

Maguwo Interchange

MAGUWO INTERCHANGE

Design of Transit Interchange
Facility in Maguwo with Spatial
Tranquility Approach

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Maguwo Interchange

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Perancangan Fasilitas Pusat Transportasi
Antarmoda di Maguwo dengan
Pendekatan Ketenangan Spasial

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PENULIS

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Lembar Pengesahan

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Statement of Authenticity

I hereby solemnly declare that all parts of this work are my own work, except works in which are referred to in the references, and that there is no assistance from other parties in whole or in part in the process.

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Yogyakarta, 26 August 2024

Author



Ahmes Syahda

Abstract

The rise of population in Yogyakarta has resulted in an increasingly congested streets. This condition is worsened by the low number public transit ridership in the city. Park and Ride Adisutjipto is a parking facility located near Adisutjipto airport in the east side of Yogyakarta. The site is adjacent to Maguwo station and is one of the central hubs for Trans Jogja buses. The airport has seen a significant decline of passenger numbers in the recent years due to the migration of commercial flights to the new airport in Kulon Progo. As such, its parking facility has fallen into disuse and disrepair.

In promoting the use of public transport, the site of Park and Ride Adisutjipto can be developed into a central hub for public transit. This allows multiple modes of transit to be integrated in one area, providing direct interchange between buses, trains, taxis, and private vehicles. In this project, the theme of “spatial tranquility” is employed as the design strategy to minimise the chaotic environment that are often present in a transit interchange.

The result of this project is a design of transit interchange that features many of the tranquility elements adapted from traditional Javanese architecture.

Keywords: transit hub, interchange facility, Maguwo, tranquility, Javanese architecture,

Abstrak

Meningkatnya penduduk di Yogyakarta berdampak pada semakin tinggi tingkat kemacetan. Hal ini diperparah dengan rendahnya jumlah penumpang angkutan umum di kawasan perkotaan. Park and Ride Adisutjipto adalah fasilitas parkir yang terletak di sebelah Bandara Adisutjipto di sisi timur kota Yogyakarta. Fasilitas ini terletak bersebelahan dengan Stasiun Maguwo dan juga berperan sebagai salah satu pusat pemberhentian bus Trans Jogja. Bandara Adisutjipto telah mengalami penurunan jumlah penumpang yang drastis pada beberapa tahun terakhir akibat pemindahan penerbangan komersil ke bandara baru di Kulon Progo. Pada hasilnya, fasilitas parkir bandara semakin terbengkalai dan tidak terawat.

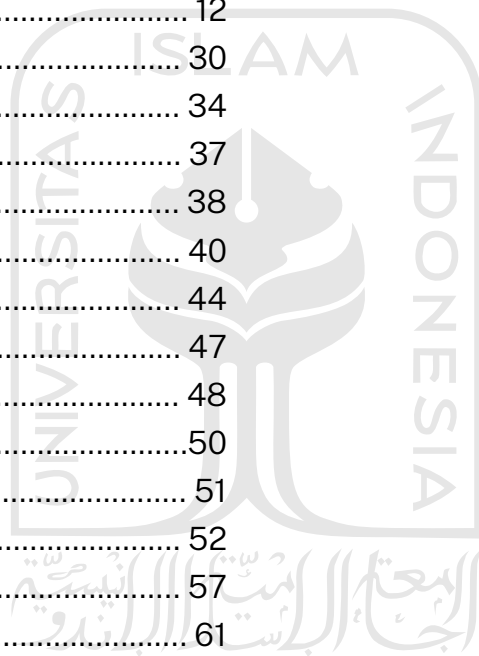
Dalam mendukung penggunaan angkutan umum, kawasan Park and Ride Adisutjipto dapat dikembangkan menjadi pusat angkutan umum. Ini memungkinkan berbagai moda angkutan untuk diintegrasikan dalam satu kawasan, memberikan akses langsung antar moda bus, kereta api, taksi, dan kendaraan pribadi. Dalam proyek ini, pendekatan “ketenangan spasial” diangkat sebagai strategi desain untuk meminimalisir suasana semrawut yang kerap ditemui pada pusat angkutan umum

Hasil dari proyek ini adalah desain pusat integrasi antarmoda yang menggunakan elemen-elemen ketenangan hasil adaptasi dari arsitektur tradisional Jawa.

Kata kunci: pusat angkutan umum, fasilitas integrasi antarmoda ketenangan, arsitektur Jawa

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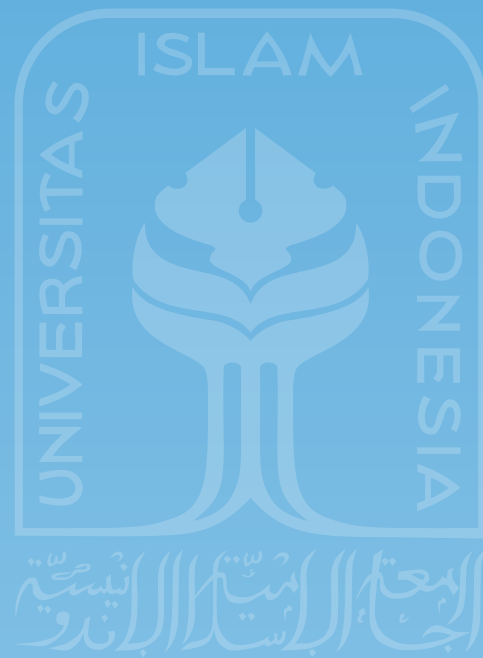
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1



INTRODUCTION

Design premise
Problem formulation
Design method
Design framework

DESIGN PREMISE



Figure 1.1 Congestion in Yogyakarta

Author, 2023

Public Transport in Yogyakarta

Yogyakarta is one of the most populated cities in Java. Its metropolitan includes the City of Yogyakarta, as well as parts of Sleman and Bantul. It is estimated that over one million reside within “kartamantul”, Yogyakarta’s metropolitan area. In addition to its large population, the city also boasts a large tourism industry. Over 7 million people visited the city in 2023. This combination of factors often result in public streets not being able to meet its demand, causing congestion.

Public transport has existed in Yogyakarta for decades with multiple modes provided, such as land, rail, and air. Within its metropolitan area, city buses serve many destinations in the form of “Trans Jogja” buses while commuter rail connects neighbouring towns and cities. These transport options reduce the number of private vehicles on the street, thereby helping solve the issue of street congestion.

Modal share is a metric that measures the number of travellers using one type of transportation over other types of transportations. One study found that motorbikes and cars account for over 75% of vehicle movement in Yogyakarta while Trans Jogja only accounts for less than 1% (Risdiyanto, 2020). In order to entice more people in using public transport, the city needs to employ more pull factors. One of which is the integration between transport modes.



Figure 1.2 Adisutjipto airport

Author, 2015

Relocation from Adisutjipto to YIA

Commercial services began operating in Adisutjipto Airport in 1964 and the airport eventually gained international status in 2004. As commercial flights became more affordable to the general public in the early 2000s, passenger number departing and arriving kept rising and peaked at 8.4 million passengers in 2018. Many expansions and upgrades of airport facilities were built to support the rapid increase of passengers.

Ultimately, a brand new civilian airport was needed to support the rising passengers and Yogyakarta International Airport in Kulon Progo commenced operation in 2020. As a result, many airlines have since relocated their services from Adisutjipto to YIA.

Adisutjipto Airport now remains open for select short-haul flights and served 124 thousand passengers in 2023, a sharp decline from its peak in 2018. This has led to many of its facilities falling into disuse. One of such facilities is the parking area on the north side of the Maguwo Station. This parking area which can support hundreds of cars and motorbikes now sits mostly vacant. Despite the opening of Jogja-Solo Commuterline rail service in 2021 which makes a stop at Maguwo Station and being one of the main hubs of Trans Jogja bus network, this 'park and ride' facility still remains underutilised.



Figure 1.3 Adisutjipto airport pedestrian

Author, 2024



Figure 1.4 Adisutjipto airport parking facility

Author, 2024



Figure 1.5 Trans Jogja buses in Adisutjipto

Author, 2024



Figure 1.6 Adisutjipto Trans Jogja bus stop

Author, 2024

Potential for Bus-Rail Transit Interchange

The site of Adisutjipto Airport's north parking area currently hosts many public transit services. KRL Commuterline serves a railway commuter service connecting Yogyakarta and Solo. Trans Jogja buses serve many destinations within Yogyakarta urban area. Airport shuttle services are also present, serving passengers from Adisutjipto to YIA. Creating a meeting place between transit modes can create a pull factor to entice passengers as well as non-passengers to spend time in the interchange.



Figure 1.7 KRL train arriving Maguwo station

Author, 2024



Figure 1.8 YIA Ekspres train arriving Yogyakarta station

Author, 2023

Maguwo as the Gateway to Yogyakarta

Maguwo station currently serves KRL Jogja-Solo line and receives a significant number of passengers arriving from Solo. Many passengers continue their journeys on buses and taxis. The need of pickup facility as well as a place for quick rest is crucial for such journeys to ensure efficient transfer between transit modes. In addition, providing an attractive interchange place can entice more people into using public transport for their 'last-mile' journey.

Airport Rail Link to YIA

YIA Airport Express is a rail service that connects Yogyakarta International Airport to the city centre of Yogyakarta. According to a news article from Harian Jogja from 2023, this rail service is planned to be extended from its current terminus in Yogyakarta station to Maguwo station in order to accommodate passengers departing from the eastern part of Yogyakarta to YIA. This means that new amenities such as check-in facility for airport train passengers are needed to accommodate such service.

PROBLEM FORMULATION

General Problems

- How to design a transport interchange facility?

Specific Problems

- How to design an air-bus-rail interchange facility?
- How to implement commercial facilities for transit interchange?
- How to apply tranquility approach for a transport interchange?

Goals and Objectives

- To design an air-bus-rail interchange with spatial arrangement that meets standards
- To design an air-bus-rail interchange that can multiple alternative transportation modes
- To design an air-bus-rail interchange that can accommodate commercial facility
- To design an air-bus-rail interchange with tranquility sensory experience



Macro Issues	Significant reduction in passengers travelling to and from Adisutjipto airport due to relocation of flights to YIA	Potential for bus-rail interchange in Maguwo station	Threat of chaotic experience in a transit interchange
Micro Issues	Underused airport facilities such as parking facilities leading to neglect	Inadequate transfer amenities for passengers travelling between rail and bus transport in Maguwo	Poorly designed sensory elements in a transit interchange
Variables	Creating a pull factor for the current site of Adisutjipto parking facility by means of commercial centre	Designing a suitable air-bus-rail interchange facility near Maguwo station	Designing a transit interchange that can induce a calming sensation for the users
Problem Formulation	How to design an airport-bus-rail interchange with commercial facility in Maguwo with spatial tranquility approach		

Table 1.1 Problem Formulation Table

Author, 2024

DESIGN METHOD

Data Gathering	<p>Primary sources Data collection through on-site survey.</p> <p>Secondary sources Data collection through study on literature, articles, precedents, regulations, and guidelines.</p>
Site Analysis	<p>Study on the existing building and site.</p>
Literature Study	<ol style="list-style-type: none"> 1. Study on building typology for a bus-rail interchange facility through precedents, guidelines, and regulations. 2. Study on commercial facility implementation on bus-rail interchange. 3. Study on spatial tranquility approach.
Conceptual Design	<p>Creating conceptual design alternatives.</p>
Design Evaluation	<p>Evaluating design alternatives in accordance to regulations and standards.</p>
Final Design	<p>Developing the design in more detail.</p>

Table 1.2 Problem Formulation Table

Author, 2024

Design Framework

Macro Issue	Significant reduction in passengers travelling to and from Adisutjipto airport due to relocation of flights to YIA		Potential for bus-rail interchange in Maguwo station	Threat of chaotic experience in a transit interchange
Micro Issue	Underused airport facilities such as parking facilities leading to neglect		Inadequate transfer amenities for passengers travelling between rail and bus transport in Maguwo	Poorly designed sensory elements in a transit interchange
General Problem	How to design an air-bus-rail interchange with commercial facility in Maguwo with spatial tranquility approach			
Specific Problem	How to design an air-bus-rail interchange facility?	How to implement commercial facilities for transit interchange?	How to apply sensory tranquility approach for transport interchange?	
Literature Study	Multimodal transportation interchange typology	Commerce in transport interchange	Multi-sensory experience in architecture	
Design Response	Spatial Planning	Building Structure	Building Envelope	Building Infrastructure
	Site Planning	Passenger Circulation	Vehicular Circulation	Building Material

Table 1.3 Design framework table

Author, 2024

Excellency, Originality & Novelty

Perancangan Terminal Condongcatur dengan Prinsip TOD (Transit Oriented Development)

Author : Moh. Bintang Lazuardi R
Location : Terminal Condongcatur
Approach : Transit-oriented development principles
Problem : Traffic issue around Condongcatur

Design of Mixed Use Building of Bogor Station with Inclusive Design Approach

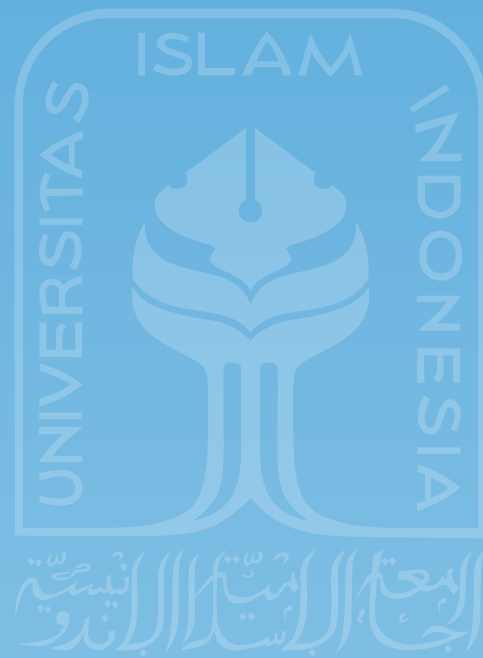
Author : Faiz Rizky Nauli Harahap
Location : Bogor Station
Approach : Mixed-use housing and inclusive design
Problem : Congestion around station area

Redesain Terminal Bus Giwangan Tipe A Yogyakarta Dengan Pendekatan Biophilic Design

Author : Zahra Hanan Amany Shafa
Location : Giwangan Terminal
Approach : Biophilic design
Problem : Stressful situation when transferring between modes
in Giwangan terminal



2



DESIGN PROBLEM SEEKING

Site context

Design theme

Concepts and functions

Precedent study

SITE CONTEXT

Name of site : **Park and Ride Bandara Adisutjipto**
 Address : Jl. Raya Jogja-Solo, Karangploso, Maguwoharjo, Depok, Sleman 55281
 Area : 21,500 m²
 Existing function : Parking/Park and Ride Facility
 Owner : Balai Pengelolaan Terminal dan Perparkiran (BPTPAR -Dinas Perhubungan DIY)
 Land use : C-1 High Density Mixed Zoning

North side : Jl. Raya Jogja-Solo
 East side : Jl. Airport Adisutjipto
 South side : Maguwo Railway Station
 West side : Yogyakarta Class I Immigration Office

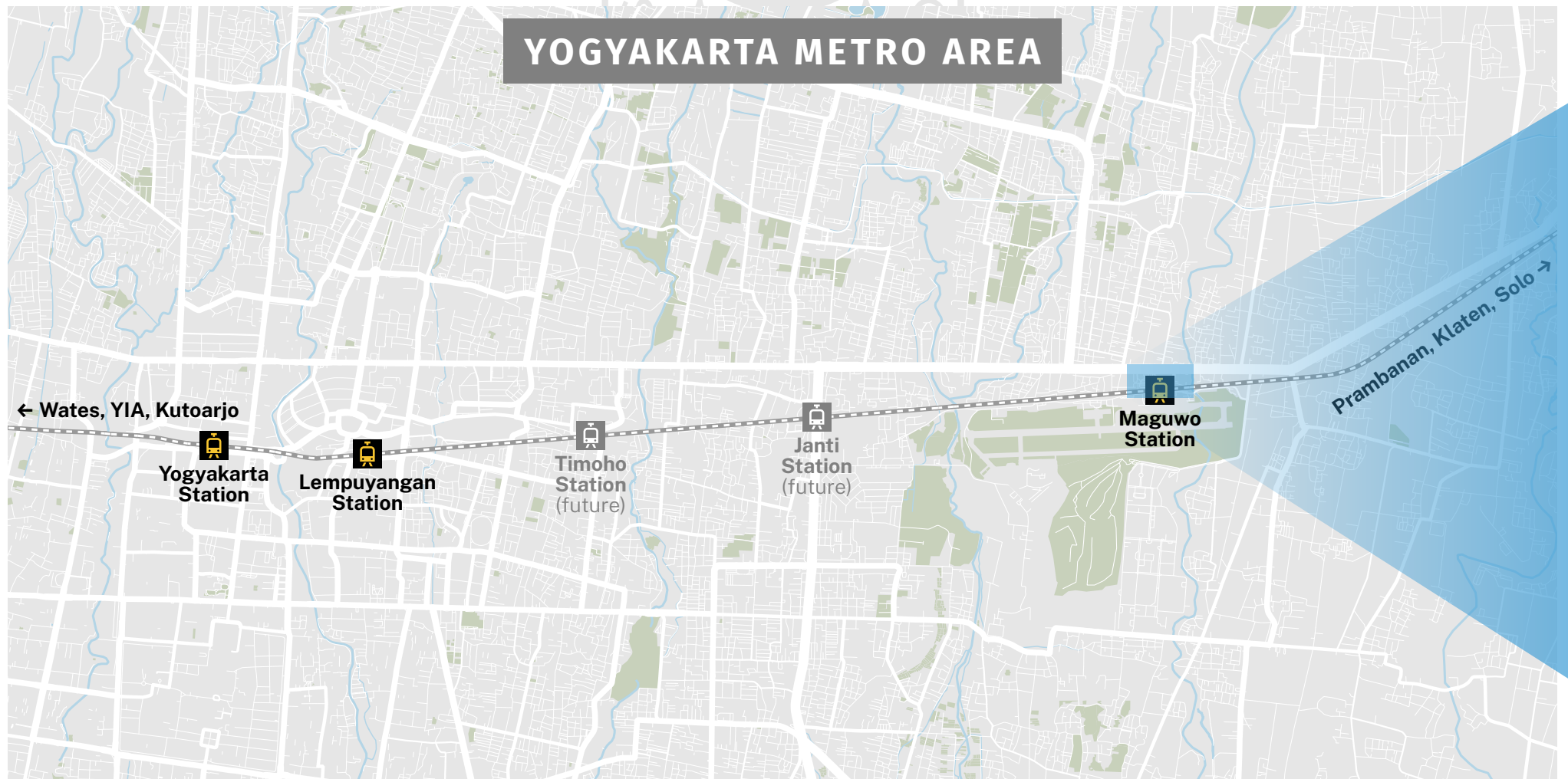
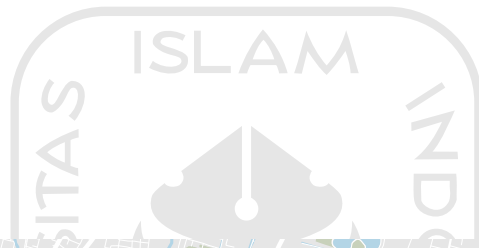


Figure 2.1 Adisutjipto within Yogyakarta metropolitan area

OpenStreetMap with author's modification, 2024

Land Use

Park and Ride Adisutjipto is located in Maguwoharjo, Depok, Sleman. The area surrounding the proposed site is planned to be developed into a mixed zoning TOD facility as part of Sleman's building developmental planning programme (RDTR) 2023-2042.

The proposed site itself is classified under **C-1 (High Density Mixed Zoning)** classification.

R	Residential
K	Commercial
KT	Office
C	Mixed Zoning
TR	Transportation
P	Farming

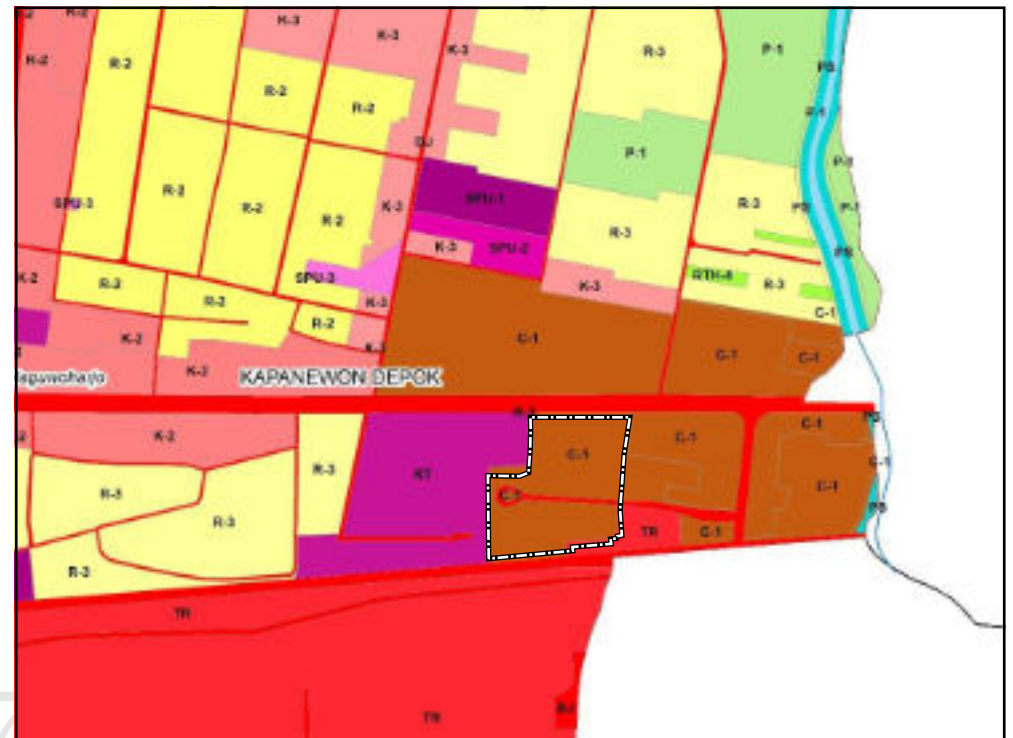


Figure 2.2 Land use map in Maguwoharjo
Disperparu Kab. Sleman -Draft RDTR Sleman Tengah 2023-2042, 2022



Figure 2.3 Satellite imagery of Park and Ride Adisutjipto surrounding area

Google Earth-Maxar Technologies, 2021

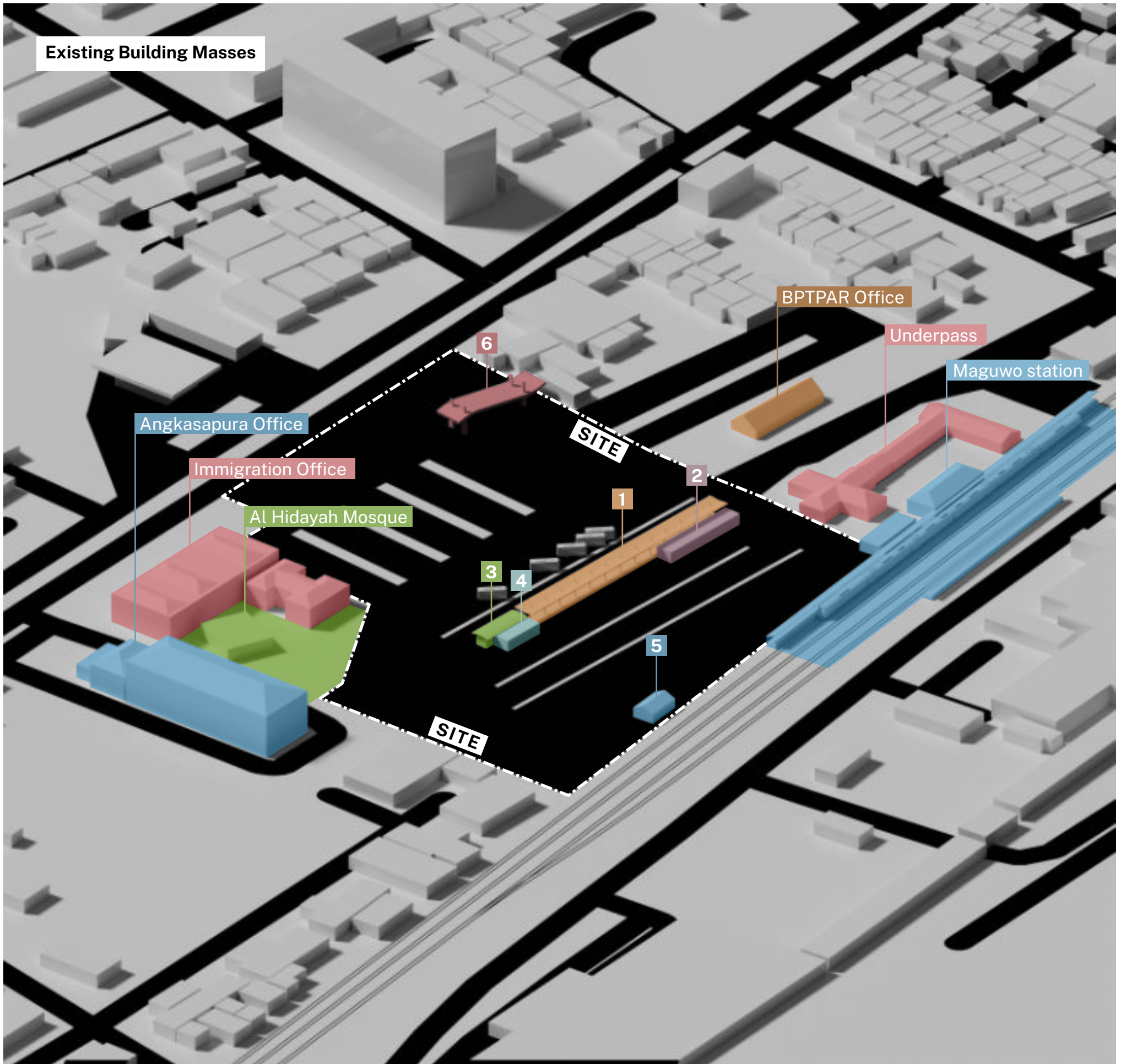



Figure 2.4 Axonometric view of existing building masses


Author, 2024

Existing Building Masses


1 Main canopy
 Function : Pedestrian link from underpass to bus stop
 Construction : Freestanding steel canopy
 Condition : Poor



4 Former Airport Shuttle Lounge
 Function : **Abandoned / vacant**
 Construction : Steel frame
 Condition : Average




2 Former Convenience Store
 Function : **Abandoned / vacant**
 Construction : Steel frame
 Condition : Poor



5 Public Restroom
 Function : Public restroom (working condition)
 Construction : Concrete frame
 Condition : Poor



3 Trans Jogja Bus Stop
 Function : Bus stop shelter
 Construction : Lightweight steel frame
 Condition : Good



6 Exit Portal Gate
 Function : **Abandoned / vacant**
 Construction : Cantilever steel truss roof
 Condition : Average




Figure 2.5 Existing building masses with photographs

Author, 2024

Climate Data

Sun Chart

The chart shows that the sun stays within 58° north and 75° south at solar noon. During critical hours, namely at 09:00 and 15:00, the sun altitude varies between 32° to 40° throughout the year. This data can be used to determine the appropriate proportion of shading devices needed to maintain the balance between natural light and comfortable temperature.

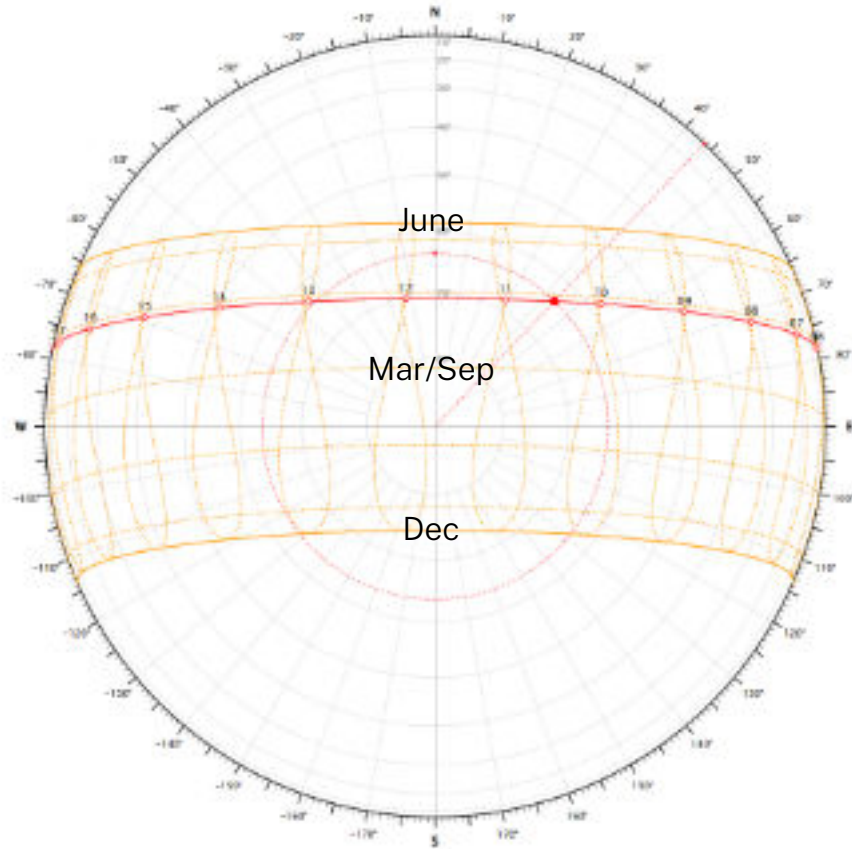


Figure 2.6 Yogyakarta sun chart.

Andrew Marsh, 2024

Wind rose

The chart shows that the wind comes from the south for the majority of times throughout the day, with only a minor deviation from south-southeast. The highest average wind speed is recorded around 12 km/h from the south. This data can be used to calculate the wind catchment for optimising cross-ventilation.

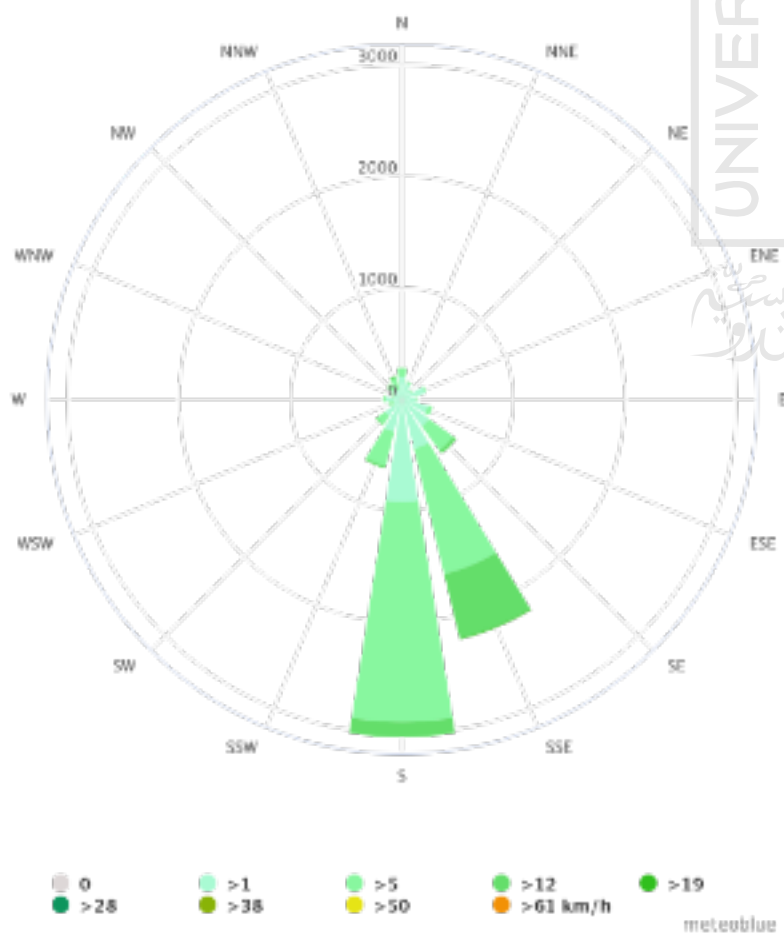


Figure 2.7 Yogyakarta wind rose.

meteoblue, 2024

Temperature and precipitation

The average temperatures in Yogyakarta varies between 28°C to 29°C during the day and 22°C to 24°C during the night. This data can be used to determine the type of building material and construction for the climate in Yogyakarta.

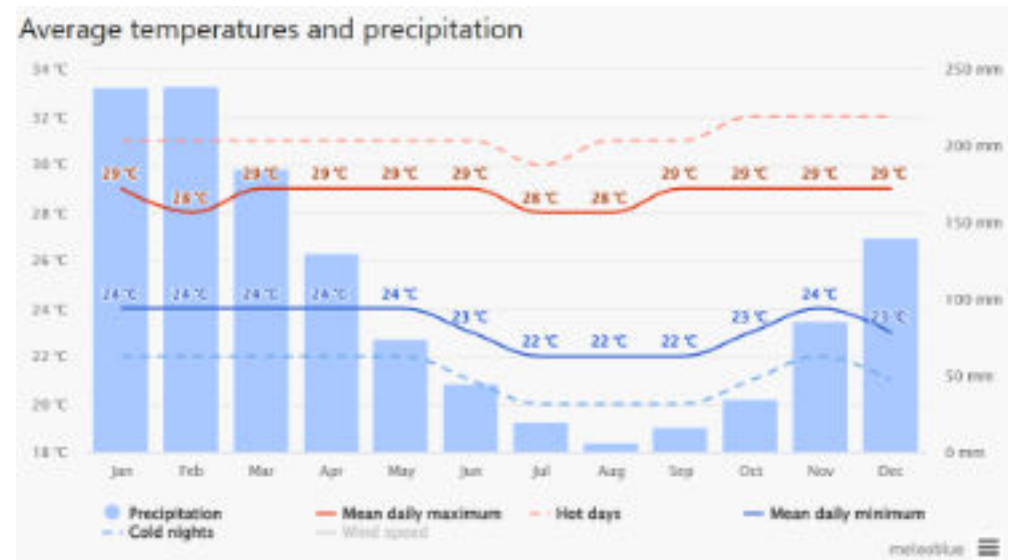


Figure 2.8 Yogyakarta average temperature and precipitation. meteoblue, 2024

Temperature and precipitation

The highest number rainy days is recorded on February and March, while the lowest is in August. The number of days vary between 5 to 25 days of the month. This data can be used to determine the appropriate shading and provisioning of canopy for the building.

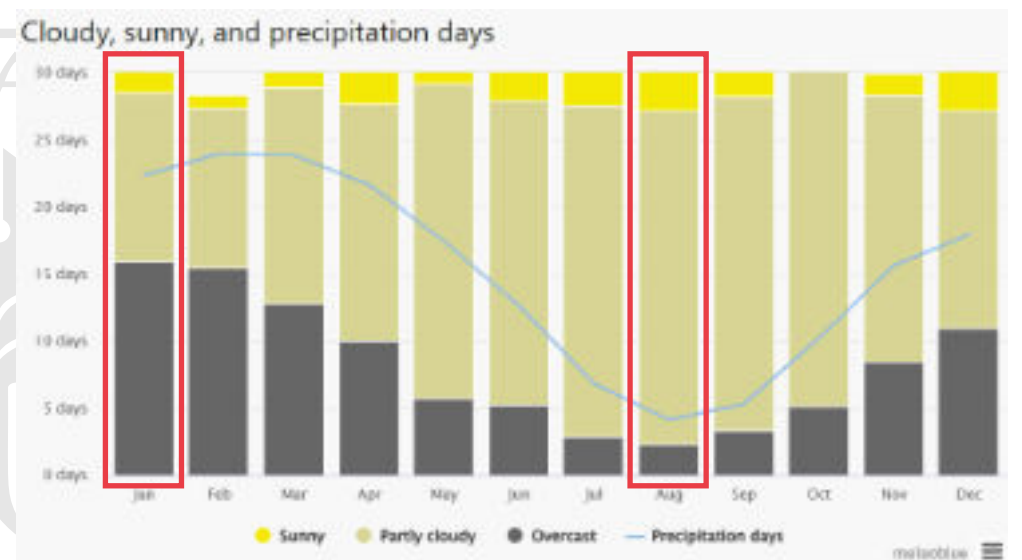


Figure 2.9 Yogyakarta number of sunny days. meteoblue, 2024

Precipitation amount

The highest precipitation occurs on February, meaning that during the month the highest volume of rainfall is recorded. The lowest precipitation is in August. This data can be used to design the green area as well as the capacity of infiltration wells needed to catch water runoff for the site.

