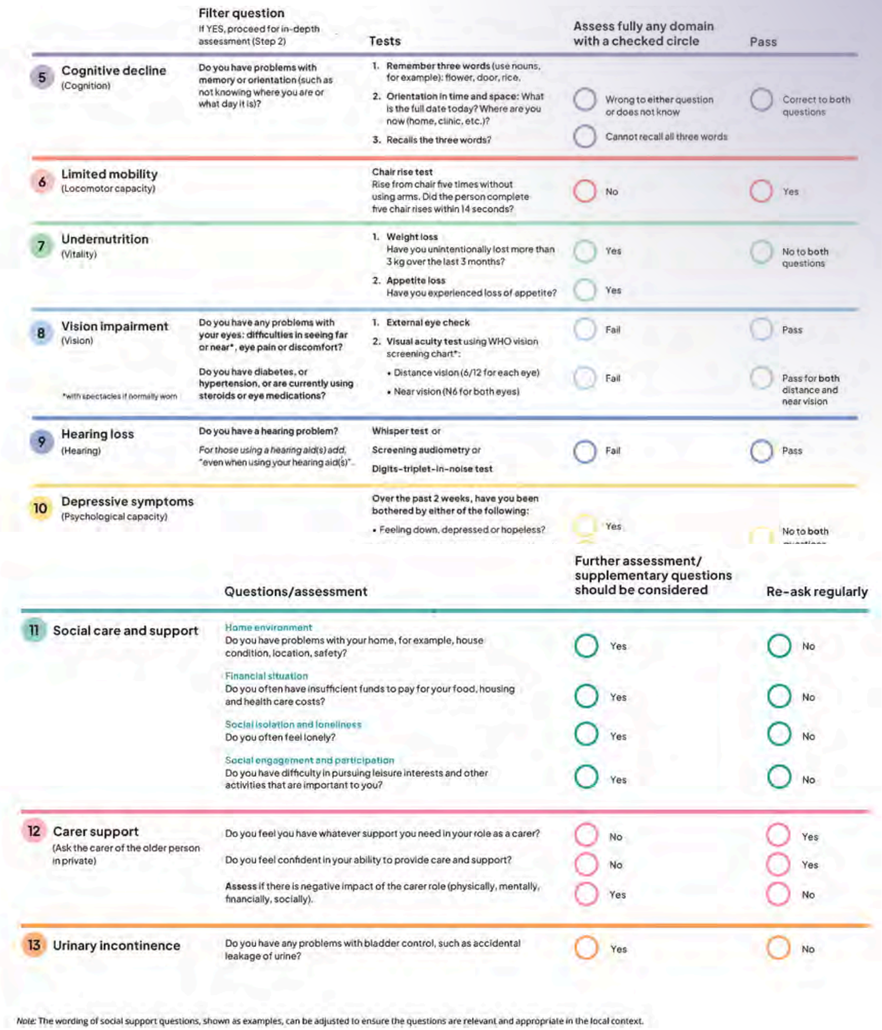


Table 2.1
ICOPE Care Pathway
Source: ICOPE Handbook

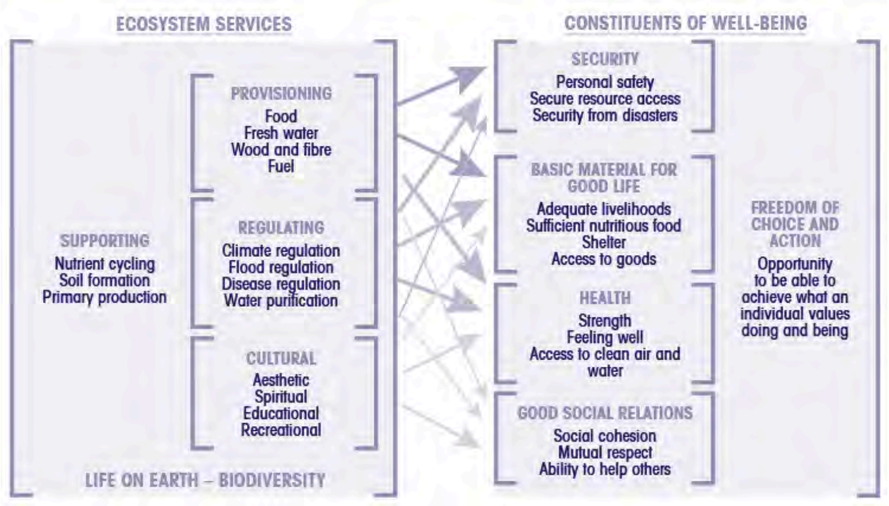
Table 2.2
ICOPE Assesment
Source: ICOPE Handbook



WHO Healthy Cities

The World Health Organization (WHO) characterizes a "Healthy City" as a place committed to the ongoing development and enhancement of its physical and social environments. This commitment involves expanding community resources to foster mutual support among residents, thereby enabling them to manage their daily lives and fulfill their maximum potential[11].

Figure 2.23
Health Map
Source: WHO Healthy Cities



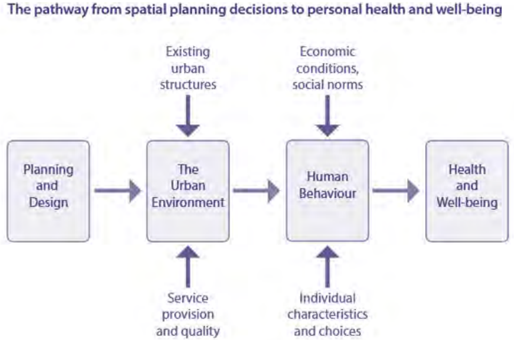
The Healthy Cities movement operates on several core principles. People-Centric Development emphasizes investments that prioritize integration, inclusion, and non-discrimination, fostering resilience and trust within the community. Community Participation is essential, ensuring that residents are actively involved in decisions about their living environments, thereby producing services and urban spaces better tailored to local needs. Prosperity and Sustainability focus on bolstering community wealth through values-based governance and adopting sustainable investment practices, such as universal social protection and the circular economy. Lastly, Environmental Stewardship involves implementing policies designed to reduce carbon emissions, improve air quality, and encourage physical activity by promoting walking and cycling over car usage.

This global movement, initially launched by the WHO in 1986, seeks to use health promotion to establish effective healthy public policies at the local level. By incorporating health concerns directly into urban planning, cities gain the capacity to address contemporary challenges and significantly improve their residents' overall well-being[11].

Figure 2.24
Constituents of Well-Being
Source: WHO Healthy Cities

City of Well-being

The concept of a "City of Well-being" describes an urban setting that is carefully crafted to foster the health, happiness, and overall quality of life for those who live there. This approach goes beyond conventional urban design by unifying diverse components—including communal facilities, efficient public transportation, accessible green areas, and affordable housing—to nurture comprehensive physical, mental, and social well-being[12].



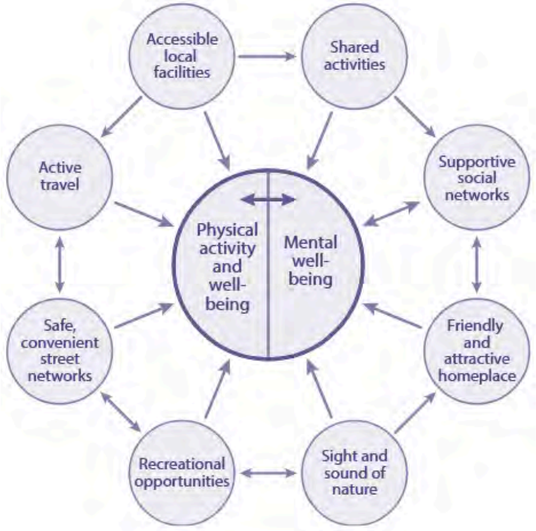


Figure 2.25
The pathway from spatial planning decision to personal health and well-being
Source: City of Well-being

Key Characteristics of a City of Well-being:

The defining characteristics of a City of Well-being center on integrated urban development focused on holistic quality of life.

- Health-Centric Infrastructure involves prioritizing the creation of accessible healthcare facilities, recreational spaces, and pathways designed for pedestrians to promote active living and ensure convenient access to necessary medical services.
- Environmental Sustainability requires the execution of green strategies, including ample parks, effective sustainable waste management systems, and initiatives aimed at pollution reduction, guaranteeing a healthful residential environment.
- Social Inclusivity means developing neighborhoods designed to accommodate diverse resident groups, offering community centers, affordable housing, and targeted programs to foster strong support networks and social interaction.
- Economic Accessibility focuses on guaranteeing equitable access to quality education, employment opportunities, and affordable essential goods and services to minimize socioeconomic inequalities among the population.

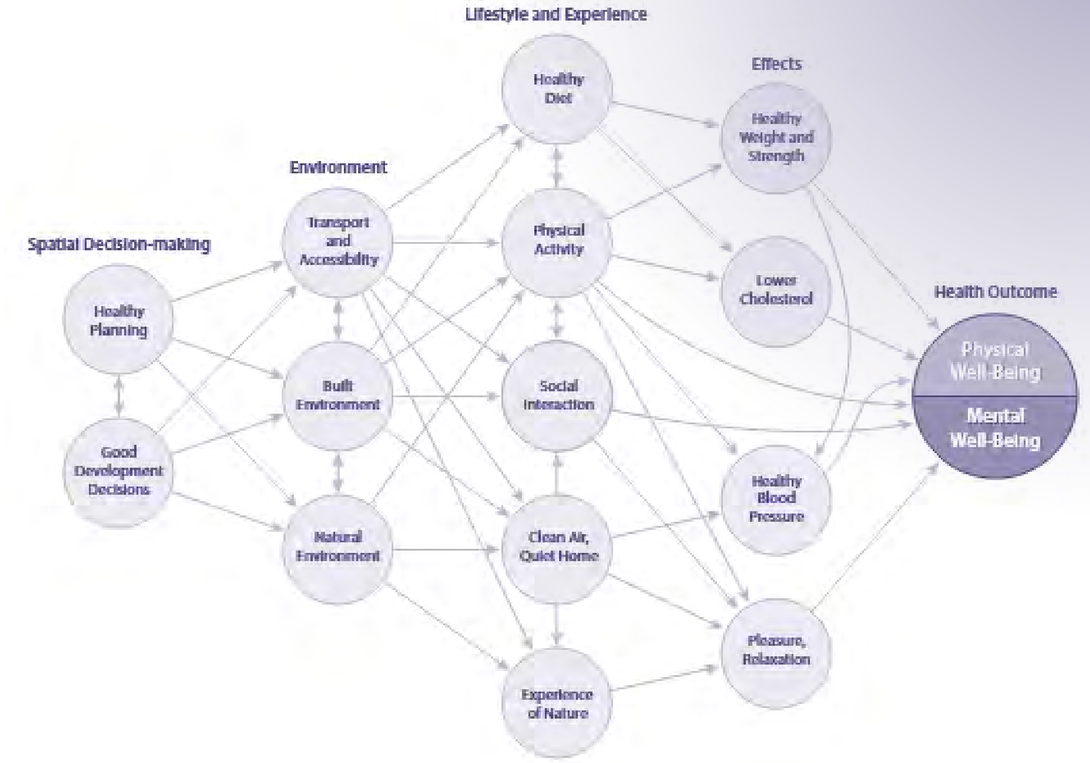


Figure 2.26
Well-being connections
Source: City of Well-being

Figure 2.27
Well-being connections
Source: City of Well-being

Study of Building Typology

Aging in Place

Aging in place is defined as the capability of older adults to continue living safely and autonomously within their existing homes and communities as they advance in age. This concept involves more than just physically staying in one's dwelling; it also necessitates maintaining robust social networks, easily accessing required services, and ensuring the living environment continually adapts to the individual's changing needs[3].

This residential preference is linked to several positive health outcomes, including a higher quality of life, lower healthcare expenditures, and strengthened social connectedness. Despite these benefits, obstacles such as the loss of independence, declining health, and a heightened risk of injury can impede successful aging in place. Addressing these hurdles requires a thorough grasp of the elements that either support or restrict this choice.

The immediate residential environment is critical for supporting the aging-in-place model. Consequently, housing designs and policies must prioritize safety, accessibility, and close proximity to necessary services. Furthermore, rapid technological progress offers vital solutions, with smart home devices, assistive technologies, and mobile health applications capable of enhancing safety, facilitating communication, and providing remote health monitoring.

Social Housing

Social housing represents a cornerstone of fair urban growth, offering low-income communities stable, affordable, and inclusive residential options. It is conventionally financed via public subsidies, social policies, and Public-Private Partnerships (PPPs) to guarantee that vulnerable populations can access housing.

Within the scope of Intergenerational Housing, the core tenets of social housing can be customized to implement health-focused, elderly-friendly residential models within Indonesia's 3 Million Housing Program. By giving priority to housing that is both affordable and adaptable, Intergenerational Housing can function as a model for urban development that is resilient and inclusive. The integration of flexible housing types, communal infrastructure driven by the community, and accessible healthcare facilities ensures the constructed environment actively supports social interaction and aging-in-place. Furthermore, using a participatory planning method boosts the residents' feeling of ownership, contributing to sustainable long-term housing stability. Finally, Intergenerational Housing supports the Healthy Cities framework by incorporating public amenities, green spaces, and high walkability, solidifying the idea that social housing must both alleviate housing shortages and elevate the quality of life for its occupants.

Elderly Housing

Elderly housing denotes residential settings intentionally designed to meet the requirements of aging individuals, emphasizing comfort, accessibility, and safety. These solutions incorporate principles such as universal accessibility, proximity to social and healthcare services, and barrier-free design to facilitate both independent living and aging in place[14].

Within the scope of the Intergenerational Housing project, elderly housing units feature modular and adaptive layouts, alongside health-supportive infrastructure that is fully integrated into the design. These units are complemented by easily walkable connections to communal and public areas. The overarching goal is to establish an inclusive, sustainable living environment that actively enhances social interaction, well-being, and a high quality of life for its older residents.

City at Eye Level

The "City at Eye Level" is a global undertaking dedicated to making urban spaces more appealing and accessible at the human scale. This methodology centers on optimizing the function and design of ground floors, or "plinths," with the aim of fostering active streets and public areas that stimulate community engagement and social interaction[13].

A fundamental tenet of this philosophy is the creation of transparent and active plinths that establish a seamless connection between outdoor environments and the buildings' interiors. This integration is vital for enriching the pedestrian experience and boosting the overall vibrancy of urban settings. The initiative provides valuable guidance for community leaders, architects, and urban planners who seek to design places and streets that prioritize human experiences and needs.

The Plinth

The plinth designates the street-level section of a building or urban setting that directly interfaces with the public realm and the street. It is crucial in determining the quality of the pedestrian experience, local accessibility, and social interaction. An effectively designed plinth enhances inclusivity, safety, and vibrancy by providing active frontages, transparent facades, and public-facing functions.

For the Intergenerational Housing project, the plinth is engineered to promote community interaction and accessibility by integrating healthcare facilities, commercial spaces, and public amenities directly at the street level. This design strategy cultivates a more walkable, human-scaled, and lively environment, thereby promoting both urban vitality and social cohesion.

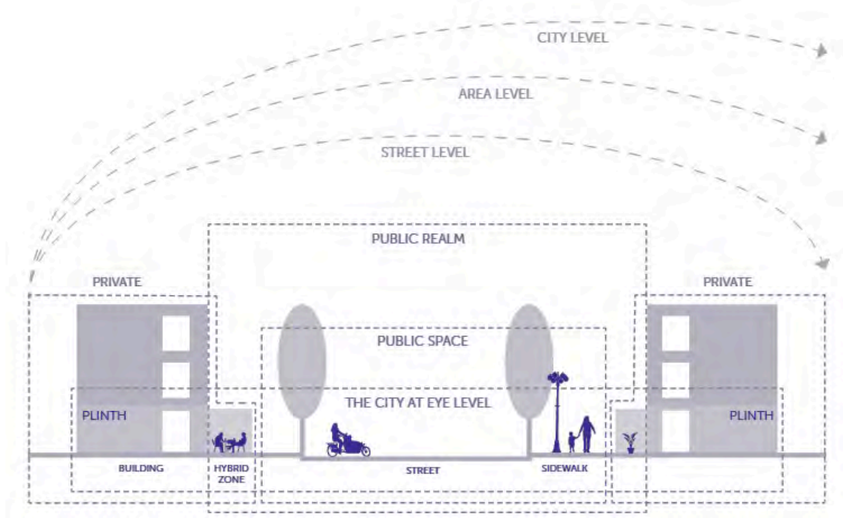


Figure 2.28
The Plinth
Source: City at Eye-Level

| The Critical Role of Housing as Determinant of Healthy Ageing

In the context of the World Health Organization’s (WHO) framework for healthy ageing and the Integrated Care for Older People (ICOPE) approach, housing is not merely a shelter but a fundamental determinant of health that dictates an individual's ability to maintain autonomy and well-being. Research indicates that medical care accounts for only approximately 10% of overall health outcomes, whereas environmental conditions, genetic factors, and personal behaviours constitute the remaining 90%. Consequently, residential design serves as a critical, non-clinical intervention point for extending the "health span" of ageing populations

1. The Environmental Component of Functional Ability
The WHO defines Healthy Ageing as the process of developing and maintaining Functional Ability, which enables well-being in older age. Functional Ability is theoretically constructed as the interaction between an individual’s Intrinsic Capacity (physical and mental reserves) and the Environment in which they live. As intrinsic capacity inevitably declines with age—manifesting as reduced mobility, sensory impairment, or cognitive decline—the built environment becomes increasingly critical. A supportive housing environment can compensate for physiological losses, thereby maintaining the individual's functional ability, whereas a maladapted environment exacerbates disability,

2. Facilitating Ageing in Place
Housing is the primary enabler of "Ageing in Place," defined as the ability to live in one’s own home and community safely, independently, and comfortably, regardless of age or capacity. The physical configuration of the home directly influences the management of geriatric syndromes, particularly falls and mobility loss. Environmental modifications—such as the removal of clutter, improvement of lighting, and installation of grab rails—are evidence-based interventions recommended by ICOPE to reduce fall risks and prevent injury-related mortality,. By resolving environmental hazards, housing design prevents the premature institutionalization of older adults, allowing them to remain in familiar surroundings that support their identity and continuity of life.

3. Housing as a Preventative Health Intervention
Beyond safety, housing acts as a proactive tool for preserving Vitality and Cognitive Capacity. "Curating Homes" argues that residential environments should shift from a clinical, barrier-free focus to an "enabling" approach that fosters active living. For instance, communal spaces within housing developments (e.g., communal kitchens and gardens) facilitate social interaction and nutritional health, directly addressing risk factors for malnutrition and social isolation, which are linked to depression and cognitive decline,. Furthermore, housing that integrates "Active Design" principles encourages physical movement within daily routines, combating sarcopenia and frailty.

4. Psychosocial Well-being and Dignity
Finally, the home functions as a "sanctuary" that nurtures peace of mind and empowers individuals to pursue what they value. Housing design that prioritizes privacy, autonomy, and social connection supports the psychological domain of intrinsic capacity. In the context of care dependency, housing that accommodates caregivers (e.g., through sufficient space for assistance) is essential for preventing caregiver burnout and ensuring the sustainability of home-based care.
In conclusion, housing is a pivotal social determinant of health. By modulating the interaction between declining intrinsic capacity and environmental demands, appropriate housing design transforms the built environment into a therapeutic agent that sustains functional ability and dignity throughout the life course.

Kampung Admiralty

Kampung Admiralty, finished in 2017 and designed by WOHA, stands as Singapore's inaugural integrated public development, consolidating various public services and facilities within a single structure. Constrained by a compact 0.9 Ha site and a 45m height restriction, the design utilizes a layered "club sandwich" methodology. This approach places a Community Plaza in the lower section, a Medical Centre in the middle, and a Community Park complete with senior apartments in the upper section. This unique "Vertical Kampung" (vertical village) maximizes activity at the ground level and encourages social diversity, supporting both active aging in place and intergenerational connection.

Figure 2.29
Greenery in Kampung Admiralty
Source: archdaily.com

Figure 2.30
Communal Space in Kampung Admiralty
Source: archdaily.com

Figure 2.31
Birds View of Kampung Admiralty
Source: archdaily.com

Figure 2.32
Section Kampung Admiralty
Source: archdaily.com

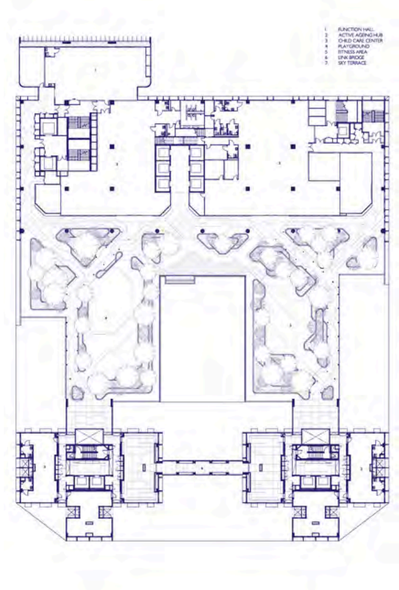


Figure 2.33
Plan of Kampung Admiralty
Source: archdaily.com

Figure 2.34
Facade of Kampung Admiralty
Source: archdaily.com

Lessons from Kampung Admiralty for Intergenerational Housing

Kampung Admiralty showcases integrated, age-friendly urban design, offering valuable insights for Intergenerational Housing:

- Housing + Healthcare + Social Spaces – Easy access to clinics, wellness centers, and community hubs supports elderly well-being. Intergenerational Housing should integrate similar health-promoting infrastructure.
- Aging in Place with Universal Design – Barrier-free layouts and adaptive housing ensure long-term usability. Intergenerational Housing must prioritize accessible, modular homes.
- Strong Community Engagement – Intergenerational spaces and social hubs reduce elderly isolation. Intergenerational Housing should create walkable, interactive public areas.
- Sustainable, Climate-Responsive Design – Green infrastructure and passive cooling enhance resilience. Intergenerational Housing must adopt eco-friendly urban solutions.
- Public-Private Collaboration – Government and private sector partnerships made Kampung Admiralty feasible. Intergenerational Housing should leverage subsidies and investment partnerships.

By applying these lessons, Intergenerational Housing can become a health-centered, sustainable, and inclusive housing model, supporting Indonesia's 3 Million Housing Program and Healthy Cities vision.

Forest City Liuzhou

Figure 2.35
Birds View of Forest City Liuzhouy
Source: archdaily.com

Liuzhou Forest City, conceived by Stefano Boeri Architetti, is recognized as the world's inaugural forest city, situated north of Liuzhou, China. Spanning 175 hectares alongside the Liujiang River, the city is planned to accommodate 30,000 residents within structures entirely enveloped by approximately 40,000 trees and one million plants, representing over 100 distinct species.

Designed as a sustainable urban ecosystem, the city is projected to absorb about 10,000 tons of CO2 and 57 tons of micro-particles annually, concurrently generating 900 tons of oxygen. The development aims for energy self-sufficiency by utilizing solar panels and geothermal energy. It will be linked to the main city of Liuzhou through efficient transportation networks and will comprise residential zones, commercial areas, and public amenities such as a hospital and schools. Ultimately, the design is intended to foster biodiversity and blend seamlessly with the natural landscape.

Lessons from the Liuzhou Forest City initiative include:

- Urban Greening for Pollution Mitigation: The extensive vegetation is projected to absorb about 10,000 tons of CO_2 and 57 tons of pollutants annually, while producing approximately 900 tons of oxygen. This underscores the potential of urban greening in improving air quality.
- Thermal Regulation: The abundant greenery is expected to lower the urban heat island effect, demonstrating how vegetation can contribute to temperature regulation in cities.
- Noise Reduction: The plant-covered structures can act as natural sound barriers, reducing noise pollution within the urban environment.
- Aesthetic and Psychological Benefits: Integrating nature into urban settings can enhance the visual appeal of the cityscape and provide psychological benefits to residents, such as reduced stress and improved well-being.

Figure 2.36
Facade of Forest City Liuzhouy
Source: archdaily.com

Figure 2.37
Surrounding of Forest City Liuzhouy
Source: archdaily.com

Figure 2.38
Greenery of Forest City Liuzhouy
Source: archdaily.com

The Participatory Housing - Kelvin Ma

The project titled "Participatory Housing - A system of reconfigurable spaces for 21st-century living," developed by Kelvin Ma in Hong Kong, employs a data-driven, reverse design methodology to achieve highly flexible and customizable public housing. The system processes user preferences and input data to determine spatial configurations, allocate housing units, and generate designs using distinct materials that simplify future upgrades and modifications. This ongoing, interactive process seeks to closely align the physical living environment with its inhabitants, enabling continuous spatial improvements based on direct user feedback. The project was recognized with the WA Award Cycle 35.

Figure 2.39
The Participatory Housing
Source: worldarchitecture.org

Figure 2.40
Module The Participatory Housing
Source: worldarchitecture.org

Figure 2.41
Module The Participatory Housing
Source: worldarchitecture.org

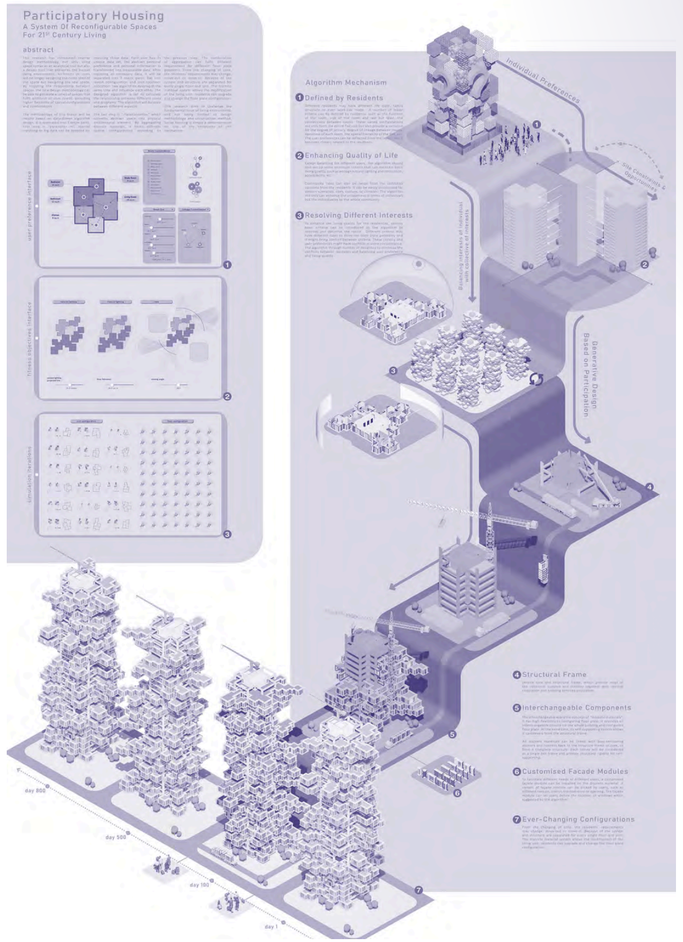


Figure 2.42
The Participatory Housing Presentation Board
Source: worldarchitecture.org

Figure 2.43
Section of The Participatory Housing
Source: worldarchitecture.org

Lessons from Kelvin Ma's Participatory Housing

- Prefabricated Modular Efficiency – Fast, cost-effective construction with minimal waste, ideal for large-scale housing like 3 Million Housing Program.
- Adaptability for Diverse Users – Flexible layouts support families, singles, and elderly residents, aligning with Intergenerational Housing's aging-in-place approach.
- Sustainable & Reconfigurable Design – Expandable, reusable modules reduce waste and ensure long-term urban resilience.

These principles can enhance Intergenerational Housing by creating scalable, adaptable, and health-focused housing solutions for Indonesia's Healthy Cities vision.

Kampung Susun Kunir

Kampung Susun Kunir, located in the historic Kota Tua district of Jakarta Barat, Indonesia, exemplifies a thoughtful integration of community engagement, cultural preservation, and sustainable architectural design. Constructed to accommodate 33 families displaced by urban development projects, this vertical village stands as a testament to participatory design and social resilience.

Figure 2.44
Kampung Susun Kunir
Source: dprkp.jakarta.go.id

Architectural Design and Community Engagement
The development comprises a single block with four floors and a semi-basement, providing 33 residential units, each measuring 36 square meters. The units are thoughtfully designed to include a living room, one bedroom, a multifunctional room, kitchen, bathroom, and balcony. Notably, the design prioritizes accessibility by incorporating features for the elderly and individuals with disabilities. A distinctive aspect of Kampung Susun Kunir is its emphasis on communal spaces, fostering social interaction and community cohesion. These include spaces for meetings, business activities, exhibitions, and a community gallery dedicated to preserving cultural artifacts. The participatory approach involved collaboration with Architecture Sans Frontieres (ASF) Indonesia and active involvement from the residents, ensuring that the design reflects the community's needs and cultural values.

