TUGAS AKHIR

STUDIO DESAIN ARSITEKTUR 4

INTEGRATIVE DESIGN OF URBAN FARMING AS A PUBLIC SPACE AND COMMUNITY HUB TO ENHANCE THE WELLBEING OF JAKARTA'S CITIZENS

Ditulis untuk memenuhi sebagian persyaratan akademik
guna memperoleh gelar Sarjana Arsitektur

Oleh:

NAMA : EDMUND SERRANO BUDIARTA

NPM : 01022210011

PROGRAM STUDI ARSITEKTUR
FAKULTAS DESAIN
UNIVERSITAS PELITA HARAPAN
JAKARTA

2025

TUGAS AKHIR

STUDIO DESAIN ARSITEKTUR 4

DESAIN INTEGRATIF *URBAN FARMING* SEBAGAI RUANG PUBLIK DAN PUSAT KOMUNITAS UNTUK MENINGKATKAN KESEJAHTERAAN MASYARAKAT JAKARTA

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2025

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		Halaman : 1 dari 2

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Full Name (Student ID)
: 2.
: 3.

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Program Studi : Arsitektur
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○ Medan
○ Surabaya

Jenis Tugas Akhir : ◉ Skripsi *Thesis (Undergraduate/S1)* ○ Thesis *Thesis (Graduate/S2)*
Type of Final Assignment
○ Magang *Internship* ○ Disertasi *Dissertation*
○ Makalah (*Term Paper*) *Term Paper* ○ Karya Tulis Ilmiah *Scientific Papers*
○ Proyek Akhir *Final Project*

Judul Tugas Akhir : Desain Integratif Urban Farming sebagai Ruang Publik dan Pusat Komunitas untuk Meningkatkan Kesejahteraan Masyarakat Jakarta
Title of Final Assignment

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Nama Lengkap *Full Name*	Edmund Serrano Budiarta		

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PERSETUJUAN DOSEN PEMBIMBING TUGAS AKHIR

DESAIN INTEGRATIF URBAN FARMING SEBAGAI RUANG PUBLIK DAN PUSAT KOMUNITAS UNTUK MENINGKATKAN KESEJAHTERAAN MASYARAKAT JAKARTA

Oleh:

Nama	: **Edmund Serrano Budiarta**
NPM	: **01022210011**
Program Studi	: **Arsitektur**

Telah diperiksa dan disetujui untuk diajukan dan dipertahankan dalam Sidang Tugas Akhir guna memperoleh gelar Sarjana Arsitektur pada Program Studi Arsitektur, Fakultas Desain Universitas Pelita Harapan, Tangerang, Banten.

Tangerang, 10 Mei 2025

Menyetujui

Pembimbing

(Dr. Ir. Felia Srinaga, MAUD.)

Ketua Program Studi

(Andreas Yanuar Wibisono, S.T., M.Ars.)

Dekan

(Dr. Ir. Susinety Prakoso, MAUD., MLA.)

UNIVERSITAS PELITA HARAPAN

FAKULTAS DESAIN

PERSETUJUAN TIM PENGUJI TUGAS AKHIR

Pada hari Selasa tanggal 13 Mei 2025 telah diselenggarakan Sidang Tugas Akhir untuk memenuhi sebagian persyaratan akademik guna memperoleh Gelar Sarjana Arsitektur pada Program Studi Arsitektur, Fakultas Desain Universitas Pelita Harapan, atas nama:

Nama	**:**	Edmund Serrano Budiarta
NPM	**:**	01022210011
Program Studi	**:**	Arsitektur
Fakultas	**:**	**Desain**

termasuk ujian Tugas Akhir yang berjudul "DESAIN INTEGRATIF *URBAN FARMING* SEBAGAI RUANG PUBLIK DAN PUSAT KOMUNITAS UNTUK MENINGKATKAN KESEJAHTERAAN MASYARAKAT JAKARTA" oleh tim penguji yang terdiri dari:

Nama Penguji	**Jabatan dalam Tim Penguji**	**Tanda tangan**
1. Dr. Ir. Felia Srinaga, MAUD.	, sebagai Ketua	
2. Dr. Undi Gunawan, S.T., M.T.	, sebagai Anggota	
3. Andreas Dwiputro Handoyo, S.T., M.T.	, sebagai Anggota	

Tangerang, 13 Mei 2025

ABSTRAK

Edmund Serrano Budiarta (01022210011)

Desain Integratif *Urban Farming* sebagai Ruang Publik dan Pusat Komunitas untuk Meningkatkan Kesejahteraan Masyarakat Jakarta
(iv + 99 halaman: 66 gambar; 2 tabel)

Penelitian ini mengangkat konsep integrasi pertanian perkotaan sebagai pusat komunitas dan ruang publik di Jakarta untuk meningkatkan ketahanan pangan, resiliensi iklim, dan kesejahteraan masyarakat. Jakarta, sebagai salah satu kota dengan tingkat urbanisasi tertinggi, menghadapi tantangan serius terkait keterbatasan ruang hijau, ketahanan pangan, polusi udara, dan efek pulau panas perkotaan. Dalam konteks ini, pertanian perkotaan muncul sebagai solusi potensial yang tidak hanya memanfaatkan ruang terbatas untuk produksi pangan lokal tetapi, ketika digabungkan dengan pusat komunitas dan berbagai fasilitas pendukungnya, juga menawarkan manfaat sosial dan lingkungan yang signifikan.

Penelitian ini didasarkan pada empat pertanyaan utama. Pertama, bagaimana pertanian perkotaan dapat meningkatkan ketahanan pangan dan resiliensi iklim. Kedua, apa saja kriteria dan persyaratan ruang yang diperlukan untuk mendukung pertanian perkotaan di lingkungan perkotaan yang padat. Ketiga, bagaimana peran pusat komunitas berbasis pertanian perkotaan dalam meningkatkan kesejahteraan masyarakat. Dan keempat, bagaimana strategi desain arsitektur dapat dikembangkan secara efektif untuk mengintegrasikan pertanian perkotaan dengan infrastruktur kota yang ada.

Metodologi penelitian yang digunakan meliputi studi literatur dari berbagai sumber seperti buku, artikel jurnal, dan analisis preseden untuk memahami berbagai pendekatan dan praktik terbaik dalam desain perkotaan dan pertanian perkotaan. Hasil yang diharapkan dari tesis ini adalah terciptanya desain inovatif dan berkelanjutan yang berhasil mengintegrasikan pertanian perkotaan sebagai pusat komunitas di Jakarta. Desain ini mencakup berbagai ruang dan program yang diusulkan, seperti *agricultural spaces* (beserta *support dan infrastructure*-nya), *Educational and Interactive Spaces*, *Social and Recreational Spaces*, dan *Health & Wellness Spaces*. Dengan pendekatan ini, penelitian ini dibuat untuk memberikan solusi desain arsitektur untuk meningkatkan kualitas hidup dan keberlanjutan di kawasan perkotaan.

Referensi : 17 Referensi (2006-2024).
Kata Kunci : Pertanian Perkotaan, Ketahanan Pangan, Pusat Komunitas, Kesejahteraan Masyarakat.

ABSTRACT

Edmund Serrano Budiarta (01022210011)

Integrative Design of Urban Farming as a Public Space and Community Hub to Enhance the Wellbeing of Jakarta's Citizens
(iv + 99: 66 images; 2 tables)

This research explores the concept of integrating urban farming as a community hub and public space in Jakarta to enhance food security, climate resilience, and community well-being. Jakarta, as one of the most densely urbanized cities, faces significant challenges related to the limited availability of green spaces, food security, air pollution, and urban heat island effects. In this context, urban farming emerges as a potential solution that not only utilizes limited urban spaces for local food production but also, when combined with community centers and various supporting facilities, offers significant social and environmental benefits.

This research is guided by four main questions. First, how can urban farming improve food security and climate resilience. Second, what are the criteria and spatial requirements needed to support urban farming in densely populated urban areas. Third, what role do community centers based on urban farming play in enhancing community well-being. And fourth, how can effective architectural design strategies be developed to integrate urban farming with existing urban infrastructure.

The research methodology includes a comprehensive literature review from various sources such as books, journal articles, and precedent analysis to understand different approaches and best practices in urban design and urban farming. The expected outcome of this thesis is the creation of an innovative and sustainable design that successfully integrates urban farming as a community hub in Jakarta. The design encompasses various proposed spaces and programs, such as agricultural spaces (including their support and infrastructure), Educational and Interactive Spaces, Social and Recreational Spaces, and Health & Wellness Spaces. With this approach, the research aims to provide an architectural design solution that enhances the quality of life and sustainability in cities.

Reference : 17 references (2006-2024).
Keywords : Urban Farming, Food Security, Community Hub, Community Well-being.

KATA PENGANTAR

Puji syukur kami panjatkan kepada Tuhan Yang Maha Kasih, hanya karena anugrah dan karuniaNya, sehingga Tugas Akhir ini dapat diselesaikan.

Tugas Akhir dengan judul ini "DESAIN INTEGRATIF *URBAN FARMING* SEBAGAI RUANG PUBLIK DAN PUSAT KOMUNITAS UNTUK MENINGKATKAN KESEJAHTERAAN MASYARAKAT JAKARTA" ini ditunjukan untuk memenuhi sebagian persyaratan akademik guna memperoleh Sarjana Arsitektur Fakultas Desain Universitas Pelita Harapan, Tangerang.

Penulis menyadari bahwa tanpa bimbingan, bantuan, dan doa dari berbagai pihak, Tugas Akhir ini tidak akan dapat diselesaikan tepat pada waktunya. Oleh karena itu, penulis mengucapkan terima kasih yang sebesar-besarnya kepada semua pihak yang telah membantu dalam proses pengerjaan Tugas Akhir ini, yaitu kepada:

1) Dr. Ir. Susinety Prakoso, MAUD., MLA., selaku Dekan Fakultas Desain.
2) Andreas Yanuar Wibisono, S.T., M.Ars., selaku Ketua Program Studi Arsitektur.
3) Dr. Ir. Felia Srinaga, MAUD., selaku pembimbing Tugas Akhir.
4) Dr. Ir. Susinety Prakoso, MAUD., MLA., selaku Penasehat Akademik penulis.
5) Semua dosen yang telah mengajar penulis selama berkuliah di program studi Arsitektur Universitas Pelita Harapan.
6) Papa, mama, dan kakak yang telah membantu dan mendukung penulis hingga dapat menyelesaikan Tugas Akhir ini.

Akhir kata, penulis menyadari bahwa masih banyak kekurangan dalam Tugas Akhir ini. Oleh karenanya saran dan kritik dari pembaca akan sangat bermanfaat bagi penulis. Semoga Tugas Akhir ini dapat bermanfaat bagi semua pihak yang membacanya.

Tangerang, 13 Mei 2025

Edmund Serrano Budiarta

CULTIVATING CONNECTION

Edmund Serrano Budiarta
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EDUCATION

Ipeka Integrated Christian School

Mathematics & Sciences, 2018-2021

Cumulative GPA of 3.82 / 4.00

Universitas Pelita Harapan

Bachelor of Architecture, 2021-2025

Cumulative GPA of 3.62 / 4.00

Thesis Project:

Integrative Design of Urban Farming as a Public Space and Community Hub to Enhance the Well-Being of Jakarta's Citizens

SKILLS

- AutoCAD — Advanced
- Procreate — Advanced
- SketchUp — Advanced
- Illustrator — Advanced
- Lumion — Advanced
- Photoshop — Intermediate
- Enscape — Intermediate
- InDesign — Intermediate

Personal Values

Dedication, Enthusiasm, Curiosity, Responsibility, Cooperation, Optimism, & Persistence

Interests

Drawing, Sketching, Digital Painting

Maquette / Model-Making, Typography

Language

Indonesian (Native or Bilingual Proficiency)

English (Full Professional Profiency)

IELTS Overall Band Score 8.0

bit.ly/portfolioedmund

ACADEMIC AND PROFESSIONAL EXPERIENCES

COURSES

IISMA (Indonesian International Student Mobility Awards)

Student at University College London, September - December 2023

Selected to participate in a three-month student exchange program at University College London's Architecture and Arts & Sciences Department. Completed courses including "Ethics & Agency", "Urban Physics", "Urban Inequalities & Global Development", and "Approaches to Knowledge: Introduction to Interdisciplinarity."

AA online Summer School: "What now? Agents of Care"

Participant, July 2021

Participated in a full-time, two-week course that offered an intensive program of design studios, seminars, lectures, and discussions centered around the theme of the Venice Biennale 2021. Developed the project titled "Unveiling the Undervalued," which was published in the :Reporting from Venice AA Summer School Book 2021".

Artciv3D Studio: Architecture Design Course

Participant, May - July 2021

Participated in Artciv3D Studio's "Animation Packet Course," a comprehensive curriculum focused on architectural and interior design, as well as rendering and animation techniques. The course involved developing a residential house design from concept to completion, utilizing three interconnected software programs: AutoCAD, SketchUp, and Lumion.

LEADERSHIP & ORGANIZATIONAL ROLES

GAMATARA (Gabungan Mahasiswa Arsitektur)

Head of Studi Banding, September 2022 - September 2023

Led the Studi Banding division of UPH Architecture Student Organization, organizing events and activities in collaboration with other universities.

PUBLICATIONS

Asian Institute of Low Carbon Design 13th International Conference

Publisher and Presenter, February 2025

Published my work "Integrative Design of Urban Farming as a Public Space and Community Hub to Enhance the Well-Being of Jakarta's Citizens" in the *Journal of the Asian Institute of Low Carbon Design 2025*. I also had the opportunity to present my work at the AILCD 13th International Conference and Workshop, "Grasping Architecture Intelligence Possibilities," held from February 21–24, 2025, at the University of Kitakyushu, Japan.

EXHIBITIONS

ArchUPH wave: “Hybridtual” International Workshop

Installation Commitee and Exhibitor, June 2022

Participated in the annual exhibition hosted by UPH Architecture in collaboration with RSP and M Bloc Academy as part of the installation committee. My team and I were responsible for designing and constructing the entrance installation for the exhibition. Moreover, my first-year projects, “Constructive Destruction” and “Refined Ambiguity”, were selected for display, showcasing its research and design process.

ArchUPH wave: “Chimera Hybrids” Critique

Presenter, June 2022

Presented my first-year works, “Constructive Destruction” and “Refined Ambiguity” in the “1st-Year Architecture Studio Critique: Chimera Hybrids” event hosted at M Bloc Space.

IndoBuildTech Expo 22: “Reflections of Questions” Exhibition

Installation Commitee and Exhibitor, November 2022

Participated in UPH Architecture’s “Reflections of Questions” Exhibition at IndoBuildTech Expo 2022, ICE BSD. The exhibition featured an installation that encapsulated my first-year design process, presented through thought-provoking questions via video and maquette displays. Additionally, I showcased a book I authored, offering a critical analysis of Francis Kéré’s Startup Lions Campus as part of the “Architecture and Critique” course.

ArchUPH: “Elements” Exhibition

Exhibitor, September 2023

Participated in UPH Architecture’s “Elements” Exhibition, where my second-year project, “The Literalounge: Unplugging into Literature”, was featured. The exhibition presented a collection of drawings, diagrams, models, and installations, illustrating the full design process—from identifying design challenges and generating ideas to developing solutions and creating tangible representations of the final concepts.

ArchUPH: Prospectus Selected Works 24/25

Exhibitor, Published 2025

Showcased my third-year project, “Stairscapes”, in the “ArchUPH: Prospectus 24/25” book, which highlights selected works from that academic year. The project presents an office design located in Peruri Blok M, emphasizing the integration of staircases with natural vistas and the incorporation of landscaping and natural elements to enrich the workspace environment.

bit.ly/portfolioedmund

PROFESSIONAL EXPERIENCES

Julio Architect & Partners Internship

Assisted in Technical Drawings and 3D Models

June - August 2024

During my internship, I contributed to 2D plan drawings as well as technical construction details for commercial projects, including restaurants and cafés. Additionally, I participated in the discussion and development of the 3D designs.

ES&A (Edmund Serrano & Associates)

Principal Architect -- Freelance

September 2021 - Current

Managed design projects across residential (houses) and commercial sectors (restaurants, cafés, and sports facilities), overseeing the entire process from concept development to final design.

COMPETITIONS

Buildner: “A Virtual Home: Into the Metaverse” International Competition

Top 40 Honorable Mentions

Submitted June 2022

Created a design proposal for a virtual home in the metaverse titled “Blockchain.” Without physical constraints, the focus shifted to incorporating essential design elements that would make the virtual home feel familiar and comfortable, ensuring a sense of connection and usability in a digital space.

Saint Gobain Architecture Student Contest 2025

1st Prize Winnner

Submitted March 2025

Created a design proposal for the renovation and adaptive reuse of an old school building in Chimilin, as well as a residential building and co-creation lab (including laboratories, offices, and multipurpose halls) for architecture students in Villefontaine, both located in the Nord-Isère region of France. The project is titled “Timeless Interplay: Merging Old and New through Mass and Void.”

Project Overview

AUTHOR	Edmund Serrano Budiarta
TITLE	Integrative Design of Urban Farming as a Public Space and Community Hub to Enhance the Wellbeing of Jakarta's Citizens
OUTPUT TYPE	Design Proposal
FUNCTION	Urban farming complex with integrated community and commercial facilities
LOCATION	Central Jakarta
DATE	August 2024 - May 2025

Table of Contents

01
Introduction

1.1 Background

As the capital and economic hub of Indonesia, Jakarta exerts a powerful attraction, particularly in terms of economic opportunities, employment, and urban lifestyle. According to Turner (1972) and Evers (1982), city centers inherently draw migrants due to their strategic location and abundant job prospects. Consequently, Jakarta has experienced rapid urbanization, becoming one of the most densely populated cities in the world. This dynamic and complex urban environment demands sophisticated strategies to manage ongoing migration and growth.

The swift rise in population poses significant challenges for local governments in ensuring a livable and high-quality urban environment. The continuous development of infrastructure, office buildings, housing, apartments, and commercial centers has led to a marked reduction in green spaces. This loss of open land has contributed to environmental problems, including deteriorating air quality, the urban heat island effect, and heightened food security challenges, all of which diminish residents' overall quality of life.

Rapid urbanization has also driven the conversion of agricultural land into built environments, thereby increasing the distance between food production areas and urban markets (Haletky, 2006). Fiisabiilillah and Maulana (2016) report that Jakarta currently produces only around 4% of its food needs locally, rendering it heavily dependent on external supplies. By 2021, Indonesia's food import value had exceeded $24 billion. This dependency strains urban food systems, escalating transportation and distribution costs. Urban farming thus emerges as a viable strategy to bolster local food production, enhance food security, and reduce external reliance (Yusoff et al., 2017).

Urban farming refers to the cultivation of crops within urban settings to strengthen local food systems. Its forms range from rooftop gardens and vertical farms to greenhouse systems, utilizing advanced technologies such as hydroponics and aeroponics (Hou, 2009; Widiantoro et al., 2024). Hydroponics cultivates plants in nutrient-rich water, while aeroponics nourishes roots via nutrient mist, expanding possibilities for food production in space-constrained cities. Greenhouses further enable controlled microclimates for year-round farming, even within Jakarta's challenging urban environment. Collectively, these innovations advance urban resilience by addressing food security concerns.

Beyond enhancing food production, urban farming offers critical solutions to environmental challenges. First, it improves air quality by absorbing carbon dioxide and releasing oxygen, a vital function in Jakarta's heavily polluted environment (Artmann & Sartison, 2018). Second, urban farming mitigates the urban heat island effect. Plants on rooftops, facades, and open spaces absorb heat and provide shade, reducing ambient temperatures and building energy demands, thereby lowering carbon emissions (Artmann & Sartison, 2018).

Third, urban farming fosters social and psychological well-being. In a city where green spaces are scarce, gardening activities offer physical exercise, stress relief, and opportunities for social interaction, helping residents reconnect with nature amidst urban density (Artmann & Sartison, 2018; Rahmawati et al., 2024). Urban farms, therefore, not only serve as food production sites but also as community hubs promoting mental health and social cohesion.

While urban farming alone cannot fully resolve crises such as food insecurity, pollution, and urban overheating, it represents an important initial step toward raising public awareness and fostering sustainable urban transformation. This research thus seeks to explore the integration of urban farming into community centers and public spaces in Jakarta. The study focuses not merely on increasing local food production but on how urban farming can catalyze social interaction, education, and community well-being. This aligns with the broader vision of urban farming as a multi-dimensional strategy offering ecological, economic, and social benefits.

The proposed design program incorporates several key components. Agricultural Spaces will serve as the foundation, featuring rooftop gardens, vertical farms, greenhouses, and community allotments. Rooftop gardens will double as open public spaces, providing greenery and fostering interaction within the urban fabric. Vertical farms and greenhouses will be designed with operational areas for urban farmers, including plant care zones, storage, and visitor access, offering educational experiences on sustainable farming techniques. Community allotments will empower residents to grow their own food, nurturing a sense of ownership and connection to urban agriculture.

Educational and Interactive Spaces will facilitate public engagement through workshops, classes, and demonstration gardens, promoting knowledge of sustainable farming practices and healthy eating. Cooking demonstrations using freshly harvested ingredients will further reinforce the farm-to-table concept, encouraging active community participation (Rahmawati et al., 2024; Santoso et al., n.d.).

Social and Recreational Spaces will strengthen community ties, featuring a farm-to-table café or restaurant showcasing produce from the urban farms. Gathering spaces such as halls, courtyards, picnic areas, and small amphitheaters will provide venues for relaxation and social events, enhancing urban life through nature-based experiences.

Finally, Support and Infrastructure systems—including composting facilities, rainwater harvesting, greywater recycling, and produce processing centers—will underpin the sustainability of the urban farming ecosystem, ensuring operational efficiency and environmental harmony.

Through this integrated design approach, this thesis aims to create spaces that not only promote food security and climate resilience but also serve as urban oases fostering community welfare. Ultimately, it aspires to contribute to architectural strategies that enhance urban quality of life and sustainability.

01 Rapid Urbanization

Figure 1. Background
Source: Online Blog

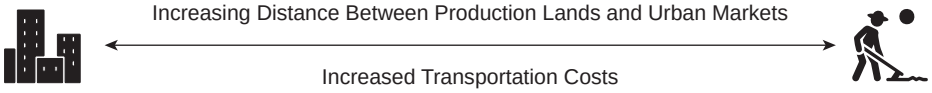
Jakarta, as the capital city and economic hub of Indonesia, holds significant appeal, particularly in the realms of economic opportunities, employment, and urban lifestyle. This has led to a rapid rate of urbanization, making Jakarta one of the most densely populated cities in the world.

02 The Conversion of Green Spaces into Built Urban Areas

The continuous development of infrastructure, office buildings, residential areas, apartments, and commercial centers has resulted in a substantial reduction of green open spaces and various environmental challenges.

03 Food Security Crisis

The reduced availability of food and the increasing distance between production areas and urban markets have significant implications. Jakarta can only locally produce approximately 4% of its food needs, making it highly dependent on supplies from other regions. This dependency places substantial pressure on the urban food system by escalating transportation costs.



1.2 Research Questions

Building upon the background of rapid urbanization and the urgent need for sustainable solutions to enhance food security, climate resilience, and community well-being in Central Jakarta, this research identifies several key problem statements. These statements highlight the necessity of integrating urban farming into the design of community centers and public spaces. The principal research questions are as follows:

1. What are the spatial criteria and programmatic requirements necessary to effectively accommodate urban farming within a dense urban environment?
2. What is the role of community centers and public spaces in promoting social well-being, and what spatial programs are needed to support urban farming as an integral part of these spaces?
3. What design strategies can harmoniously integrate urban farming with community centers and public spaces into a cohesive spatial system?

1.3 Aims & Objectives

In response to the identified problem statements, this research aims to:

1. Define the spatial criteria and programmatic requirements necessary for effectively accommodating urban farming in dense urban contexts;
2. Explore the role of community centers and public spaces in fostering social well-being and identify spatial programs that support urban farming within these settings;
3. Develop design strategies that integrate urban farming with community centers and public spaces into a coherent and harmonious urban fabric.

Entrance View

02
Theoretical Framework

Integrative Design of Urban Famring as Public Space and Community Hub

2.1 Urban Farming

This chapter provides a comprehensive analysis of urban farming, beginning with its fundamental concepts, procedural stages, and diverse application methods. It subsequently identifies spatial criteria, environmental requirements, and spatial programming essential for the successful integration of urban farming into architectural design.

2.1.1 Definition of Urban Farming

Urban farming refers to the cultivation, harvesting, and distribution of agricultural produce within or on the periphery of urban environments. This practice encompasses traditional agriculture—such as the cultivation of vegetables, fruits, and herbs—as well as modern techniques, including hydroponics, aeroponics, greenhouse cultivation, and vertical farming. These innovations optimize both horizontal and vertical spatial use and significantly reduce water consumption, rendering them particularly suited to the spatial constraints of metropolitan areas (Ellis & Sumberg, 1998).

The primary objectives of urban farming are to enhance access to affordable, sustainable local food sources and to diminish reliance on external food distribution networks. In the context of rapid urbanization, urban farming emerges as a strategic response to urban challenges, including food security, environmental sustainability, and social welfare (Ellis & Sumberg, 1998).

Beyond food production, urban farming plays a critical role in promoting urban environmental sustainability. By localizing food production, it substantially reduces carbon emissions associated with long-distance transportation. Additionally, it mitigates the urban heat island effect—an urban phenomenon where built environments retain excessive heat—through the cooling influence of vegetation, thus creating more temperate microclimates. Moreover, urban farming enhances air quality by absorbing pollutants and generating oxygen, contributing to healthier urban living conditions. Accordingly, urban farming not only addresses nutritional needs but also significantly improves environmental quality and urban dwellers' well-being (Mougeot, 2006).

Figure 2.1 Benefits of Urban Farming
Source: Online Blog

2.1.2 Stakeholders & Process

Urban farming engages four primary stakeholders—agricultural experts, vendors, the public, and biotechnologists—within an integrated system promoting a sustainable food cycle. This system spans crop production, processing, consumption, and waste recycling.

1. Crop Production

The process begins with seed preparation in controlled environments (laboratories and nurseries) ensuring optimal light, temperature, and humidity for plant growth (Grumezescu & Holban, 2018). Cultivation follows, often employing vertical farming systems with automated irrigation and supplemental LED lighting to optimize spatial and resource efficiency. Agricultural experts oversee plant development to harvest, enabling timely, fresh, and nutritionally superior produce while enhancing local food resilience through accelerated harvest cycles.

2. Food Processing

Post-harvest, vendors manage sorting, packaging, and preliminary preparation in specialized facilities, minimizing preservative use due to proximity between producer and

consumer. Fresh produce is then processed in local kitchens, ensuring year-round supply independent of seasonal variations. Initiatives like Bowery Farming, New York, exemplify such models, reducing water consumption by up to 95% compared to traditional agriculture (Grumezescu & Holban, 2018).

3. Consumption

Urban consumers access fresher, minimally processed foods through restaurants, markets, and public venues, fostering healthier eating habits and emotional investment in sustainable food systems (Grumezescu & Holban, 2018).

4. Waste Management

Organic waste—such as food scraps and biodegradable packaging—is processed using technologies like aerated composting, converting waste efficiently into compost for agricultural reuse. Biotechnologists play a crucial role in optimizing these processes, closing the urban farming loop (Grumezescu & Holban, 2018).

Urban farming necessitates not only production and processing areas but also integration with community facilities, including markets, restaurants, educational spaces, recreational zones, and composting sites. This interconnected design sustains a holistic urban farming ecosystem embedded within daily civic life.

Figure 2.2 Bowery Farming, New York
Source: Grumezescu & Holban, 2018

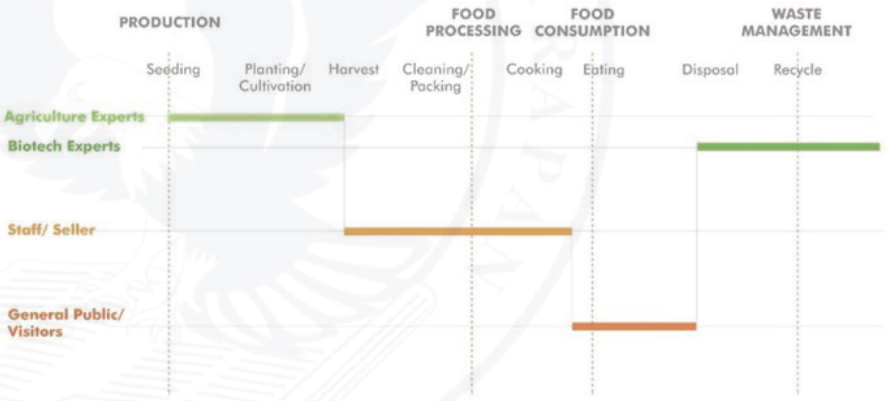


Figure 2.3 Stakeholders & Activity Diagram
Source: Adjie, 2020

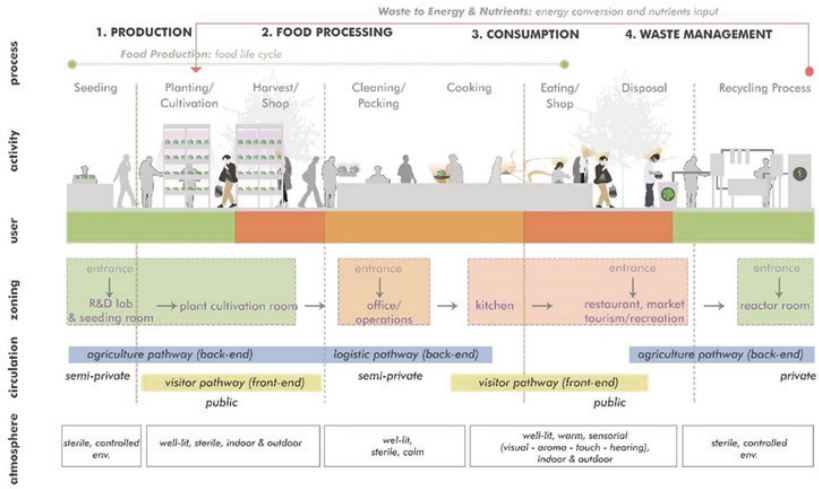


Figure 2.4 Urban Farming Process and Spatial Requirements
Source: Adjie, 2020

2.1.3 Urban Farming Methods

Urban farming employs two primary approaches: soil-based systems and hydroponic systems, both offering adaptive solutions to spatial and resource constraints in urban environments (Proksch, 2016).

Soil-Based Systems

Soil-based farming utilizes soil as the primary medium for nutrient, water, and oxygen uptake, replicating natural ecological processes where organic and inorganic matter must first decompose before absorption. This method emphasizes the gradual enhancement of soil fertility to sustain long-term productivity. It is often implemented in underutilized urban spaces such as parks and rooftops (Proksch, 2016).

1. Container Gardens: Plants are cultivated in flexible containers (e.g., grow bags, recycled crates) to overcome challenges associated with poor soil conditions or limited sunlight. Due to limited soil volume, these systems are susceptible to rapid temperature fluctuations and desiccation, mitigated through automated irrigation technologies such as EarthBox.
2. Productive Green Roofs: Building rooftops are transformed into productive green spaces, offering environmental benefits such as stormwater management, microclimate regulation, and enhanced building energy efficiency, in addition to local food production.
3. Vertical Growing Structures: Urban vertical spaces are optimized using green façades (climbing plants trained along trellises) and living walls (pre-planted panels with integrated irrigation systems), thereby expanding agricultural potential on building exteriors.

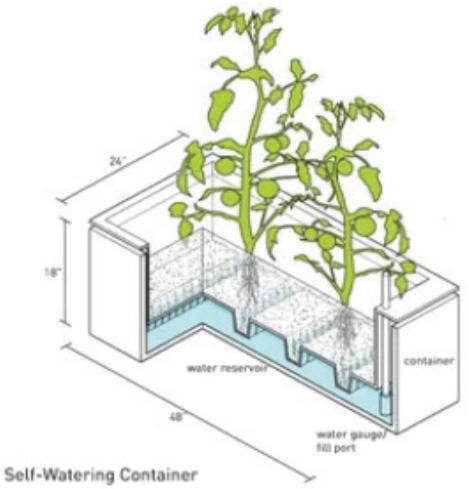


Figure 2.5 Container Gardens
Source: Proksch, 2016

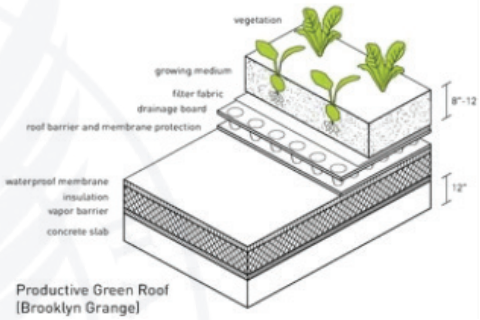


Figure 2.6 Green Roofs
Source: Proksch, 2016

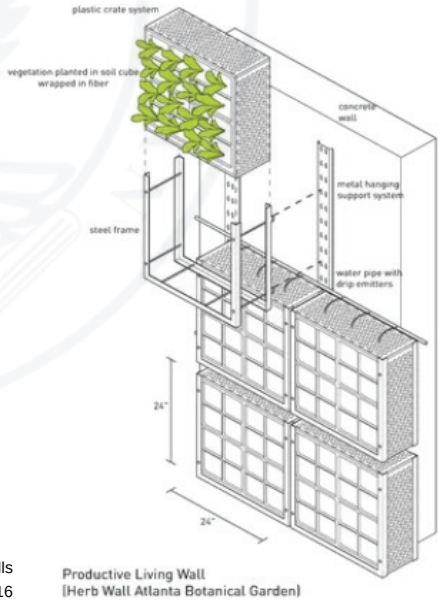


Figure 2.7 Living Walls
Source: Proksch, 2016

Hydroponic Systems

Hydroponic farming eliminates the need for soil, instead delivering nutrient-rich solutions directly to plant roots. Typically housed within controlled environments such as greenhouses, hydroponic systems achieve enhanced water efficiency and accelerated harvest cycles compared to conventional soil-based agriculture (Proksch, 2016).

1. Flood and Drain (Ebb-and-Flow): In this system, inert growing media are periodically flooded with nutrient solutions and subsequently drained back into a reservoir. It is suitable for deep-rooted crops but is less ideal for rooftop applications due to the structural load imposed by water and media.
2. Drip System (Dutch Bucket System): Nutrient solutions are delivered directly to the root zone via slow drip irrigation, commonly employed for vine crops such as tomatoes, cucumbers, and peppers. Its lightweight infrastructure makes it particularly suitable for rooftop gardens.
3. Raft Culture: Plants are suspended on floating Styrofoam rafts above nutrient-enriched water pools. This system is highly efficient for producing leafy greens but is generally unsuitable for rooftop installations due to significant water weight.
4. Nutrient Film Technique (NFT): A thin film of nutrient solution continuously flows over plant roots within narrow channels, making it highly efficient for growing leafy vegetables. Its lightweight construction is particularly amenable to rooftop integration.
5. Aeroponics: In aeroponic systems, plant roots are suspended in air and intermittently misted with nutrient solutions. Offering optimal aeration, aeroponics is ideal for small leafy vegetables and herbs, though its commercial application remains limited.
6. Vertical Hydroponic Structures: These systems maximize spatial efficiency by arranging plants in vertical tiers, with nutrient solutions cascading from the upper to lower levels via gravity. While highly space-efficient, they demand increased water input due to planting density.

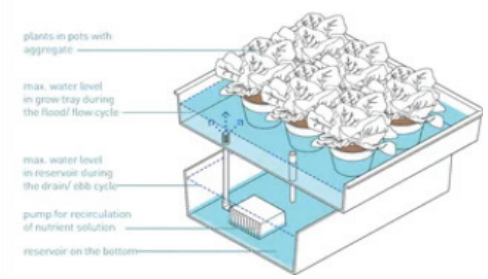


Figure 2.8 Flood and Drain System
Source: Proksch, 2016

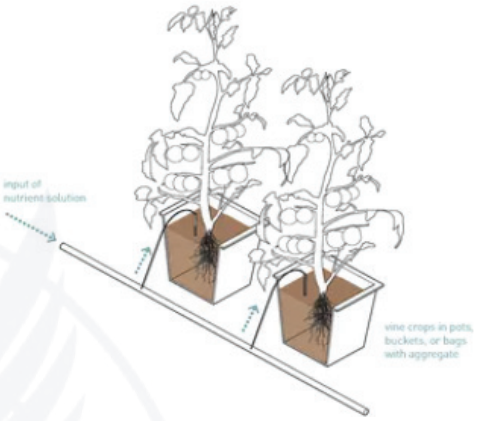


Figure 2.9 Drip System
Source: Proksch, 2016

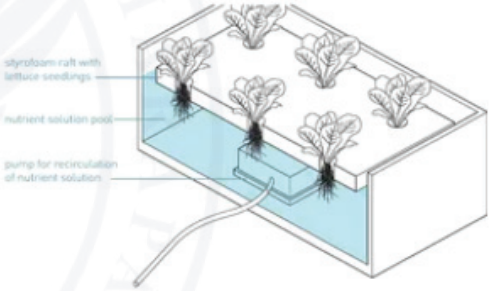


Figure 2.10 Raft Culture
Source: Proksch, 2016

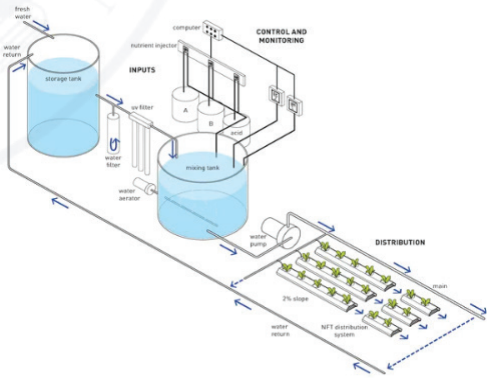


Figure 2.11 NFT System
Source: Proksch, 2016

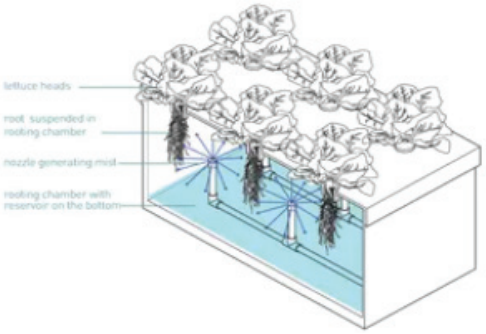


Figure 2.12 Aeroponic
Source: Proksch, 2016

2.1.4 Design Guidelines

Designing functional, aesthetic, and sustainable urban farming spaces requires adherence to key criteria and standards. The following guidelines are based on the work of Christopher Szymberski:

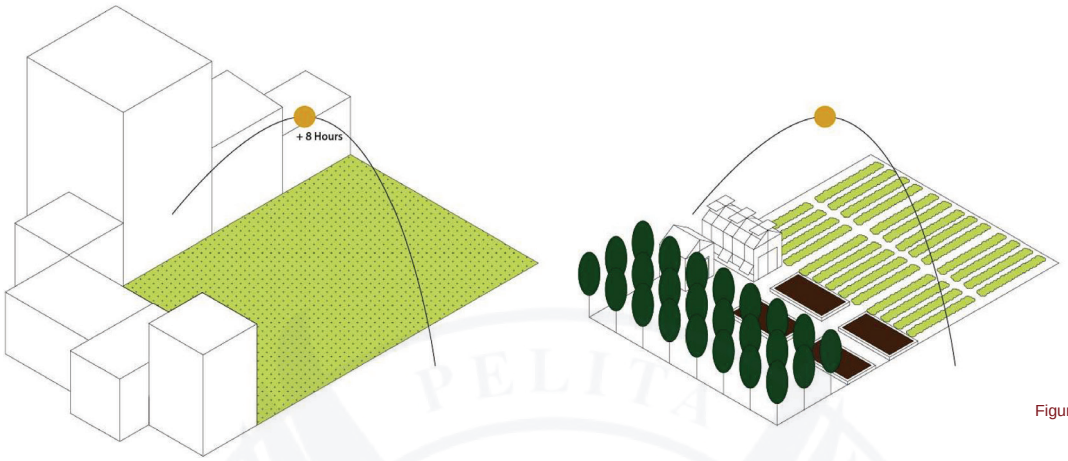


Figure 2.13 Siting and Orientation
Source: Szymberski, 2018

Siting and Orientation

The location and orientation of urban farming facilities critically influence solar exposure, air circulation, and community interaction.

