

TUGAS AKHIR 146 PERANCANGAN BERBASIS EDGE



DIKERJAKAN OLEH :
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ARNIS ROCHMA HARANI, ST, MT





Berstatus sebagai PTNBH, Undip mendirikan perusahaan yang diberi nama PT UNDIP Mandiri Aneka Jasa Usaha (MAJU) guna meningkatkan sumber pendapatan universitas, memfasilitasi hilirisasi dan komersialisasi hasil penelitian civita akademika Undip, serta mendukung reputasi kampus sebagai universitas kelas dunia.



Salah satu strategi yang digunakan adalah dengan membangun UNDIP Executive Office yaitu, kantor sewa untuk mewadahi usaha pribadi alumni dan mahasiswa tingkat akhir UNDIP baik yang bergerak dibidang enterpreneur maupun bidang profesi lainnya. Undip Executive Office juga dilengkapi oleh fasilitas penunjang berupa meeting room, entertainment room, restaurant, coffee shop, mini market, fitness room dan lain sebagainya guna meningkatkan efektivitas pengguna didalamnya.

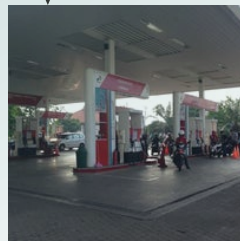


Lokasi

Jl. Prof. Soedarto, Tembalang, Semarang



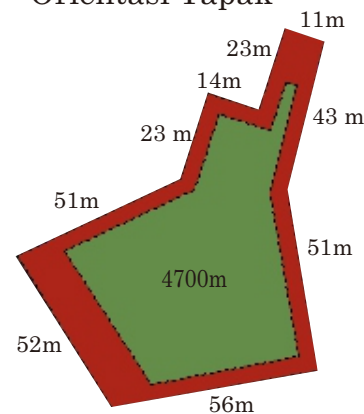
— Batas GSB
— Batas GSJ



Luas tapak : 4700m²
KDB : 40%
RTA : 60%
KLB : 1.6
GSB : 16m

Lantai dasar : 450m²
luas total bangunan : 6500m²
Tinggi bangunan : 13 lantai
Orientasi Tapak : Barat laut

Panjang lahan



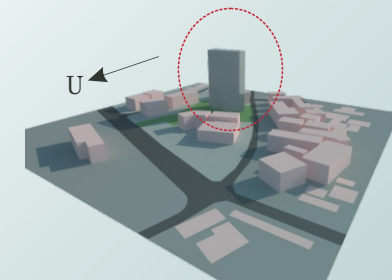
Analisis tapak

A. Analisis Orientasi

Kedalaman Bangunan	Saving energy							
	North (%)	North east (%)	Equal (%)	Southeast (%)	South	Soutwest	West	Nortwest
12m	5,01	-0,37	0,00	-0,35	5,01	-0,3	-2,59	-0,37
13m	4,38	-0,36	0,00	-0,35	4,38	-0,36	-2,20	-0,35
14	3,78	-0,32	0,00	-0,30	3,78	-0,32	-3,29	-0,30
15	3,21	-0,32	-0,30	-0,30	3,21	-0,32	-2,72	-0,30
16	2,67	-0,31	0,00	-0,30	2,67	-0,31	-2,19	-0,30



Berdasarkan percobaan pada aplikasi edge, bangunan sebaiknya berorientasi ke sisi utara atau selatan tapak karna berpotensi memiliki saving energy paling besar. Sementara itu, saving energy paling rendah terdapat pada bangunan yang berorientasi ke sisi barat. Sehingga, bukaan pada bagian ini diminimalisir agar jumlah panas yang masuk ke bangunan bisa ditekan (dikurangi).



View to Site



- Tapak memiliki potensi yang besar untuk dikembangkan sebagai bangunan rental office karna berlokasi di Jl. Prof. Soedarto, Tembalang, Semarang yang merupakan jalan utama sebagai gate masuk dan keluar menuju Universitas Diponegoro, ramai dikunjungi dan mudah untuk dicapai dari segala arah.



