

LANGGENG LUTUNG

Final Architectural Design Studio (FADS) 2025

A Design of **Javan Lutung** (*Trachypithecus auratus*) **Rescue Center** in Magelang with **Behavioral Approach**

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Desain Pusat Penyelamatan Lutung Jawa (*Trachypithecus auratus*) di Magelang dengan Pendekatan Perilaku

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I declare the work that contained in this Final Architectural Design Studio Project report is my work, not an existing work of someone else. For any material that has not originated by me, I certify the sources have been properly and fully acknowledged in the text

I sincerely declare that this statement is true and submit it to the Department of Architecture at the Islamic University of Indonesia to be used for educational and publication purposes.

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LIST OF CONTENT

01. INTRODUCTION

Design Premise	
Project Title	
Design Problem Study	
Javan Lutung as Javanese endemic animal	03
The existence and population distribution	
Javan Lutung categorized vulnerable	04
Community awareness	05
Javan Lutung in culture, people, beliefs	06
Javan Lutung as an ecosystem balancer	08
Current Situation & Needs	10
Problem Mapping	11
Problematique	12
Methodology	14
Matrix of design thinking	16
Design Hypothesis	
The role of stakeholders	18
Engaging behavior to the issues	
Excellency, Originality and Novelty	21

02. LUTUNG STUDY

About Javan Lutung	
Ecosystem and food	24
Lutung growth	25
Habitual envionment	26
Behavior approach for lutung	27
Daily Behavior	28

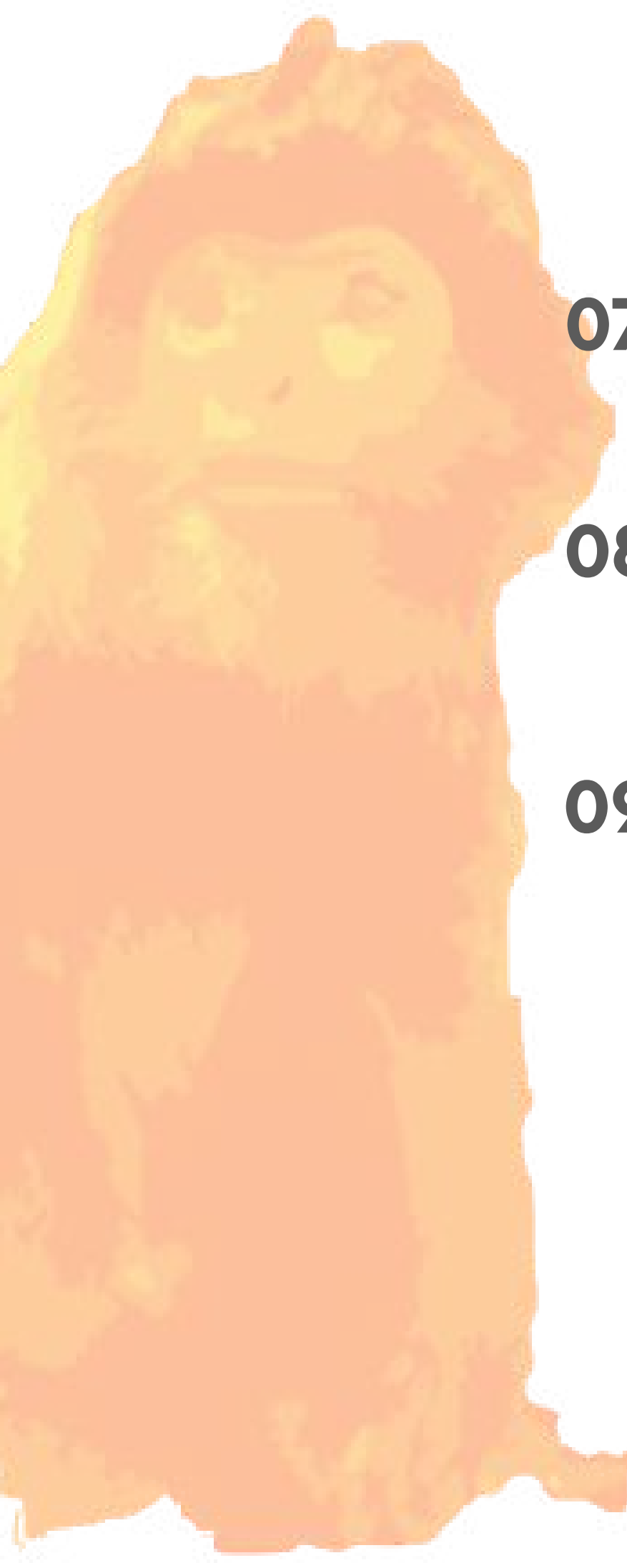


LIST OF CONTENT

03.	PROBLEM STUDY	
	Study of Location, Site and Context	
	Animal Welfare	31
	Protection	
	Community Related	33
	Site Selection	36
	Accessibility map	38
	S.W.O.T. analysis	39
	Regulation	
	Precedent Study : Building Typology	
	Nyaru Menteng Rescue Centre and Forest School	40
	Great Ape House	42
	Building For Animal	45
	Monkey House Artis	47
	Hills of the hidden Buddha & Chicu Art Museum	49
	Precedent Study :Design Approach	
	Behavior Approach	51
	Activity Flow	
	Zoo (Animal & Visitor)	52
	Animal Welfare	53
	Edu-tourism	54
04.	DESIGN PROBLEM SOLVING	
	Rescue Center Programming	
	User Analysis	57
	User Prediction	60
	User Program	61
	Spatial Character	
	Spatial Programming	63

LIST OF CONTENT

05.	ANALYSIS & RESPOND	
	Analysis Userflow	69
	Management Staff	70
	Javan Lutung	
	Visitor	
	Analysis Behavior	
	Environmental Behavior	72
	Javan Lutung Re-Birth	73
	Javan Lutung School	74
	Main Activities	75
	Analysis Privacy	
	Spatial Gradient Privacy	76
	Design Programming 01	
	Space Characteristic	76
	Space Requirement List	82
	Site regulation development	84
06.	CONCEPT EXPLORATION	
	Deepth Slte Analysis	
	Site Contextual	86
	Existing Natural Elements	87
	Site Regulation	88
	Existing Analysis	89
	Design Concept	
	Spatial Programming	92
	Design Conecpt	93
	Spatial/Zoning Concept	95
	Site context development	97
	Conceptual	98
	Design Programming	
	1 st Exploration:	110
	Zoning & Massing Concept	
	Urgency & Advantage	
	2 nd Alternative:	112
	Zoning & Massing Concept	
	Urgency & Advantage	
	3 rd Alternative:	113
	Zoning & Massing Concept	
	Urgency & Advantage	



LIST OF CONTENT

07.	Design Comprehensive Evaluation	
	• Building Mass Design	125
	Building Coverage Area	126
	Final Exploration	134
	Building Mass Transformation	135
08.	Design Development	
	• Spatial Requirement	137
	Situation plan	138
	Site plan	139
	Elevation plan	140
	Section	141
09.	Design Test & Details	
	• Design Result	
	Food Preparation forest	143
	Lutung Resccue Narrative	144
	Activity Flow Narrative	145
	Landscape Setback Design	146
	Vistor Centre	147
	Facility Centre	150
	Management Office	152
	Lutung Facility	154
	Viewing Behavior Design	158
	Medical & Food Function	162
	Structural Detail	164
	Lutung Cages	167
	Island School	172
	Utility Scheme	174
	Rendering	



LIST OF CONTENT

10.	Design Evaluation	
	• Connection Type Changes	173
	• Use of The Lutung Facility Roof	
	• Details of Building Usage	
11.	Attachment	
	• Plagiarism check	180
	• APREB	
	• 3D model – Maquette	

PREFACE

Foreword

Assalamualaikum Warahmatullahi Wabarakatuh

Peace and blessings be upon you, and may Allah's mercy and grace be with you always.

All praise and gratitude are due to Allah the Almighty, Who has bestowed His abundant mercy, blessings, and guidance. Salutations and peace are upon the noble Prophet Muhammad (peace be upon him), the exemplary guide for all humanity. By His grace, I have been able to complete this Final Project Report entitled **"A Design of Javan Lutung (*Trachypithecus auratus*) Rescue Centre in Magelang with a Behavioral Approach"**. I wish to take this opportunity to express my sincere appreciation to the many individuals and institutions who have generously offered their support, guidance, and encouragement throughout the course of this work:

1. Allah the Almighty, for granting me health, strength, ease, and the countless blessings which have enabled me to complete this project successfully.
2. My beloved parents, Mr Hardilan Mohamad Arifin and Mrs Ratna Prima Dewi, whose unwavering support, love, and prayers have been the foundation of my perseverance and determination.
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11. All other friends and colleagues, too numerous to name individually, whose encouragement and assistance have been greatly appreciated.

I am fully aware that this report is not without its shortcomings in terms of structure, writing, and presentation. I therefore welcome any constructive feedback and suggestions for improvement. It is my sincere hope that this work may offer some benefit to its readers and contribute meaningfully to the field.

Thank you,

Wassalamualaikum warahmatullahi wabarakatuh

Peace be upon you, and may Allah's mercy and blessings be with you.



Abstract

This design proposal presents a Javan lutung (*Trachypithecus auratus*) rescue centre in Magelang, Indonesia, developed through a behavioural approach that emphasizes the species' natural activity patterns, environmental mimicry, and seamless integration with human functions. The design responds to key aspects of lutung behaviour—such as arboreal movement, social interaction, and territorial instincts—by creating spatial configurations that support natural behaviours in captivity. Layered canopy structures, organic enclosures, and transitional zones are employed to mimic the forest environment while enabling effective human-lutung interaction for care and observation. User circulation is strategically planned to reduce animal stress and promote educational engagement for visitors and students. The centre also incorporates a school-based rehabilitation programme to raise community awareness and encourage active conservation efforts, ultimately aiming to release healthy lutungs back into the wild. As such, the sanctuary functions not only as a rescue facility but also as a dynamic platform for sustaining lutung populations through education, research, and community involvement.



Abstrak

Proposal desain ini menyajikan pusat penyelamatan lutung Jawa (*Trachypithecus auratus*) di Magelang, Indonesia, yang dikembangkan melalui pendekatan perilaku yang menekankan pada pola aktivitas alami spesies ini, peniruan terhadap lingkungan, dan integrasi tanpa batas dengan fungsi-fungsi manusia. Desainnya merespon aspek-aspek kunci perilaku lutung—seperti pergerakan arboreal, interaksi sosial, dan naluri teritorial—dengan menciptakan konfigurasi spasial yang mendukung perilaku alami di penangkaran. Struktur kanopi berlapis, kandang organik, dan zona transisi digunakan untuk meniru lingkungan hutan sekaligus memungkinkan interaksi yang efektif antara manusia dan lutung untuk perawatan dan pengamatan. Sirkulasi pengguna direncanakan secara strategis untuk mengurangi stres pada satwa dan mendorong keterlibatan edukasi bagi pengunjung dan siswa. Pusat rehabilitasi ini juga menggabungkan program rehabilitasi berbasis sekolah untuk meningkatkan kesadaran masyarakat dan mendorong upaya konservasi aktif, yang pada akhirnya bertujuan untuk melepaskan lutung yang sehat kembali ke alam liar. Dengan demikian, pusat penyelamatan ini tidak hanya berfungsi sebagai fasilitas penyelamatan, namun juga sebagai wadah yang dinamis untuk mempertahankan populasi lutung melalui pendidikan, penelitian, dan keterlibatan masyarakat.

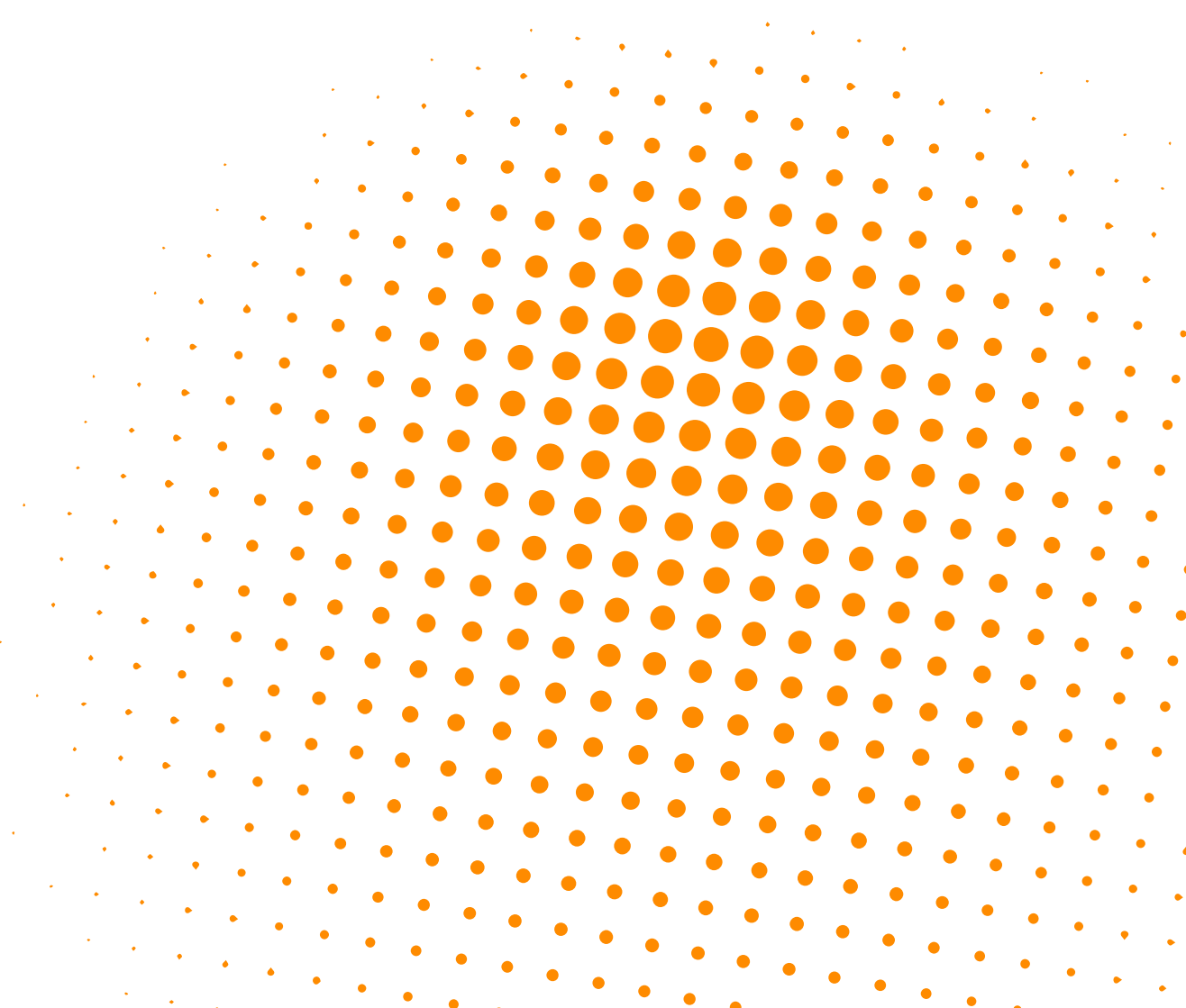
LIST OF FIGURE

1.1	Close up Javan Lutung potrait	3.26	Monkey house artis maquette
1.2	Javan Lutung distribution in Java-Bali-Lombok	3.27	Monkey house artis section
1.3	Specific distribution of Javan Lutung	3.28	Monkey house artis section
1.4	Data species Javan Lutung	3.29	Chimpanzee enclosure
1.5	Degradation Javan Lutung population	3.30	Structural and architecture elements
1.6	PROFAUNA demonstration towards lutung’s illegal poaching	3.31	Column to ground
1.7	Rescued Javan Lutung	3.32	Building from the enclosure
1.8	Lutung Kasarung Folks	3.33	Activity flow principle D.K Ching
1.9	Hanoman legends	3.34	Human & animal interaction in zoo by Ernest N
1.10	Bodhisa story	3.35	handling process discussion JLC
1.11	4 Monkey images in Borobudur’s relief		
1.12	Rescued Javan Lutung by BKSDA Yogya		
1.13	Figurative design concept		
1.14	Figurative behavior concept		
1.15	Rough spatial design		
2.1	Lutung in part of forest ecosystem		
2.2	Lutung food character		
2.3	Javan Lutung growth scheme		
2.4	Altitude of Javan Lutung’s habitat		
2.5	Lutung arboreal lifestyle		
2.6	Social behavior of lutung		
3.1	Animal welfare principle		
3.2	Javan Lutung rescue pressessive prttection scheme		
3.3	Javan lutung Center		
3.4	One socialization Javan Lutung cage		
3.5	Community program in JLC Malang		
3.6	Lutung’s trans-location		
3.7	JLC community districbution		
3.8	JLC problem identification		
3.9	Lutung existence in Mount Merapi and Merbabu Map		
3.10	Spotted Javan Lutung in National Park Camera		
3.11	National Park Mount Merbabu Zone division		
3.12	Region accessibiloity		
3.13	Site accessibiloity		
3.14	Site accessibility		
3.15	Nyaru menteng orangutan		
3.16	Great Ape House		
3.17	Section Great Ape House		
3.18	Great Ape House Cable Structure		
3.19	Concept Great Ape House		
3.20	Great Ape House siteplan		
3.21	Building for animal Siteplan		
3.22	Building for animal Perspective development		
3.23	Building for animal perspective development		
3.24	Building for animal section concept		
3.25	Monkey house artis Siteplan		

LIST OF FIGURE

6.1	Site form
6.2	Magelang-Salatiga mainroad access
6.3	Wekas village
6.4	Surroundings elements
6.5	Climate data general
6.6	Climate data rainfall
6.7	Sunpath diagram
6.8	Windrose diagram
6.9	Existing element mappping
6.10	Existing tree variation
6.11	Lutung allo-mothering
6.12	Site zoning conceptual
6.13	Site privacy conceptual
6.14	Site zoning conceptual
6.15	Site context conceptual and strategies
6.16	Lutung Behavior
6.17	Building form conceptual and activity flow
6.18	Building form conceptual analysis
6.19	Choosen building form conceptual analysis
6.20	Accessibility concept
6.21	Movement conceptual
6.22	Building envelope
6.23	Visitor and management staff behavior
6.24	Staff and lutung interaction
6.25	Safety barrier concept
6.26	Island barrier concept
6.27	Food forest preparation
6.28	Food forest
6.29	Exposure concpetual
6.30	Lutung cage design by behavior
6.31	Island school concept
6.32	Observation center
6.33	Site analysis
6.34	Zoning massing exploration 01
6.35	Zoning massing exploration 02
6.36	Zoning massing exploration 03
6.37	A.i render imaginery
6.38	Zoning massing exploration 04
6.39	Contour pattern on site
6.40	Privacy planning on site
6.41	Activity exploration 04
6.42	massing concept exploration 04
6.43	Zoning massing concept exploration 05
6.44	Contour pattern on site
6.45	Privacy planning on site
6.46	Contour development
6.47	Activity exploration 05
6.48	massing concept exploration 05

7.1	Comperhensive siteplan
7.2	Comperhensive situationplan
7.3	Comperhensive schematic design plan
7.4	Lutung cage
7.5	petung bamboo texture
7.6	Teak wood texture
7.7	School island section
7.8	Comperhensive design elevation
7.9	Comperhensive design sections
7.10	Comperhensive site context development
7.11	Choosen design
7.12	Building mass transformation

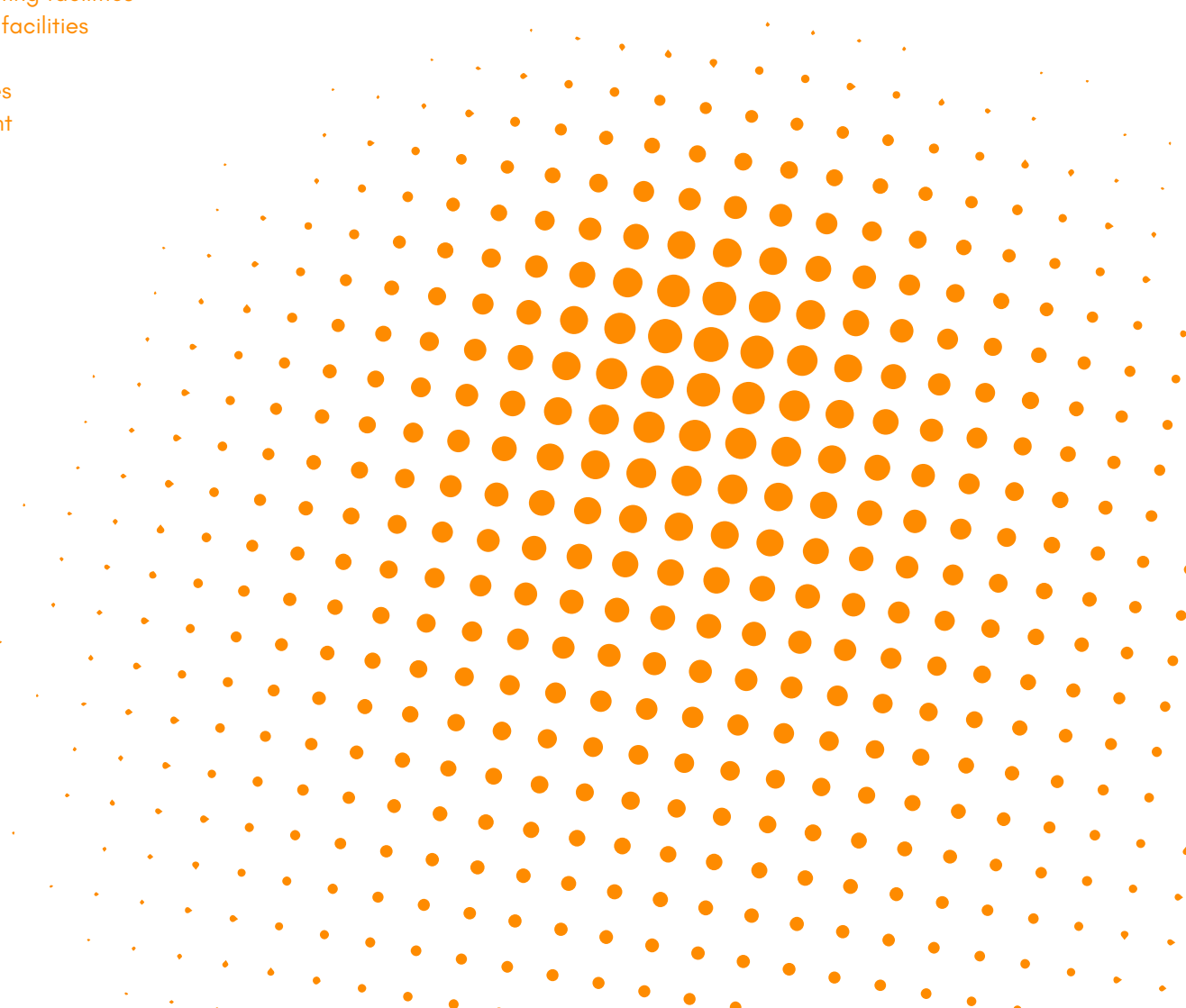


LIST OF FIGURE

8.1	Situation plan		
8.2	Site plan		
8.3	Design elevations		
8.4	Site section A		
9.1	Site plan	9.41	Construction detail human building
9.2	Landscape food forest	9.42	Roof plan detail structure
9.3	Building activity flow scheme	9.43	Natural light concept
9.4	Repressive procces scheme	9.44	Quarantine cage
9.5	Setback section	9.45	Socialization cage
9.6	Setback partial plan	9.46	Island school cage
9.7	Visitor centre plan	9.47	Tree bracket section detail
9.8	Lobby entrance	9.48	Tree bracket concept plan
9.9	Lobby frame concept	9.49	Island school plan
9.10	Receptionist area	9.50	Island school & control room
9.11	Corridor area	9.51	School island section
9.12	Souvenir area	9.52	Swing behavior frame detail
9.13	Human building section	9.53	School island
9.14	Prayer room	9.54	School island cage
9.15	Amphitheatre	9.55	School island 02
9.16	Restaurant	9.56	Lutung facility structure exploda
9.17	Open library	9.57	Island school structure exploda
9.18	Management office plan	9.58	School structure details
9.19	Head manager office room	9.59	Electricity scheme
9.20	Conference hall	9.60	Clean water scheme
9.21	Corridor	9.61	Barrier free & vertical system
9.22	Lutung facility plan	9.62	Fire safety & emergency scheme
9.23	Facility entrance		
9.24	Interactive park corridor	10.1	Langgeng Lutung
9.25	Observation deck	10.2	Ball bolt steel joinery
9.26	Sitting area	10.3	Steel cap joinery
9.27	Interpretative park viewing	10.4	Section B revision
9.28	Observation deck entrance	10.5	Cross welding joinery
9.29	Interpretative park area	10.6	Multicross welding joinery
9.30	Observation deck viewing angle	10.7	Pile foundation before
9.31	Interpretative park viewing angle	10.8	Pile foundation after
9.32	Lutung facility section	10.9	Lutung facility roofplan before
9.33	Operation room	10.10	Lutung facility roofplan after
9.34	Food preparation pantry	10.11	Maximation skylight in lutung facility building
9.35	Lutung facility section	10.12	Skylight details
9.36	Quarantine cage	10.13	Site plan
9.37	Socialization cage		
9.38	Infant playground		
9.39	Natural light & air circulation scheme		
9.40	Air circulation through louvre		

LIST OF Table

1.1	Matrix of design thinking by Bryan lawson
1.2	Excellency, originality and novelty
1.3	Test method
1.4	Classification type of animal protection and buildng typology
1.5	Rehabilitation JLC data
1.6	Animal “Welfare” principle analysis
1.7	Behavioral principle analysis
1.8	Sustainability principle analysis
1.9	Activity and function in JLC organization: head office
1.10	Activity and function in JLC organization: conservation department
1.11	Activity and function in JLC organization: health & well-being department
1.12	Activity and function in JLC organization: educaction & research department
1.13	Activity and function in JLC organization: maintenace & environment department
1.14	Activity and function in JLC organization: safety & monitoring department
1.15	Activity and function in JLC organization: communication & public relations
1.16	Rescue center design programming
1.17	Rescue center design programming: supporting activities
1.18	Rescue center design programming: management activities
1.19	Rescue center design programming: service activities
1.20	Space programming: javan lutung facilities
1.21	Space programming: javan lutung supporting facilities
1.22	Space programming: javan lutung health facilities
1.23	Space programming: visitor
1.24	Space programming: management offices
1.25	Space programming: service management
1.26	Space programming calculation
1.27	Room programming Before
1.28	Room programming After
1.29	Final space requirement
1.30	Space usage details





01.

Intro duction

Design Premise

Designing Rrescue Center of Javan Lutung in Magelang with Behavior Approach

The design of the Javan Lutung Rescue Center in Magelang using a behavioural approach studies how the artificial environment can be adapted to the ethological needs of Javan Lutung so that they can adapt, undergo rehabilitation, and eventually be released to their natural habitat. This approach is important because Javan lutungs (*Trachypithecus auratus*), Indonesia's endemic primate, are increasingly threatened by hunting and deforestation. By understanding their natural behaviours, such as social patterns, exploration and need for vertical space, the rescue centre design can create an environment that supports their physical and mental recovery before returning to the wild.

The main advantage of this approach is its ability to create spaces that are not only functional but also aligned with the welfare of the animals. In the context of architecture, this behaviour-based design contributes to the creation of spaces that are more adaptive, natural and supportive of long-term rehabilitation. In terms of nature conservation, this rescue centre helps species conservation by increasing the success rate of rehabilitation and release. In addition, the application of sustainable design, such as the use of eco-friendly materials and integration with the surrounding ecosystem, reduces the ecological footprint of the building and strengthens the role of architecture in nature conservation.

Project Title

Designing Rescue Centre of Javan Lutung in Magelang with Edu-tourism Approach

Rescue Center

A rescue center is a specialized facility dedicated to the rehabilitation, protection, and conservation of animals, particularly those rescued from illegal trade, habitat destruction, or human conflict. As a form of conservation area, a rescue center serves as an intermediate space between captivity and the wild, focusing on medical care, behavioral rehabilitation, and eventual reintroduction to natural habitats whenever possible.

Javan Lutung

The Javan lutung (*Trachypithecus auratus*), also known as the Javan lutung, is an arboreal primate endemic to Java, Bali, and parts of Lombok, Indonesia. They play a crucial role in forest ecosystems by aiding seed dispersal. However, their population is declining due to habitat destruction, illegal pet trade, and deforestation, making them a protected species under Indonesian law and a focus of conservation efforts.

Behavior

In wildlife and animal-related architecture, such as rescue centers or sanctuaries, the behavioral approach ensures that enclosures, pathways, and habitats support natural instincts and movement patterns. For instance, primate enclosures incorporate vertical spaces and climbing structures to mimic their arboreal lifestyle, while open-plan rehabilitation areas encourage social interaction among animals.



Figure 1.1 Close up Javan Lutung Potrait. Source: pngtree.com

Design Problem Study

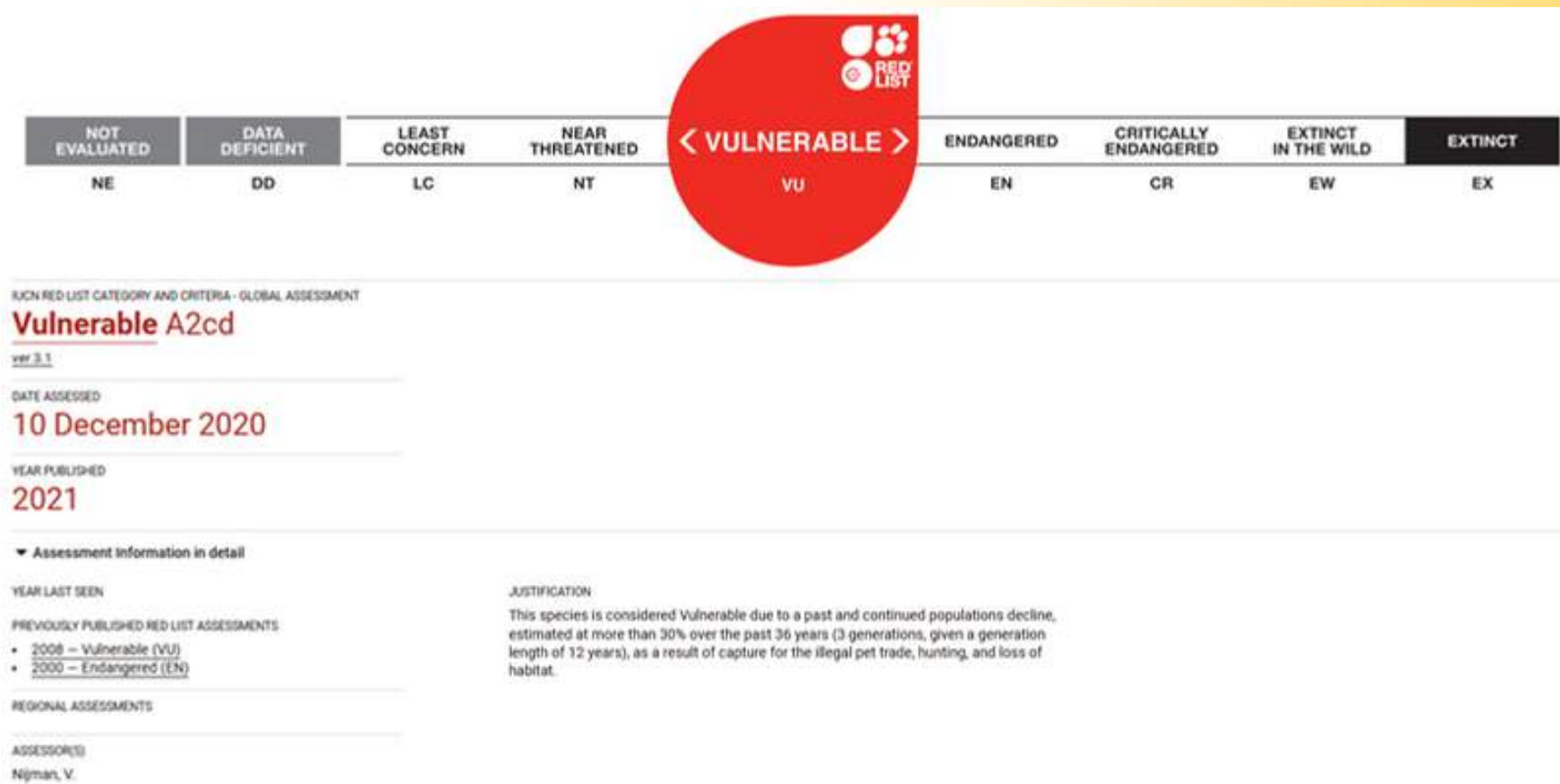
The Javan lutung has the Latin name *Trachypithecus auratus* and is endemic to Indonesia. It has other names such as Budeng, Javan lutung or Ebony Leaf Monkey. The Javan lutung has a body size of about 80 cm with a long tail and weighs approximately 6 kg. The Javan lutung will have a golden orange fur colour until its youth and then blackens as it ages.



Javan lutungs live in groups of 7-20 individuals. Lutung is a diurnal animal (more active during the day) and mostly lives in the trees. They mainly eat leaves and some fruits and flowers. The Javan Lutung's distribution habitat is found on Java Island, Bali Island, Lombok Island and Nusa Barung.

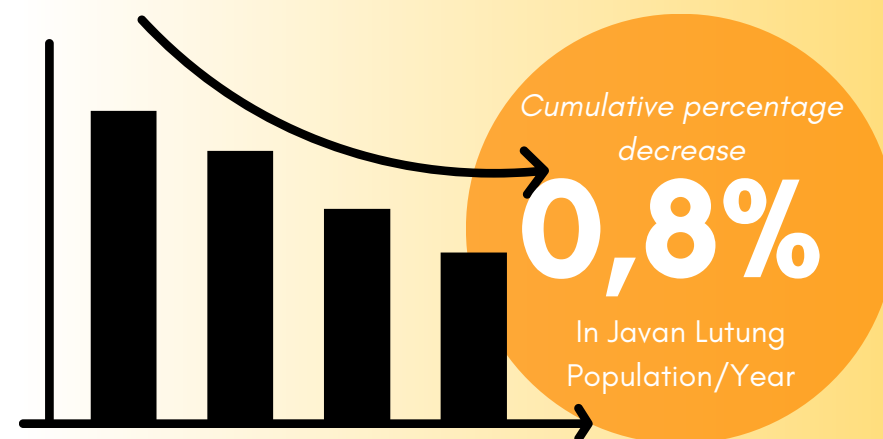
Javan Lutung in Java Island

Javan Lutung in Java Island can be found in mountainous areas such as the Dieng Mountains, Merbabu-Merapi Mountains and other mountains. This is because Javan lutungs can inhabit various types of forests such as mangrove forests, deciduous forests, plantations and in primary and secondary forests.



The Javan lutung (*Trachypithecus auratus*) is categorized as Vulnerable (VU) on the IUCN Red List due to quantitative criterion A, which indicates a significant population decline. This criterion is met when a species experiences a population reduction of at least 30% over the last 10 years or three generations, primarily due to habitat loss, hunting, or other threats. Deforestation for agriculture, logging, and urban expansion has drastically reduced the Javan lutung's natural habitat, while illegal wildlife trade further exacerbates their decline.

As their forest homes shrink, Javan lutungs struggle to find food and shelter, increasing human-wildlife conflicts. The lack of strict law enforcement against poaching and habitat destruction worsens the situation. Conservation efforts, including habitat restoration, stricter wildlife protection laws, and community education, are essential to prevent the species from slipping into the Endangered category.



Javan Lutung Population

The main factors for the decline of the Javan lutung population are illegal capture for the pet trade, illegal hunting and habitat loss. Another factor of population decline is also supported by changes in spatial distribution caused by human activities in the form of forest land use which has an impact on the isolation of Javan Lutung.

Animal Community **Awareness**

Non-Government community

ProFauna Indonesia is a non-profit organization that focuses on the protection of wildlife and their habitats. Founded in 1994, ProFauna is engaged in wildlife conservation, especially those that suffer from illegal exploitation and illegal trade. The organization plays a role in public education, policy advocacy, and direct action in saving Indonesia's endemic fauna. Realizing public awareness and involvement in wildlife and habitat conservation.

The Aspinall Foundation is an international conservation organization dedicated to the protection and reintroduction of endangered species into their natural habitats. In Indonesia, the foundation has established significant conservation programs, particularly focusing on Javan primates, including the Javan Lutung. In collaboration with the Indonesian Ministry of Environment and Forestry, The Aspinall Foundation established the Javan Primate Rehabilitation Center in Ciwidey, West Java, in 2011. In October 2024, The Aspinall Foundation, in partnership with the East Java Natural Resources Conservation Agency (BBKSDA Jawa Timur), released five Javan Lutung.

01.



02.



Government stakeholders

In Indonesia, there are several government organisations that act as key stakeholders in the conservation of endemic wildlife and fauna. They work together with various parties, including non-governmental organisations, academics, and local communities, to preserve biodiversity. Centrally, these government organisations are led by the Ministry of Environment and Forestry (MoEF), which is responsible for the regulation of protection, management of conservation areas, animal rescue and rehabilitation, and enforcement of illegal activities.



Figure 1.6 PROFAUNA demonstration towards lutung's illegal poaching, Source: profauna.net

Figure 1.7 Rescued Javan Lutung, Source: aspinallfoundation.org

Javan Lutung with Culture
Myth & Legends



Lutung Kasarung

Hanoman



Dynamic,
Intelligence,
Adaptability



respecting elders,
helping selflessly &
doing good to others



Wisdom,
Balance

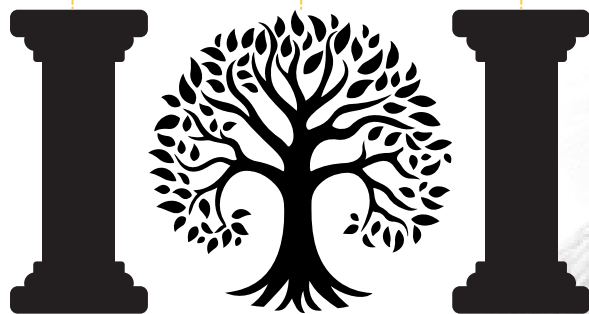


Guardian of natura

Some areas on the island of Java still have myths or beliefs that are difficult to refute. Several cultures and legends, such as Lutung Kasarung and Hanoman, have become synonymous with the characteristics of monkeys or lutungs, which are agile, wise, loyal, and so on. Basically, the atmosphere created in the fairy tales is a forest that becomes a safe and comfortable place for the lutung characters in the two fairy tales. This became the basis for the design of the project so that natural elements such as forests could be incorporated into the form of lutung dwellings.

Javan Lutung with Culture

Relief Symbolic



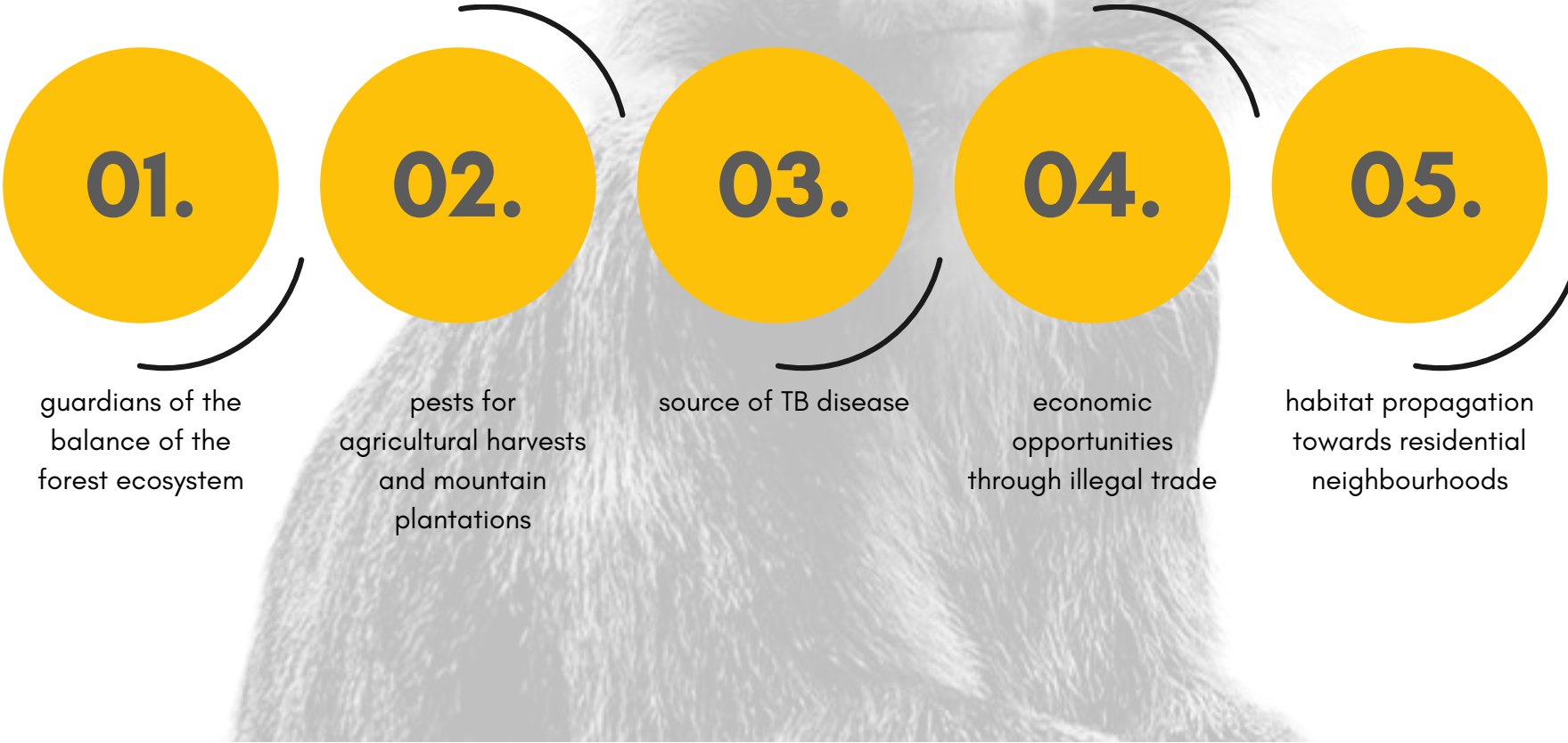
Every relief monkey relief there's element of pillar and tree



As a genus of *Trachypithecus* that is related to monkeys, lutungs have a special affinity with the culture, myths short stories and other special meanings in Java. One of them is the legend of 'Lutung Kasarung' - a classic story in Sundanese culture about a prince who was cursed to become a lutung before finally regaining his original form and marrying a king's daughter. In addition, depictions of monkeys or lutungs are also found on the reliefs of temples in Java. In Borobudur Temple, monkeys appear in several relief panels, including Jataka and Awadana.

Javan Lutung with People

Based on the research ‘Community perceptions in Pamoyanan People's Forest, Cibinong District, Cianjur Regency, the existence of Javan Lutung (*Trachypithecus auratus*)’ has diverse ecological and social values. Some people realise the importance of this species in maintaining the balance of the ecosystem, but there are also those who still see it as a pest or trade commodity. Conservation efforts must strengthen education and socialisation so that people better understand the important role of Javan lutungs in the ecosystem and support their sustainability.





*'For Magelang region, Javan Hawk and Javan Lutung can still be found in several locations although their populations are now increasingly rare, including in Mount Andong, **Mount Merapi National Park, and Mount Merbabu**'*

news:magelangkab.go.id

Top News
Ber One Health Upaya Bersama Cegah Risiko Zoonosis di Jawa Timur (20 Tahun HPSM Kolaborasi Untuk Indonesia Bersih)
Niat Beli Monyet Pantai Justru Dapat Lutung Jawa, Yuyus Serahkan Ke BKSDA Yogyakarta



BERITAMAGELANG.ID - Organisasi Pelindung Hutan dan Satwa Liar, PROFAUNA Indonesia, mengajak masyarakat lebih peduli terhadap pelestarian primata, khususnya Lutung Jawa yang semakin terancam punah. Ajakan tersebut dilakukan dalam bentuk kampanye publik, yang dilaksanakan di alun - alun Kota Magelang, Kamis (01/03).

SIARAN PERS

Gakkum KLHK Berhasil Mengungkap Jaringan Perdagangan On Line Satwa Endemik Surili Dan Lutung Jawa

6 Juni 2020 , dibaca 1008 kali.

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233/HUMAS/PP/HMS.3/6/2020

Home > Halaman Depan > PROFAUNA Kampanye di Magelang Ajak Masyarakat Peduli Pestaarian Lutung

Ditulis oleh ProFauna pada Kam, 03/01/2018 - 11:49

PROFAUNA Kampanye di Magelang Ajak Masyarakat Peduli Pestaarian Lutung Jawa

Penyelamatan Lutung Jawa Dari Jual Beli Online

ANTARA FOTO/Asep Fathurahman - detikNews

Selasa, 15 Jun 2021 21:30 WIB

Javan Lutung Extinction Situation

Reflecting on the sad situation of the Javan Lutung whose population is often declining, the Government and related organizations are trying to preserve the habitat of the Javan Lutung through rehabilitation and forest protection programs. On the other hand, the presence of education and socialization continues to be delivered to people who live near Javan lutung habitat (mountains).

This decree prohibits the hunting, trade, and keeping of Javan lutungs without an official permit. Violations of this provision may be subject to sanctions in accordance with Law No. 5 of 1990 concerning the Conservation of Living Natural Resources and Ecosystems, with imprisonment of up to 5 years and a fine of up to IDR 100 million. In addition, this decree requires individuals or parties who have kept Javan lutungs prior to this decree to surrender the animals to the state through the Ministry of Forestry and Plantations. This measure aims to ensure that the Javan lutung can be rehabilitated and returned to its natural habitat, supporting the conservation and preservation of this endemic species.

Decree of the Minister of Forestry and Plantations
Number: 733/Kpts-11/1999

DESIGNATED THE JAVAN LUTUNG (TRACHYPITHECUS AURATUS) AS A PROTECTED SPECIES.

Minister of Environment and Forestry Regulation No.
P.106/MENLHK/SETJEN/KUM.1/12/2018

STRENGTHENS THE PROTECTION STATUS OF THE JAVAN LUTUNG.

Problem Mapping

Background

Javan Lutung's Habitat Loss and Population Fragmentation

Illegal Wildlife Trade and Hunting

Human-wildlife Conflict

Issue

Javan Lutung extinction leads environment degradation

The disappearance of the ethnic race of Javanese monkeys

Potential infectious diseases due to primate husbandry

Javan lutung absence affects forest quality, especially trees and fruits

Needs

awareness-raising needs

primate rescue-rehab needs

primate wildlife skills needs

basic primate conservation needs

General-Specific Issue

General,
requirement of creating environment that support lutung's security, cure process and fostering their natural behaviors while leads their wildlife activity better

Specific,
Lack of adequate vertical space and improper lutung's living space may develop abnormal habits. Needs proper and limited human exposure towards lutung

Design objective

Ensuring Javan Lutung's well-being, promoting sustainability and fostering positive impacts by provide a naturalistic habitat that meet's lutung physical, social and psychological needs, reducing stress and encouraging natural behaviors. A rehabilitation and conservation efforts will support the species to get cured and prepared programs with goals of maintain a stable population.

Problematique

Rescue Center Design of Javan Lutung with Behavior Approach

Background

Non-Architectural Issue

Javan Lutung's species categorized vulnerable following with 0,8% percentage decrease in year

Habitat destruction due to land clearing, changes in land use map lutung populations, and thus inhibit activity patterns.

Magelang region has the second largest protected area in the central Java area with an evenly Javan Lutung distributed

Illegal trade and private keeping have led to the endangerment of lutungs and the spread of disease.

Conservation in the National Park does not support lutung conservation in terms of safety and behavioral aspects.

government participation that lacks attention to the specific conservation needs of the Javan Lutung species and inadequate repressive protection process

Architectural Issue

development of center design regulations that foster local community awareness and involvement

absence of primate protection centers in region with supporting related stakeholders.

the design center areas lacks to consider behavior design approach with goals to support cured-quarantine procces

Problem Formulation

How to design a conservation site in the form of a **rescue center** in Magelang that **improve the quality** of life and **rehabilitation** of Javan Lutung by taking into account the **behavioural approach**?

How to design a rescue centre that can improve the well-being of lutung through rehabilitation and preparation for wildlife?

How to design a rescue centre that can improve the well-being of lutung through rehabilitation and preparation for wildlife?

Problem Limitation

The growth of lutung's population in rescue and the concern of repressive protection procces develop a nurturing rescue, rehabilitation and quarantine activity.

Approach

rescue center,
provide a Javan Lutung rescue center to protect and preserve it from illegal trade and habitat loss. besides preparing lutung for self-sustaining wildlife

behavior,
a focus that prioritize lutung's natural habiitat and supporting their authentic arboreal, social and foraging behaviors to support the Javan Lutung well-being improvment.



Design Goals

A secure, quiet environment ensures their safety and well-being, fostering natural resting patterns and group cohesion. Additionally, the center serves as a hub for rescued, conservation, research, and public education, raising awareness and promoting long-term protection of Javan lutungs and their ecosystem. The support aspect of educate and preparing lutung's back to survive better in wildlife.

Design Method

Behavior Design Approach

A secure, quiet environment ensures their safety and well-being, fostering natural resting patterns and group cohesion. Additionally, the center serves as a hub for rescued, conservation, research, and public education, raising awareness and promoting long-term protection of Javan lutungs and their ecosystem. The support aspect of educate and preparing lutung's back to survive better in wildlife.

Data Collection Method

01.

Primary Data

Primary data would be collected by interviews and observation to a conservation of Javan Lutung natural habitat and social behavior. Primary data of existing site would be enhance from issues by the community

Interviews were conducted to strengthen the knowledge of Javan lutungs to the community related to the Javan lutung Centre (JLC) related to the issue of problems, background, conservation systems and matters related to the sustainability of Javan lutungs as a design reference.

02.

Secondary Data

Secondary data was conducted in the form of research on literature review and obtaining statistical data from several community regarding Javan Lutung.

A review of theoretical literature on Javan lutungs, habitat, population, behavioural activities and animal needs is needed to examine behavioural patterns that will be used as a design reference.

Design Approach **Method**

Designing a rescue center for this species in Magelang requires an approach that prioritizes their natural behaviors, rehabilitation needs, and eventual reintegration into the wild. Below is a behavior-based design approach to ensure the well-being and recovery of rescued lutungs.

1. Understanding Javan Lutung behavior as a Design Foundation (arboreal lifestyle, social structure, foraging behavior, territoriality and human enclosure)
2. Zoning strategy based on Behavioral Needs (consideration of space purpose and space form)
3. Understanding socialization, healing and rehabilitation process to made interconnected repressive programs towards lutung
4. Structural and material consideration for lutung Behavioral Enrichment

Approach in General

Behavior

The behavioral approach in architectural design focuses on how the built environment influences human or animal behavior, emphasizing comfort, functionality, and psychological well-being. This approach considers spatial organization, sensory experiences, and interaction patterns to create environments that enhance natural behaviors and social dynamics. In wildlife sanctuaries, for example, design elements mimic natural habitats to promote species-specific activities, reduce stress, and encourage enrichment (**Zeisel, 2006**). Similarly, in human-centered architecture, factors like wayfinding, territoriality, and privacy shape user experience and engagement with space (**Lang, 1987**).

Some principles of behavioural architecture that must be considered according to **Carol S. in the book 'Behavioral Architecture**, towards an accountable design process' include the ability to communicate between humans and the environment, designs that can be understood by users through the senses or imagination of building users, then can accommodate user activities with physical and psychological comfort and pay attention to the conditions and behaviour of its users.

On the other hand, according to **Haryadi, B. Setiawan in his book entitled 'Environmental and Behavioural Architecture' (2014)** states that behaviour underlies an approach to architecture that emphasises the attachment between space and humans or users who then form functions. He explained that the adjustment between behaviour and the environment is divided into two, namely:

changes in behaviour to suit the environment

change the environment to suit the behaviour

Matrix of Design Thinking
The approach applied by Bryan Lawson (1990) develops the concept of design solution thinking by understanding how designers (architects) make decisions by considering all four aspects to create a balanced design.

Matrix of Design Thinking	focus : function, space efficiency, production		focus : form & aesthetic
	Practical	Formal	
Regulation National-Regional Regulation of Jawa Tengah and Magelang of Indonesia Government Regulation	Draft Regional Regulation Document (Raperda) of RTRW of Magelang District 2023-2043 Land use in Magelang District is divided into 2: protected areas (for conservation) including TNGMb-TNGMr and cultivated areas.	Peraturan Menteri Kehutanan Nomor P.56/Menhut-II/2006, pembagian taman nasional gunung merbabu. Taman Nasional Gunung Merbabu dibagi menjadi zona inti, zona rimba, zona pemanfaatan dan zona rehabilitasi.	
User Lutung Jawa, Rescue Community	The design must consider the comfort of the activities of Javan Lutung as well as staff and other users for their daily welfare including the handling of rescue and rehabilitation of lutung.	Design should follow Javan Lutung culture symbolic representation of dynamic, while also creates the sense of safety and enjoyment towards Javan Lutung care time.	
Client Rescue community & Govenrment stakeholder	The design should take into account the needs of rehabilitation and preparatory schools that are fostered by the concept of 'animal welfare and conservation function regulation' from the government	A sanctuary design that represent lutung's endemic value while attracting the potential user and visitor. Besides design should mimicking natural environment of lutung.	
Designer Architect	Spatial Design Mimicking Natural Behavior Designing vertical space and multi layered canopies to encourage natural aboreal movement. Spatial arrangement following repressive cure process for lutung while considering local communiity and goals of education	Dynamic design & Mimicking Material The representation of dynamic organic forms as an adaptation of nature and the use of materials that resemble the natural habitat of lutungs can be important points in the design.	

Table 1.1 Matrix of design thinking by Bryan Lawson, Source: author,2025

<i>focus: new solution & inovation</i>	<i>focus: meanings, culture, history, identity</i>
Radical	Symbolic
Minister of Forestry Regulation No. P.56/Menhut-II/2006, article 3 paragraph (1) for the jungle zone, utilization and rehabilitation -areas are habitat to protect & support wildlife breeding efforts -has the attraction of certain ecosystems with beautiful and unique geological formations -presence of invasive species that interfere with native species or species	Minister of Environment and Forestry Regulation No. P.7/Menlhk/Setjen/OTL.0/1/2016 provision of data and information, promotion and marketing of conservation of natural resources and ecosystems. Follow-up conducted by Balai TNGMb in the provision of regional data and information at the site level
Javan Lutung Behavior adaptation are implement to be an innovative space design for example: stilt architecture or levitation architecture to improve the quality of Javan Lutung activity. Design that engage communnity to be more actively observe rehabilitation-empowerness of living practices	The sense of interconnected between Javan Lutung and community with representation of safe house to balancing the lutung's important of existence and communy for good conservation efforts as an endemic animal
Implementing the latest innovations of man-made habitats for lutung in order to strengthen the level of security and monitoring process of rehabilitation and forest schools for lutungs. In addition, the use of arboreal principles in the design is intended to improve the quality of lutung activities and provide limitations on human exposures.	rescue center as an identity to develop self-awareness of the importance of protecting the endemic Javan lutung and as the main effort in preserving it.
Innovative Design Implementing modular structure/prefabricated to enhance flexibility of the design to suit with lutung's population growth without destroying the surrounding habitat. Designing vertical movement path for lutung and interactive human enclosure design.	Dynamic symbol Creating an rescue center environment that empower lutung safety and educate local community to get aware of Javan Lutung as endemic animal. incorporate the lutung symbol into the building design as the main identity of the design

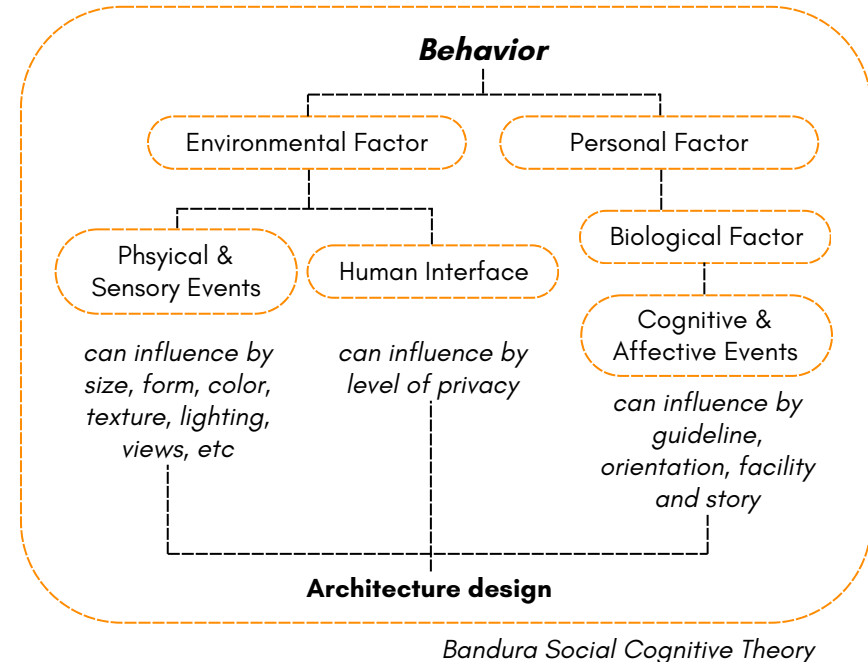
Table 1.1 Matrix of design thinking by Bryan Lawson, Source: author,2025

Design Hypothesis

With the illegal trade and habitat loss factors affecting the declining Javan lutung population, **there is a need for a Javan lutung sanctuary, rehabilitation and preparation centre**. The design needs to be based on the rehabilitation process and forest school process based on the behavioural patterns of lutung and humans. On the other hand, the design must also implement the aspects of conservation areas that have been included in government regulations and international standards.

how behavior can solve the issue

By integrating behavioral architecture principles into the rescue center's design, the facility can enhance lutung rehabilitation, reduce human-wildlife conflict, and promote conservation awareness while ensuring a sustainable and ethical rescue process. Architecture relating to the lutung's personal behavior is to mimicking their natural habitat conditions while minimising the human interfare to ensure lutung's well-being and effectiveness of conservation.



Design Concept Hypothesis

Rescue center design will exhibit natural behavior faster and improving lutung rehabilitation care, beside that quarantine space should reduce stress and increased mental stimulation that support their survival skills in the wild. Moreover the to foster a sustainable conservation and care model there's a need to build community collaboration.

stilt architecture

Elevating structures on stilts will reduce land disturbance, preserving the natural habitat and minimizing deforestation, which is crucial for the conservation of the Lutung Jawa.

mimicking natural habitat

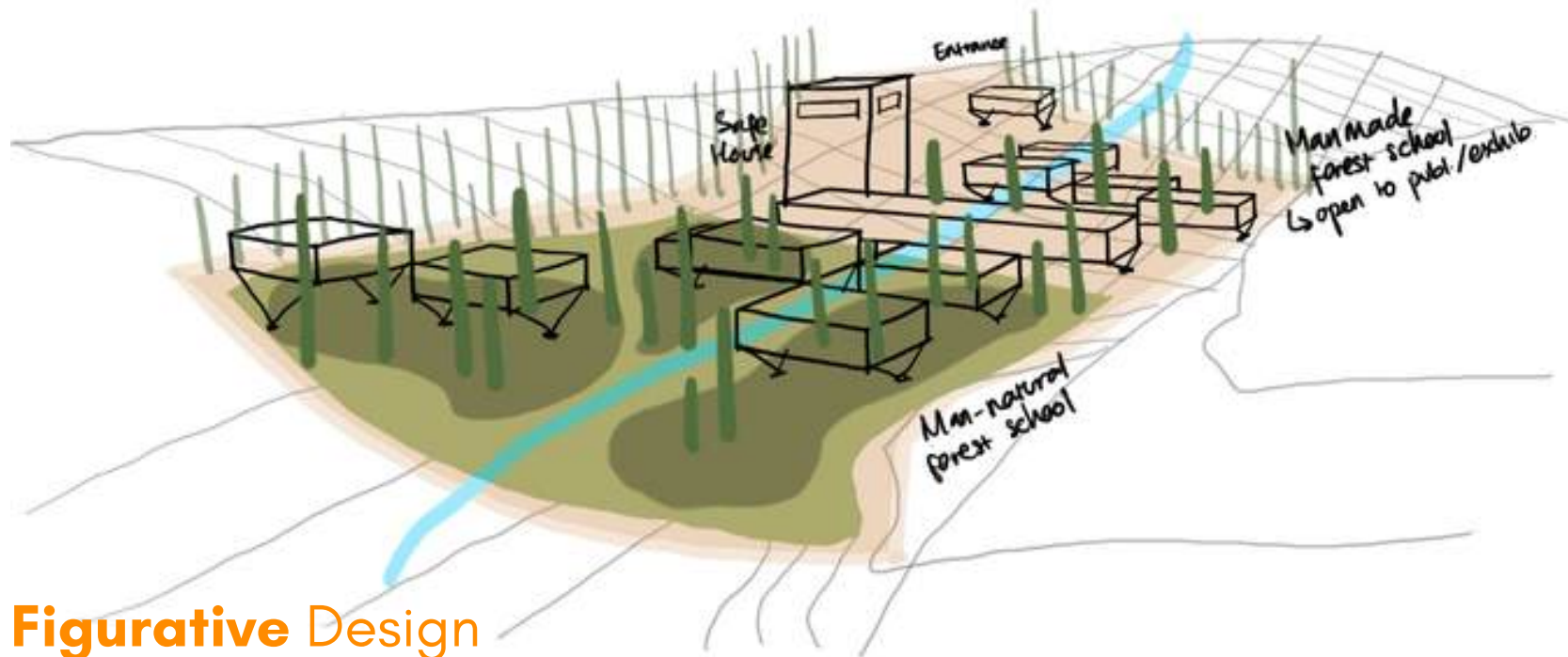
make environment of social grouping based on lutung social habits but still considerate flexibility in groups by progressive enclosure mimic natural forest environment (manmade to nature)

cognitive and physical stimulation interior

used of foraging-based feeding that fits in the structural element. considerate to varying diverse climbing structure and vertical movement to adapt arboreal habits.

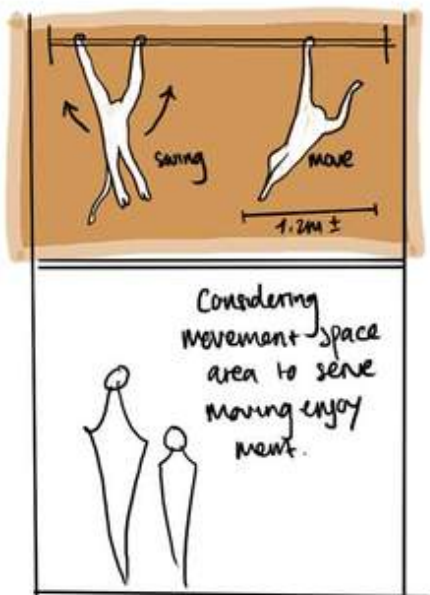
advanced repressive programs

introduction and exposure to escape simulation, defensive response and natural object as to prepared them in the wildlife



Figurative Design

The Javan Lutung Rescue Center is envisioned as a sanctuary woven into the fabric of nature, embodying the harmony between architecture and the dense tropical forests where these primates thrive. The design is a metaphorical "Forest Cocoon", providing protection, rehabilitation, and a seamless transition back into the wild. By the inspire of tree canopies and elevated walkways for lutung can be used in natural way. Site should consider the need of sustainability of energy by creating rainwater collection system and canopy corridors for example. Each pods or building can have multi-level habitat that stimulate Javan Lutung's vertical movement.



Javan lutungs are arboreal primates, meaning they spend most of their lives in trees. Their movement is highly dependent on vertical climbing, leaping, and horizontal brachiation (swinging from branch to branch). To create a rescue center that aligns with their natural behavior, both vertical and horizontal design elements must work together to mimic the multi-layered forest environment they are adapted to.

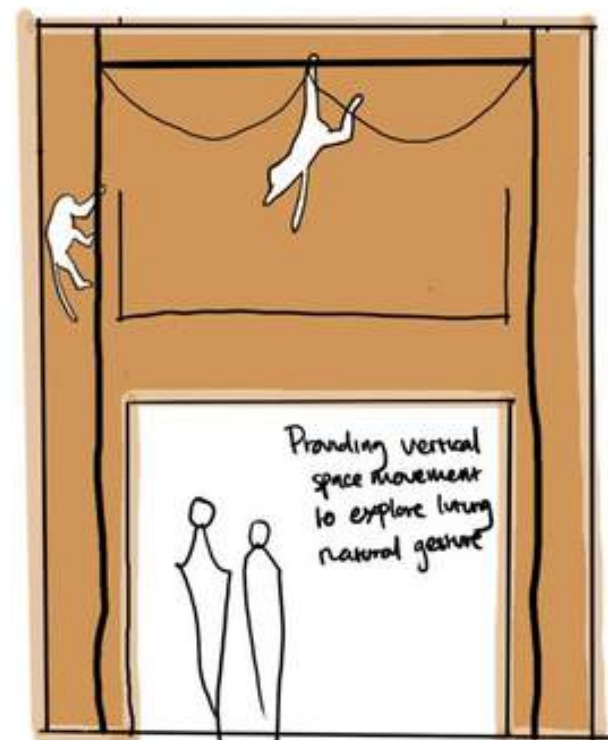
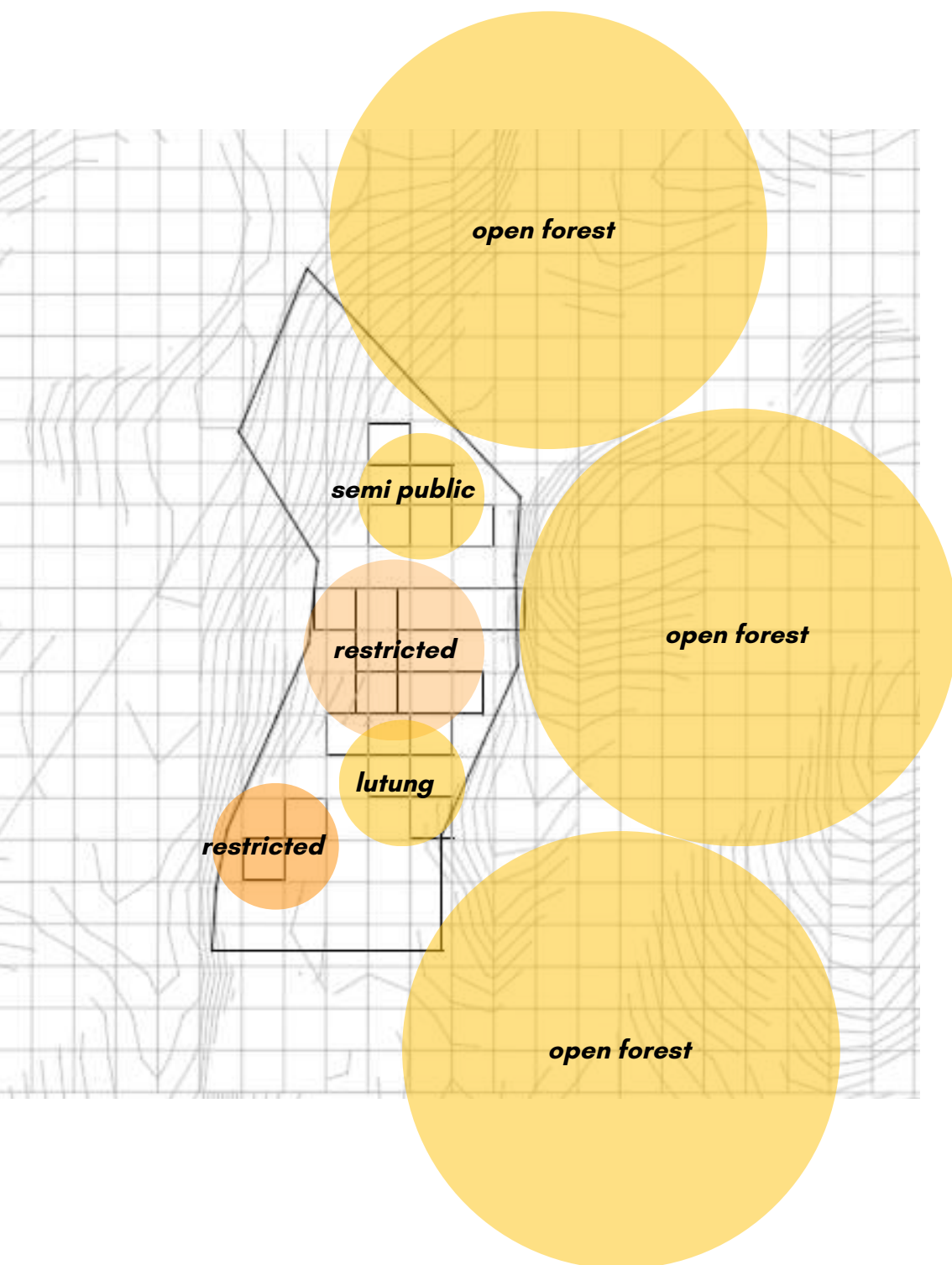


Figure 1.13 Figurative design concept, Source: author, 2025
Figure 1.14 Figurative behavior concept, Source: author, 2025



Figurative Design

Soft Transition Zones in the Javan Lutung Rescue Center serve as a gradual bridge between rehabilitation and release, designed to ease the primates back into their natural habitat. These zones consist of progressively expanding enclosures, beginning with smaller, structured spaces and gradually opening into larger, semi-wild environments that encourage independent exploration. Hidden resting areas are carefully integrated along pathways, using dense foliage, hollowed tree structures, and camouflaged platforms to mimic the safe, elevated retreats lutungs seek in the wild. This design allows them to pause, observe, and regain confidence in both vertical climbing and horizontal movement, fostering their natural instincts before full reintegration into the forest.

excellency
originality
novelty

The design of the Javan Lutung rescue centre in Magelang has been reviewed with other research or design that has the weight of the quality of methodological studies and analysis in the relevant field. The study also has a consideration of excellence, originality and novelty as the latest innovation or solution of a rescue centre design.

Author Name	Title	Approach	Difference	Lesson Learned
Aulia Alfaatihah (2023)	Ongals : Design Of Hybrid School Of Orangutan In Yogyakarta Through Participatory Approach	Participatory Approach	Differences in animal species (apes), implementation of natural habitat design that is still located within the zoo	Using the sym+biome concept, the school is aimed at the animals, staff and visitors. The consideration of detailed spatial design makes the school stage more ready for release.
Panji Sultan Alfatriyan (2022)	Jatimulyo Bird Conservation In Kulonprogo With Enviromental Behaviour Design Approach	Behavior Approach	The difference between the case study and the type of animal is that the design follows the behavioral patterns of birds of various types.	The design concept implements the behavioral patterns and spatial needs of birds such as dimensional details in cages to building envelope design considerations that affect the thermal quality of air aimed at the flying activity of a bird.
Cokro Susanto (2024)	Perancangan Pancer Door Wildlife Sanctuary Sebagai Kawasan Konservasi Penyu di Kabupaten Pacitan Dengan Pendekatan Renaturalisas	Renaturalization Approach	Difference of animal (turtles) indicating very different ecosystems and habits.	The renaturalisation approach (which is specific and appropriate) can support the turtle nesting process more optimally because it is in line with environmental aspects. And the concept of 'see-do-buy' tourism has a major impact on conservation education.
La Nadi Maulana (2024)	Rumah Singgah Primata: Redesain Pusat Rehabilitasi Lutungg Jawa Di Javan lutung Center Melalui Kajian Ilmu Etologi	Etology Approach	Difference of design approach and design scale (re-design & management offiices only)	Aligning architecture design with the natural behavior & welfare needs of endangered species. Seeing etological approach as to focus on movement patterns, foraging behavior especially the management activity, while also considering environment aspect.

The novelty of the design that will be applied in the design of the Javan Lutung rescue centre is to apply a behavioural approach as a parameter of design success that focuses on the comfort and safety of the space. Other supporting aspects are the implementation of passive design concepts and architectural stilts as a technique for solving natural environmental problems. Another development is the design within the scope of regulations that support animal welfare.

Test Method

For a rescue center, function testing may include tracking animal movement, assessing spatial efficiency, monitoring stress levels, and analyzing enclosure interactions. Methods like behavioral observation, environmental monitoring, and prototype testing help refine the design for optimal usability, safety, and adaptability before full implementation.