1. Siting: Sites must maximize solar access, preferably with a southern orientation to enhance photosynthesis. Accessibility is equally important to foster social participation and integrate green spaces within the urban fabric (Szymberski, 2016).
2. Orientation: Crops should receive at least eight hours of sunlight daily, with careful layout planning to prevent overshadowing. Taller plants should be positioned to the north to minimize shading on lower vegetation (Szymberski, 2016).
3. Adjacency: Proximity to major roads and access points facilitates waste management, logistics, and distribution (Szymberski, 2016).

Lighting and Ventilation

1. Lighting: While natural sunlight is prioritized. supplemental LED lighting is recommended where natural light is insufficient or for nighttime cultivation (Szymberski, 2016).
2. Ventilation: Effective air circulation mitigates humidity and fungal growth. Natural ventilation should be maximized, with mechanical systems deployed as needed to regulate temperature and moisture levels (Szymberski, 2016).

Water Management

1. Irrigation: Automated drip irrigation systems ensure even water distribution while minimizing waste (Szymberski, 2016).
2. Rainwater Harvesting and Greywater Reuse:
   A. Rainwater harvesting captures runoff for irrigation, offering chemical-free water sources (Proksch, 2016).
   B. Greywater reuse—drawing from sinks, showers, and laundry—must adhere to strict protocols, including immediate use within 24 hours and deployment through drip systems to prevent pathogen spread (Proksch, 2016).
3. Drainage: Adequate drainage systems are crucial, particularly for rooftop and vertical farms, to prevent water accumulation that could harm both crops and structures (Szymberski, 2016).

Waste Management

1. Organic Waste: Aerated composting systems accelerate decomposition for reuse as fertilizer (Szymberski, 2016).
2. Recycling: Facilities for non-organic waste and material recycling must be incorporated, with storage capacity sufficient for a minimum two-week interval between collections (Szymberski, 2016).

Accessibility & Connectivity

1. Access: Sites should feature at least two pedestrian gates (minimum width 1 meter) and vehicular access (minimum width 3.5 meters) to accommodate deliveries and transport. Universal design principles should ensure access for children, the elderly, and persons with disabilities (Szymberski, 2016).
2. Public Connectivity: Integration with public facilities encourages social engagement and broadens the farm's utility for education, recreation, and community activities (Szymberski, 2016).

Harvest Storage

1. Dry Storage: Grains and legumes should be kept at 10°C–15°C to prevent spoilage (Szymberski, 2016).
2. Cold Storage: Fruits and vegetables require refrigeration between 2°C–4°C to preserve their condition (Szymberski, 2016).

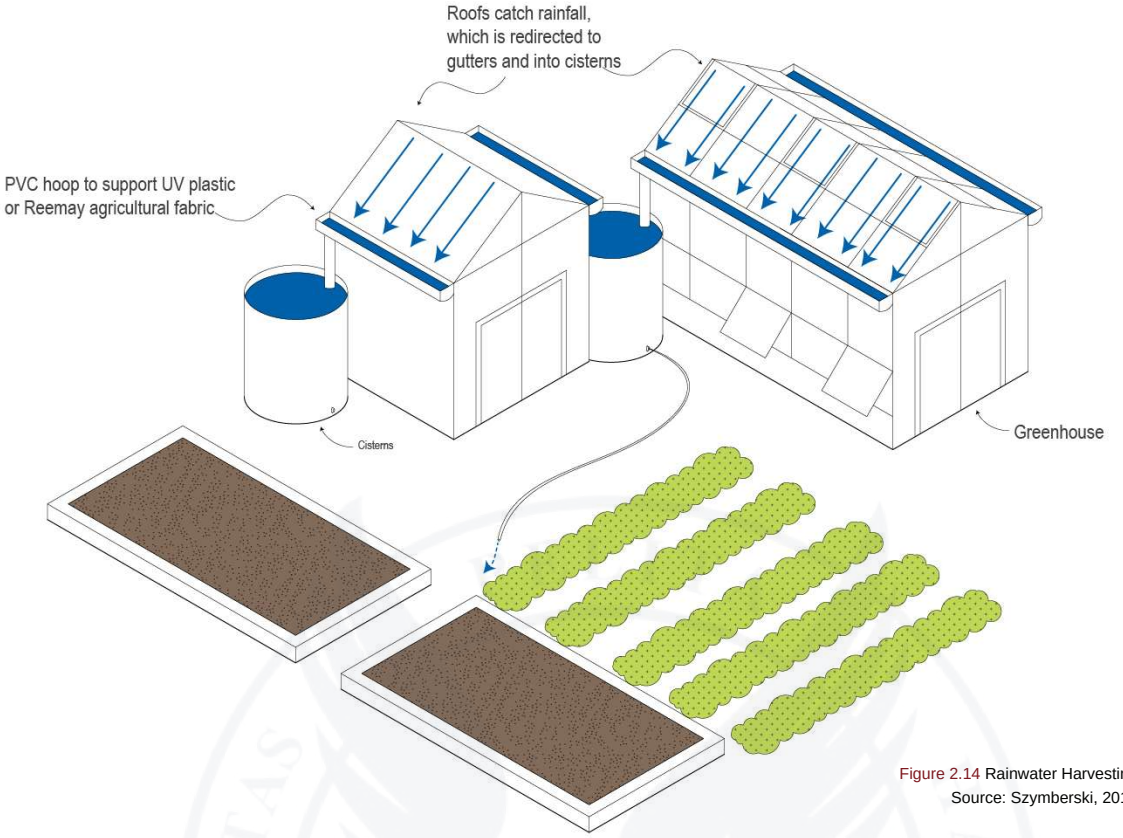


Figure 2.14 Rainwater Harvesting
Source: Szymberski, 2018

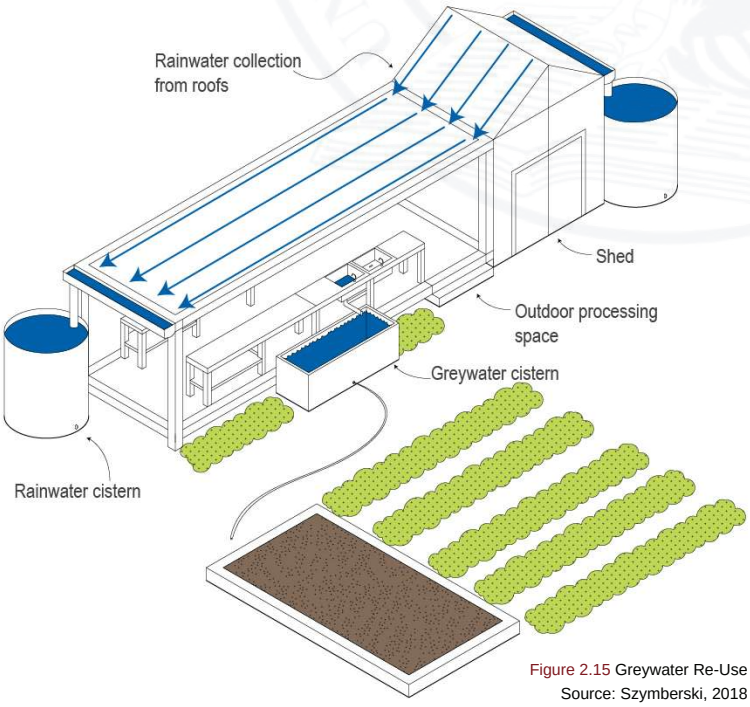


Figure 2.15 Greywater Re-Use
Source: Szymberski, 2018

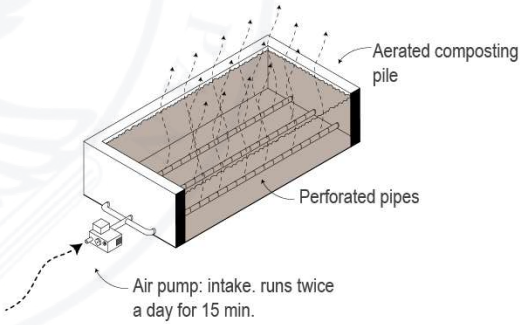


Figure 2.16 Organics Management
Source: Szymberski, 2018

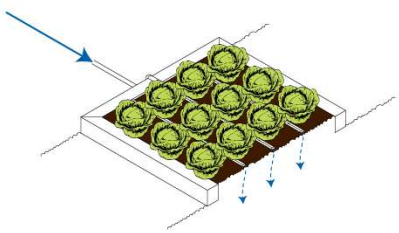


Figure 2.17 Water Harversting
Source: Szymberski, 2018

Table 1. Urban Farming Programs

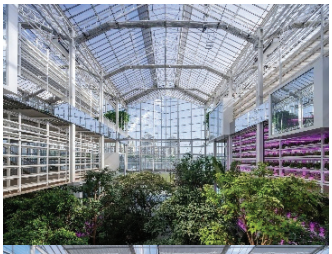
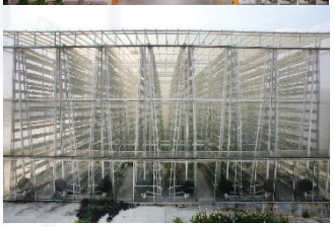
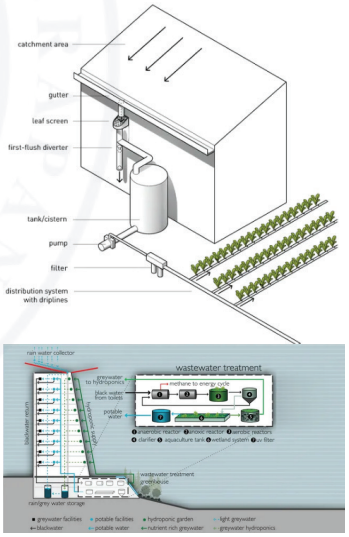
Programs	Method	Criteria & Design Guideline	Implementation
Greenhouse (indoor)	Soil-based System: Container Gardens	Sunlight and LED Supplemental Lighting Automated Irrigation System and Water Management Ventilation Shading System dan Energy Curtains Cooling Systems Materiality	 
	Hydroponic System: Flood-and-Drain System, Drip System, Raft Culture, Nutrient Film Technique (NFT), Aeroponic		
Vertical Farming (indoor)	Soil-based System: Container Gardens, Green Façades, Living Walls Hydroponic System: Flood-and-Drain System, Drip System, Cascade System (NFT), Aeroponic	Sunlight and LED Supplemental Lighting Automated Irrigation System and Water Management Ventilation	 
Rooftop Garden (outdoor)	Soil-based System: Productive Green Roof	Sunlight Structure and Construction Implementation Drainage System and Rainwater Harvesting	

Table 2. Urban Farming Supporting System / Facilities

Supporting System / Facilities	Explanation	Criteria & Design Guidelines	Implementation
Laboratorium	Monitoring of Plant Safety and Health, Harvested Crops, and Plant-Based Products	-	-
Office and Staff Room	Workspaces for management and agricultural staff, equipped with appropriate staff facilities.	Work and Meeting Room Rest Area Pantry Restroom (W/C)	-
Strorage	Storage of harvested crops to maintain quality and preserve freshness	Dry Storage Cold Storage	
Water Management	Collection and storage of rainwater Utilization of wastewater from washing machines or showers for urban farming irrigation needs.	Rainwater Harvesting System Greywater Harvesting System	
Waste Management	Provision of sorting and disposal areas for non-organic waste. Implementation of aerated composting systems to accelerate the decomposition of organic materials and produce fertilizer.	Waste Disposal Area Recycling and Composting Area	-

2.2 Community Center

As discussed previously, urban farming requires not only cultivation spaces but also access to public amenities and community facilities that support agricultural functions, social interaction, and communal activities. The integration of urban farming with community centers offers significant potential to enhance public participation and promote sustainable design.

This section explores the integration of urban farming within community centers, beginning with a conceptual understanding of community centers as public spaces. It then identifies the spatial criteria and programmatic requirements necessary to design community centers that holistically support urban farming activities.

2.2.1 Community Centers as Public Spaces

Community centers serve as vital public spaces designed to meet the social, cultural, and recreational needs of communities. Beyond functioning as gathering places, they facilitate inclusive and egalitarian social interactions, ensuring accessibility for all individuals regardless of age, gender, ethnicity, or socioeconomic status. As public spaces, community centers play a critical role in democratic life by fostering active civic participation and strengthening social bonds within communities (Cho et al., 2015).

When integrated with urban farming, community centers can function as hubs for education, cultural exchange, and local creative development. Facilities such as eco-education workshops, community gathering spaces, recreational areas for health and wellness, and co-working spaces can be synergistically combined with farming activities. This integration creates dynamic environments that foster sustainability, empower local communities, and reinforce the role of community centers as catalysts for local economic development, social cohesion, and environmental enhancement (Cho et al., 2015; Holland & De la Salle, 2010).

2.2.2 Design Guidelines

As public spaces, community centers must be designed according to key urban space framework criterias. These interconnected elements collectively shape ideal community centers capable of supporting urban farming activities (Cho et al., 2015).

Accessibility

1. Pedestrian Access Points
   - A. Provide an adequate number of pedestrian access points by utilizing gates, color differentiation, and clear signage.
   - B. Ensure the provision of at least two horizontal access points or one vertical access point.
   - C. Clearly distinguish formal access points (main entrances) from informal ones.
2. Universal Access
   - A. At least one universal access point should be provided at every level change
     - I. Avoid rough textures and uneven surfaces.
     - II. Ramp slopes must not exceed a 1:12 ratio.
     - III. Hallways and corridors must be wide enough to allow two individuals to pass in opposite directions comfortably.
   - B. Provide at least two direct pedestrian access points to the site.
   - C. Public spaces must be entirely safe and navigable for pedestrians.

Connectivity

1. Movement Patterns
   - A. The site must be well-integrated into the surrounding urban context.
   - B. Ensure strong connections to external pedestrian routes; Internal circulation routes must be continuous and avoid dead-ends.
2. Sightlines and Wayfinding
   - A. Ensure strong horizontal and vertical visibility (both inside-out and outside-in).
   - B. Main entrances and exits must be easily visible and identifiable.

Mobility Means

1. Bicycle-Friendly Urban Spaces
   - A. Bicycle parking facilities should be available within or near the site (within 200 meters).
   - B. Dedicated bicycle lanes must be provided, well-separated from pedestrian paths (recommended width: 1.5 to 2.5 meters).
2. Public Transport
   - A. Ensure access to public transportation options within 400 meters of the site.
   - B. Provide connectivity to a variety of transit modes.
3. Vehicular Access (Optional)
   - A. Provide vehicular parking facilities that comply with standard parking dimensions and capacity; at least 20% of spaces should be designated for persons with disabilities.
4. Drop-Off Areas
   - A. Designate drop-off points in close proximity to the main entrance.
   - B. Provide dedicated taxi stands.

Spatial Variety

1. Spatial Variety
   - A. Subdivide the site into clearly defined sub-spaces. Incorporate variety in form, size, proportion, solar exposure, paving types, surrounding surfaces (material, texture, color, pattern), and green elements to enrich spatial perception and experience.
2. Adaptability
   - A. Employ flexible spatial layouts.
   - B. Ensure spatial dimensions align with the intended function—larger spaces offer greater versatility.
   - C. Accommodate temporary and programmatic flexibility.

Environmental Design

1. Greenery
   - A. Incorporate substantial natural views; provide abundant greenery and water features.
   - B. Allocate areas for physical activity and relaxation within green open spaces.
   - C. Utilize a diversity of plant forms and patterns to enhance sensory experience and spatial quality.
2. Environmental Strategies
   - A. Integrate vegetation for shading and cooling, stormwater runoff mitigation, and pollution reduction.
   - B. Employ sustainable water management techniques.

User Comfort

1. Protection / Shade
   - A. Ensure walkways are shielded from direct sunlight.
   - B. Provide a balance of shaded and sunlit areas.
   - C. Orient buildings along a north-south axis to minimize solar exposure.
2. Air Control and Optimization
   - A. Utilize natural ventilation strategies.
   - B. Implement irregular building arrangements to prevent wind tunnel effects.
3. Noise Control and Optimization
   - A. Introduce transition zones or green buffers between main roads and buildings.
   - B. Promote pleasant natural soundscapes (e.g. rustling leaves, birdsong).

2.2.3 Community Center Programs

Several spatial programs can be integrated within a community center to support urban farming activities, including community gardens, farm-to-table restaurants, markets or shops, educational workshops, community gathering spaces, and areas dedicated to physical activity and relaxation. The following discussion elaborates on how each program can be implemented within an architectural framework centered on urban farming.

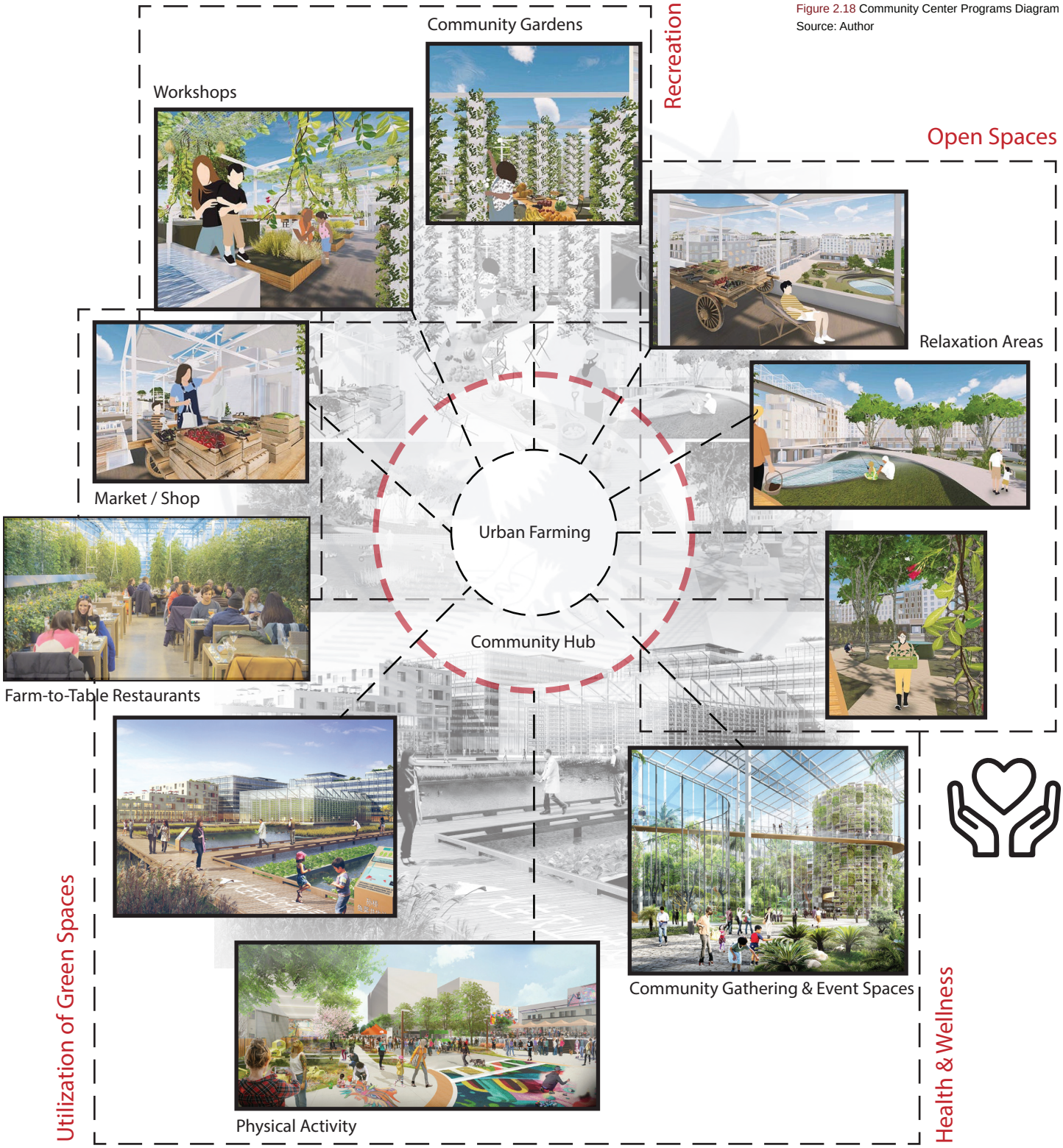


Figure 2.18 Community Center Programs Diagram
Source: Author

Figure 2.19 Figure Fridheimar Tomato Farm, Iceland
Source: Online Blog

Farm-to-Table Restaurants

A farm-to-table restaurant sources its ingredients directly from on-site urban farms, promoting environmental sustainability and offering fresh, locally produced meals. This model strengthens the link between food producers and consumers. Architectural design should facilitate seamless connections between farming areas and kitchen facilities, enabling efficient distribution. Open kitchens enhance transparency and visitor engagement, while natural materials such as wood and integrated greenery reinforce the sustainability narrative (Holland & De la Salle, 2010).

Figure 2.20 Gary Comer Youth Center, Chicago
Source: Hoerr Schaudt Landscape Architects

Community Gardens

Community gardens provide a collective space for residents to cultivate and maintain plants, strengthening social bonds and enhancing local food production. Design considerations include optimal sun exposure, efficient water management, and the potential use of rooftops or vertical farming to address urban density constraints.

An exemplary case is the Gary Comer Youth Center in Chicago, where rooftop gardens are integrated with educational spaces, forging a strong visual and experiential connection between farming and learning environments (Proksch, 2016; Holland & De la Salle, 2010).

Markets

Markets serve as vital nodes for distributing urban farm products, supporting local economies and promoting food security. They may take the form of temporary pop-ups or permanent shops integrated into the community center. Design should prioritize visitor flow, comfort, and product display, employing semi-open structures with natural lighting and ventilation to create an inviting and sustainable shopping experience (Holland & De la Salle, 2010).

Figure 2.21 Shengli Market, Shanghai
Source: LUO Studios

Educational Workshops

Educational workshops empower the community with knowledge and skills related to urban agriculture, covering topics such as cultivation techniques, land management, composting, and agricultural technologies. Spaces should be flexible, accommodating both classroom instruction and hands-on activities. Design elements may include multifunctional furniture, direct access to gardens, and integration of technological tools like simulation software and visual aids to enhance learning outcomes (Holland & De la Salle, 2010).

Community Gathering & Event Spaces

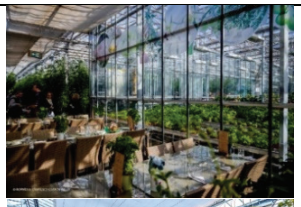
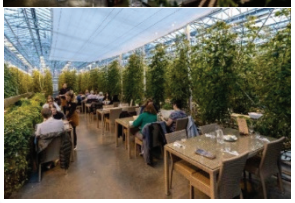
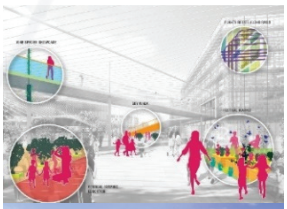
Community gathering spaces host social and educational events, including meetings, exhibitions, discussions, and food festivals, fostering engagement around urban farming. Flexibility is key; movable partitions, access to adjacent outdoor areas, and adaptable layouts ensure that spaces can accommodate a range of activities and scales (Holland & De la Salle, 2010).

Physical & Relaxation Spaces

Spaces dedicated to physical and mental wellness—such as areas for yoga, meditation, walking trails, and nature-based recreational activities—enhance community health. Designs should incorporate natural elements including greenery, water features, and abundant sunlight to create restorative environments. Landscaped walking paths, outdoor yoga gardens, and meditation areas promote positive psychological well-being (Holland & De la Salle, 2010).

Figure 2.22 Sunqiao Urban Agricultural District, China
Source: Sasaki Assocaites

Table 3. Community Center Programs

Programs	Criteria & Design Guidelines	Implementation
Farm to Table Restaurants	Establishing a direct connection between agricultural areas and kitchens to facilitate the efficient distribution of food supplies. Open kitchen concept. Direct visual connectivity with agricultural areas (enhanced visibility). Integration of natural elements into interior design, including the use of wooden materials and green plants.	 
Community Gardens	Utilization of natural lighting (sunlight). Automated irrigation systems (optional) and water management. Effective ventilation systems.	
Market	Pop-up market or permanent retail store. Semi-open architectural concept featuring natural lighting and optimal ventilation. Visitor circulation flow designed for comfort and engaging product displays.	
Educational Workshop	Flexible layout adaptable to accommodate various activities. Directly connected to a community garden for demonstration purposes.	 
Community Gathering / Event Spaces	Flexible layout with movable partition walls to support diverse activities. Connection to green open spaces, providing both physical and relaxation areas.	
Physical and Relaxation Spaces	Situated near or within green open spaces to enable direct interaction with nature. Incorporation of natural elements such as plants, water, and sunlight. Inclusion of dedicated areas for yoga, meditation, walking paths, or other wellness activities.	-

2.3 Wellbeing

This chapter examines dimensions of wellbeing related to the integration of urban farming within public spaces and community centers. It begins by establishing a foundational understanding of wellbeing based on international standards, then identifies the most critical dimensions — environmental, social, physical, emotional, and intellectual — that urban farming integration particularly enhances to improve urban quality of life.

2.3.1 Types of Wellbeing

Wellbeing is a multidimensional concept encompassing physical, mental, and social health. According to the World Health Organization (WHO), health is defined as “a state of complete physical, mental, and social wellbeing and not merely the absence of disease or infirmity” (WHO, 2009). Thus, wellbeing involves not only life satisfaction and happiness but also the capacity to function physically, manage life stressors, and build meaningful social connections (Schramme, 2023).

Physical wellbeing concerns bodily health and the ability to perform daily activities effectively, encompassing fitness, nutrition, and freedom from disease. Mental wellbeing pertains to psychological health, emotional balance, stress resilience, and life satisfaction, often measured through indices such as the WHO-5 Well-Being Index. Social wellbeing involves building and maintaining positive interpersonal relationships and fostering a sense of community belonging (Schramme, 2023).

Beyond the WHO framework, comprehensive models such as the Eight Dimensions of Wellness and the Ten Dimensions of Wellness provide a more holistic evaluation, integrating aspects like creativity and culture alongside traditional domains.

The Ten Dimensions of Wellness

Developed by the Life of Wellness Institute, the Ten Dimensions of Wellness articulate an interconnected model of holistic wellbeing:

1. Physical Wellbeing: Maintaining physical health through balanced nutrition, exercise, sleep, and preventive care (Schramme, 2023).
2. Emotional Wellbeing: Effectively managing emotions and stress, cultivating self-awareness, and fostering supportive relationships.
3. Occupational Wellbeing: Deriving meaning and satisfaction from one’s work, balancing career and personal life.
4. Social Wellbeing: Building healthy, empathetic relationships and strong social networks.
5. Spiritual Wellbeing: Seeking meaning and purpose through spirituality, self-reflection, or mindfulness.
6. Intellectual Wellbeing: Engaging in critical thinking, lifelong learning, and cognitive stimulation.
7. Environmental Wellbeing: Creating and maintaining safe, healthy, and sustainable living environments.
8. Financial Wellbeing: Managing personal finances to achieve security and reduce economic stress.
9. Cultural Wellbeing: Valuing cultural heritage and promoting intercultural respect and understanding.
10. Creative Wellbeing: Expressing oneself through artistic and creative pursuits, fostering emotional and intellectual growth.

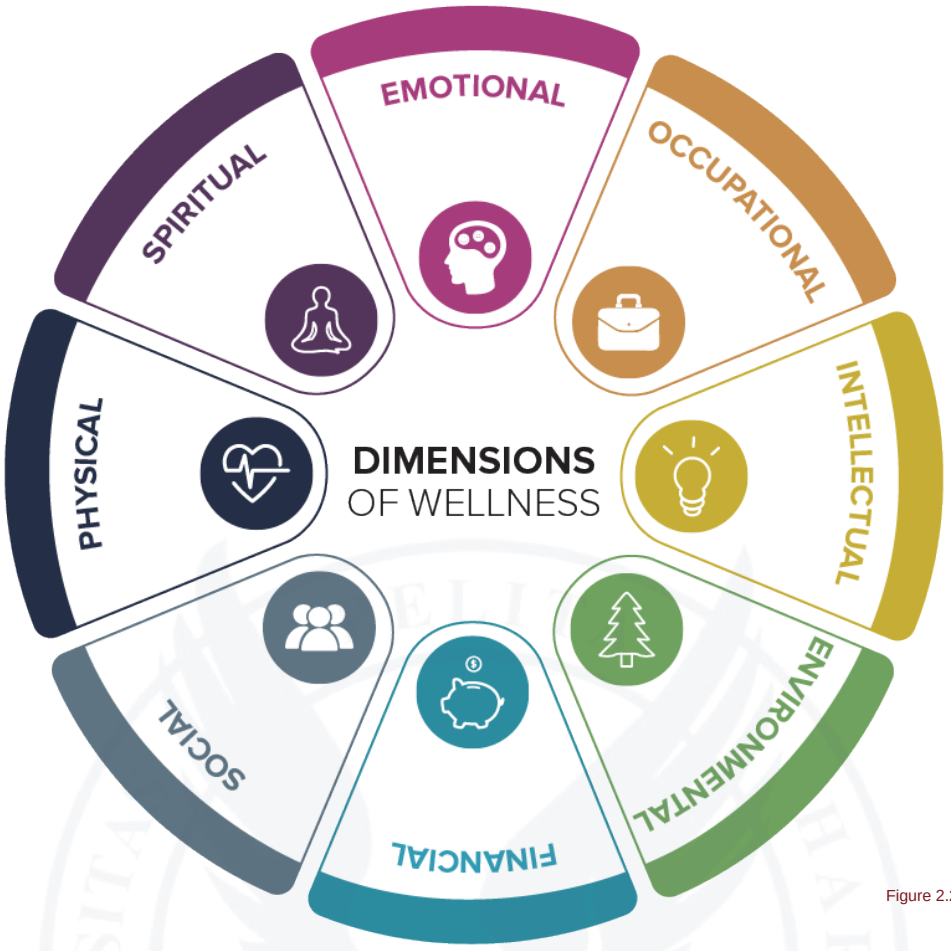


Figure 2.23 The 8 Dimensions of Wellbeing
Source: Schramme, 2023

2.3.2 Wellbeing Integration

The integration of urban farming into public spaces and community centers significantly enhances community wellbeing. This approach extends beyond sustainable food provision to the holistic improvement of quality of life across multiple dimensions of wellbeing. Key areas of focus include environmental, social, physical, emotional, and intellectual wellbeing.

Environmental Wellbeing

Environmental wellbeing is a core outcome of integrating urban farming into public and communal spaces. Urban agriculture provides local, sustainable food sources while enhancing urban ecological quality. Vegetation in urban areas mitigates carbon footprints, improves air quality, and reduces the urban heat island effect. Architecturally, initiatives such as rooftop gardens, vertical farming, greenhouses, and accessible green spaces foster both ecological resilience and social wellbeing.

Social Wellbeing

Urban farming fosters social cohesion through collaborative gardening activities, promoting interpersonal connections and knowledge sharing. Agricultural spaces can serve as venues for workshops, community events, and local farmers' markets, reinforcing communal ownership and collective responsibility. These interactions strengthen social solidarity and foster inclusive social networks.

Physical Wellbeing

Physical wellbeing is directly supported through urban farming by providing communities with fresh, healthy produce and encouraging healthier lifestyles. Gardening activities—such as planting, watering, and harvesting—offer light physical exercise that supports overall fitness. When integrated with community centers, such spaces provide recreational opportunities that simultaneously enhance public health.

Emotional Wellbeing

Interaction with nature through urban farming significantly improves emotional wellbeing. Green spaces created for agriculture offer respite from urban stressors and promote mindfulness. Horticultural activities, recognized as therapeutic, have been shown to reduce anxiety and elevate positive emotions. Successfully cultivating and harvesting crops also instills a sense of accomplishment and enhances self-esteem.

Intellectual Wellbeing

The integration of community centers can also function as educational hubs, facilitating the acquisition of agricultural skills, promoting sustainability awareness, and enhancing practical knowledge in urban agriculture.

Main Plaza View

03
Precedent Study

Sunqiao Urban Agricultural District

3.1 Sunqiao Project Overview

Designed by Sasaki Associates, the Sunqiao Urban Agricultural District addresses Shanghai's growing demand for food by implementing large-scale vertical farming accessible to the public. Beyond its role in food production, it serves as a center for innovation, education, and public interaction, promoting sustainable agricultural practices within a dense urban context (Despommier, 2019).

Governace and Management

Funded and managed by the local Sunqiao government, the project forms part of Shanghai's urban food security strategy. Initiated in 2017 and still under development, Sunqiao adopts a closed-loop food supply system, encompassing production, distribution, consumption, and waste processing in one integrated location. The initiative enhances food sustainability while bridging the gap between urban consumers and food sources (Adjie, 2020; Despommier, 2019).

Location and Site Context

Located approximately 15 km from downtown Shanghai and 5 km from the Zhangjiang Hi-Tech Park, the site lies between four major roads and is intersected by two canals—Shenjia and Yinjiabang—which supply water for the agricultural systems. The master plan integrates tertiary road networks to enhance accessibility and internal connectivity (Adjie, 2020).

Closed-Loop Food Supply Model

Sunqiao supports a closed-loop agricultural ecosystem. While 80% of Shanghai's food traditionally comes from peri-urban farms, the city's evolving dietary trends—particularly the increased consumption of leafy greens—are addressed through vertical farming and greenhouse cultivation at Sunqiao. Compared to conventional agriculture, the system uses less water, emits fewer greenhouse gases, and reduces food waste and habitat loss (Adjie, 2020).

Figure 3.1 Sunqiao Location and Site Context
Source: Sasaki Associates, Adjie 2020

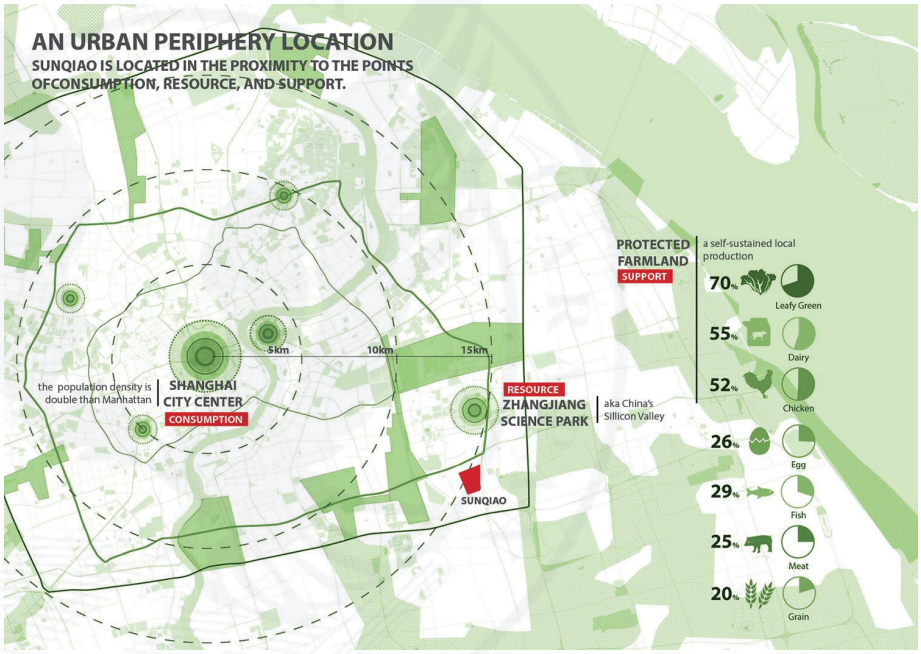


Figure 3.2 Shanghai Food Supply
Source: Sasaki Associates

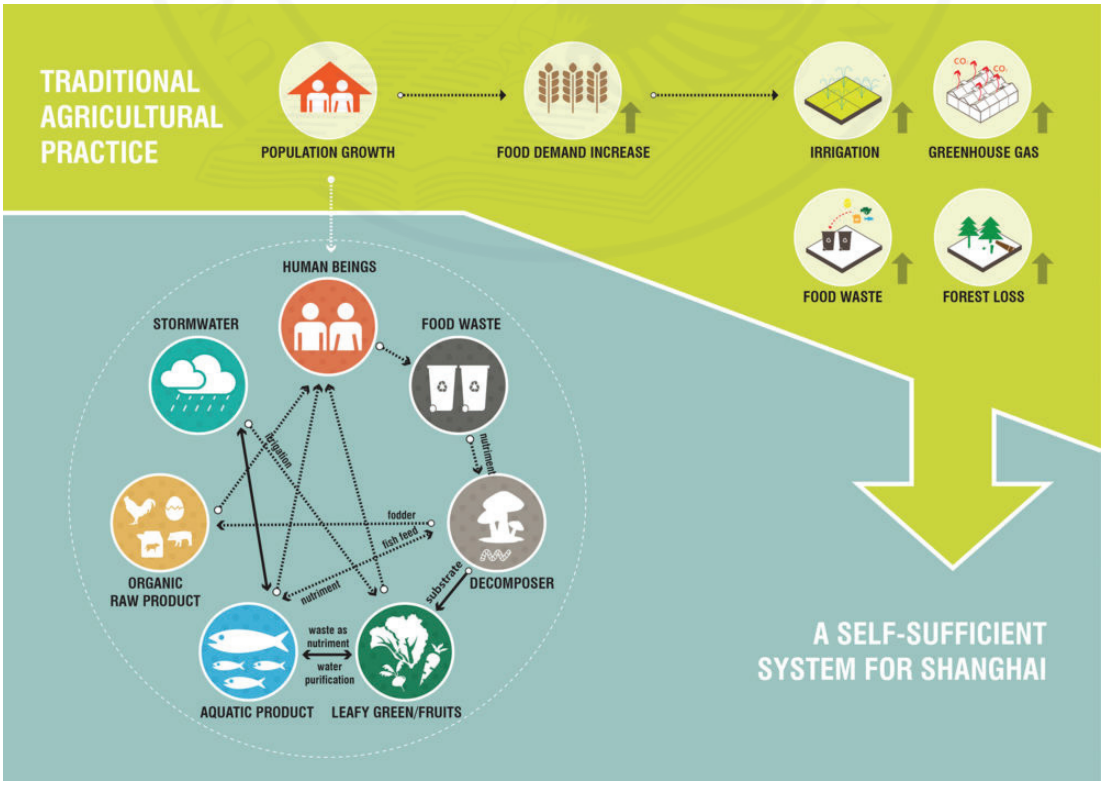


Figure 3.3 Sunqiao Closed-Loop Food Supply Model
Source: Sasaki Associates

Agricultural Techniques

Sunqiao employs a hybrid of hydroponic and aquaponic systems, featuring vertical green walls, algae farming, greenhouses, and a vertical seed library. These methods maximize urban space use while minimizing reliance on traditional farmland. Additional infrastructure includes office spaces, commercial zones, educational centers, and integrated waste processing facilities (Adjie, 2020).

