TAYLOR'S UNIVERSITY
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SCHOOL OF ARCHITECTURE, BUILDING & DESIGN
Centre for Modern Architectural Studies in Southeast Asia
Bachelor of Science (Honours) in Architecture

GREEN STRATEGIES FOR BUILDING DESIGN (ARC61804)

A2: Passive Green Building Strategies

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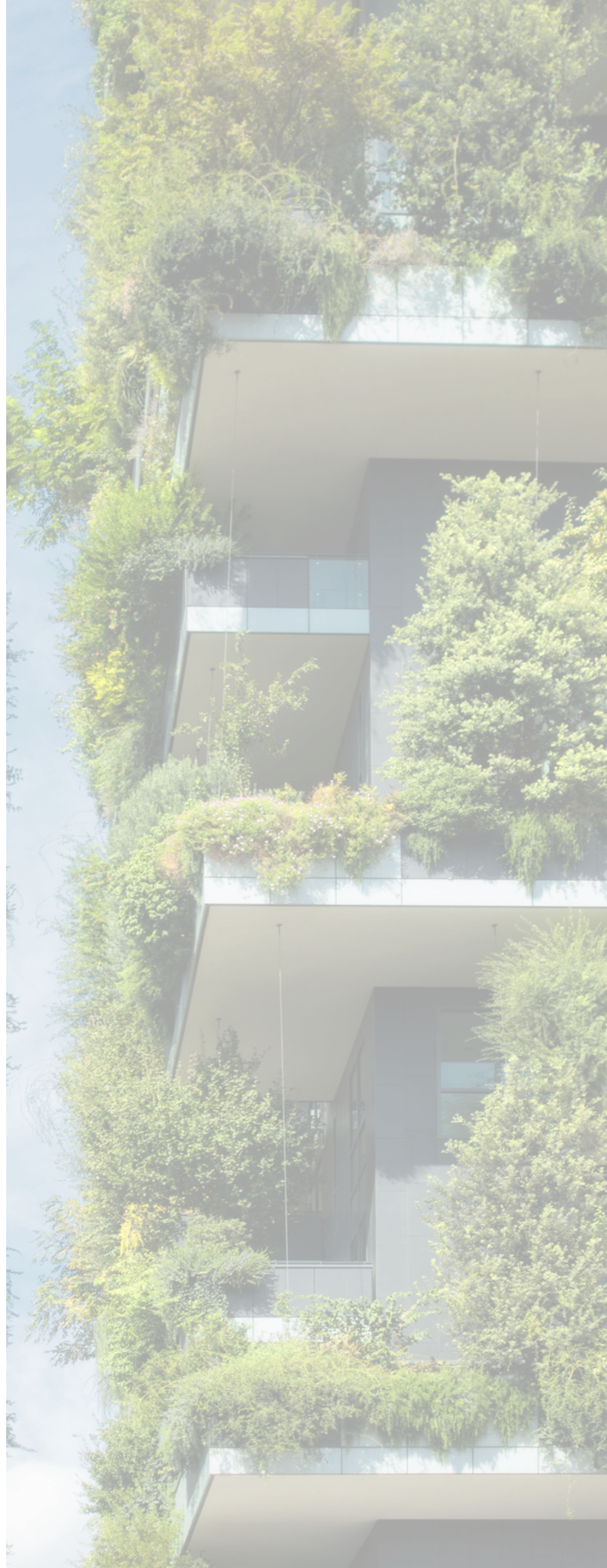

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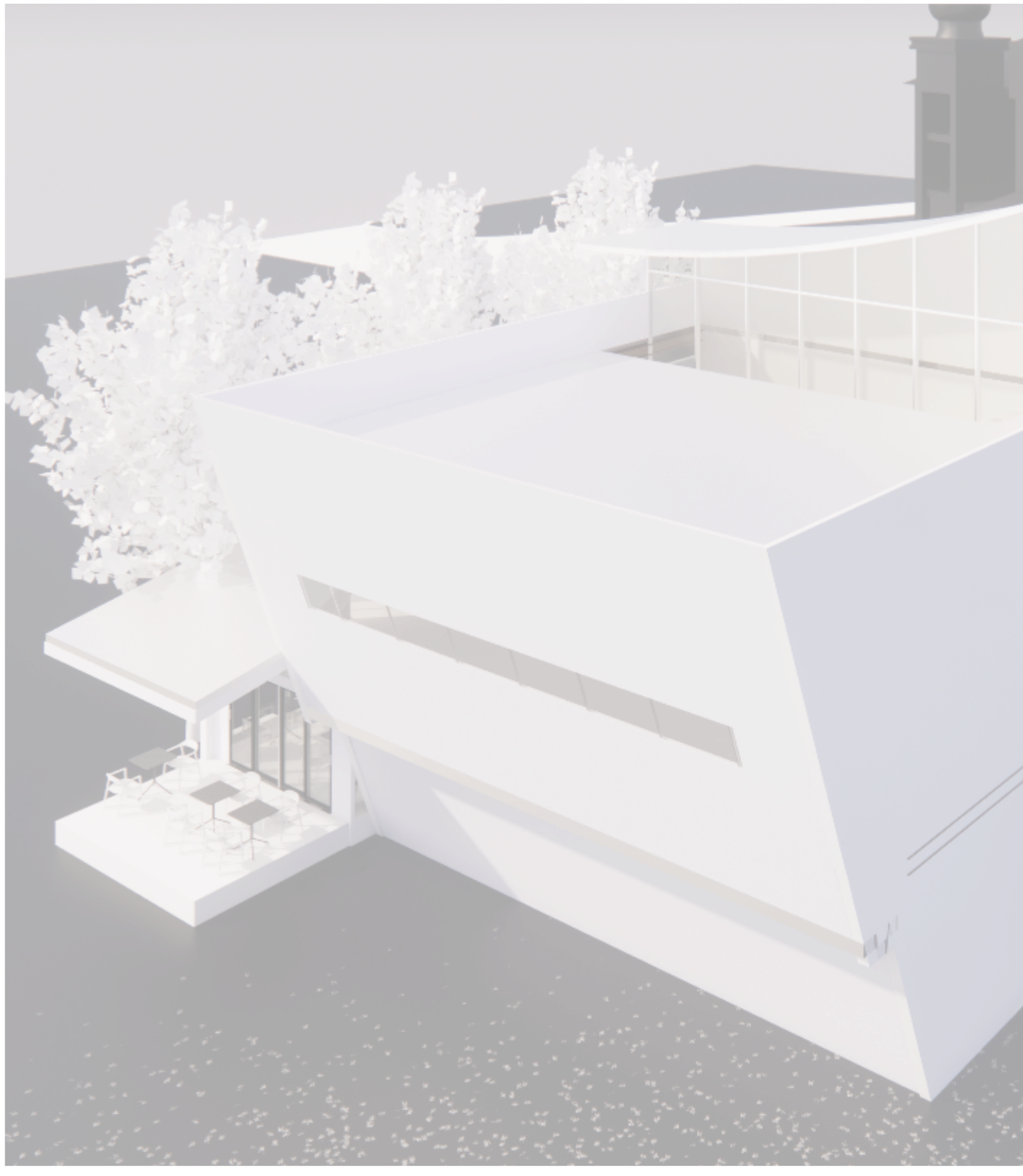
INTRODUCTION

This project is part of the Pekan Poetic Architecture Museum brief, which calls for the design of an experiential annex that conveys the essence of Pekan's cultural, historical, and geographical identity.

