

A thick, dark grey L-shaped bar is positioned in the top-left corner of the page. It consists of a horizontal bar extending to the right and a vertical bar extending downwards, forming an 'L' shape.

AM522_INTEGRATED BUILDING SYSTEM

Design Development of IBS

JAN 19

CHEENG SENG CEE (ADRIAN)

1001336003

INTRODUCTION OF IBS

IBS

INTRODUCTION

Synopsis

This report provides a general outline description of the building services to be provided for the Proposed Mixed Development in Datuk Keramat, Kuala Lumpur.

In preparing this report, the design criteria and design development are based on the overall architecture concept layout dated on 23 Mar 2019 and justified assumptions. While these layouts and designs will be refined along the further development of the layout and detail design stage, the principles and design concept established would still be applied. Any changes to the principles will only occur in the event of major changes to the present building layout.

Brief Description of Project

This development consists of:

- | | |
|--------------------|----------|
| - Car Park Levels | B2 - B1 |
| - Commercial Area | G - L1 |
| - Hotel: | |
| - Podium | G - L1 |
| - Hotel Room | L2 - L12 |
| - Facilities Floor | L13 |
| - Apartment: | |
| - Tower A | L2 - L22 |
| - Tower B | L2 - L16 |
| - Facilities Floor | L12 |
| - M&E Break Level | L12 |

Design Scope

The shell and core scope of work for building services to be provided will include:

1. Air Conditioning and Mechanical Services
2. Access Point and Security System
3. Solid Waste System
4. Green Building Index
5. Vertical Transportation
6. Fire Prevention and Safety
7. Electrical and Telecommunication
8. Building Maintenance System
9. Drainage and Sewage
10. Water Supply and Storage

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AIR CONDITIONING & MECHANICAL SERVICES

AIR CONDITIONING AND MECHANICAL SERVICES

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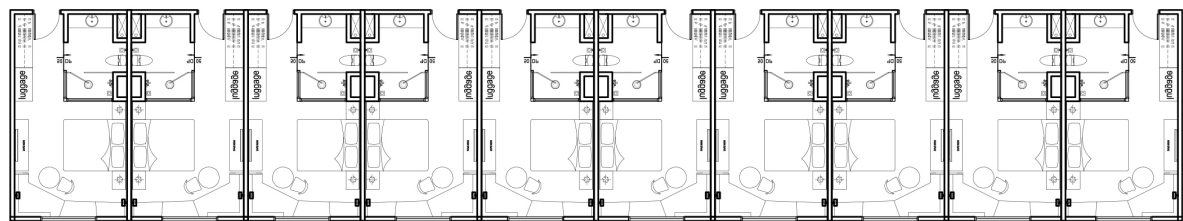
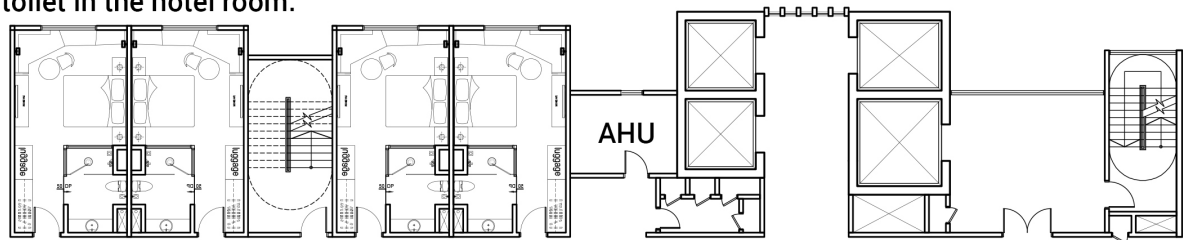
General

The design of the air conditioning and mechanical ventilation system shall be up to the standard required for a modern energy efficient building. The design concept set to achieve the best energy efficiency and low impact to the environment, in order to be sustainable. The design of the services shall be simple, easy to installation and ease of operation and maintenance.

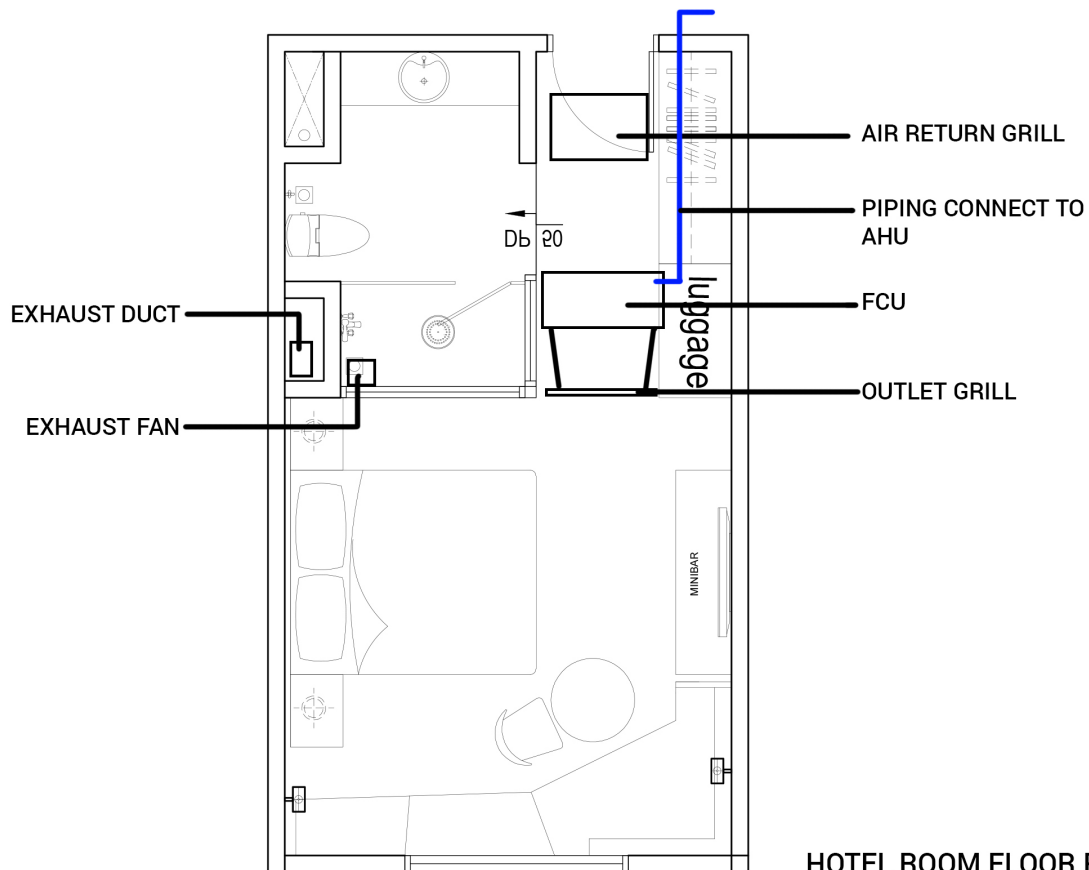
Design Scope

Hotel:

Hotel shall be using centralised air conditioning system. AHU room located at each of the typical floor plan. FCU in each unit will have piping connected to the AHU, AHU are connected with the plant room. A cooling tower is needed in this system. Provide mechanical ventilation for each toilet in the hotel room.



TYPICAL HOTEL FLOOR PLAN



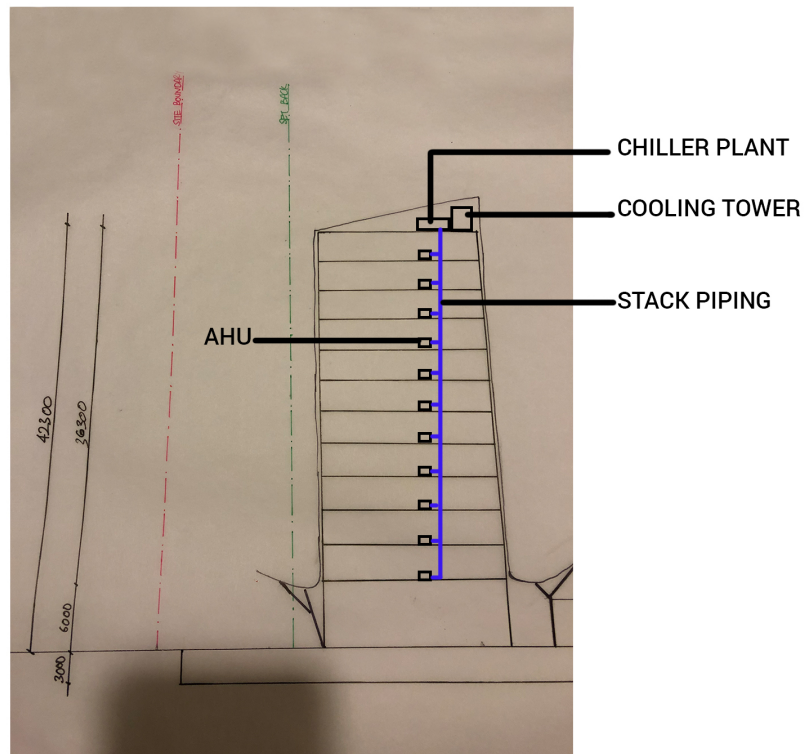
HOTEL ROOM FLOOR PLAN

AIR CONDITIONING AND MECHANICAL SERVICES

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Location of Machines:

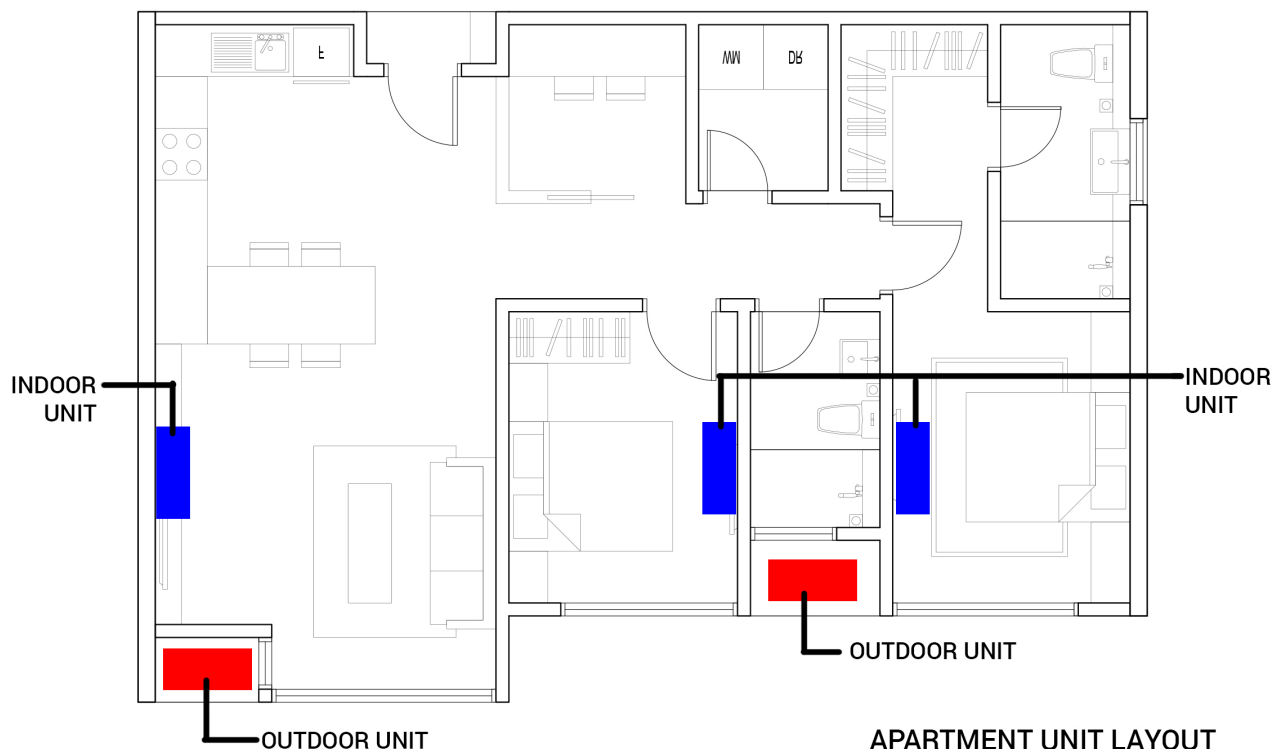
The diagram below show the general location of the machines required for this system.



SCHEMATIC SECTON HOTEL

Apartment:

Apartment shall be using split air conditioning system. There will be indoor and outdoor unit, compressor (outdoor) and wall hung unit or ceiling mount unit (indoor). The selection of split ac system must have inverter function to maximise energy saving. The diagram below shown the location of outdoor unit (A/C ledge) and indoor unit.

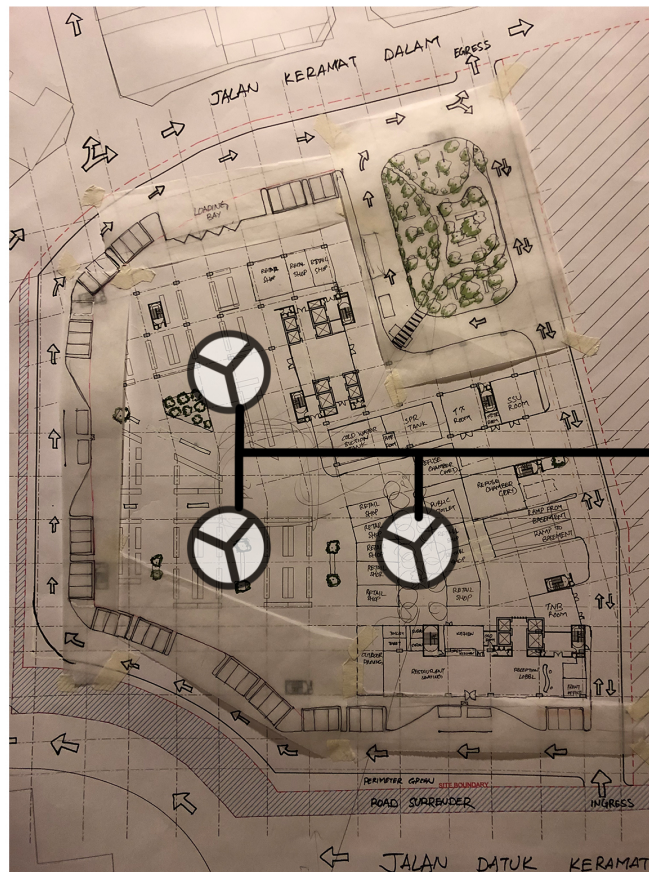


AIR CONDITIONING AND MECHANICAL SERVICES

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Commercial:

The design of the commercial area of this development is open plan. For the ventilation of this commercial area should maximise the use of natural ventilation. A small amount of retail shop will be using split air conditioning system. For the open plan commercial area, should provide "Big Ass Fan". The diagram below shown the location of the "Big Ass Fan".

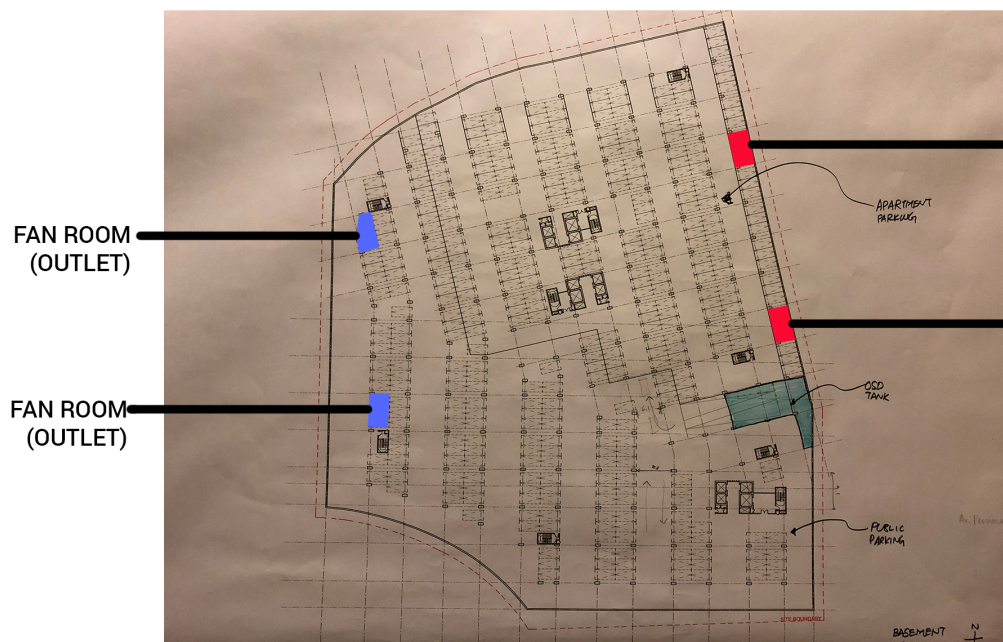


BIG ASS FAN

GROUND FLOOR PLAN

Basement Car Park:

The basement is more than 70m in length, should provide smoke spill system. The diagram below shown the location of fan room for intake and outlet.