Programmatic Zoning

The district is organized into six functional categories:

1. Commercial (9%): Local food markets and trade facilities
2. R&D and Greenhouses (44.25%): Research, innovation, and plant cultivation
3. Offices (13.75%): Technology company spaces for collaborative research
4. Public Engagement (13.75%): Educational and recreational programs
5. Agricultural Production (19%): Hydroponic and aquaponic zones
6. Vehicle Circulation (0.25%): On-site traffic infrastructure

Main facilities include R&D centers, laboratories, science museums, interactive greenhouses, medicinal gardens, markets, and office buildings. These are interconnected by landscaped plazas and green spaces designed to foster community interaction (Adjie, 2020).

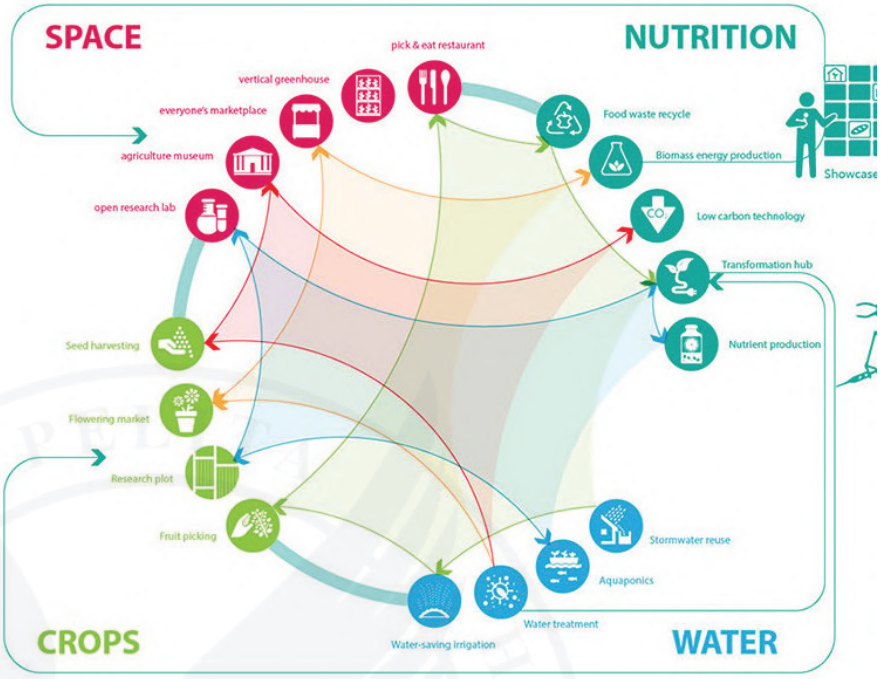
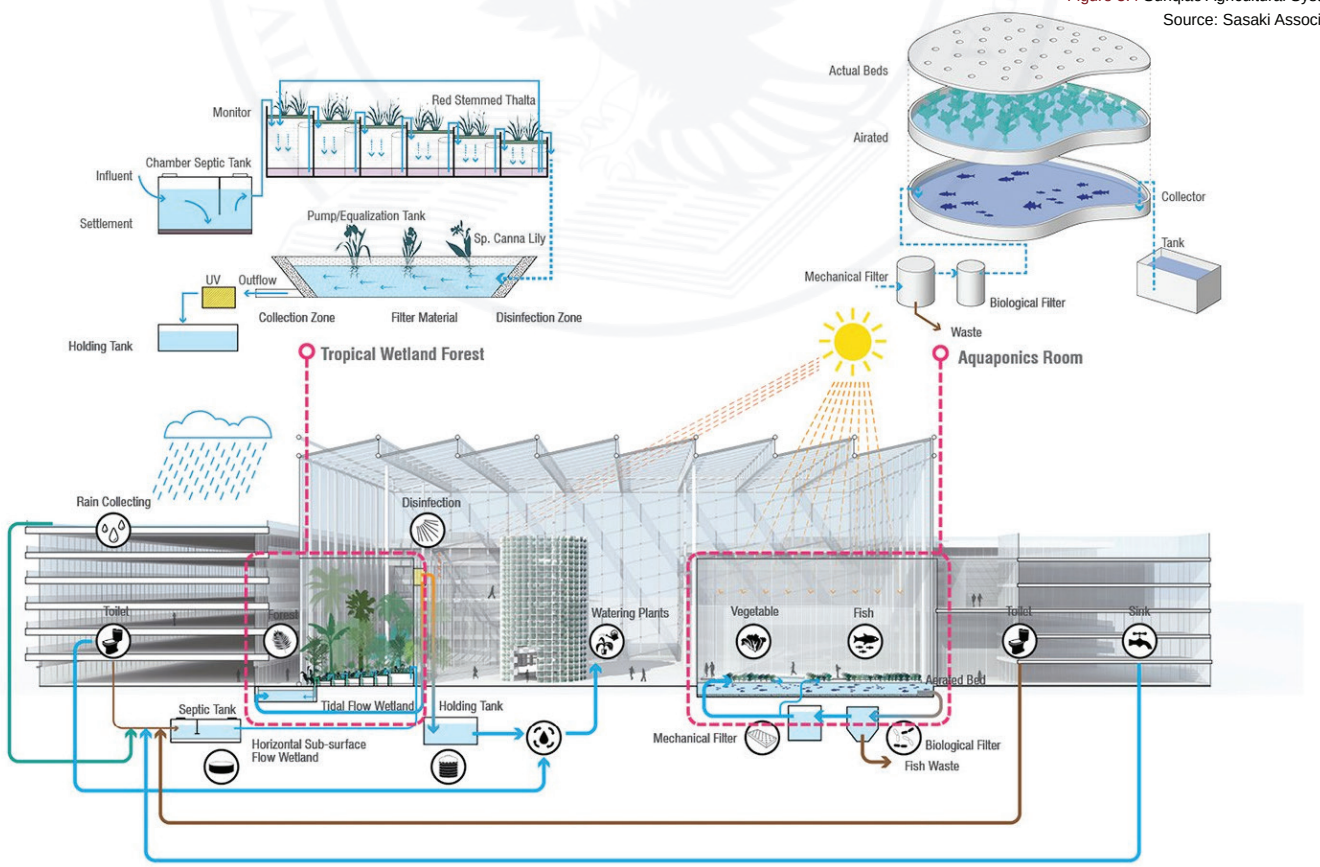


Figure 3.4 Sunqiao Agricultural Techniques
Source: Sasaki Associates

Figure 3.4 Sunqiao Agricultural Systems
Source: Sasaki Associates



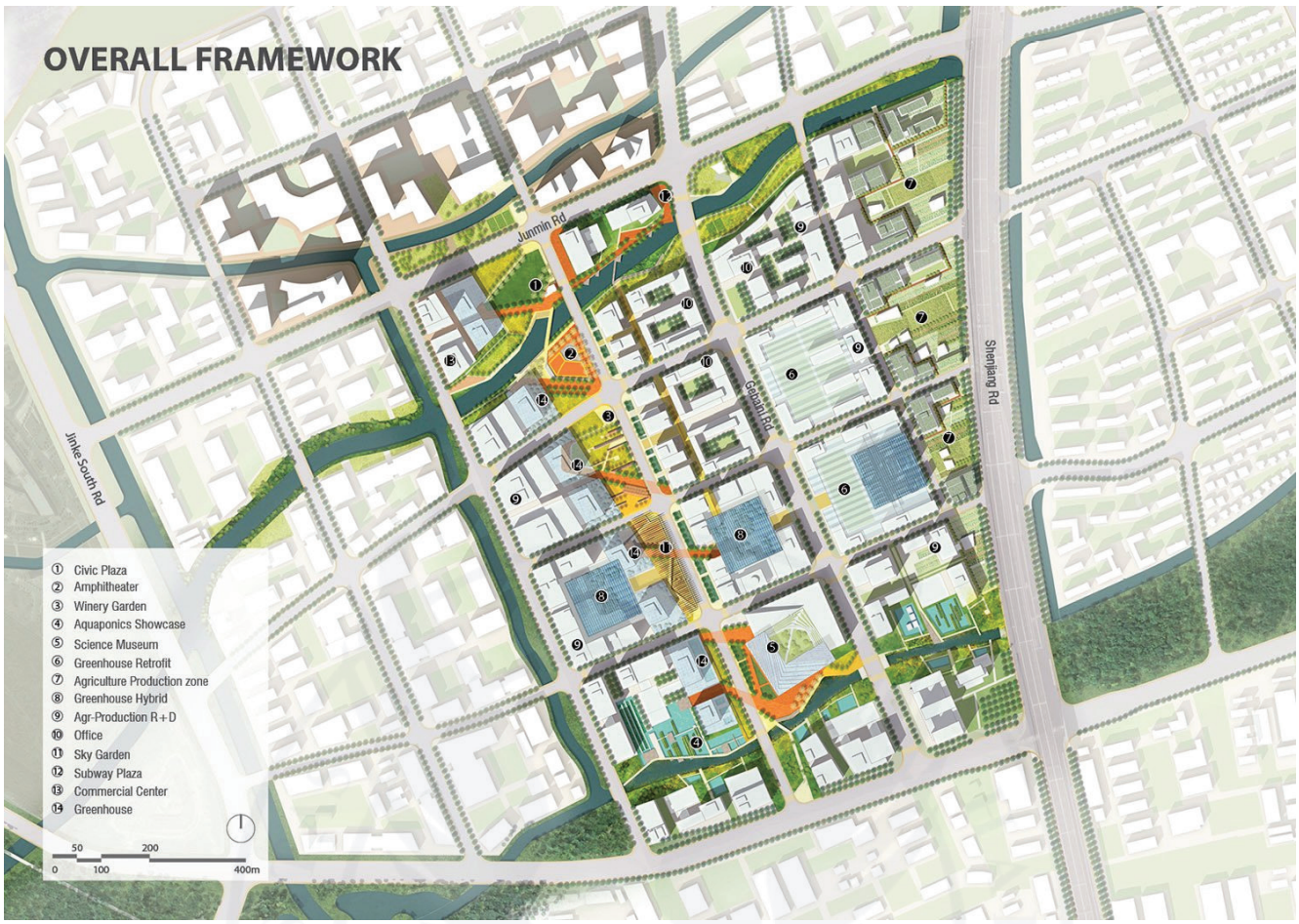


Figure 3.5 Sunqiao Site Plan
Source: Sasaki Associates

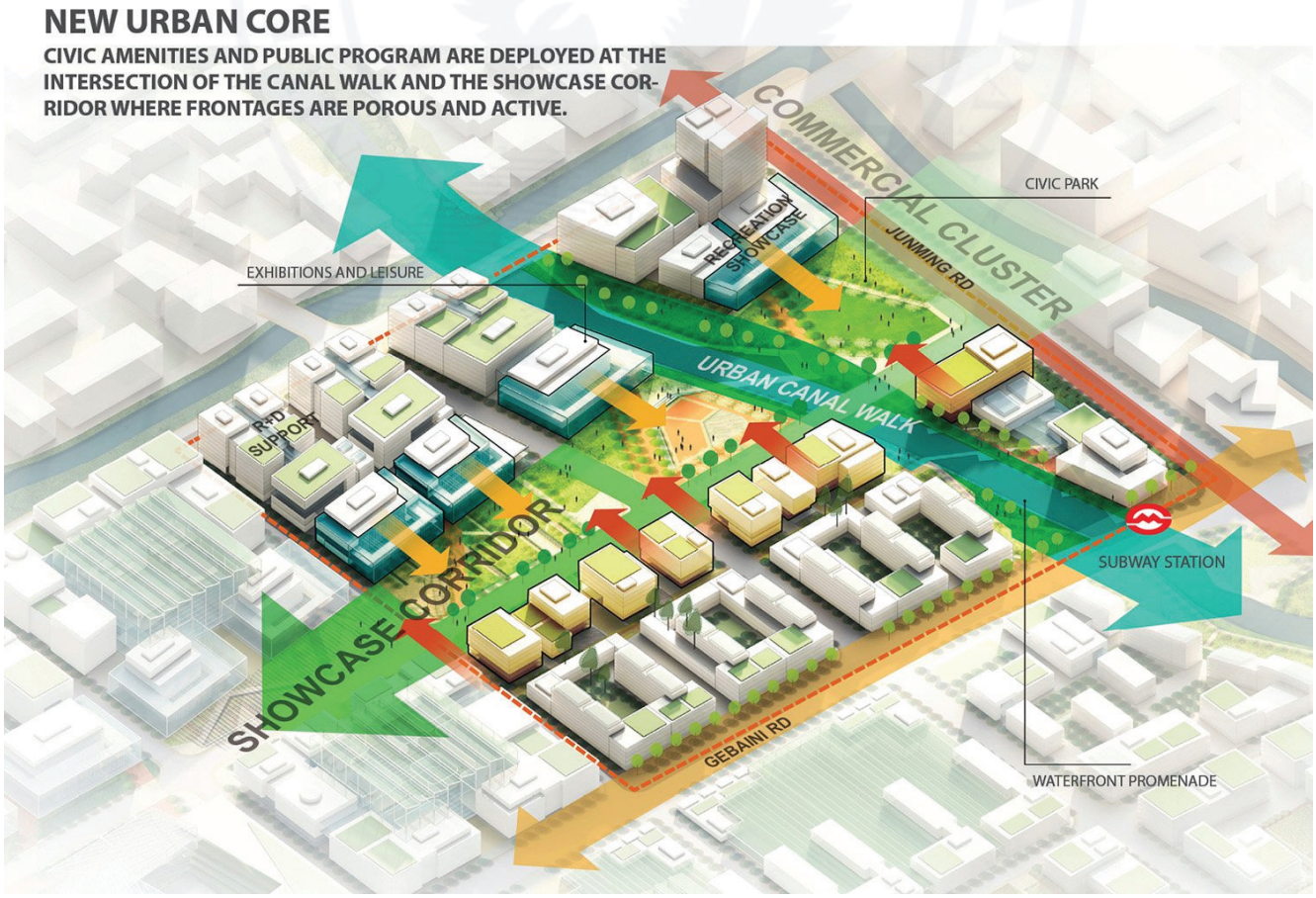


Figure 3.6 Sunqiao Commercial Programs
Source: Sasaki Associates

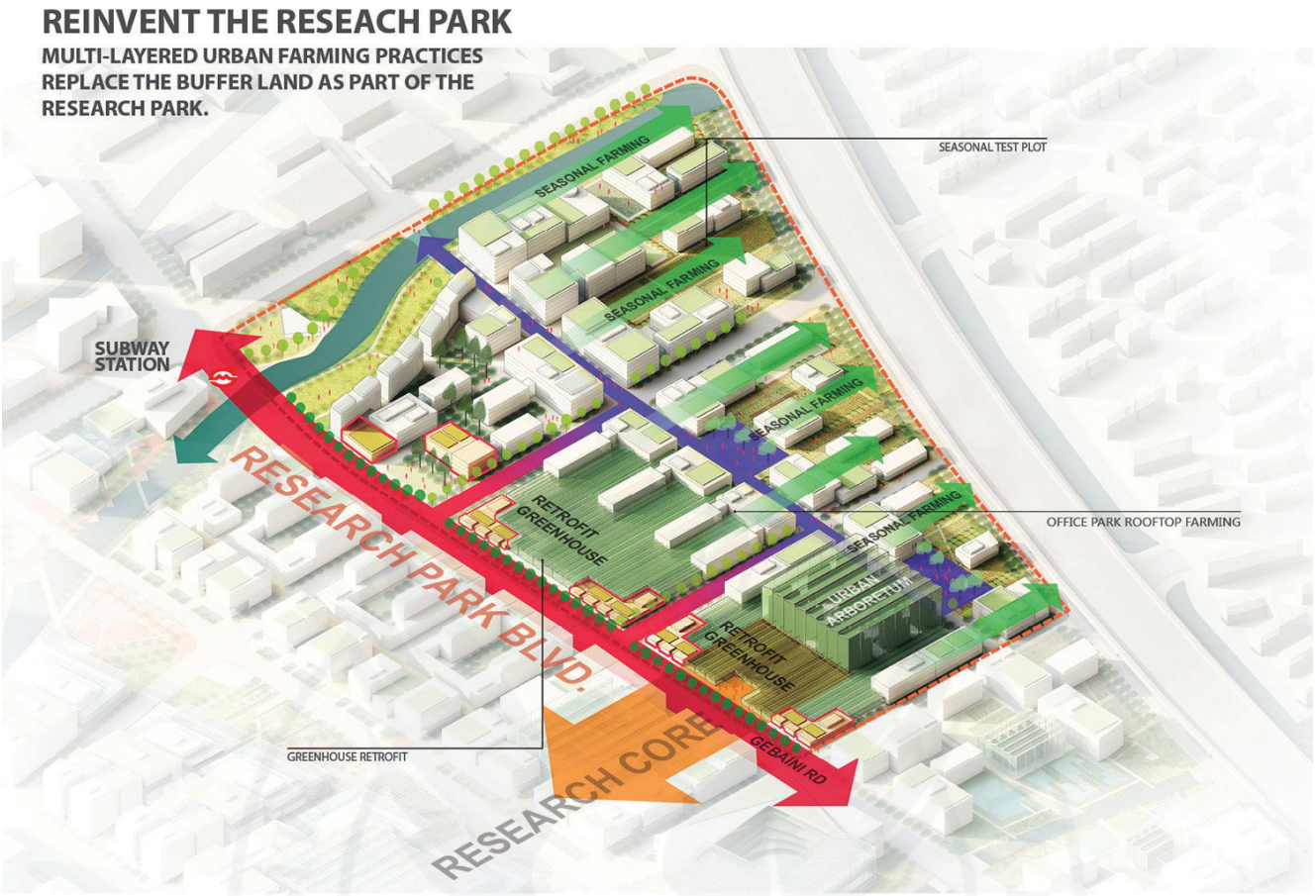


Figure 3.7 Sunqiao Urban Farming Programs
Source: Sasaki Associates

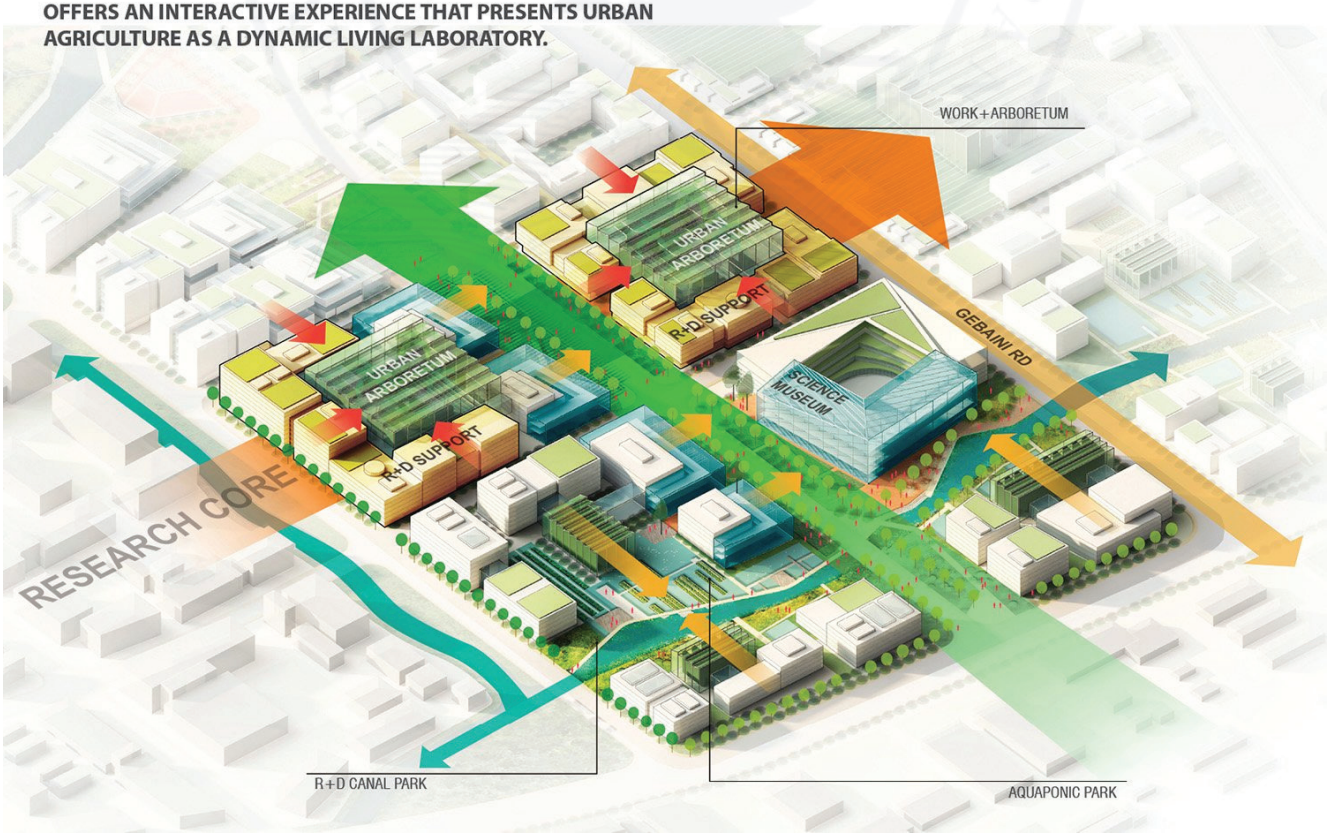


Figure 3.8 Sunqiao Research & Development Programs
Source: Sasaki Associates

3.2 Architectural Analysis

Spatial Organization and Connectivity

The district employs a grid-based spatial framework, with building modules measuring 250x250m, 300x250m, and 300x400m. Primary axes accommodate vehicle movement, while secondary axes structure pedestrian flow. Physical separation between functions—agriculture, office, and public spaces—is mediated by buffer zones, which double as open, interactive public areas. This transparency transforms agricultural operations into a living exhibition, challenging the traditional opacity of farm layouts (Adjie, 2020).

Greenhouse and office buildings are arranged to shield inner courtyards from external noise, with curtain walls serving as acoustic barriers. Office blocks positioned at site corners form a protective layer around central greenhouse spaces (Adjie, 2020).

Access and Circulation

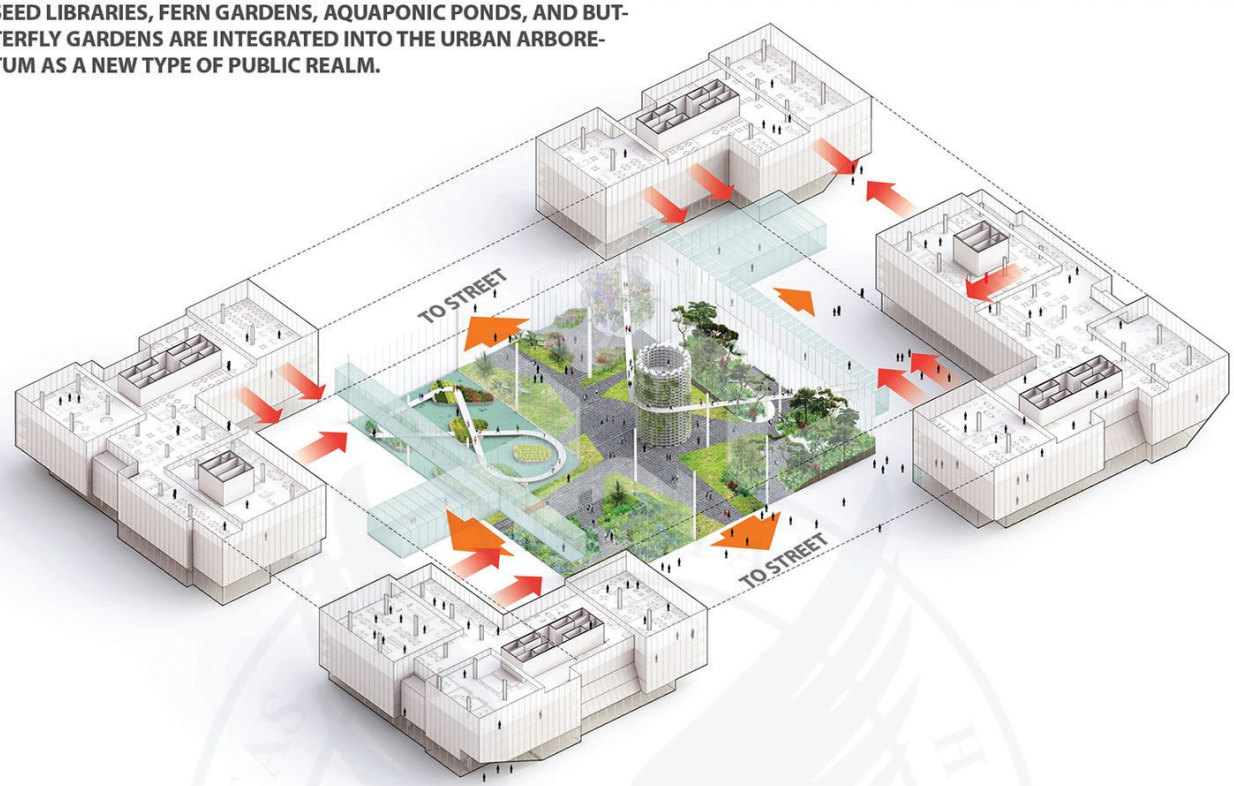
Multiple site entry points accommodate pedestrians, vehicles, and a nearby subway line, ensuring robust connectivity. Public and semi-private zones are loosely delineated to encourage interaction while preserving functionality. A dedicated pedestrian corridor on the western edge promotes walkability and reduces pedestrian-vehicle conflict (Adjie, 2020).

Figure 3.9 Sunqiao Spatial Organization and Connectivity
Source: Adjie, 2020

Figure 3.10 Sunqiao Access and Circulation
Source: Adjie, 2020

NEW FORM OF WORKPLACE

SEED LIBRARIES, FERN GARDENS, AQUAPONIC PONDS, AND BUTTERFLY GARDENS ARE INTEGRATED INTO THE URBAN ARBORETUM AS A NEW TYPE OF PUBLIC REALM.



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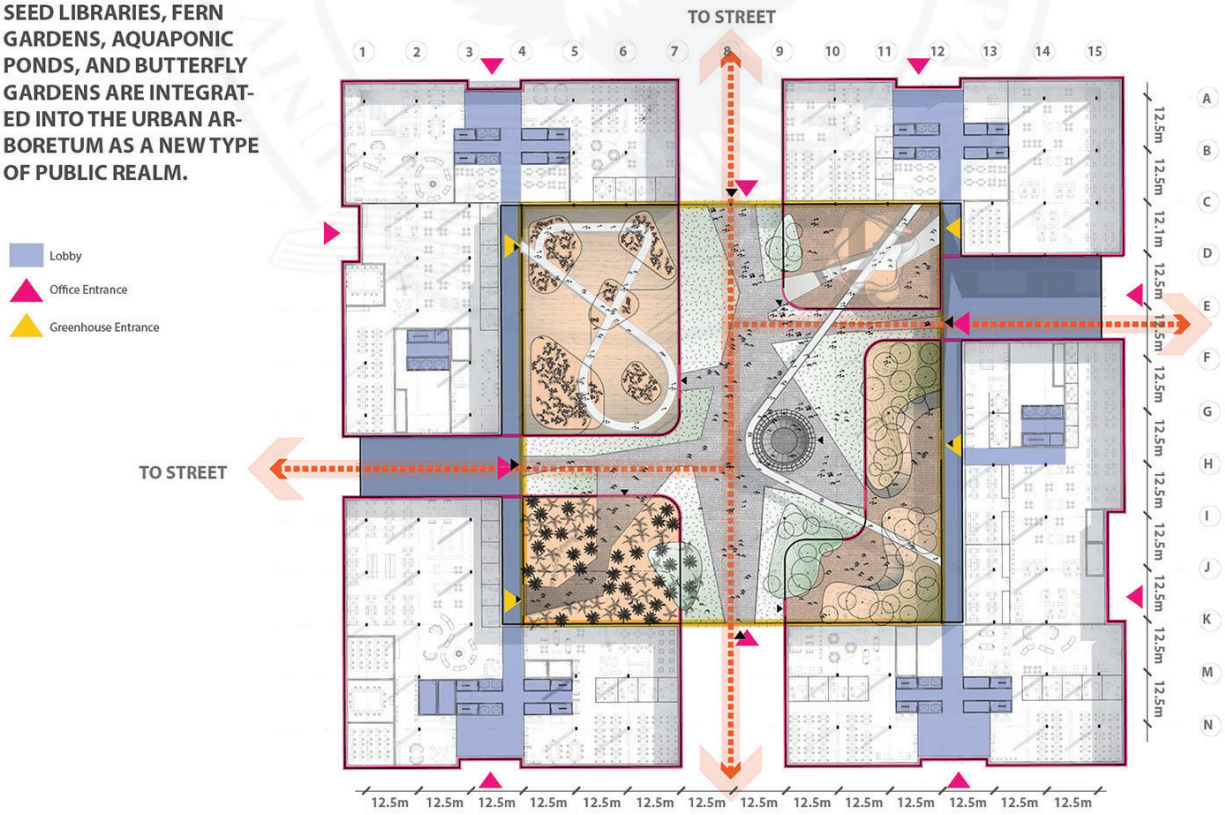


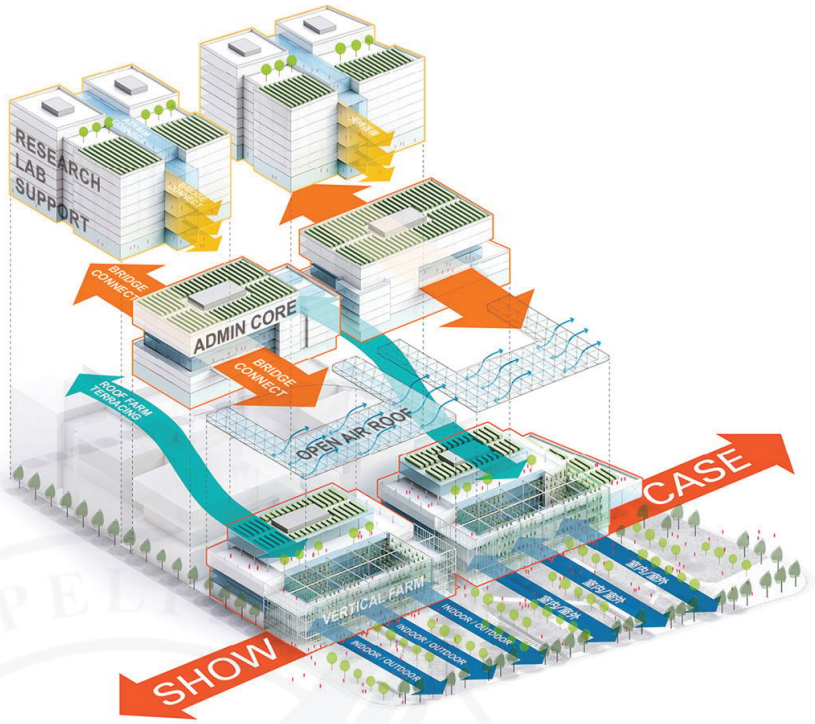
Figure 3.11 Sunqiao Spatial Organization and Connectivity (2)
Source: Sasaki Associates

Ventilation Strategies

Both cross and stack ventilation systems are employed to regulate indoor temperature and humidity. Cross ventilation facilitates horizontal airflow, while stack ventilation leverages vertical air movement to exhaust warm air and draw in cooler air. Open-air roofs and strategically placed open corridors enhance passive ventilation effectiveness (Adjie, 2020).

Materials and Color Palette

Material choices correspond to functional needs. Transparent glass and curtain walls dominate greenhouses and R&D zones to facilitate light penetration and public visibility, reinforcing the idea of agriculture as exhibition. Conversely, concrete and cement are used in offices to ensure privacy. The natural color palette—blues from reflective glass and earth tones from wood and stone—responds to Shanghai's seasonal climate, enhancing thermal comfort and atmospheric quality (Adjie, 2020).



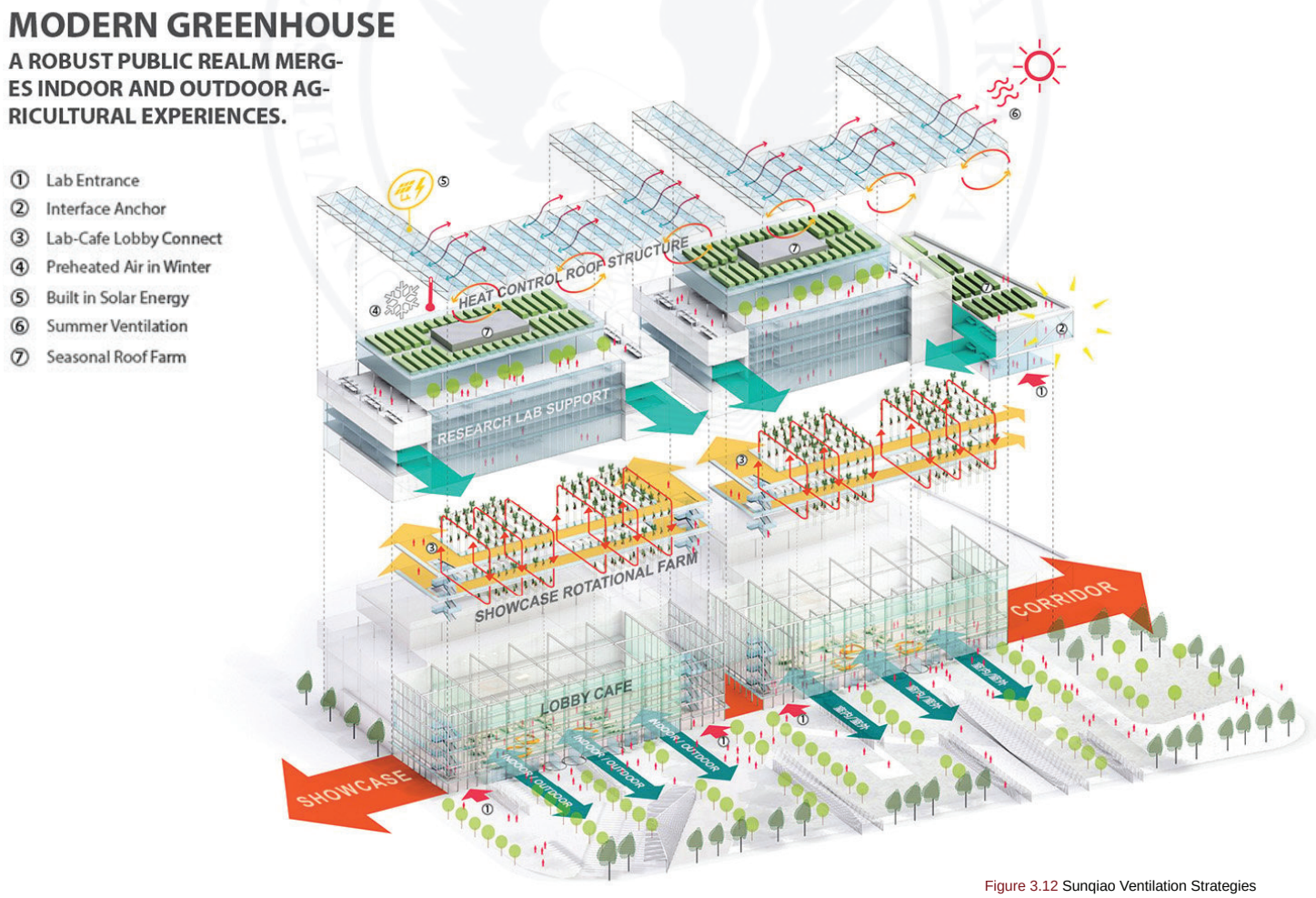


Figure 3.12 Sunqiao Ventilation Strategies
Source: Sasaki Associates

Figure 3.13 Sunqiao Renders
Source: Sasaki Associates

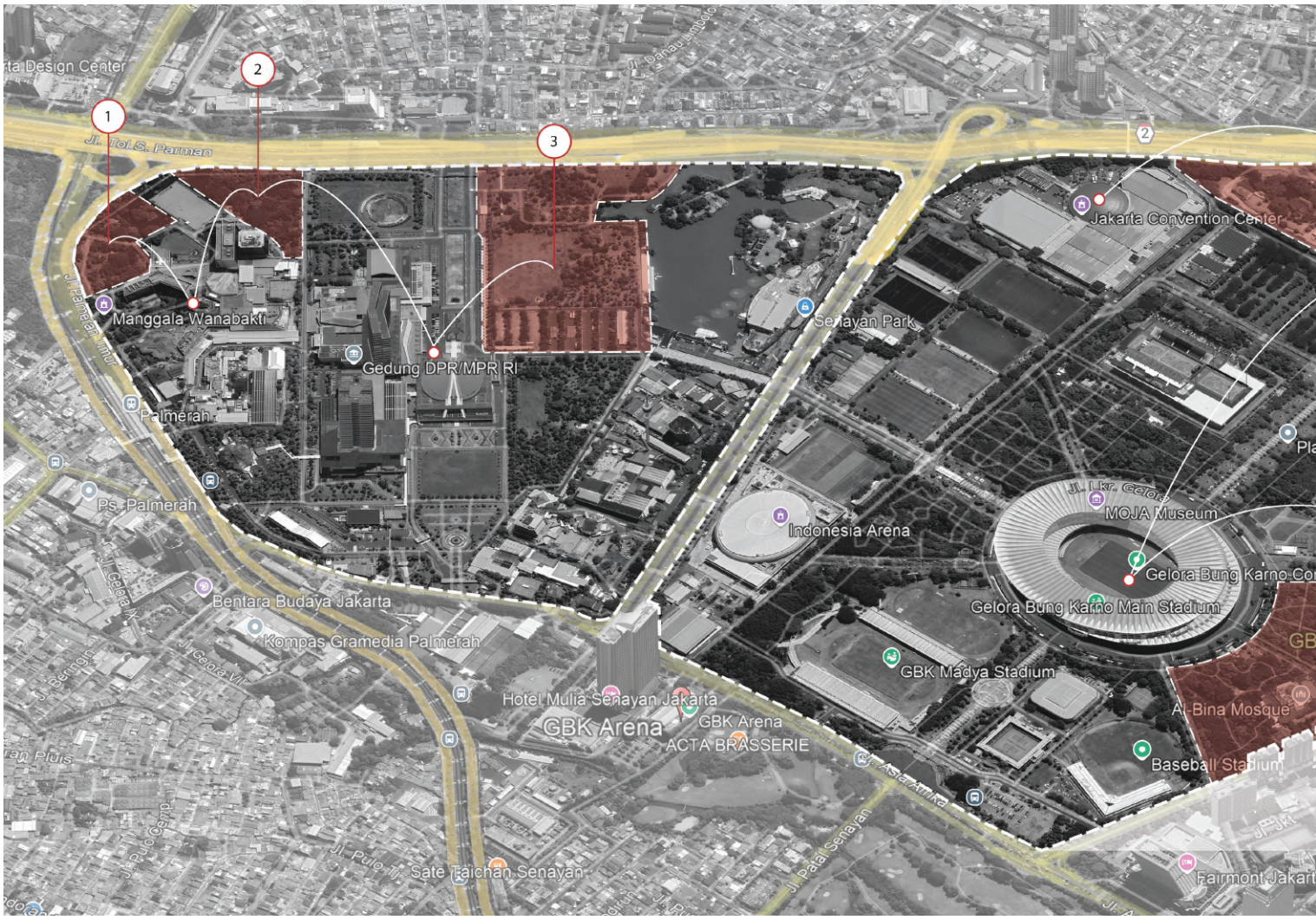
Figure 3.13 Sunqiao Renders
Source: Sasaki Associates

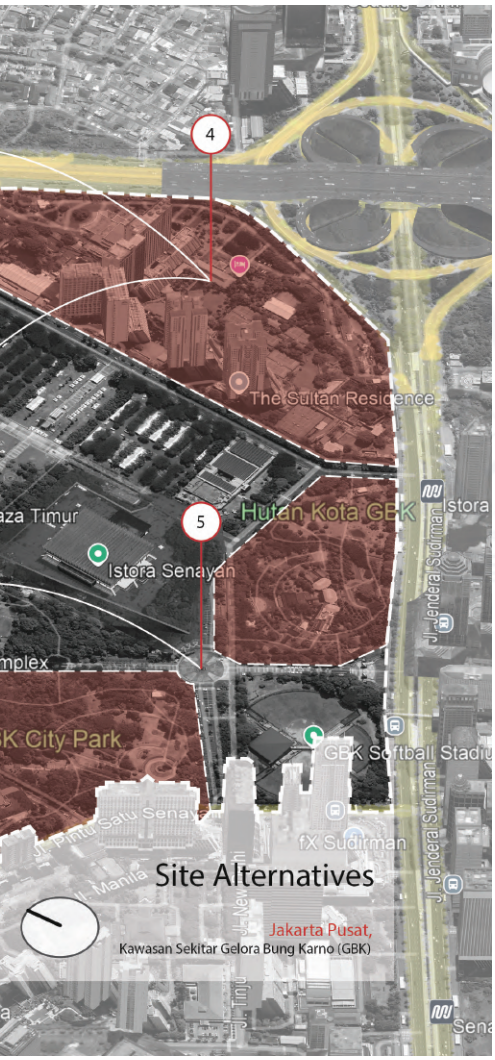
Aerial View

04

Design Exploration & Development

Figure 4.1 Site Alternatives
Source: Author





4.1 Site Alternatives and Selection

Five alternative sites were considered, all located within Central Jakarta in the vicinity of the Gelora Bung Karno (GBK) complex. This area, situated at the heart of the city, is characterized by significant landmarks that influence site selection, namely GBK, the MPR/DPR RI Building, and Manggala Wanabakti.