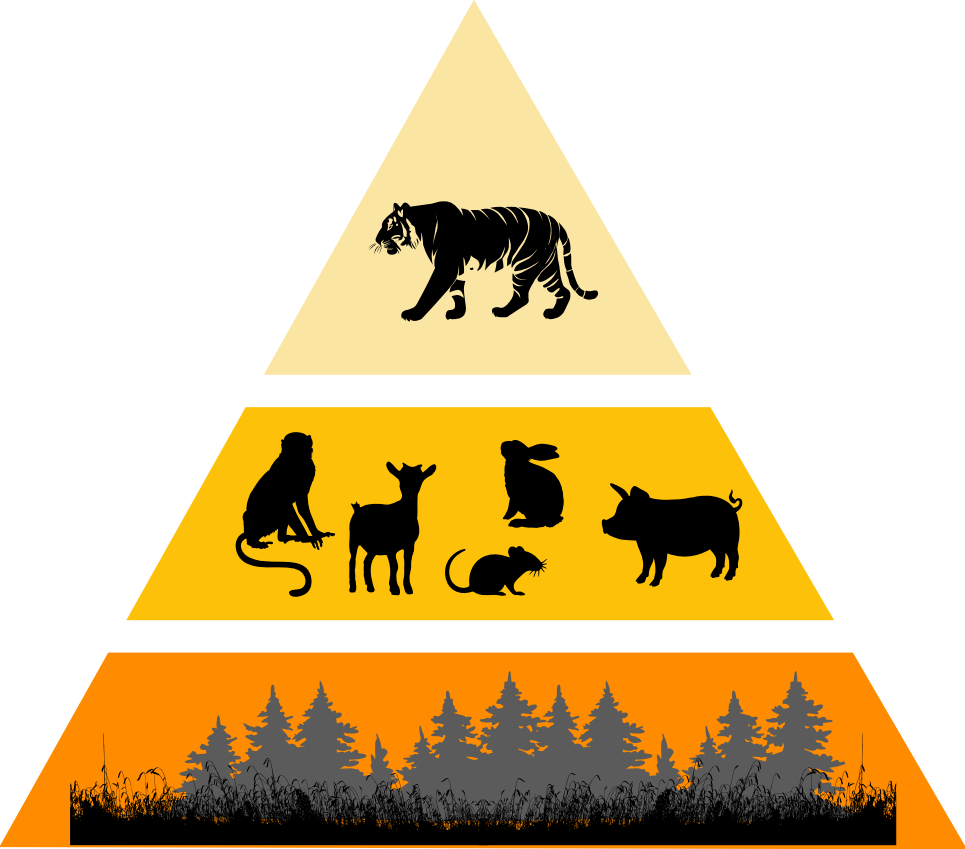
Variable	Parameters	Design Scope	Models	Procedures
Rescue Center	Design a lutung safe space that mimics the natural habitat by facilitating natural movement and other activities. Ensure that the design environment is stable while enhancing the lutung's survival and health.	Good layout, building form, circulation, security, thermal comfort and accessibility	Siteplan, Building Plan, 3d Model	follow animal welfare requirements, conservation regulations, animal repression systems and local building regulations
Behavioral Architecture	Apply zoning design as a form of rehabilitation process. Ensure the design expresses the animal's natural behaviour by reducing the animal's dependence on humans and ensuring the animal can adapt to the natural habitat.	Space programming, privacy design, safety and adaptability design	Siteplan, Building Plan, 3d Model	follow animal welfare requirements, conservation regulations, animal repression systems and local building regulations



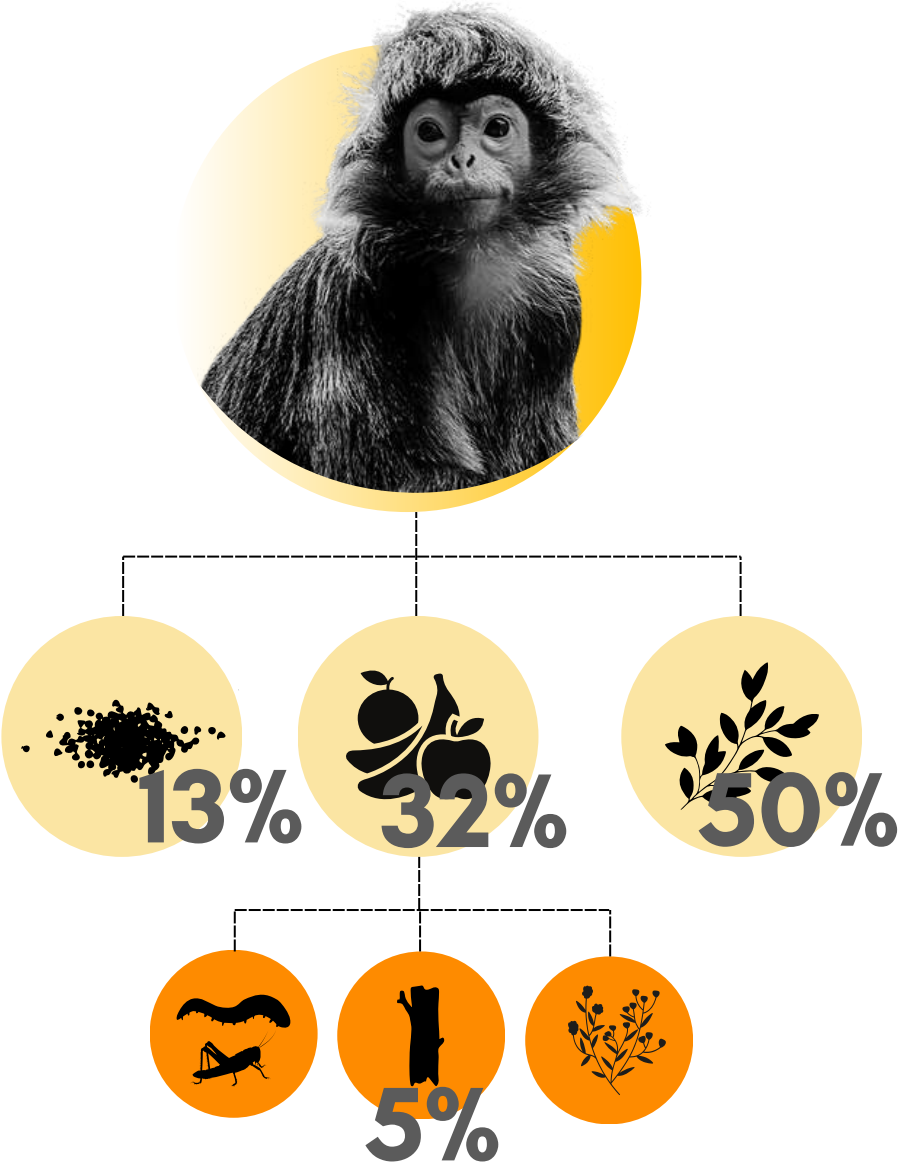
02.

Lutung Study

About Javan Lutung

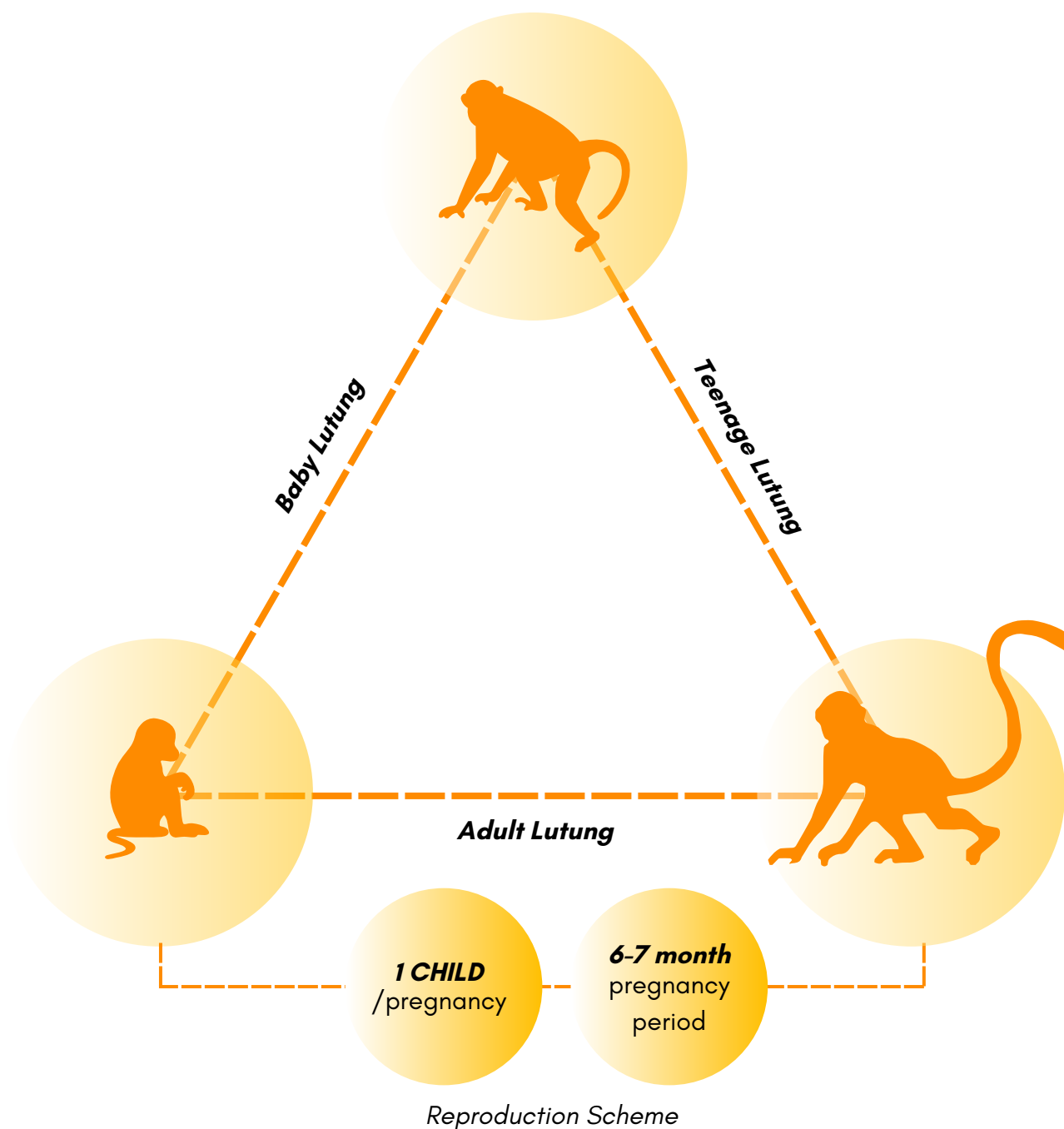


Javan Lutung can maintains healthy forests, they support the water cycle, air purification, and carbon sequestration, which benefit local communities and the global climate. Besides it also part of primate evolution many local traditions respect lutungs as symbols of nature and harmony, reinforcing the importance of protecting biodiversity.



By eating fruits and excreting seeds far from the parent tree, they help with forest regeneration and biodiversity cited from Kool (2004). As they consume flowers and nectar, they may help with pollination, benefiting plant reproduction. Their feces provide natural fertilizer, enriching soil quality and promoting plant growth.

Figure 2.1 Lutung in part of forest ecosystem, Source: author,2025
Figure 2.2 Lutung food character, Source: author,2025



Growth and Breeding of Javan lutungs

Based on the observations of **Hidayatullah (2015)**, young lutungs that are still in the care of their mothers and have a small body size are in the age range of 0-4 years. Then the maturity of adolescence occurs in the range of 4-8 years which shows the proportion of body size and reaches the optimal level of reproductive maturity. Lutung then enters the adult age structure when it reaches the age range of 8-20 years with a larger body. In a study conducted by **Wibowo et al., (2022)** estimated that the age range of Javan Lutung can reach 8-20 years, influenced by habitat conditions, food availability, and the threat of predators or human activities.

Figure 2.3 Javan Lutung growth scheme, Source: author, 2025

habitat criteria of Javan Lutung

Based on Nijman (2000), the Javan Lutung inhabits mangrove forests, coastal swamp forests, deciduous forests to highland forests with altitude criteria reaching 3500 mdpl but in general Lutung has a habitat at an altitude of 1000-2500 mdpl. However habitat suitability analyses that their preference decrease with increasing elevation, implying they are more commonly found in lower-midi elevation forest with consideration of source or food trees and residence trees. Specifically, Javan Lutung are found in the hiking trails of Mount Merbabu, Mount Merapi and the national park area. A study conducted by **Ayunin, Q., & Setiawan, A. (2014)** identified that the habitat preference of Javan lutungs in Mount Merapi National Park is at an altitude of 1,500-2,000 m above sea level. As well as having low human intensity and tree density of 139 trees / ha.

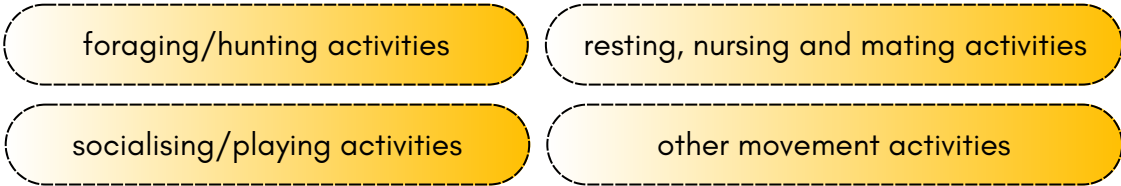


Figure 2.4 Altitude of Javan Lutung's habitat, Source: author, 2025

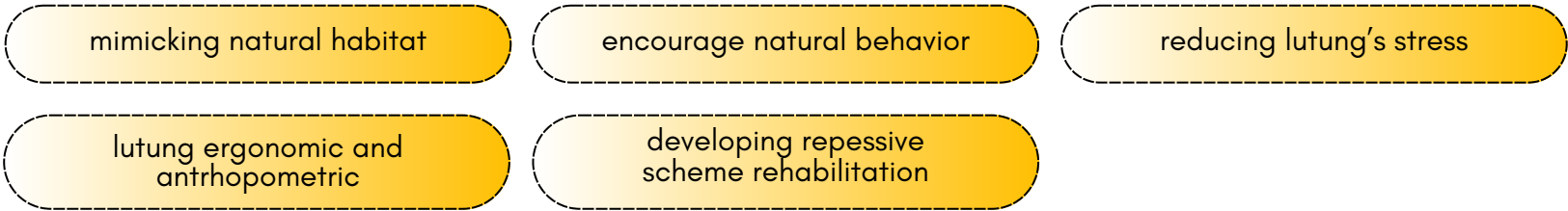
Approach for animal

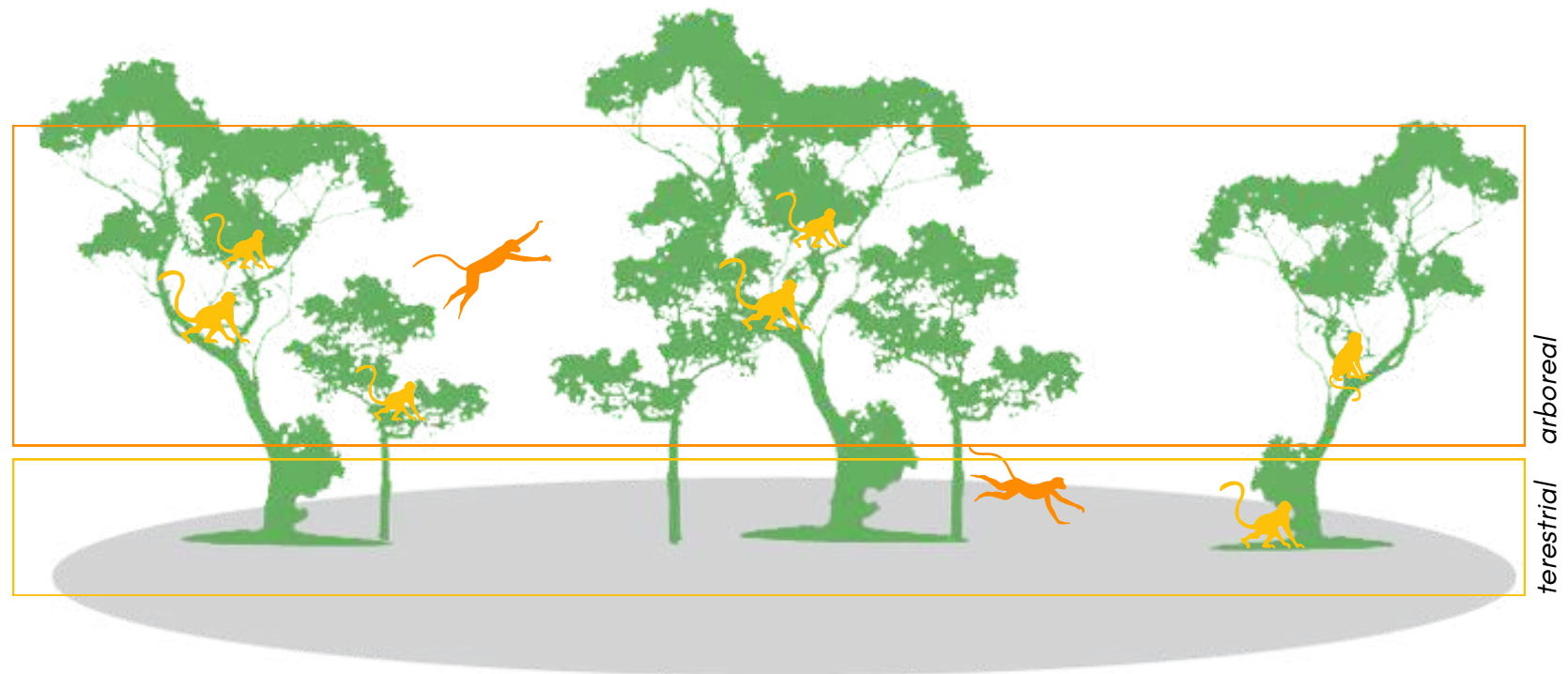
Behavior

Architecture can also influence an animal's behaviour as a user subject. According to Amrullah et al. (2021) and Nursal (2001) by placing animal behaviour as a design variable which includes:



Key aspect behavioral approach for Javan Lutung Rescue Center Design





General Behavior of Javan Lutung

According to Alikodra (2002), animal behaviour is defined as the animal's activities and habits of life such as active time, movement areas, foraging, nest building, social relationships, vocal behaviour and mating and childbirth. Javan Lutung are social animals that live in groups of 6-21 lutung, led by one or two male lutung, according to Kool (1991). As the group leader, the male lutung is responsible for dominating the group with protection, supervision and daily activities. According to Kurniawan (2014), he also plays a role in directing the movement of the group when searching for food, finding a place to rest and a place to sleep.

Quoted from Suwelo (1982), the Javan Lutung is a diurnal animal which is generally active in the morning until noon for foraging and sleeping movements. During napping time, lutungs will sleep in trees separately but close together, baby lutungs will follow females and male lutungs will separate. A prominent behaviour of female lutungs is *allo-mothering* or caring for other female cubs. Male lutungs will often travel individually or in groups with other males.



Figure 2.5 Lutung arboreal lifestyle, Source: author, 2025
Figure 2.6 Social behavior of lutung, Source: author, 2025

Javan Lutung Behavior

Javan Lutung generally started socialising in the morning (07.00–10.00) and rested in the afternoon (12.00–14.30) in the study of Javan Lutung in Bromo Tengger Semeru National Park by **Subarkah et al. (2011)**. Meanwhile, research on lutungs in Gunung Gede Pangrango National Park conducted by **Nursal (2001)** began in the morning at 05.30 and resting activities were mostly found in the afternoon observation time (13.30–14.00). In research conducted by **Qomariah (2015)** lutung activity at Mount Biru began at 06.00 in the morning with a peak resting time in the afternoon at 12.30 am.

A study on the daily activities of lutungs in Bromo Tengger Semeru National Park conducted by **Subarkah et al. (2011)** stated that 31.82% of lutung spent their time eating, 30.9% doing other activities and 31.79% moving. However, a study found that the presentation of lutung doing eating activities was 36%, moving by 39%, this was then specified by the division of 16% presentation for resting and 9% for other activities by **Leksono (2014)**. And in the study of Javan Lutung on Mount Biru conducted by **Qomariah (2015)** found that 44.22% of the time the lutung did eating, 9.75% to move and 43.58% to rest.

In research from **Qomariah (2015)** the division of lutung behaviour into four, namely: feeding behaviour, moving behaviour, resting behaviour and social behaviour. Based on **Alikodra (2002)**, Javan lutungs have social activities that include grooming, pre-copulation, masturbation, copulation, mating, giving birth, grinning-fighting and endangered gestures. Genetically, Javan lutungs only give birth to one child per pregnancy period that occurs throughout the year with a gestation period of 6–7 months in research conducted by Nugroho, A. A., & Sugiyarto. (2015)



03.

Problem Study

animal welfare

Five Freedom of Animal Welfare

The World Organisation for Animal Health (OIE) (now known as WOAH - World Organisation for Animal Health) has been a key global authority on animal welfare since its establishment. **In 1992, the OIE and the UK** focused on veterinary health, humane treatment, and ethical considerations for animals. there is five freedom on animal welfare approach:



Indonesian regulations in **Law No.41/2014** also explain the animal welfare that must be implemented in a zoo, sanctuary or rehabilitation centre. The prohibition of animal abuse and exploitation also focuses on wildlife. The law also tightens the rules on illegal animal trade.



Repressive protection efforts against crimes committed against endemic Javan lutungs are focused on the goal of **SECURITY AND RESTORATION** which provides protection for Javan lutungs. In general, the Natural Resources Conservation Centre (KSDA) only temporarily houses the Javan lutung, which is then handed over to the Javan lutung Centre (JLC) for rehabilitation.

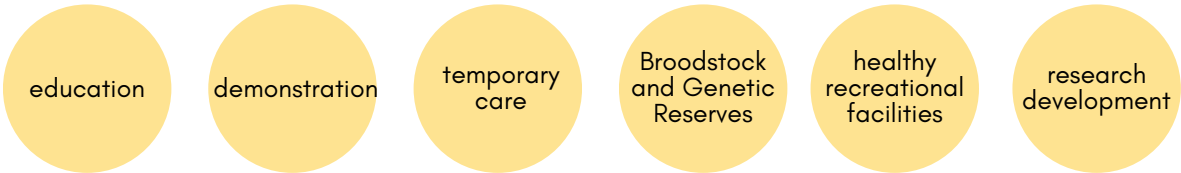
Sanctuary

Design Typology

Animal Conservation Study

Indonesia's endemic animal conservation efforts are governed by a comprehensive legal framework established by the Ministry of Environment and Forestry with some supporting stakeholders. Based on Law Number 32 of 2024, the protection and conservation of natural resources and their ecosystems are divided into several provisions such as habitat development in article 19 paragraph 3 with the aim that animals can live and develop naturally and in sustainable protection and observation.

Based on the regulations of the Ministry of Environment and Forestry, Conservation Institutions must also have supporting functions, one of which is the following function:



Conservation form

With the aim of rescue and rehabilitation, conservation institutions in Indonesia are very diverse. Some of the main focuses of conservation are providing rescue, protection, retraining, breeding, research, education and entertainment conservation. The overall difference in the form of conservation is generally in the purpose or vision of the institution itself and the amount of human interaction with the animals.

Type of place	Main Focus	Goals	Human Interaction
Sanctuary	Permanent protection for non-releasable animals	semi-free life without exploitation	very limited
Zoo	Entertainment, Education and Conservation	Exhibition, Research and Conservation	very high demand
Park	Natural ecosystem protection	conserve flora and fauna and their habitats	restricted to tourist
rescue-rehabilitation center	rescue, healing and survival retraining	release back into the wild	temporary interaction

Table 1.4 Classification type of animal protection and building typology, Source: author, 2025i



About Community

Javan lutung Center

By Aspinall Indonesia in Malang Region

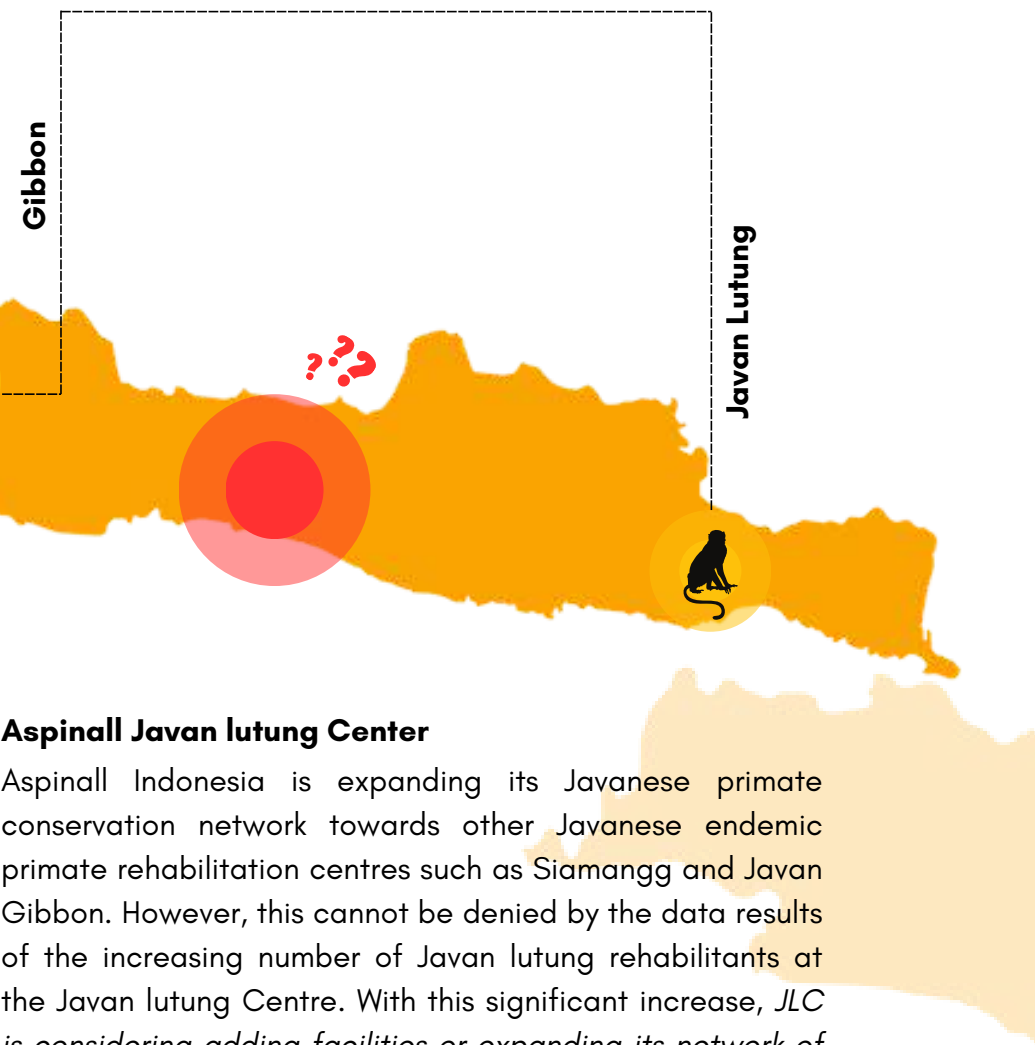
The Aspinall Foundation operates a Javan lutung Rehabilitation Center in East Java, Indonesia, dedicated to rescuing and rehabilitating Javan lutungs (*Trachypithecus auratus*) affected by the illegal pet trade. The center focuses on preparing these primates for reintroduction into their natural habitats. Through rehabilitation and release efforts, the center demonstrating the effectiveness of provide a safe space, especially a shelter for lutung. Several facilities and environment that Aspinall established are natural enclosure quarantine shelter and man-made forest school. Beside that, Aspinall also conduct engagement between communities with open volunteering and educate awareness.

Goals

Through these comprehensive efforts, The Aspinall Foundation Indonesia Programme strives to ensure the long-term survival and well-being of the Javan lutung in its natural habitat.



The background to the establishment of this rehabilitation centre was the concern over the decline of the Javan lutung population from 2007 to 2009, especially in West Java (the first) in 2011, which led to the establishment of a primate rescue centre in Bandung, followed by the establishment of the Javan lutung Center in Coban Talun, Batu, East Java due to rampant illegal trade.



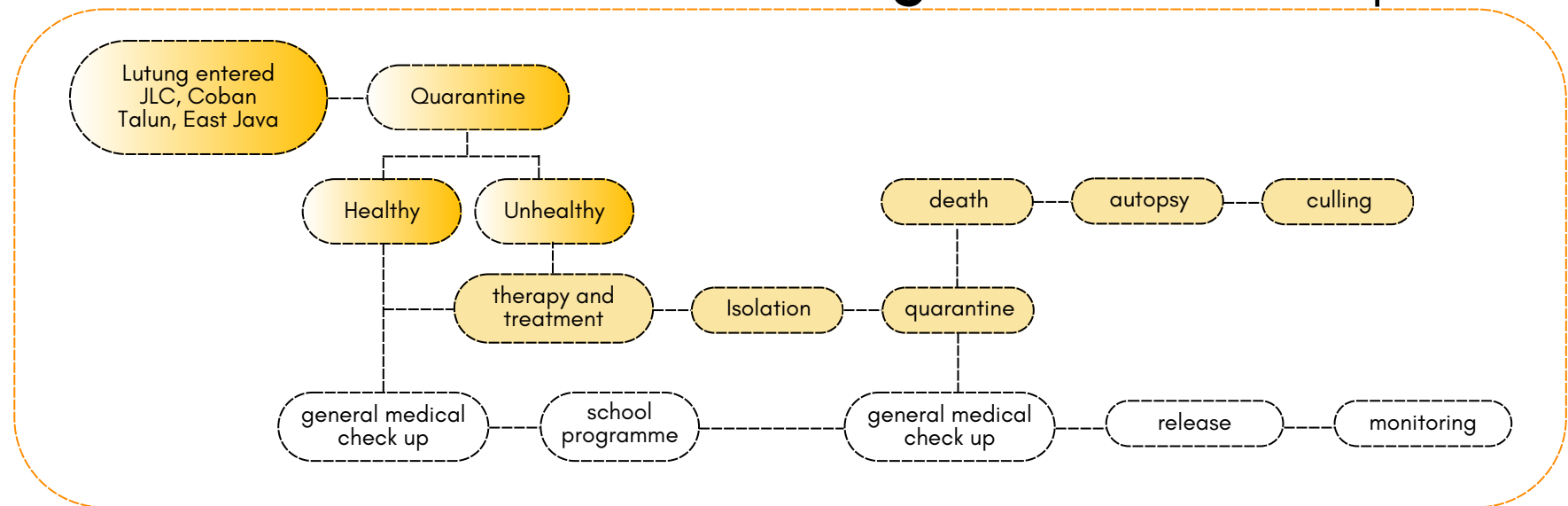
Aspinall Javan lutung Center

Aspinall Indonesia is expanding its Javanese primate conservation network towards other Javanese endemic primate rehabilitation centres such as Siamangg and Javan Gibbon. However, this cannot be denied by the data results of the increasing number of Javan lutung rehabilitants at the Javan lutung Centre. With this significant increase, *JLC is considering adding facilities or expanding its network of rehabilitation centres especially for lutungs.*

TAHUN	JUMLAH LUTUNG JAWA YANG DIREHABILITASI
2019	25 ekor
2020	24 ekor
2021	31 ekor
2022	16 ekor
2023	29 ekor

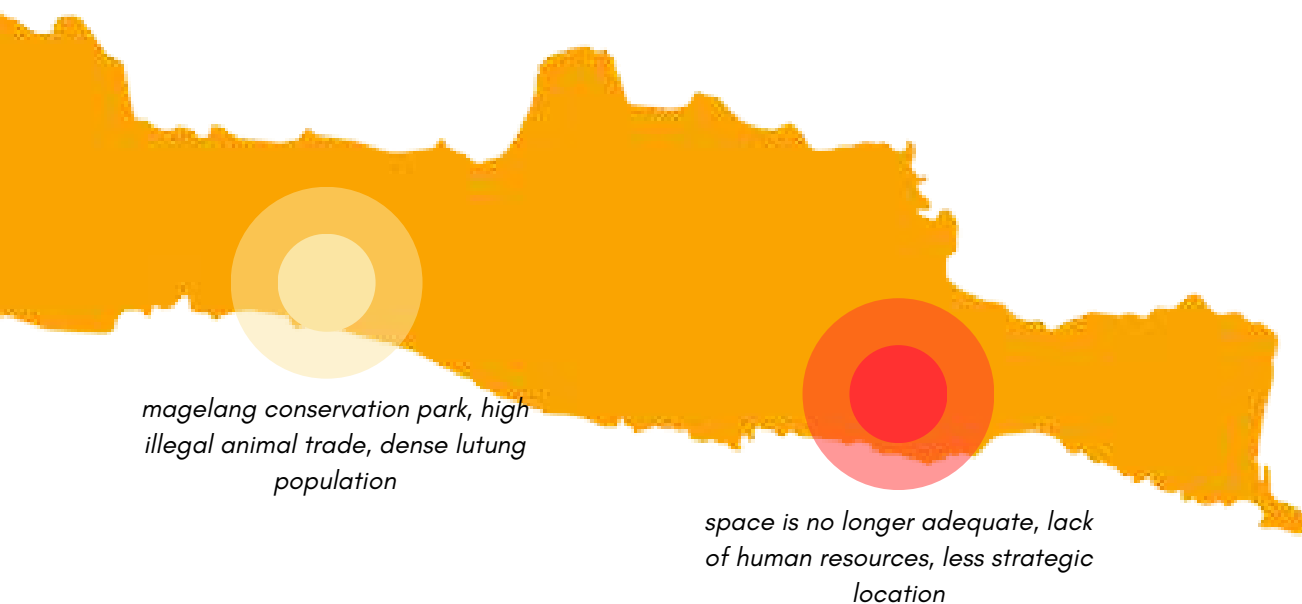
Table 1.5 Rehabilitation JLC data, Source: author, 2025

Mechanisms of **Rehabilitation Programmes** – JLC Aspinall



By Aspinall Indonesia in Malang Region

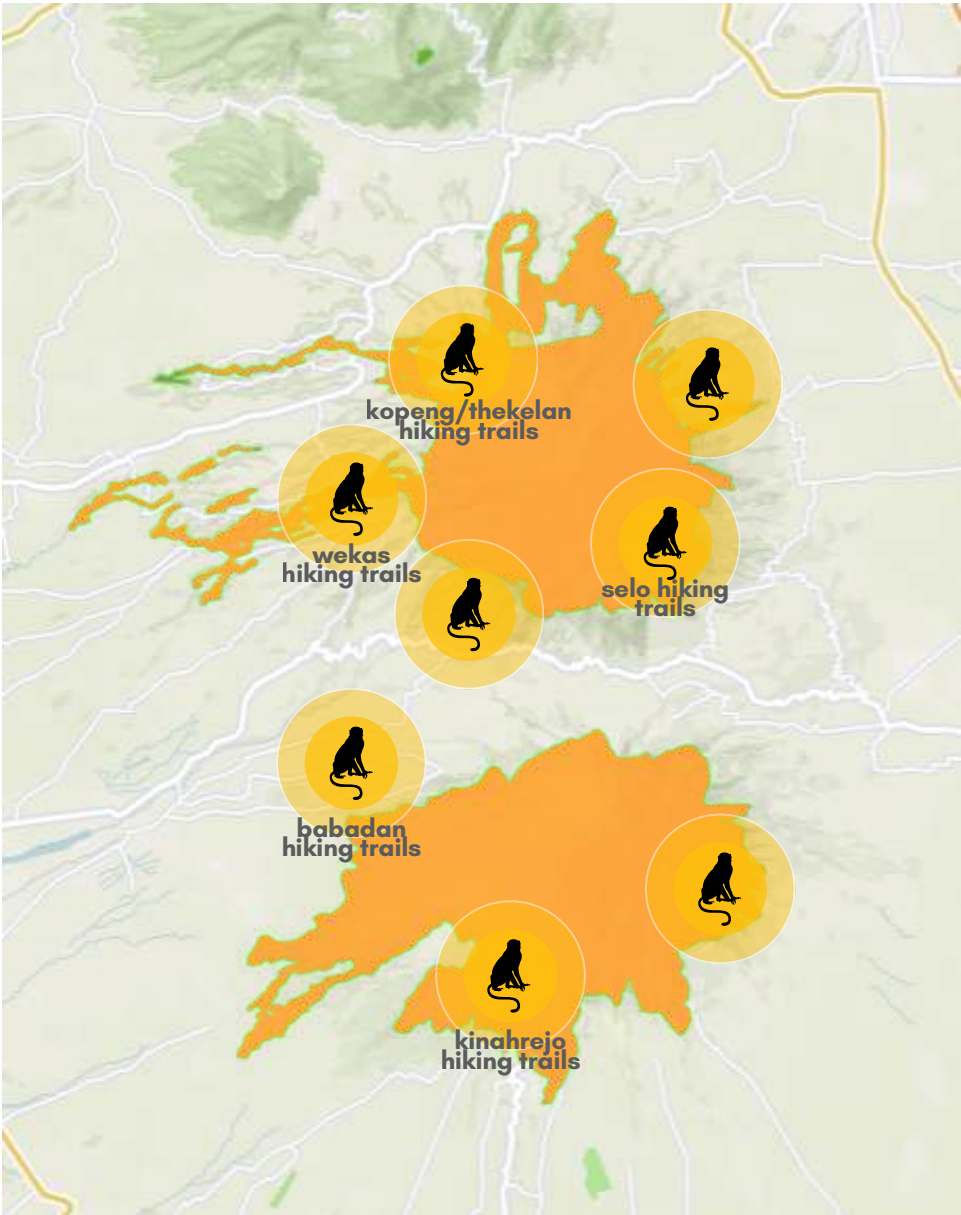
In the rehabilitation stage, lutungs are placed in enclosures that resemble natural habitats to develop wild behaviours such as foraging and social interaction. Once deemed ready, the lutungs are released into a safe habitat, followed by monitoring to ensure their adaptation. From 2012 to 2018, JLC has successfully released 78 Javan lutungs, some of which have gone on to breed in the wild, demonstrating the programme's success in supporting the conservation of the species. The challenge of assessing site of conservation and forest areas as release site is most important. Cited from **Ananda, A.N., et.al (2022)** the location should must have a long-term carrying and guaranteed safety for lutung.



Based on the analysis of alternative locations using SWOT conducted in **Ananda, A.N, et.al's research (2022)**, it can be concluded that the need for locations with **quality-quantity infrastructure and easy accessibility, settled veterinary medical personnel and developed locations with monitoring** is very important in the development of JLC or other Javan primate rehabilitation centres. Based on the interview, the need for a facility that can be reached from all sides of the island of Java is very large in providing opportunity to be able to help and assist the rescue and rehabilitation of Javan Lutung

Figure 3.8 JLC problem identification, Source: author, 2025

Study of *Location, Site and Context*



01.

An area that can be reached by the entire island of Java = Central Java area.

02.

A secure environment (monitored) include in conservation area = national park

03.

Dense lutung population with high rate of illegal animal trade

Javan Lutung in National Park - Magelang

The habitat of Javan Lutung in Mount Merbabu National Park is in secondary and primary natural forest (dryland forest). Javan lutungs can be observed by camera traps scattered on the wekas trail (Pakis sub-district), Selo hiking trail (Selo sub-district) and Sependok trail (Ampel sub-district) with the specific purpose of monitoring the Javan lutung population according to Balai Taman Nasional Gunung Merbabu. (2024). For example, Javan lutungs were found in the forest valley of the Selo hiking trail near post 1 of the Mount Merbabu hike. This forest valley is a habitat corridor for Javan lutungs that provides survival, natality and movement according to **Latifiana, K., & Handayani, K. P. (2019).**

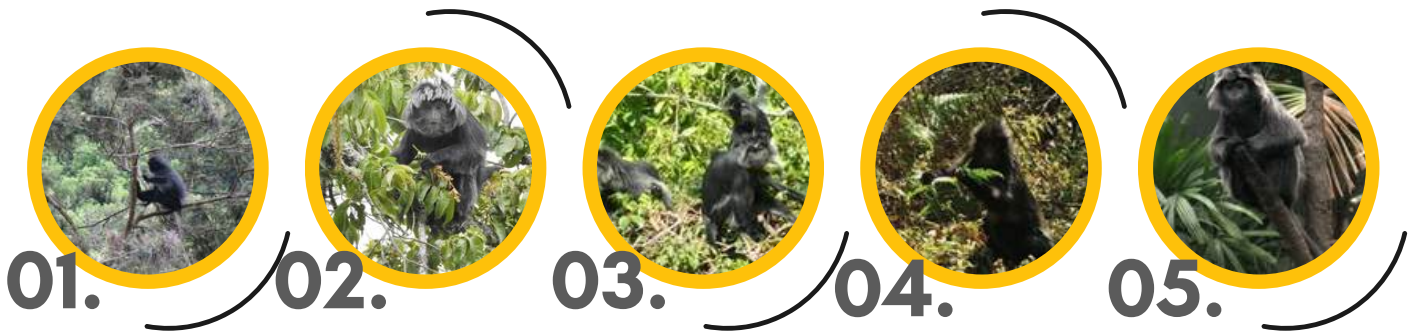


Figure 3.9 Lutung existence in Mount Merapi and Merbabu Map, Source: MLHK edited by Author
Figure 3.10 Spotted Javan Lutung in National Park Camera, Source: Laporan Konservasi Taman Nasional Gunung Merbabu

Site Selection Study

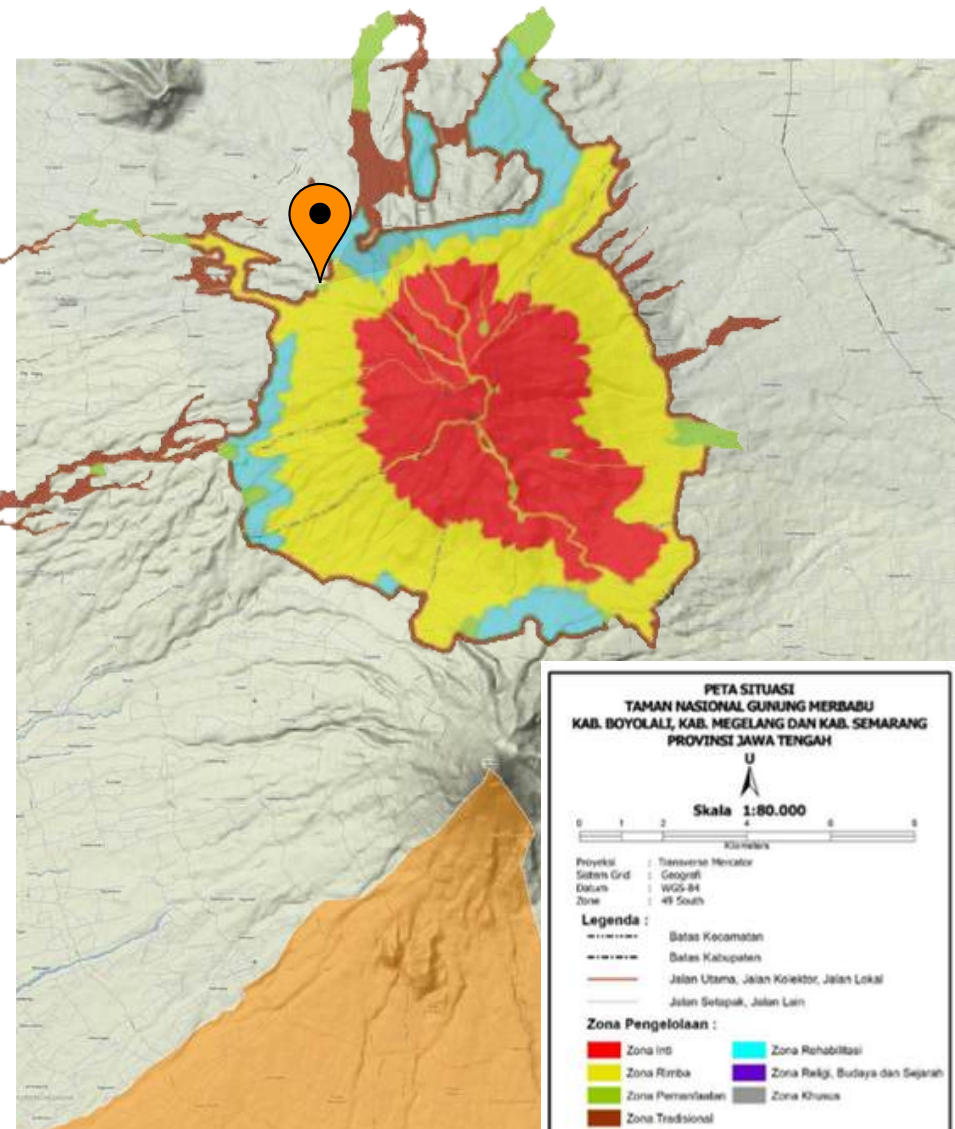
Magelang as a protected place

Within the context, Javan Lutung are found or seen scattered in the radius of Mount Merbabu National Park. Some were spotted on hiking trails and in protected forests. This is supported by the mapping of zones designated for protection and other utilisation. Mount Merbabu National Park (TNGMb) follows the zoning regulations outlined by Indonesia's **conservation law (Law No. 5 of 1990 on the Conservation of Natural Resources and Ecosystems) and Government Regulation No. 28 of 2011 on the Management of Nature Tourism Parks**. The zoning system is designed to balance conservation efforts with sustainable utilisation and community involvement. The National Park is divided into several functional zones, each with specific regulations affecting human activities, including the design and placement of the Javan Lutung rescue centre.

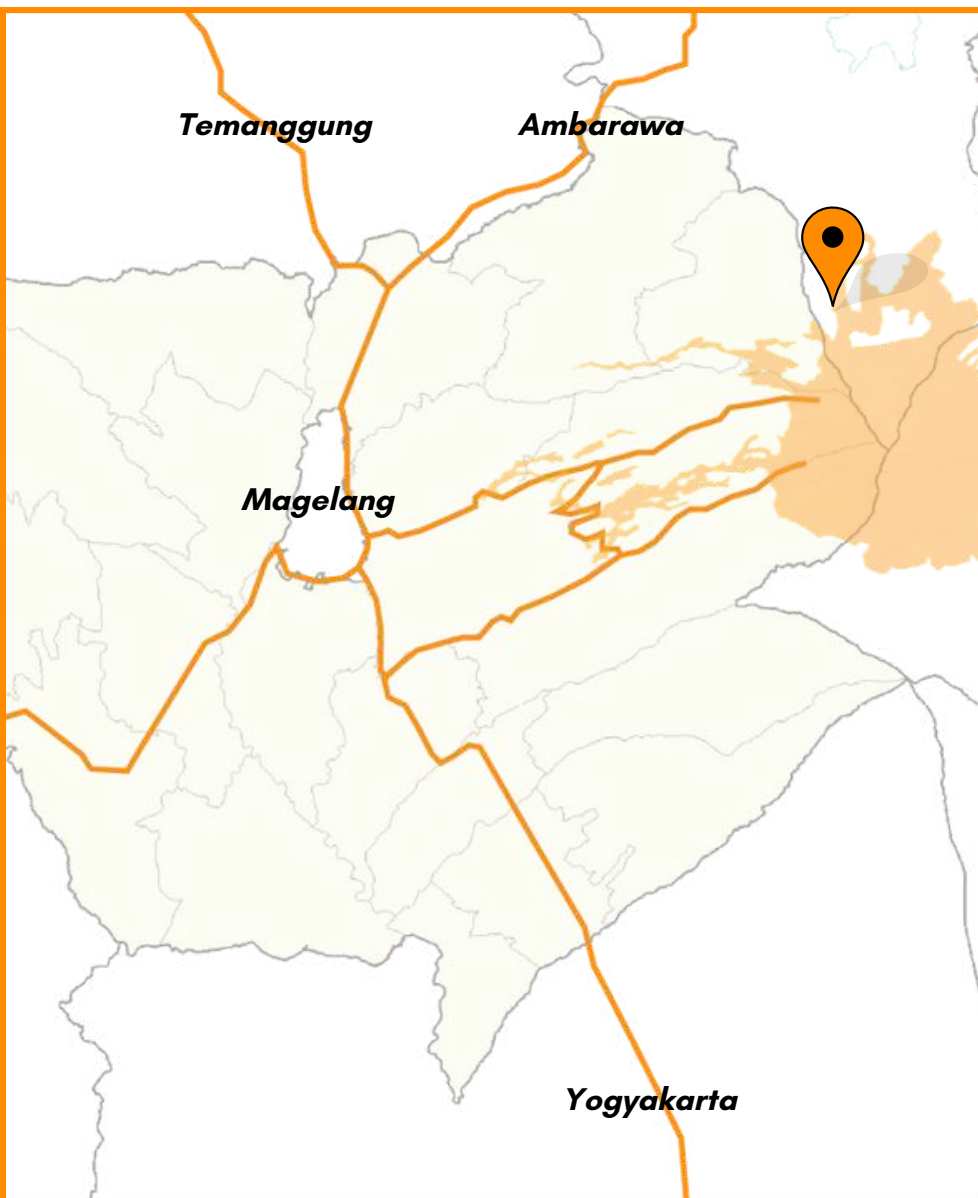
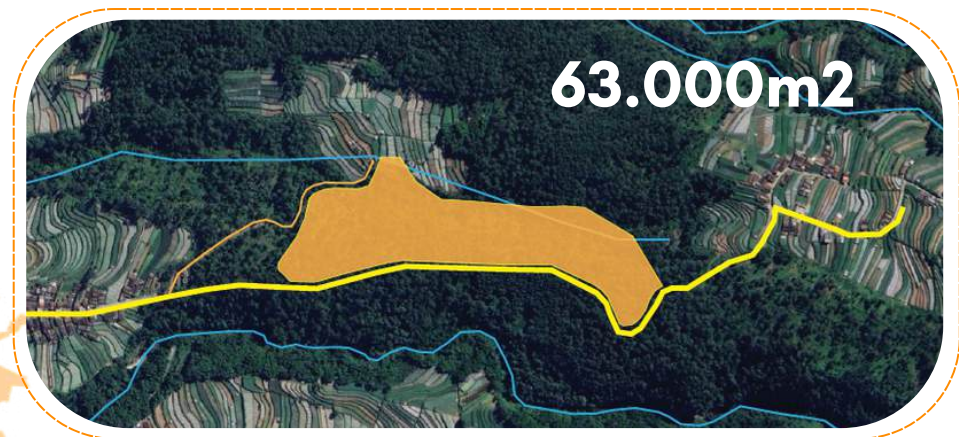
Rehabilitation
Allowed-good for
pre-release

Utilisation
Allowed-good for
forest school

*zones that can be used for Javan
lutung conservation space*

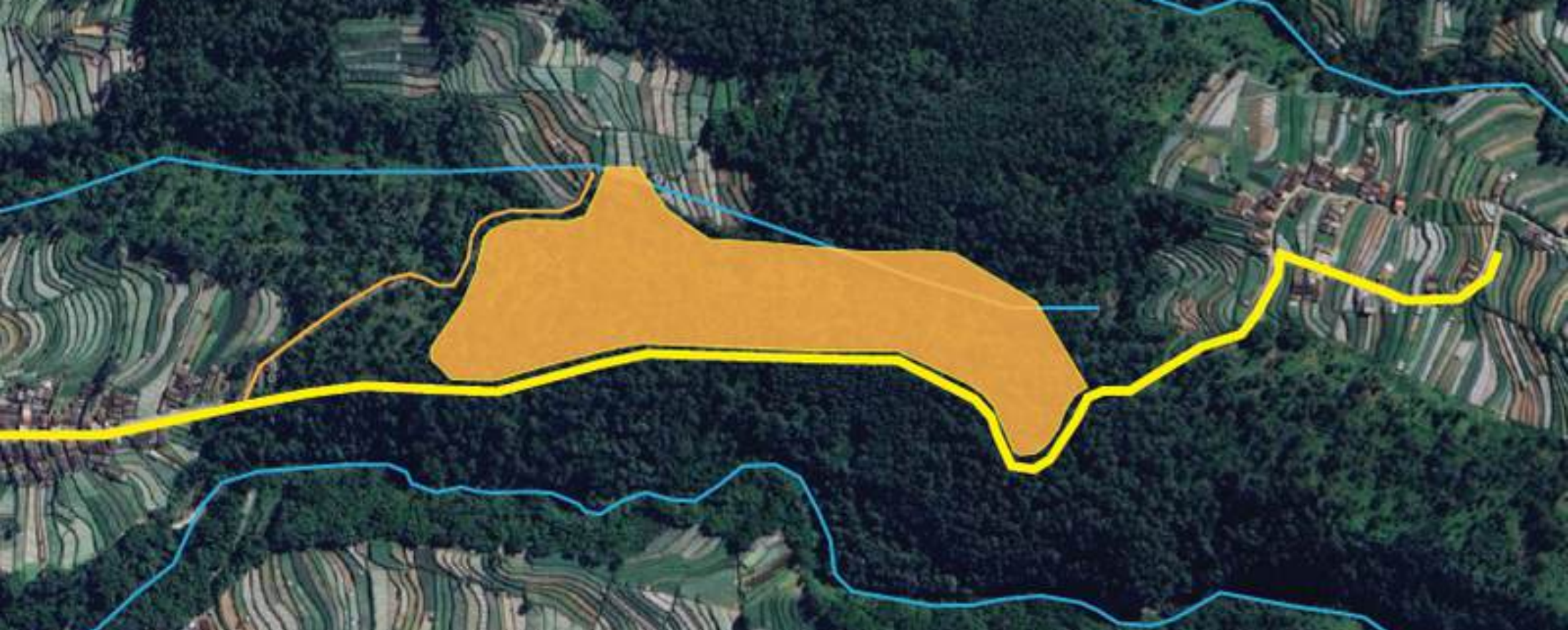


Purworejo



Site Selection Study Condition

Located on Poglan A, Kaponan, Distric Pakis, Magelang Regency, Central Java. This area is located at an **altitude of 1,500m** above sea level which has good environmental quality ecologically. The availability of supportive natural resources such as river water sources and mountain springs are complemented by vegetation that is suitable for lutung food. Surrounded by a large forest of trees, this location could be ideal for supporting a comfortable and safe rehabilitation environment for lutungs. On the other hand, taking into account the repressive handling process, which requires easy accessibility, is very suitable. Besides that, this strategic location can also be accessed from other parts of Java Island due to its location on the main Magelang-Salatiga road.



S.W.O.T Analysis

S

Providing proximity to natural habitats by the located at foothills Merbabu mountains that hosts montane forest & biodiversity hotspot (suitable for lutung). It also fostering the reintroduction of individuals better with similar environment situation by existing conservation framework. Supported by protected areas and conservation infrastructure enhance better design.

W

This area may require attention to better infrastructure development in terms of communication channels, power sources and investment in other facilities. There is a possibility for conflict with settlements.

O

Involving local communities in conservation efforts can foster employment, self-awareness and new circulating income streams. While adding educational and research value, the potential magnitude of ecotourism can encourage greater conservation awareness among visitors.

T

The risk of disease transmission between humans and primates is a concern, necessitating strict health protocols to protect both staff and animals. Settlement invasions by loose lutungs around rehabilitation centres

About Program Precedent

Nyaru Menteng Orangutan

Rescue and Rehabilitation Centre, Borneo

The Nyaru Menteng Orangutan Rescue and Rehabilitation Centre, established in 1999 by the Borneo Orangutan Survival (BOS) Foundation, is located approximately 28 kilometers from Palangka Raya in Central Kalimantan, Indonesia. It is the largest orangutan care center in Indonesia, dedicated to rescuing and rehabilitating orphaned and displaced orangutans affected by habitat loss and the illegal pet trade, with the ultimate goal of releasing them back into the wild.

Nyaru Menteng also has a vision to prepare orangutans to recognise and adapt to their natural habitat. It also focuses on orangutan population conservation. Nyaru Menteng try to rised the awareness among local communities about the importance of orangutan conservation, while also provides alternnative livelihoods to communities.

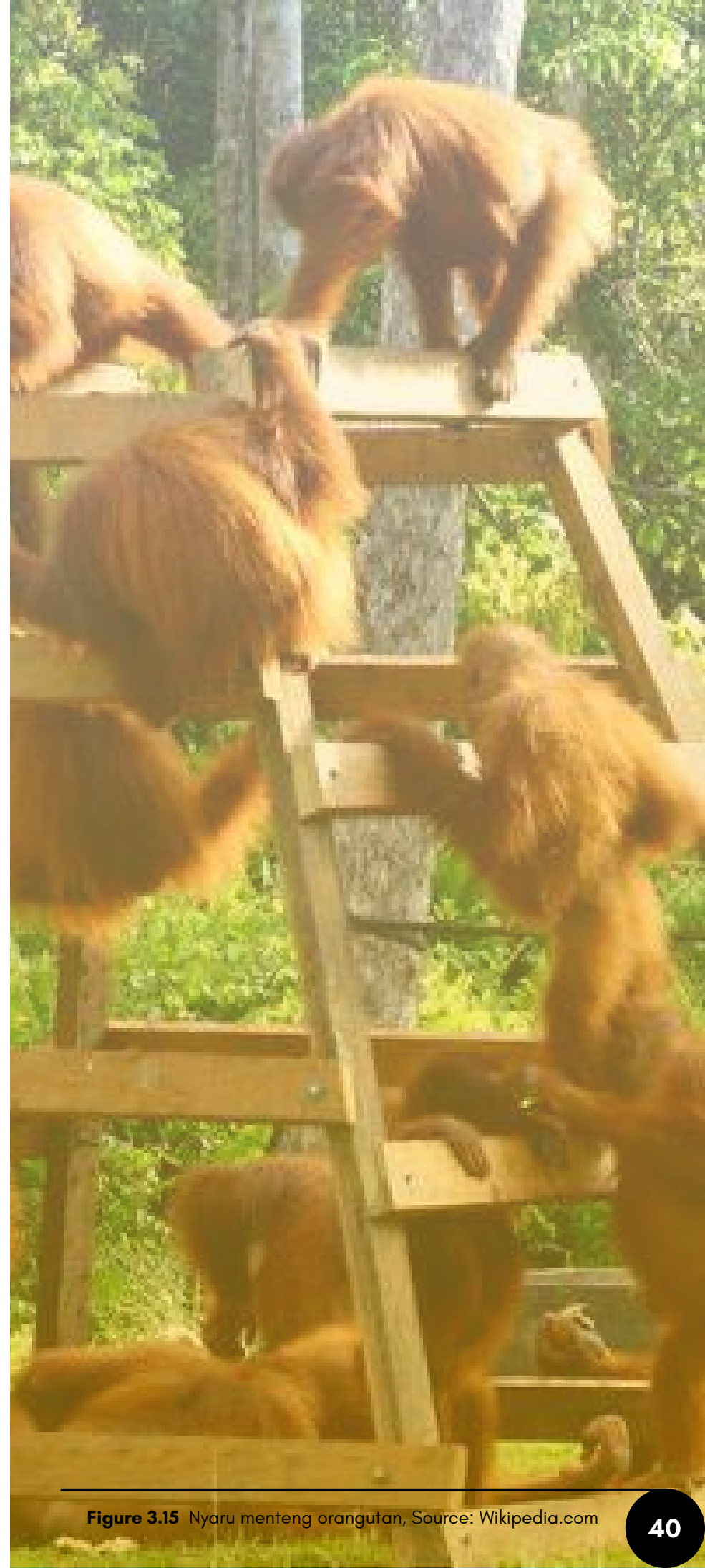
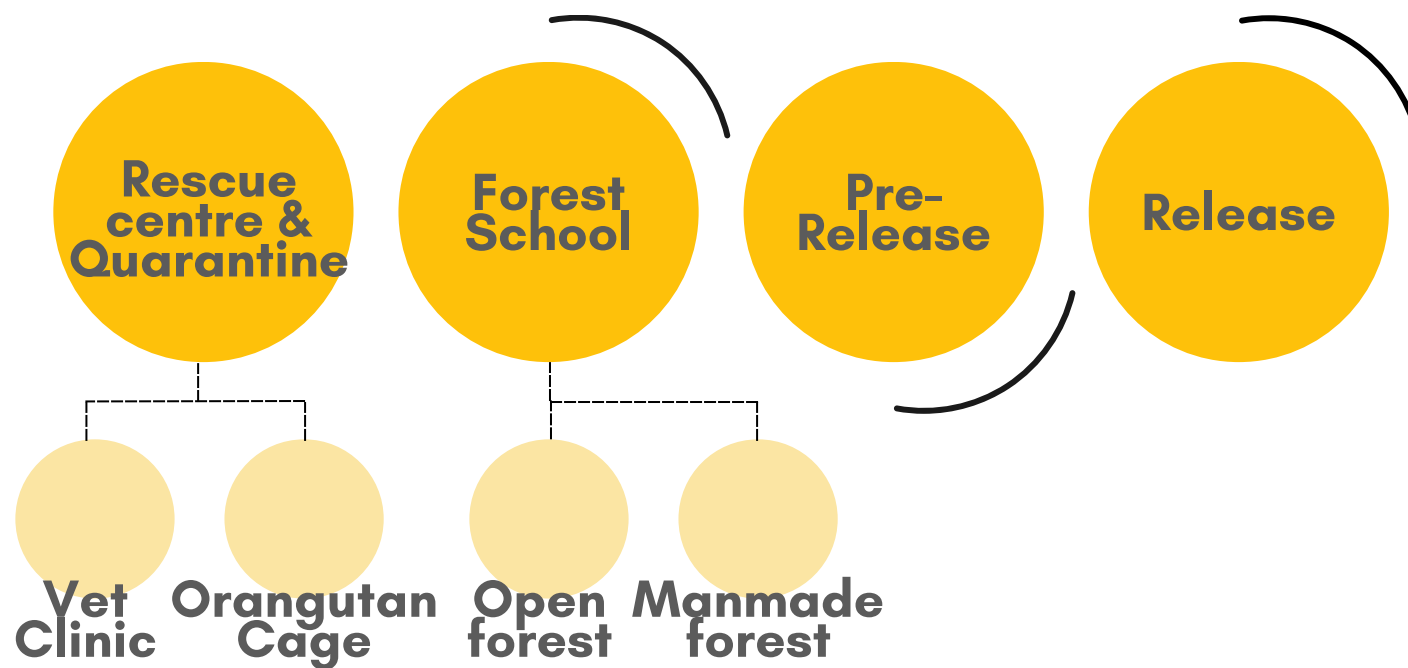


Figure 3.15 Nyaru menteng orangutan, Source: Wikipedia.com



Nyaru Menteng Vision Phase

Nyaru Menteng provides first aid to orangutans who are victims of illegal captivity, sickness and other needs. By providing a quarantine room that assesses the health of orangutans better. In addition, Nyaru Menteng also provides an essential 'forest school' to develop orangutan survival skills to live independently in their habitat. Nyaru Menteng also has a private protected forest facility that is used to demonstrate orangutans adapting to their habitat under supervision. Nyaru Menteng also releases orangutans that are ready to live independently in several protected areas, such as the Bukit Batikap Protection Forest.

About Precedent

Great Ape House

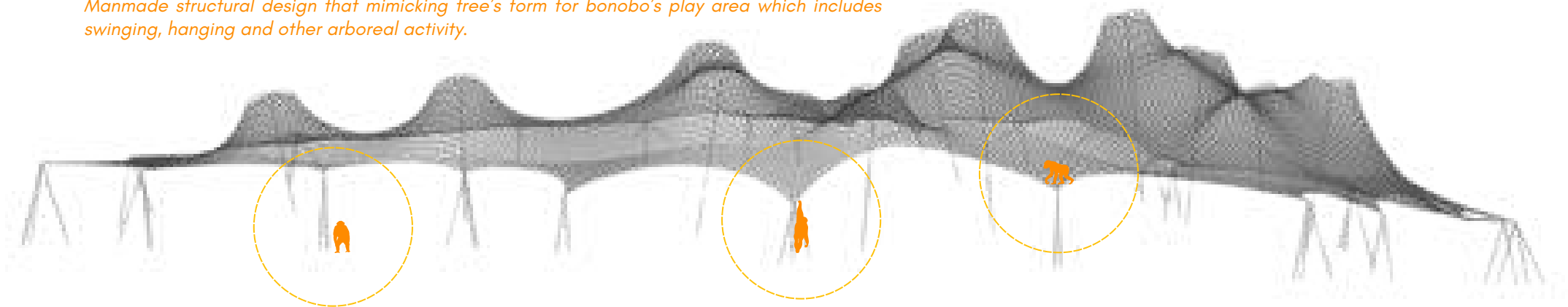
by Hascher Jehle in Stuttgart, Germany

Great Ape House is notable example of modern architecture integrated with naturalistic zoo environment. The structure provides expansive habitats for gorillas and bonobos, offering 13 times more space than their previous enclosures. The main design concept is to draw inspirations from site's topography while emphasizing park as extension rather than a standalone building. The indoor enclosure are housed within a monolithic concrete structure beneath the green roofspace that provides naturalistic environment for the apes. The used mimicking a forest canopy as example of artificial trees offering climbing opportunities for the nonobos.



Figure 3.16 Great Ape House, Source: archdaily.com
Figure 3.17 Section Great Ape House, Source: archdaily.com

Manmade structural design that mimicking tree's form for bonobo's play area which includes swinging, hanging and other arboreal activity.



Great Ape House **Lesson Learn**

Design concept precedent

The representation of natural habitats is implemented in the design of both outdoor and indoor buildings with mimicking techniques, design to reduce animal stress and develop animal behaviour patterns.

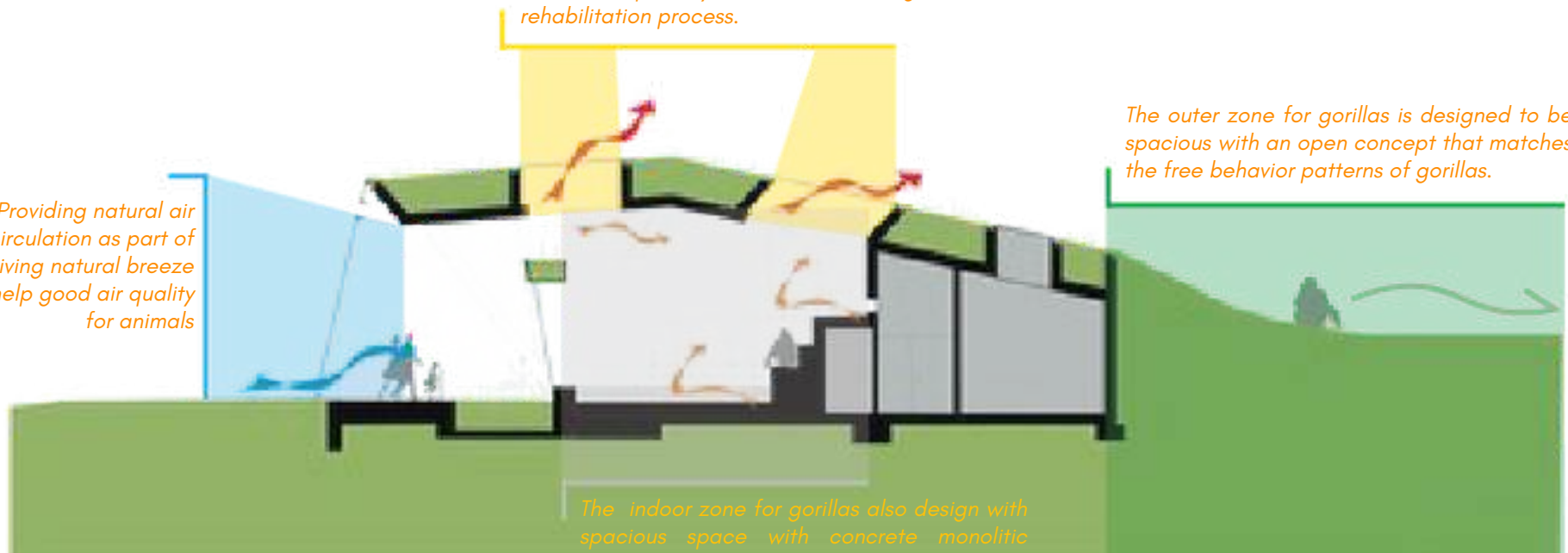
The implementation of green roofs helps to provide better insulation both enhancing air quality and humidity while balancing to blend structure into environment.

The semi-open design of the space trains primate adaptation. Providing supporting elements such as platforms, ropes or climbing structures as a means of providing food can also help increase animal activity.

Providing natural light design can have a big impact on the health of animals in the interior, especially when considering the rehabilitation process.

Providing natural air circulation as part of giving natural breeze can help good air quality for animals

The outer zone for gorillas is designed to be spacious with an open concept that matches the free behavior patterns of gorillas.



The indoor zone for gorillas also design with spacious space with concrete monolithic which mimicing to cave that helps to reduce their stress and provide playful areas

Great Ape House **Lesson Learn**

Design concept precedent

In contrast, human flow—comprising staff and visitors—must be efficient, secure, and minimally disruptive to the primates. Clear separation between public, staff-only, and animal zones ensures safety, reduces stress, and supports both animal welfare and operational functionality. Thoughtful design elements like dual circulation paths, visual privacy, and enriched environments allow apes to choose visibility while enabling passive human observation.



Primate activity areas benefit from enrichment features that don't require direct human contact, such as puzzle feeders and automated doors, preserving autonomy. Simultaneously, human routines like feeding, cleaning, and education are supported through efficient access points, observation areas, and flexible program spaces. Designing with contingency in mind—such as secure shift zones and medical access—adds robustness to the facility.



About Building Typology Precedent

Building for Animal

by Maison H in Apenheul Park Netherland

The Tamarin Monkey Area, designed by Maison H, is a specialized habitat within the Apenheul Primate Park in the Netherlands, tailored to accommodate various tamarin species, including the Golden Lion Monkey, Coppery Titi, Pied Tamarin, and White-faced Saki. The design of outdoor area for Tamarin Monkey are considering their habits started from their instincts, cognitive stimulation, movement pattern and environmental needs of tamarin such as food.



Figure 3.21 Building for animal Siteplan, Source: maisonh.nl
Figure 3.22 Building for animal Perspective development, Source: maisonh.nl

Building for Animal Lesson Learn

Building Typology Precedent

Understanding species-specific needs is crucial for creating effective spaces. In this case, the habitat supports monkey arboreal lifestyle, social structure, and movement patterns.

The ability to separate or group monkey families helps manage social dynamics and territorial behavior with interconnected yet modular enclosures allow for different species to share spaces

Blurring the boundaries between built and natural environments results in a more authentic experience for both animals and visitors.