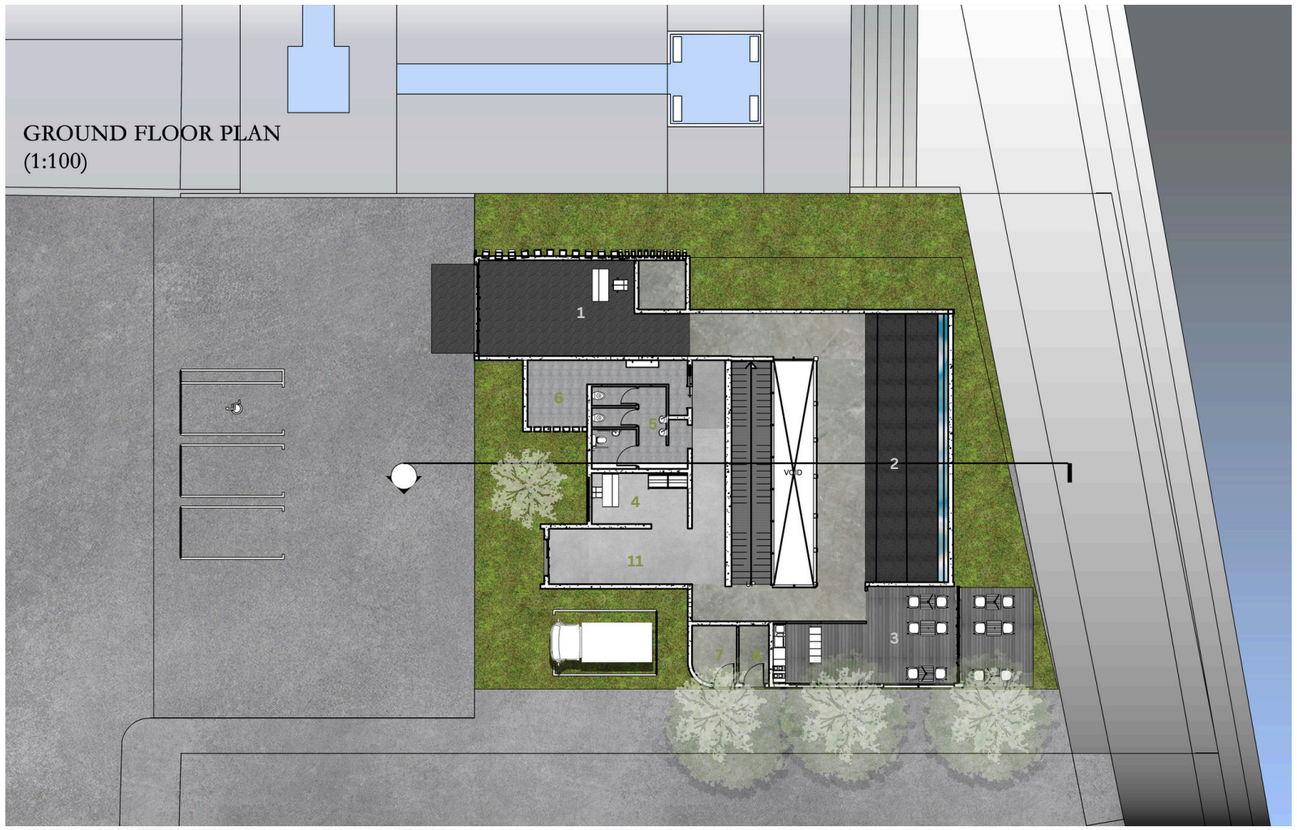
My proposal, "Echoes Along River Pahang Through the Flow of Time," draws inspiration from the Pahang River as a silent witness of history, life, and floods that have shaped the community. Rather than relying on artifacts, the museum uses space, light, water, sound, and materiality to immerse visitors in the intangible echoes of memory.

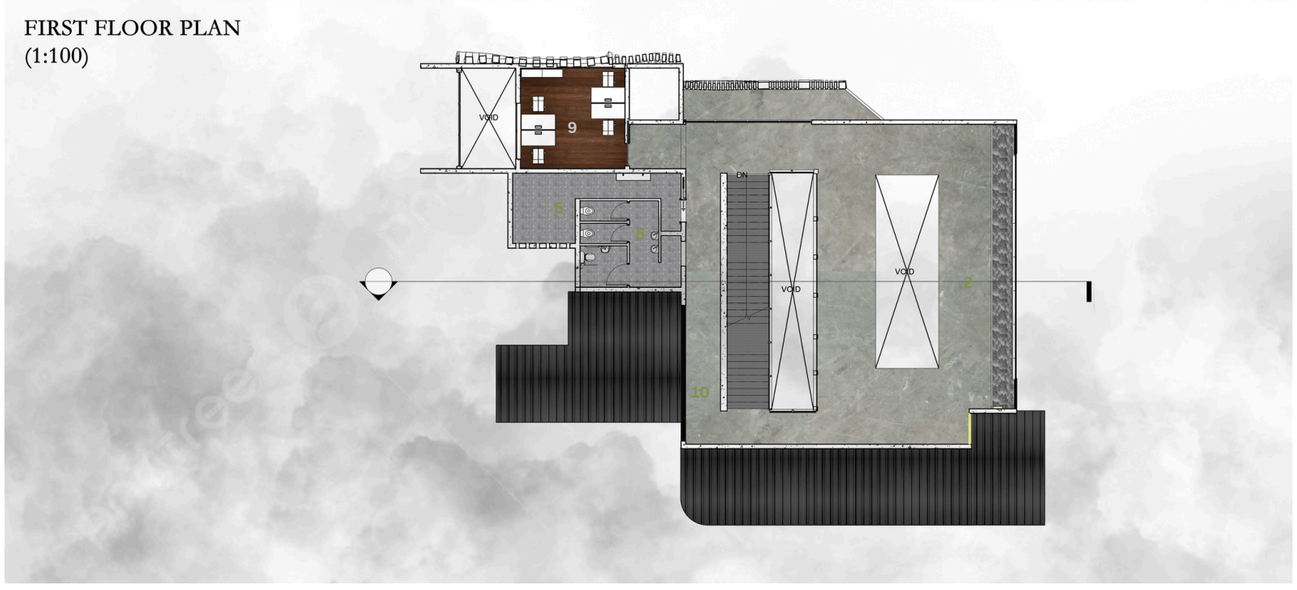
In parallel, the design applies passive green building strategies suited to Pahang's tropical climate, such as natural ventilation, daylighting, water management, and sustainable materials. These strategies reduce impact, improve comfort, and strengthen the poetic narrative where natural forces shape the experience.



INTRODUCTION

Floor Plan





Legend	Space
1	Entrance
2	Gallery Space
3	Cafe
4	Souvenier shop
5	Toilet
6	Surau
7	MNE
8	Difuse Room
9	Office
10	Viewing point
11	Exit

SITE INTRODUCTION

SITE CONTEXT

Penisula Malaya

Sultan Abdullah Mosque Museum

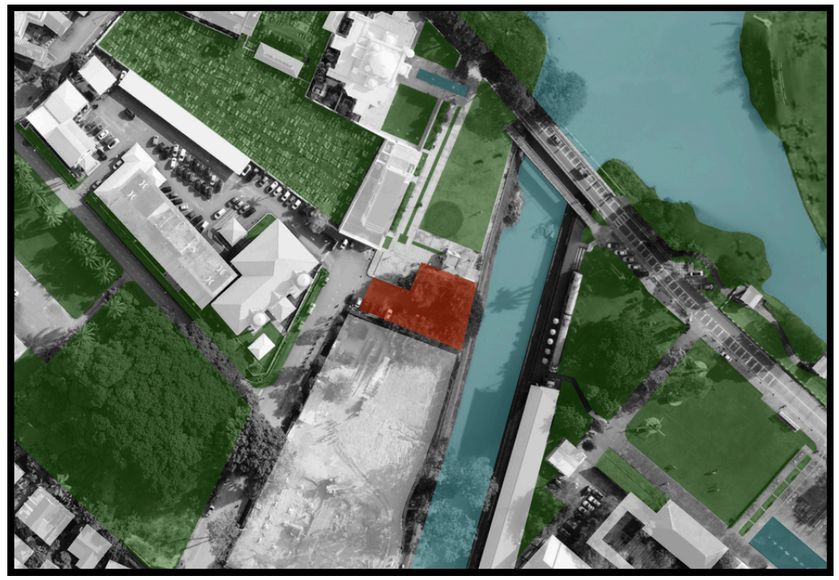
Pahang River

Train cafe

Sultan Abu Bakar Museum

SITE INTRODUCTION

SITE CONTEXT



The **Pekan Poetic Museum** is located in **Pekan.** The site is surrounded by several museum and mosque. Together, these form a network of museums and heritage sites .

Besides,The Pahang River defines the eastern edge of the site. It is both a cultural backbone and an environmental factor (flooding, seasonal shifts). Tropical vegetation surrounds the river, offering shade and framing views.

Landscape
Preserved existing trees and natural topography, embedding the buildings into a green framework.

Hardscape:
Central void serve for ventilation function,and also space allow plants to grow

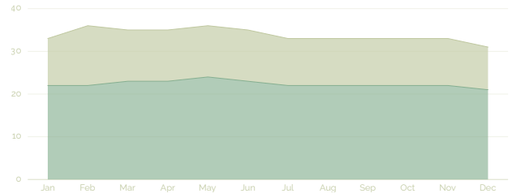
Topography
Facing a river, with water body, allow to reduce surrounding temperature and increase humidity of site

SITE INTRODUCTION

CLIMATE ANYLYSIS

Pahang has a **hot, humid and rainy** tropical climate with **high temperatures** and frequent rainfall year-round, especially during **inter-monsoon months**. This supports a lush, green environment. However, climate change and urbanization are increasing **extreme weather events**, requiring adaptive strategies to improve the city's environmental resilience and long-term sustainability.