1. Gelora Bung Karno (GBK)

As Indonesia's largest sports complex, GBK primarily serves as a stadium and public space for sports and community events. Its extensive infrastructure, including accessible transport links, green open spaces, and supporting facilities, presents a strong advantage for the site selection process, enhancing the feasibility of a public-oriented urban farming project.

2. MPR/DPR RI Building

The MPR/DPR RI Building, home to the national legislative bodies, presents distinct security and zoning considerations. Proximity to this site necessitates careful management of public-private boundaries to avoid disrupting governmental functions. Although the primary legislative activities will eventually relocate to the new capital (IKN) in Kalimantan, the building's historical and symbolic significance mandates its preservation and sensitive contextual integration.

3. Manggala Wanabakti

As the headquarters of the Ministry of Environment and Forestry, Manggala Wanabakti introduces strong environmental synergies. Locating the project near this institution could amplify sustainability initiatives and environmental stewardship. Even with potential functional shifts due to the national capital relocation, the building remains a heritage asset vital to Jakarta's ecological and historical fabric.

Site Selection Criteria

To support the development of an integrated urban farm, public space, and community center, the selected site must meet the following criteria:

1. Green Open Space: Sufficient open areas with ample sunlight to support vertical or horizontal farming, already a strength in this district.
2. Adequate Site Area: The site must accommodate agricultural zones, educational facilities, and community spaces without compromising functional or aesthetic integrity.
3. Accessibility: The location must be well-connected to public transportation, pedestrian networks, and cycling routes to encourage active community participation.
4. Integration with Surroundings: Physical and programmatic connectivity with adjacent buildings and functions, particularly public hubs like GBK, is crucial to establishing a vibrant community-oriented space.

Following an evaluation against these criterias, site 3 emerged as the most promising candidate. It exhibits sufficient land area, optimal accessibility, and strong contextual synergy, making them highly suitable for the envisioned integration of urban farming with public and community spaces in Central Jakarta.

Sun Path

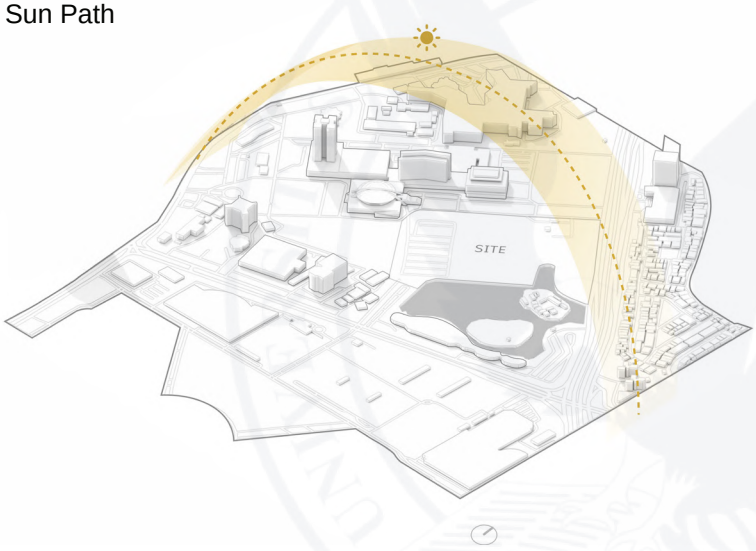


Figure 4.2 Site Analysis - Sunpath
Source: Author

Green Space

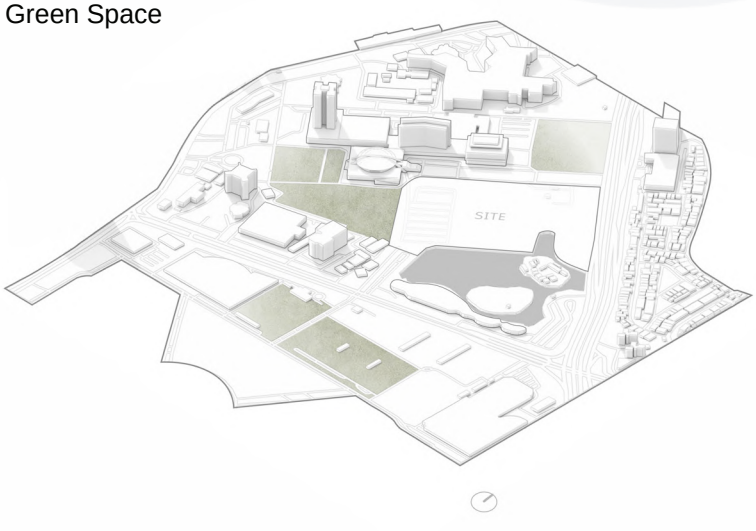


Figure 4.3 Site Analysis - Green Spaces
Source: Author

4.2 Selected Site Analysis

Following a thorough selection and evaluation process, Site 3 has been chosen for further development. A comprehensive site analysis is undertaken to support the iterative design process and massing development.

This analysis addresses the sunpath to optimize natural lighting, energy efficiency, and building orientation; examines green spaces to enhance ecological connectivity and aesthetic-functional integration; studies vehicular and pedestrian circulation to ensure efficient, safe, and comfortable movement; assesses public transport connectivity to promote sustainable mobility; and reviews surrounding zoning to ensure harmonious contextual integration.

Sunpath Analysis

The sunpath analysis indicates that a south-facing building orientation is optimal, allowing for consistent sunlight exposure throughout the day. Eastern and western orientations are less efficient, as they receive sunlight only during morning or afternoon hours, respectively. Consistent solar access is critical for optimal photosynthesis, a key factor for successful urban farming.

To maximize spatial efficiency, the design should incorporate rooftop gardens, terracing, and voids. Planting strategies must ensure unobstructed sunlight, with taller vegetation positioned on the northern edge to prevent shading of lower crops to the south.

Green Space Integration

The site is surrounded by significant green areas, offering a valuable opportunity to seamlessly integrate the new development with the existing ecological landscape. The urban farming and community center must be designed not as isolated entities, but as extensions of the surrounding green network, thereby strengthening ecological connectivity and enhancing the site's visual and functional qualities.

Circulation

The site benefits from direct access to a major road on its eastern boundary, with existing vehicular access and parking facilities that can be adapted to future design needs. This offers flexibility to accommodate efficient private vehicle mobility. Additionally, the surrounding pedestrian network provides a strong foundation for a walkable, inclusive design approach.

Public Transportation Access

The site enjoys high mobility potential, being within walking distance of multiple public transport modes:

1. MRT Jakarta via Istora Mandiri Station
2. KRL Commuter Line via Palmerah Station
3. TransJakarta BRT via nearby bus stops

This strategic location facilitates accessibility and supports sustainable urban mobility. Consequently, pedestrian-friendly design features—such as safe and comfortable pathways to public transport hubs—are essential to reinforce the site's integration within the city's transportation network.

Surrounding Zoning Context

The site is embedded within a dynamic zoning context characterized by diverse functions:

1. Administrative and Office Functions: Institutions such as the DPR-MPR Building and TVRI Headquarters imbue the area with an official and institutional character, serving as centers for governance and national media.
2. Social and Cultural Functions: Facilities such as Gelora Bung Karno Complex, Indonesia Arena, Jakarta Convention Center (JCC), Manggala Wanabakti, and Graha Jalapuspita establish the site as a hub for sports, cultural, and social activities, with regional and international reach.
3. Commercial Functions: The proximity of Senayan Park enhances the area's commercial vitality, attracting a broad demographic.

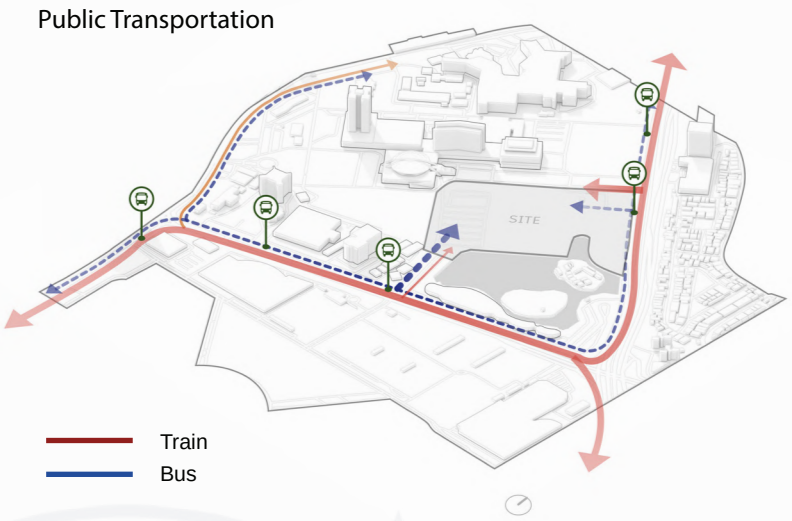


Figure 4.3 Site Analysis - Public Transportation
Source: Author

Figure 4.4 Site Analysis - Circulation and Access
Source: Author

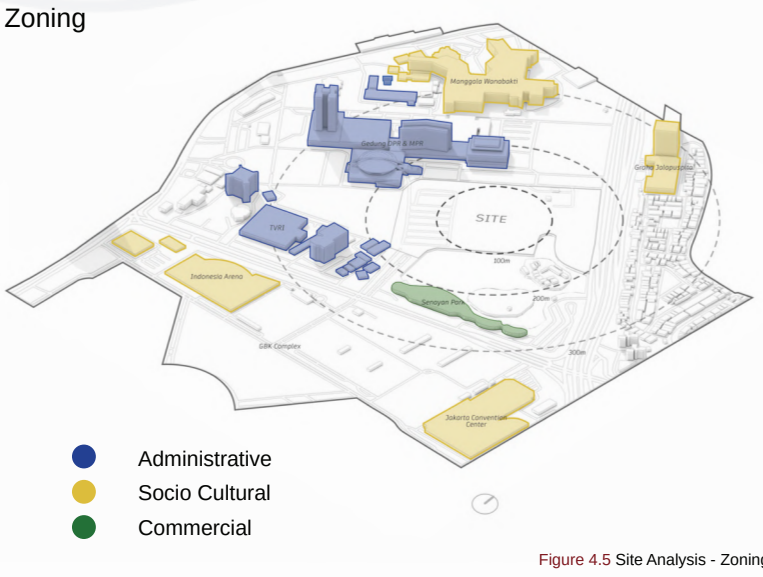


Figure 4.5 Site Analysis - Zoning
Source: Author

Design Charettes

A collaborative design charrette was conducted in partnership with the Urban+ Institute – Jakarta to gain a comprehensive understanding of the project site across multiple spatial scales: macro, meso, and micro. This multi-layered analytical process was essential not only to uncover the spatial, social, and environmental dynamics of the broader urban context but also to inform a responsive and contextually grounded design intervention.

At the macro level, regional infrastructural networks, ecological corridors, and socio-economic flows were mapped to position the site within its wider metropolitan framework. This enabled a critical evaluation of connectivity, accessibility, and resilience across scales. The meso-scale analysis focused on adjacent urban morphologies, community patterns, and transitional zones, revealing the nuanced relationships between the site and its immediate urban fabric. Finally, the micro-scale investigation informed the architectural decisions within the site itself, ensuring that the spatial organization, orientation, and functional distribution of built elements were intimately responsive to existing site conditions.

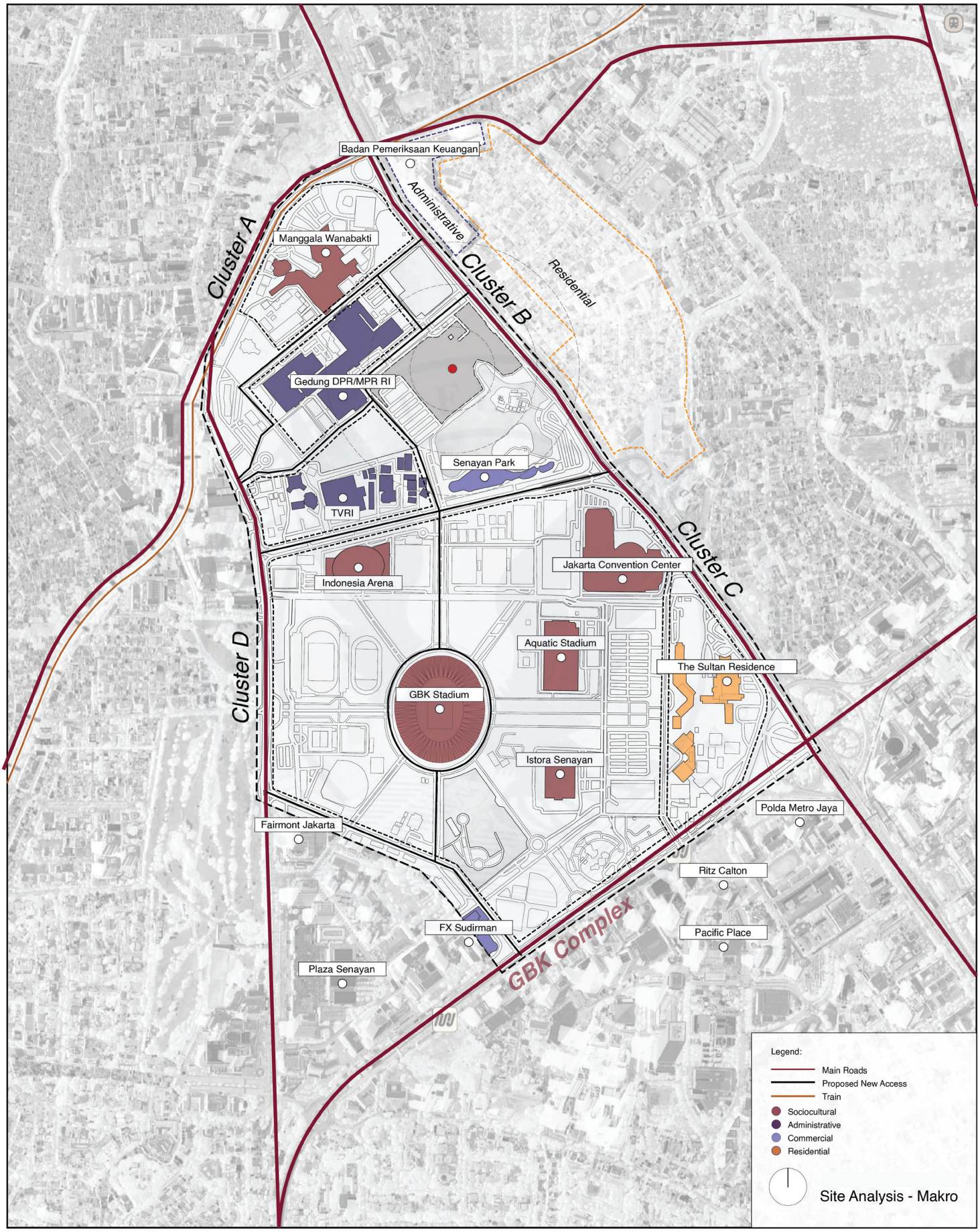
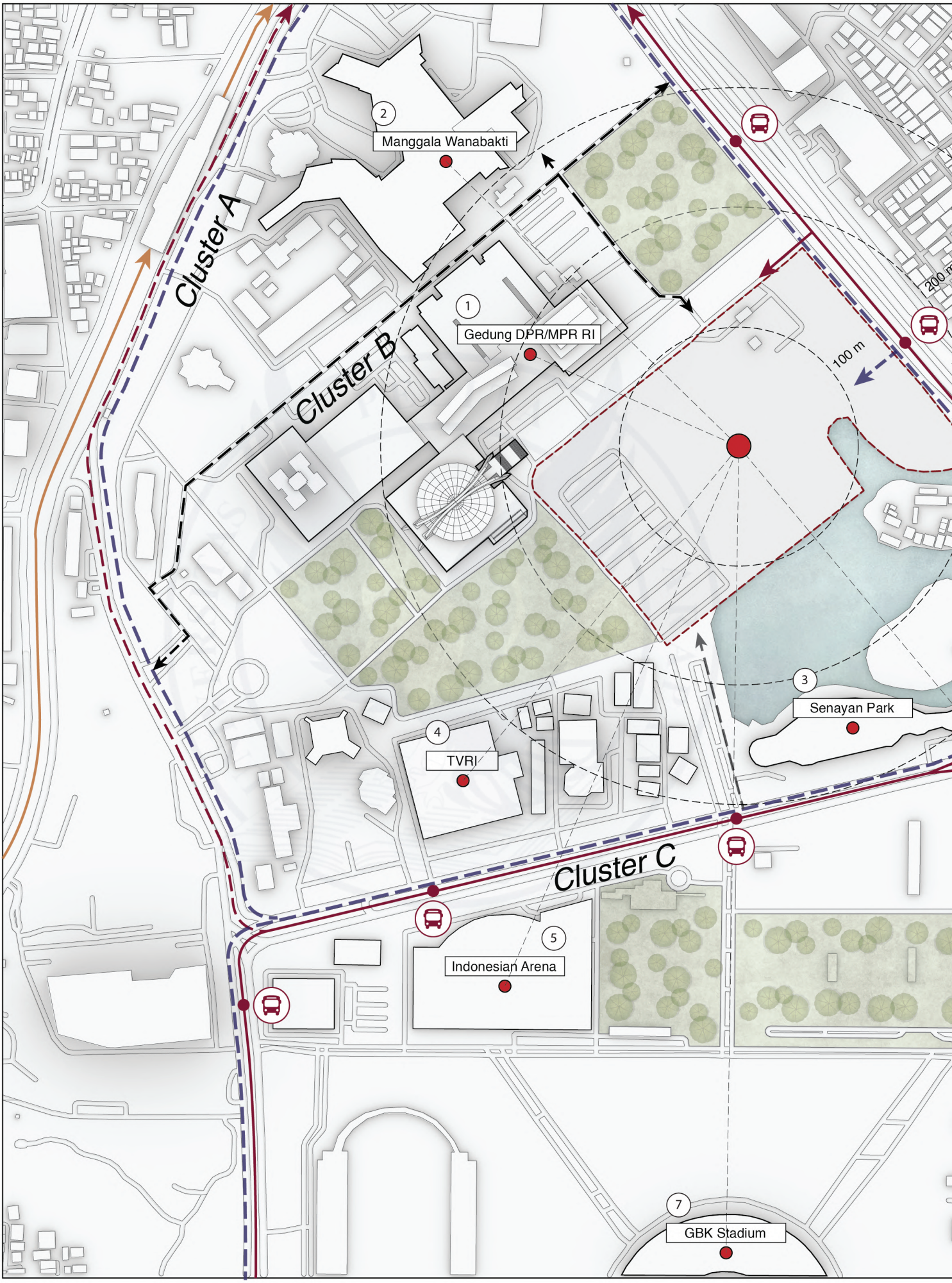
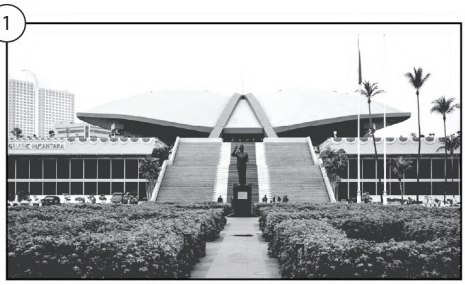


Figure 4.6 Site Analysis - Macro
Source: Author


Cluster A
Cluster B
Cluster C
2
Manggala Wanabakti
1
Gedung DPR/MPR RI
100 m
200 m
3
Senayan Park
4
TVRI
5
Indonesian Arena
7
GBK Stadium

1



Gedung MPR DPR/DPR RI

2

Manggala Wanabakti

3

Senayan Park

4

TVRI

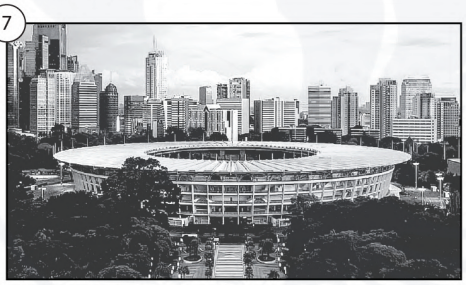
5

Indonesian Area

6

Jakarta Convention Center

7



GBK Stadium

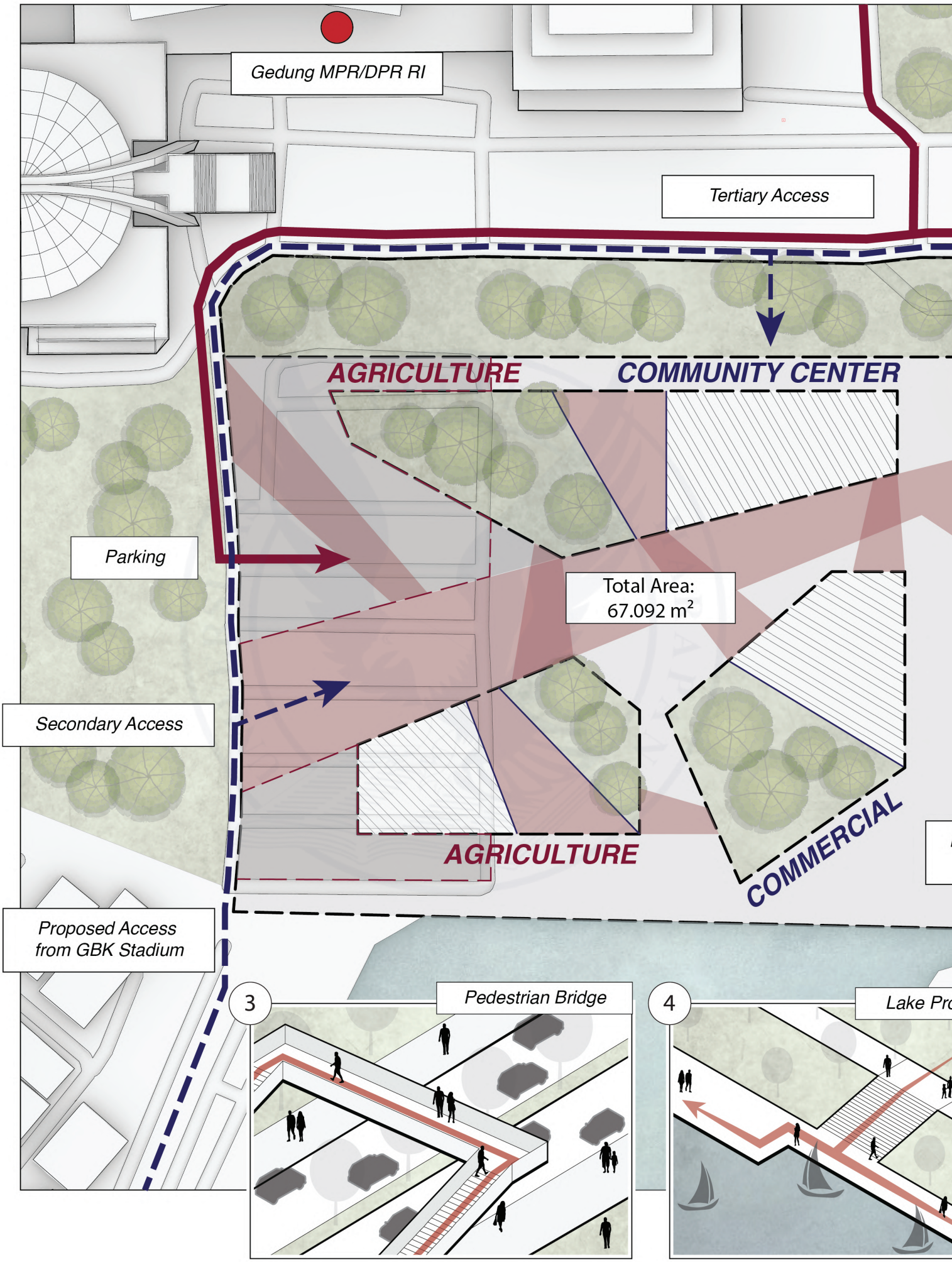
Legend:

- Vehicular Access
- Pedestrian Access
- Train
- New Proposed Access

Scale 1 : 5000

Site Analysis - Meso

Figure 4.7 Site Analysis - Meso
Source: Author


Gedung MPR/DPR RI
Tertiary Access
AGRICULTURE
COMMUNITY CENTER
Parking
Total Area:
67.092 m²
Secondary Access
AGRICULTURE
COMMERCIAL
Proposed Access
from GBK Stadium
3
Pedestrian Bridge
4
Lake Pro

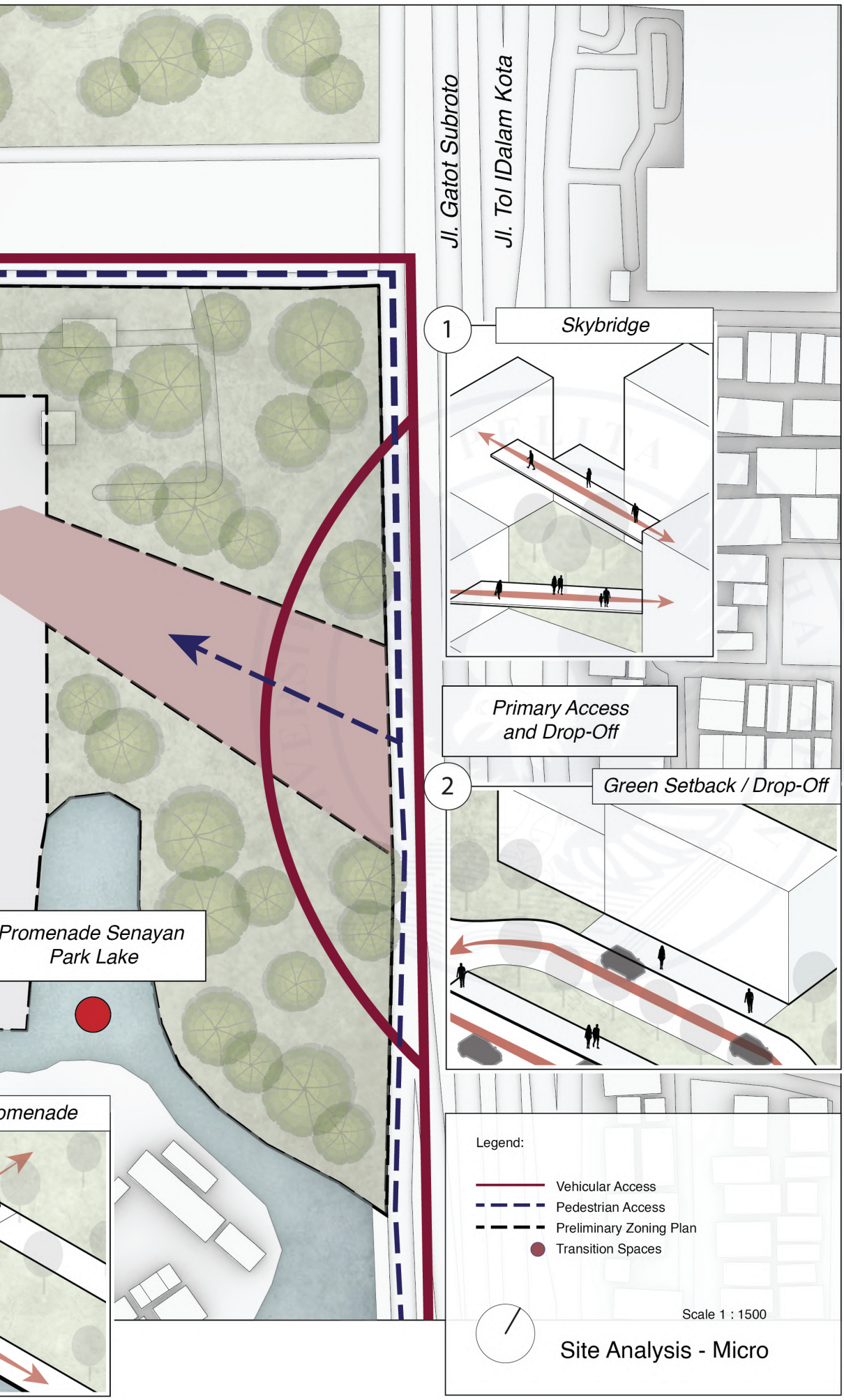


Figure 4.8 Site Analysis - Micro
Source: Author

4.3 Design Iterations

Building on previous findings, several design iterations were explored to optimize site functionality, maximize environmental integration, and create architecture that contributes not only functionally but also aesthetically, sustainably, and socially.

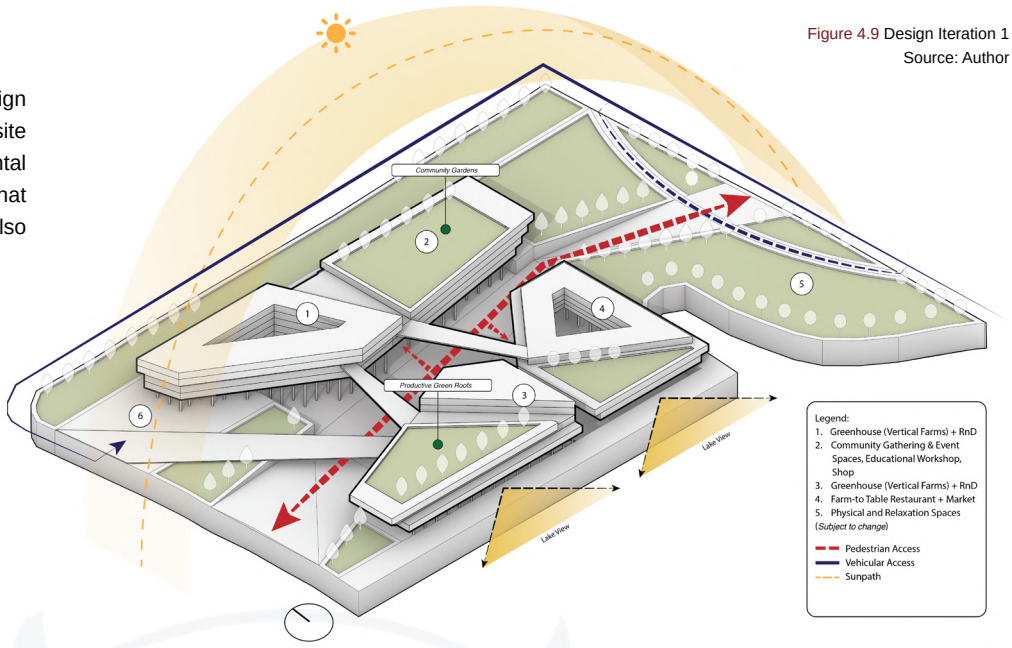


Figure 4.9 Design Iteration 1
Source: Author

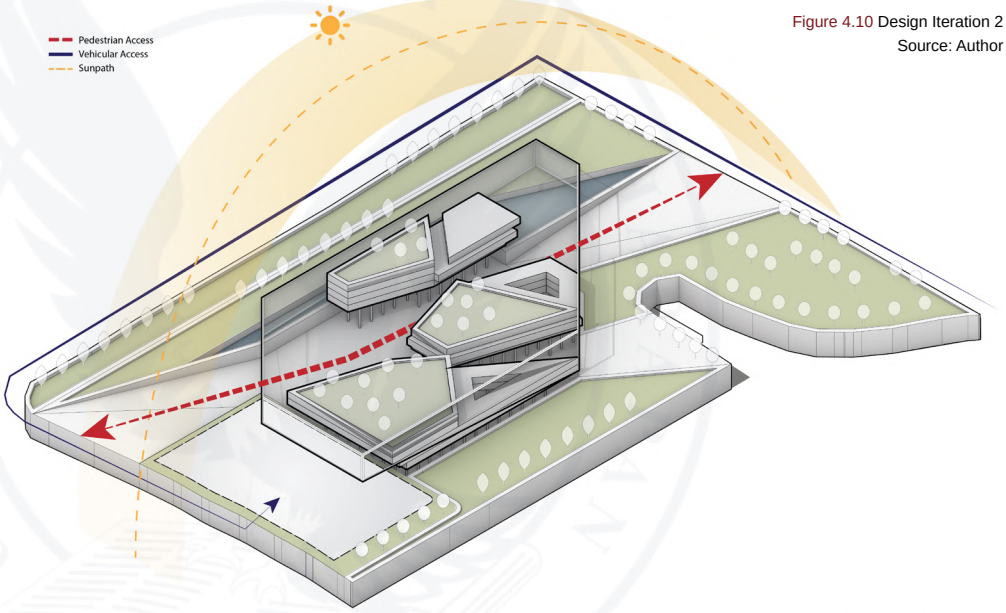


Figure 4.10 Design Iteration 2
Source: Author

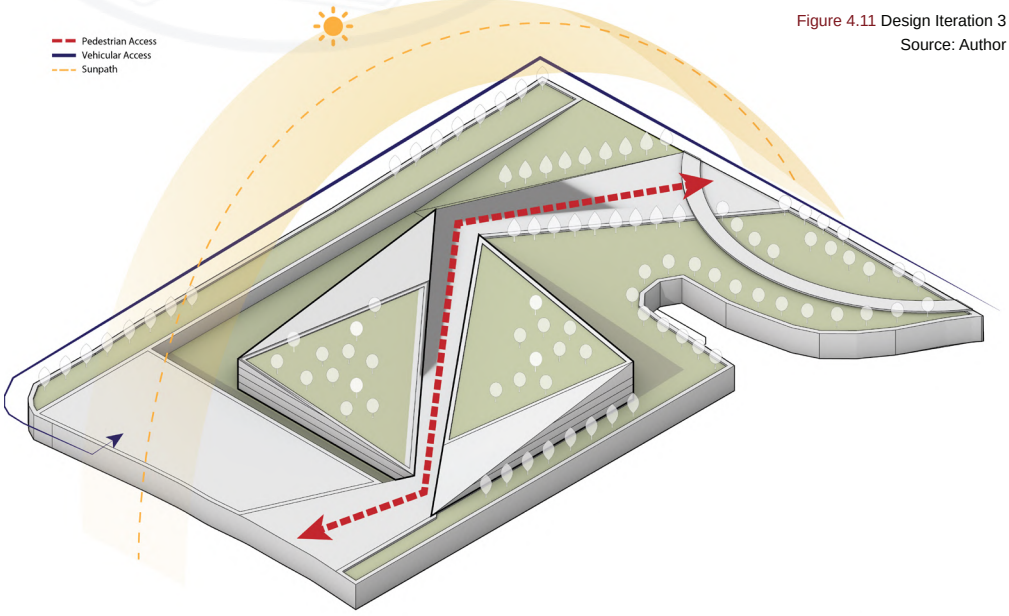


Figure 4.11 Design Iteration 3
Source: Author

Iteration 1

The first iteration seeks to harmonize architecture and landscape by utilizing site elevation changes to create the impression of "cutting into the ground." A pedestrian axis traverses the site, visually and physically connecting the eastern and western edges, enhancing site connectivity and offering an immersive spatial experience.

Building masses are longitudinally oriented towards the south to maximize solar exposure. Design elements such as cantilevers, terraces, and voids introduce a dynamic yet functional composition. Bridges connect the building masses, reinforcing functional interrelations. Roofs are activated as productive green roofs and community gardens at varying elevations, embodying the project's vision of an integrated urban farm and public community hub.

Iteration 2

The second iteration advances the conceptual approach of the first by further integrating architecture with landscape through elevation manipulation. A central pedestrian pathway cuts through the terrain, connecting the site's eastern and western boundaries both visually and physically. Building orientation remains southern-facing, and dynamic architectural features such as cantilevers, terraces, and voids are retained.

A key innovation distinguishes this iteration: a continuous glass envelope encloses all building masses, creating a unified microclimate. This greenhouse-like structure optimizes natural light, establishes an immersive public oasis, and fosters an ideal environment for urban farming, education, and community interaction within a singular, controlled ecosystem.

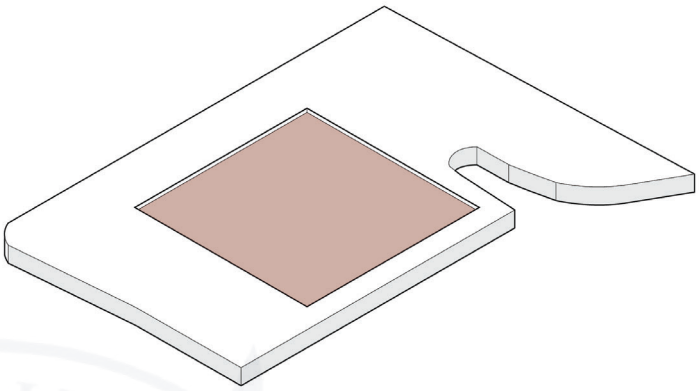
Iteration 3

The third iteration offers a distinctly different approach, deeply merging architecture with the natural landscape. Two large triangular masses appear to emerge organically from the ground, presenting a dramatic yet harmonious visual language.

