HOSPITAL BEYOND HOSPITAL

Environmentally Sensitive Healing space

The Proposed Rehabilitation of AMK Thye Hua Kwan Hospital, Singapore

YIO CHU KANG SECONDARY SCHOOL

Seccondary 3

GROUP S0009

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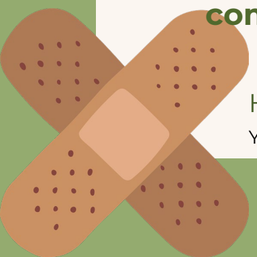
Project Introduction

Our project "Hospital Beyond Hospital" aims to redefine healthcare for the elderly at AMK Thye Hua Kwan Hospital. We are creating a holistic sanctuary that prioritizes well-being and dignity, challenging traditional hospital norms.

Our approach integrates Sustainability Development Techniques (SDT) to minimize ecological impact while enhancing patient care. Through innovative design and technology, we aim to improve both patient experience and operational efficiency. Biophilic Design harnesses natural elements for a calming environment, while Universal Design ensures accessibility for all. Therapeutic Spaces like gardens and sensory rooms promote relaxation and rejuvenation, fostering a community-centric healing environment.

Reference:
Photo Reference: from google earth



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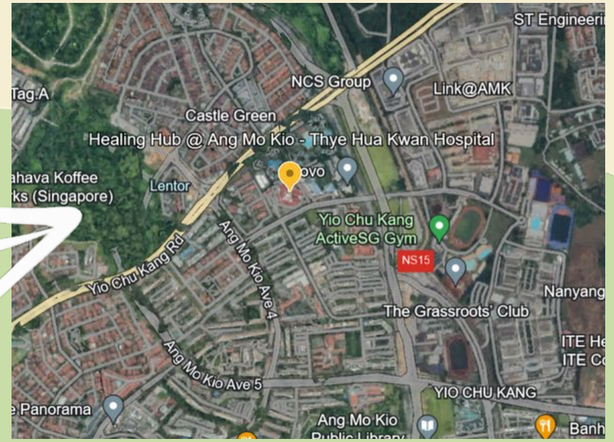
Jovan Tan

Site Location and Analysis

Site location and analysis are essential steps in any project to ensure optimal resource utilization to consider in the creation of robust sustainable solutions.

Singapore Map



Ang Mo Kio Vicinity

LEGEND:

- WIND DIRECTION
- SUNRISE
- DIRECTION
- NOISE DIRECTION
- SUNSET

Project Site

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INTEGRATED SYSTEMS

MAIN SYSTEMS:

- ENERGY
- WATER
- GREEN

SECONDARY SYSTEMS:

- FOOD
- TECHNOLOGY & INNOVATION
- WASTE MANAGEMENT

SUSTAINABLE DESIGN TECHNIQUES (SDT)

SDT aims to minimize resource use, cut carbon emissions, and enhance climate resilience. It advocates energy efficiency, renewables, green and blue infrastructure, also integrating food systems, technology and innovation and waste management into development.

This fosters healthier buildings, communities, and ecosystems while mitigating environmental damage, all for long-term sustainability.

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ENERGY

At AMK Thye Hua Kwan's "Hospital Beyond Hospital," we prioritize sustainability through energy-efficient practices.

By integrating smart building systems:

- motion control system
- solar panels- renewable energy source
- LED lighting fixture

Natural ways to lower the energy consumption:

- High ceiling to accumulate natural daylight
- passive cooling system
- integrate landscape and water features for the natural cooling surroundings

EXISTING BUILDING CONDITION

SOCIAL SPACE

ENTRANCE LOBBY

DESIGN PROPOSAL

skylight will be installed in the public spaces like corridors.

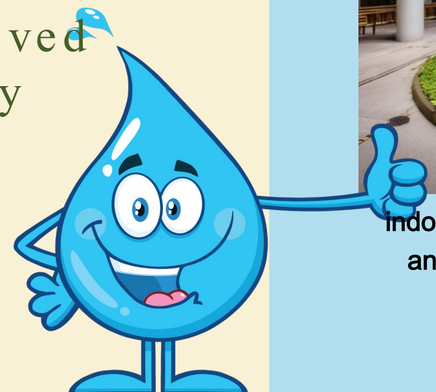
Proposed lobby design with high ceiling and large glass windows to accumulate natural daylighting

Solar panels will be installed on rooftops to harness renewable energy, significantly reducing the hospital's reliance on fossil fuels and lowering energy costs.