FAN ROOM
(OUTLET)

FAN ROOM
(OUTLET)

FAN ROOM
(INTAKE)

FAN ROOM
(INTAKE)

BASEMENT

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ACCESS POINT AND SECURITY SYSTEM

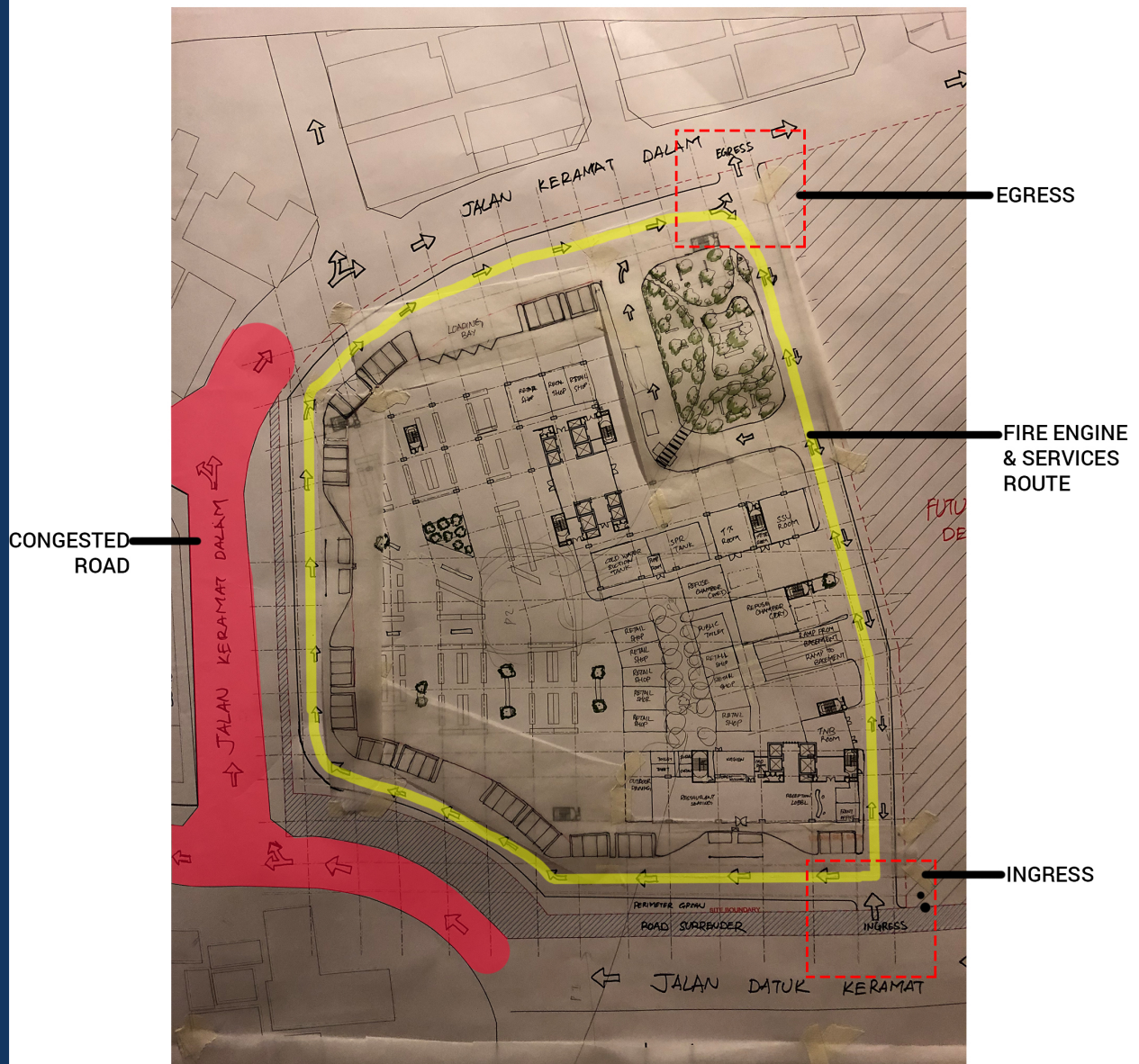
ACCESS POINT AND SECURITY SYSTEM

General

The main ingress and egress should design and locate away from the busiest street. The design of the access point for drop off, TNB, loading/unloading, car park entry, refuse chamber and other services shall be easily access. Hotel, apartment and commercial area each should have individual drop off.

Design Scope

General ingress and egress should locate away from the busiest street. The diagram below will shown the ingress and egress of the development, fire engine route cum services route.



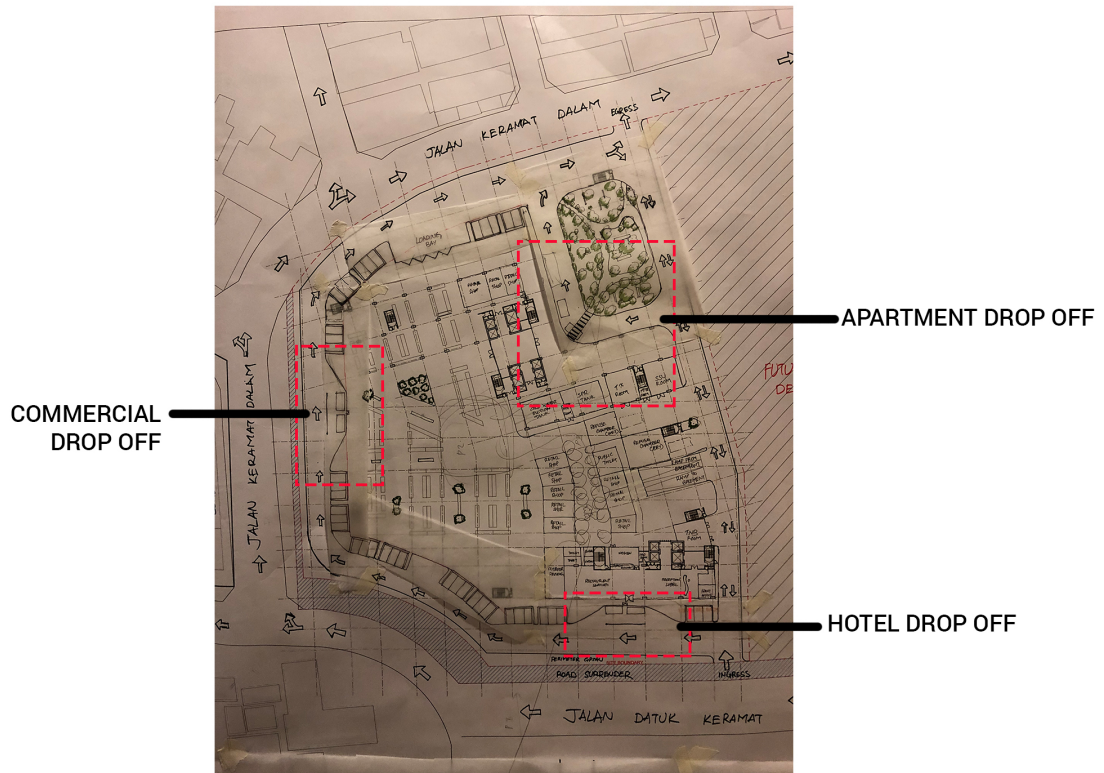
GROUND FLOOR PLAN

ACCESS POINT AND SECURITY SYSTEM

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Location of Drop Off:

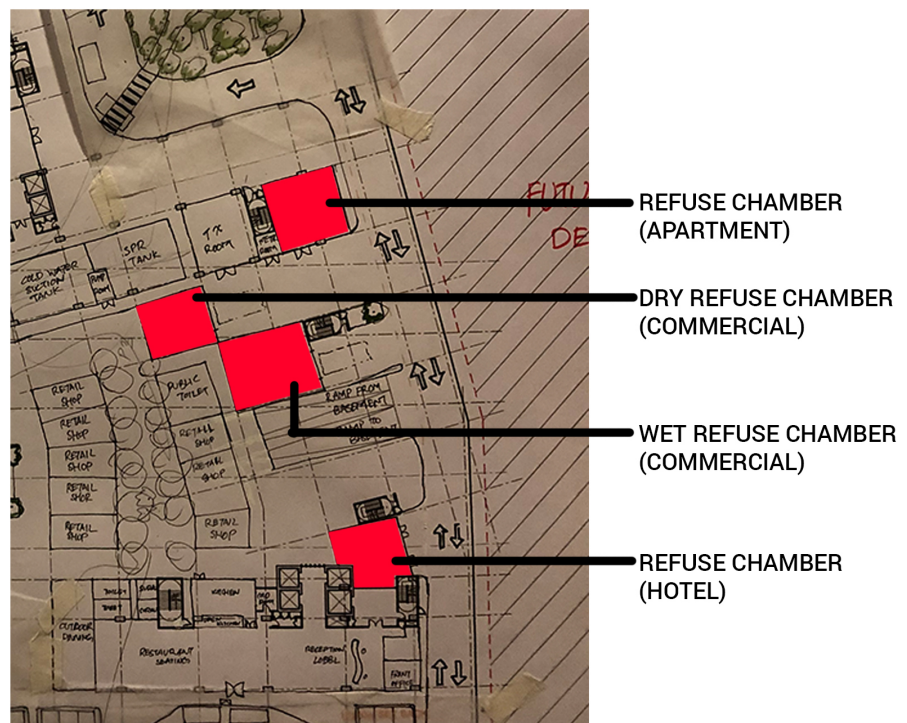
The diagram below show the different drop off hotel, apartment and commercial.