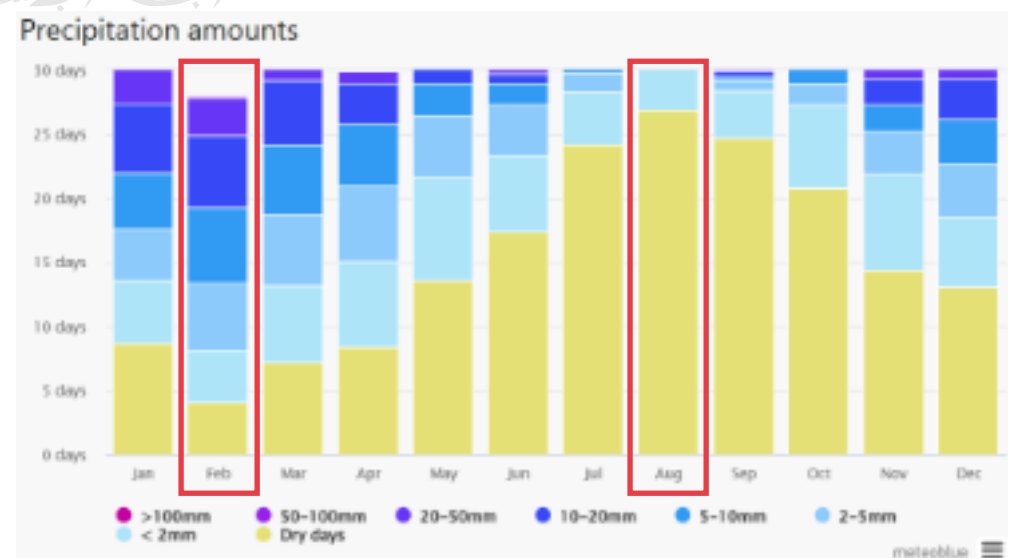


Figure 2.10 Yogyakarta precipitation. meteoblue, 2024

Building Codes

Building Coverage Ratio : **60%** max
 Green Area Ratio : **10 - 30%** min
 Height Limit : **40 m**

Setback

Jl. Jogja-Solo : **29m** from centreline

- (5) Tingkat kepadatan lokasi sebagaimana dimaksud dalam Pasal 4 huruf e, meliputi:
- bangunan gedung di lokasi renggang dengan KDB 30% (tiga puluh persen) sampai dengan 45% (empat puluh lima persen);
 - bangunan gedung di lokasi sedang dengan KDB diatas 45% (empat puluh lima persen) sampai dengan 60% (enam puluh persen);
 - bangunan gedung di lokasi padat dengan KDB diatas 60% (enam puluh persen).
- (6) Tingkat ketinggian sebagaimana dimaksud dalam Pasal 4 huruf f, meliputi:
- bangunan gedung bertingkat rendah, yaitu jumlah lantai bangunan gedung sampai dengan 4 (empat) lantai dan/atau dengan ketinggian plafon lantai teratas paling tinggi 16 (enam belas) meter dari peil lantai dasar;
 - bangunan gedung bertingkat sedang, yaitu jumlah lantai bangunan gedung 5 (lima) lantai sampai dengan 8 (delapan) lantai dan/atau dengan ketinggian plafon lantai teratas paling tinggi 32 (tiga puluh dua) meter dari peil lantai dasar;
 - bangunan gedung bertingkat tinggi, yaitu jumlah lantai bangunan gedung lebih dari 8 (delapan) lantai dan atau dengan ketinggian plafon lantai teratas lebih dari 32 (tiga puluh dua) meter dari peil lantai dasar.

Figure 2.11 Building intensity regulation

Perbup Sleman 49 2012

As-built BCR	Green Coverage Ratio
0 - 30%	30% minimum
31 - 70%	20% minimum
71 - 100%	10% minimum or 25% roof garden

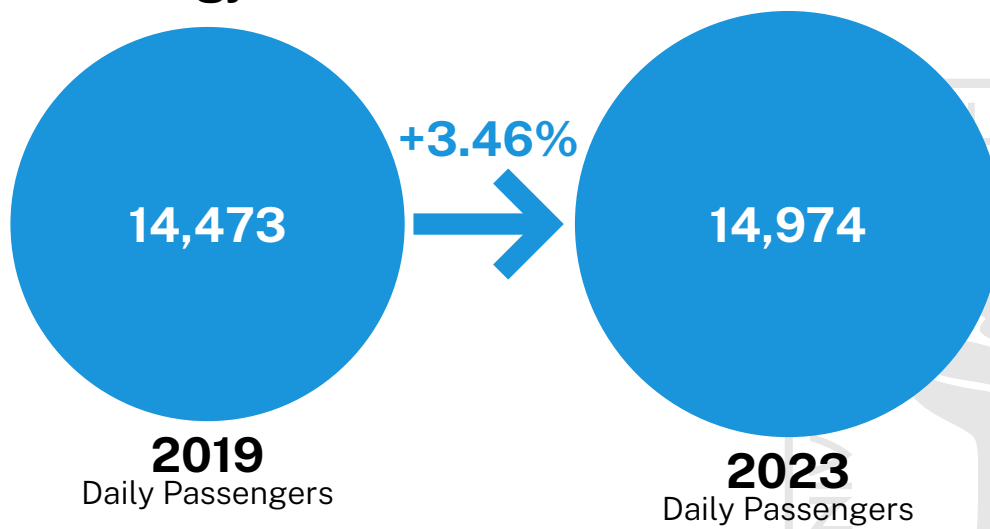
Table 2.1
 Green coverage ratio regulation

Author, 2024
 (sourced from Perbup Sleman 49 2012)

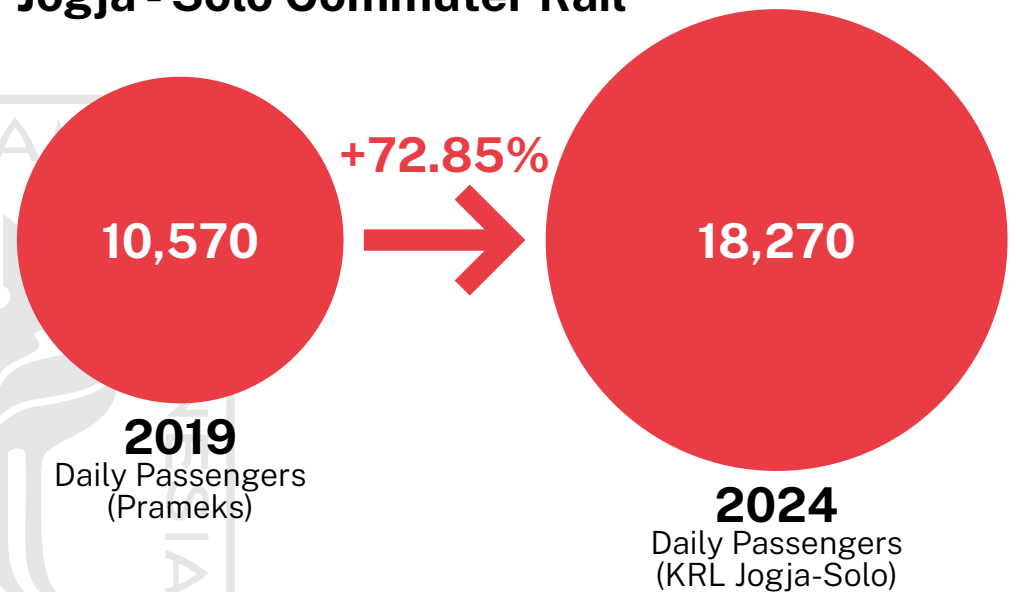
Ridership Recovery Post Pandemic

While many public transport riderships have had a major decline during the pandemic, beginning in 2023 buses and trains have surged back their previous ridership and even surpasses previous record highs.

Trans Jogja and Teman Bus



Jogja - Solo Commuter Rail



Trans Jogja and Teman Bus Passenger Number			
Year	Annual	Daily	Growth
2013	5,978,726	16,380	-
2014	6,506,290	17,825	+8.82%
2015	6,468,678	17,722	-0.58%
2016	6,409,205	17,559	-0.92%
2017	5,317,484	14,568	-17.03%
2018	5,880,610	16,111	+10.59%
2019	5,282,737	14,473	-10.17%
2020	2,776,667	7,607	-47.44%
2021	2,098,745	5,749	-24.41%
2022	3,045,957	8,345	+45.13%
2023	5,465,574	14,974	+79.44%
2024	-	-	-

Table 2.2 Trans Jogja passenger number

Bappeda DIY and Dishub DIY, 2024

KA Prameks Passenger Number			
Year	Annual	Daily	Growth
2016	2,973,891	8,125	-
2017	3,650,144	10,000	+23.08%
2018	3,940,671	10,796	+7.96%
2019 (Jan-Aug)	2,537,023	10,570	-2.09%
2020	-	-	-
2021	-	-	-
KRL Commuterline Jogja-Solo Passenger Number			
Year	Annual	Daily	Growth
2021	1,755,865	4,811	-
2022	4,494,475	12,314	+155.96%
2023	6,453,099	17,680	+43.58%
2024 (Jan-Feb)	1,069,227	18,270	+3.34%

Table 2.3 Jogja-Solo commuter rail passenger number

Tribun Jogja, 2018

Yogyakarta Transit Public Network

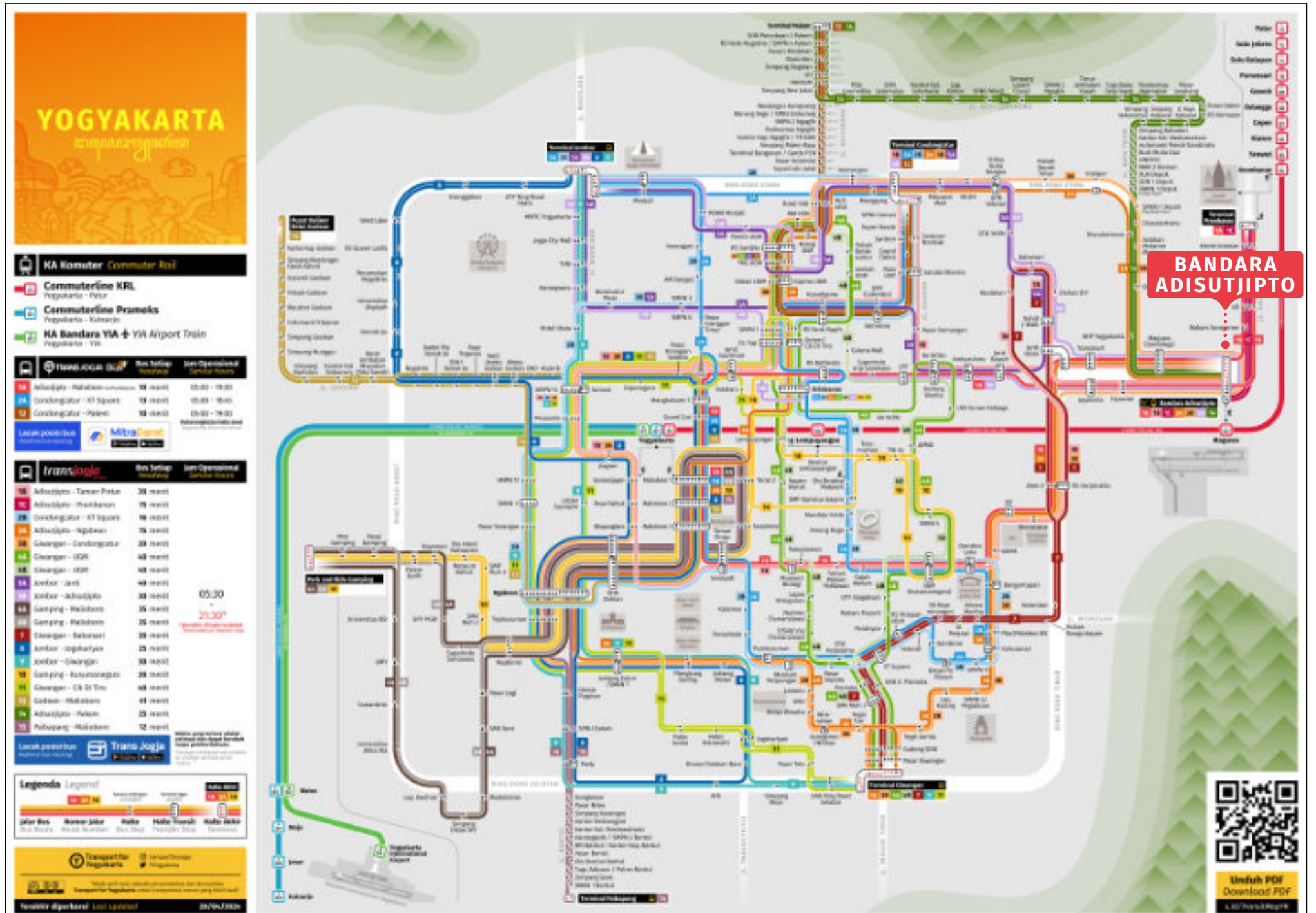


Figure 2.12 Yogyakarta transit map

Author via Transport for Yogyakarta, 2024

Bus Coverage from Bandara Adisutjipto

- 1A** Prambanan / Malioboro
- 1B** Taman Pintar (via Babarsari)
- 1C** Prambanan
- 3A** Malioboro (via Condongcatu)
- 3B** Giwangan
- 5B** Jombor
- 14** Pakem

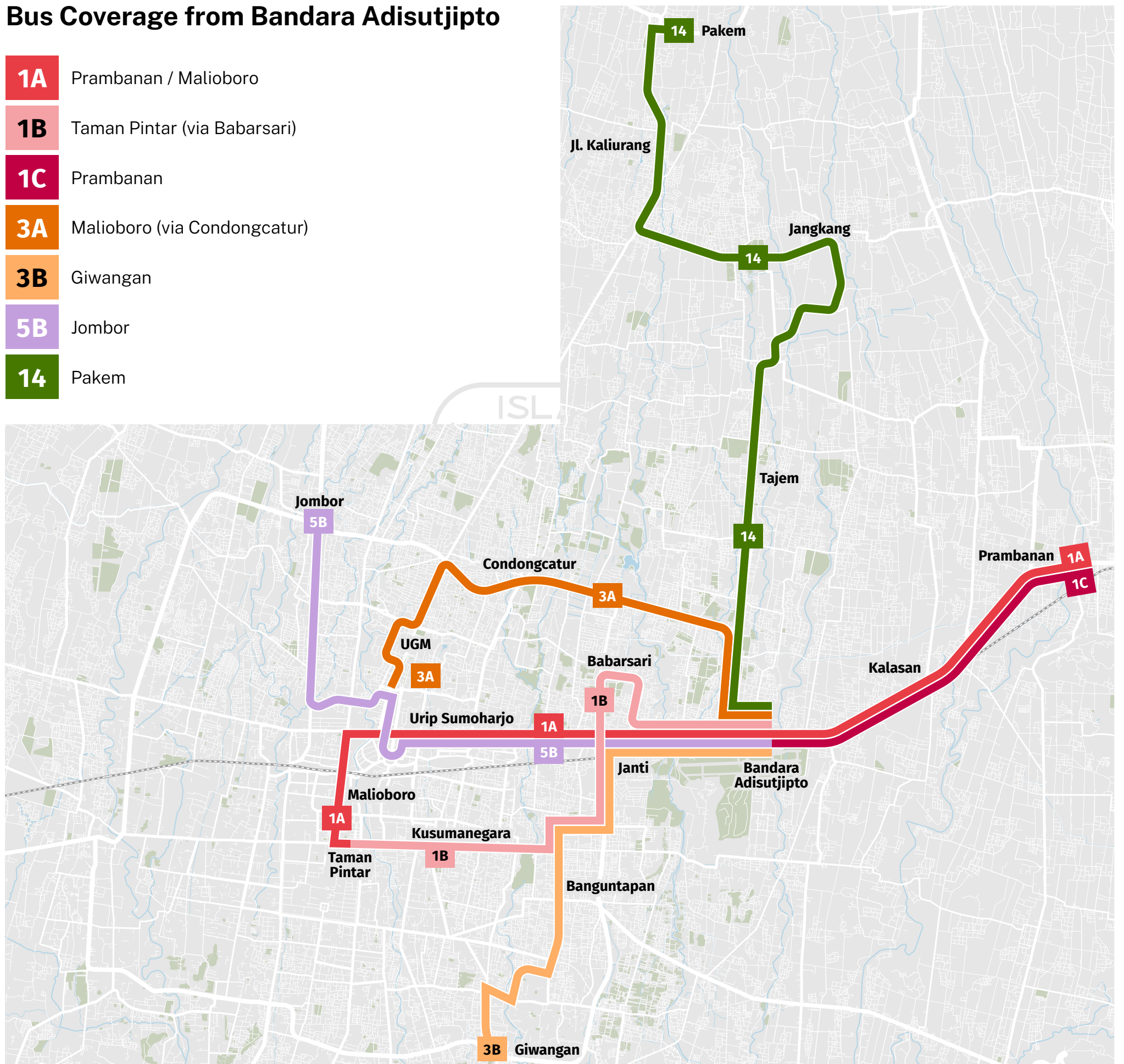


Figure 2.13 Trans Jogja buses from Maguwo

Author, 2024

User Activity

Passengers:

- KRL Jogja – Solo passengers
- Bus passengers (Trans Jogja and Teman Bus)
- Adisutjipto airport passengers

Non-passengers:

- Drivers (Dropping off/picking up passengers)
- Bus driver and crew
- Visitors

Visitors on foot

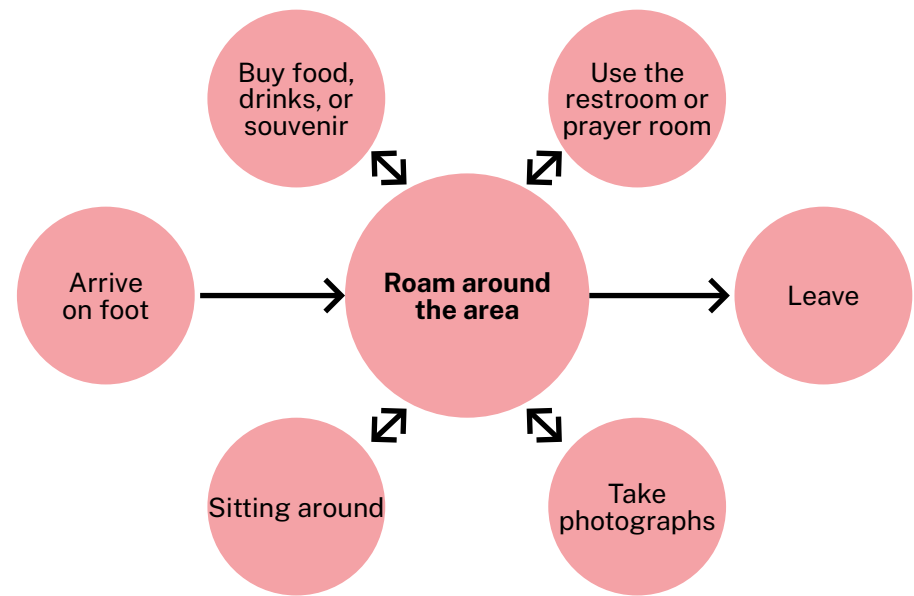


Figure 2.14 Visitor on foot activity diagram

Author, 2024

Bus Passenger Transferring

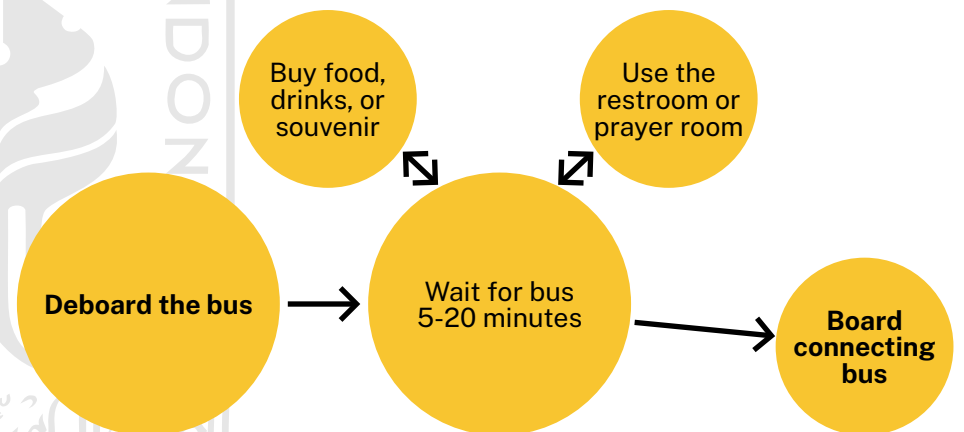


Figure 2.15 Bus passenger transferring activity diagram

Author, 2024

Bus Driver and Crew

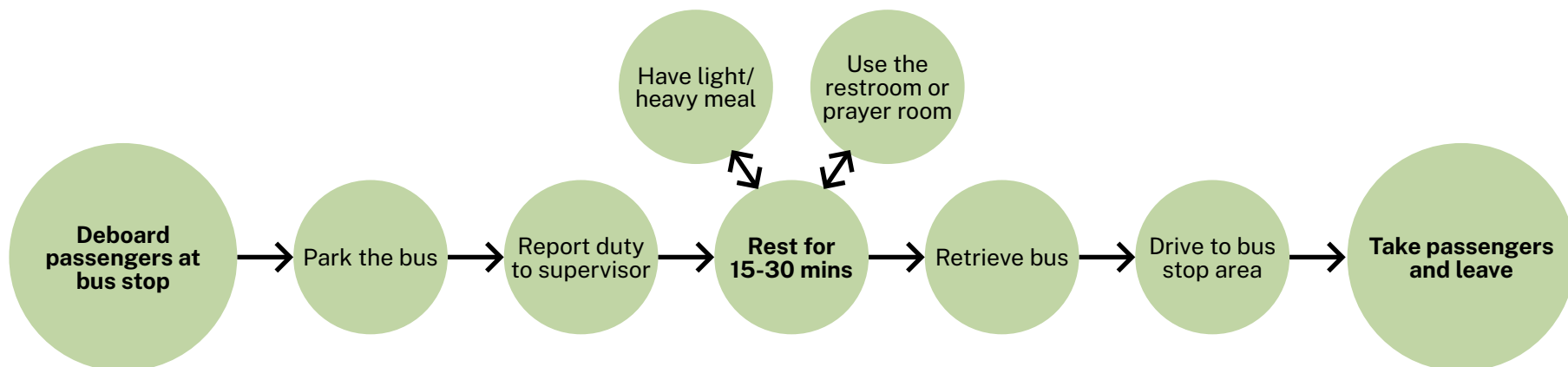


Figure 2.16 Bus crew activity diagram

Author, 2024

Train Passenger Departing

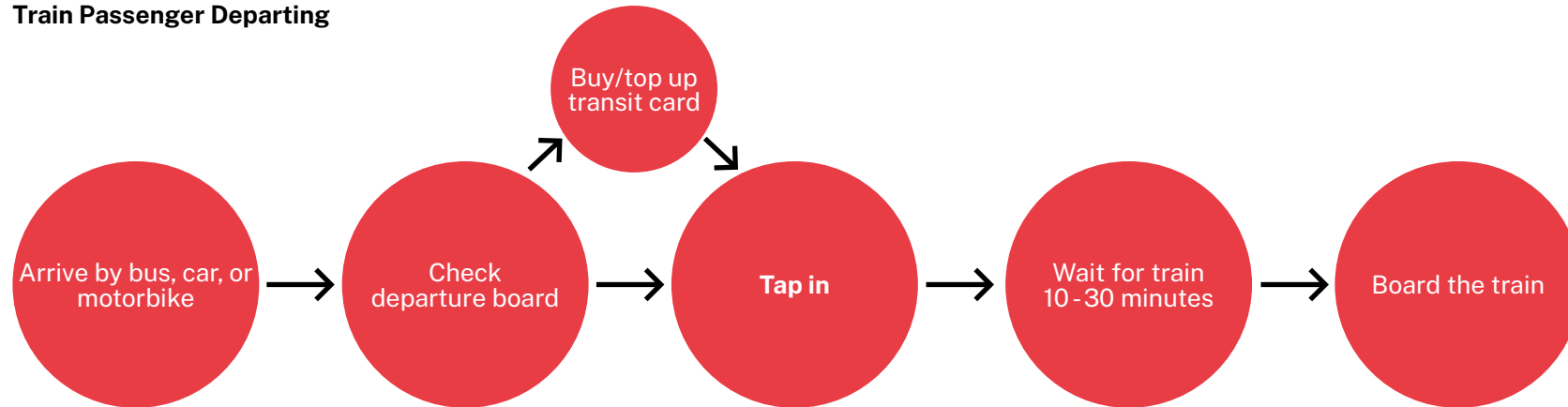


Figure 2.17 Commuter passenger departing activity diagram

Author, 2024

Train Passenger Arriving

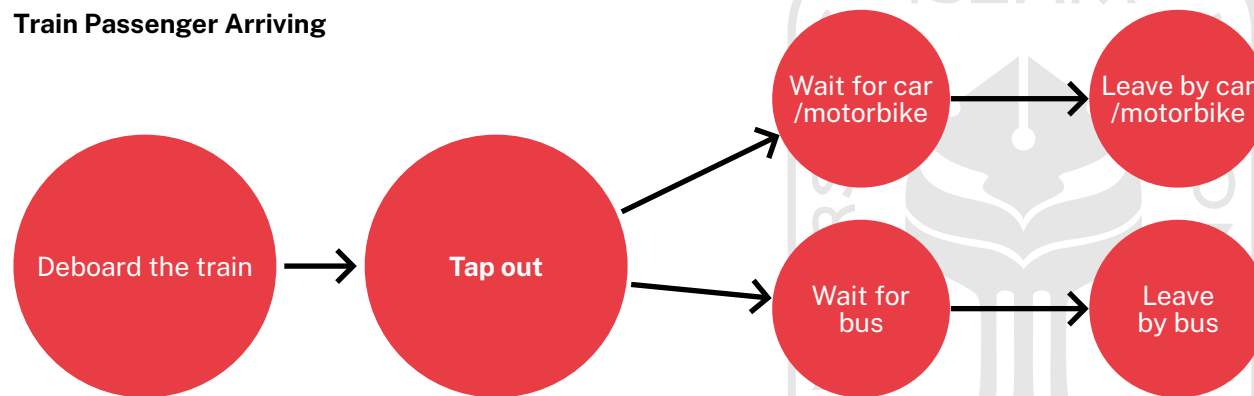


Figure 2.18 Commuter passenger arriving activity diagram

Author, 2024

Taxi/Car Driver Picking Up Passenger

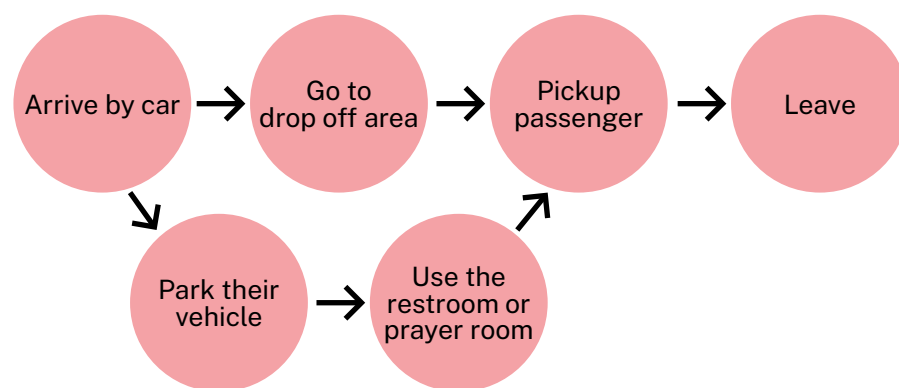


Figure 2.19 Taxi driver activity diagram

Author, 2024

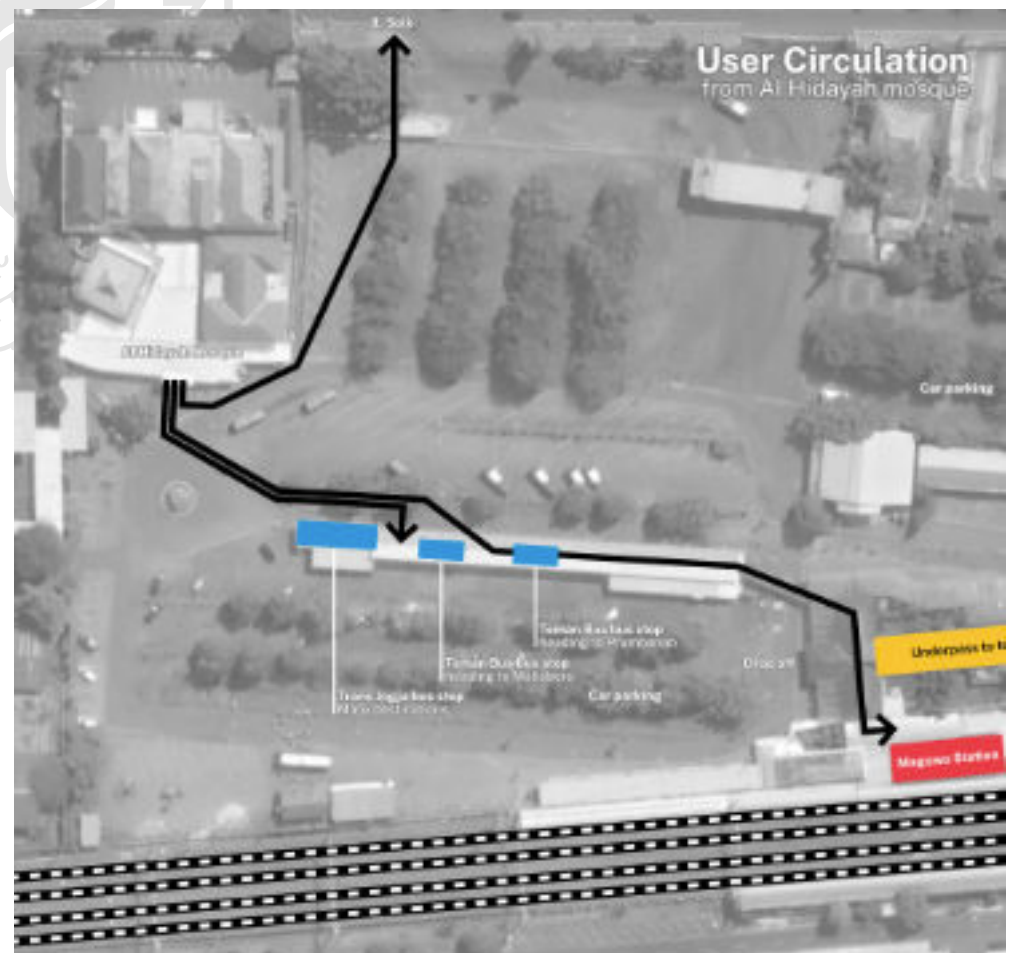
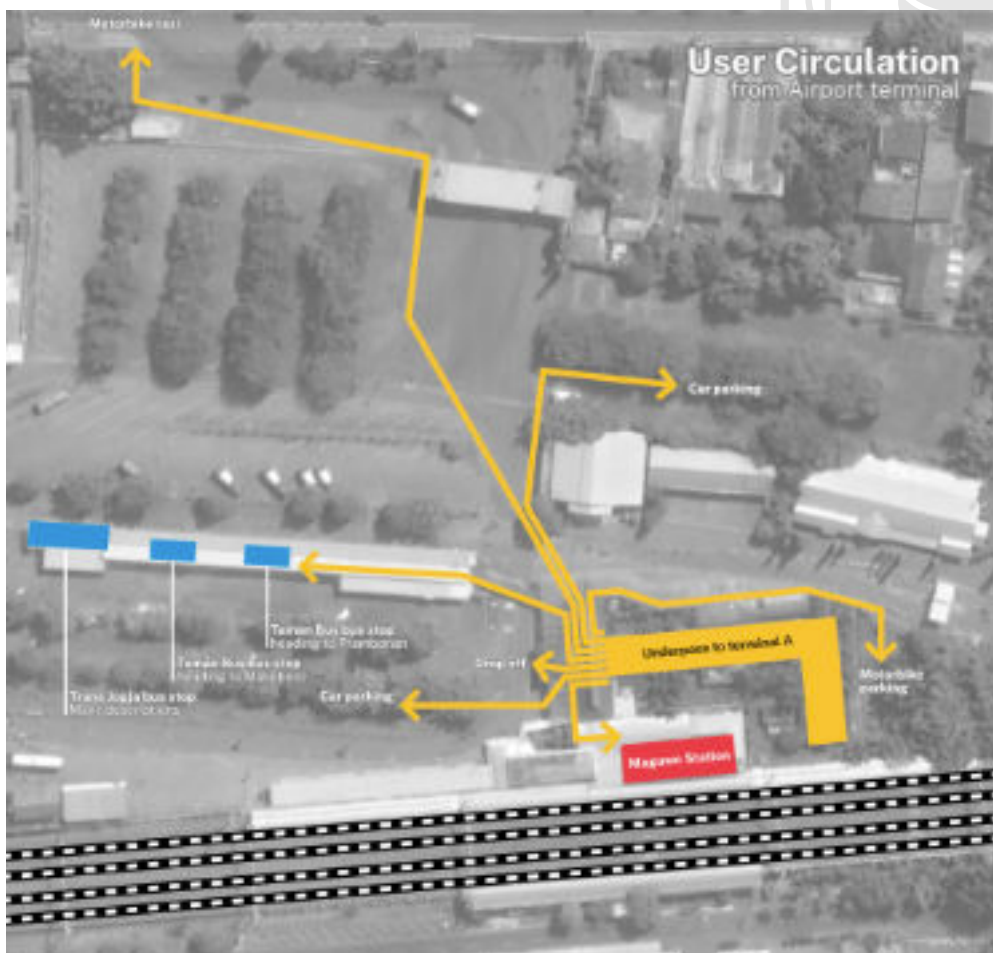
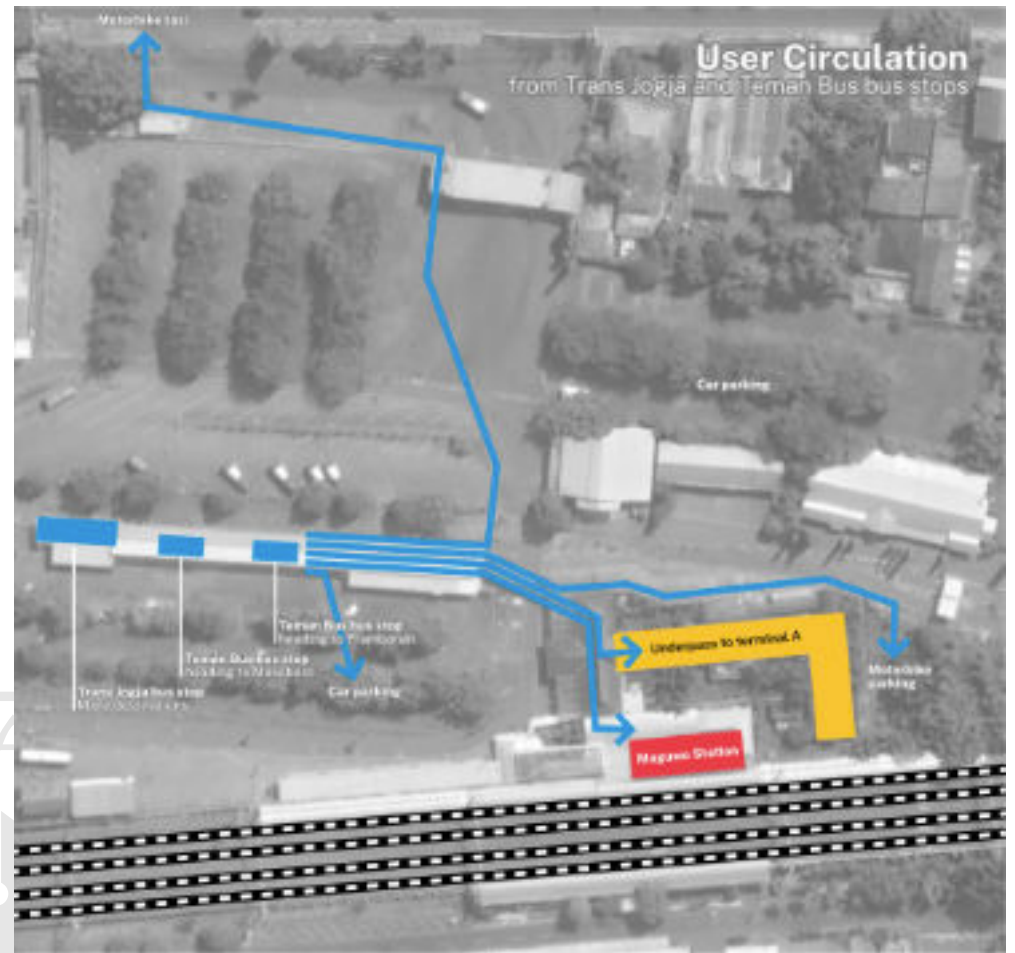
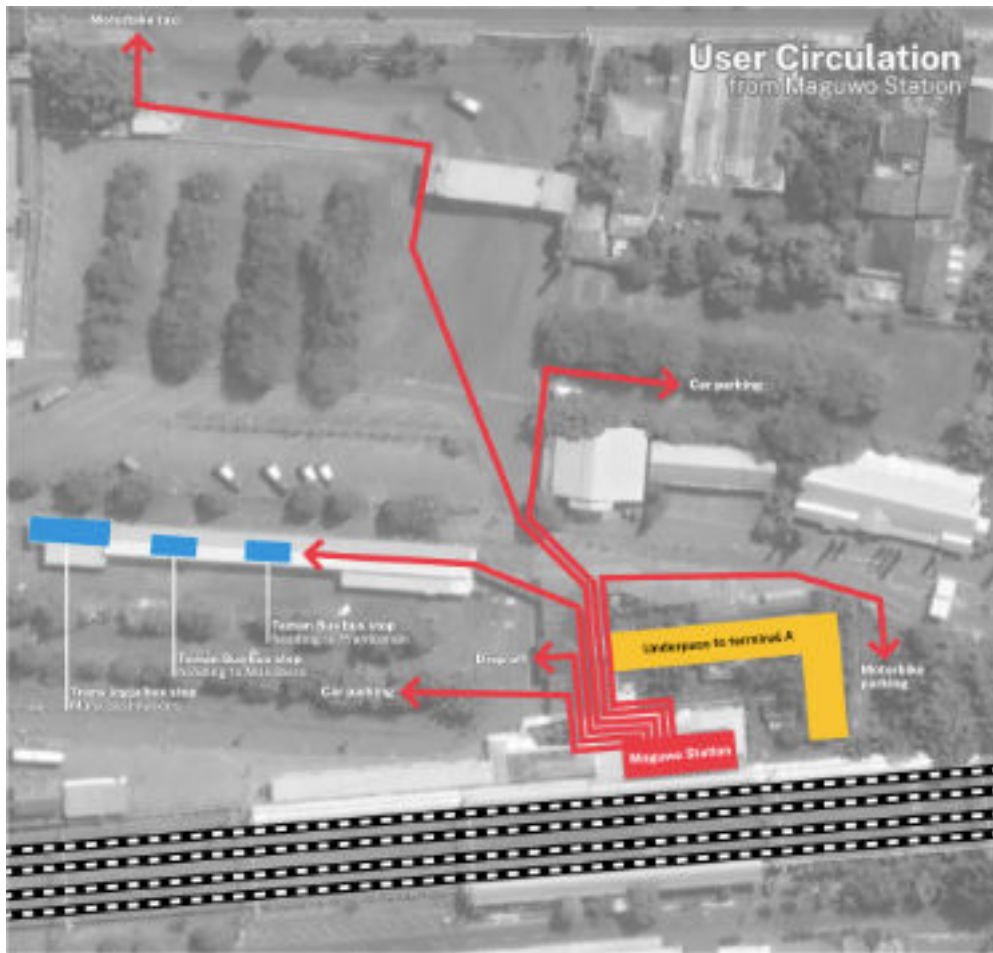