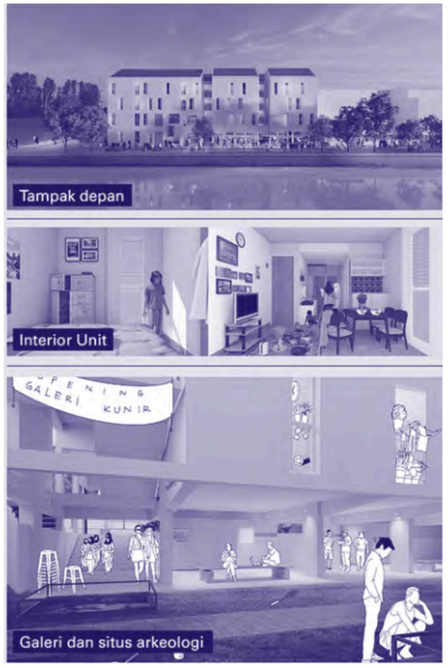


Figure 2.45
Interior of Kampung Susun Kunir
Source: scribd.com

Cultural Integration and Historical Context
Situated within a heritage zone, the project pays homage to Jakarta's rich history. During construction, archaeological excavations uncovered remnants such as stone foundations and 13 stone umpak (pedestals), believed to be part of the old Batavia city wall. These findings are thoughtfully displayed in the Galeri Kunir, a dedicated space within the building, serving as a bridge between past and present. The integration of these elements not only enriches the residents' living experience but also educates visitors about the area's historical significance.

Sustainability and Social Impact
Beyond providing adequate housing, Kampung Susun Kunir addresses environmental and social sustainability. The building's design includes green open spaces, motorbike parking areas, and facilities that support local economic activities, such as spaces for residents' businesses. The cooperative management model empowers residents, promoting self-governance and communal responsibility. The project's success has been recognized with architectural awards, highlighting its excellence in design and its positive impact on the community.

In summary, Kampung Susun Kunir stands as a model of how architecture can serve social needs, preserve cultural heritage, and promote sustainable living. Its design reflects a deep understanding of the community's history, needs, and aspirations, offering valuable insights for future urban development projects.

3.

Design Problem Solving

Spatial Programming

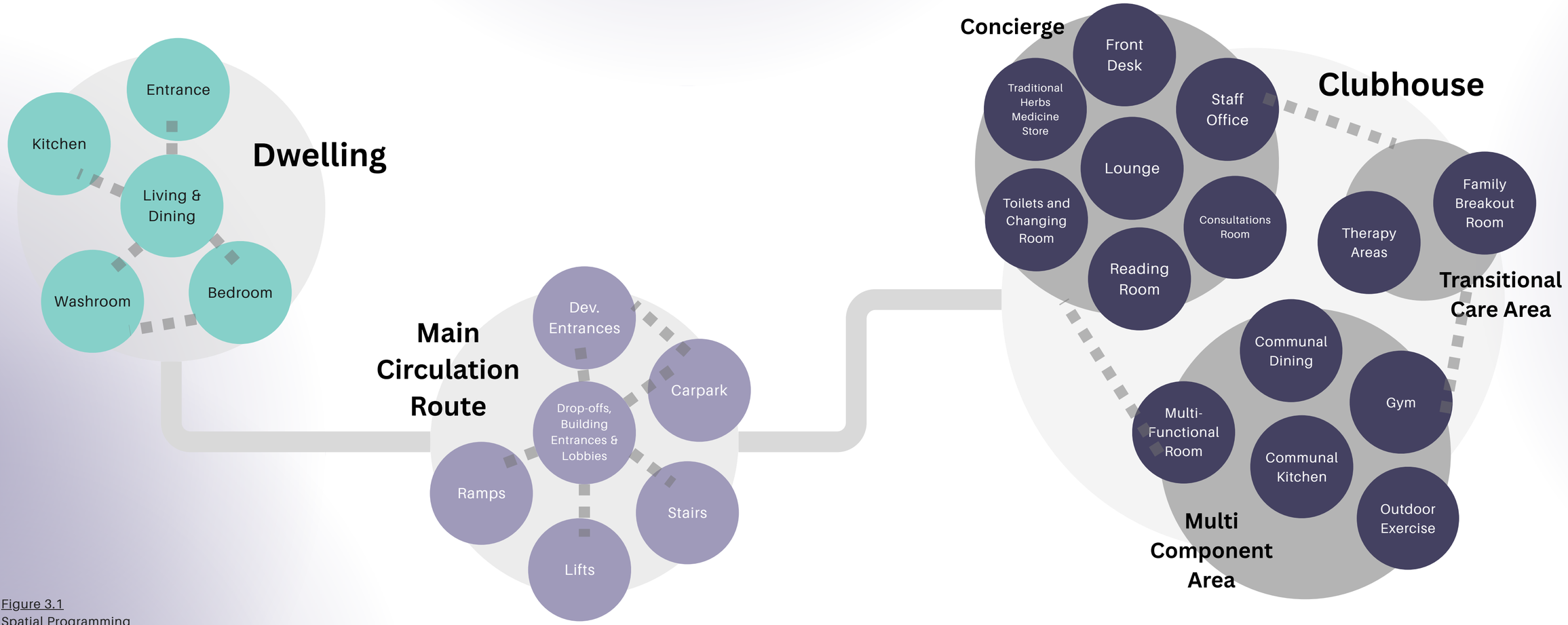


Figure 3.1
Spatial Programming
Source: Author

| User Profiles

Based on the WHO ICOPE framework, the resident profiles can be categorized by their level of Intrinsic Capacity (physical and mental reserves) and the resulting Functional Ability (interaction with the environment).

- **The "Pre-Frail" or Declining Capacity**

This group represents the core target of ICOPE interventions—those experiencing early declines who need supportive environments to reverse or delay frailty.

ICOPE Domain	Characterization
Locomotor (Mobility)	**Reduced Gait Speed & Strength:** Muscle mass peaks in early adulthood and declines with age; older adults often adopt a "cautious gait" with slower speed and shorter steps. Grip strength is a strong predictor of mortality.
Vitality (Nutrition)	**Malnutrition Risk:** Reduced appetite, changes in body composition (fat replacing muscle), and sensory impairments (taste/smell) lead to weight loss,.
Sensory (Vision/Hearing)	**Sensory Decline:** Thickening corneas require 50% higher lighting levels. High-frequency hearing loss makes communication in noisy environments difficult.
Cognitive	**Mild Cognitive Impairment (MCI):** Forgetfulness, difficulty with complex tasks, but retains independence. Disorientation in complex environments.

- **The Care-Dependent (Significant Loss of Capacity)**

This group requires an environment that compensates for severe loss of capacity to maintain dignity and basic quality of life.

ICOPE Domain	Characterization
Locomotor	**Severe Mobility Loss:** Reliance on mobility aids (wheelchairs, walkers) or complete bed-bound status,. Height shrinkage (avg. 3.5cm loss in older Asian adults).
Cognitive	**Dementia/Severe Decline:** Loss of memory, orientation, and ability to perform daily tasks. Potential for wandering or getting lost.
Psychological	**Depressive Symptoms:** 1 in 10 older adults experience subthreshold depression. Risk of social isolation due to inability to leave the unit.
Urinary	**Incontinence:** Affects 1/3 of older people; major cause of dependency and social withdrawal,.

- **The Caregiver (Formal & Informal)**

According to the ICOPE implementation framework, the caregiver is a critical component of the care ecosystem whose well-being directly impacts the older resident.

Role	Characterization (Status)	Functional Needs
Informal (Family)	**High Stress Risk:** Often experience psychological distress, depression, and physical strain from lifting/transferring.	**Respite:** Time away from care duties. **Training:** Learning how to assist safely. **Social:** Connecting with other carers.
Formal (Staff/Nurse)	**Operational Load:** Tasked with monitoring health, managing emergencies, and coordinating care.	**Efficiency:** Clear sightlines for monitoring. **Workflow:** Efficient routes for service delivery.

- **The Younger Generation (Intergenerational)**

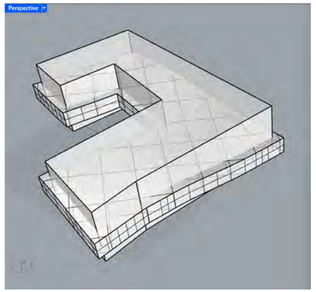
While not the focus of ICOPE care, their presence is the "Intervention" for the psychological domain of the older residents.

Role	Characterization	Functional Needs
Social Catalyst	**High Energy/Noise:** Children and working adults have different daily rhythms and noise levels compared to seniors.	**Interaction:** Spaces to engage with seniors. **Separation:** Acoustic privacy for study/work.

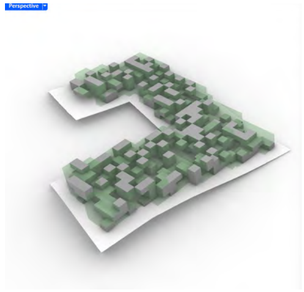
Table 3.1
User Profiles
Source: Author

| Generative Process

The methodology for generating the architectural structure draws direct inspiration from the principles of 3D medical imaging. Specifically, the concept of a voxel, a volumetric pixel used to represent anatomical data is adapted as a foundational modular structural unit. This module is initially employed to volumetrically saturate the entire site boundary, creating a dense initial mass. The subsequent definition of the final building forms is achieved through a subtractive process, mimicking negative volume segmentation commonly used in medical imaging to isolate anatomical structures by removing surrounding context. This approach allows for a precise, data-driven volumetric design.



Site Boundary



Saturating

Removing

Figure 3.2
Process of Generative Massing
Source: Author

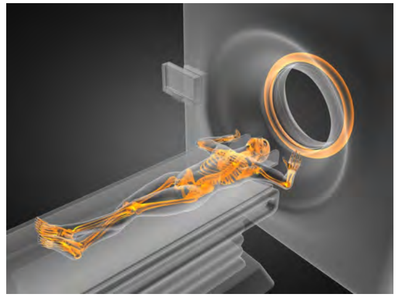


Figure 3.3
3D Medical Imaging
Source:
openmedscience.com

3D Medical Imaging

3D medical imaging encompasses methods used to reconstruct two-dimensional data from scans (such as MRI, CT, or ultrasound) into comprehensive three-dimensional representations. Rather than examining individual cross-sectional "slices," this allows researchers and clinicians to visualize complete volumetric structures[15].

Fundamentally, these 3D images are composed of tiny volumetric elements called voxels, which are the three-dimensional counterparts to pixels. Each voxel contains a value (like signal intensity or density) that corresponds to a small, defined volume within the patient's body.

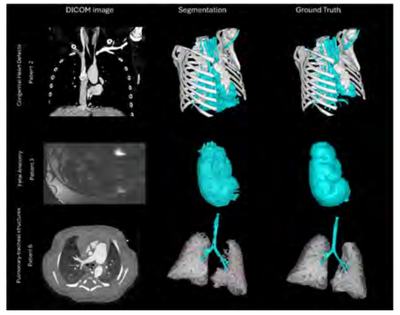


Figure 3.4
Image Segmentation
Source:
researchgate.com

Image Segmentation

Image segmentation in the context of medical imaging is a procedure that separates a medical image into various, distinct regions or segments. The purpose of this division is to accurately isolate and identify specific tissues, anatomical structures, or areas of abnormality within the image[16].

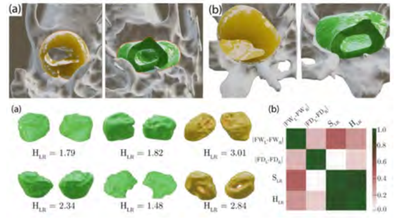


Figure 3.5
Negative Volume
Segmentation
Source: nature.com

Negative Volume Segmentation

Negative volume segmentation is a medical imaging method that concentrates on segmenting the empty space between different anatomical structures, rather than segmenting the structures themselves[17].

The Nodes

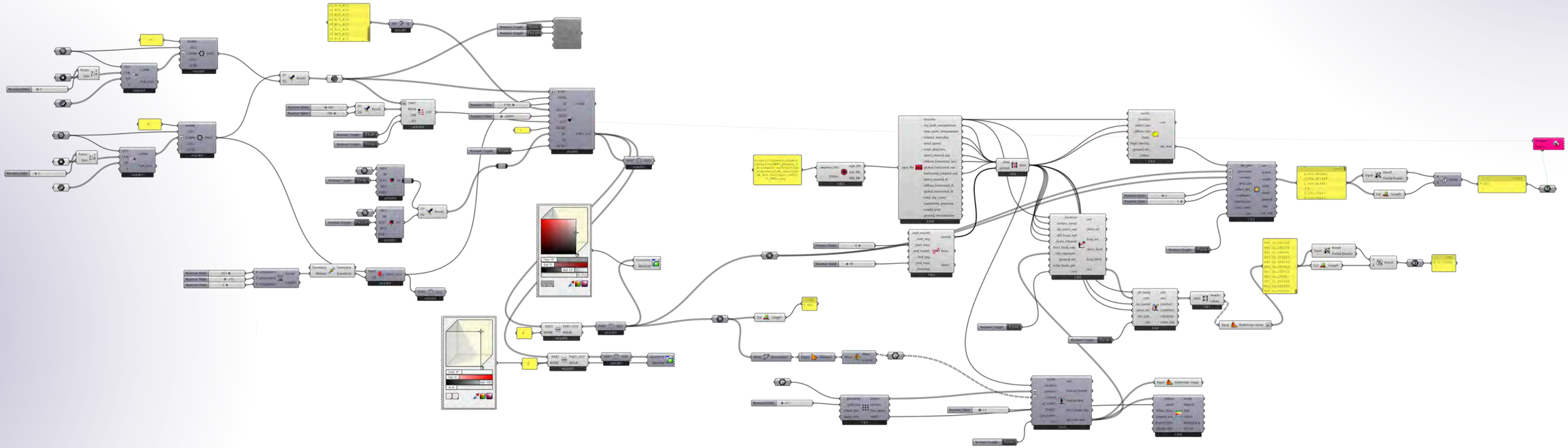


Figure 3.6
Grasshopper Nodes
Source: Author

Galapagos Simulation

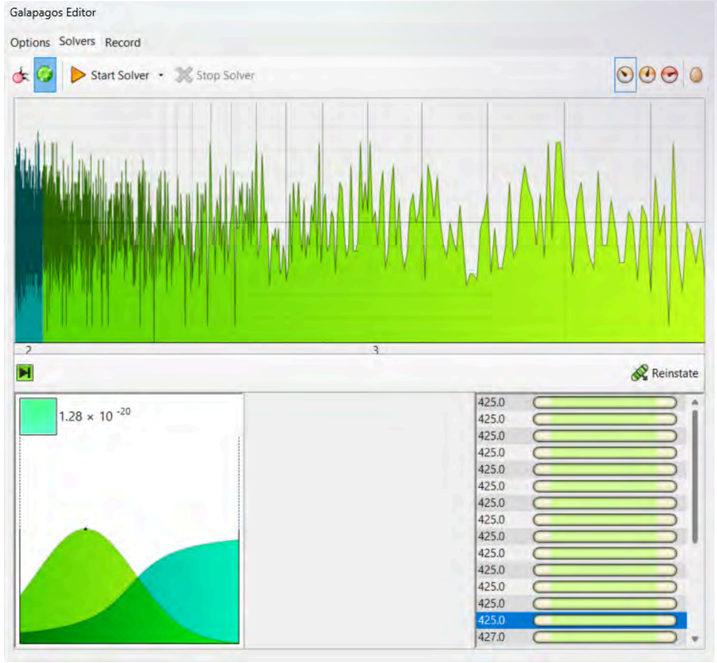


Figure 3.7
Galapagos
Source: Author

Leveraging Grasshopper's Wasp plugin, various massing configurations are procedurally generated and iteratively refined through Galapagos (or another multi-objective optimization solver, e.g., Wallacei, Opossum). This optimization process is driven by key environmental performance objectives: specifically, the minimization of solar radiation gain on building surfaces and the maximization of outdoor comfort as quantified by the Universal Thermal Climate Index (UTCI) for communal outdoor spaces. The resulting high-performance massing then establishes the primary structural and organizational grid for the strategic integration of the space program, designed to directly support and facilitate the principles of the WHO ICOPE approach within the development

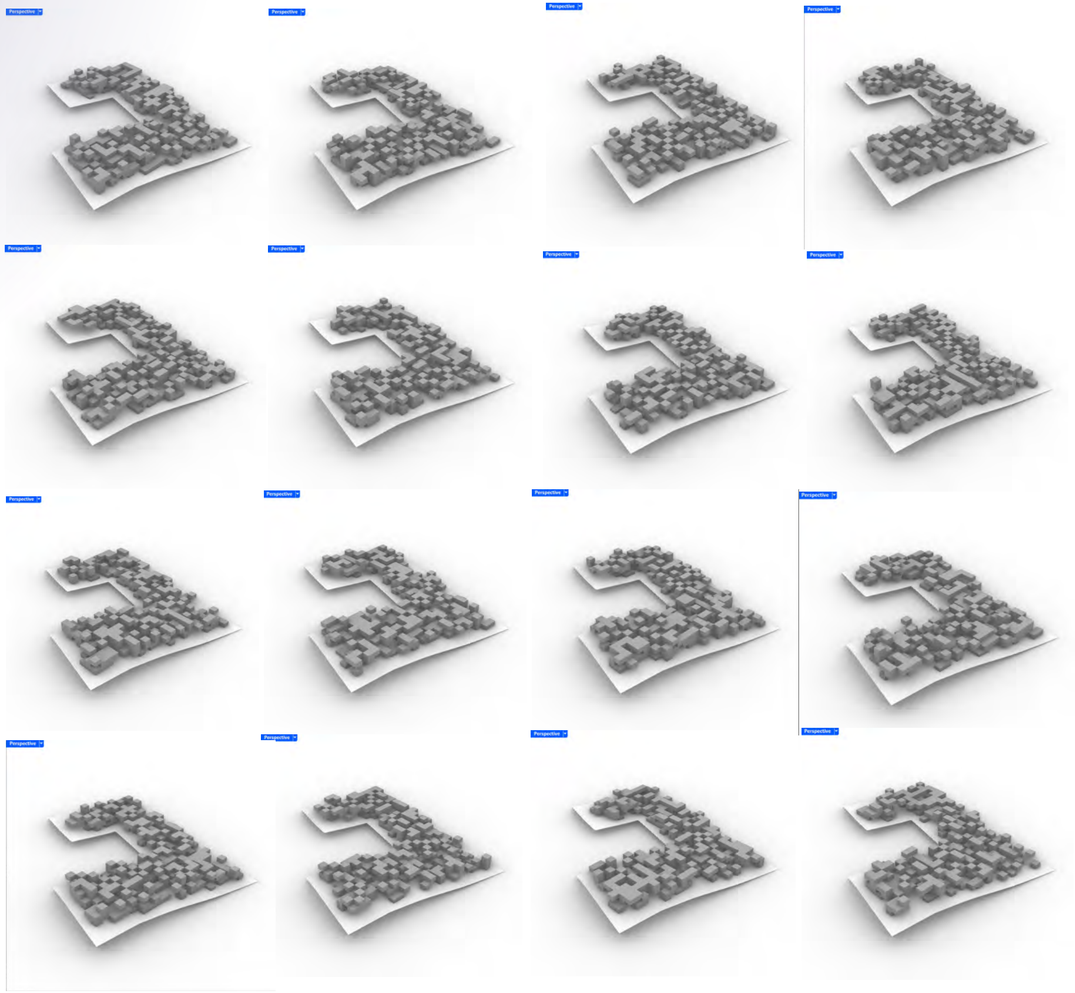


Figure 3.8
Mass Alternatives
Source: Author

Universal Thermal Climate Index

The optimal subset of configurations identified in the initial simulation was then carried forward into a subsequent analytical phase. This secondary simulation was specifically designed to further refine these selections by determining the most favorable Universal Thermal Climate Index (UTCI) performance.

LB Outdoor Solar MRT (OutdoorSolarMRT)

Calculate Mean Radiant Temperature (MRT) as a result of outdoor shortwave solar shining directly onto people as well as longwave radiant exchange with the sky.
-
This component uses the SolarCal model of ASHRAE-55 to estimate the effects of shortwave solar and a simple sky exposure method to determine longwave radiant exchange.
-

LB Human to Sky Relation (HumanToSky)

Calculate parameters for the relationship between human geometry and the sky given the position of a human subject and context geometry surrounding this position.

The outputs of this component can be plugged into either the "LB Outdoor Solar MRT" or the "LB Indoor Solar MRT" in order to account for context shading around a human subject in these MRT calculations.
-

LB UTCI Comfort (UTCI)

Calculate Universal Thermal Climate Index (UTCI).
-
UTCI is a thermal comfort model strictly for the outdoors. It is an international standard for outdoor temperature sensation (aka. "feels-like" temperature) and is one of the most common of such "feels-like" temperatures used by meteorologists. UTCI that attempts to satisfy the following requirements:

1) Thermo-physiological significance in the whole range of heat exchange conditions.
2) Valid in all climates, seasons, and scales.
3) Useful for key applications in human biometeorology.

While UTCI is designed to be valid in all climates and seasons, it assumes that human subjects are walking (with a metabolic rate around 2.4 met) and that they naturally adapt their clothing with the outdoor temperature. For outdoor situations that do not fit these criteria, the Physiological Equivalent Temperature (PET) model is recommended.
-

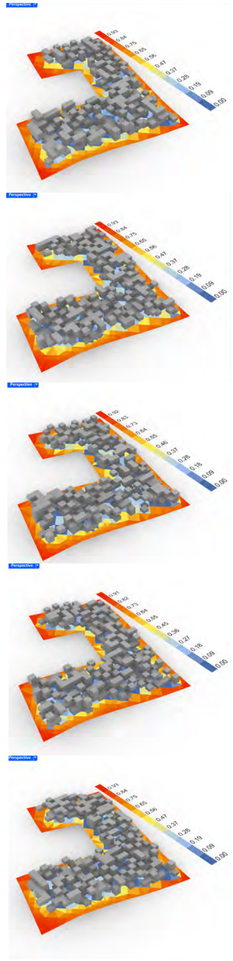


Figure 3.9
Site Outdoor Solar MRT
Source: Author

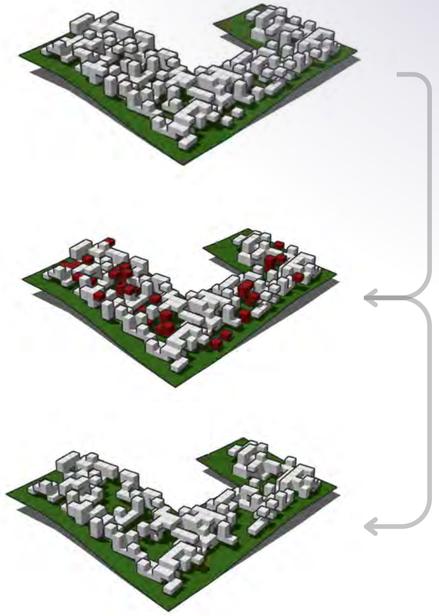


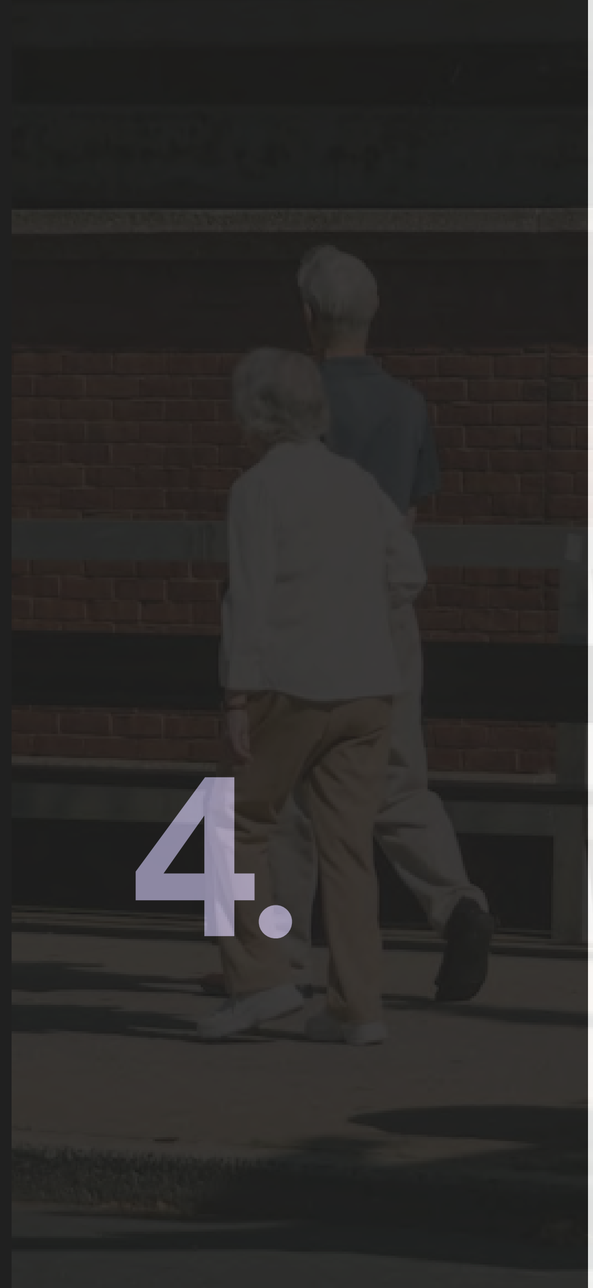
Figure 3.10
The Human Touch
Source: Author

| The Human Touch

The most optimal configuration identified through simulation was then subjected to designer-led adjustments. This 'human touch' involved refining the design to accommodate contextual considerations such as regulatory compliance, structural feasibility, cost implications, and circulation efficiency. Notably, this refinement process resulted in an approximate 10% reduction in the overall modular count.

This computational strategy addresses the physiological vulnerability of the aging population through two primary mechanisms:

1. Preserving Vitality (Thermoregulation): By minimizing Solar Radiation Gain on building envelopes, the design passively reduces indoor thermal loads. This intervention protects elderly residents, who suffer from diminished thermoregulatory responses, against heat stress and dehydration, thereby sustaining Vitality.
2. Enabling Locomotor Capacity (UTCI): The simulation maximized Universal Thermal Climate Index (UTCI) comfort hours in communal areas. By creating thermally comfortable microclimates, the design removes environmental barriers to outdoRor physical activity, directly facilitating Locomotor Capacity and social participation.



4.

Analysis and Respond

| Design Framework

Based on the WHO ICOPE framework, the Domains of Intrinsic Capacity is translated into a framework. The core philosophy of this design approach is that the built environment must compensate for declines in Intrinsic Capacity (the individual's physical and mental reserves) to maintain Functional Ability (the ability to be and do what they value).

1. Domain: Locomotor Capacity (Mobility)

Focus: Preventing falls, maintaining muscle strength, and ensuring independent movement.

• **Design Challenge:**
How to create a continuous, barrier-free environment that encourages physical activity for all ages while mitigating fall risks for older adults with gait or balance issues?

• **Design Criteria:**
- Seamless Connectivity: Elimination of thresholds and vertical barriers.
- Safety & Stability: Support systems integrated into the architecture.
- Active Design: Spaces that passively encourage movement (walking, climbing).

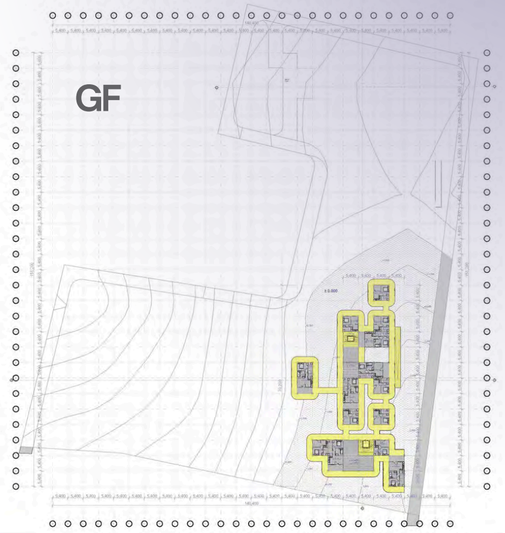
• **Design Guidelines:**
- The "Route": Create a continuous "Main Circulation Route" that connects all major amenities with a minimum clear width of 1900mm (communal) to allow mobility aids and pedestrians to pass.
- Continuous Support: Install dual-level handrails on both sides of circulation paths, ramps, and stairs to accommodate different heights (children and adults).
- Rest Nodes: Integrate seating at intervals of no more than 50m along exterior routes to allow for recovery.
- Flooring: Use slip-resistant (R12) flooring in wet areas and shock-absorbing materials in exercise zones.