WATER

We integrate water-saving fixtures, rainwater harvesting systems, and greywater recycling to efficiently manage water resources.

- Capturing rainwater for non-potable uses like in irrigation of greens, cleaning the facilities.
- Recycling greywater from sinks and showers for cleaning & reserve for fire hydrant.
- Using permeable pavements *Alternatives to traditional pavement on our paved surfaces can help reduce runoff by infiltrating rain water.



EXISTING BUILDING CONDITION

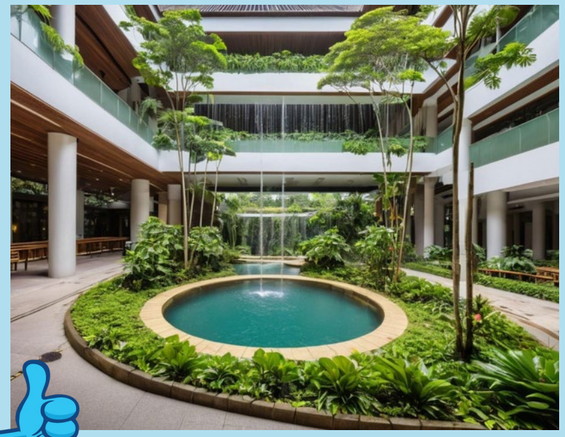
photo by: Elian Simon Tabinas

INDOOR SPACE 1

INDOOR GARDEN 2

DESIGN PROPOSAL

generated in PROME AI



indoor water features such as ponds and fountains for natural cooling

manmade pond for therapeutic effect, inviting biodiversity, natural cooling. this approach also embrace the system of green infrastracture.

Inspiration Diagram- Water Management System

PERMEABLE GROUND PAVEMENT

BIOSWALE

Water collected from rain garden after purification

WATER CASCADE

To produce oxygen to the water Therapy

DRAIN PIPE

Collect the overflow water to keep in the rain harvest tank

IRRIGATION

This tank will function seasonally, offering a full flowing steam during wet season while using for irrigation in the project

Reference: Photo and study Reference: in LinkedIn

GREEN

We enhance environmental quality through strategic green infrastructure.

- Green roofs -provide insulation and absorb rainwater, reducing energy use and stormwater runoff.
- Vertical gardens
- Interior Landscape

Greens are generally to cool surrounding areas and improve air quality by absorbing pollutants. Indoor plants further enhance air purification and promote a sense of well-being.
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EXISTING BUILDING CONDITION

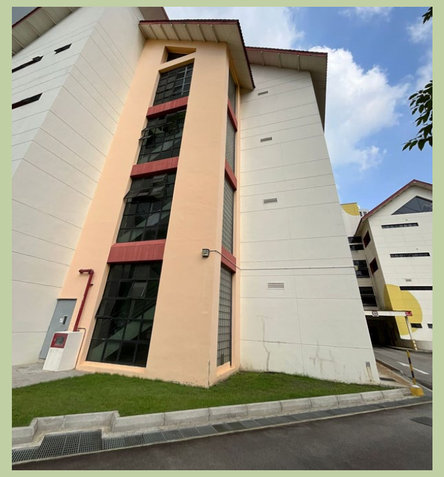

photo by: Elian Simon Tabinas

photo from website

DESIGN PROPOSAL

living wall in interior and exterior of the building using pot system to be hang in a frame using drip system to irrigate the plants with recycled water.

proposed interior garden with accent lightwell in the middle that will help to give natural daylight and promote proper air circulation.

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FOOD

We would to add sustainable food practices by sourcing locally grown, organic produce for patient meals. On-site urban gardens support therapeutic horticulture, benefiting patient well-being and fostering a connection to nature.

We also implement composting and food waste reduction initiatives to minimize landfill waste and enrich soil health.

These efforts promote sustainable agriculture, reduce carbon emissions from food
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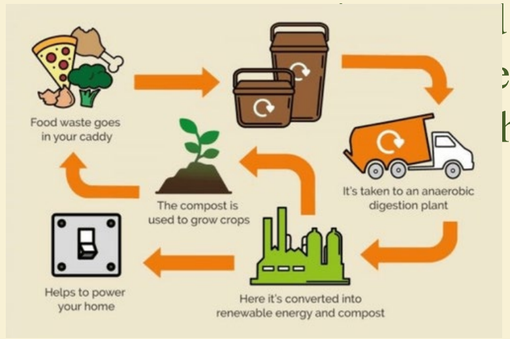

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DESIGN INSPIRATION

photo reference: Khoo Teck Phuat Hospital, their lush urban farm in the roof area of the building and tend by the community.