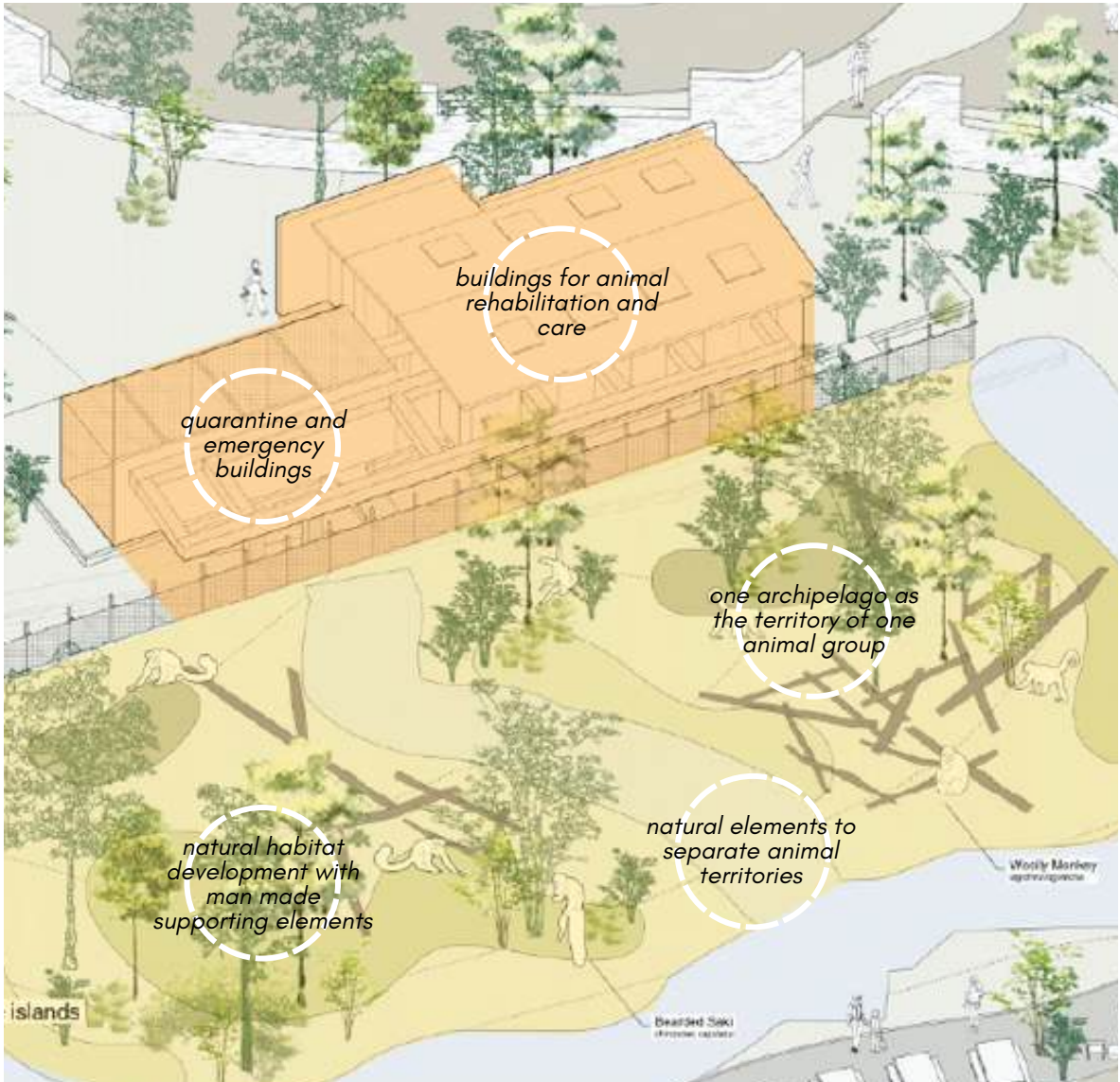
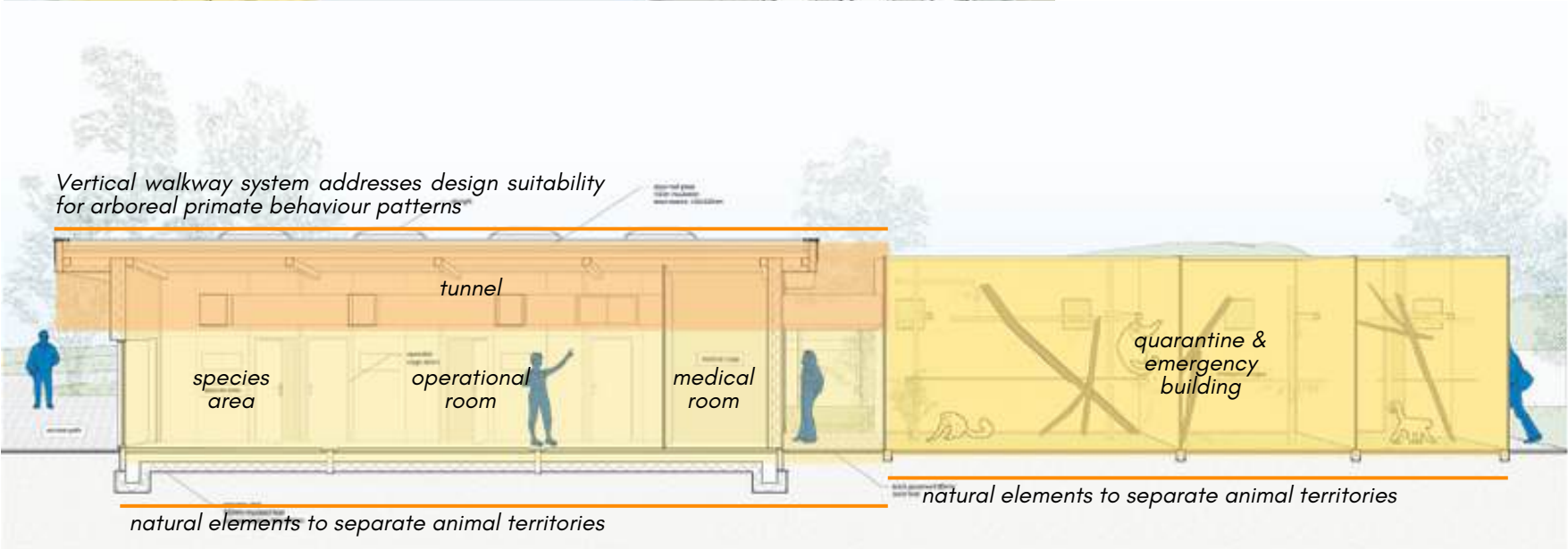
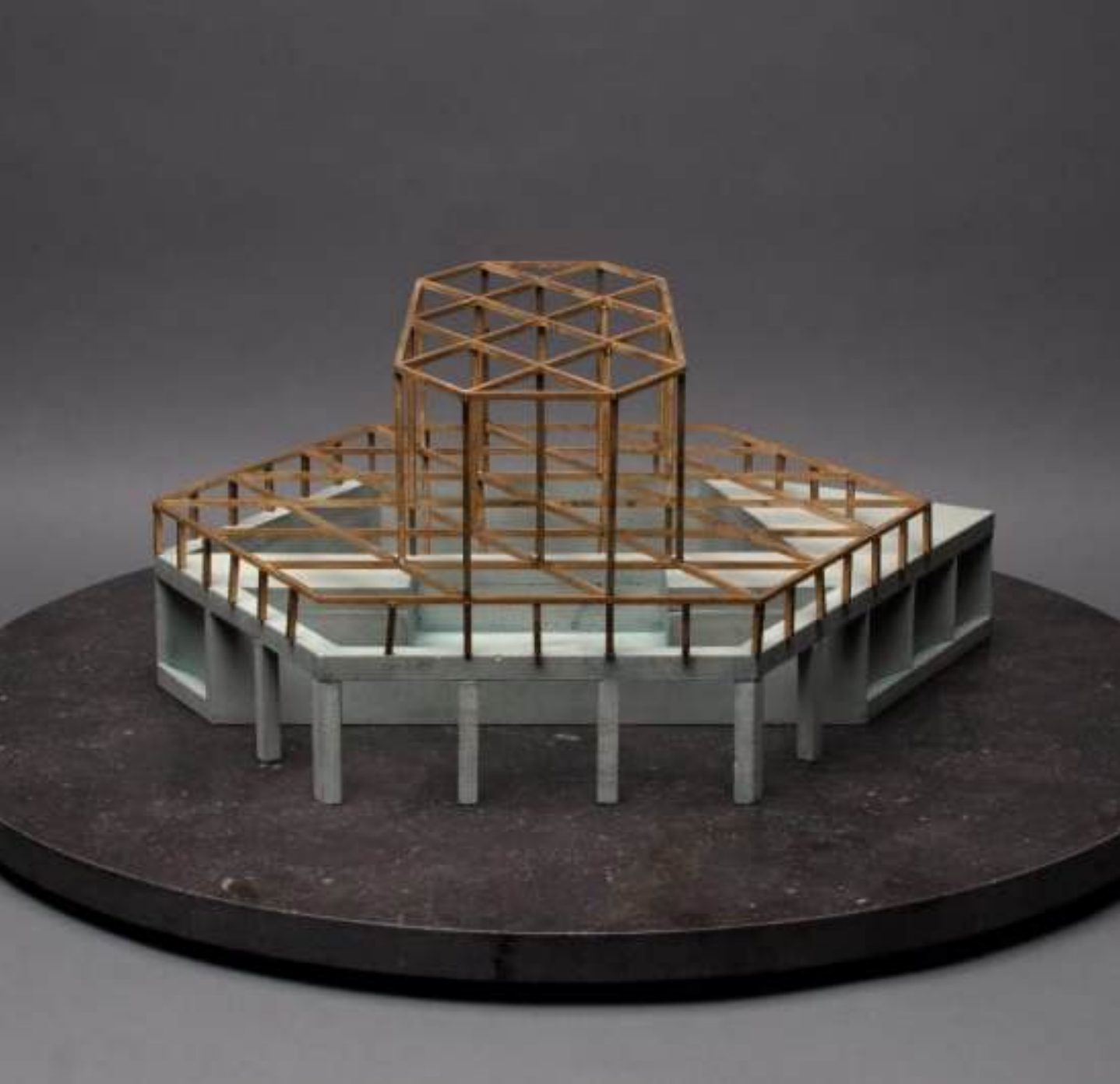


Figure 3.23 building for animal perspective development, Source: maisonh.nl
 Figure 3.24 building for animal section concept, Source: maisonh.nl



About Building Typology Precedent

Monkey House Artis

by **ARD DE VRIES & Studio DONNA VAN MILLIGEN** - Netherlands

The idea of contrasting the form and placement of the human connection with the monkeys, fostered the solution of elevating an animal that has a physical habit of hanging over human buildings. A pavilion that has intact proportions for the restaurant function and a wooden structure for the monkeys' playground. With glass material as the intermediary for maximum lighting function, visual comfort and integrity of exposure can be achieved to the maximum.

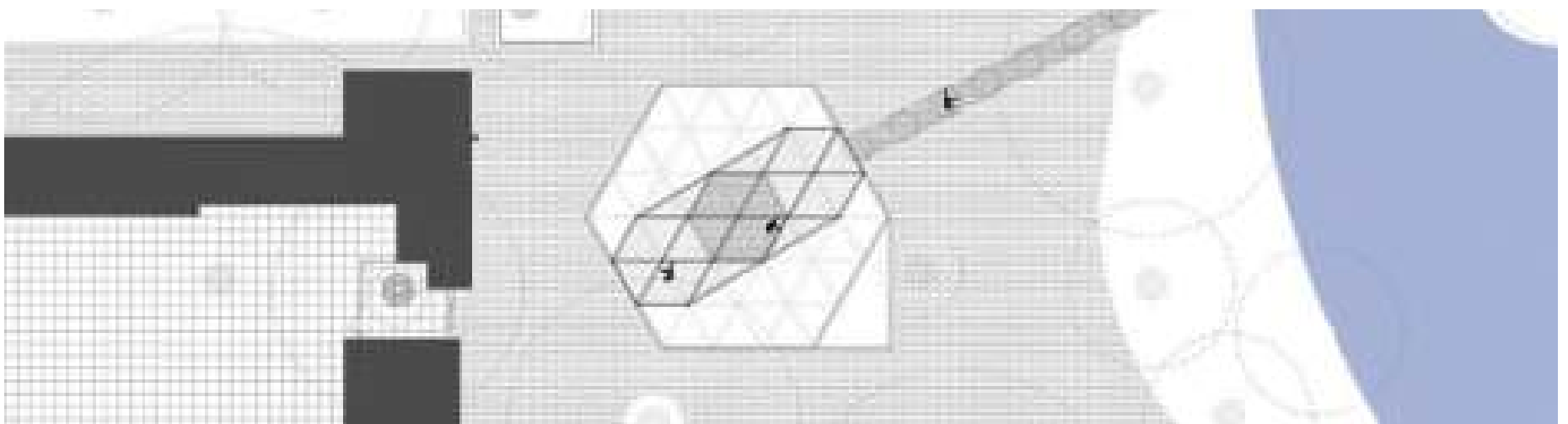


Figure 3.25 Monkey house artis Siteplan, Source: thebestnewarchitects.com
Figure 3.26 Monkey house artis maquette, Source: thebestnewarchitects.com

Artis Monkey House

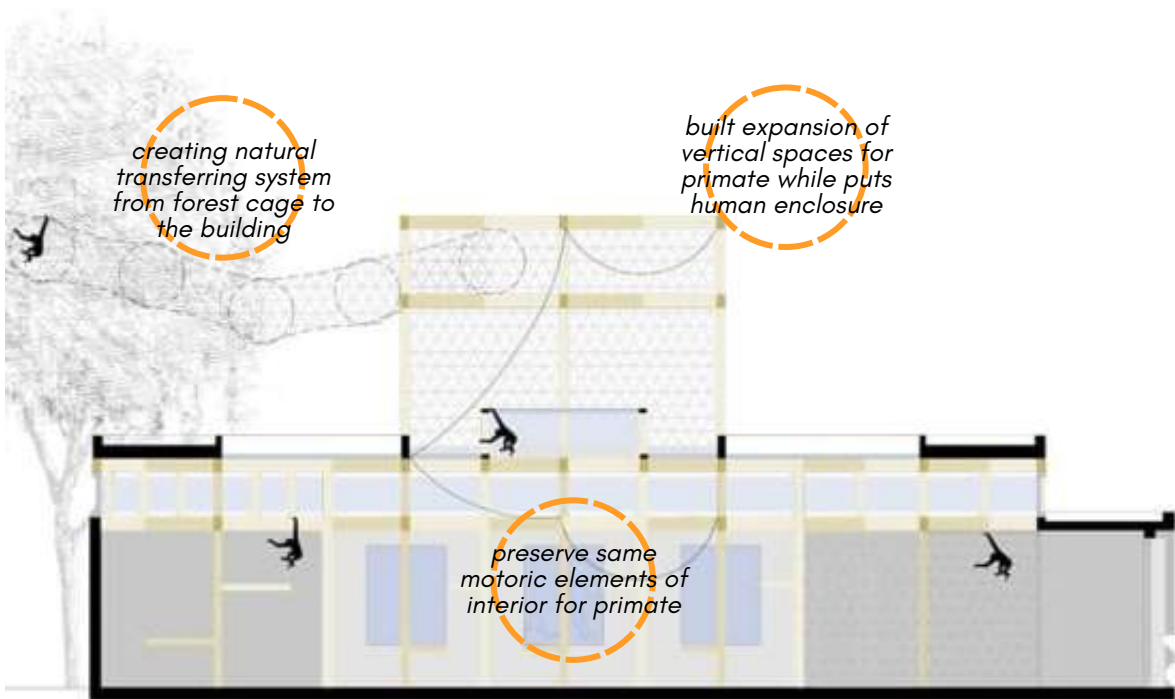
Lesson Learn

Building Typology Precedent

Enhance physical and mental well-being for primate by prioritizing naturalistic elements and the use of adaptable enclosure by flexible and modular architecture structure.

Encouraging primate motor stimulation with the application of natural materials such as various types of wood

Ensuring animals feel safe while promoting closer enclosure by elevating decks and puts hidden viewing blinds that avoid direct human presence



Vertical walkway system addresses design suitability for arboreal primate behaviour patterns

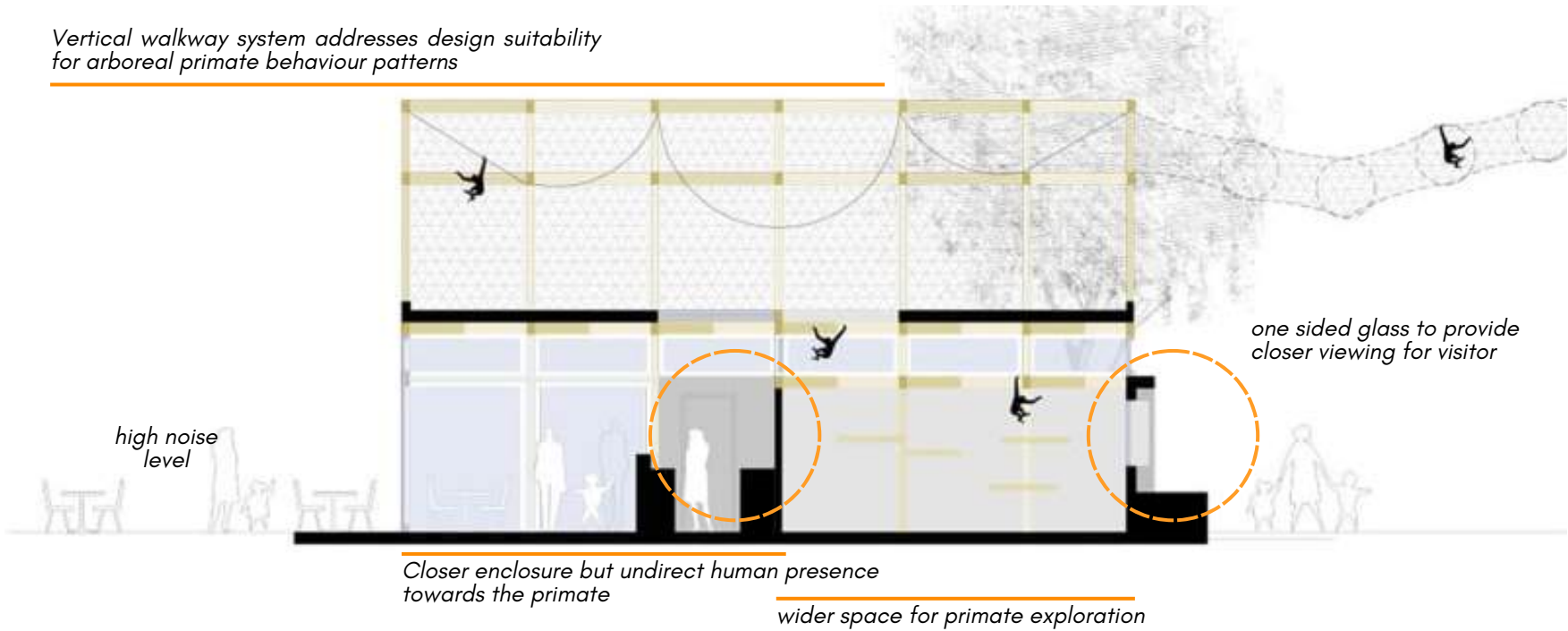


Figure 3.27 Monkey house artis section, Source: thebestnewarchitects.com
 Figure 3.28 Monkey house artis section, Source: thebestnewarchitects.com



About building Principle Precedent

Taronga Zoo Chimpanzee Enclosure

by Jackson Teese Architecture

The Taronga Zoo Chimpanzee Enclosure stands as a striking testament to architectural and zoological collaboration, skillfully balancing safety, transparency, and chimpanzee wellbeing. As part of an upgrade to a heritage-listed facility (originally built in 1980), it introduces a free-form, aviary-style tensile separation enclosure crafted from Carl Stahl X-Tend stainless steel mesh and cable netting—designed to carry loads inherently and by some heavy sub-structures. The enclosure avoids boxy shapes, instead adopting an irregular, faceted geometry and semi-transparent black mesh that blends with the tree canopy



Figure 3.29 Chimpanzee enclosure, Source: lsaa.org
Figure 3.30 Structural and architecture elements, Source: lsaa.org



Taronga Chimpanzee Enclosure Lesson Learn

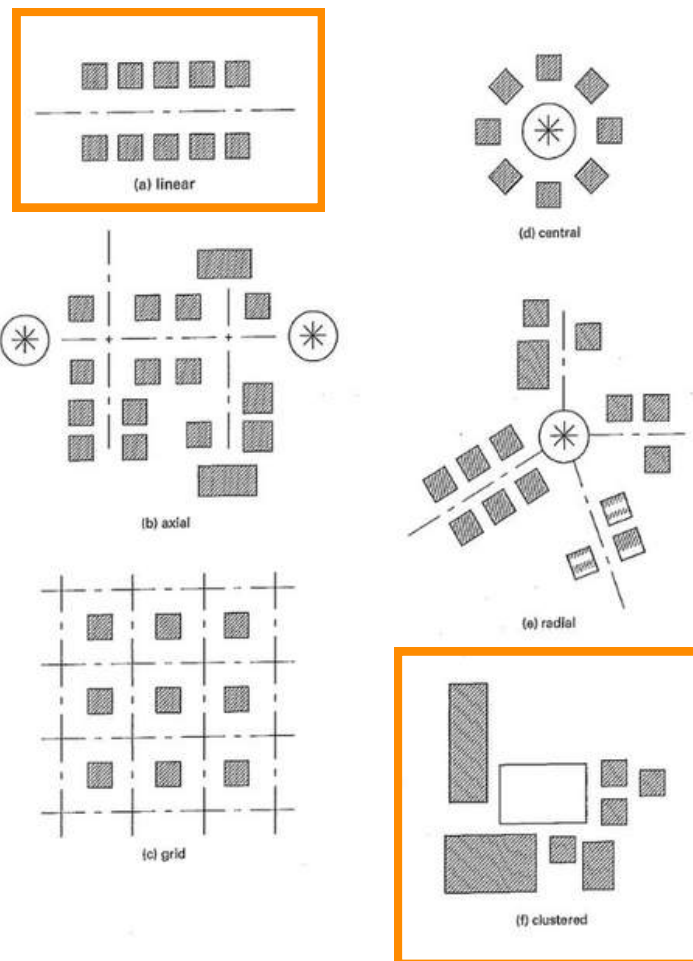
Building Typology Precedent

The timber-clad masts doubled as architectural supports and enrichment elements, giving chimpanzees dynamic climbing opportunities in a naturalistic way.

The irregular geometry, semi-transparent mesh, and natural timber finishes helped the enclosure merge into the surrounding canopy, maintaining a harmonious zoo aesthetic.

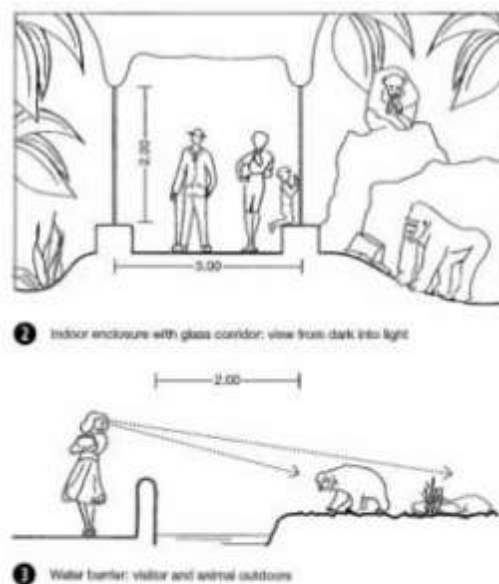
Cable-net systems require precise engineering and tension maintenance over time; environmental exposure (sun, salt air, wind) can affect longevity, and maintenance access must be factored into the design.





Analysis of Behavior

According to DK Ching, circulation configurations shape the experience of space and direct movement. In the design of the Javan lutung rescue centre, circulation patterns are designed to separate humans and lutungs to reduce stress, while still allowing for supervision. This approach adapts the space to the natural behaviour of lutungs, which are sensitive to direct interaction.



Analysis of Behavior

Ernest Neufert book of Data Architect 4 talking about principle of barriers in animal park that emphasize the importance of **creating enclosure** that align with the natural behavior and psychological well-being of animals while **ensuring visitor/staff safety**.

According to this principle barriers should be as unobtrusive as possible using natural elements such as moats, elevation, water streams or vegetation to maintain a sense of freedom and reducing stress. In the context of designing rescue center for javan lutung, applying this method can reflect the lutung's arboreal lifestyle—such as using **elevating platforms, apply canopy level enclosure and create visual screens of foliage** to minimize the feels of captivity,

Analysis of Animal Welfare Principle

The evaluation of animal welfare aspects is crucial as a basis for animal architecture design because it ensures that the physical, psychological, and natural behavioral needs of animals are optimally met in an artificial environment. By considering animal welfare principles—such as freedom from pain, stress, and discomfort—architecture can be designed to create spaces that are safe, healthy, and supportive of animals' natural behavioral expressions.

Animal Welfare Principle Analysis				
Variable	Indicator	Benchmark	Test	Concept
Free from <i>hunger & Thirst</i>	Easy access & available water	strong and stable water sources	Site planning & landscape design	Centered access w universal design (ramp)
	Easy access & own-food source	feed categories that are readily available on site and maintained	Site planning & landscape design	Management access divided with others
Free from <i>discomfort</i>	Availability of hang/swing area	provide a wide & sufficient number of physical instruments with appropriate dimensions	Playground, Quarantine, Socialization cage design	Cage consist with modular form, 1,5m swing gap
	Availability of shade/sleep area	sufficient number of shades & comfortable height	Shelter of vegetation or some kind	Locating//Mimicing tree form structure
	Minimum exposure to human	distance/boundaries with human interaction	Barrier, one-way glass	Vegetation fences connecting water streams
Free form <i>pain, injury & disease</i>	Safe cage form and dimension	chosen soft material no sharp corners	Chooosen material	Following space req. No sharp edge, Replaceable, easy obtain material
	Avoid lutung's colision	following standard size or more	Cage standard by JLC	-
	Availability clinic room	clinic room closed to lutung's area	Calculation clinic distance	In radius 20 meters
	Maximum cage hygiene	materials & flooring should be easy to clean	Chooosen material	Floor slab coating/ layering
Free to <i>express normal behavior</i>	An environment similar to the native habitat	there are natural sun and wind vegetation elements for lutung	Landscape & Cage by passive design	Exposed to the outside, has a tree structure, has shade
Free form <i>stress & pressure</i>	Minimum exposure to human	distance/boundaries with human interaction	Barrier, one-way glass	Natural fences (vegetation & water streams)
	Safe from poaching	maximum safety of rescue center	Rescue center area boundaries	Natural fences (vegetation & water streams)

Table 1.6 Animal “Welfare” principle analysis, Source: author, 2025i

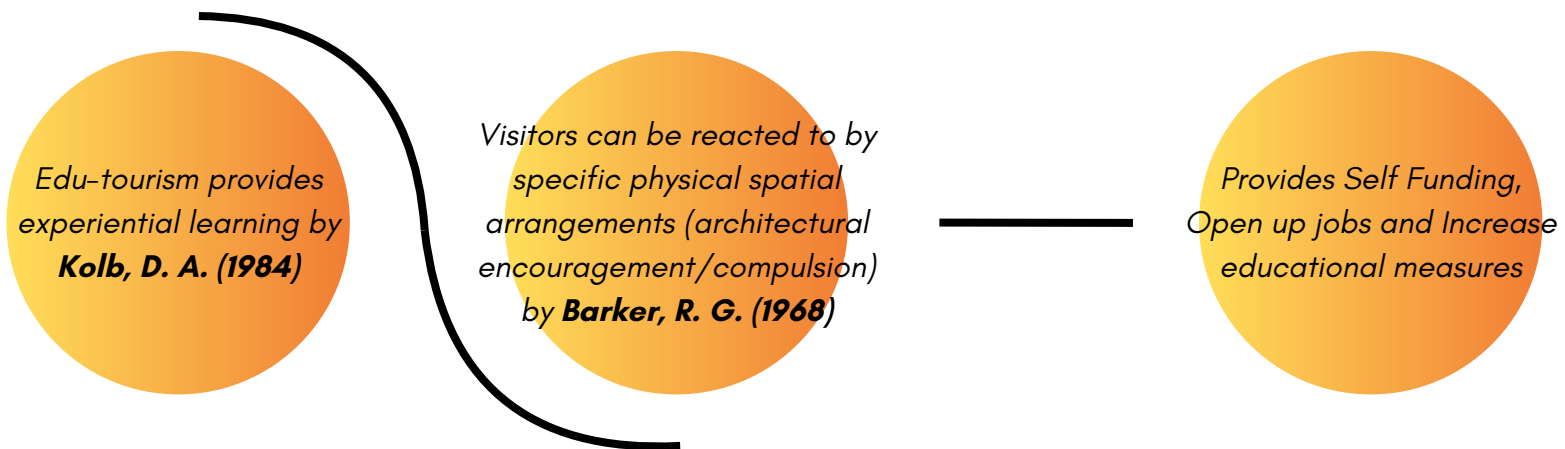
Analysis of Behavior & Sustainability Principle

The 1976 book “The Mutual Interaction of People and Their Built Environment: A Cross-Cultural Perspective”, edited by Amos Rapoport, presents a foundational argument in environmental-behavior studies: that human behavior and the built environment are interdependent and shaped by cultural context. People develop habits and routines in response to environmental affordances—features of the space that encourage certain behaviors over others.

Behavior Principle Analysis				
Variable	Indicator	Benchmark	Test	Concept
Space	Standard size	Meet the needs of the number of users	Site planning & landscape design	Following space requirements
	Form	The convenience of wayfinding	Comfortable movement	Following space requirements
Experience			Multifunction space/ Amphitheatre	Spacious & Landscape Integration
	Rising Awareness	Visitor flow	Front plaza - plaza - mini museum - interpretative park	Centered connecting movement path
	Zoning Integration	Connected corridor	Landscape design	Using axis line circulation
Habitual	Food source	Food forest	Vegetation type & placement	-
			Grading	-
	Rescue & Rehabilitation	School programme	Stimulation element	Man made interior

Sustainability Principle Analysis				
Variable	Indicator	Benchmark	Test	Concept
Commercial	Conducting seminar	Amphitheatre	Size & room placement	Very visible area
	Provide cost support	Restaurant	-	-
	Delivering memorable product	Souvenir room	Room placement	-
Pressesive Protection	Rising Awareness	Mini museum	Museum layout & elements	Interpretative flow, emotional experience
	Delivering memorable experience	Interactive Park	Transferring system & management	Linear Javan Lutung viewing

Table 1.7 Behavioral principle analysis, Source: author, 2025
Table 1.8 Sustainability principle analysis, Source: author, 2025



Supporting Function

Edu-Tourism

An additional step in supporting conservation efforts is to increase the role of edu-tourism, which prioritises tours to raise public awareness of the threatened status of the Javan lutung. From a social and economic perspective, edu-tourism acts as a bridge between conservation and local community empowerment. When people feel that they are directly benefiting from the rescue centre, they tend to be more supportive of Javan lutung protection efforts.



Figure 3.35 handling process discussion JLC, Source: jatimnet.com



04.

Problem Solving

programme needs precedent

Javan lutung Center

Program - Introduction

JLC implements the introduction programme as an effort to release and place Javan lutungs in environmental areas that support their lives but are not their natural habitat. This supportive aspect can be assessed by the availability of food, environmental suitability and the suitability of other ecosystem relationships for Javan lutungs. This effort includes the rescue, rehabilitation and conservation processes that are regulated by the Ministry of Environment and Forestry's work system.

rehabilitation programme & timeframe

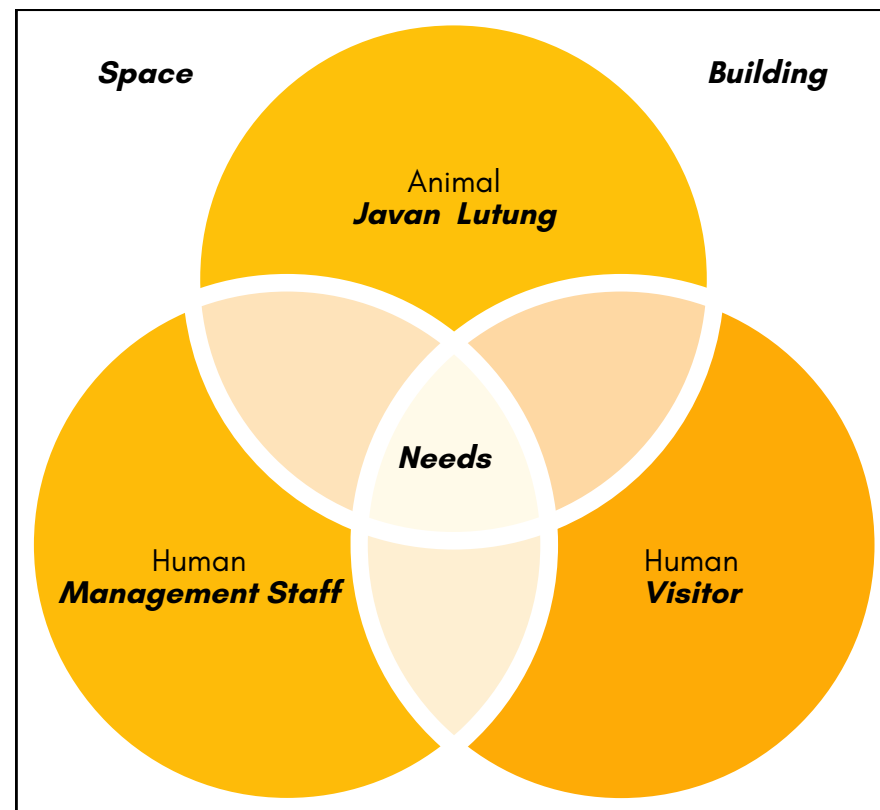
The rehabilitation timeframe depends on the condition of the Javan lutung when it enters the JLC. The rehabilitation programme aims to maximise the Javan lutung's health condition in terms of physical and mental health. Physical health is assessed by: Physical examination, bacterial examination, viral examination and parasite examination. Javan lutungs that die within the JLC environment will receive a burial coated with additives to prevent disease outbreaks from affecting the environment.

socialisation programme & timeframe

The socialisation programme has the goal of allowing Javan lutungs to behave naturally. There are stages of socialisation such as: Colonisation, introduction of natural food, housing enrichment and other treatments that stimulate the natural instincts of Javan lutungs. The socialisation programme has a fairly regular time span. This adapts to the conservation vision of not holding and releasing Javan lutungs. The range of the socialisation programme adjusts to the maturity of the Javan lutung's readiness to return to its habitat, but usually the socialisation programme takes 3-4 months.

Analyse function requirements *based on users activities & habits*

The Javan lutung Centre (JLC), an animal rehabilitation centre specialising in Javan lutungs, is designed to meet their physical, psychological and ecological needs through several architectural aspects such as functionality based on users, activities and space requirements. The functional aspect focuses on exploring the design efficiency and effectiveness of the spatial layout designed to support user activities or habits.



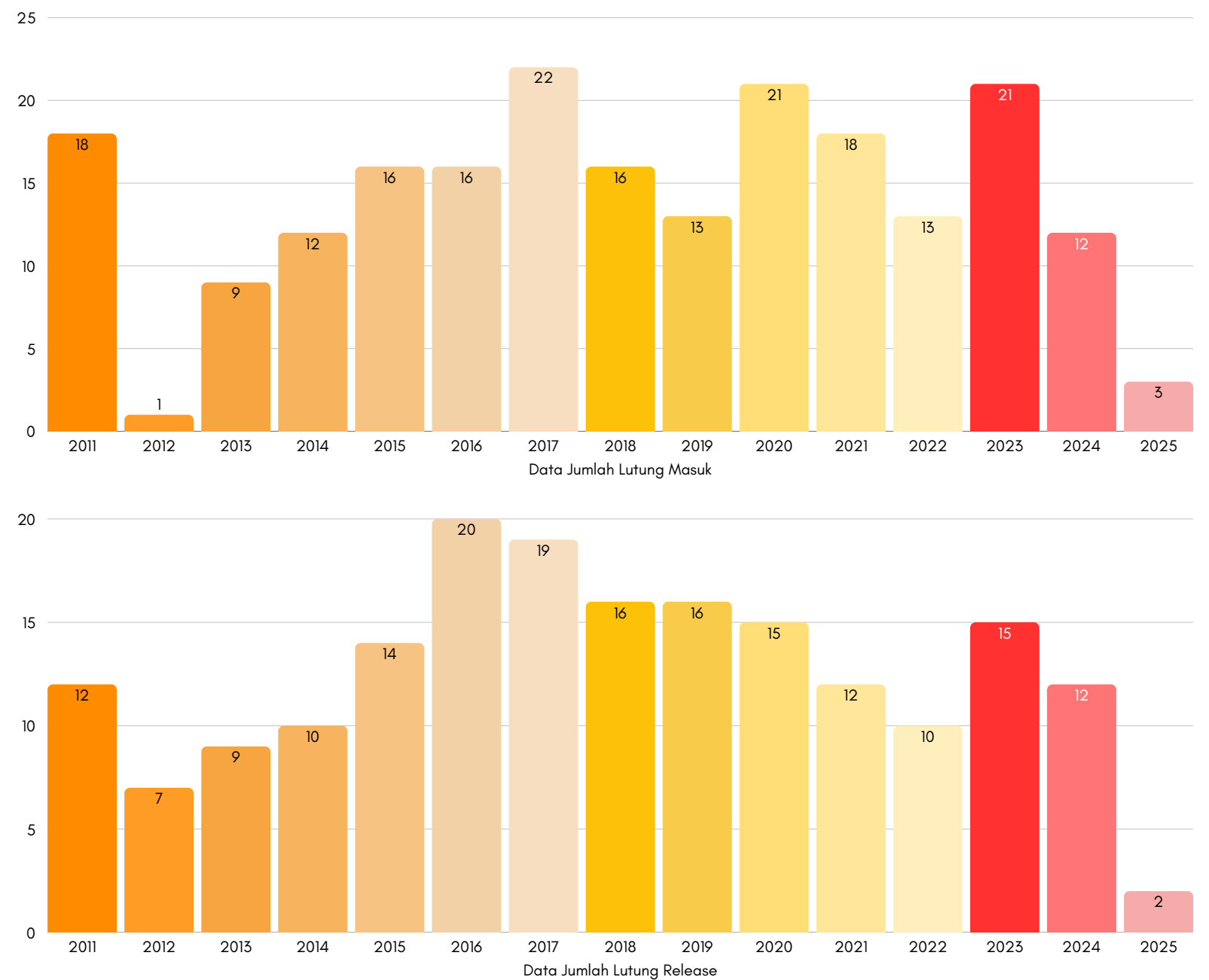
The functional aspect of the rehabilitation centre is to support the rescue, recovery and release of Javan lutungs back to their original habitat in the forest. Being a halfway house and preparation area, JLC also functions primarily as a means of educating visitors who come as well as conservation cooperation with the government. According to interviews, **this rehabilitation centre has a sexy issue of educational and tourist functions.** JLC should be a safe and comfortable place for Javan lutungs to behave normally in order to improve the welfare of their species. This is of course driven by improving the quality of the area including limiting exposure to humans (visitors). However, an educational and tourist area requires a very large proportion of visitor exposure.

User Aspect: Javan Lutung

According to Constantinos A. Doxiadis in his book Ecistics: An Introduction to the Science of Human Settlements (1968), there are three main principles in architecture and regional planning. One of these principles emphasises the human aspect as the actor, which in this context is analysed based on three main groups, namely the Javan lutungs, the management, and the visitors.

Javan Lutung Classification: Existing

The classification of Javan lutungs in the Javan lutung Centre (JLC) consists of Wild Javan lutungs and Captive Javan lutungs. Wild lutungs are individuals that live naturally in their natural habitat, while captive-bred lutungs live in an artificial/semi-natural environment. Both species of lutungs were recovered from the police and the East Java KSDA Centre.





Javan lutungs have a dynamic group organisation that is classified into number, sex and age range. This classification can assist in understanding the social structure, reproductive patterns and ecological roles of each individual within the Javan lutung group. Sex identification also influences the development of rehabilitation strategies related to architectural design. Based on the data collected during the interviews, the Javan lutungs were divided into groups of 8-12 lutungs, led by 1 male (alpha male). Overall, the lutungs rehabilitated at the JLC rehabilitation centre are classified as follows:

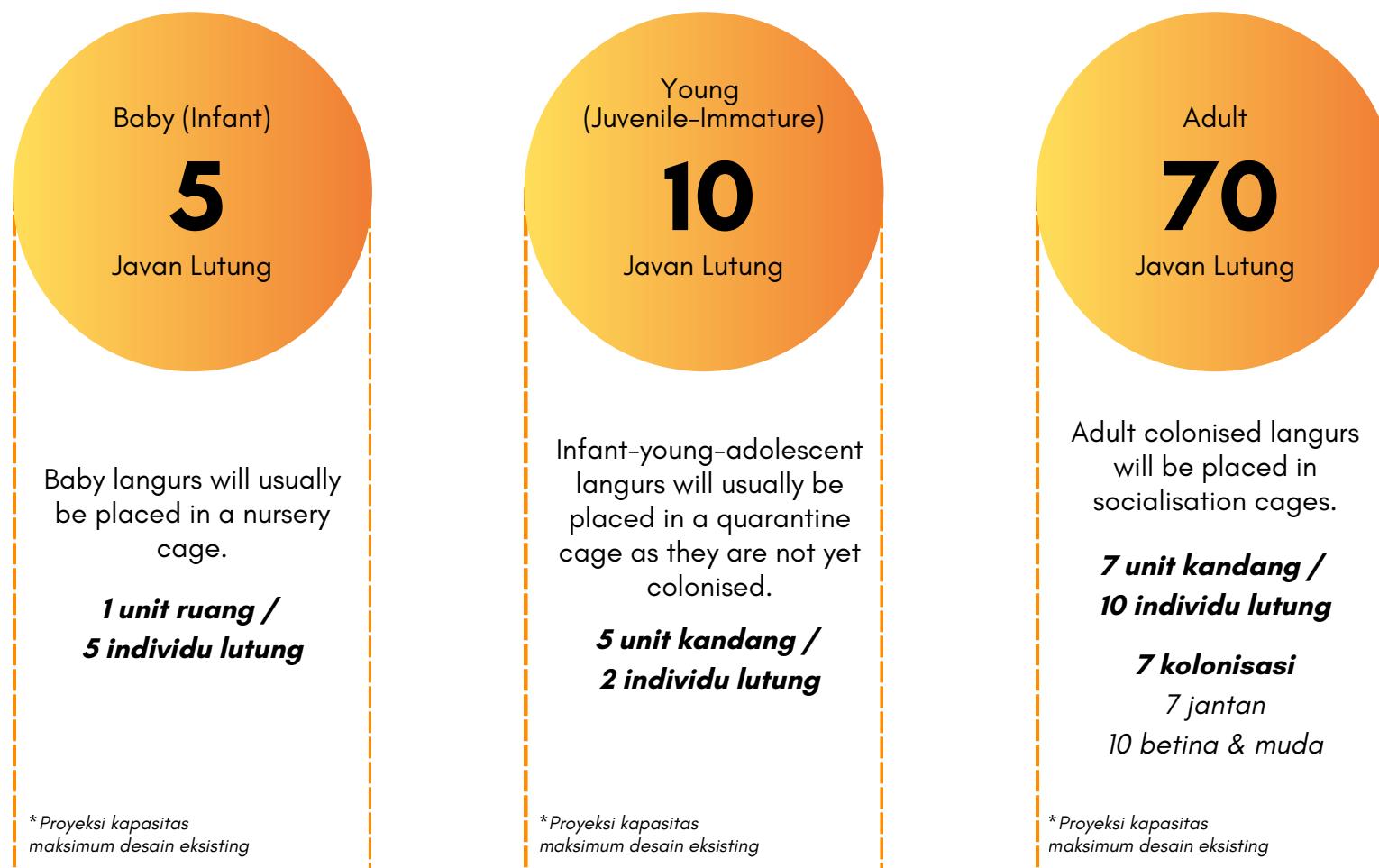


Javan Lutung Classification: Projection

Looking at the dynamics of the lutung population in the KSDA rehabilitation centre, it can be seen that the number of females and young lutungs that dominate the population is an illustration for population increase and greater colonisation division. In addition to this, an additional supporting factor for the population is the number of incoming lutungs from the KSDA centre. This concludes the need for a rehabilitation centre design that should be able to accommodate all the Javan lutungs that will increase in the future according to their age.



Total jumlah Lutung Jawa yang direhabilitasi pada rentang tahun 2022 -2024 = 72 ekor



Javan Lutung *Future Projection*

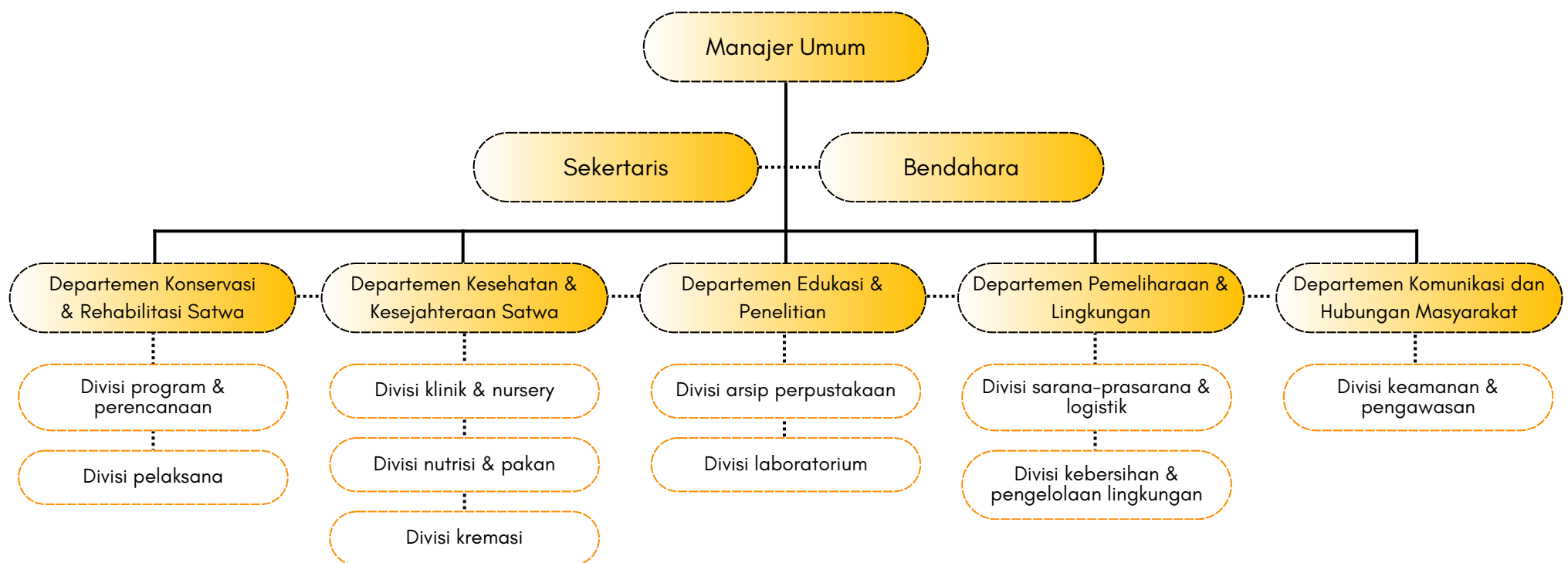
An interview with Mr Iwan revealed that the number of Javan lutung individuals rehabilitated at the Javan lutung Centre (JLC) is projected to increase, in line with the declining population trend of the species in its natural habitat from year to year. This phenomenon is not only caused by the declining population in the wild, but also driven by the intensification of law enforcement efforts by the government in order to protect wildlife. In addition, increasing public awareness of the importance of ecosystem conservation and the protection of primates classified as protected animals has also contributed to the increase in the number of individuals entering the rehabilitation programme.

Planning & design programme approach

Javan lutung Center

Management

The well-being and success of the Javan lutung Centre is inseparable from the role of the conservation manager in charge of the centre. The organisational structure of the conservation manager is responsible for developing a care plan, managing the artificial environment, the natural environment and preparing the Javan lutungs for the wild. JLC has a conservation management organisation structure that functions optimally as follows:



Issue on Management

The problem with management is the lack of human resources in some divisions. This labour shortage is based on limited funding factors and the location that cannot be reached easily and quickly. Some divisions that have these problems are divisions:

1. Animal health & welfare department: doctors and cremation experts are still casual or on-call.
2. Laboratory education & research department: research specialists are still casual and not available on a flexible basis.
3. Maintenance & environment department: all divisions have too few members and are still on-call.

Planning & design programme approach

Javan lutung Center

Activity-functions of the Javan lutung Center organisation

The Javan lutung Center's organisational structure plan was obtained through interviews and observations of the working conditions at the centre. The Javan lutung Rehabilitation Centre (JLC) has a range of 25 managers with all divisions filled and working optimally.

Positions	Duties & Function	Amount
<i>Manajer Umum</i>	Pimpinan utama organisasi yang mengelola keseluruhan operasional, visi, misi dan tujuan	1
<i>Sekretaris</i>	Mengelola administrasi kegiatan konservasi, komunikasi internal-eksternal serta mendukung kelancaran kerja dalam organisasi	1
<i>Bendahara</i>	Mengelola segala keuangan pusat rehabilitasi satwa untuk memastikan keberlanjutan operasional & pendanaan	1
<i>Jumlah keseluruhan direksi pusat konservasi</i>		3

Table 1.9 Activity and function in JLC organization: head office, Source: author, 2025

Departemen Konservasi & Rehabilitasi Satwa		
Divisi Riset & Pengembangan	Memberikan data dan juga inovasi untuk dasar perencanaan program rehabilitasi	1
Divisi Pemantauan & Evaluasi	Mengukur keberhasilan implementasi program berdasarkan indikator yang telah ditentukan dengan memberikan evaluasi	1
Jumlah keseluruhan divisi program & perencanaan		2
Divisi Ahli Ekologi & Pengayaan	Memastikan lingkungan rehabilitasi dapat meniru dan sesuai dengan habitat alami satwa baik secara ekologi maupun enrichments	1
Divisi Perawat Satwa (Animal Keeper)	Bertanggung jawab atas perawatan harian satwa dan pemenuhan kebutuhan dasar satwa secara fisik maupun mental	3
Jumlah keseluruhan divisi pelaksana		4

Departemen Kesehatan & Kesejahteraan Satwa		
Divisi Klinik & Nursery	Bertanggung jawab untuk pelayanan medis, perawatan intensif dan pengelolaan satwa bayi-muda dan satwa berkebutuhan khusus.	2
Divisi Nutrisi & Pakan	Bertanggung jawab atas penyediaan pakan, enrichment dan kebutuhan spesifik kondisi masing masing satwa	2
Divisi Kremasi	Bertugas menangani satwa yang mati dan mencegah wabah penyakit dari dampak kematian satwa	1
Jumlah keseluruhan departemen kesehatan & kesejahteraan satwa		5

Table 1.10 Activity and function in JLC organization: conservation department, Source: author, 2025
Table 1.11 Activity and function in JLC organization: helath & well-being department, Source: author, 2025

Departemen Edukasi & Penelitian		
Divisi Arsip Perpuustakaan	Pusat pengelolaan informasi dan pendataan yang berkaitan dengan konservasi satwa.	1
Divisi Laboratorium	Bertanggung jawab atas penelitian ilmiah dan analisis data untuk mendukung rehabilitasi satwa	1
Jumlah keseluruhan divisi edukasi & penelitian		2

Departemen Pemeliharaan & Lingkungan		
Divisi MEP	Pengelolaan dan pemeliharaan sistem kelistrikan, teknis dan juga pemipaan dipusat rehabilitasi baik untuk aktivitas satwa maupun organisasi	1
Divisi Penyediaan Alat dan Logistik	Bertanggung jawab atas pengadaan, penyimpanan, distribusi alat dan kebutuhan operasional	1
Jumlah keseluruhan divisi sarana prasarana & logistik		2
Divisi Kebersihan	Bertugas untuk menjaga kebersihan lingkungan di seluruh area koonservasi yang ada dipusat rehabilitasi JLC	1
Divisi Pemeliharaan Fasilitas Kawasan	Bertanggung jawab atas perawatan, perbaikan infrastruktur serta fasilitas fisik di pusat rehabilitasi JLC	1
Jumlah keseluruhan divisi sarana prasarana & logistik		2

Table 1.12 Activity and function in JLC organization: education & research department, Source: author, 2025

Table 1.13 Activity and function in JLC organization: maintenance & environment department, Source: author, 2025

Departemen Keamanan & Pengawasan		
Divisi Keamanan & Pengawasan	Bertugas untuk penjagaan keamanan satwa, staf, fasilitas serta pengunjung dipusat rehabilitasi	3
Jumlah keseluruhan departemen keamanan & pengawasan		3

Departemen Komunikasi & Hubungan Masyarakat		
Divisi Hubungan Masyarakat	Menjalin hubungan baik dengan berbagai pihak eksternal dan menyediakan informasi terkait pusat rehabilitasi kepada pihak eksternal	1
Divisi Publikasi & Media	Memperluas jaringan dan bertanggung jawab atas citra pusat rehabilitasi dengan pihak lain	1
Jumlah keseluruhan departemen komunikasi & hubungan masyarakat		2



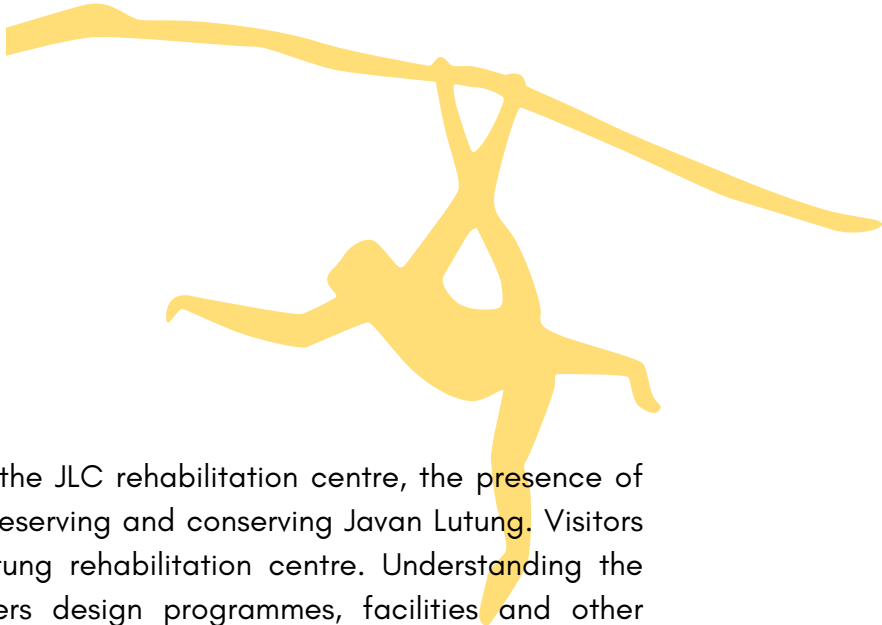
Table 1.14 Activity and function in JLC organization: safety & monitoring department, Source: author, 2025

Table 1.15 Activity and function in JLC organization: communication & public relation department, Source: author, 2025



05.

Analysis & Respond



Analysis of Userflow

Visitor and Purpose

As one of the key aspects in driving the operational quality (funding) of the JLC rehabilitation centre, the presence of visitors also plays a role in developing awareness of the importance of preserving and conserving Javan Lutung. Visitors can be classified based on their purpose for coming to the Javan Lutung rehabilitation centre. Understanding the characteristics of visitor group/individual objectives can help managers design programmes, facilities and other development aspects that are better, more efficient and appropriate to the needs of their use.

01. Education

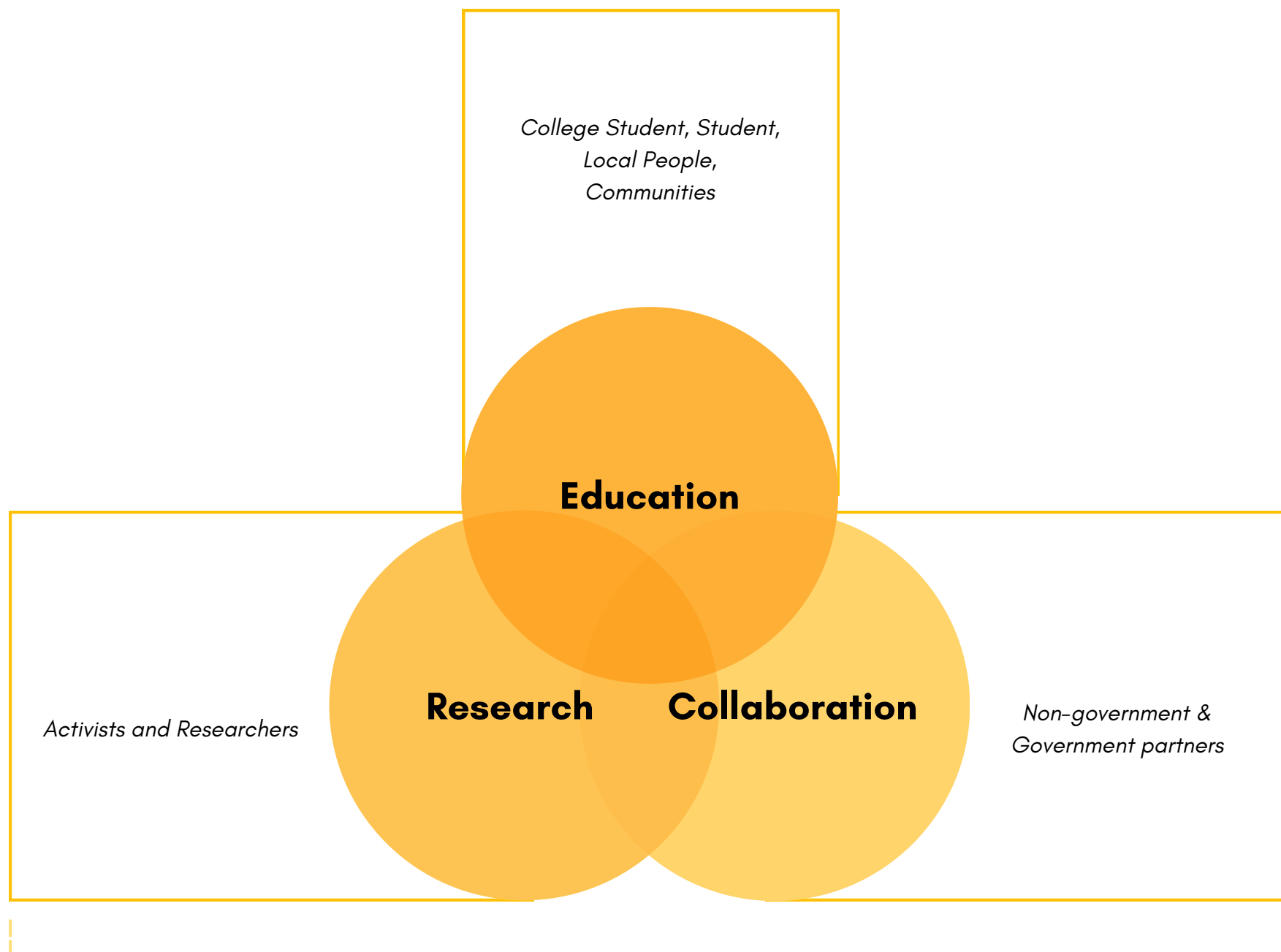
Visitors with educational purposes usually have an interest, a need to understand more about the role of the rehabilitation centre or specific information related to Javan lutung Center (JLC). They also want to gain insight into animal behaviour, conservation, rehabilitation efforts and programmes within the centre.

02. Research

A simple distinction between educational and research purposes is that it encompasses academics, scientists and students who study and explore the specifics of lutung life, health and welfare. Research often produces data that supports conservation strategies and can be further developed by the JLC rehabilitation centre.

03. Collaboration

Collaborative visitors generally come from organisations, government institutions, private partners and animal communities that work together or are interested in protected wildlife conservation. Usually, these visitors share the same vision of conservation efforts and encourage animal conservation campaign efforts to the general public and for the benefit of the country.



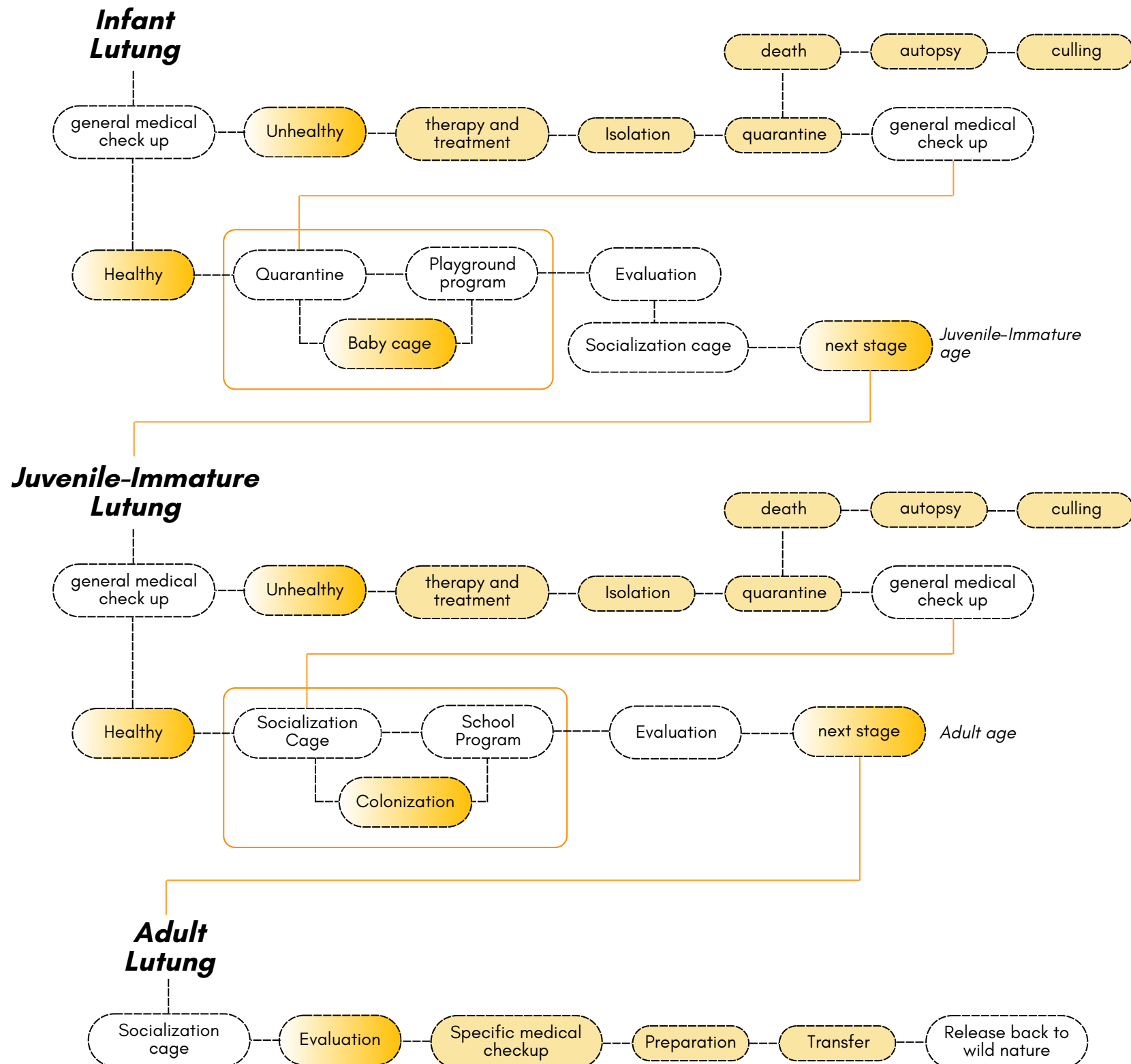
*User space requirements based on visitor purpose are categorised
as preventive measures*

Visitor Classification

The Javan lutung Centre (JLC) is located in the Coban Talun tourist area which has a very high tourist exposure, as explained in the interview results. External visits to the JLC are open to the public for the working time range Monday-Saturday with a maximum total of 30–40 visitors. However, visits to the core lutung conservation area (cages) still have visit restrictions which are usually divided into groups of a maximum of 8 people. This is because it will affect the effectiveness of the purpose of the visit and the stress level of the lutungs to human exposure.

Analysis of Javan Lutung Activity-flow

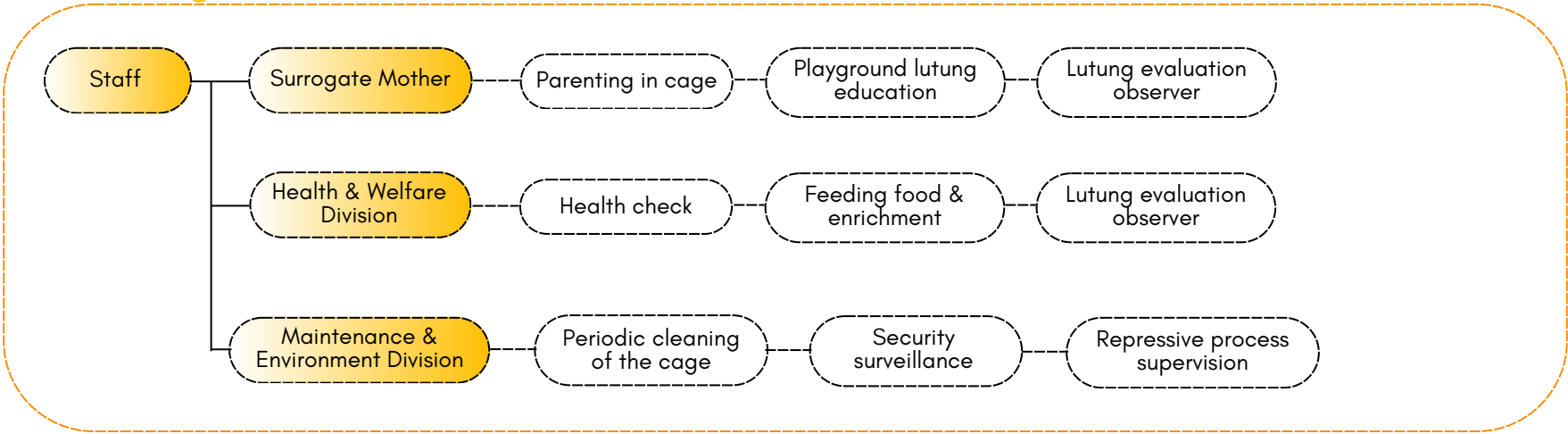
As one of the key aspects in driving the operational quality (funding) of the JLC rehabilitation centre, the presence of visitors also plays a role in developing awareness of the importance of preserving and conserving Javan Lutung. Visitors can be classified based on their purpose for coming to the Javan Lutung rehabilitation centre.



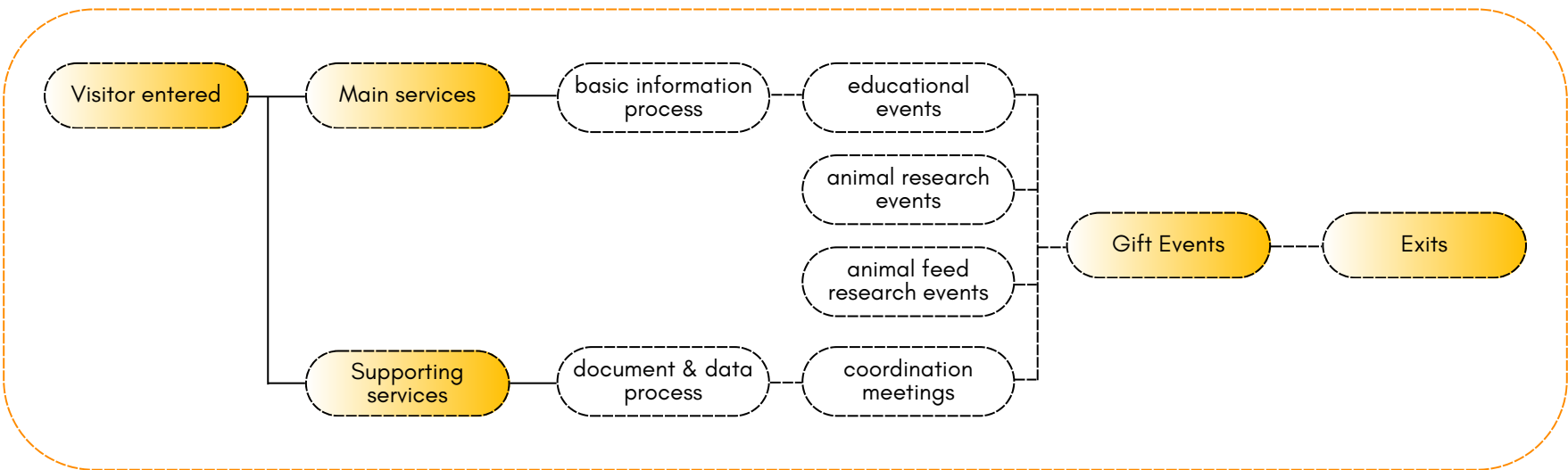
Analysis of Existing Userflow

As one of the key aspects in driving the operational quality (funding) of the JLC rehabilitation centre, the presence of visitors also plays a role in developing awareness of the importance of preserving and conserving Javan Lutung. Visitors can be classified based on their purpose for coming to the Javan Lutung rehabilitation centre.

Management Staff



Visitor



Analysis of Behavior

Based on the book "ECISTIC: An Introduction to the Science of Human Settlements" written by **Constantinos A. (1968)**, there are basic principles of architecture and planology that influence a place is activity. There are 4 foci of activity that are grouped into:

Main Activities

The main activity group in a lutung rehabilitation centre will have a Javan lutung protagonist and its manager. This core activity has the main function of building the conservation centre and the main facilities for Javan lutungs (cages and rehabilitation rooms). In the context of architecture, the core area will be prioritised in the design and has a more in-depth emphasis on needs.

B1

Supporting Activities

Supporting activity groups in architecture are related to the impact of activities to support the continuity of the main activity through additional facilities. The consideration in the design of the rehabilitation centre is to support preventive activities aimed at visitors.

B2

Management Activities

The activities of the manager are an additional consideration in the design of the rehabilitation centre which relates to the process of monitoring, guarding, caring for Javan lutungs, managing administrative aspects and system development strategies in this conservation area. Manager activities have basic needs for facilities that can accommodate them well.

B3

Service Activities

The service activity group in the rehabilitation centre has service specifications for the main characters (Javan lutungs, managers and visitors) In the architectural design of service activities focuses on providing utilities that can integrate activities with each other.

B4

Study

Environmental Behavior

According to Zeisel J. (2016) in a book “Observing Enviironmental Behavior” the focus of method for forming activity list is to observe the relationship between spatial settings and subject activities by providing insight valuable for architect to design. This observation also efforting to understand what activities occur, how they relate spatially and how environment supports or hinder these behaviors. In reality the complexity of activity or behavior can be simplified to guide the action of design. So activities can be control over from the behavioral impact and create design decision.

Elements in Environmental Behavior Observation	
Who is	<i>Actor</i>
doing <i>what</i>	<i>Act</i>
with <i>whom?</i>	<i>Significant Others</i>
In what <i>relationship</i> ,	<i>Relationships</i>
	aural, visual, tactile, olfactory, symbolic
in what <i>context</i> ,	<i>Sociocultural Context</i>
	situation culture
and <i>where?</i>	<i>Physical Setting</i>
	props spatial relations

In Rescue Center of Javan Lutung the relationship between lutung was the management staff with significant job of:



New Development

Javan Lutung Re-Birth

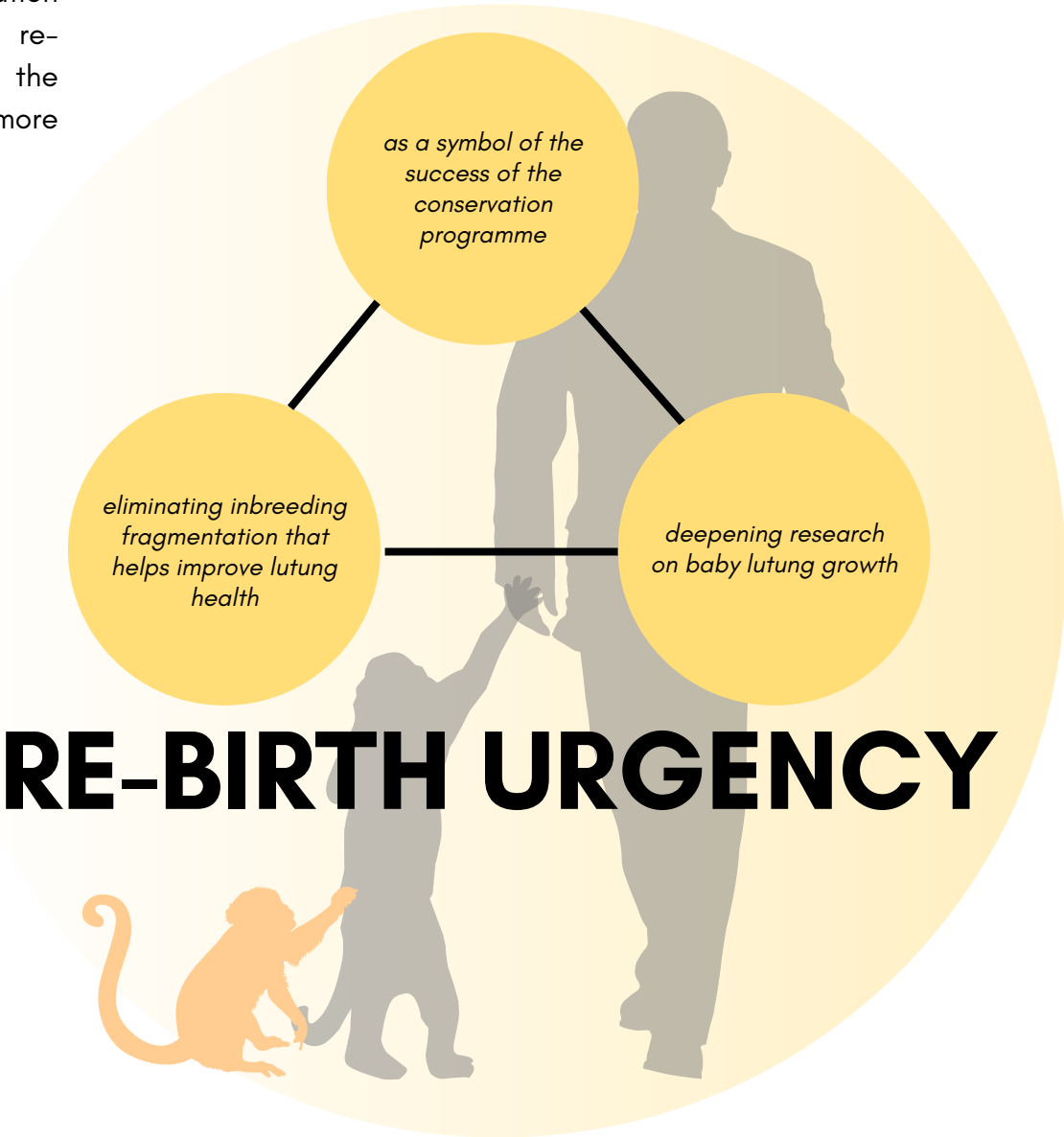
As a long-term conservation effort, the birth of Javan lutungs will help stabilise the population slowly. As an additional effort at the re-introduction stage birth control can help the socialisation/colonisation stage with a more appropriate sex ratio.