The roofs of these triangular forms function as green spaces for urban farming and communal gardens. Skylights and glazed facades ensure abundant natural light penetration, creating bright, functional interiors. Beneath the elevated masses, an interconnected basement level forms "islands" of programmable spaces, accommodating urban farming, community areas, and supporting facilities.

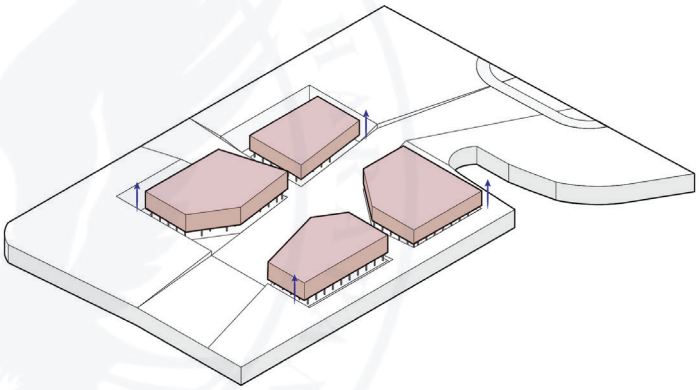
4.4 Massing Development & Site Transformation

Of the three design iterations developed, Design Iteration 1 was selected as the most optimal alternative. Subsequent explorations and design developments included massing and site transformation diagrams, zoning analysis, schematic sections, and isometric projections.



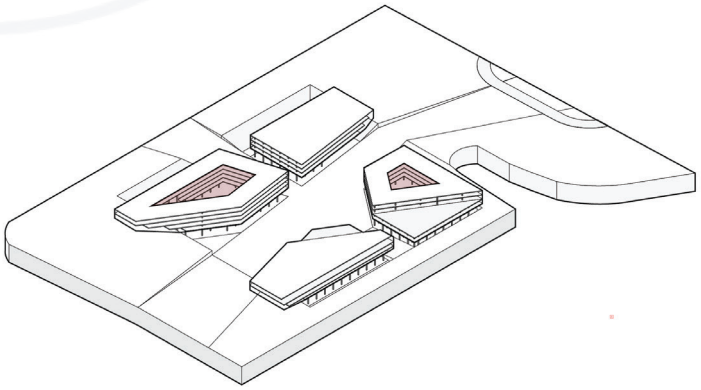
1 *Carve*

Excavates and sinks the site to an elevation of 3.5 meters below ground level.



4 *Lift*

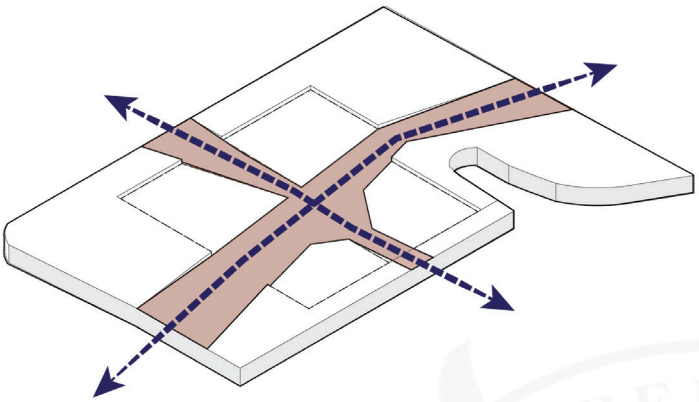
Lifts up the masses to an elevation of 3.5 meters above ground level to further increase connectivity and accessibility.



5 *Solid - Void*

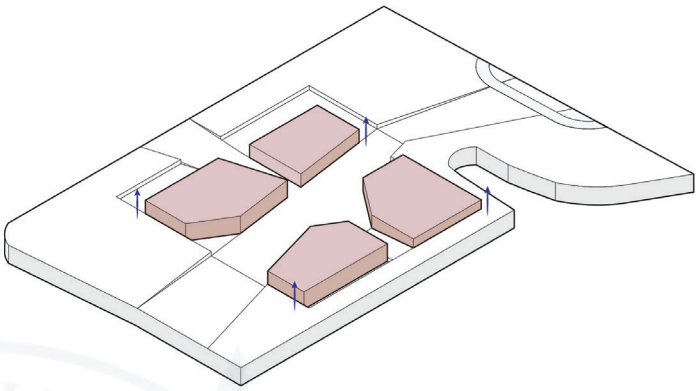
Creates voids within the masses to form central courtyards, enhancing openness and allowing sunlight to support the building's urban farming function.

Figure 4.12 Massing and Site Transformation Diagram
Source: Author



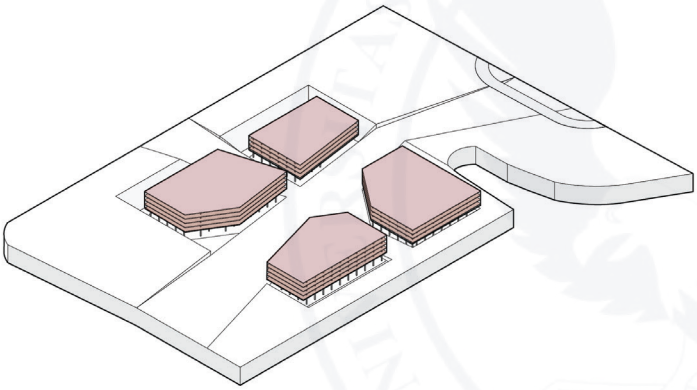
2 Connect

Connects all ends of the site by creating pedestrian pathways that "cuts across" and traverses the site, enhancing overall connectivity and accessibility.



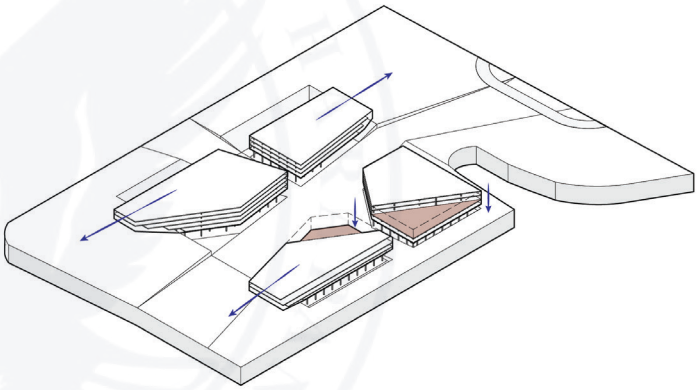
3 Extrude

Extrudes the building's main programs into four separate masses.



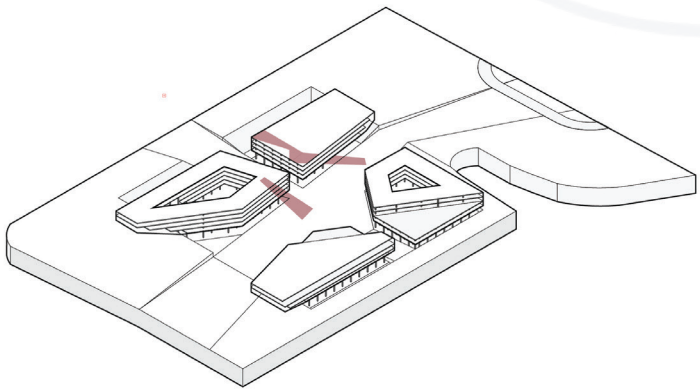
5 Divide

Divides the masses into levels spanning 4 to 5 floors.



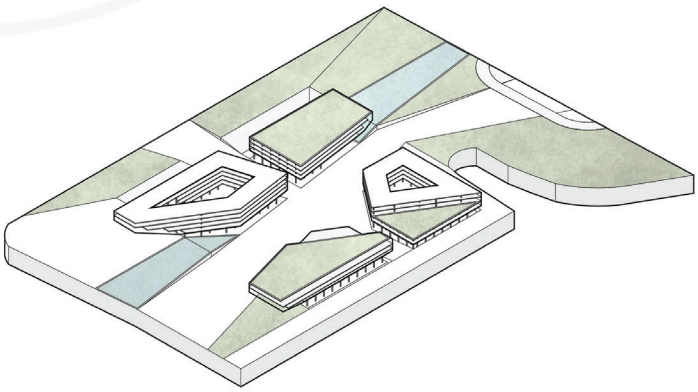
6 Extend & Subtract

Adjusts the shape and volume of the masses -- extends the edges to form cantilevers and subtractis a portion to create variations in height.



6 Connect

Integrates skybridges to connect the four masses at different levels.



7 Develop

Design and develop the site's landscape to establish spatial harmony with the built environment.

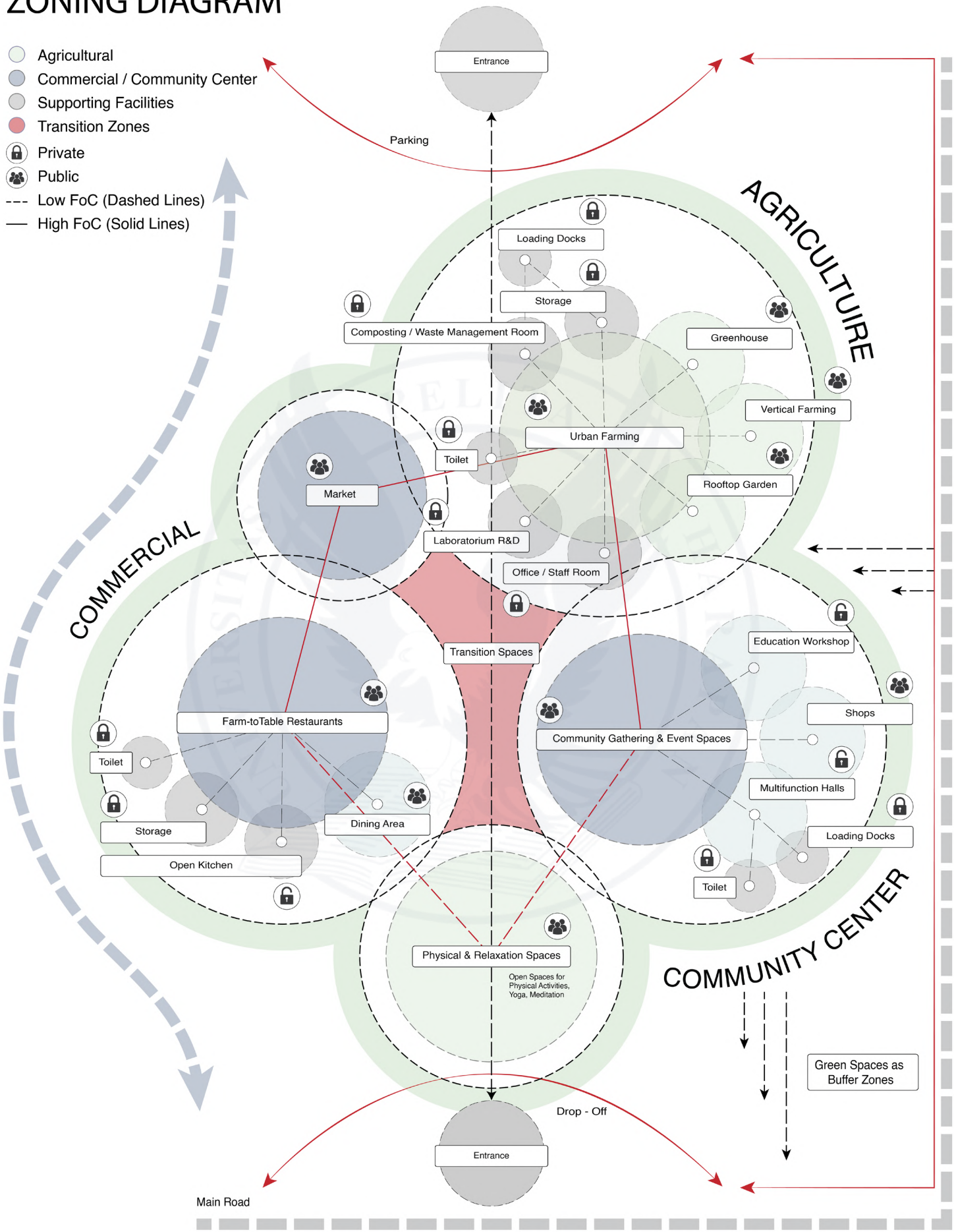


Figure 4.13 Zoning Diagram
Source: Author

Zoning Diagram

This zoning diagram illustrates the spatial organization of all essential programs supporting the three primary functions of the project: urban farming, a community center, and commercial spaces. Each function serves a distinct role—urban farming fosters local food production and education, the community center offers social and cultural engagement, and commercial areas stimulate economic activity. Though individually defined, these elements are deliberately interconnected, fostering synergy and shared use across the site.

The diagram proposes four primary pedestrian access points, one on each side of the site, converging into a central plaza that acts as the heart of the development. This central space not only facilitates movement and gathering but also strengthens the connection between the site's diverse functions.

Surrounding physical and transitional spaces—such as gardens, seating zones, and open green buffers—enhance the flow between zones while offering areas for relaxation, reflection, and informal social interaction.

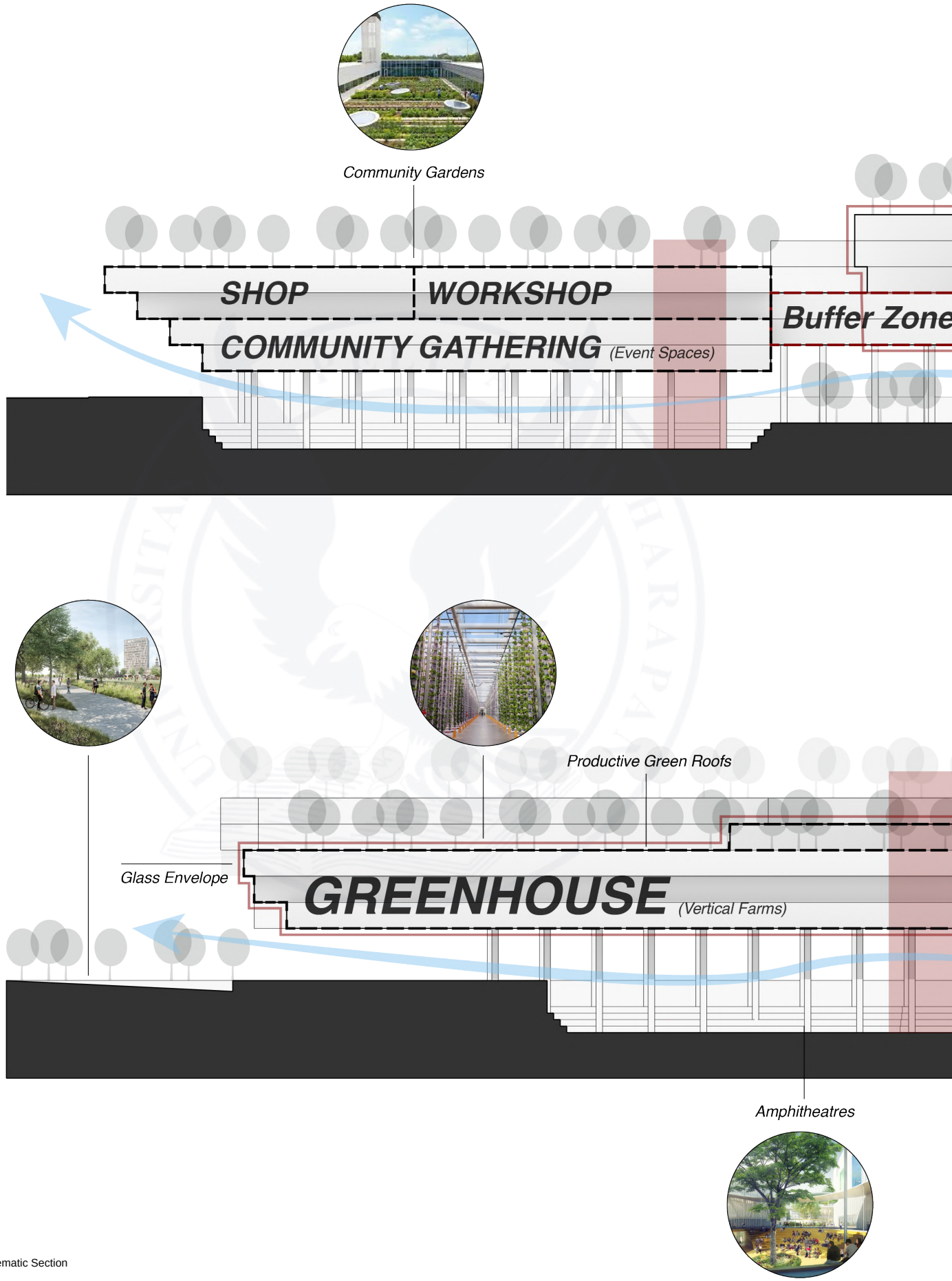


Figure 4.14 Schematic Section
Source: Author

Productive Green Roofs

GREENHOUSE (Vertical Farms)

R&D

Glass Envelope

Amphitheatres

North Facade

Productive Green Roofs

R&D Buffer Zones

RESTAURANT (Farm-to-Table)

MARKET

South Facade

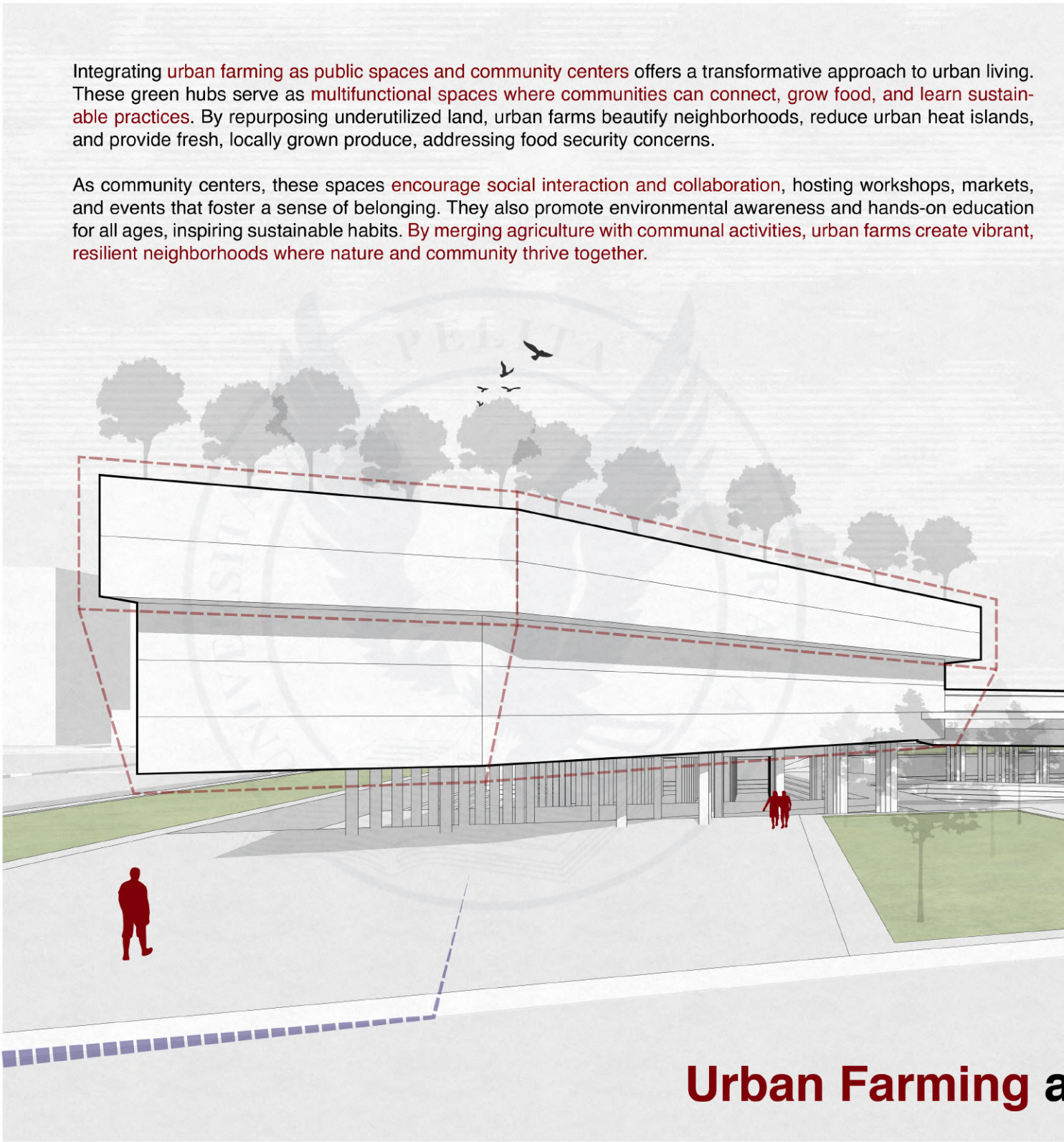
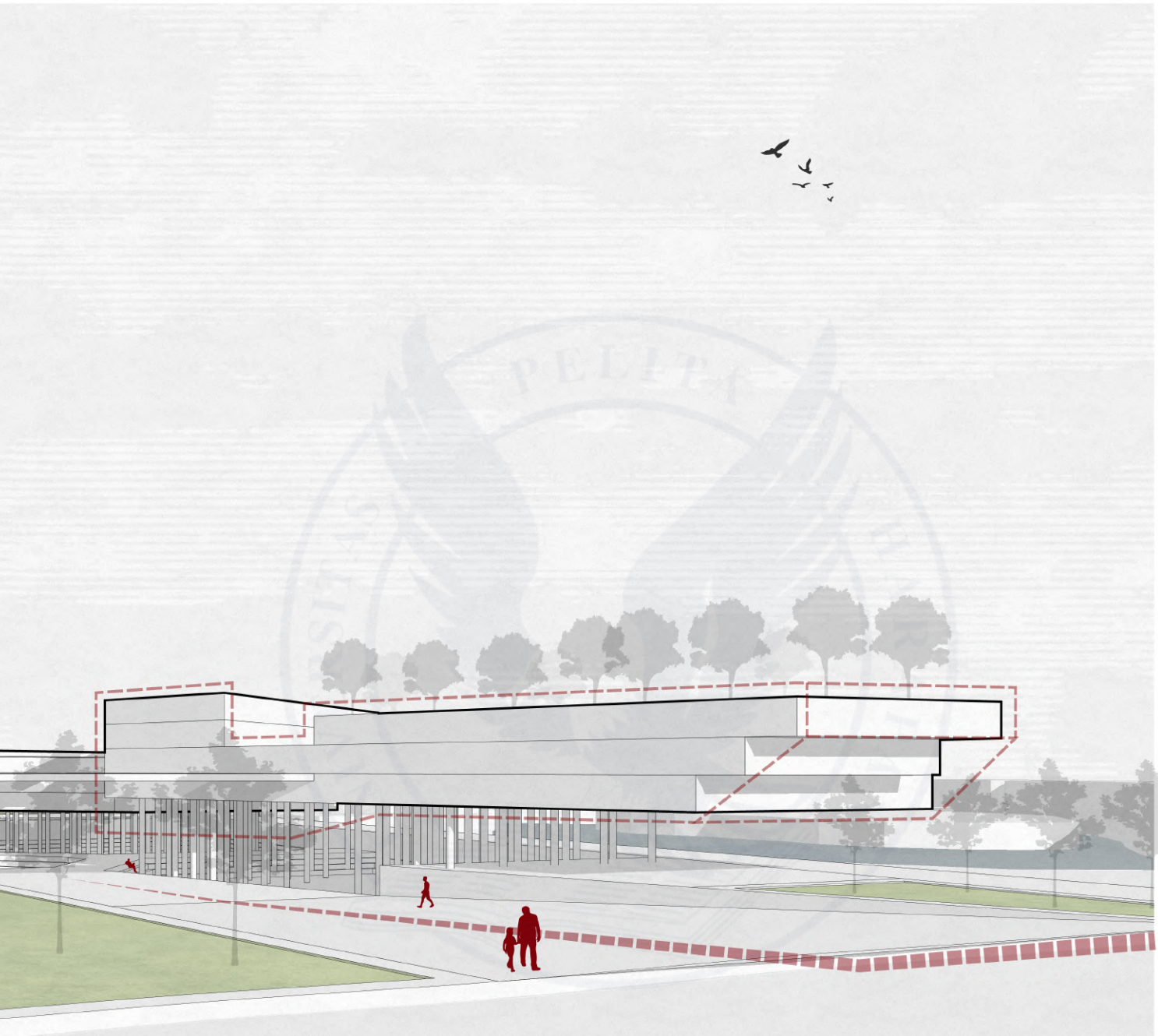


Figure 4.15 Schematic Perspective
Source: Author



s a Catalyst for Community and Connection

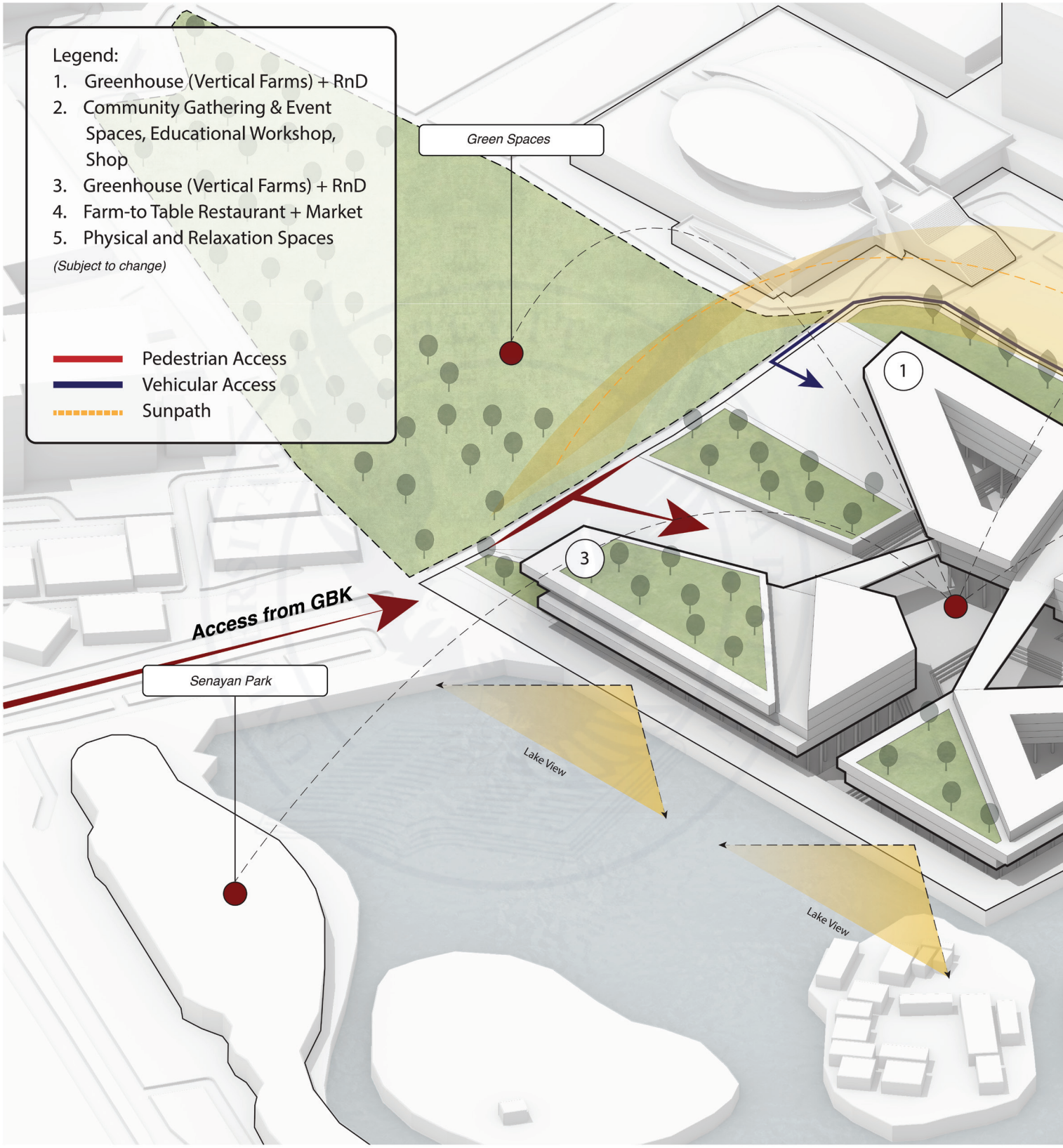
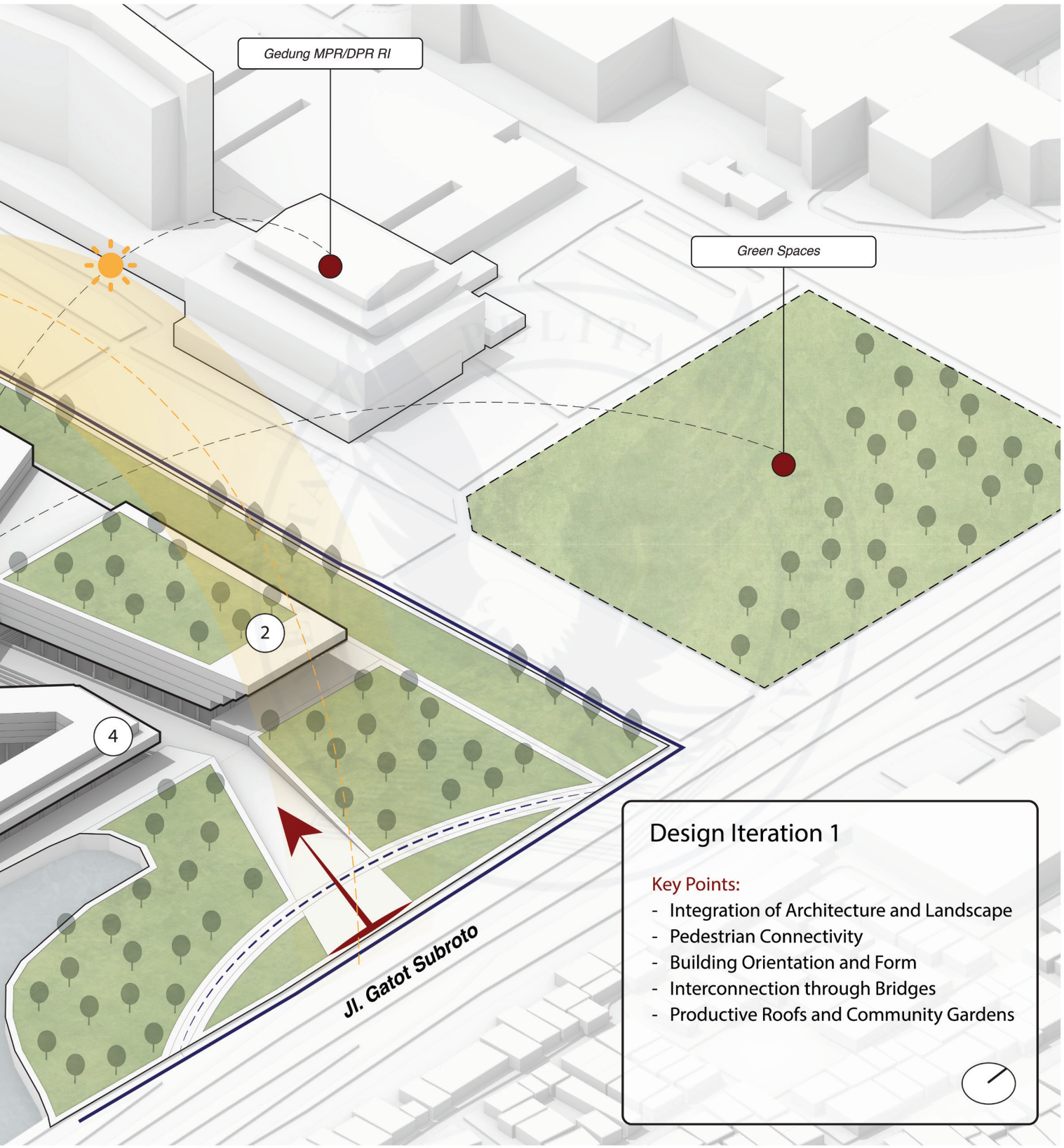


Figure 4.15 Schematic Isometry Diagram
Source: Author



Design Iteration 1

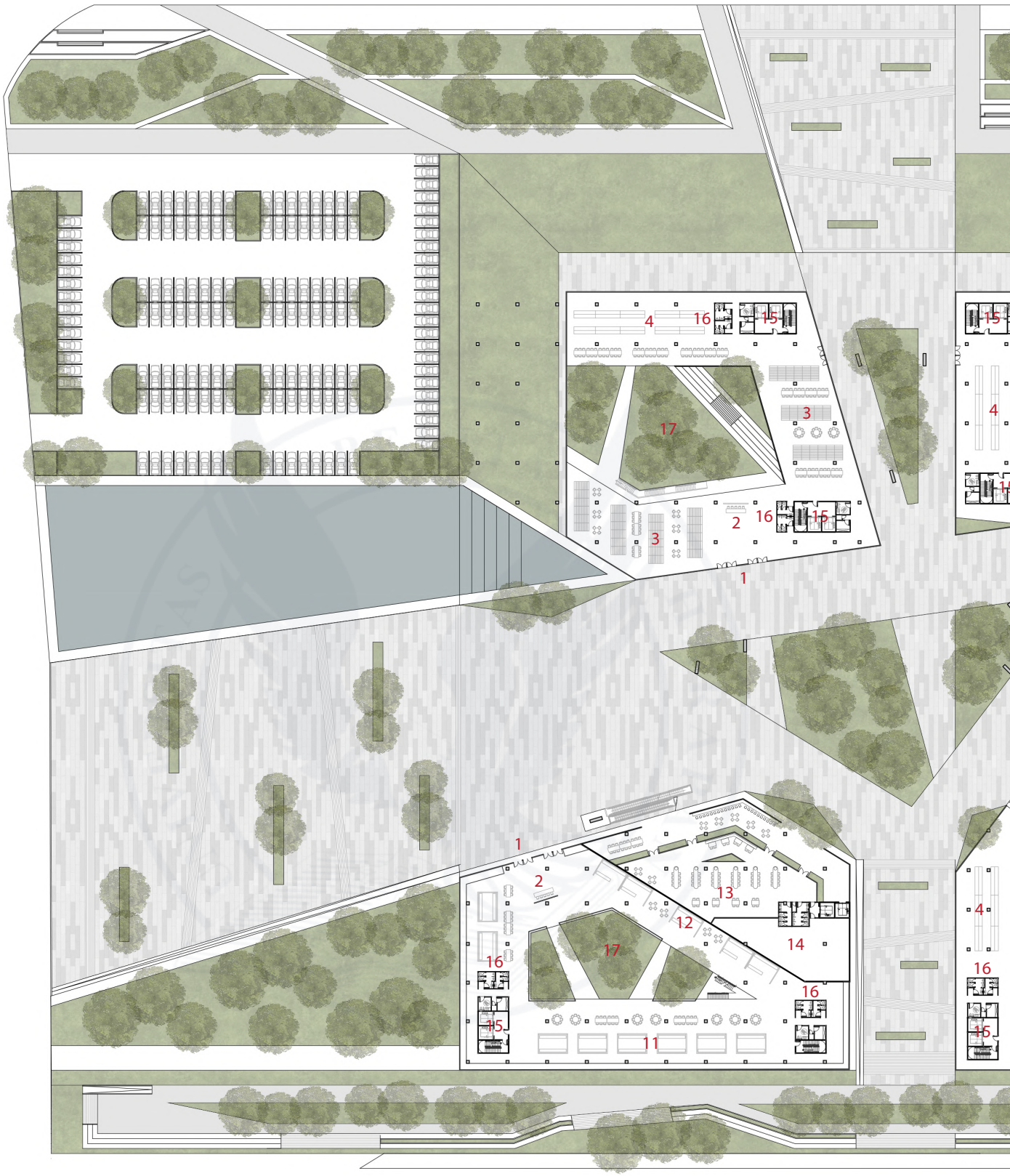
Key Points:

- Integration of Architecture and Landscape
- Pedestrian Connectivity
- Building Orientation and Form
- Interconnection through Bridges
- Productive Roofs and Community Gardens

05 DESIGN OUTCOME

INTEGRATIVE DESIGN OF URBAN FARMING AS PUBLIC SPACE AND COMMUNITY HUB

Aerial View



5.1 Site Planning and Zoning

A dedicated drop-off area near the main road ensures smooth vehicular flow, while four primary pedestrian access points—one on each side—create seamless connectivity across the site. These access routes converge at a central plaza, envisioned as the heart of the development, fostering social interaction and community gatherings.

Surrounding the plaza are four distinct building masses, thoughtfully programmed with urban farming spaces, a community center, and commercial functions—creating a vibrant, self-sustaining micro-neighborhood. Between the main road and the buildings lies an expansive green buffer zone, offering open spaces for physical activity, relaxation, and environmental filtering from road noise and pollution. To the south, the design embraces the natural edge of the site with a lake promenade, linking directly to the adjacent Spark Promenade Lake, enhancing walkability and reinforcing the site's connection to the broader urban landscape.

