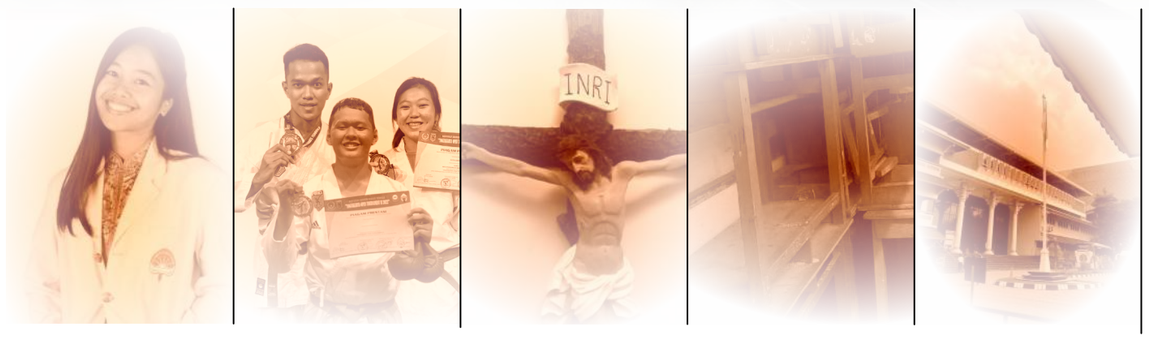
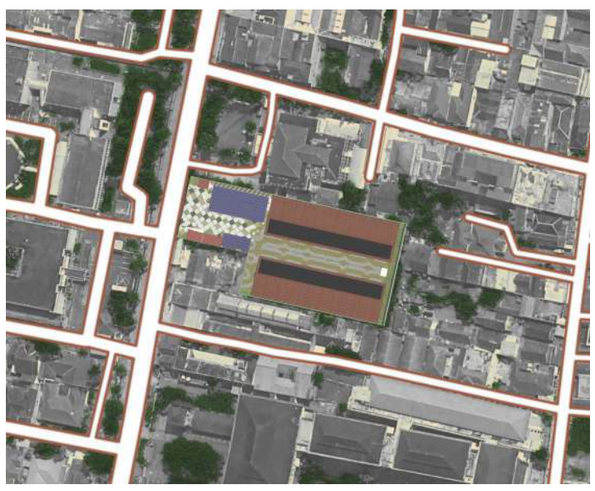
BENEDIKTUS-FRANSISKA
DORMITORY

PROBLEM DESIGN



Atma Jaya Yogyakarta University as one of the best private universities in Indonesia has a very large number of students and it is common knowledge that the Babarsari street area has a **very high demand for student housing needs**. In order to produce excellent, inclusive, and humanist students, **a catholic-oriented dormitory** was created and this project is the second dormitory of Atma Jaya Yogyakarta University. Even though it's a Catholic dormitory, all students from all cultural and religious backgrounds can apply to be part of the dormitory. This shows the nature of **"inclusiveness/ Inklusif"**. Brothers and Sisters as mentors also foster dormitory students to become better human beings such as holding rosary prayers together in May and October and unite all students through togetherness events such as playing badminton, Malam Akrab, and having monthly meals together. This action fulfills the **"humanist/ Humanis"** aspect of UAJY. UAJY also has **major problem with their unused/ expire furniture**. Most of their unused furniture was placed in their own motorcycle parking and near laboratory of biotechnology.

SITE AND REGULATION



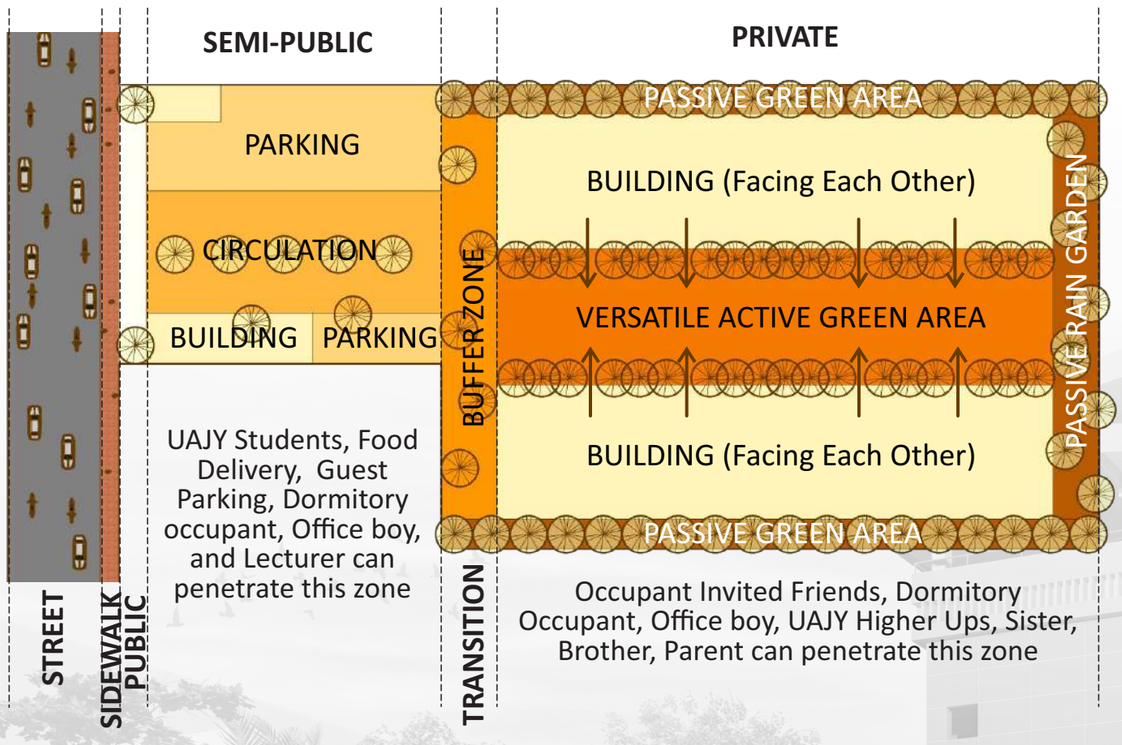
Location :

Site location is at JL. Babarsari, No. 44, Catur Tunggal, Depok, Janti, Caturtunggal, Sleman, Sleman Regency, Special Region of Yogyakarta 55281

Regulation :

KDB : 40% (37% Used in Design)
KLB : 4
GSB : 5-8 meters
Maximum Building Height : 44 meters
Basement Plan : 1 Floor
Territory Allotment : Settlement

LANDSCAPE PROGRAMMING



STRATEGY-PRIORITY

HIGHEST

OCCUPANT COMFORT = The top priority of UAJY's dormitory is student achievement, personality, and academic grades (excellent grades).