Warming Chamber



Comfortness

A warm room with a sterile, cushioned lining, naturally air-conditioned with intensive daylight. Minimum birth capacity of 2 baby lutungs



New Development

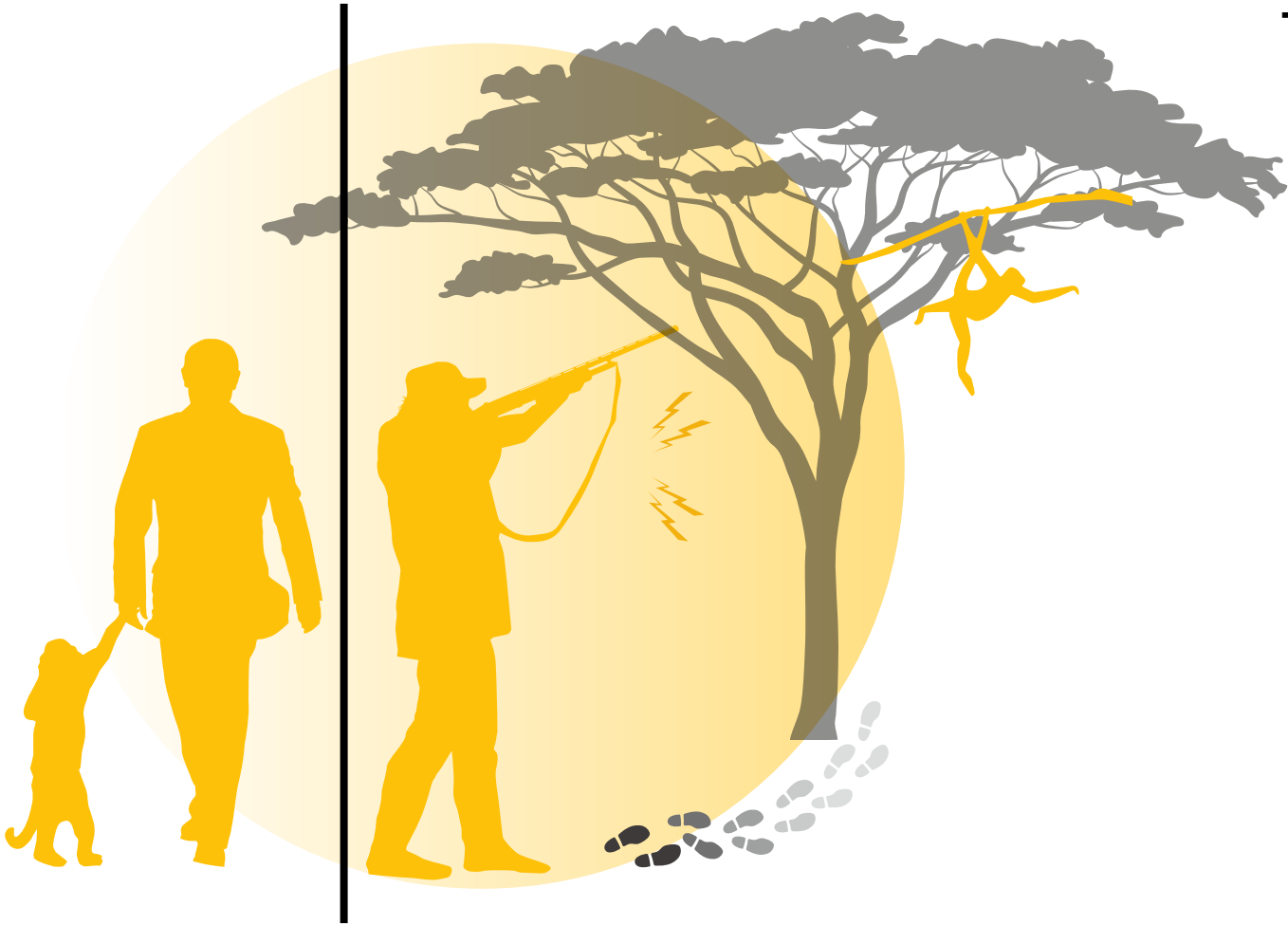
Javan Lutung School

Developing the Javan lutung's natural instincts and adaptive responses to human danger through simulation and environmental conditioning. There will be no significant change in population decline due to poaching other than the development of new habits or behaviours for both Javan lutungs and the public. Rehabilitated lutungs will be more vulnerable with greater levels of human exposure. However, this contradicts the readiness of released lutungs without any further training on poaching and self-protection. 3 New habitual development:

Avoid human voices, dog sounds, vehicle sounds and gunshots.

Introduction to hunting conditions and areas by simulating smells, conditions, puppets

Reflective escape to hide to high ground



Threat Anticipation School

Space
needs

Semi Wild Cage

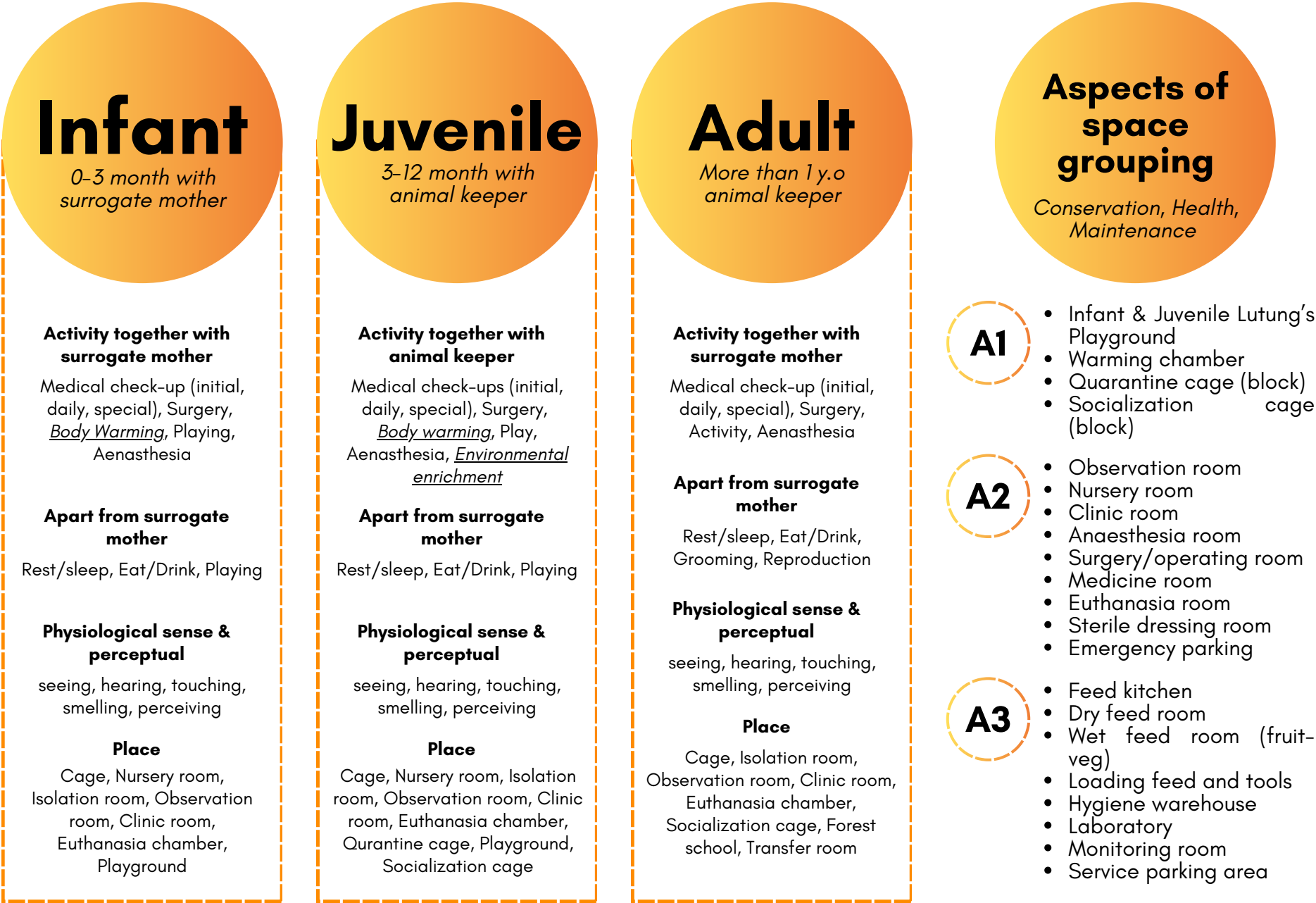
simulated hunting with human replicas, sound engineering, odour engineering, safe place engineering

Safe Zone

Unsimulated safe environments with appropriate shelters

Javan Lutung

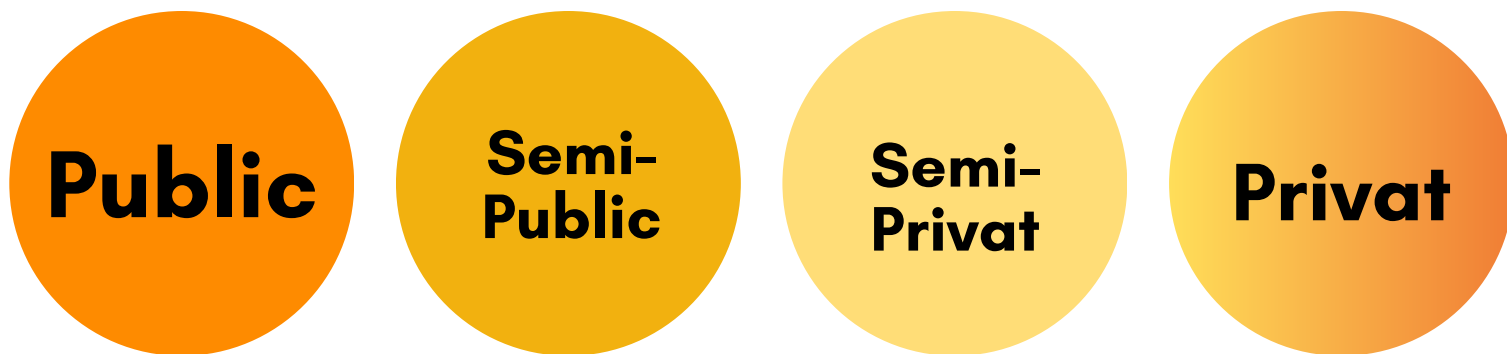
JLC implements the introduction programme as an effort to release and place Javan lutungs in environmental areas that support their lives but are not their natural habitat. This supportive aspect can be assessed by the availability of food, environmental suitability and the suitability of other ecosystem relationships for Javan lutungs. This effort includes the rescue, rehabilitation and conservation processes that are regulated by the Ministry of Environment and Forestry's work system.



Analysis

Spatial Gradient of Privacy

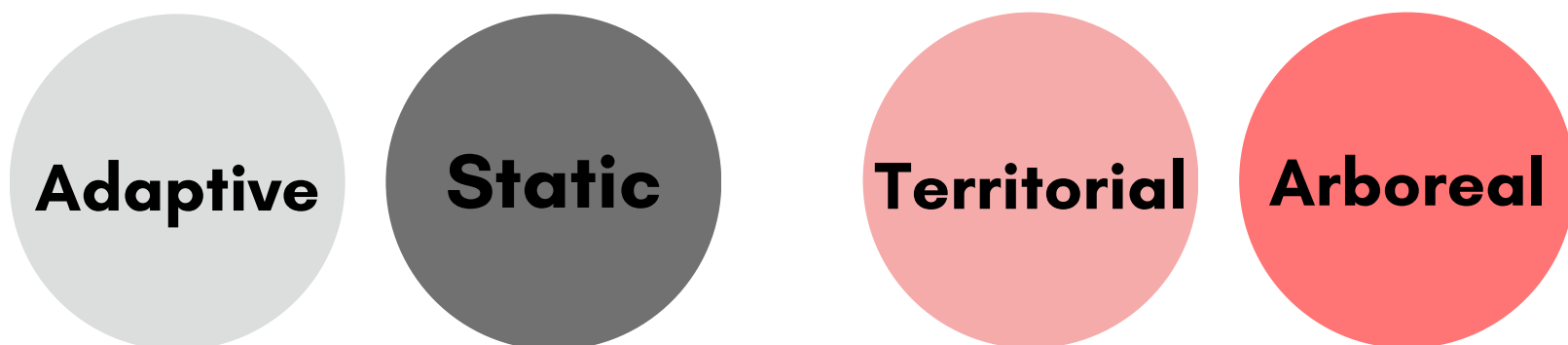
The application of the Spatial Gradient of Privacy principle in Pattern Language theory allows for a clear transition of space from public to private. The zoning starts from a space filled with a lot of human exposure as visitors and staff to a private zone that is only filled with lutungs. With the consideration of lutungs who are sensitive to disturbance while controlling the amount of exposure to human interaction responsibly to create a safe, comfortable space and foster a better rehabilitation process and preparation for wild release.



Analysis

Activity Properties

JLC implements the introduction programme as an effort to release and place Javan lutungs in environmental areas that support their lives but are not their natural habitat. This supportive aspect can be assessed by the availability of food, environmental suitability and the suitability of other ecosystem relationships for Javan lutungs. This effort includes the rescue, rehabilitation and conservation processes that are regulated by the Ministry of Environment and Forestry's work system.



NO	ACTIVITY	SPACE REQUIREMENTS	USER	SPATIAL CHARACTERISTIC	SPATIAL CATEGORY
1	Medical check-ups (initial, daily and special)	Observation room	Javan Lutung, Medic staff	Clean/Sterile, Spacious, Bright	<div><div></div><div></div><div></div></div>
2	Surgery procedures	Clinic room	Javan Lutung, Medic staff	Clean/Sterile, Spacious, Bright	<div><div></div><div></div><div></div></div>
3	Body warming procedures	Warm Chamber	Javan Lutung, Surrogate mother	Warm temperature, Controlled humidity	<div><div></div><div></div><div></div></div>
4	Aenesthesia, Observation procedures (X-ray)	Isolation room	Javan Lutung, Medic staff	Clean/Sterile, Spacious, Bright	<div><div></div><div></div><div></div></div>
5	Ending the lives of animal	Euthanasia room	Javan Lutung, Cremation staff	High privacy, Clean/sterile	<div><div></div><div></div><div></div></div>
6	Resting & Sleeping	Nursery room	Infant Lutung	Warm temperature-natural light, Clean/sterile, Cheerful color	<div><div></div><div></div><div></div></div>
		Quarantine cage	Juvenile-Immature Lutung	Vertical shape is favoured, safe material, no sharp corners, not easily damaged	<div><div></div><div></div><div></div></div>
		Socialization cage	Adult Javan Lutung	Vertical shape is favoured, safe material, no sharp corners, not easily damaged	<div><div></div><div></div><div></div></div>
7	Treatments and medicine	Medicine room	Javan Lutung, Medic staff	Clean/Sterile, Spacious, Bright	<div><div></div><div></div><div></div></div>
8	Handling health emergencies	Emergency parking	Medic staff	Spacious, Easy Access	<div><div></div><div></div><div></div></div>
9	Change of health sterile clothing	Sterile dressing room	Medic staff	Spacious, Clean/sterile	<div><div></div><div></div><div></div></div>

Table 1.16 Rescue center design programming, Source: author, 2025

NO	ACTIVITY	SPACE REQUIREMENTS	USER	SPATIAL CHARACTERISTIC	SPATIAL CATEGORY
10	socialising-grooming eating and drinking (feeding) resting/sleeping animal care and evaluation	Quarantine cage	Javan Lutung, Staff	Vertical shape is favoured, safe material, no sharp corners, not easily damaged	
11	socialising-grooming eating and drinking (feeding) resting/sleeping	Socialization cage	Javan Lutung, Staff	Vertical- horizontal shape is favoured, strong material, no sharp corners, not easily damaged	
12	environmental enrichment, play, natural environment training & development	Playground & Forest school	Javan Lutung	Small cage, Clean/sterile, Colorful	

Rescue Center

Design Programming A3

NO	ACTIVITY	SPACE REQUIREMENTS	USER	SPATIAL CHARACTERISTIC	SPATIAL CATEGORY
1	Research into lutung diseases and reproductive processes	Laboratory	Javan Lutung, Staff	Isolated, Clean/sterile	
2	Storing and preparing dry food	Dry food room Wet food room	Staff	Dry, Cool, Ventilated, Cleanable	
3	Prepare enrichment feed with other mixtures	Feed kitchen	Staff	Centralised, Hygiene	
4	Distribution, management and organisation of feed ingredients and tools	Loading food & tools area	Staff	Covered, Secure, Accesible	
5	Manage and store feed and goods	Hygiene warehouse	Staff	Dry, Ventilated	
6	Research on lutung activity and condition, facility safety monitoring	Monitoring room	Staff	Highplacement , Secure	
7	Transferring lutung, food & utensil loading area	Service parking area	Staff, Javan Lutung	Functional, Shaded	

Table 1.16 Rescue center design programming, Source: author, 2025

Design Programming Supporting Activities

JLC implements the introduction programme as an effort to release and place Javan lutungs in environmental areas that support their lives but are not their natural habitat. This supportive aspect can be assessed by the availability of food, environmental suitability and the suitability of other ecosystem relationships for Javan lutungs.

NO	ACTIVITY	SPACE REQUIREMENTS	USER	SPATIAL CHARACTERISTIC	SPATIAL CATEGORY
1	Arrival, Welcoming events, Taking photo	Arrival Plaza	Visitor	Open, Naturalistic	
2	Search for educational information, conservation area information and facility information	Information Center	Visitor	Interactive, Calming color	
3	Hosting educational events, hosting other side events	Amphitheater	Visitor	Semi-open, inclusive seating	
4	Reading books, Procurement of literature and information documents	Library	Visitor	Contemplative, Quite, Bright	
5	Relaxing, meeting point with others	Sitting & Waitting area	Visitor	Clear orientation, Open	
6	Eating, Drinking Relaxing	Cafe & Resto	Visitor	Casual, Nature-blended	
7	Defecation or micturition	Toilet	Visitor	Hygiene, Well-ventilated	
8	Praying	Mushola	Visitor	Quite, Respectful, Bright	
9	Dropping off items and lost and found centre	Lugage & Lost-found room	Visitor	Secured, Shaded	
10	Parking	Car & Motorcycle parking area	Visitor	Functional, Shaded	

Table 1.17 Rescue center design programming: supporting activities, Source: author, 2025

Design Programming Supporting Management Activities

JLC implements the introduction programme as an effort to release and place Javan lutungs in environmental areas that support their lives but are not their natural habitat. This supportive aspect can be assessed by the availability of food, environmental suitability and the suitability of other ecosystem relationships for Javan lutungs.

NO	ACTIVITY	SPACE REQUIREMENTS	USER	SPATIAL CATEGORY
1	Seeking information or co-operation, serving visitors	Front office	Open, Formal interior, Clear sign	
2	Relaxing and meeting point with others	Lounge (Waiting room)	Comfortable, Bright, Natural light	
3	Parking	Parking area (motorcycle & car)	Secured, Shaded	
4	Store, update and manage archive documents containing data	File storage room	Secured, Dry, Ventilated	
5	Work and coordinate on management within the rehabilitation centre	Meeting room	Formal, Quite, Accessible	
6	Eating, Drinking and Relaxing	Pantry	Efficient room, Relaxing material	
7	Store items for educational and tourist events	Educational-development tool storage	Rugged, Dry, Well - organized	
8	Praying	Mushola	Quite, Respectful, Bright	
9	Defecation or micturition	Toilet	Hygiene, Well-ventilated	

Table 1.18 Rescue center design programming: management activities, Source: author, 2025

Design Programming Service Activities

JLC implements the introduction programme as an effort to release and place Javan lutungs in environmental areas that support their lives but are not their natural habitat. This supportive aspect can be assessed by the availability of food, environmental suitability and the suitability of other ecosystem relationships for Javan lutungs.

NO	ACTIVITY	SPACE REQUIREMENTS	USER	SPATIAL CATEGORY
1	Maintain and monitor all visitor accessibility and security	Security room	Alert, Compact, Strategic location	
2	Maintain surveillance camera footage	CCTV room	Darkened, Cool	
3	Store operational items throughout the rehabilitation centre	General warehouse	Large, Dry, Well-organized	
4	Store cleaning tools and materials	Janitor & cleaning warehouse	Wet-ready, Accessible, Chemical safe	
5	Controlling and distribute building water	WWTP room	Isolated, Controlled	
6	Distribute and controlling main electricity power	Electricoty room	Secured, Restricted, Dry, Coated	
7	Operate emergency power backup	Generator room	Secured, Restricted, Dry, Coated	
8	Manage air circulation and electricity distribution	AHU & transformer room	Insulated, Coated, Accessible	
9	Manage internal telecommunication system	PABX room	Cool, Dust controlled	

Table 1.19 Rescue center design programming: service activities, Source: author, 2025

Rescue Center

Space Lutung Activities

The basic needs for lutungs in the repressive programme are basic housing and health support facilities. The repressive programme consists of a quarantine phase, a socialisation phase, and a reintroduction phase. Additional housing areas provide convenient circulation for staff management to regularly clean the lutung cages, especially the base or floor.

The primary health facilities for infant lutungs are play areas and warm rooms. For adolescent to adult lutungs, no special rooms are required beyond health support facilities. Health-related spaces include medication rooms, operating rooms, and post-mortem cleaning rooms.

Space Programming					
Javan Lutung Facilities					
No.	Room Name	Capacity	Room amount	Standard size	Area
1.	Playground Infant	3-5 Infant Lutung		1 3x5m = 15m ² /u	30
2.	Quarantine Cage Juvenile-Immature	1 Javan Lutung		3x4m = 12m ² /u 4 height = 3m 12m ² + 2m distance = 14m x 4 = 56m ²	56
3.	Quarantine Cage Block	-	-	movement spc 56m+10m ² =66m ² 66m ² x12 lutung=	
4.	Socialization Cage Adult	10-12 Javan Lutung		4 792m ² 792mx4 = 3168 3168 + setback 2-3 m= 3268	616
5.	Socialization Cage Block	-	-	66m ² x 21 lutung	3268
6.	Island School Green Area	21 Javan Lutung		1 = 1281m ²	1281
7.	Island House	3 Javan Lutung		4 56m ² x 4= 224m ²	224
Area Total					5475
Circulation + 50%					2737,5
Total					8212,5

Javan Lutung Supporting Facilities					
No.	Room Name	Capacity	Room amount	Standard size	Area
1.	Warming Chamber	2 Javan Lutung		1 3x4m = 12m ²	12
2.	Arboretum Room	100 Vegetation		1 1,5x3m = 4,5m ²	4,5
3.	Laboratory	3 Person		1 25m ²	25
4.	Dry Food Room	3 Person		1 3x3m = 9m ²	9
5.	Wet Food Room	3 Person		1 3x3m = 9m ²	9
6.	Food-Prep Kitchen	3 Person		1 3x3m = 9m ²	9
7.	Tools Warehouse	2 Person		1 10m ²	10
8.	Loading-Prep Food & Tools	2 Person		1 20m ²	20
Area Total					98,5
Circulation + 50%					49,25
Total					147,75

Javan Lutung Health Facilities					
No.	Room Name	Capacity	Room amount	Standard size	Area
1.	Observation Room	2 Person 1 Lutung		1 4m ²	8
2.	Nursery	2 Person 2 Lutung		1 6m ²	6
3.	Clinic Room	2 Person 1 Lutung		2 3x5m = 15m ² /u	15
4.	Isolation Room	2 Person 1 Lutung		1 2x3m = 6m ²	6
5.	Operation Room	2 Person 1 Lutung		1 4x5m = 20m ²	20
6.	Anesthesia Room	2 Person 1 Lutung		1 3x4m = 12m ²	12
7.	Euthanasia Room	2 Person 1 Lutung		1 2x3m = 6m ²	6
8.	Medicine Room	2 Person		1 2x3m = 6m ²	6
9.	Sterile Changing Room	3 Person		1 2m ² /person	6
10.	Loading Transfer	2 Person		1 4x6m = 24m ²	24
Area Total					97
Circulation + 50%					48,5
Total					145,5

Table 1.20 Space programming : javan lutung facilities, Source: author, 2025
Table 1.21 Space programming : javan lutung supporting facilities, Source: author, 2025
Table 1.22 Space programming : javan lutung health facilities, Source: author, 2025

Rescue Center

Space Programming Main & Management Activities

With the addition of public educational functions, more consideration is given to the layout of parking and public spaces, which are supported by commercial areas of 10–20%. Public spaces with primary educational functions are provided in the amphitheatre and conference hall. Additional educational roles are provided by the lutung museum and interactive park on how lutungs form colonies.

Additionally, public facilities such as prayer rooms, pantries, toilets, and others are centralised to accommodate the needs of visitors and management staff together, aiming for a more efficient spatial layout.

Utility spaces are also included in areas separate from the main building to ensure privacy and easier maintenance.

Visitor					
No.	Room Name	Capacity	Room amount	Standard size	Area
1.	Arrival Plaza	30 Visitor + 15 Staff		1 1m2/ person	35
2.	Information Center	30 Visitor + 5 Staff		1 2m2/ person 2m2/ person	70
3.	Amphitheater	50 Visitor + 5 Staff		1 10m2 stage area	120
4.	Library	16 Visitor		1 24m2	40
5.	Sitting Area	16 Visitor		1 16m2	16
6.	Café and Resto	10 Visitor + 4 staff		4 12m2	48
7.	Lugage Room	2 Staff		1 20m2	20
8.	Playground	4 Kids		1 12m2 1m2/ person	12
9.	Public Mosque	±50% human (25 Visitor) ±50% human (25 Visitor)		1 room + 10m2 ablution	35
10.	Public Toilet	Visitor)		2 ±20m2	40
11.	Mini Museum	16 Visitor + 2 Staff		1 4x5m = 20m2	40
12.	Interpretative Nature Park	30 Visitor + 2 Staff		1 -	1000
Area Total					1476
Circulation + 50%					738
Total					2214

Management Office					
No.	Room Name	Capacity	Room amount	Standard size	Area
1.	Director/Manager Room	1 Person		1 25m2	25
2.	Scretary Room	1 Person		1 4m2/ Person	4
3.	Funding Room	1 Person		1 4m2/ Person	4
4.	Program & Planning Division	2 Person		1 4m2/ Person	8
5.	Executive Division	4 Person		1 4m2/ Person	16
6.	Health & Welfare Division	5 Person		1 4m2/ Person	20
7.	Research & Education Division	2 Person		1 4m2/ Person	8
8.	Facility & Logistic Division	2 Person		1 4m2/ Person	8
9.	Management & Hygiene Division	2 Person		1 4m2/ Person	8
10.	Security & Monitoring Division	3 Person		1 4m2/ Person	12
11.	Communication Relation	2 Person		1 4m2/ Person	8
12.	Division	2 Person		1 4m2/ Person	8
Area Total					93
Circulation + 50%					46,5
Total					139,5

Service Management					
No.	Room Name	Capacity	Room amount	Standard size	Area
1.	Security Guard	1 Person		4 4m2	16
2.	CCTV Room	1 Person		1 4m2/ Person	4
3.	General Warehouse	1 Person		1 4m2/ Person	4
4.	Cleaning + Janitor Room	2 Person		1 4m2/ Person	8
5.	WWTP Room	4 Person		1 4m2/ Person	16
6.	Electricity Room	5 Person		1 4m2/ Person	20
7.	Generator Room	2 Person		1 4m2/ Person	8
10.	Stairs	3 Person		1 4m2/ Person	12
11.	Visitor Parking Area	(70%motorcycle & 30%car) = 15 Car + 30 Motorcycle		1,5m2/u. motor 1 12,5m2/ u. car	232,5
12.	Staff Parking Area	(70%motorcycle & 30%car) = 7 Car + 18 Motorcycle		1,5m2/u. motor 1 12,5m2/ u. car	114,5
13.	Loading Dock Area	2 Vehicle		1 42,5m2/ u.truck	85
14.	Emergency Parking Area	2 Vehicle		1 18m2/ u. car	36
Area Total					556
Circulation + 50%					278
Total					834

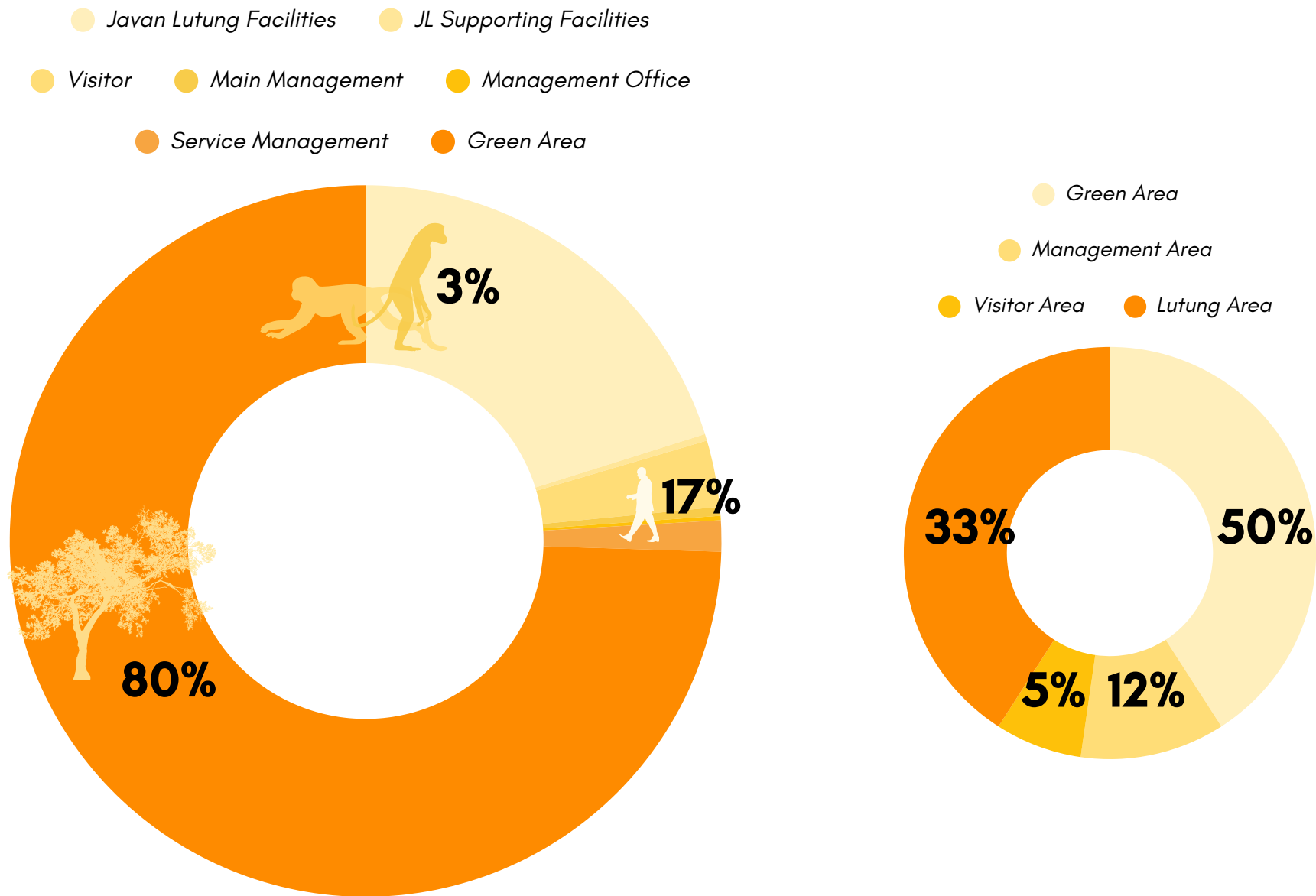
Table 1.23 Space programming : visitor, Source: author, 2025
Table 1.24 Space programming : management office, Source: author, 2025
Table 1.25 Space programming : service management, Source: author, 2025

Space Programming Service Activities

Based on the calculation of the space size, it can be concluded that the total area of the building reaches 11,550 square metres, which takes up 17% of the building area, including the circulation design.

TOTAL CALCULATION				
No.	Part	Capacity	Area	Notes
1.	Javan Lutung Facilities	-	8212,5	13,04%
2.	Javan Lutung Supporting Facilities	-	147,75	0,23%
3.	Visitor	-	2214	3,51%
5.	Management Office	-	139,5	0,22%
6.	Service Management	-	834	1,32%
Total Area			11547,75	11.550
Site Area			63000	51.450

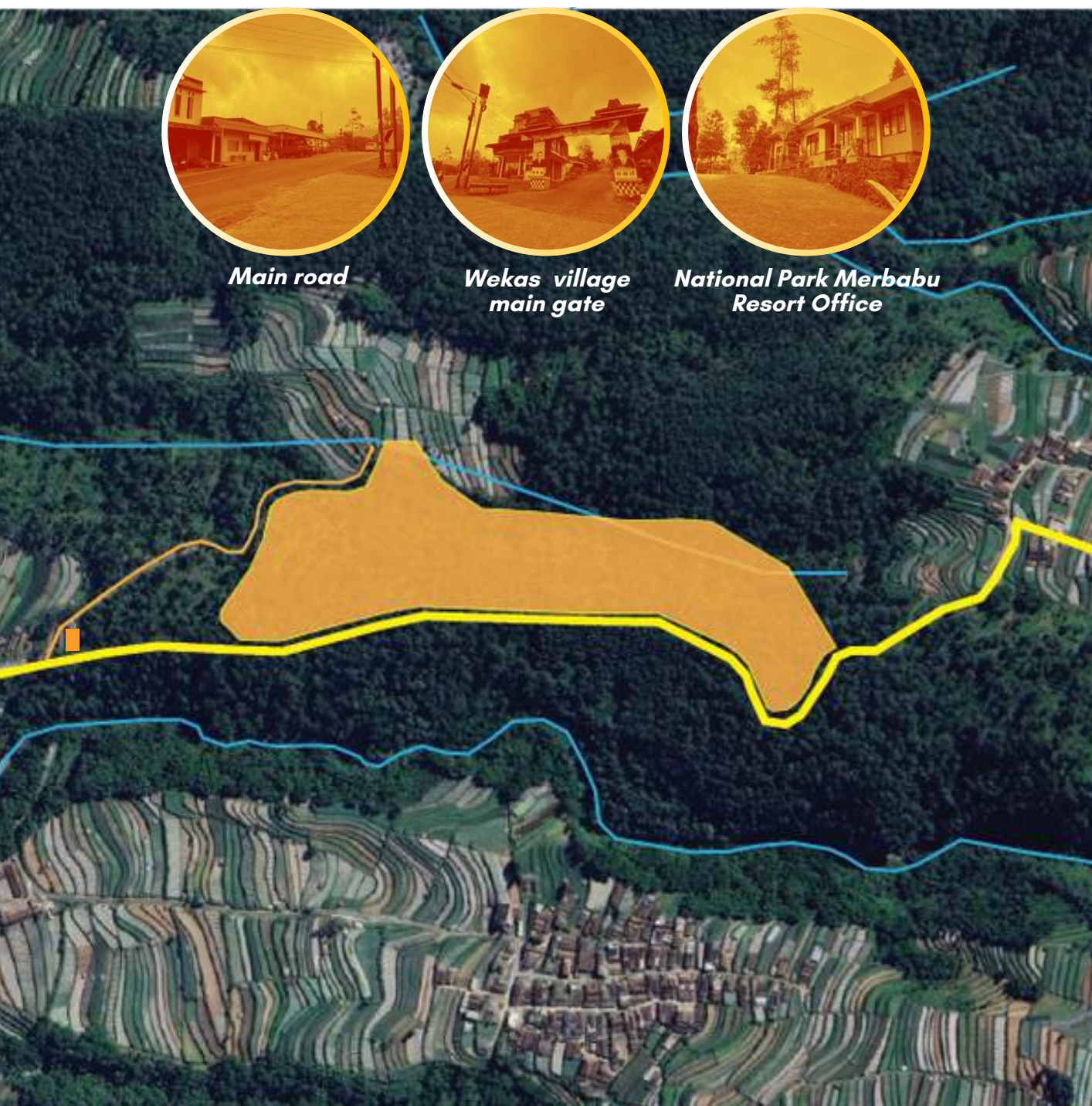
Based by the regulation and the JLC interview, the regulation for building calculation would define as **BCR (+) 20% and GAR (-) 80%.**



The graph above shows the land use distribution of 6.3 hectares, which prioritises green open space to achieve the minimum regulatory limit of 80%. This calculation includes the use of roofing materials or building materials that affect the percentage of closed or open building coverage. This consideration leads to a monkey enclosure system that is more oriented towards open architectural design in order to create a more natural living environment for monkeys and allow them to interact directly with natural elements such as sunlight, wind, and rainwater.

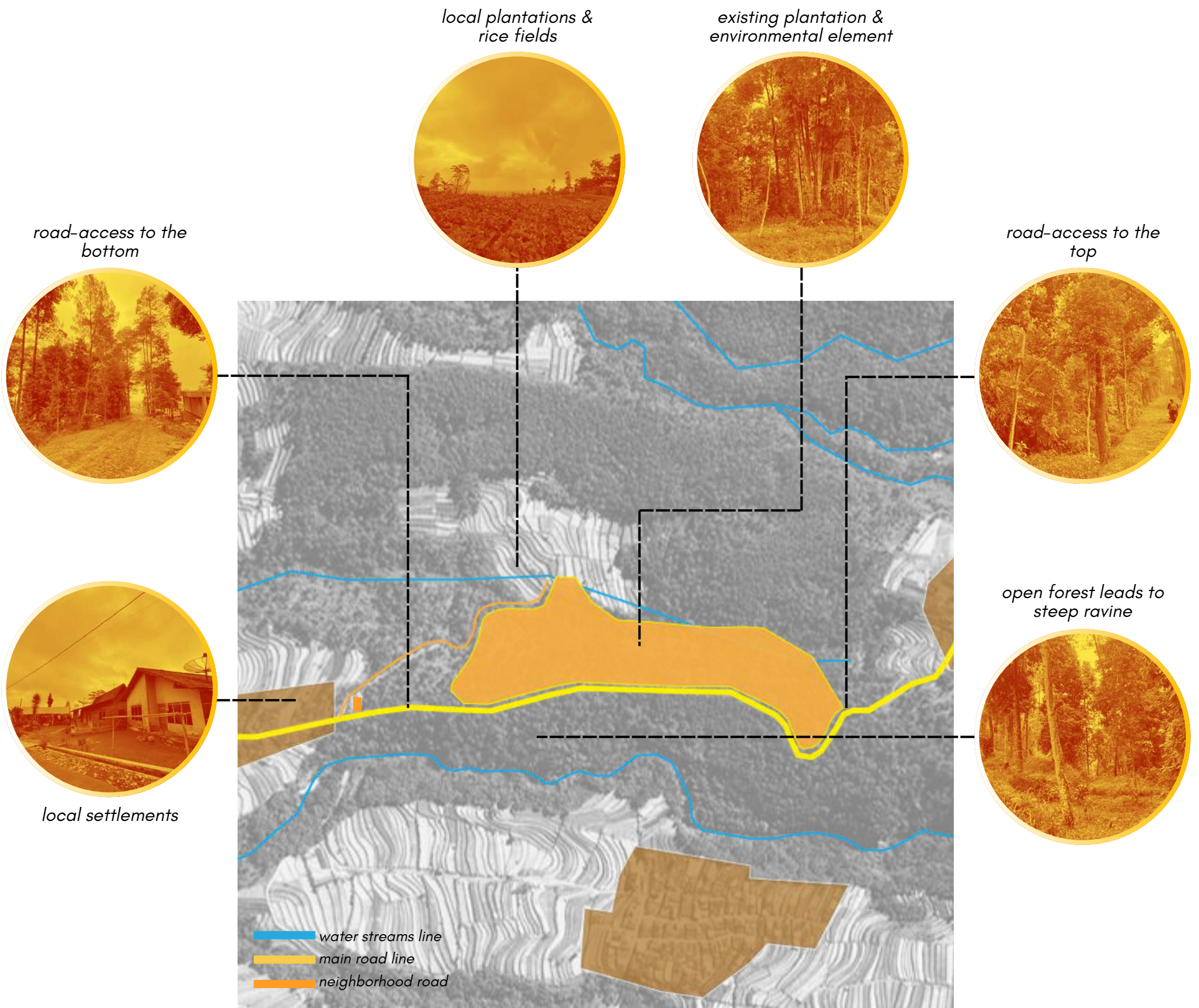


06.
**Conceptual
Exploration**



Analysis of Selected Site

Entering the area of the Mount Merbabu National Park, this location, which is close to the Mount Merbabu tracking route via Wekas, is located right in the utility zone with an environmental height that is more like a Javan Lutung habitat. Located right behind the Pakis resort office of Mount Merbabu National Park, precisely on the Poglan A road, Pakis District. The location can be reached directly through the Magelang Salatiga highway which is suitable for 2-wheeled and 4-wheeled vehicles.



surroundings

Figure 6.4 Surrounding elements, Source: author, 2025

Site Regulation Analysis

Broadly speaking, the general provisions of land use in the utility zone of the Mount Merbabu National Park are to have a permitted **BCR ≤10%, FAR ≤10, and GAR ≥90%** as the design benchmark in a protected area.

through the Minister of Forestry
Regulation No. P.56/Menhut-II/2006

BCR
+20%

FAR
0,5

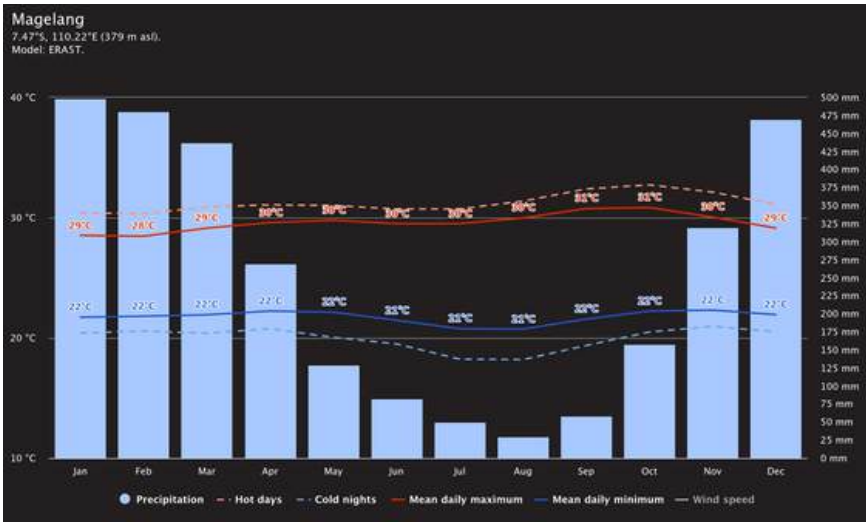
GAR
-80%

Building Height
25m

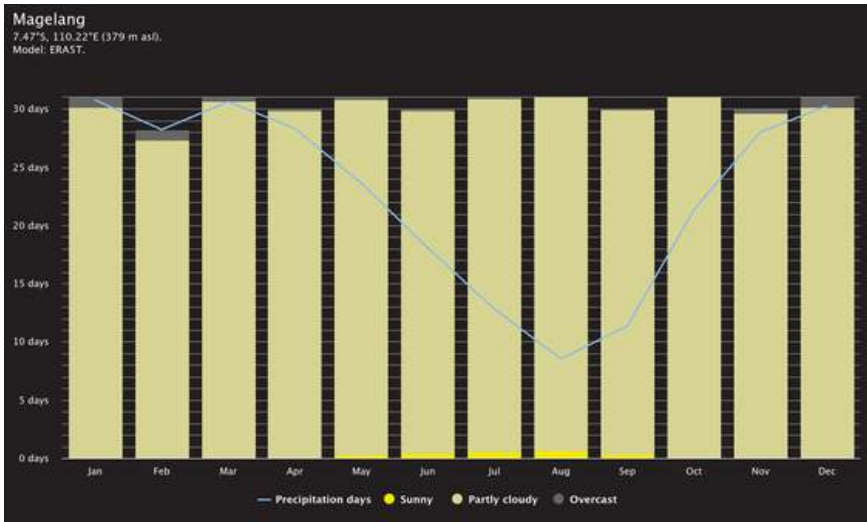
GSB
3m & 2m /building

In accordance with the building planning and design standards in article 13 paragraphs 4, 5 and 6 in the Magelang District Regulation No. 3 Year 2023 and Regulation No. 10 Year 2011 article 30 specifically mention the setback of building to road and within the building design. From this regulation it can be conclude that BCR can form 40%, FAR 0,4, GAR can form 10%, building height 25m.

Site Environmental Analysis

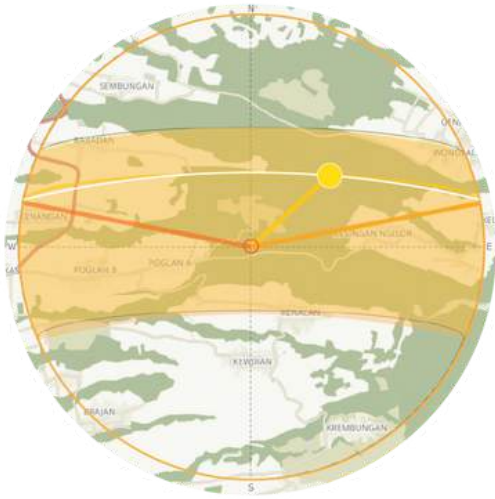


The climatic data from Meteoblue for Magelang indicates a tropical monsoon climate with consistently high humidity, moderate temperature ranges, and substantial rainfall throughout the year, particularly from November to April. The average daily temperature fluctuates between 21°C and 31°C, offering a generally warm and stable thermal environment suitable for primates like the Javan lutung.

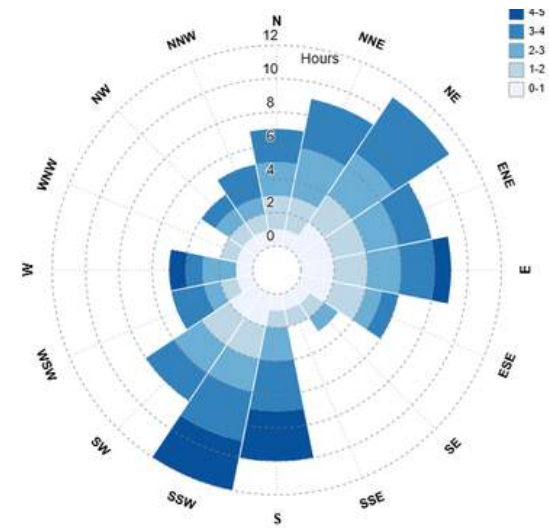


Magelang’s high rainfall during the wet season and drier period from June to August call for weather-resilient design in the Javan lutung rescue center, with wide roof overhangs, raised floors, and good drainage. Limited sunlight also suggests the need for efficient lighting and backup solar power.

Figure 6.5 Climate data general, Source: meteoblue.com
Figure 6.6 Climate data rainfall, Source: meteoblue.com



The sun diagram for Magelang shows consistent sun exposure throughout the year, with the sun rising from the east and setting in the west, and relatively high sun angles - especially around midday - supporting optimal daylighting and passive solar heating. This supports the incorporation of daylight-oriented architectural designs, such as placing activity zones and observation areas in sunlit positions while providing shaded zones using vegetation or roof overhangs into the lower ground contours to prevent overheating.



The wind rose shows predominant wind directions from the east and southeast, particularly during the dry season, suggesting that ventilation systems and open structures in the Javan lutung rescue center should be oriented to capture these breezes for natural cooling. Enclosures and visitor pathways should also be aligned to reduce wind stress while enhancing air circulation, which is essential for maintaining animal comfort and minimizing humidity buildup in tropical conditions.

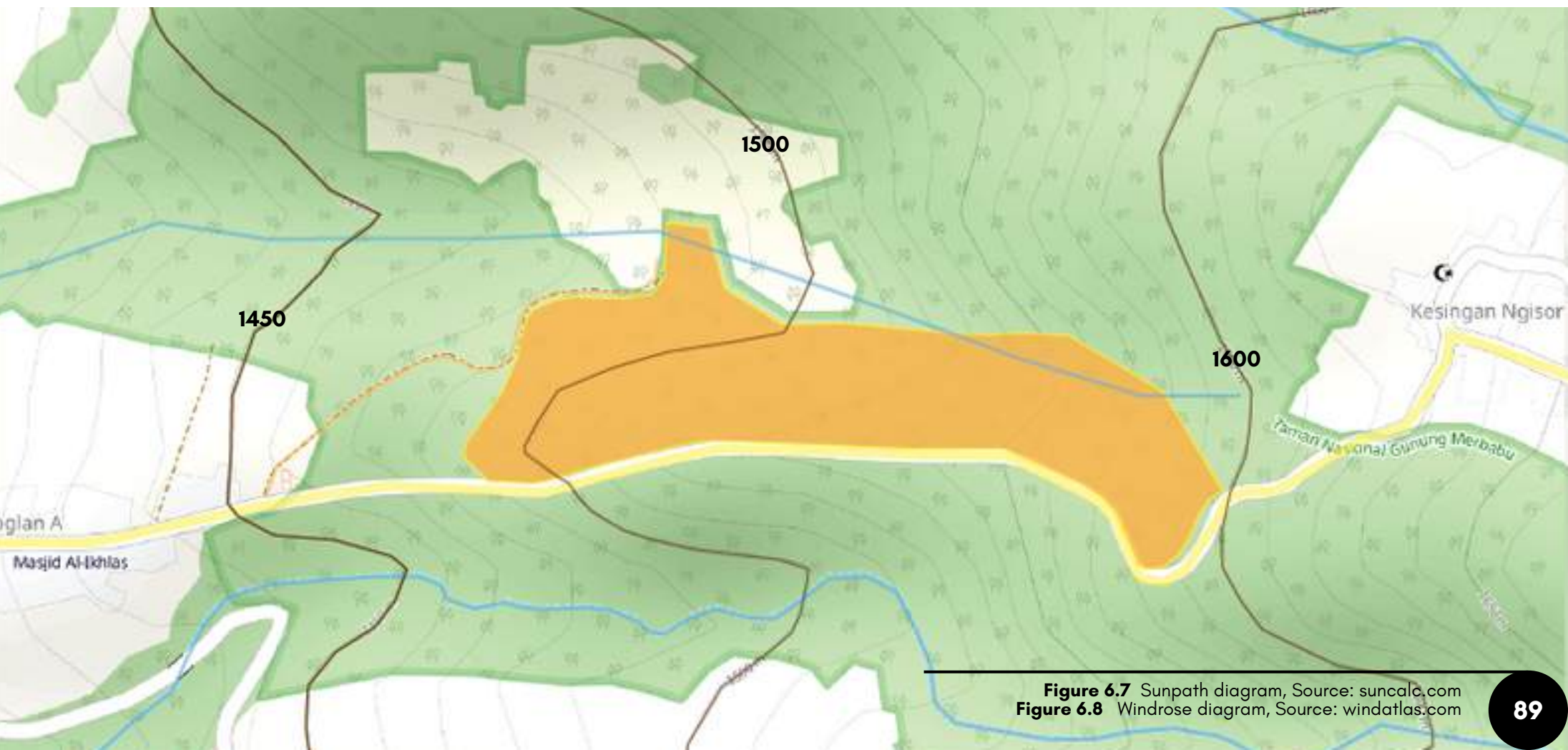
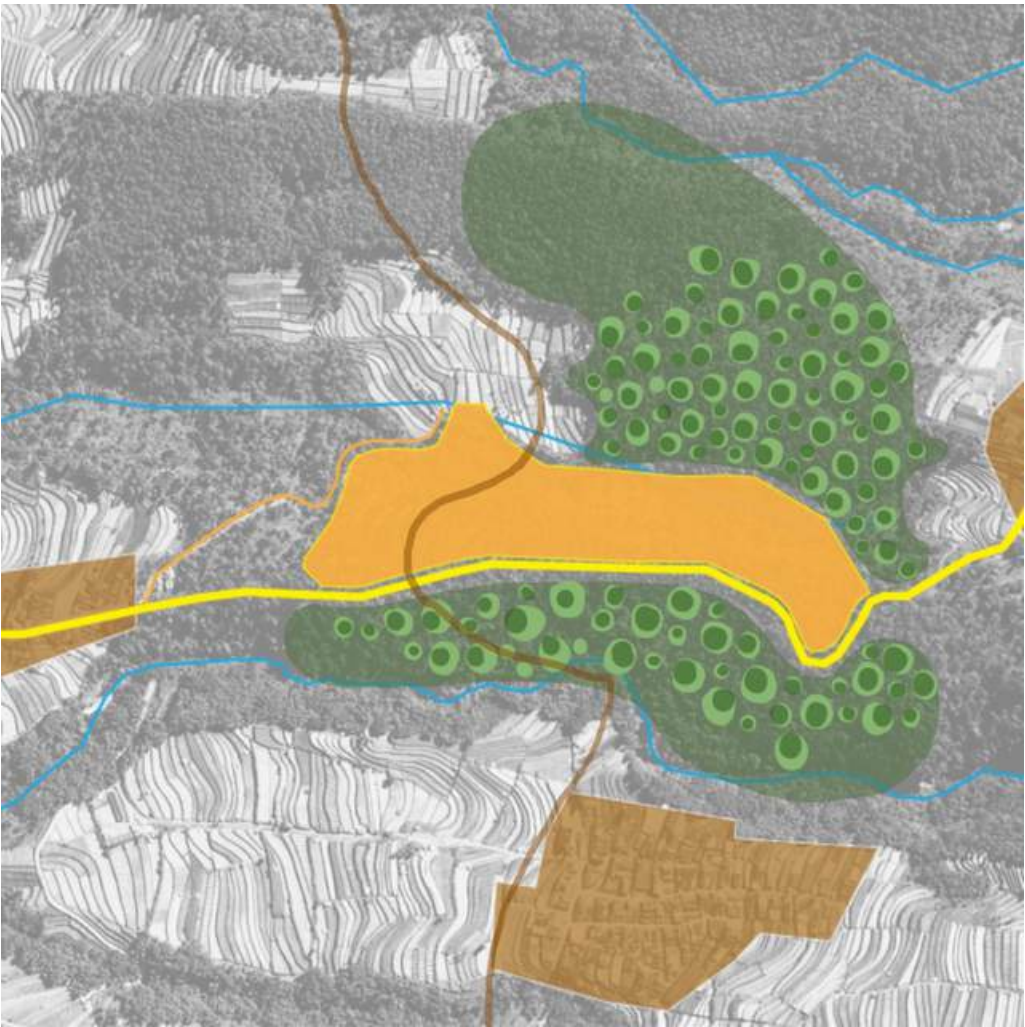


Figure 6.7 Sunpath diagram, Source: suncalc.com
Figure 6.8 Windrose diagram, Source: windatlas.com

Site Existing **Vegetation** Analysis



Calliandra leafs



For lutungs, JLC recommend Calliandra tree that provides a beneficial supplementary food source, especially in degraded or secondary forests where native vegetation might be limited. Its relatively high protein content makes it a more suitable and nutritious option within their diet.

Teak tree leafs



According to Kool (1993), lutung choose young leaves from teak trees as their main food source because of their rich protein content. In addition, the characteristics of teak trees, which are suitable and adaptable to the habitat, are an advantage of the food source cycle for lutung in the wild.

Guava tree (branches & leafs)

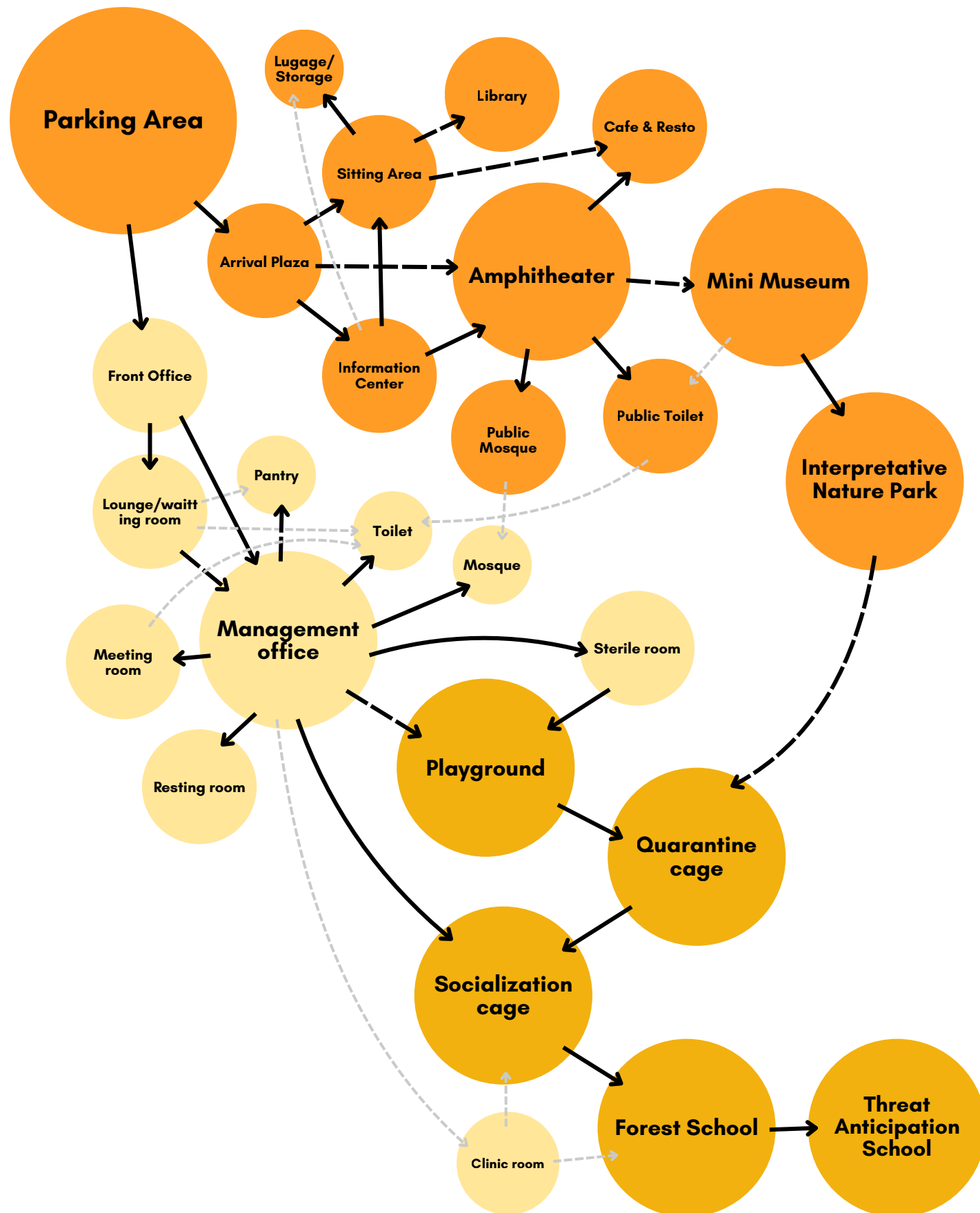


Guava (*Psidium guajava*) leaves and young branches can serve as a food source for lutungs, particularly because the leaves are relatively tender and contain beneficial secondary compounds like antioxidants. While not as protein-rich as some legumes, guava leaves are palatable and digestible for **folivorous primates** like lutungs

Dadap tree (branches & leafs)



Dadap (*Erythrina* spp.) is a leguminous tree known for its fast growth and nitrogen-fixing properties. Its leaves are soft, protein-rich, and highly nutritious, making them an excellent food source. At the other side, dadap tree as chosen to be sleeping bed by lutung regarding the character of the height and diameter of the shade in accordance with the needs of lutung



Study

Spatial Programming



Public Area (Visitor-Staff)



Semi Public-private Area (Staff-Lutung)



Private Area (Lutung)



Direct Adjacency



Indirect Adjacency



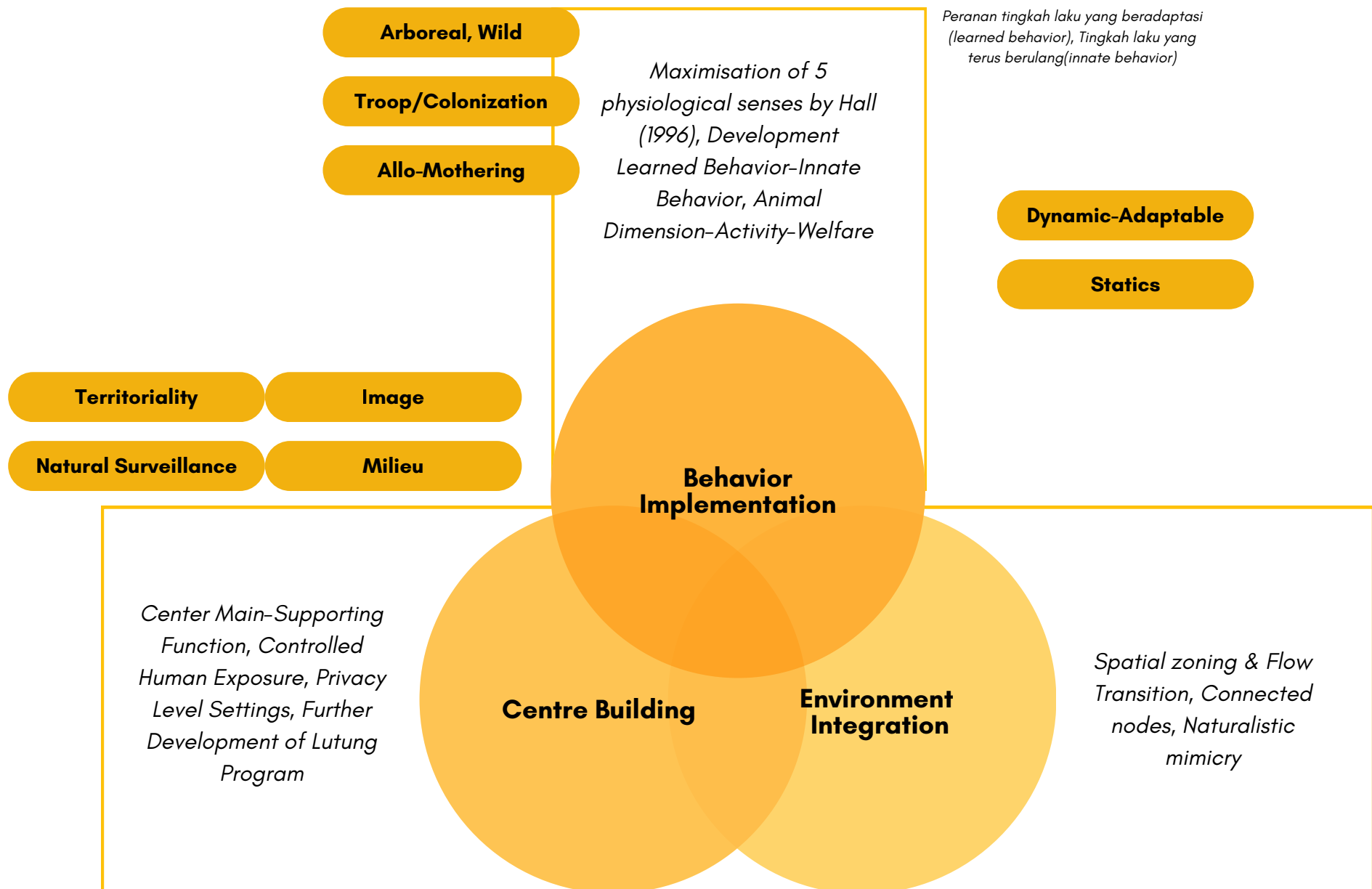
Nearby



Activity flow

Design *Concept*

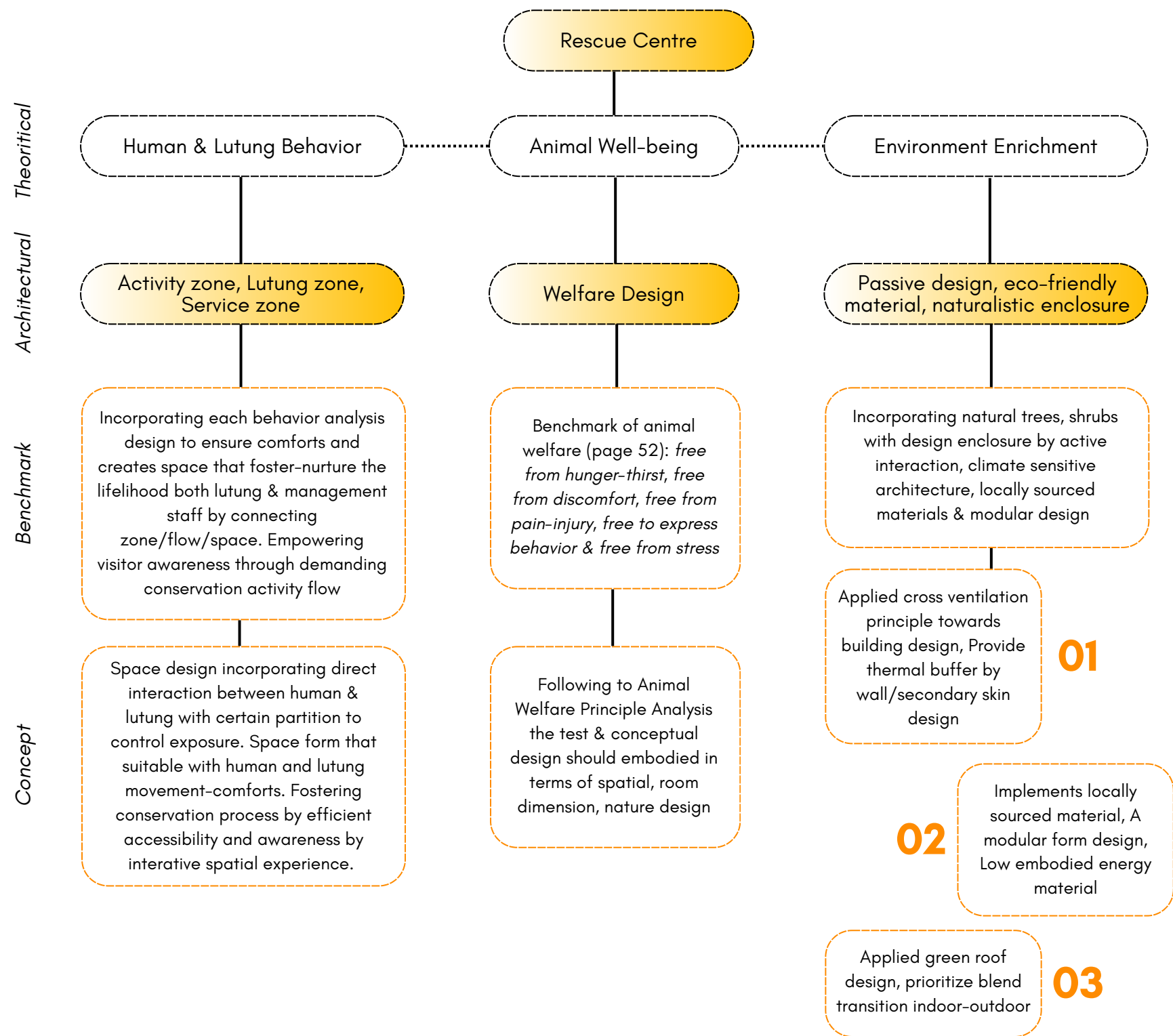
Spatial concept and Behavior Consideration



All the three principle leads by the rescue centre design that emphasize behavioral principle and environmental strategies to promote animal welfare while balancing human interaction between visitor and management staff that incorporate to operational sustainability. At it's core adressing lutung welfare relationship into creation of man-made habitat development can leads improving cognitive challenge and enrichment activities from mental and phsyical by 5 phsyicological sense. Simulatenously, human activity are demand and regulated via guided corridor that maintain controlable and restricted sensory exposure towards lutung. Thic concept ment human activity served in different placement with lutung and needs defined barrier. An envirnment integration placed at layered spatial zoning from public to private as it gradually transitioning the different zone still needs a connected nodes-interactive waypoints to maintain narrative continuity lutung conservation. A designed building center acts as a hub applying layered visual while offering econommic self-funding mechanisms.

Design *Concept*

Behavior based habitat design for Javan Lutung conservation : integrating environment enrichment, and controlable human interaction





analysis & respond

Understand Need & Privacy Level Settings

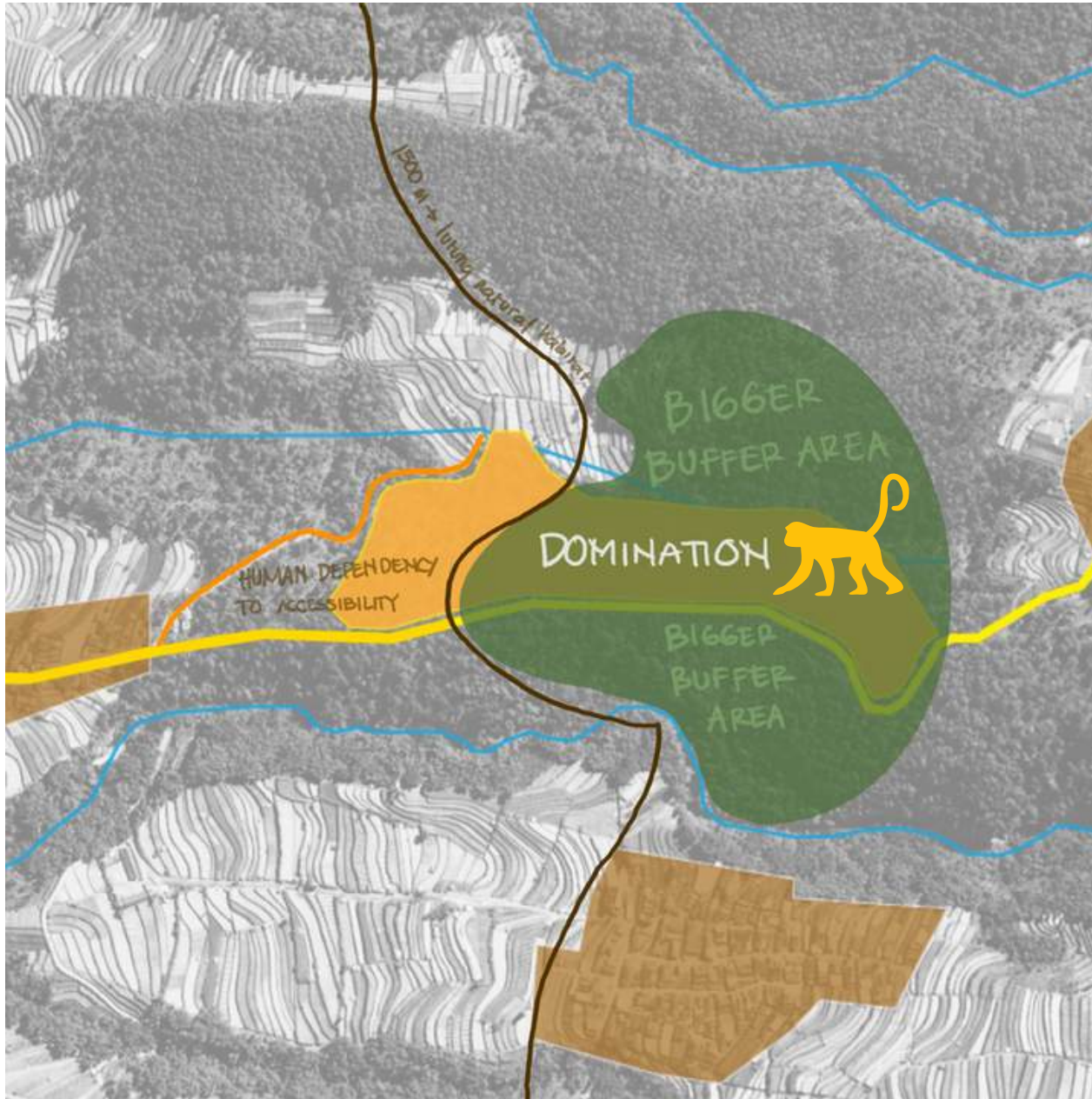
The sun diagram for Magelang shows consistent sun exposure throughout the year, with the sun rising from the east and setting in the west, and relatively high sun angles - especially around midday - supporting optimal daylighting and passive solar heating.



Applying the idea of allo-mothering in Javan lutungs (a kind of monkey where individuals other than the biological mother help raise offspring) to architecture and site zoning. This approach could lead to a more cooperative, communal, and adaptive design strategy.



Figure 6.11 Lutung allo-mothering, Source: wikipedia.com
Figure 6.12 Site zoning conceptual, Source: author, 2025
Figure 6.13 Site privacy conceptual, Source: author, 2025



analysis & respond

Implementing *Landscape urbanism* principle

As to respect the natural environment of merbabu mountain the spatial design should implement landscape urbanism principle where putting domination of lutung zone that require and consist larger green area rather than human zone. Considering the natural needs & behavior human are prioritizing the accessibility as a main point of movement comfort. The spatial design should follow contoured pattern-curved, sun orientation and wind rose as to follow the design development such as building orientation, building form and building material.

analysis & respond

Considering & Fostering Site Context

By the site data analysis, the design development from site context started on how the contoured-sloopy area would delivered rain water runoff, how the 2 sided windrose flow would impact building air circulation and how sun orientation impacting the natural lights. Building mass would develop following each contour line to have align earthquake rotation. At the same time, a small diagonnal orientation helps to gather air circulation better for each building mass and develop jam-proof rain water runoff. By this intention, the design would have similar arrangement towards the contour and gave more smmaller environment impact regarding the structure and constructing method later on.