Figure 2.20 Circulation mapping

Author, 2024

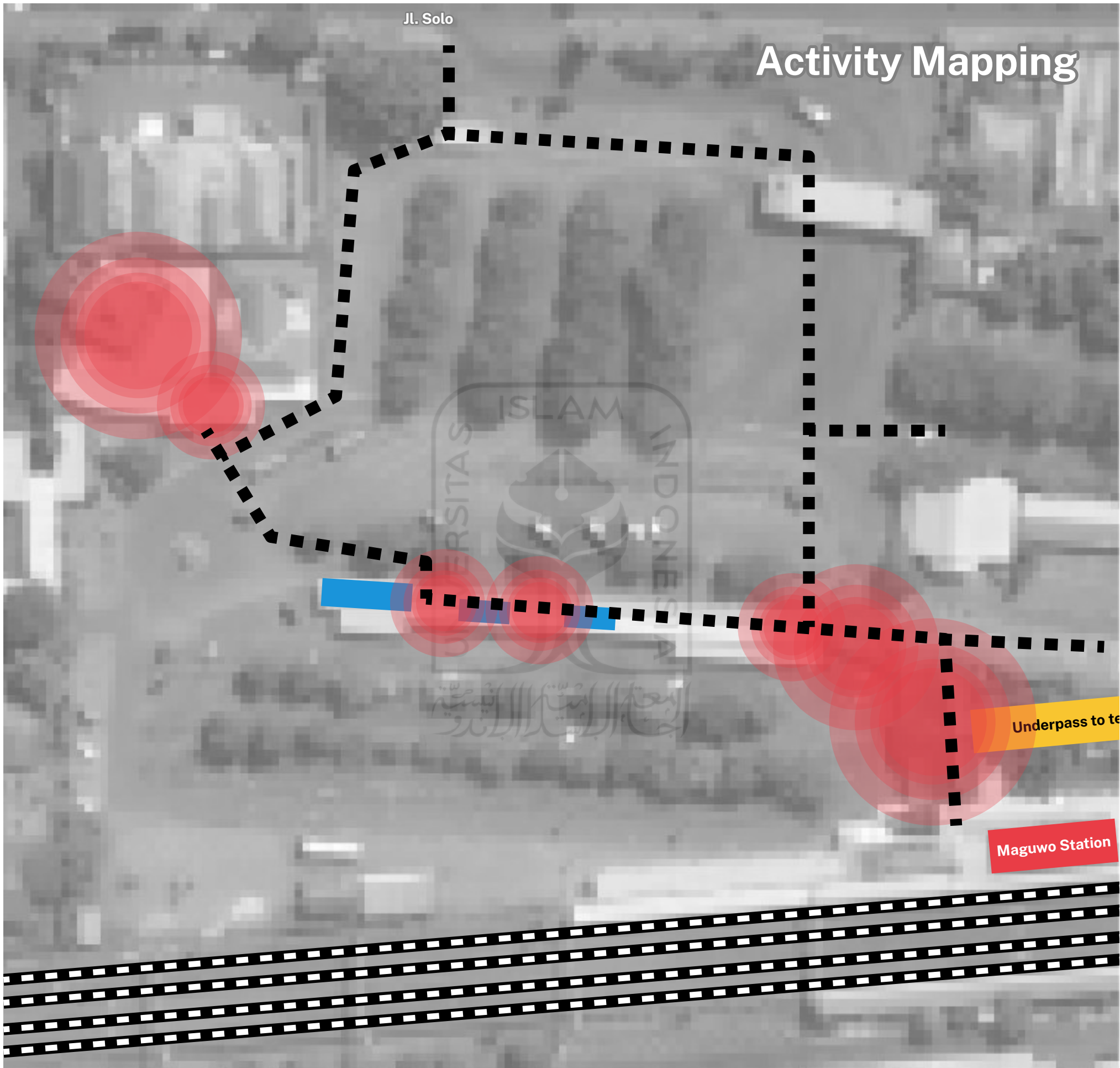


Figure 2.21 Activity mapping

Author, 2024

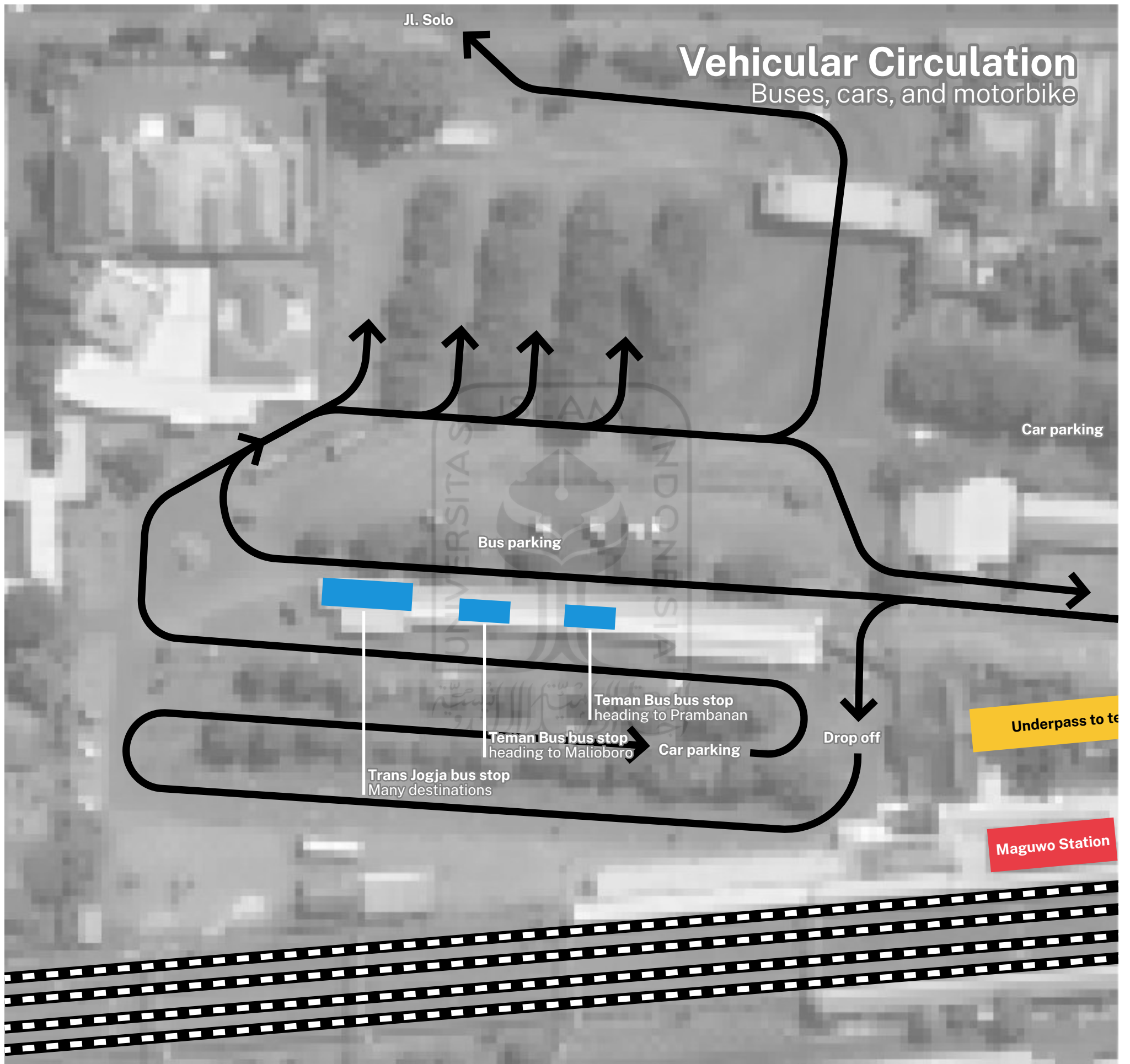


Figure 2.22 Vehicular circulation-cars and motorbike

Author, 2024

Conflict Points

Pedestrian and vehicular conflict points

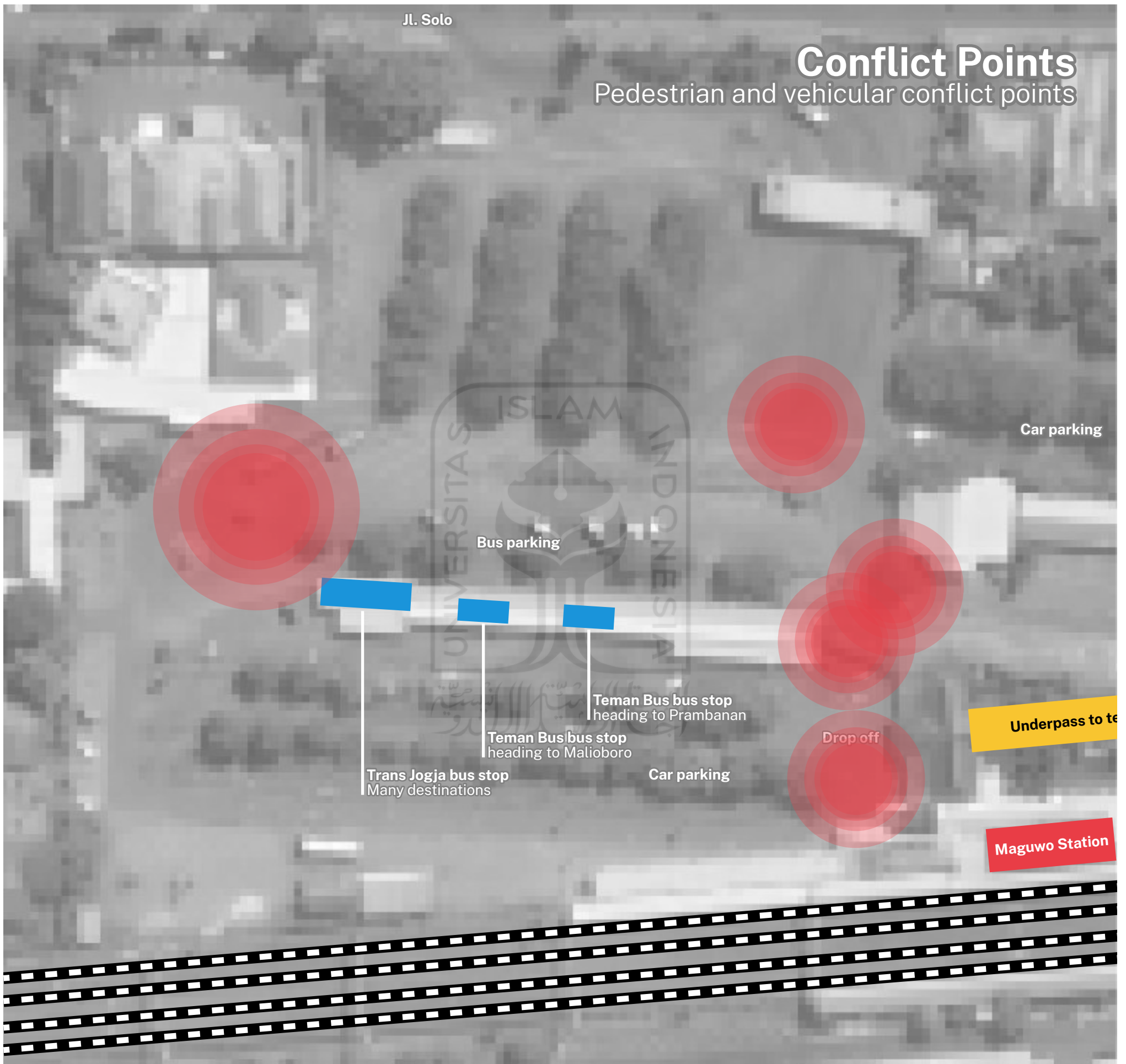






Figure 2.23 Conflict point mapping

Author, 2024



Bus Dimensions

The dimensions of buses affect how the interface between building and bus is designed. This includes platform layout, bus bays, and floor height required for each types of buses.

Bus Models	Width (mm)	Length (mm)	Passenger Door Layout	Entry Height (mm)	Floor Height (mm)	Wheelchair Accessibility	Photo
8-metre Medium Bus pre-2020 production year	2100	8000 - 8400	Middle door	800	800	Requires assistance	 <p>Author, 2022</p>
8-metre Medium Bus post-2020 production year	2100	8200 - 8400	Front and middle doors	300	800	Requires assistance	 <p>Author, 2022</p>
8-metre Medium Bus provision for future fleet	2100	8400	Front and middle doors	300	300	Yes	 <p>Mobil Anak Bangsa, 2024</p>
12-metre Standard Bus provision for future fleet	2500	10500 - 12000	Front and middle doors	300	300	Yes	 <p>Author, 2023</p>

DESIGN THEME

Spatial Tranquility

Tranquil can be described as a condition of calmness in the surrounding environment. It can also be described as a calm state of mind (Molt, 2019). The demand for tranquil spaces can be attributed to the rising rate of stress in urban living. As cities grow to accommodate more people, natural spaces are increasingly becoming a scarce commodity.

A transport interchange is often a high activity space with high number of movement. This intense sensory load may induce stress for many people using the facility. The approach of spatial tranquility may help to reduce stress impacted by such busy environment.

Pang Yun Jie (2021) found common design language in spaces designed with calmness in mind.

- A. Framed views
- B. Open to sky
- C. Threshold
- D. Scale
- E. Natural features
- F. Soundscape
- G. Strolling along the periphery
- H. Sitting around the periphery

These factors are related with how the human mind perceive sight, sound, smell, and touch.

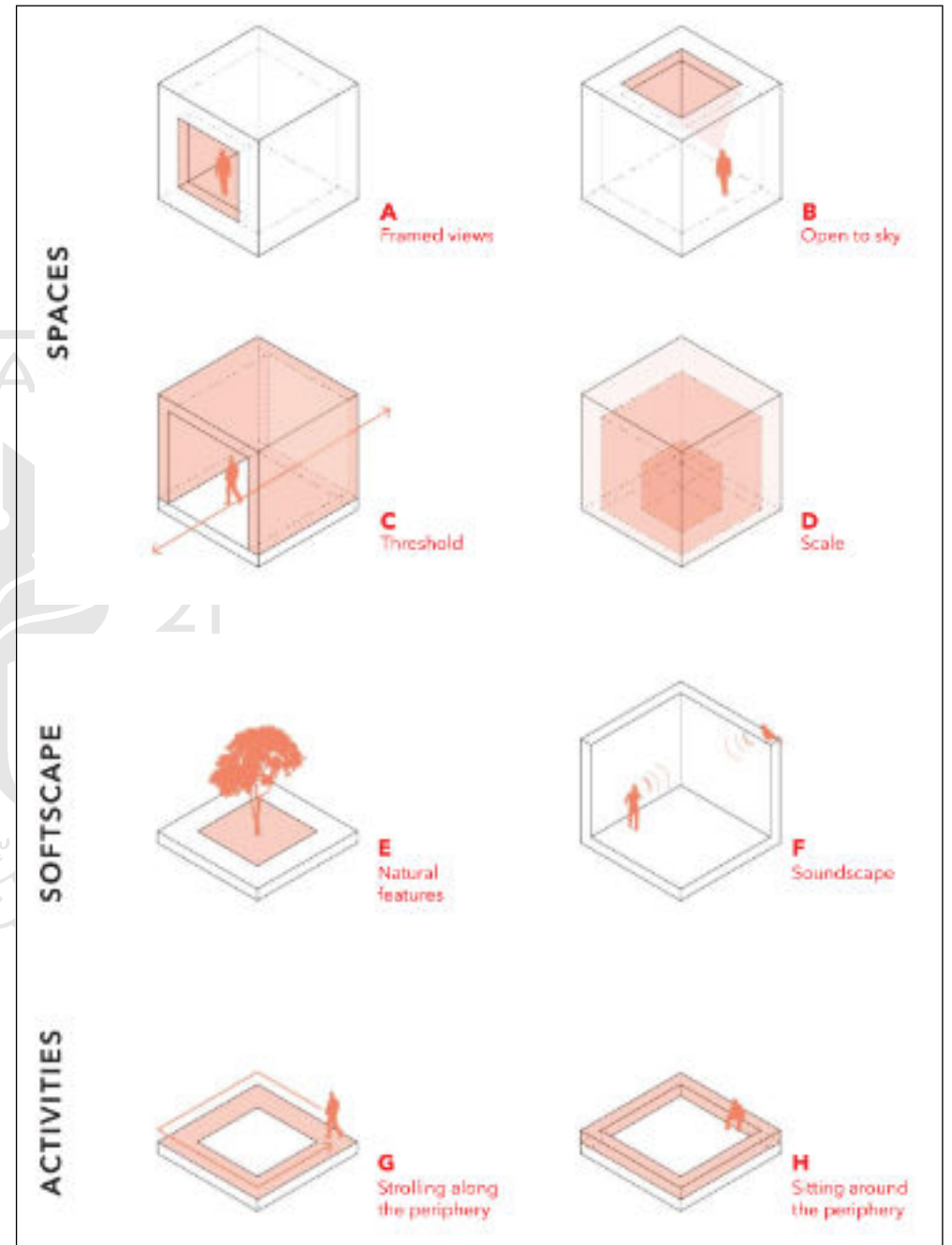


Figure 2.24 Design tools for spatial tranquility

Pang Yun Jie, 2021

Tranquility in Javanese Architecture

A traditional Javanese home is often comprised of four main spaces (Widayat, 2004):

1. Pendhapa (meeting hall)
2. Pringgitan (performance place)
3. Dalem (inner area, for bedrooms)
4. Gandhok and pawon (kitchen/utility)

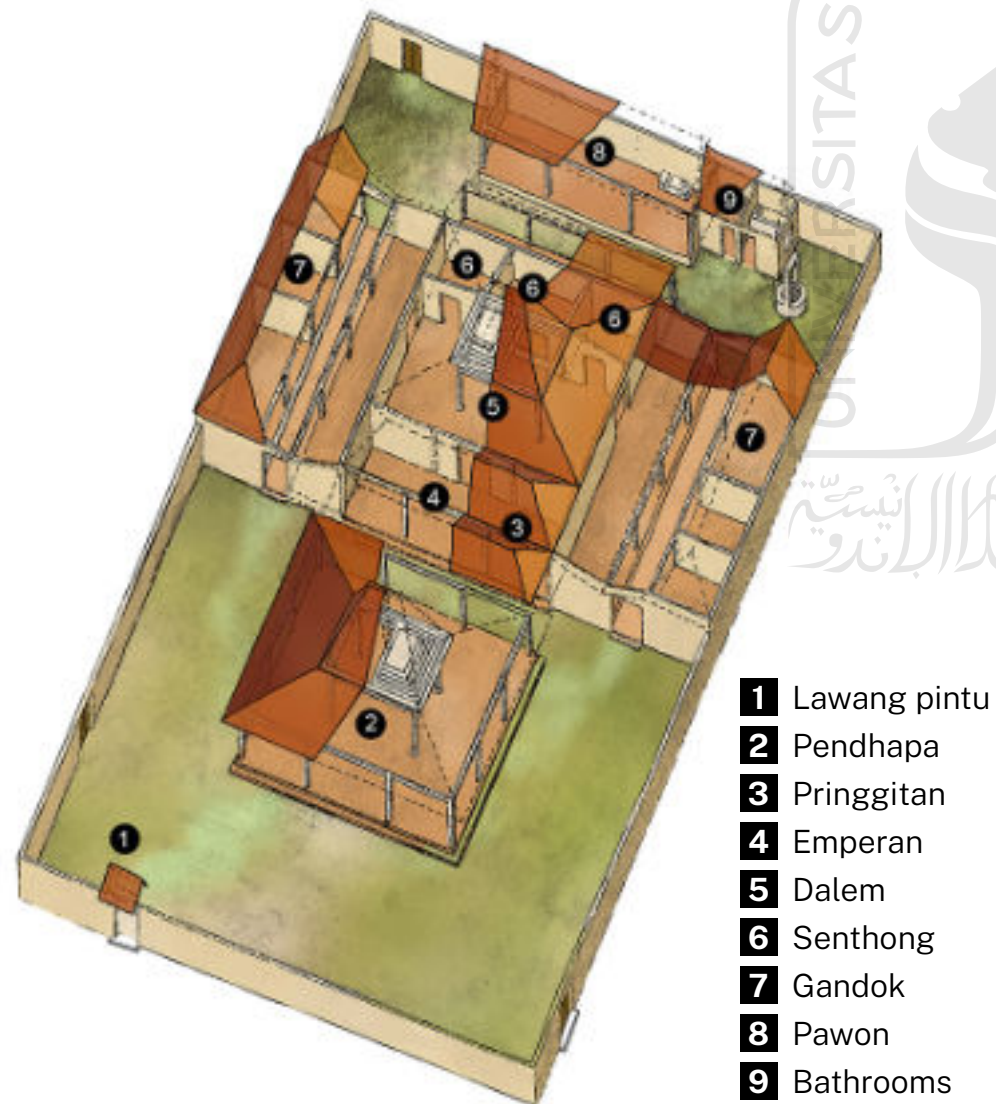


Figure 2.25 Traditional Javanese home Rochelimit via Wikimedia Commons, 2015

Utilising Jie’s framework on tranquility, the design strategies relating to tranquility on Javanese home can be assessed.

Framed views

A pendopo typically provides an open view to 3 sides of the structure. These views are often framed by structural elements, namely the columns and beams, as well as other decorative elements.



Figure 00 Interior of Pendopo Agung

Royal Ambarrukmo, 2024

Open to sky

While a typical Javanese homes don’t provide skylighting, grander structures such as mosques often utilise stacked “tajug” roof design as a way to incorporate skylighting into the interior.



Figure 00 Masjid Gedhe Kauman
Mustaka Group, 2022

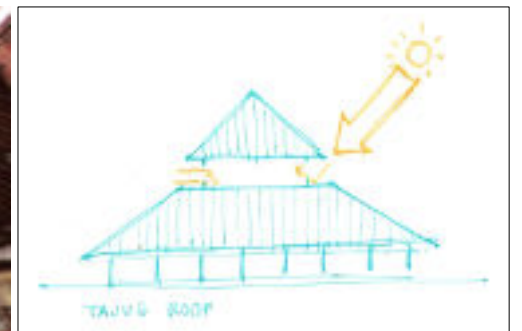


Figure 00 Tajug roof
Author, 2024

Threshold

The contrast of audiovisual elements between spaces emphasises the sense of belonging. In traditional Javanese architecture the contrast between the different areas of a home highlights the philosophy of each designated spaces.



Figure 00 Javanese home threshold

Author, 2024

Scale

The arrangement of spaces in a traditional Javanese home follows a linear axis from public towards the front to private towards the back. This axis determines the how private a space is and thusly, the scale of said space.

Natural features

Traditional Javanese architecture often employ a front yard which include many natural features such as trees and hedges. Inner courtyard or a garden can also be found on buildings with higher status as it requires more costly maintenance.

Soundscape

The soundscape in a traditional Javanese architecture is haighly influenced by the building material and construction. In most structures, tile roof with timber construction is often employed. This benefits the auditory experience of the users by dampening outside noise and keeping echo to a minimum. Although in a more public area such as the pendhapa, higher roof height and hard flooring introduces more echo in the space.

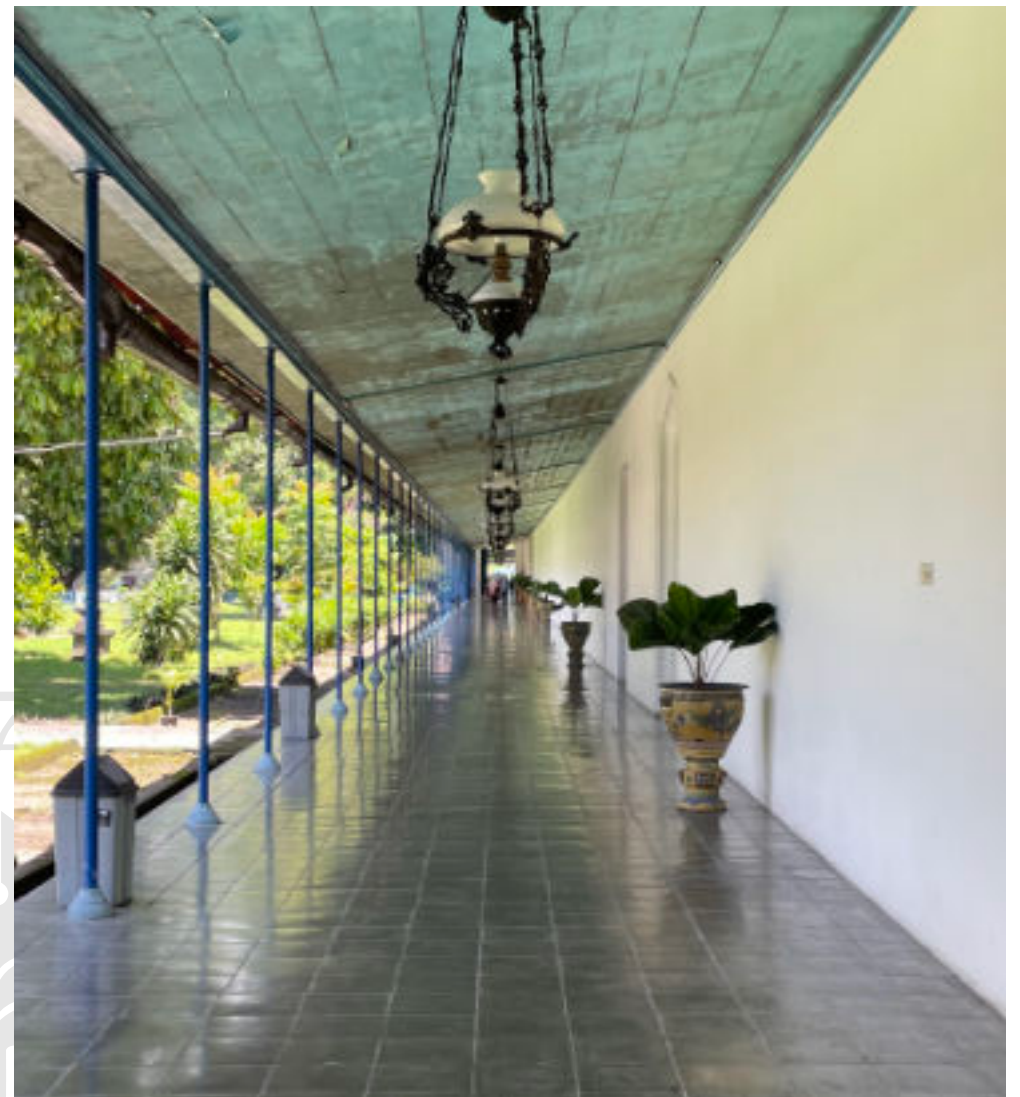


Figure 2.26 Inner garden of Keraton Surakarta

Author, 2021



Figure 2.27 Water feature in front of Mangkunegaran

Author, 2023

Strolling around the periphery

A pendhapa is often surrounded by an open yard. This allows the user the experience the space freely from multiple perspectives. This combined with the rhythm of walking may invoke a calming sensation for the user.

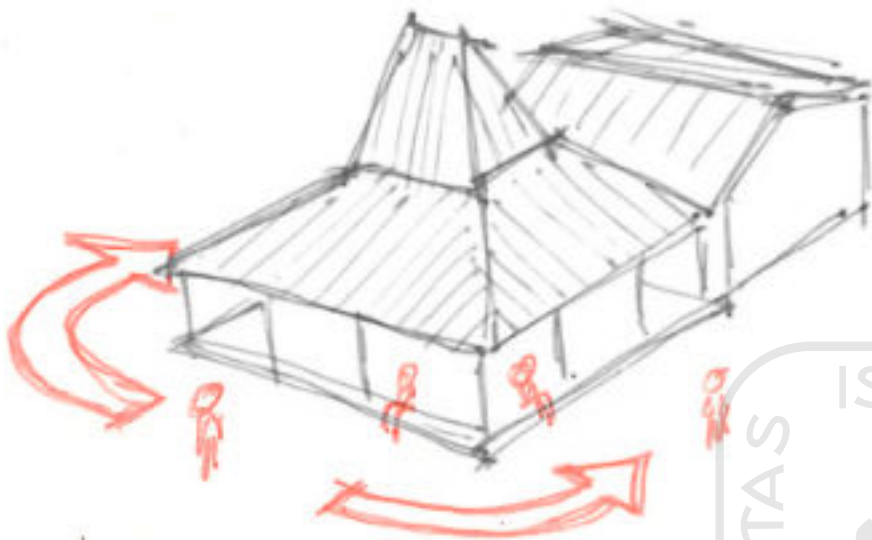


Figure 00 Free movement in the perimeter of a pendhapa

Author, 2024

Sitting around the periphery

The raised platform of a pendhapa can function as a sitting area for the user. The generous roof overhang of a typical pendhapa protects the users from unwanted natural elements such as rain and direct sunlight. Sitting around the perimeter of a pendhapa is a common activity in Javanese culture as it induces a calming sensation.



Figure 2.28 A pendhapa in Kotagede

Author, 2024



Figure 2.29 A pendhapa in Kotagede

Author, 2024

PRECEDENT STUDY

Cakra Selaras Wahana, Jakarta

by Studio Lawang

Cakra Selaras Wahana (CSW) is a transit interchange in Jakarta located in South Jakarta. It commenced operation in 2021, connecting the MRT station ASEAN and Transjakarta bus stops. Its design seek to solve the issue of disintegration between transit modes in Jakarta.

Lesson Learned

- Although one of its main design focus is the human-centred design, the streetscape surrounding the space is quite hostile for pedestrian. While the relocation of pedestrian access to upper level provides more safety, it is still creates a barrier for people with limited mobility.
- The limited site of CSW gave its designers creative ways in creating building masses that fits within the constraints of exiting infrastructures while still allowing for efficient use of space.

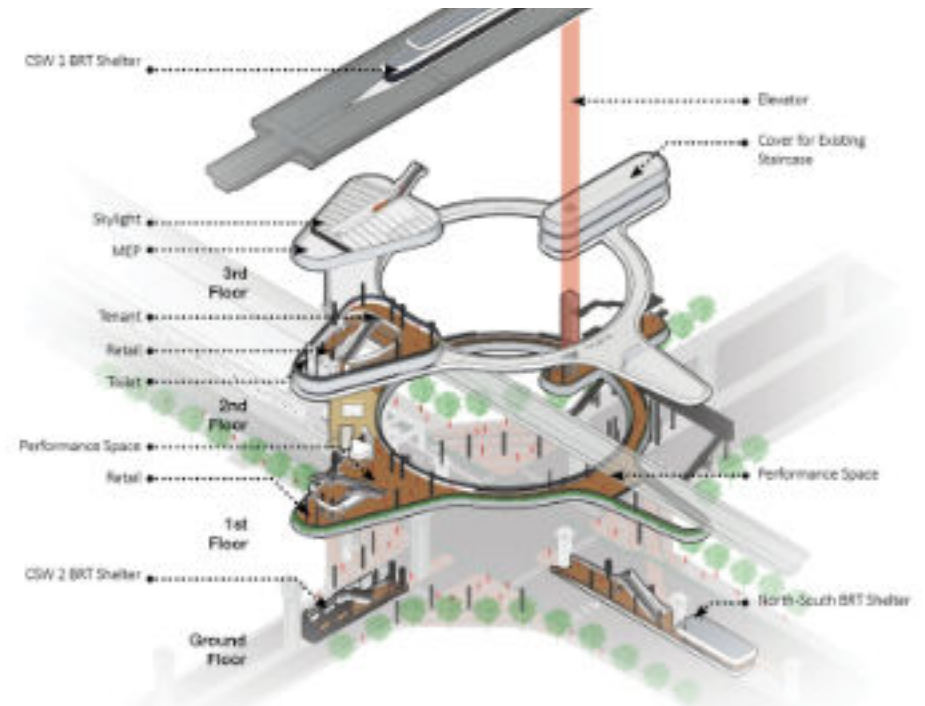


Figure 2.30 CSW exploded diagram

Studio Lawang, 2021



Figure 2.31 CSW aerial view

Mario Wibowo, 2021



Figure 2.32 CSW from street level

Mario Wibowo, 2021

Toa Payoh Interchange, Singapore

by Housing and Development Board of Singapore

Toa Payoh Interchange is one of the busiest bus interchange in Singapore. It is located in Toa Payoh and was opened in 2002. It is integrated within HDB Hub, the headquarter of the Housing and Development Board, as well as Toa Payoh Central, a four-storey shopping mall complex. The bus interchange became the first to be air-conditioned bus interchange in the city.