DESIGN PROPOSAL

proposed urban farm on to of the roofs. Implementing the 'Zero Roof' policy. No vaccant roof - utilization of space.

BUILDING MATERIALS

going ZERO WASTE

To achieve ZERO WASTE in Singapore, we will implement comprehensive waste segregation, recycling, and composting programs.

Promoting recycling in construction fosters a culture of sustainability and environmental responsibility among builders, designers, and consumers.

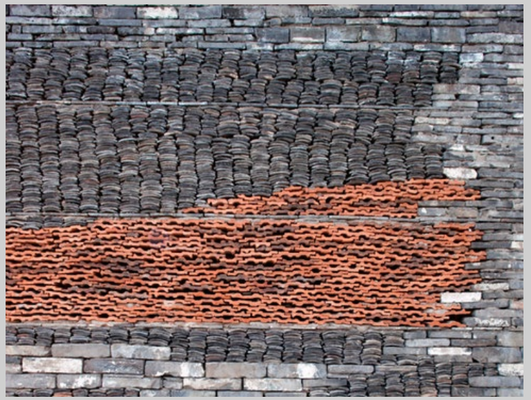
- Metal Recycling: Scrap metals such as steel and aluminium, can be melted down and reformed into new products, conserving energy and reducing mining activities.

- Wood Recycling: Salvaged wood can be repurposed for new construction projects, furniture making, or as biomass for energy production.

- Concrete & Bricks: Crushed concrete can

Picture shows the existing building and roof tiles will be recycled and reuse it as building construction aggregates and pavements to the public spaces.

crushesd roof tiles to be recycled.



repurposed roof tiles as wall accent.

ECONOMICS

The conversion from conventional to green building practices is economically feasible by integrating the Sustainable Development Techniques (SDT):

- Energy- lower the energy consumption
- Water- sustainable in non-potable water
- Green- natural environmental cooling
- Food- producing it's own food 'Fresh Produce'
- Building Materials- Prioritizing the recycling of materials like walls, roofs, windows, and metals reduces environmental impact and costs. Can reduce construction costs by lowering material expenses and disposal fees.

SDT ensure long-term savings and enhance project sustainability.

EXISTING BUILDING

PROPOSED DESIGN

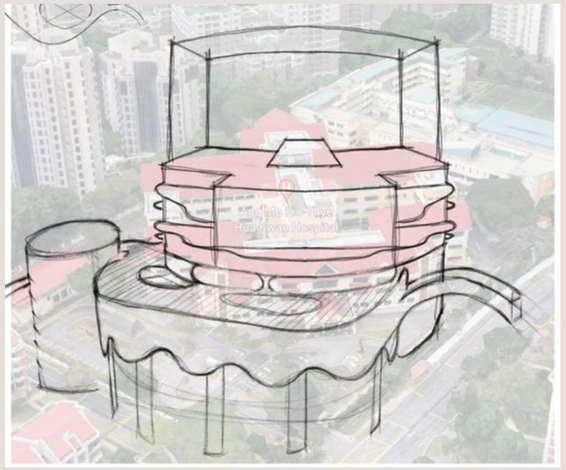
DESIGN PROCESS

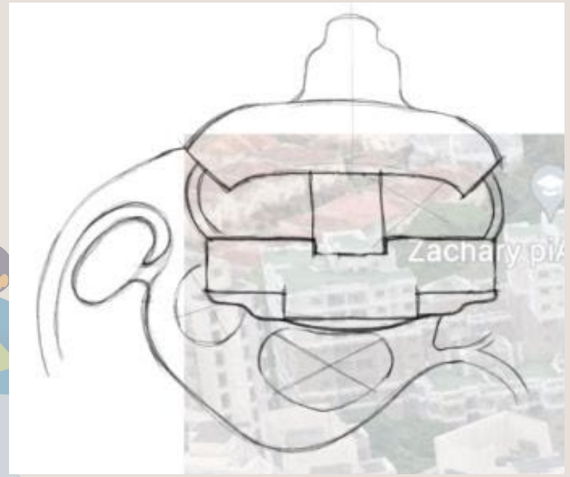
We are designing the hospital with biophilic principles to create a convenient, green, and sustainable facility for the residents of Ang Mo Kio.