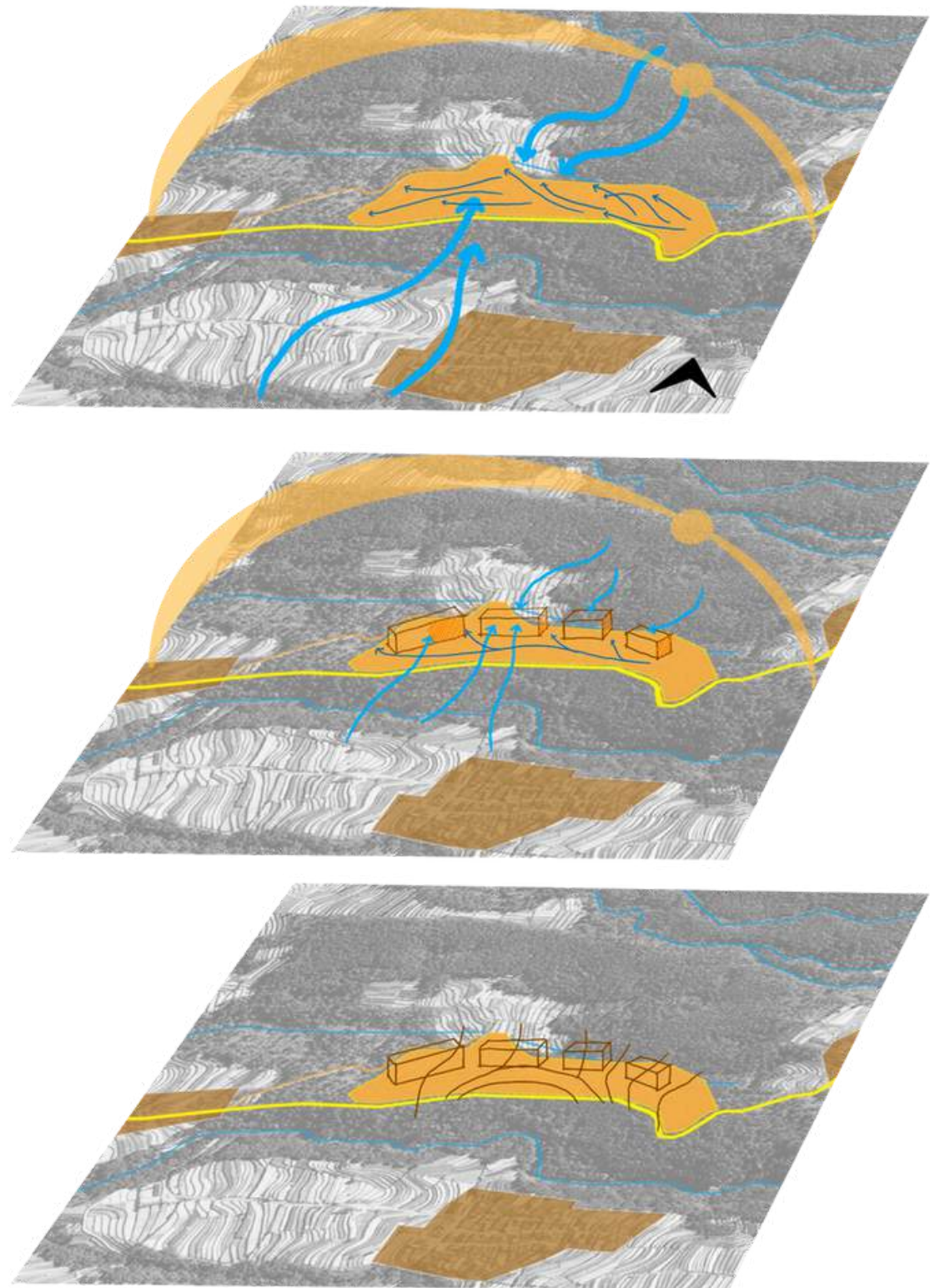


Figure 6.15 Site context conceptual and strategies, Source: author, 2025

Main Activities

Lutung with Surogate Mother

Their surrogate mothers focuses on nurturing orphaned or rescued infants through a carefully managed bonding process. Surrogate mothers, often adult female lutungs with strong maternal instincts, provide essential care such as grooming, protection, and social interaction, which are critical for the infants' emotional and physical development. Management staff also put closer exposure in terms of handling process

Main Activities

Lutung In Quarantine

Inside a quarantine cage involves close monitoring and care to ensure their health and adaptation before integration with other lutung or release into a larger enclosure. During this period, the lutung undergo health checks, behavioral observation, and gradual acclimatization to a safe and controlled environment. This stage is crucial for preventing disease transmission, reducing stress, and assessing the individual's physical and psychological readiness

Main Activities

Lutung in Socialization

This controlled environment allows them to interact, communicate, and establish group dynamics through grooming, playing, and shared foraging. These interactions are essential for building trust, reducing stress, and preparing the lutung for integration into larger groups or semi-wild habitats. Socialization in this stage is a key step in the rehabilitation process, promoting natural behaviors and improving the chances of successful reintegration into their native ecosystems.

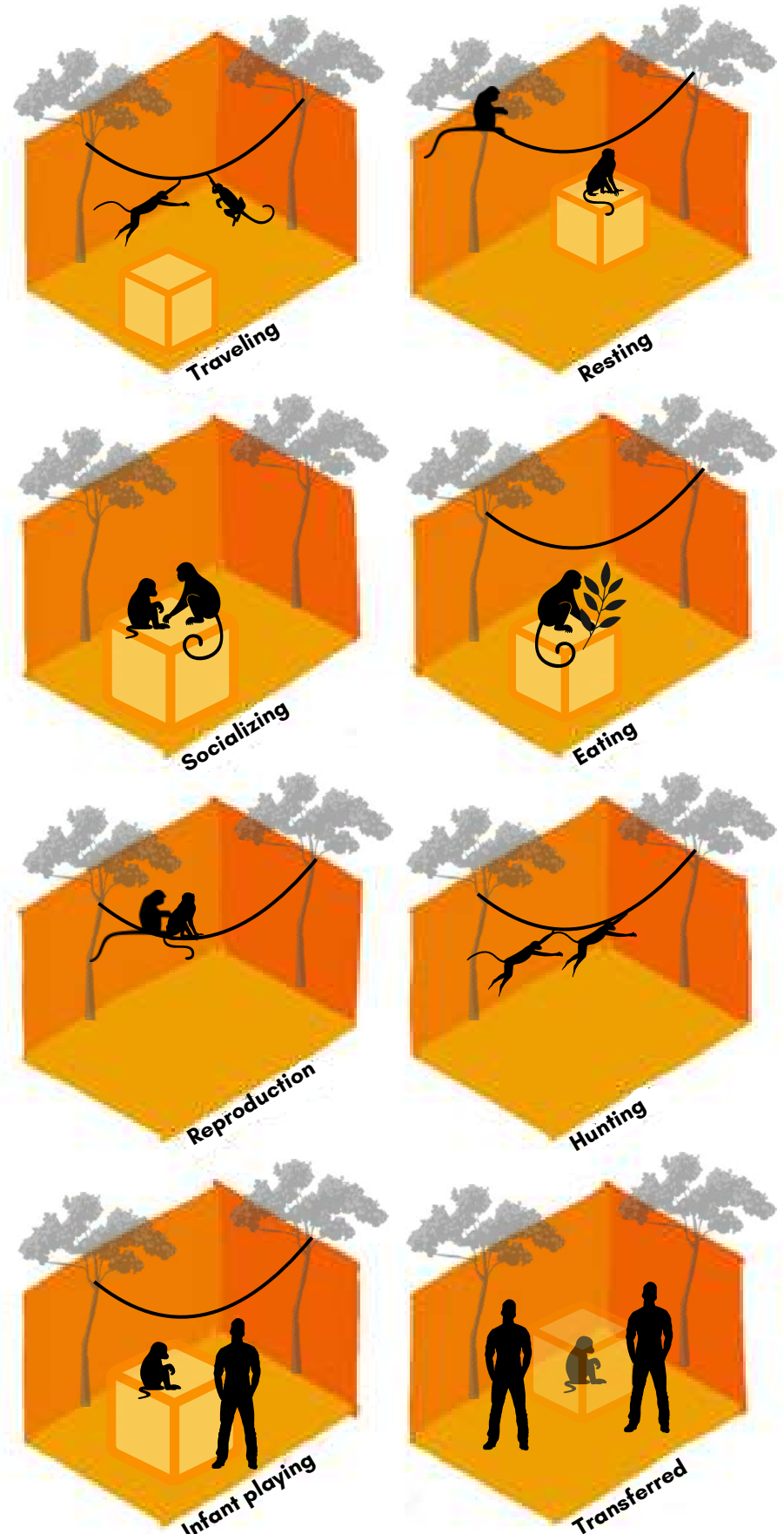
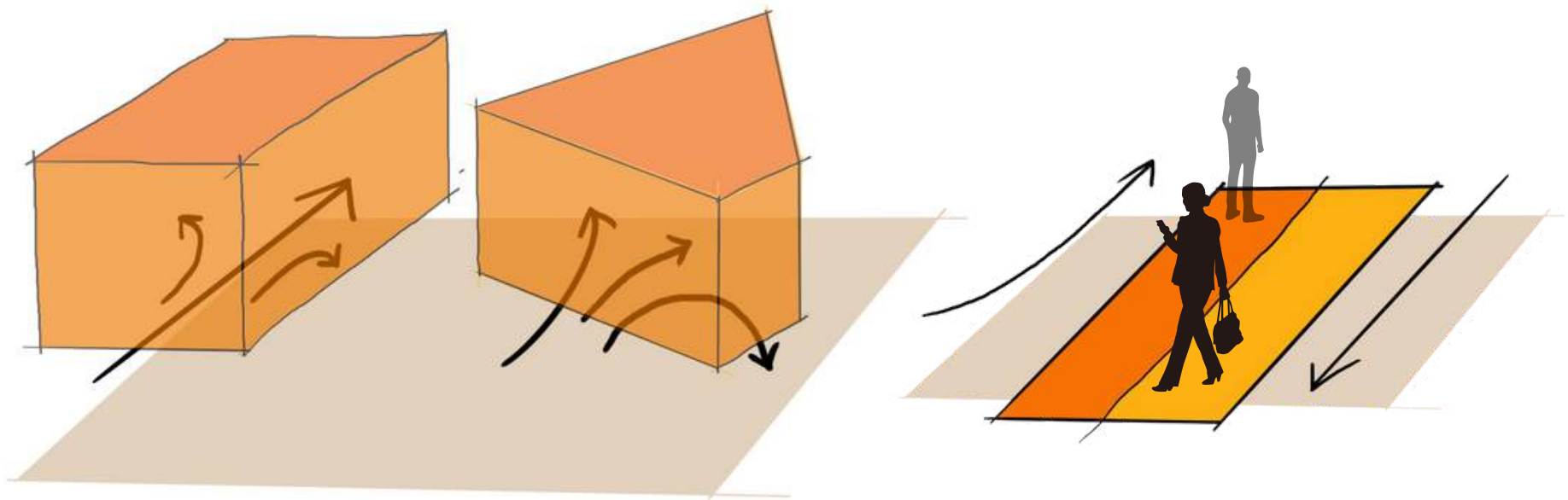


Figure 6.16 Lutung Behavior, Source: author, 2025



analysis & respond

Building Form Analysis

RIGID RECTANGULAR

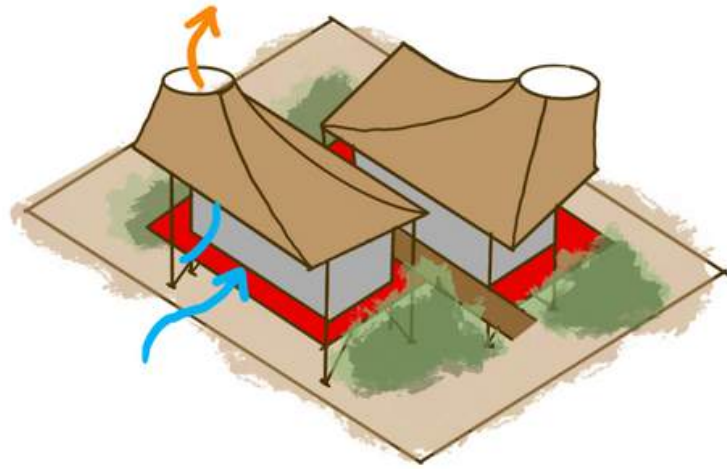
The rigid box shape creates a rigid movement pattern and has sharp corners. This **will endanger and inhibit lutung** that are energetically active. The box shape also makes it difficult to create an organic and flexible multi-level vertical structure. This will deprive lutungs of the stimulation of curiosity and exploration that affects their physical and mental health.

IRREGULAR FORM

Irregular form penetrate more variety in terms of activity flow. It also generate more character in terms of narrative and maximise the land use. As part of the strategies, this irregular layout also provide flexibility by dividing the zones as it form special function or purposes. This strategies also enhance the circulation more organic and enabling spontaneous interaction.

TWO WAY ACCESS

The two-way corridor in the transitional space design provides a smoother circulation flow, separates incoming and outgoing traffic, and gives visitors the flexibility to choose routes according to their interests. This pattern encourages broader exploration, presents a diverse spatial experience, facilitates emergency evacuation, and creates interaction points on various sides of the path.



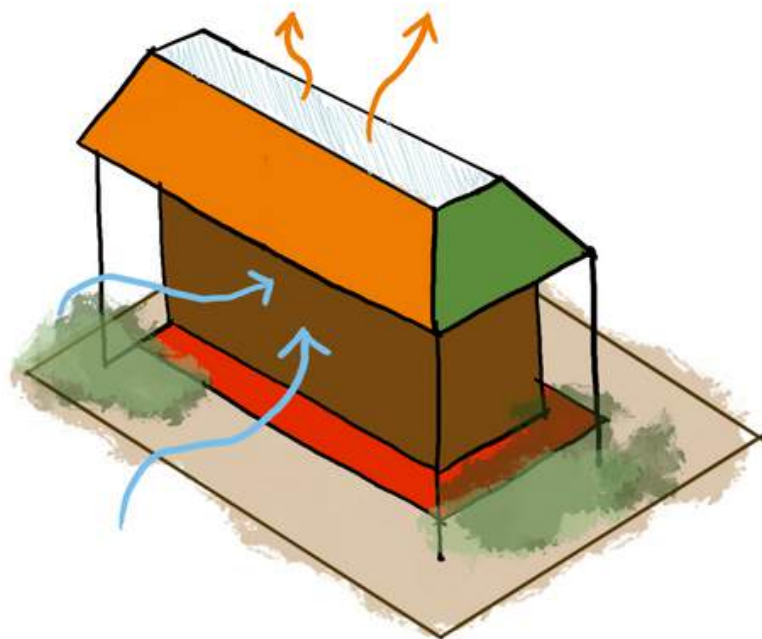
Building Concept Alternative 01

A simply vernacular roof technique was intend to develop organized the controlable thermal insulation, rainfall managemenet, supporting natural ventilation.While also intend to preserve traditional roofing method. Vernacular roof also do respect the contour and site context regarding the material choosen to be environmentally friendly.



Building Concept Alternative 02

As it follows the regulation of the “protected forest”, mimicking design to blend within the nature helps to reduce visual and ecological disruption. The design would helps to elevate the activity area too get better airflow and reducing ground moisture impact. This method ensure the building to adapt the forest it self by implement the modular building scheme.

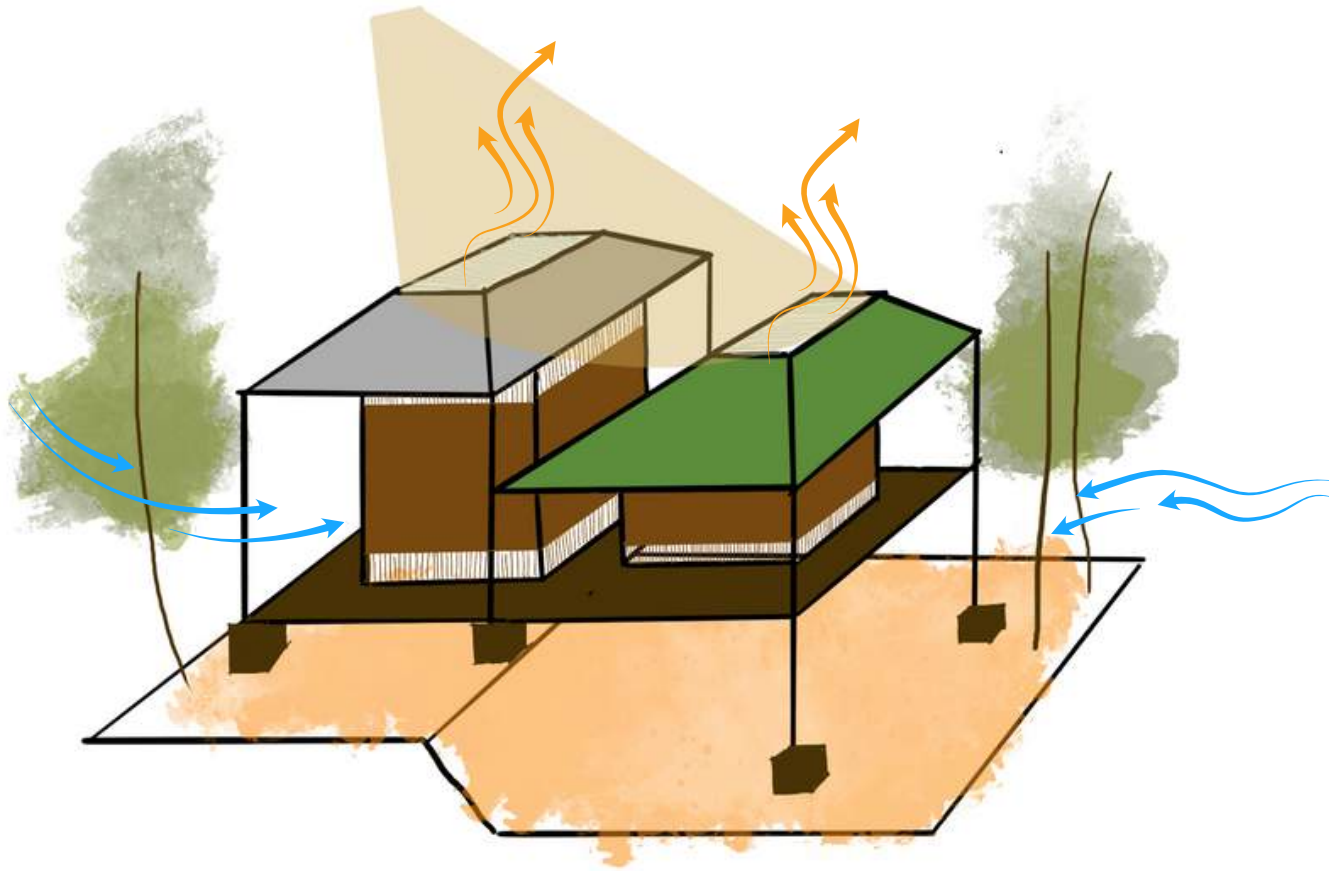


Building Concept Alternative 02

Combining both vernacular and mimicking gforest this design prioritize on passive design, especially when it comes to air circulation and nnatural light control. Therefore, the roof design try to imitates the contour of Mount Merbabu as to gatheh rnatural form. Incorporating with passive design the wall should implementts of air transfered pores which by using permeable motifs.

analysis & respond

Building Form, Material, Structure

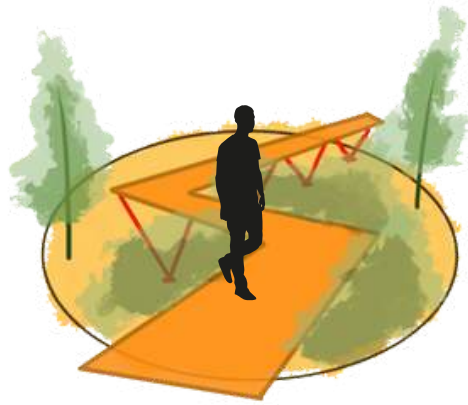


Stilt architecture & overhang-green roof

Using the cut-and-fill strategy in this area can have a positive impact by minimising changes to the natural contours and reducing erosion. In addition, this technique can give the landscape a harmonious feel. Supported by the selection of local materials such as natural stone and local wood, this maximises the use of environmentally friendly materials, reduces carbon emissions, and empowers the community. It is encouraged by the use of green roof materials that can maintain better thermal insulation and are natural.

Modular wall & passive design

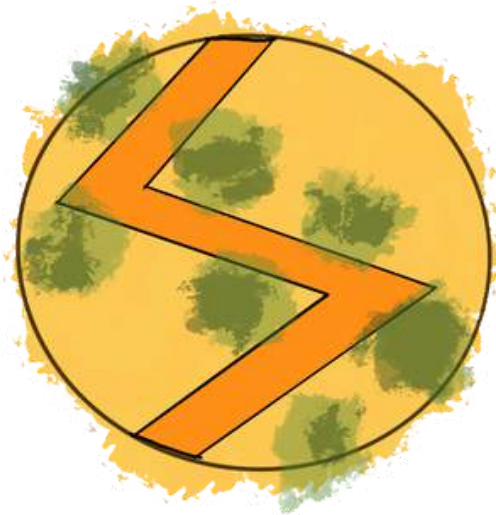
Chosen wood materiality, naturally provides thermal insulation, helping maintain comfortable indoor temperatures, while modular construction allows for quick assembly and easy repair in weather sensitive area. By the louvre design, cross ventilation, opening dimension also supporting passive design to it's strategies and minimizing heat or coolnes inside the building.



Design Sketch Concept

Accessibility

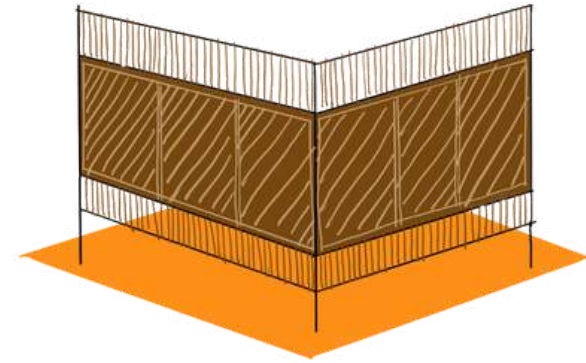
Leads to preserve the existing slope, remain existing site context, creates natural runoff, improve safety **making viewing activity experience** or interpretative from all accessibility. This form technique intend to helps easy and improving some user experience.



Design Sketch Concept

Movement

A linear activity flow can creates clear zoning for functional separation. Segmentation also minimize cross-exposure between human and lutung directly. This pattern can gain narrative understanding in lutung rescue journey by spatially. Clustered layout are enables pause point that serve controlable and well monitored area.



Design Sketch Concept

Building material & structure

Modular skin facade provides climate responsive through dynamic shading and cross ventilation panels. The basic needs is to have modular plate that are easy to repair, upgrade and expand. It helps to echo the forest by similar character of skin texture (wood) with forest tree.



Building Material

The Magelang community forest has a large production of teak, mahony and natural rock. So that the utilization of these materials can be implemented into modular plates to structural elements.



Galvanic Steel prefabrication was implemented to support the advantages of the tilt/elevation structure. With the extreme weather of the place, especially responding to damp and cold, steel is a strong material that does not rot easily.



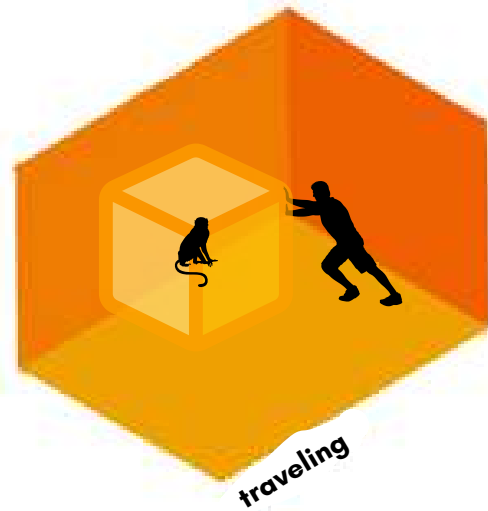
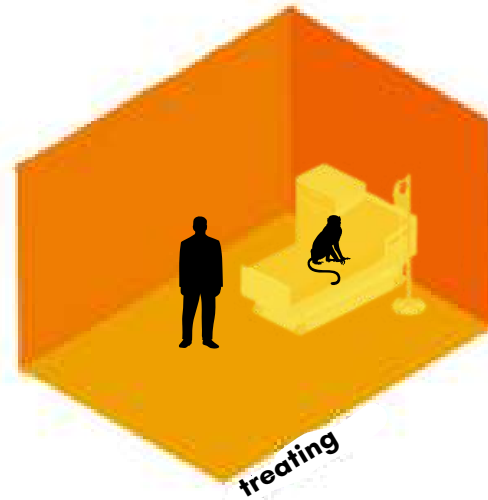
It is also important to choose wood shingles and asphalt singles that have a natural aesthetic and are more resilient to forest conditions. Both materials also provide better thermal insulation.



Design Sketch Concept *Human Activity*

In terms of space, humans have a fixed place to carry out their activities. In this case, the division of space between management staff and visitors is equal. This shows the intention to create a zone for human activities that is more centred on one large building that can accommodate all visitor and management staff activities. With this spatial programme pattern, all the main facilities for visitors will be centred at the front, and all the main facilities for management staff will be graded according to the privacy of the building.

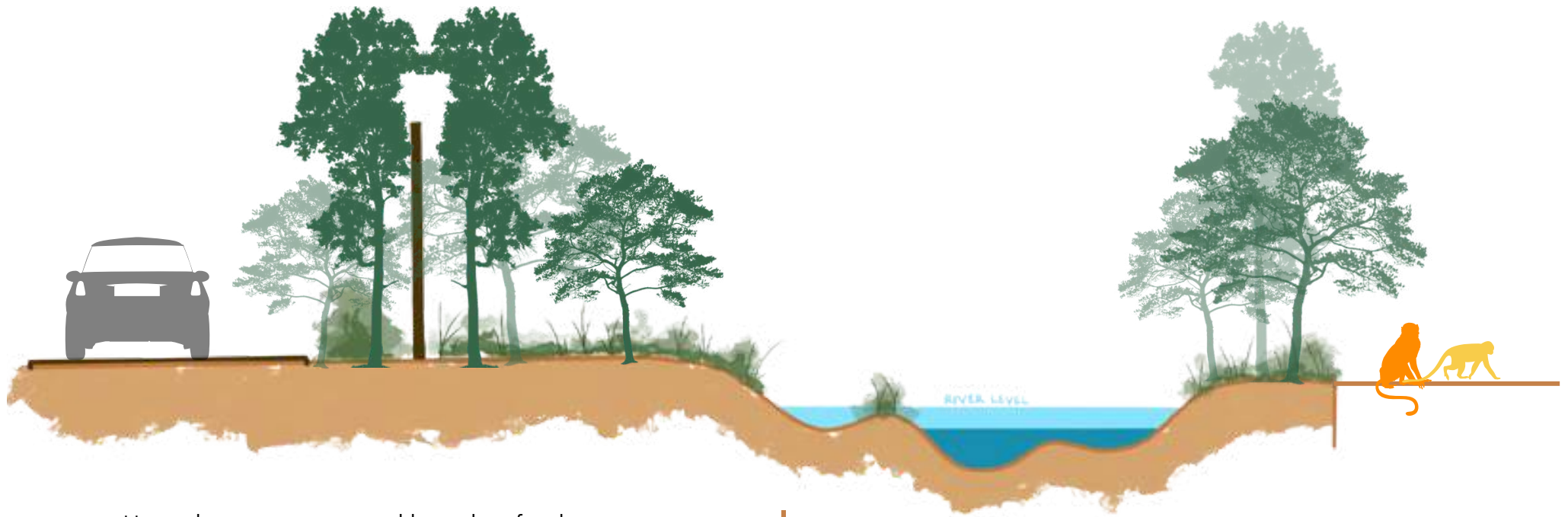
Figure 6.23 Visitor and management staff behavior, Source: author, 2025



Design Sketch Concept

Human & Lutung Activity

As wild animals, lutungs have limited interaction with humans. Interaction between humans, particularly management staff, is only temporary, such as when delivering food, transferring lutungs to new locations, providing care for lutungs, and conducting research. This requires special attention to ensure that the space for interaction between management staff and lutungs is efficient and compact.



Using the river as a natural boundary for the rescue center provides both strategic and ecological benefits. It acts as a sound buffer, reducing vehicle noise from nearby areas and creating a calmer environment essential for wildlife recovery. The river also forms a clear barrier, helping prevent human intrusion and safeguarding the center’s operations.



Safety Concept

What if Lutung Escape?

Beyond reducing noise, the river strengthens the separation between the center and nearby human activity, creating a more secluded forest environment. This benefits both the animals and the forest school, which can provide focused, nature-based education with fewer distractions. As such, the river plays a key role in supporting both wildlife care and conservation learning

Figure 6.25 Safety barrier concept, Source: author, 2025
Figure 6.26 Island barrier concept, Source: author, 2025

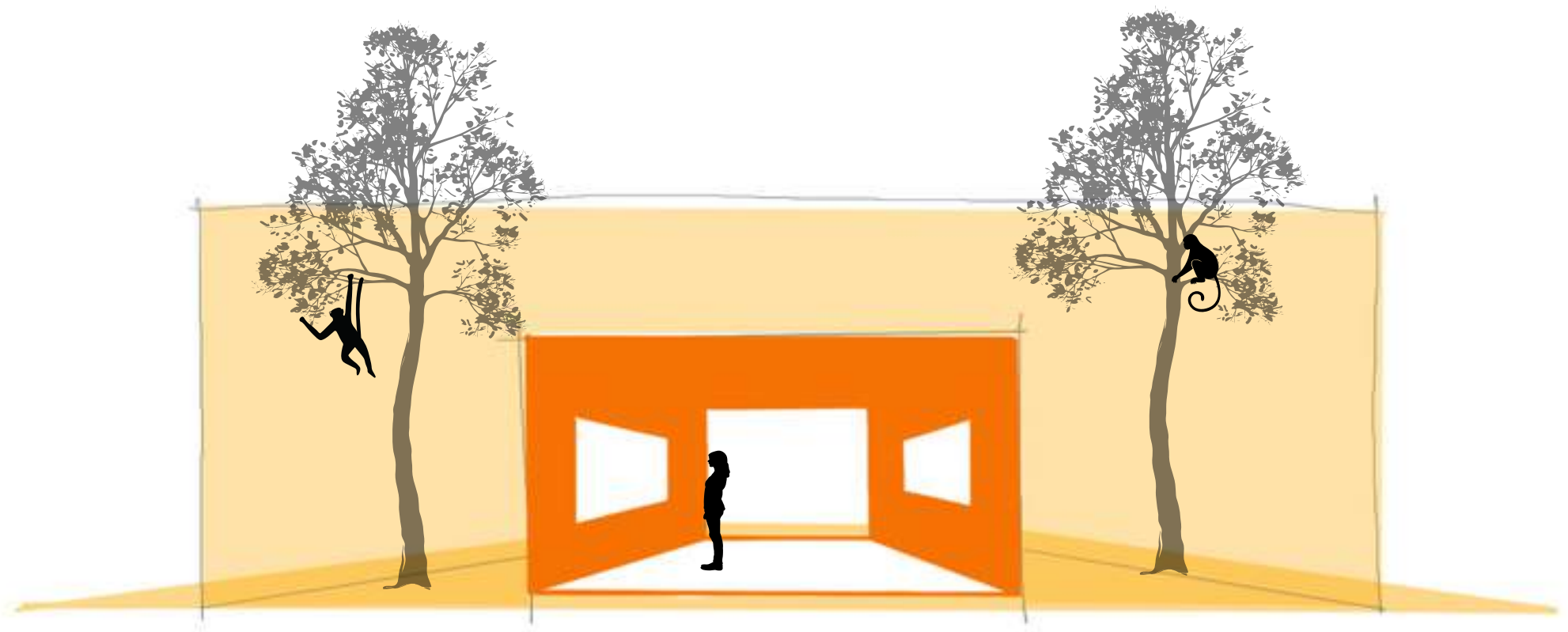
Food Forest

Low cost & Sustainability

These endangered primates rely heavily on diverse, native vegetation for nutrition, behavioral enrichment, and habitat familiarity. A food forest mimics their natural ecosystem, reducing stress and promoting natural foraging behaviors critical for their eventual reintroduction into the wild. Additionally, it **minimizes dependency on external food sources, enhancing sustainability and biosecurity.**

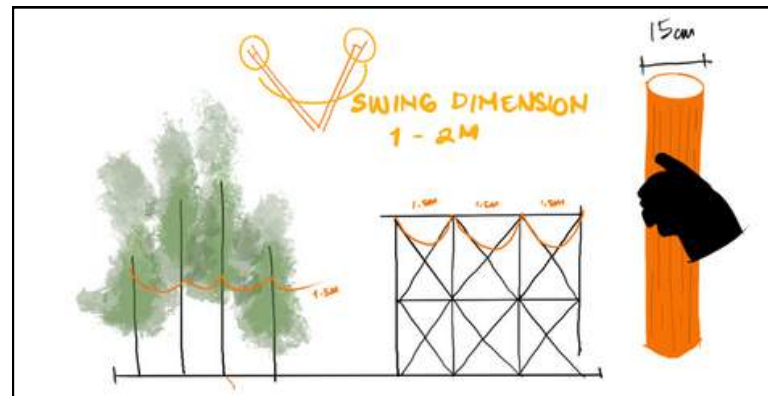
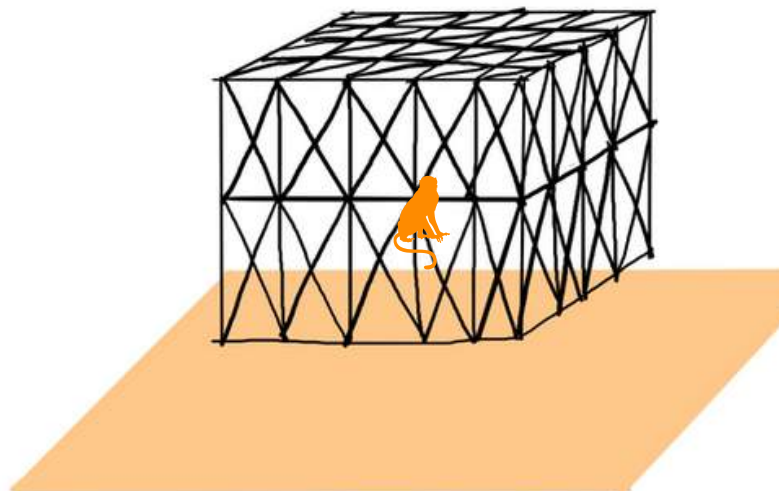


As the boundaries and reducing noise disturbance towards lutung, Tree forest also fostering the quality of forest/jungle for lutung natural habitat scene. Therefore this strategies are develop to surrounds the island school later on.



Exposure Concept

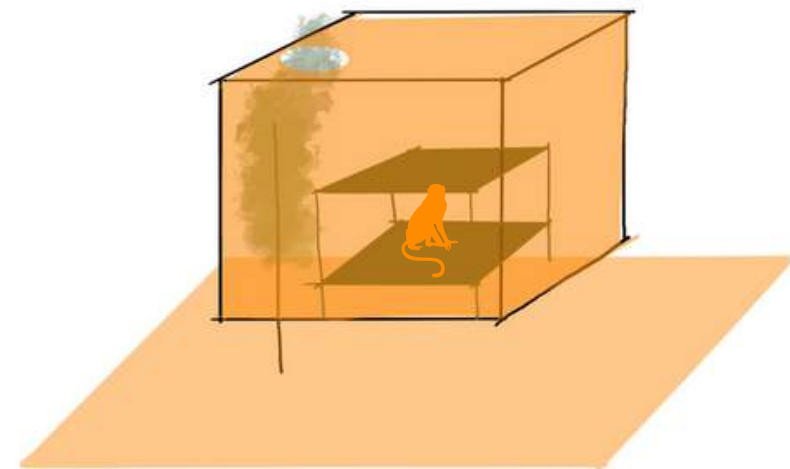
With the intention of providing free movement space for the langurs, human activities are restricted and limited within the room in order to control human safety and the privacy of the langurs. A one-way glass window system is implemented to block the langurs' view into the building. On the other hand, this concept also gives the langur a dominant presence over visitors, providing insight into their way of life. Indirectly, this concept facilitates direct interaction between visitors and the langur without exposing them to direct contact.



Design Sketch Concept

Lutung Cage by Swing Behavior

Accommodating their natural brachiation—swinging from branch to branch—which typically requires varied distances between 1 to 2 meters and sturdy, well-placed grab points that mimic tree branches. Incorporating multiple levels, dynamic climbing structures, and natural materials allows the lutungs to engage in species-specific locomotion, which is critical for maintaining their physical health, muscle tone, and joint flexibility.

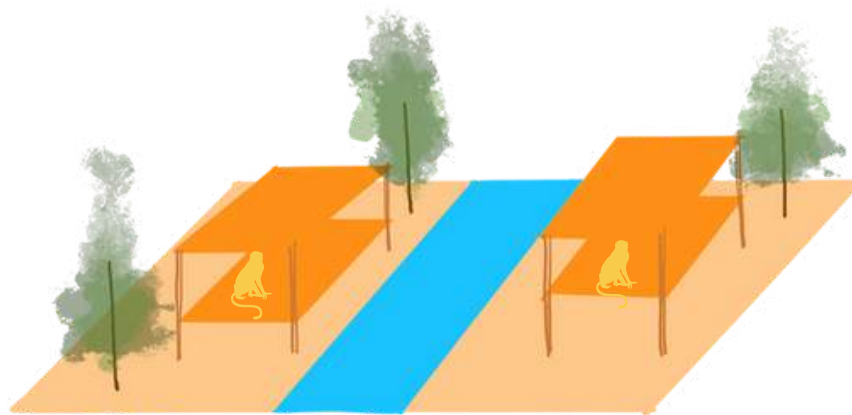


Design Sketch Concept

Lutung Cage by Eat Behavior

incorporating their natural food sources, the key consideration is selecting and placing native tree species that align with their folivorous-frugivorous diet. The goal is to simulate their natural foraging behavior by strategically placing these trees and edible vegetation throughout different vertical levels of the enclosure, encouraging movement, exploration, and selective feeding.

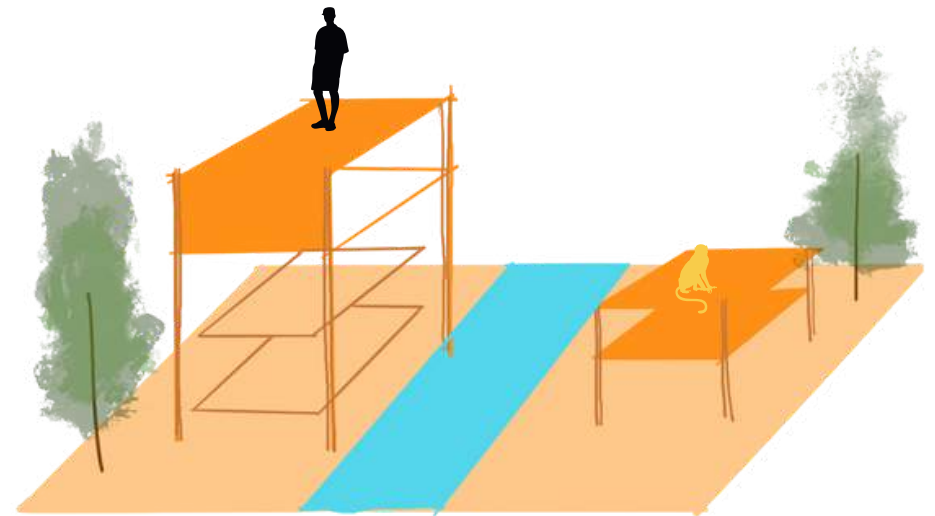
Figure 6.30 Lutung cage design by behavior, Source: author



Design Sketch Concept

Island School Transfer System

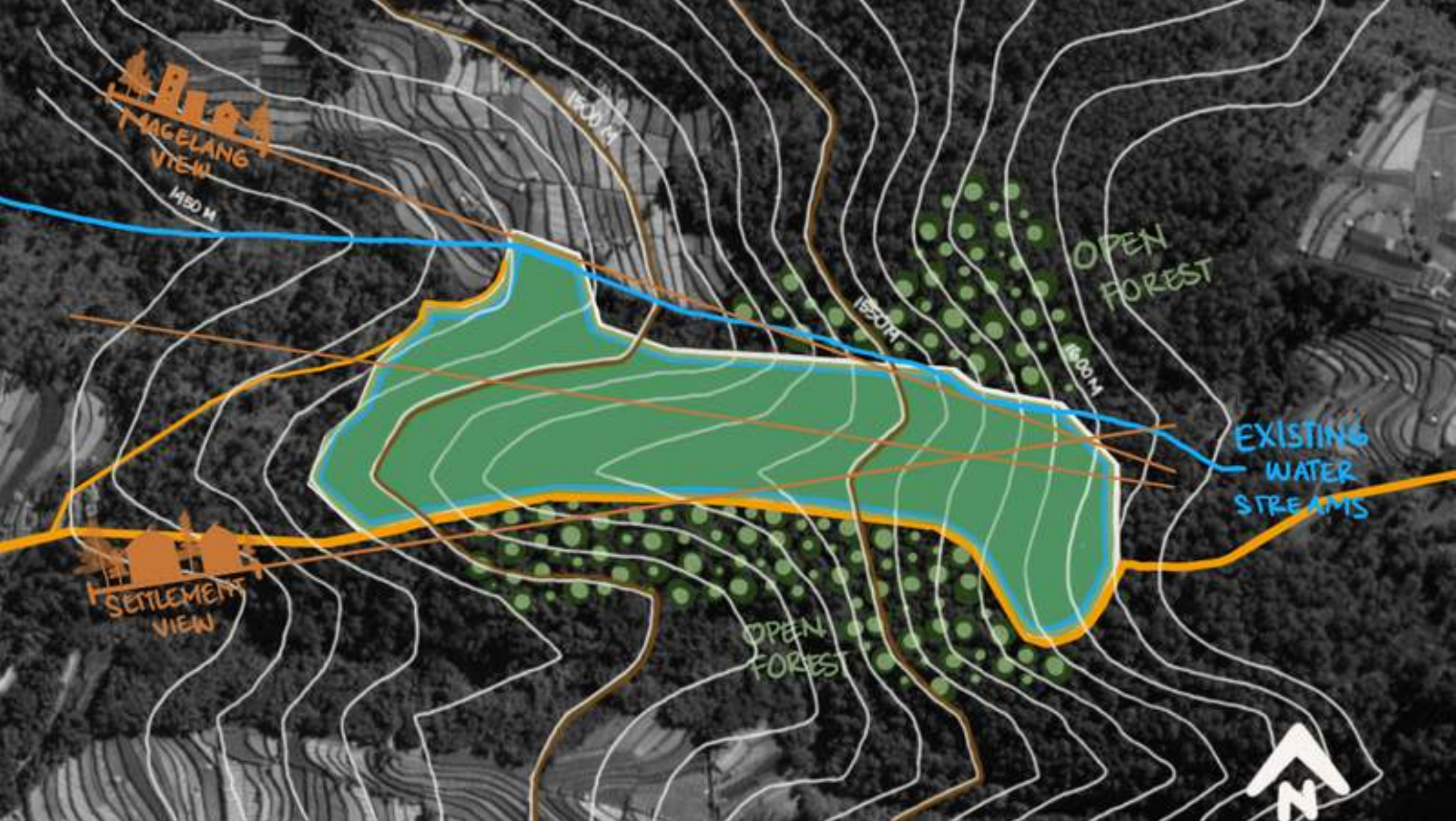
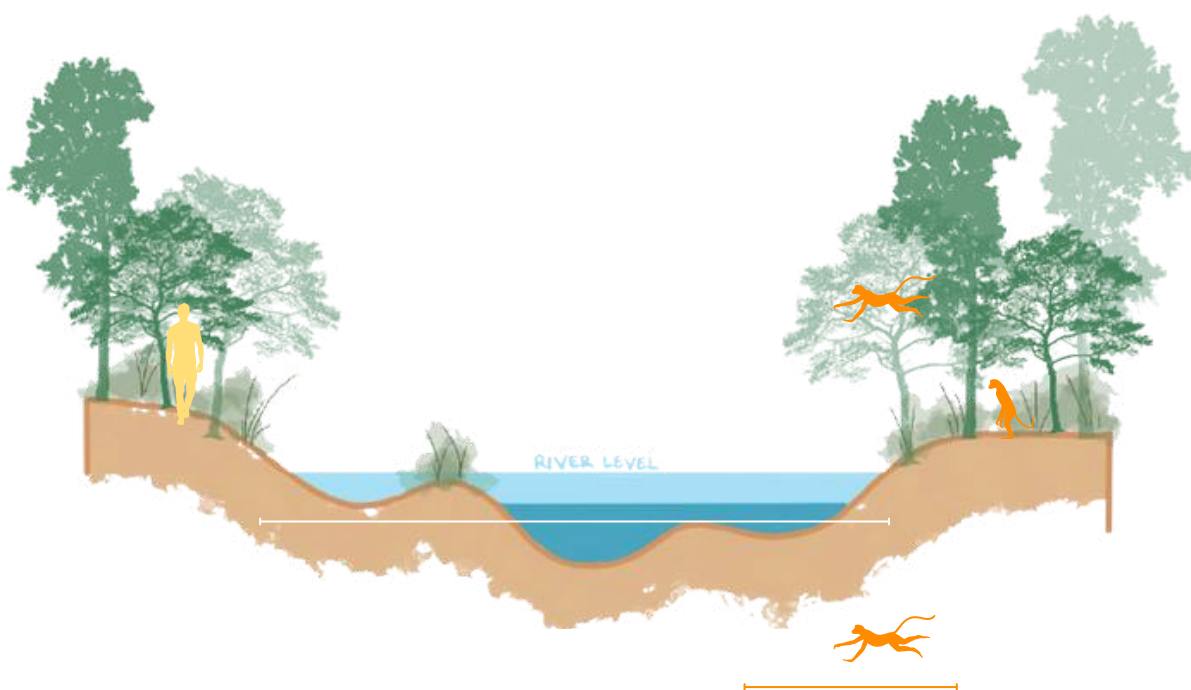
Serving as a semi-natural environment helps to create a safe controlled routes for transferring lutung between enclosures of cages and school island. Besides to fostering their natural behavior such as climbing, exploration and group dynamics as preparation of colonization or release. It's important to manage animal movement safely without direct handling as to minimise stress and give traditional-based transfer.



Design Sketch Concept

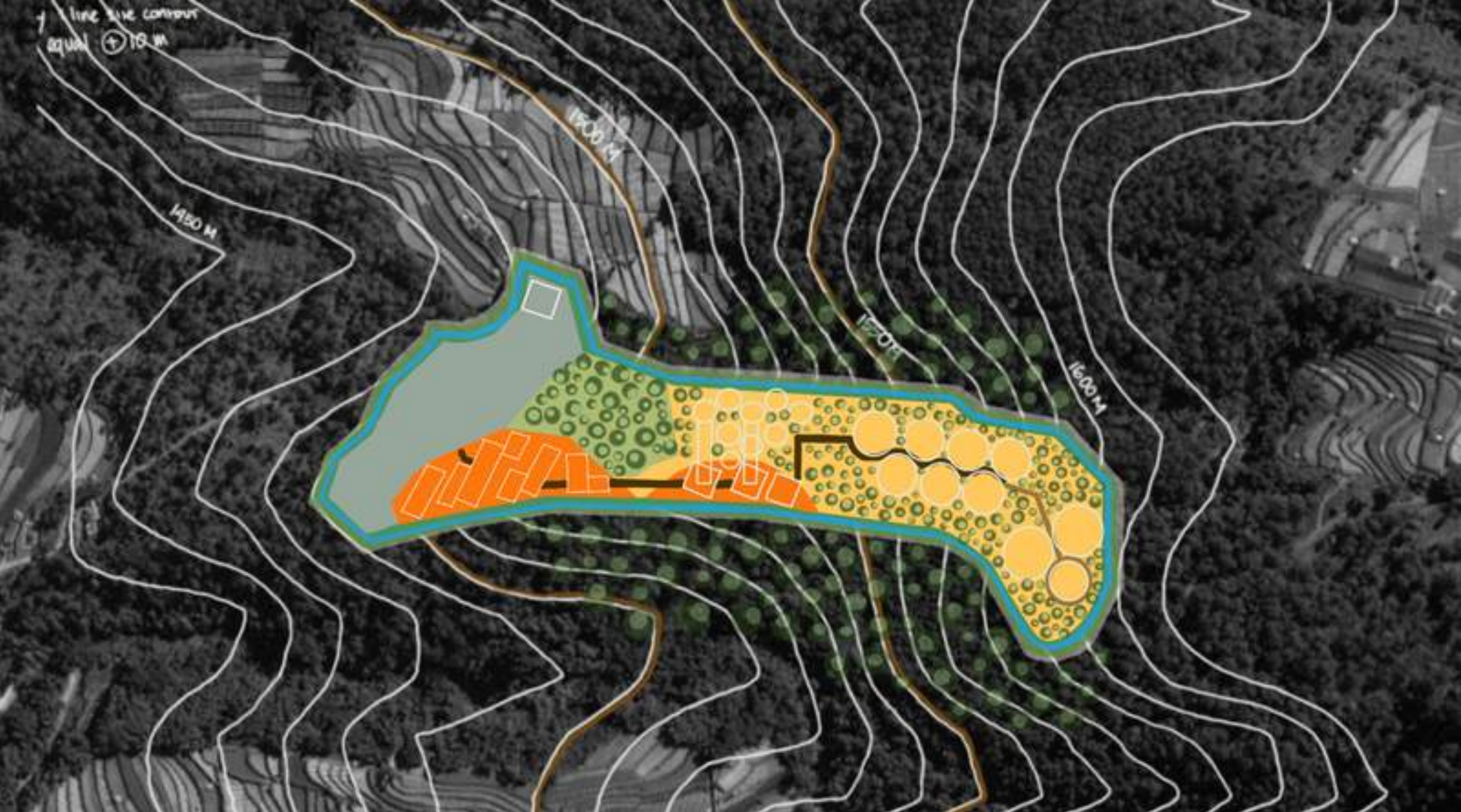
Observation Deck

Observation deck allowing the monitored area to enable early detection of injury, illness or any activities from lutung and visitor. Part of the supporting function, this facilities also elevate the learning system about the lutung and the conservation efforts while also reduce human interference and promoting natural behavior of lutung. It also gave safety effects from wild (aggressive animals).



By designing a river with varying surface depths, the flow dynamics can be optimized to create anaerobic zones that support natural oxygenation processes, benefiting both human health and that of lutungs (leaf monkeys) by improving water quality and ecological balance. These anaerobic conditions can aid in reducing harmful pathogens and pollutants, creating a healthier environment. Integrating the river as a natural boundary for a rescue center placed in the middle of a forest near human settlements not only utilizes the landscape's existing features for enclosure and protection but also fosters a sustainable interface between human activity and wildlife rehabilitation efforts.

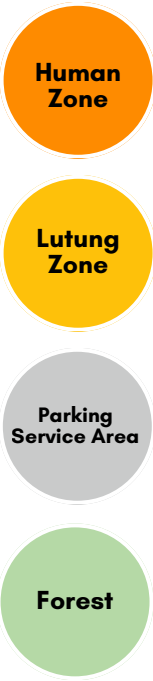
Figure 6.33 Site analysis, Source: author, 2025



Design Exploration

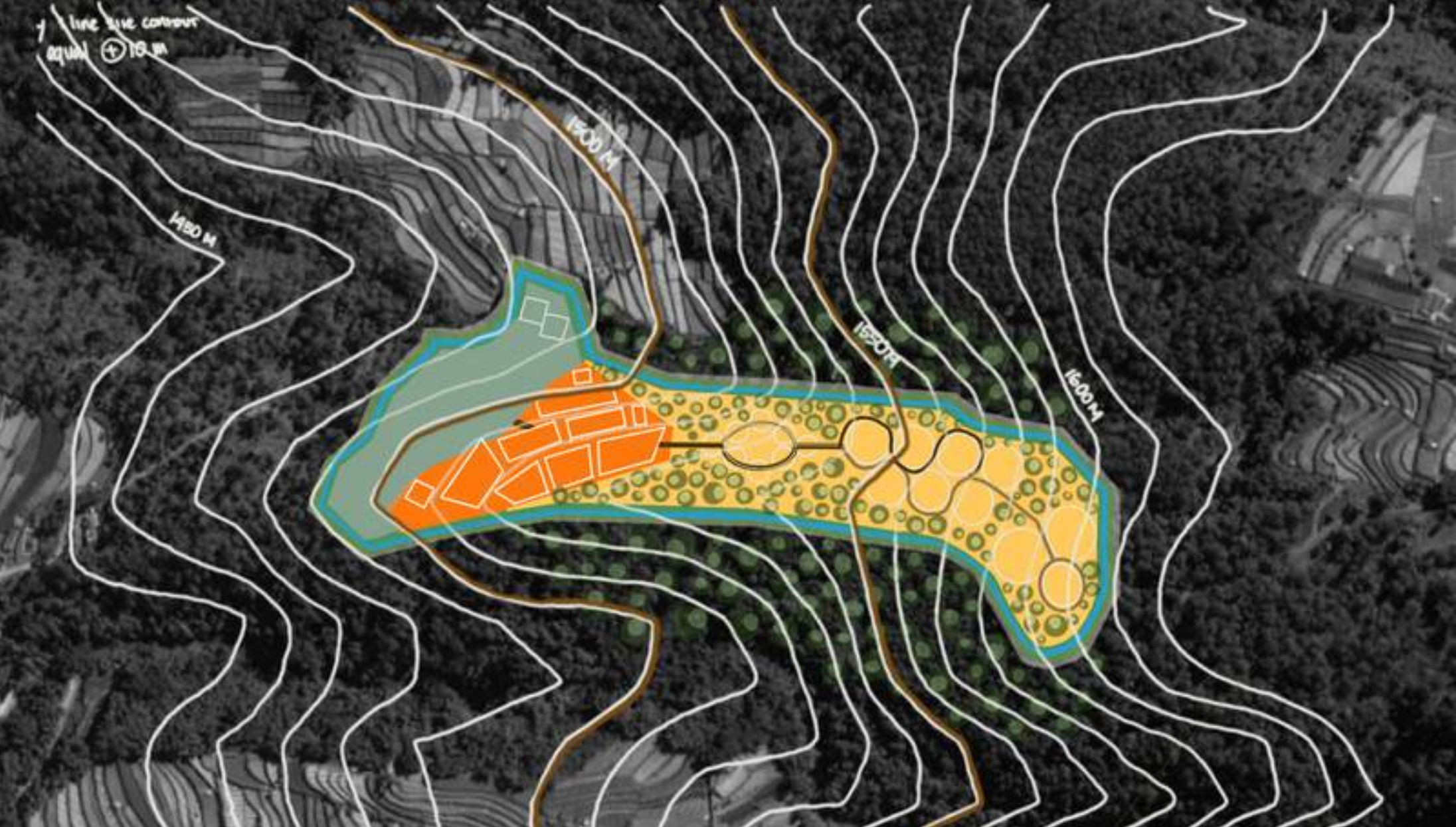
Zoning & Massing Concept 01

Exploration 01 makes a clear zoning differentiation as for human (visitor-management), storage area and lutung's zone. The intention was to put human exposure more closer to main road, as it bridging the lutung's privacy to make it safer. All human zone can be easily access and having more aligned ground state. Putting the lutung's zone with enriching food forest in one zone area are more beneficial for lutung maintaining cost. The division human zone for visitor and management are clearly visible by thid exploration.



Urgency	Advantages
Putting different human zone between visitor and management can provide better activity flow (no disturbance), but it request bigger human exposure area.	Larger food forest can provide bigger chance of sustaining low cost in maintaining lutung. Provide more higher noise cancellation from outside area.
Adapting natural contour design helps to ensure ecological sensitivity, structural safety and sustainability design. Utilizing exisiting topography minimise change existing condition and enhance water drainage.	Clear differentiation between building for management and visitor helps to secure operational efficiency.
Linear activitty flow ensure a clear and controlled progression through each stage of rehabilitation and visitor activity. Especially when it goes to minimize contamination and supports safetyy protocols	
This exploration are better to choose for the operational flow, depict good narrative (protection)	

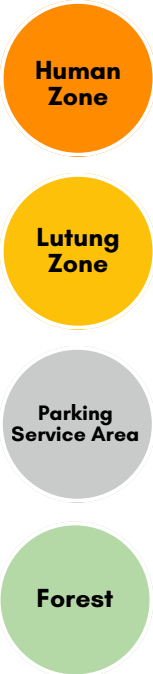
Figure 6.34 Zoning massing exploration 01, Source: author, 2025



Design Exploration

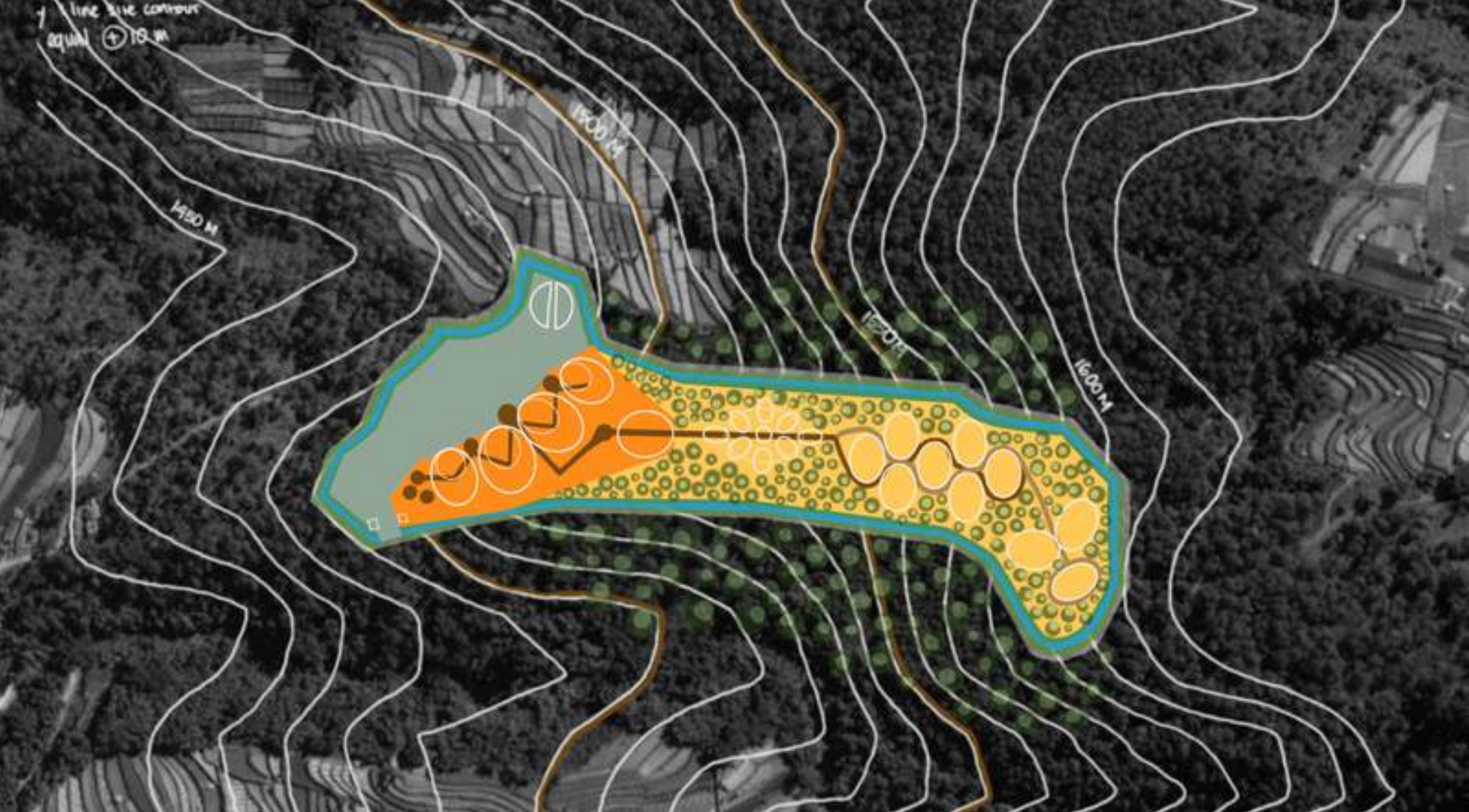
Zoning & Massing Concept 02

This exploration 02, The intention to put human zone are to make centralised high exposure towards lutung (considering noise, activity and disturbance). The parking area are ment placed to be easy accessible through 2 roads. As to be a zone functioned as commercial, management offices, education this arrangement also support lutung to have more suitable perfect height habitat. Based by the sketch it can be seen that lutung's zone also have provides more privacy by the existing forest north-southern part of the site.



Urgency	Advantages
Privacy Level Settings: High exposure human area are ment to be far with the distance of 115m (especially for socialization cage & school)	Larger food forest can provide bigger chance of sustaining low cost in maintaining lutung. Provide more higher noise cancellation from ouutside area.
Centered human access provides more efficiency in terms repressive & handling process. Despite both of management and visitor will have same activity path flow.	
Making a self-sustaining food forest can do as natural ecosystem that reducing reliance on external food supplies & supporting natural behaviors.	
This exploration are better to choose for the good zoning, environment-friendly design and high pprivacy consideration	

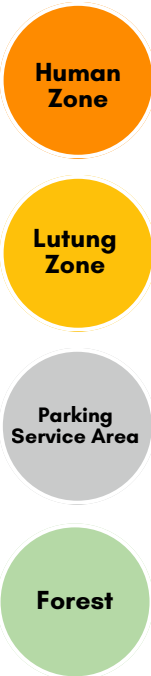
Figure 6.35 Zoning massing exploration 02, Source: author, 2025



Design Exploration

Zoning & Massing Concept 03

Exploration 03, Considering the building mass ellipse formed smooth continuous a sense fullity and oragnic connection with nature. The presence functionally enhance phsyical separatin from ground level hazards. Making segmented zones provide clarity with boundadries of human exposure. In this exploration providing one transition building can significantly enhance visitor experience, and controled management. Activity flow are made to suit perfectly with segmented zoning which following the basic human wayfinding behavior. While linear activity flow do the sam eas to enhance protection narrative and management activity.



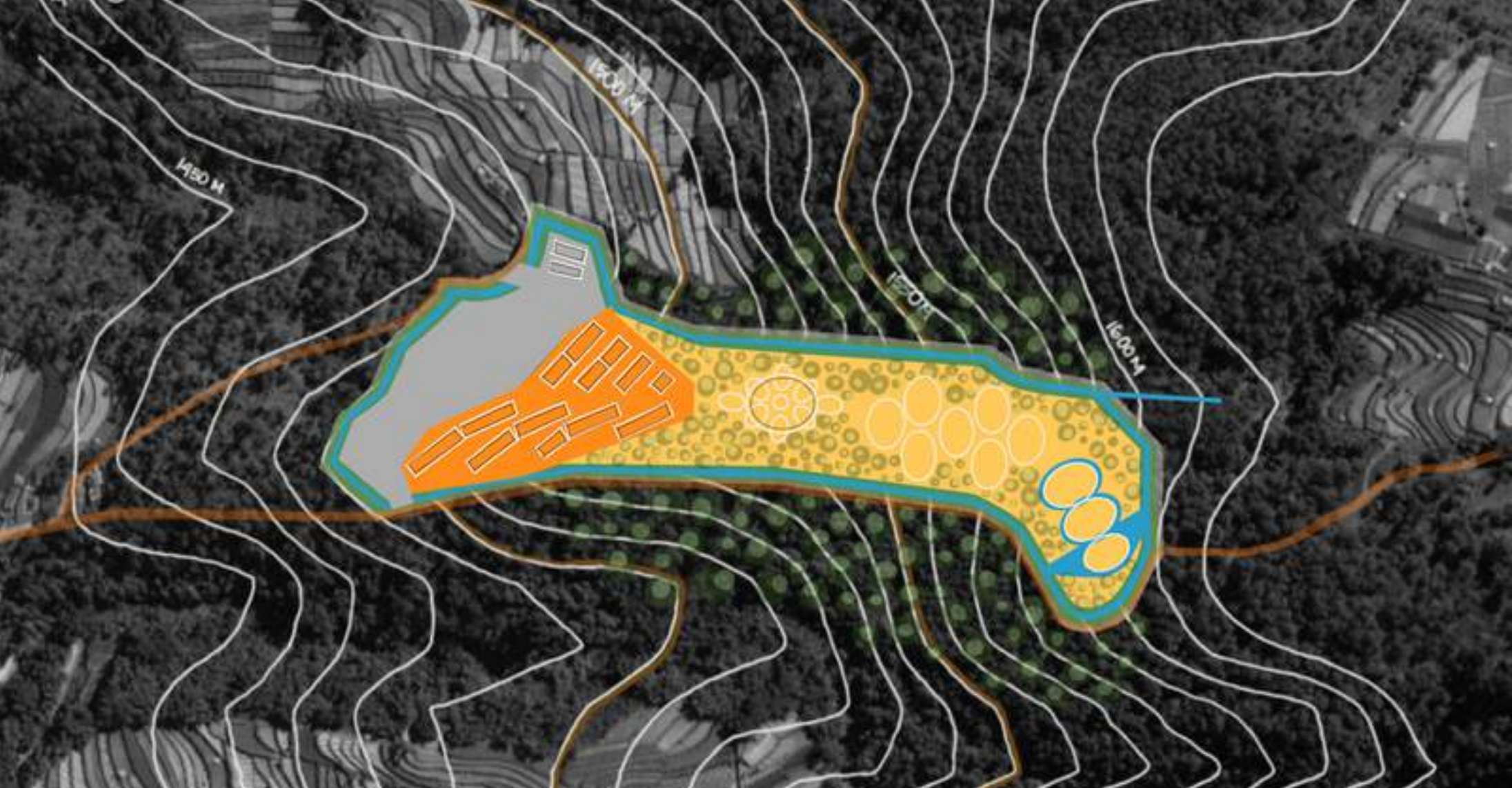
Urgency	Advantages
Privacy Level Settings: High exposure human area are ment to be far with the distance of 115m (especially for socialization cage & school)	More efficiency in activity process by the centered building mass for all human activity. It aslo ensure more safety both for human and lutung.
Developing the behavior based massing deign as to suit with user preference and emnody a better activity. In terms for lutung massing design can fostering natural behavior (arboreal)	
Centered human building massing helps to deeper human connection goals and reinforcing primates it own area. Directing the building function as to educate, engages and other activity immerse visitor/staff in preservation efforts	

Figure 6.36 Zoning massing exploration 03, Source: author, 2025



A.I Visualization

Figure 6.37 A.i render imagery, Source: promeai.com



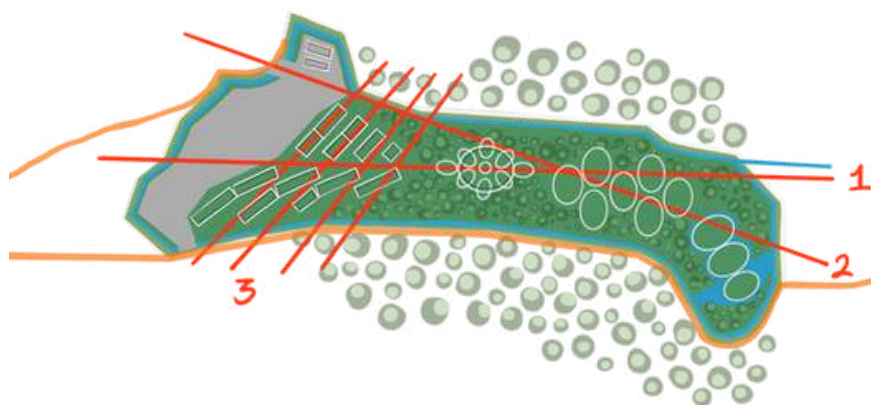
Chooosen Exploration
Zoning & Massing Concept 04

After several anlysis regarding the site context and lutung requiirement-condition. Human building massing should integrate with the soil condition while the preferenece of activity needs a rigid space form. Aligning a single axis activity are more beneficial following to emphasize main circulation and management process. Putting self food forest around outside the cages and building can provide more naturalistic envirointment. It can occurs more natural behavior towards the staff and also lutung.



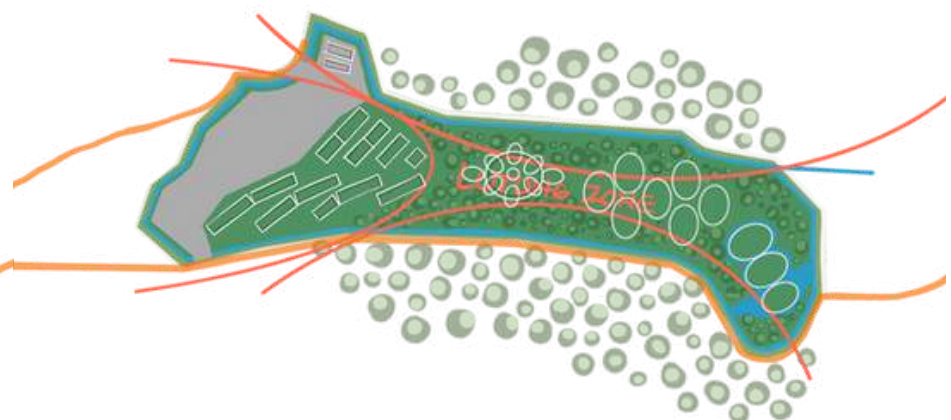
Urgency	Advantages
Privacy Level Settings: High exposure human area are ment to be far with the distance of 115m (especially for socialization cage & school)	Larger food forest can provide bigger chance of sustaining low cost in maintaining lutung. Provide more higher noise cancellation from ouutside area.
Centered human access provides more efficiency in terms repressive & handling process. Despite both of management and visitor will have same activity path flow.	
Making a self-sustaining food forest can do as natural ecosystem that reducing reliance on external food supplies & supporting natural behaviors.	
This exploration are better to choose for the good zoning, environment-friendly design and high pprivacy consideration	

Figure 6.38 Zoning massing exploration 04, Source: author, 2025



01

Key consideration of this exploration is to implement linear activity flow towards the lutung and segmented/clustered for human activity. Besides this intend to gave comfort of wayfinding and suit to sloopy degrees of the site. Enhancing efficient in terms of management process and divide privacy level settings especially to categorised main activity and supporting ones.



02

This exploration also tries to enhance private area for lutung by compressing the lutung zone into the middle of site area. Hence the visitor area are formed following the contour axis that intend to create single axis faults (patahan). This exploration carried 5 building typology as to served visitor, management staff, quarantine cage, socialization cage and school program.



- | | |
|-----------------------------------|--------------------------------------|
| 01 Visitor Parking Area | 09 Supporting facilities |
| 02 Management Parking Area | 10 Mini Lutung Museum |
| 03 Information & Locketing | 11 Playground |
| 04 Front Office | 12 Quarantine Cage |
| 05 Souvenir | 12 Lutung Facilities |
| 06 Cafe & Restaurant | 13 Interpretative Nature Park |
| 07 Amphitheater | 14 Socialization Cage |
| 08 Management Offices | 15 Threat School - Island |

Design Exploration

Activity Flow 04

adopting a segmented and divided activity path flow for visitors and management staff is of urgent and critical importance to ensure the safety, well-being, and successful rehabilitation of this endangered species. This separation minimizes noise, stress, and potential contamination between human activities and sensitive animal zones, which is especially vital for traumatized or recovering individuals. But unfortunately it's less efficient and bring unconditionally controlable.