TEMPERATURE



Consistently high temperatures throughout the year. Air temperatures ranging from **24 °C to 32 °C** with hottest month (May) reaching highs around 32 °C

RAINFALL

The city receives averaging approximately **2,630 mm**. annually. Monsoons bring heavy rains— especially October to December (~350 mm/month)

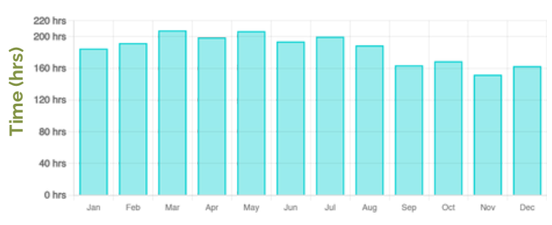
WIND

Average wind speeds range from ~7 km/h in calm months (May) up to ~17 km/h in windy months (January)

HUMIDITY

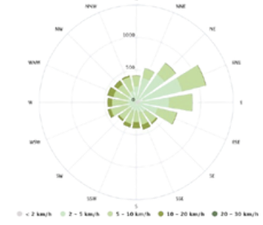
Virtually constant and high at ~84–89%; always feels muggy to oppressive

DAYLIGHT



Daylight remains near 12 hours most of the year (11h 55min–12h 19min), with sunrise around 07:00 and sunset around 19:00

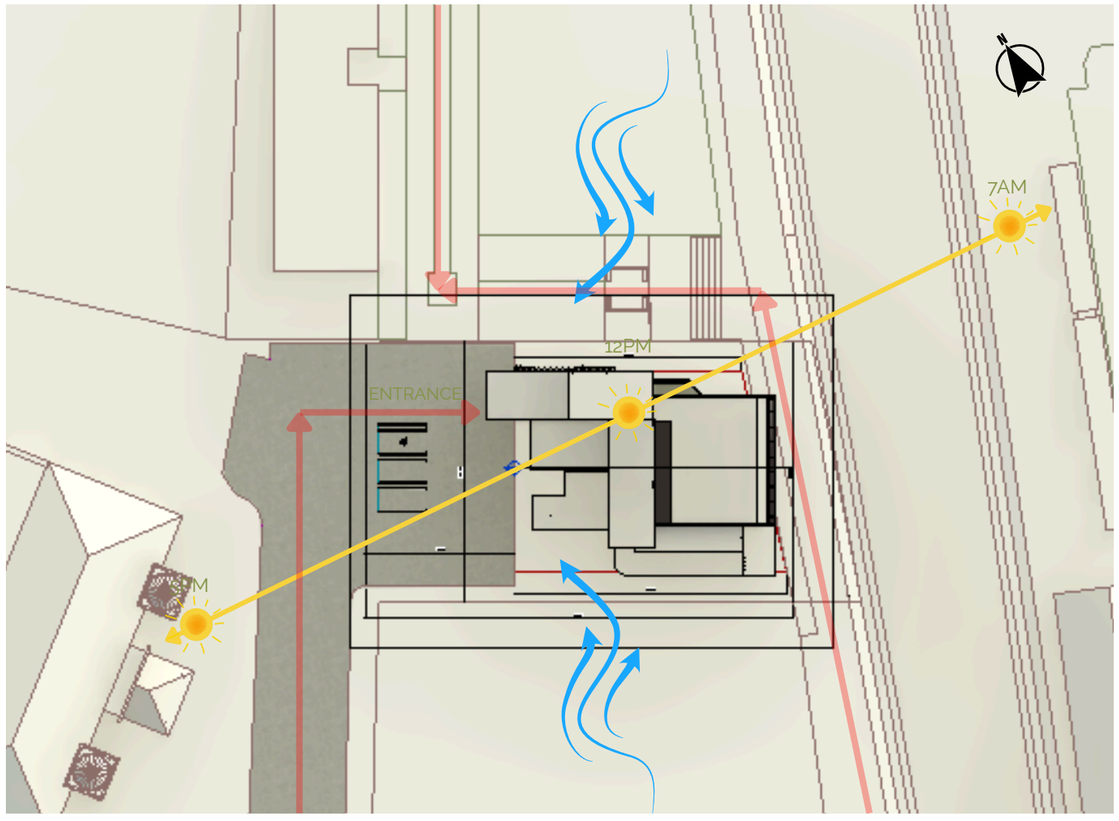
WIND ROSE DIAGRAM

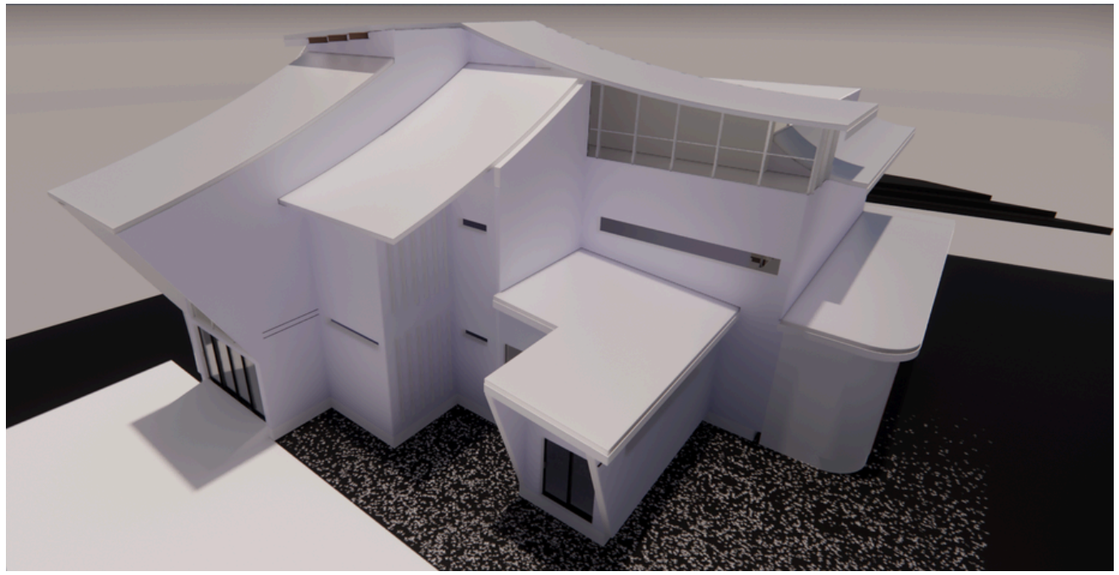


Prevailing winds shift: typically from the south (May–Oct), north (Nov–Mar), with occasional breezes from the east in April and October

SITE INTRODUCTION

BUILDING ANALYSIS





BUILDING ORIENTATION

Building is oriented facing north east direction to appreciate the view of river.

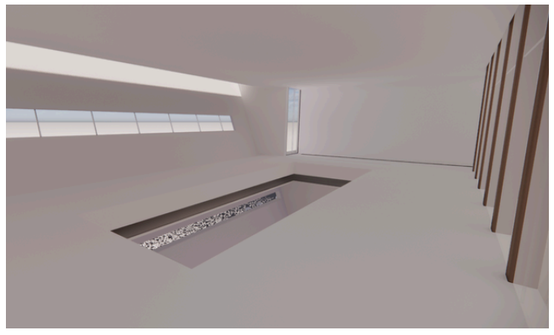
ENTRANCE LOCATION

Building entrance located near the main circulation path.