Building Depth

Kedalaman Bangunan	Saving energy							
	North (%)	North east (%)	Equal (%)	Southeast (%)	South	Soutwest	West	Nortwest
12m	5,01	-0,37	0,00	-0,35	5,01	-0,3	-2,59	-0,37
13m	4,38	-0,36	0,00	-0,35	4,38	-0,36	-2,20	-0,35
14	3,78	-0,32	0,00	-0,30	3,78	-0,32	-3,29	-0,30
15	3,21	-0,32	-0,30	-0,30	3,21	-0,32	-2,72	-0,30
16	2,67	-0,31	0,00	-0,30	2,67	-0,31	-2,19	-0,30

- Berdasarkan hasil percobaan tabel diatas, dapat diketahui juga bahwa semakin kecil nilai kedalaman bangunan, maka semakin tinggi saving energinya.
- Untuk memaksimalkan potensi saving energy tanpa mengesampingkan efisiensi fungsi bangunan dalam kantor (Planning office space-Francis Duffy) building depth yang direncanakan adalah 12m.

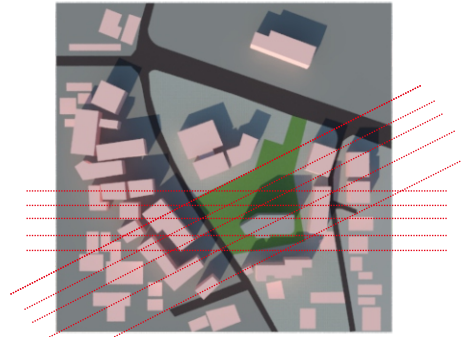




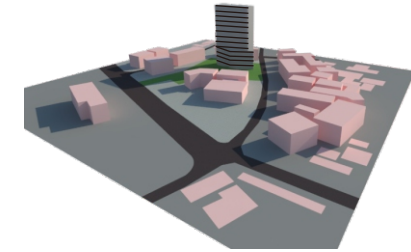
Konsep Pembentukan Massa



Lahan Pembangunan



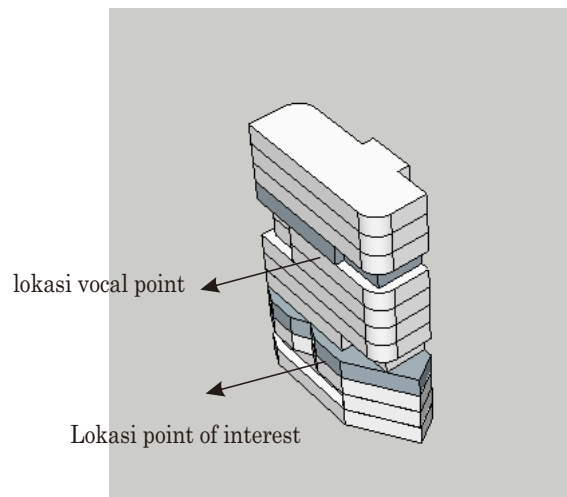
Pemenuhan Grid Kota dan Tapak, dengan perencanaan luas total bangunan dan jumlah lantai memaksimalkan fungsi lahan



Massa bangunan akhir berorientasi ke sisi utara dan selatan pada tapak, bangunan menghadap ke jalan utama.



Pemberian bukaan pada sisi utara dan selatan bangunan guna mendapatkan nilai saving bangunan yang tinggi, dan meminimalisis pada sisi barat dan timur.