GROUND FLOOR PLAN

Location of Refuse Chamber:

For each building, the refuse chamber need to be separated. The diagram below show the location of refuse chamber.



PART PLAN OF GROUND FLOOR PLAN

ACCESS POINT AND SECURITY SYSTEM

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Location of Drop Off:

The diagram below show the different drop off hotel, apartment and commercial.

LOADING/UNLOADING
(COMMERCIAL)



LOADING/UNLOADING
(HOTEL)

GROUND FLOOR PLAN

Location of Car Park Entry:

The diagram below show the location of ramp going down to the basement parking.



RAMP TO BASEMENT



SOLID WASTE SYSTEM

SOLID WASTE SYSTEM

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General

The solid waste proposed are based on the purpose of each type of building accordingly. The size of the equipment use for the system are based on the calculation of waste generated by each type of building.

Summary of Schedule of Area

This development schedule of area:

- Car Park Levels	141,278 sqft
- Commercial Area	130,000 sqft
- Hotel:	
- Podium	15,144 sqft
- Hotel Room	68,250 sqft
- Facilities Floor	7,572 sqft
- Apartment:	
- Tower A	171,990 sqft
- Tower B	122,850 sqft
- Facilities Floor	16,380 sqft

Calculate size of refuse center for

A) 250 units apartment

B) 150 rooms hotel

C) 100,000 sqft shopping center/retail space

A) 250 unit apartment

MGB per floor:

Total unit per floor : 7 units

Collection frequency : per day

Estimation of waste : $0.025 \text{ m}^3 / \text{unit}$

Calculation : 7×0.025

: $0.175 = 0.18 \text{ m}^3$

Proposed nos of MGB : 1 unit MGB 240 liter

Spiral Waste Bin:

Type of building : Apartment

Collection frequency : 2 per week

Estimation of waste : $0.025 \text{ m}^3 / \text{unit}$

Total nos of unit : 250 units

Calculation : 250×0.025

: 18.75 m^3

Proposed spiral waste bin with the capacity of 19 m^3 (brand, type and storage capacity based on manufacture).

IBS

PART PLAN OF GROUND FLOOR PLAN



GREEN BUILDING INDEX

GREEN BUILDING INDEX (GBI)

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General

The Green Building Index (GBI) is Malaysia's industry recognised green rating tool for buildings to promote sustainability in the built environment and raise awareness among Developers, Architects, Engineers, Planners, Designers, Contractors and the Public about environmental issues and our responsibility to the future generations.

The GBI rating tool provides an opportunity for developers and building owners to design and construct green, sustainable buildings that can provide energy savings, water savings, a healthier indoor environment, better connectivity to public transport and the adoption of recycling and greenery for their projects and reduce our impact on the environment.

Select the right GBI tool for: Apartment, Hotel, Shopping Center

Hotel:

GBI Non-Residential New Construction (NRNC): Hotel Tool

Apartment:

GBI Residential New Construction (RNC) Tool

Shopping Center:

GBI NREB: Retail Tool

GBI Score Card

PART	CRITERIA	ITEM	POINTS	TOTAL
1	EE	ENERGY EFFICIENCY		
	EE1	Minimum EE Performance		
	EE2	Renewable Energy		
	EE3	Advanced EE Performance based on OTTV & RTTV		
	EE4	Home Office & Connectivity		
	EE5	Sustainable Maintenance		

In part 1, is related to energy efficiency. The development will have solar panel as renewable energy. All the electrical items have to energy efficiency. Light bulb to use LED or fluorescent lamp, A/C should invertor technology.

2	EQ	INDOOR ENVIRONMENTAL QUALITY		
	Air Quality, Lighting, Visual & Acoustic Comfort			
	EQ1	Minimum IAQ Performance	2	
	EQ2	Daylighting	2	
	EQ3	Sound Insulation		
	EQ4	Good Quality Construction	1	
	EQ5	Volatile Organic Compounds		
	EQ6	Formaldehyde Minimisation		
	Verification			
	EQ7	Post Occupancy Evaluation: Verification	2	

In part 2, the design focused on natural ventilation and natural daylighting. This apply to the open plan market, it maximise natural ventilation with high ceiling height and with natural daylight penetrate into the market.

ACCESS POINT AND SECURITY SYSTEM

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SM	SUSTAINABLE SITE PLANNING & MANAGEMENT		
3	Site Planning & Transport		
	SM1	Site Selection	1
	SM2	Public Transportation Access	12
	SM3	Community Services & Connectivity	8
	SM4	Open Spaces, Landscaping & Heat Island Effect	4
	Site & Construction Management		
	SM5	Construction System & Site Management	
	SM6	Stormwater Management	3
	SM7	Re-development of Existing Sites & Brownfield Re-development	
	SM8	Avoiding Environmentally Sensitive Areas	2
	SM9	Building User Manual	

In part 3, the design approach for the development focus on connection to the public transportation with the site, creating open spaces in the market with landscaping and create a social sustainable community within the boundary of this development. Our development is a reinvigoration of brownfield.

MR	MATERIALS & RESOURCES		
4	Reused & Recycled Materials		
	MR1	Storage & Collection of recyclables	2
	MR2	Materials Reuse and Selection	2
	MR3	Construction Waste Management	2
	Sustainable Resources		
	MR4	Recycled Content Materials	1
	MR5	Regional Materials	1
	MR6	Sustainable Timber	1

In part 4, the development need to use as much recycle materials as possible. All new materials should be local products.

WE	WATER EFFICIENCY		
5	Water Harvesting & Recycling		
	WE1	Rainwater Harvesting	4
	WE2	Water Recycling	
	Increased Efficiency		
	WE3	Water Efficient Landscaping	2
	WE4	Water Efficient Fittings	4

In part 5, the development must have rainwater harvesting system. The development should design more vertical planting. For fittings in toilet must adopt water efficient fittings.

IN	INNOVATION		
6	IN1	Innovation in Design & Environmental Design Initiatives	5
	IN2	Green Building Index Facilitator (GBIF)	1

In part 6, the development have bio waste recycling system.

TOTAL POINTS		
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POINTS	GBI RATING
86+ points	Platinum
76 to 85 points	Gold
66 to 75 points	Silver
50 to 65 points	Certified

Additional Cost Added to Total Construction Cost

- Platinum	15-20%
- Gold	10-15%
- Silver	6-10%
- Certified	3-6%

If the development able to score the points according to the proposed scoring, it will in Gold GBI rating, but there will be 10-15% additional cost add to the total construction cost.



VERTICAL TRANSPORTATION

VERTICAL TRANSPORTATION

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General

The design of vertical transportation is generally divided into three categories, public, private and services/fire.

Design Scope

The number of lifts for each building type are various due to the number of rooms and occupants per floor are different. This development proposed to use KONE as the lift system. This are the result using KONE online calculation of lifts required for each type of building.

Apartment

After entering all the infomations required, the system calculated out actual elevator required for 35 storey at 7 units per floor is 3. The system is user friendly and easy to understand. The down side of the calculation method is that it does not show what type or specific elevator is suitable for this situation.

The screenshot shows the KONE Quick Traffic Elevator Traffic Calculation interface for an Apartment building. The 'Building information' section is set to 'Residential' type and 'Private sector' usage. The 'Zone information' section shows 35 stops, 105m travel for the zone, and a population of 756. The 'Applied parameters' section shows a peak handling capacity of 7.5, an acceleration rate of 1 m/s², an interval of 70s, and a travel time of 32s. The 'System parameters' section shows a normal acceleration, a speed of 3.3 m/s, and an estimated elevator size of 16.54 persons. The 'Required number of elevators' section shows that 3 elevators are required based on the interval, handling capacity, and actual requirements.

Required number of elevators	
Required by interval	2.75
Required by handling capacity	2.65
Actually required	3

Hotel

The system calculated actual required of elevator for a 10 storey at 15 units per floor is 2. Same down side of the calculation method will be faced here, it does not show the specific elevator suitable for this situation.

The screenshot shows the KONE Quick Traffic Elevator Traffic Calculation interface for a Hotel building. The 'Building information' section is set to 'Hotel' type and 'Serviced apartments' usage. The 'Zone information' section shows 10 stops, 25m travel for the zone, and a population of 300. The 'Applied parameters' section shows a peak handling capacity of 10, an acceleration rate of 1 m/s², an interval of 45s, and a travel time of 25s. The 'System parameters' section shows a normal acceleration, a speed of 1.4 m/s, and an estimated elevator size of 5.63 persons. The 'Required number of elevators' section shows that 2 elevators are required based on the interval, handling capacity, and actual requirements.

Required number of elevators	
Required by interval	1.78
Required by handling capacity	1.15
Actually required	2

Shopping Center

The system has it limitation, the area highlighted in red is the limitation. It limited the number of people in the zone. Conclusion witht this system calculation method we can not get the actual required elevator for shopping center.