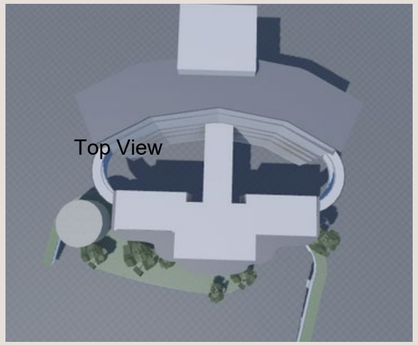
PROJECT GOAL:

- To ensure that elderly patients and all hospital users have the best possible experience.
- Fostering a sense of connection with the natural environment.

This approach will not only enhance their well-being but also promote healing and comfort throughout their stay.







Made Possible with Roblox Studio

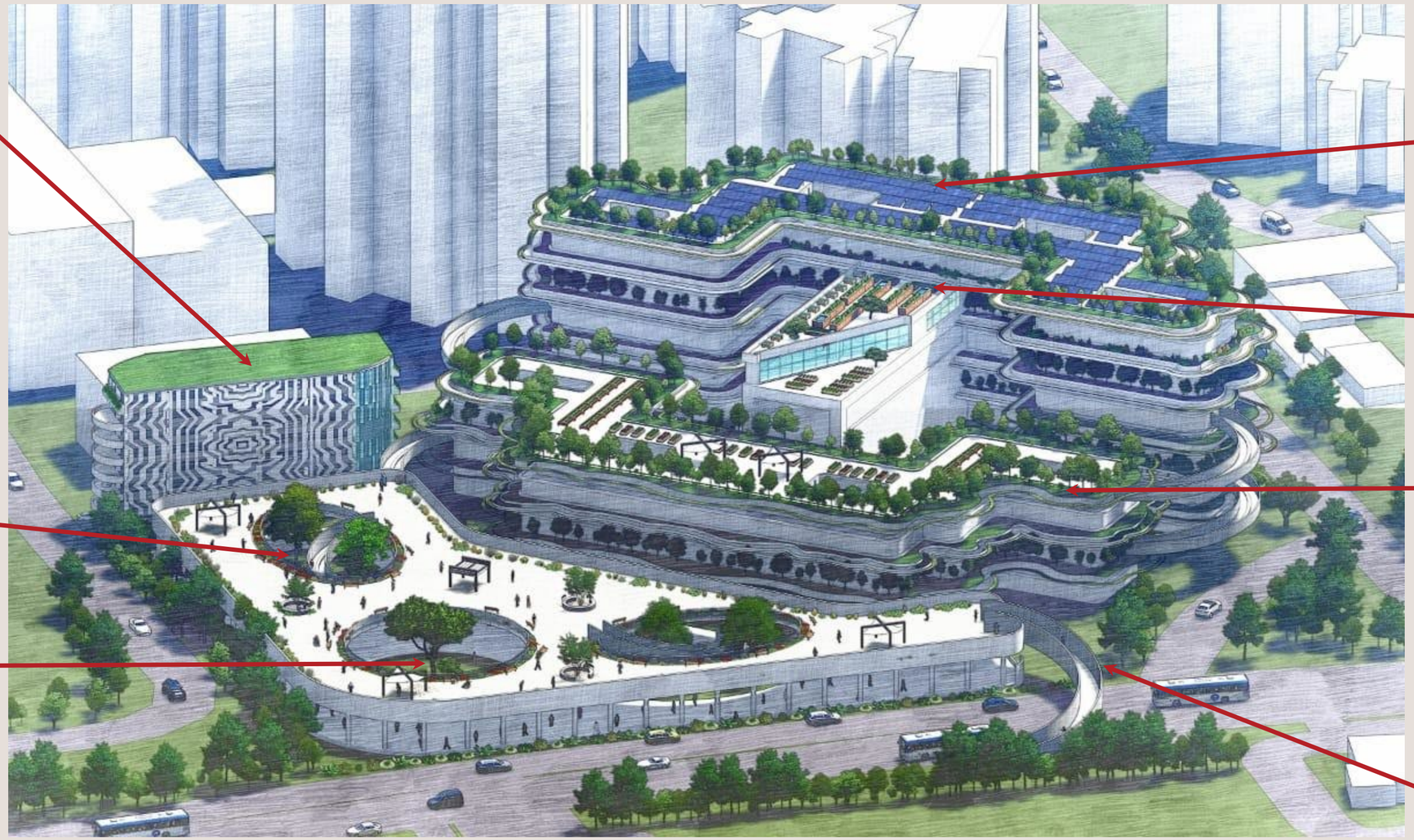
Biophilic Hospital

The rehabilitation of Ang Mo Kio Thye Hua Hospital represents an ambitious project aimed at transforming a conventional medical facility into a **‘Environmentally Sensitive Healing space’** - green, sustainable, and community-centric environment.