Summary

11,000 m ²	Bus circulation and parking
5,200 m ²	Bus terminal building
14+4	Bus berths (end-on + sawtooth)
14	Bus parking spaces
25	Bus routes served



Figure 2.33 Toa Payoh Interchange

Jansen Chua, 2014



Figure 2.34 Toa Payoh Interchange bus terminal building

ZKang123, 2020



Figure 2.35 Toa Payoh Interchange map

SBS Transit, unknown

KL Sentral, Kuala Lumpur

Concourse area : 30,500 m²

Number of platforms : 12

KL Sentral is the main transit hub of Kuala Lumpur connecting six different transit modes under a single roof. Said transit modes includes; intercity trains (KTM ETS), commuter trains (KTM Komuter), light rail (LRT Kelana Jaya Line), monorail (KL Monorail), airport rail link (ERL), as well as city buses (RapidKL).

Lesson Learned and Design Strategy:

- A station can be designed **centred around the station hall** or concourse for increasing the efficiency of passenger flow.
- Space frame roof construction can be implemented to **maximise roof span**, reducing the amount of columns need which might hinder user circulation.
- Designing with large area of retail can help make the station not only an intermediate place between transit modes but also a destination on itself.
- The **lack of open plaza and connectivity** to surrounding doesn't benefit the local community. This can contribute to road traffic congestion around the area due to limited options to access the station.
- While a large footprint can benefit user experience, KL Sentral's massive floor area compared to the number of platform it serves leaves parts of the building sitting empty and unproductive, especially around ERL arrivals.



Figure 2.36 KL Sentral concourse Wikimedia Commons-hams Nocete, 2017

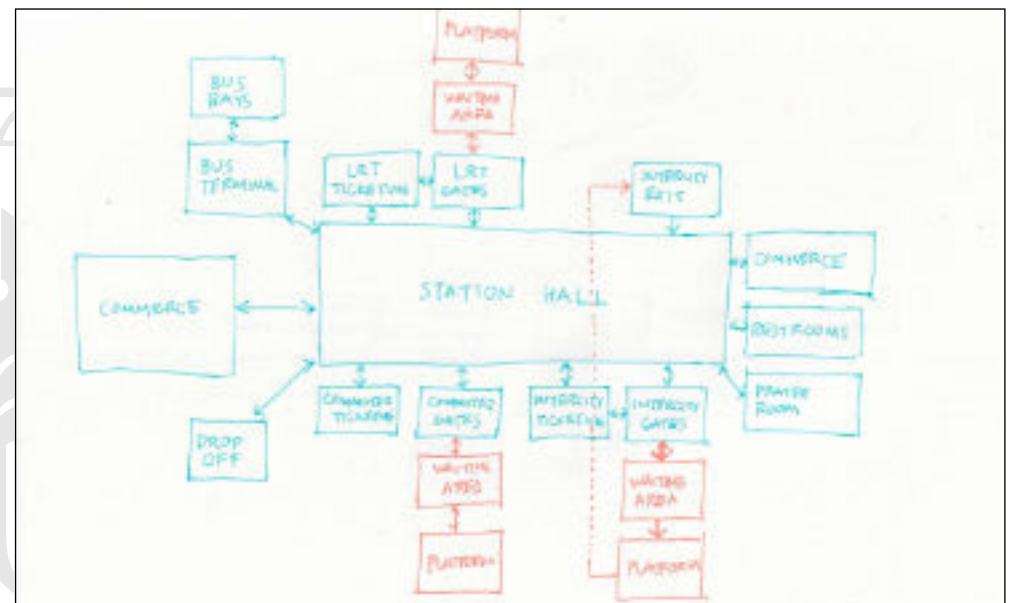


Figure 2.37 KL Sentral passenger flow

Author, 2024

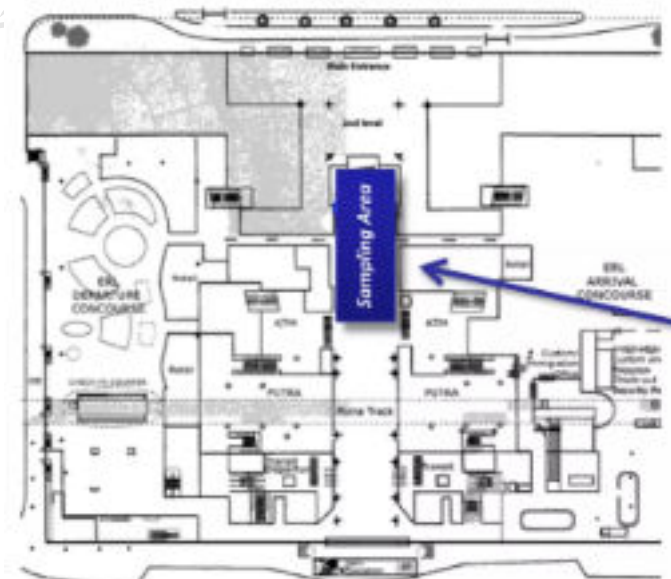
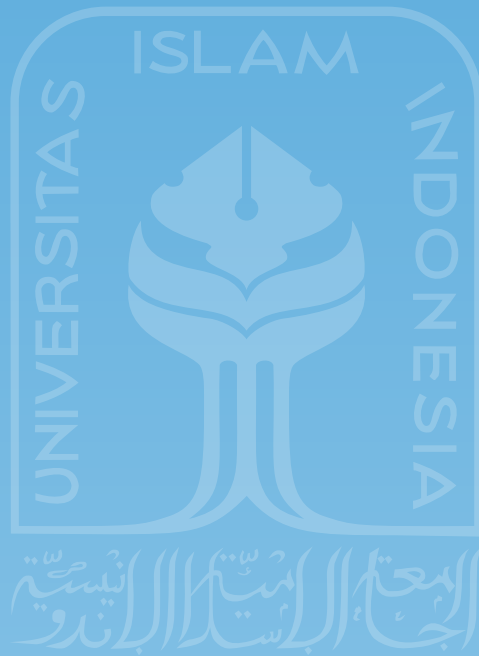


Figure 2.38 KL Sentral floor plan

3thirds Inc Sdn. Bhd., 2018

3



DESIGN PROBLEM SOLVING

Site context concepts

Design exploration

Figurative design concept

DESIGN EXPLORATION

Spatial Diagram

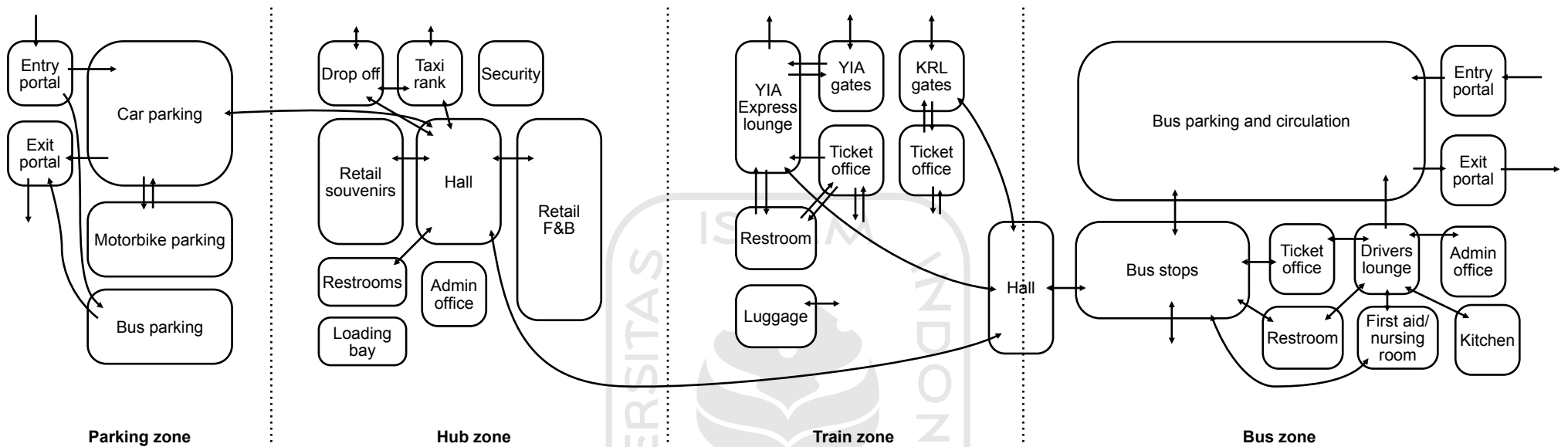


Figure 3.1 Spatial diagram

Author, 2024

Preliminary Floor Area Calculation

Zone	Room	Access	Requirement/Standard	Capacity	Area	Source	
Hub	Venue hall	Public			1,500 m ²	P	
	Outdoor retail units	Public	25-50m ² /unit Min. frontage 3m	52 x 42 m ²	2,184 m ²	P	
	Indoor retail unit	Public	25-50m ² /unit Min. frontage 3m	12 x 46 m ² 6 x 48 m ² 12 x 40 m ²	1,320 m ²	P	
	YIA Express area	Public	Accommodate 150% of train capacity	300 seatings	720 m ²	P	
					Total + 50% circulation	8,592 m²	

Zone	Room	Access	Requirement/Standard	Capacity	Area	Source
Bus Indoor	Passenger service office	Staff only	12m ² /booth Min. frontage 2.2m/booth	2 booths	24 m ²	LTA
	Administrative office	Staff only			20 m ²	LTA
	Manager room	Staff only	Adjacent to administrative office		8 m ²	LTA
	Staff lounge with briefing room	Staff only			55 m ²	LTA
	Staff toilets	Staff only	Adjacent to staff lounge	Male: 2 cubicles, 2 urinals, 2 wash basins Female: 1 cubicle, 2 wash basins	36 m ²	LTA
	Public toilets	Public		Male: 3 cubicles, 4 urinals, 4 wash basins Female: 4 cubicle, 6 wash basins 1 accessible toilet	75 m ²	P
	Server room	Staff only	Adjacent to passenger service office		7.5 m ²	LTA
	Ticket office	Staff only	Min. frontage 2.2 m/booth		9 m ²	LTA
	Ticket machine	Public	5m ² /machine 2m frontage	2 machines	10 m ²	LTA
	Berth queue rail	Public	3 x 900mm width of queue line 700mm clear width	5 berths @ 20m length	270 m ²	LTA
	Seatings	Public	Min. 4 priority seats/boarding berth Min. 6 benches total 0.6m ² /seat	4 seats x 4 boarding berths + 50 seats	40 m ²	LTA AD
	Concourse clear zone (main circulation)	Public	6m width Clear of any obstructions	5 berths @ 20m length	600 m ²	LTA
	ATM / vending machine	Public	1.5m ² /machine	5 machines	7.5 m ²	LTA
	Storeroom	Staff only			6 m ²	LTA
	Nursing room with first aid room	Public	3 x 4 m minimum	2 persons	12 m ²	PUPR
	Cleaner's room	Staff only	Min. door width 1.2m		10 m ²	LTA
	Technician's room	Staff only			6 m ²	LTA
	Canteen	Public	One wash basin sink One double bowl sink at servery area		55 m ²	LTA
	Kitchen	Staff only	Adjacent to canteen One double bowl sink Exhaust and grease trap		15 m ²	LTA
	Rodent-free Storeroom	Staff only	Adjacent to kitchen		4.8 m ²	LTA
Total + 20% circulation					1,525 m²	
Bus Outdoor	Bus parking	Staff only	3 parking spaces/bus route 44.5m ² /space (for 12 m bus)	21 spaces for city bus 14 spaces for coach	1,557.5 m ²	LTA
	Parking circulation	Staff only	Minimum clear width: • One-directional saw-tooth 12 m • Two-directional saw-tooth 14 m • One-directional end-on 18 m • Two-directional end-on 21 m Max. gradient 1:20	400 m ² for each boarding berths + 100% of bus parking	3,557.5 m ²	LTA + P
	Boarding berth	Public	20 x 8m/berths	4 berths	640 m ²	LTA + P
	Alighting berth	Public	20 x 8m/berth	1 berth	160 m ²	LTA + P
	Exit driveway	Staff only	8m width	100m length	800 m ²	LTA
	Bus crew parking	Staff only	1x2.5m/space + 100% circulation	30 motorbike parking	150 m ²	LTA
	Total + 20% circulation					8,238 m²

P: Precedent study
AD: Architect's Data (Ernst Neufert)

LTA: Land Transport Authority (Singapore)
PUPR: Ministry of Public Works and Housing (Indonesia)

Table 3.1 Preliminary Floor Area Calculation

Author, 2024

SITE ANALYSIS

Zoning

The zoning is plotted based on human/vehicular area. This is made to minimise conflicts between pedestrian and vehicles.

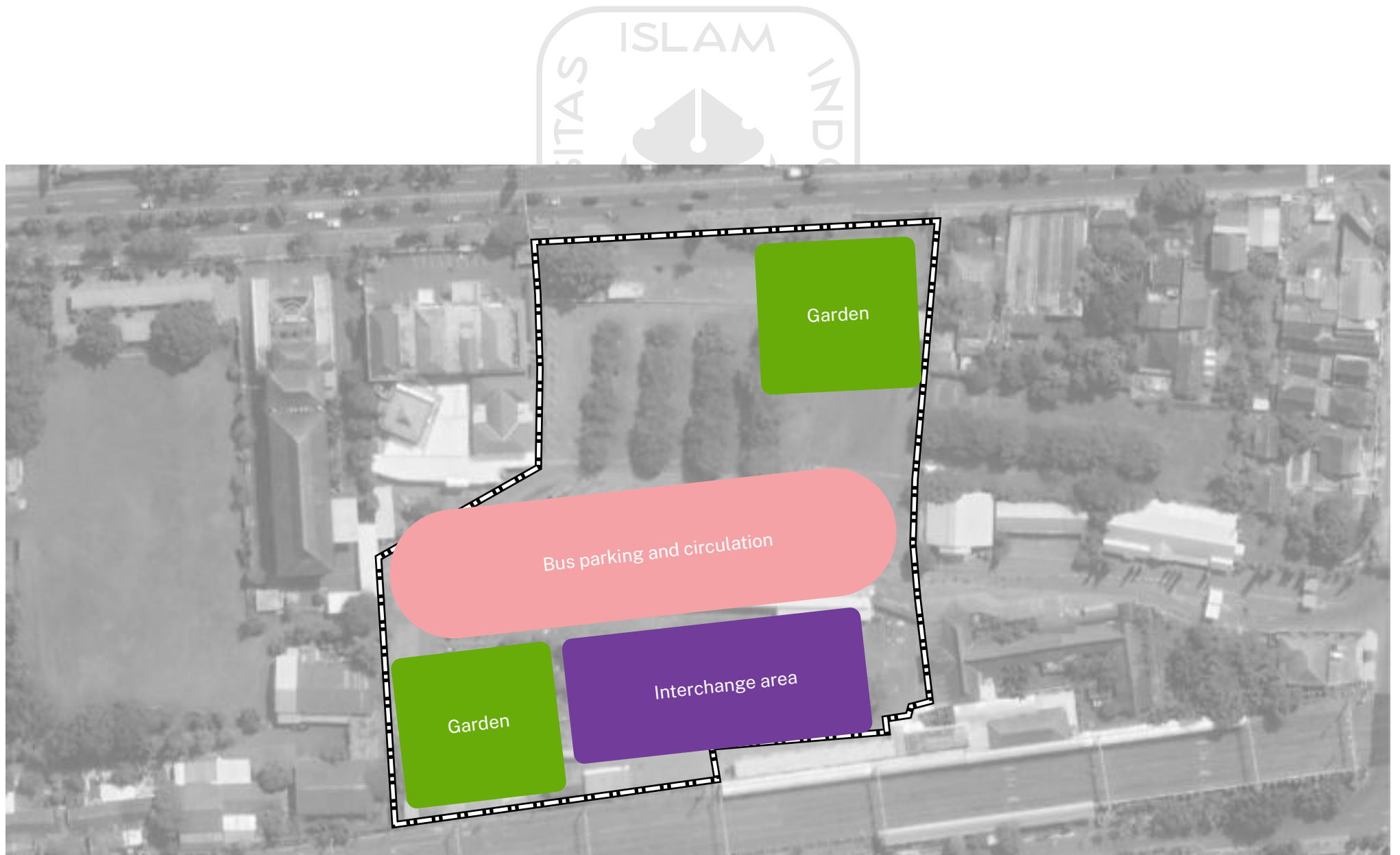


Figure 3.2 Zoning analysis

Author, 2024

Circulation

Bus station is arranged in a linear form to accommodate multiple bus bays. This ensures that many buses can pick up and drop off passengers all at once without having to queue.

Provision for an additional station entrance is made to provide easier connection for passengers transferring between bus and rail.

Commerce is located out of the way of main circulation to avoid conflict as well as to provide view to the railway tracks which is desirable.

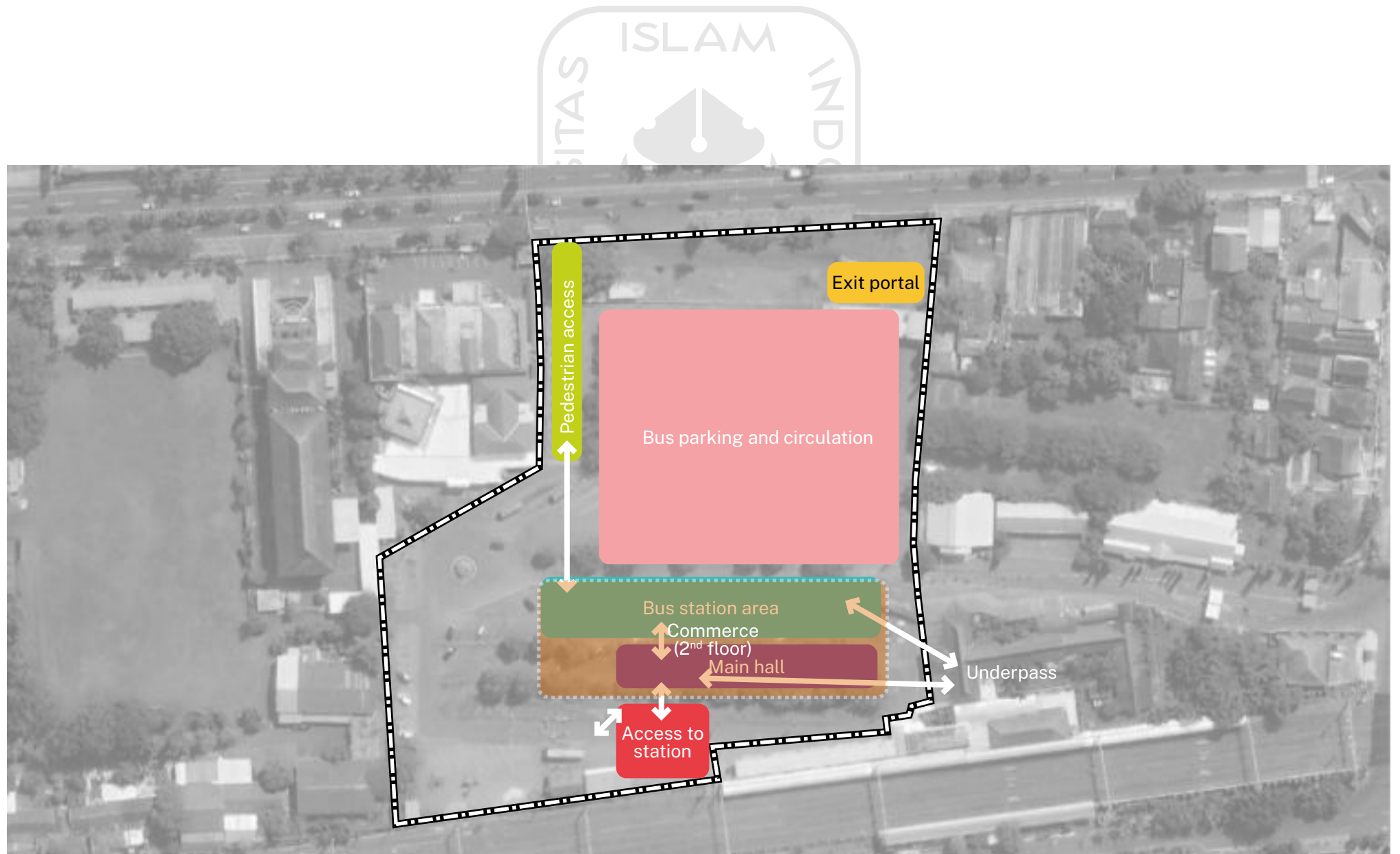


Figure 3.3 Circulation analysis

Author, 2024

Site Access

Access points to and from the site are divided into two types, vehicular and pedestrian.



Vehicular access points accommodates access to cars, motorbikes, and buses. Entrances are available via north side and east side.



Pedestrian access points only allows foot access from the outside.

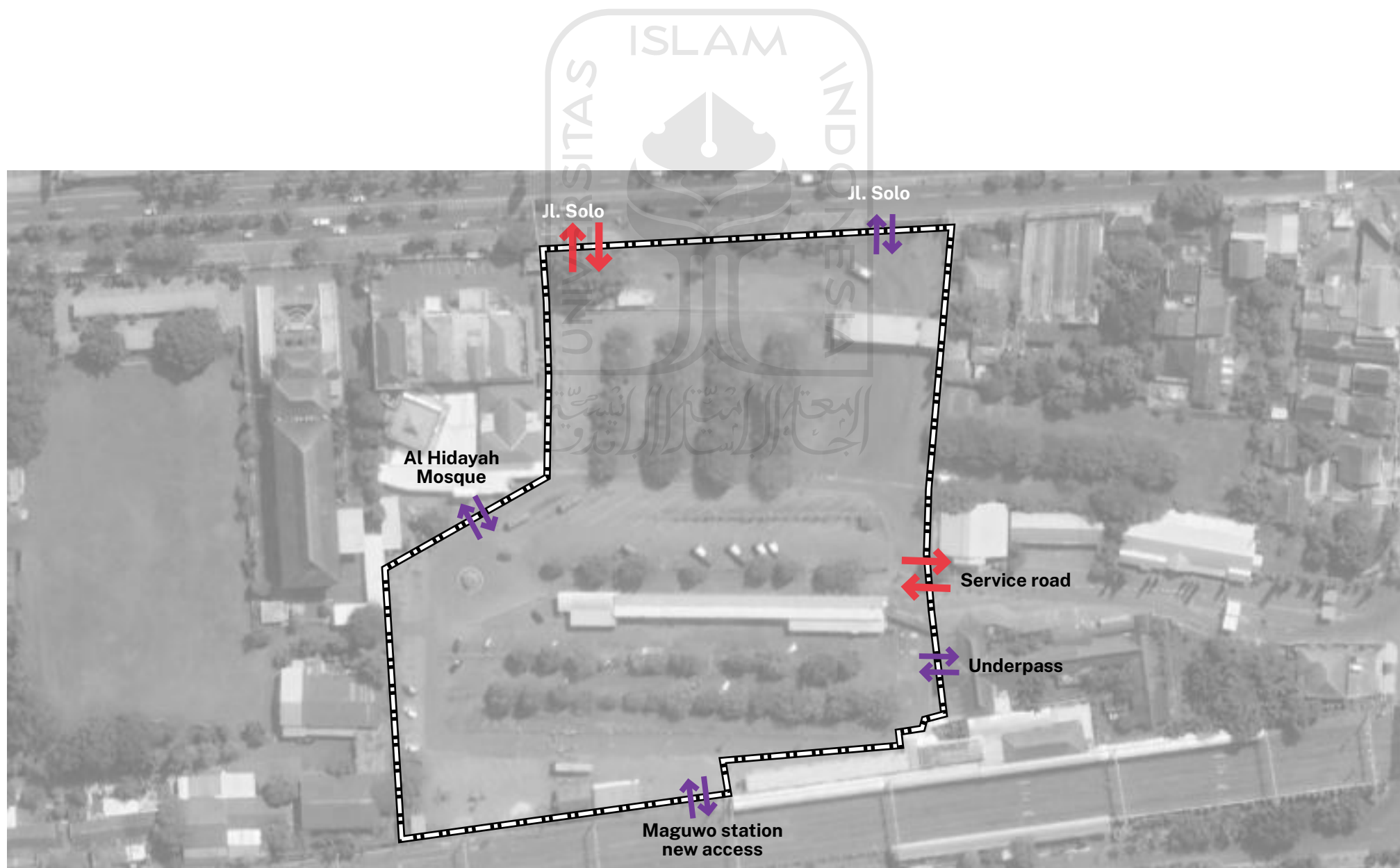
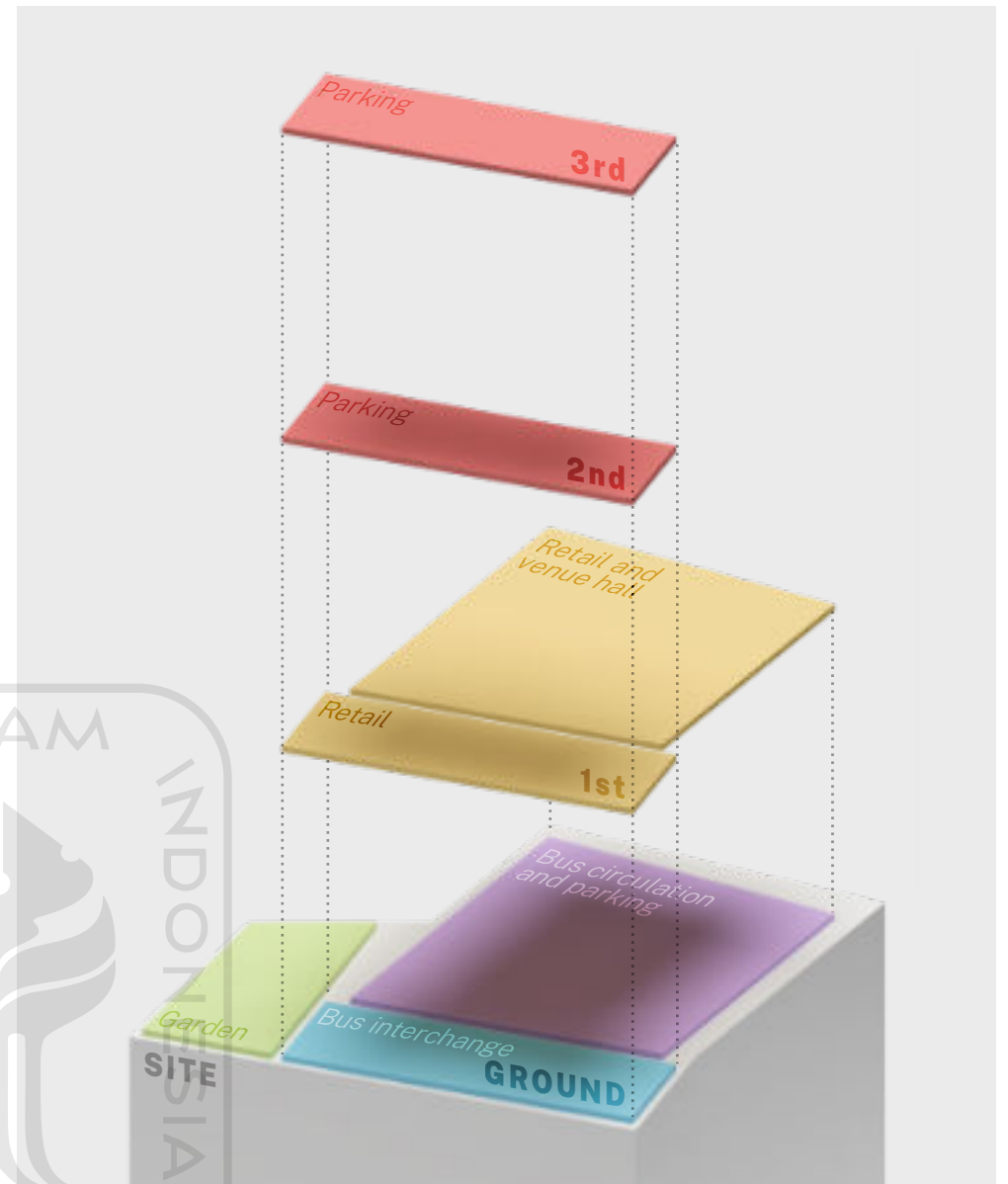


Figure 3.4 Access analysis

Author, 2024

Massing Concept

The main building mass is comprised one integrated structure divided into zones based on the floor levels. The ground level is design for bus circulation and parking with the bus interchange on the south side. The first floor is for retail and venue hall. While the upper floors are for visitors parking.



Design Transformation

The main building mass is comprised one integrated structure divided into zones based on the floor levels. The ground level is design for bus circulation and parking with the bus interchange on the south side. The first floor is for retail and venue hall. While the second floor is for parking.

Figure 3.5 Massing concept

Author, 2024



Figure 3.6 Design transformation

Author, 2024

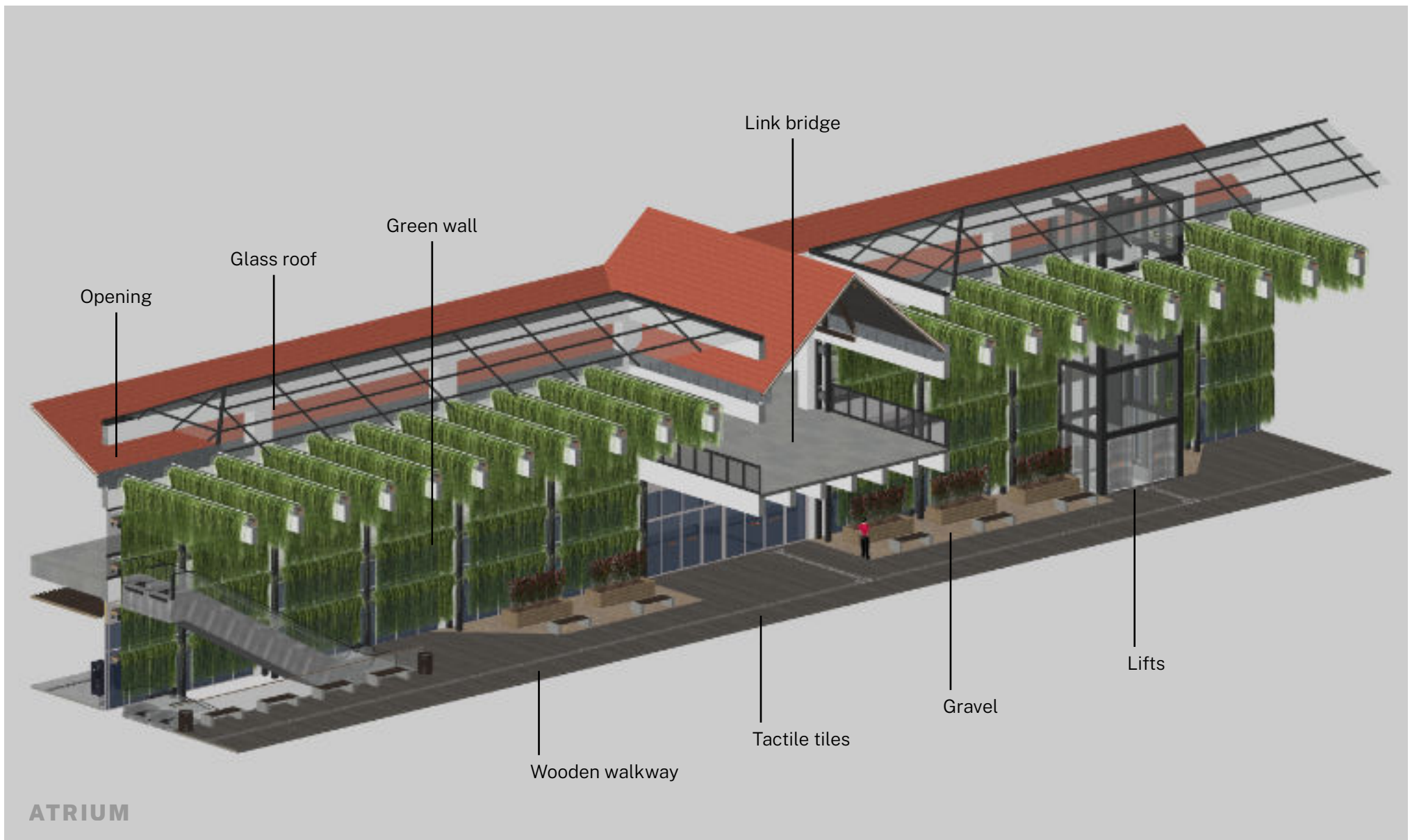


Figure 3.7 Detail of atrium

Author, 2024



Figure 3.8 Detail of green wall

Author, 2024

Bus Berth Module

Bus berth is a space for boarding and alighting passengers. Each berth can accommodate up to 12m standard bus.