OPERATIONAL COST = UAJY dormitory is known for its low cost with excellent facilities. So, low operating costs may help reduce UAJY subsidies.

FIRST COST = more than 80% of UAJY's profits come from students payment. First cost still be considered as an important factor to create a new facility for students.

RESILIENCE = Dormitory buildings that have been built must be able and relevant to be used in long term. "The greenest buildings are the ones that have been used the longest and have not been demolished"

WALKING THE TALK = Demonstrating the values of UAJY which has become the motto of UAJY. These things will be visible to UAJY students and their graduates.

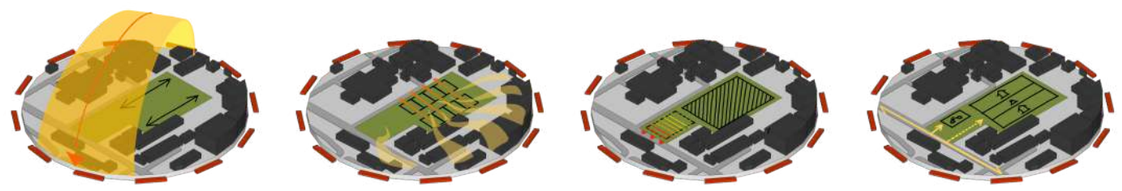
BRAND RECOGNITION = Atma Jaya itself already has reputation, and this project is already the second dormitory. Dormitory facility has been known for a long time and Atma Jaya's brand itself is already impressive at the first place.

HIGHER SALES/RENTAL PRICE = The initial UAJY dormitory didn't have high rents price, and barely made a profit. Profit is not the main orientation, but rather the quality of UAJY graduates, especially those living in dormitories. UAJY even subsidies for it's student initial dormitory.

ACCESS TO GREEN FUNDS = Yogyakarta itself doesn't have very big incentives for green buildings so it's not a top priority to get funds or deductions. It's only bonus.

LOWEST

SITE ANALYSIS



DAYLIGHT

The location enjoys abundant natural daylight due to its tropical location. Optimize building orientation and shading needed to collect indirect daylighting.

WIND

The city experiences gentle to moderate breezes. Utilize cross-ventilation by strategically placing openings for natural cooling inside buildings.

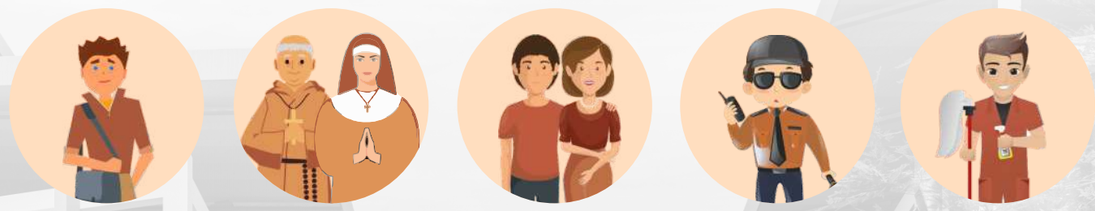
NOISE

Yogyakarta has various noise sources like traffic. Plan the building layout to minimize noise impact and consider sound-absorbing materials.

CIRCULATION

Ensure efficient access for pedestrians and vehicles. Integrate pedestrian pathways and green spaces to enhance mobility and aesthetics.

USERS



STUDENT

BROTHER AND SISTER

PARENT (VISITOR)

SECURITY

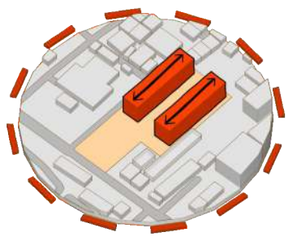
OFFICE BOY

U.A.J.Y

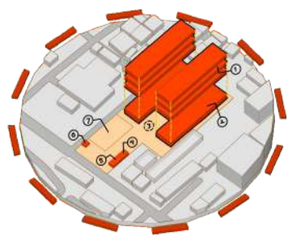
United Adequate Joyful Youngster

United = Architecture as a catalyst for a relationship.
Adequate = The building and the site have to responsible to nature, and the student must be well-facilitated in order to fulfill their task.
Joyful = a fun place to grow, because **Youngster** still need a lot to learn and experience.

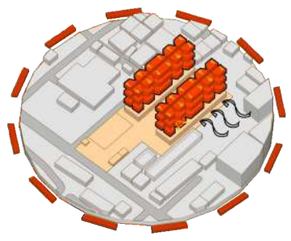
DESIGN TRANSFORMATION



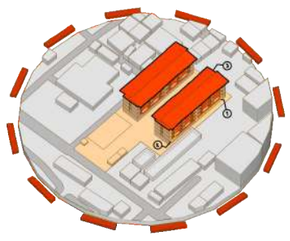
East-west orientation to minimize excessive radiation on the building's facade.



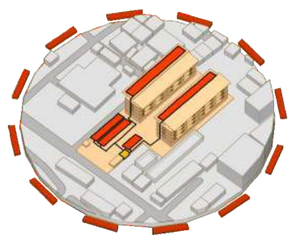
Area division on the site based on zoning programming.



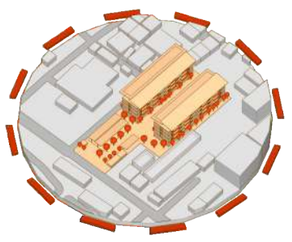
Mass subtraction for building natural cross ventilation.



Addition of shading to reduce radiation on the building's facade.