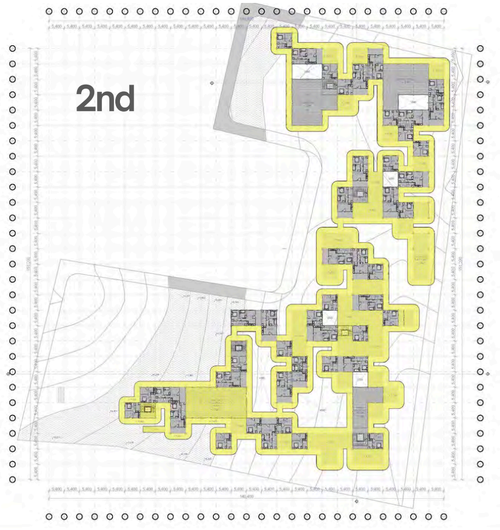
The Active Loop

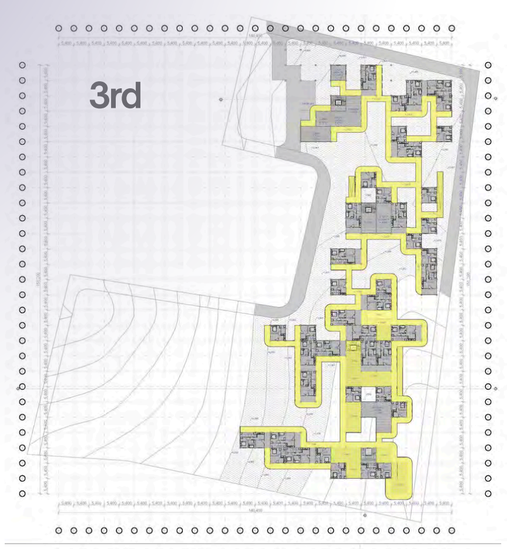
Design Concept:
A circulation spine that functions as an exercise track, connecting intergenerational play zones with senior fitness stations, ensuring that movement is a shared, safe, and social daily ritual.

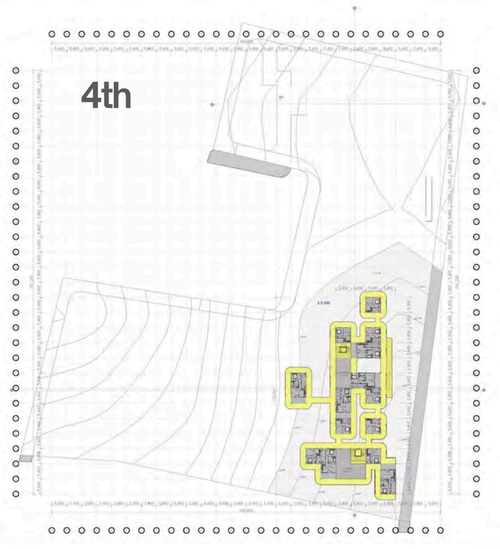
CIRCULATION

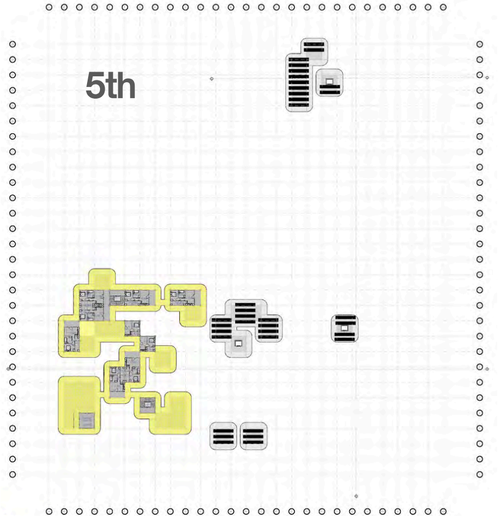
Figure 4.1
Circulation Plan
Source: Author

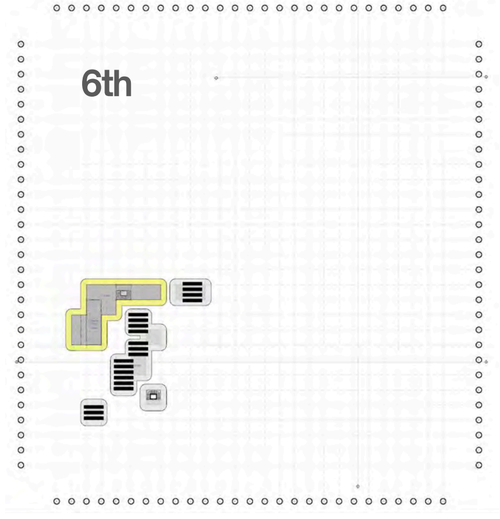












2. Domain: Cognition (Memory & Orientation)

Focus: Preventing disorientation, supporting memory, and reducing anxiety.

• **Design Challenge:**
How to design complex housing environments that are intuitive to navigate for those with cognitive decline (e.g., dementia) without creating a sterile, institutional atmosphere?

• **Design Criteria:**
- Legibility: Spaces must be easy to read and understand.
- Familiarity: Design elements that evoke recognition and comfort.
- Sensory Stimulation: Engaging multiple senses to aid memory.

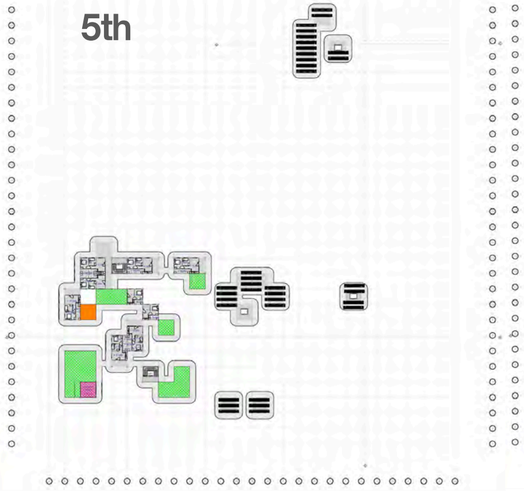
• **Design Guidelines:**
- Visual Access: Use open-plan layouts and glazing to provide clear sightlines to destinations (e.g., seeing the toilet from the bed, or the dining area from the lounge).
- Distincitve Wayfinding: Avoid repetitive, hotel-like corridors. Use "landmarks" at junctions to aid orientation.
- Avoid Dead Ends: Design continuous looped paths to prevent the frustration and anxiety caused by reaching a dead end.
- Colour Coding: Use distinct but warm colours to differentiate floors or zones, avoiding blue/green spectrums that age-related vision changes may render indistinguishable.

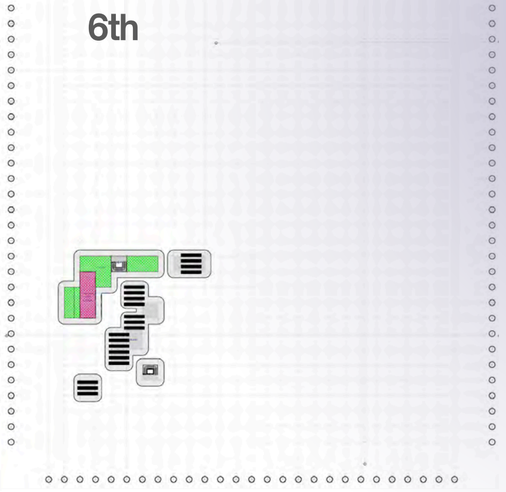
Intuitive Navigation

• Design Concept:
"A layout strategy where architecture acts as a memory aid, using distinct sensory zones to guide residents naturally between private and public realms.

INDOOR
SEMI-OUTDOOR
OUTDOOR

Figure 4.2
Social Area Plan
Source: Author





3. Domain: Vitality (Nutrition & Energy)

Focus: Preventing malnutrition and promoting social eating.

• **Design Challenge:**
How to transform eating from a solitary biological necessity into a communal event that combats malnutrition and social isolation?

• **Design Criteria:**
- Social Facilitation: Spaces that encourage group dining.
- Sensory Appetite Stimulation: Lighting and layout that makes food appealing.
- Accessibility: Kitchens that are usable by people with reduced strength.

• **Design Guidelines:**
- The Social Kitchen: Design communal kitchens with variable height countertops and "Food Safety Triangles" (sink-stove-prep proximity <1000mm) to allow intergenerational cooking classes.
- Farm-to-Table Visibility: Establish a visual connection between the "Communal Farm" (gardens), the kitchen, and the dining area to promote mindful eating.
- Ambiance: Use warm lighting (3000K-3500K) and warm colors (orange/yellow) in dining areas to stimulate appetite, avoiding blue light which suppresses it.

• **Design Concept:**
"The Culinary Hearth" – Positioning the dining and kitchen areas not just as service spaces, but as the social anchor of the building, where food production (gardening) and consumption bridge the generational divide.

Figure 4.3
Communal Dining
Perspective
Source: Author

Figure 4.4
Communal Farming
Perspective
Source: Author

4. Domain: Sensory Capacity (Vision & Hearing)

Focus: Compensating for loss of visual acuity and hearing clarity.

• **Design Challenge:**
How to create an environment that communicates clearly to users with sensory impairments without becoming visually chaotic or acoustically harsh?

• **Design Criteria:**
- Visual Contrast: enhancing object definition.
- Acoustic Control: Reducing background noise to aid communication.
- Illumination: High-quality, glare-free light.

• **Design Guidelines:**
- Acoustic Zoning: Separate "Loud Zones" (playgrounds) from "Quiet Zones" (reading rooms) using buffer spaces to prevent noise interference for hearing aid users.
- Lighting Levels: Older adults require 50% higher lighting levels. Design for 300+ lux in communal areas and 500+ lux in task areas.
- Contrast Design: Use high-contrast colours between floors and walls, and on step nosings, to aid depth perception. Avoid high-gloss finishes that cause glare.
- Visual Cues: Incorporate visual indicators (flashing lights) alongside doorbells or fire alarms for the hard of hearing.

Figure 4.5
Contrast Interior
Source: Author

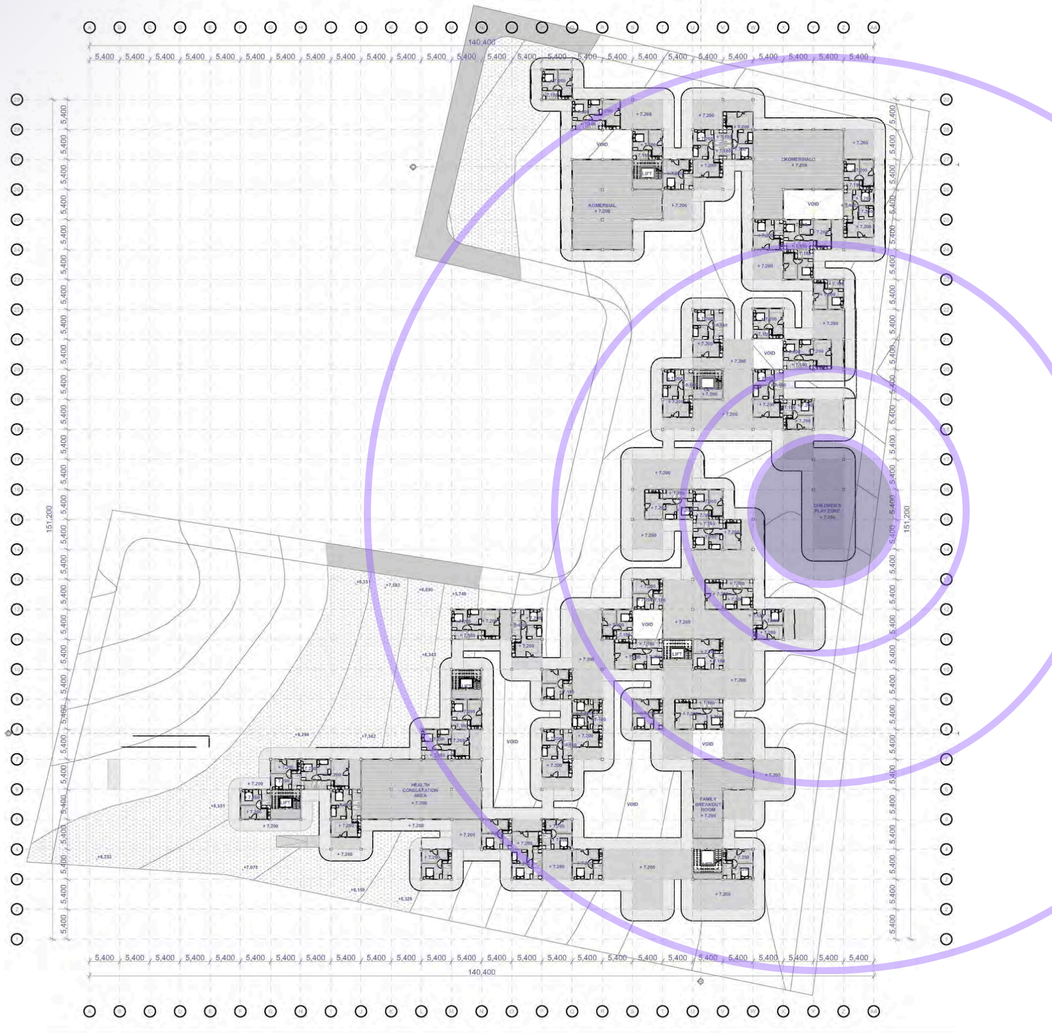


Figure 4.6
Loud Zone
Source: Author

5. Domain: Psychological Capacity (Mood & Depression)

Focus: Combatting isolation, depression, and promoting intergenerational bonding.

• Design Challenge:
How to design density that prevents loneliness while respecting the need for retreat and privacy?
• Design Criteria:
- Intergenerational Contact: Creating "collision points" for different age groups.
- Biophilia: Connection to nature to reduce stress.
- Purpose: Spaces that allow contribution and productivity.

• Design Guidelines:
- Intergenerational Play: Co-locate children's play zones with shaded seating for older adults to allow for "passive participation" and observation.
- Biophilic Sanctuaries: Ensure visual access to greenery from all principal living areas to reduce cortisol levels and improve mood.
- Flexible "Third Spaces": Create Multi-Functional Rooms that can transition from quiet reading to group therapy or children's tutoring, fostering diverse social interactions.

• Design Concept:
"Symbiotic Living" – A spatial programming strategy where the daily routines of children (play, learning) and older adults (exercise, rest) overlap in shared "collision zones," fostering spontaneous interaction and reducing the psychological burden of isolation.

Figure 4.7
Children's Play
Perspective
Source: Author

Figure 4.8
Multi Function Room
Perspective
Source: Author

Third Places Distribution

Lobby (A)

The Drop-offs, Building Entrances, and Lobbies are crucial transitional spaces designed to create an inviting arrival experience, facilitate essential staff-resident interaction, and serve as hubs for seeking assistance and addressing emergencies. The Front Desk, typically integrated into the Concierge area and placed prominently near the Clubhouse entrance, acts as the first point of contact, providing essential daily assistance and seamlessly connecting residents with in-house services and local resources.

Hydrotherapy (B)

Hydrotherapy Pool is a vital facility that offers residents a gentle, therapeutic approach to enhance their functional abilities, including mobility and muscle strength. The pool's unique properties, such as buoyancy, resistance, and temperature, create an ideal environment for relaxation and low-impact activities that build strength, coordination, and confidence, and enhance balance to reduce falling risk factors, particularly benefiting those with knee osteoarthritis by alleviating pain.

The Reading Room (C)

The Reading Room is a significant communal space designed to be a haven for ongoing learning integral to cognitive health and overall well-being, thereby enhancing residents' cognitive functioning and adaptability. This area serves as a central hub for users to access information, allowing them to explore empowerment through learning and stay connected to societal changes that inform their decision-making.

Figure 4.9
Lobby
Perspective
Source: Author

Figure 4.10
Hydrotherapy
Persspective
Source: Author

Figure 4.11
Reading Room
Perspective
Source: Author

Figure 4.12
Floor Plan - 2nd
Source: Author

Children Play Zone (D)

· Intergenerational Interaction: Play areas are designed to promote intergenerational interactions within the community. Intergenerational Housing is a residential concept that integrates people of different age groups, including children, within a shared living environment to foster mutual support and social interaction.

· Observation and Engagement: The design encourages the participation of older adults by recommending the inclusion of shaded seating near the play zone so that they can safely observe and engage with the children

Family Breakout Room (E)

The Family Breakout Room serves as a welcoming and visible space for caregivers and family members who are involved in the resident's recovery process.

· Support for Caregivers and Family Involvement: The room is designed to encourage family involvement and experience sharing in therapy sessions.

· Rest and Recuperation: It provides a comfortable place for both caregivers and users (residents) to rest after therapy sessions.

· Community and Connection: By fostering interactions among users and their caregivers, the room helps build a sense of community and connection, enhancing the overall support system during the recovery process.

· Information Display: Information on available rehabilitation products (such as through display screens, flyers, or handouts) should be placed in the Family Breakout Room or waiting area for easy access by users and their caregivers

Health Consultation Area (F)

Health Consultation area is designed to provide a personal setting for private discussions and health screenings. This space is crucial for fostering a comforting atmosphere for confidential conversations and promoting resident autonomy and well-being through proactive engagement in their health journeys. The rooms are versatile, supporting in-person consultations, telemedicine sessions utilizing computers, cameras, and high-speed Internet, and serving as a setting for initial discussions with therapists

Figure 4.13
Children Play Zone Pers.
Source: Author

Figure 4.14
Family Breakout Room Perspective
Source: Author

Figure 4.15
Health Consultation Area Perspective
Source: Author

Figure 4.16
Floor Plan - 3rd
Source: Author

Multi-function Room (G)

The room is specifically designed to host Lifestyle programmes combining physical and cognitive training with nutrition workshops. To maximize accessibility and usage, the rooms is located near open area which facilitate flexible use and expansion of space

Figure 4.17
Multi Function Room Perspective
Source: Author

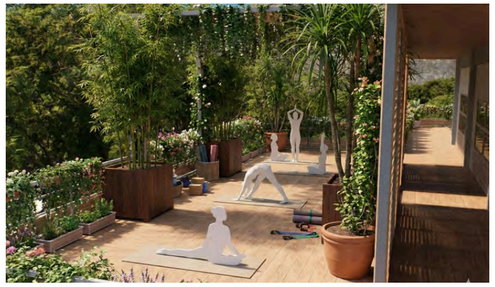
Figure 4.17
Communal Dining Perspective
Source: Author

Communal Kitchen & Dining (H)

The Communal Dining area is vital, especially for older adults living alone, as shared meals address nutritional needs and promote social interaction.
Significance and Function:
· It encourages healthy eating habits and fosters positive emotions through shared meals, contributing to a sense of community and belonging

The Communal Kitchen is designed as a collaborative environment for nutritional education and hands-on workshops.
Significance and Function:
· It empowers residents to take charge of their cooking and self-care, enhancing culinary skills and promoting healthier eating habits.
· It encourages residents to share culinary experiences, fostering community bonds and social connections.

Figure 4.18
Floor Plan - 4th
Source: Author



Gym (I) and Outdoor Exercise Area (J)

Gym enhances functional abilities for older adults through a holistic approach. Its main purposes are to support physical exercise and training:

· Enhancing Physical Health: Physical activities and exercise are integral to Multi-Component Programmes, enhancing mobility and muscle strength to reduce the risk of malnutrition, cognitive impairment, and depressive symptoms. Regular exercise is vital for older adults' health, as it is one of the most effective ways to prevent bone loss, Parkinson's disease, and dementia.

· Combating Age-Related Decline: The Gym focuses on low-impact cardio equipment and strength training using bodyweight, resistance bands, and light weights to effectively combat age-related muscle loss.

· Functional Independence: Functional exercises that replicate daily tasks, such as chair stands and core work, further support residents in maintaining independence and overall well-being.

Communal Farming (K)

The Communal Farm provides opportunities for residents to engage in activities that significantly benefit their overall health and sense of community:

· Mental Well-being and Nutrition: Participation enhances mental well-being and nutrition.

· Sustainable Lifestyle: This engagement encourages a sustainable lifestyle and instills a sense of accomplishment and belonging among residents.

· Nutritional Support: Cooking programmes linked to the farm further improve access to nutritious food while fostering social connectivity.

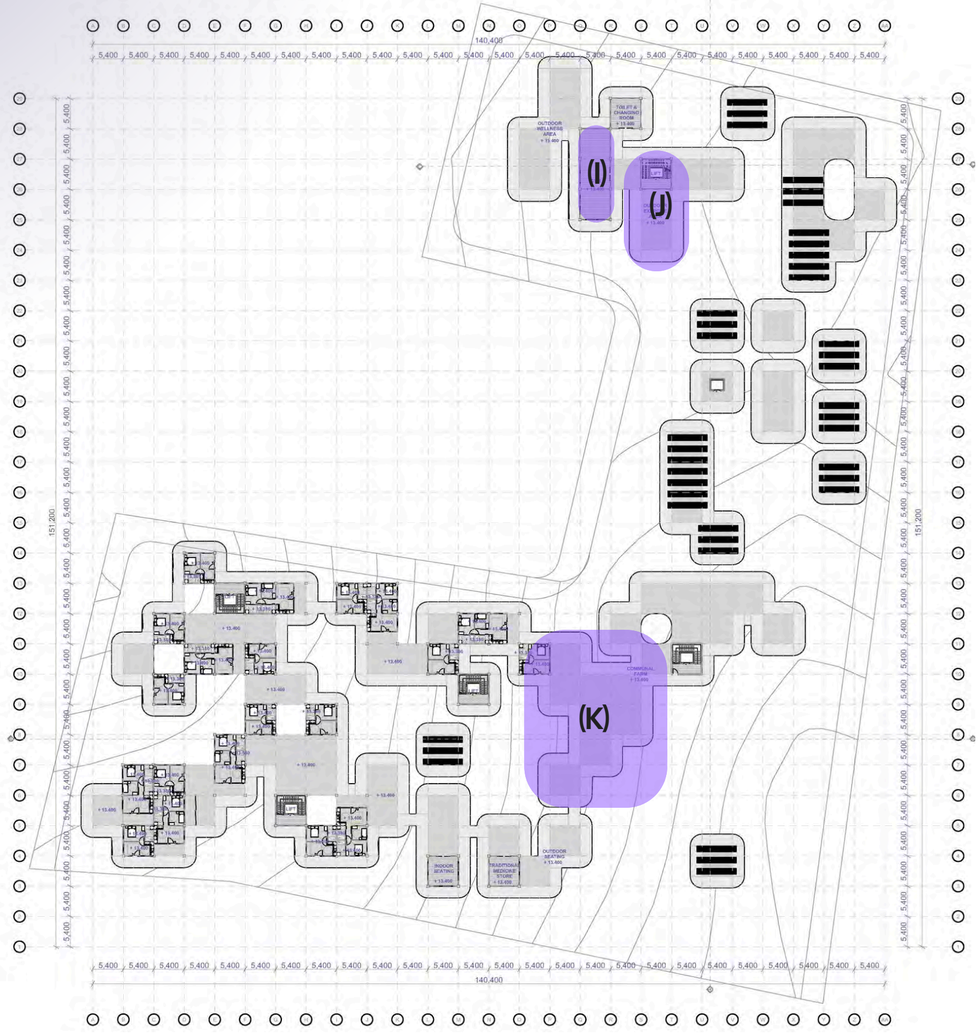
· Farm-to-Table Experience: A visual connection between the Communal Farm and the Communal Dining area and Communal Kitchen can promote mindful eating and facilitate farm-to-table experiences.

Figure 4.19
Gym Perspective
Source: Author

Figure 4.20
Outdoor Exercise Area Perspective
Source: Author

Figure 4.21
Communal Farming Perspective
Source: Author

Figure 4.22
Floor Plan - 5th
Source: Author

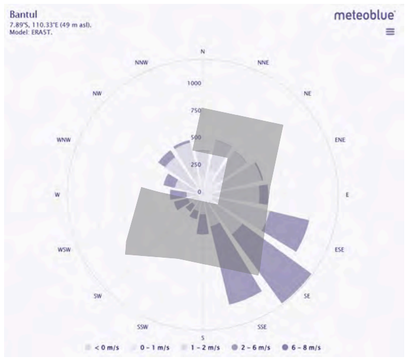


| Applied General Recommendations

Site Planning

Environmental Quality

The site has a unique property where the lowest point of the site is the area where wind mostly coming from. Since the height of the building is following the contour of the site, it makes the received wind on the building is optimized which helps the air circulation and quality.



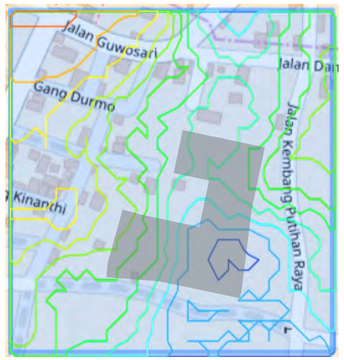


Figure 4.23
Site Contour
Source: cadmapper.com

Figure 4.24
Wind Rose
Source: meteoblue.com

Figure 4.25
Site Plan
Source: Author

Walkability

The addition of ramps and the vehicles pathway that is organized on the outer perimeter of the site ensure safe, accessible and inclusive walking environments to promote independence within the site.

Space Planning

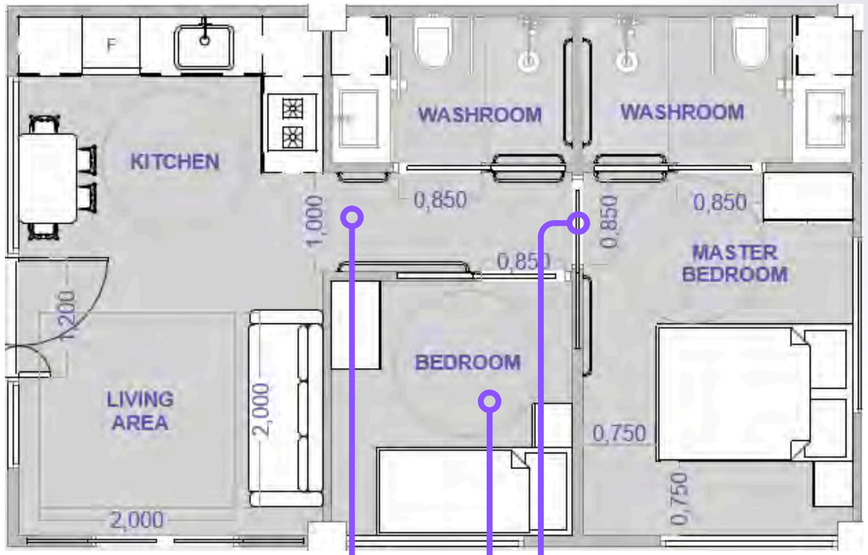


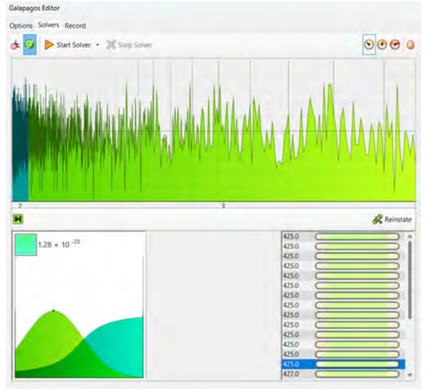
Figure 4.26
Unit Modul
Source: Author

Corridors
Provide a clear width of min. 950mm allowing manoeuvring space for mobility aids, with potential for grab rails on both sides.

Manoeuvring Space
Provide a turning circle of diameter 1500mm (min. 1200mm) in all functional areas.

Door Clear Opening Width
Ensure a clear door opening width of min. 850mm).ideally with an additional minimum 350mm nip to the leading edge of the door to facilitate easy access and manoeuvrability, particularly for those using mobility aids.

Space Planning



Reduce Heat Gain
Avoid west-facing façades, as they are prone to excessive summer heat gain from the late afternoon sun.

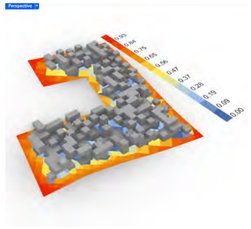
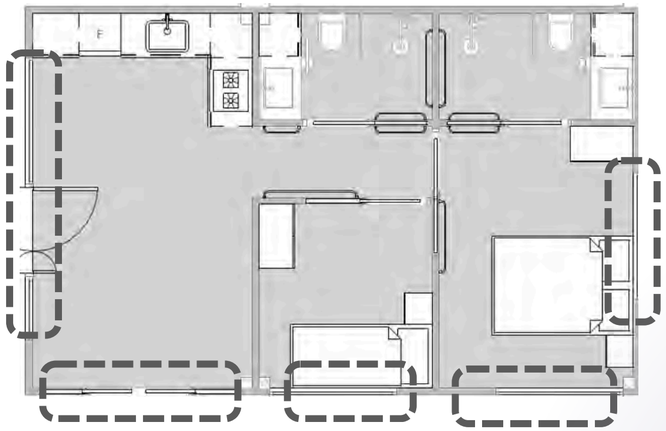


Figure 4.27
Galapagos
Source: Author

Figure 4.28
Site Outdoor Thermal
Source: Author

Figure 4.29
Unit Plan Opening
Source: Author



Daylight Maximisation
Design layouts that maximise natural light through large windows, skylights, and open spaces to enhance mood and well-being

Adjustable Lighting
Use layered lighting with dimmable fixtures to allow residents to adjust brightness according to their needs and preferences.