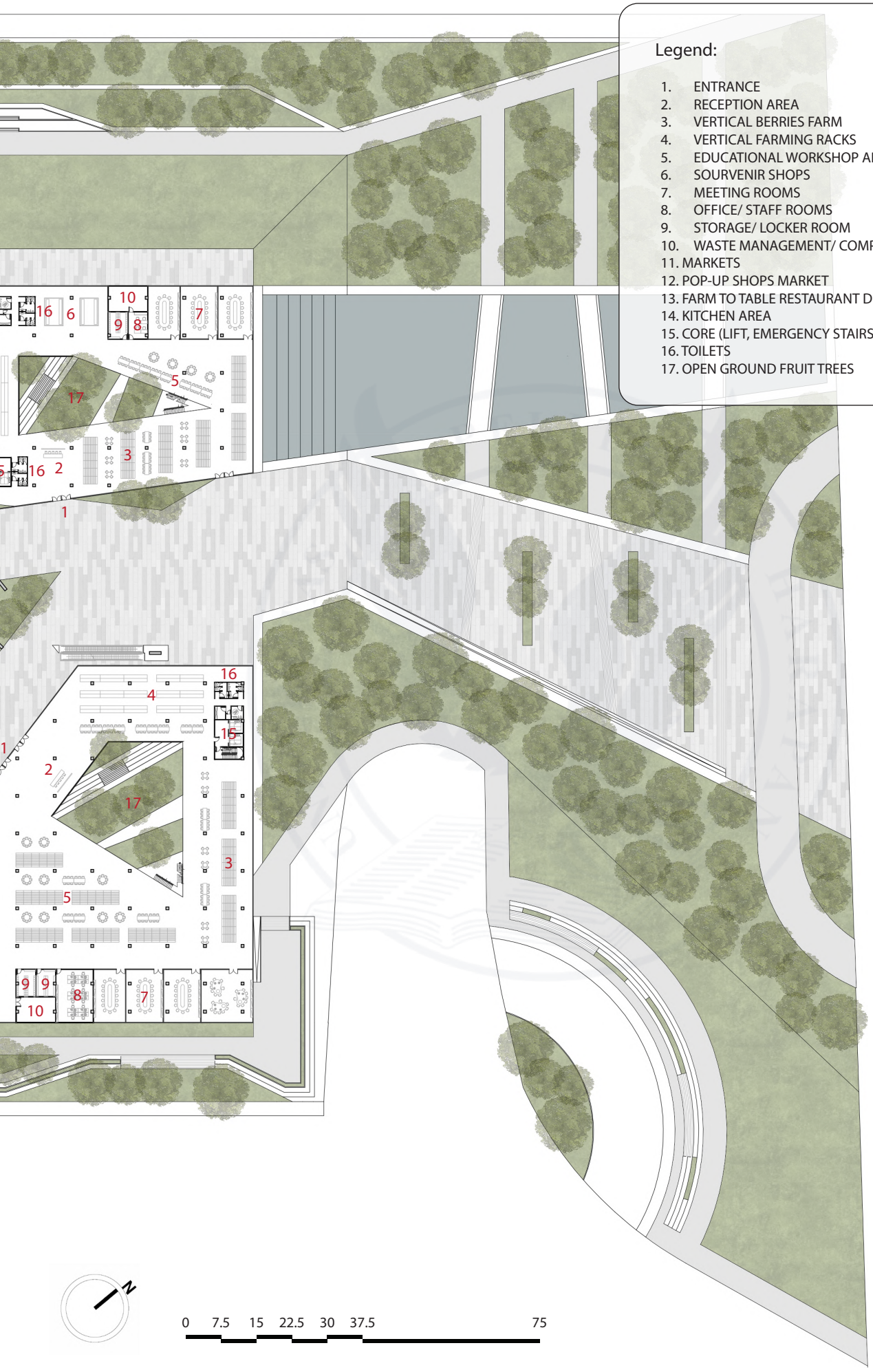
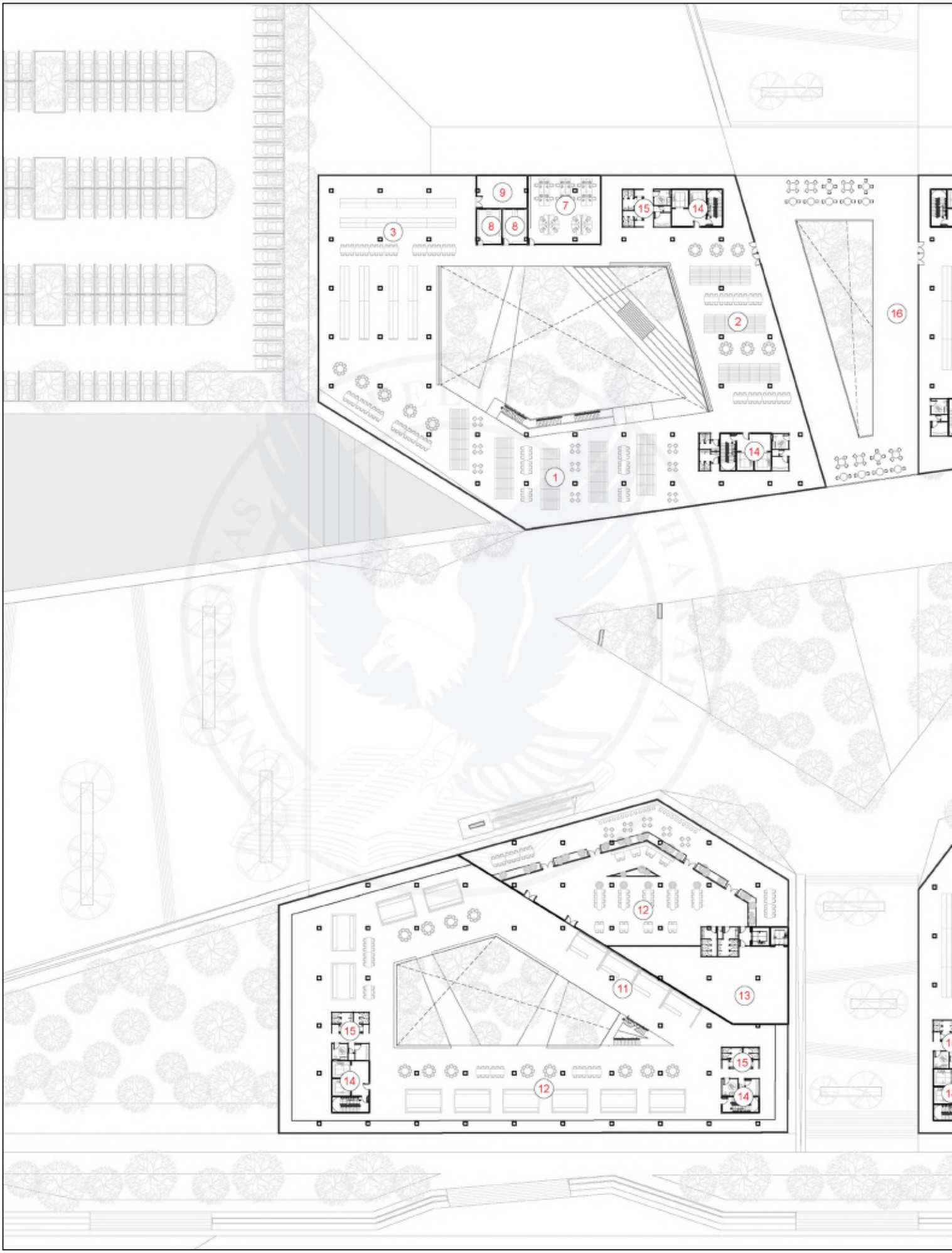


Figure 5.1 Site Plan
Source: Author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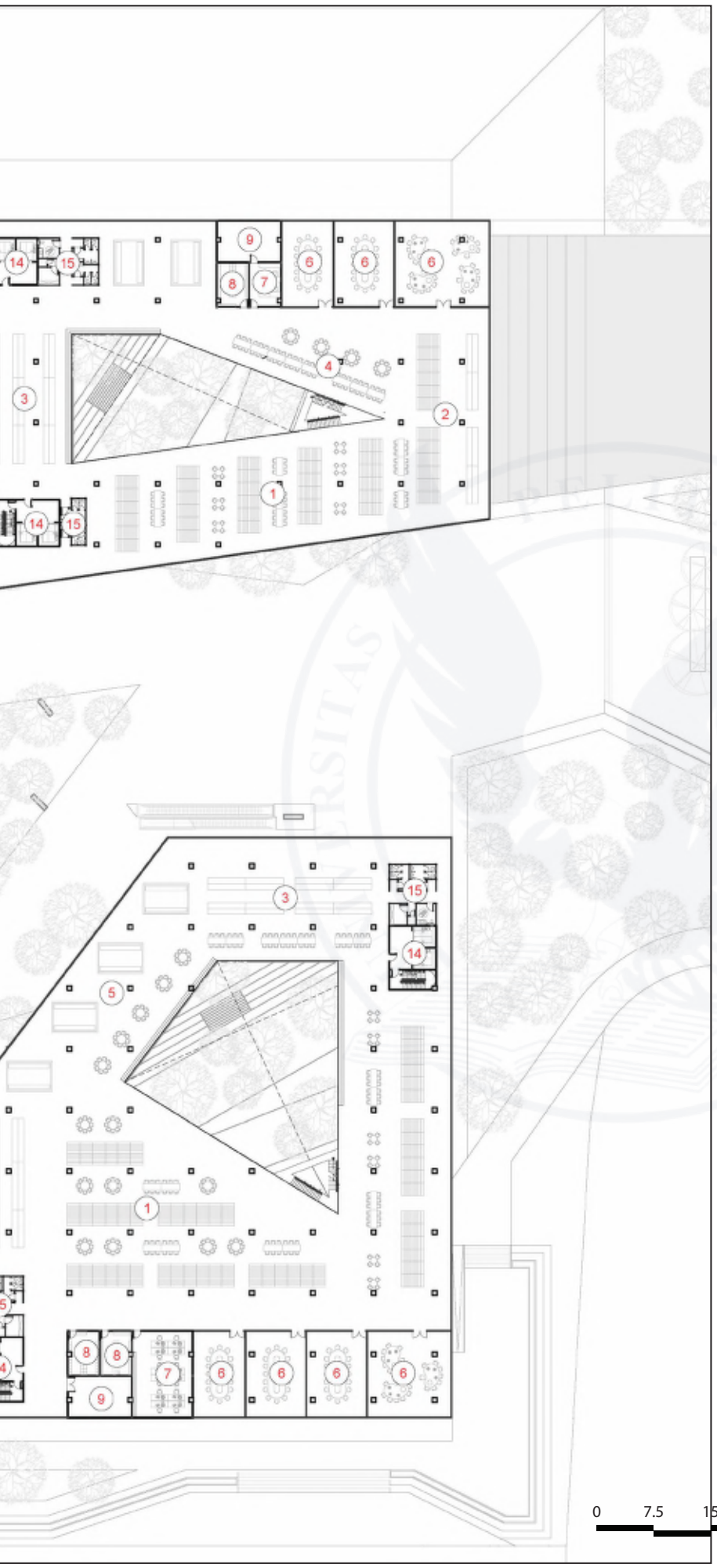
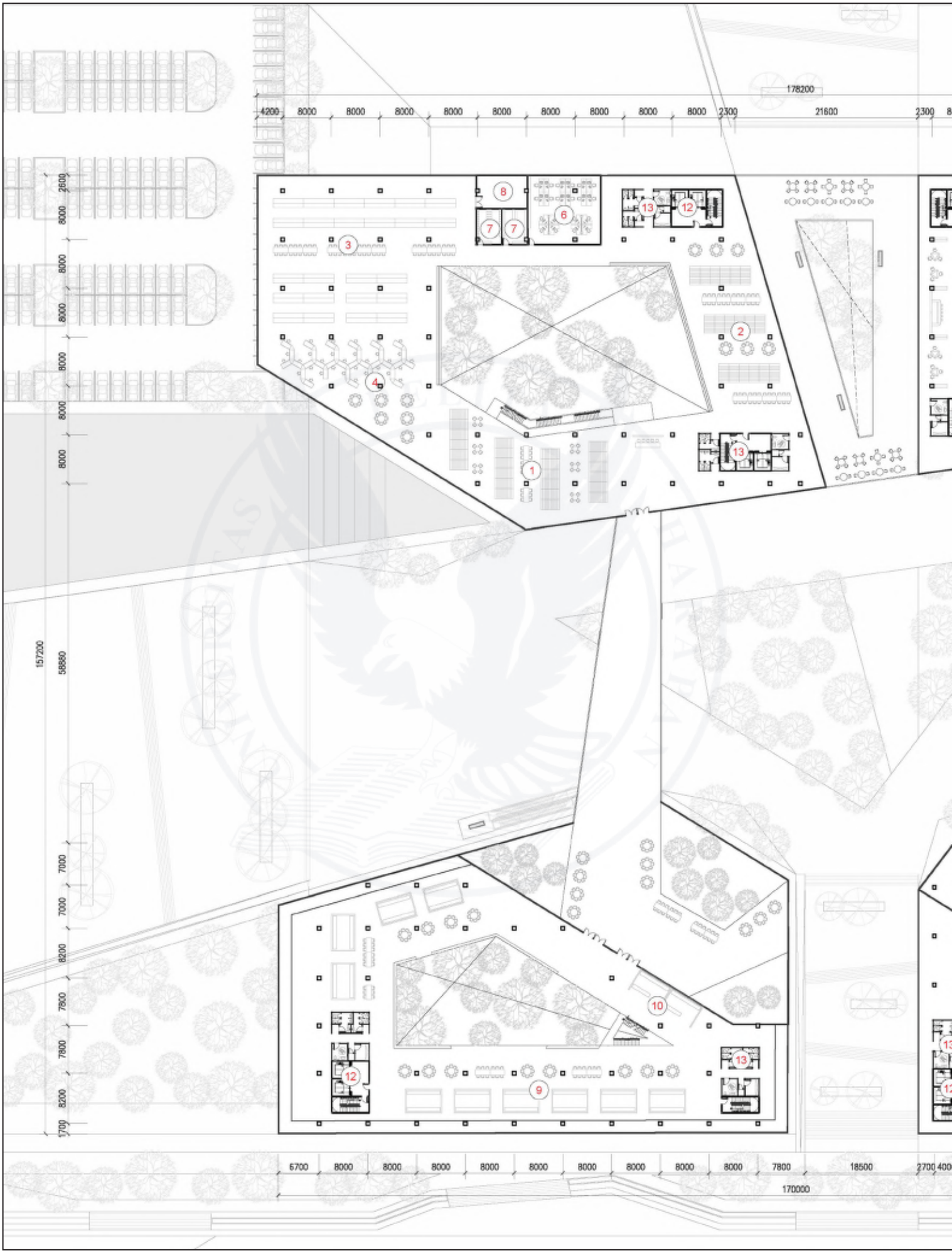


Legend:

1. FRUITY VEGETABLES (HIGH WIRE)
2. FRUITS CULTIVATION
3. VERTICAL FARMING RACKS
4. EDUCATIONAL WORKSHOP AREA
5. SOUVENIR SHOPS
6. MEETING ROOMS
7. OFFICE / STAFF ROOM
8. STORAGE / LOCKER ROOMS
9. WASTE MANAGEMENT / COMPOSTING ROOMS
10. MARKETS
11. POP-UP SHOPS MARKET
12. FARM-TO-TABLE RESTAURANT DINING AREA
13. KITCHEN AREA
14. CORE (LIFT, EMERGENCY STAIRS, SHAFT / MEP)
15. TOILETS (M/F/DISABLED)
16. TRANSITION OUTDOOR AREA

Figure 5.2 Floor Plan - 1st Floor
Source: Author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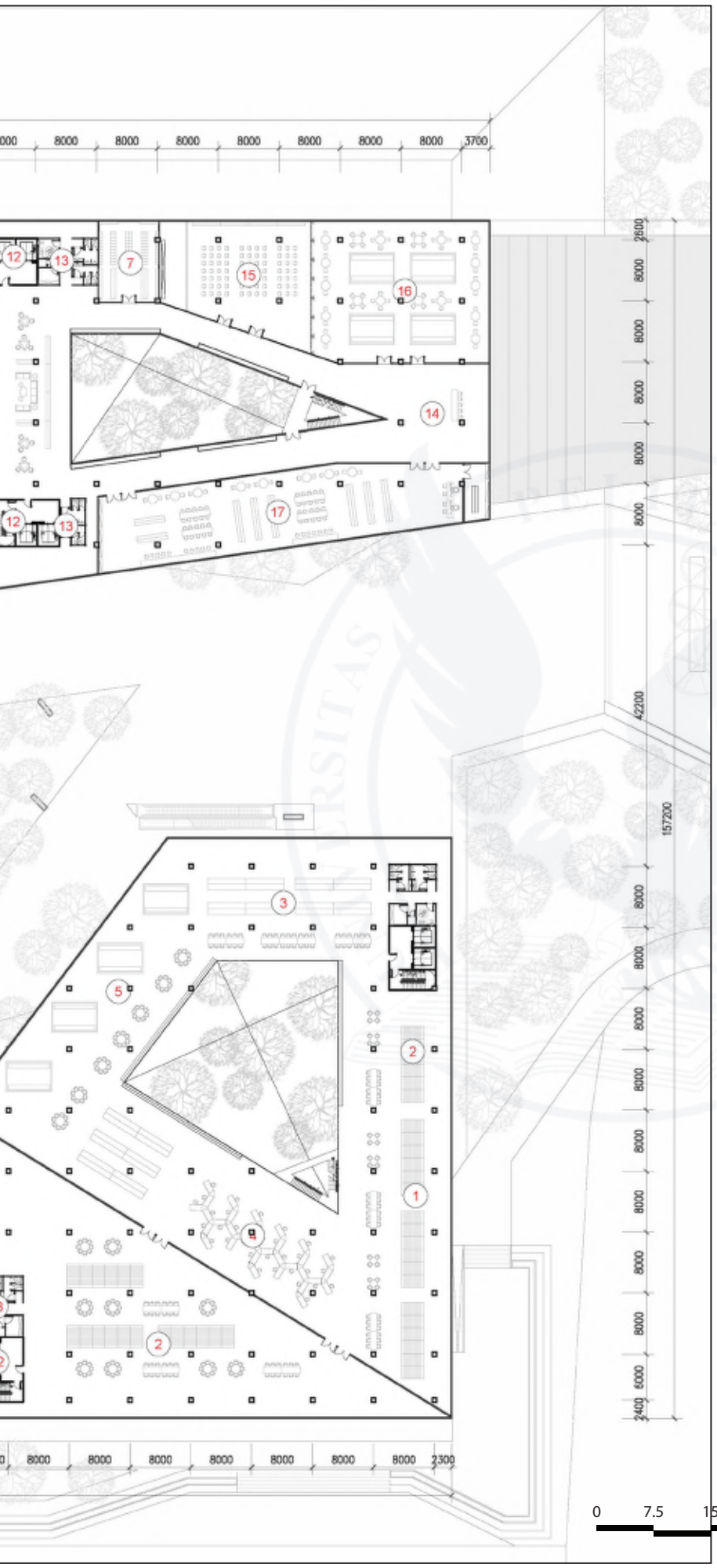
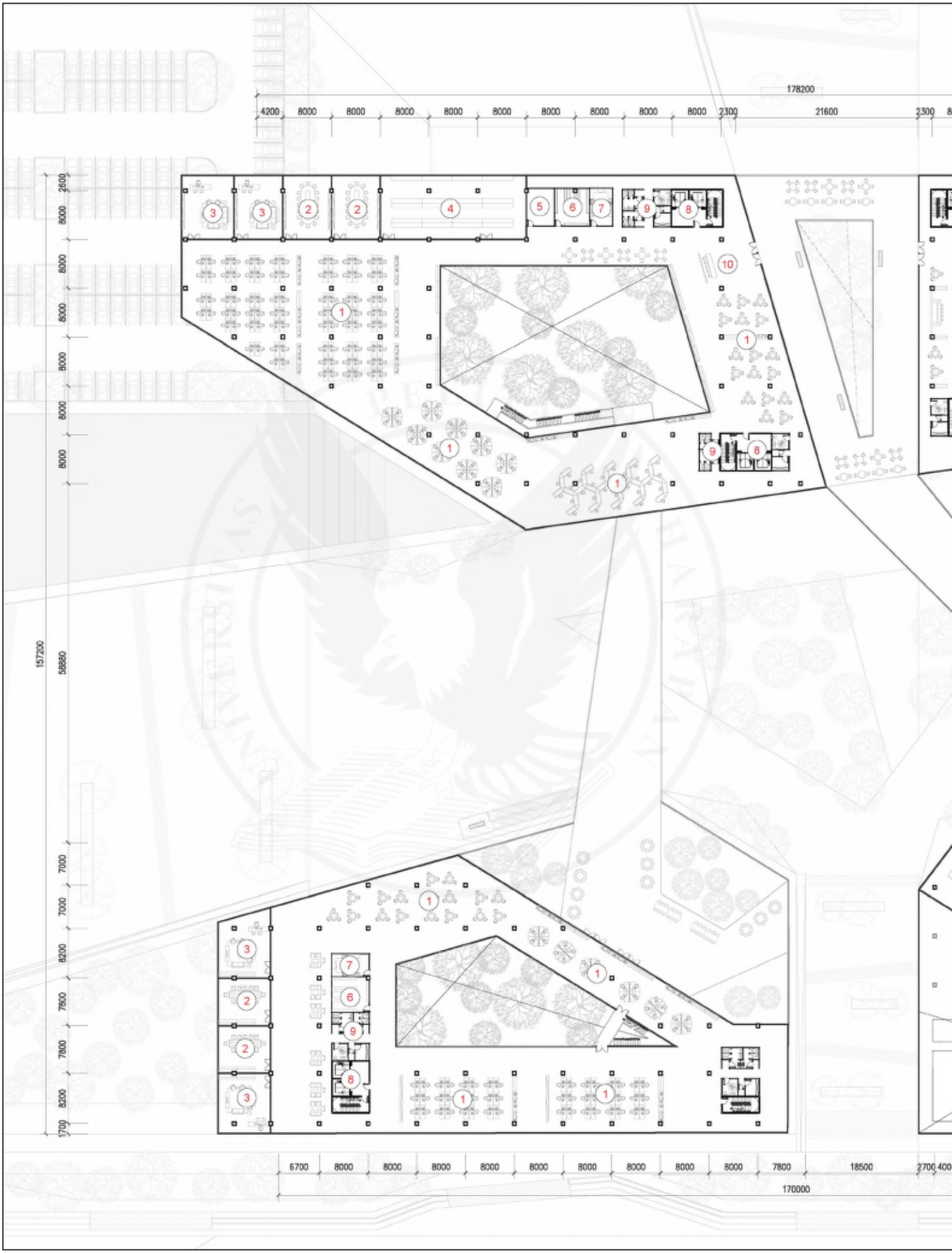


Legend:

1. FRUITY VEGETABLES (HIGH WIRE)
2. FRUITS CULTIVATION
3. VERTICAL FARMING RACKS
4. EDUCATIONAL WORKSHOP AREA
5. SOUVENIR SHOPS
6. OFFICE / STAFF ROOM
7. STORAGE / LOCKER ROOMS
8. WASTE MANAGEMENT / COMPOSTING ROOMS
9. MARKETS
10. POP-UP SHOPS MARKET
11. OUTDOOR SEATING AREA
12. CORE (LIFT, EMERGENCY STAIRS, SHAFT / MEP)
13. TOILETS (M/F/DISABLED)
14. RECEPTION AREA
15. AUDITORIUM / LECTURE HALLS
16. MULTIPURPOSE HALLS
17. LIBRARY
18. LOUNGE AREA

Figure 5.3 Floor Plan - 2nd Floor
Source: Author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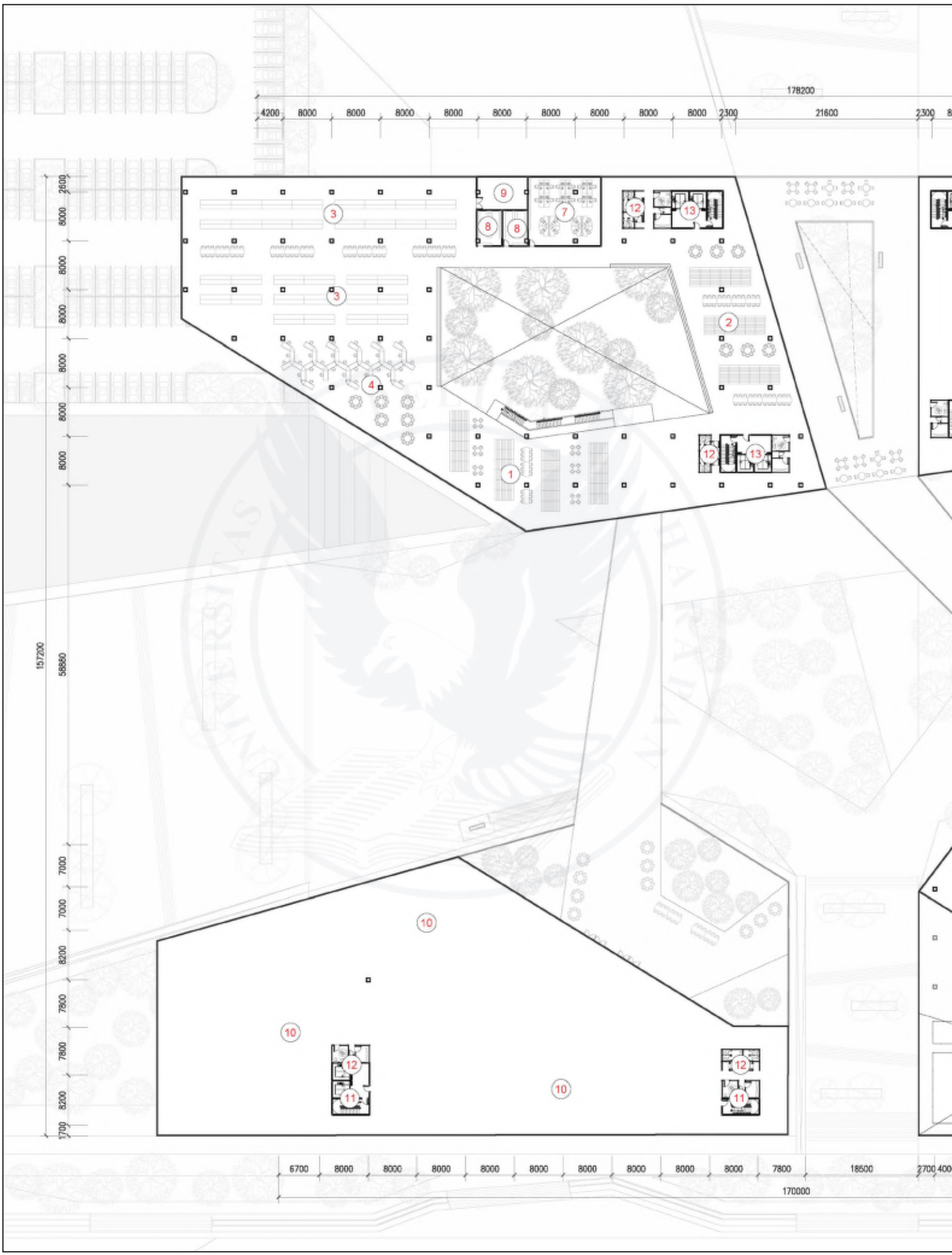
Legend:

1. OFFICE AREA (RESEARCH & DEVELOPMENT)
2. MEETING ROOMS
3. SENIOR CABINS
4. LABORATORY
5. WASTE MANAGEMENT / COMPOSTING ROOMS
6. STORAGE / LOCKER ROOMS
7. OPEN PANTRY
8. CORE (LIFT, EMERGENCY STAIRS, SHAFT / MEP)
9. TOILETS (M/F/DISABLED)
10. RECEPTION AREA
11. AUDITORIUM / LECTURE HALLS
12. MULTIPURPOSE HALLS
13. LIBRARY
14. LOUNGE AREA

Figure 5.4 Floor Plan - 3rd Floor
Source: Author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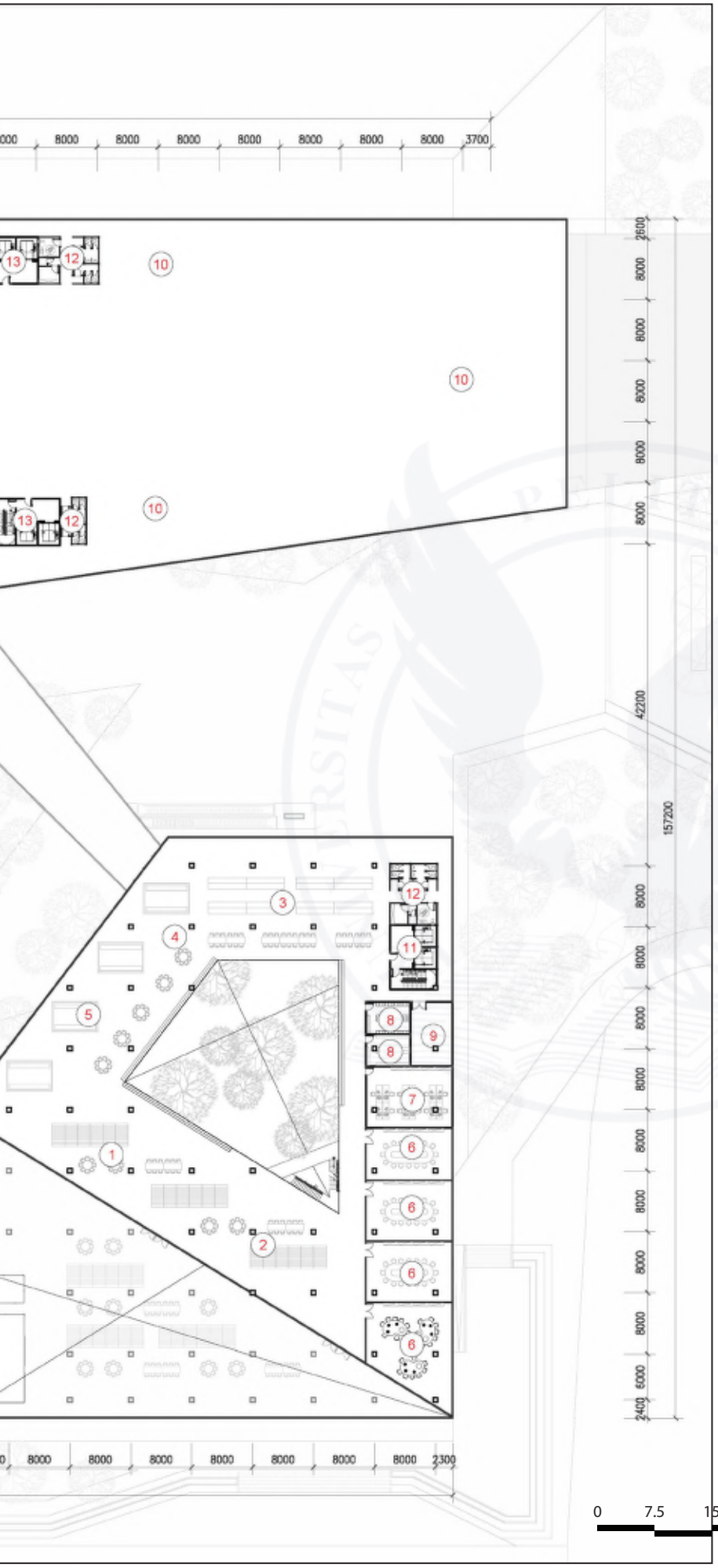


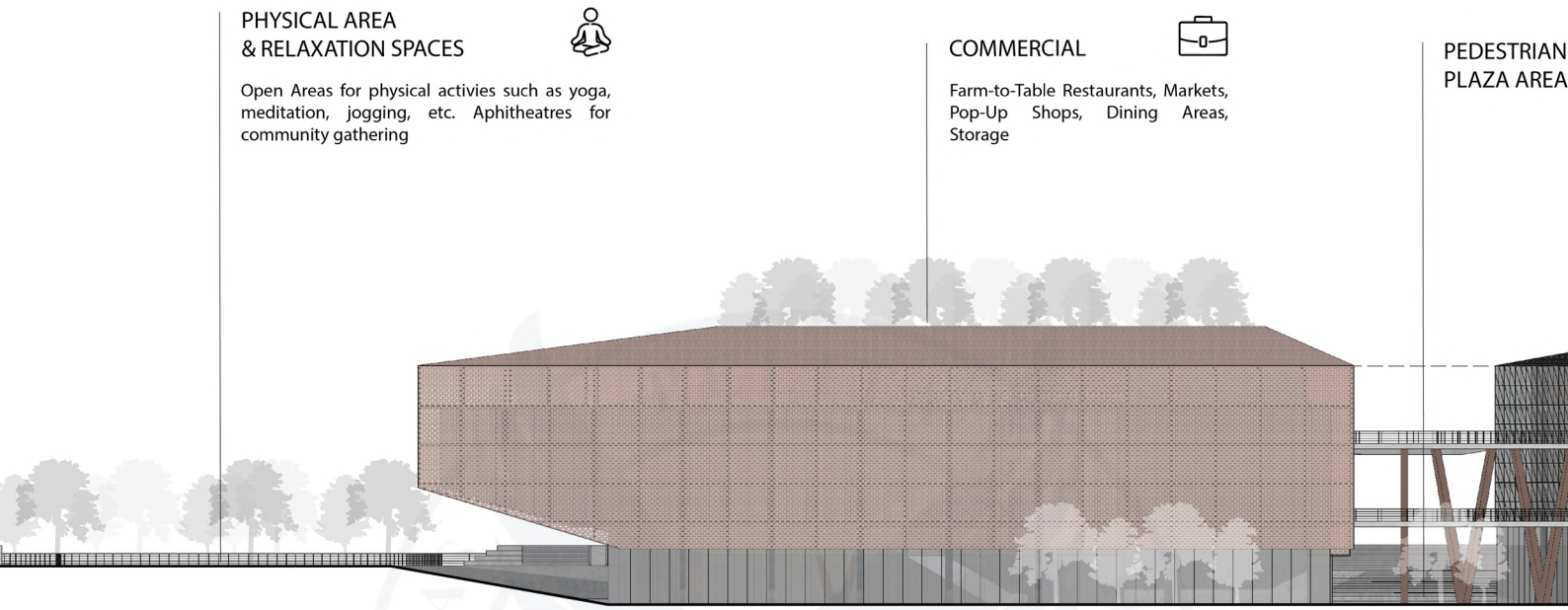
Legend:

1. LEAFY VEGETABLES (GUTTERS)
2. LEAFY VEGETABLES (BASIN)
3. LEAFY VEGETABLES (VERTICAL FARMING RACKS)
4. EDUCATIONAL WORKSHOP AREA
5. SOUVENIR SHOPS
6. MEETING ROOMS
7. OFFICE / STAFF ROOM
8. STORAGE / LOCKER ROOMS
9. WASTE MANAGEMENT / COMPOSTING ROOMS
10. ROOFTOP GARDENS
11. CORE (LIFT, EMERGENCY STAIRS, SHAFT / MEP)
12. TOILETS (M/F/DISABLED)

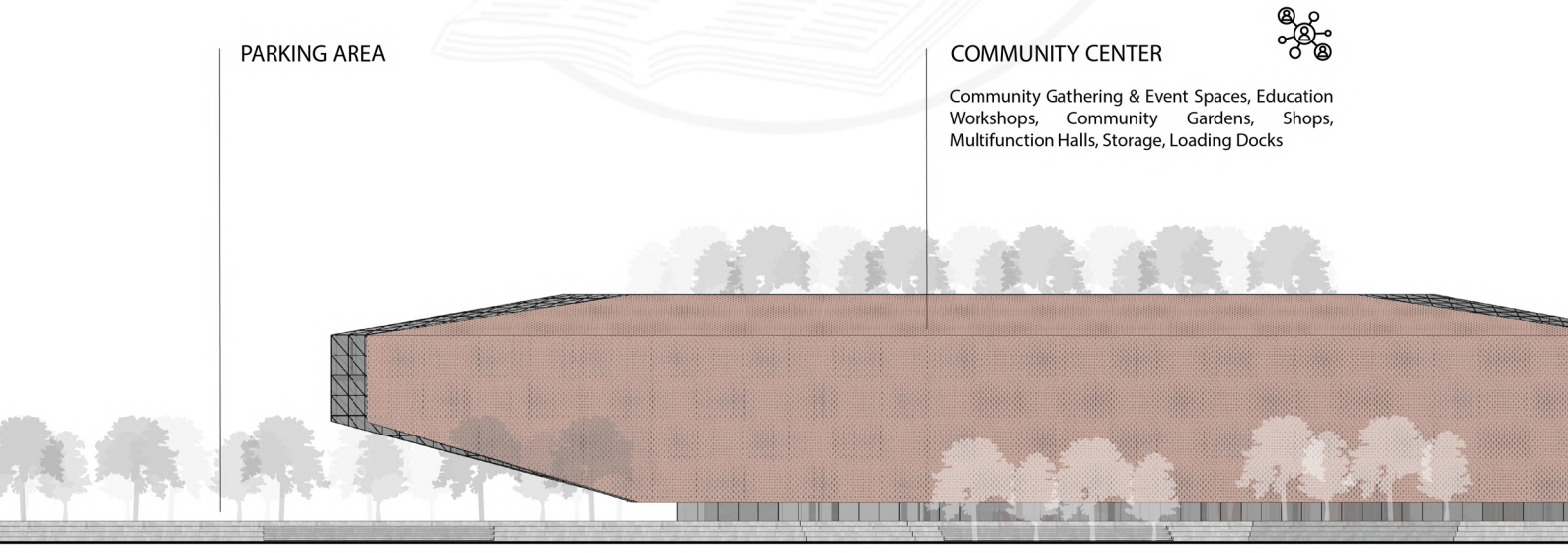
Figure 5.5 Floor Plan - 4th Floor
Source: Author

Main Plaza View

Figure 5.6 Schematic Elevation A' & B' Drawings
Source: Author



ELEVATION A



ELEVATION B

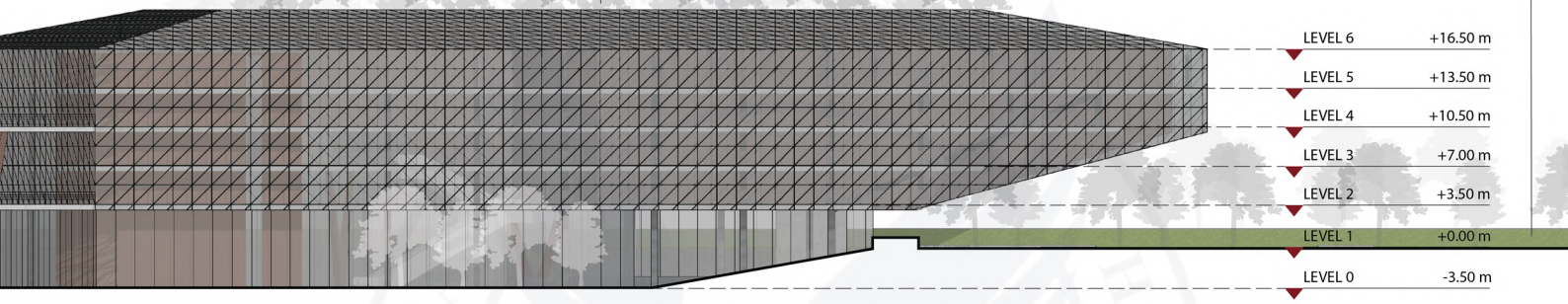
0 10 50 100

PATHWAY

URBAN FARMING

Greenhouses, Vertical Farming, Rooftop Gardens, Laboratories, Office / Staff Rooms, Waste Management / Composting Rooms, Storage, Loading Docks

PARKING AREA



PEDESTRIAN PATHWAY
PLAZA AREA

URBAN FARMING

Greenhouses, Vertical Farming, Rooftop Gardens, Laboratories, Office / Staff Rooms, Waste Management / Composting Rooms, Storage

PHYSICAL AREA
& RELAXATION SPACES

Open Areas for physical activies such as yoga, meditation, jogging, etc. Aphitheatres for community gathering