Length : 20 m
Width : 8 m passing lane
 8 m bus bay zone
 7 m concourse zone
Seatings : 12 priority seatings

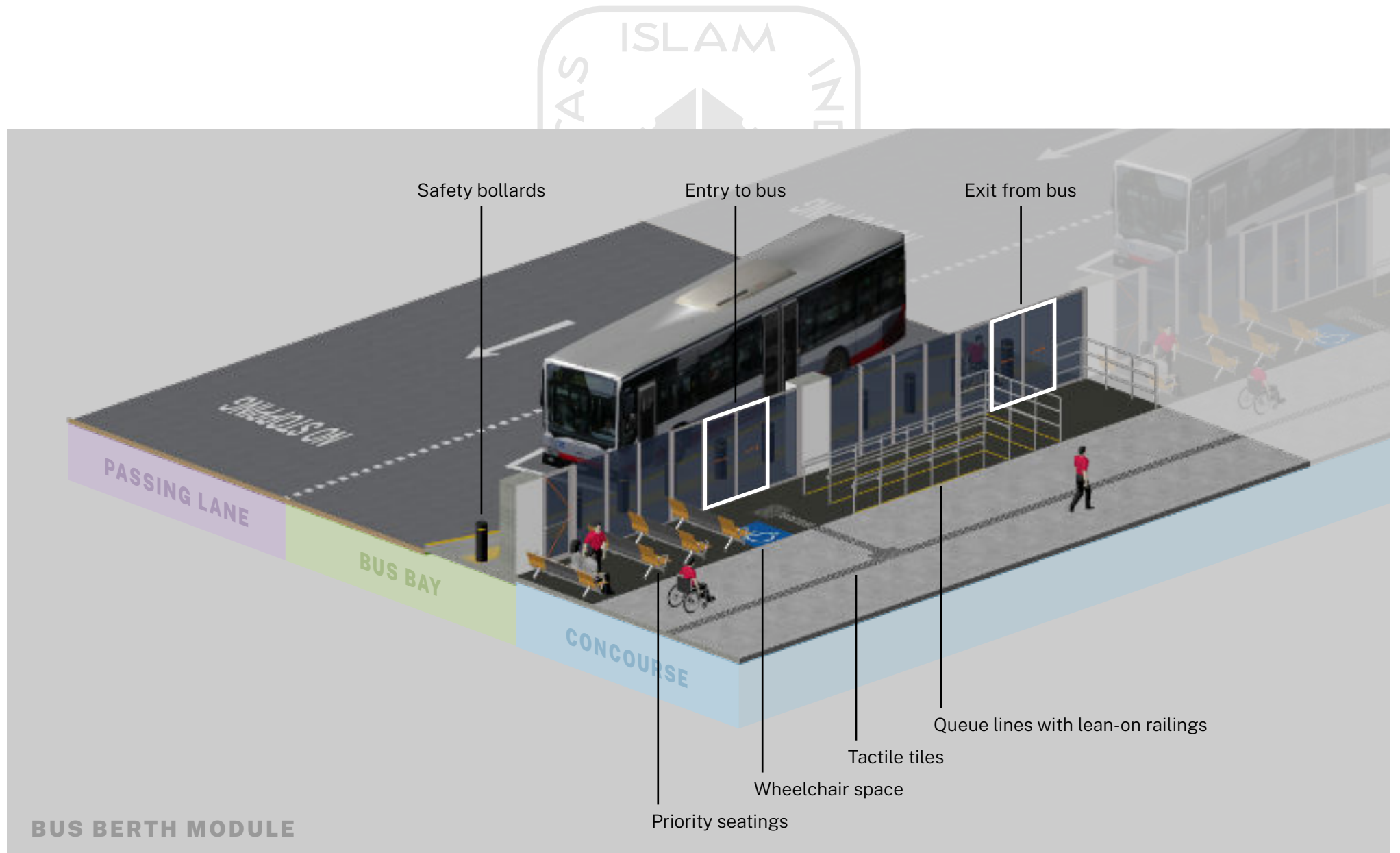


Figure 3.9 Detail of bus berth module

Author, 2024

4



DESIGN RESULT

Illustrative site plan and sections

Situation plan

Site plan

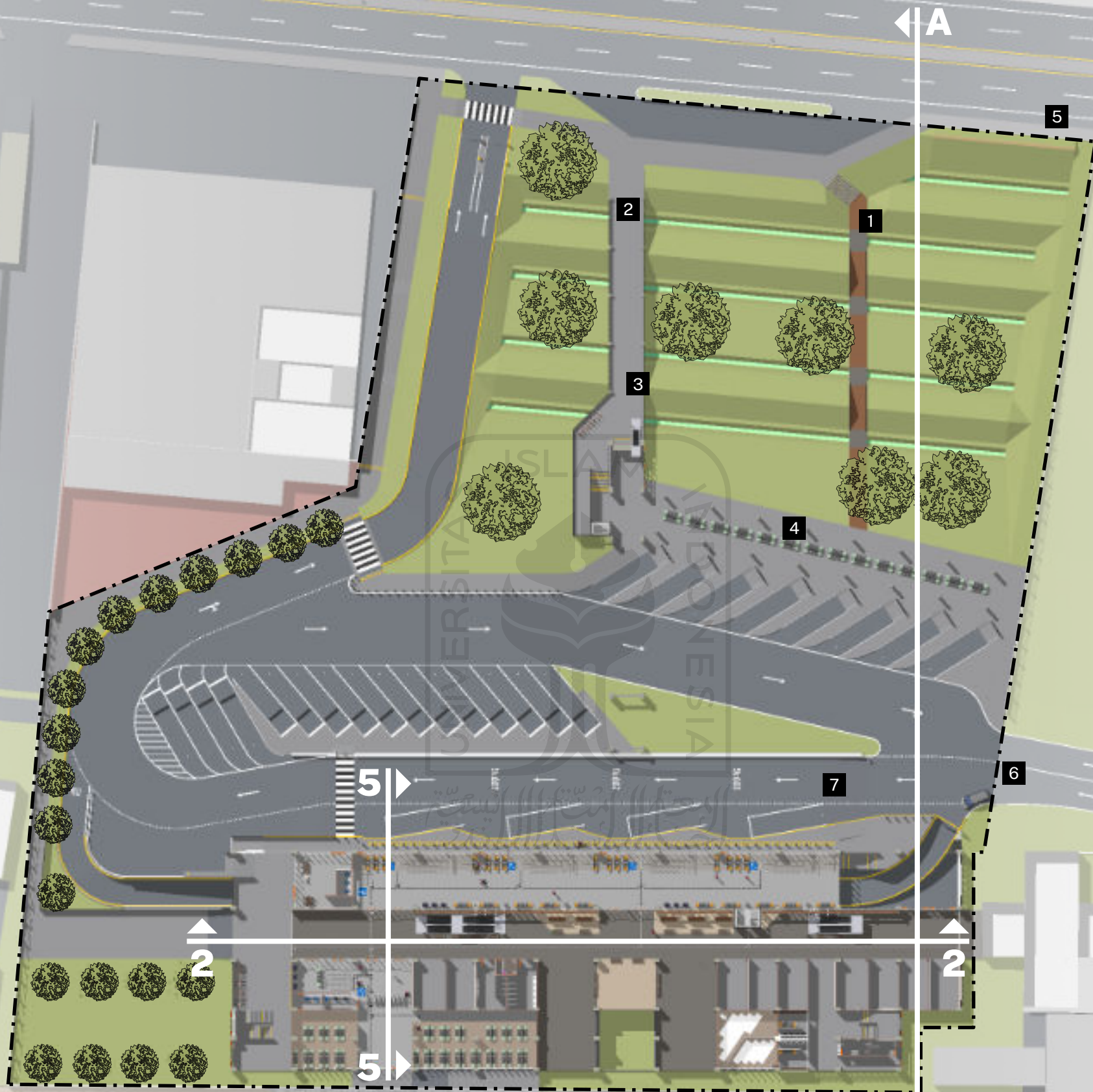
Floor plans, sections, elevations

Structural system

Infrastructure

Details

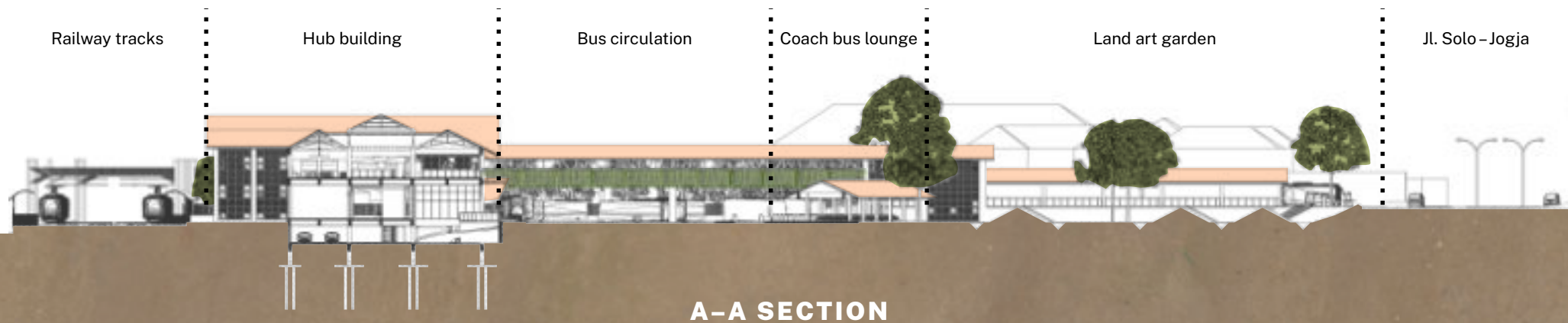
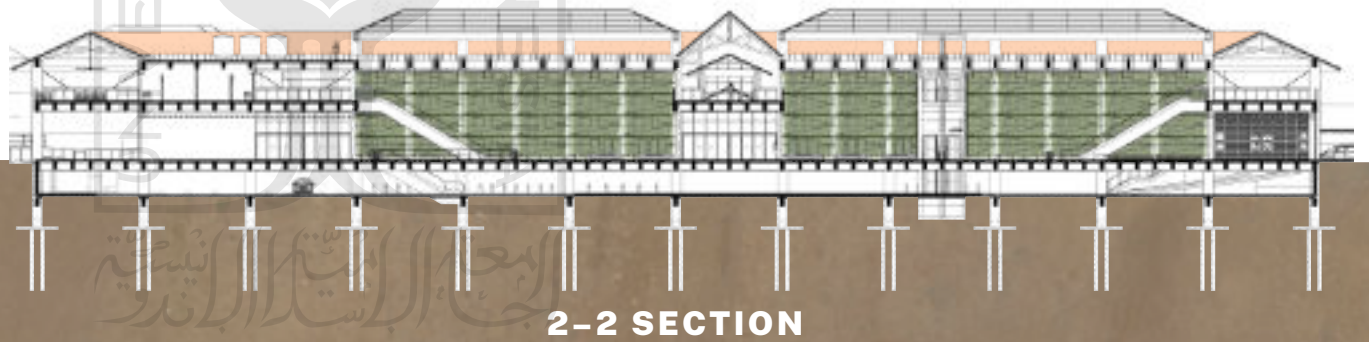
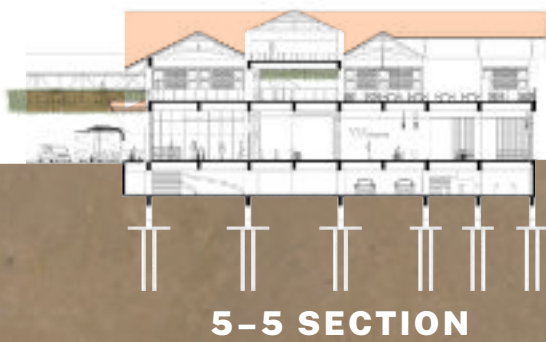
Visualisation



SITE PLAN

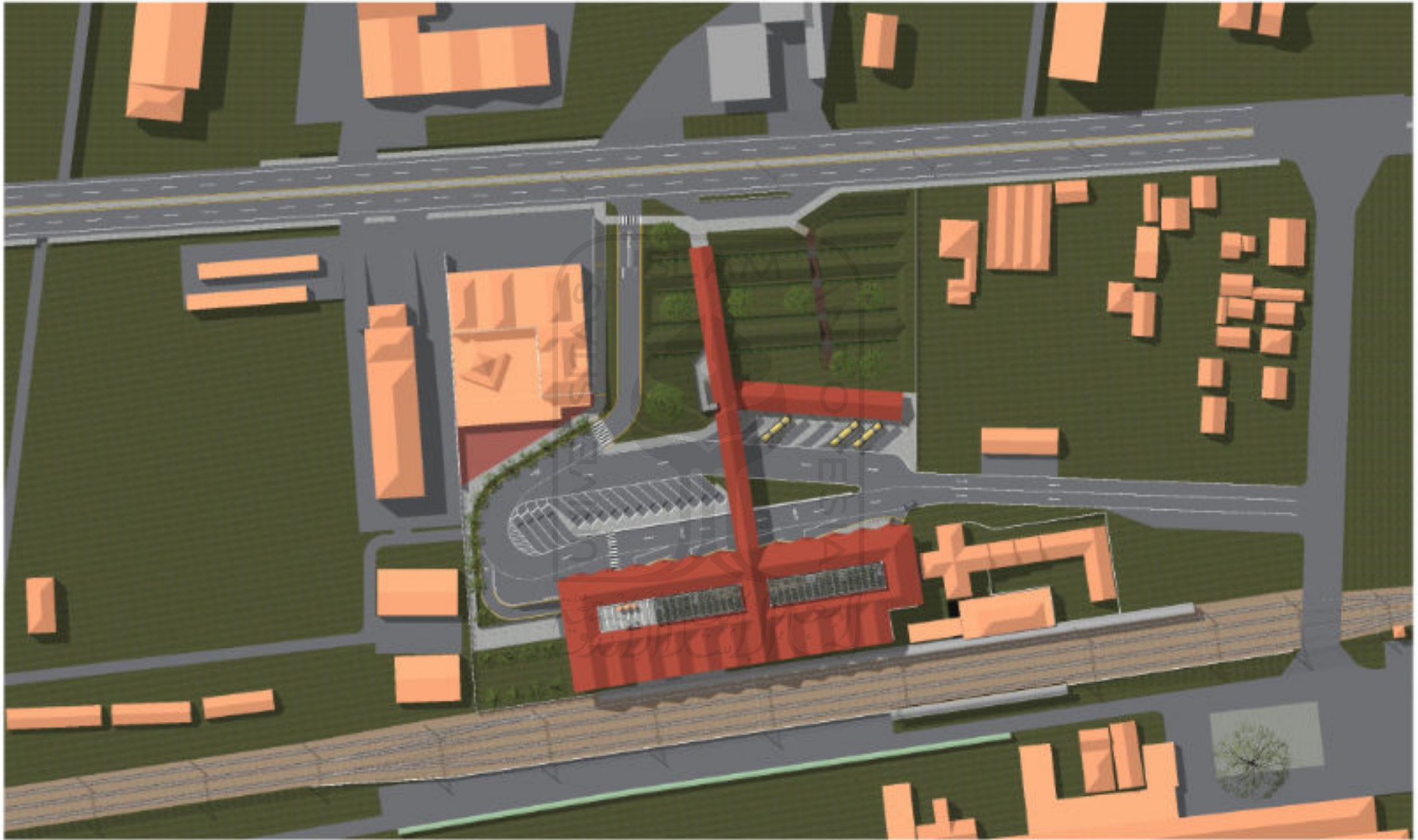
8

Illustrative site plan and sections



Situation Plan

ARCHICAD EDUCATION VERSION



INTERNATIONAL BACHELOR PROGRAM IN ARCHITECTURE
 MAGUWO



PROJECT NAME
 Design of
 Transit Interchange Facility in Maguwo
 with Spatial Tranquility Approach
 RIBA, ARCHITECTURAL DESIGN STUDIO

SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.
EXAMINER 1 Prita Ayu R. Agustiananda, Engg. S.T., M.K.
EXAMINER 2 Prof. Drs. Fajar Mahendra, En. Ing., Ar., Ir., S.M., S.K.

STUDENT
 Ahmadi Syahza
 17512029

DRAWING TITLE
 Situation Plan

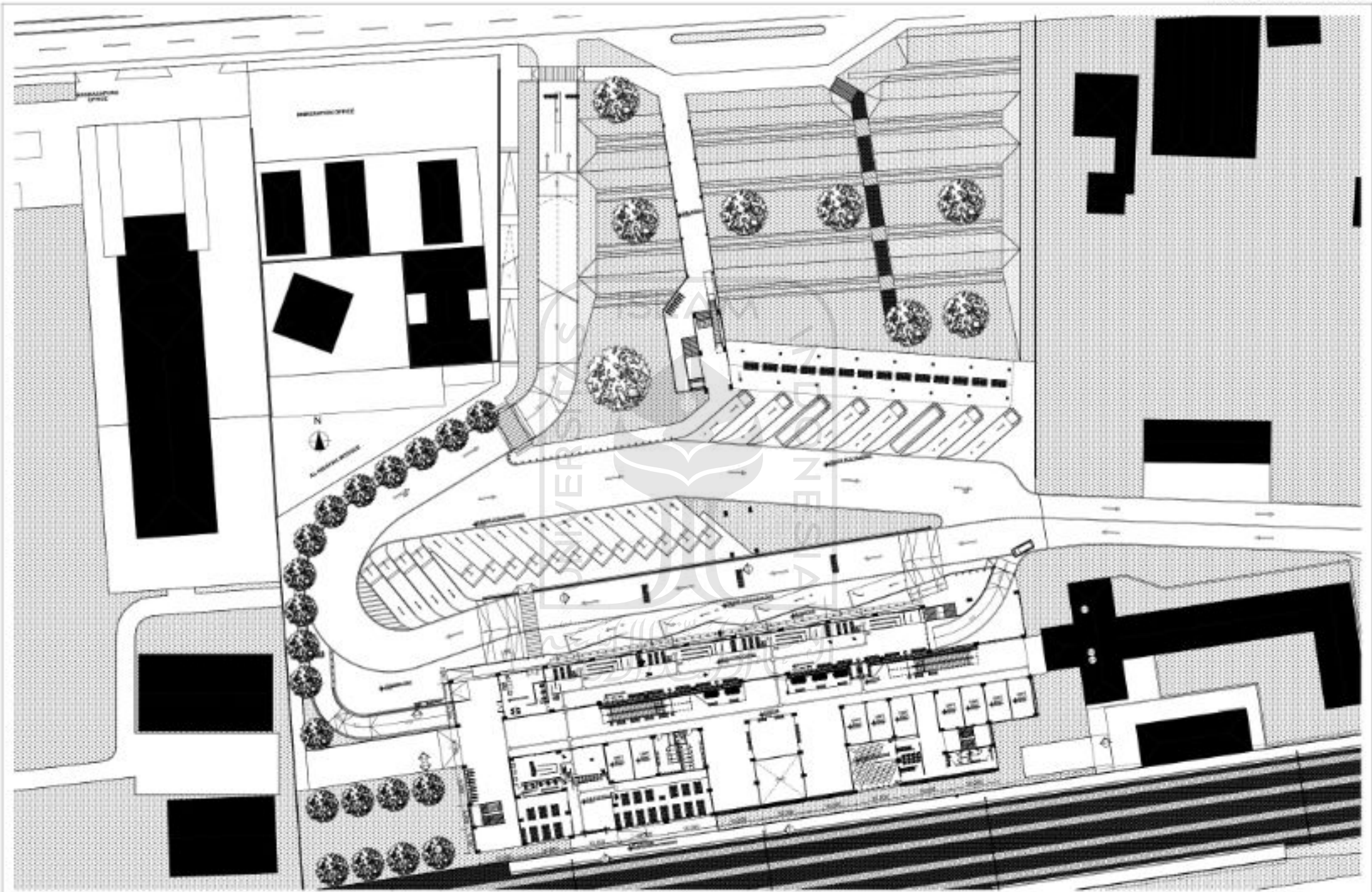
SCALE

PAGE
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TOTAL
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Site Plan

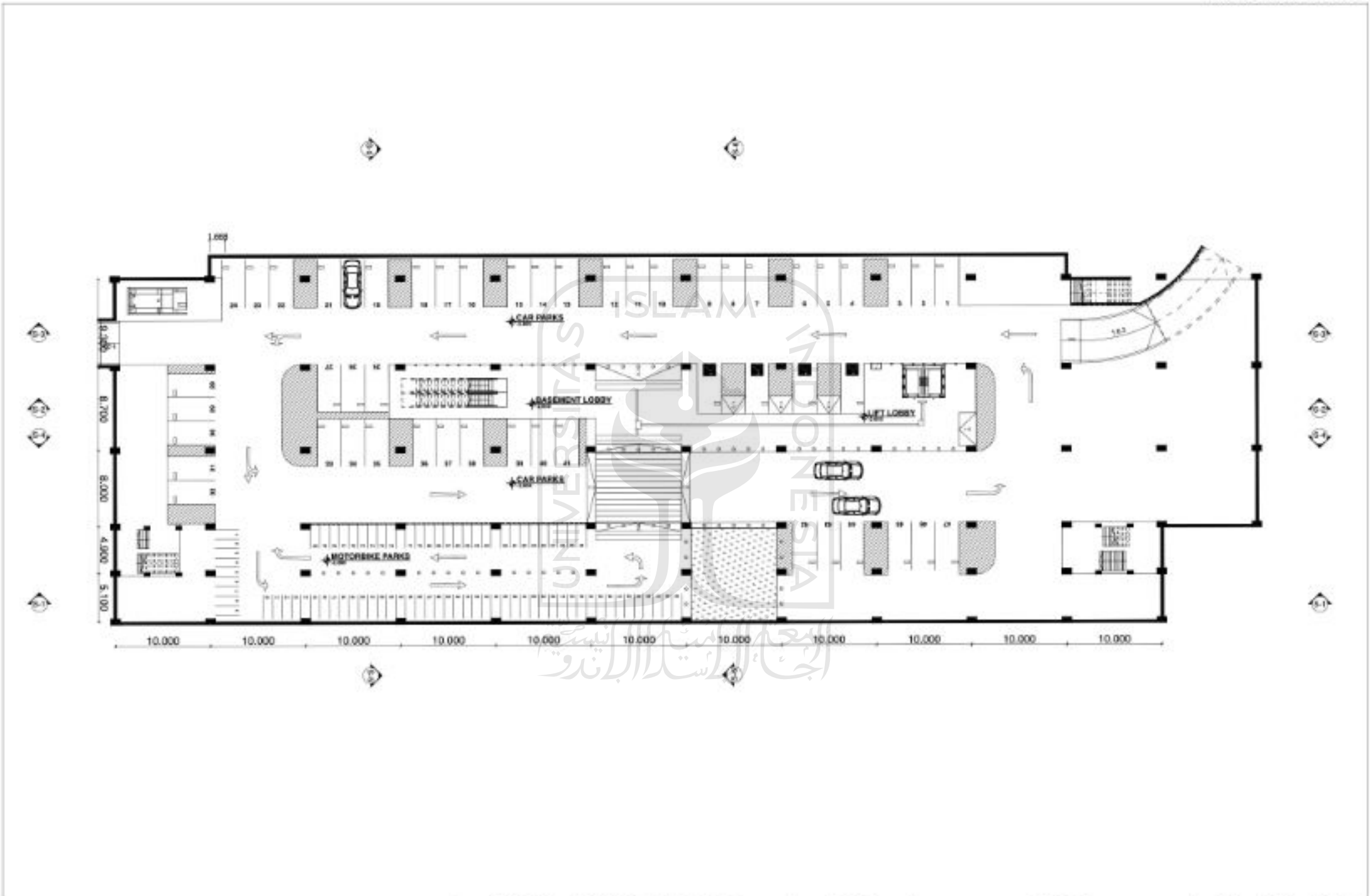
ARCHICAD EDUCATION VERSION



	INTERNATIONAL BACCALAUREATE PROGRAM IN ARCHITECTURE ACADEMIC PART		PROJECT NAME Design of Transit Interchange Facility in Megawati with Spatial Sustainability Approach <small>FINAL ARCHITECTURAL DESIGN STUDIO</small>	SUPERVISOR Arif Budi Sulhas, S.T., M.Sc., Ph.D.	STUDENT Ahmadi Syahda 17512029	DRAWING TITLE Site Plan	SCALE 1:500	PAGE 2	TOTAL -
			EXAMINER 1 Prita Ayu R. Agustiananda, Erang, S.T., M.A.						
			EXAMINER 2 Prof. Sri Fatma Mahendra, Dr. Ing., Ar., Ir., M.A., Ph.D.						

Floor Plan - Basement

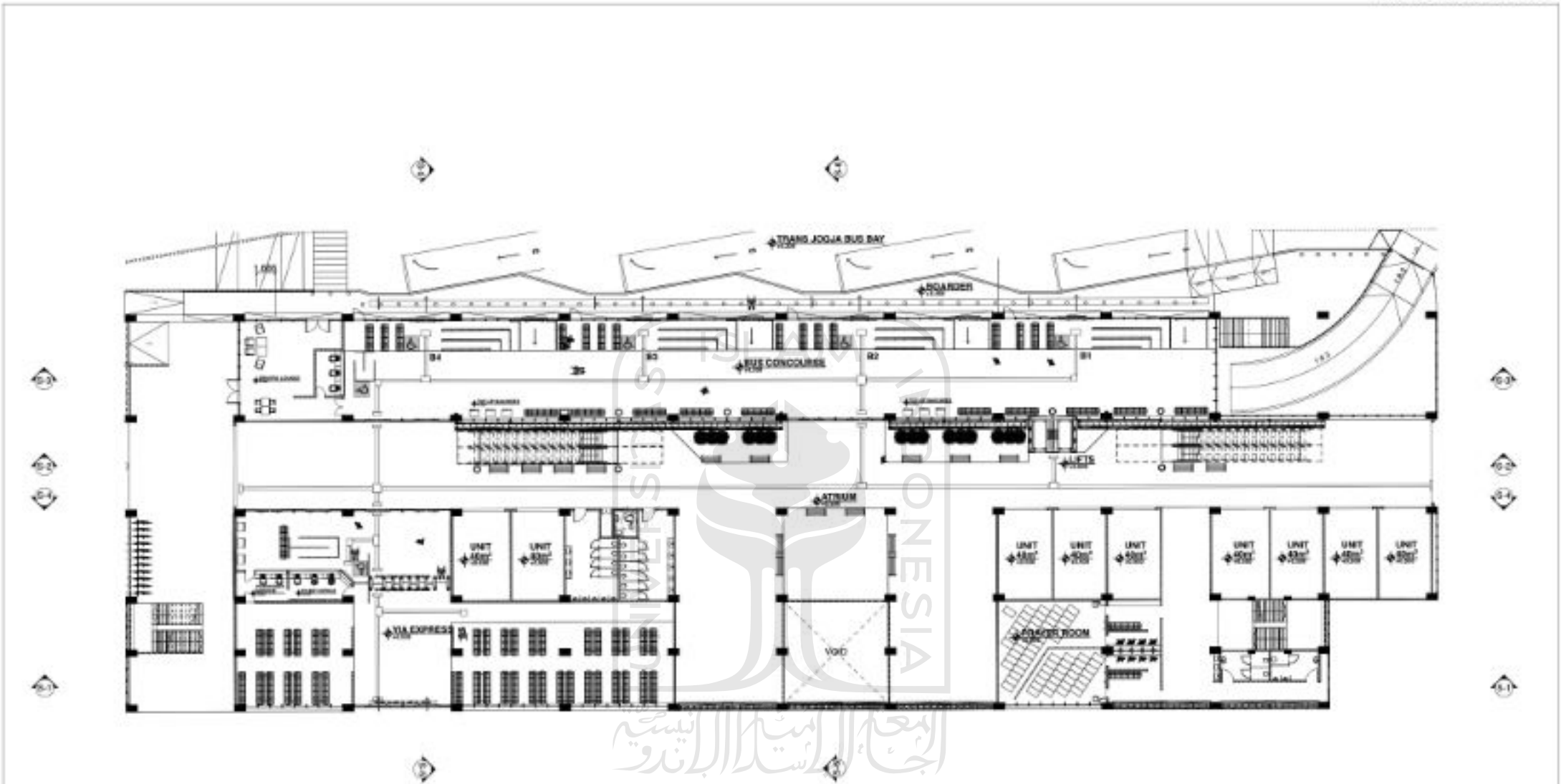
ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach RIA: ARSITEKTURA TERBUK TERBUK	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmeid Syahza 17512029	DRAWING TITLE HUB - Basement	SCALE 1:250	PAGE 3	TOTAL -
		DESIGNER 1 Prita Ayu R Agustinanda, Engg. S.T., M.A.					
		REVISOR 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. Ir., S.M., S.K.					

Floor Plan - Ground Floor

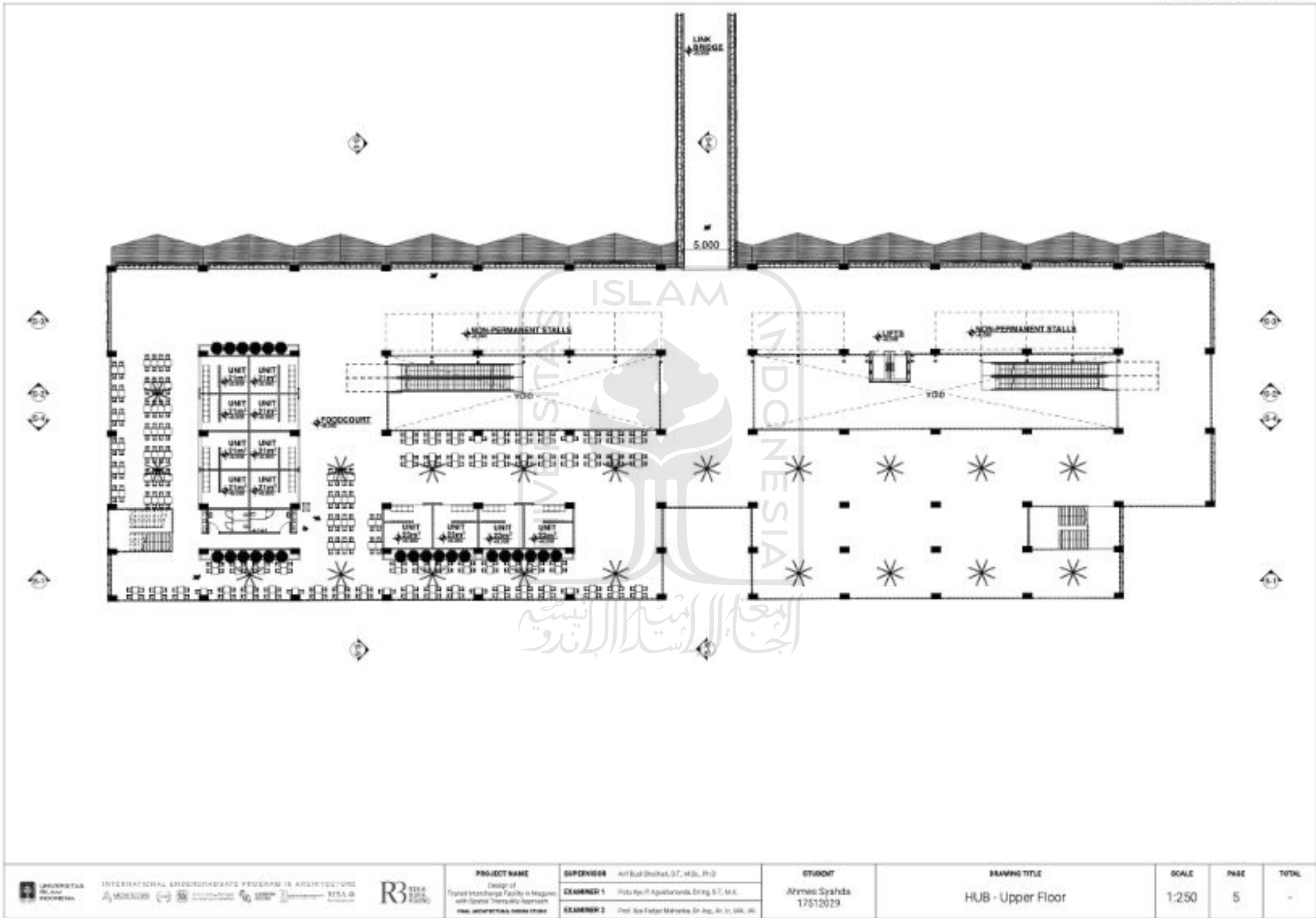
ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Magelang with Green Transitivity Approach <small>PROF. ARCHITECTURAL DESIGN STUDIO</small>	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmeid Syahza 17512029	DRAWING TITLE HUB - Ground Floor	SCALE 1:250	PAGE 4	TOTAL -
		DESIGNER 1 Putu Ayu R. Agustinanda, Engg. S.T., M.A.					
		DESIGNER 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. Ir., S.M., Ph.D.					

Floor Plan - Upper Floor

ARCHICAD EDUCATION VERSION



INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE
 MAGUWO



PROJECT NAME
 Design of
 Transit Interchange Facility in Maguwo
 with Spatial Tranquility Approach

SUPERVISOR Ari Budiharta, S.T., M.Sc., Ph.D.
DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.A.
REVISOR 2 Prof. Drs. Fauzan Mahendra, En. Ing., Ar., Ir., M.A., Ph.D.

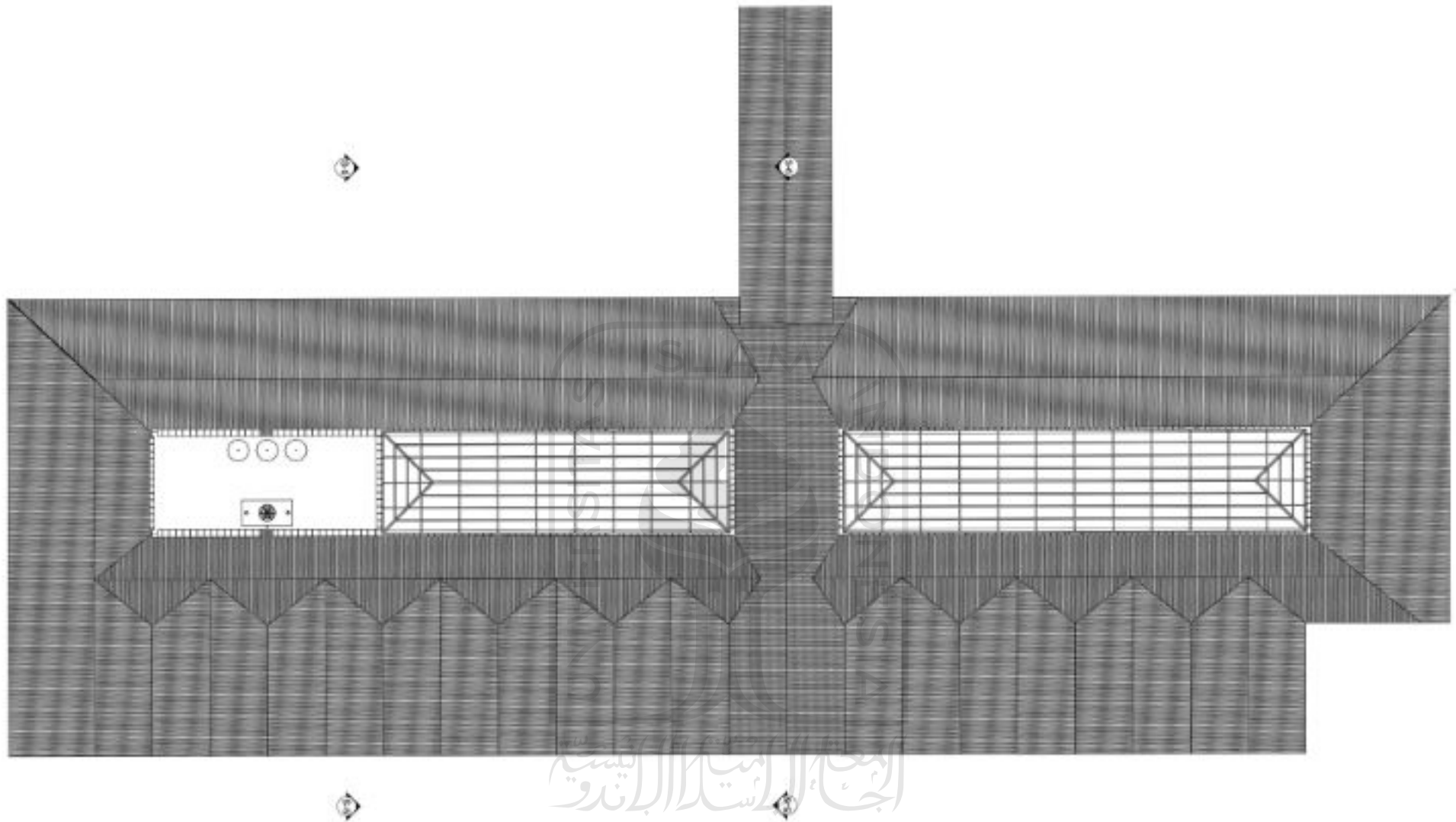
STUDENT
 Ahmeid Syahza
 17512029

DRAWING TITLE
 HUB - Upper Floor

SCALE	PAGE	TOTAL
1:250	5	-

Roof Plan

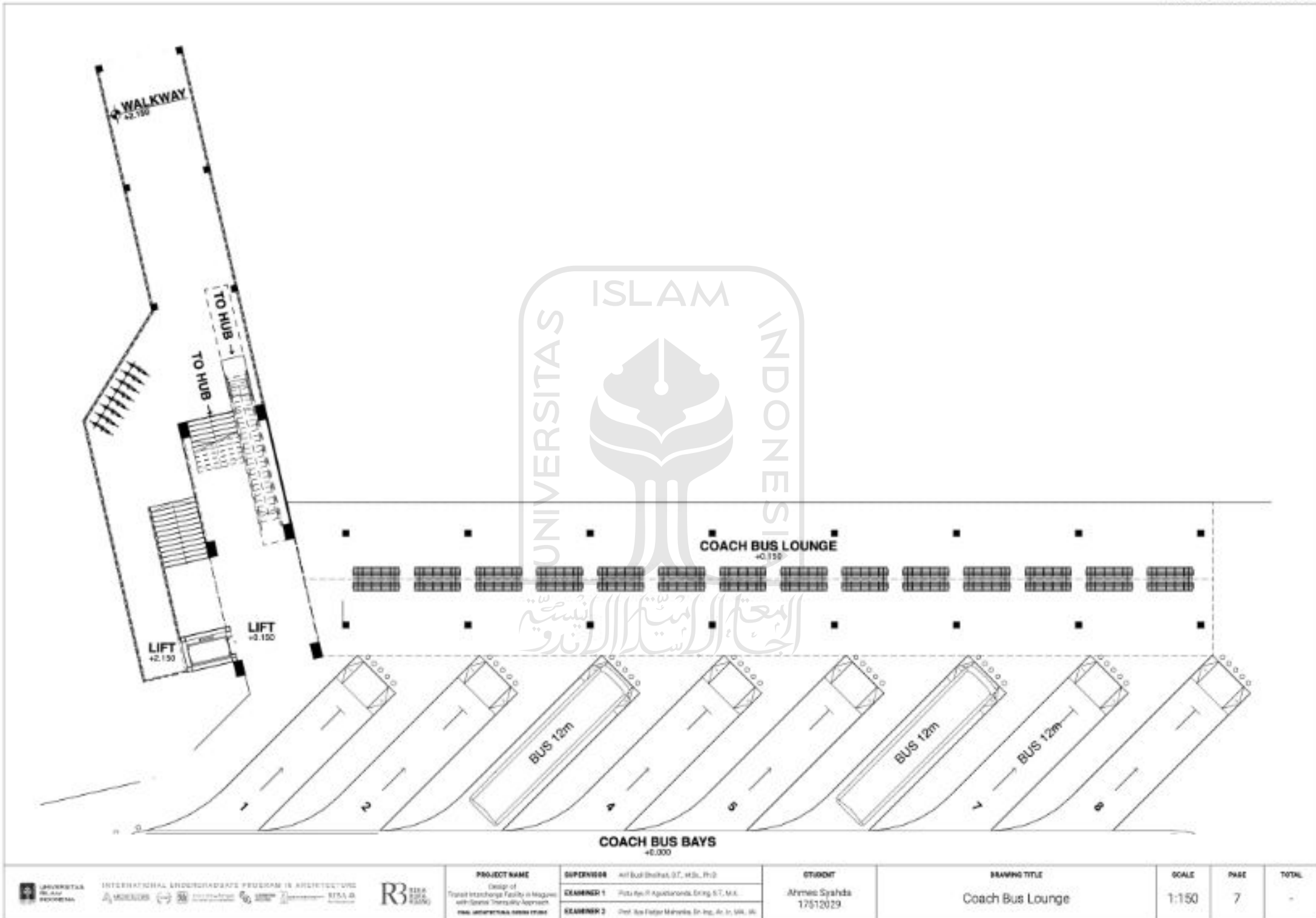
ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Maguire with Green Tranquility Approach <small>PROJ. ARCHITECTURAL DESIGN STUDIO</small>	SUPERVISOR Arief Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmeid Syahza 17512029	DRAWING TITLE HUB - Roof	SCALE 1:250	PAGE 6	TOTAL -
		DESIGNER 1 Prita Ayu R. Agustinawati, Engg. S.T., M.K.					
		DESIGNER 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. Ir., S.M., S.K.					