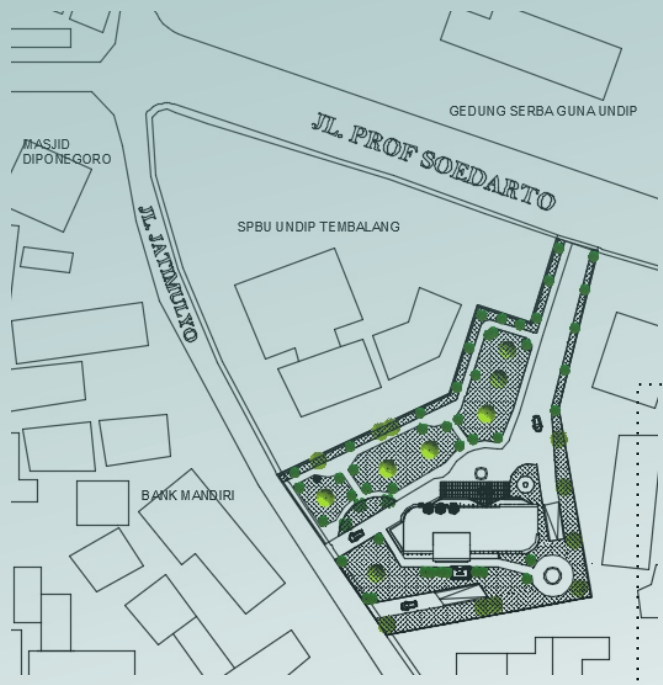
Bentuk Gubahan Massa Akhir



Konsep Zoning Aktifitas



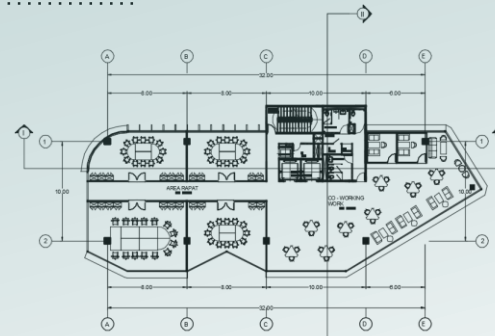
GUBAHAN MASSA



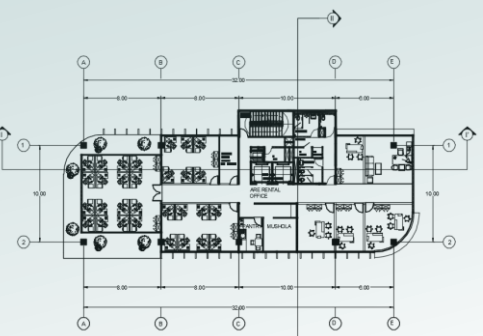
GAMBAR DENAH SITEPLAN



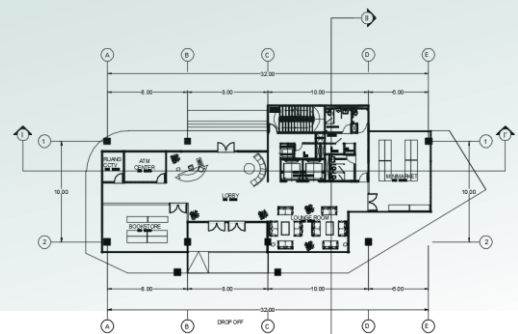
GAMBAR DENAH



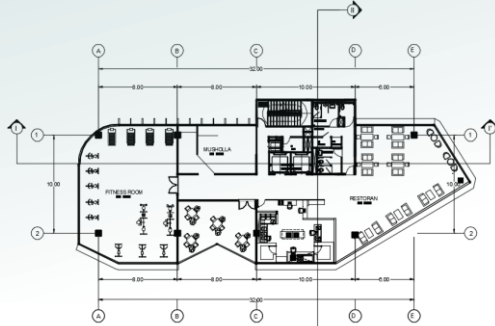
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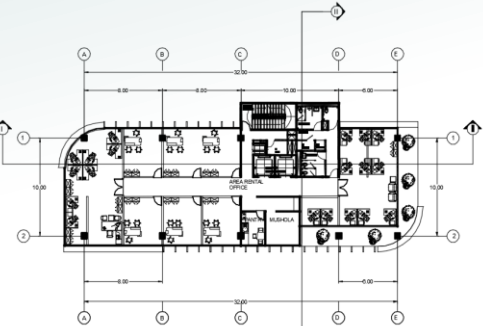
GAMBAR DENAH LANTAI 8, 9