Figure 6.41 Activity exploration 04, Source: author, 2025

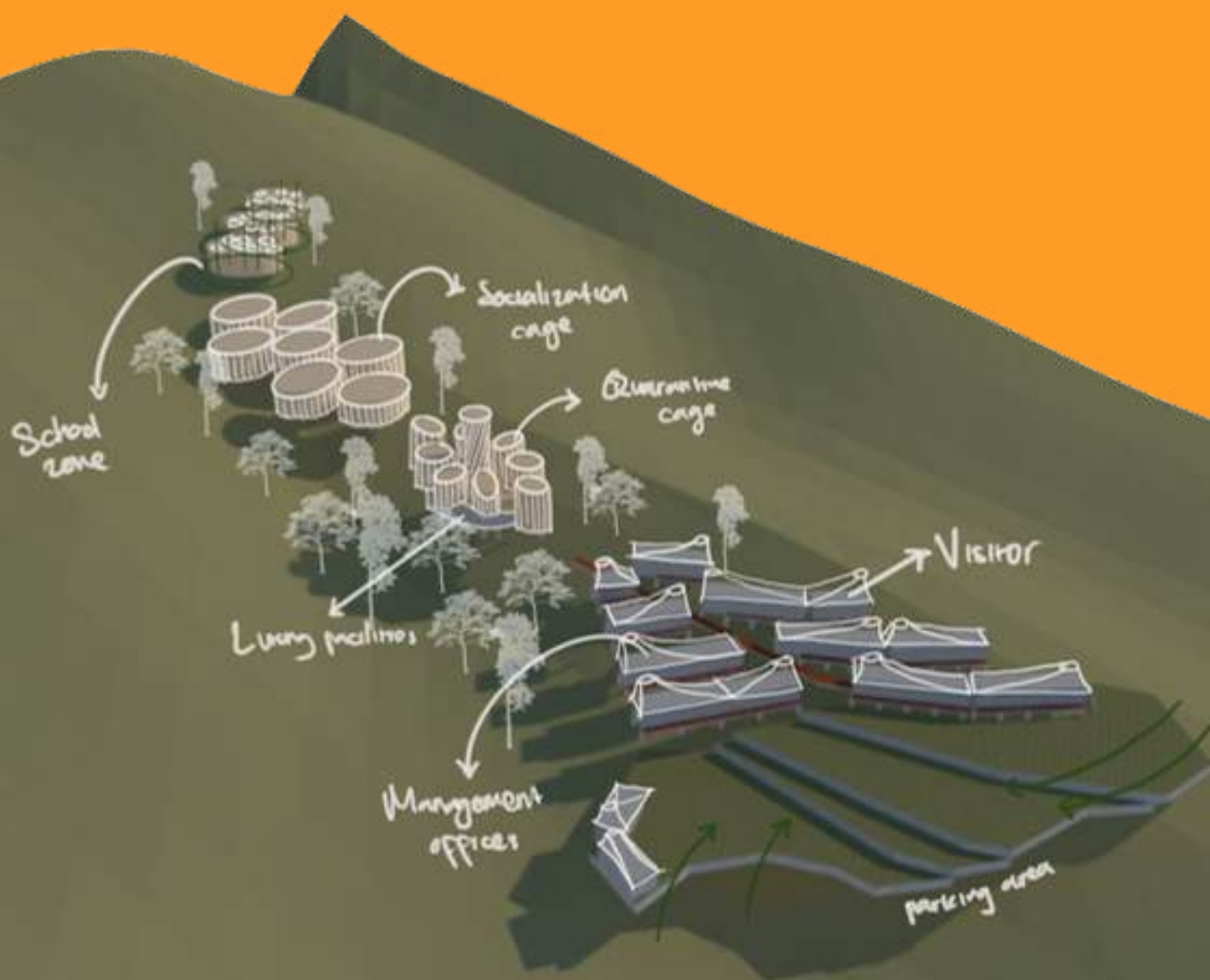
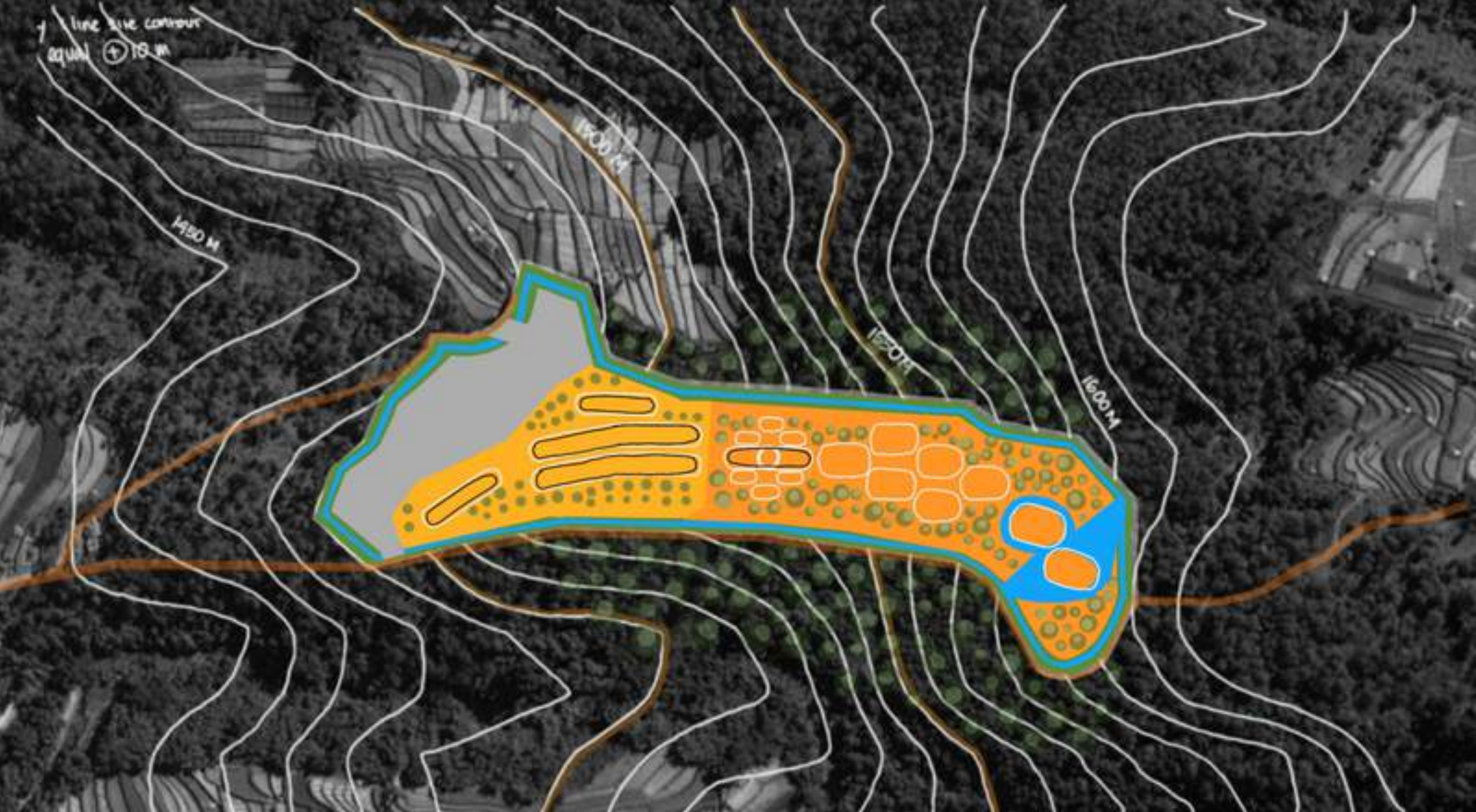
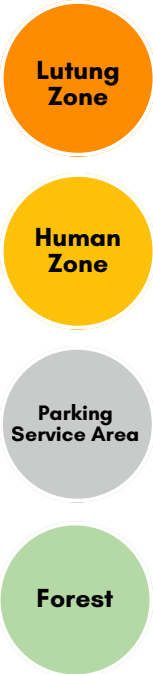


Figure 6.42 massing concept exploration 04, Source: author, 2025



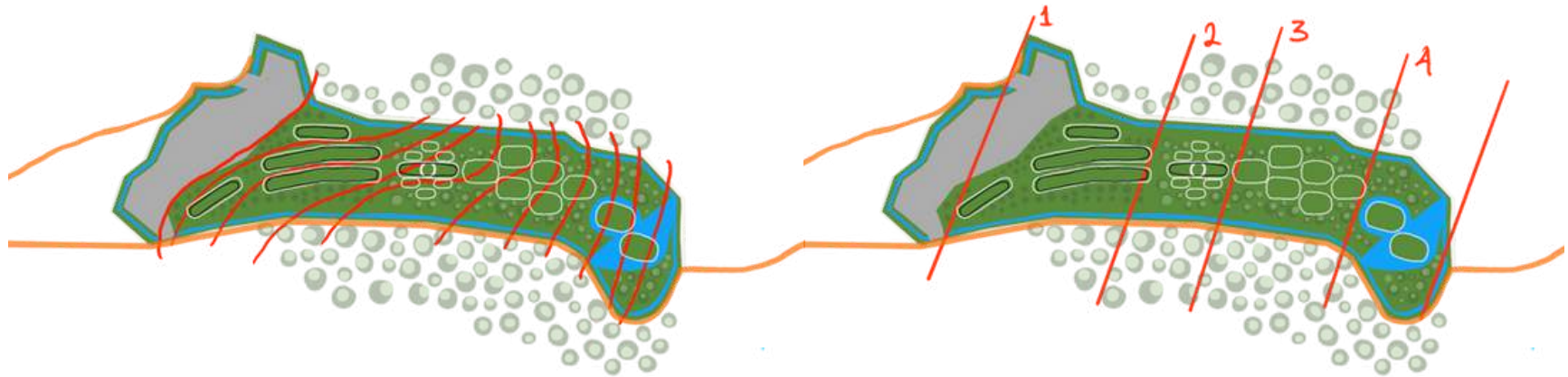
Chooosen Exploration
Zoning & Massing Concept 05

Second choosen exploration are develop by the characteristic of site contour and combination of space form behavior. Creates 4 building typology as to function of edu-tourism, rescue center and school program. All building would be connected and depend on one single access to serve security and controlable activity. Serving self-food forest into 2 phase with their own characteristic to suit lutung needs. This exploration are highly concern towards behavior of activity path flow.



Urgency	Advantages
Privacy Level Settings: High exposure human area are ment to be far with the distance of 115m (especially for socialization cage & school)	Larger food forest can provide bigger chance of sustaining low cost in maintaining lutung. Provide more higher noise cancellation from ououtside area.
Centered human access provides more efficiency in terms repressive & handling process. Despite both of management and visitor will have same activity path flow.	Making a divide self-food forest area provides better management as to prepare food and feeding activity follows.
Design following natural environment character bring more sustainable by the strength, cost and functionally.	
This exploration are better to choose for the good zoning, environment-friendly design and high pprivacy consideration	

Figure 6.43 Zoning massing concept exploration 05, Source: author, 2025

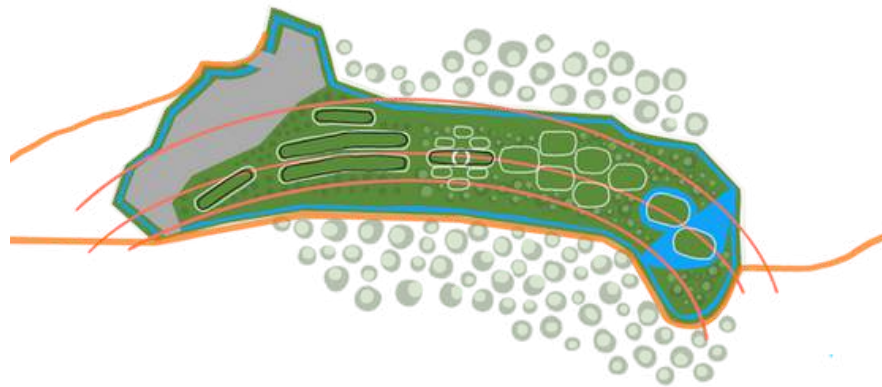


01

Following the contour pattern, this exploration essential to align architectural interventions with the natural topography to minimize land disturbance and maintain ecological balance. Adapting this technique can creates staggered views, natural drainage and retaining structure.

02

Provide division of privacy level settings into 4 phases can bring and foster lutung comfort by limitation on human exposure. Zoning should separate public areas (such as education or viewing zones) from core animal care spaces, with the latter placed in secluded, quiet zones surrounded by vegetation or natural barriers, visual and acoustic buffer



03

This exploration also enhance segmented contour by different direction that emphasize viewing area. While at the same moment, segmented part are showing the gradation exposure from around outside planning area which can be soluted by making semi-organic linear building mass.



- | | |
|-----------------------------------|--------------------------------------|
| 01 Visitor Parking Area | 09 Supporting facilities |
| 02 Management Parking Area | 10 Mini Lutung Museum |
| 03 Information & Locketing | 11 Playground |
| 04 Front Office | 12 Quarantine Cage |
| 05 Souvenir | 12 Lutung Facilities |
| 06 Cafe & Restaurant | 13 Interpretative Nature Park |
| 07 Amphitheater | 14 Socialization Cage |
| 08 Management Offices | 15 Threat School - Island |

Design Exploration *Activity Flow 05*

Linear activity flow that flanks adjacent buildings is essential, this layout creates a clear and intuitive pathway that connects key zones, enabling smooth movement while enhancing wayfinding for both visitors and staff. By organizing activities linearly along a central spine, the design ensures balanced spatial distribution and visual coherence, allowing the flanking buildings to be accessed efficiently without disrupting the overall flow. Additionally, this strategy supports modular growth and simplifies orientation, which is particularly important in educational or conservation-focused facilities.

Figure 6.47 Activity exploration 05, Source: author, 2025



Figure 6.48 massing concept exploration 05, Source: author, 2025



07.
**Design
Comper
hensive**

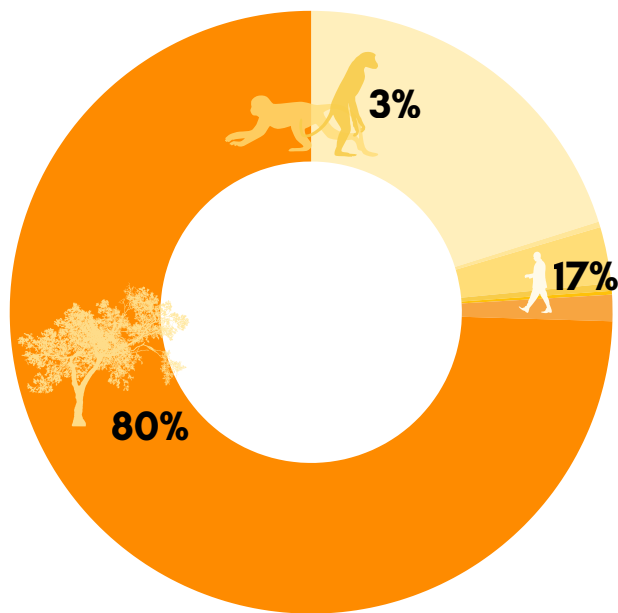
Building Coverage

Comperhensive Evaluation

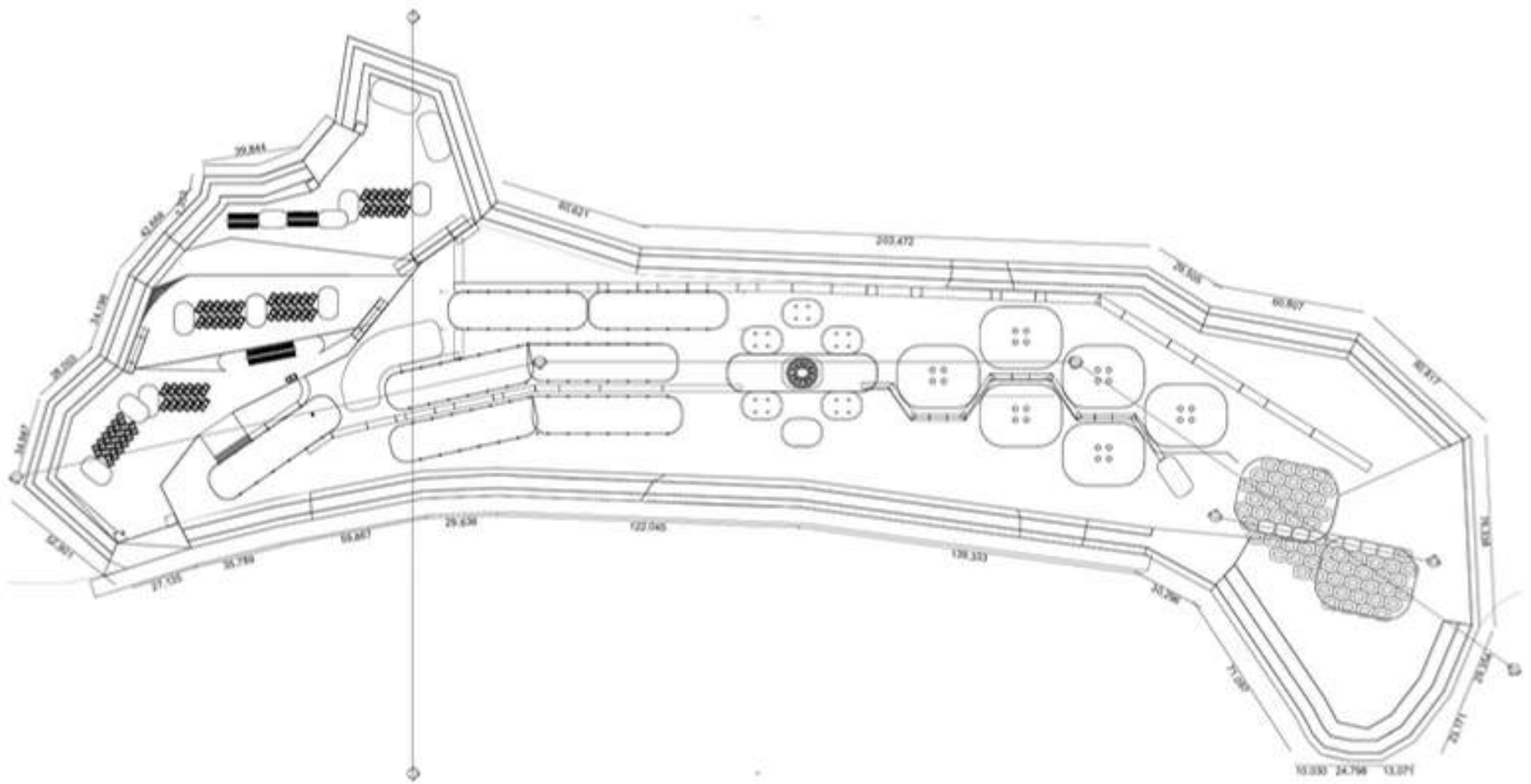
From a comprehensive evaluation, it can be seen that the selection of mass composition does not provide efficiency in the use of space in that location. Therefore, several space selections are given more attention by prioritising the main activities of visitors, managers, and Javanese langurs. The main management functions are combined with office management activities in order to obtain a more optimal functioning space.

TOTAL CALCULATION				
No.	Part	Capacity	Area	Notes
1.	Javan Lutung Facilities	-	12831	
2.	Javan Lutung Supporting Facilities	-	171,75	
3.	Visitor	-	1863	
4.	Main Management	-	298,5	
5.	Management Office	-	139,5	
6.	Service Management	-	871,5	
Total Area			16175,25	16.175

TOTAL CALCULATION				
No.	Part	Capacity	Area	Notes
1.	Javan Lutung Facilities	-	8212,5	13,04%
2.	Javan Lutung Supporting Facilities	-	147,75	0,23%
3.	Visitor	-	2214	3,51%
5.	Management Office	-	139,5	0,22%
6.	Service Management	-	834	1,32%
Total Area			11547,75	11.550



Thus, land use and layout comply with regulatory requirements. This is also encouraged by the choice of open and closed structures to balance the main aspect of building coverage for the langur enclosure. How the langur enclosure will be defined by the closed or open nature of the roof.



1.

Site Plan

Building Mass

Comperhensive Evaluation

The evaluation also assessed that the large building mass would be inefficient for the management of Lutung Jawa. In addition to consuming more building coverage, this building mass pattern also does not clearly define the zoning elements. Therefore, a modification of the mass is needed to provide boundaries for users, especially to achieve 'privacy control' that will affect the comfort of Lutung Jawa.

With these considerations in mind, the design can create three zones with gradual privacy controls. The visitor zone prioritises a large number of users (humans), the facility zone has a moderate number of users (humans) and indirect interaction with the Javanese langur, and the Javanese langur zone has minimal interaction/exposure and a dominant number of users with the Javanese langur.



Site Plan

- | | |
|-----------------------------------|--------------------------------------|
| 01 Visitor Parking Area | 09 Supporting facilities |
| 02 Management Parking Area | 10 Mini Lutung Museum |
| 03 Information & Locketing | 11 Playground |
| 04 Front Office | 12 Quarantine Cage |
| 05 Souvenir | 12 Lutung Facilities |
| 06 Cafe & Restaurant | 13 Interpretative Nature Park |
| 07 Amphitheater | 14 Socialization Cage |
| 08 Management Offices | 15 Threat School – Island |

Rescue Center Design of Javan Lutung Design Comperhensive

Figure 7.2 Comperhensive situationplan, Source: author, 2025

Activity Flow 01

Repressive Process for Lutung

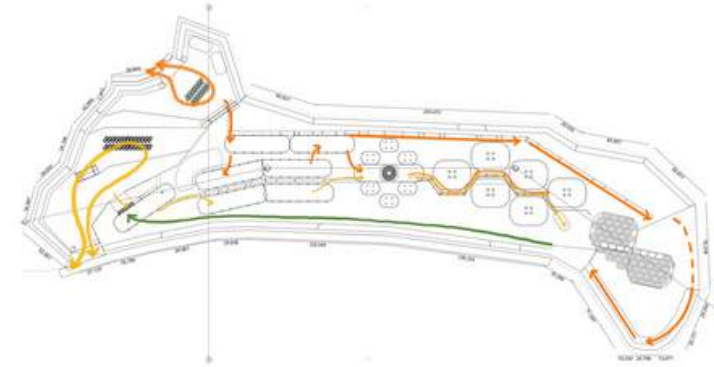
Transfer handling process require direct single corridor without any prevention. This because the condition of lutung should be considered important (sick, dying or under anesthesia). Therefore partcularly lutung pathwalk are demand to be more private and linear align the site form.



Activity Flow 02

Parking Circulation

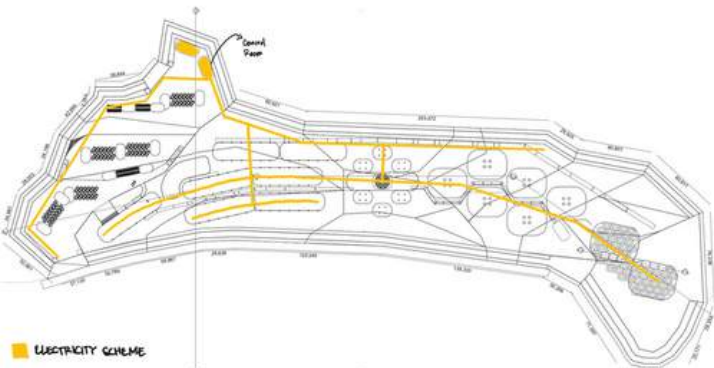
Following the wayfinding and activity flow principle the linear parking circulation can provide anticipation on junction and bring controlable human exposure.



Activity Flow 03

Activity and Emergency Scheme

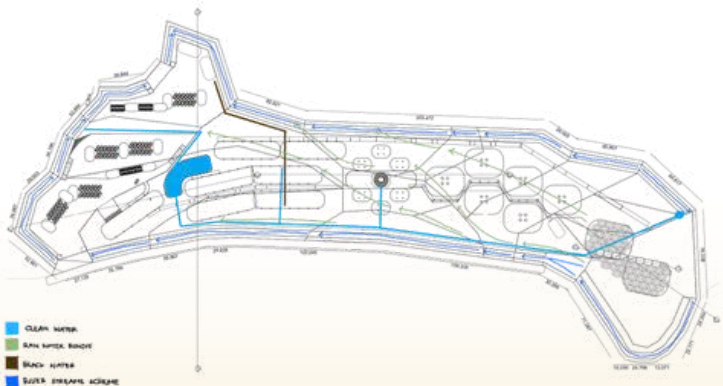
By organizing activities linearly along a central spine, the design ensures balanced spatial distribution and visual coherence, allowing the flanking buildings to be accessed efficiently without disrupting the overall flow. An emergency access are dveelop to have direct and shorter distance to assembly point.



Utility

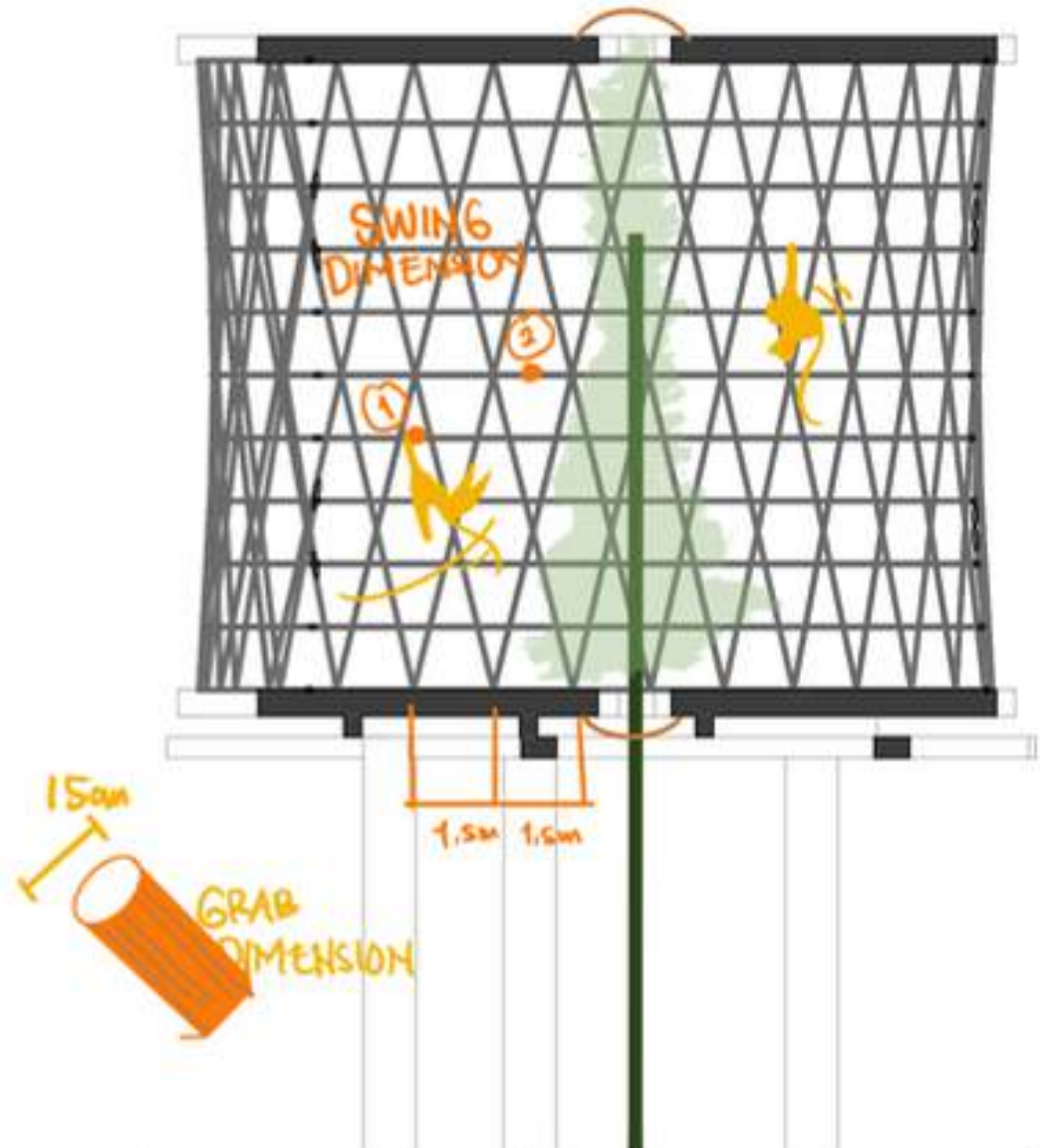
Electricity & Water Scheme

the main problem in the location of the mountain is the supply of electrical energy which must have a long scheme and part of the water management system of plumbing in concerning to be much efficiently. This design should consider the better massing placement to incorporating more centered utility system location.



Comprehensive Evaluation

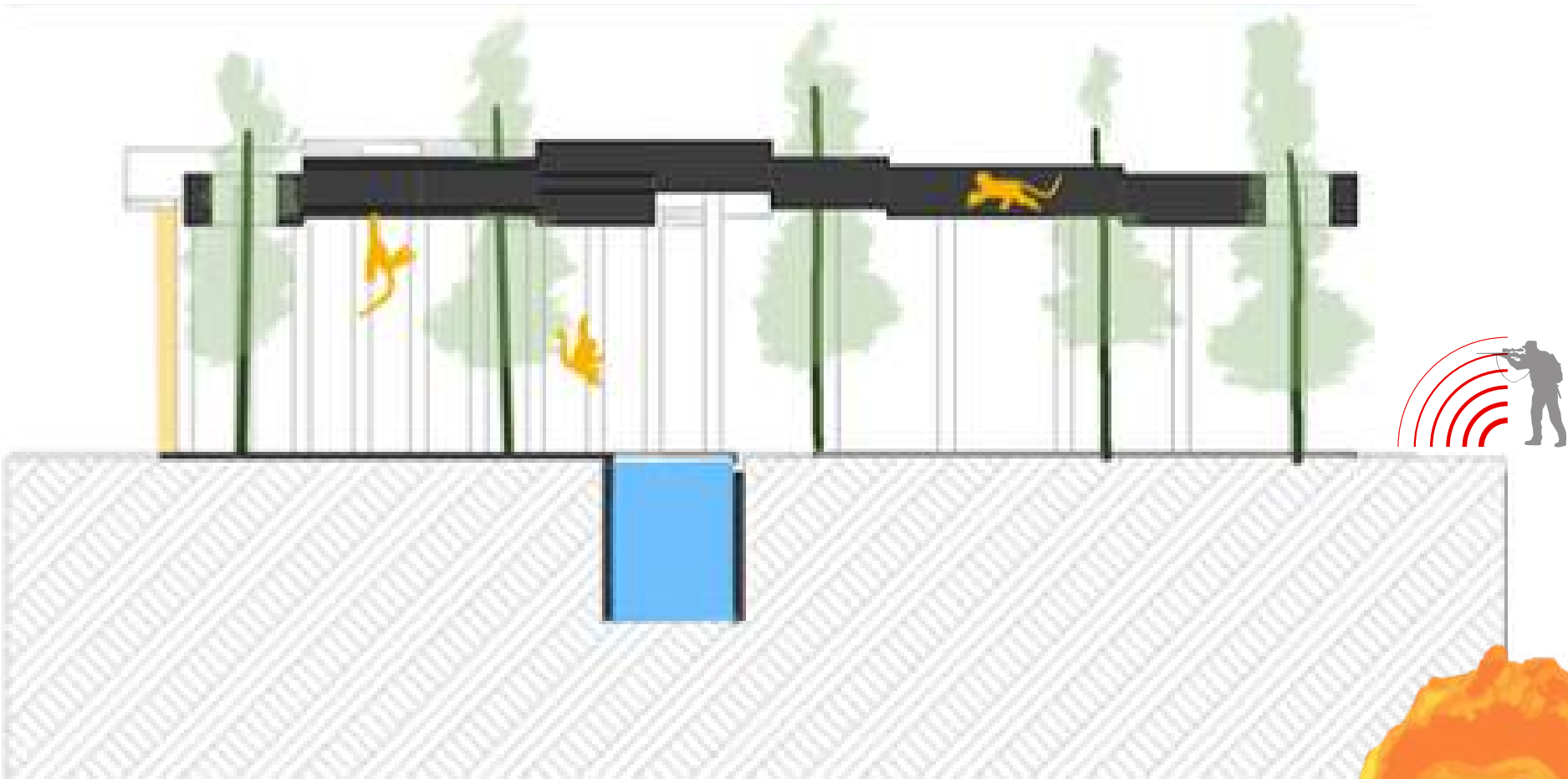
The shape of the lutung enclosure during the socialisation phase does not have to be closed and cage-like (as is common). The enclosure area can be made open and use natural boundaries so that the lutung has more freedom of movement, similar to its habitat in the wild. The implementation of the enclosure structure can be defined in more detail to classify whether the enclosure is considered building coverage or not.



Rescue Center Design of Javan Lutung *Lutung Cage*

The benefits of this design include improved physical health through muscle development, enriched psychological well-being by promoting natural behaviors, and increased success in socialization and pre-release conditioning. Overall, it ensures the enclosure functions not just as a holding space, but as a dynamic, enriching habitat aligned with the lutung's ecological and behavioral needs. Cage form with considering unharmed edges towards lutung movement and intend to bring in natural habitats by providing gaps in lutung food vegetation.

This approach resolves the contradiction by creating a space where learning and adaptation occur naturally, rather than through forced exposure or high-stress conditioning. As a result, lutungs develop behavioral resilience and ecological competence in a context that supports both their autonomy and emotional well-being, leading to a more ethical and effective rehabilitation process.



Rescue Center Design of Javan Lutung
School Programme

The Javan lutung (lutung jawa) school program for anticipation threat training is a critical component of pre-release preparation, aimed at reducing their vulnerability to human-related threats, particularly poaching. This program conditions lutungs to recognize and avoid danger through multisensory exposure to human-associated cues.

**Sound-based
training**

human voices, vehicle noises, or gunfire sounds are played to trigger natural flight or avoidance responses;

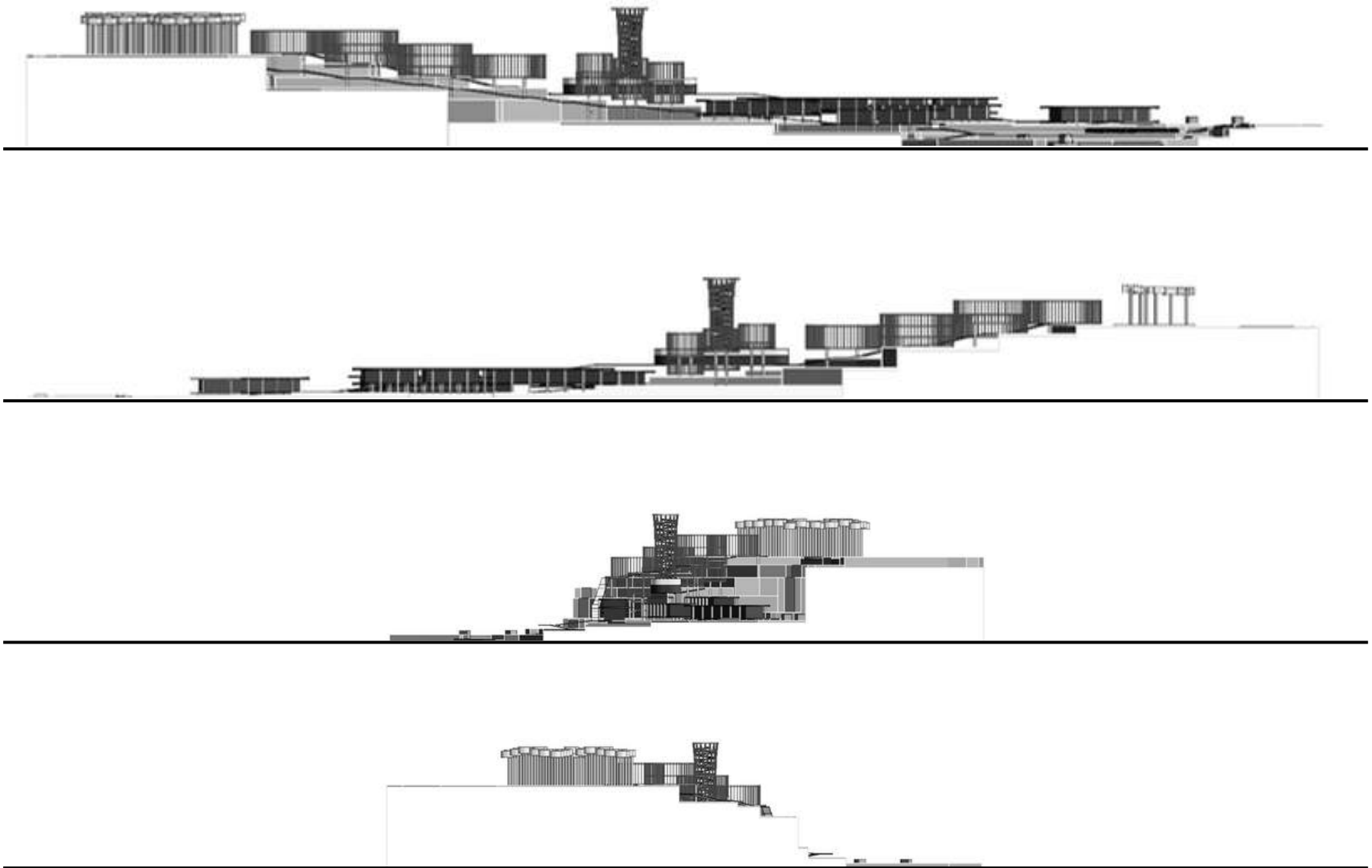
**Visual
training**

humans in various postures (e.g., with tools or weapons);

**Olfactory
cues**

the scent of human sweat, smoke, or oil-based products in controlled scenarios

Figure7.7 School island section Source: author, 2025



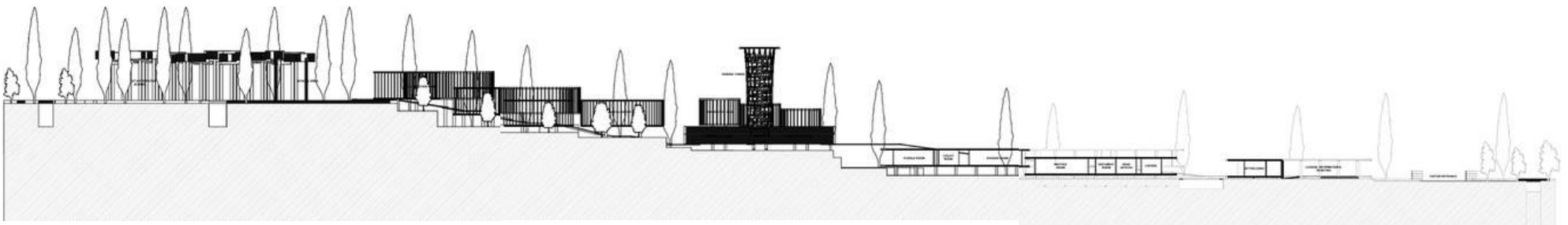
Rescue Center Design of Javan Lutung
Elevation



Rescue Center Design of Javan Lutung

Section A

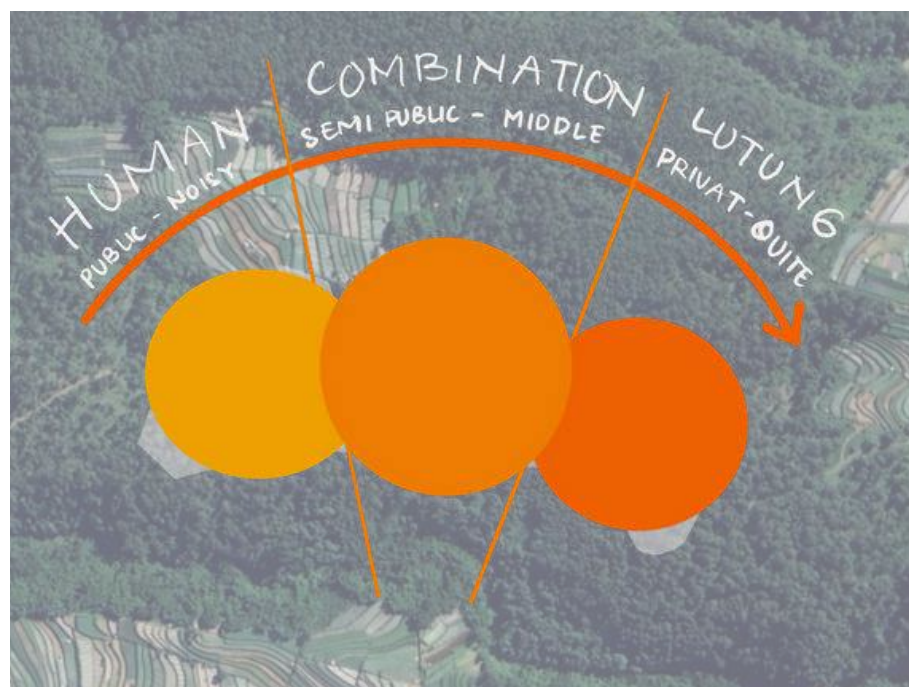
This design implement a 360-degree viewing tower in a Javan lutung rescue center allows full, non-intrusive observation of the enclosure, supporting both animal welfare and education. It enables caretakers to monitor behavior and safety without causing stress, while offering visitors a unique perspective to learn about lutung conservation and natural behaviors. Placing a school island for Javan lutungs at a higher altitude is better because it closely mimics their natural montane forest habitat. Higher altitudes offer cooler temperatures, denser vegetation, and more vertical forest structure—ideal for their brachiation, foraging, and social behaviors.



Rescue Center Design of Javan Lutung

Edu-Tourism Area

Integrating an amphitheater, souvenir room, mini museum, and café supports edu-tourism by enhancing visitor experience and generating self-sustaining income. The amphitheater hosts educational events, the museum offers insights into Javan lutung conservation, the souvenir room promotes ethical merchandise, and the café increases visitor comfort and revenue. Together, they create a funding loop where education drives tourism and tourism funds conservation.



Final Exploration

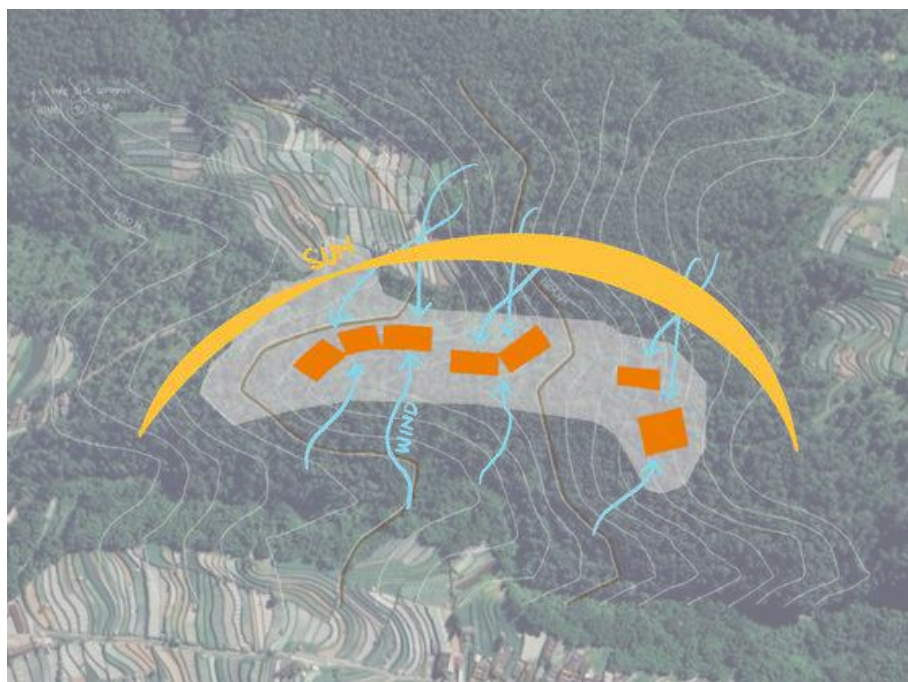
01

The main strategy is to establish clear boundaries between humans and langurs, resulting in three types of users: humans, human-langur combinations, and langurs. This is to create a safer transition zone with langurs. The human zone (noisy) will be located at the front of the site to take advantage of two access points, while the langur zone will be located at the rear to reduce excessive exposure to humans.



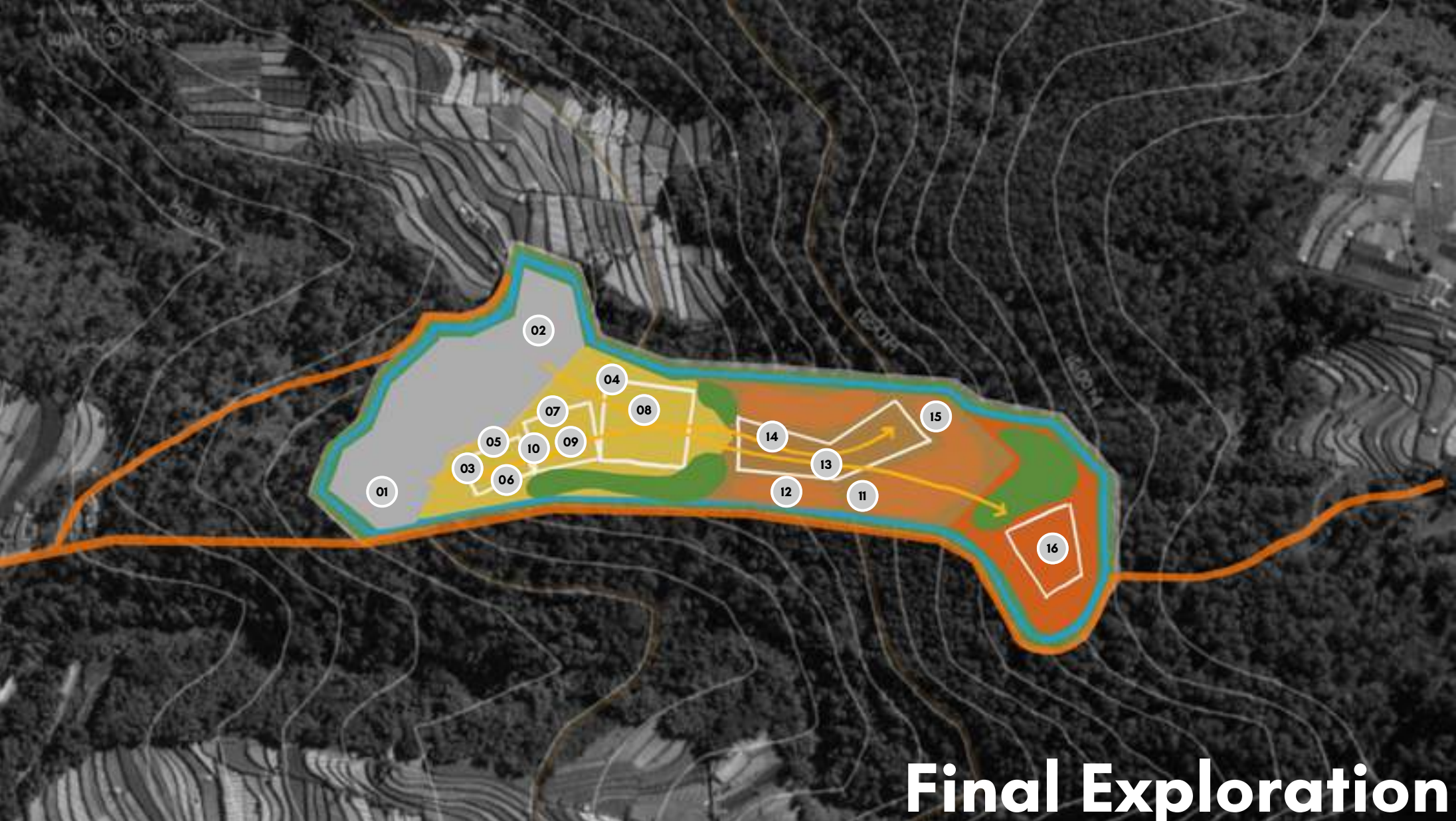
02

The placement of the building mass follows the contour lines to prevent the impact of earthquakes that often occur in this location. In addition, the placement and orientation also show the interface between one building and another, as well as the direction of user activity. This strategy will add a more orderly and controlled direction of activity.



03

By considering natural elements, this exploratory design helps to provide better and more optimal ventilation and natural lighting. With the building's facade facing the wind source, it becomes one of the ways to control the airflow through the building envelope.



Final Exploration

- | | |
|-----------------------------------|--------------------------------------|
| 01 Visitor Parking Area | 09 Supporting facilities |
| 02 Management Parking Area | 10 Mini Lutung Museum |
| 03 Information & Locketing | 11 Playground |
| 04 Front Office | 12 Quarantine Cage |
| 05 Souvenir | 13 Lutung Facilities |
| 06 Cafe & Restaurant | 14 Interpretative Nature Park |
| 07 Amphitheater | 15 Socialization Cage |
| 08 Management Offices | 16 Threat School – Island |

Chosen Design

Linear activity flow that flanks adjacent buildings is essential, this layout creates a clear and intuitive pathway that connects key zones, enabling smooth movement while enhancing wayfinding for both visitors and staff. By organizing activities linearly along a central spine, the design ensures balanced spatial distribution and visual coherence, allowing the flanking buildings to be accessed efficiently without disrupting the overall flow. Additionally, this strategy supports modular growth and simplifies orientation, which is particularly important in educational or conservation-focused facilities.

Building Mass Transformation

Rescue Center Design of Javan Lutung

Changes in the mass of the building take into account the contours of the site, with the linear mass of the building placed parallel to the land so that the construction strength and structural form will be more stable and resistant to earthquakes. The placement of the lutung area is considered to surround the human building with the aim of focusing attention 360 degrees on the lutung. This also encourages effective management that can be accessed from the side of the building. A solid roof structure is placed on the human-made building and integrated into the facility building sections.

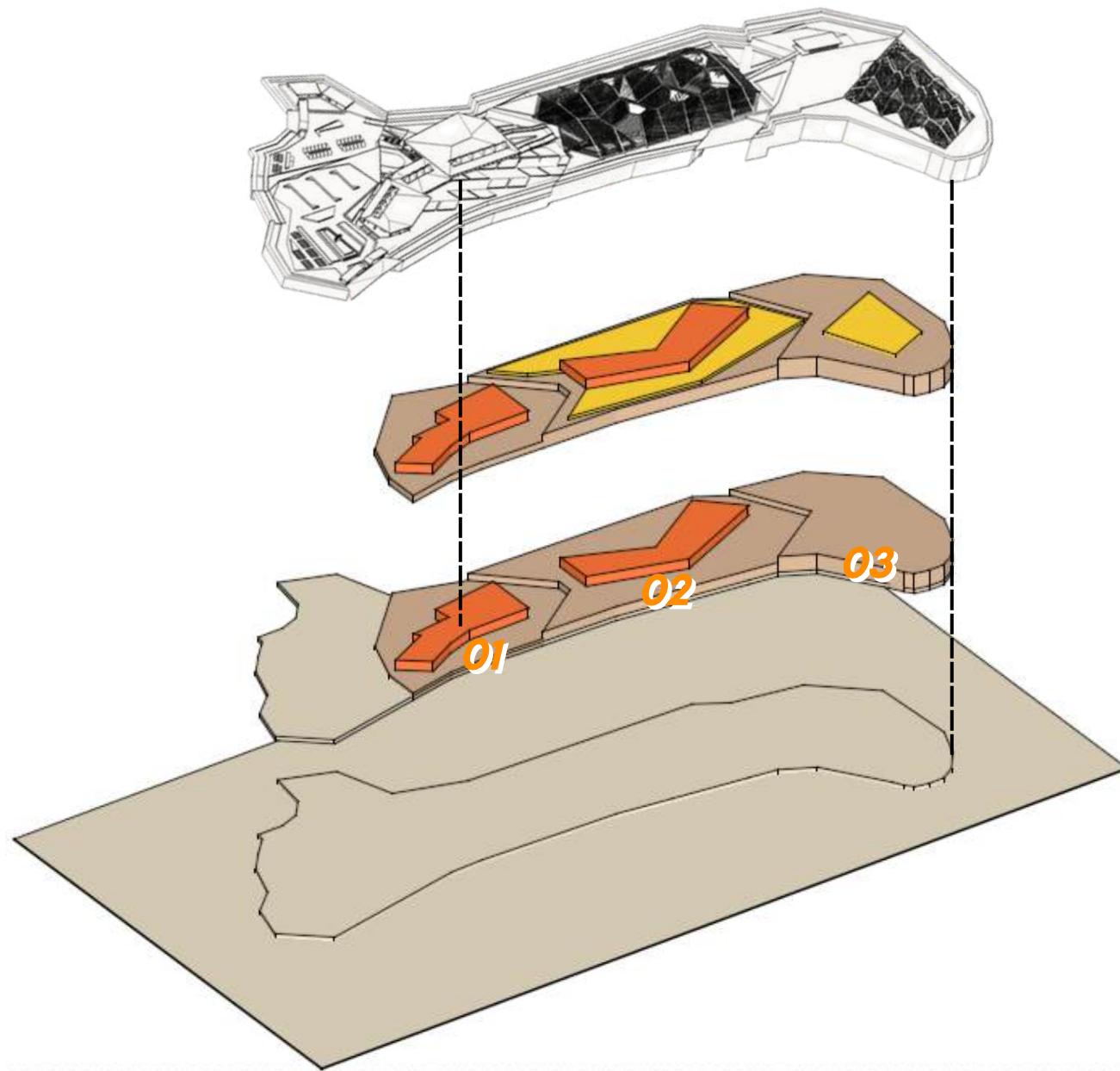


Figure 7.12 Building mass transformation, Source: author, 2025



08.
**Design
Development**

SPACE REQUIREMENTS

TOTAL CALCULATION					
No.	Part	Capacity	Area	Notes	
1.	Javan Lutung Facilities	-	8212,5	13,04%	
2.	Javan Lutung Supporting Facilities	-	147,75	0,23%	
3.	Visitor	-	2214	3,51%	
5.	Management Office	-	139,5	0,22%	
6.	Service Management	-	834	1,32%	
			Total Area	11547,75	11.550
			Site Area	63000	51.450

Based on the calculation of the space size, it can be concluded that the total area of the building reaches 11,550 square metres, which takes up 17% of the building area, including the circulation design.

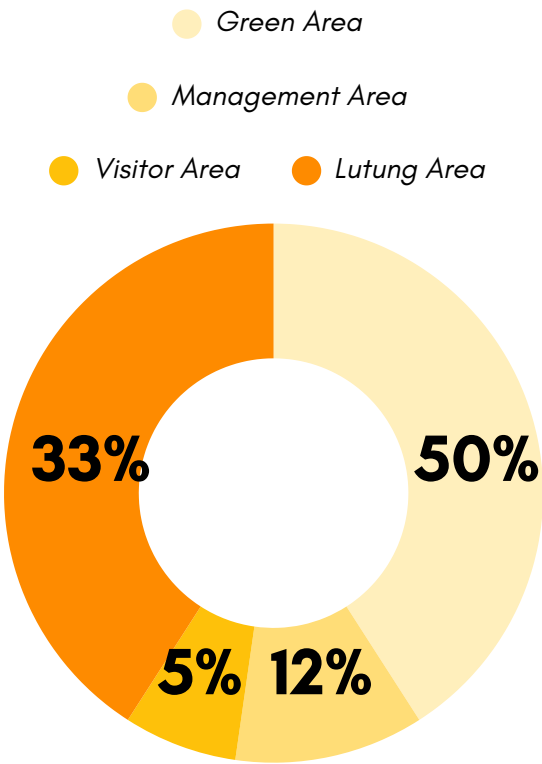
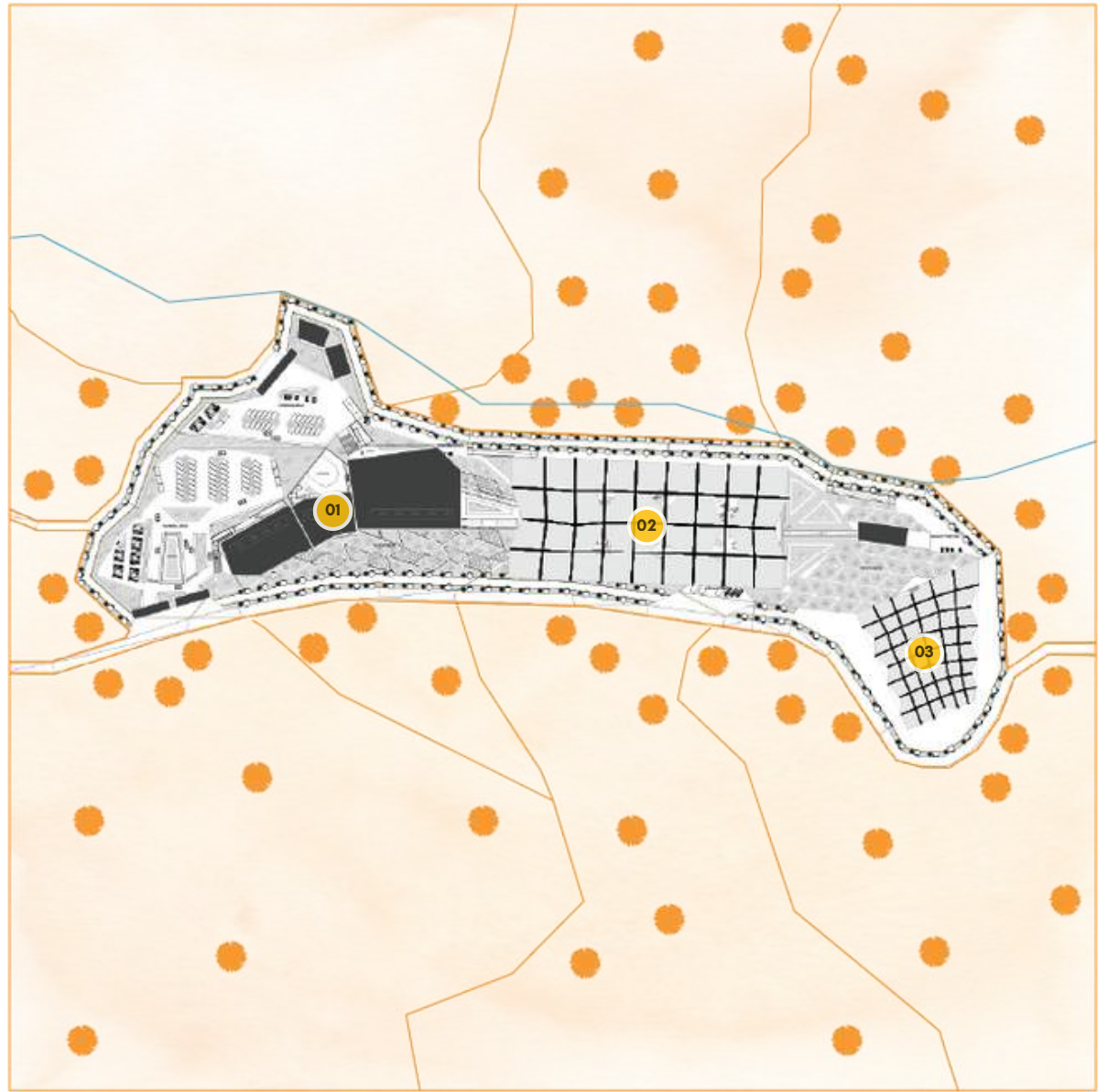


Table 1.29 Final space requirement, Source: author, 2025

Situation Plan

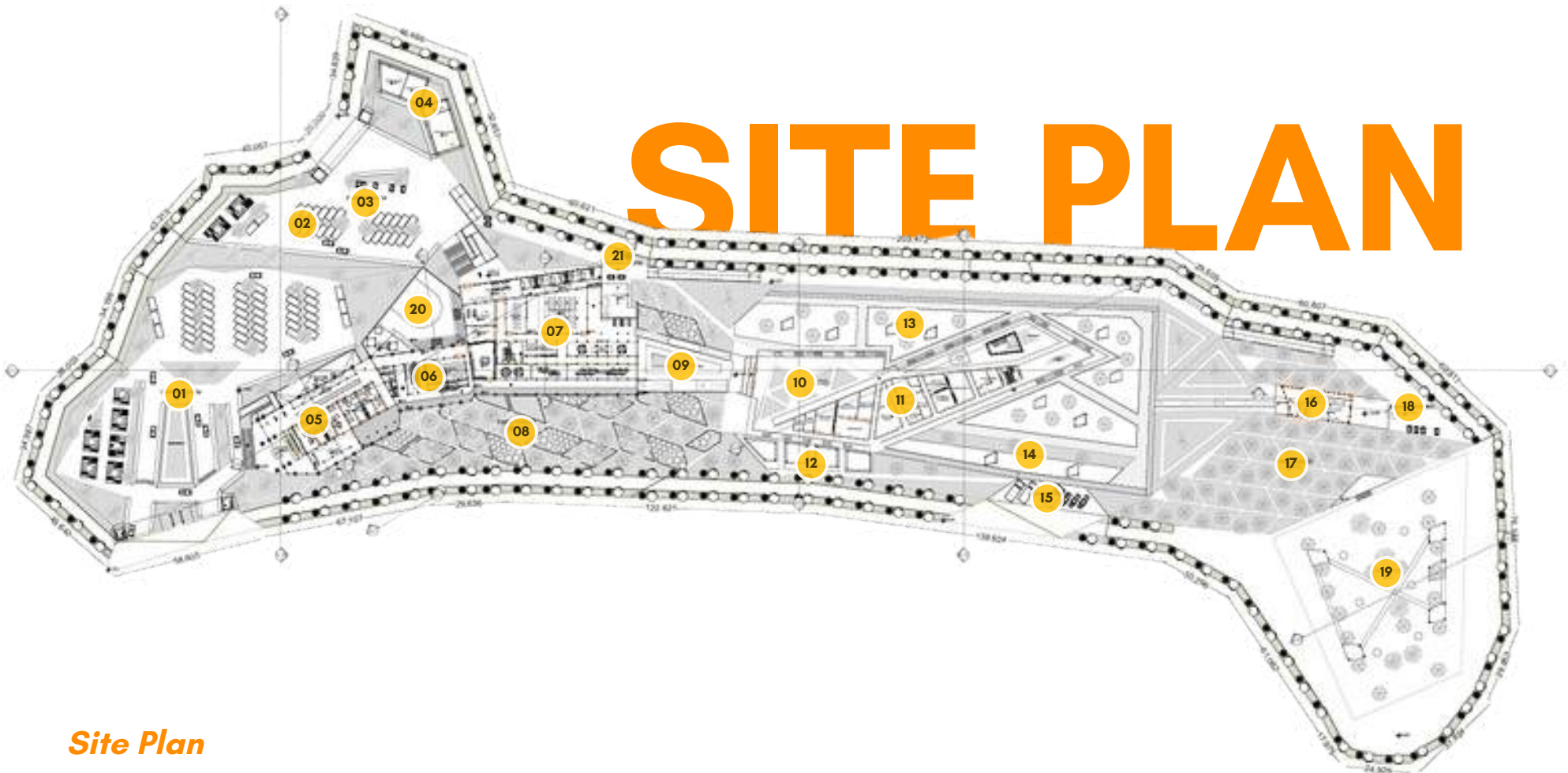
- 01 Human Building
- 02 Lutung Facility
- 03 School Island

Considering its location, Langgeng Lutung is significantly affected by the natural situation of protected forests within the Merbabu National Park. This is also based on the accessibility of climbing via Mount Merbabu via Suwanting. At the same time, perfect accessibility is possible on both sides of the site. Natural water streams can also be utilised as a means of meeting water needs up to the boundaries of the lutung area.



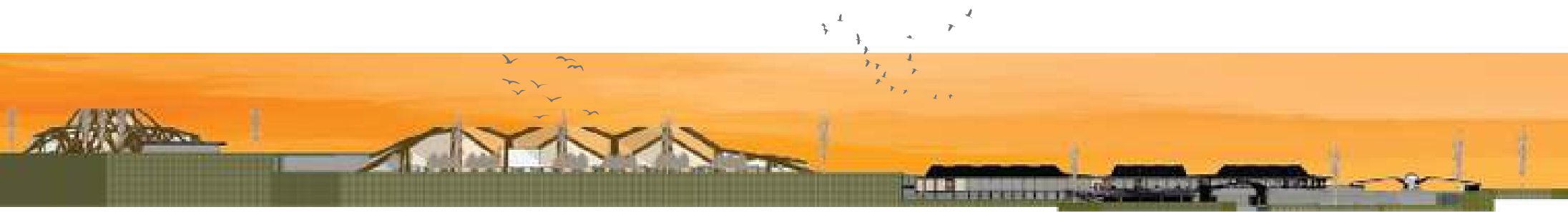
SITUATION PLAN

SITE PLAN



Site Plan

- | | | | |
|-----------------------------------|-----------------------------|------------------------------|-------------------------|
| 01 Visitor Parking Area | 07 Management Office | 13 Socialization Cage | 19 Island School |
| 02 Management Parking Area | 08 Food Forest | 14 Infant Playground | 20 Amphitheatre |
| 03 Buggy Car Pool | 09 Bridge | 15 Loading Area | 21 Loading Dock |
| 04 Utility Room | 10 Interactive Park | 16 Control Room | |
| 05 Visitor Center | 11 Medical Facility | 17 Tree Forest | |
| 06 Facility Center | 12 Quarantine Cage | 18 Buggy Drop | |



North Elevation



South Elevation



West Elevation

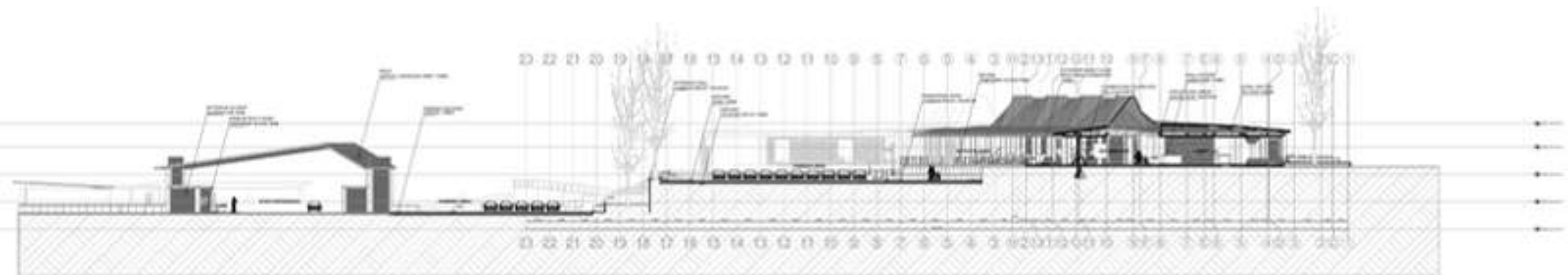


East Elevation

Situation Plan

Following with the massing form to imitate the mountain, this elevation drawing illustrate how the roof form gradually implements at each building area. Therefore this roof became as statement from the elevation figure. As part of the image of the design, Langgeng Lutung are well placed by following the contour context even with the helps of cut and fill technique due to mitigate cost aspect. This contoured building mass became one strategies to minimize the effect to face earthquake that often occurs at mountain area.

SECTION

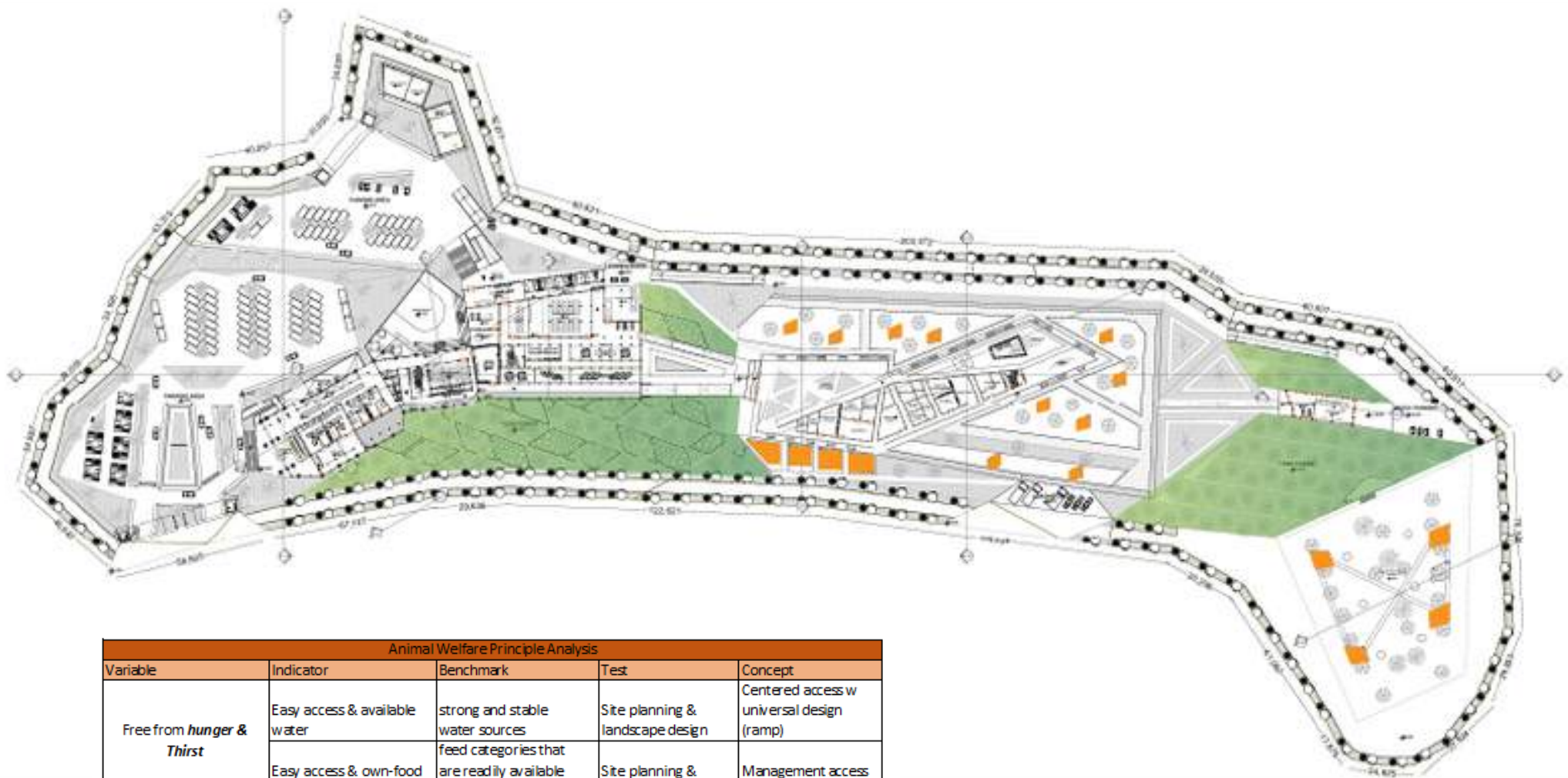


Section A

This section shows that placement of parking area are develop submerged due to purposing a privacy and elegant look of the entrance. This concept also to considerate of having two vehicle access as to prevent kammed of visitor and management activity. As to provide manageable security or safety of the design each entrance would be provided a safe guard as to gave parking instructions



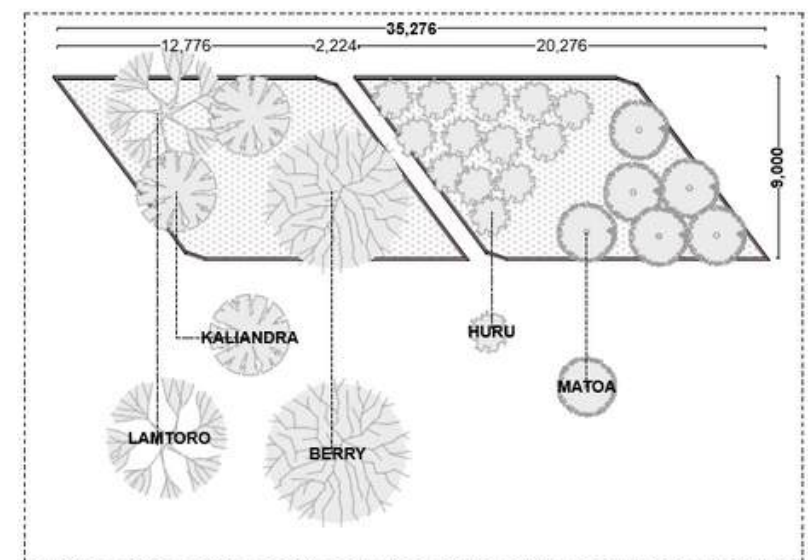
09.
**Design
Test Result**



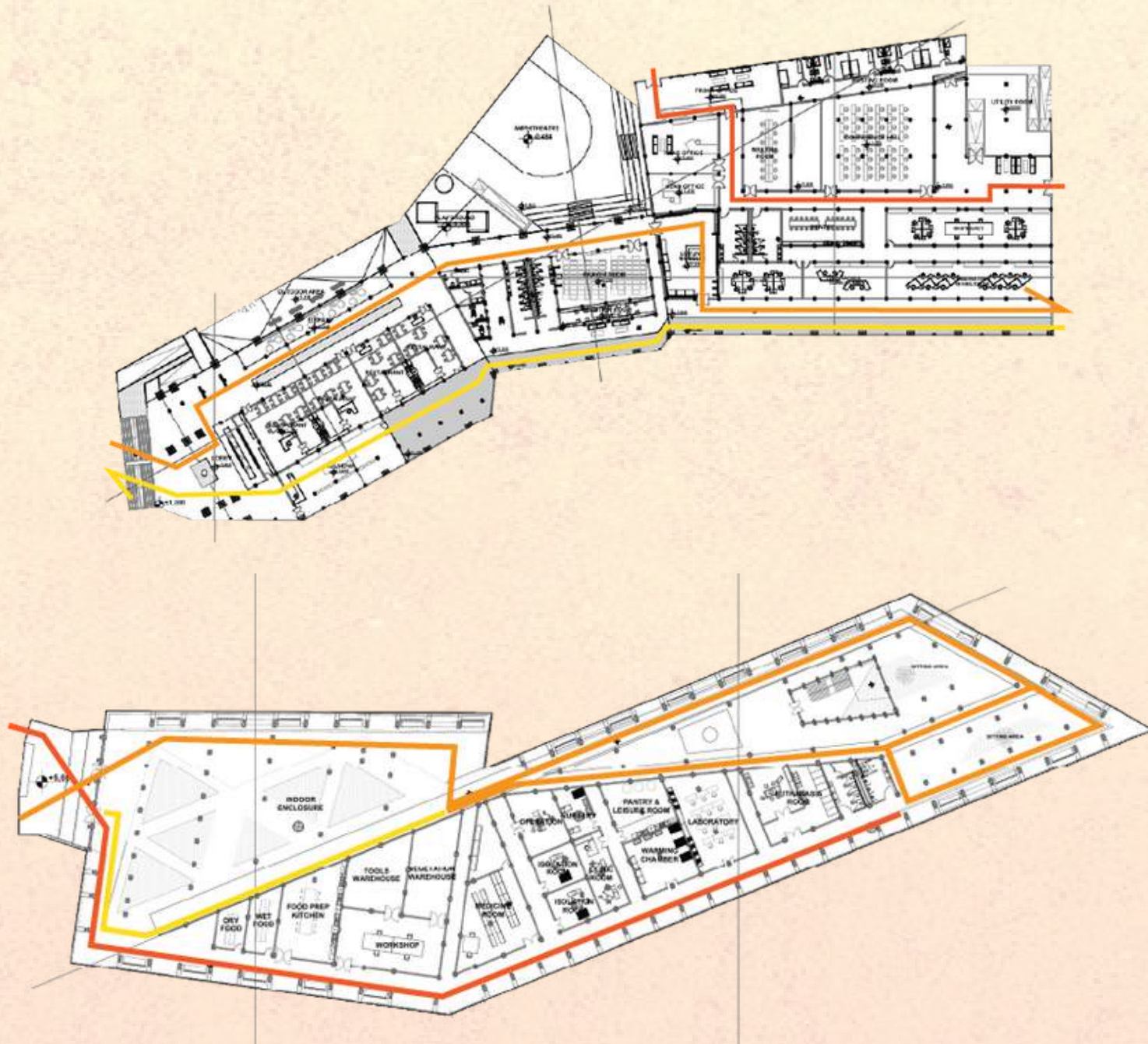
Animal Welfare Principle Analysis				
Variable	Indicator	Benchmark	Test	Concept
Free from <i>hunger & Thirst</i>	Easy access & available water	strong and stable water sources	Site planning & landscape design	Centered access w universal design (ramp)
	Easy access & own-food source	feed categories that are readily available on site and maintained	Site planning & landscape design	Management access divided with others
Habitual	Food source	Food forest	Vegetation type & placement	-
	Rescue & Rehabilitation	School programme	Grading	-
			Stimulation element	Man made interior

Site Plan

With having two acces, Langgeng Lutung face a benficial aspect such as the multi activity flow that define for management staff and visitor. At the same moment, it also manage the lutung transfer proccess much easier and efficient. By considering the sustainability of lutung food source.The landscape design would develop as food preparation forest, where all the lutungs food are farmed moderate by management with pirpose of cutting the annual cost and empower local people to involve.