Anti-Glare Solutions
Use solar-controlled glazing, like insulated glass units, dual-pane low-emissivity glass, and/or install sun control window film to optimise daylight, minimise heat gain, and improve thermal efficiency.

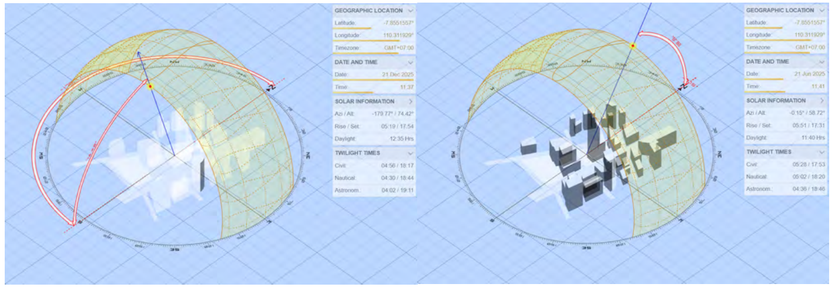


Figure 4.30
Sun Extreme Position
Source: andrewmarsh.com

Figure 4.31
Detail Section
Source: Author

Figure 4.32
Shading
Source: Author

Shading Devices
Select window types and shading to manage glare and heat while allowing direct sunlight:

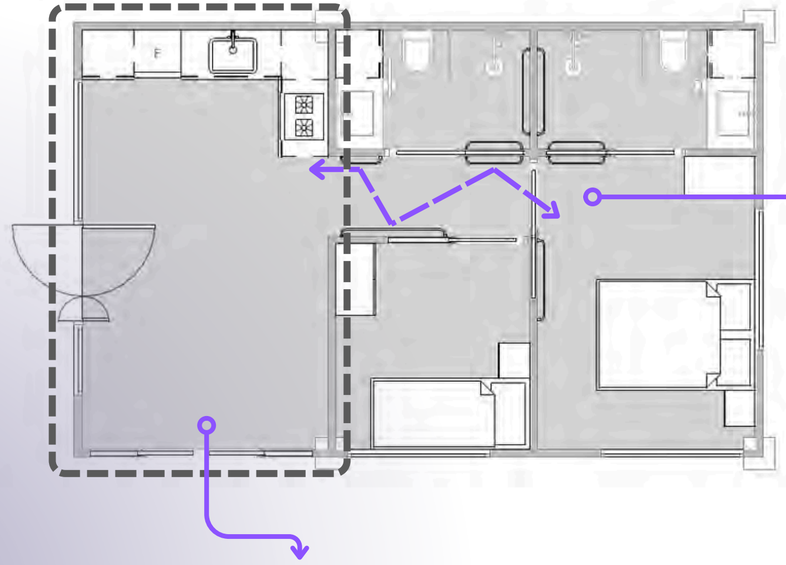
- East and West Facing

Use vertical elements, like adjustable vertical fins with proper spacing.

- South and North Facing:

Incorporate horizontal overhangs and additional vertical shading for southeast or southwest windows

Space Planning

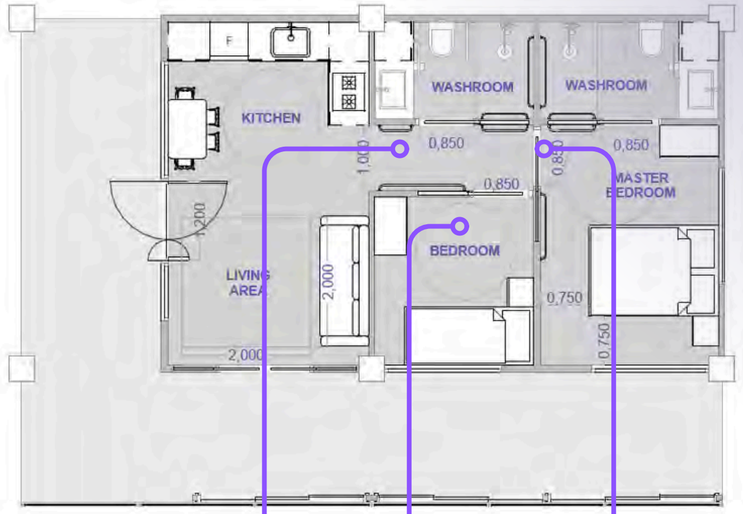


Corridor Wall Space
Position the door opening to enable the potential installation of continuous grab rail support along the corridor wall. Ensure that users can easily reach the opposite side, ideally within arm's reach, even when the rail is interrupted by a door.

Prioritise plans without corridors to facilitate easy manoeuvring, especially for those with mobility aids.

Ample Storage
Provide built-in storage to avoid clutter at home, which can pose fall risks

Figure 4.33
Unit Plan
Source: Author



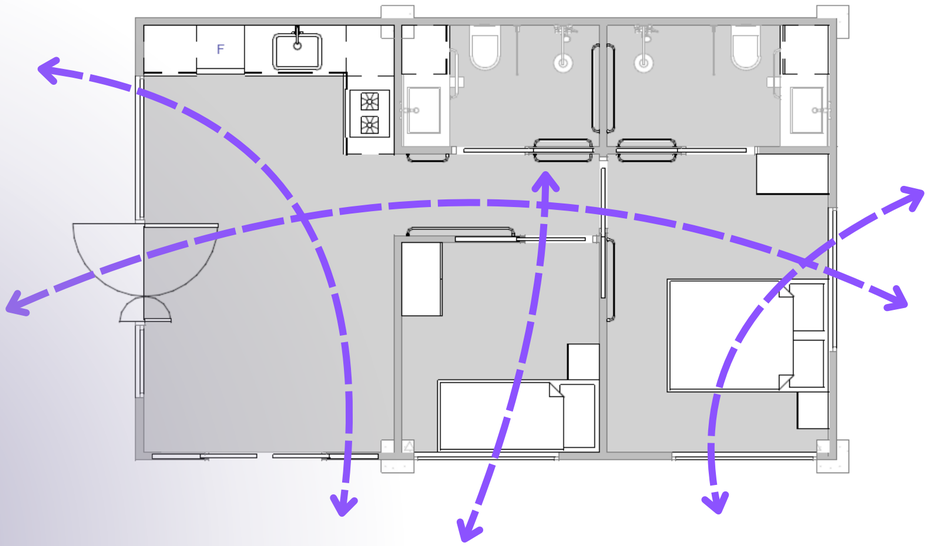
Corridors
Provide a clear width of min. 950mm allowing manoeuvring space for mobility aids, with potential for grab rails on both sides.

Door Clear Opening Width
Ensure a clear door opening width of min. 850mm).ideally with an additional minimum 350mm nip to the leading edge of the door to facilitate easy access and manoeuvrability, particularly for those using mobility aids.

Manoeuvring Space
Provide a turning circle of diameter 1500mm (min. 1200mm) in all functional areas.

Figure 4.34
Unit Plan
Source: Author

Space Planning



Dual Aspect Design

Opt for a dual aspect home design with operable windows on two different sides to maximise daylight, ventilation, and adaptability

Figure 4.35
Unit Plan
Source: Author

Air

Enhanced cross-ventilation mitigates heat-related risks and improves air quality, vital for older adults with age-related conditions.

View

Locate the window sill at a maximum of 800mm above floor level for a good, seated view and extend the window height to at least 1800mm for standing views.

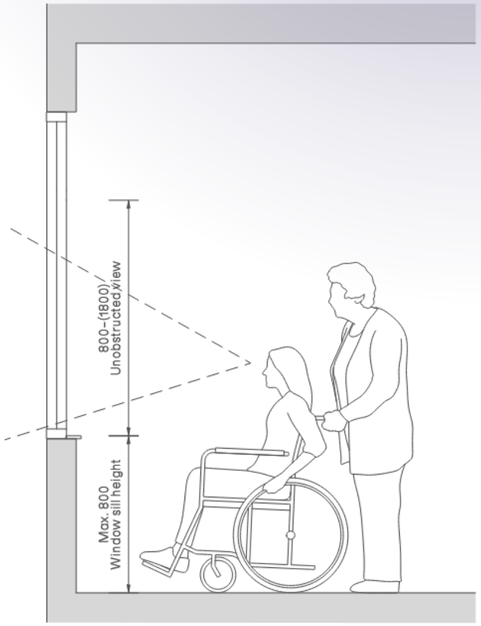
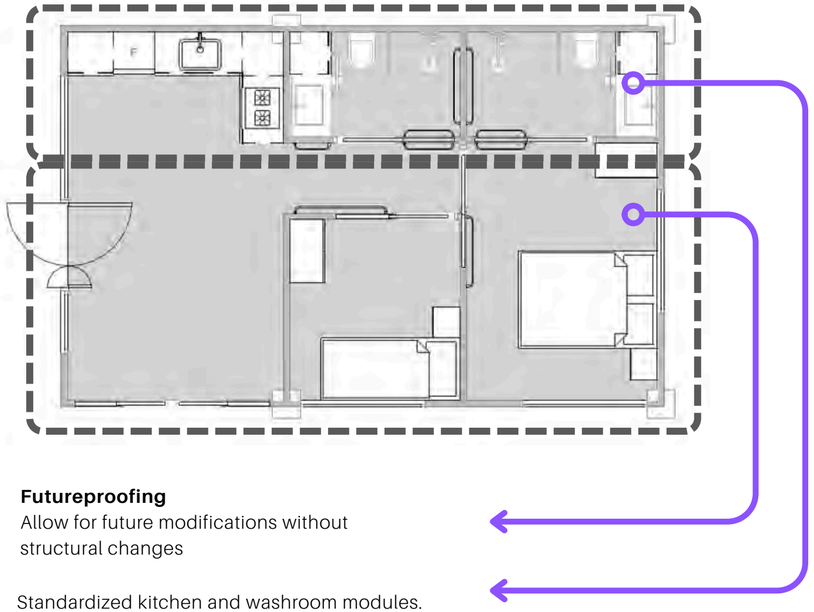


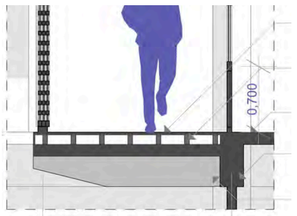
Figure 4.36
Window Height
Source: Curating Homes

Space Planning



Futureproofing
Allow for future modifications without structural changes

Standardized kitchen and washroom modules.



Step-Free Access

No Thresholds: Ensure all routes are completely stepfree with no thresholds, to reduce fall risk, especially for those individuals with weakened legs or balancing issues.

Figure 4.37
Unit Plant
Source: Author

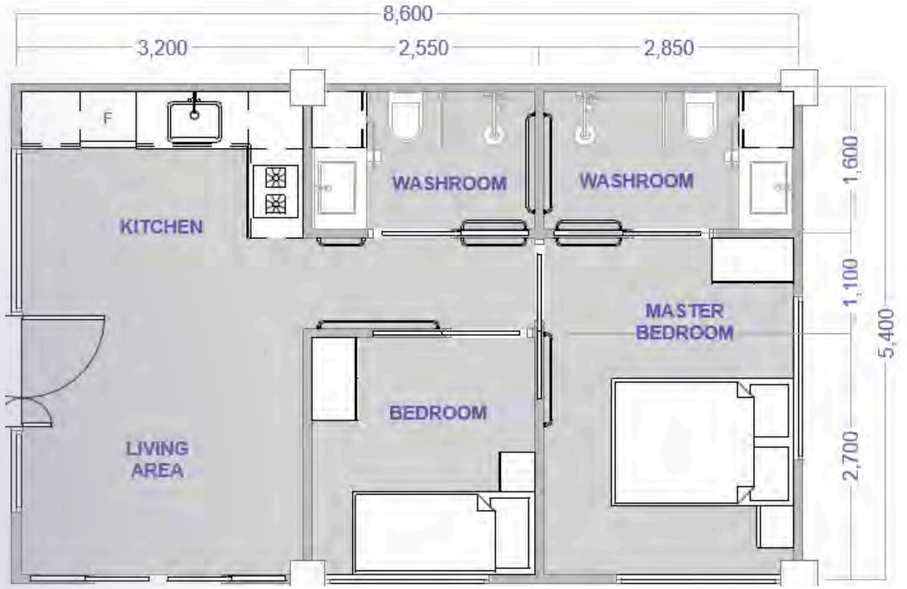
Figure 4.38
Step Free Access
Source: Author

Figure 4.39
Situation Plan
Source: Author

Greenery & Landscaping
Prioritise garden or nature views, which benefit cognitive function, sensory experience, well-being, and mental health.

Street Views
Avoid busy street views, as they reduce satisfaction with surroundings

| Types of Configuration



Owned Unit

Designed for 50+ year old users.

Figure 4.40
Owned_Unit Plant
Source: Author

Rental Unit

Designed for 25+ year old users.

Figure 4.41
Rental Unit Plant
Source: Author

5.

Design Description

Block Plan

Figure 5.1
Block Plan
Source: Author

Site Plan

Figure 5.2
Site Plan
Source: Author

Floor Plans
Ground Floor Plan

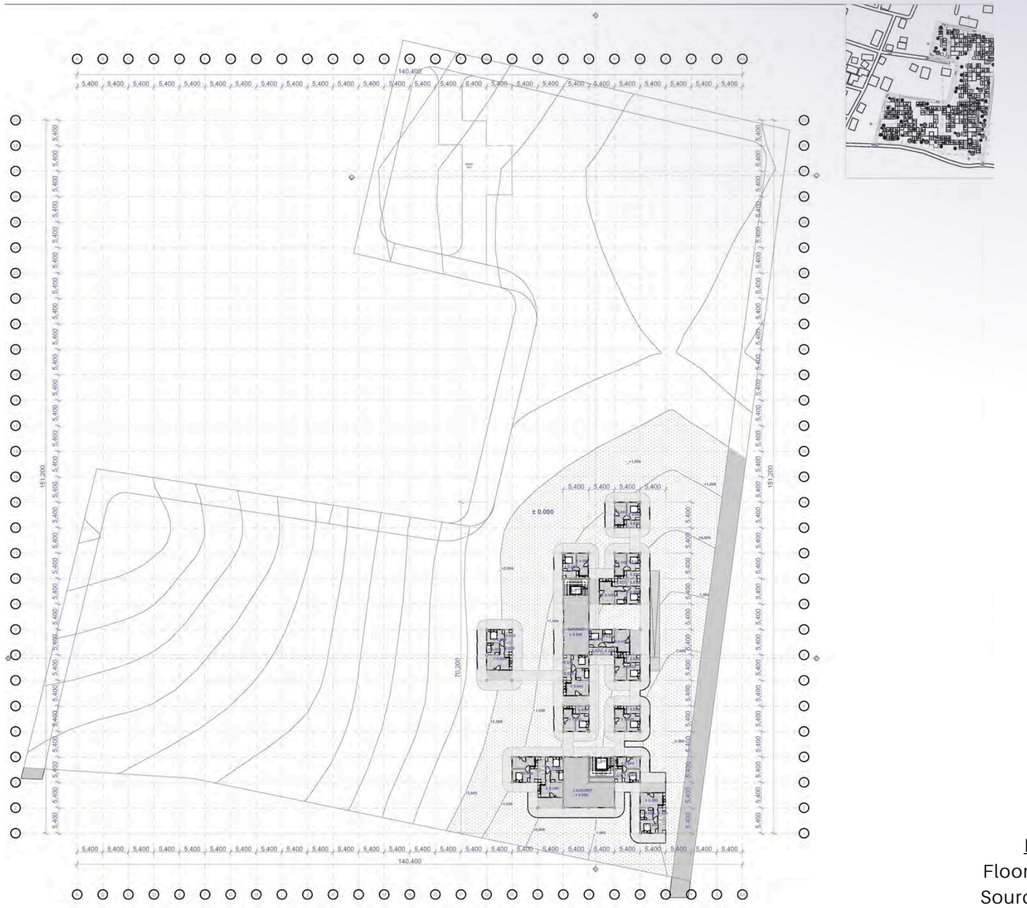


Figure 5.3
Floor Plan - GF
Source: Author

Floor	Space	Area (m2)
GF	**Lounge**	58.32
	Laundry	87.48
	. Owned Units (6x)	349.92
	. Rented Units (8x)	233.28
	Circulation + Collision Points	825.99
	Total / Floor	**1,554.99**

1st Floor Plan

Figure 5.4
Floor Plan - 1st
Source: Author

Floor	Space	Area (m2)
1st	**Lobby**	29.16
	.+ Front Desk	29.16
	.+ Lounge	87.48
	Staff Office	58.32
	Hydrotherapy	58.32
	Reading Room	87.48
	. Owned Units (20x)	1,166.40
	. Rented Units (22x)	641.52
	Circulation + Collision Points	2,111.61
	Total / Floor	**4,269.45**

2nd Floor Plan

Figure 5.5
Floor Plan - 2nd
Source: Author

Floor	Space	Area (m2)
2nd	**Community Health Center**	233.28
	.+ Outdoor	29.16
	Family Breakout Room	116.64
	.+ Outdoor	87.48
	Children's Play Zone	87.48
	Commercial Area	408.24
	. Owned Units (22x)	1,283.04
	. Rented Units (24x)	699.84
	Circulation + Collision Points	3,655.86
	Total / Floor	**6,601.02**

3rd Floor Plan

Figure 5.6
Floor Plan - 3rd
Source: Author

Floor	Space	Area (m2)
3rd	**Media Room**	116.64
	Communal Kitchen	58.32
	Communal Dining	58.32
	.+ Outdoor	204.12
	Multi-Purpose Room	145.80
	.+ Outdoor	87.48
	.+ Storage	29.16
	.+ Service	29.16
	. Owned Units (22x)	1,283.04
	. Rented Units (29x)	845.64
	Circulation + Collision Points	3,507.30
	Total / Floor	**6,364.98**

4th Floor Plan

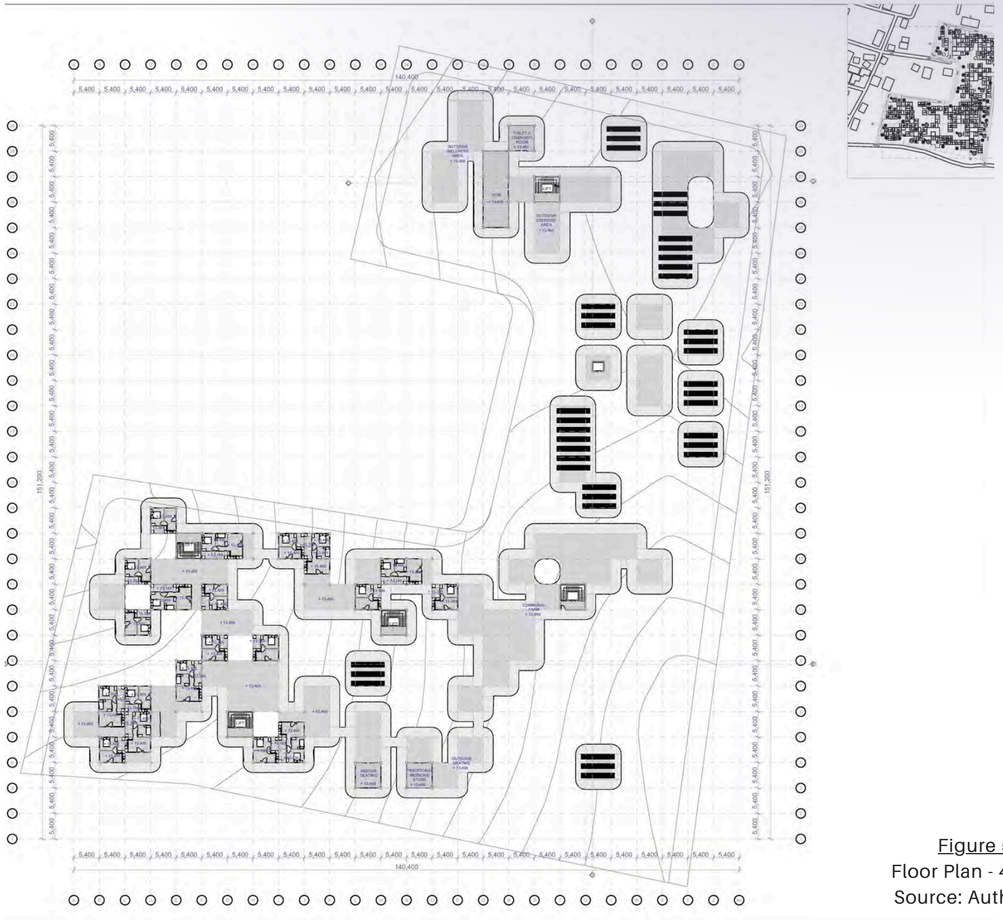


Figure 5.7
Floor Plan - 4rd
Source: Author

Floor	Space	Area (m2)
4th	**Communal Farm**	49,572
	Traditional Herb Drink Store	5,832
	.+ Outdoor	14,580
	. Owned Units (8x)	46,656
	. Rented Units (12x)	34,992
	Circulation + Collision Points	298,623
	Total / Floor	**450,255**

5th Floor Plan

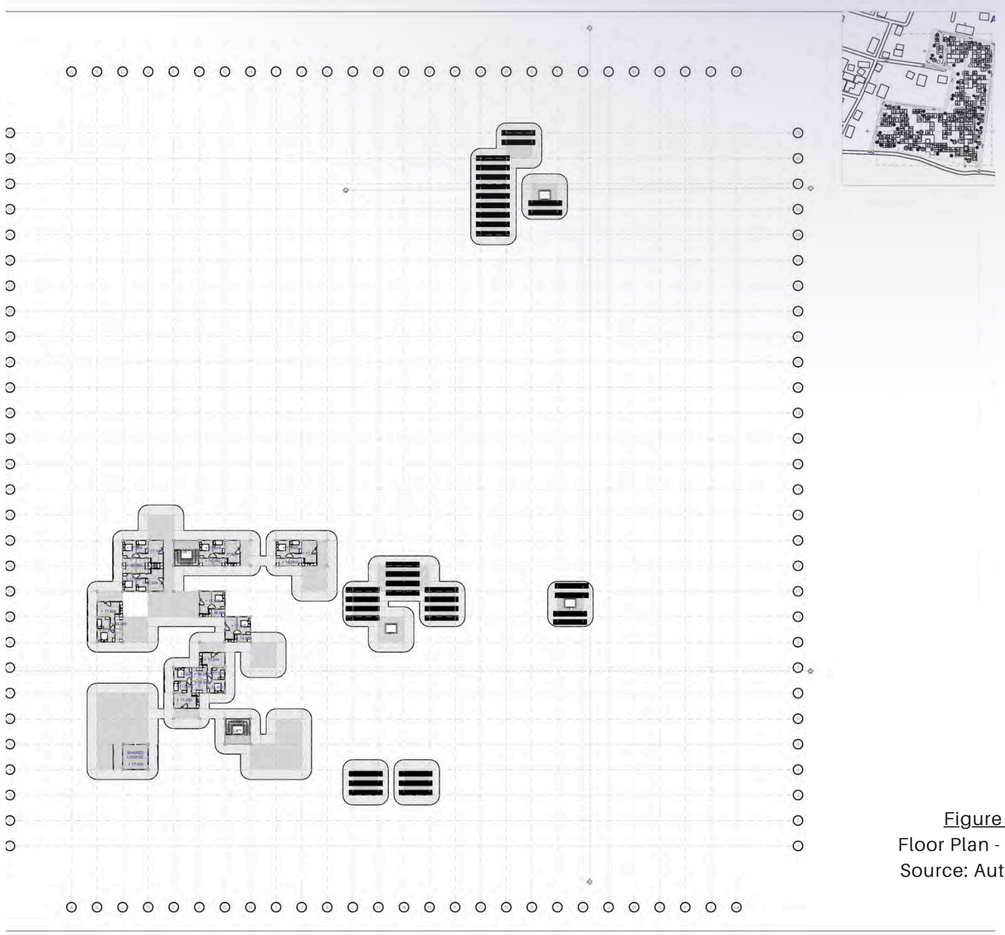


Figure 5.8
Floor Plan - 5th
Source: Author

Floor	Space	Area (m2)
5th	**Shared Lounge**	2,916
	.+ Outdoor	14,580
	. Owned Units (7x)	40,824
	. Rented Units (2x)	5,832
	Circulation + Collision Points	115,652
	Total / Floor	**179,804**

6th Floor Plan

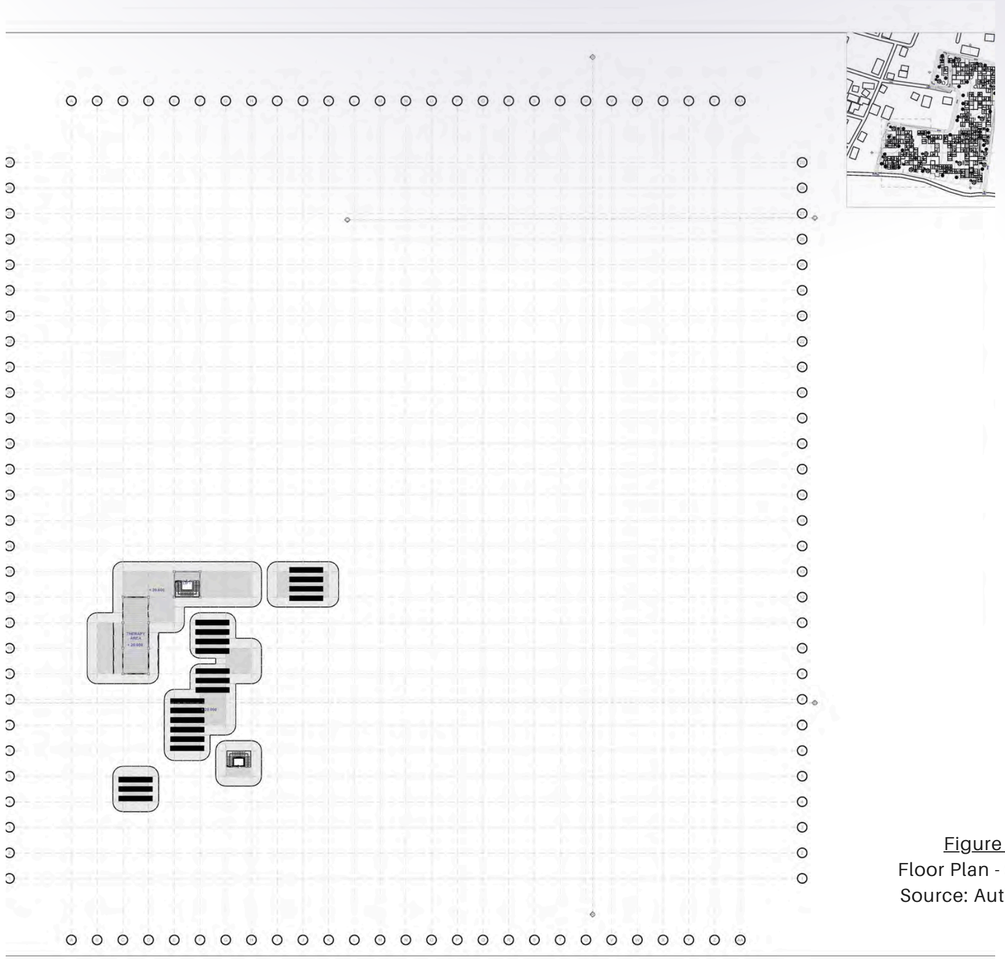


Figure 5.9
Floor Plan - 6th
Source: Author

Floor	Space	Area (m2)
6th	**Therapy Area**	8,748
	.+ Outdoor	20,412
	Circulation + Collision Points	26,702
	Total / Floor	**55,862**
Total		**2,564,965**

Table 5.1
Building Property
Source: Author

Total Site Area: 15,591 m²

Building Coverage: 6,394 m² (41.01%)
Pavements: 2,088 m² (13.39%)

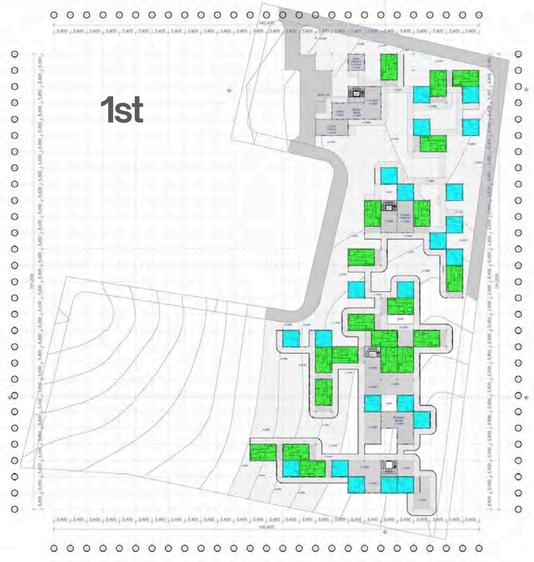
Green Coverage: 7,109 m² (45.60%)