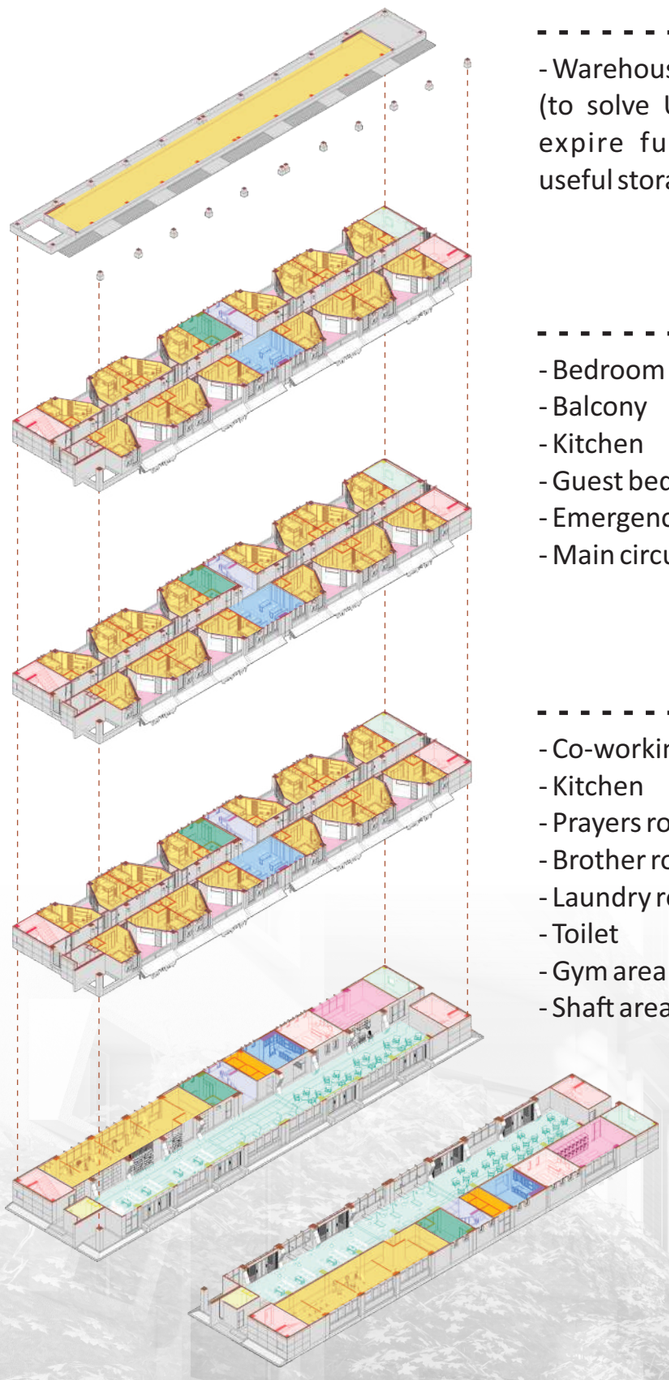


Placement of solar panels facing the equator to maximize their efficiency.



Strategic placement of vegetation for microclimate optimization on a site.

AXONOMETRY EXPLODE



5th Floor

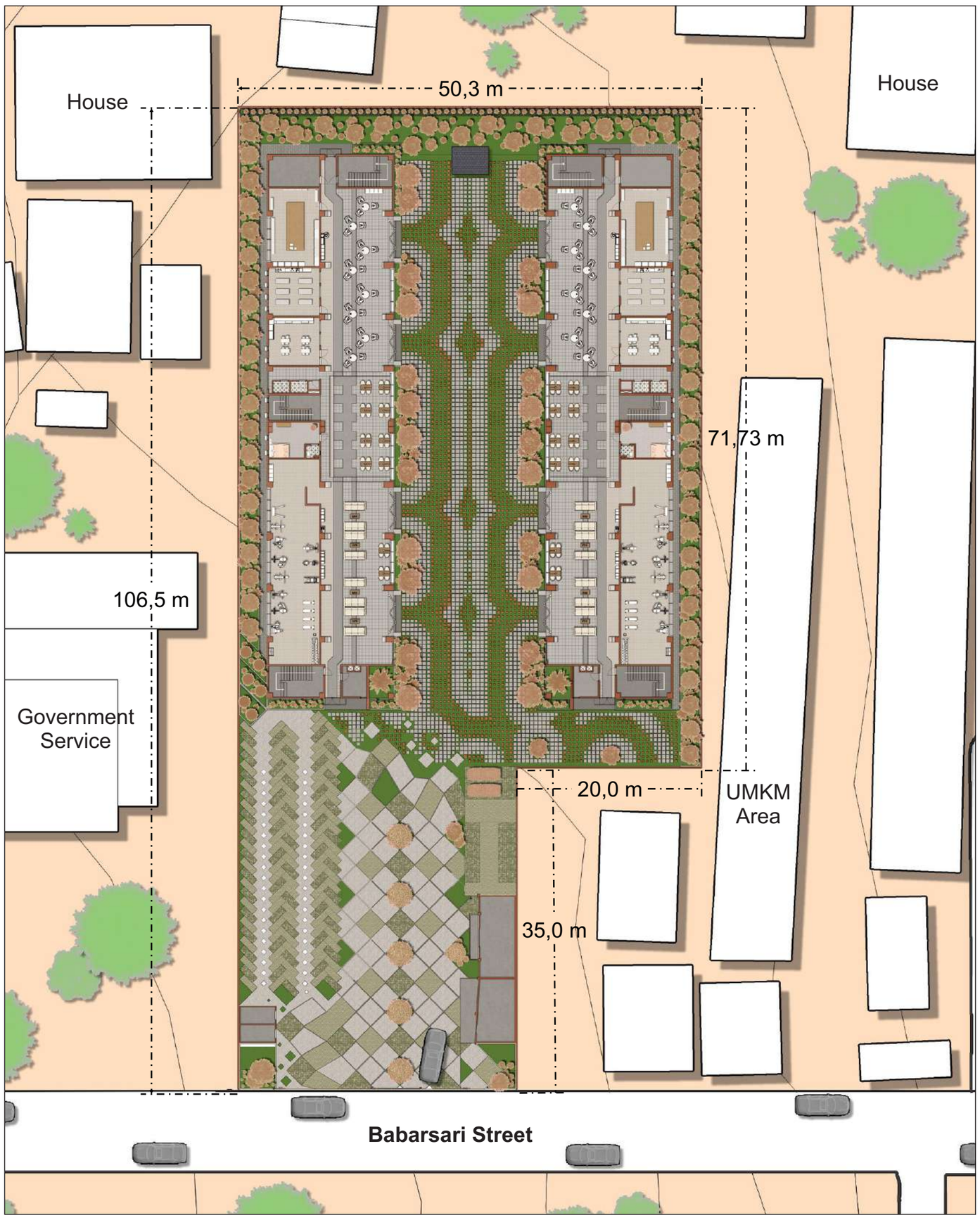
- Warehouse area
(to solve UAJY unused and expire furniture yet still useful storage problem)

2nd-4th Floor

- Bedroom
- Balcony
- Kitchen
- Guest bedroom
- Emergency exit
- Main circulation

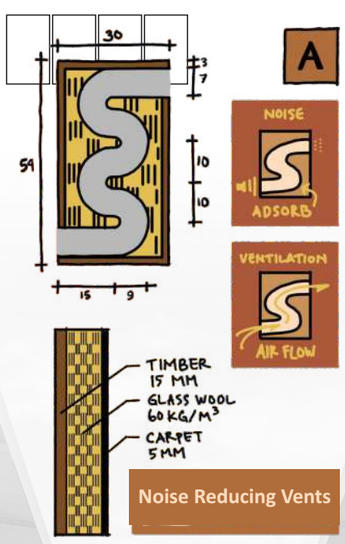
Ground Floor

- Co-working area
- Kitchen
- Prayers room
- Brother room
- Laundry room
- Toilet
- Gym area
- Shaft area