BUILDING TYPOLOGY

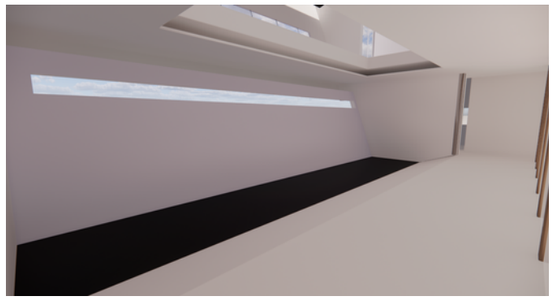
Monolithic building with double volumn spaces

First floor Gallery space



Managment Office

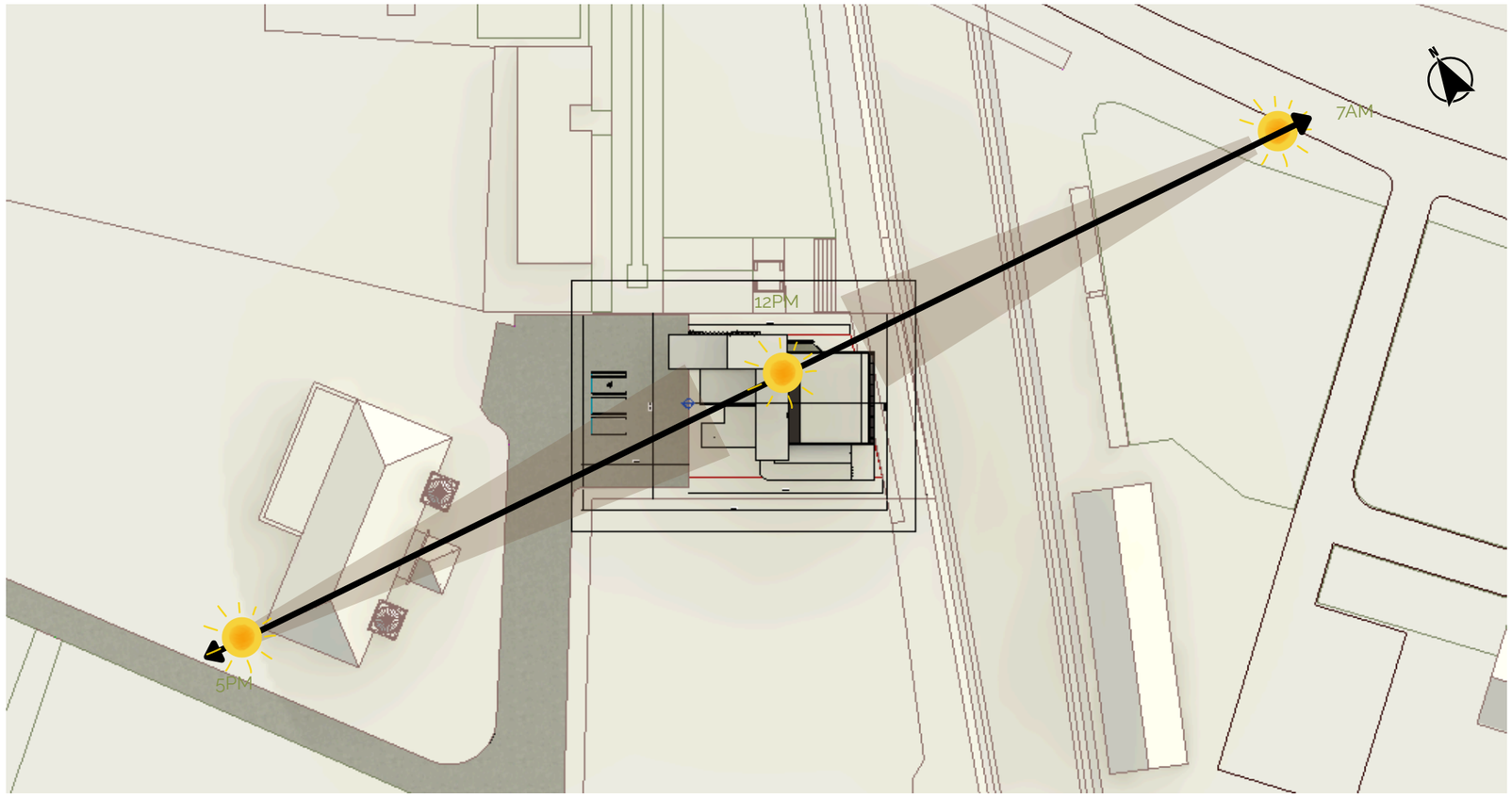
Ground floor Gallery space



Small cafe

DAY LIGHTHING

SUNPATH ANALYSIS



Morning

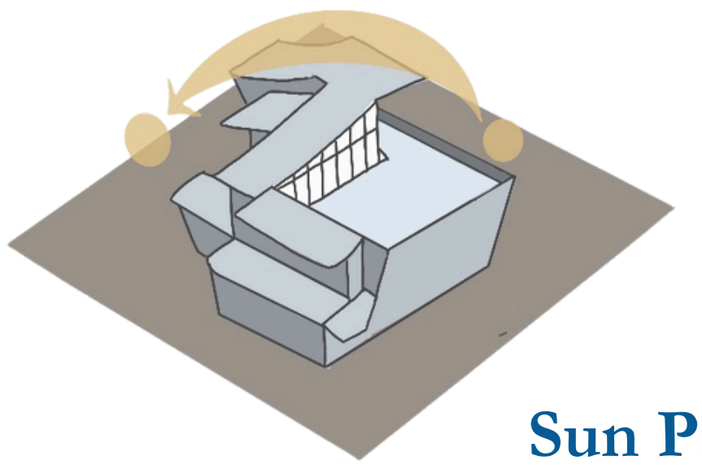
North east facade receive harsh sunlight,causing glare.The concrete facade will block the direct sunlight and absorb heat from sun, creating indoor thermal comfort.

Afternoon

Sunlight at its highers point,the centre void can be taken of advantages by bouncing the light into indoor spaces.

Evening

South west facade receive harsh sunlight,space in that direction like entrance and exit will experience thermal incomfort.Therefore, a frosted glass curtain wall will help to reduce direct sunlight and partially blocks infrared rays, lowering interior heat.