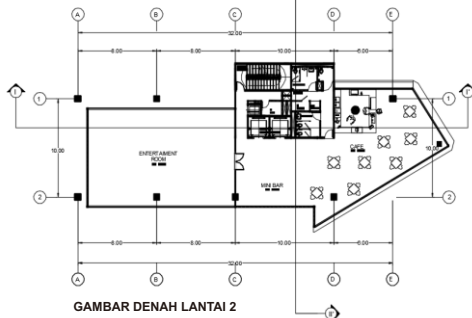
GAMBAR DENAH LANTAI 1



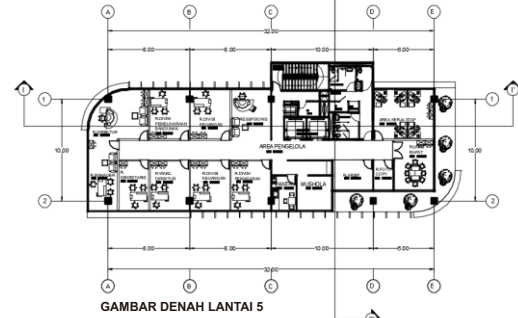
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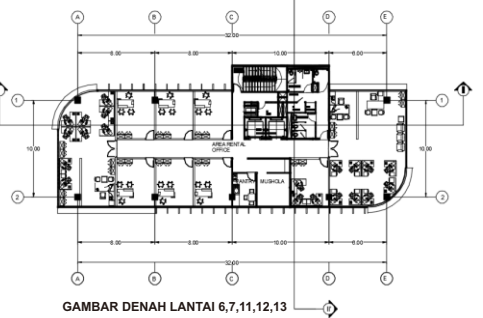
GAMBAR DENAH LANTAI 10



GAMBAR DENAH LANTAI 2

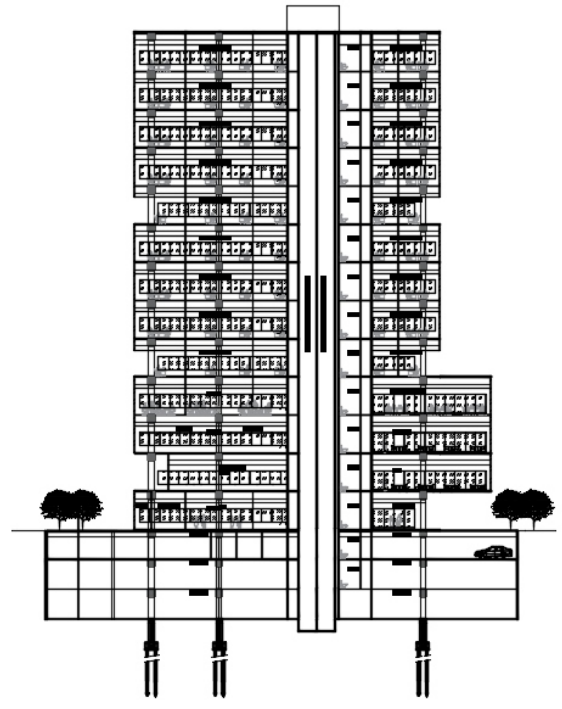


GAMBAR DENAH LANTAI 5

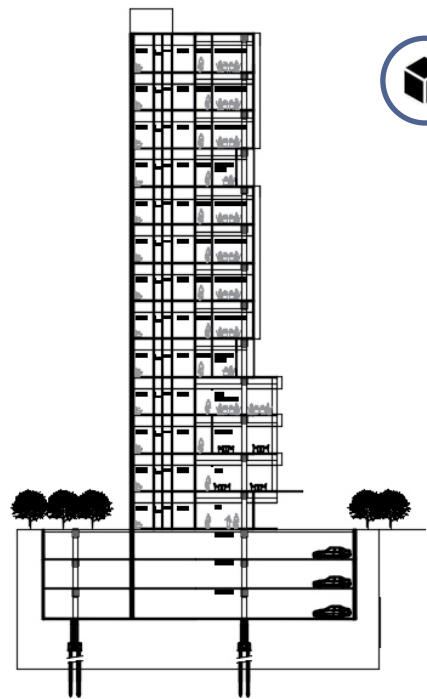


GAMBAR DENAH LANTAI 6,7,11,12,13

RUMAH LIFT p.57.00
 ROOFTOP +54.00
 13th FLOOR +49.50
 12th FLOOR +49.00
 11th FLOOR +45.50
 10th FLOOR +40.50
 9th FLOOR +36.00
 8th FLOOR +31.50
 7th FLOOR +27.00
 6th FLOOR +22.50
 5th FLOOR +18.00
 4th FLOOR +13.50
 3th FLOOR +9.00
 2nd FLOOR +4.50
 1st FLOOR +0.00
 BASEMENT 1 -3.50
 BASEMENT 2 -7.00
 BASEMENT 3 -10.50