Existing Parking Block- We added more levels to to accommodate more slots, to lessen the ground parking. Converted the roof into green to lower down the temperature & to invite biodiversity. For natural ventilation and daylighting we design it with louvers and screens.

Atrium open above facilitate ample natural light penetration and airflow in the social space below.

Social Spaces above ground- to maximize the use of space and the community can able to enjoy the area, way to remove the stigma of a hospital facilities.



Solar Panel in Roof area

Urban Farm

Integrating greeneries in different spaces and vegetation near wards can enhance healing of the patients.

Ramp connected directly to the road so the community can able to access the social spaces integrated in the hospital.

BUILDING SECTION ANALYSIS

ATRIUM OPEN ABOVE WITH GREENERY

reducing urban heat island effect and create restorative environments.

TREES PROVIDE SHADE FROM DIRECT SUNLIGHT

reducing energy consumption for air conditioning and help filter pollutants from the air.

URBAN FARM ON ROOF

establish on-site gardens for therapeutic horticulture.

INDOOR GARDEN WITH RAINWATER HARVESTING POND

conserve water resources and promote water efficiency.

SOLAR PANELS REDUCE ENERGY DEMAND

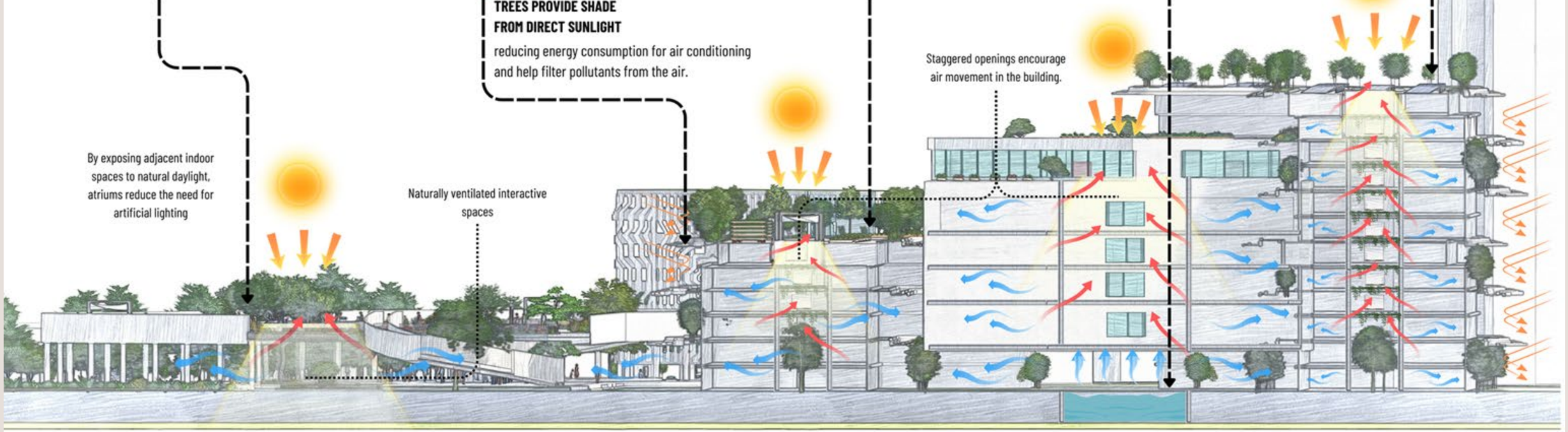
utilize renewable energy source and reduce carbon emissions.

By exposing adjacent indoor spaces to natural daylight, atriums reduce the need for artificial lighting