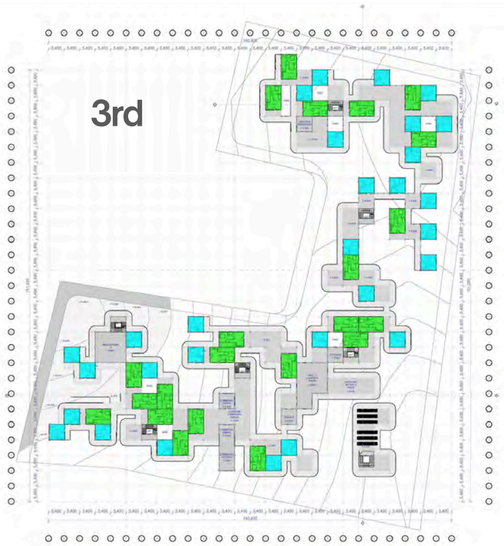
Unit Allocation Plan

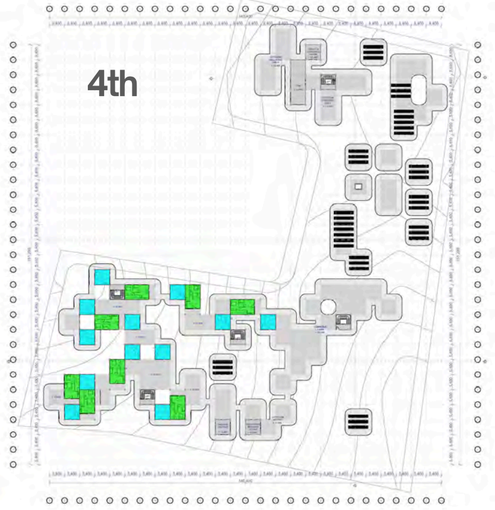
RENTED UNIT

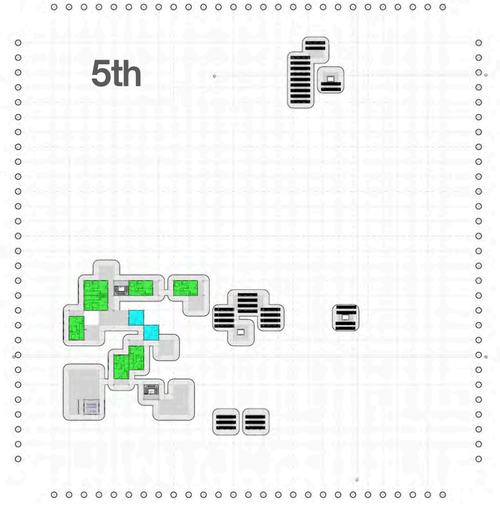
OWNED UNIT

Figure 5.10
Unit Allocation Plan
Source: Author









Elevation

Figure 5.11
North Elevation
Source: Author

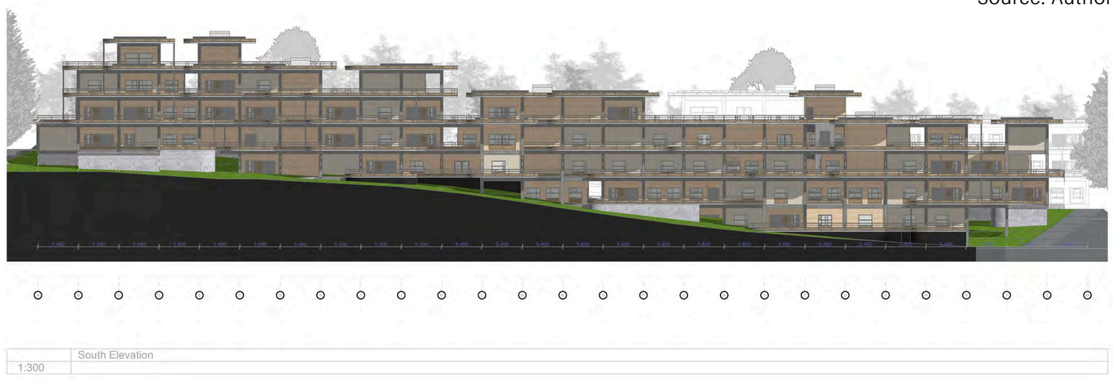


Figure 5.12
South Elevation
Source: Author

Figure 5.13
East Elevation
Source: Author

Figure 5.14
West Elevation
Source: Author

Sections

Figure 5.15
B-B Section
Source: Author

Figure 5.16
A-A Section
Source: Author

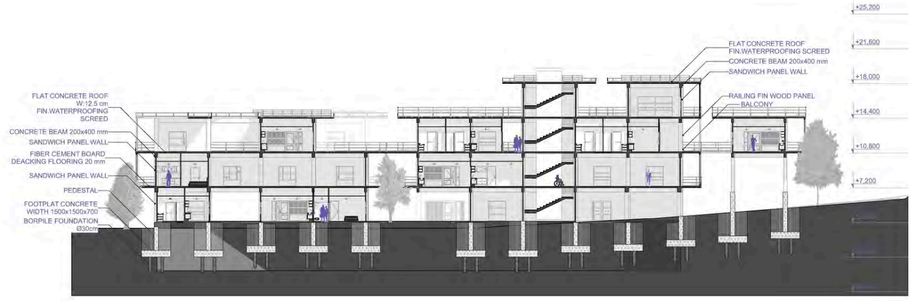


Figure 5.17
C-C Section
Source: Author

Details

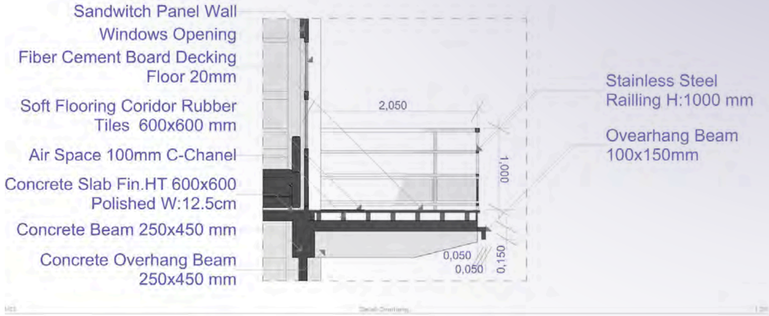
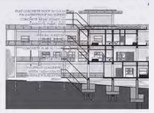
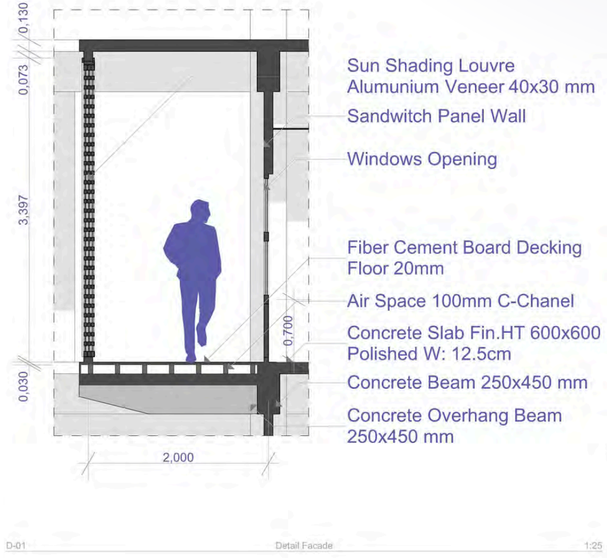
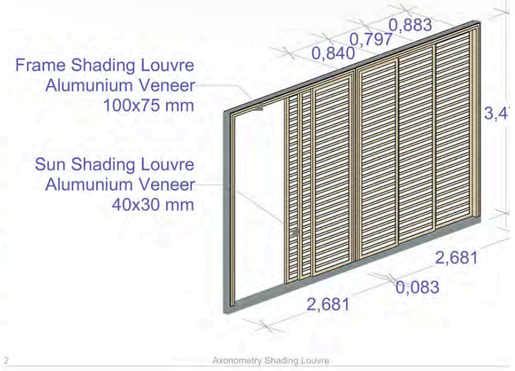


Figure 5.18
Section Details
Source: Author







Units Axonemtry

Figure 5.19
Unit Axonometry
Source: Author

Kitchen Details

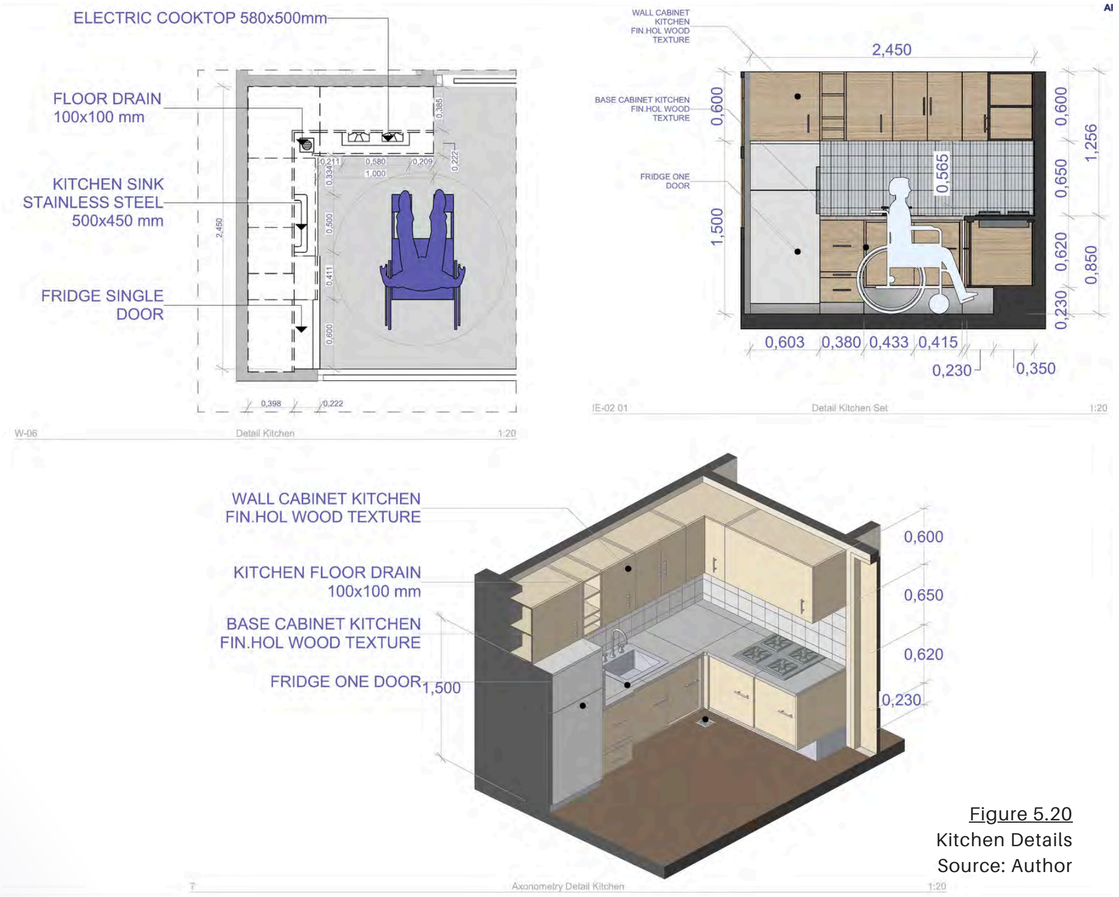


Figure 5.20
Kitchen Details
Source: Author

Opening Details

Double Door Asym...	Exterior Sliding Door	Pocket Door	Vertical Multi-Sash ...	Vertical Multi-Sash ...	Vertical Multi-Sash ...
7	2	99	3	5	188
1,300×2,100	0,900×2,100	0,950×2,100	0,500×2,100	0,900×2,100	0,400×2,100
0,130	0,130	0,000			
2,230	2,230	2,100	0,130	0,130	0,130
			2,230	2,230	2,230
2,100 / 1,300	2,100 / 0,900	2,100 / 0,950	2,100 / 0,500	2,100 / 0,900	2,100 / 0,400
2,100 / 1,300	2,100 / 0,900	2,100 / 0,950	2,100 / 0,500	2,100 / 0,900	2,100 / 0,400
2,100	2,100	2,100	2,100	2,100	2,100

Figure 5.21
Opening Details
Source: Author

Flooring Details

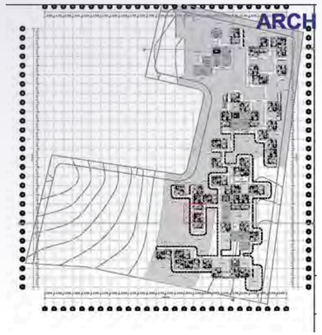
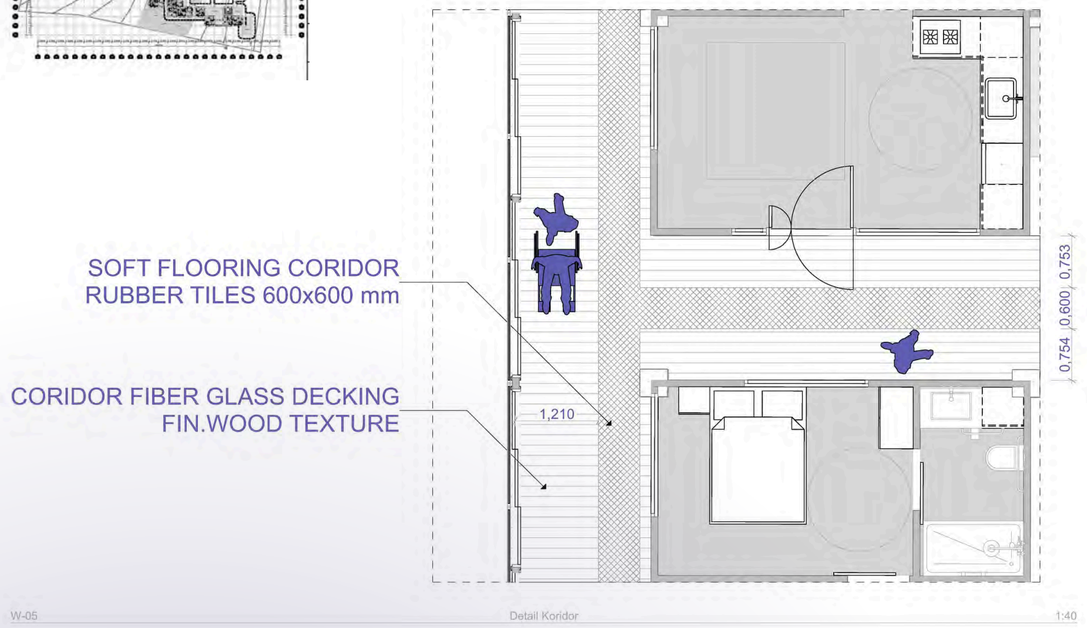