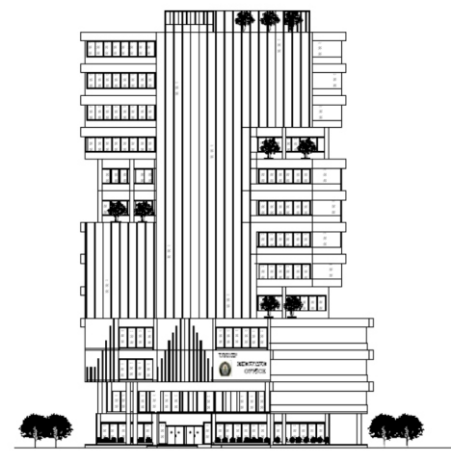
RUMAH LIFT p.57.00
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 2nd FLOOR +4.50
 1st FLOOR +0.00
 BASEMENT 1 -3.50
 BASEMENT 2 -7.00
 BASEMENT 3 -10.50



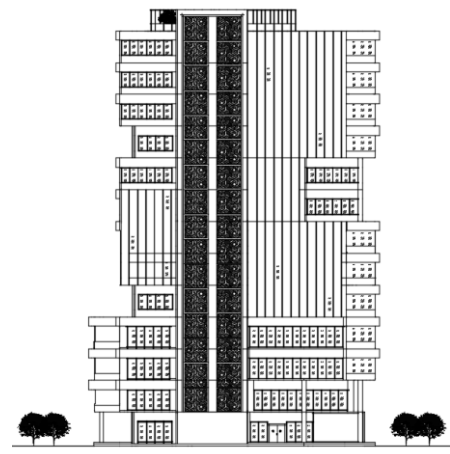
GAMBAR POTONGAN



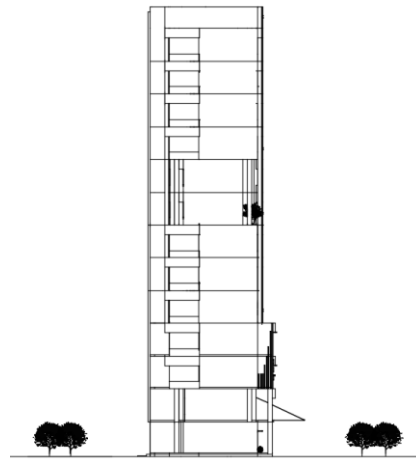
GAMBAR TAMPAK



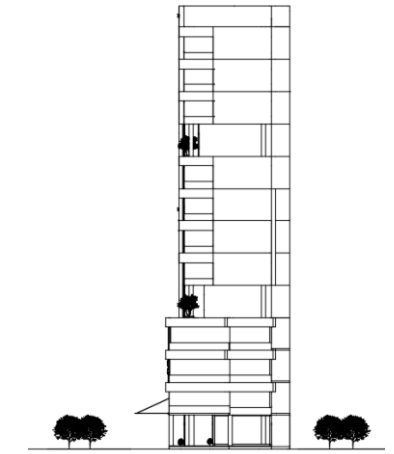
FASAD UTARA



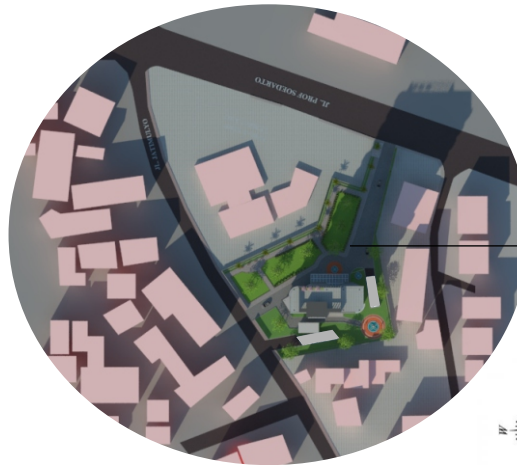
FASAD SELATAN



FASAD TIMUR



FASAD BARAT



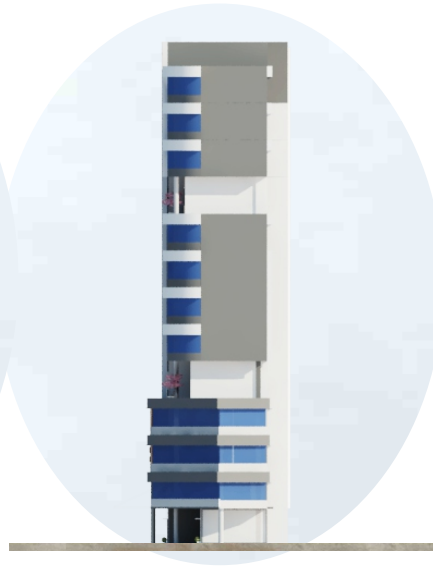
GAMBAR TAMPAK ATAS



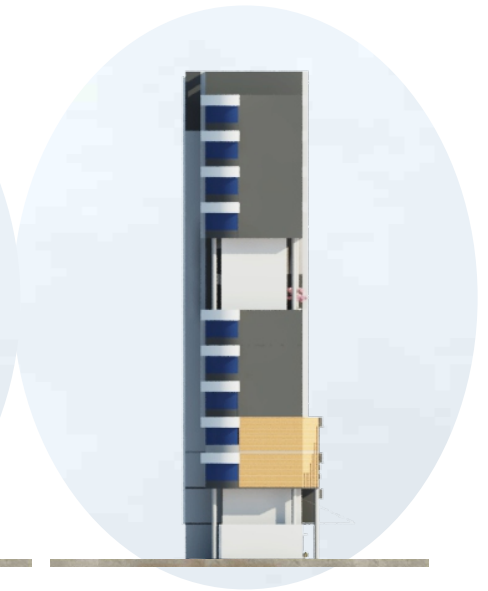
FASAD UTARA



FASAD SELATAN



FASAD TIMUR



FASAD BARAT

INTERIOR OFFICE



RUANG KERJA



RUANG KERJA



LOBBY



RUANG RAPAT

EKSTERIOR OFFICE



EKSTERIOR OFFICE



EKSTERIOR OFFICE



EKSTERIOR OFFICE



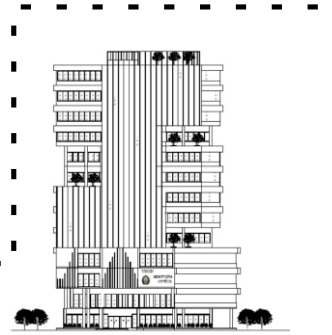
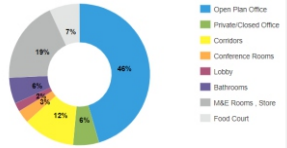
EDGE

Building Data

Gross Internal Area Excluding Car Parking	6,000	m ²
Floors Above Grade	13	no.
Floors Below Grade	3	no.
Floor-to-Floor Height	4.5	m

Open Plan Office	9,641	2,731	m ²
Private/Closed Office	551	366	m ²
Corridors	401	707	m ²
Conference Rooms	341	207	m ²
Lobby	461	125	m ²
Bathrooms	161	343	m ²
M&E Rooms, Store **		1,113	m ²
Food Court	161	408	m ²
Gross Internal Area		6,000	m²

	Default	User Entry	
Occupancy Density	10		m ² /Person
Operational Hours	10		Hours/Day
Working Days	5		Days/Week
Holidays	12		Days/Year



Building Orientation

Floor plan depth	13	m
Main Orientation	Equal	

*** These parameters will be used to estimate building dimensions. If the exact details of the dimensions and orientation are available, then complete the User Entry fields in the Building Lengths section. The orientation of the building will have a direct effect on energy consumption.