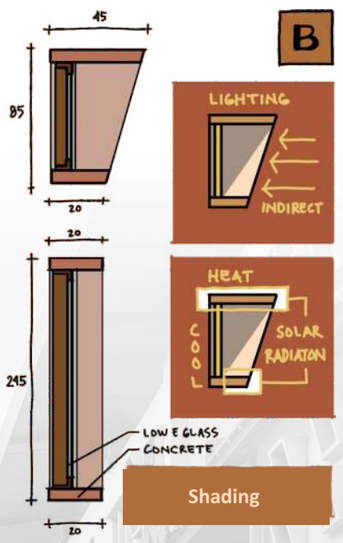


BUILDING SCIENCE

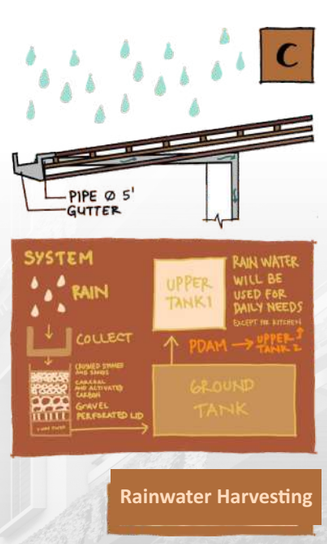
The utilization of cross-ventilation with openings in the walls allows the entire building to utilize natural ventilation (with the assistance of fans if needed). Floating roofs and shading on the building are used to minimize direct radiation onto the building's skin. Abundant vegetation is also distributed around the building to create a cooler microclimate for the structure.



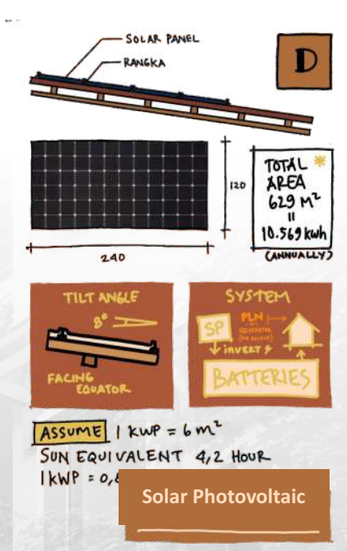
Noise Reducing Vents



Shading

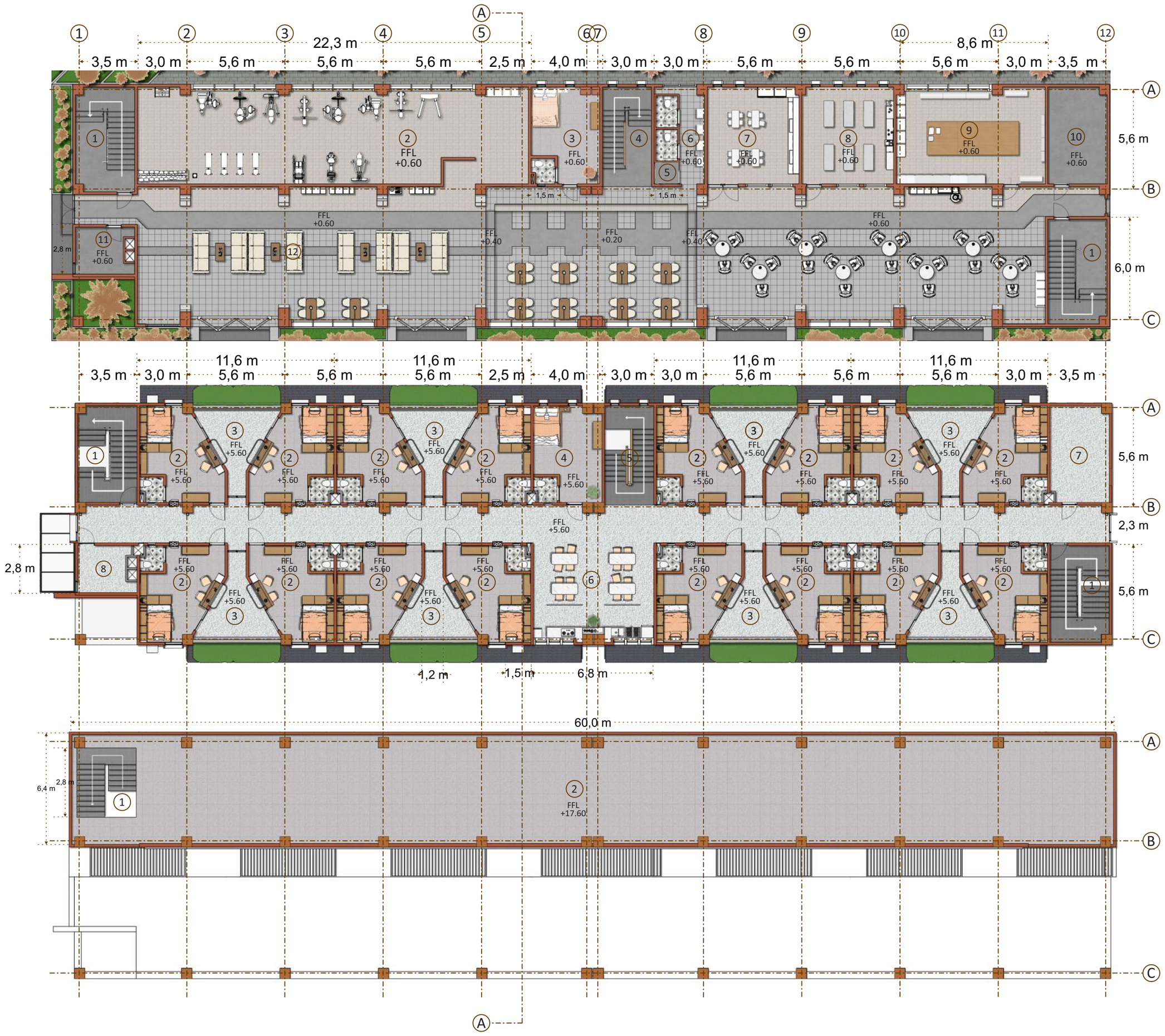


Rainwater Harvesting



Solar Photovoltaic

FLOOR PLAN



Ground Floor
1. Emergency Stairs
2. GYM
3. Brother Room
4. Public Stairs
5. Shaft and Janitor Room
6. Toilet
7. Kitchen
8. Prayers Room
9. Laundry Room
10. Warehouse
11. Shaft Room
12. Co-working Space

1st -3rd floor
1. Emergency Stairs
2. Student room
3. Balcony
4. Guest Room
5. Public Stairs
6. Kitchen
7. Warehouse
8. Shaft Rom