Figure 5.22
Flooring Details
Source: Author



Structures Scheme

Figure 5.23
Axonemetry - Structure
Source: Author

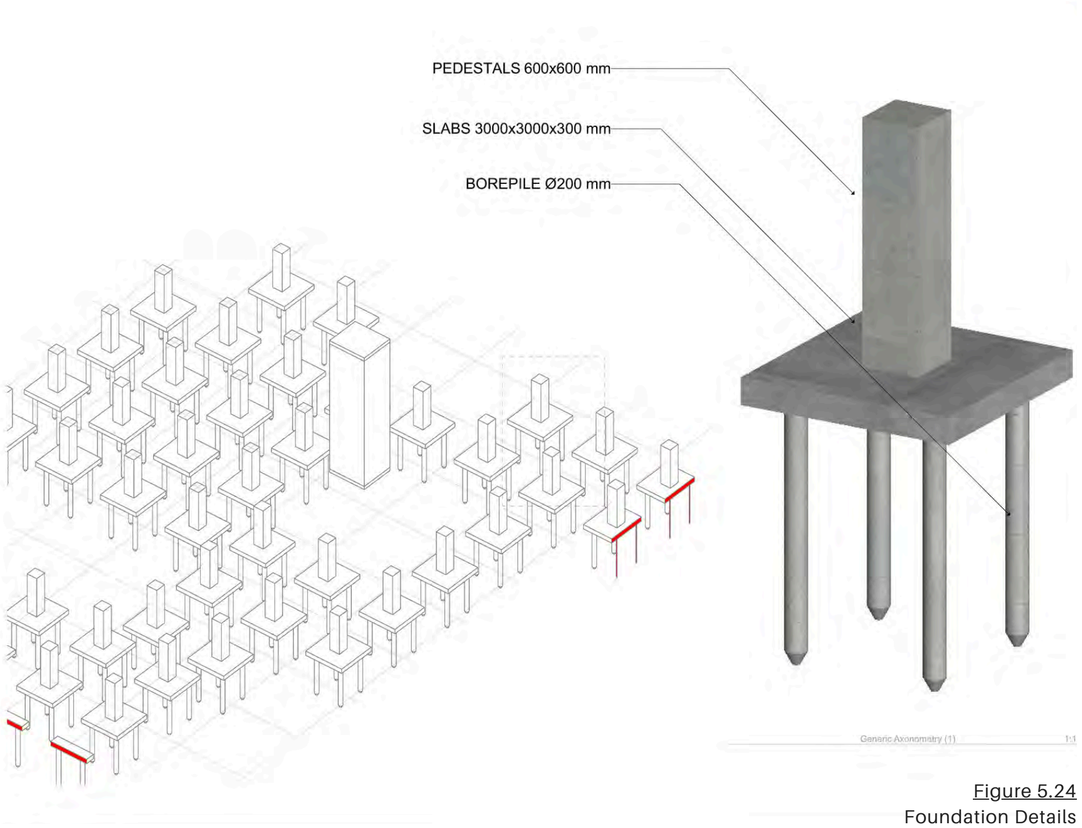


Figure 5.24
Foundation Details
Source: Author

Accesibility

Figure 5.25
Accesibility Plan - GF
Source: Author

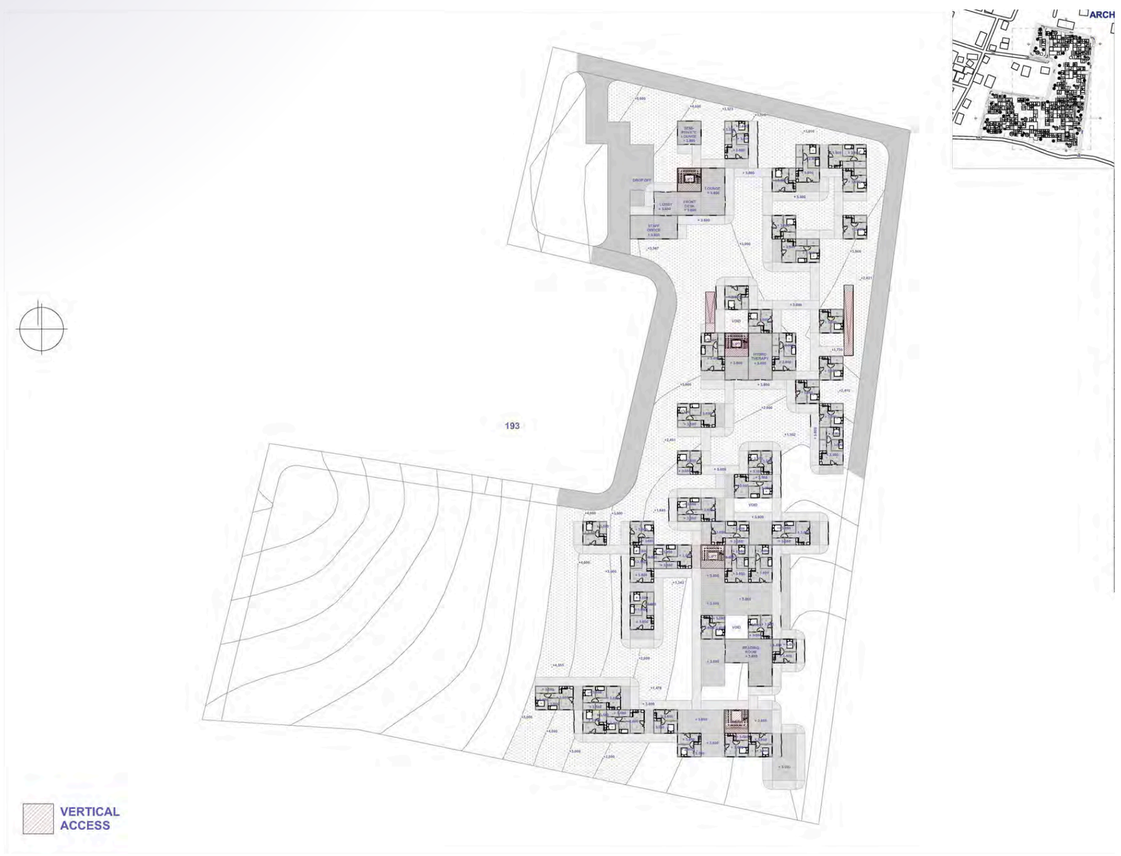


Figure 5.26
Accesibility Plan - 1st
Source: Author

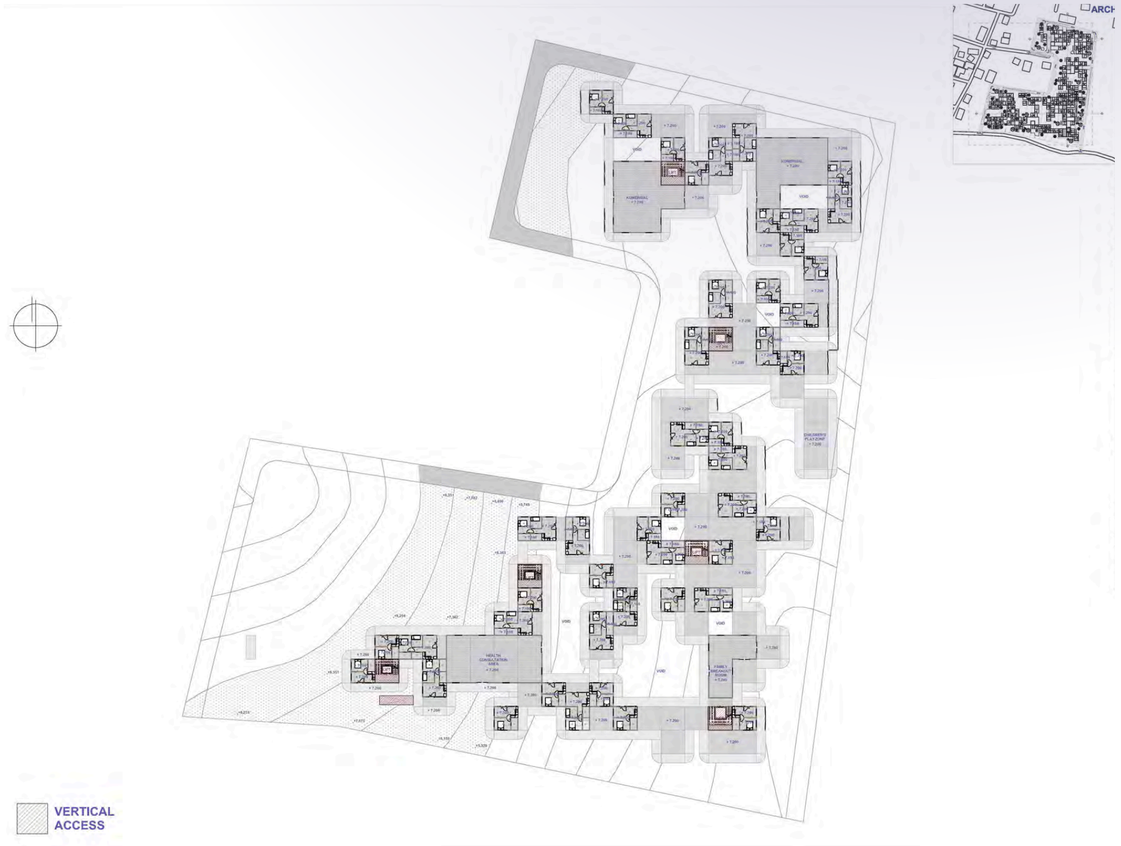


Figure 5.27
Accesibility Plan - 2nd
Source: Author

Figure 5.28
Accesibility Plan - 3rd
Source: Author

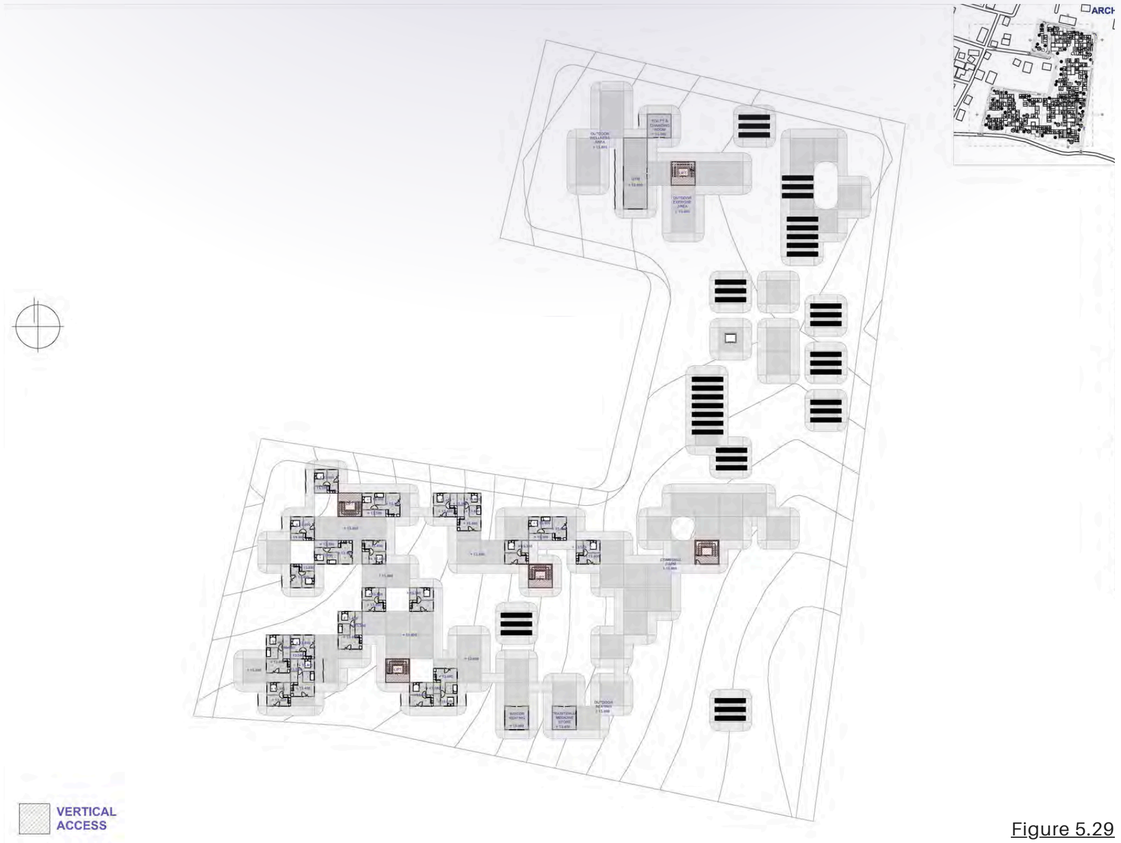


Figure 5.29
Accesibility Plan - 4th
Source: Author

Ramp Details

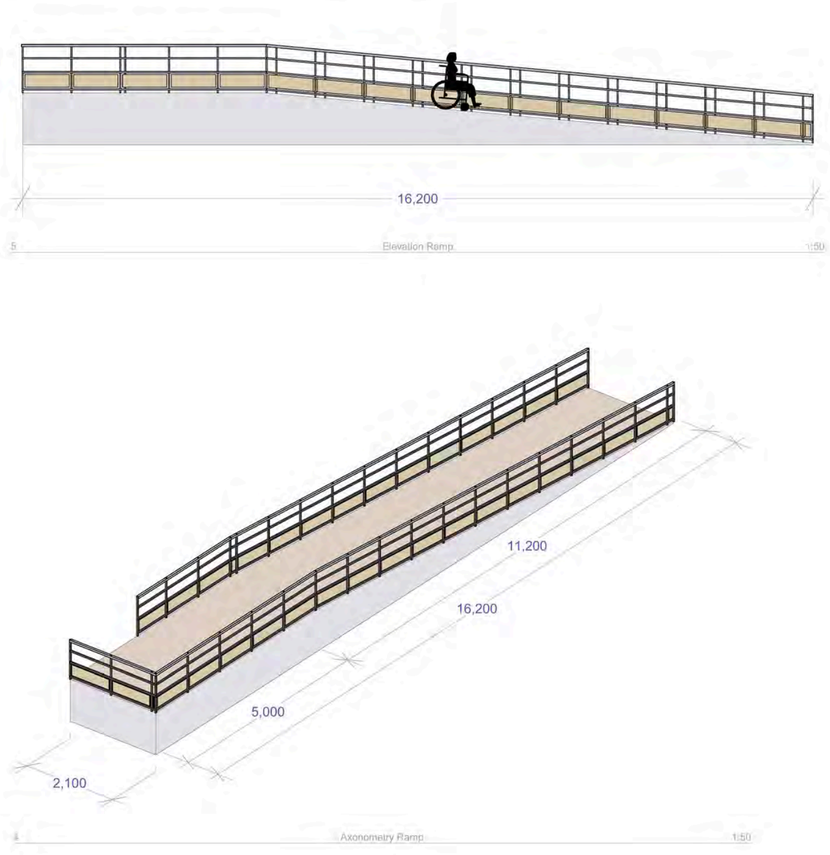


Figure 5.30
Ramp Details
Source: Author

| Emergency Scheme

Figure 5.31
Emergency Scheme
Source: Author

| Plumbing Scheme

Figure 5.32
Plumbing Scheme
Source: Author

Foul Water Scheme

Figure 5.33
Foul Water Scheme Plan
Source: Author

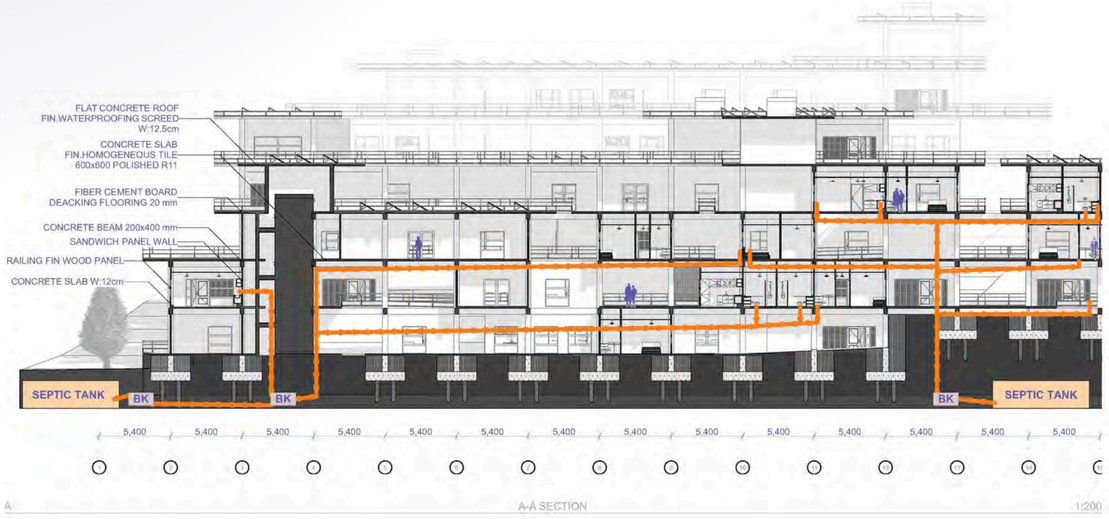


Figure 5.34
Foul Water Scheme
Source: Author

Electrical Scheme

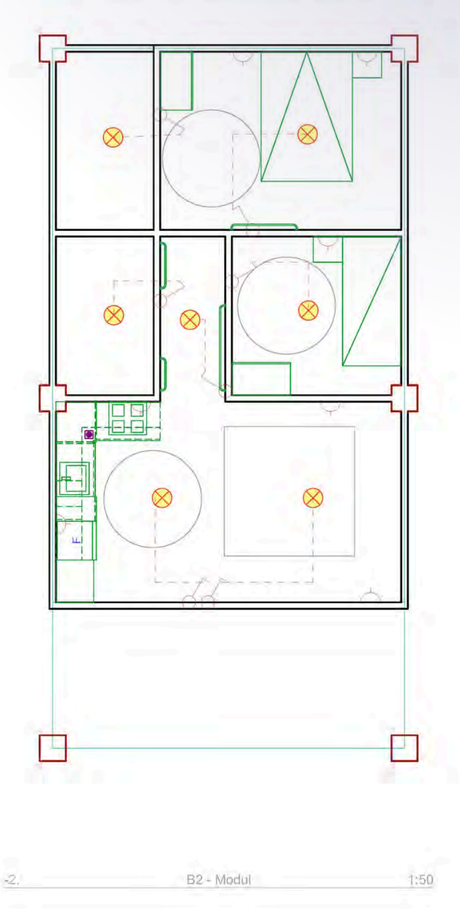


Figure 5.35
Electrical Scheme
- Owned Unit
Source: Author

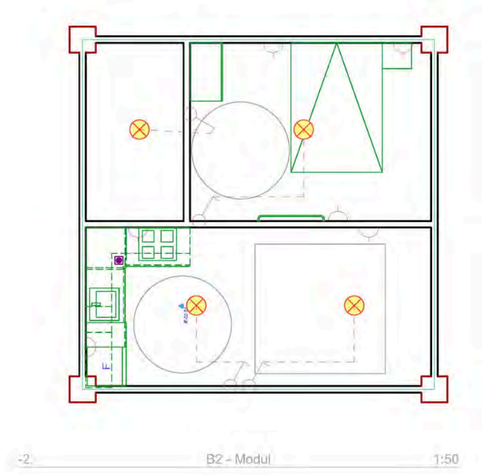


Figure 5.36
Electrical Scheme
- Rental Unit
Source: Author

Perspectives

Figure 5.37
Facade
Perspective
Source: Author

Figure 5.38
Rooftop
Perspective
Source: Author

Figure 5.39
Building Vista
Source: Author

Figure 5.40
Birds Eye View
Source: Author

Figure 5.41
Shading on Facade
Source: Author

Figure 5.42
Living Area
Source: Author

Figure 5.43
Bedroom
Source: Author

6.

Evaluation

Conclusion Review

This chapter synthesizes the outcomes of the design evaluation, incorporating critical feedback from both examiners and supervisors. The evaluation process yielded valuable, constructive insights aimed at significantly enhancing the overall quality, efficacy, and coherence of the project design. Implementation of this feedback is crucial for developing a more robust, comprehensive, and well-rounded design solution.

The following table presents a structured synthesis of the feedback received from the examiners and supervisors on the design project.

Table 6.1
Conclusion Review
Source: Author

Category	Design Focus	Response
Programmatic Allocation & Clarity	**Explicit Programmatic and Ownership Clarity**: Detailed articulation of the intergenerational component's spatial allocation. **Explicit delineation of building property** and a comprehensive justification of the housing typology's critical role in the broader urban context.	• Explicit Programmatic **(Page 123)** • Ownership Clarity **(Page 33)** • Explicit delineation of building property **(Page 109-122)**
Design Framework & Guidelines	**Formalization of Design Framework**: Clear and concise documentation of the Design Criteria, Design Guidelines, and Design Concepts.	• Formalization of Design Framework **(Page 71-83)**
Problem Definition & Context	Comprehensive Problem: Formal definition of the core **Design Problems**. Provision of references and **justifications for the selected project location** and **Contextual adjustment for WHO ICOPE**.	• Design Problems **(Page 15-16)** • Justifications for the selected project location **(Page 29)** • Contextual adjustment for WHO ICOPE **(Page 155-156)**
Inhabitant Characterization & Needs	Evidence-Based User-Centric Design: Tabulation of the key **inhabitant characteristics** derived from the ICOPE framework (International Classification of Older Persons). Explicit contextualization and adaptation of ICOPE principles for the local Bantul environment. **Enhancement of literature review concerning the elderly's specific needs** related to: movement/mobility patterns, micro-climatic factors (humidity), and social interaction requirements; include a proposed schedule of activities to support this demographic.	• Inhabitant characteristics **(Page 57-60)** • Design Enhancement of literature review concerning the elderly's specific needs **(Page 159-165)**
Technical Performance & Simulation	Demonstration of Technical Performance: Integration of **Building Performance Simulation** results, specifically demonstrating how the design accommodates the physiological and comfort needs of older adults. Study of the **Rainwater Management Strategy**.	• Building Performance Simulation **(Page 68)** • Rainwater Management Strategy **(Page 87)**

| Contextual Adjustment of WHO ICOPE for Bantul, DIY

Based on the WHO ICOPE framework regarding Intergenerational Housing in Bantul, Yogyakarta, the implementation of integrated care requires significant contextual adjustments. These adjustments must reconcile the universal medical and functional goals of ICOPE with the local climatic, regulatory, socio-cultural, and geomorphological realities of the Bantul region.

The following outlines have necessary adjustments across systemic, environmental, and socio-cultural dimensions:

1. Systemic Integration with Primary Health Care (Puskesmas)

The WHO ICOPE implementation framework emphasizes that care must be community-based and integrated into existing primary health structures. In the context of Bantul, the design must act as a spatial extension of the local Puskesmas (Community Health Centre).

· Decentralized Screening (Step 1): The "Basic Assessment" phase of ICOPE, which screens for declines in intrinsic capacity, should be decentralized from the clinic to the housing level. The design allocates specific spaces, such as the Concierge and Lounge, to function as triage points where community health volunteers can conduct initial screenings using digital tools like the ICOPE app.

· Referral Pathways (Step 2): Positive screenings must trigger a seamless referral to the Puskesmas for "In-depth Assessment." The architectural program facilitates this by incorporating Consultation Rooms equipped for telemedicine, bridging the distance between the residential complex and formal medical facilities.

2. Climatic and Environmental Adaptation

The tropical climate of Bantul, characterized by high humidity and solar radiation, necessitates architectural interventions to protect the Vitality and Locomotor domains of older adults, who suffer from diminished thermoregulatory capacity.

· Performance-Based Massing: To mitigate heat stress, a significant risk factor for frailty, the building morphology utilizes computational optimization (Grasshopper/Galapagos) to minimize solar radiation gain on western façades while maximizing wind permeability. This passive cooling strategy is critical for maintaining indoor thermal comfort without excessive reliance on mechanical systems.

· Ventilation Strategies: The design must incorporate cross-ventilation features.This prevents respiratory aggravation and mould growth, which are detrimental to the aging immune system.

· Shading and Glare Control: To protect the Sensory (Vision) domain, facades must employ vertical fins (East/West) and horizontal overhangs (South/North) to admit daylight while preventing glare, which can cause disorientation and increase fall risks for those with cataracts or visual impairments.

Figure 6.1
Shading and Overhang
Source: Author

3. Regulatory

· Regulatory Compliance (Sultan Ground): The project is situated on Sultan Ground (land owned by the Yogyakarta Sultanate), which subjects it to specific cultural and developmental restrictions. The design adheres to a maximum building height of 20 meters and a Building Coverage Ratio (BCR) of 60%, necessitating a medium-rise, high-density configuration that preserves open space for communal use.

4. Socio-Cultural Contextualization (Gotong Royong)

The implementation of ICOPE in Indonesia must align with the Javanese philosophy of Gotong Royong (mutual assistance). The architecture fosters this through specific programmatic adjustments that promote social cohesion and intergenerational support.

· Communal Farming and Dining: Addressing the Vitality (Nutrition) domain, the design integrates a Communal Farm and Communal Kitchen. This facilitates a "farm-to-table" program where residents grow and cook local produce together. This not only combats malnutrition through shared meals (social facilitation of eating) but also reinforces community bonds through collective labor.

· Intergenerational Zoning: To manage the Psychological domain, the design addresses the potential conflict between active children and resting seniors. Acoustic zoning strategies separate high-energy areas (playgrounds) from restorative spaces (reading rooms), while creating controlled intersection points (e.g., lobbies, gardens) where intergenerational interaction can occur organically without causing stress.

Figure 6.2
Communal Dining
Source: Author

Figure 6.3
Communal Farm
Source: Author

Rain Drops Management

The management of rainwater runoff is a critical component of sustainable architectural design, particularly in high-rainfall environments. This design employs a multi-layered approach, utilizing both material choices and an integrated drainage plan to manage water from the roof level down to the pedestrian corridor.

1. Flat Roof Management

The use of a flat concrete roof facilitates a controlled rainwater management system. To prevent ponding and control runoff, the roof structure is designed with a minimal slope toward designated drainage points.

- Internal Drainage System: Rainwater is collected via recessed scuppers or internal roof drains strategically placed at the lowest points of the slab.
- Insulation and Membrane: A high-quality waterproof membrane is applied over the roof slab and thermal insulation layer. This membrane provides a continuous, impervious barrier, channeling water efficiently toward the internal drainage system, thereby preventing infiltration and concrete degradation.

2. Overhangs and Façade Protection (Drip Line Management)

The extended overhang used along the corridor is essential for sun shading and façade protection, but it requires precise management of rainwater runoff to prevent splash-back and dampness at the corridor level.

- Drip Edge Integration: A specialized drip edge or continuous waterline gutter is integrated along the outermost edge of the overhang. This feature includes a precise profile (a small groove or lip) that breaks the surface tension of the water, ensuring droplets are directed away from the building envelope.

3. Corridor Drainage and Sub-Surface Runoff

The corridor employs a board decking system (e.g., composite or treated timber boards) set atop an elevated substrate, creating a system for immediate surface water removal.

- Permeable Surface: The decking creates a semi-permeable surface. This design ensures that direct rainfall or water dripping from the overhangs passes rapidly through the gaps between the deck boards.
- Sub-Deck Drainage: The water is channeled to a sub-surface layer—typically a sloping concrete slab or membrane—located beneath the decking. This sub-deck is graded toward a perimeter or central linear drain, effectively managing the runoff without interrupting pedestrian flow.
- Safety and Durability: This methodology keeps the main walking surface dry, enhancing safety for elderly residents (reducing slip hazards) and protecting the decking material's long-term integrity from constant moisture exposure.

By combining controlled roof runoff, precise drip-line management at the overhang, and sub-surface drainage in the corridors, the design establishes an integrated, efficient, and user-safe rainwater management strategy.

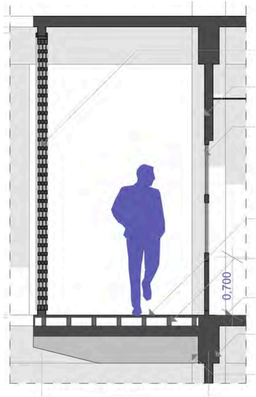


Figure 6.4
Corridor Section
Source: Author

Figure 6.5
Block Plan
Source: Author

| Study on Elderly Movement

1. Physiological Changes and Gait Characteristics Research indicates that movement capabilities in older adults are defined by the status of their musculoskeletal system (muscles, joints, bones) and how these interact with their environment.

· Sarcopenia and Decline: Muscle mass typically peaks in early adulthood and naturally declines with age. If not managed, this leads to sarcopenia (severe loss of muscle mass and strength), which is a strong predictor of mortality and care dependency,.

· The "Cautious Gait": To maintain stability, older adults often unconsciously adopt a specific walking pattern known as a "cautious gait." This is characterized by a slower walking speed, shorter stride length, and spending more time with both feet on the ground to navigate uneven surfaces safely.

· Pain limitations: Chronic pain, particularly from conditions like osteoarthritis or low back pain, acts as a significant barrier to movement, often creating a cycle where pain leads to inactivity, which in turn worsens stiffness and muscle loss,.

2. The "Multimodal" Intervention Strategy WHO studies emphasize that maintaining movement requires more than just walking. The gold standard for preventing mobility loss is multimodal exercise.

· Components: An effective movement program must combine resistance training (to build muscle), balance training (to prevent falls), aerobic activity (for endurance), and flexibility training,.

· Nutrition Synergy: Physical movement interventions are significantly more effective when combined with adequate protein intake (1.0–1.2g per kg of body weight), as ageing bodies absorb protein less efficiently,.

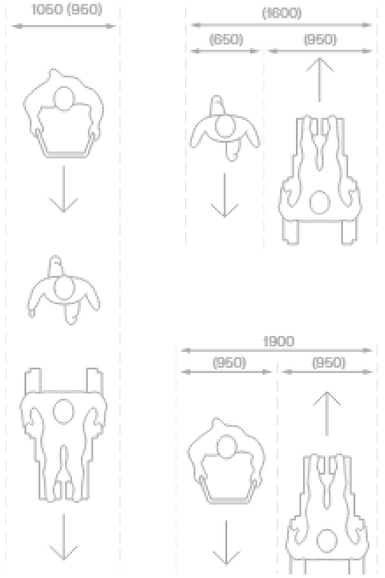


Figure 6.6
Corridor Movement Standards
Source: Curating Homes

3. The built environment acts as a prosthetic for declining movement capacity. If the environment is maladapted, a person with limited capacity becomes disabled; if adapted, they remain independent.

• **The 50-Meter Rule:** Research suggests that outdoor walking routes should provide seating nodes at intervals of no more than 50 meters. This distance corresponds to the limited endurance of older adults with mobility issues, allowing them to rest and regain balance before continuing.

• **Spatial Dimensions for Mobility Aids:** To accommodate the movement of wheelchairs and walking frames, corridors require a minimum clear width of 1050mm in private dwellings and 1900mm in communal areas (to allow two-way traffic). A turning circle of 1500mm is required in all functional areas to allow a full 360-degree turn,

· **Surface Consistency:** Approximately 55% of slips and falls occur on slippery surfaces. Therefore, flooring must maintain a high slip resistance rating (R12 for wet/outdoor areas) and avoid sudden changes in gradient or texture, which can confuse the "cautious gait" and cause tripping,

• **Handrail Continuity:** Continuous, dual-level handrails are essential along circulation routes. They must extend on both sides to provide constant support, particularly for those with weakness on one side of the body (e.g., post-stroke).

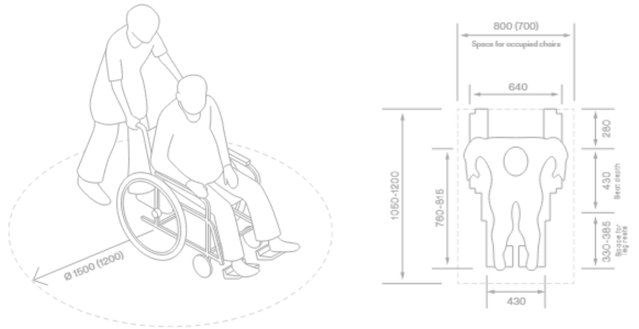


Figure 6.7
Wheelchair DImensions
Source: Curating Homes

Study on Humidity for Elderly

Based on the provided sources, particularly the "Curating Homes" guide and the "WHO ICOPE" handbook, there are several specific studies and research insights regarding the impact of humidity on older adults.

1. Physiological Vulnerability and Thermoregulation

Research indicates that older adults have a diminished capacity for thermoregulation (the body's ability to maintain core temperature), making humidity control not just a matter of comfort, but of survival.

· Compromised Sweat Response: Older adults often struggle with the sweat response mechanism. In high humidity, sweat does not evaporate efficiently, increasing the risk of heat stress, dehydration, and heat exhaustion.

· Optimal Range: Research defines the ideal indoor humidity level for seniors as 45% to 60%. Maintaining this range is crucial to prevent physical discomfort and skin issues, such as dryness or irritation.

· Respiratory Stress: High humidity can exacerbate respiratory issues. This is particularly dangerous for older adults with chronic conditions like heart or lung disease, as the added stress on the body from regulating temperature in humid conditions can trigger adverse health events.

2. Respiratory Health and Biological Contaminants

Humidity is a primary driver of indoor pollutants that disproportionately affect the aging respiratory system.

· Mould and Bacteria Growth: High humidity, particularly in washrooms and kitchens, fosters the growth of mould, bacteria, viruses, and dust mites. Research highlights that this moist environment can worsen respiratory issues and allergies in older adults.

· Ventilation and Sleep Quality: Poor ventilation leads to increased humidity and CO2 levels. Research links this to reduced sleep quality in older adults. Proper management of humidity through ventilation lowers airborne pollutants, enhancing deep sleep and REM sleep, which are vital for cognitive maintenance.

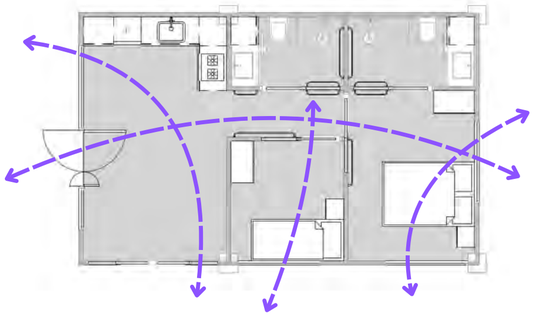


Figure 6.8
Unit Plan
Source: Author

3. Safety Risks: Falls and Mobility

Humidity is a direct environmental risk factor for falls, which are a leading cause of injury in the elderly.

· Slippery Surfaces: Research estimates that 55% of slip, trip, and fall incidents occur on slippery surfaces, often caused by high humidity or rainfall. Impermeable pavements can become dangerously slick when humid or wet, posing severe risks to older adults with reduced physical strength.

· Visual Perception: In humid conditions, condensation on surfaces or eyewear (when moving between temperature zones) can obscure vision, further increasing fall risks for those with already declining visual acuity.

4. Behavioral Impacts: Usage of Space

Humidity levels directly influence how and when older adults use their living environments.

· Outdoor Space Utilization: Research shows that older adults' willingness to use outdoor spaces is contingent on the similarity between indoor and outdoor temperature and humidity. They prefer consistent conditions; significant differences in humidity between the inside and outside will deter them from going outdoors, leading to a sedentary lifestyle.

· Thermal Shock: Sudden transitions between humidity levels (e.g., leaving a dehumidified room into a humid corridor) can cause discomfort. Design strategies must mitigate these "microclimate" differences to encourage movement.

5. Design and Technological Interventions

To address these findings, the sources recommend specific design and technological implementations:

· IoT Humidity Control: Installing humidity control systems connected to HVAC is recommended to automatically detect and regulate indoor moisture levels to stay within the 40–60% safety zone,.

· Cross-Ventilation: To combat the "mould risk" in washrooms and kitchens, the designs incorporated operable windows and cross-ventilation strategies to naturally lower humidity and airborne pollutants,.

· Material Selection: In outdoor areas prone to humidity-induced slickness, materials like EPDM rubber are used for their durability and slip resistance.

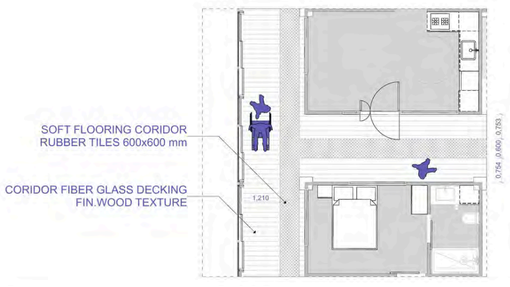


Figure 6.9
Floor Materials
Source: Author

Study on Social Interaction for Elderly

The study of social interactions among elderly people reveals that maintaining social connection is not just a leisure activity but a critical medical and psychological necessity for Healthy Ageing.

1. The Link Between Social Interaction and Health

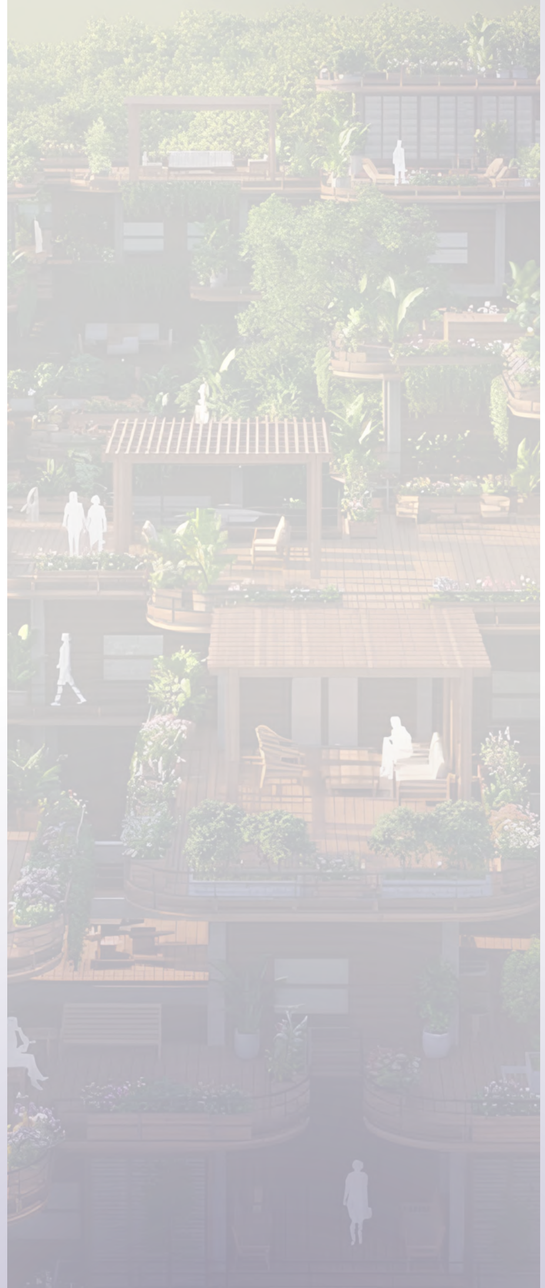
Research distinguishes between social isolation (objectively having few contacts) and loneliness (a subjective feeling of disconnection). Both are potent risk factors for deterioration in older age.

- Impact on Mortality and Disease: Social isolation and loneliness are associated with a higher likelihood of preventable mortality. They are linked to increased risks of cardiovascular disease, stroke, anxiety, depression, and dementia.
- Cognitive Preservation: Social engagement is a protective factor against cognitive decline. Interacting with others stimulates cognitive functions (attention, memory, reasoning). Conversely, isolation is a risk factor for the progression of cognitive impairment.
- Nutritional Health (The "Social Facilitation" of Eating): There is a strong correlation between eating alone and poor appetite. Research indicates that older adults consume, on average, 44% more food when dining with others compared to eating alone. The presence of others provides "social modelling," encouraging positive eating patterns and reducing the risk of malnutrition.

2. Barriers to Social Interaction

The sources highlight that older adults often withdraw from social situations due to declines in their Intrinsic Capacity (physical and mental reserves) or environmental hurdles.

- Sensory Barriers:
  - Hearing Loss: Untreated hearing loss causes embarrassment and difficulty communicating, leading to withdrawal and isolation. Background noise in communal areas often exacerbates this.
  - Vision Impairment: Poor vision restricts mobility and the ability to recognize faces or navigate social spaces, reducing the confidence to leave home.
- Physiological Barriers:
  - Urinary Incontinence: The fear of accidental leakage or the inability to find a toilet quickly causes anxiety, leading many seniors to restrict their social outings and stay home.
  - Mobility: Difficulty walking or fear of falling limits access to community centers and social gatherings.
- Environmental Barriers: Lack of accessible transport, financial constraints, and safety concerns in the neighbourhood prevent older adults from maintaining their social networks.



3. Architectural Design for Social Interaction

To counter isolation, housing design must actively facilitate organic interaction. The "Curating Homes" guide and your thesis context (Bantul) suggest specific strategies:

- The "Social Loop" and Circulation:
  - Avoid Dead Ends: Circulation routes should be continuous loops rather than dead ends to encourage walking and chance encounters. Corridors should be wide enough (min 1900mm in communal areas) to allow two people (including wheelchair users) to pass or stop and chat.
  - Seating Nodes: Seating should be provided every 50 meters along pathways. These nodes act as resting spots that naturally become social gathering points.
- Communal Dining and Kitchens:
  - Design communal dining areas to be "homelike" rather than institutional. Including a visible cooking area or a Communal Kitchen fosters interaction through food preparation activities.
- Acoustic Zoning:
  - To support socialisation for those with hearing loss, spaces must be acoustically treated to reduce reverberation. Create distinct "Quiet Zones" for intimate conversation separate from "Loud Zones" (like gyms or playgrounds).
- Intergenerational Contact:
  - In the context of the Bantul design, creating spaces where seniors can watch children play (passive participation) or engage in shared activities (active participation) is vital. This aligns with the "City of Well-being" concept where mixed demographics interact.

4. Programmatic Interventions

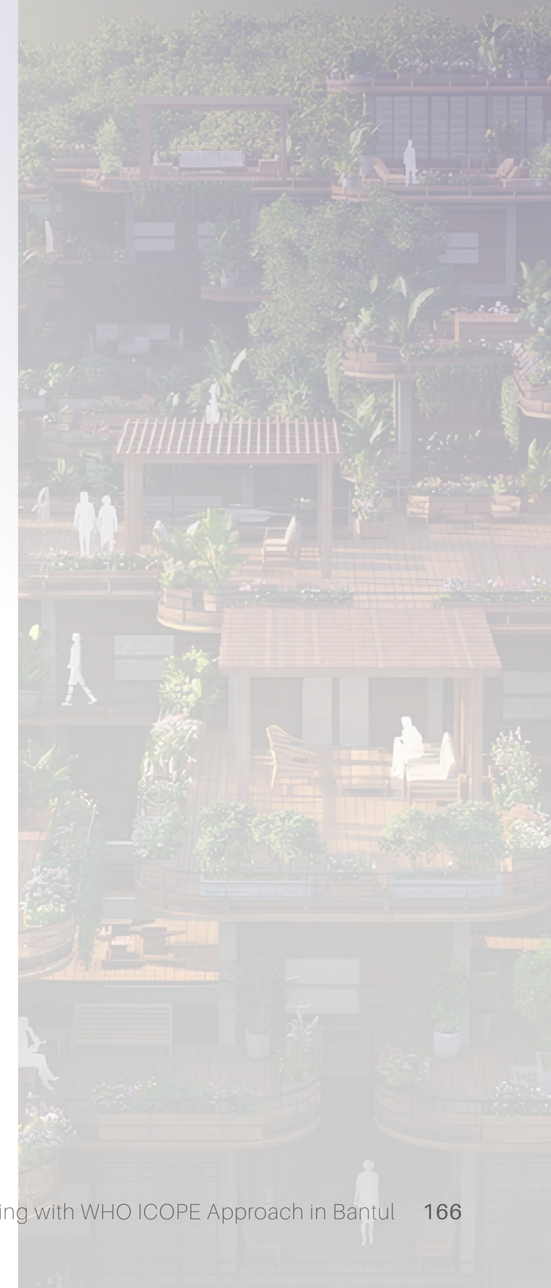
Beyond physical space, structured activities are required to maintain social health.