The screenshot shows the KONE Quick Traffic Elevator Traffic Calculation interface for a Shopping Center building. The 'Building information' section is set to 'Office' type and 'Multiple tenant, Fixed working hours' usage. The 'Zone information' section shows 3 stops, 16m travel for the zone, and a population of 2500. The 'Applied parameters' section shows a peak handling capacity of 13, an acceleration rate of 1 m/s², an interval of 30s, and a travel time of 25s. The 'System parameters' section shows a normal acceleration, a speed of 0.6 m/s, and an estimated elevator size of 40.63 persons. The 'Required number of elevators' section shows that 6 elevators are required based on the interval, handling capacity, and actual requirements.

Required number of elevators	
Required by interval	3.79
Required by handling capacity	5.84
Actually required	6

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FIRE PREVENTION AND SAFETY

FIRE PREVENTION AND SAFETY

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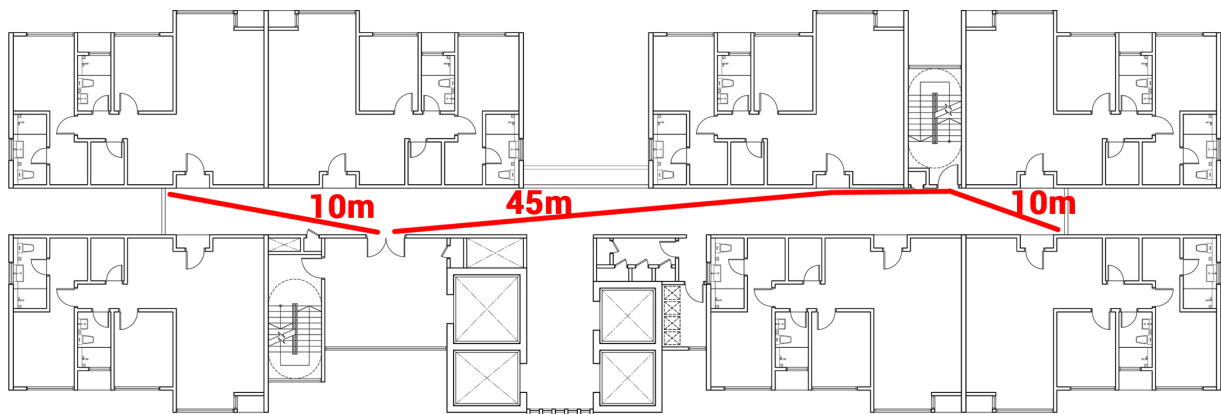
General

The design of fire prevention is when fire occurs, occupants in the building are able to escape in a safe and easy manner.

Maximum Travel Distance

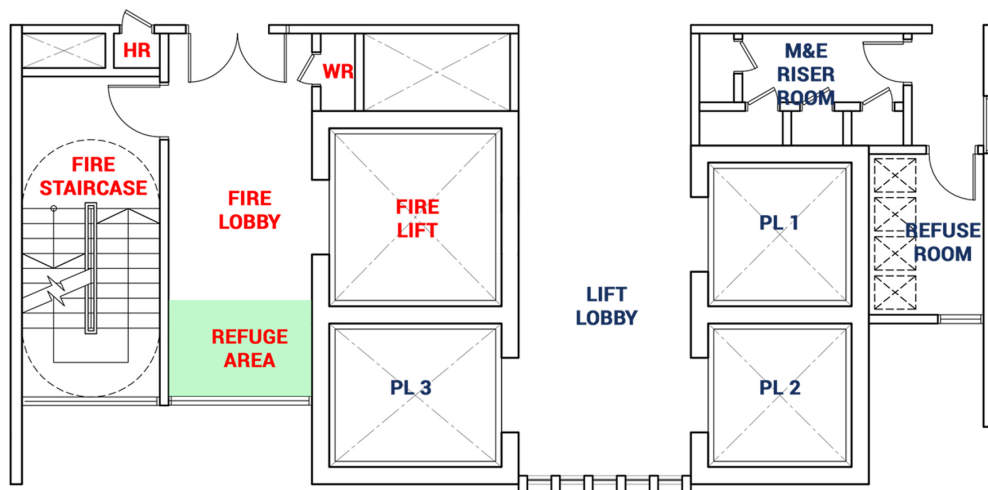
The design of travel distance should follow as listed below:

Type	Dead-End Limit (m)	Travel Distance with Sprinkler (m)
Hotel	15	45
Apartment	15	45
Commercial	Not Required	61



Fire Lobby

The design of fire lobby should have fire lift, wet riser, attached with storey exits (staircase), refuge for disable, fire rated door and walls at least 2hours duration.



IBS

When a building is divided into compartments, used or intended to be used for different purposes, the purpose group of each compartment shall be determined separately.



Break tank is consider as active fire fighting system. Break tank is needed for every 60m of the the building. In the development, total height of hotel did not exceed 60m, one break tank on the ground floor is sufficient. While the both towers of apartment exceeded 60m, two break tanks are provide in each tower. The first break tank is on the ground floor while second break tank is located at the facilities floor which is at 41m height of each tower.



IBS

- a) Building volume 7001 m³ to 28000 m³ : At least one fire appliance access
- b) Building volume 56001 m³ to 84000 m³ : Two fire appliance access
- c) Building volume 84001 m³ to 112000 m³ : Three fire appliance access
- d) Building volume above 112000 m³ : All round fire appliance access (Island Site)

[illegible]

Fire control room is the first place fire fighter will go when the building is on fire. Location of fire control room should be as close to the road as possible, for the ease of the fire fighter. In the fire control room should have the main fire alarm panel, initiating devices, manual call points, alarm field proven operating software to perform data acquisition and control functions.



ELECTRICAL AND TELECOMMUNICATION

ELECTRICAL AND TELECOMMUNICATION

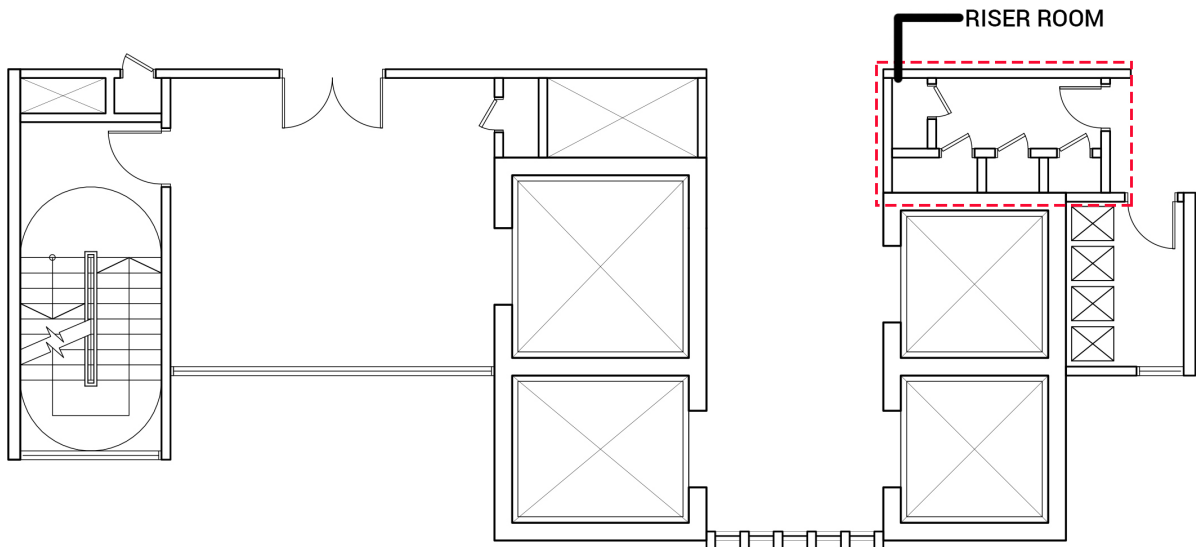
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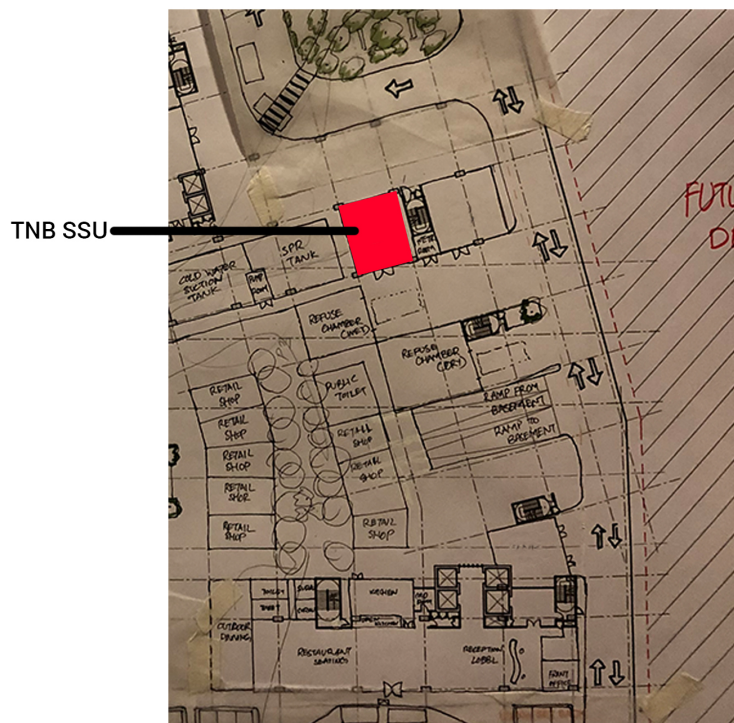
This is where the building have electric and telecommunication.