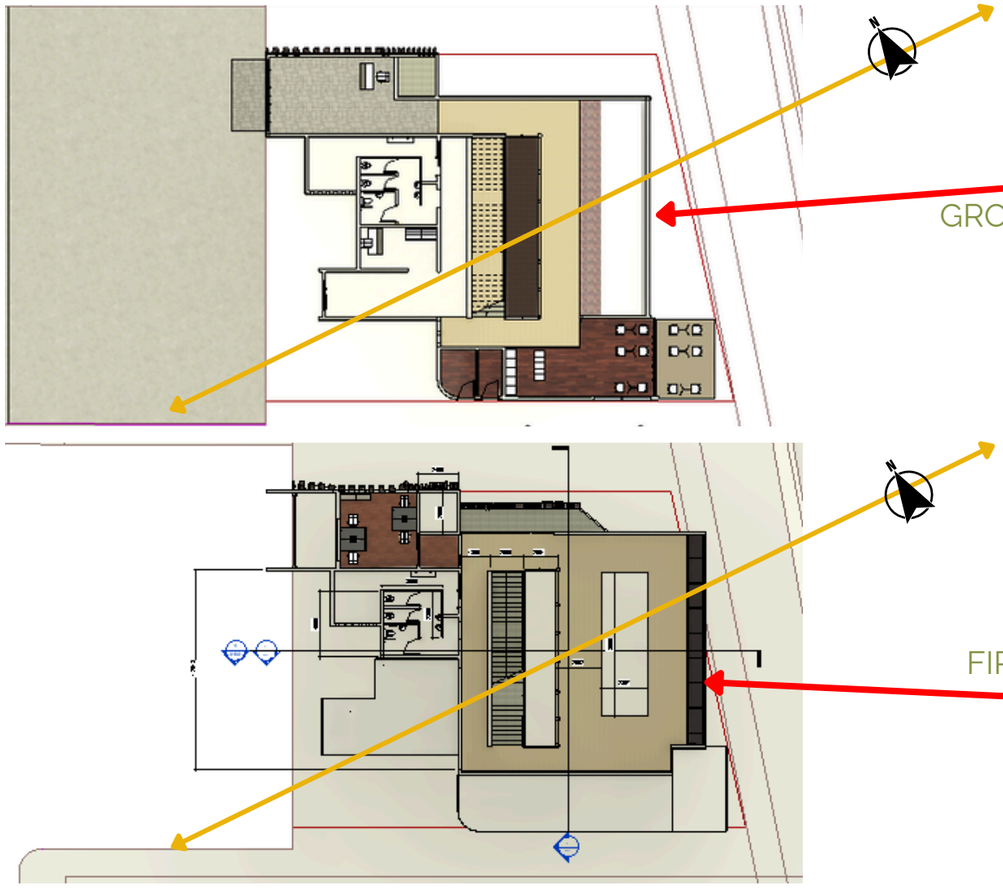


Sun Path

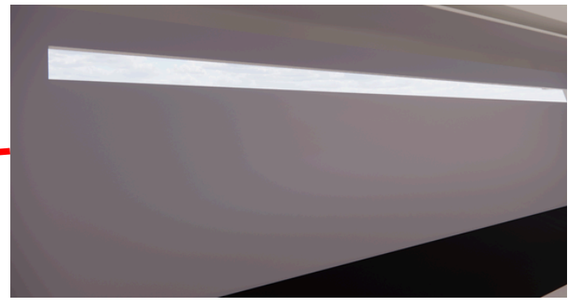
South west facade

DAY LIGHTHING

SUNPATH TO SPACE DESIGN

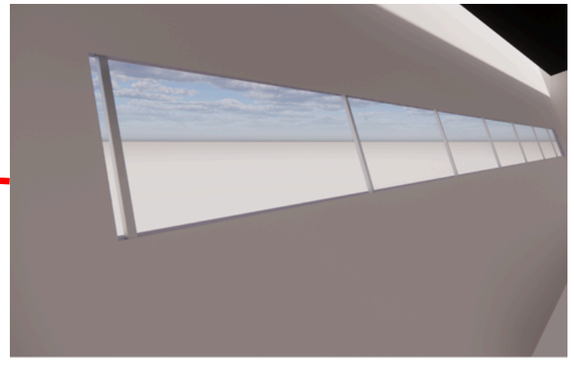


OPENING ON GF BACK FACADE

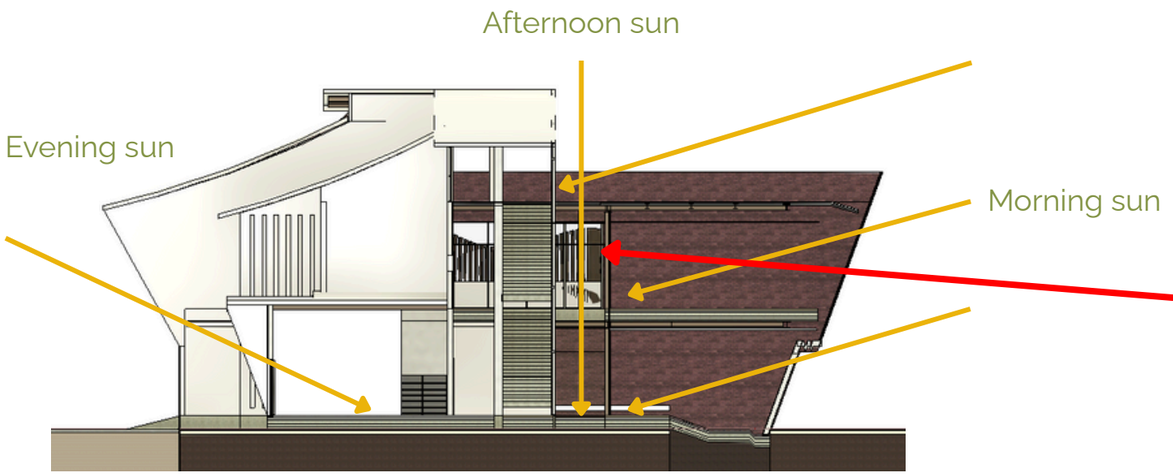


An opening on ground floor Northeast facade,higher opening block direct sunlight in the morning,only allow reflected light into the building

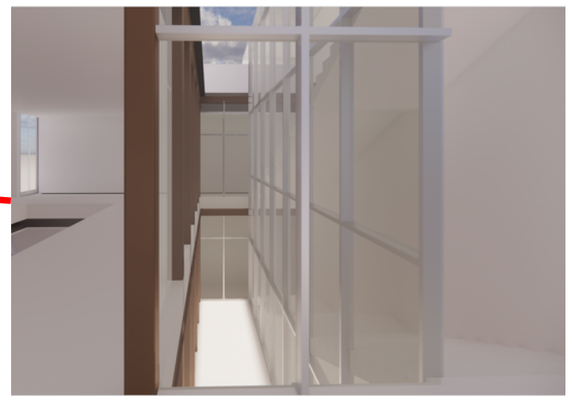
OPENING ON FF BACK FACADE



An opening on first floor Northeast facade,normal height opening allow sunlight go into building and create natural lighting effect



CENTRE VOID



Centre void with no cover.During noon time,sunlight shine into the void and create reflected light,which create natural lighthing for internal spaces

FACADE DESIGN

MATERIAL DESIGN

Frosted glass

- Softens and spreads sunlight evenly, reducing glare and harsh shadows.
- Cuts direct solar gain, lowering interior heat buildup.
- Reduces need for artificial lighting during the day.

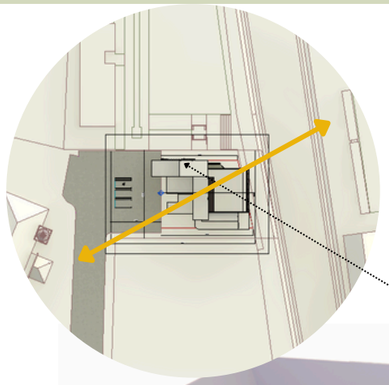
Brick wall

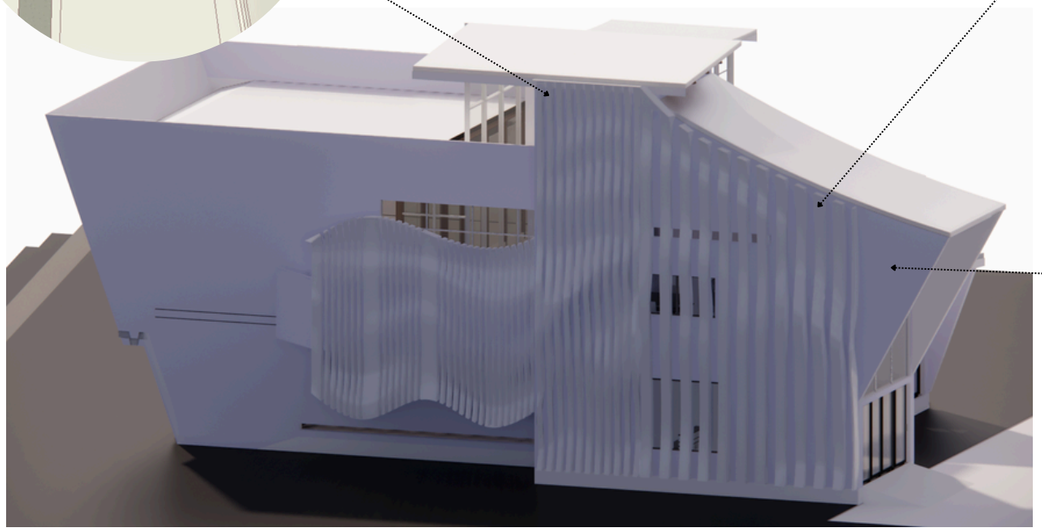
- Absorbs heat during the day and releases it at night, stabilizing indoor temperature.
- Long lifespan, low maintenance, reducing material replacement needs.
- Brick allows limited vapor permeability, reducing humidity buildup.

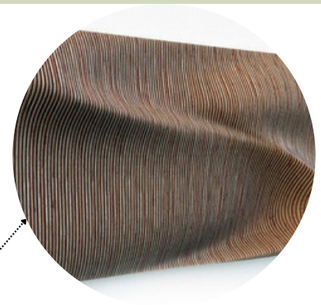
Water Curtain Wall

- Falling water absorbs heat and cools surrounding air, improving thermal comfort.
- Adds moisture to the air, which can feel refreshing in hot, dry moments
- Water refracts and reflects natural light, creating dynamic shadow and ripple effects.

FACADE DESIGN







Wood facade

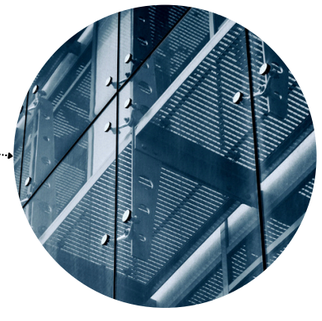
- Wood as local material
- filtered light through gap
- cover window opening to reduce direct sunlight
- Ensure privacy as this direction facing the main circulation

Concrete facade

- Absorbs heat by day, releases at night for cooler interiors.
- Durable & low maintenance – reduces material use over time.
- Acoustic buffer – blocks outside noise, keeping spaces calm

Overhang roof

- Blocks high sun angles, reducing direct heat gain on walls and windows.
- Creates shaded outdoor spaces and cooler air near openings, enhancing cross-ventilation.