4th Floor
1. Emergency Stairs
2. Warehouse

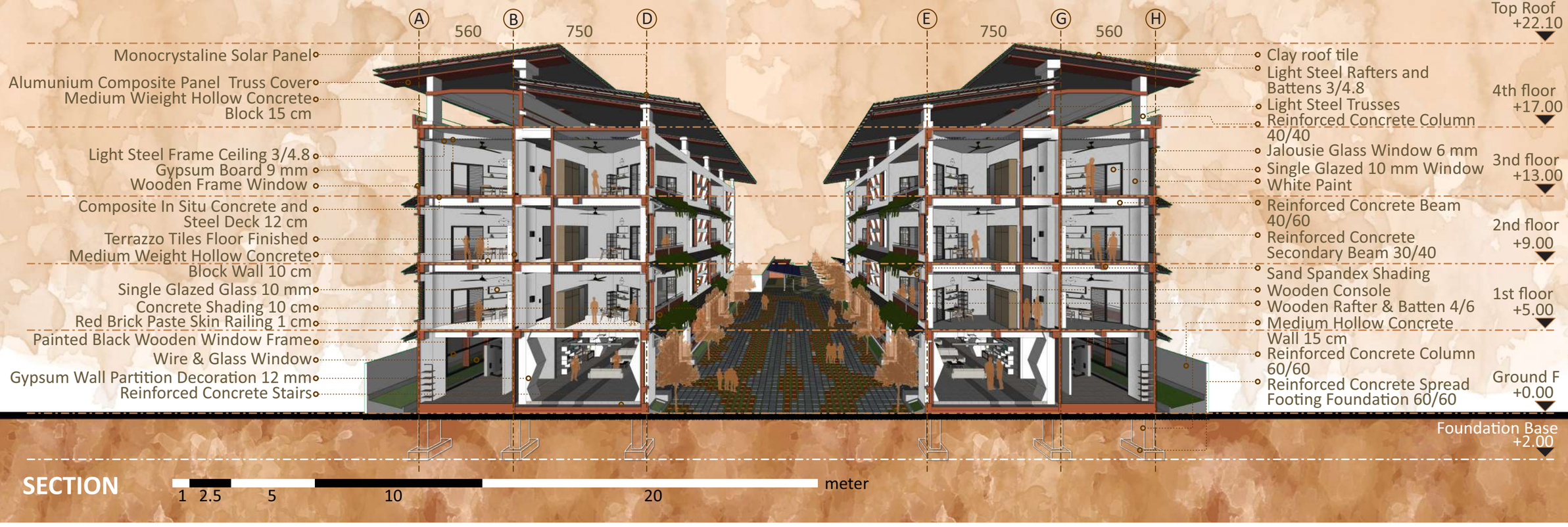
NORTH ELEVATION

1 2 5 10 20 meter

WEST ELEVATION

1 2 5 10 20 meter

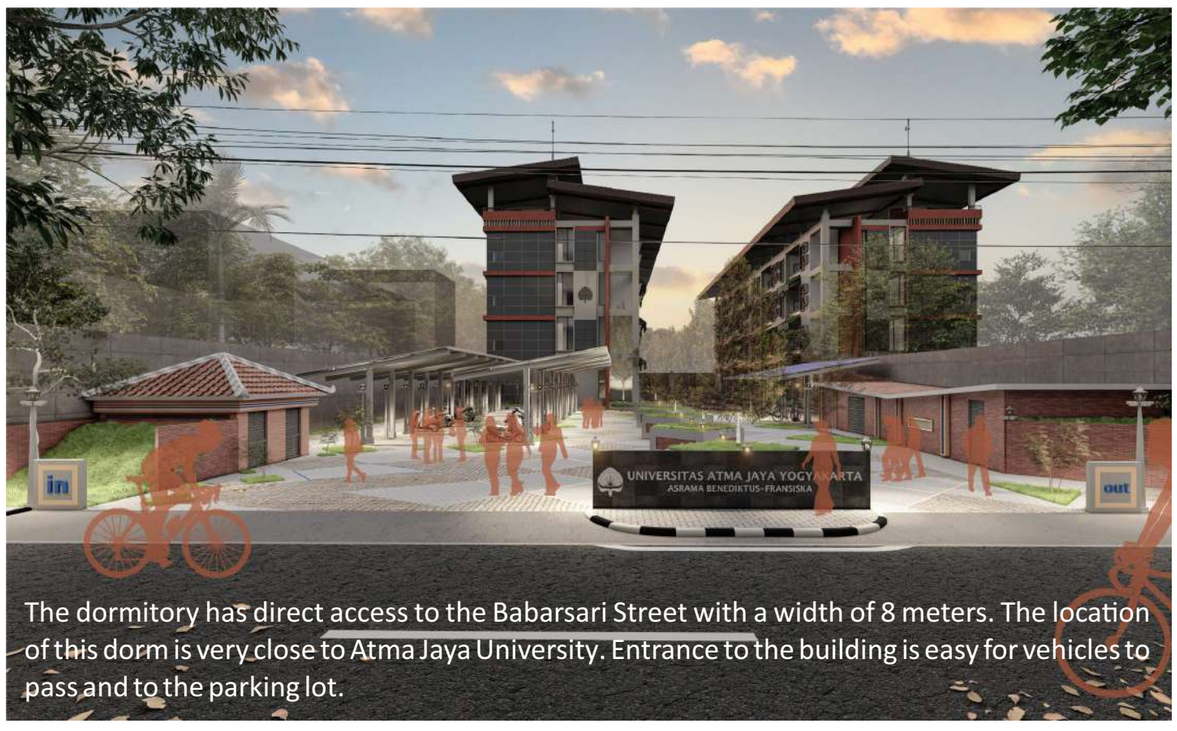
SECTION A-A



SECTION

1 2.5 5 10 20 meter

EXTERIOR RENDER



The dormitory has direct access to the Babarsari Street with a width of 8 meters. The location of this dorm is very close to Atma Jaya University. Entrance to the building is easy for vehicles to pass and to the parking lot.