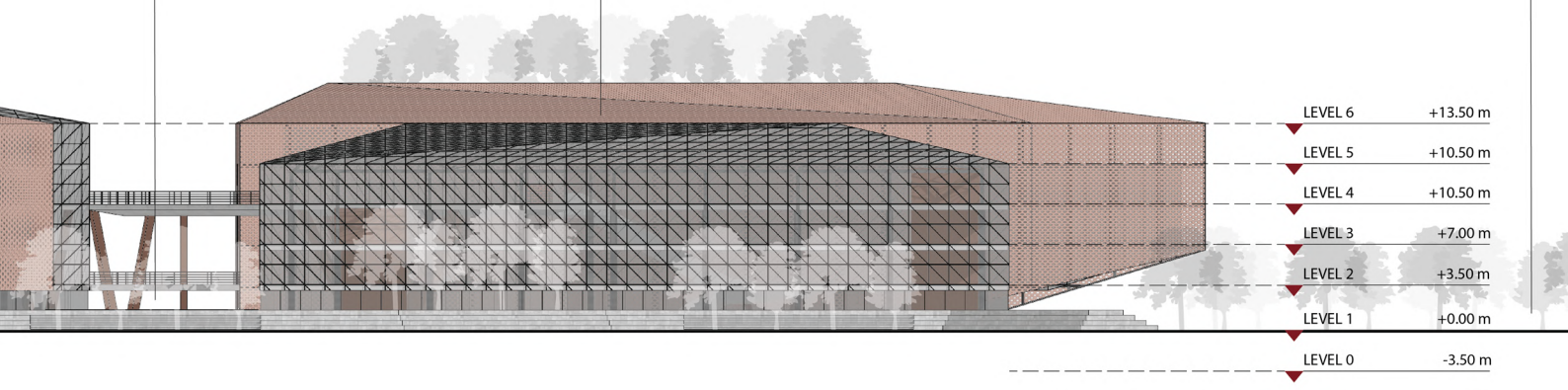
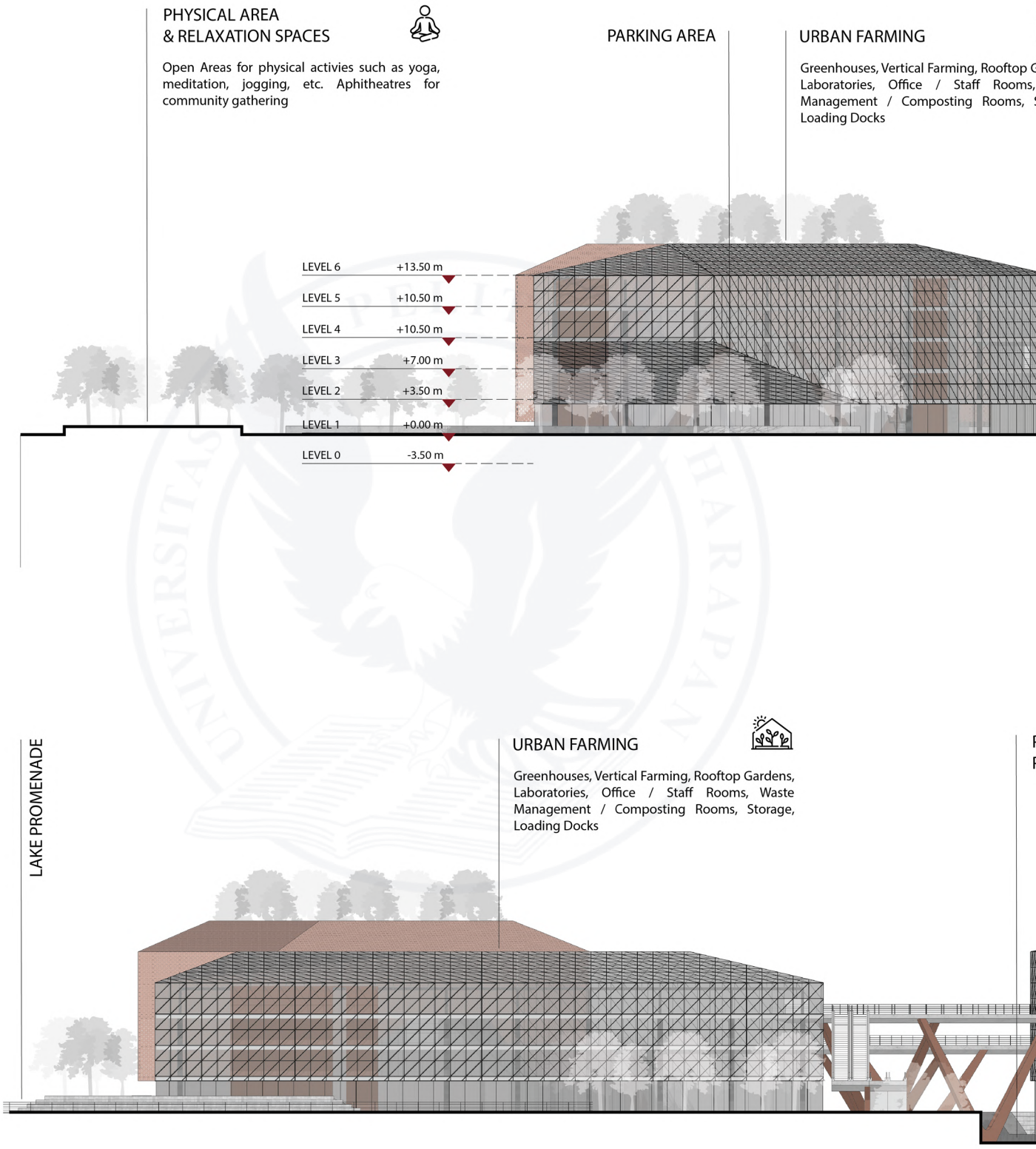


Figure 5.6 Schematic Elevation C' & D' Drawings
Source: Author



0 10 50 100

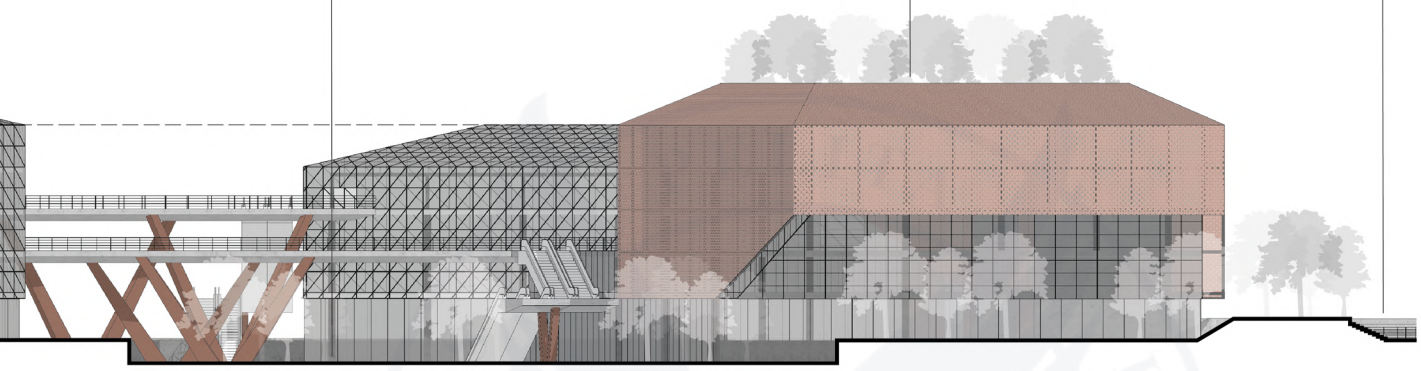
Gardens,
Waste
Storage,

PEDESTRIAN PATHWAY
PLAZA AREA

COMMERCIAL

Farm-to-Table Restaurants, Markets, Pop-Up Shops, Dining Areas, Storage

LAKE PROMENADE



ELEVATION C

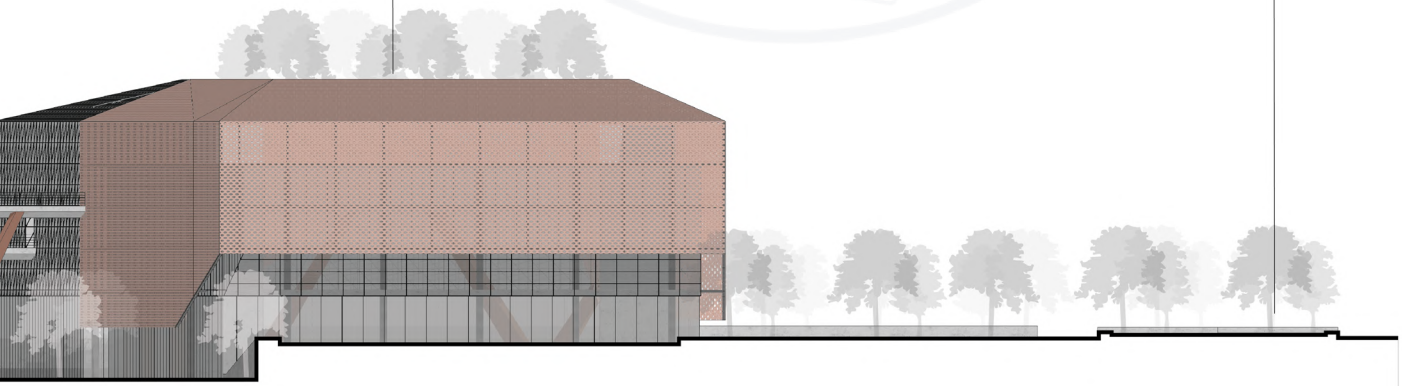
PEDESTRIAN PATHWAY
PLAZA AREA

COMMUNITY CENTER

Community Gathering & Event Spaces, Education Workshops, Community Gardens, Shops, Multifunction Halls, Storage, Loading Docks

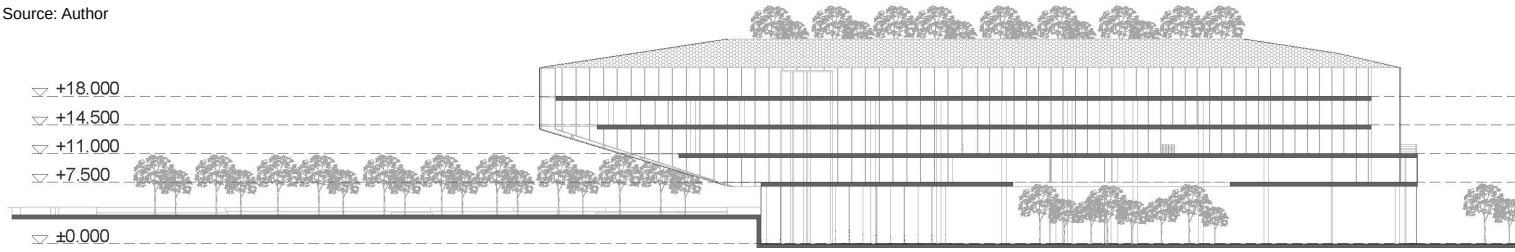
PHYSICAL AREA
& RELAXATION SPACES

Open Areas for physical activies such as yoga, meditation, jogging, etc. Aphitheatres for community gathering

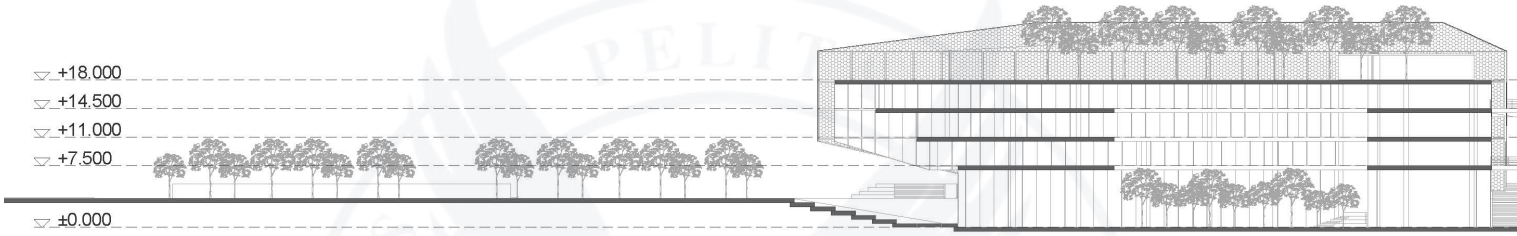


ELEVATION D

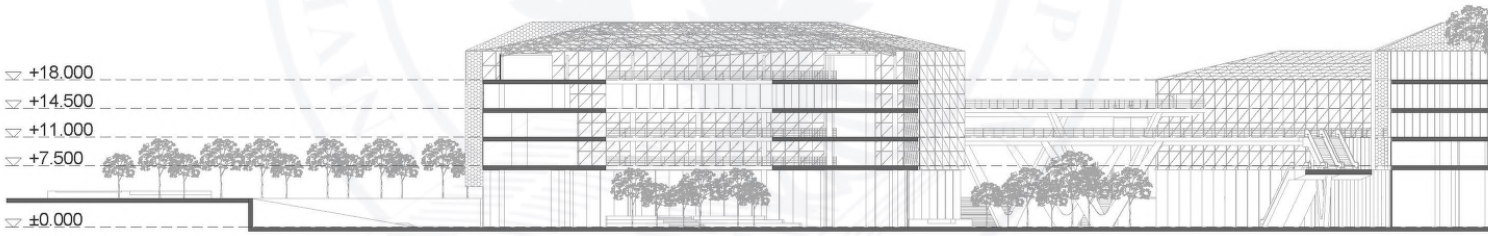
Figure 5.7 Section Drawings
Source: Author



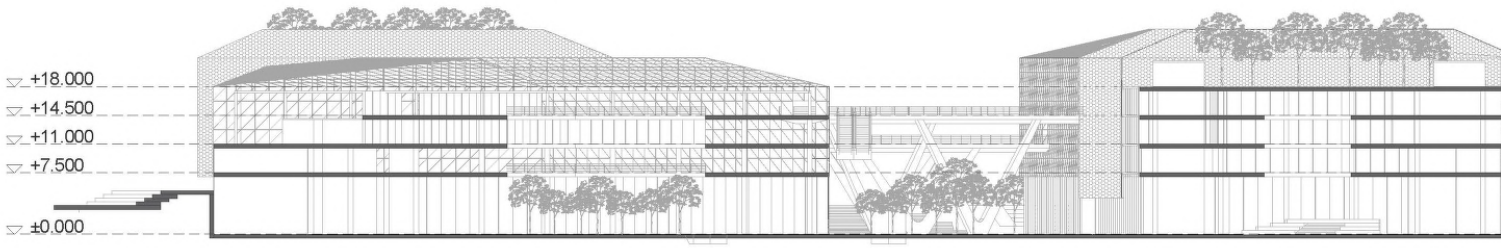
SECTION A-A



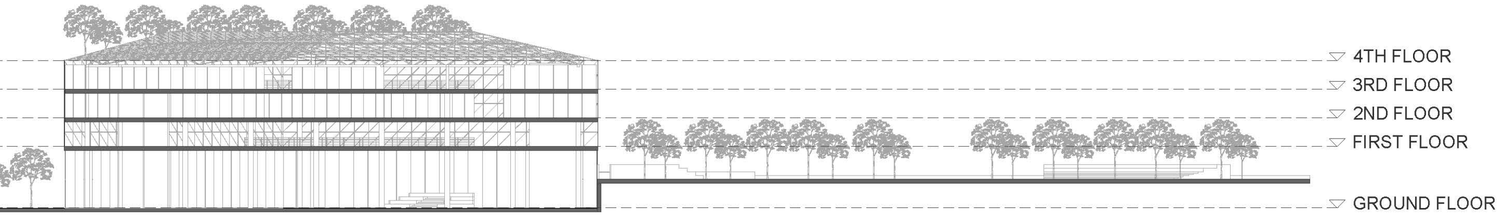
SECTION B-B

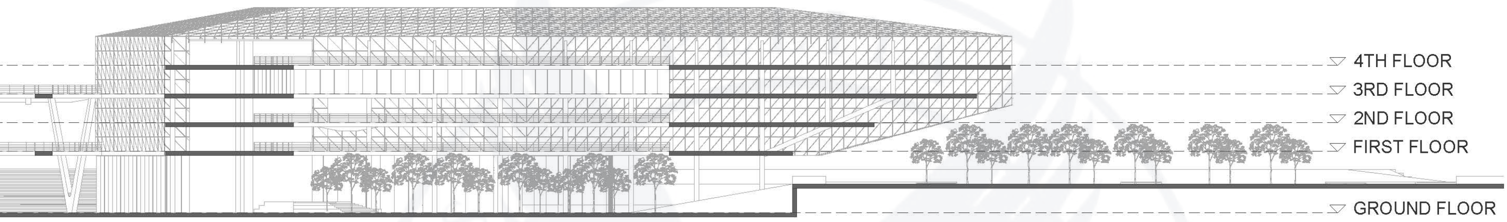


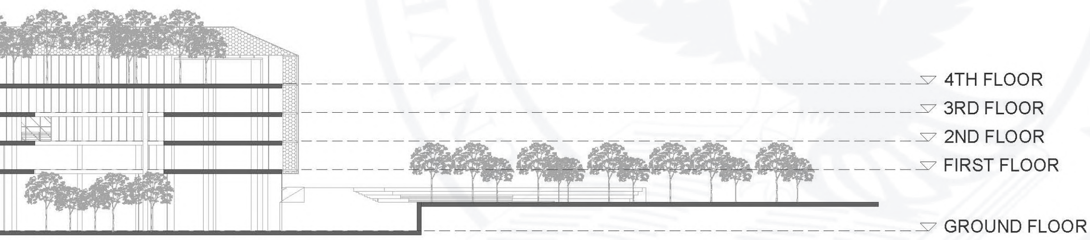
SECTION C-C

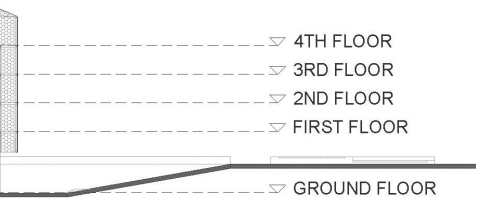


SECTION D-D









5.2 Form and Massing Strategy

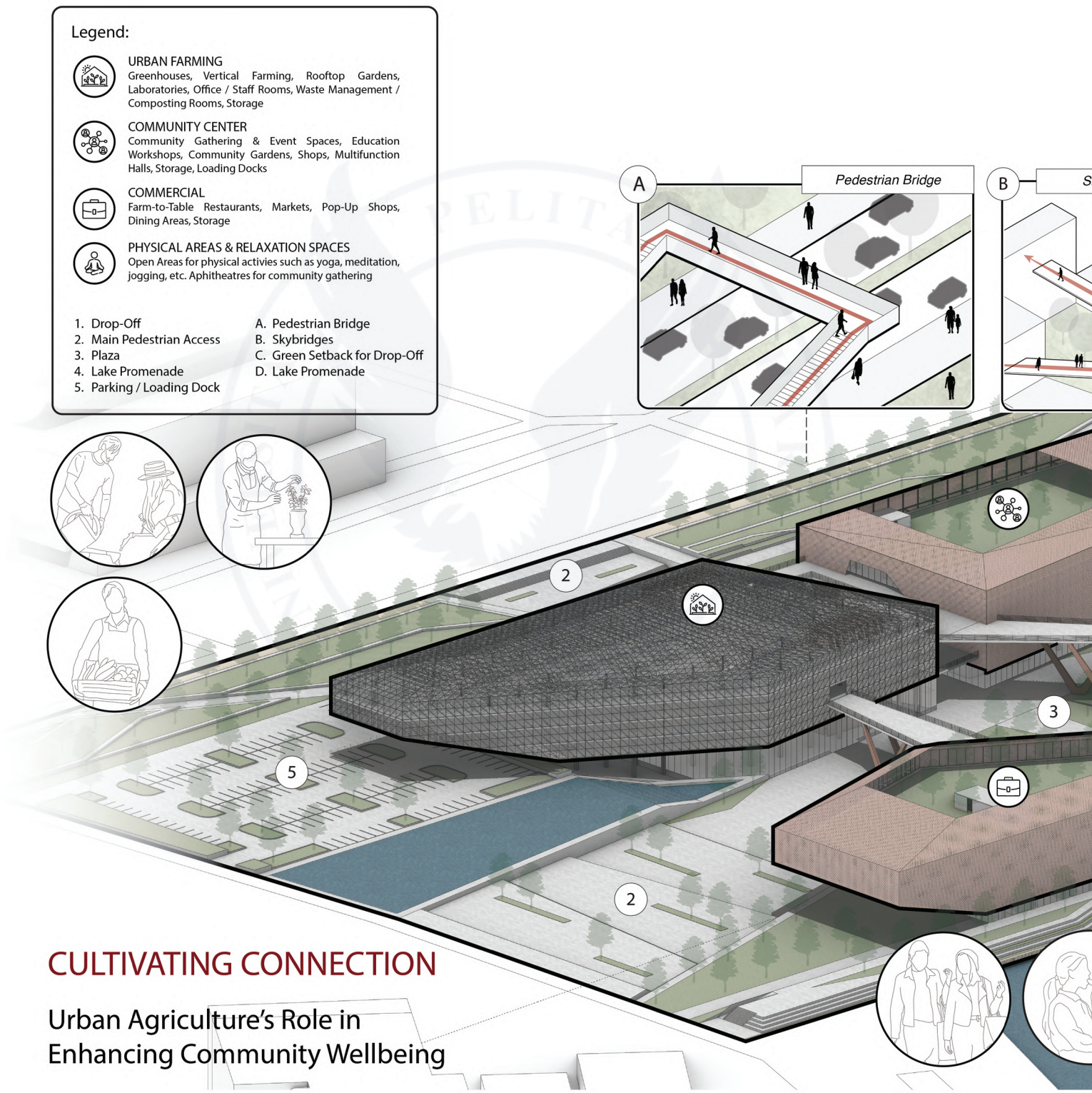
These elevation and section drawings illustrate the project's form and massing strategy. The building adopts an elongated, southward-oriented layout to optimize sunlight exposure for urban farming. Each structure's distinct architectural expression reflects its function: the building with the triangular glass façade houses the urban farming spaces, while the volumes clad in a terracotta-colored secondary skin accommodate the community center and commercial functions.

The sequence of spaces—green buffer, building, plaza, building, green buffer—is clearly articulated, promoting a balanced interplay between built and open environments. The drawings also highlight central voids with indoor gardens and rooftop gardens, emphasizing ventilation, daylighting, and the integration of greenery throughout the design.

0 10 50 100

Main Plaza View

Figure 5.8 Isometry Schematic Diagram
Source: Author



5.3 Spatial Organization and Layout

This project integrates urban farming, a community center, commercial areas, and physical and relaxation spaces into a cohesive framework designed to enhance overall community wellbeing. A variety of activities can occur simultaneously across different zones, offering spaces for leisure, stress relief, and social interaction. The design promotes a sense of openness and accessibility, encouraging spontaneous use and fostering inclusive engagement.

Seamless internal and external connectivity is achieved through a thoughtful network of plazas, lake promenades, a pedestrian bridge, and a skybridge. These elements not only facilitate smooth circulation throughout the site but also strengthen connections to the surrounding urban fabric, creating a vibrant, interconnected community hub.

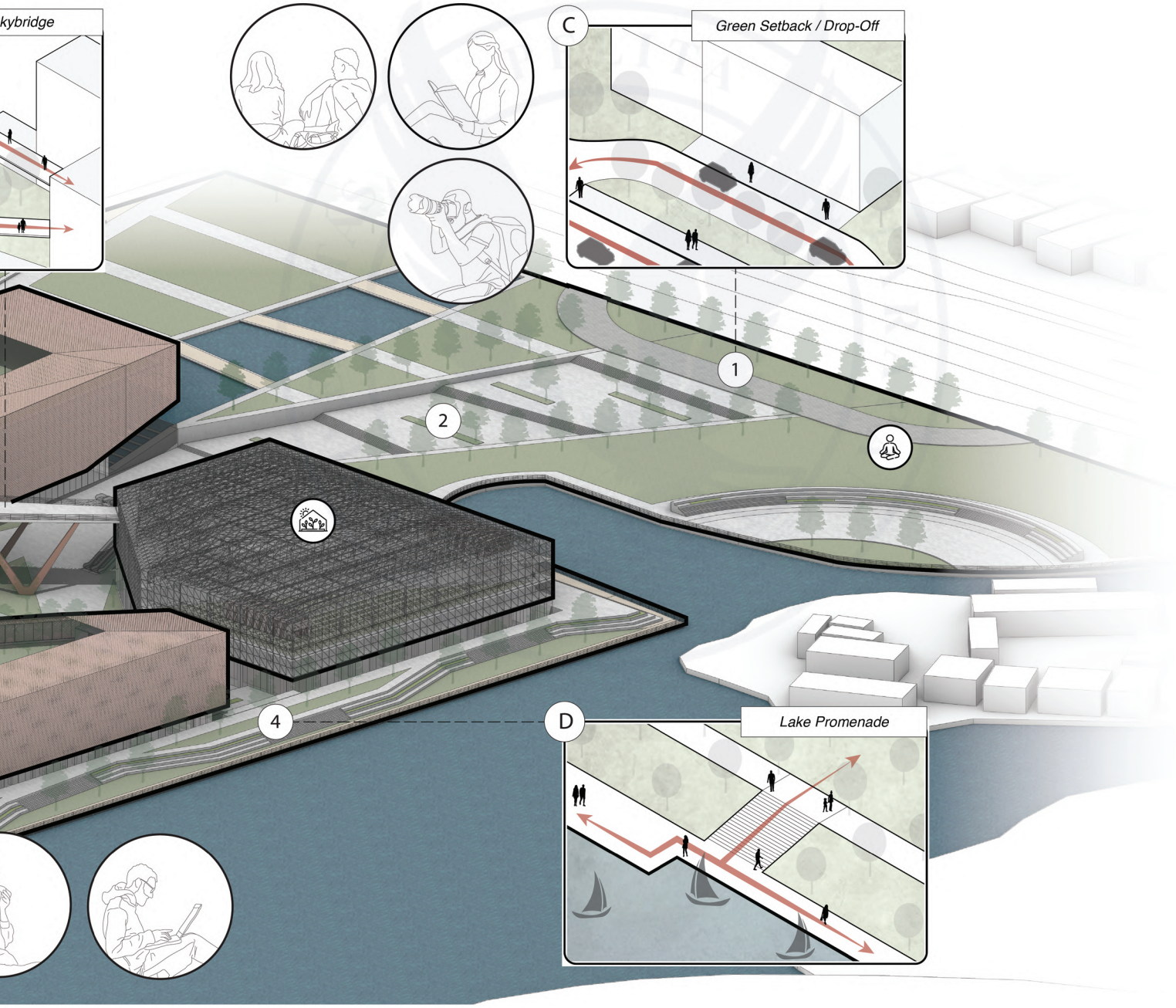


Figure 5.9 Physical and Relaxation Spaces
Source: Author

The physical and relaxation spaces, along with the lake promenade, offer a serene environment where people can unwind, connect with nature, and engage in a variety of activities that support wellbeing. Surrounded by lush greenery and the calming presence of the lake, these areas are designed as inviting retreats for exercise, social interaction, or quiet contemplation. Whether it's a morning jog, yoga by the water, a leisurely walk, or simply relaxing on a bench, visitors can enjoy a peaceful escape that promotes mental and physical rejuvenation.

Figure 5..11 Section Perspective
Source: Author

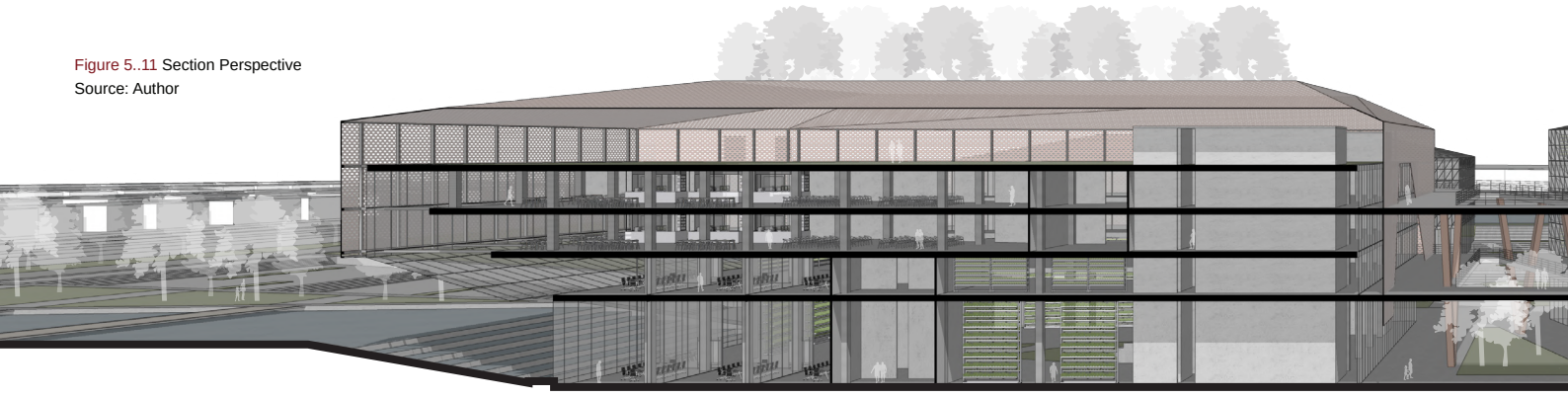
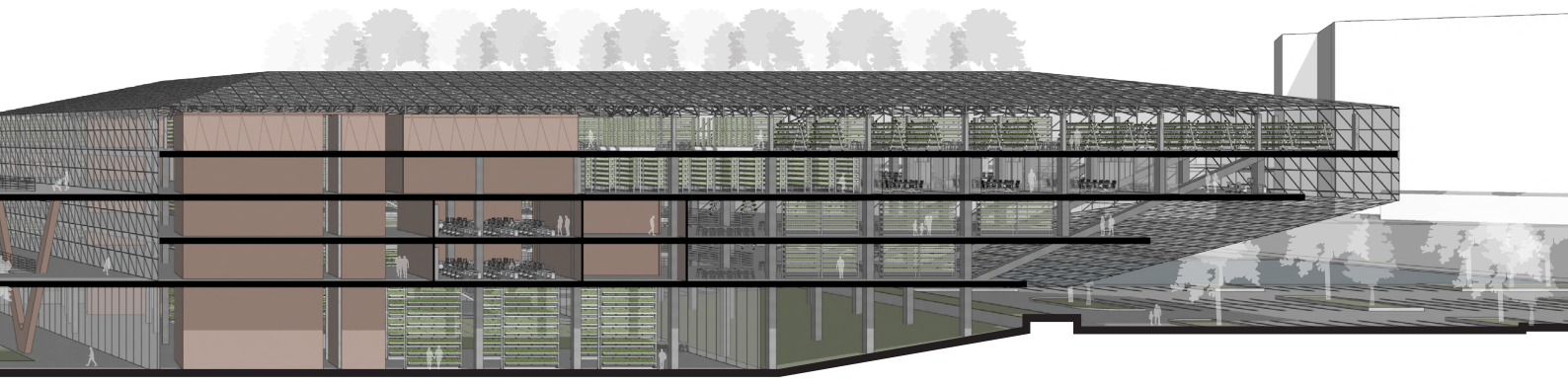
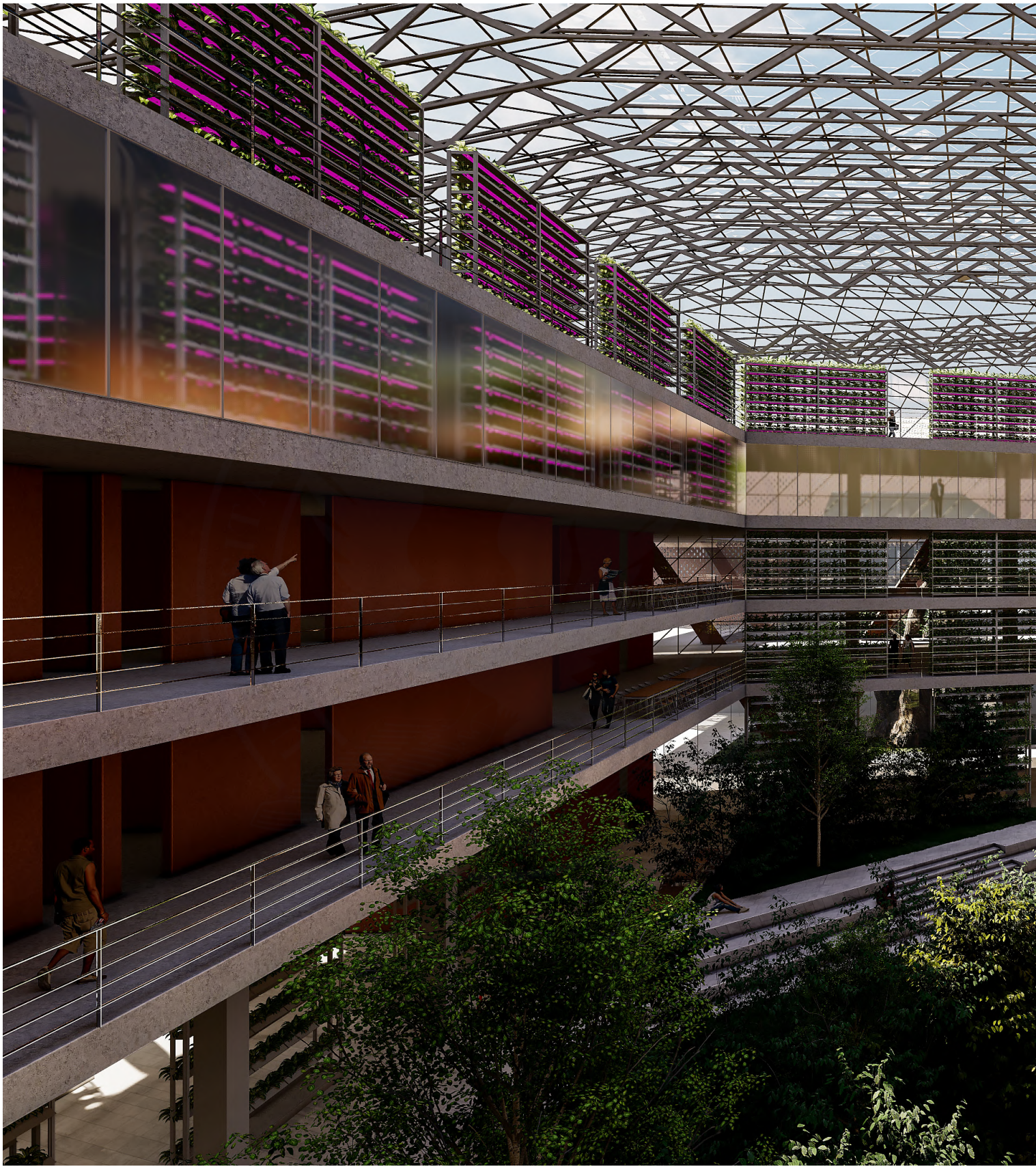


Figure 5.10 Lake Promenade
Source: Author

This section perspective illustrates the seamless connection between the urban farming spaces and the community center, highlighting how their functions are thoughtfully intertwined. The design encourages interaction and shared experiences, allowing people to engage in both agricultural and social activities within a unified public environment. By blurring the boundaries between growing, learning, and gathering, the space fosters a vibrant, inclusive atmosphere where community and cultivation coexist harmoniously.





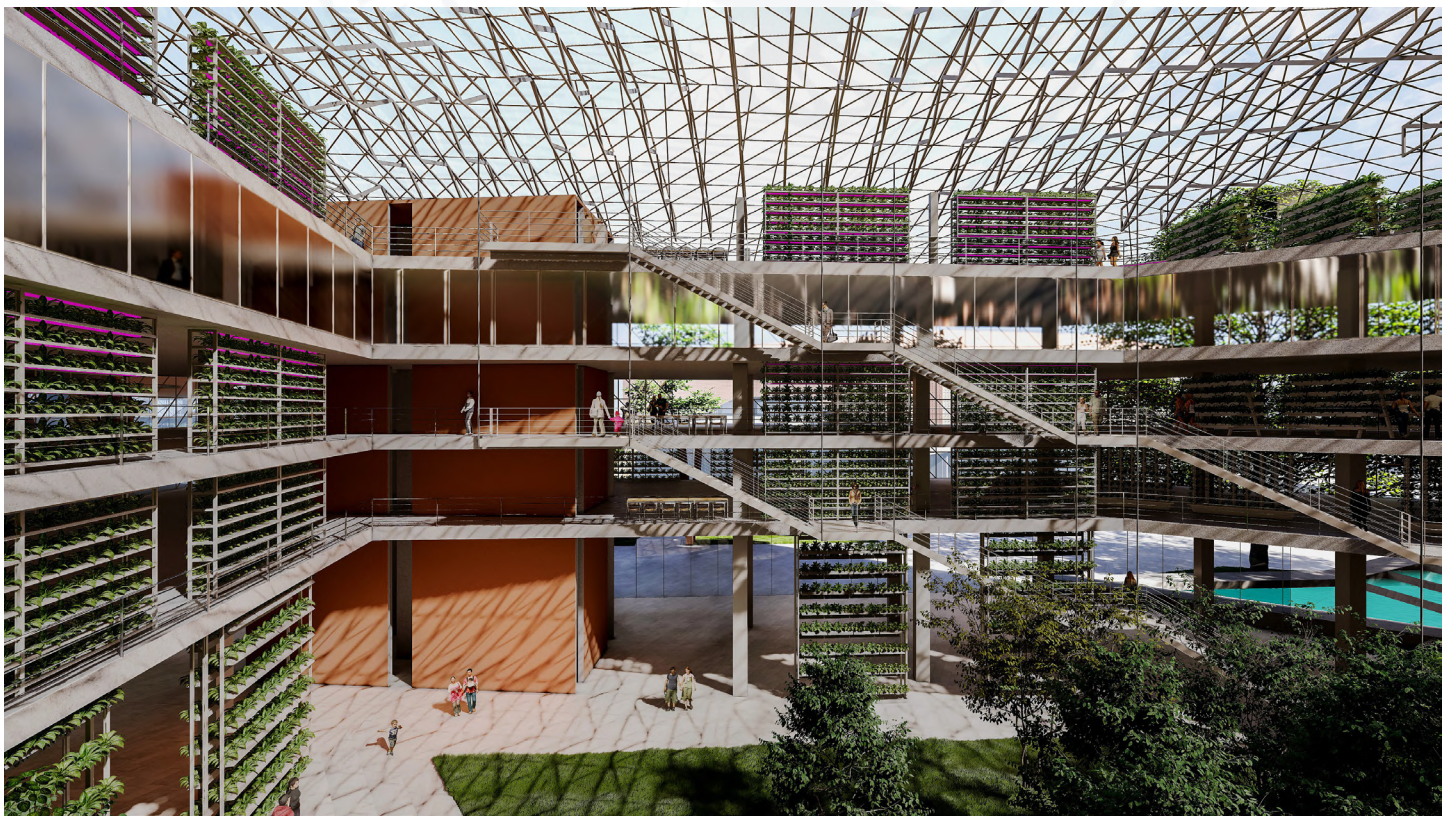
Urban Farming View

5.4 Implementation of Central Voids as Living, Breathing Spaces

Each building mass is designed with a central void that opens the heart of the structure to sunlight, air, and activity. These voids create a sense of openness and visual relief, allowing natural light to penetrate deep into the building and activating all levels with warmth and energy.

At ground level, the voids become vibrant community gathering spaces and venues for events, while also housing lush indoor gardens that enhance well-being. Throughout the vertical structure, these openings enable urban farming to thrive, making food production an integrated and visible part of daily life. The result is a built environment that breathes, connects, and cultivates.