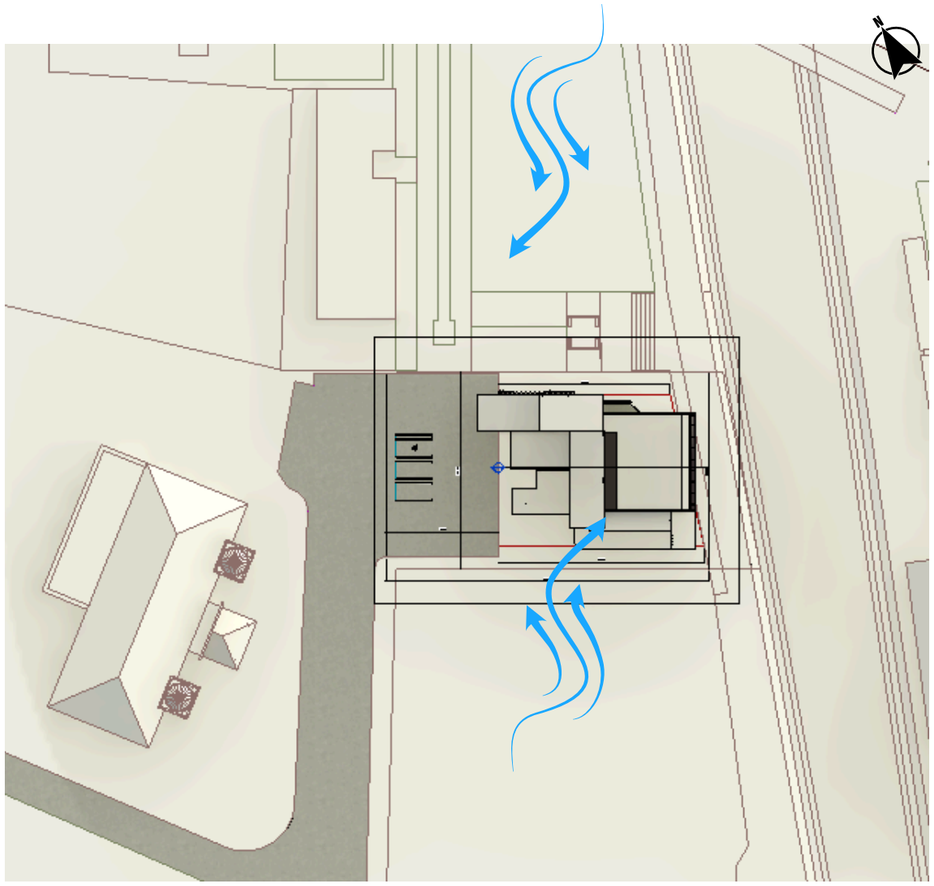


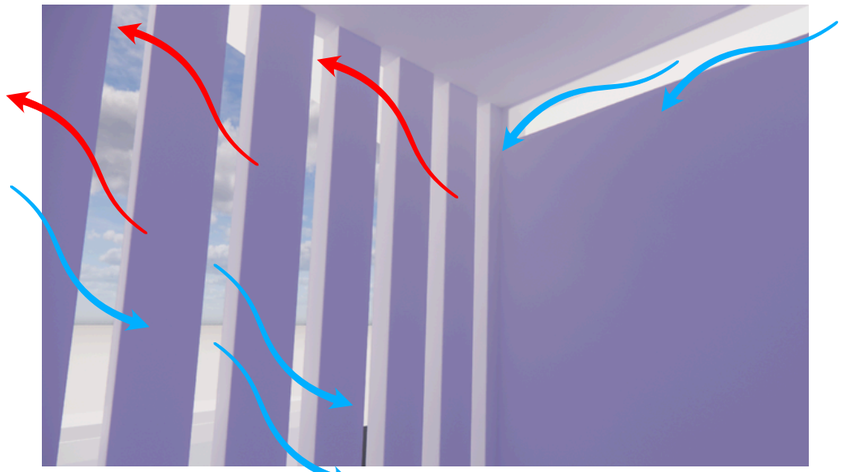
Curtain wall

- Allows ample daylight into Entrance and Exit space
- Set behind deep eaves and vegetation to prevent glare and overheating.