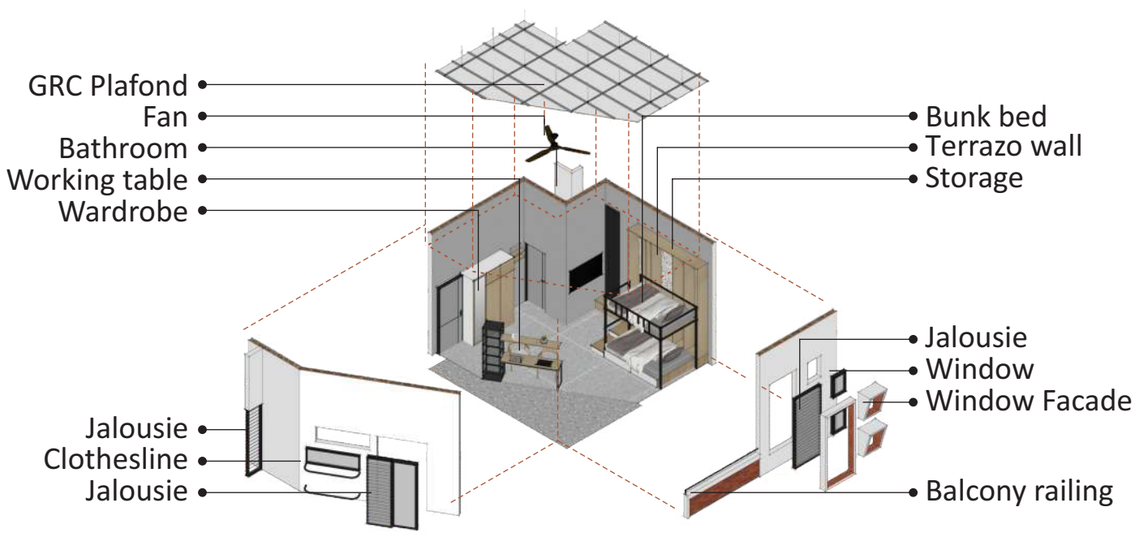
The pavement design in the landscape in the middle of the building uses organic shapes, but is still easy to pass as circulation to the main building. The arrangement of vegetation were made linear according to the building, with shading and buffer functions.

In the front yard of the building, there is a linear arrangement of vegetation as a shade. There area bicycles and motorbikes parking, according to the needs of building occupants. Processing of building facades with a dominant terracotta texture following the campus UAJY building style.

The side facade of the building is useful as interior shading (bedrooms). There are roof vines on every balcony which embellishes the facade. Windows and balconies face north and south, so they are not exposed to direct sunlight.

INTERIOR RENDER

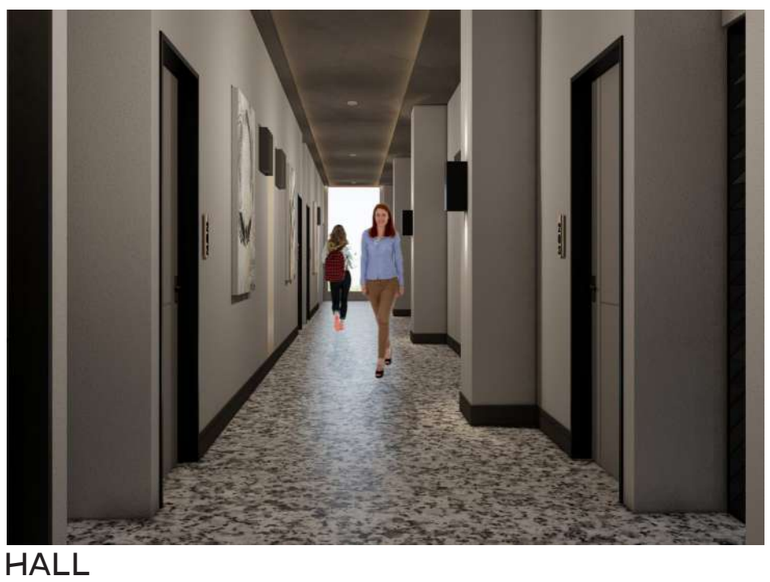
BEDROOM



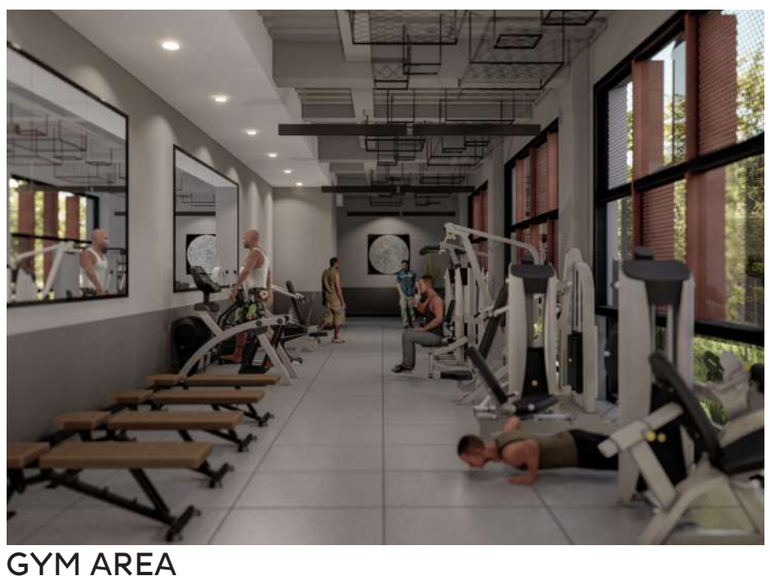
PANTRY

CO-WORKING SPACE

PRAYER ROOM



HALL



GYM AREA

BALCONY

Total Subproject Floor Area 5,442.18 m^2	Final Energy Use 1,394 *kWh/Month*	Final Water Use 235.00 *m^3/Month*	Base Case Utility Cost 25,925.28 *Thousand Rp/Month*	Utility Cost Reduction 25,345.66 *Thousand Rp/Month*	Incremental Cost 1,729,441.97 *Thousand Rp*
Payback in Years 6.17 *Yrs.*	Operational Co2 Savings 158.23 *tCo2/Year*	Embodied Energy Savings 1,876.36 *MJ/m^2*	Energy Savings 360.75 *MWh/Year*	Water Savings 9,217.62 *m^3/Year*	Carbon Emissions **0.00** *tCo2/Year*