Design Scope

Usually the design of electrical and telecommunication riser will be in one riser room for the ease of maintenance. The diagram below show the location electrical riser and telecommunication which consist of ELV, EL, TEL and ICT.



Location of substation



PART PLAN OF GROUND FLOOR PLAN



BUILDING MAINTENANCE SYSTEM

BUILDING MAINTENANCE SYSTEM

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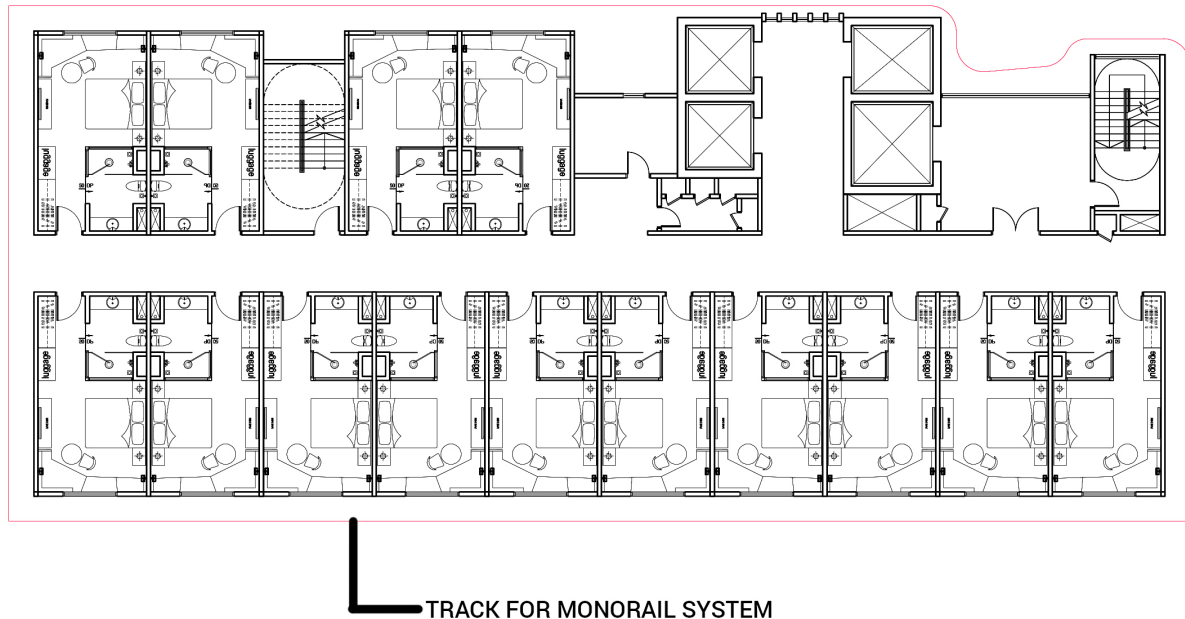
General

This is a system that able workers to clean and do maintenance on the facade of the building.

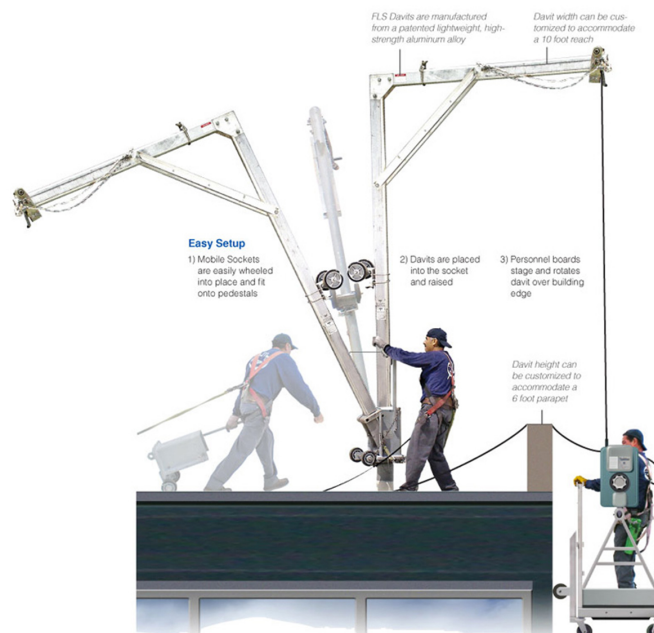
Design Scope

In the development, it is proposed to use monorail system and davit system. The monorail system will have a track at the perimeter of the building at the top floor. The development is using the system because the roof of the hotel tower is proposed to be the facilities floor. The davit system is proposed to be used at the apartment blocks.

Monorail System



Davit System





DRAINAGE AND SEWAGE

DRAINAGE AND SEWAGE

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General

This system is a must in a building in order to transfer the sewage from the toilet to the STP or Oxydation Pond. For surface drainage, in the site must provide OSD Tank before water flow into the public drainage line.

Calculation of PE

Apartment

PE/ UNIT	UNIT	TOTAL PE
5	250	1250

Commercial

PE/100sqm	Sqm	TOTAL PE
3	12077	362

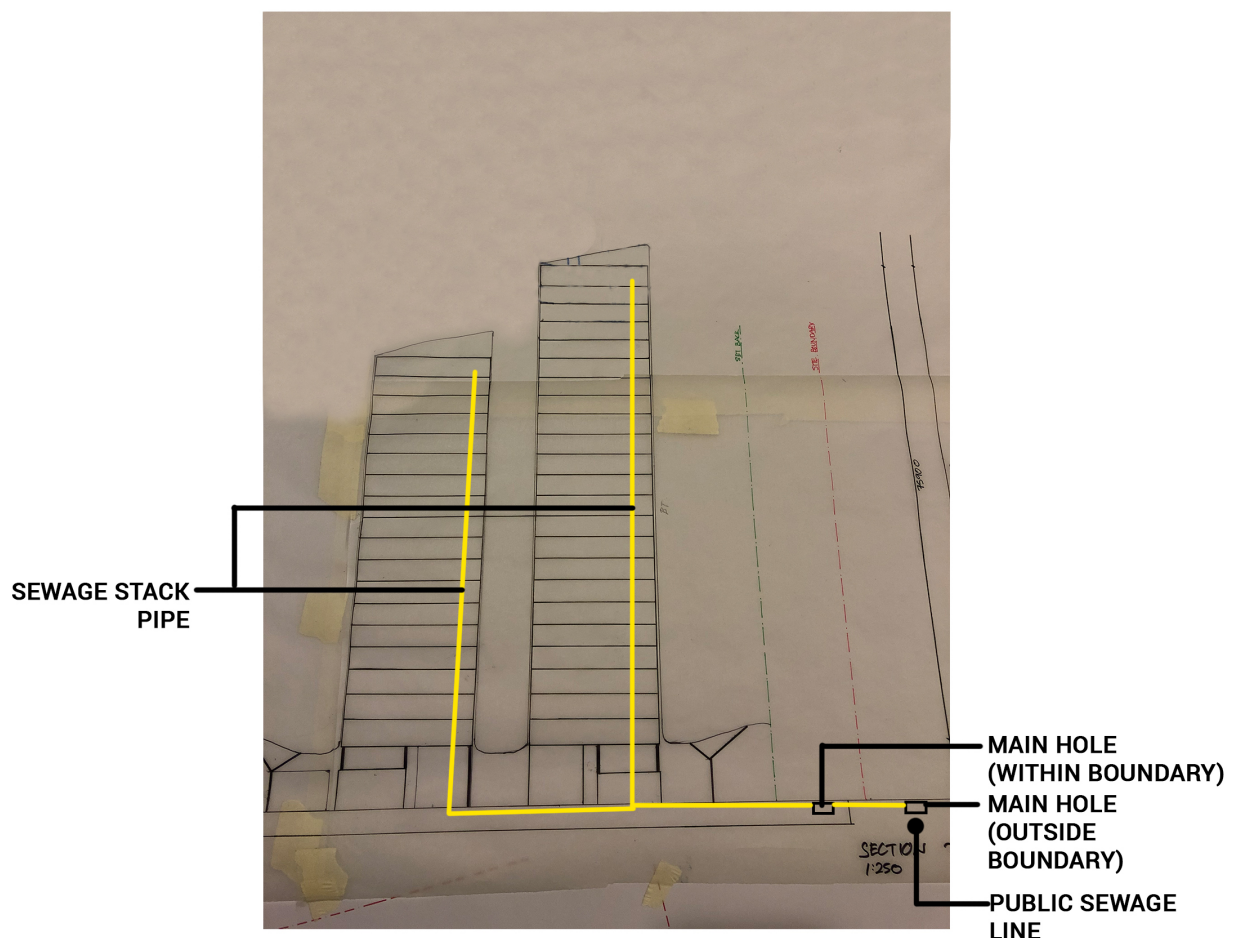
Hotel

PE/ROOM	ROOM	TOTAL PE
4	150	600

2212

In this development, the total PE produced by all three buildings is 2,212 PE.