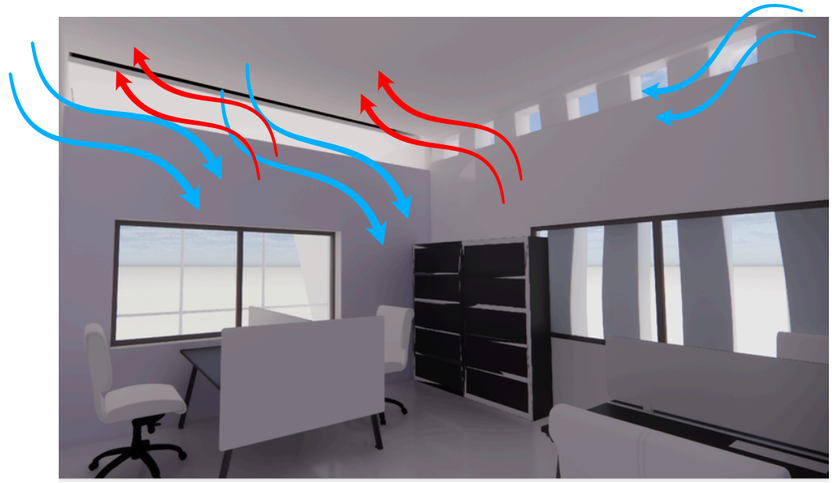
VENTILATION

VENTILATION IN SPACE

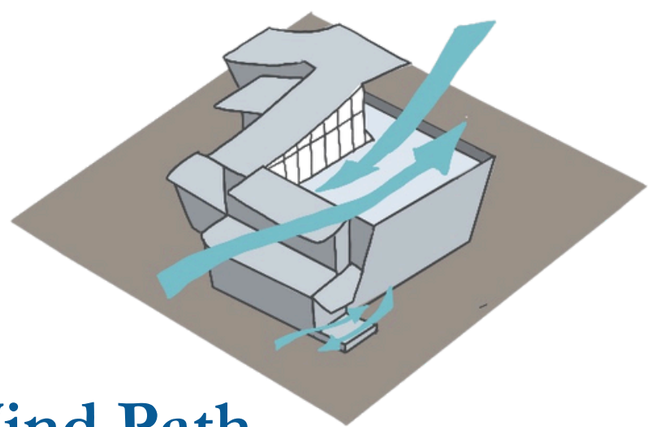




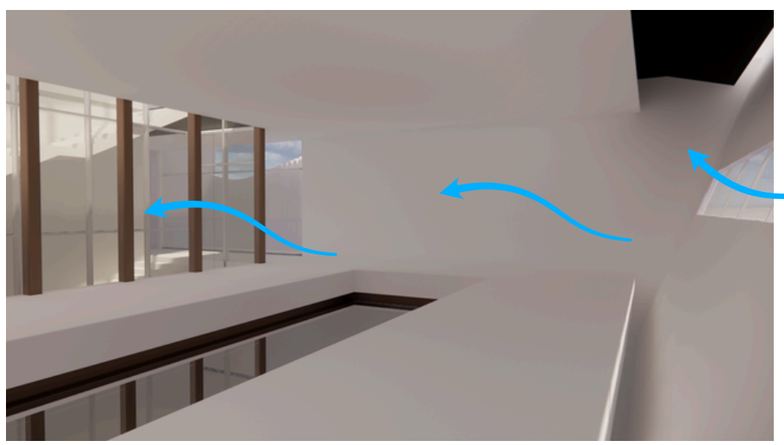
Surau



Management office



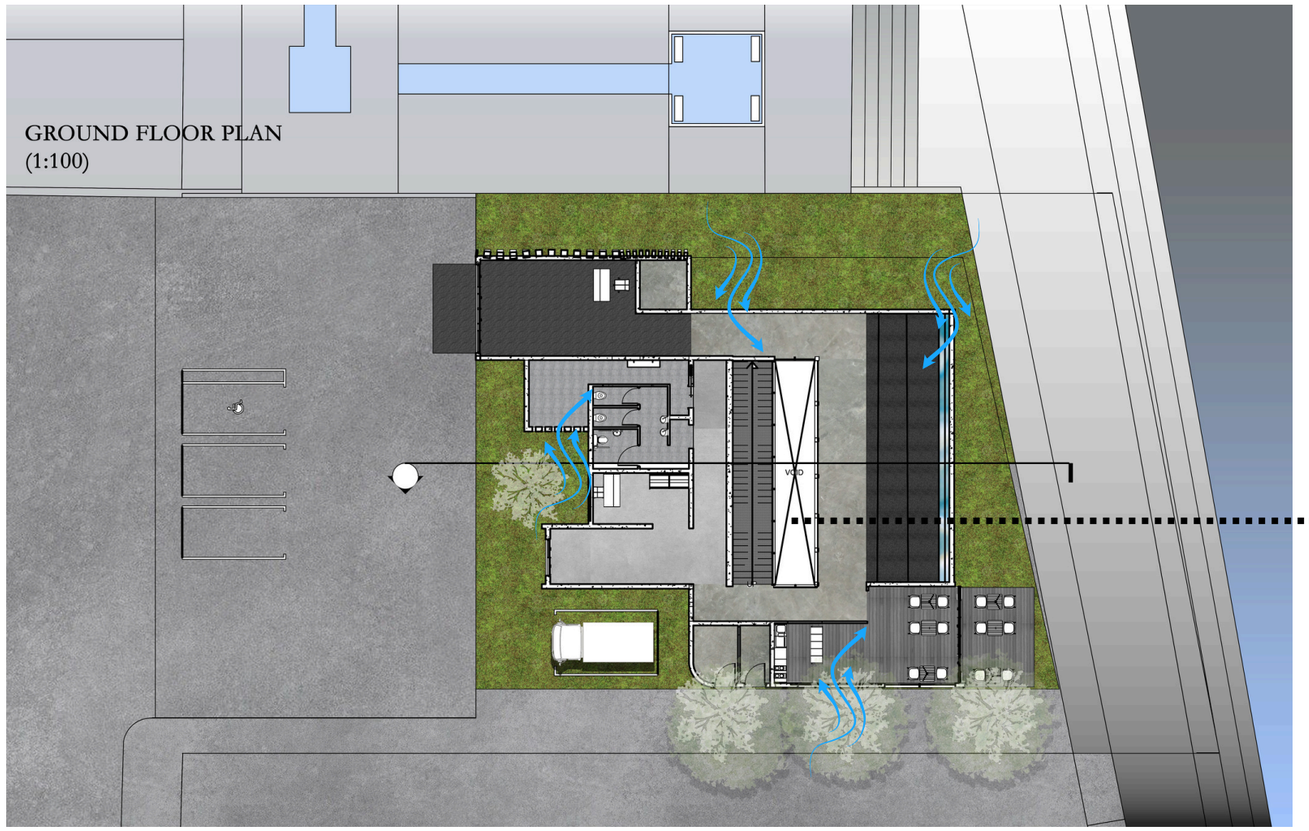
Wind Path

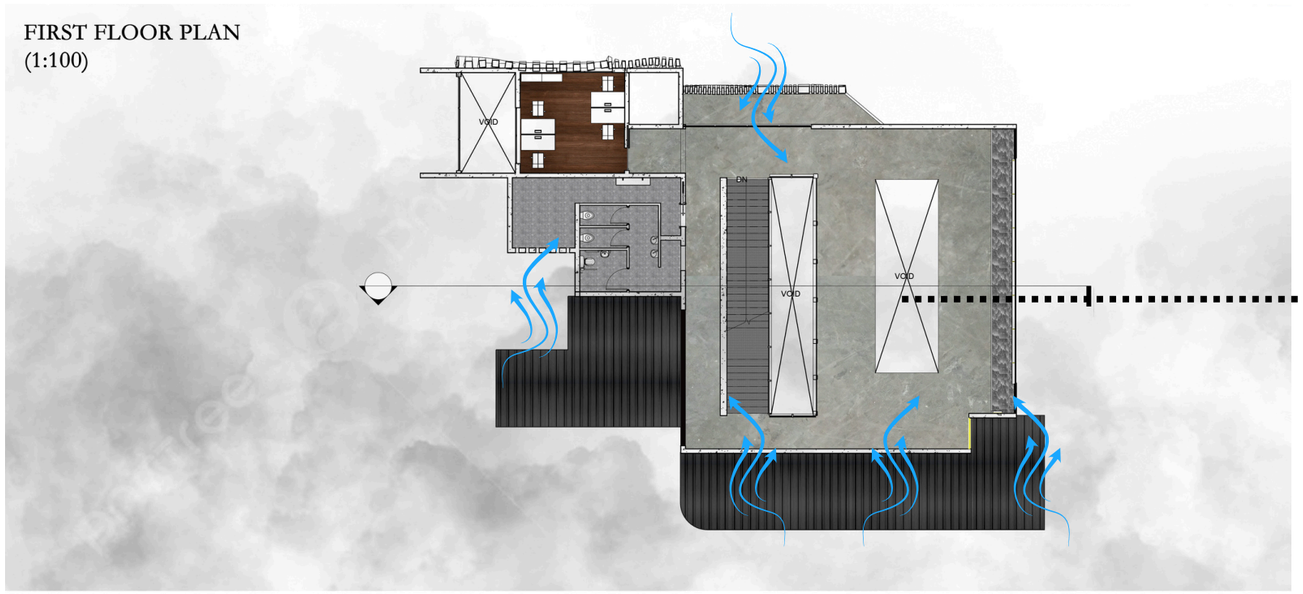


FF Gallry space

VENTILATION

VENTILATION IN SPACE





DOUBLE VOLUMN SPACE

-Designed with a double-height volume, allowing warm air to rise naturally toward the upper part of the structure.

-High-level openings and roof vents are incorporated to allow hot air to escape.

-Creates a pressure difference that draws in cooler outdoor air from lower-level openings.

-Improving thermal comfort without the use of air-conditioning.

VENTILATION

VENTILATION IN SURROUNDING

River

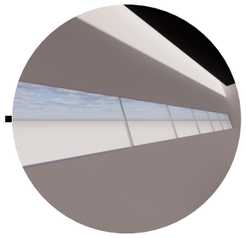
Breezes often move along the river corridor; orienting openings towards the river enhances airflow through the building.

Water curtain wall

The water feature cools the space naturally through evaporation, while encouraging vertical airflow, enhancing ventilation, and reinforcing the sensory experience of the river.

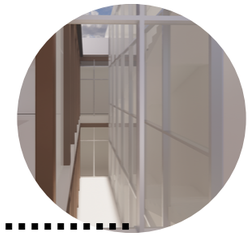
Green Landscaping

Green landscaping provides shade, reduces heat gain, and cools the microclimate through evapotranspiration,



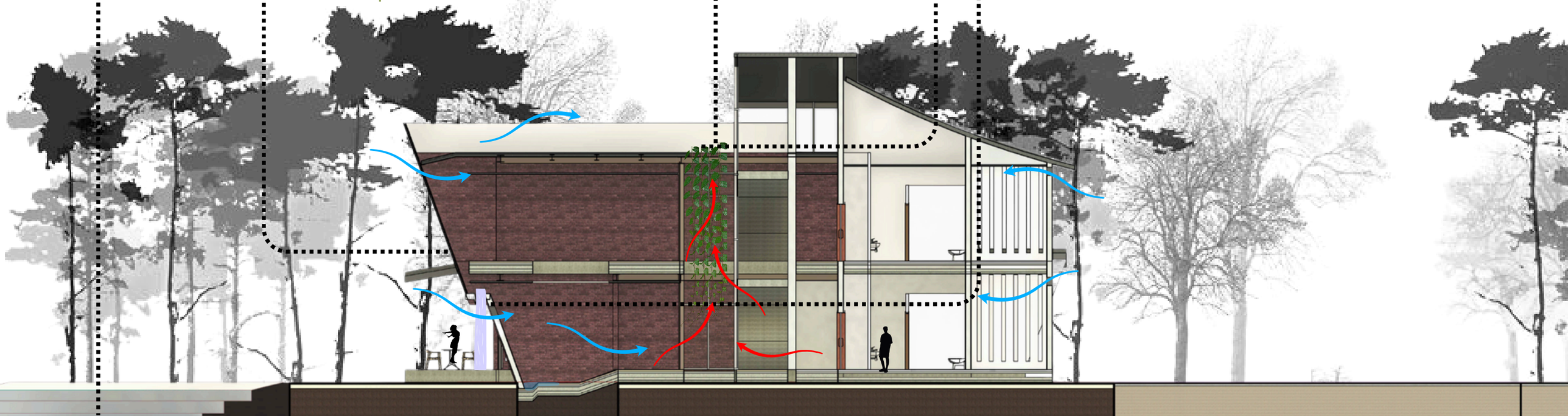
Air gap on wall

The wall air gap reduces heat gain by allowing hot air to escape and cooler air to circulate naturally



Centre void

The central void enhances natural ventilation and daylight by allowing hot air to rise and escape while drawing cooler air through the building.



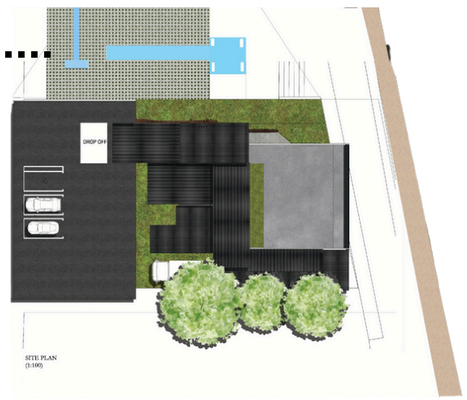
STRATEGIC LANSCAPE

River

Large amount of water body reduce surrounding temperature,creating a cooler microclimate compared to inland areas.