Figure 5..12 Urban Farming - Central Voids
Source: Author



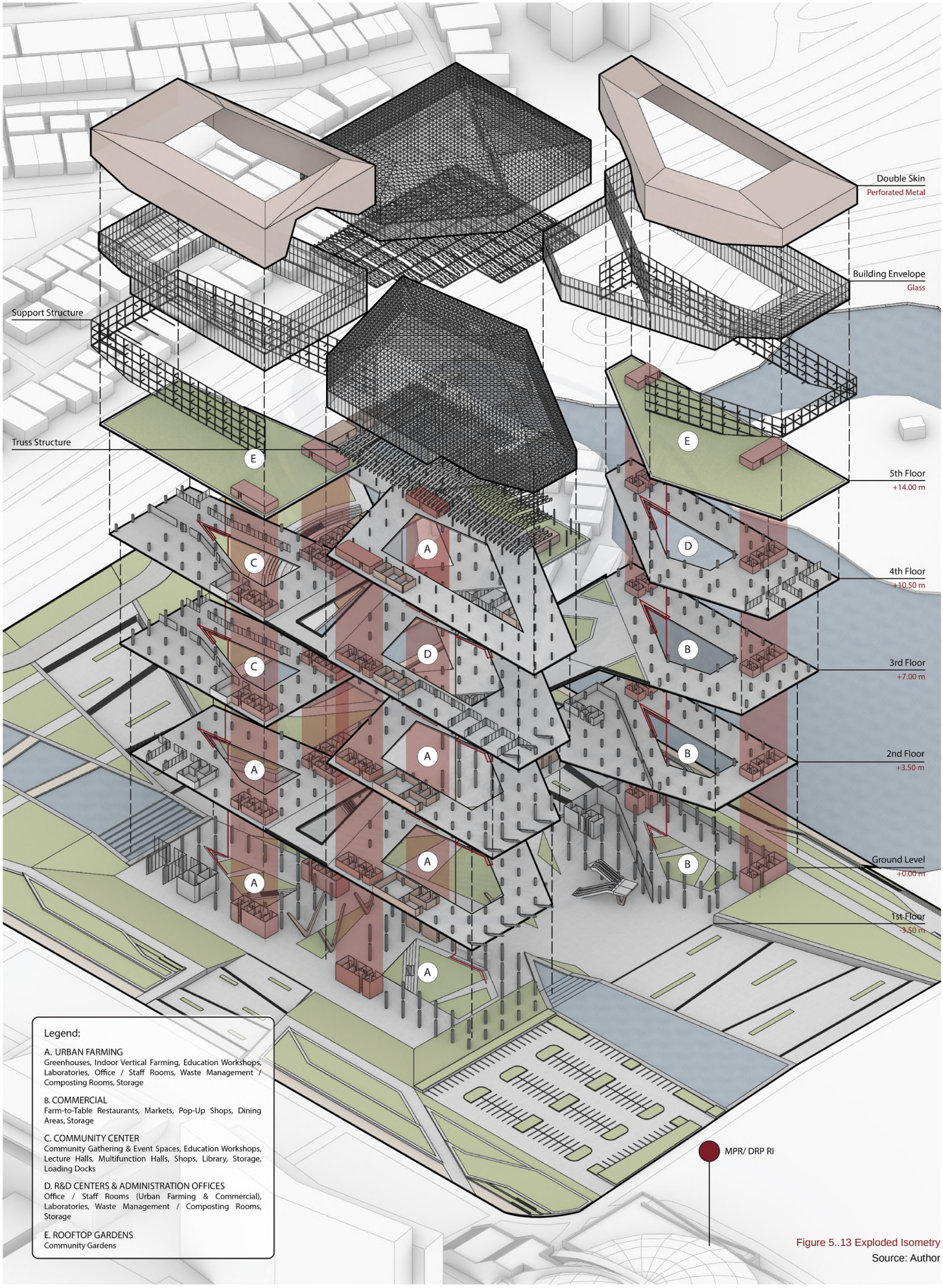


Figure 5..13 Exploded Isometry
Source: Author

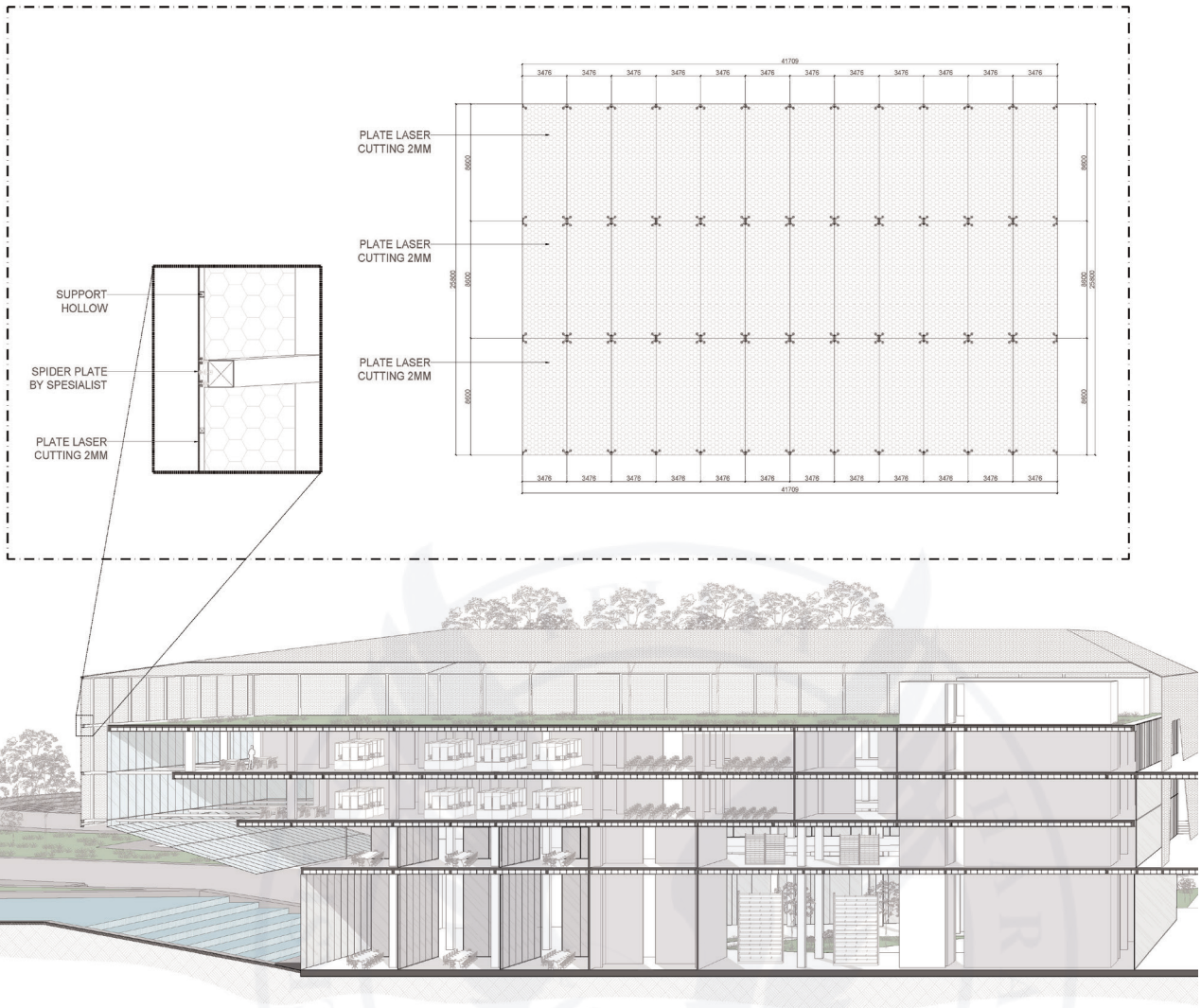
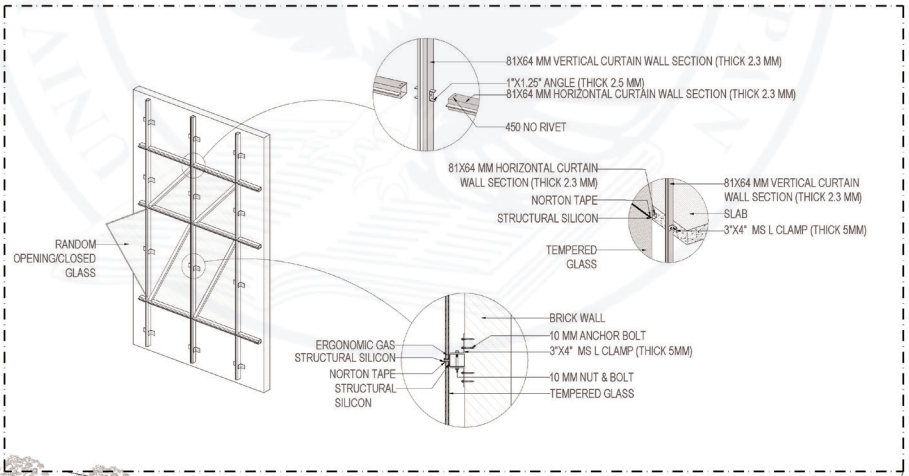


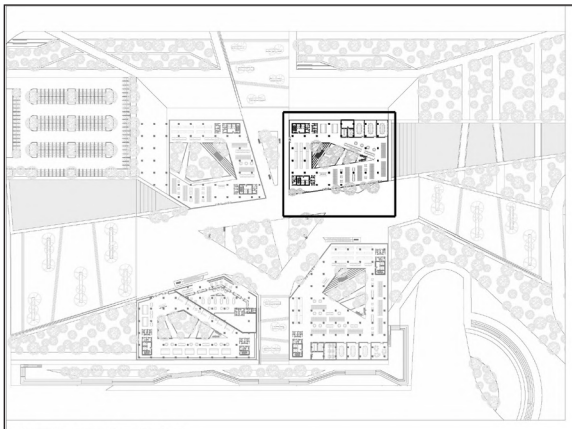
Figure 5..14 Adaptive Facade
Source: Author



5.5 Adaptive Facade Strategies

The façade of the urban farming building is designed in a triangular form and utilizes glass as its primary material. This design not only establishes an iconic and futuristic architectural expression but also serves as an active component in regulating the building's microclimate. The glass façade is mechanically operable, allowing for automated opening and closing to optimize both cross and stack ventilation. This enables the circulation of natural air, which helps maintain optimal temperature and humidity levels conducive to plant growth. The extensive use of glass also facilitates the penetration of abundant natural light, thereby supporting the photosynthetic processes within the vertical farming system employed in the building.

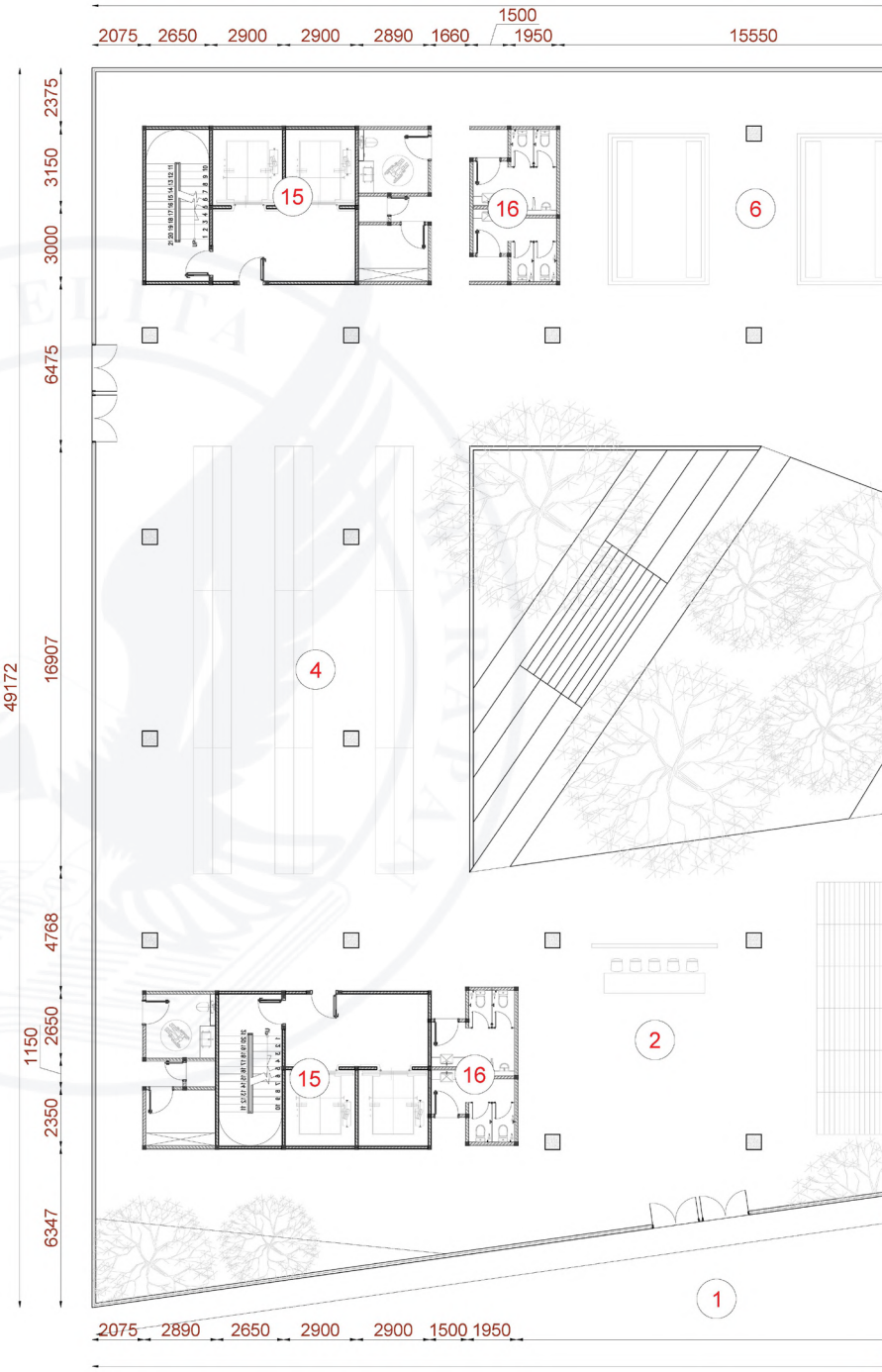
Conversely, the community center building also incorporates a glass façade to foster visual connectivity between interior and exterior spaces. However, it is further enhanced by a secondary layer composed of perforated metal panels, functioning as a secondary skin. This additional layer serves multiple purposes: it provides solar shading to mitigate direct sunlight exposure, reduces excessive heat gain, and generates dynamic shadow patterns within the interior. Moreover, the perforated panels afford a degree of privacy without compromising visual openness, while simultaneously enhancing the building's overall energy efficiency. This architectural approach embodies a spirit of openness and communal engagement, creating a comfortable and inviting environment for social interaction.



KEYPLAN

GROUND FLOOR

1. ENTRANCE
2. RECEPTION AREA
3. VERTICAL BERRIES FARM
4. VERTICAL FARMING RACKS
5. EDUCATIONAL WORKSHOP AREA
6. SOURVENIR SHOPS
7. MEETING ROOMS
8. OFFICE/ STAFF ROOMS
9. STORAGE/ LOCKER ROOM
10. WASTE MANAGEMENT/ COMPOSTING ROOMS
11. MARKETS
12. POP-UP SHOPS MARKET
13. FARM TO TABLE RESTAURANT DINING AREA
14. KITCHEN AREA
15. CORE (LIFT, EMERGENCY STAIRS, SHAFT/ MEP ROOM)
16. TOILETS
17. OPEN GROUND FRUIT TREES



BUILDING 2 - GROUND FLOOR

SKALA 1 : 150

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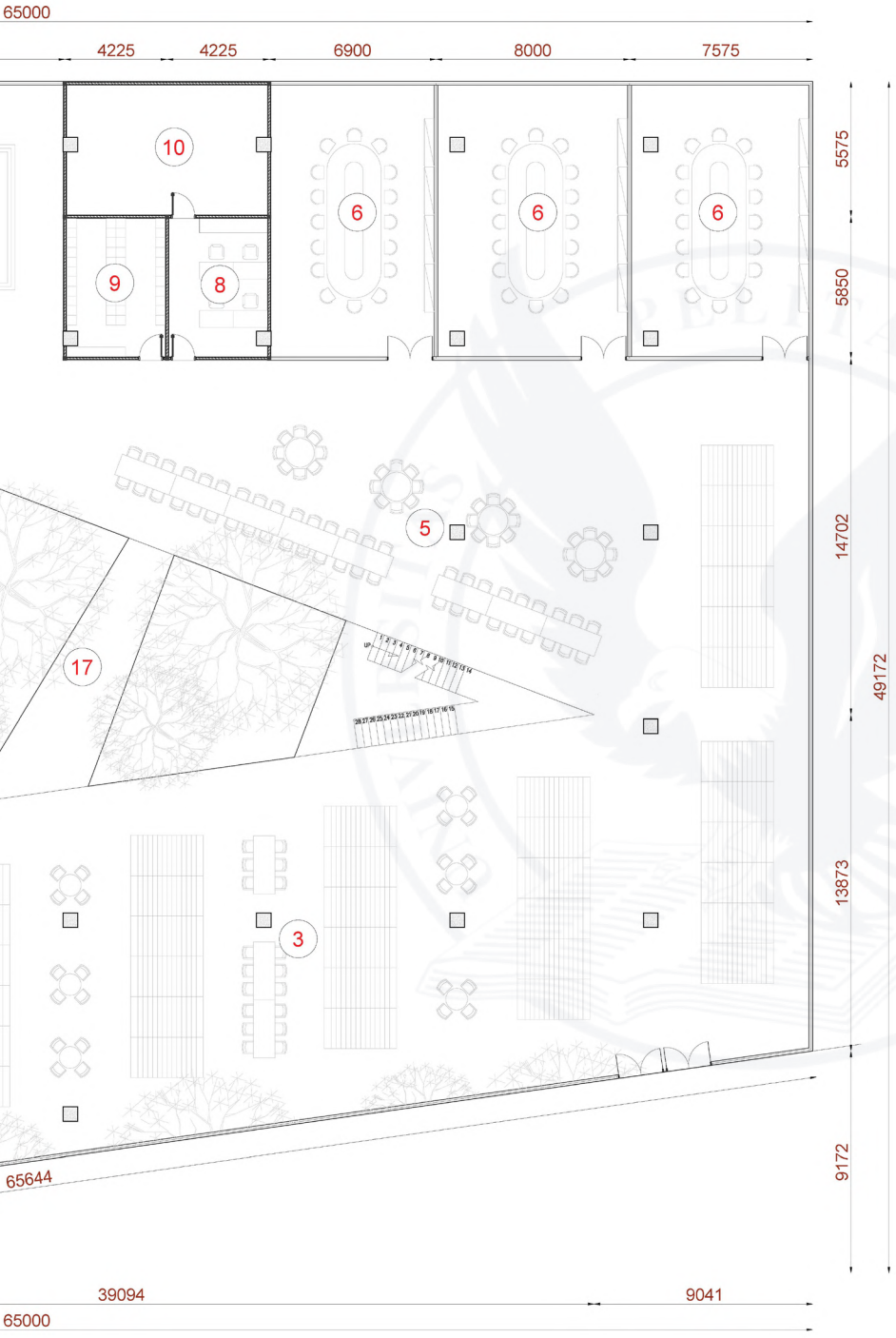
A-5

5.5 Urban Farming, Community Center, and Commercial Design Outcome

The following are a few examples of the enlarged floor plans highlighting the design planning and spatial layout of the three primary programmatic components: urban farming, the community center, and commercial areas. Each plan offers a closer look at how spaces are organized to support their specific functions while maintaining cohesion within the overall project. The complete set of drawings can be found by scanning the following barcode..



SKALA 1:150 PADA KERTAS A1

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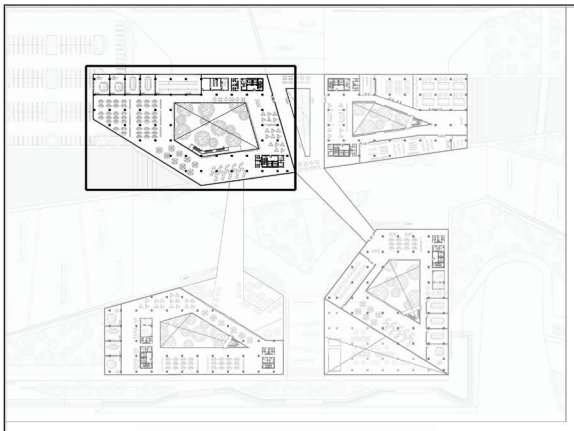
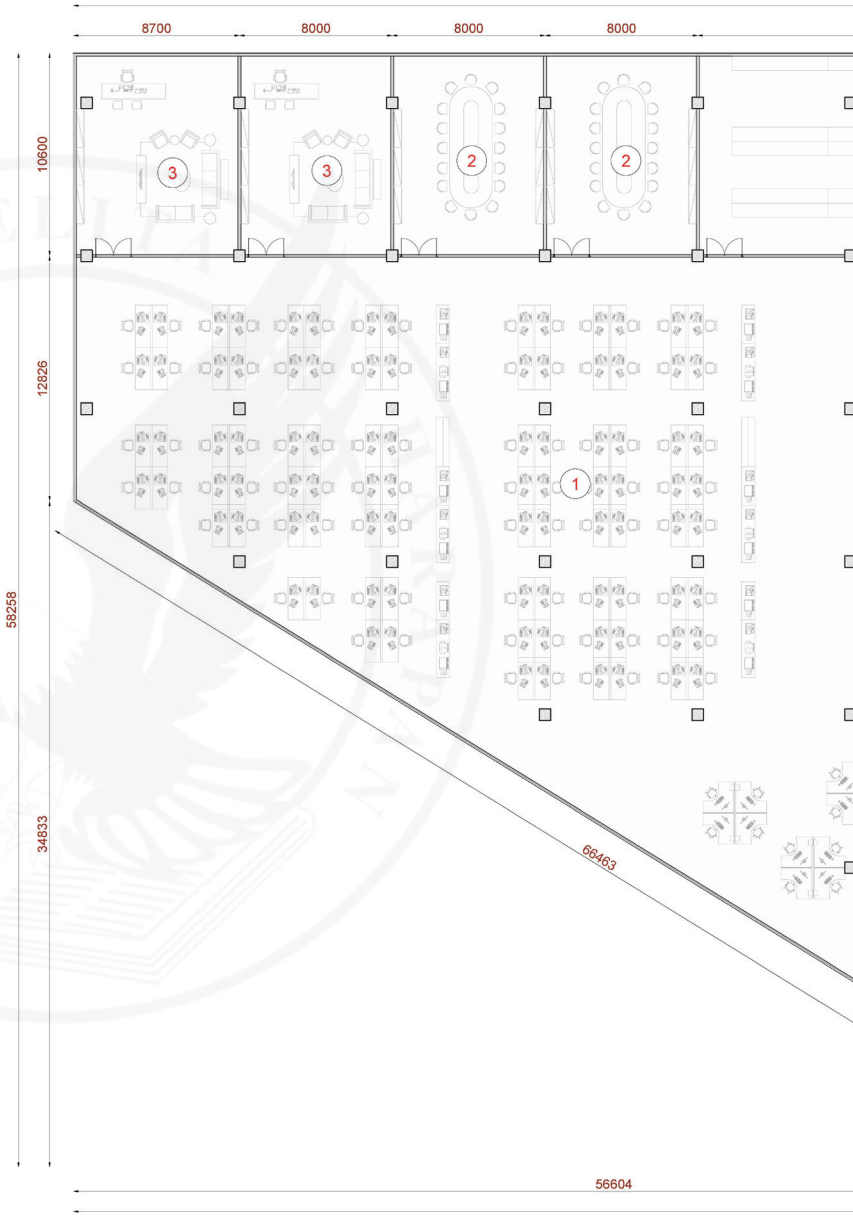


KEYPLAN

3RD FLOOR

1. OFFICE AREA (RESEARCH & DEVELOPMENT)
2. MEETING ROOMS
3. SENIOR CABINS
4. LABORATORY
5. WASTE MANAGERMENT / COMPOSTING ROOMS
6. STORAGE / LOCKER ROOMS
7. OPEN PANTRY
8. CORE (LIFT, EMERGENCY STAIRS, SHAFT / MEP)
9. TOILETS (M/F/DISABLED)
10. RECEPTION AREA
11. AUDITORIUM / LECTURE HALLS
12. MULTIPURPOSE HALLS
13. LIBRARY
14. LOUNGE AREA



BUILDING 1 - 3RD FLOOR

SKALA 1 : 200

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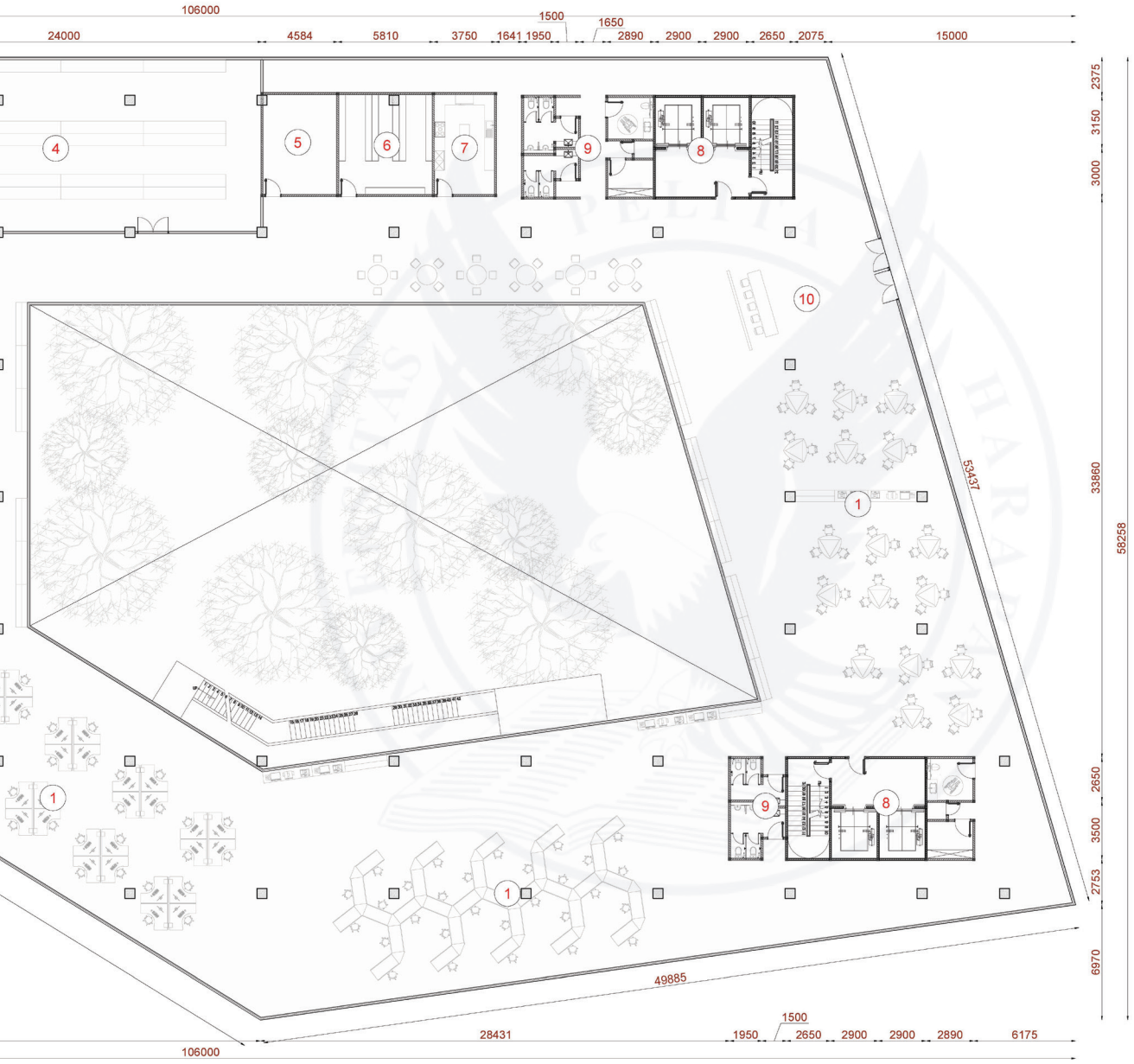
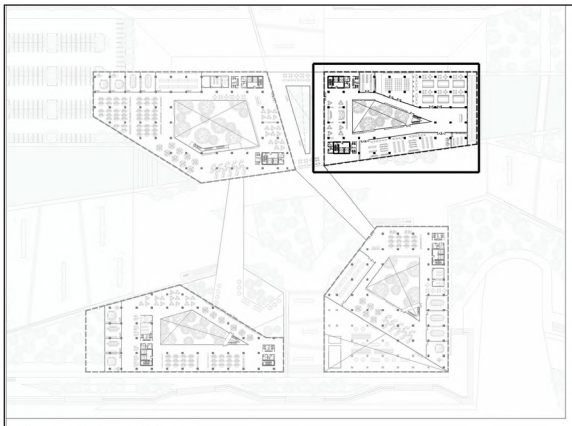


SKALA 1:200 PADA KERTAS A1

0 5 10 20 30 40



KEYPLAN

3RD FLOOR

1. OFFICE AREA (RESEARCH & DEVELOPMENT)
2. MEETING ROOMS
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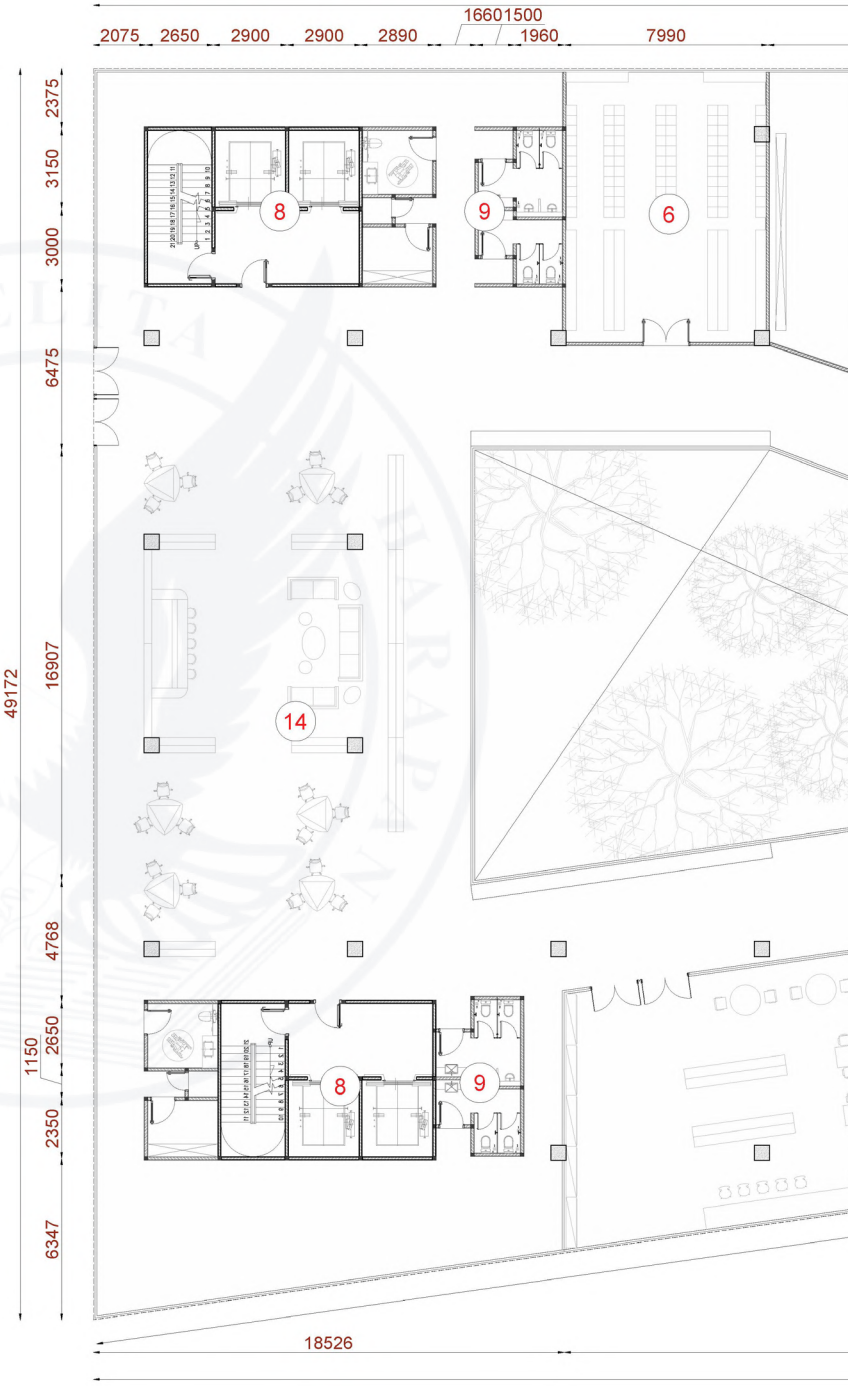
10. RECEPTION AREA
11. AUDITORIUM / LECTURE HALLS
12. MULTIPURPOSE HALLS
13. LIBRARY
14. LOUNGE AREA



BUILDING 2 - 3RD FLOOR

SKALA 1 : 150

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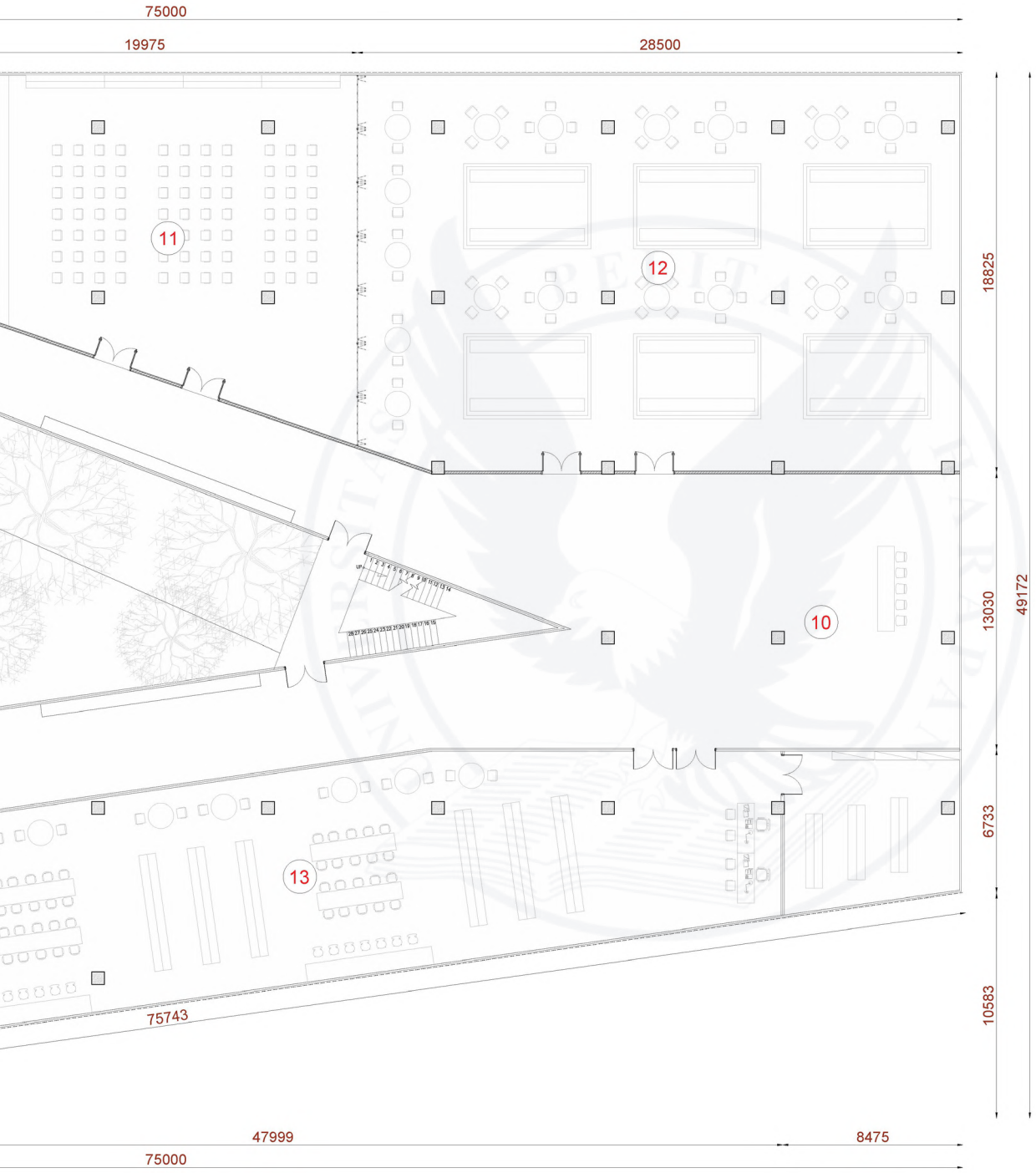
A-5



SKALA 1:150 PADA KERTAS A1

0 1.5 3 4.5 5 7.5 15

05
Conclusion

6.1 Conclusion

This study investigates the integrative design of urban farming as a public space and community hub aimed at enhancing societal well-being in Jakarta. Rapid urbanization in the city has led to the loss of green spaces, declining environmental quality (air pollution and urban heat island effects), and a food security crisis. Heavy reliance on external food supplies further strains distribution systems and escalates living costs. Within this context, urban farming emerges as a viable solution, offering not only local food security improvements but also environmental and social benefits. Integrating advanced technologies such as hydroponics and aeroponics within a public and community-centered spatial framework, urban farming has the potential to foster healthier, more sustainable, and inclusive urban environments.

This research is guided by three principal questions:

1. What spatial criteria and requirements are necessary to effectively accommodate urban farming within dense urban environments?
2. What roles do public spaces and community centers play in supporting social well-being, and what spatial programs are needed to reinforce urban farming as a community hub?
3. What design strategies can harmoniously integrate urban farming, public spaces, and community centers into a cohesive spatial entity?

The theoretical framework identifies critical criteria for urban farming spaces, including site selection and building orientation, natural lighting and ventilation, water management systems, harvest storage, waste management, accessibility and connectivity, and environmental integration and aesthetics. Proposed programs include greenhouses, vertical farms, rooftop gardens, and supporting infrastructures.

6.2 Recommendations

This research contributes a foundational framework for integrating urban farming with public spaces and community centers. However, opportunities for further exploration remain. Future researchers are encouraged to develop more quantifiable evaluation models to assess design effectiveness, conduct interdisciplinary studies encompassing fields such as food technology, circular economy, and environmental psychology, and integrate data-driven approaches, such as big data analytics and urban simulation modeling, to validate findings across diverse urban contexts.

From a governance perspective, policy support and regulation are critical for successful implementation. Governments are encouraged to promote incentive mechanisms—such as tax relief or green technology subsidies—for developers and communities involved in urban farming initiatives. Urban spatial planning should also allocate strategic land for urban agriculture, while educational initiatives should be strengthened through collaborations among academia, industry, and civil society.

Urban farming should not be regarded merely as a design intervention, but as a broader social and economic movement. Multi-stakeholder collaboration—including government, private sector, academia, and local communities—must be actively pursued, supported by public awareness campaigns highlighting the individual's role in building greener, healthier, and more resilient cities.

This study marks a critical first step; however, its continuation and expansion are essential to ensure that the benefits of urban farming are realized for both present and future generations.

06
Acknowledgement

I wish to extend my deepest gratitude to Rumah Atsiri Indonesia: Aromatic Wellness Destination – Tawangmangu and Urban+ Institute – Jakarta for their invaluable collaboration and support throughout the course of this research and design project. Their contributions have been instrumental in shaping both the theoretical framework and practical outcomes of this thesis.

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07
Publication

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08
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