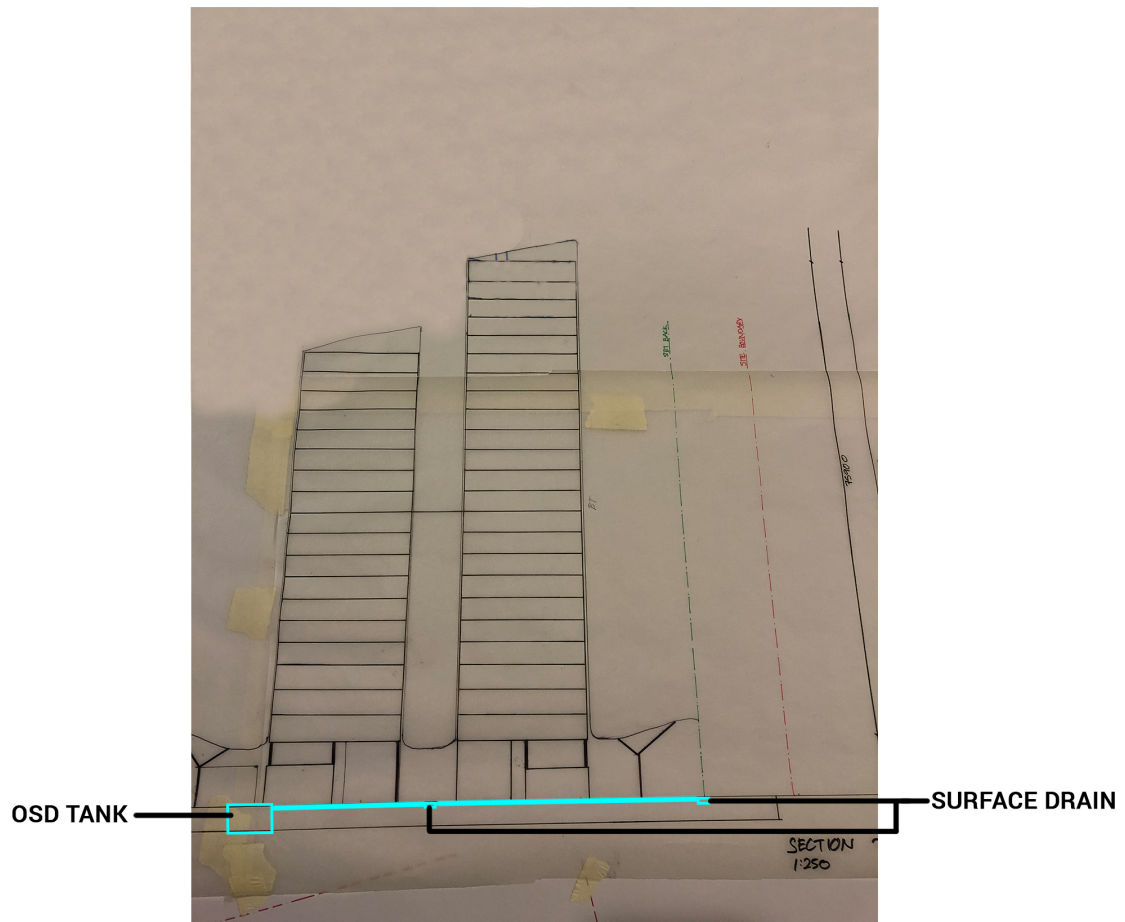
The diagram below show the sewage drainage system, from toilet in the tower to the main hole within boundary then only connect to the public main sewage line.



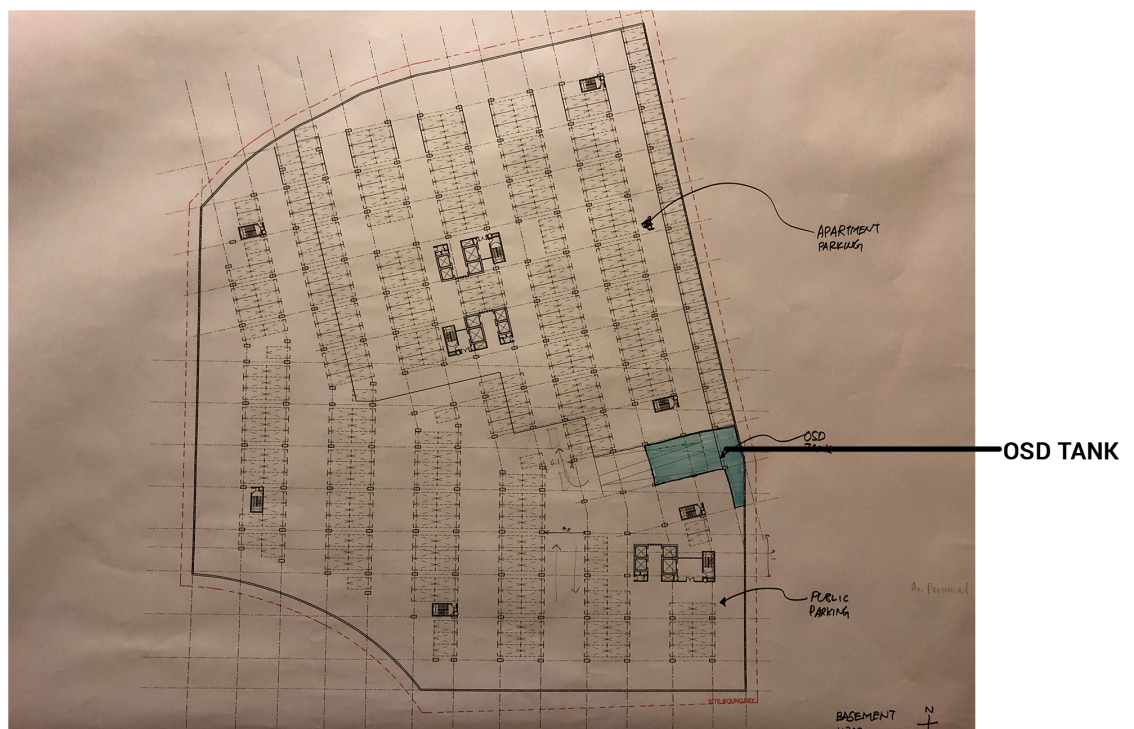
DRAINAGE AND SEWAGE

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The diagram below show the surface drainage system and OSD Tank.



The diagram below show the location of OSD Tank in the basement.





WATER SUPPLY AND STORAGE

WATER SUPPLY AND STORAGE

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General

Water supply divided into two ways, main one is the potable water from the main supply pipe, second is the rainwater. Storage also divided into two, domestic cold water tank is to store potable water while rainwater harvesting tank is to store collected rainwater.