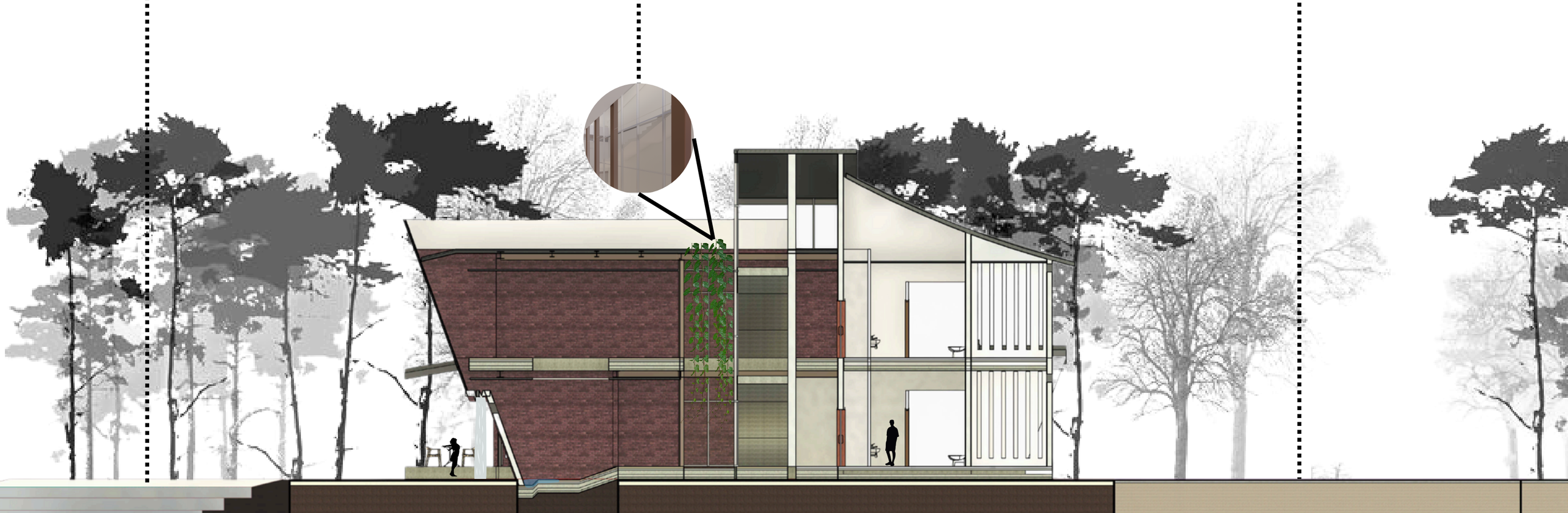
Ivy Plant

Growth of plant in the void can reduce glare and reflected sunlight into the building as it filter them

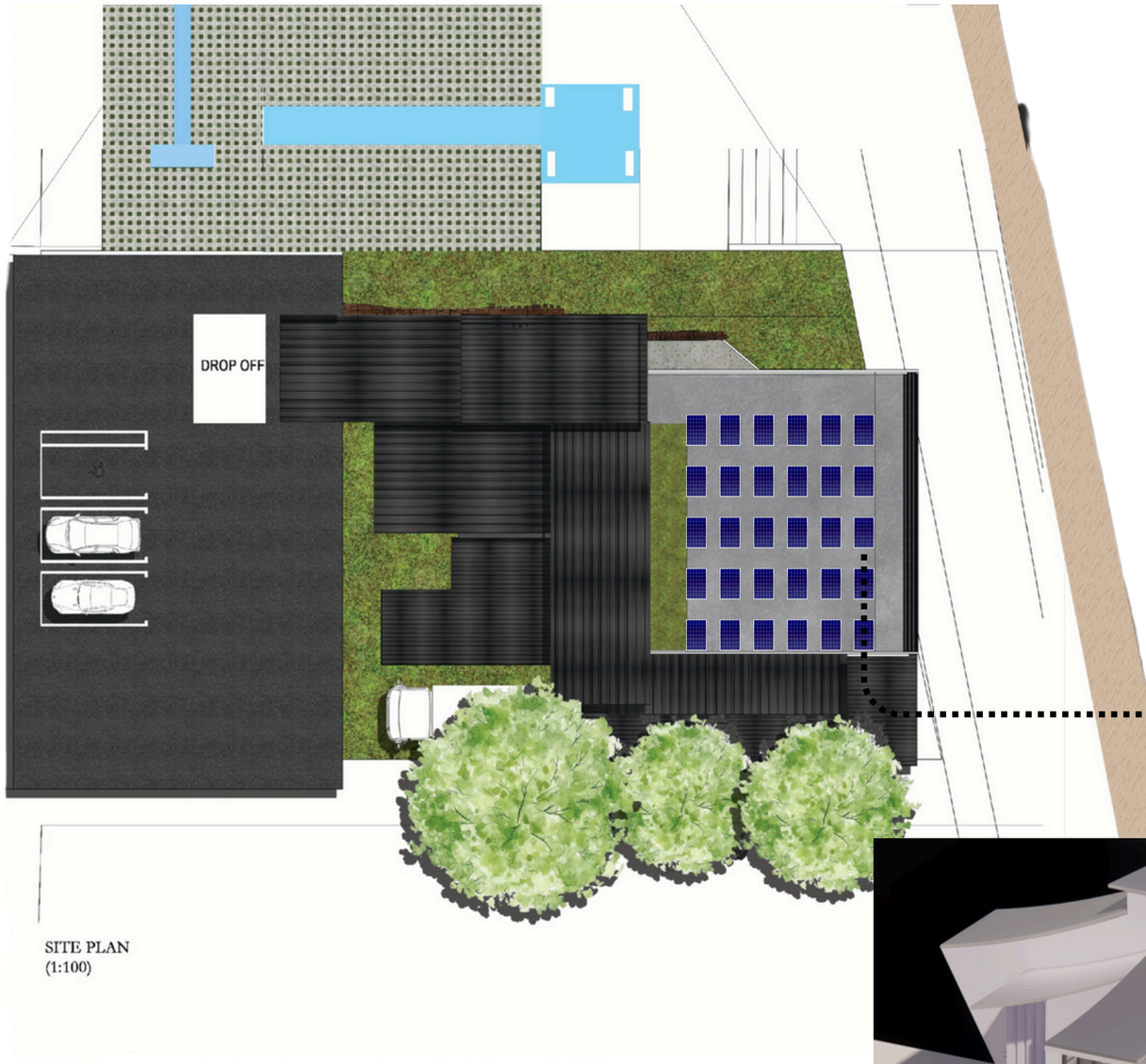


Water drainage

Small drainage system serve as a guide visitor follow it and walk to the building



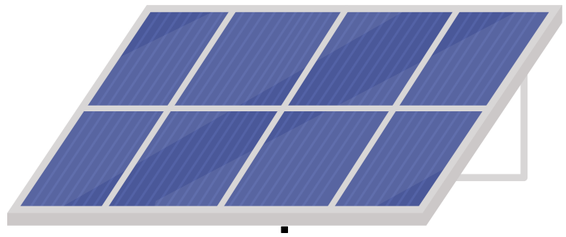
RENEWABLE ENERGY



SITE PLAN
(1:100)

SOLAR PANELS

- Converts abundant sunlight in Pekan's equatorial climate into electricity.
- Reduces dependence on the grid, lowering long-term operational costs.



CONCLUSION

My design, "Echoes Along River Pahang Through the Flow of Time," is an experiential museum that transforms the memory of the river and its floods into an architectural journey. Instead of relying on artifacts, the building allows visitors to experience history through rain, light, shadow, brick, pebble, and water — elements that embody both permanence and flow.

At the same time, the museum integrates passive design strategies that respond to Pekan's hot-humid tropical climate. The north-east oriented gallery captures soft morning daylight, while the south-west side houses service spaces to buffer harsh afternoon sun. Brick and concrete façades act as thermal mass, stabilizing indoor temperatures, while air gaps, central voids, and cross-ventilation allow hot air to escape and cooler breezes to circulate. Features like the water curtain wall and rain gap provide evaporative cooling and acoustic comfort, while frosted glass and overhang roofs filter daylight, reduce glare, and minimize heat gain. Landscaping around the museum further cools the microclimate and links the building back to the river's ecology.

Through these strategies, the design becomes both poetic and sustainable. It not only narrates the echoes of the Pahang River but also demonstrates how architecture can work with natural forces to create comfort, reduce energy demand, and honor the environment. In this way, the museum is a living memory of history and a model of passive design in a tropical context.

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