Landscape design



Management Activity Flow

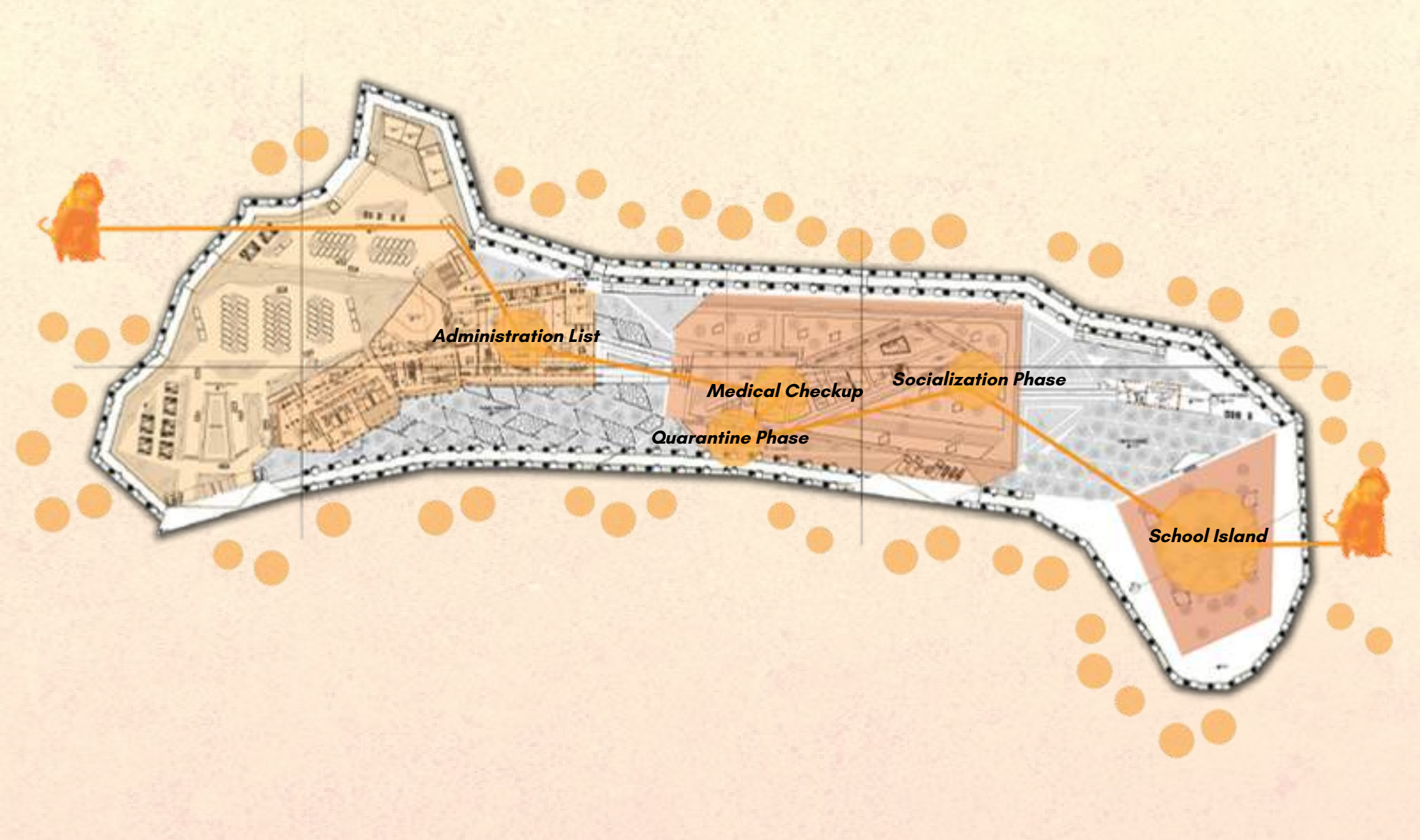
With separate parking areas and entrance lanes, staff have their own centrally designed area. This is intended to create a more compact, fast and efficient system of cooperation, as the divisions are located close to each other.

Visitor Activity Flow

The visitor experience route was designed using a linear principle in order to achieve the goal of controlling activities. On the other hand, the linear principle also provides clear boundaries for the stages of visitor education regarding the rescue of Javan Lutung.

Visitor Return Activity Flow

The return route has a design layout that aligns with the flow of visitor activities. This is intended to ensure that the museum experience remains structured until the end and is evenly distributed.



Repressive Process Naration

Management Offices

The lutung rescue process starts from the presence of individual animal problems that are followed up through the administration and observation process. Once they got accepted they being transferred to Langgeng Lutung as to follow medical check up.

Quarantine Phase

Lutung will be observed, treats and having rest in the Lutung Facility where it fulls with medical room, quarantine area and infant playground. This step would generate a safer area for the form of closed cage to determine cleanliness.

Socialization Phase

As lutung forming a colonization a bigger area to perform activity has profoundly positive impact to foster natural movement, individual space and hierarcihcal-cohesive group integration by giving open enclosure interaction space.

Island School

After several basic training in socialization phase lutung transfered to island school due to prepared them for release back. This area involves controlled simulation with natural threats. This area key impact is to enhanced self-defense responses. By building this survival skills in a semi-natural but secure setting, to equiped lutung in a better physically and behaviorally.



Lobby Aesthetics

To design and develop a lobby that embodies a warm and welcoming atmosphere, inspired by the timeless elegance and spiritual richness of Borobudur reliefs. This space will serve as the first point of contact and emotional connection for visitors. Through the visual narrative of the Borobudur reliefs—depicting a frame of pillars and trees.

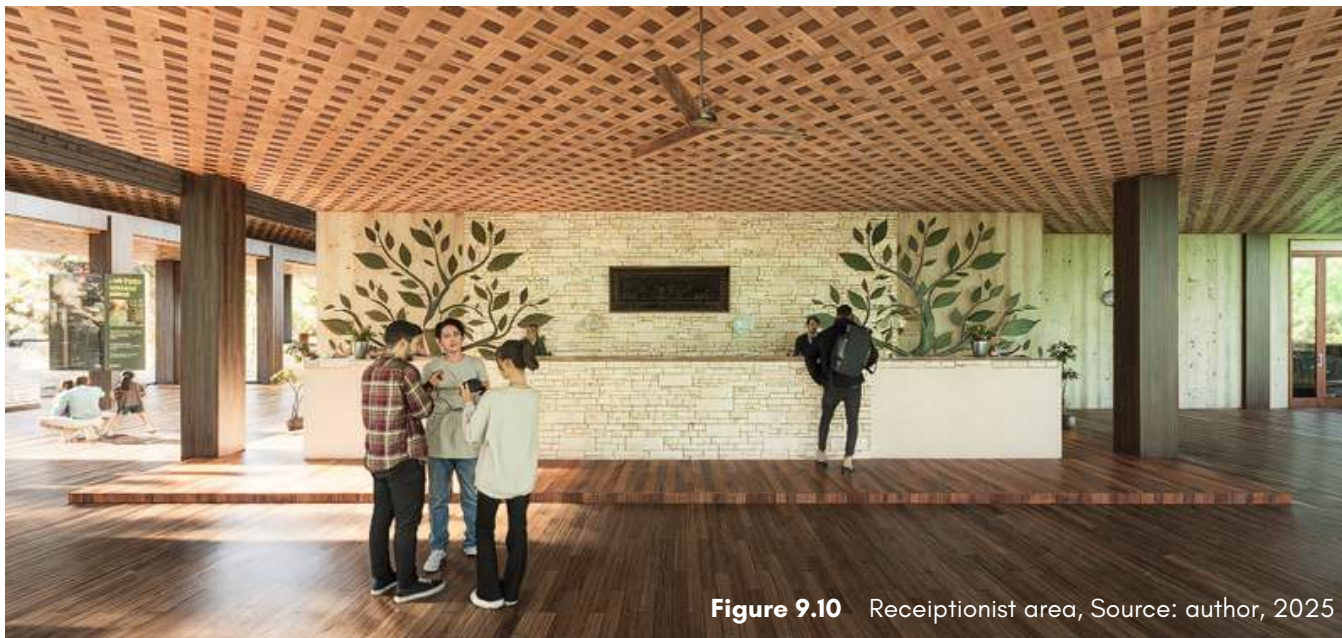


Figure 9.10 Receptionist area, Source: author, 2025



Figure 9.11 Corridor area, Source: author, 2025

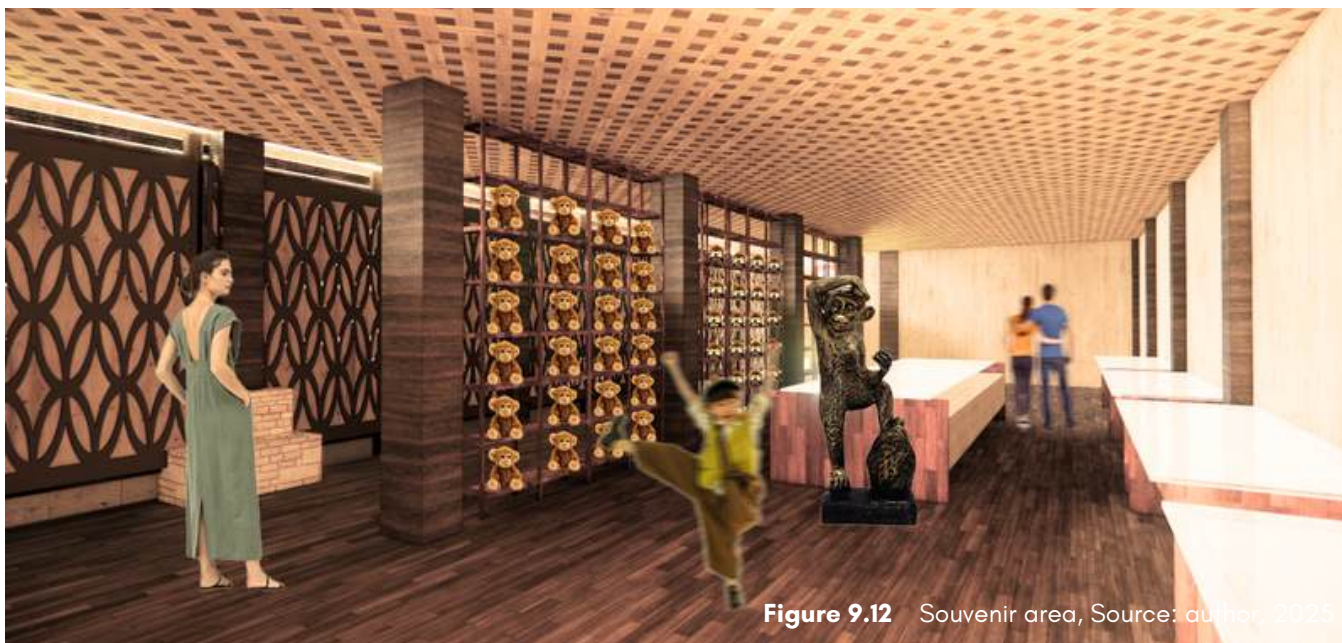
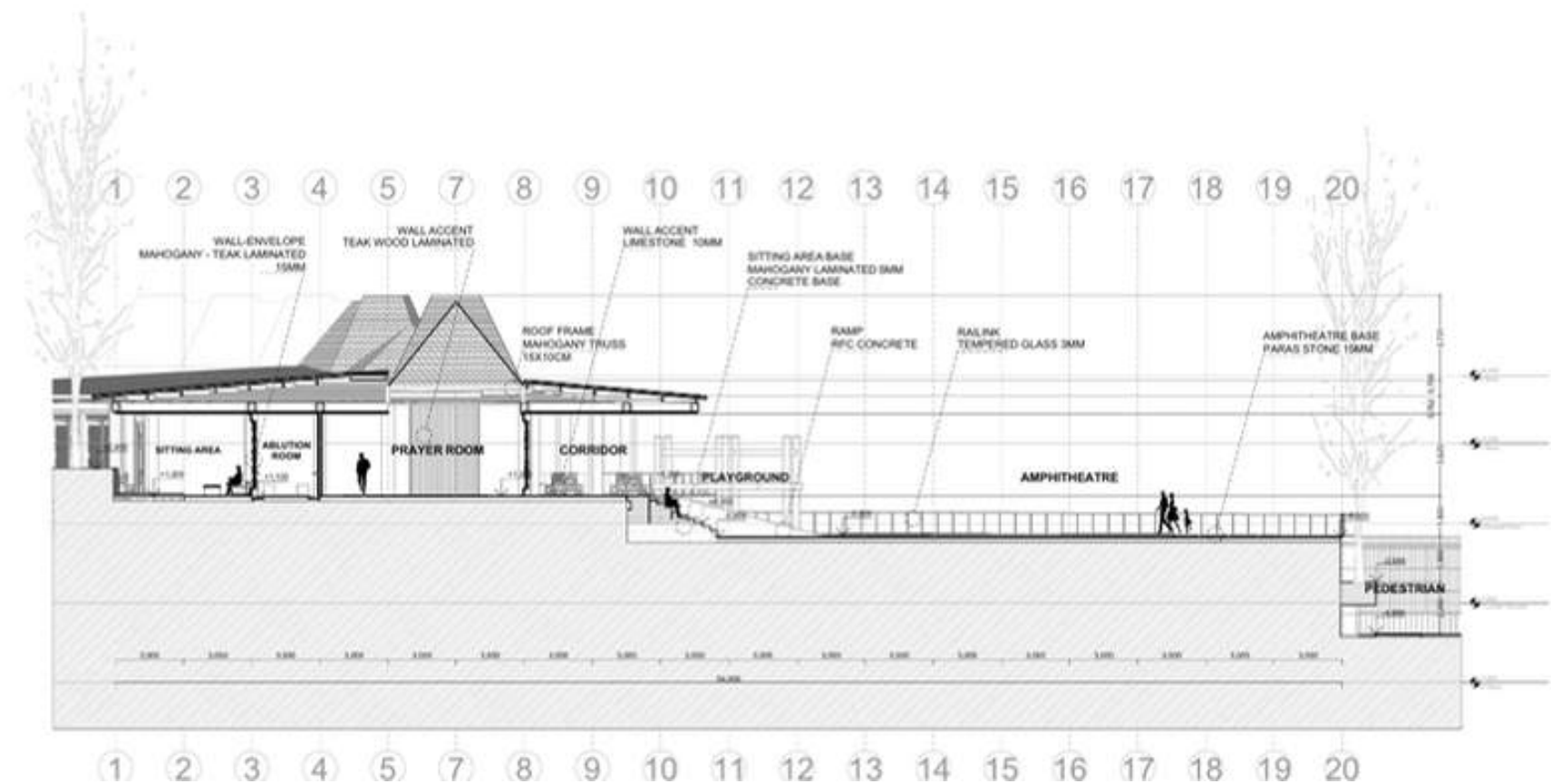


Figure 9.12 Souvenir area, Source: author, 2025

Visitor Center

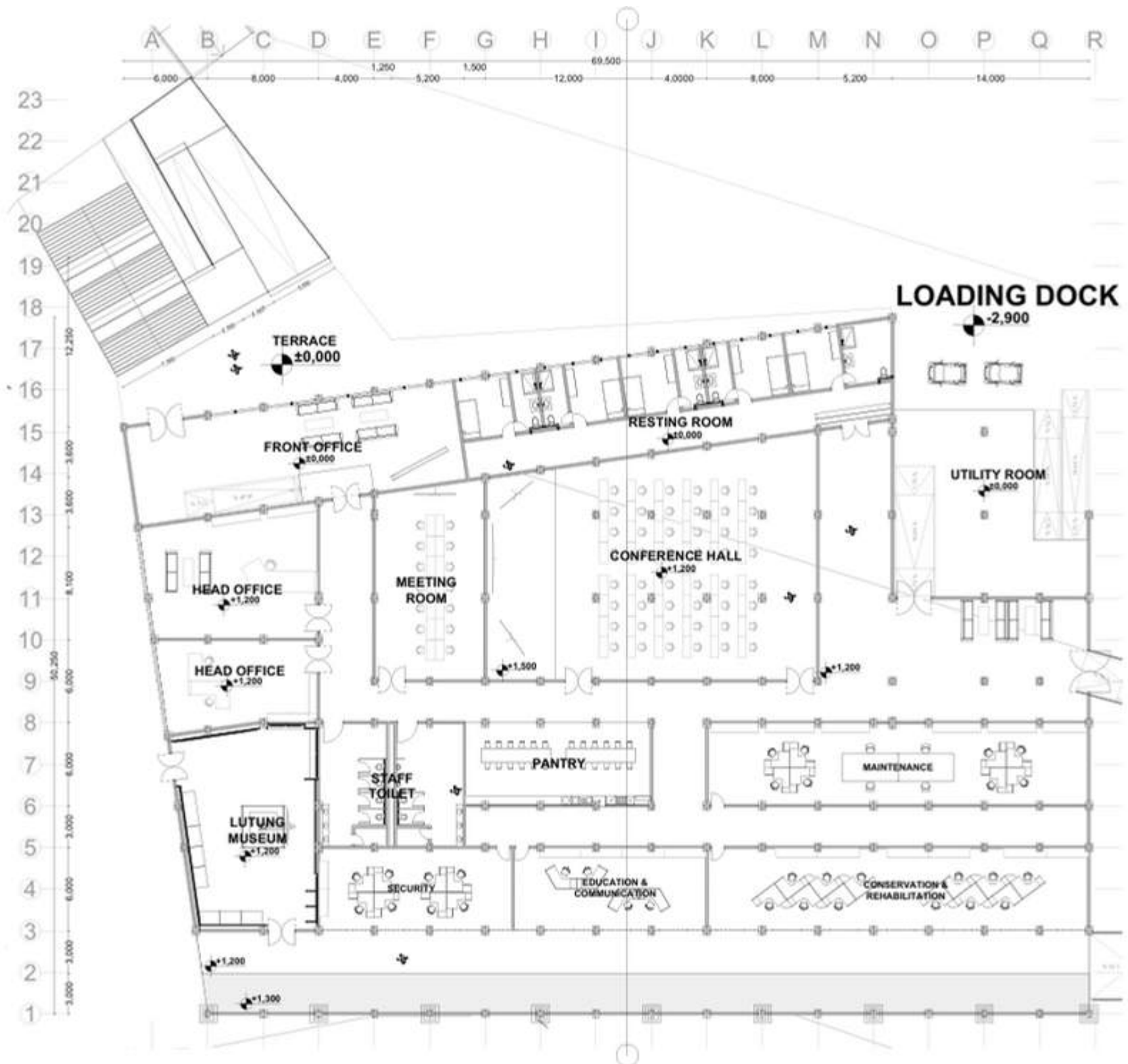
The lobby area nuance designed to mimicking the local nuance of central java-borobudur temple as it giving stones, woods and bamboos. On the hand of experience the visitor would meet information board and guided through a statement skylight as to move along to the next building. This area particularly being supported by the souvenir shop, which to serves the goodbye face to visitor and demand them to bring memories along.



Facility Center

The section draw visualize the placement of prayer room and amphitheatre along aside to pursue a compacct visitor activity. Many education events would be helds outdoorly at Langgeng Lutung amphitheatre. Besides theres also mini library and playground to support the activities and leaving an impression while sparking children's enthusiasm.





Management Office

Langgeng Lutung pays attention to the space requirements that are appropriate for the activities of each worker. The placement of workspaces has a main hierarchy from the head of management down to the divisions. The placement of security rooms is given extra attention to ensure safety.



Figure 9.19 Head manager office room, Source: author, 2025

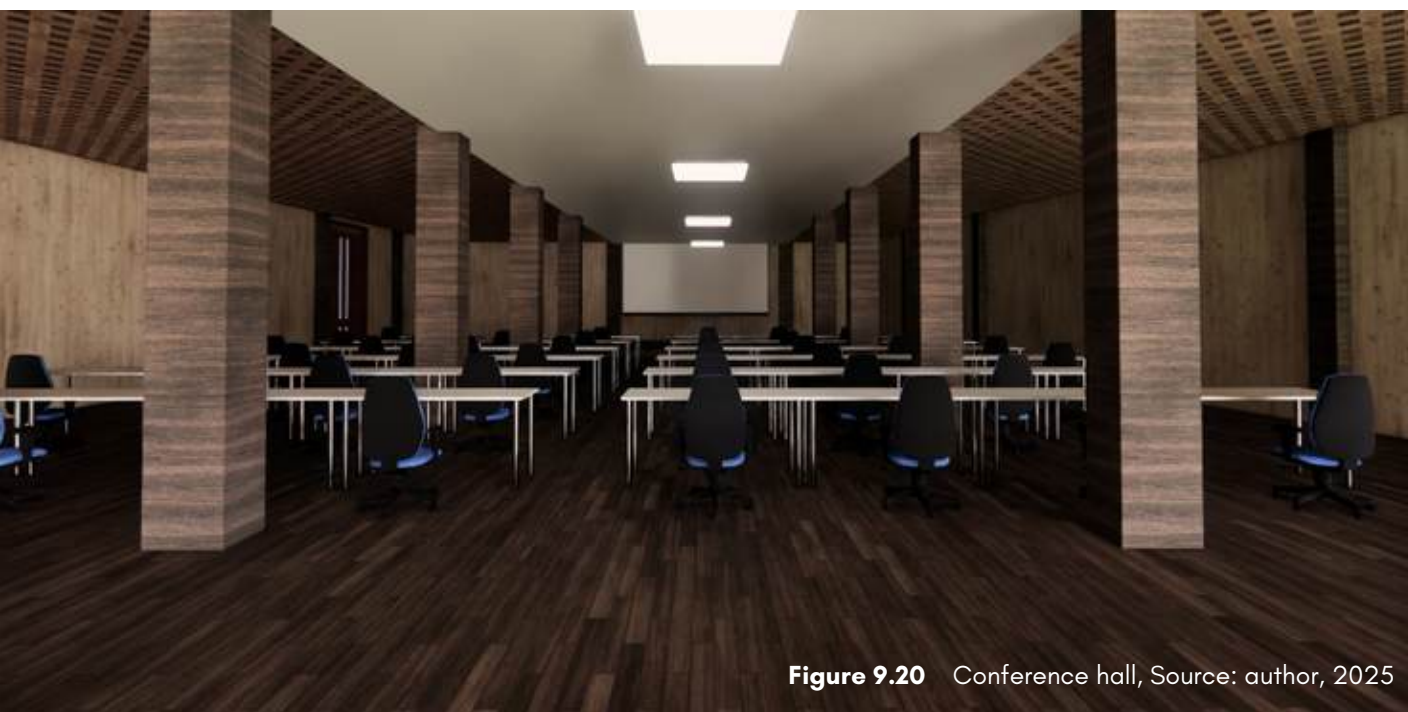


Figure 9.20 Conference hall, Source: author, 2025

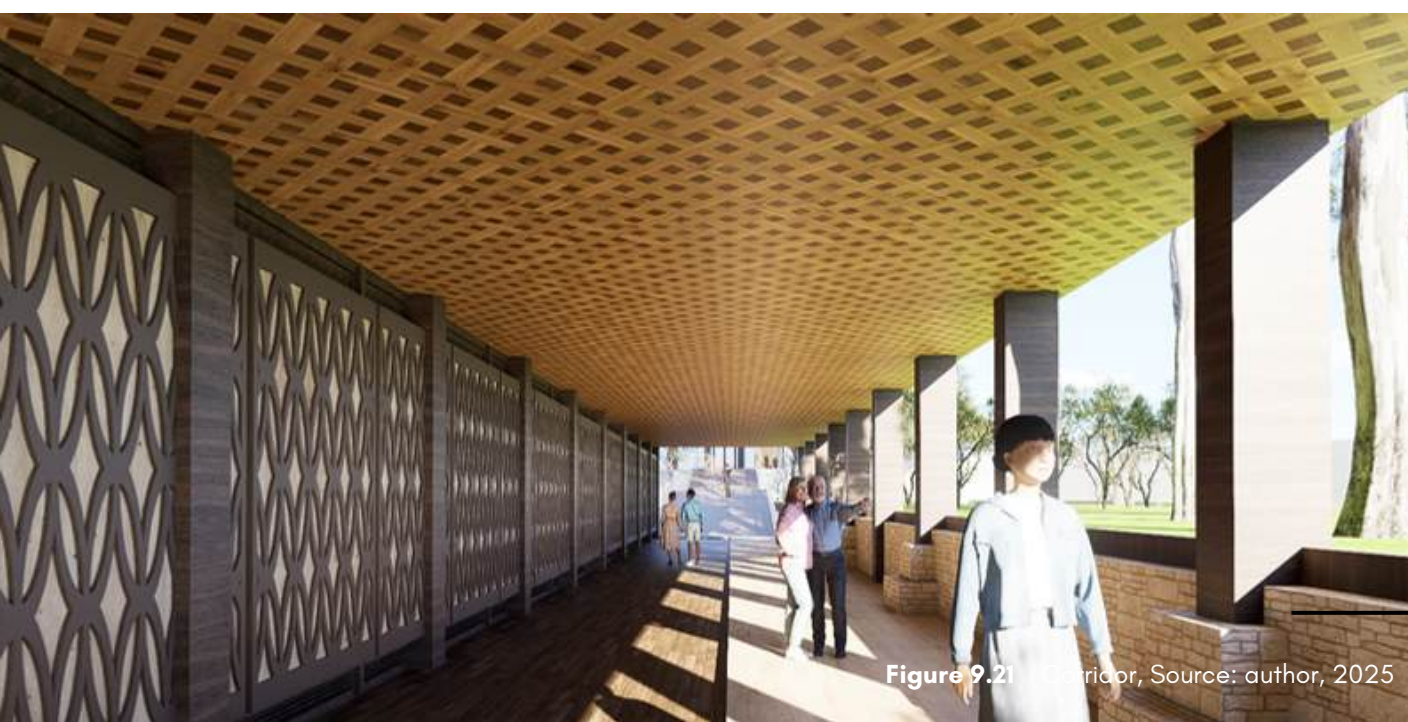
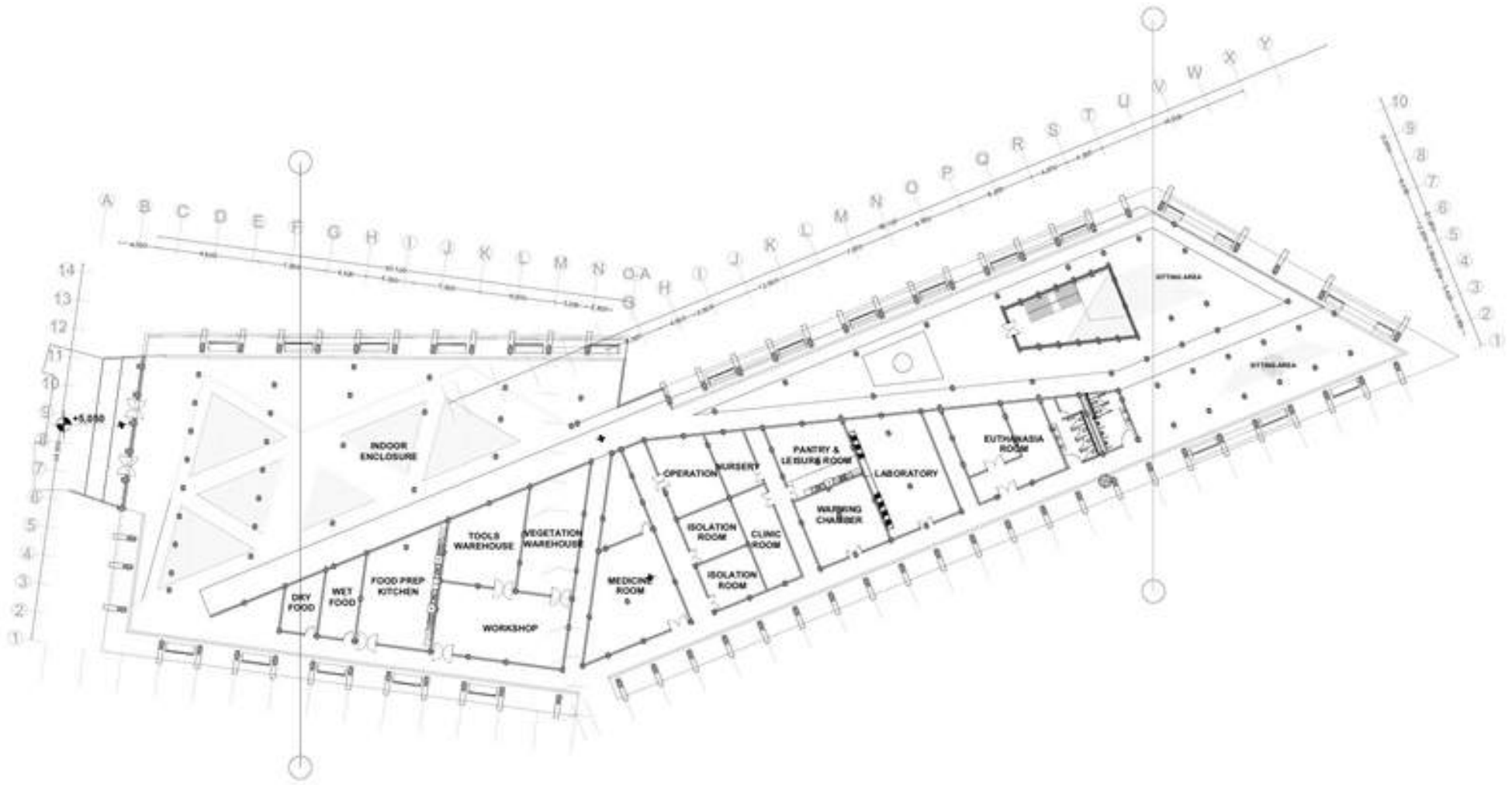


Figure 9.21 Corridor, Source: author, 2025

Management Office

The management office design follows a clustered flow layout, where functional zones are grouped to promote efficiency and communication while maintaining a clear hierarchy of spaces. The core management offices are organized in close proximity, forming a central hub that supports quick collaboration. Adjoining this cluster, a spacious conference hall serves as the primary venue for large-scale presentations and strategic discussions



Lutung Facility

Serving the facility for lutung as to give interactive park for visitor. This area consist with lutung cages : quarantine, socialization and infant playground. Therefore the floor plan of this facility focusing on health aspect of lutung. The visitor would stop interacting with lutung at interactive park due to privacy needs. While a lots of information of socialization process can be read along with the spatial experience. All medical activity would travel from south door as it placed near with another loading area. Under one mesh all lutung's life getting supported as well to inform knowledge to visitor.



Figure 9.22 Lutung facility plan, Source: author, 2025
Figure 9.23 Facility entrance, Source: author, 2025



Interactive Park

Nestled within the verdant mesh canopy, this interactive park offers an immersive journey on how lutung develop their colony. By entering wooden pathway & spaces evoking one natural elements of tree. The window dimension and orientation overlooking spacious ways to watch rescued lutung swings, forage, eats and socialize in a safer area. This long experiences try to unveil the challenges of Javan Lutung's lifestyle in their natural habitat. Hence to elevate this interactive park, visitor can enjoy lutung's view while resting on bench .



Figure 9.25
Observation deck, Source: author, 2025



Figure 9.26
Sitting area, Source: author, 2025



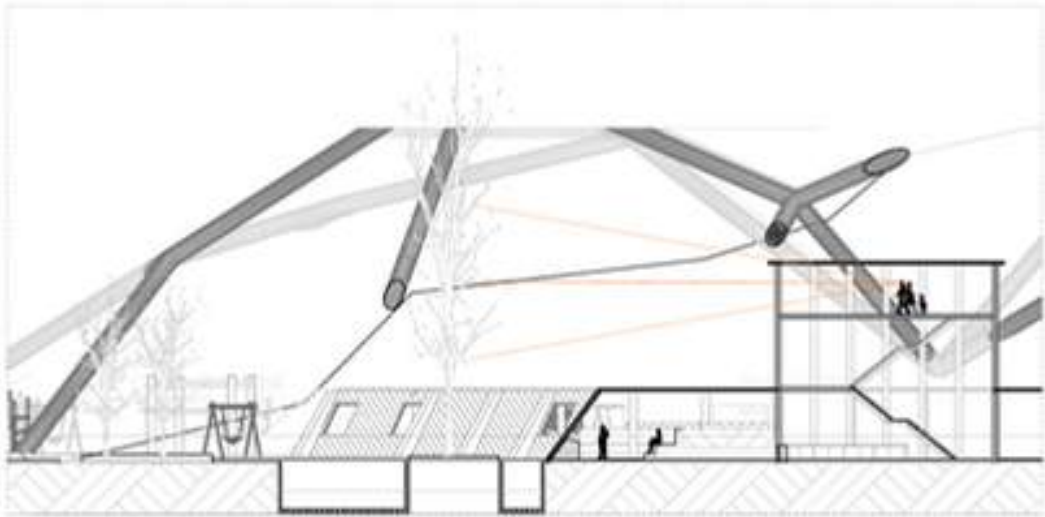
Figure 9.27
Interpretative park viewing, Source: author, 2025



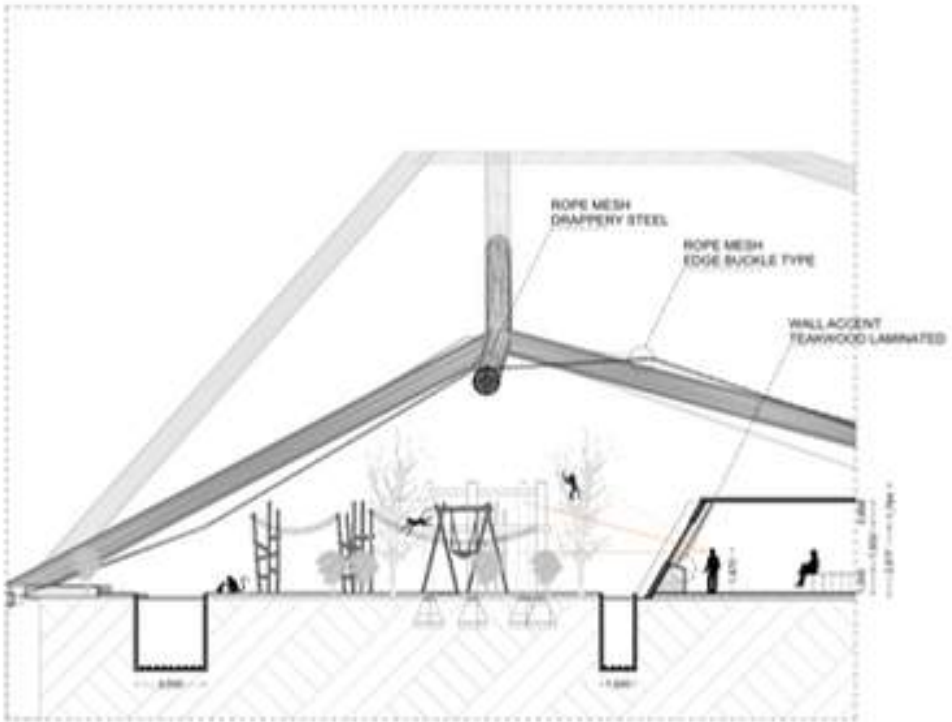
Figure 9.28
Observation deck entrance, Source: author, 2025



Figure 9.29
Interpretative park area, Source: author, 2025



The pattern of directional gaze on viewing deck



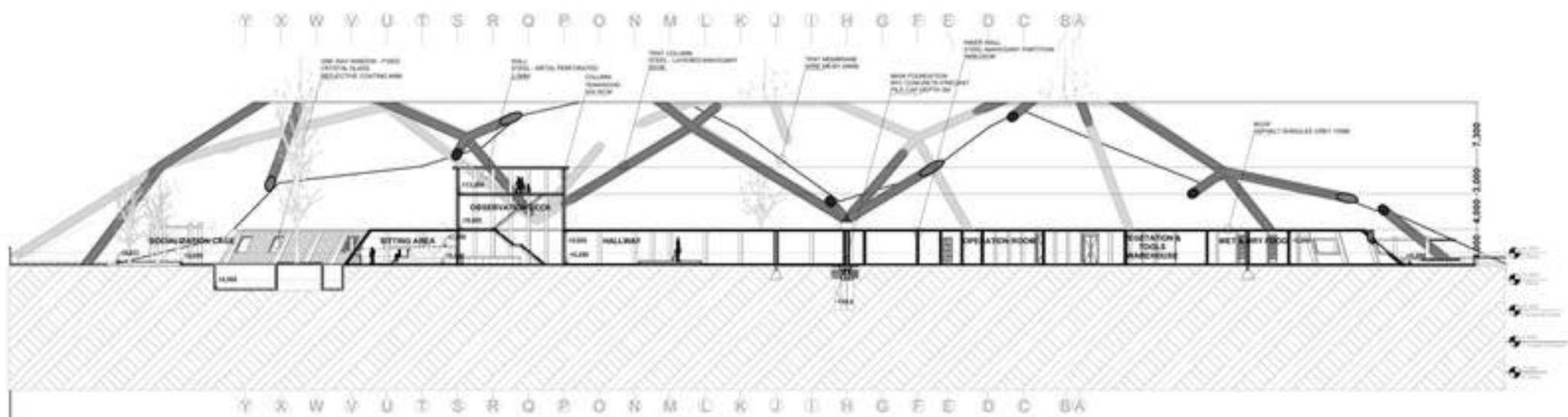
The pattern of directional gaze on interpretative park

Viewing Behavior

Incorporating rising gabove treetops space, an observation deck invites visitor ascend gradually via stairs pausing at several levels. This design rewarded 360-degree view of the lutung’s lush, open enclosure below where lutung having the daily activity. The function are develop to helps some research activity and to elevate visitor experience without giving intrusion for lutung. Concerning the wider area of interactive park the placcement of sitting area spread compactly inside this facility.

Animal Welfare Principle Analysis				
Variable	Indicator	Benchmark	Test	Concept
Free from <i>hunger & Thirst</i>	Easy access & available water	strong and stable water sources	Site planning & landscape design	Centered access w universal design (ramp)
	Easy access & own-food source	feed categories that are readily available on site and maintained	Site planning & landscape design	Management access divided with others
Free from <i>discomfort</i>	Availability of hang/swing area	provide a wide & sufficient number of physical instruments with appropriate dimensions	Playground, Quarantine, Socialization cage design	Cage consist with modular form, 1,5m swing gap
	Availability of shade/sleep area	sufficient number of shades & comfortable height	Shelter of vegetation or some kind	Locating//Mimicing tree form structure
	Minimum exposure to human	distance/boundaries with human interaction	Barrier, one-way glass	Vegetation fences connecting water streams
Pressesive Protection	Rising Awareness	Mini museum	Museum layout & elements	Interpretative flow, emotional experience
	Delivering memorable experience	Interactive Park	Transferring system & management	Linear Javan Lutung viewing

Figure 9.30 Observation deck viewing angle, Source: author, 2025
 Figure 9.31 Interpretative park viewing angle, Source: author, 2025



Medical & Food Room

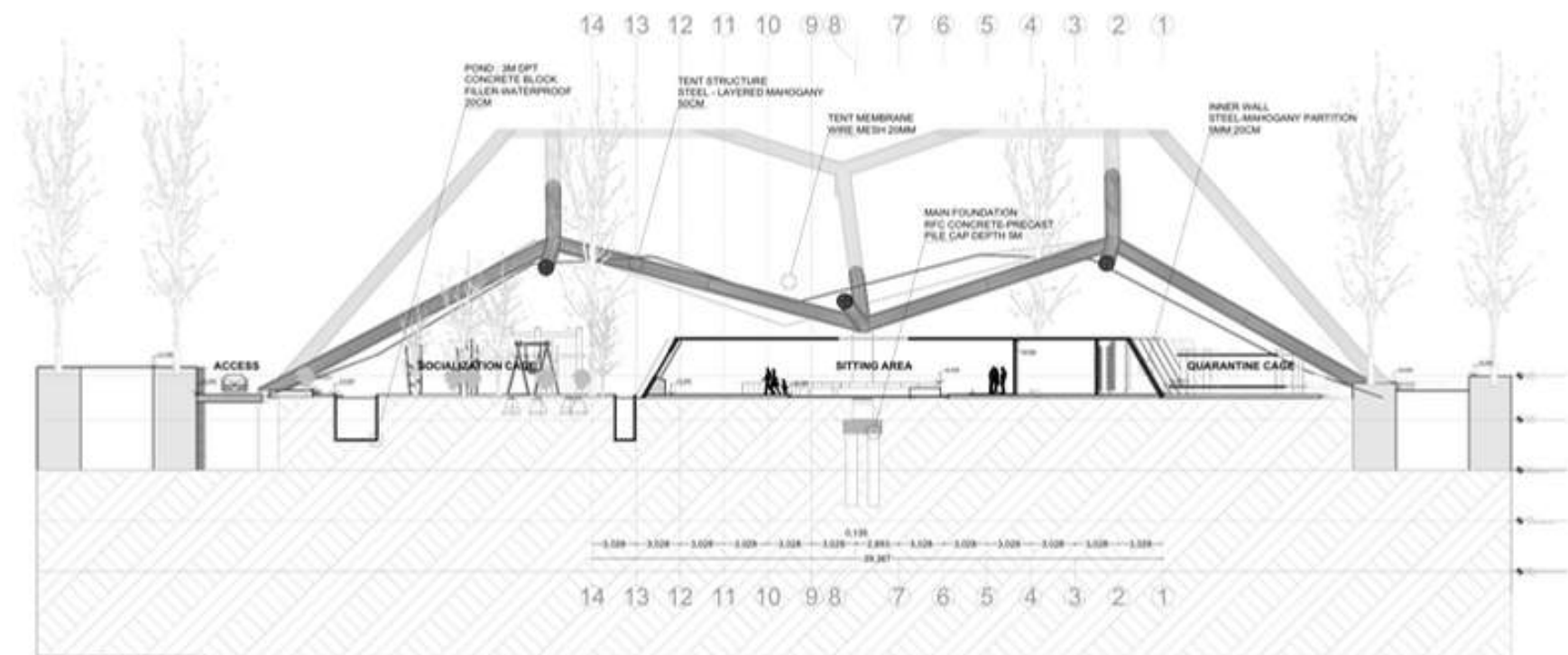
Langgeng glutung also designed lutung's medical facility with consider the layout is organized for efficient veterinary workflow, with designated zones for triage, examination, minor procedures, and post-care observation. A dedicated isolation enclosure with independent access ensure it safety for animals and management staff. As to provide food, medicine, surgical procedures and death management are concentrated in one area.



Figure 9.33
Operation room, Source: author, 2025



Figure 9.34
Food preparation pantry, Source: author, 2025



Socialization Cage

The Javan lutung socialisation enclosure is designed with an open enclosure concept that allows the lutungs to experience natural air circulation, exposure to sunlight, and visual and auditory stimuli from the surrounding environment, which are important for maintaining their natural behaviour. With a large area and live vegetation inside, the lutungs can climb, jump, and form social interactions more freely, thereby strengthening their motor skills and social bonds between individuals. Additionally, the open enclosure reduces stress caused by isolation and creates a more dynamic and stimulating environment. Overall, this design not only enhances the rehabilitation process but also reflects a commitment to ethical principles and the welfare of wild animals.

Quarantine Cage

The closed quarantine enclosure for Javan lutungs provides a safe, controlled space for health checks and recovery. With regulated conditions and minimal disturbances, it ensures hygiene, reduces stress, and supports close monitoring—serving as a vital first step in the rehabilitation process.

Infant Playground

The open play area for baby Javanese lutungs supports their early development in a setting that mimics the wild. It allows for natural exploration, builds confidence, and enables direct observation by caregivers. This design plays a key role in preparing them for future rehabilitation and release.



Figure 9.36
Quarantine cage, Source: author, 2025



Figure 9.37
Socialization cage, Source: author, 2025



Figure 9.38
Infant playground, Source: author, 2025

Envelope Detail

The rich contrast of mahhony and plywood deep color enhance the visual expressions of the traditional Batik Kawung motif that symbolize harmony and continuity. The envelope design combines with some louvre as to elevate the function. Gicing the passive climate strategy while do honor on javaneese heritage. 2 orientation louvre panels allow for natural cross ventilation and guide fresh air in and expelling hot air through othe rlouvre or direct to the roof

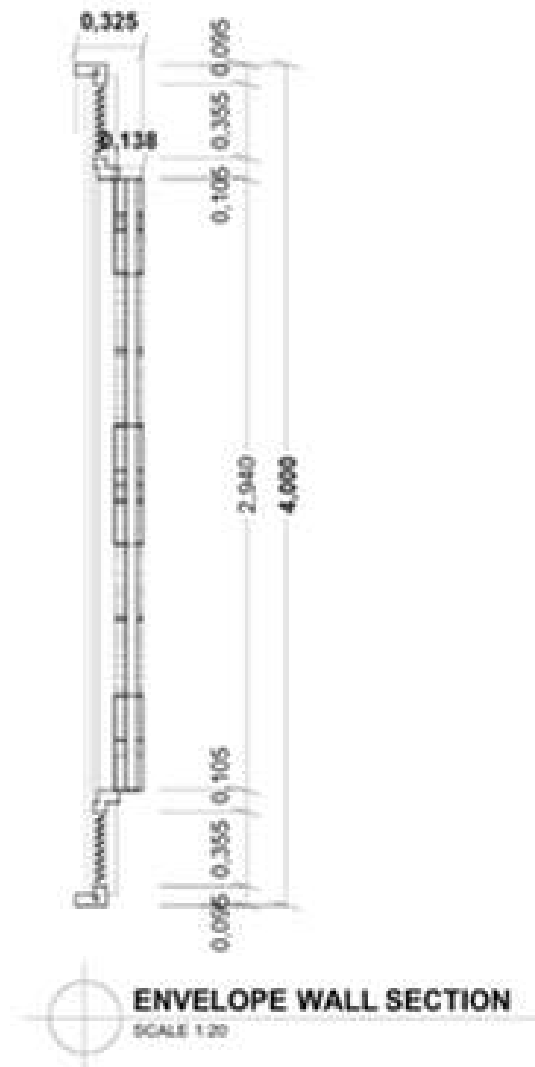
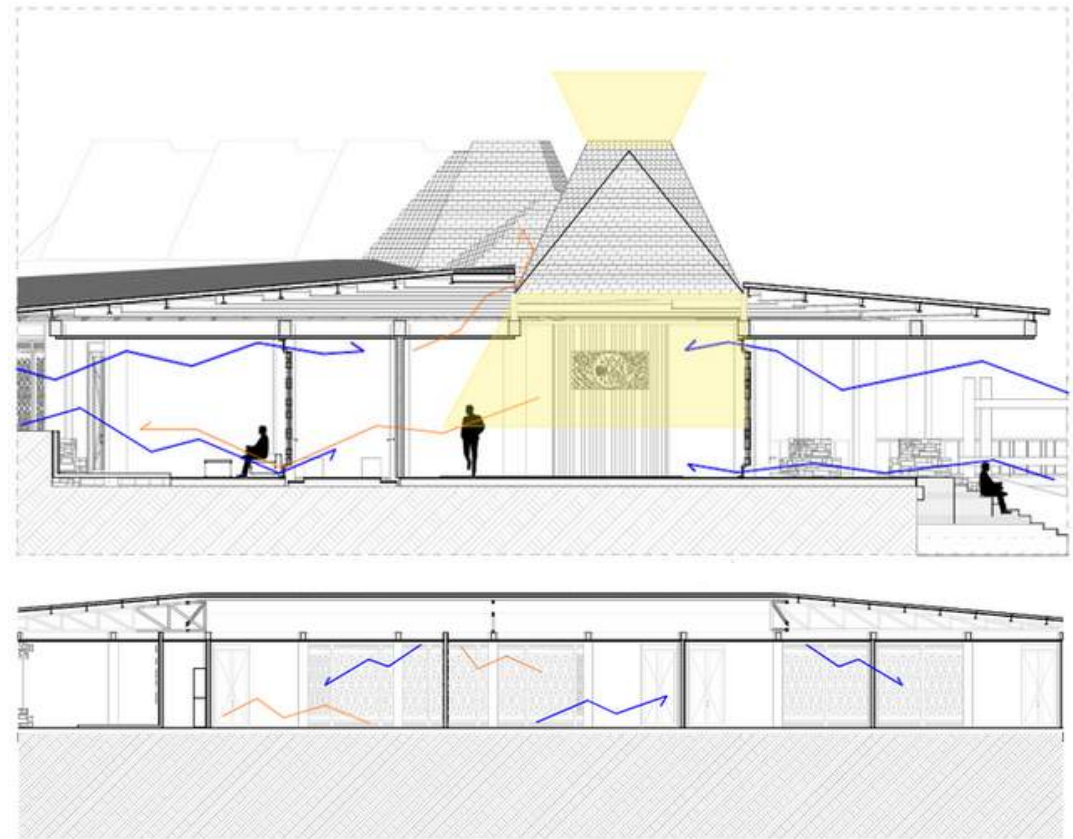
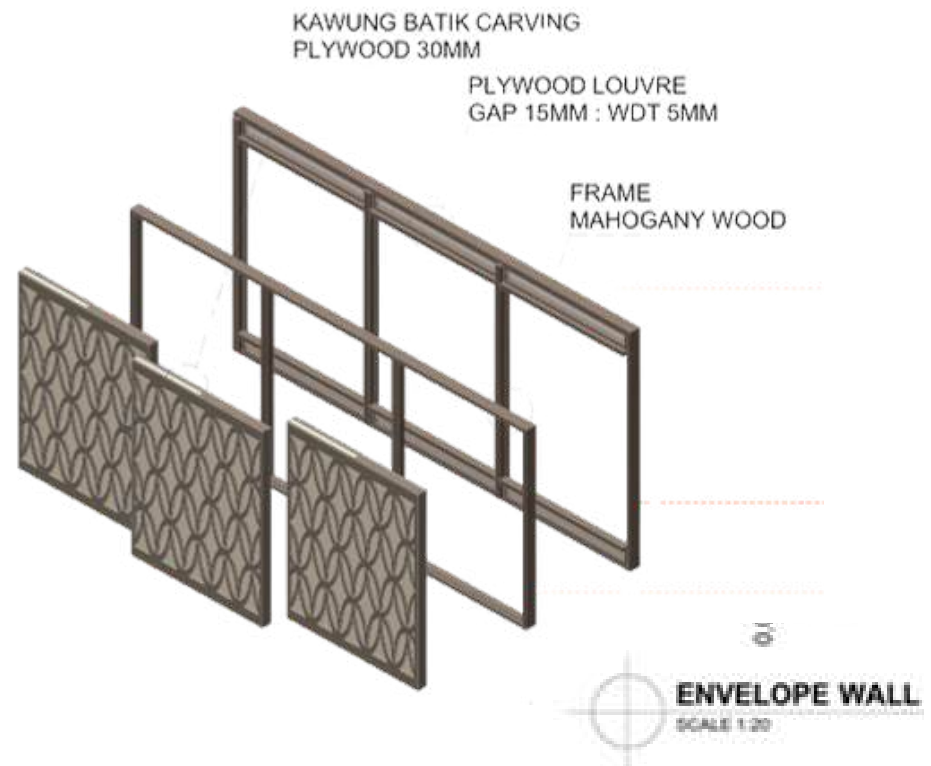
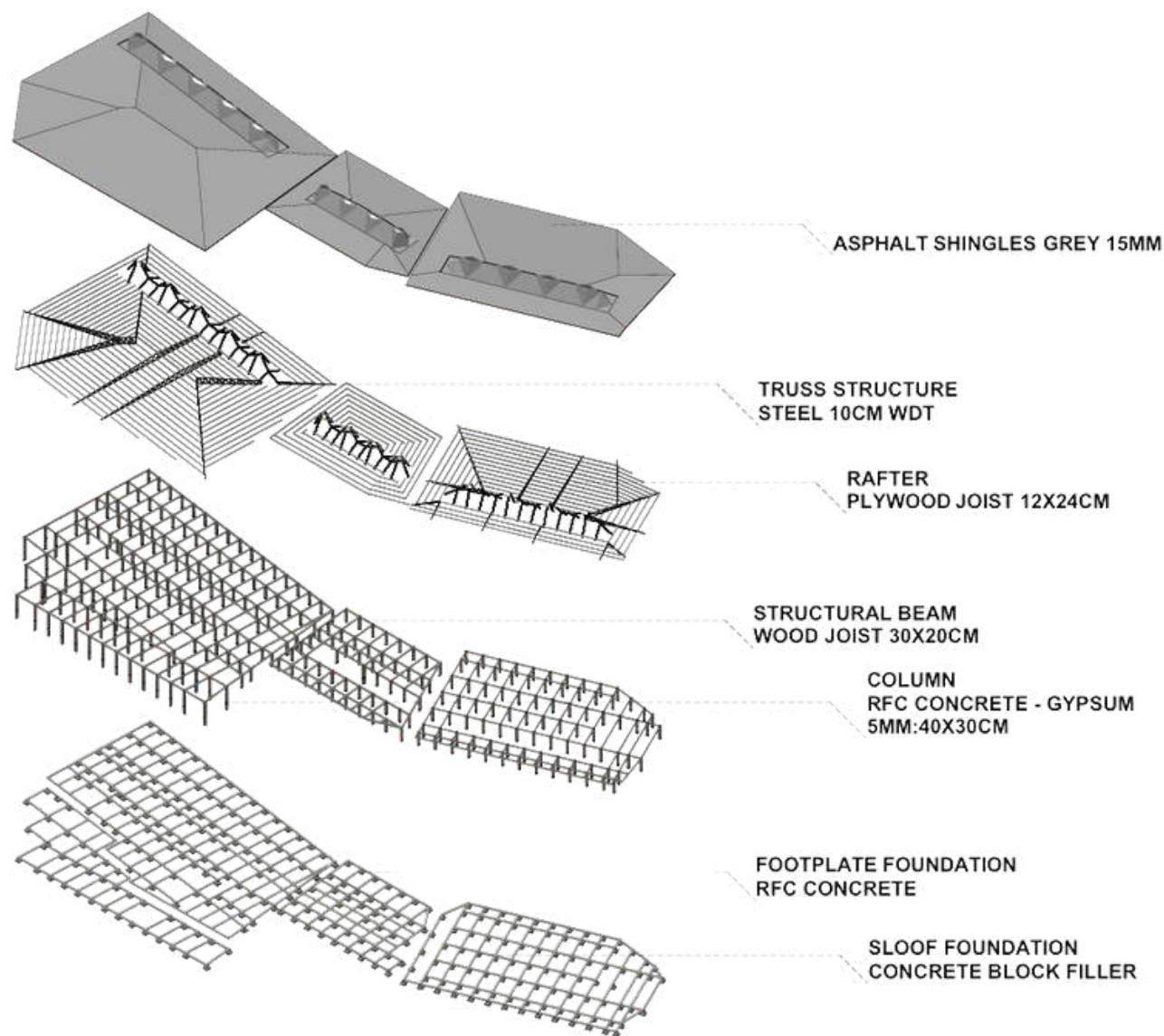


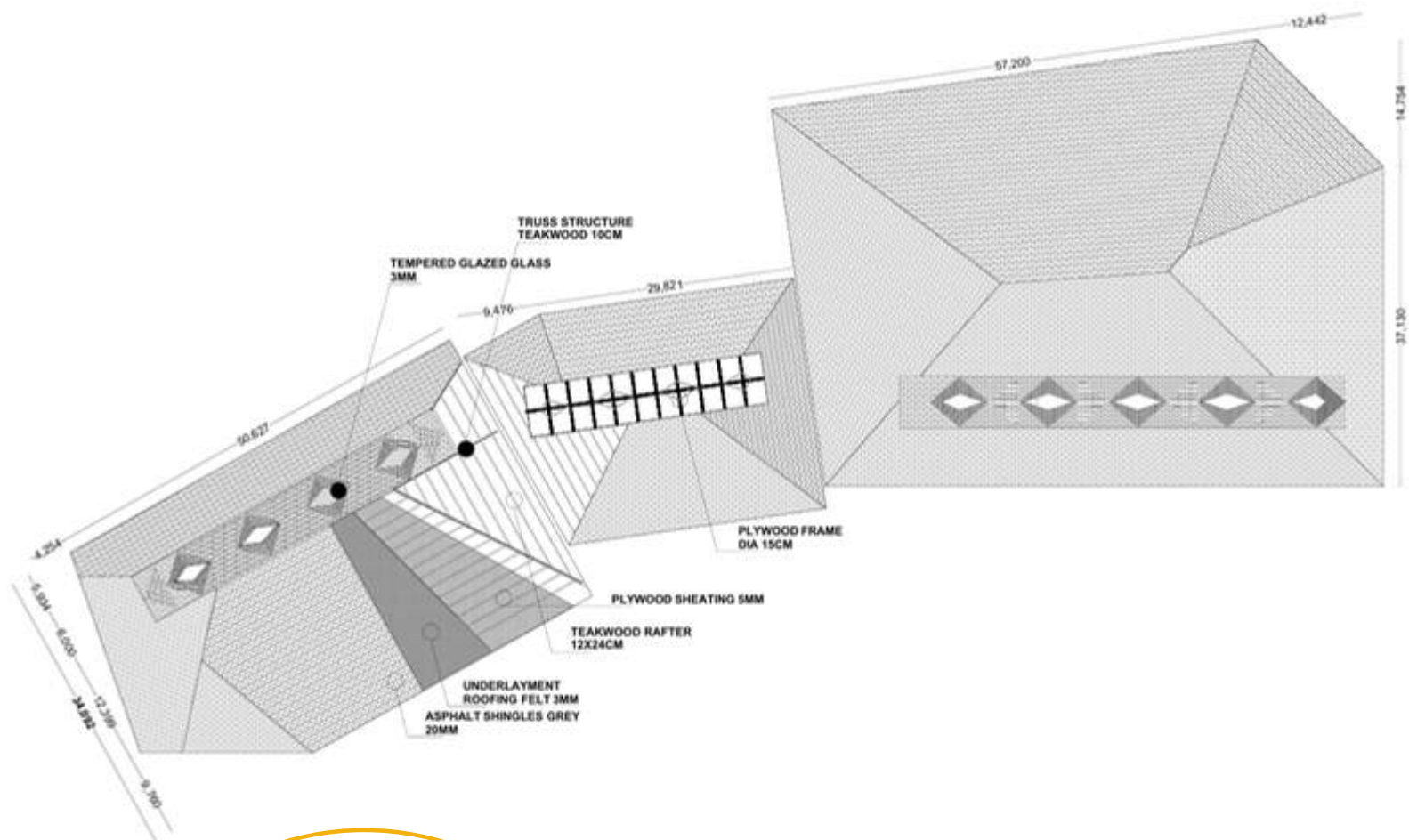
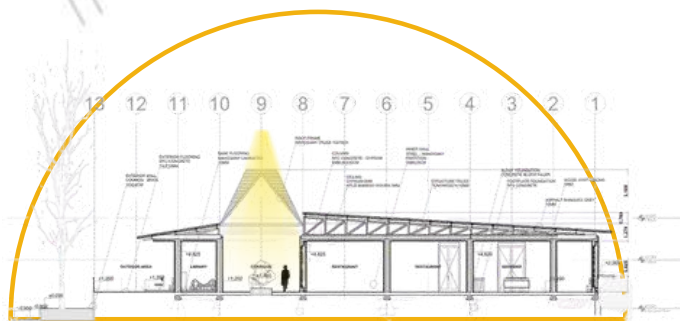
Figure 9.39 Natural light & air circulation scheme, Source: author, 2025
Figure 9.40 Air circulation through louvre, Source: author, 2025



Roof Strcuture Detail

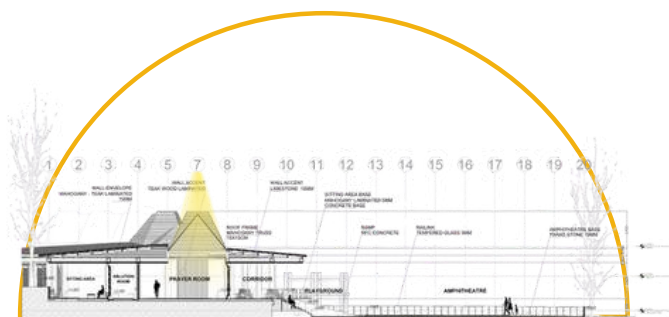
The implementation of modified hip roof combined with pyramid form introduce structural elegance and climae tropical responsive design. This shape enhance the efficient deflect wind from all direction, transferring heavy rains and shifting wind patterns. It allows the natural vertical airflow to promote passive ventilation. Using a cladding roof with asphalt shingles adds layer practical benefit as it lightweight, durable and offer excellent waterproofing against tropical downpours.

detail construction



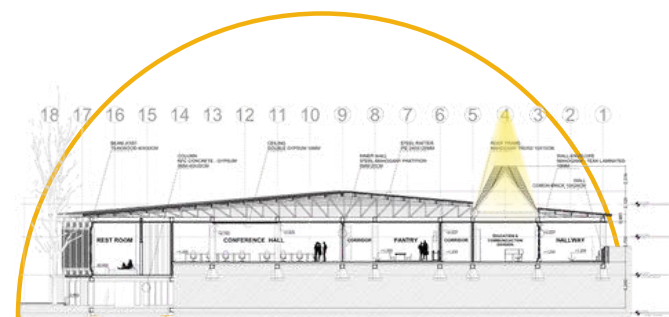
Natural light as path guidance

Placement of skylight at the visitor centre intends to provide visitor guidance to the next area. With the design, it also foster reading natural light to the open library and enough glare towards restaurant



Natural light provide activity comfort

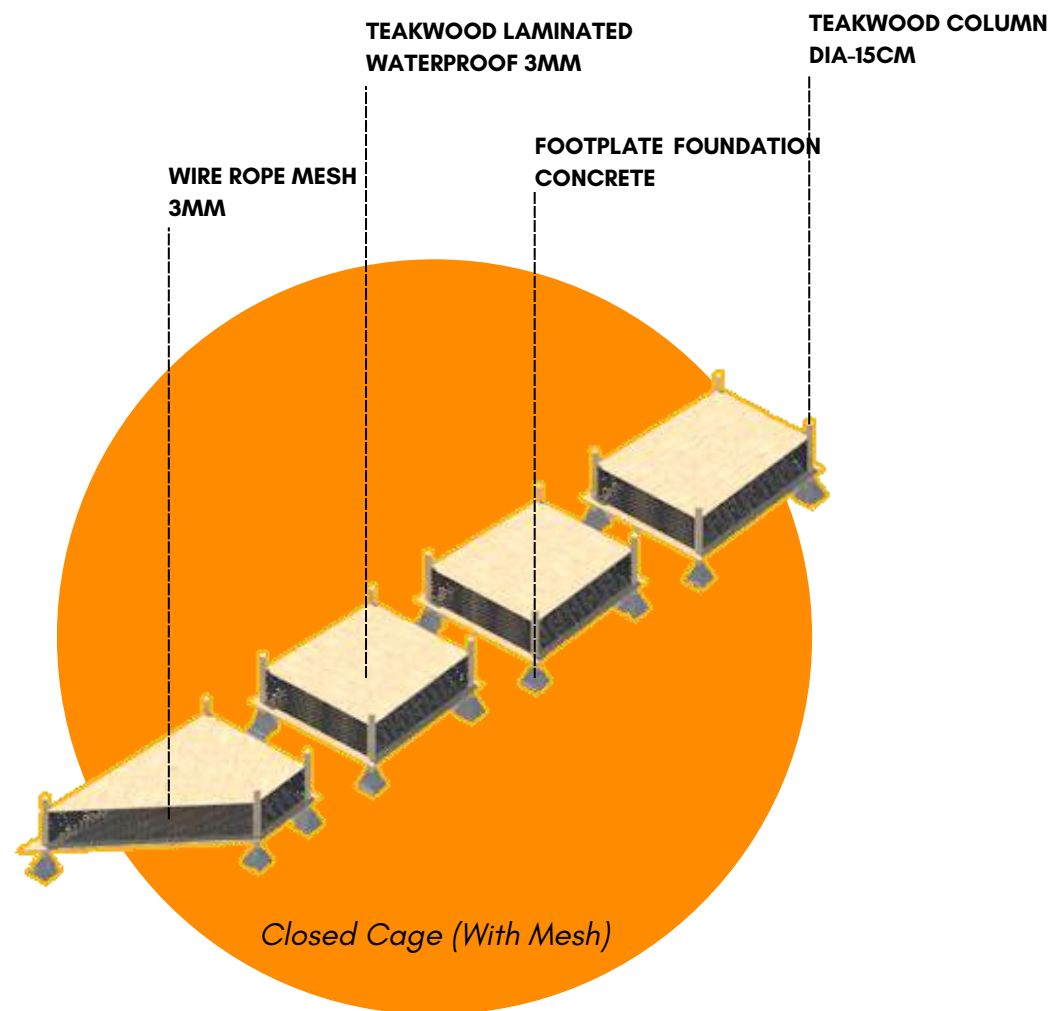
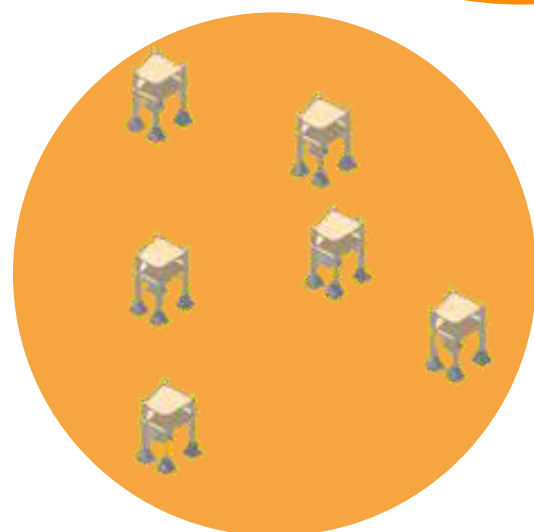
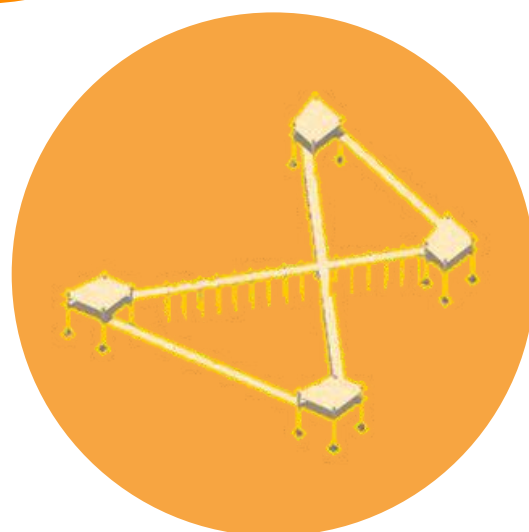
Natural light in facility centre was meant to provide satndarize eyecomfort towards toilet and prayer room activity.



Natural light provide working comfort

Incorporating skylight to let natural light come isinside offices, helps to reduce electricity cost and provides more visual comfort during the day.

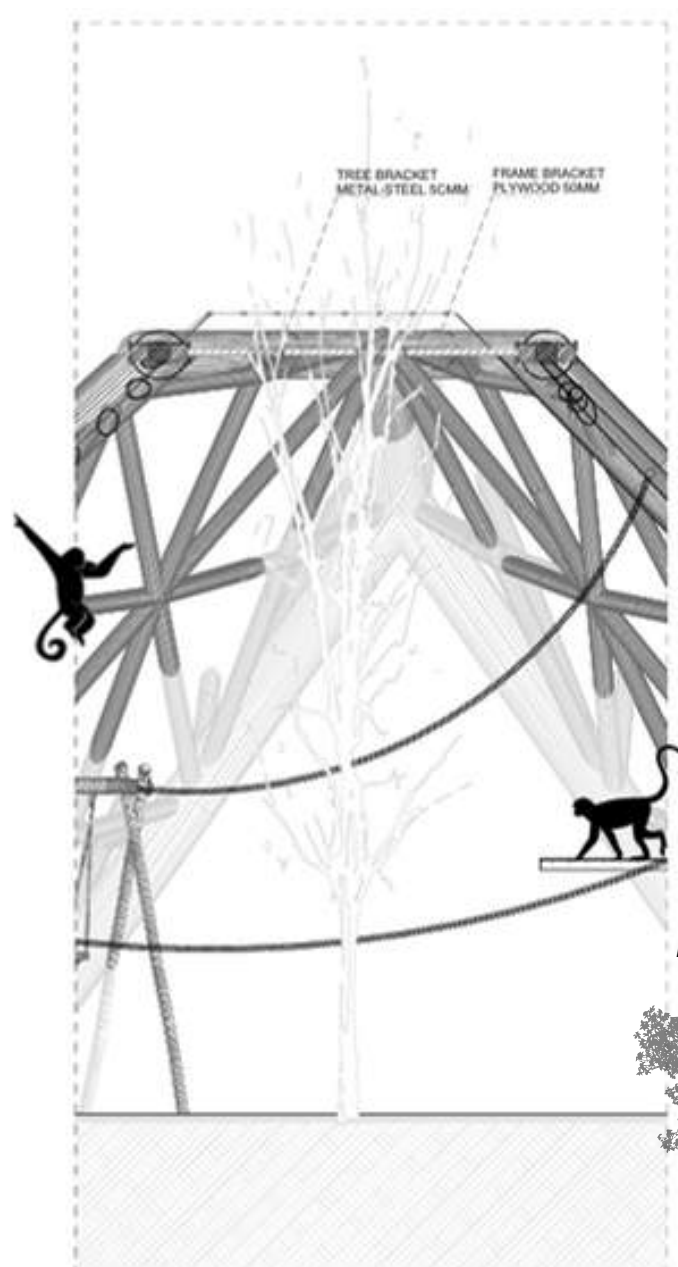
Figure 9.42 Roof plan detail structure, Source: author, 2025
Figure 9.43 Natural light concept Source: author, 2025



Cage Detail

Cage placement

During the rehabilitation process or quarantine phase, enclosed enclosures with mesh walls are crucial for minimising direct contact and preventing disease transmission, while still allowing visual and olfactory interaction with surrounding animals. This controlled environment supports health monitoring and ensures biosecurity, while reducing stress through limited sensory exposure. Conversely, during the socialisation phase, open enclosures facilitate more natural interaction and movement, encouraging behavioural development and social bonding essential for group-living primates like lutungs. The transition from closed to open enclosures reflects a shift from individual health stabilisation to group integration, supporting physical recovery and psychological well-being.



Tree bracket section detail

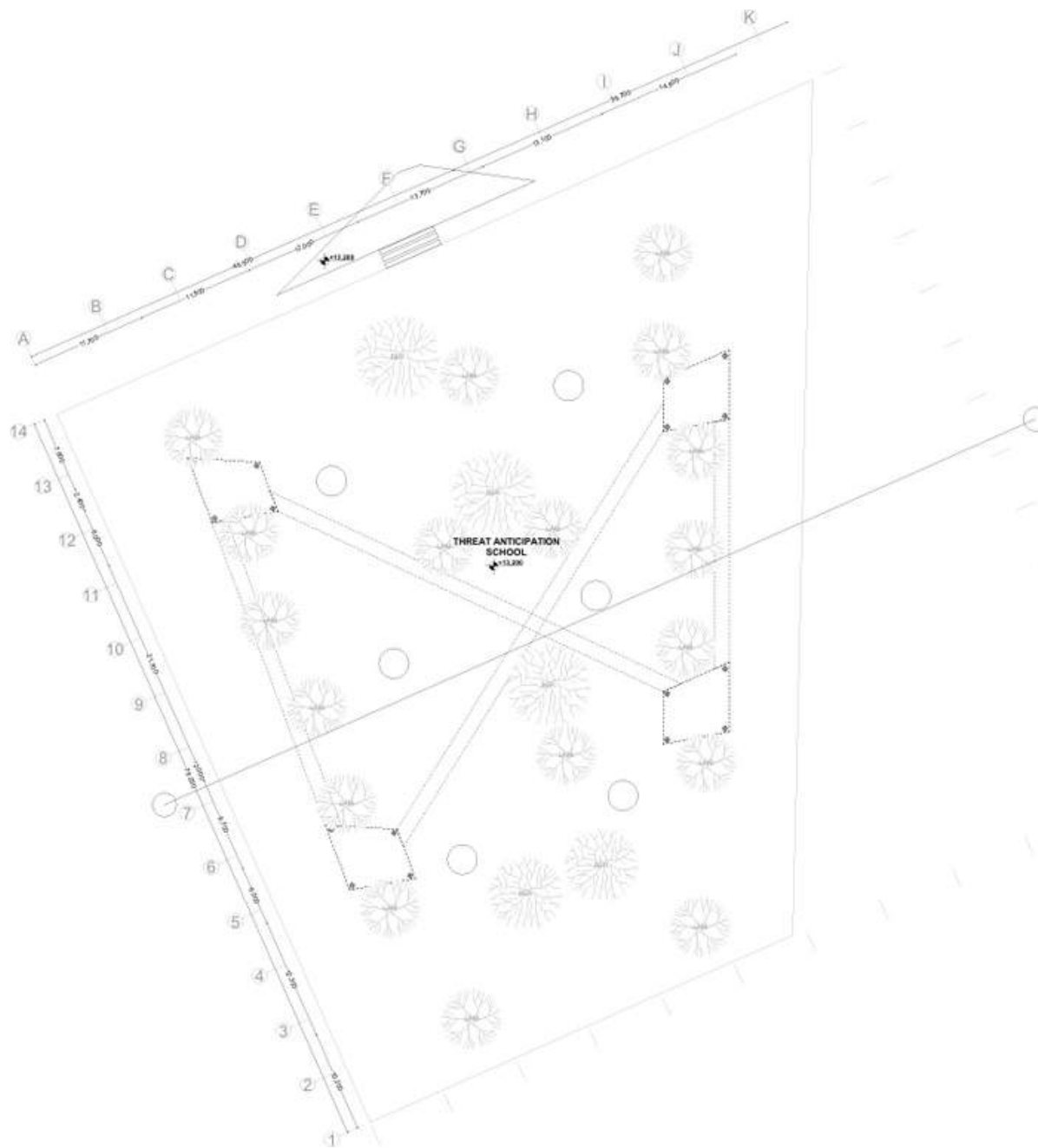
*Following the tree branches
shapes and growth*



Tree bracket plan

Tree bracket design

By securing and guiding the growth of trees inside the enclosure, these structural supports encourage vertical vegetation development without compromising the integrity of the mesh barrier. This approach not only preserves the enclosure's safety and containment function but also integrates living trees as dynamic components of the habitat. The growing trees provide natural shade, climbing opportunities, and foraging elements, all of which are vital for the physical activity, psychological stimulation, and species-specific behaviors of Javan lutungs.