Naturally ventilated interactive spaces

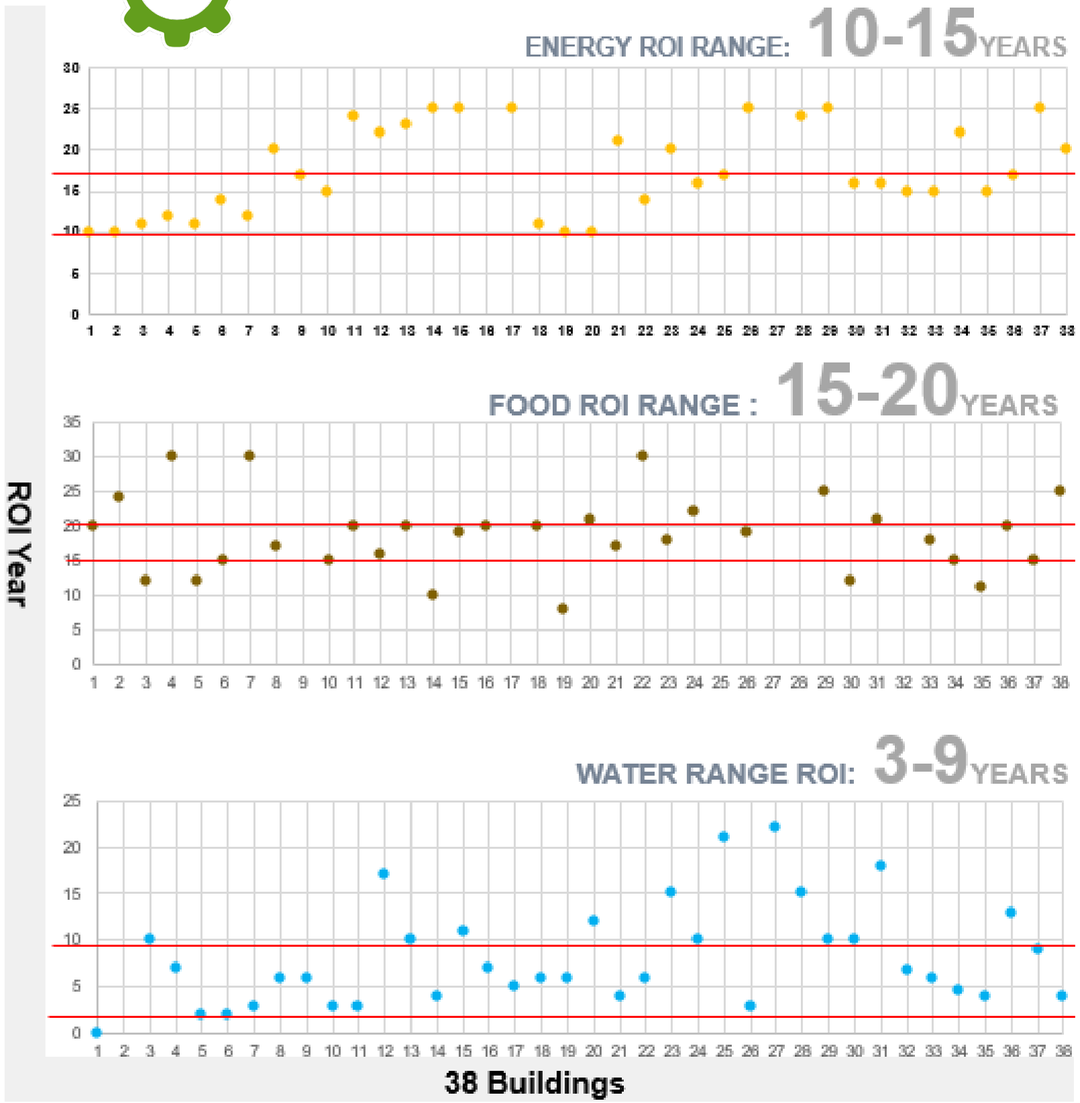
Staggered openings encourage air movement in the building.

As warm air ascends, cooler air is drawn in from lower levels, promoting ventilation



DESIGN SOLUTION ANALYSIS

Return On Investment (ROI)



Based on our research in the NUS Master of Science in Integrated Sustainable Design (MSc ISD) by Ar Joan De Leon- which studied 38 buildings in Singapore converted into Green Buildings, the fastest system to achieve a return on investment (ROI) is water, taking only 3-9 years. This is followed by energy, requiring 10-15 years, and finally food, which takes 15-20 years, depending on

Sustainable-Return On Investment (SROI)

investment on sustainability and long-term value creation.

AGREED

The development will involve upfront and additional costs borne by the developers, but the community and government will reap significant long-term benefits. Sustainable and green development have a lot of BENEFITS to Health & Well-being, Community, Environment, Wildlife by conserving resources, and enhances biodiversity. Economically, it lowers operational costs, increases property values, and creates jobs.

Conclusion

By integrating the Sustainable Design Techniques (SDT) in the project we can able to champion the 10 out of 17 Sustainable Development Goals (SDG) of United Nations through built environment as a solution.

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Environmentally Sensitive

Healing space

AMK Thye Hua Hospital, Singapore

PacificLight Crea8 Sustainability

Thank you

Our Planet, Our Responsibility