	Default	User Entry	
North	9:51	32	m
South	9:51	36	m
East	9:51	12.546	m
West	9:51	12.546	m
Northeast	9:51	4.5	m
Northwest	9:51	16	m
Southeast	9:51		m
Southwest	9:51	7	m



Saving Energy

OFE01 - Reduced Window-to-Wall Ratio Calculator

Orientation	Wall Area (m ²) Default (%)	Window Area (m ²) Default (%)	Ratio (%)
North	100.00	100.00	100.00
South	200.00	100.00	50.00
East	100.00	100.00	100.00
West	100.00	100.00	100.00
Northeast	50.00	100.00	200.00
Northwest	100.00	200.00	200.00
Southeast	200.00	100.00	50.00
Southwest	100.00	100.00	100.00

1. WWW (Window-to-wall Ratio-Calculator)

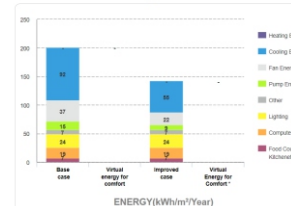
WWR	29.13%
WWR	29.13%

2. OFE04(External Shading Devices Annual Average Shading Factor)

Window Type	Window Orientation	Window Area	Shading Type	Shading Factor	AASF
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30
Type 1	South	100	External Shading	0.3	0.30

OFE04 External Shading Devices - Annual Average Shading Factor (AASF) of 0.3
AASF 0.30

29.13% Meets EDGE Energy Standard



Saving Energy Total
29.13 %

Saving Water

Modul 5. Saving Water

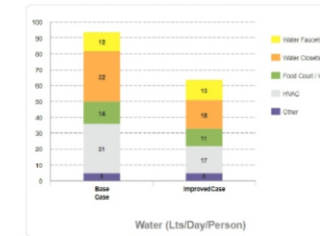
- OFW01 Low-Flow Faucets in All Bathrooms 7 l/min **Saving energy : 12.12%**
- OFW02 Dual Flush for Water Closets in All Bathroom 3.3 l/Flush ; 6L/Flush **Saving energy : 18.48%**
- OFW03 Water-Efficient Urinals in All Other Bathrooms 3.3 l/Flush **Saving energy : 19.96%**
- OFW04 Water-Efficient Faucets for Kitchen Sinks 5L/Flush **Saving energy : 22.06 %**
- Rai water harvesting system 100% **Saving energy : 32.20%**
- OFW07 Grey Water Treatment and Recycling System **Saving energy : 32.80%**

Net Lettable Area	5000	m ²
Jam operasional	458	jam/hari
Konsumsi Air dari Fitur Air	19	m ³

Model	Volume	Unit
Model 1	1000	m ³
Model 2	2000	m ³
Model 3	3000	m ³
Model 4	4000	m ³
Model 5	5000	m ³

Item	Value	Unit
Water	1.940	m ³
Electricity	1.940	kWh

32.80% Meets EDGE Water Standard



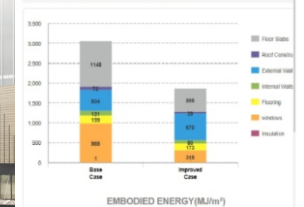
Saving Water Total
32.80 %

Saving Material

Category	Energy	Material
Energy	31.05%	
Material		38.87%

Building Material	Improved Case Selection	Proportion %	Thickness	Slab Index
Floor Slab	In-Situ Concrete with >25% GGBS	100%	100mm	lightest
Roof Construction	In-Situ Concrete with >25% GGBS	100%	100mm	lightest
External Walls	Type 1: Ferrocement Slab Panel Type 2: Common Brick Wall with Internal & External Plaster	100%	100mm	lightest
Internal Walls	Type 1: Ferrocement Slab Panel Type 2: Common Brick Wall with Plaster on Both Sides	100%	100mm	lightest
Flooring	Type 1: Finished Concrete Floor Type 2: Ceramic Tile	100%	100mm	lightest
Window Frames	Type 1: UPVC	100%	100mm	lightest

38.87% Meets EDGE Material Standard



Saving Material Total
38.87 %