Floor Plan - Coach Bus Lounge

ARCHICAD EDUCATION VERSION



North Elevation

ARCHICAD EDUCATION VERSION



INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE
 ARCHITECTURE



PROJECT NAME
 Design of
 Transit Interchange Facility in Magway
 with Green Transplicity Approach
 RIBA ACCREDITED

SUPERVISOR Ari Budiharta, ST, MSc, PhD
DESIGNER 1 Putu Ayu R Agustinanda, Engg, ST, M.A.
DESIGNER 2 Prof. Ica Fatma Mahendra, En. Ing., Ar. Ir., SIA, AI

STUDENT
 Ahmeid Syahza
 17512029

DRAWING TITLE
 HUB - North Elevation

SCALE	PAGE	TOTAL
1:250	8	-

East Elevation

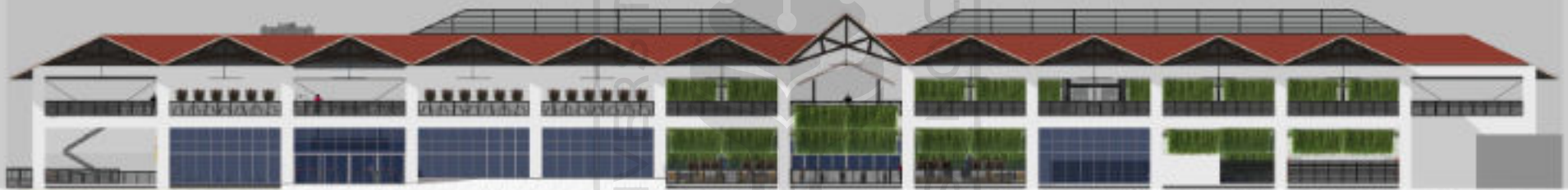
ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach DESAIN ARSITEKTUR TRANSIT	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmadi Syahza 17512029	DRAWING TITLE HUB - East Elevation	SCALE 1:100	PAGE 9	TOTAL -
		DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.A.					
		DESIGNER 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. Ir., SIAA, SIA					

South Elevation

ARCHICAD EDUCATION VERSION



INTERNATIONAL BACHELOR'S PROGRAM IN ARCHITECTURE
 ARCHITECTURE



PROJECT NAME
 Design of
 Transit Interchange Facility in Megawati
 with Special Transitivity Approach
 100% UNIVERSITAS ISLAM INDONESIA

SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.
EXAMINER 1 Prita Ayu R. Agustiananda, Ering, S.T., M.A.
EXAMINER 2 Prof. Drs. Fauzan Mahendra, En. Ing., Ar., Ir., M.A., Ph.D.

STUDENT
 Ahmeid Syaifada
 17512029

DRAWING TITLE
 HUB - South Elevation

SCALE	PAGE	TOTAL
1:250	10	-

West Elevation

ARCHICAD EDUCATION VERSION



INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE
 MAGUWO



PROJECT NAME
 Design of
 Transit Interchange Facility in Maguwo
 with Spatial Tranquility Approach

SUPERVISOR Ari Budiharta, S.T., M.Sc., Ph.D.
DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.K.
DESIGNER 2 Prof. Ica Fatma Mahendra, En. Ing., Ar. In., S.M., Ph.D.

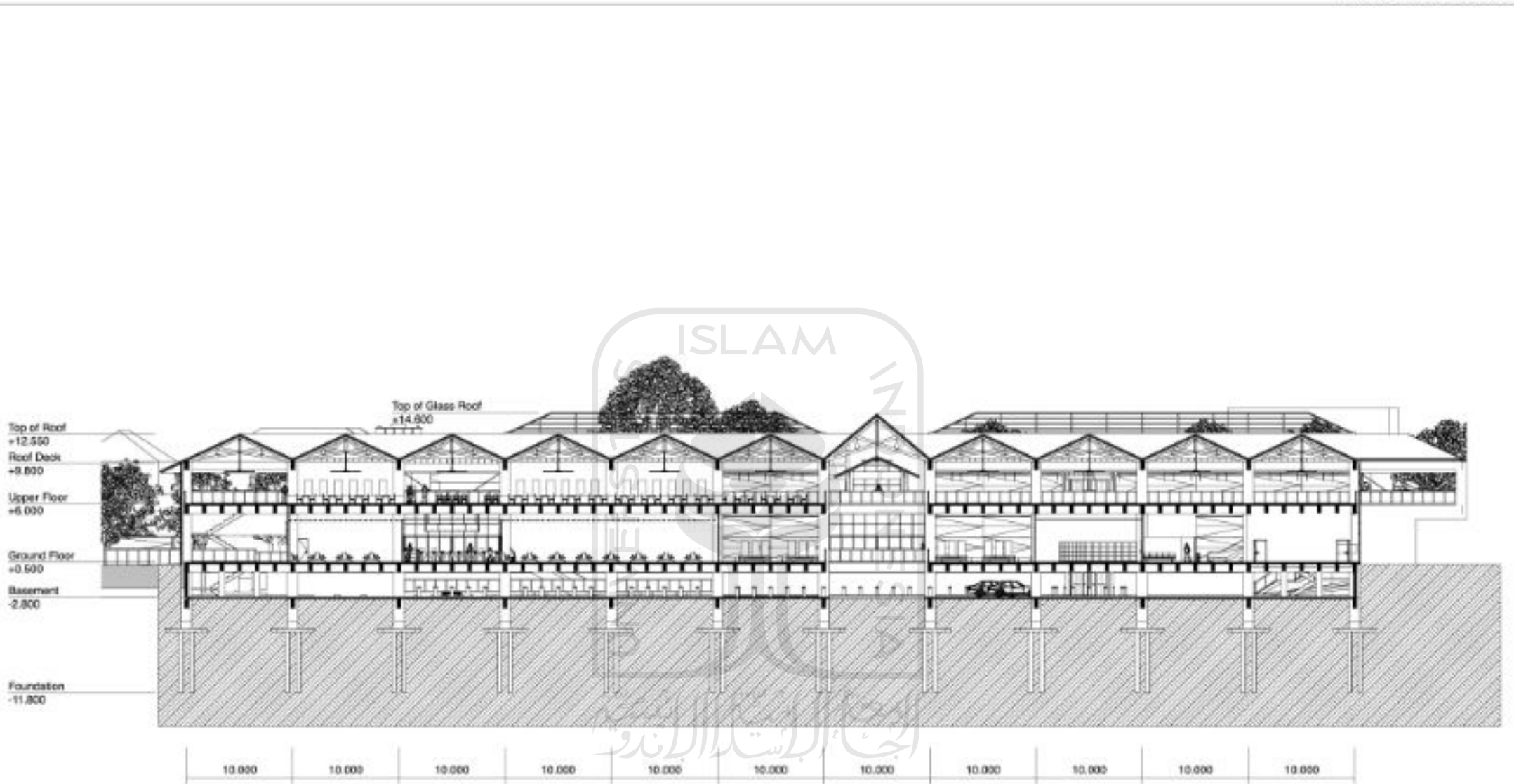
STUDENT
 Ahmeid Syahza
 17512029

DRAWING TITLE
 HUB - West Elevation

SCALE	PAGE	TOTAL
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S-1 Section

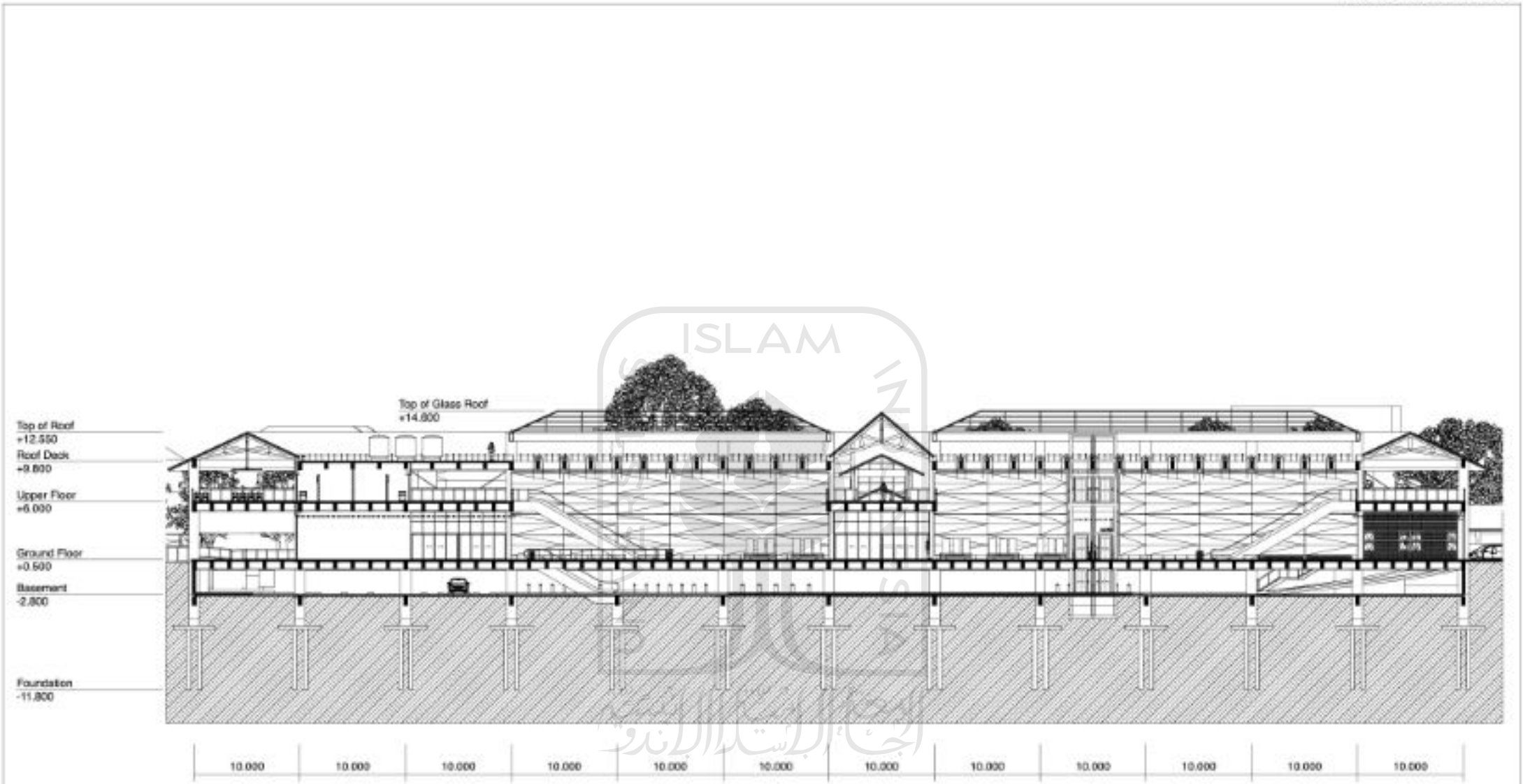
ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Megawati with Spatial Sustainability Approach <small>FAK. ARSITEKTUR BINA BANGUN</small>	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmadi Syahda 17512029	DRAWING TITLE S-1 Section	SCALE 1:250	PAGE 12	TOTAL -
		EXAMINER 1 Prita Ayu R. Agustiananda, Engg. S.T., M.A.					
		EXAMINER 2 Prof. Drs. Fajar Mahendra, En. Ing., Ar. In., M.A., Ph.D.					

S-2 Section

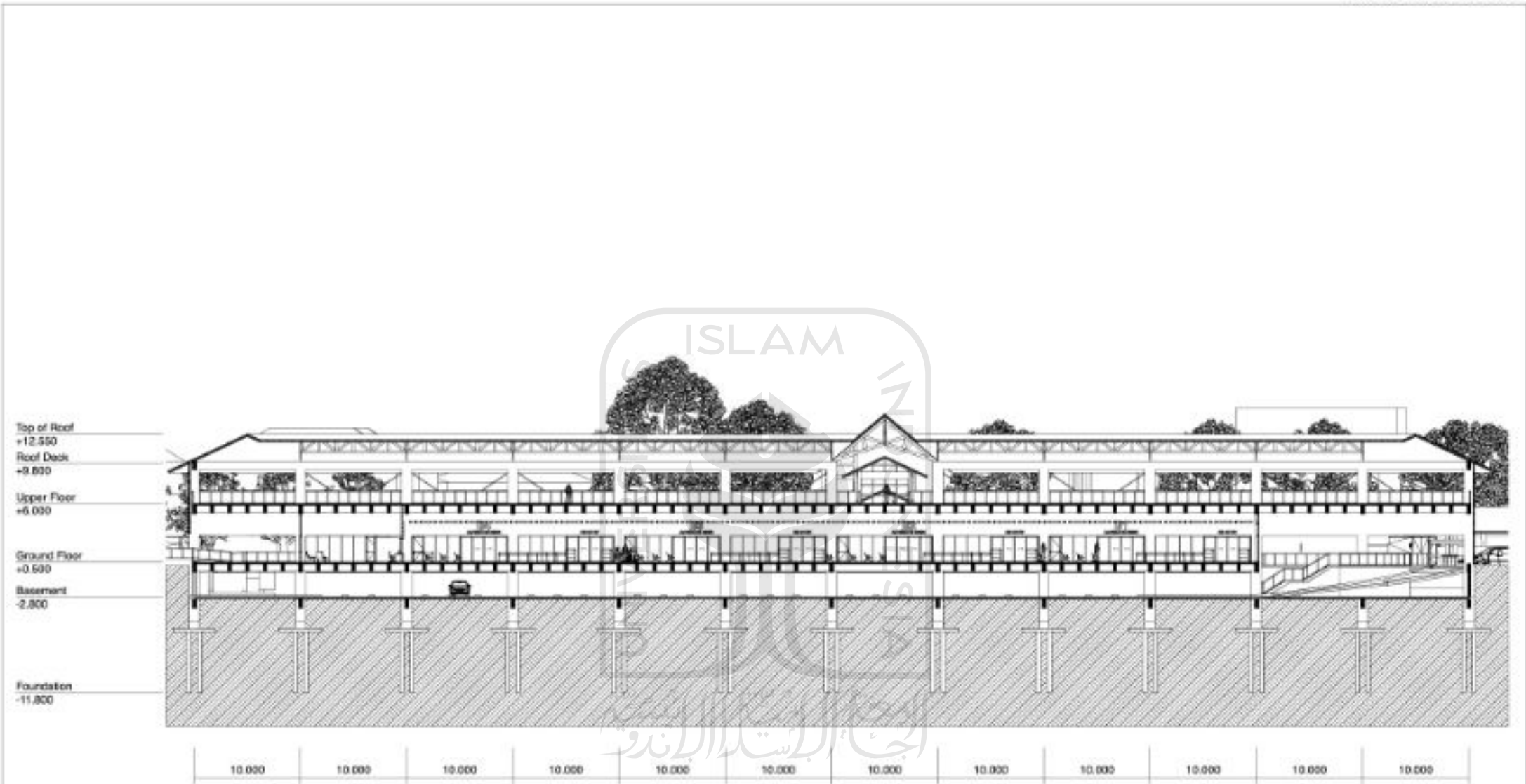
ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach DESAIN ARSITEKTUR TRANSIT INTERCHANGE	SUPERVISOR Arief Budi Sulhan, S.T., M.Sc., Ph.D.	STUDENT Ahmeid Syahza 17512029	DRAWING TITLE S-2 Section	SCALE 1:250	PAGE 13	TOTAL -
		DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.A.					
		REVISOR 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. In., S.M., S.K.					

S-3 Section

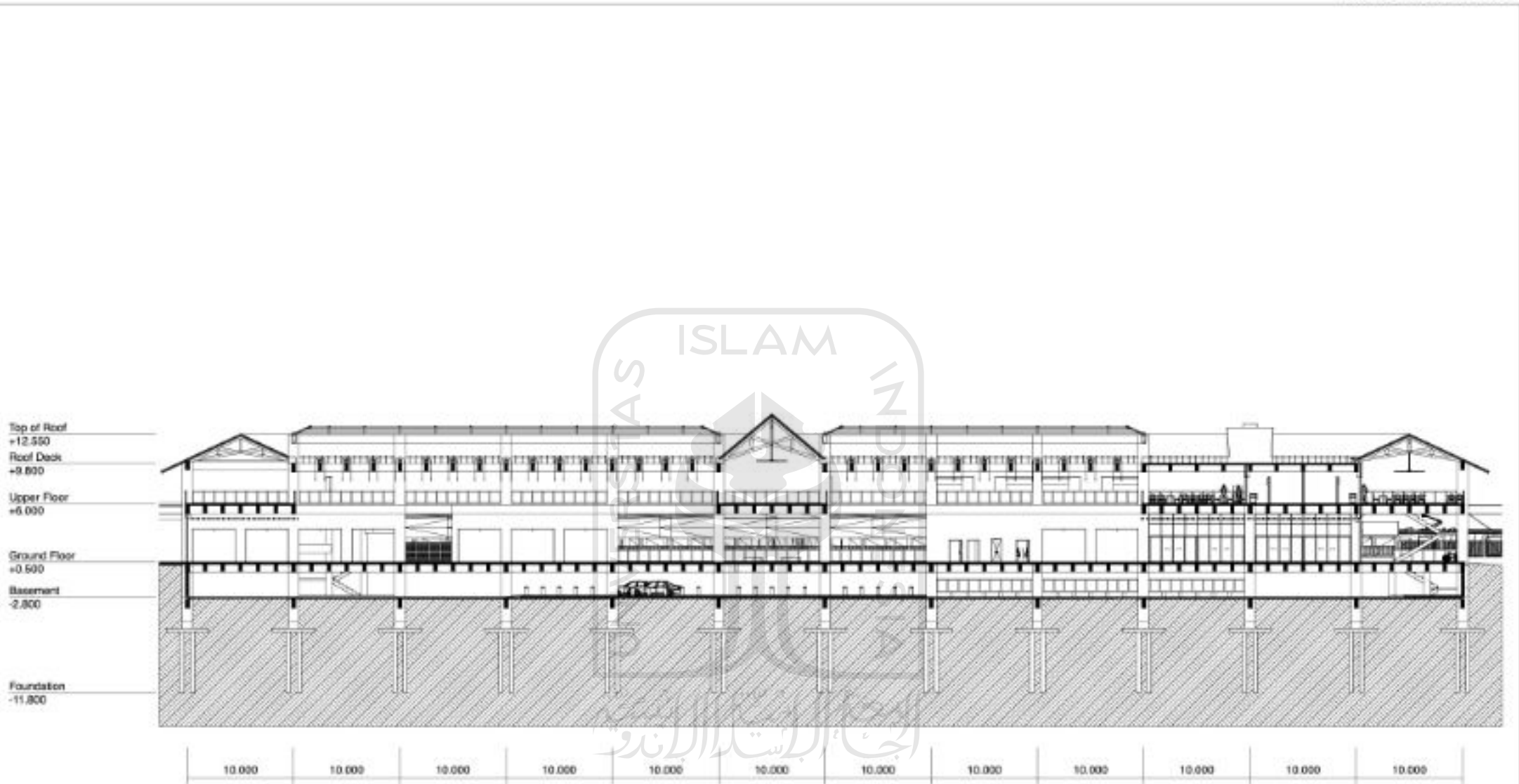
ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Megawati with Spatial Sustainability Approach <small>FINAL ARCHITECTURAL DESIGN STUDIO</small>	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmeid Syahda 17512029	DRAWING TITLE S-3 Section	SCALE 1:250	PAGE 14	TOTAL -
		EXAMINER 1 Prita Ayu R Agastananda, Engg. S.T., M.A.					
		EXAMINER 2 Prof. Asa Fajar Mahendra, En. Ing., Ar., Ir., MSc., Ph.D.					

S-4 Section

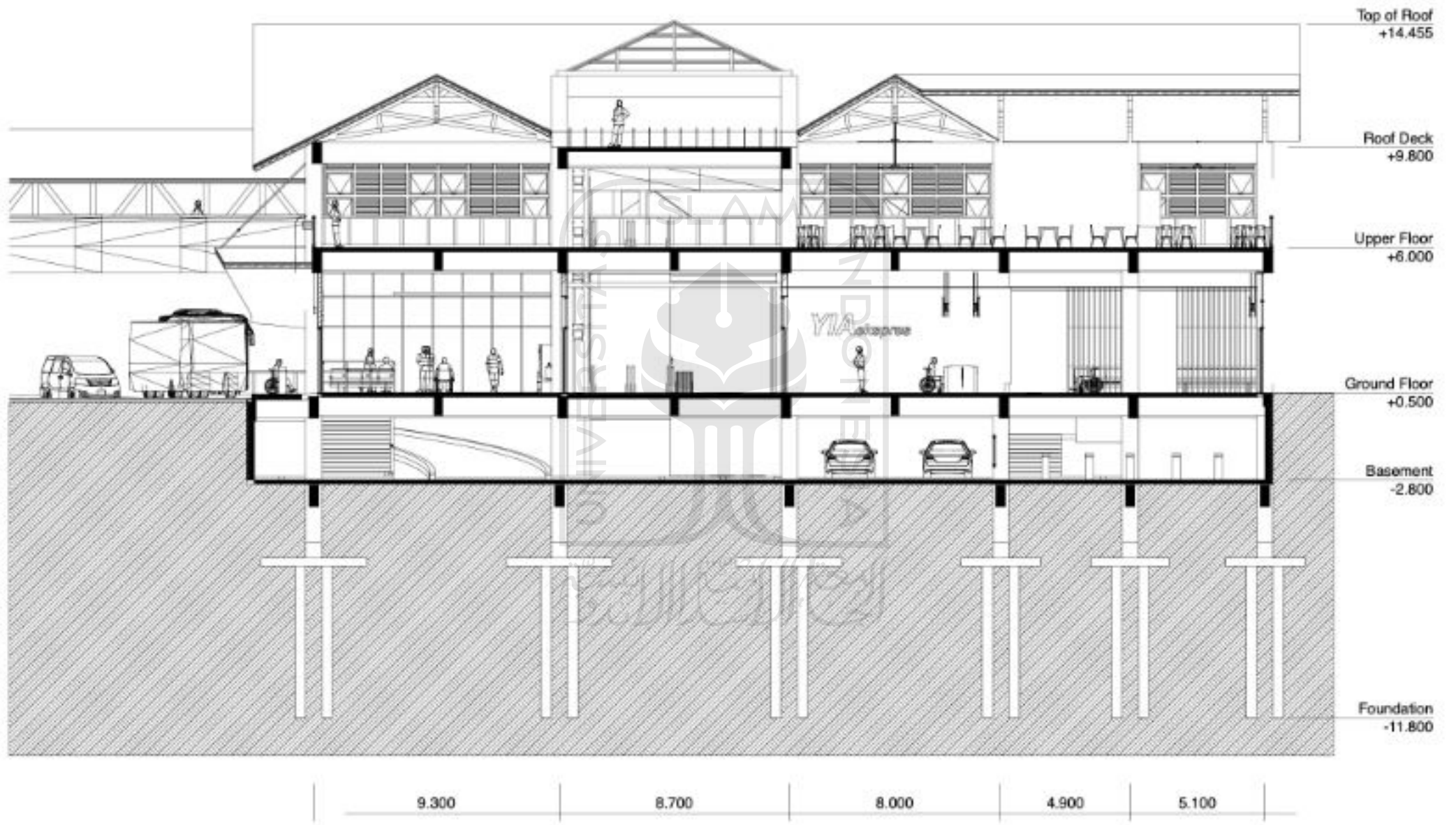
ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach DESAIN ARSITEKTUR TRANSIT INTERCHANGE	SUPERVISOR Arief Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmeid Syahza 17512029	DRAWING TITLE S-4 Section	SCALE 1:250	PAGE 15	TOTAL -
		DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.K.					
		REVISOR 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. In., S.M., S.K.					

S-5 Section

ARCHICAD EDUCATION VERSION



INTERNATIONAL BACHELOR'S PROGRAM IN ARCHITECTURE



PROJECT NAME

Design of Transit Interchange Facility in Megangse with Green Transitivity Approach

SUPERVISOR

Arti Budi Sulastri, S.T., M.Sc., Ph.D.

EXAMINER 1

Prita Ayu R Agastananda, Engg. S.T., M.A.

EXAMINER 2

Prof. Sri Fatma Mahendra, En. Ing., Ar. In., M.A., Ph.D.

STUDENT

Ahmed Syaifa
17512029

DRAWING TITLE

S-5 Section

SCALE

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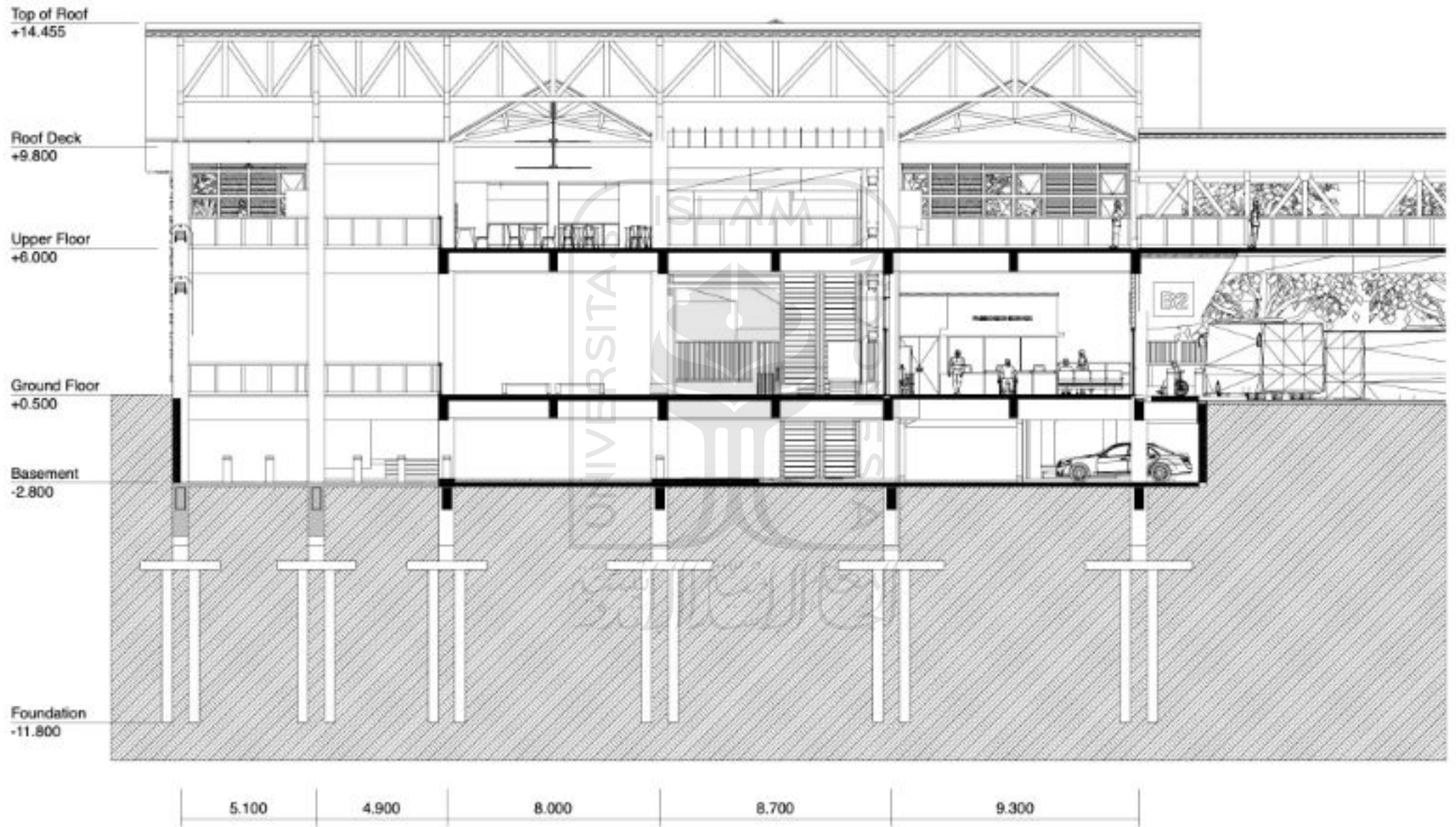
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S-6 Section

ARCHICAD EDUCATION VERSION



S-A Section

ARCHICAD EDUCATION VERSION

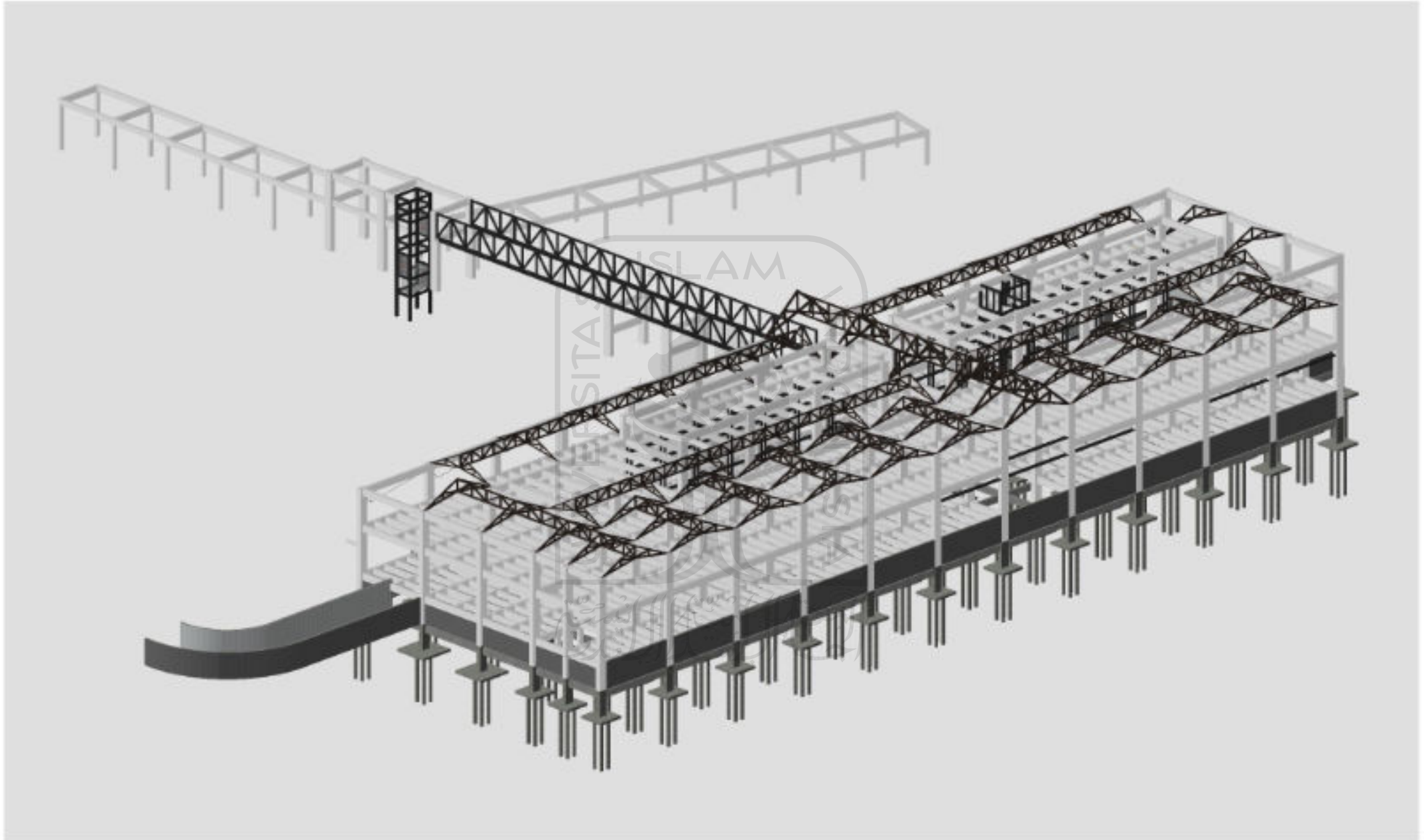


الجمهورية الإسلامية اندونيسية

	PROJECT NAME Design of Transit Interchange Facility in Magelang with Spatial Sustainability Approach <small>FAK. ARCHITECTURAL DESIGN STUDIO</small>	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmiri Syaifada 17512029	DRAWING TITLE S-A Site Section	SCALE 1:400	PAGE 18	TOTAL -
		EXAMINER 1 Putu Ayu R. Agustiananda, Erang, S.T., M.A.					
		EXAMINER 2 Prof. Drs. Fatmahan Mulyana, En. Ing., Ar. In., M.A., Ph.D.					

Axonometric View - Structural System

ARCHICAD EDUCATION VERSION



INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE
MAGUWO



PROJECT NAME
Design of
Transit Interchange Facility in Maguwo
with Spatial Tranquility Approach

SUPERVISOR Ari Budiharta, S.T., M.Sc., Ph.D.
DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.A.
REVISOR 2 Prof. Drs. Fajar Mahendra, En. Ing., Ar., Ir., S.M., S.K.