- Group Activities: Group-based exercise (multimodal training) and cognitive stimulation therapy (group discussions, reminiscence therapy) are more effective than individual sessions because they build peer support networks.
- Volunteering: Engaging older adults in volunteering (e.g., as "House Captains" or activity helpers) provides a sense of purpose and strengthens community ties, combatting the loss of role often felt after retirement.
- Digital Connection: Providing Wi-Fi and training on digital devices in communal areas (like a Reading Room) helps seniors maintain contact with distant family and friends, reducing feelings of loneliness.

Scheduled Activities

ACTIVITY	FREQUENCY	LOCATION	ICOPE GOAL	CONTEXT
Mobility & Physical Health				
Morning "Jalan Sehat" (Healthy Walk)	Daily, 6:00 AM – 7:00 AM.	Start in the Multi-Purpose Hall, move through Balcony Walkways, end in the Central Courtyard	Maintain balance, strength, and gait speed.	Uses the covered walkways (protected from sun/rain) and green courtyards (fresh air) to encourage walking and exercise.
Intergenerational Gardening Club	Weekly (e.g., Saturday morning	Communal Garden	Improve flexibility, functional strength, and dexterity (light lifting, bending).	Promotes collaboration: youth handle heavy lifting, seniors manage planting/care.
Aquatic Exercise	2-3 times per week	Hydrotherapy Pool	Low-impact joint movement, muscle conditioning.	Critical in a tropical climate for cooling down while exercising.
Cognition & Social Interaction				
Morning Drink & Newspaper Reading Group	Daily, 9:00 AM	Shared Lounge	Stimulate language, memory, and current awareness.	Informal, daily schedule encourages routine socialization. Uses the shared lounge to naturally facilitate passive interaction.
Digital Literacy / Mentoring Session	Bi-weekly	Multi-Purpose Hall	Technology engagement, problem-solving, and cognitive stimulation.	Youth mentor seniors on using smartphones/internet (reversing traditional roles).
Nutrition				
Communal Cooking Class	Bi-weekly	Communal Kitchen & Dining	Skill maintenance, socialization, and healthy meal preparation.	Focuses on local, healthy Indonesian cuisine (lots of vegetables, spices). Uses the shared kitchen as a social gathering point.
Herb Harvest Day	Monthly	Communal Garden	Encourage consumption of fresh, healthy produce and foster food security.	Links consumption directly to the communal garden spaces, promoting physical engagement with food production.
General Health				
Mindfulness Session	Daily or 3 times per week.	Meditation/Quiet Room or Shaded Outdoor Terrace.	Stress reduction, emotional regulation, and mental clarity.	Uses the dedicated quiet room or a secluded, shaded outdoor area for peaceful reflection, away from high-traffic zones.
Health Check & Sensory Screening Day	Quarterly	Health Constultation Room	Prompt identification of declines in vision, hearing, and basic health metrics.	Integrates the Health Clinic facility into the community's proactive health schedule, aligning directly with the ICOPE assessment model.

Table 6.2
Scheduled Activiteiss
Source: Author



| Design Brief Evaluation

Examiner 1 (Ir. Wiryono Raharjo, M.Arch., Ph.D.)

EXAMINERS' NOTE	RESPONSE	REFERENCE
INTERGENARATIONAL HOUSING DEFINITION	**Intergenerational Housing** Intergenerational housing is a residential concept that integrates people of different age groups such as seniors, families, young professionals, and children within a shared living environment. It is designed to foster social interaction, mutual support, and community cohesion, addressing challenges like elderly isolation, housing affordability, and childcare support. hese housing models often include shared spaces, accessible design, and programs that encourage intergenerational engagement, such as communal gardens, activity centers, and co-living arrangements.	Page 03
CLARITY ON DESIGN PROBLEMS	**Architectural and Typological** **- Vertical Living Challenges** The thesis identifies the inherent difficulty of vertical living for the elderly. Relying solely on elevators or having steep ramps (1:12) presents barriers. The design problem is how to create a "ground-level" experience or fully accessible vertical transition that supports independent mobility. **- Barriers to Mobility** Standard architectural details often fail older adults. Common problems include thresholds that cause tripping, corridors that are too narrow for two-way traffic with mobility aids, and heavy doors that are difficult to operate. **- Sensory and Cognitive Disorientation** Uniform, institutional environments can lead to stress and confusion. A key design problem is the lack of "wayfinding" cues. Complex layouts, repetitive corridors, and a lack of visual distinction make navigation difficult for those with cognitive decline. **Inadequate Indoor Environmental Quality** Poor ventilation and lighting exacerbate health issues. Older adults require higher lighting levels than younger people. A design problem is ensuring adequate lux levels and proper contrast without causing glare, which can obscure vision and increase fall risks	Page 15
	Systemic and Contextual **- Fragmented Care Delivery** Current housing often lacks the infrastructure to support the "Stepped-Care Model" of ICOPE. The design problem is how to spatially integrate health services (screening rooms, consultation spaces) into a residential setting without making it feel like a hospital **- Economic Constraints vs. Quality** The project operates under significant financial constraints. The design problem is balancing low construction costs with the need for high-quality, durable, and safe materials necessary for an aging population	Page 16
	Social-Behavioral **- Inability to Guarantee Social Interaction** Architecture can facilitate cohesion but cannot guarantee it. The design problem lies in creating a framework of shared spaces such as courtyards, community gardens, and activity centers that encourage organic, rather than forced, intergenerational connection. **- Social Isolation and Loneliness** Despite high-density living, older adults often face isolation. The design must address the lack of "collision points" where natural social interaction can occur, particularly for those with limited mobility who cannot travel far to socialize.	

Table 6.3
Design Brief Evaluation - Examiner 1
Source: Author

Examiner 2 (Dr. Ar. Yulianto Purwono Prihatmaji, S.T., M.T., IPM., IAI.)

EXAMINERS' NOTE	RESPONSE	REFERENCE
CLARITY ON OWNERSHIP AND STAKEHOLDERS	In this structure, the Ministry of Housing and Settlements (Kementerian PKP) acts as the commissioning body, supporting the development as part of the 3 Million Housing Program a national initiative targeting the provision of livable, affordable housing for low-income communities. The private sector partner, such as PT. Ingria Pratama Capitalindo Tbk (GRIA), would act as the developer and operator, responsible for financing, constructing, and managing certain aspects of the project.	Page 33
DESIGN REFERENCES	**Kampung Admiralty** Kampung Admiralty, finished in 2017 and designed by WOHA, stands as Singapore's inaugural integrated public development, consolidating various public services and facilities within a single structure. Constrained by a compact 0.9 Ha site and a 45m height restriction, the design utilizes a layered "club sandwich" methodology. This approach places a Community Plaza in the lower section, a Medical Centre in the middle, and a Community Park complete with senior apartments in the upper section. This unique "Vertical Kampung" (vertical village) maximizes activity at the ground level and encourages social diversity, supporting both active aging in place and intergenerational connection.	Page 45
	Forest City Liuzhou Liuzhou Forest City, conceived by Stefano Boeri Architetti, is recognized as the world's inaugural forest city, situated north of Liuzhou, China. Spanning 175 hectares alongside the Liujiang River, the city is planned to accommodate 30,000 residents within structures entirely enveloped by approximately 40,000 trees and one million plants, representing over 100 distinct species. Designed as a sustainable urban ecosystem, the city is projected to absorb about 10,000 tons of CO2 and 57 tons of micro-particles annually, concurrently generating 900 tons of oxygen. The development aims for energy self-sufficiency by utilizing solar panels and geothermal energy. It will be linked to the main city of Liuzhou through efficient transportation networks and will comprise residential zones, commercial areas, and public amenities such as a hospital and schools. Ultimately, the design is intended to foster biodiversity and blend seamlessly with the natural landscape.	Page 47
	The Participatory Housing by Kelvin Ma The project titled "Participatory Housing - A system of reconfigurable spaces for 21st-century living," developed by Kelvin Ma in Hong Kong, employs a data-driven, reverse design methodology to achieve highly flexible and customizable public housing. The system processes user preferences and input data to determine spatial configurations, allocate housing units, and generate designs using distinct materials that simplify future upgrades and modifications. This ongoing, interactive process seeks to closely align the physical living environment with its inhabitants, enabling continuous spatial improvements based on direct user feedback. The project was recognized with the WA Award Cycle 35.	Page 49
	Kampung Susun Kunir Kampung Susun Kunir, located in the historic Kota Tua district of Jakarta Barat, Indonesia, exemplifies a thoughtful integration of community engagement, cultural preservation, and sustainable architectural design. Constructed to accommodate 33 families displaced by urban development projects, this vertical village stands as a testament to participatory design and social resilience.	Page 51
SITE LOCATION JUSTIFICATION	Site Selection: The selection of the project site, located on Kembang Putihan Raya St. Pringgading, Guwosari, Pajangan, Bantul Regency, Special Region of Yogyakarta, was driven by a multi-criteria approach that integrates critical demographic challenges with environmental suitability. Here is the strategic justification for the site choice: 1. Addressing the Demographic Imperative The primary social criterion for site selection was the pressing demographic paradox within the region: • Bantul's Elderly Population: Bantul Regency reports the highest share of elderly residents in Daerah Istimewa Yogyakarta (DIY). • Health Disparity: Despite this large elderly demographic, Bantul paradoxically registers the lowest life expectancy compared to other regions in DIY. • Strategic Impact: Locating the Housing project in Bantul directly targets the region facing the most acute need for proactive, health-supportive residential environments for older adults.	Page 29
	2. Site Feasibility and Land Context The selection was intentionally tied to the local land and policy context: • Sultan Ground (SG) Utilization: The chosen land is designated as Sultan Ground, aligning the project with the Governor's initiative to utilize SG for developing cost-effective, well-integrated housing solutions.	

	• Development Potential: The specific location was chosen due to its identification as the largest available Sultan Ground area found in public documentation, providing the necessary scale for an ambitious intergenerational housing and community complex. 3. Environmental and Walkability Advantages The site's suburban character and physical features directly mitigate urban stressors, supporting the project's goal of promoting active and healthy aging: • Suburban Zoning and Connectivity: Situated in a suburban area relatively close to the central Yogyakarta city, the site balances accessibility with tranquility. This location facilitates engagement with the broader urban context while avoiding central urban density. • Environmental Quality and Safety: The site is characterized by a low volume of traffic and abundant greenery and landscaping, offering significant environmental benefits: ○ Reduced Stressors: Lower traffic density results in reduced noise pollution and lower exposure to airborne contaminants. ○ Safety and Mobility: The low-busy roads create a safer environment for walking and cycling, directly encouraging the physical activity necessary to combat sedentary lifestyles and maintain mobility among older residents. In summary, the site at Kembang Putihan Raya St. Pringgading was selected as the optimal location where critical demographic need converges with the necessary governmental context (Sultan Ground) and a supportive, tranquil suburban microclimate conducive to promoting health and well-being.	
RELATIONSHIP WITH LOCAL STAKEHOLDERS	The project is limited by the absence of a comprehensive, wide-scale participatory design process involving the broader elderly community. Design decisions are therefore based on academic research and partner insights rather than extensive, direct input from a diverse range of potential future residents. The social and cultural nuances captured in the design are consequently limited by this scope.	Page 19
HOUSING SIGNIFICANCE	**1. The Environmental Component of Functional Ability** The WHO defines Healthy Ageing as the process of developing and maintaining Functional Ability, which enables well-being in older age. Functional Ability is theoretically constructed as the interaction between an individual's Intrinsic Capacity (physical and mental reserves) and the Environment in which they live. As intrinsic capacity inevitably declines with age—manifesting as reduced mobility, sensory impairment, or cognitive decline—the built environment becomes increasingly critical. A supportive housing environment can compensate for physiological losses, thereby maintaining the individual's functional ability, whereas a maladapted environment exacerbates disability,	Page 44
	2. Facilitating Ageing in Place Housing is the primary enabler of "Ageing in Place," defined as the ability to live in one's own home and community safely, independently, and comfortably, regardless of age or capacity. The physical configuration of the home directly influences the management of geriatric syndromes, particularly falls and mobility loss. Environmental modifications—such as the removal of clutter, improvement of lighting, and installation of grab rails—are evidence-based interventions recommended by ICOPE to reduce fall risks and prevent injury-related mortality,. By resolving environmental hazards, housing design prevents the premature institutionalization of older adults, allowing them to remain in familiar surroundings that support their identity and continuity of life.	
	3. Housing as a Preventative Health Intervention Beyond safety, housing acts as a proactive tool for preserving Vitality and Cognitive Capacity. "Curating Homes" argues that residential environments should shift from a clinical, barrier-free focus to an "enabling" approach that fosters active living. For instance, communal spaces within housing developments (e.g., communal kitchens and gardens) facilitate social interaction and nutritional health, directly addressing risk factors for malnutrition and social isolation, which are linked to depression and cognitive decline,. Furthermore, housing that integrates "Active Design" principles encourages physical movement within daily routines, combating sarcopenia and frailty.	
	4. Psychosocial Well-being and Dignity Finally, the home functions as a "sanctuary" that nurtures peace of mind and empowers individuals to pursue what they value. Housing design that prioritizes privacy, autonomy, and social connection supports the psychological domain of intrinsic capacity. In the context of care dependency, housing that accommodates caregivers (e.g., through sufficient space for assistance) is essential for preventing caregiver burnout and ensuring the sustainability of home-based care. In conclusion, housing is a pivotal social determinant of health. By modulating the interaction between declining intrinsic capacity and environmental demands, appropriate housing design transforms the built environment into a therapeutic agent that sustains functional ability and dignity throughout the life course.	
CLARITY ON DESIGN FRAMEWORK (DESIGN CHALLENGE, DESIGN CRITERIA, DESIGN GUIDELINES AND DESIGN CONCEPT)	**1.Domain:Locomotor Capacity (Mobility)** Focus: Preventing falls, maintaining muscle strength, and ensuring independent movement. • Design Challenge: How to create a continuous, barrier-free environment that encourages physical activity for all ages while mitigating fall risks for older adults with gait or balance issues? • Design Criteria: ◦ Seamless Connectivity: Elimination of thresholds and vertical barriers. ◦ Safety & Stability: Support systems integrated into the architecture. ◦ Active Design: Spaces that passively encourage movement (walking, climbing).	Page 71-74

REGARDING OF THE APPROACH.	• Design Guidelines: ◦ The "Route": Create a continuous "Main Circulation Route" that connects all major amenities with a minimum clear width of 1900mm (communal) to allow mobility aids and pedestrians to pass. ◦ Continuous Support: Install dual-level handrails on both sides of circulation paths, ramps, and stairs to accommodate different heights (children and adults). ◦ Rest Nodes: Integrate seating at intervals of no more than 50m along exterior routes to allow for recovery. ◦ Flooring: Use slip-resistant (R12) flooring in wet areas and shock-absorbing materials in exercise zones. • Design Concept: The Active Loop: A circulation spine that functions as an exercise track, connecting intergenerational play zones with senior fitness stations, ensuring that movement is a shared, safe, and social daily ritual.	
	2. Domain: Cognition (Memory & Orientation) Focus: Preventing disorientation, supporting memory, and reducing anxiety. • Design Challenge: How to design complex housing environments that are intuitive to navigate for those with cognitive decline (e.g., dementia) without creating a sterile, institutional atmosphere? • Design Criteria: ◦ Legibility: Spaces must be easy to read and understand. ◦ Familiarity: Design elements that evoke recognition and comfort. ◦ Sensory Stimulation: Engaging multiple senses to aid memory. • Design Guidelines: ◦ Visual Access: Use open-plan layouts and glazing to provide clear sightlines to destinations (e.g., seeing the toilet from the bed, or the dining area from the lounge). ◦ Distincitve Wayfinding: Avoid repetitive, hotel-like corridors. Use "landmarks" at junctions to aid orientation. ◦ Avoid Dead Ends: Design continuous looped paths to prevent the frustration and anxiety caused by reaching a dead end. ◦ Colour Coding: Use distinct but warm colours to differentiate floors or zones, avoiding blue/green spectrums that age-related vision changes may render indistinguishable. • Design Concept: Intuitive Design: A layout strategy where architecture acts as a memory aid, using distinct sensory zones to guide residents naturally between private and public realms.	Page 75-78
	3. Domain: Vitality (Nutrition & Energy) Focus: Preventing malnutrition and promoting social eating. • Design Challenge: How to transform eating from a solitary biological necessity into a communal event that combats malnutrition and social isolation? • Design Criteria: ◦ Social Facilitation: Spaces that encourage group dining. ◦ Sensory Appetite Stimulation: Lighting and layout that makes food appealing. ◦ Accessibility: Kitchens that are usable by people with reduced strength. • Design Guidelines: ◦ The Social Kitchen: Design communal kitchens with variable height countertops and "Food Safety Triangles" (sink-stove-prep proximity <1000mm) to allow intergenerational cooking classes. ◦ Farm-to-Table Visibility: Establish a visual connection between the "Communal Farm" (gardens), the kitchen, and the dining area to promote mindful eating. ◦ Ambiance: Use warm lighting (3000K-3500K) and warm colors (orange/yellow) in dining areas to stimulate appetite, avoiding blue light which suppresses it. • Design Concept: "The Culinary Hearth" – Positioning the dining and kitchen areas not just as service spaces, but as the social anchor of the building, where food production (gardening) and consumption bridge the generational divide.	Page 79-80
	4. Domain: Sensory Capacity (Vision & Hearing) Focus: Compensating for loss of visual acuity and hearing clarity. • Design Challenge: How to create an environment that communicates clearly to users with sensory impairments without becoming visually chaotic or acoustically harsh? • Design Criteria: ◦ Visual Contrast: enhancing object definition. ◦ Acoustic Control: Reducing background noise to aid communication. ◦ Illumination: High-quality, glare-free light. • Design Guidelines:	Page 81-82

	◦ Acoustic Zoning: Separate "Loud Zones" (playgrounds) from "Quiet Zones" (reading rooms) using buffer spaces to prevent noise interference for hearing aid users. ◦ Lighting Levels: Older adults require 50% higher lighting levels. Design for 300+ lux in communal areas and 500+ lux in task areas. ◦ Contrast Design: Use high-contrast colours between floors and walls, and on step nosings, to aid depth perception. Avoid high-gloss finishes that cause glare. ◦ Visual Cues: Incorporate visual indicators (flashing lights) alongside doorbells or fire alarms for the hard of hearing.	
	5. Domain: Psychological Capacity (Mood & Depression) Focus: Combatting isolation, depression, and promoting intergenerational bonding. • Design Challenge: How to design density that prevents loneliness while respecting the need for retreat and privacy? • Design Criteria: ◦ Intergenerational Contact: Creating "collision points" for different age groups. ◦ Biophilia: Connection to nature to reduce stress. ◦ Purpose: Spaces that allow contribution and productivity. • Design Guidelines: ◦ Intergenerational Play: Co-locate children's play zones with shaded seating for older adults to allow for "passive participation" and observation. ◦ Biophilic Sanctuaries: Ensure visual access to greenery from all principal living areas to reduce cortisol levels and improve mood. ◦ Flexible "Third Spaces": Create Multi-Functional Rooms that can transition from quiet reading to group therapy or children's tutoring, fostering diverse social interactions. • Design Concept: "Symbiotic Living" – A spatial programming strategy where the daily routines of children (play, learning) and older adults (exercise, rest) overlap in shared "collision zones," fostering spontaneous interaction and reducing the psychological burden of isolation.	Page 83-84
STUDY ON BUILDING TYPOLOGY	**Social Housing** Social housing represents a cornerstone of fair urban growth, offering low-income communities stable, affordable, and inclusive residential options. It is conventionally financed via public subsidies, social policies, and Public-Private Partnerships (PPPs) to guarantee that vulnerable populations can access housing. Within the scope of Intergenerational Housing, the core tenets of social housing can be customized to implement health-focused, elderly-friendly residential models within Indonesia's 3 Million Housing Program. By giving priority to housing that is both affordable and adaptable, Intergenerational Housing can function as a model for urban development that is resilient and inclusive. The integration of flexible housing types, communal infrastructure driven by the community, and accessible healthcare facilities ensures the constructed environment actively supports social interaction and aging-in-place. Furthermore, using a participatory planning method boosts the residents' feeling of ownership, contributing to sustainable long-term housing stability. Finally, Intergenerational Housing supports the Healthy Cities framework by incorporating public amenities, green spaces, and high walkability, solidifying the idea that social housing must both alleviate housing shortages and elevate the quality of life for its occupants.	Page 41
	Elderly Housing Elderly housing denotes residential settings intentionally designed to meet the requirements of aging individuals, emphasizing comfort, accessibility, and safety. These solutions incorporate principles such as universal accessibility, proximity to social and healthcare services, and barrier-free design to facilitate both independent living and aging in place. Within the scope of the Intergenerational Housing project, elderly housing units feature modular and adaptive layouts, alongside health-supportive infrastructure that is fully integrated into the design. These units are complemented by easily walkable connections to communal and public areas. The overarching goal is to establish an inclusive, sustainable living environment that actively enhances social interaction, well-being, and a high quality of life for its older residents.	
INITIAL DESIGN CONCEPT AND ITS RELATION TO URBAN AREA	The final design proposal for Generational Housing will integrate the findings from exploratory and evaluative thinking to create a health-centered, sustainable, and inclusive housing model that supports all age groups. The proposal will include: • Modular Housing Units: Flexible and adaptable designs to accommodate multigenerational families and evolving needs over time. • Green Infrastructure: Parks, community gardens, playgrounds, and pedestrian-friendly pathways to promote physical activity, mental well-being, and environmental sustainability. • Intergenerational Community Spaces: Shared kitchens, activity centers, and public plazas to foster social interaction, collaboration, and mutual support across generations. • Smart Technologies: IoT-enabled health monitoring, energy-efficient systems, and smart home features to enhance quality of life and sustainability. By combining these elements, Generational Housing will serve as a model for healthy urban living, addressing the challenges of multigenerational living while promoting sustainability, inclusivity, and community well-being.	Page 14

Table 6.4
Design Brief Evaluation - Examiner 2
Source: Author

| Design Comprehensive Evaluation

Examiner 1 (Ir. Wiryono Raharjo, M.Arch., Ph.D.)

EXAMINERS' NOTES	RESPONSE	REFERENCE
CONSISTENCY OF PROJECT TITLE	Design of Intergenerational Housing with WHO ICOPE Approach in Bantul	Page 03
CLARITY ON DESIGN LIMITATIONS	This architectural design proposal, while comprehensive in its approach, is subject to a number of limitations inherent in its context, scope, and implementation strategy. These limitations are acknowledged as areas requiring further research, validation, and real-world testing. **1. Contextual and Regulatory Limitations** • Dependency on Preliminary Government Initiatives: The project's premise is linked to a proposed government initiative for affordable housing in Yogyakarta which, as of the research date, remains in the preliminary planning stage and has not yet been realized. • Uniqueness of Sultan Ground: The project is sited on Sultan Ground, which is governed by the specific authority of the Keraton Yogyakarta. Navigating the cultural and administrative complexities of developing this land presents a significant procedural limitation that is beyond the scope of this architectural study. • Local Building Code Restrictions: The design must adhere to the Bantul Regency's building regulations, including specified limits on Building Coverage Ratio (KDB), building height, and setbacks. These regulations inherently limit the achievable density and architectural forms on the site. • Geological Site Conditions: The Bantul region is known for its vulnerability to environmental hazards, including earthquakes. While the design can incorporate resilient strategies, the inherent geological risk of the location remains a fundamental limitation. **2. Socio-Behavioral Limitations** • Limited Community Consultation: The project is limited by the absence of a comprehensive, wide-scale participatory design process involving the broader elderly community. Design decisions are therefore based on academic research and partner insights rather than extensive, direct input from a diverse range of potential future residents. The social and cultural nuances captured in the design are consequently limited by this scope. • Inability to Guarantee Social Interaction: The design strategically provides a framework of shared spaces—such as courtyards, community gardens, and activity centers to encourage intergenerational connection. However, architecture can only facilitate social cohesion; it cannot guarantee it. The success of these spaces is highly dependent on community management, programming, and the residents' willingness to engage. • Mitigation of Inter-Age Conflicts: The design attempts to mitigate potential conflicts between different age groups (e.g., noise from children's play areas affecting seniors' rest) through strategic zoning. The effectiveness of this spatial separation is a behavioral variable that cannot be fully predicted or controlled by design alone.	Page 19
	3. Economic and Implementation Limitations The project operates under significant financial constraints inherent to its social housing mission. The need to remain affordable for low-income households limits the budget for construction, materials, and long-term maintenance. The proposed Public-Private Partnership (PPP) model , while a viable strategy for funding, introduces its own limitation by requiring the design to balance its primary social goals with the commercial needs of a private investor, who would need to recoup their investment through revenue-generating components. This creates a fundamental tension between social value and commercial viability. **4. Architectural and Typological Limitations** • Inherent Challenges of Vertical Living for the Elderly: While the design is fully committed to barrier-free principles with elevators and 1:12 ramps, vertical housing still presents inherent mobility and psychological challenges for some elderly residents compared to single-story living. The reliance on elevators, for example, creates a dependency on technology and maintenance. • Scope of the Generative Design Process: The use of a generative design process (Grasshopper, Galapagos, Ladybug) optimizes the building layout based on quantifiable metrics like solar radiation. This methodology is limited in its ability to optimize for qualitative, culturally specific, or nuanced socio-spatial factors, which still required significant qualitative design judgment.	Page 20

Table 6.5
Design Comprehensive Evaluation - Examiner 1
Source: Author

Examiner 2 (Dr. Ar. Yulianto Purwono Prihatmaji, S.T., M.T., IPM., IAI.)

EXAMINERS' NOTES	RESPONSE	REFERENCE
DESCRIBE DESIGN INDICATORS OF WHO ICOPE APPROACH	The integrated care for older people approach, referred to as ICOPE, aims to facilitate the reorientation of health and social services towards more person-centred and coordinated care that supports the optimization of intrinsic capacity and functional ability for older people. ICOPE is WHO's approach to support the delivery of integrated care for older people within the context of a PHC-oriented health system.	Page 34
	1. **Domain: Locomotor Capacity (Mobility)** Focus: Preventing falls, maintaining muscle strength, and ensuring independent movement. **2. Domain: Cognition (Memory & Orientation)** Focus: Preventing disorientation, supporting memory, and reducing anxiety. **3. Domain: Vitality (Nutrition & Energy)** Focus: Preventing malnutrition and promoting social eating. **4. Domain: Sensory Capacity (Vision & Hearing)** Focus: Compensating for loss of visual acuity and hearing clarity. **5. Domain: Psychological Capacity (Mood & Depression)** Focus: Combatting isolation, depression, and promoting intergenerational bonding.	Page 71-84

Table 6.6
Design Comprehensive Evaluation- Examiner 2
Source: Author

Design Development Evaluation

Examiner 1 (Ir. Wiryono Raharjo, M.Arch., Ph.D.)

EXAMINERS' NOTES	RESPONSE	PAGE REFERENCE
CLARITY ON DESIGN GOALS	**Design Goals** • To design an enabling physical and social environment that specifically addresses Yogyakarta's demographic imperative for aging, supporting the maintenance of intrinsic capacity to reduce, delay, or prevent care-dependency among the region's high number of elderly residents. • To implement a resilient, modular structural system derived from computational optimization that enables high spatial adaptability while balancing minimized environmental load, specifically by achieving optimal performance in solar reduction and outdoor thermal comfort suitable for the tropical Bantul climate.	Page 17
USER PROFILES AND CHARACTERISTICS	**User Profiles** Based on the WHO ICOPE framework, the resident profiles can be categorized by their level of Intrinsic Capacity (physical and mental reserves) and the resulting Functional Ability (interaction with the environment). - **The "Pre-Frail" or Declining Capacity** This group represents the core target of ICOPE interventions—those experiencing early declines who need supportive environments to reverse or delay frailty. - **The Care-Dependent (Significant Loss of Capacity)** This group requires an environment that compensates for severe loss of capacity to maintain dignity and basic quality of life. - **The Caregiver (Formal & Informal)** According to the ICOPE implementation framework, the caregiver is a critical component of the care ecosystem whose well-being directly impacts the older resident. - **The Younger Generation (Intergenerational)** While not the focus of ICOPE care, their presence is the "Intervention" for the psychological domain of the older residents.	Page 57-60 Table 3.1
UNIT ARRANGEMENT, SPACE ALLOCATION AND BUILDING PROPERTY	Space arrangement is shown through floor plan and unit allocation plan.	Page 109-124 Table 5.1

Table 6.7
Design Development Evaluation - Examiner 1
Source: Author

Examiner 2 (Dr. Ar. Yulianto Purwono Prihatmaji, S.T., M.T., IPM., IAI.)