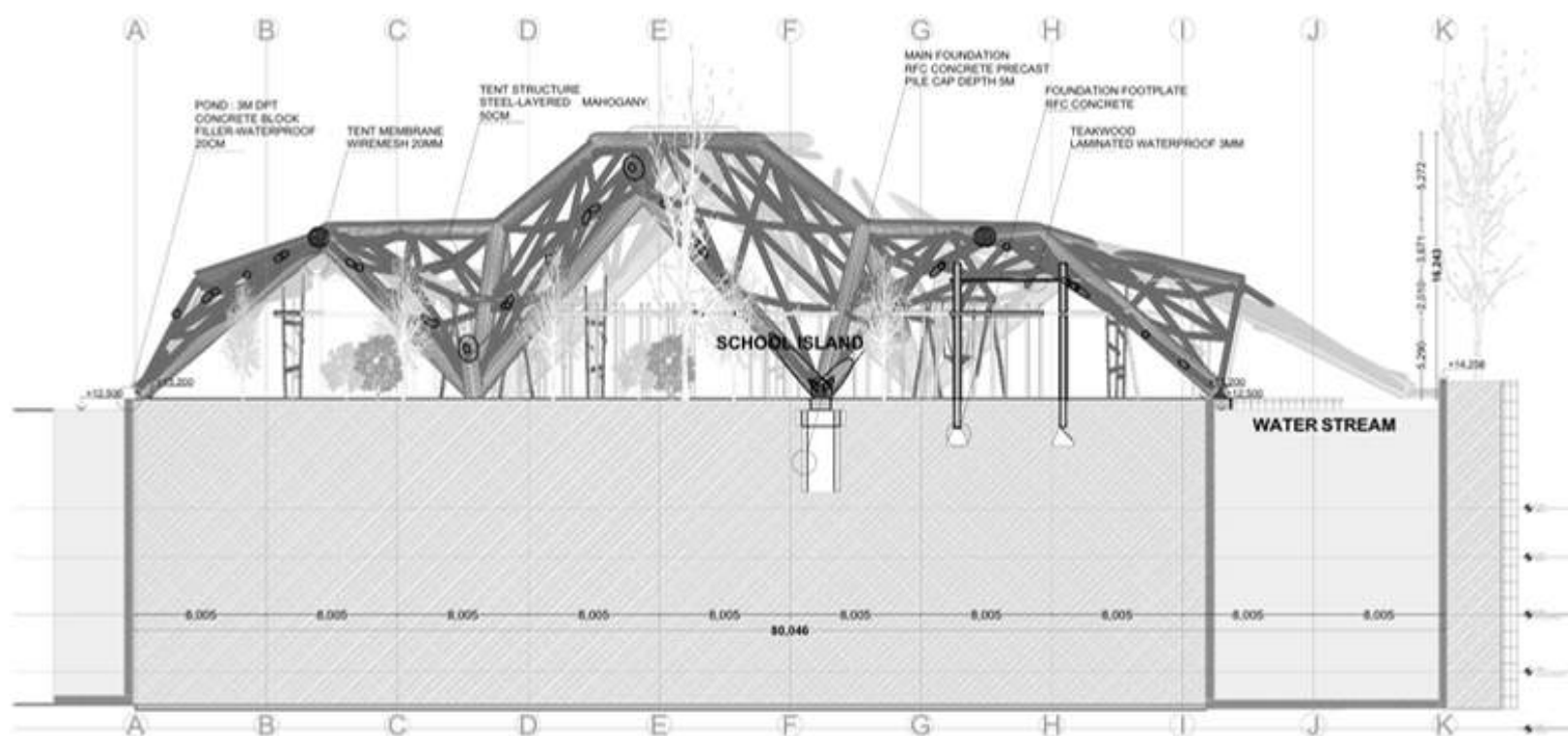


Island School

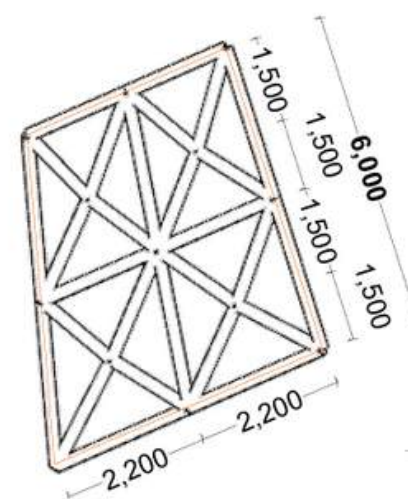
The school island with an open enclosure concept for Javan lutungs plays an important role. This area is designed to resemble a natural habitat, complete with trees, trails, and natural food sources, so that lutungs can practise their survival skills directly—such as foraging, forming social groups, and recognising environmental threats. Additionally, the school island allows the rehabilitation team to passively monitor the lutungs' readiness without causing excessive stress. With this approach, the open enclosure serves as the final stage of rehabilitation, ensuring that each individual is physically, mentally, and socially prepared before being released back into their natural habitat.



Figure 9.49 Island school plan, Source: author, 2025
Figure 9.50 Island school & control room, Source: author, 2025



Free from discomfort	Availability of hang/swing area	provide a wide & sufficient number of physical instruments with appropriate dimensions	Playground, Quarantine, Socialization cage design	Cage consist with modular form, 1.5m swing gap
	Availability of shade/deep area	sufficient number of shades & comfortable height	Shelter of vegetation or some kind	Locating/Mimicing tree form structure
	Minimum exposure to human	distance/boundaries with human interaction	Barrier, one-way glass	Vegetation fences connecting water streams
Free from pain, injury & disease	Safe cage form and dimension	choosen soft material no sharp corners	Choosen material	Following space req. No sharp edge, Replaceable, easy obtain material
	Avoid lutung's collision	following standard size or more	Cage standard by JLC	-
	Availability clinic room	clinic room closed to lutung's area	Calculation clinic distance	In radius 20 meters
	Maximum cage hygiene	materials & flooring should be easy to clean	Choosen material	Floor slab coating/ layering
Free to express normal behavior	An environment similar to the native habitat	there are natural sun and wind vegetation elements for lutung	Landscape & Cage by passive design	Exposed to the outside, has a tree structure, has shade
Free from stress & pressure	Minimum exposure to human	distance/boundaries with human interaction	Barrier, one-way glass	Natural fences (vegetation & water streams)
	Safe from poaching	maximum safety of rescue center	Rescue center area boundaries	Natural fences (vegetation & water streams)



Island School Structure Detail

With special attention to the structure of the school island, the building frame is intended to be a safe and comfortable climbing area. The diamond or triangular shape provides a grip that stimulates comfortable swinging movements. By taking into account the dimensions of swinging, running and other activities, this school island is expected to be the final step in preparing for release into the wild, with the aim of providing a semi-wild habitat as an introduction and familiarisation for the langurs.



Figure 9.53
School island, Source: author, 2025



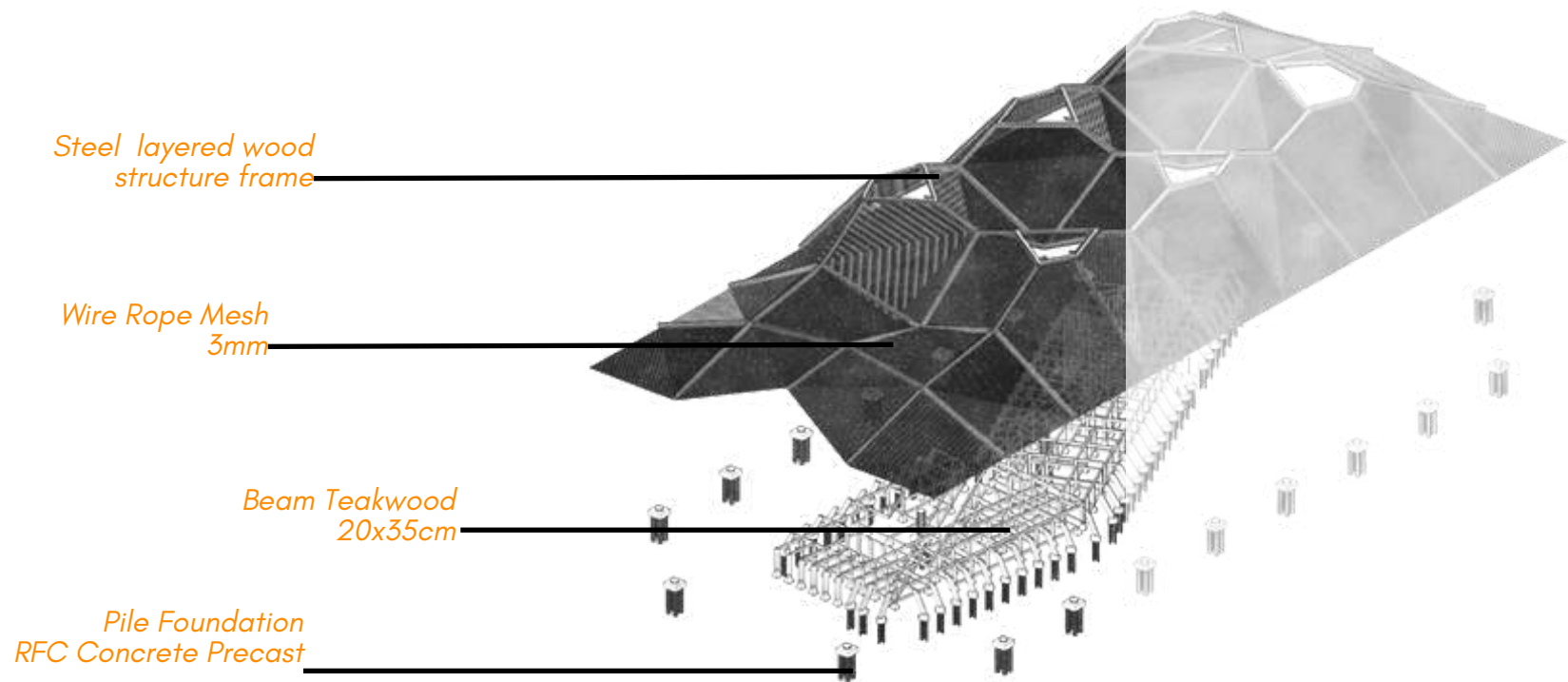
Figure 9.54
School island cage, Source: author, 2025



Figure 9.55
School island 02, Source: author, 2025

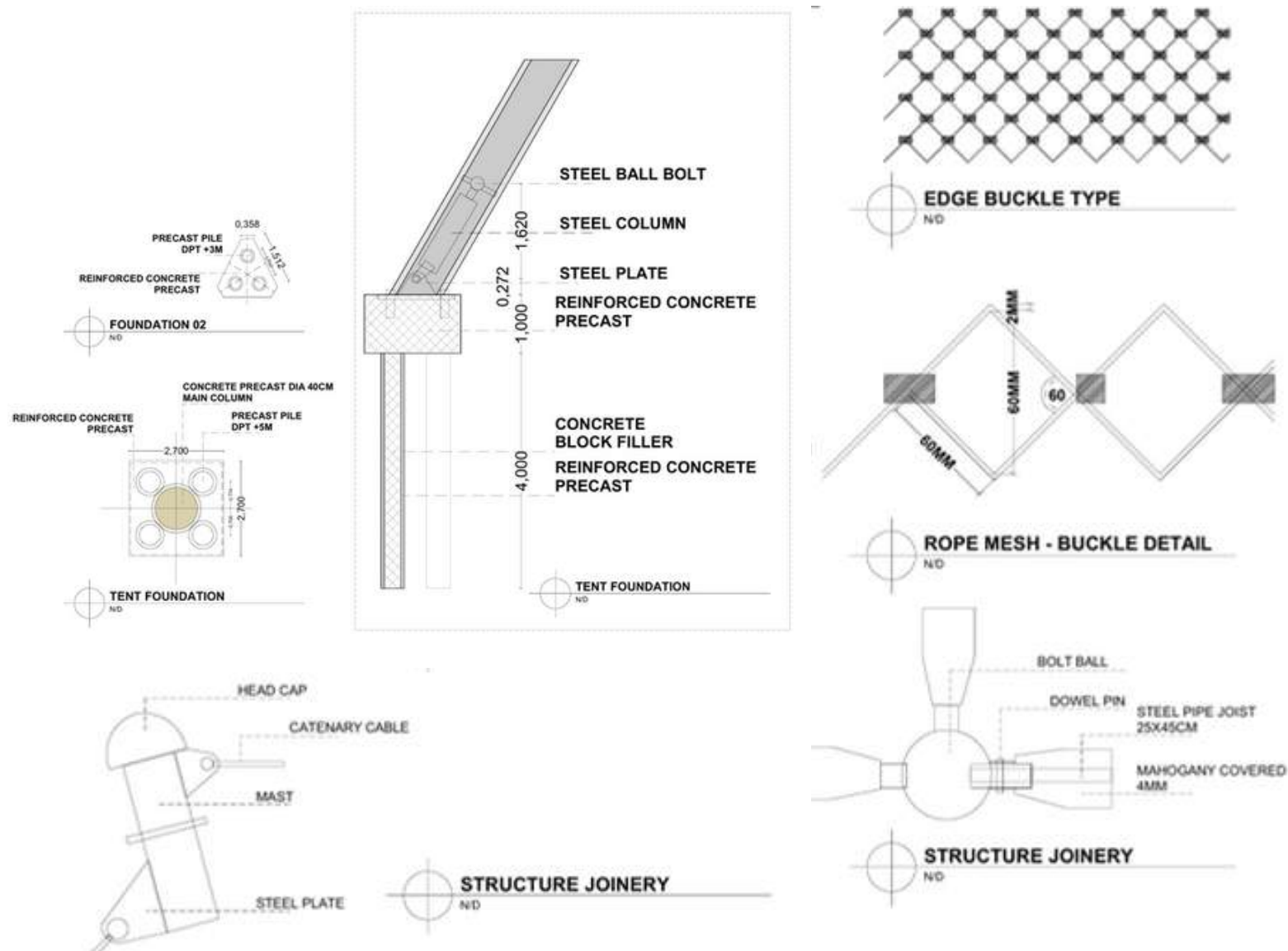
Island School

Within the school island, Javan lutungs engage in various activities that reflect their natural behaviour as part of the adaptation and preparation process for release into the wild. They actively climb trees, explore the area, search for natural food, and interact socially within their group. Activities such as grooming (mutual cleaning), playing, and occasionally displaying territorial behaviour are important indicators of their mental and social health. Langurs also learn to recognise predators or unfamiliar situations, which trains their instinctive responses to threats. All these activities take place under minimal human supervision, allowing the langurs to develop independence and essential wild behaviour.



Structure Detail

The use of rope mesh material with a tent structure in the socialisation enclosure aims to create a safe, flexible space that resembles the natural environment for Javanese langurs. Rope mesh allows light and air to enter optimally, supporting natural air circulation and healthy lighting for the langurs. Additionally, the curved tent shape creates a sense of spaciousness and reduces visual stress, helping to minimise stress and anxiety in the lutungs during the socialisation process. This structure are supported by pile foundation and steel layered wood frame to perform maximum strength and stability.



Structure Detail

The modular connection design also facilitates assembly, disassembly, and maintenance, allowing the structure to be adjusted as needed without compromising its primary function. The iron material used is coated with waterproof wood to ensure resistance to tropical weather and high humidity while giving a natural impression. With strong and efficient connections, the tent structure on the school island is able to create a safe, durable space that supports the natural activities of the langurs during their adaptation and socialisation period.

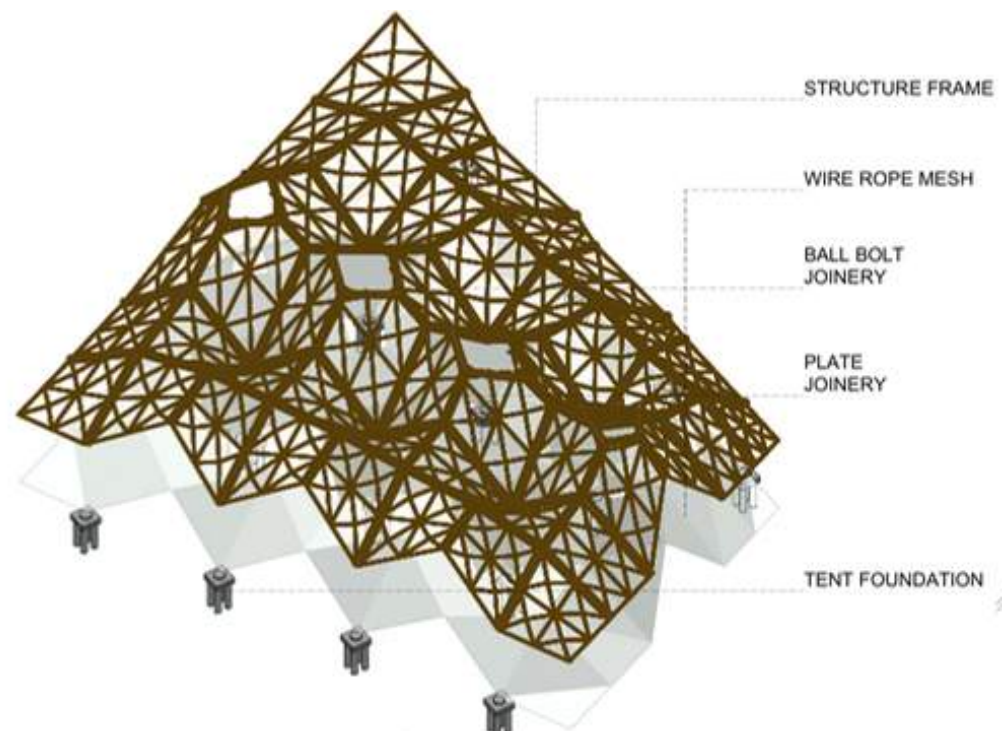
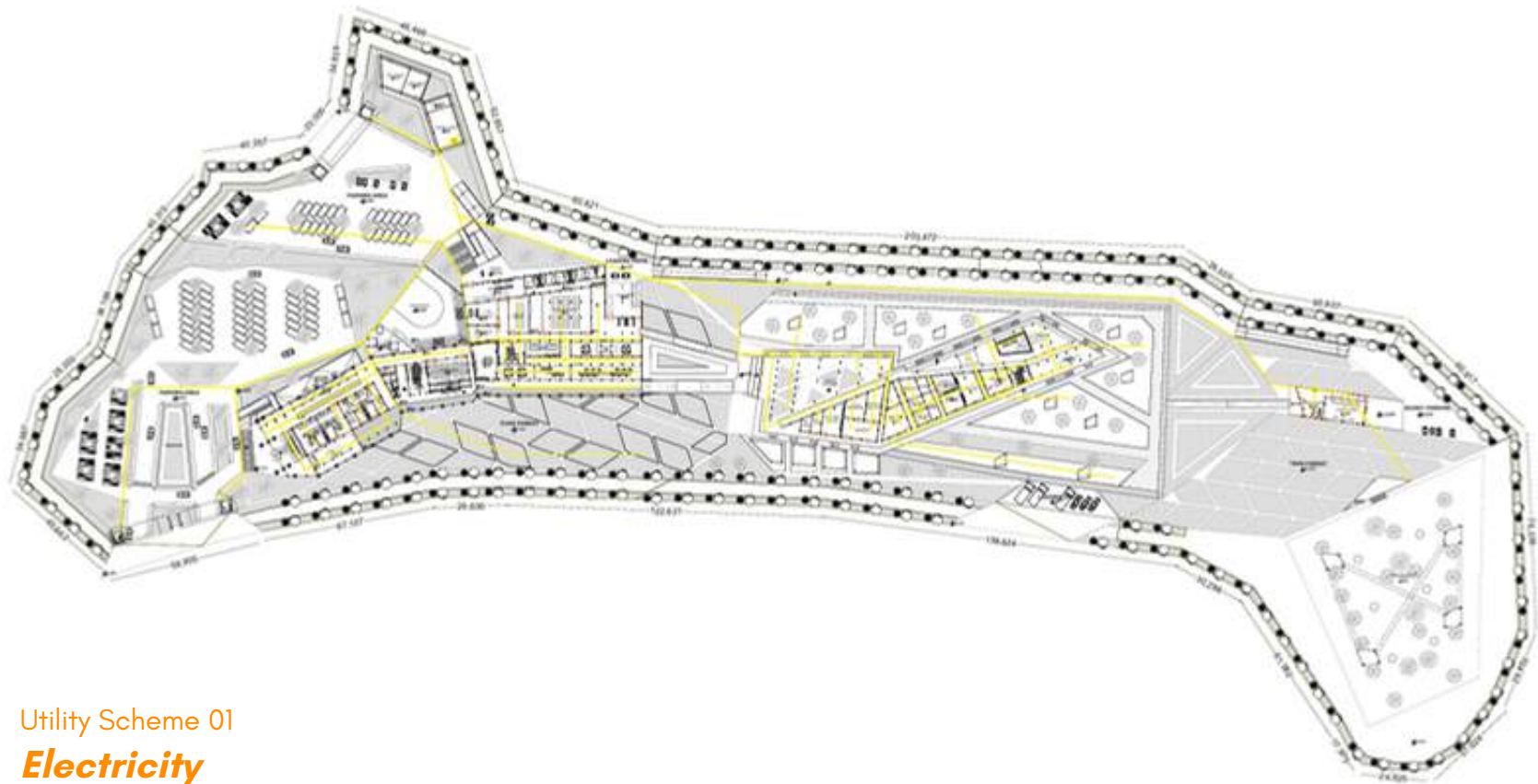


Figure 9.57 Island school structure exploda, Source: author, 2025
Figure 9.58 School structure details, Source: author, 2025

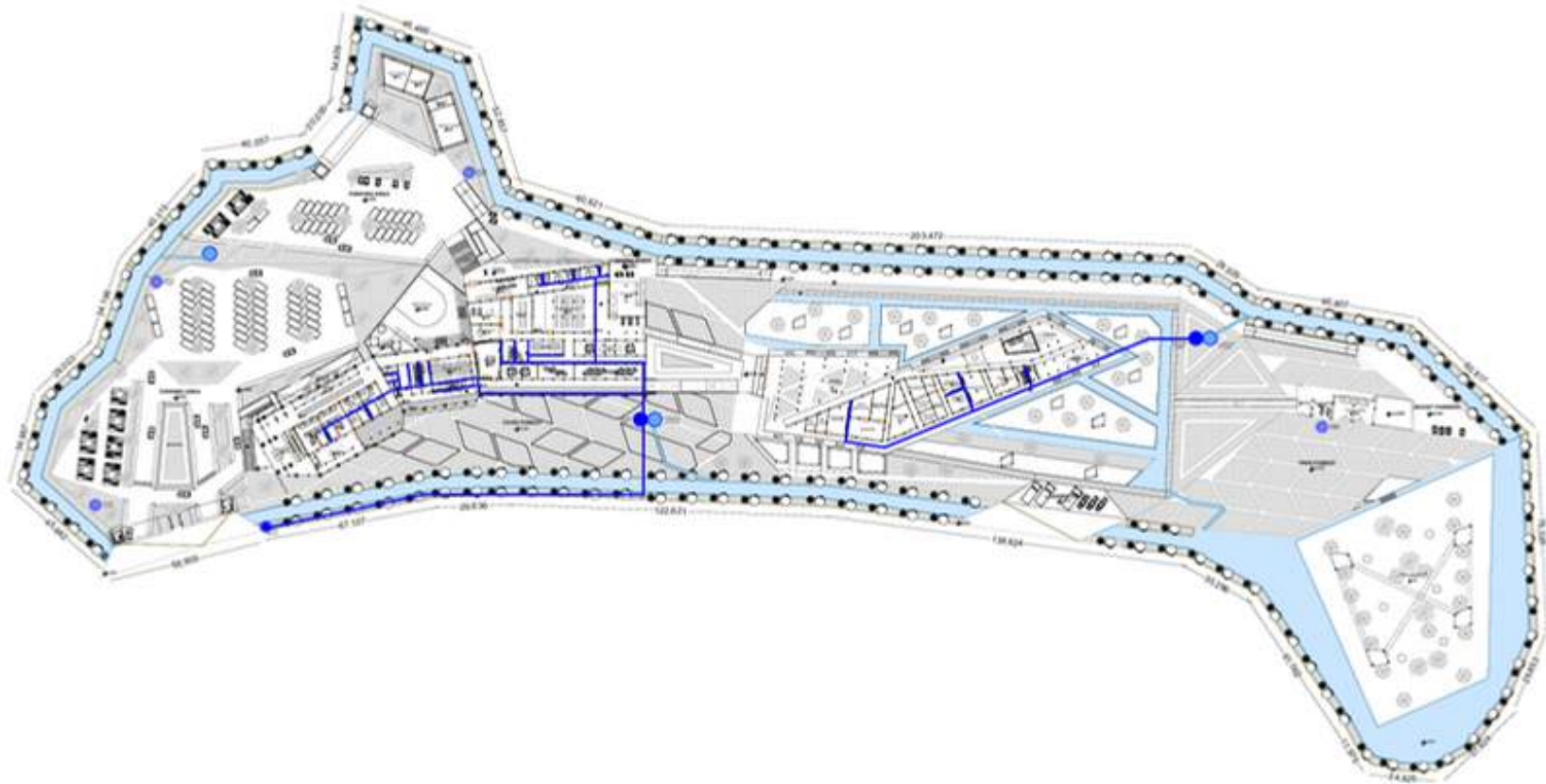


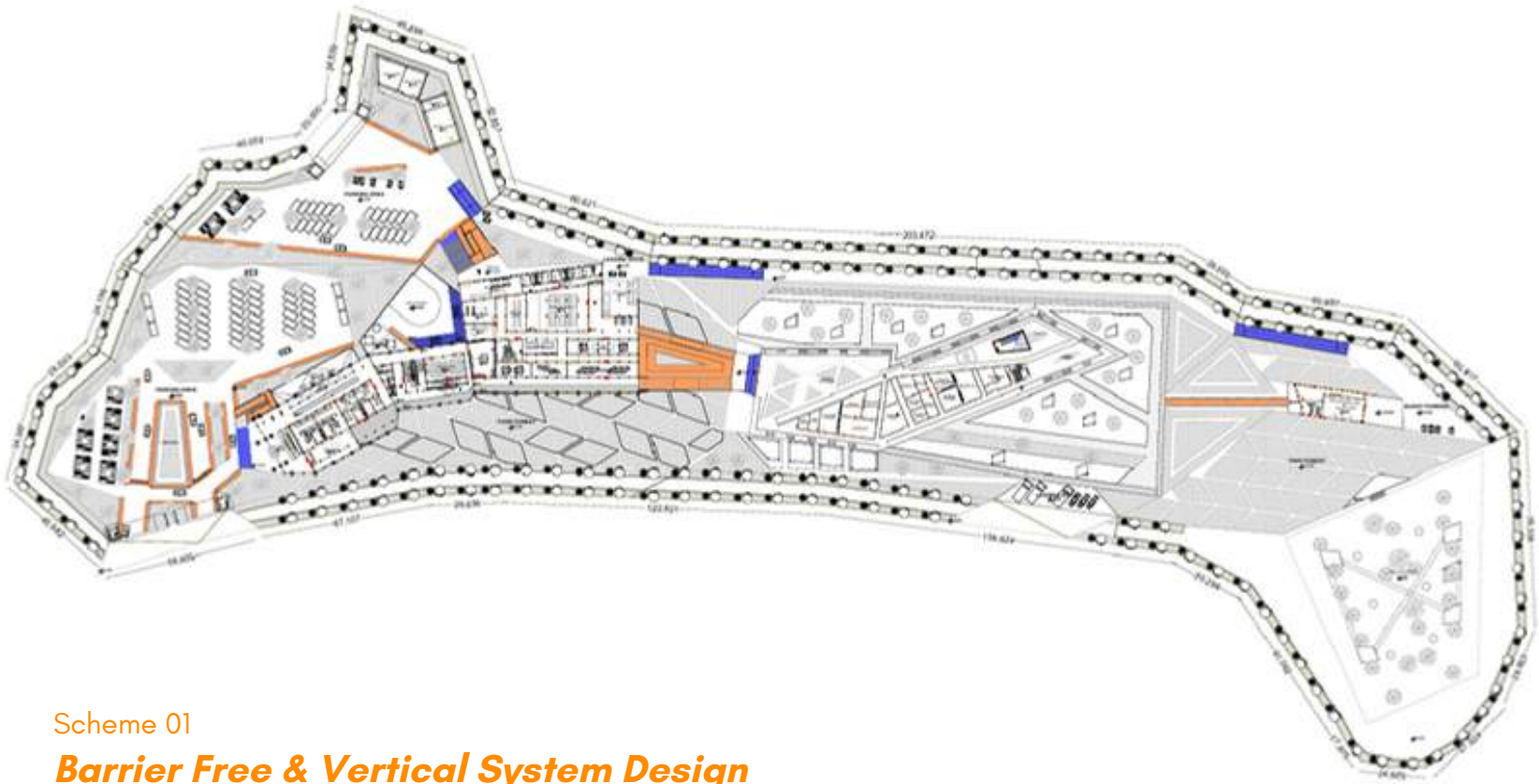
Utility Scheme 01

Electricity

Utility Scheme 02

Clean Water Management



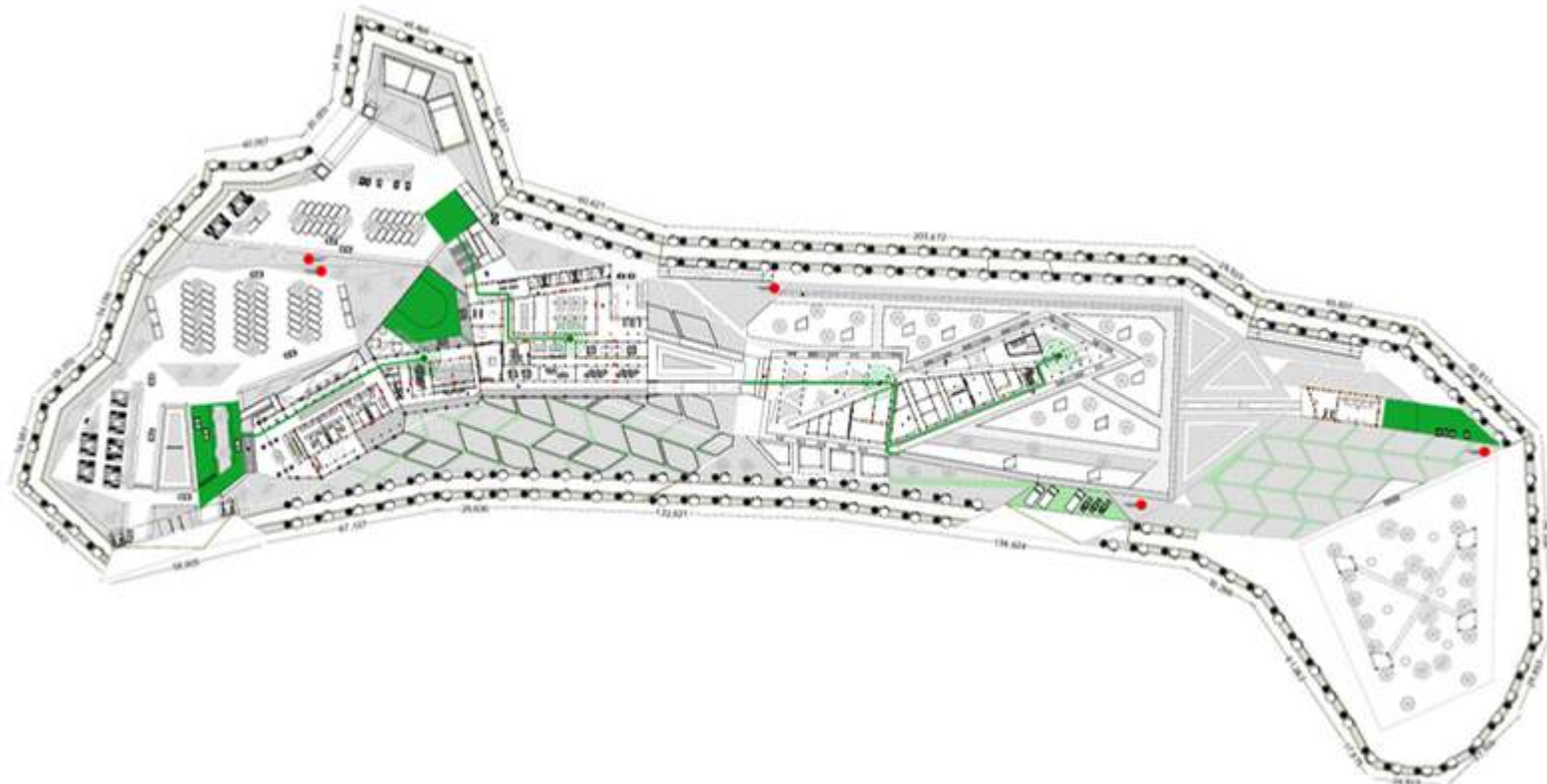


Scheme 01

Barrier Free & Vertical System Design

Scheme 02

Fire safety & Emergency exit Design





**render
visualization**



render
visualization



**render
visualization**



**render
visualization**



10. **Design Evaluation**



Design Development

Conclusion Review

The design of the Javan lutung rescue facility already has a good conceptual and development design, but several details regarding function, structure, and spatial layout need to be considered. With a spacious and tall design, it is important to consider sustainability, efficiency, and strength in order to achieve a perfect design. The following are important points that must be considered in the Langgeng Lutung design.

01

Prof. Dr. Ing. Ar. Ir. Ilya Fadjat Maharika, M.A., IAI

Selection of **connection types for large tent structures** with special heights: Are efficiency, sustainability, and strength appropriate.

02

Arif Budi Sholihah, S.T., M.Sc., Ph.D

The **use of the roof section in the lutung facility** can be developed to be more useful.

03

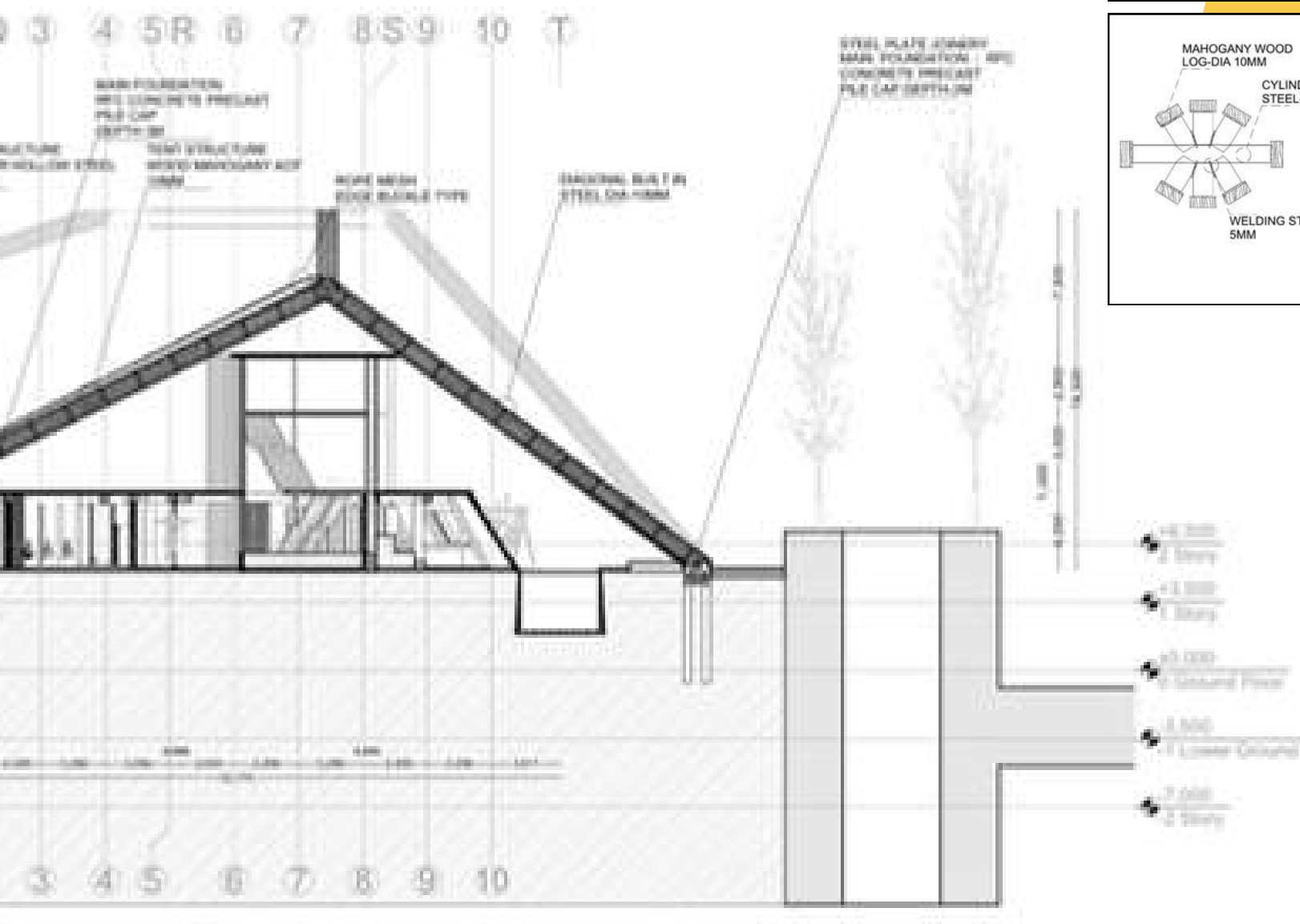
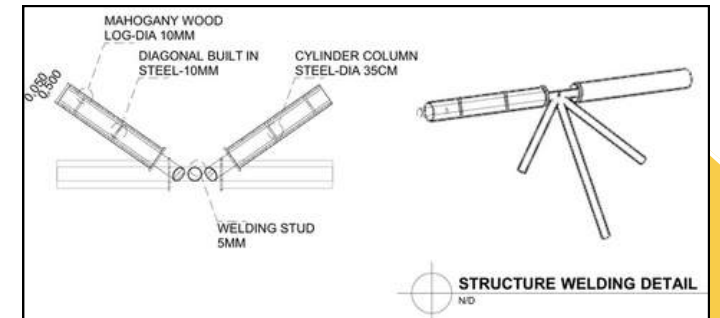
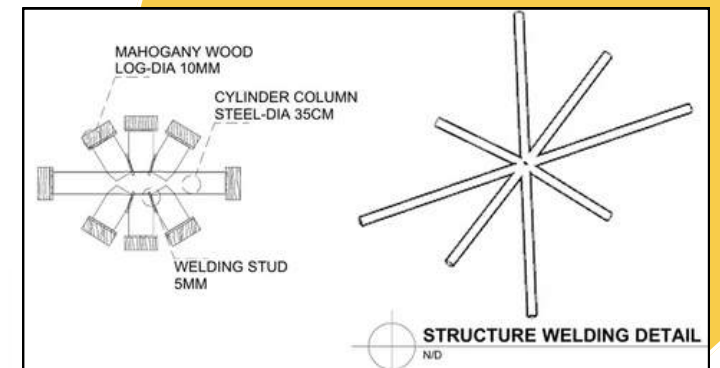
Dr.-Ing. Putu Ayu Pramanasari A., S.T., M.A.

Provide **details on the use of the space** so that the building area can function properly for users without giving the impression of excess space.

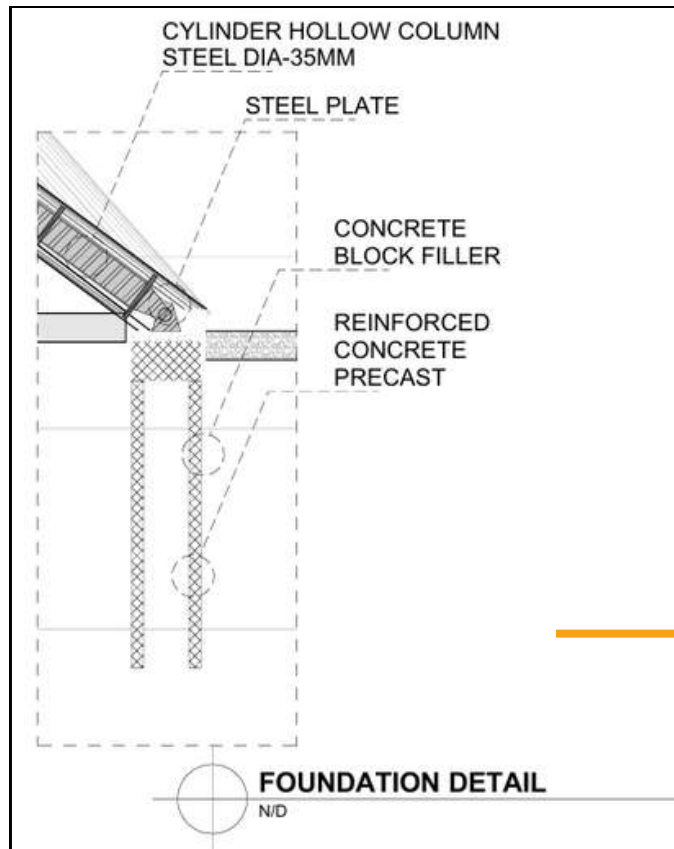
Improvement on connection types for large tent structures

The use of ball joints is highly compatible with tent designs that are 16.5 metres high with a load span of 24 metres. However, this type of joint must have custom specifications for the dimensions and direction of the joint. This requires efficient consideration of both structural strength quality and construction costs. Therefore, the joint type was modified to use a welding system on steel material with additional fasteners (studs) at the joint. This allows for structural strength with efficient construction while also facilitating maintenance.

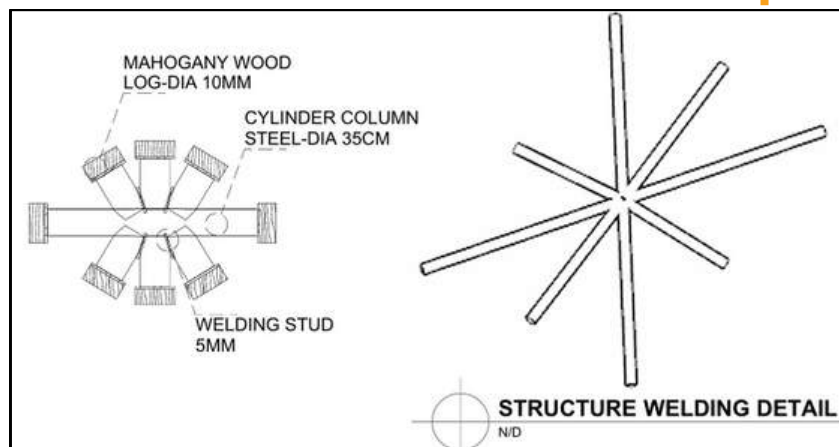
Figure 10.2 Ball bolt steel joinery, Source: author, 2025
Figure 10.3 Steel cap joinery, Source: author, 2025
Figure 10.4 Section B revision Source: author, 2025



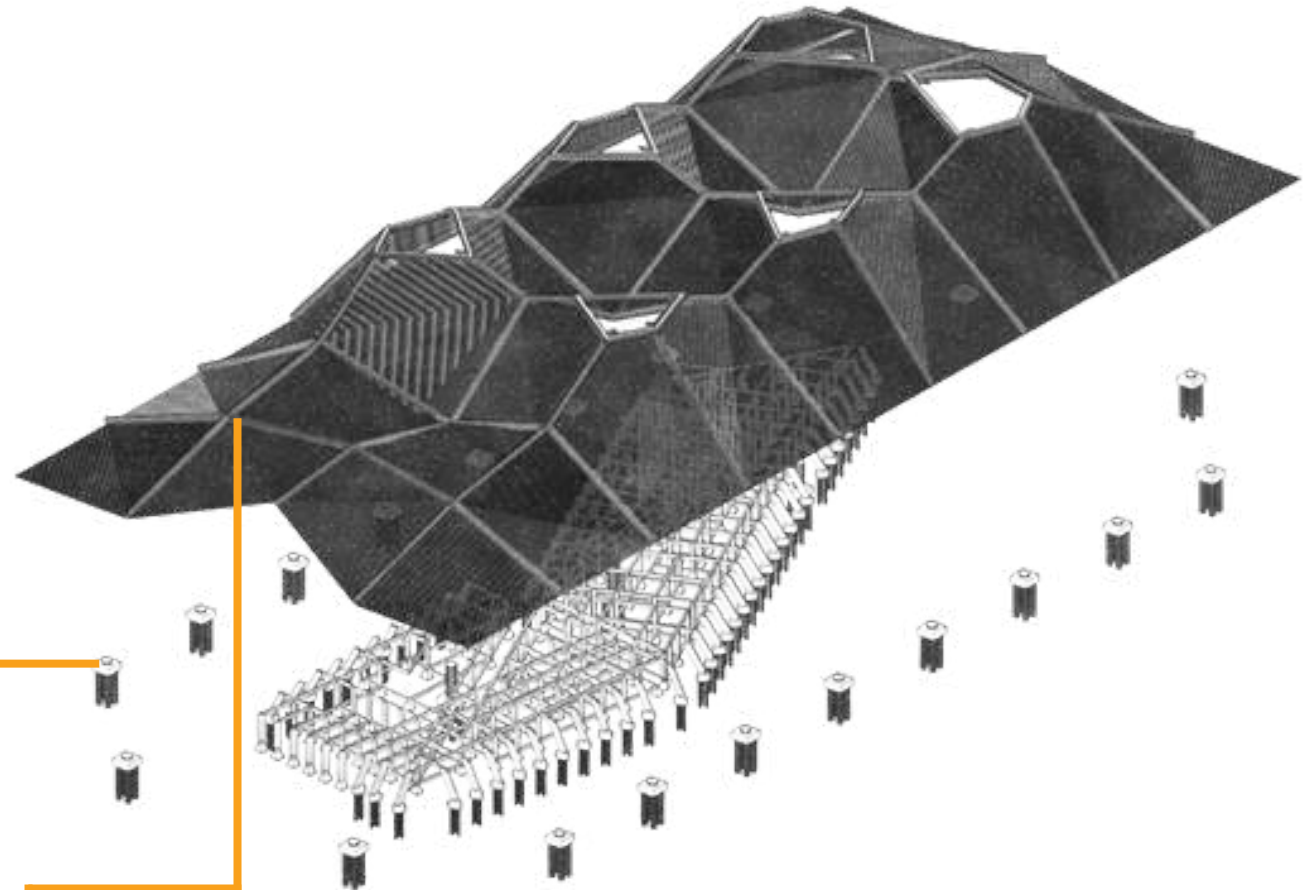
01.



01.

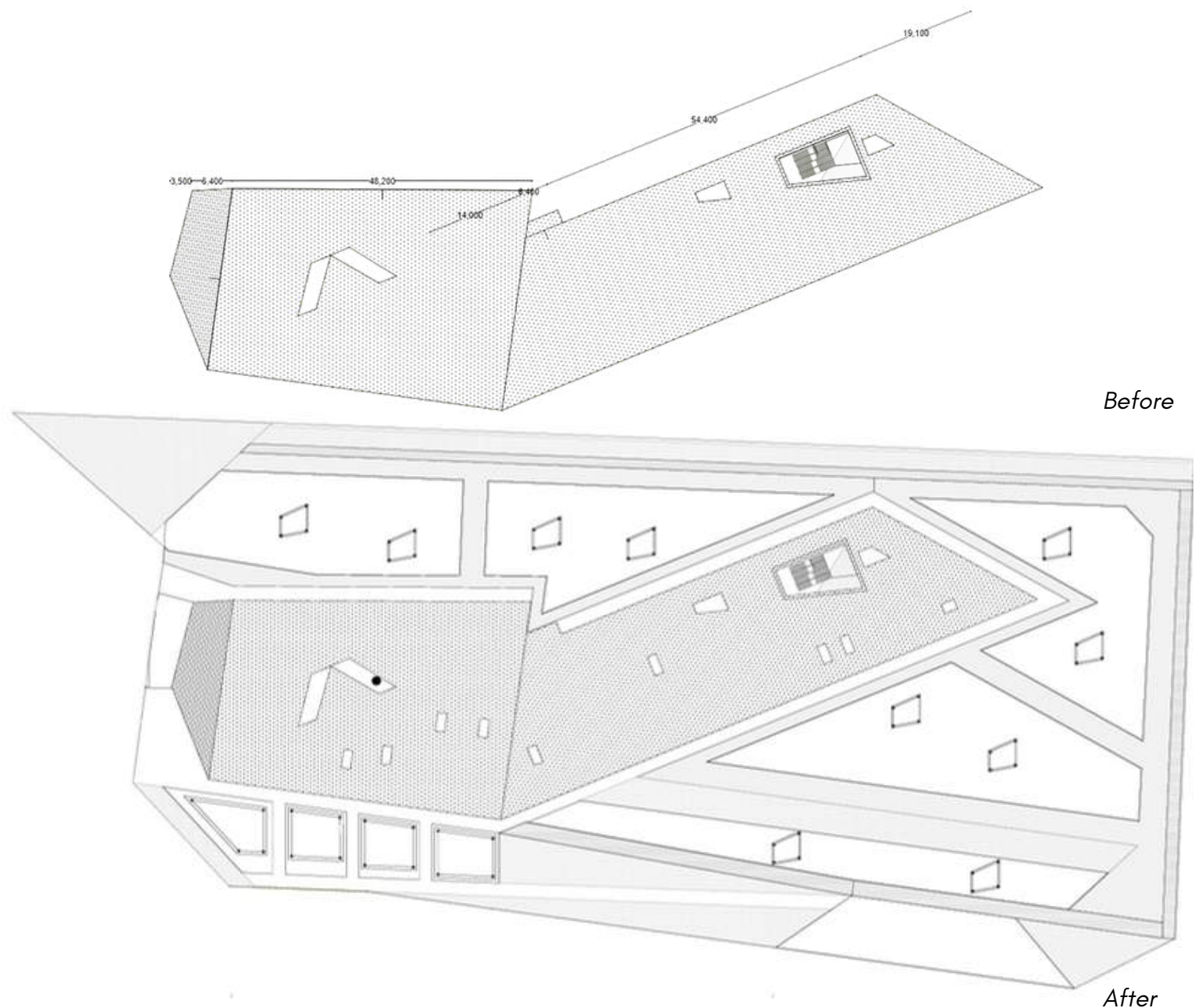


02.



Improvement of structure joinery

The selection of hollow columns provides the advantage of a perfect stiffness ratio with sufficient strength to support stainless steel mesh. The structural connections that support the pile cap foundation also provide a more even and conventional load transfer technique.



Arif Budi Sholihah, S.T., M.Sc., Ph.D

The use of the roof section in the lutung facility

The upper part of the roof of the lutung facility is maximised for natural lighting for feed storage rooms and several medical rooms. This concept is intended to regulate visual comfort while reducing electricity costs. Several considerations regarding the use of the upper roof area of the lutung facility building include efficient and easy management. If the upper roof serves an active function as a 'lutung play area,' additional wicked problems may arise, such as:

***High demand
maintenance
(lutung's poo)***

***Requires heavier
and more expensive
structures and
materials***

Arif Budi Sholihah, S.T., M.Sc., Ph.D

The use of the roof section in the lutung facility

02.

In addition, the open space on the roof also provides exposure for the langurs to remain in the socialisation area while forming their colony so that the group is perfectly formed. Besides that, this exposure also helps to open up better views for users of the observation deck.

Lutung should be colonized per group
(meant not to meet other group)

Setting control to exposure with open space

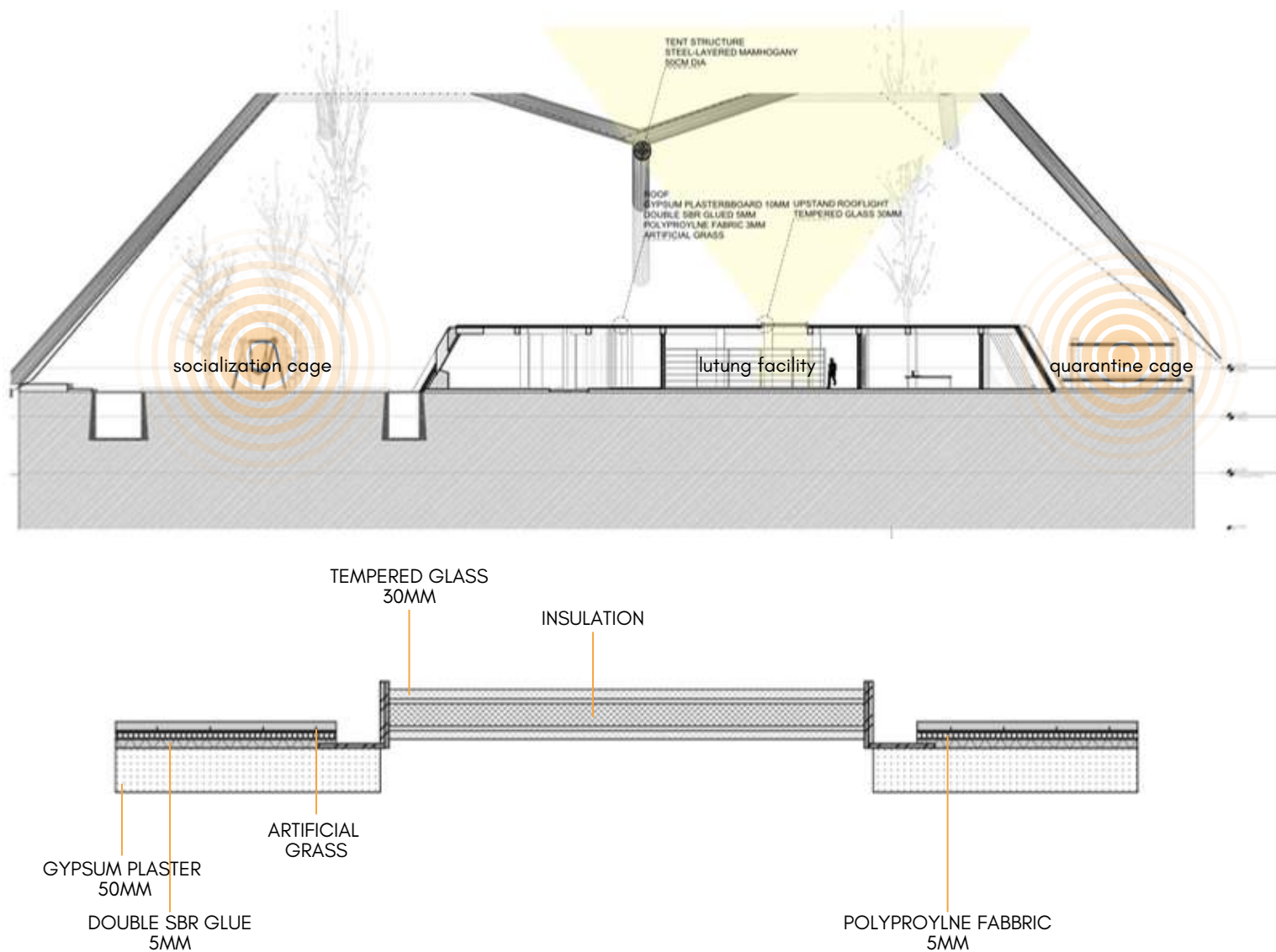
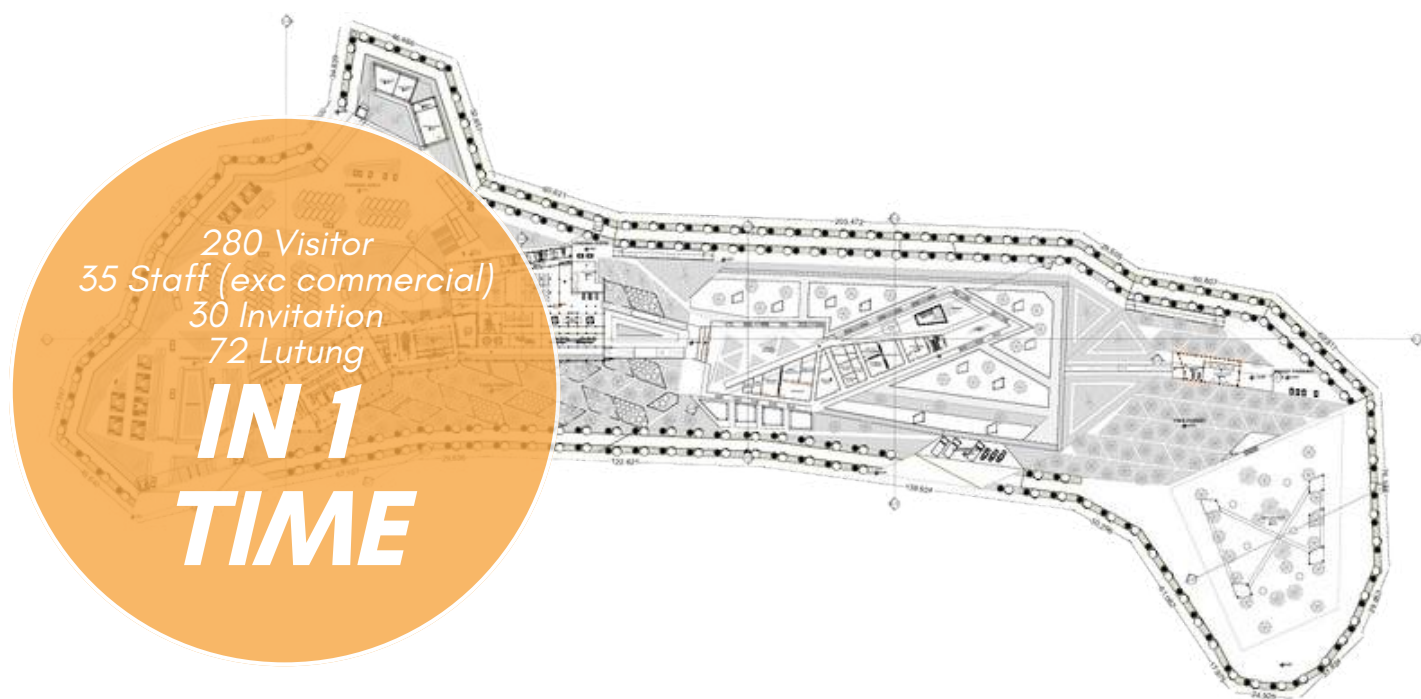


Figure 10.11 Maximation skylight in lutung facility building, Source: author, 2025
Figure 10.12 Skylight details, Source: author, 2025



TOTAL CALCULATION			
No.	Part	Capacity	Area
1.	Visitor Center	100 Visitor + 20 Staff (exc. commercial)	329,00
3.	Facility Center	80 Visitor	2481,50
5.	Management Office	35 Staff + 30 Invitees	181,00
6.	Lutung Facilities	100 Visitor + 20 Staff	271,50
7.	School Island	24 Javan Lutung (2-3 Colonnies)	5020,00
8.	Utility, etc	10 Staff	98,00
Total Area			8.381
Site Area			54.619

Dr.-Ing. Putu Ayu Pramanasari A., S.T., M.A.

Provide details on the use of the space

User details for each building are calculated based on a single arrival, **assuming the number of people who will be in the room at one time**. Thus, the building design that will accommodate the largest number of users (humans) is located in the central visitor area and the interactive park area. Some spaces are designed for temporary use or for visitors to experience while walking through or transitioning. This is implemented in the Lutung Museum section, which contains the legend of the Lutung in Java. Overall, land use allocation is also prioritized for green areas that are integrated into food forest designs, setbacks, and parking landscapes. **Land use have complies with regulatory restrictions** on building coefficient and green area coefficient.



11. **Attachment**

CHECK

Plagiarism



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SURAT KETERANGAN HASIL CEK PLAGIASI

Nomor: 2731790499/Perpus./10/Dir.Perpus/VII/2025

Bismillaahirrahmaanirrahiim

Assalamualaikum Wr. Wb.

Dengan ini, menerangkan Bahwa:

Nama : Chairunisa Dwitya Vanti
Nomor Mahasiswa : 21512201
Pembimbing : Dr.-Ing. Putu Ayu Pramanasari A., S.T., M.A.
Fakultas / Prodi : Teknik Sipil dan Perencanaan/ Arsitektur
Judul Karya Ilmiah : A Design of Javan Lutung (_Trachypithecus auratus_) Rescue Center in Magelang with Behavioral Approach

Karya ilmiah yang bersangkutan di atas telah melalui proses cek plagiasi menggunakan **Turnitin** dengan hasil kemiripan (*similarity*) sebesar **3 (Tiga) %**.

Demikian Surat Keterangan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Wassalamualaikum Wr. Wb.

Yogyakarta, 8/19/2025

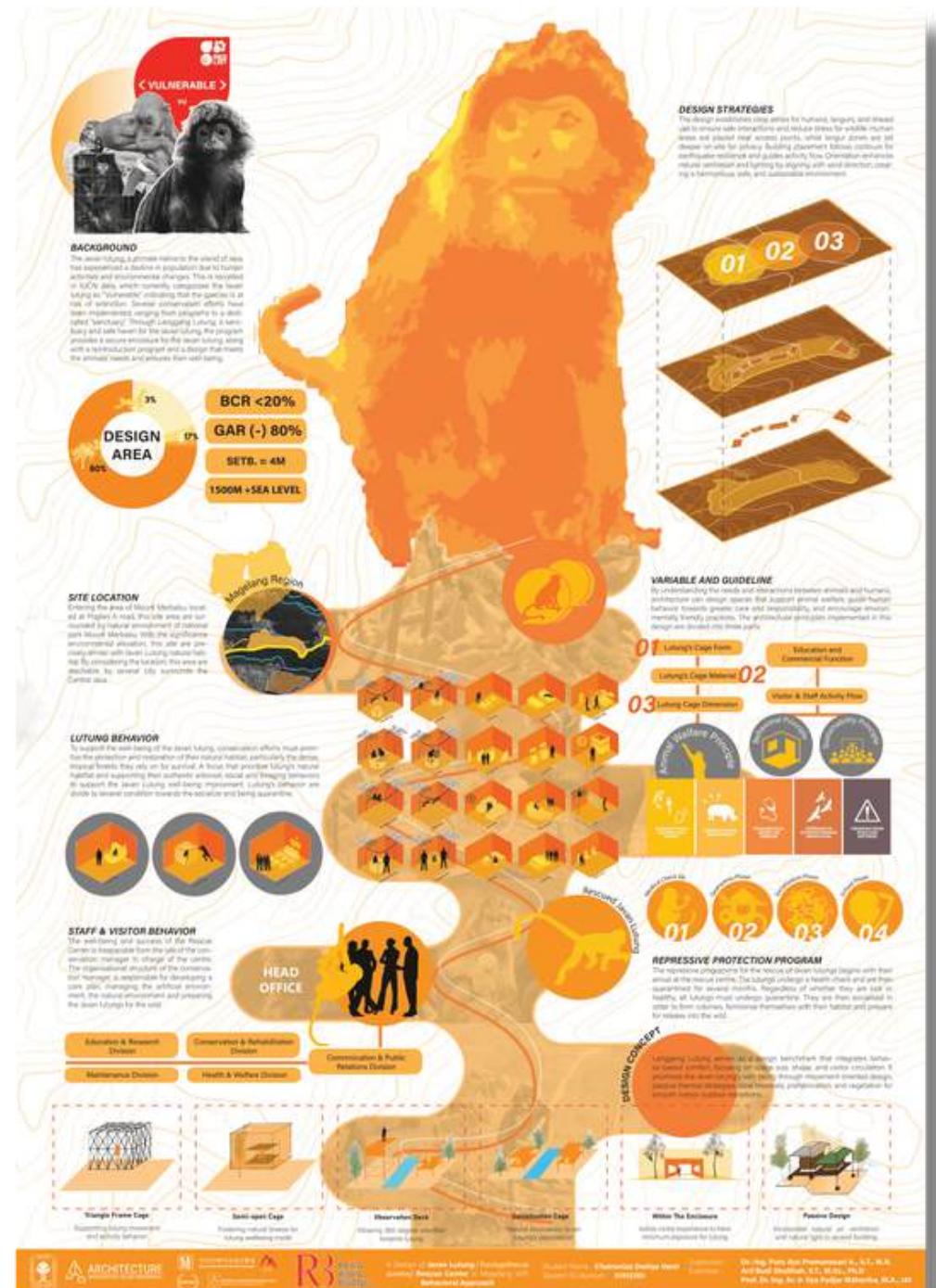
Direktur



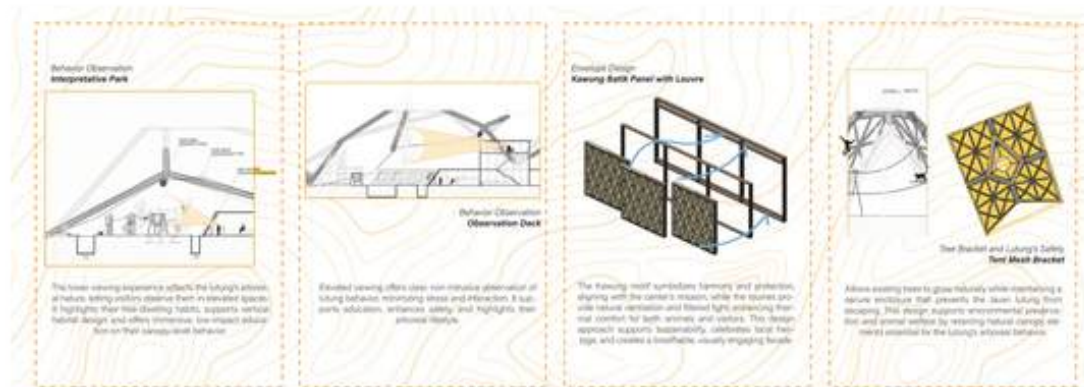
Muhammad Jamil, SIP.

APREB

Architecture Presentation Board



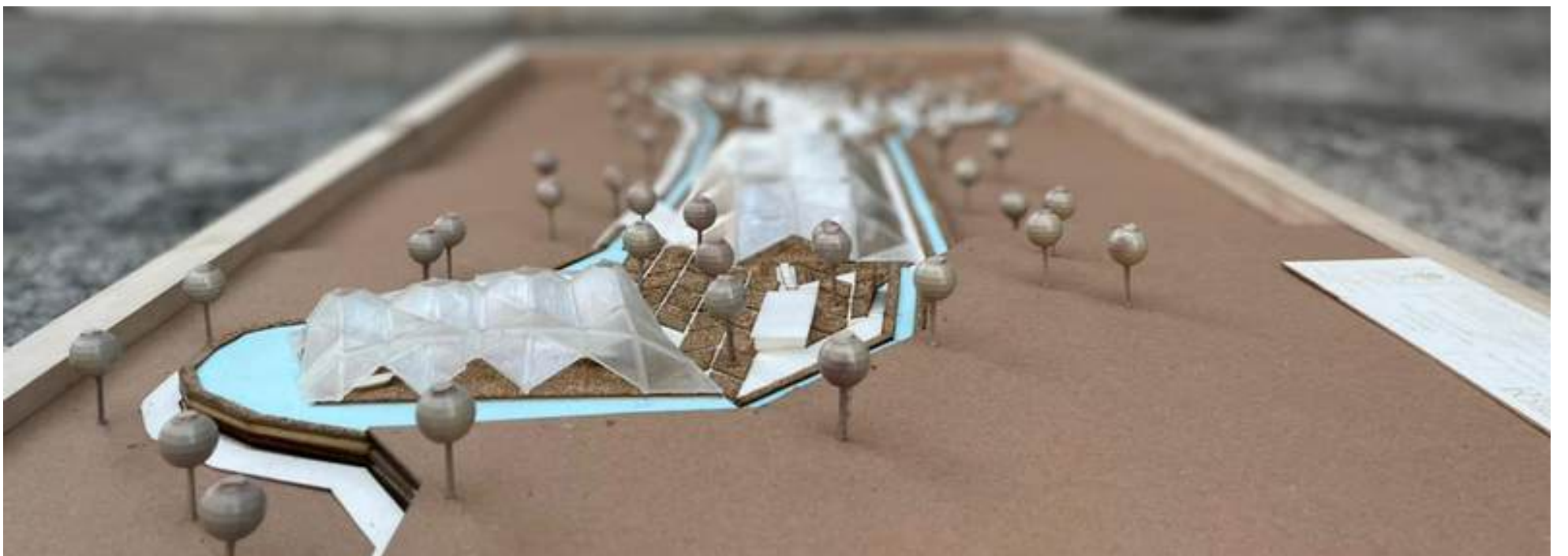


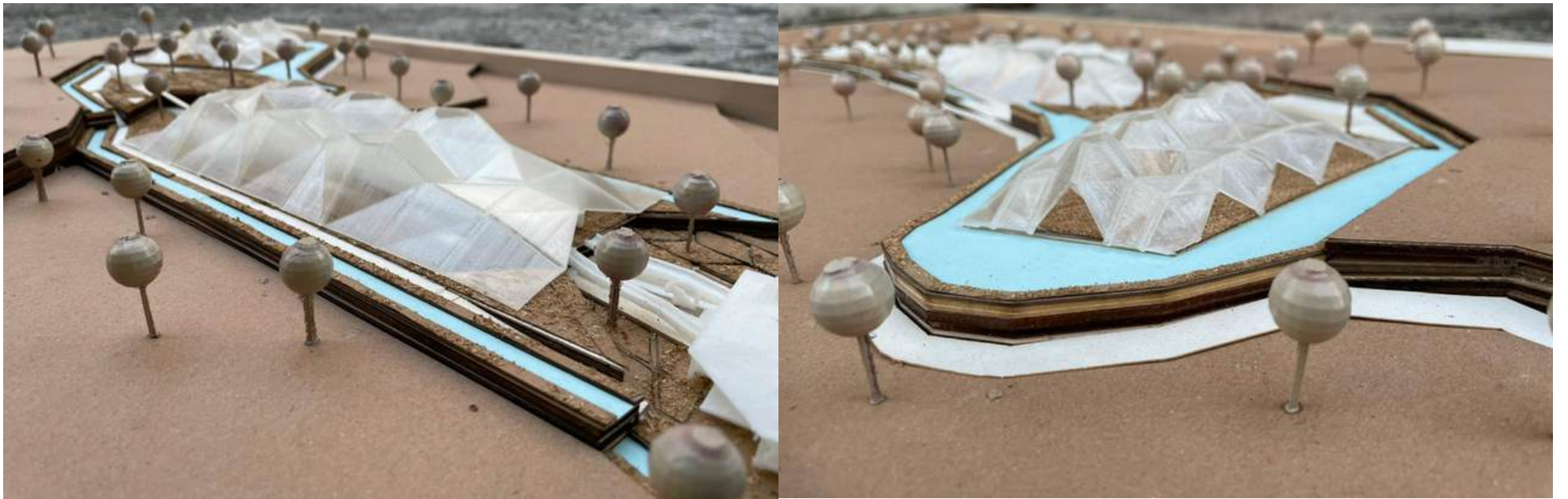


3D MODEL

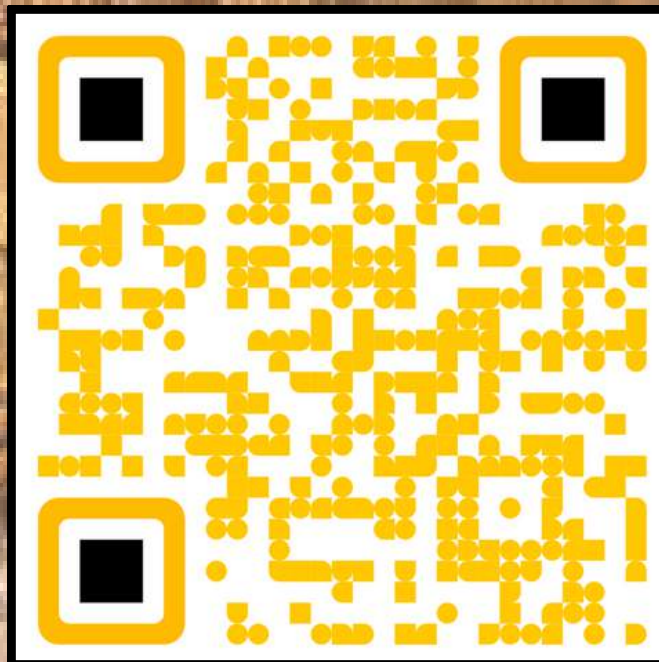
Maquette 1:700







LANGGENG LUTUNG DDD



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