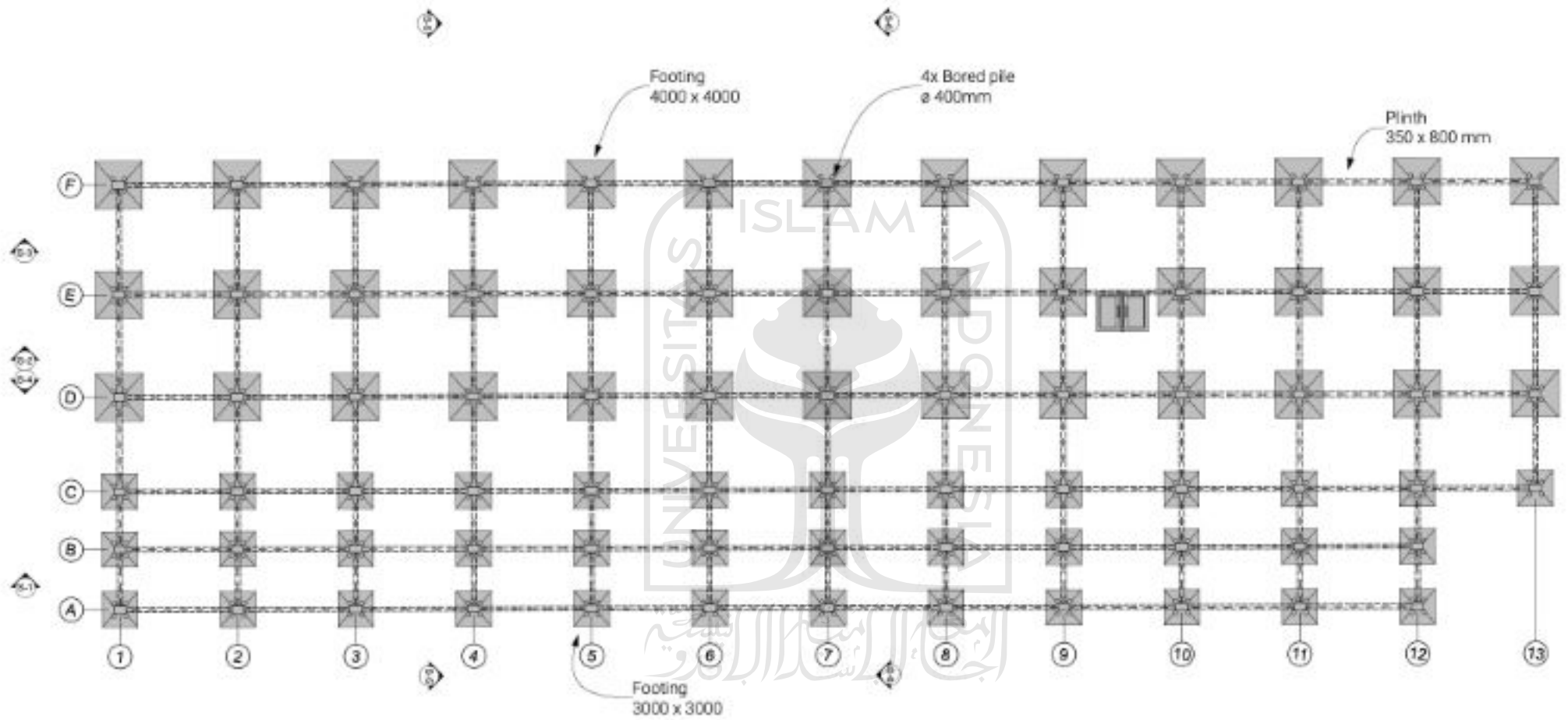
STUDENT
Ahmed Syahda
17512029

DRAWING TITLE
Axonometric View - Structural System

SCALE	PAGE	TOTAL
	19	-

Structural Plan - Foundation

ARCHICAD EDUCATION VERSION



UNIVERSITAS ISLAM INDONESIA INTERNATIONAL BACHELOR'S PROGRAM IN ARCHITECTURE

R3 RINA 2024 43000

PROJECT NAME

Design of Transit Interchange Facility in Megawati with Spatial Sustainability Approach

SUPERVISOR

Arti Budi Sulhas, S.T., M.Sc., Ph.D.

EXAMINER 1

Prita Ayu R Agastananda, Engg. S.T., M.A.

EXAMINER 2

Prof. Sri Fatma Mahendra, En. Ing., Ar., Ir., MSc., Ph.D.

STUDENT

Ahmed Syahda
17512029

DRAWING TITLE

Structural Plan - Foundation

SCALE

1:250

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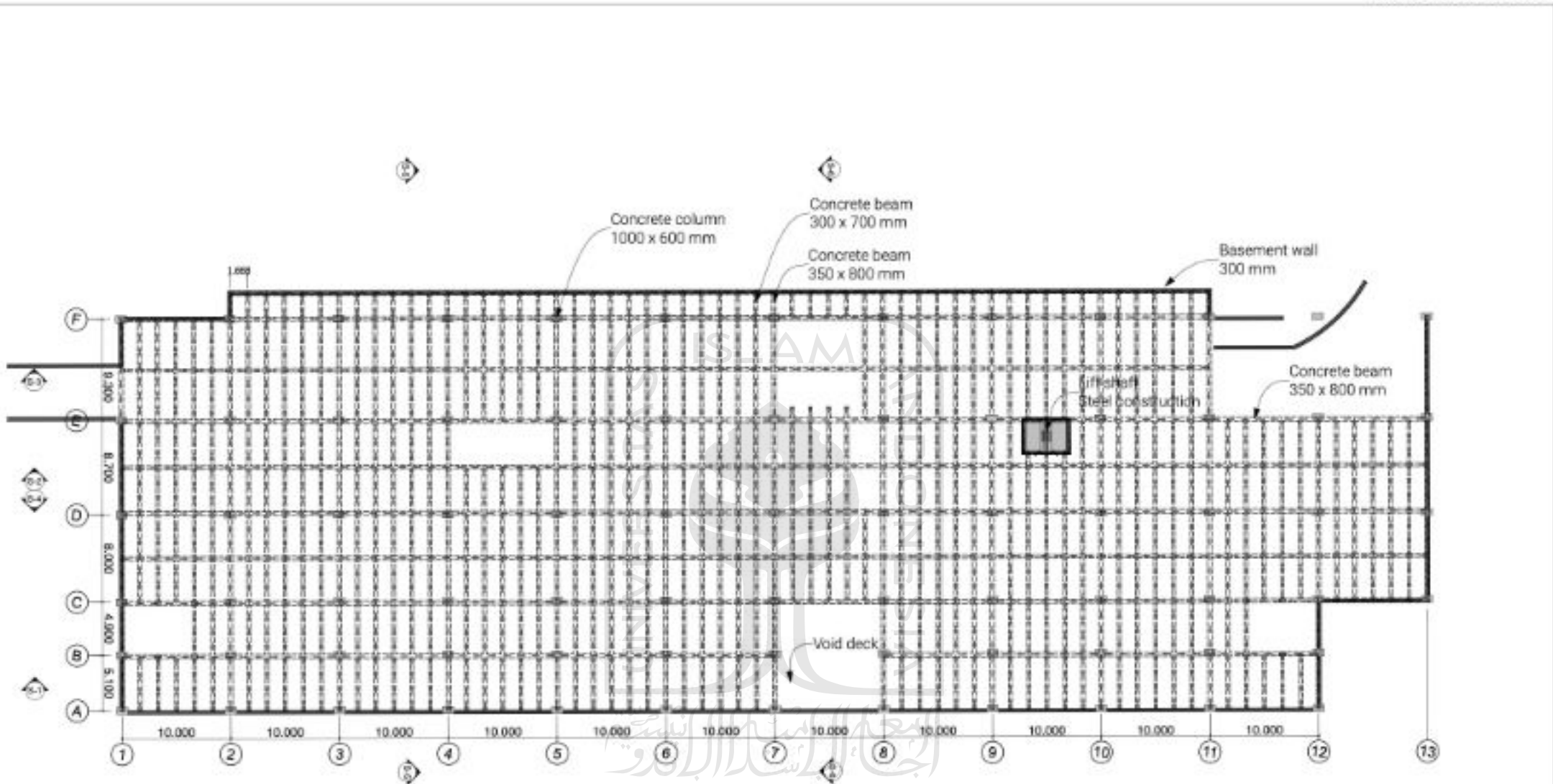
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Structural Plan - Basement

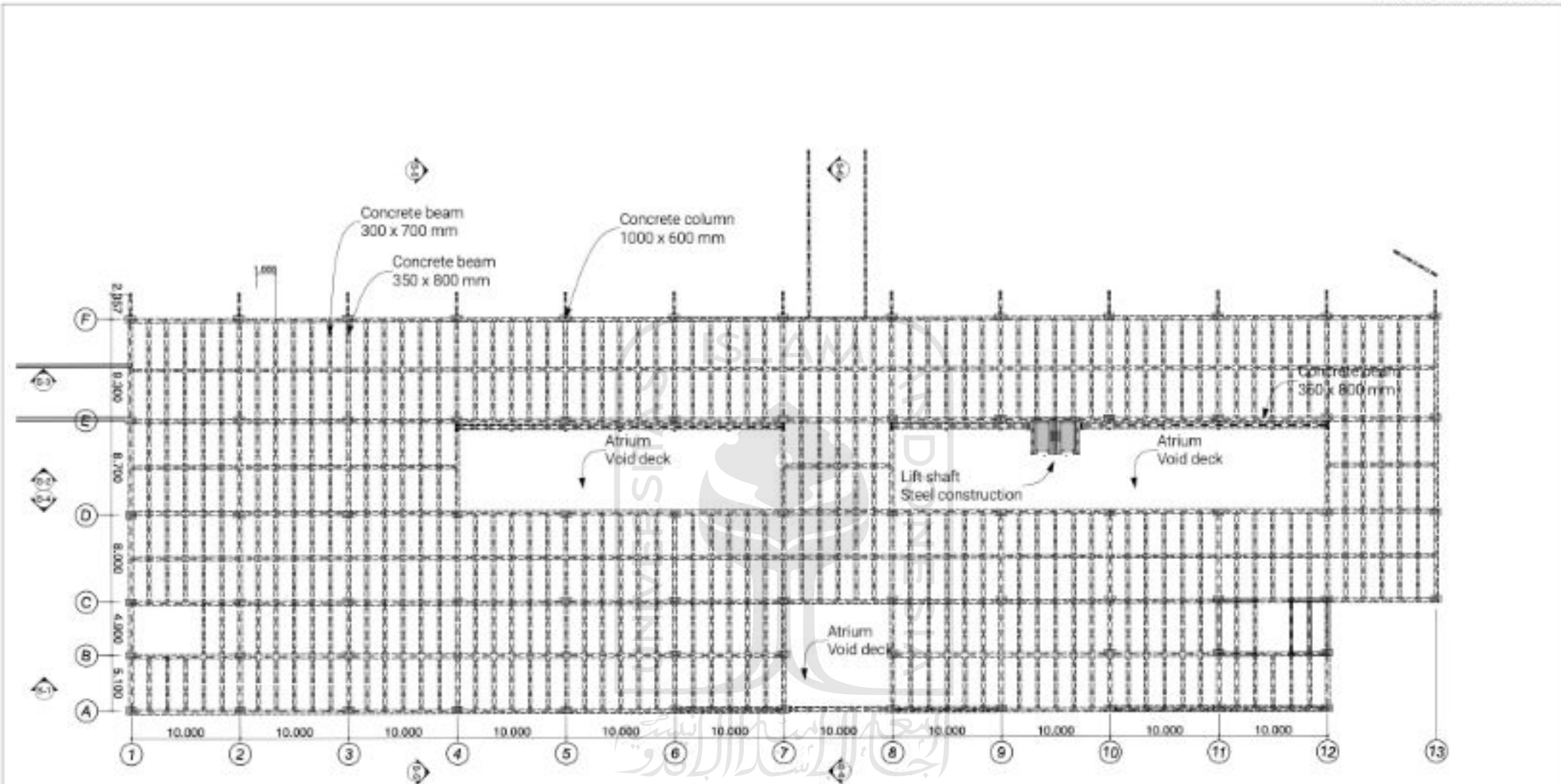
ARCHICAD EDUCATION VERSION



	INTERNATIONAL ENDORGRADUATE PROGRAM IN ARCHITECTURE MAGUWO INTERCHANGE	PROJECT NAME Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach PIAA: ARCHITECTURAL DESIGN STUDIO	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmeid Syahza 17512029	DRAWING TITLE Structural Plan - Basement	SCALE 1:250	PAGE 21	TOTAL -
			DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.A.					
			REVISOR 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. Ir., S.M., Ph.D.					

Structural Plan - Ground Floor

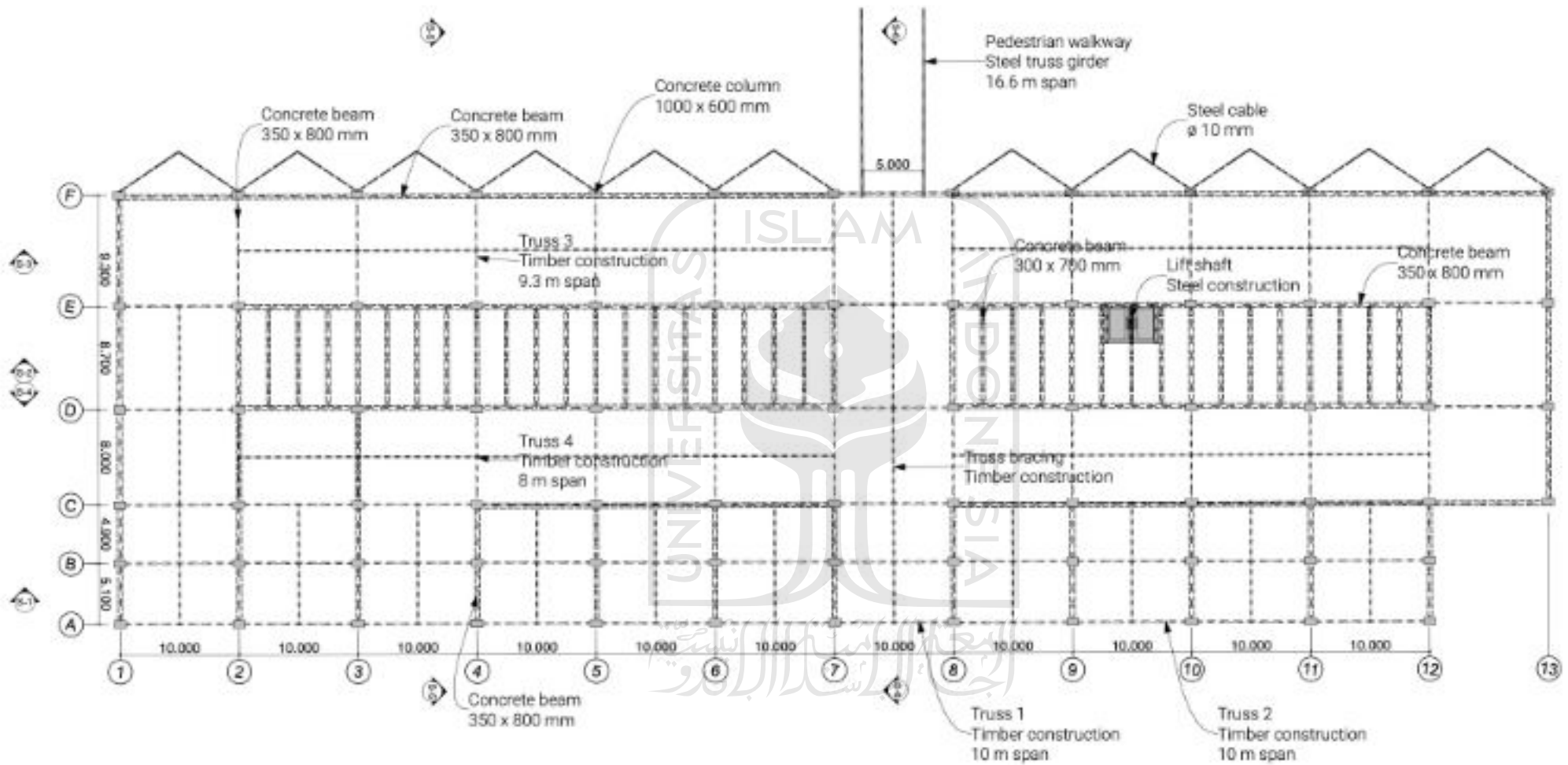
ARCHICAD EDUCATION VERSION



	INTERNATIONAL BACCALAUREATE PROGRAM IN ARCHITECTURE UNIVERSITAS BINA NUSANTARA		PROJECT NAME Design of Transit Interchange Facility in Megawati with Spatial Sustainability Approach RINA UNIVERSITAS BINA NUSANTARA	SUPERVISOR Ari Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmeo Syahda 17512029	DRAWING TITLE Structural Plan - Ground Floor	SCALE 1:250	PAGE 22	TOTAL -
			EXAMINER 1 Prita Ayu R. Agustiananda, Engg. S.T., M.A.						
			EXAMINER 2 Prof. Sri Fatma Mahendra, Dr. Ing., Ar., Ir., MSc., Ph.D.						

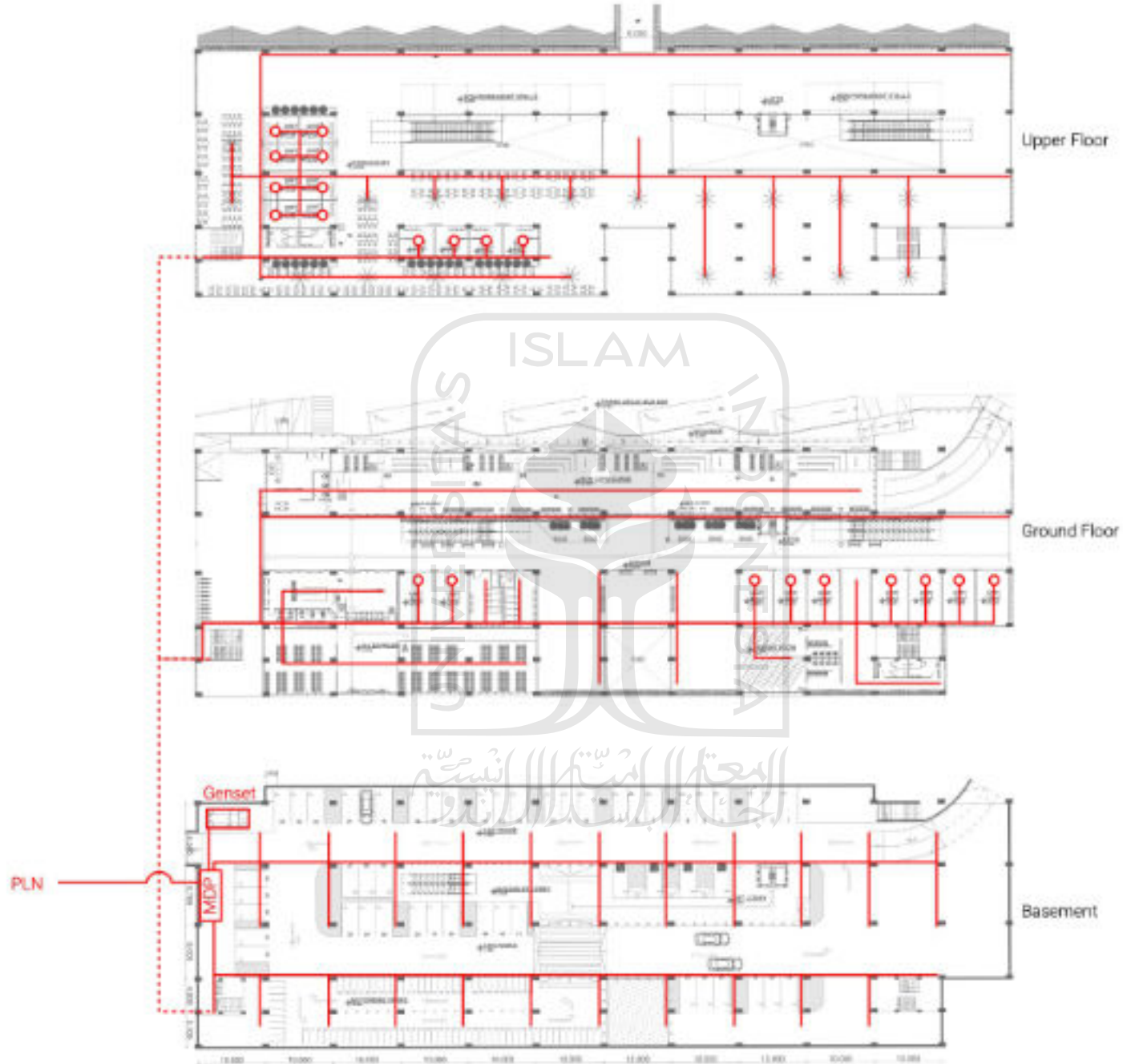
Structural Plan - Upper Floor

ARCHICAD EDUCATION VERSION



	PROJECT NAME Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach PRAJAKTA ARSITEKTUR	SUPERVISOR Airl Budiharta, ST, MSc, PhD	STUDENT Ahmao Syahda 17512029	DRAWING TITLE Structural Plan - Upper Floor	SCALE 1:250	PAGE 23	TOTAL -
		DESIGNER 1 Putu Ayu R Agustinanda, Engg, ST, MSc					
		REVISOR 2 Prof. Ika Fatma Mahendra, En. Ing., Ar., Ir., MSc, PhD					

Electricity Plan



INTERNATIONAL BACHELOR'S PROGRAM IN ARCHITECTURE
 ARCHITECTURE (A) ENGINEERING (E) DESIGN (D) INTERIOR DESIGN (ID) VISUAL COMMUNICATION DESIGN (VCD) **UISI**



PROJECT NAME
 Design of
 Transit Interchange Facility in Higway
 with Green Transportation Approach
FILE: ARCHITECTURAL DESIGN STUDIO

SUPERVISOR Ari Bud Sulhas, S.T., M.Sc., Ph.D.
EXAMINER 1 Putu Ayu R. Agustianingsih, Eng., S.T., M.A.
EXAMINER 2 Prof. Drs. Fajar Mahendra, En. Ing., Ar. In., M.A., Ph.D.

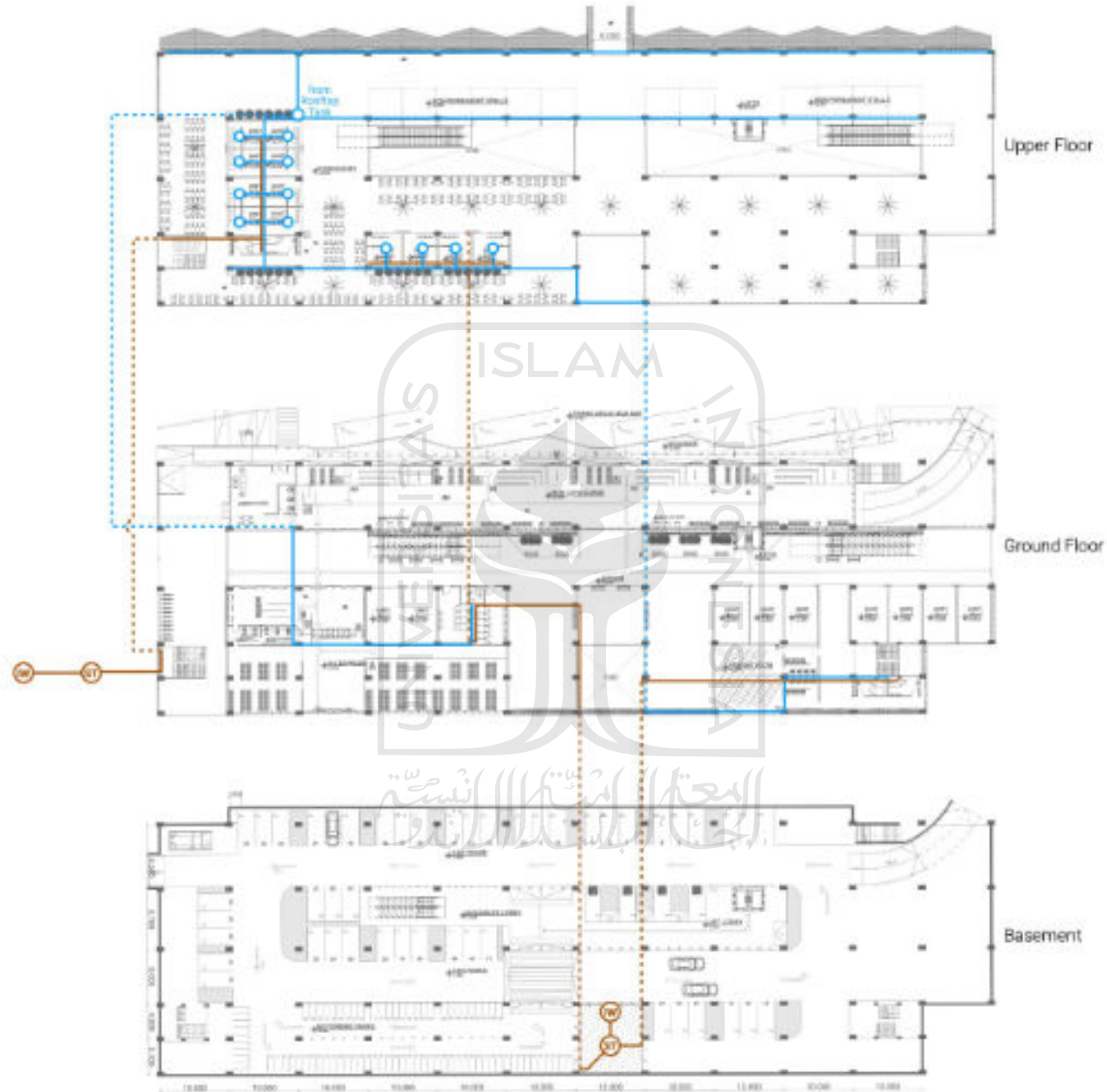
STUDENT
 Ahmir Syahda
 17512029

DRAWING TITLE
 Electricity Plan

SCALE	PAGE	TOTAL
	24	-

Water Plan

ARCHICAD EDUCATION VERSION



INTERNATIONAL BACHELOR PROGRAM IN ARCHITECTURE
 MAGUWO



PROJECT NAME
 Design of
 Transit Interchange Facility in Maguwo
 with Spatial Tranquility Approach

SUPERVISOR Ari Budiharta, S.T., M.Sc., Ph.D.
DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.A.
REVISOR 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. In., S.M., S.K.

STUDENT
 Ahmeid Syahda
 17512029

DRAWING TITLE
 Water Plan

SCALE	PAGE	TOTAL
	25	-

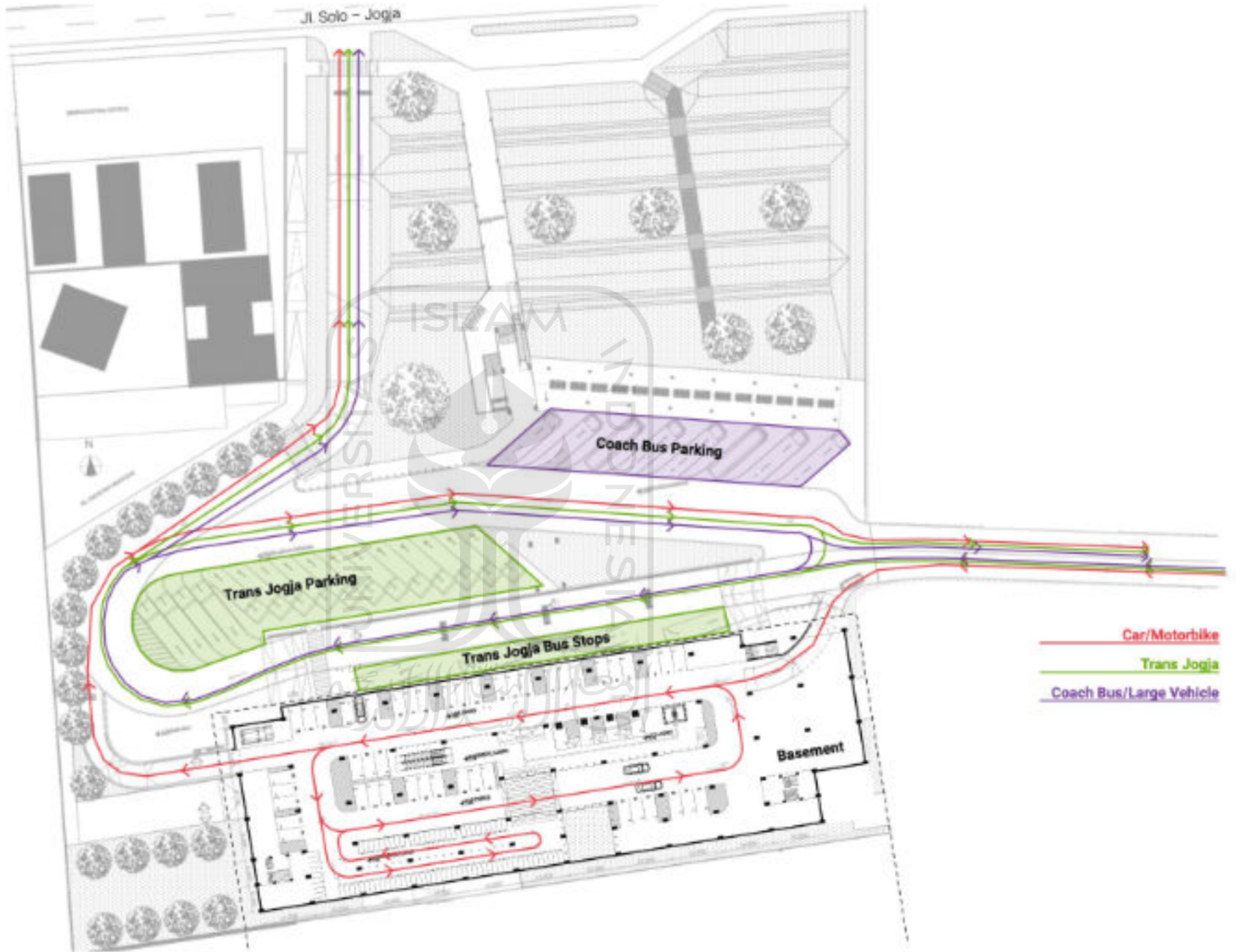
Firefighting and Evatuation Plan



	INTERNATIONAL BACHELOR'S PROGRAM IN ARCHITECTURE 		PROJECT NAME Design of Transit Interchange Facility in Rogosari with Special Transitivity Approach FOR UNIVERSITAS ISLAM INDONESIA	SUPERVISOR Ari Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmadi Syahda 17512029	DRAWING TITLE Firefighting and Evacuation	SCALE	PAGE 26	TOTAL -
			EXAMINER 1 Putu Ayu R. Agustianingsih, Eng. S.T., M.Sc.	EXAMINER 2 Prof. Drs. Fajar Mahendra, En. Ing., Ar., Ir., M.A., Ph.D.					

Circulation Plan

ARCHICAD EDUCATION VERSION



INTERNATIONAL BACHELOR PROGRAM IN ARCHITECTURE
 MAGUWO



PROJECT NAME

Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach

SUPERVISOR

Ari Budiharta, S.T., M.Sc., Ph.D

DESIGNER 1

Prita Ayu R Agustinawati, Engg. S.T., M.K.

DESIGNER 2

Prof. Ika Fatma Mahendra, En. Ing., Ar. Ir., S.M., S.K.

STUDENT

Ahmed Syahda
 17512029

DRAWING TITLE

Vehicle Circulation

SCALE

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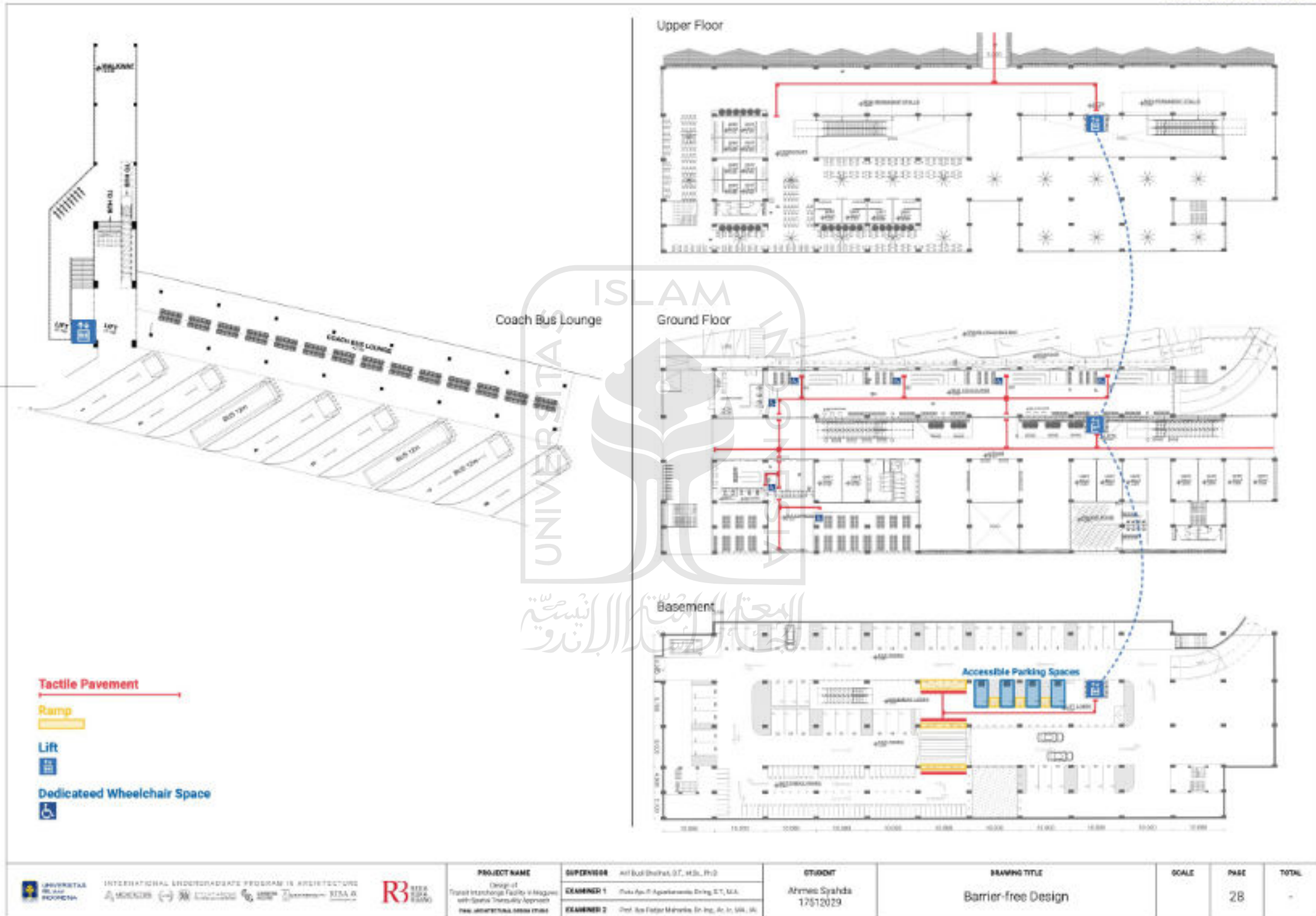
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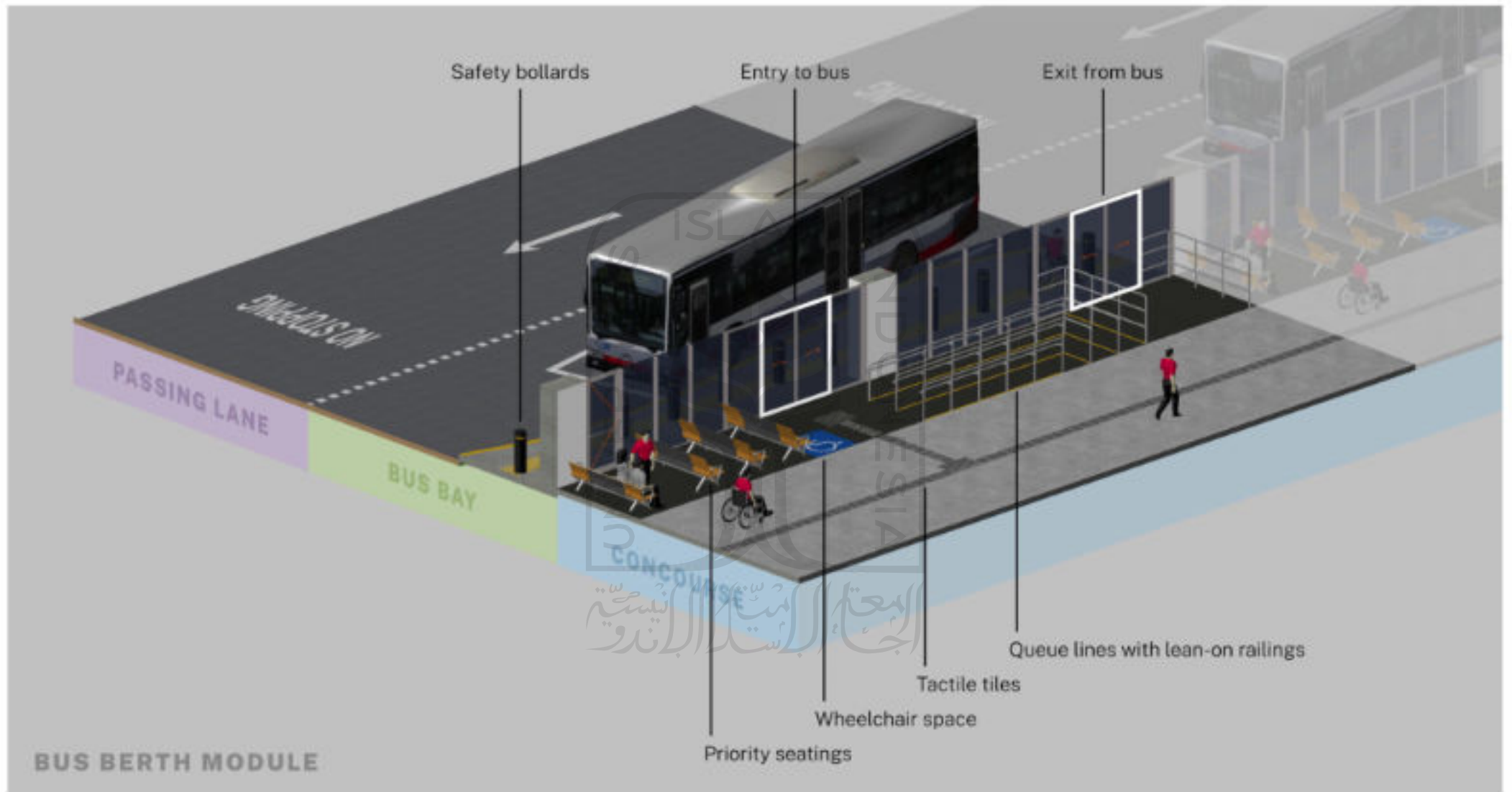
Barrier-free Design