EXAMINERS' NOTES	RESPONSE	REFERENCE
DESIGN ALIGNMENT WITH THE PAP LAB	**1. The Parametric Generative Process** The design methodology transcends traditional intuitive form-finding by adopting a data-driven, generative workflow that prioritizes environmental performance over arbitrary aesthetics. • Voxel-Based Morphogenesis: Drawing on principles from 3D Medical Imaging, the design conceptualizes the site as a volumetric field of "voxels" (3D pixels). The final massing is achieved through negative volume segmentation, a subtractive process that erodes a saturated site volume to reveal the optimal architectural form. • Evolutionary Optimization: The morphology is generated using Grasshopper and the Galapagos evolutionary solver. This algorithmic process iteratively tests thousands of configurations to satisfy conflicting objective functions: minimizing Incident Solar Radiation on building facades to reduce thermal load, while simultaneously maximizing the Universal Thermal Climate Index (UTCI) to ensure comfort in outdoor communal spaces. This demonstrates the application of advanced computational modeling to resolve complex climatic determinants.	Page 61-67
	2. The Scale of the Site The project operates at neighborhood level, moving beyond the design of a singular building to address broader urban connectivity and land governance. Situated on a 16,328 m^2 (1.6-hectare) site in Bantul. • Land Tenure Context: The site is located on Sultan Ground (Tanah Kasultanan), a unique land tenure system in Yogyakarta. The design navigates the administrative and cultural complexities of developing on land owned by the Sultanate.	Page 27
	3. Background Issues (Urban Health and Policy) The architecture serves as a spatial response to converging demographic and socio-economic crises in Indonesia, positioning the built environment as a tool for public health. • Demographic Transition: The project responds to the rapid aging of the population in Bantul, which holds the highest density of elderly residents in the Special Region of Yogyakarta but the lowest life expectancy. It integrates the WHO ICOPE (Integrated Care for Older People) framework into the housing program to preserve the "Intrinsic Capacity" of residents,. • Housing Policy Integration: Aligned with the national "3 Million Housing Program," the thesis proposes a Public-Private Partnership (PPP) financial model. This approach seeks to balance the social mandate of providing affordable housing for low-income seniors with the commercial viability required for private sector investment.	Page 05
DESIGN CONCEPT DEVELOPED FROM THE STUDY	The methodology for generating the architectural structure draws direct inspiration from the principles of 3D medical imaging. Specifically, the concept of a voxel, a volumetric pixel used to represent anatomical data is adapted as a foundational modular structural unit. This module is initially employed to volumetrically saturate the entire site boundary, creating a dense initial mass. The subsequent definition of the final building forms is achieved through a subtractive process, mimicking negative volume segmentation commonly used in medical imaging to isolate anatomical structures by removing surrounding context. This approach allows for a precise, data-driven volumetric design.	Page 61-62 Figure 3.2
WHO ICOPE APPROACH CONTEXTUALIZATION	Based on the WHO ICOPE framework regarding Intergenerational Housing in Bantul, Yogyakarta, the implementation of integrated care requires significant contextual adjustments. These adjustments must reconcile the universal medical and functional goals of ICOPE with the local climatic, regulatory, socio-cultural, and geomorphological realities of the Bantul region. The following outlines have necessary adjustments across systemic, environmental, and socio-cultural dimensions: **1. Systemic Integration with Primary Health Care (Puskesmas)** The WHO ICOPE implementation framework emphasizes that care must be community-based and integrated into existing primary health structures. In the context of Bantul, the design must act as a spatial extension of the local Puskesmas (Community Health Centre). • Decentralized Screening (Step 1): The "Basic Assessment" phase of ICOPE, which screens for declines in intrinsic capacity, should be decentralized from the clinic to the housing level. The design allocates specific spaces, such as the Concierge and Lounge, to function as triage points where community health volunteers can conduct initial screenings using digital tools like the ICOPE app. • Referral Pathways (Step 2): Positive screenings must trigger a seamless referral to the Puskesmas for "In-depth Assessment." The architectural program facilitates this by incorporating Consultation Rooms equipped for telemedicine, bridging the distance between the residential complex and formal medical facilities.	Page 155
	2. Climatic and Environmental Adaptation The tropical climate of Bantul, characterized by high humidity and solar radiation, necessitates architectural interventions to protect the Vitality and Locomotor domains of older adults, who suffer from diminished thermoregulatory capacity.	

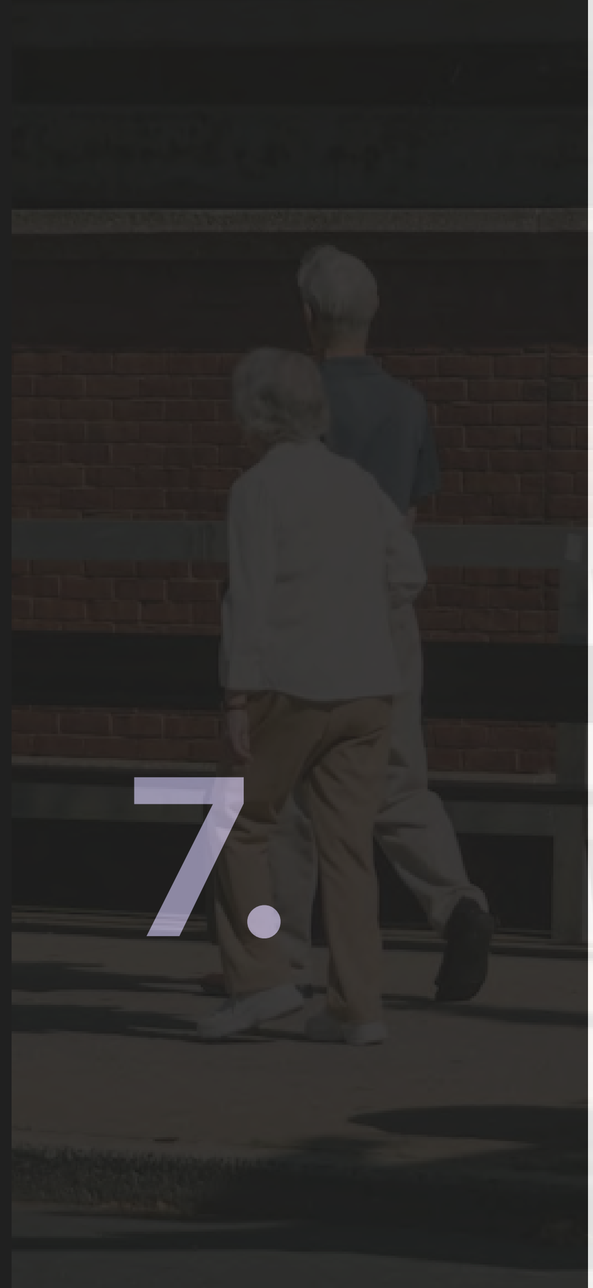
	• Performance-Based Massing: To mitigate heat stress, a significant risk factor for frailty, the building morphology utilizes computational optimization (Grasshopper/Galapagos) to minimize solar radiation gain on western façades while maximizing wind permeability. This passive cooling strategy is critical for maintaining indoor thermal comfort without excessive reliance on mechanical systems. • Ventilation Strategies: The design must incorporate cross-ventilation features.This prevents respiratory aggravation and mould growth, which are detrimental to the aging immune system. • Shading and Glare Control: To protect the Sensory (Vision) domain, facades must employ vertical fins (East/West) and horizontal overhangs (South/North) to admit daylight while preventing glare, which can cause disorientation and increase fall risks for those with cataracts or visual impairments.	
	3. Regulatory • Regulatory Compliance (Sultan Ground): The project is situated on Sultan Ground (land owned by the Yogyakarta Sultanate), which subjects it to specific cultural and developmental restrictions. The design adheres to a maximum building height of 20 meters and a Building Coverage Ratio (BCR) of 60%, necessitating a medium-rise, high-density configuration that preserves open space for communal use.	
	4. Socio-Cultural Contextualization (Gotong Royong) The implementation of ICOPE in Indonesia must align with the Javanese philosophy of Gotong Royong (mutual assistance). The architecture fosters this through specific programmatic adjustments that promote social cohesion and intergenerational support. • Communal Farming and Dining: Addressing the Vitality (Nutrition) domain, the design integrates a Communal Farm and Communal Kitchen. This facilitates a "farm-to-table" program where residents grow and cook local produce together. This not only combats malnutrition through shared meals (social facilitation of eating) but also reinforces community bonds through collective labor. • Intergenerational Zoning: To manage the Psychological domain, the design addresses the potential conflict between active children and resting seniors. Acoustic zoning strategies separate high-energy areas (playgrounds) from restorative spaces (reading rooms), while creating controlled intersection points (e.g., lobbies, gardens) where intergenerational interaction can occur organically without causing stress.	Page 156
RAIN DROP MANAGEMENT	The management of rainwater runoff is a critical component of sustainable architectural design, particularly in high-rainfall environments. This design employs a multi-layered approach, utilizing both material choices and an integrated drainage plan to manage water from the roof level down to the pedestrian corridor. **1. Flat Roof Management** The use of a flat concrete roof facilitates a controlled rainwater management system. To prevent ponding and control runoff, the roof structure is designed with a minimal slope toward designated drainage points. • Internal Drainage System: Rainwater is collected via recessed scuppers or internal roof drains strategically placed at the lowest points of the slab. • Insulation and Membrane: A high-quality waterproof membrane is applied over the roof slab and thermal insulation layer. This membrane provides a continuous, impervious barrier, channeling water efficiently toward the internal drainage system, thereby preventing infiltration and concrete degradation.	
	2. Overhangs and Façade Protection (Drip Line Management) The extended overhang used along the corridor is essential for sun shading and façade protection, but it requires precise management of rainwater runoff to prevent splash-back and dampness at the corridor level. • Drip Edge Integration: A specialized drip edge or continuous waterline gutter is integrated along the outermost edge of the overhang. This feature includes a precise profile (a small groove or lip) that breaks the surface tension of the water, ensuring droplets are directed away from the building envelope.	Page 157
	3. Corridor Drainage and Sub-Surface Runoff The corridor employs a board decking system (e.g., composite or treated timber boards) set atop an elevated substrate, creating a system for immediate surface water removal. • Permeable Surface: The decking creates a semi-permeable surface. This design ensures that direct rainfall or water dripping from the overhangs passes rapidly through the gaps between the deck boards. • Sub-Deck Drainage: The water is channeled to a sub-surface layer—typically a sloping concrete slab or membrane—located beneath the decking. This sub-deck is graded toward a perimeter or central linear drain, effectively managing the runoff without interrupting pedestrian flow. • Safety and Durability: This methodology keeps the main walking surface dry, enhancing safety for elderly residents (reducing slip hazards) and protecting the decking material's long-term integrity from constant moisture exposure. By combining controlled roof runoff, precise drip-line management at the overhang, and sub-surface drainage in the corridors, the design establishes an integrated, efficient, and user-safe rainwater management strategy.	
STUDY ON ELDERLY MOVEMENT	**1. Physiological Changes and Gait Characteristics** Research indicates that movement capabilities in older adults are defined by the status of their musculoskeletal system (muscles, joints, bones) and how these interact with their environment.	Page 159

	• Sarcopenia and Decline: Muscle mass typically peaks in early adulthood and naturally declines with age. If not managed, this leads to sarcopenia (severe loss of muscle mass and strength), which is a strong predictor of mortality and care dependency,. • The "Cautious Gait": To maintain stability, older adults often unconsciously adopt a specific walking pattern known as a "cautious gait." This is characterized by a slower walking speed, shorter stride length, and spending more time with both feet on the ground to navigate uneven surfaces safely. • Pain limitations: Chronic pain, particularly from conditions like osteoarthritis or low back pain, acts as a significant barrier to movement, often creating a cycle where pain leads to inactivity, which in turn worsens stiffness and muscle loss.	
	2. The "Multimodal" Intervention Strategy WHO studies emphasize that maintaining movement requires more than just walking. The gold standard for preventing mobility loss is multimodal exercise. • Components: An effective movement program must combine resistance training (to build muscle), balance training (to prevent falls), aerobic activity (for endurance), and flexibility training,. • Nutrition Synergy: Physical movement interventions are significantly more effective when combined with adequate protein intake (1.0–1.2g per kg of body weight), as ageing bodies absorb protein less efficiently.	
	3. The built environment acts as a prosthetic for declining movement capacity. If the environment is maladapted, a person with limited capacity becomes disabled; if adapted, they remain independent. • **The 50-Meter Rule:** Research suggests that outdoor walking routes should provide seating nodes at intervals of no more than 50 meters. This distance corresponds to the limited endurance of older adults with mobility issues, allowing them to rest and regain balance before continuing. • **Spatial Dimensions for Mobility Aids:** To accommodate the movement of wheelchairs and walking frames, corridors require a minimum clear width of 1050mm in private dwellings and 1900mm in communal areas (to allow two-way traffic). A turning circle of 1500mm is required in all functional areas to allow a full 360-degree turn, • **Surface Consistency:** Approximately 55% of slips and falls occur on slippery surfaces. Therefore, flooring must maintain a high slip resistance rating (R12 for wet/outdoor areas) and avoid sudden changes in gradient or texture, which can confuse the "cautious gait" and cause tripping, • **Handrail Continuity:** Continuous, dual-level handrails are essential along circulation routes. They must extend on both sides to provide constant support, particularly for those with weakness on one side of the body (e.g., post-stroke). (Page 159)	Page 160
STUDY ON HUMIDITY FOR ELDERLY	Based on the provided sources, particularly the "Curating Homes" guide and the "WHO ICOPE" handbook, there are several specific studies and research insights regarding the impact of humidity on older adults. **1. Physiological Vulnerability and Thermoregulation** Research indicates that older adults have a diminished capacity for thermoregulation (the body's ability to maintain core temperature), making humidity control not just a matter of comfort, but of survival. • Compromised Sweat Response: Older adults often struggle with the sweat response mechanism. In high humidity, sweat does not evaporate efficiently, increasing the risk of heat stress, dehydration, and heat exhaustion. • Optimal Range: Research defines the ideal indoor humidity level for seniors as 45% to 60%. Maintaining this range is crucial to prevent physical discomfort and skin issues, such as dryness or irritation. • Respiratory Stress: High humidity can exacerbate respiratory issues. This is particularly dangerous for older adults with chronic conditions like heart or lung disease, as the added stress on the body from regulating temperature in humid conditions can trigger adverse health events.	Page 161
	2. Respiratory Health and Biological Contaminants Humidity is a primary driver of indoor pollutants that disproportionately affect the aging respiratory system. • Mould and Bacteria Growth: High humidity, particularly in washrooms and kitchens, fosters the growth of mould, bacteria, viruses, and dust mites. Research highlights that this moist environment can worsen respiratory issues and allergies in older adults. • Ventilation and Sleep Quality: Poor ventilation leads to increased humidity and CO2 levels. Research links this to reduced sleep quality in older adults. Proper management of humidity through ventilation lowers airborne pollutants, enhancing deep sleep and REM sleep, which are vital for cognitive maintenance.	
	3. Safety Risks: Falls and Mobility Humidity is a direct environmental risk factor for falls, which are a leading cause of injury in the elderly. • Slippery Surfaces: Research estimates that 55% of slip, trip, and fall incidents occur on slippery surfaces, often caused by high humidity or rainfall. Impermeable pavements can become dangerously slick when humid or wet, posing severe risks to older adults with reduced physical strength. • Visual Perception: In humid conditions, condensation on surfaces or eyewear (when moving between temperature zones) can obscure vision, further increasing fall risks for those with already declining visual acuity.	Page 162
	4. Behavioral Impacts: Usage of Space Humidity levels directly influence how and when older adults use their living environments.	

	• Outdoor Space Utilization: Research shows that older adults' willingness to use outdoor spaces is contingent on the similarity between indoor and outdoor temperature and humidity. They prefer consistent conditions; significant differences in humidity between the inside and outside will deter them from going outdoors, leading to a sedentary lifestyle. • Thermal Shock: Sudden transitions between humidity levels (e.g., leaving a dehumidified room into a humid corridor) can cause discomfort. Design strategies must mitigate these "microclimate" differences to encourage movement.	
	5. Design and Technological Interventions To address these findings, the sources recommend specific design and technological implementations: • IoT Humidity Control: Installing humidity control systems connected to HVAC is recommended to automatically detect and regulate indoor moisture levels to stay within the 40–60% safety zone,. • Cross-Ventilation: To combat the "mould risk" in washrooms and kitchens, the designs incorporated operable windows and cross-ventilation strategies to naturally lower humidity and airborne pollutants,. • Material Selection: In outdoor areas prone to humidity-induced slickness, materials like EPDM rubber are used for their durability and slip resistance.	
STUDY ON SOCIAL INTERACTION FOR ELDERLY	The study of social interactions among elderly people reveals that maintaining social connection is not just a leisure activity but a critical medical and psychological necessity for Healthy Ageing. **1. The Link Between Social Interaction and Health** Research distinguishes between social isolation (objectively having few contacts) and loneliness (a subjective feeling of disconnection). Both are potent risk factors for deterioration in older age. • Impact on Mortality and Disease: Social isolation and loneliness are associated with a higher likelihood of preventable mortality. They are linked to increased risks of cardiovascular disease, stroke, anxiety, depression, and dementia. • Cognitive Preservation: Social engagement is a protective factor against cognitive decline. Interacting with others stimulates cognitive functions (attention, memory, reasoning). Conversely, isolation is a risk factor for the progression of cognitive impairment. • Nutritional Health (The "Social Facilitation" of Eating): There is a strong correlation between eating alone and poor appetite. Research indicates that older adults consume, on average, 44% more food when dining with others compared to eating alone. The presence of others provides "social modelling," encouraging positive eating patterns and reducing the risk of malnutrition.	Page 163
	2. Barriers to Social Interaction The sources highlight that older adults often withdraw from social situations due to declines in their Intrinsic Capacity (physical and mental reserves) or environmental hurdles. • Sensory Barriers: ◦ Hearing Loss: Untreated hearing loss causes embarrassment and difficulty communicating, leading to withdrawal and isolation. Background noise in communal areas often exacerbates this. ◦ Vision Impairment: Poor vision restricts mobility and the ability to recognize faces or navigate social spaces, reducing the confidence to leave home. • Physiological Barriers: ◦ Urinary Incontinence: The fear of accidental leakage or the inability to find a toilet quickly causes anxiety, leading many seniors to restrict their social outings and stay home. ◦ Mobility: Difficulty walking or fear of falling limits access to community centers and social gatherings. • Environmental Barriers: Lack of accessible transport, financial constraints, and safety concerns in the neighbourhood prevent older adults from maintaining their social networks.	
	3. Architectural Design for Social Interaction To counter isolation, housing design must actively facilitate organic interaction. The "Curating Homes" guide and your thesis context (Bantul) suggest specific strategies: • The "Social Loop" and Circulation: ◦ Avoid Dead Ends: Circulation routes should be continuous loops rather than dead ends to encourage walking and chance encounters. Corridors should be wide enough (min 1900mm in communal areas) to allow two people (including wheelchair users) to pass or stop and chat. ◦ Seating Nodes: Seating should be provided every 50 meters along pathways. These nodes act as resting spots that naturally become social gathering points. • Communal Dining and Kitchens: ◦ Design communal dining areas to be "homelike" rather than institutional. Including a visible cooking area or a Communal Kitchen fosters interaction through food preparation activities. • Acoustic Zoning:	Page 164

	◦ To support socialisation for those with hearing loss, spaces must be acoustically treated to reduce reverberation. Create distinct "Quiet Zones" for intimate conversation separate from "Loud Zones" (like gyms or playgrounds). • Intergenerational Contact: ◦ In the context of the Bantul design, creating spaces where seniors can watch children play (passive participation) or engage in shared activities (active participation) is vital. This aligns with the "City of Well-being" concept where mixed demographics interact.	
	4. Programmatic Interventions Beyond physical space, structured activities are required to maintain social health. • Group Activities: Group-based exercise (multimodal training) and cognitive stimulation therapy (group discussions, reminiscence therapy) are more effective than individual sessions because they build peer support networks. • Volunteering: Engaging older adults in volunteering (e.g., as "House Captains" or activity helpers) provides a sense of purpose and strengthens community ties, combatting the loss of role often felt after retirement. • Digital Connection: Providing Wi-Fi and training on digital devices in communal areas (like a Reading Room) helps seniors maintain contact with distant family and friends, reducing feelings of loneliness. social networks. • Scheduled Activities (Table 6.1)	Page 164-165 Table 6.1

Table 6.8
Design Development Evaluation - Examiner 2
Source: Author



7.

Attachment

| Poster

DESIGN OF

INTERGENERATIONAL HOUSING

WITH WHO ICOPE APPROACH IN BANTUL

The rapid urbanization and demographic shifts in the Special Region of Yogyakarta present unique challenges and opportunities for urban planning.

With a growing elderly population and increasing life expectancy, there is a pressing need to design urban environments that promote physical, social, and environmental well-being. This design explores the concept of intergenerational housing as a model for sustainable urban housing in Bantul, focusing on the integration of WHO ICOPE principles.

By addressing issues such as access to healthcare, green infrastructure, walkability, and community engagement, this design aims to create neighborhoods that enhance the quality of life for all residents, particularly the elderly. Central to this design is the concept of aging in place, which ensures that the elderly can live independently and comfortably in their own homes and communities for as long as possible.

Through thoughtful architectural design, this project seeks to transform Bantul into a model of healthy urban living that supports the well-being of its aging population while fostering a sustainable and inclusive community.

TITLE
Design Of Ageing-In-Place Housing in Bantul

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DEPARTMENT of ARCHITECTURE

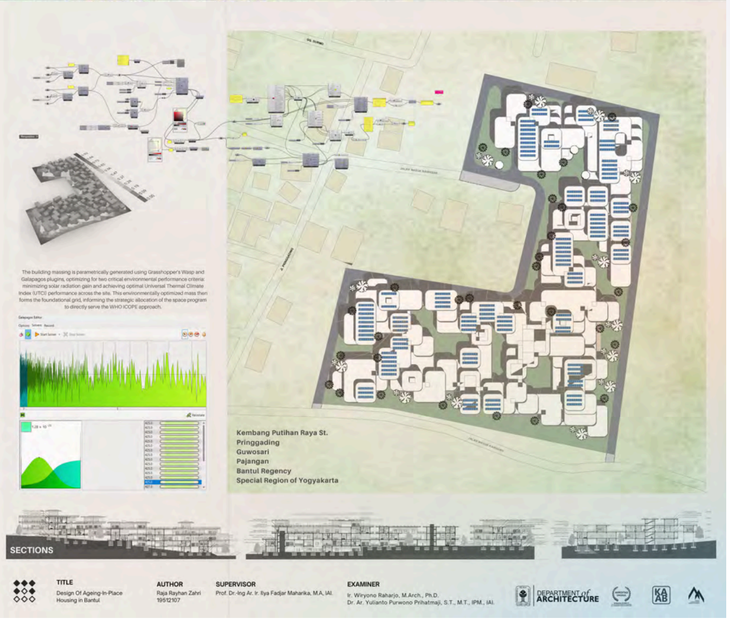
DESIGN PREMISE

This project is rooted in the concept of creating healthy, inclusive, and sustainable urban environments that address the needs of an aging population while addressing the challenges of rapid urbanization. Bantul, as part of the Daerah Istimewa Yogyakarta (DIY) region, is experiencing a demographic and cultural shift, making it the ideal setting for implementing the Intergenerational Housing model. The premise is guided by the principles of WHO ICOPE, which emphasizes on Person-Centered Care and Preferences, Optimizing Functional Ability, Safety, Continuity of Care, and Maintaining Mobility. For persons' functional ability is defined as the ability to do the things they value for as long as possible.

The following principles shape the design:

- **Aging In Place:** The design prioritizes enabling the elderly to live independently in their own homes and communities for as long as possible. This includes creating safe, accessible environments, age-friendly housing, and supportive social spaces that support the physical, social, and emotional well-being of elderly.
- **Health-Promoting Infrastructure:** The project integrates healthcare facilities, green spaces, and a network of multimodal systems to reduce the prevalence of non-communicable diseases (NCDs) and promote overall well-being. Walkable neighborhoods, cycling, and easy access to public spaces are central to the design, encouraging active lifestyles and reducing health risks.
- **Community-Oriented Spaces:** The design fosters social interaction and community engagement by creating public spaces that encourage intergenerational activities. Parks, community centers, and recreational areas are designed to bring people together, reducing social isolation and promoting mental well-being.
- **WHO ICOPE:** The underlying philosophy of ICOPE is a shift away from simply treating diseases as they appear. Instead, it adopts a model of Healthy Ageing. It focuses on maintaining and improving an individual's Functional Ability, allowing them to continue doing the things they value for as long as possible.

Through careful architectural design, this project aims to create a vibrant intergenerational housing that serves as a model for healthy urban living, addressing the challenges of an aging population while promoting sustainability and community well-being. The final design will be a holistic, human-centered solution that enhances the quality of life for all residents of Bantul and contributes to the city's vision of a healthy and inclusive Daerah Istimewa Yogyakarta.



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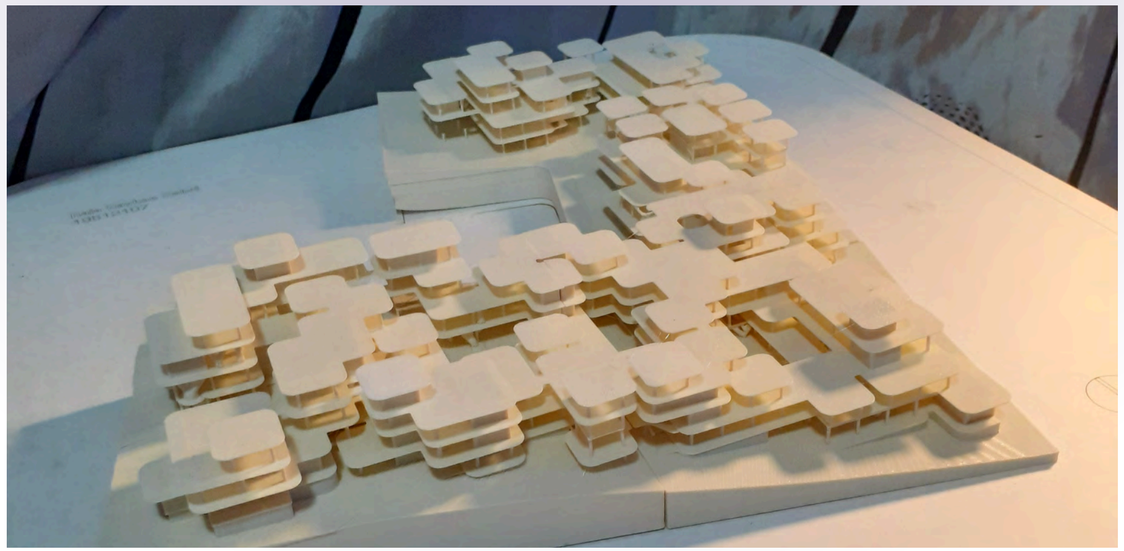
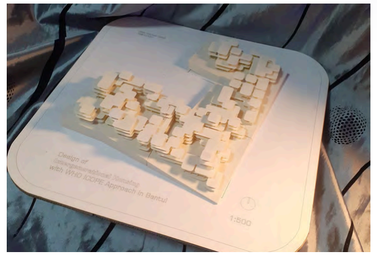
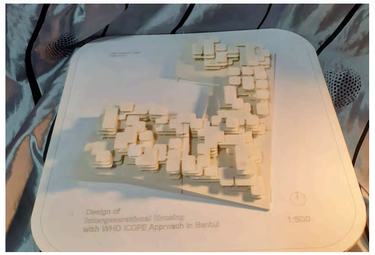
3D Printed Model







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Assalamualaikum Wr. Wb.

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Judul Karya Ilmiah	: Design of Intergenerational Housing with WHO ICOPE Approach in Bantul

Karya ilmiah yang bersangkutan di atas telah melalui proses cek plagiasi menggunakan **Turnitin** dengan hasil kemiripan (*similarity*) sebesar **12 (Dua Belas) %.**

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Wassalamualaikum Wr. Wb.

Yogyakarta, 12/17/2025
Direktur

UNIVERSITAS ISLAM INDONESIA
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