Calculation of Water Demand

Apartment

L/ UNIT	UNIT	TOTAL L
1500	250	375000

Retail Shop

L/SHOP	SHOP	TOTAL L
2000	11	22000

Commercial

L/100 Sqm	Sqm	TOTAL L
1000	12077	120770

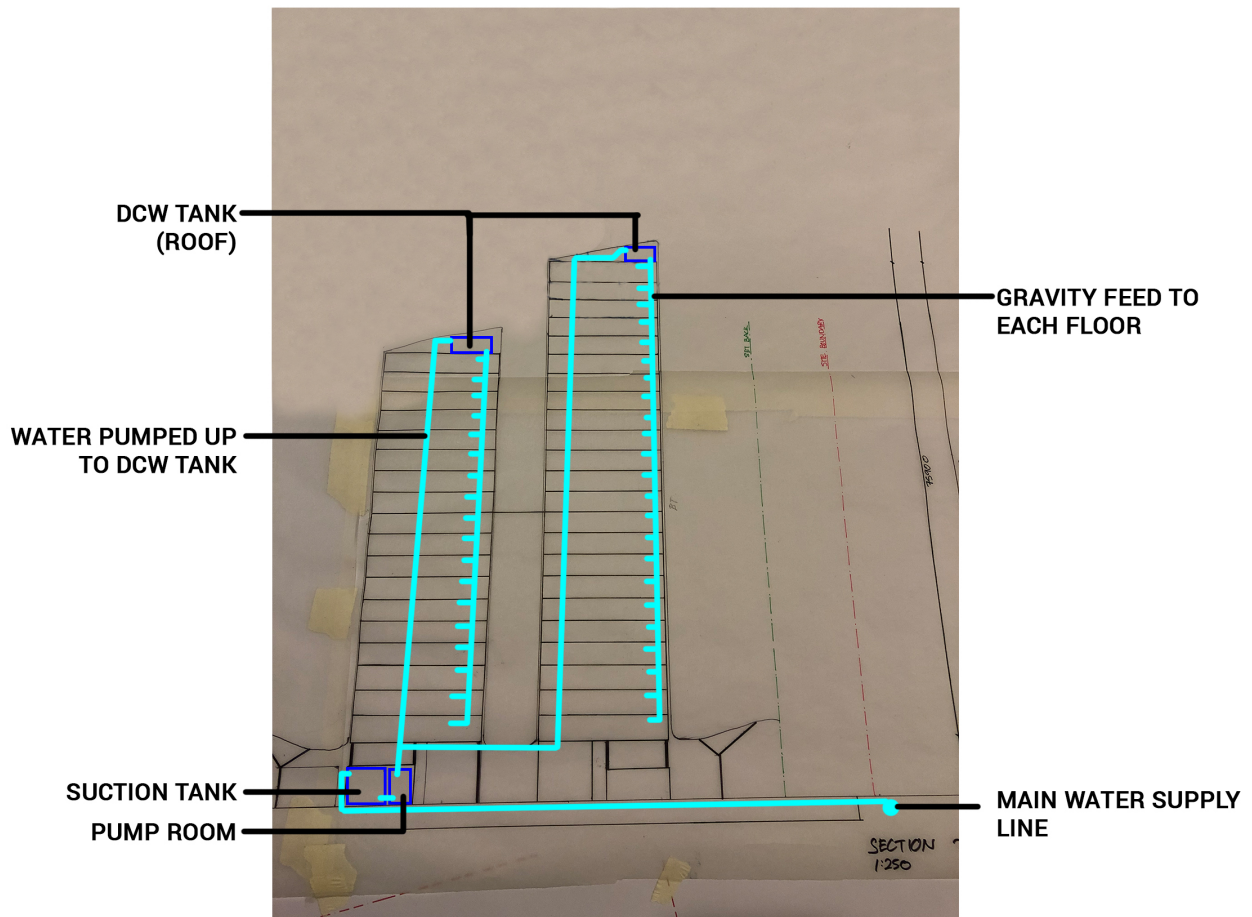
Hotel

L/100 ROOM	ROOM	TOTAL L
1500	150	225000

742770

In this development, the total water demanded is 742,770 litre.

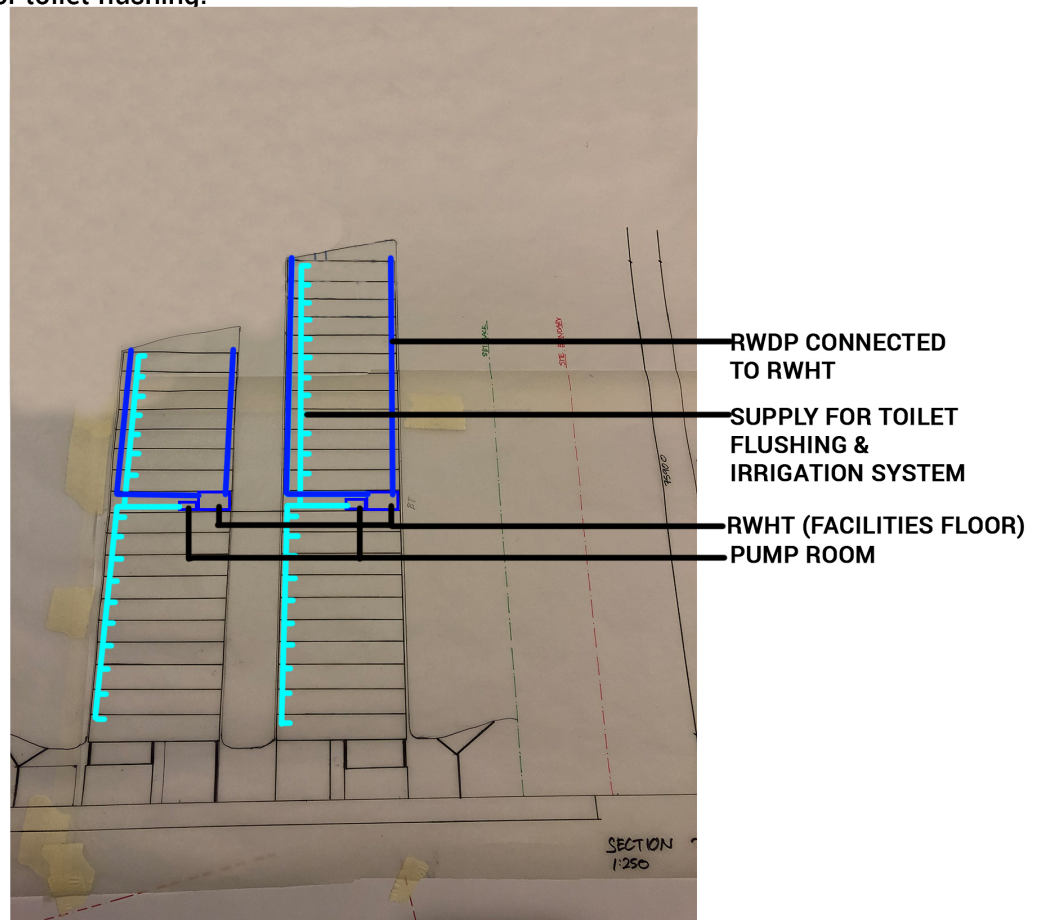
The diagram below show water from the main water supply line, go through suction tank, pumped up to the domestic cold water tank at the roof and then using gravity feed the water to each unit. The diagram also show the location of DCW tank.



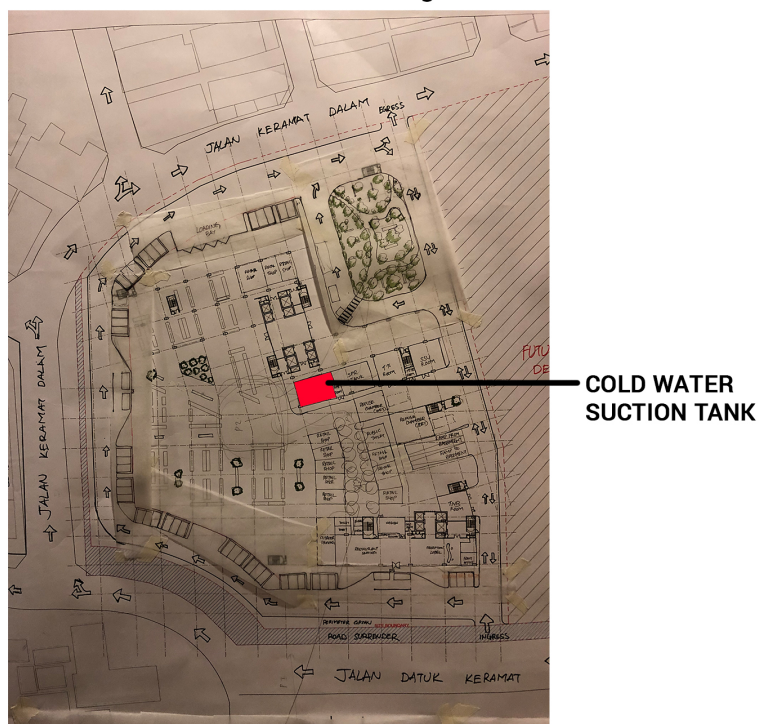
DRAINAGE AND SEWAGE

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The diagram below show process of the rainwater harvesting system in the building. The diagram also show the location of RWHT. The harvested water can be used as irrigation system of the plant at the site and use for toilet flushing.



The diagram below show the location of suction tank on the ground floor.





M&E DESIGN CRITERIA SHEET

M&E DESIGN CRITERIA SHEET

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Ventilation Design

Ventilation design should be as sustainable as possible. Hotel using centralise a/c system, the market area to use natural ventilation to the maximum with the help of low energy consumption "big ass fan".

Water Condition Design

Must provide RWHT in the development. Possible to turn the harvested rainwater into potable water.

Energy Efficient Design

All the a/c must have inverter function. Light bulb should be LED or fluorescent bulb. Maximise the use of natural daylighting.

Vertical Transportation

Elevators design should include regenerative drive system. Regenerative drive system recover energy that would normally be dissipated as heat and put in to a battery storage. Elevators should have destination control, with a destination control system, floor calls are grouped.

Solid Waste Recycle

Introduce Bio Waste Recycling System. The bio waste produced by the market can be composted and turn into fertiliser for the planting around the site.

Rainwater Harvesting System

An irrigation system that the water only supply by the rainwater harvesting tank.

Solar Panels

Solar Panels as a source of renewable energy. Facade of the building can use photovoltaic glass facade, cladding and roofing.