ARCHICAD EDUCATION VERSION



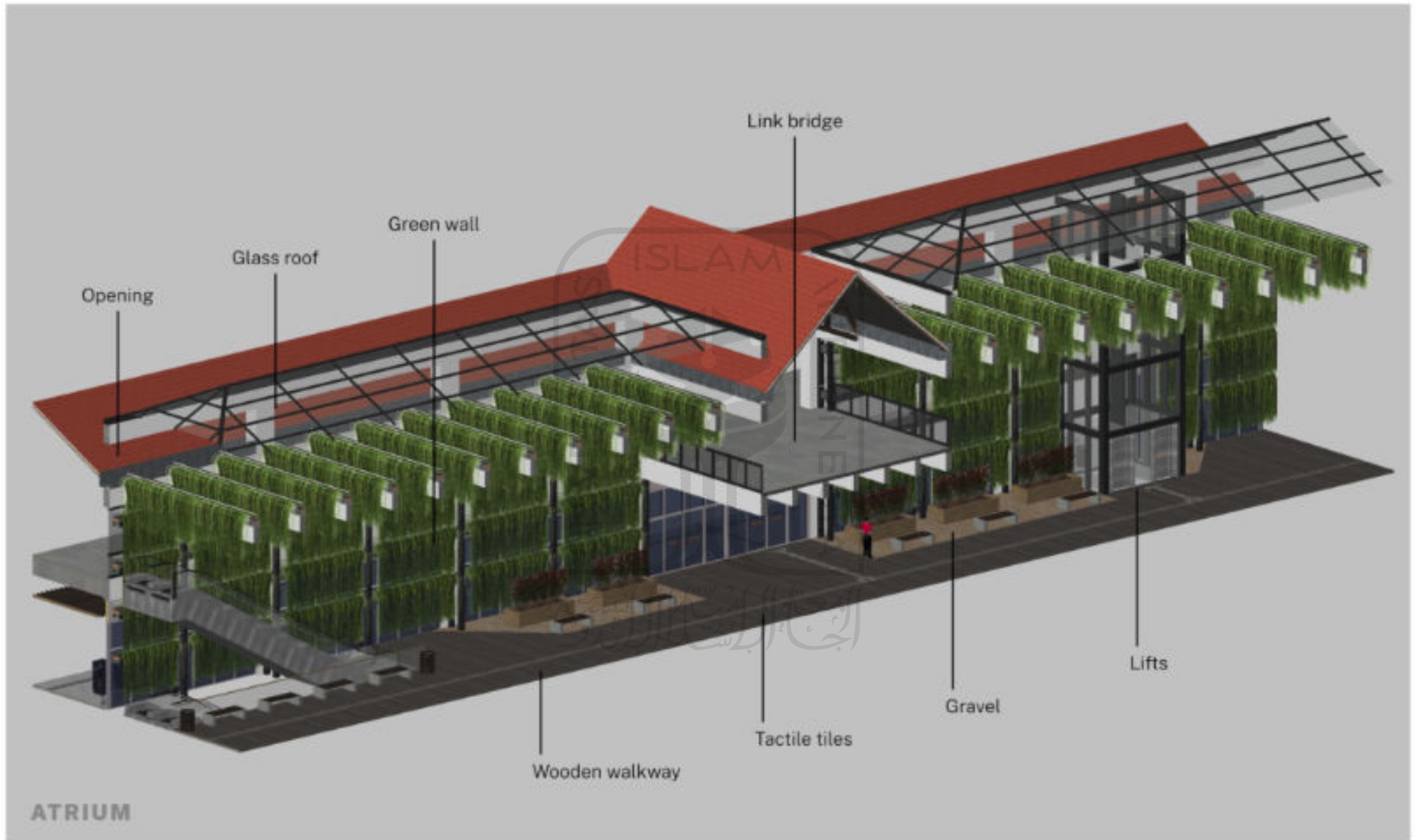
Detail - Bus Berth Module

ARCHICAD EDUCATION VERSION



	INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE MAGUWO	PROJECT NAME Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach RIBA ARCHITECTURAL DESIGN STUDIO	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmeed Syahza 17512029	DRAWING TITLE Bus Berth Module	SCALE	PAGE 29	TOTAL -
			DESIGNER 1 Putu Ayu R. Agustiananda, Engr. S.T., M.A.					
			DESIGNER 2 Prof. Ika Fatma Mahendra, En. Ing., Ar., Ir., S.M., S.K.					

Detail - Atrium



	INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE ANGGARAN (→)	PROJECT NAME Design of Transit Interchange Facility in Megawati with Special Transitivity Approach FAK. ARCHITECTURAL DESIGN STUDIO	SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.	STUDENT Ahmadi Syahda 17512029	DRAWING TITLE Atrium - Axonometry	SCALE	PAGE 30	TOTAL -
			EXAMINER 1 Prita Ayu P. Agustiananda, Erng, S.T., M.A.					
			EXAMINER 2 Prof. Drs. Fauzan Mahendra, En. Ing., Ar. In., M.A., Ph.D.					

Detail - Green Wall



INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE
MAGUWO



PROJECT NAME
Design of
Transit Interchange Facility in Maguwo
with Spatial Tranquility Approach
RIBA ARCHITECTURAL DESIGN STUDIO

SUPERVISOR Ari Budiharta, S.T., M.Sc., Ph.D.
EXAMINER 1 Prita Ayu R. Agustiananda, Engg. S.T., M.Sc.
EXAMINER 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. In., M.A., Ph.D.

STUDENT
Ahmed Syahza
17512029

DRAWING TITLE
Green Wall Detail

SCALE	PAGE	TOTAL
	31	-

3D Visualisation



View from Jl. Raya Jogja - Solo



View from north



View from south



Bird's eye view

	<p>PROJECT NAME Design of Transit Interchange Facility in Magiwo with Special Transitivity Approach FAS. ARCHITECTURAL DESIGN STUDIO</p>	<p>SUPERVISOR Airl Budi Shelhas, S.T., M.Sc., Ph.D.</p>	<p>STUDENT Ahmed Syahda 17512029</p>	<p>DRAWING TITLE Visualisation</p>	<p>SCALE</p>	<p>PAGE 32</p>	<p>TOTAL -</p>
		<p>EXAMINER 1 Prita Ayu R Agastanonda, Erang, S.T., M.A.</p>					
		<p>EXAMINER 2 Prof. Drs Fatmahanikha, En. Ing., Ar. In, M.A., Ph.D.</p>					

3D Visualisation



Land art garden



Entrance from street



Access to link bridge



Coach bus lounge



INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE



PROJECT NAME
Design of
Transit Interchange Facility in Maguwo
with Spatial Tranquility Approach

SUPERVISOR Ari Budiharta, S.T., M.Sc., Ph.D.
DESIGNER 1 Putu Ayu R. Agustiananda, Engg. S.T., M.K.
DESIGNER 2 Prof. Ika Fatma Mahendra, En. Ing., Ar., Ir., S.M., Ph.D.

STUDENT
Ahmed Syahza
17512029

DRAWING TITLE
Visualisation

SCALE	PAGE	TOTAL
	33	-

3D Visualisation



Atrium



View from east



Atrium



Bus berth



INTERNATIONAL UNDERGRADUATE PROGRAM IN ARCHITECTURE



PROJECT NAME

Design of
Transit Interchange Facility in Megway
with Special Transitivity Approach
FACIL. UNIVERSITASKOMTELKOM

SUPERVISOR

Arti Budi Shelhas, S.T., M.Si., Ph.D.

EXAMINER 1

Prita Ayu R Agastanonda, Erang, S.T., M.A.

EXAMINER 2

Prof. Drs Fatma Mahendra, En. Ing., Ar. In., M.A., Ph.D.

STUDENT

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DRAWING TITLE

Visualisation

SCALE

PAGE

34

TOTAL

-

3D Visualisation



Bus interchange



YIA Ekspres gateline



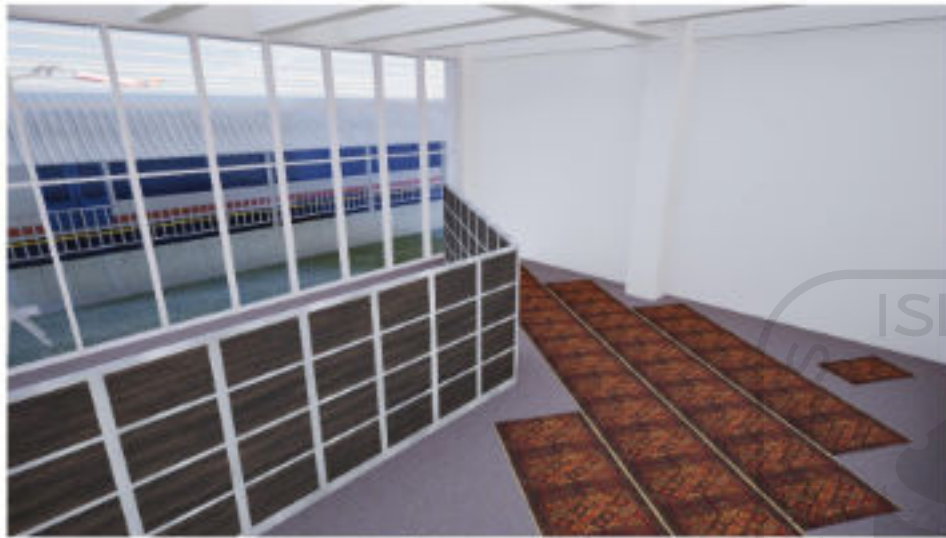
Bus interchange



YIA Ekspres lounge

			PROJECT NAME Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach <small>Desain Fasilitas Pertukaran Transpor</small>	SUPERVISOR Airl Budiharta, ST, MSc, PhD	STUDENT Ahmeid Syahza 17512029	DRAWING TITLE Visualisation	SCALE	PAGE 35	TOTAL -
			DESIGNER 1 Putu Ayu R Agustinanda, Engg, ST, M.A.						
			DESIGNER 2 Prof. Ika Fatma Mahendra, En. Ing., Ar. In., SIA, UK						

3D Visualisation



Prayer room



Food court



Basement



Food court



INTERNATIONAL BACHELOR'S PROGRAM IN ARCHITECTURE



PROJECT NAME
Design of
Transit Interchange Facility in Megang
with Special Transitivity Approach
FAS. ARCHITECTURAL DESIGN STUDIO

SUPERVISOR Airl Budiharta, S.T., M.Sc., Ph.D.
EXAMINER 1 Prita Ayu R. Agustiananda, Erang, S.T., M.A.
EXAMINER 2 Prof. Drs. Fatma Mahendra, En. Ing., Ar., Ir., M.A., Ph.D.

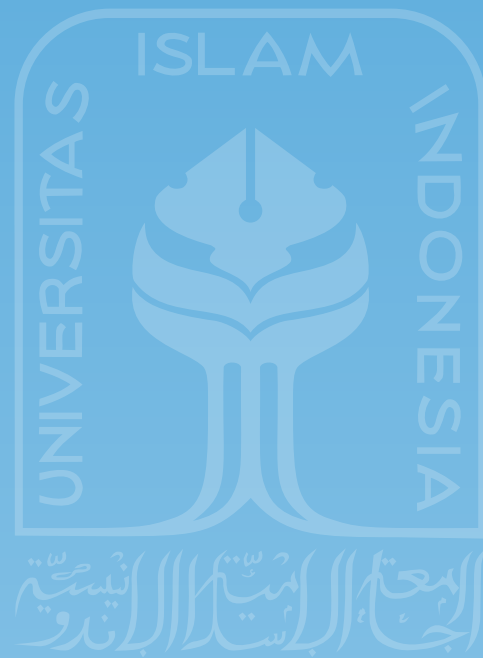
STUDENT
Ahmed Syahda
17512029

DRAWING TITLE
Visualisation

SCALE	PAGE	TOTAL
	36	-



5



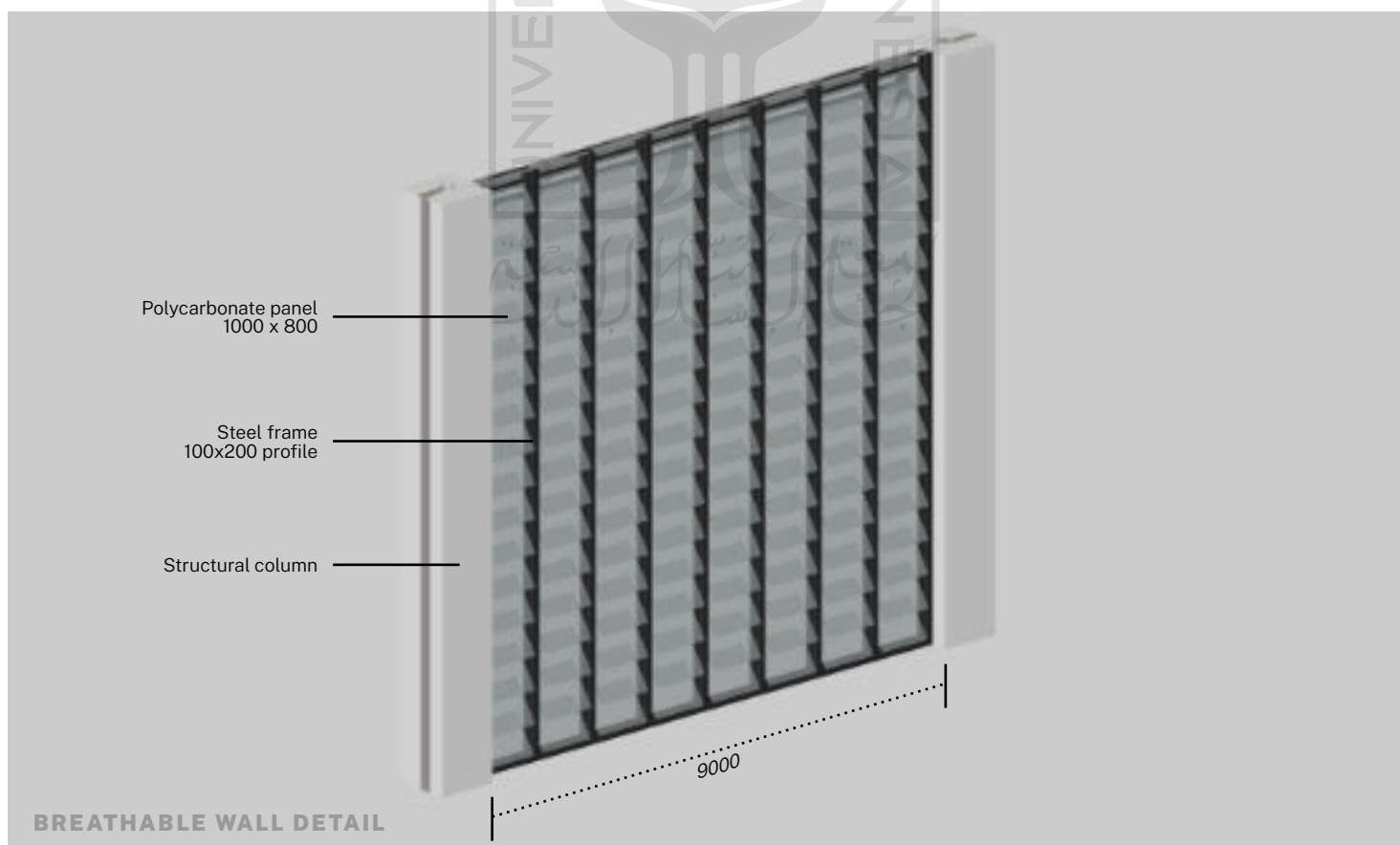
DESIGN EVALUATION

Improvement on atrium

Improvement on Atrium

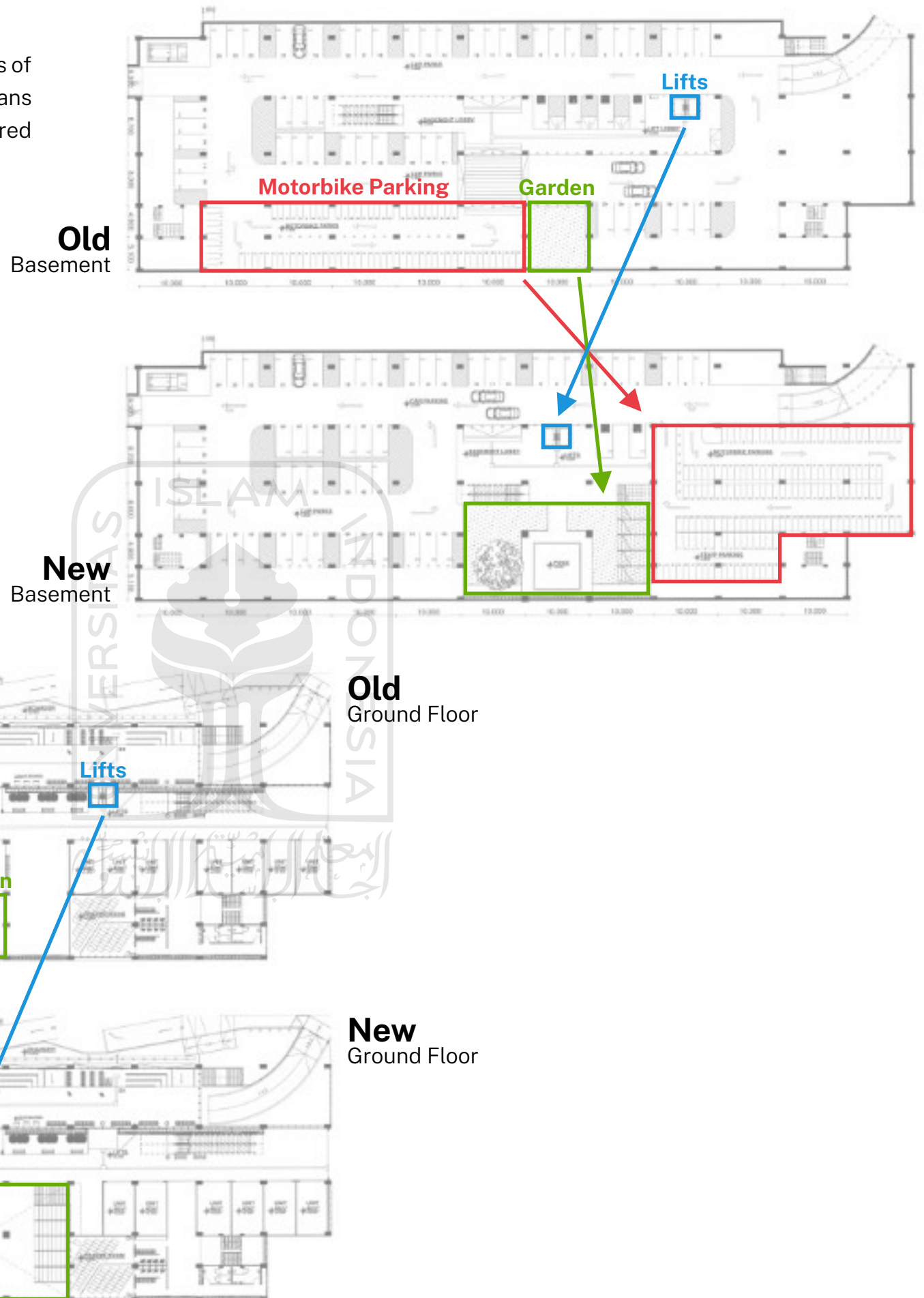
In implementing the concept of tranquility more on the design, a larger floor area of the hub building is converted into a lotus garden with waterfall feature. In the rain, rainwater would be collected on the glass roof and redirected into a stream to the middle of the pond. While this results in lower number of retail units on the ground floor, this may encourage users to explore the upper floor for food and beverages.



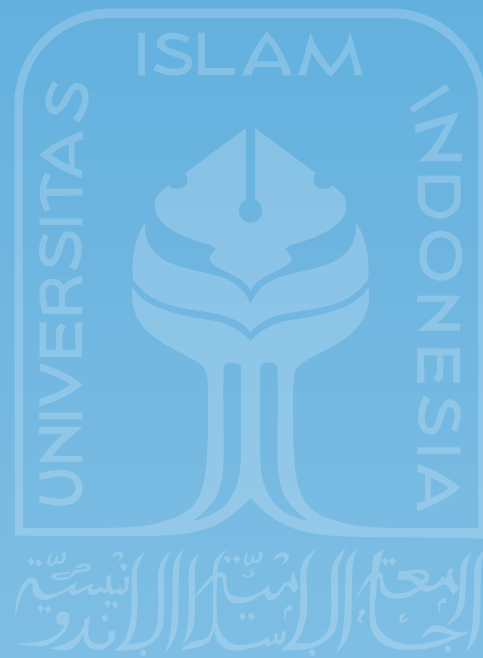


Change on Floor Plan

The garden occupies the centre three modules of the building. Spanning 30m by 18m. As it spans over multiple stories, change in layout is required for effective circulation.



6



ATTACHMENTS

Plagiarism check

Presentation posters



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SURAT KETERANGAN HASIL CEK PLAGIASI

Nomor: 2424039914/Perpus./10/Dir.Perpus/VI/2024

Bismillaahirrahmaanirrahiim

Assalamualaikum Wr. Wb.

Dengan ini, menerangkan Bahwa:

Nama : AHMES SYAHDA
Nomor Mahasiswa : 17512029
Pembimbing : ARIF BUDI SHOLIHAN, S.T., M.Sc., Ph.D
Fakultas / Prodi : Teknik Sipil dan Perencanaan/ Architecture
Judul Karya Ilmiah : M A G U W O I N T E R C H A N G E Design of Transit Interchange
Facility in Maguwo with Spatial Tranquility Approach

Karya ilmiah yang bersangkutan di atas telah melalui proses cek plagiasi menggunakan **Turnitin** dengan hasil kemiripan (*similarity*) sebesar **4 (Empat) %**.

Demikian Surat Keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Wassalamualaikum Wr. Wb.

Yogyakarta, 7/29/2024

Direktur



Muhammad Jamil, SIP.

Design of Transit Interchange Facility in Maguwo with Spatial Tranquility Approach

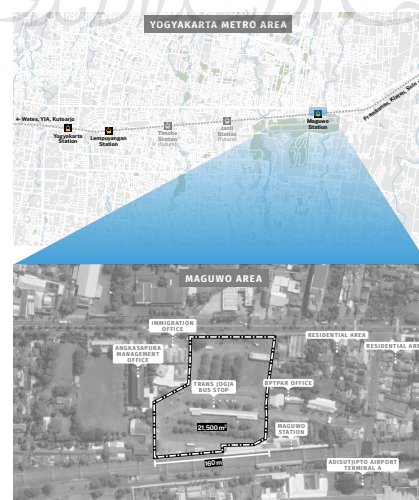
STUDI ARSITECTUR MAGUWO INTERCHANGE



The rise of population in Yogyakarta has resulted in an increasingly congested streets. This condition is worsened by the low number public transit ridership in the city. Park and Ride Adisutjipto is a parking facility located near Adisutjipto airport in the east side of Yogyakarta. The site is adjacent to Maguwo station and is one of the central hubs for Trans Jogja buses. The airport has seen a significant decline of passenger numbers in the recent years due to the migration of commercial flights to the new airport in Kulon Progo. As such, its parking facility has fallen into disuse and disrepair.

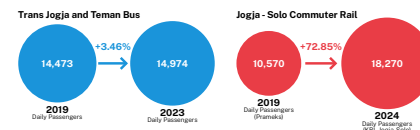
In promoting the use of public transport, the site of Park and Ride Adisutjipto can be developed into a central hub for public transit. This allows multiple modes of transit to be integrated in one area, providing direct interchange between buses, trains, taxis, and private vehicles. In this project, the theme of "spatial tranquility" is employed as the design strategy to minimise the chaotic environment that are often present in a transit interchange.

The result of this project is a design of transit interchange that features many of the tranquility elements adapted from traditional Javanese architecture.



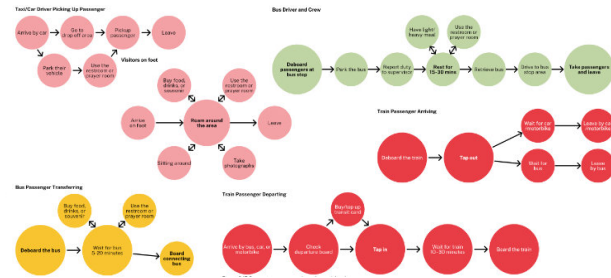
Site Information

Name of site	: Park and Ride Bandara Adisutjipto
Address	: Jl. Raya Jogja-Solo, Karangploso, Maguwoharjo, Depok, Steman 55281
Area	: 21,500 m ²
Existing function	: Parking/Park and Ride Facility
Owner	: BPTPAR - Dinas Perhubungan DIY
Land use	: C-1 High Density Mixed Zoning
North side	: Jl. Raya Jogja-Solo
East side	: Jl. Airport Adisutjipto
South side	: Maguwo Railway Station
West side	: Yogyakarta Class I Immigration Office

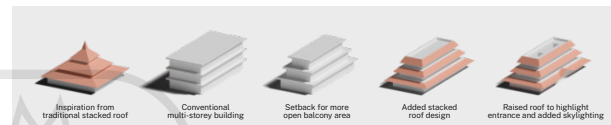
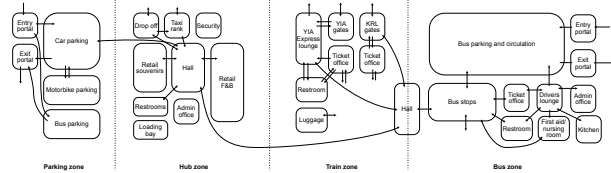




User Activity

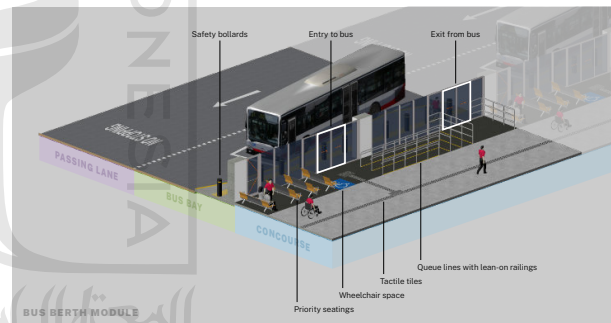


Design Exploration



The main building mass is comprised one integrated structure divided into zones based on the floor levels. The ground level is designed for bus circulation and parking with the bus interchange on the south side. The upper floor is for dining area. While the basement is for parking.

The spatial arrangement starts with the bus berth module as it is the core function of the building. Each module measures 20 metres lengthwise, able to accommodate up to 12-metre long city bus.



**B4
AUTOMATIC DOOR**



BUS INTERCHANGE



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Spatial Tranquility

Tranquil can be described as a condition of calmness in the surrounding environment. It can also be described as a calm state of mind. The demand for tranquil spaces can be attributed to the rising rate of stress in urban living. As cities grow to accommodate more people, natural spaces are increasingly becoming a scarce commodity.

A transport interchange is often a high activity space with high number of movement. This high sensory load may induce stress for many people using the facility. The approach of spatial tranquility may help to reduce stress impacted by such busy environment.

In solving this issue, this building employs many elements that bolster calming sensation such as adding vegetations, natural sunlight, noise reduction, as well as providing open views to the outside.



The building feature a central atrium with clear view to the sky. Vegetations are added to help absorb direct sunlight as well as to bring fresh air into the building.

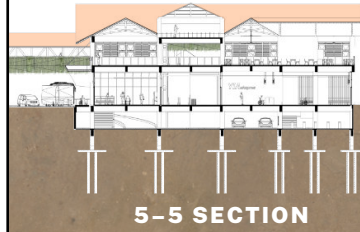
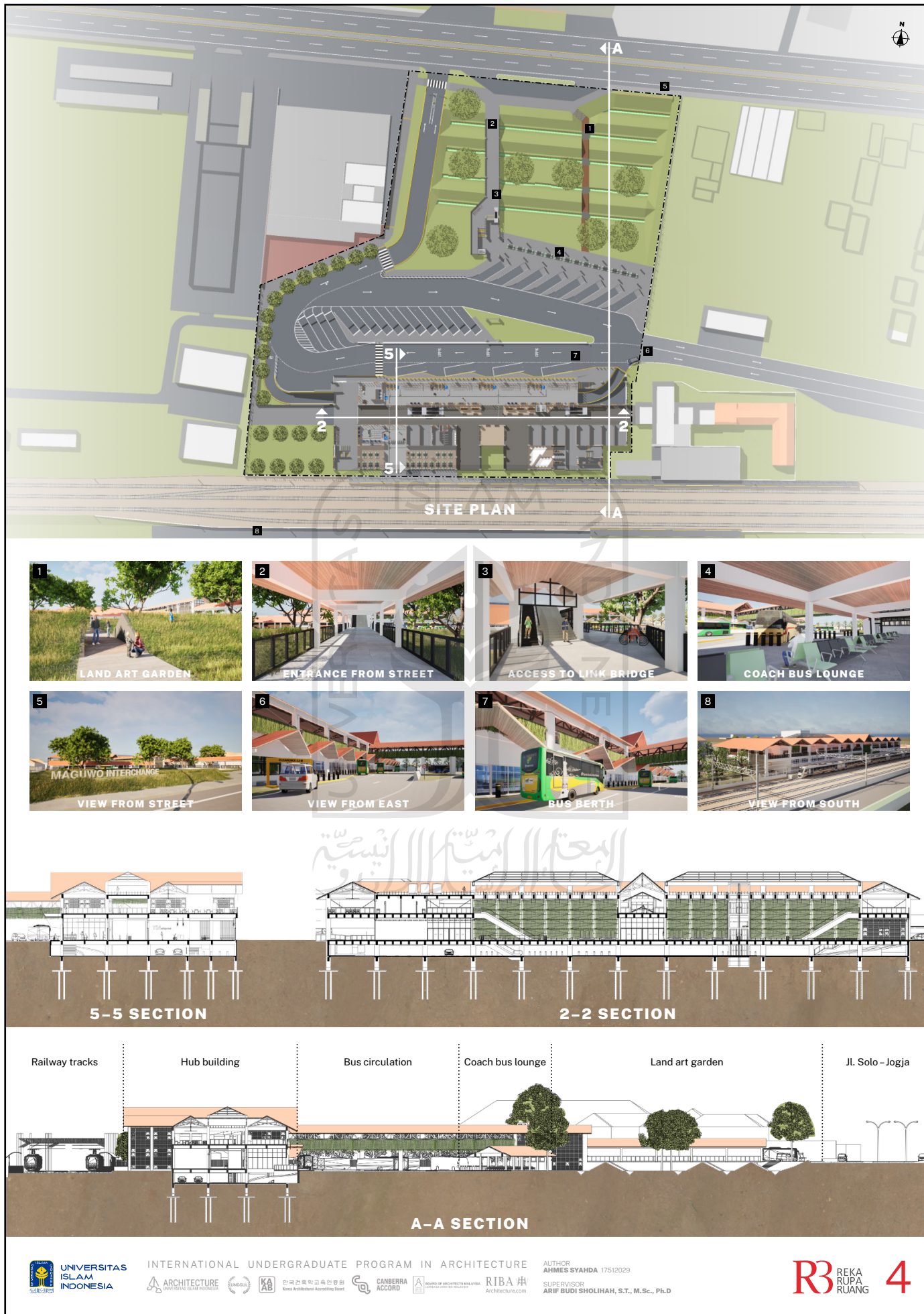


The green wall features curtain creeper plant (*Vernonia elliptica*), also known as the "Lee Kuan Yew" plant which grows downward which acts as a curtain. The construction of the housing is made of steel structure mounted to the building's structural columns. PVC pipes run along the entire housing for watering.

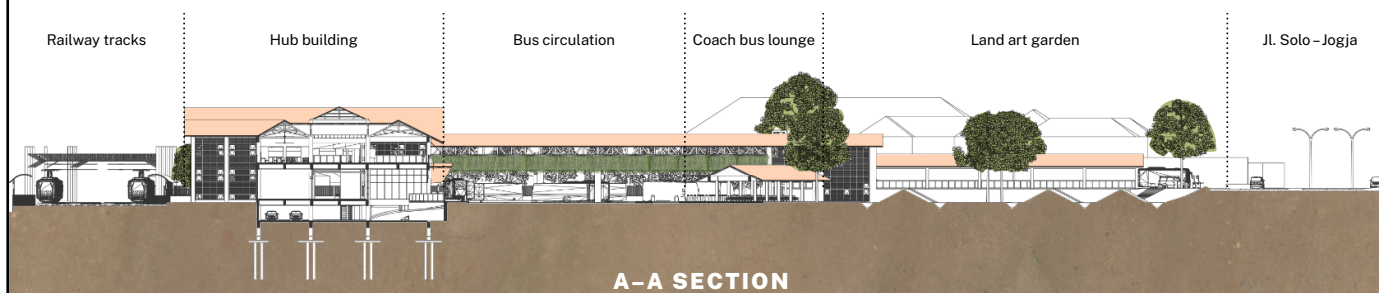
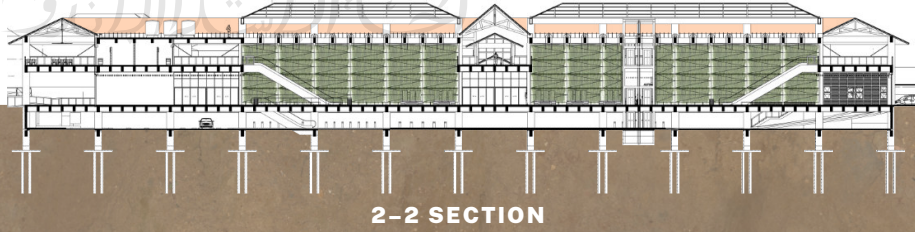


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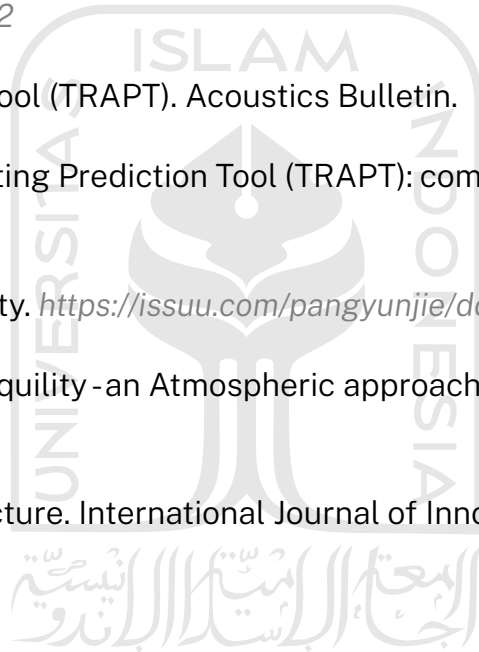
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MAGUWO INTERCHANGE
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