Reduced Window to Wall Ratio, Total 28,70%

N

North ***30.02%***

Wall (m^2) 791.14
Glaze (m^2) 237.48

South ***35.53%***

Wall (m^2) 791.14
Glaze (m^2) 281.09

S

E

W

East ***17.19%***

Wall (m^2) 189.00
Glaze (m^2) 32.48

West ***13.94%***

Wall (m^2) 189.00
Glaze (m^2) 26.35

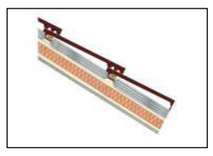
NE, NW, SE, SW ***each 26.55%***

Wall (m^2) 172,68
Glaze (m^2) 45.84

External Shading Devices - AASF

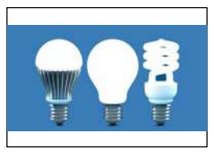
0.60

Window = 760m^2



Insulation of Roof

U-value of 0.18

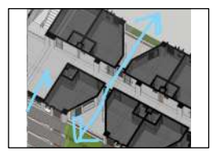


Energy-Saving Light Bulbs Internal Spaces

LED efficacy 100 lumen/ watt

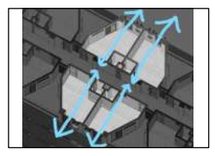
Low-E Coated Glass

U-value 1.6
SHGC 0.37



Natural Ventilation Corridors

Cross Vent



Natural Ventilation Guest Rooms

Cross Vent

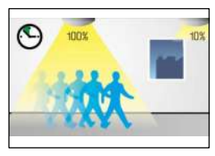
Solar Photovoltaics

157% of Total Energy Use

***surplus electricity will be sold to PLN**

Energy-Saving Light Bulbs External Spaces

LED



Lighting Controls for Corridors

Movement Sensors

Occupancy Sensors in Bathrooms

For Lighting

77.49% ENERGY SAVING

Low-Flow Showerheads

6 L/min

Low-Flow Faucets in Guest Rooms/ Apartment Area

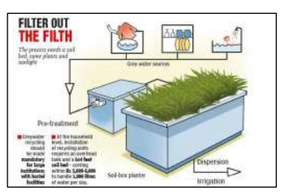
2 L/min

Dual Flush for Water Closets in Guest Rooms /Apartment Area

4.8 L/first flush and 3 L/second flush

Water-Efficient Front Loading Washing Machine

6 L/kg. of clothes



Grey Water Treatment and Recycling System

Aerators & Auto Shut-off Faucets in All Other Bathrooms

2 L/min

Water-Efficient Landscaping

4 L/m^2/day

Rainwater Harvesting System

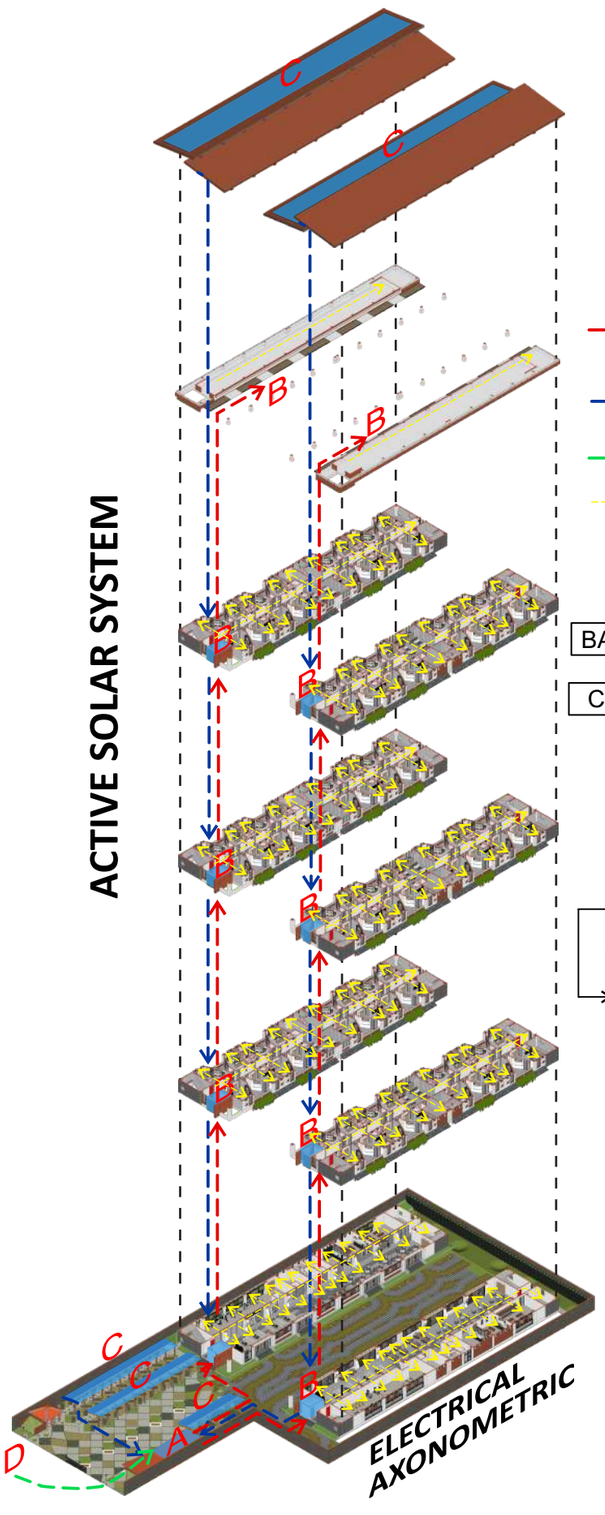
89% of Roof Area

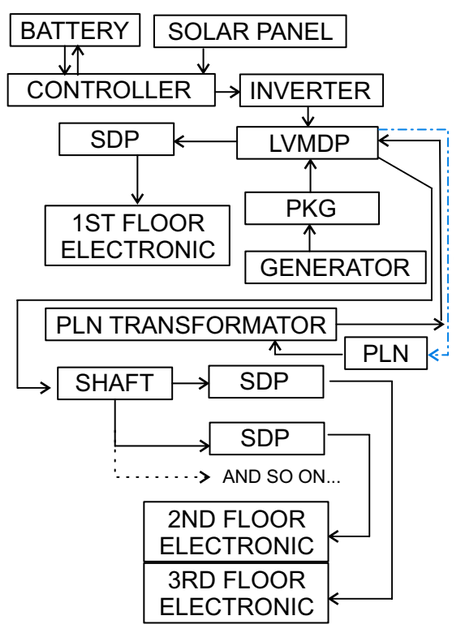
62.05% WATER SAVING

ELECTRICAL LEGEND:

A= service building for Lvmdp, generator, solar Panel controller, inverter And solar panel battery
B= sdp per floor
C = solar panel
D= transformator from State power plant

- Electrical cable To sdp
- Cable power distribute To battery solar panel
- Electrical from state
- From sdp to electronics





DRAINAGE & BLACK WATER LEGEND:

A= ground tank
B = bio-septic tank
C= infiltration wells

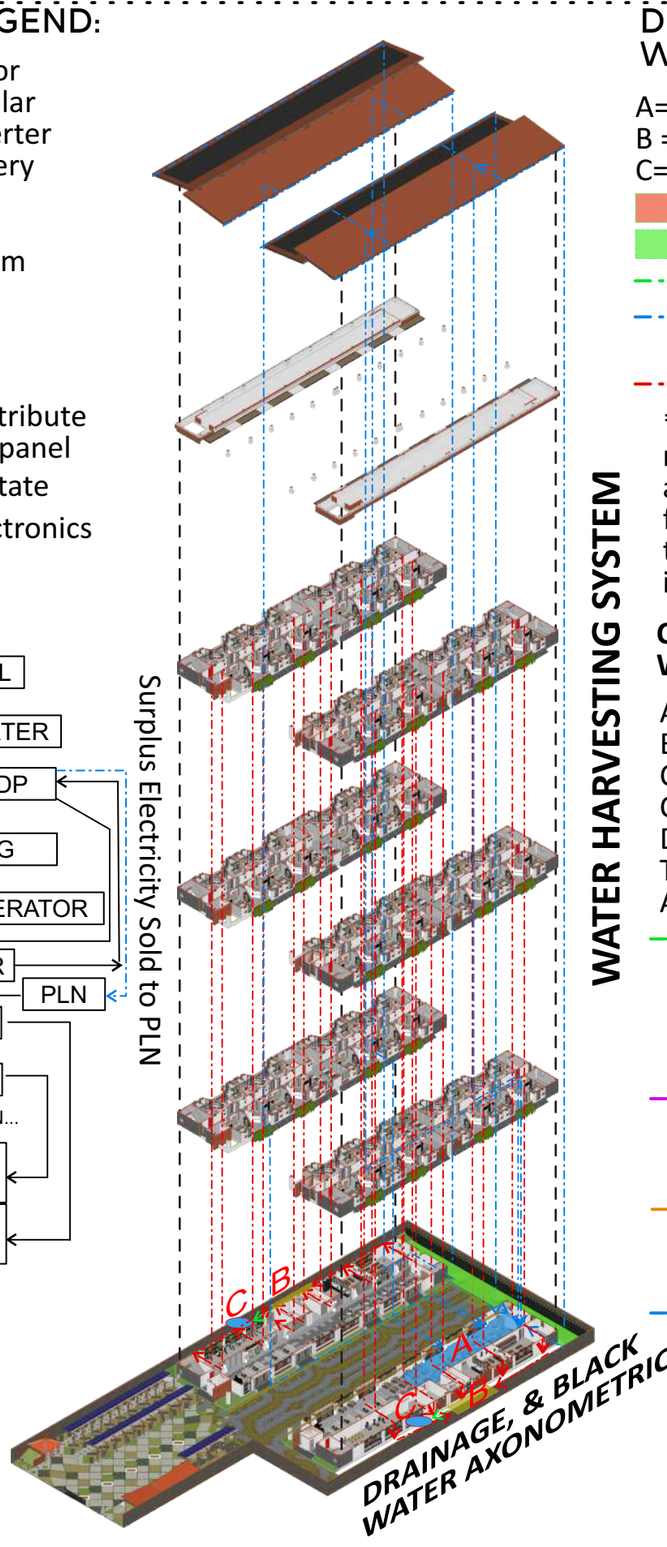
- Biopore zone
- Rain garden zone
- To infiltration wells
- To filter and Ground tank
- To septic tank

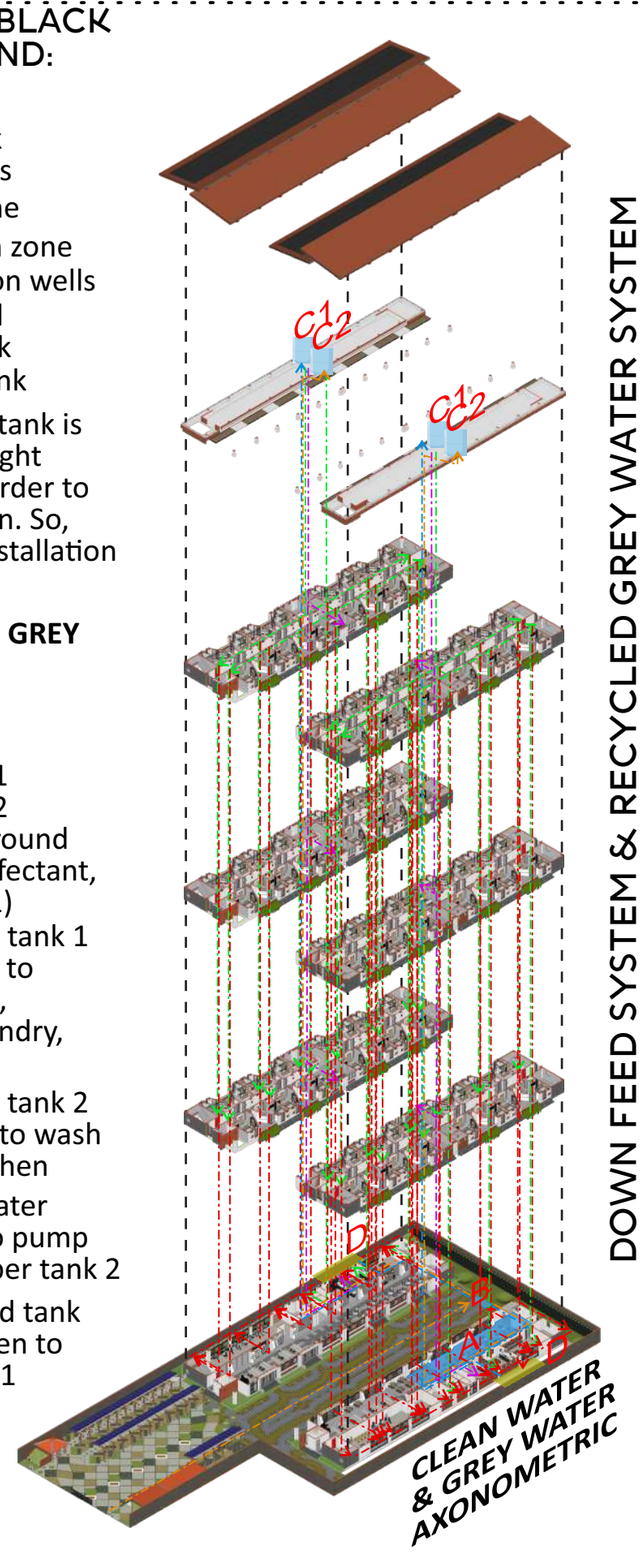
* second upper tank is needed for draught anticipation in order to facing dry season. So, the tap water installation is still needed.

CLEAN WATER & GREY WATER LEGEND:

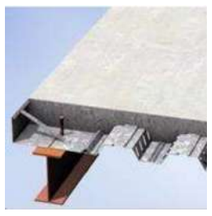
A= ground tank
B = water pump
C1= upper tank 1
C2= upper tank 2
D= grey water ground Tank, filter, disinfectant, And pump (to c1)

- From upper tank 1 (rain water) to Flush, toilet, Garden, laundry, & shower
- From upper tank 2 (tap water) to wash Basin & kitchen
- From tap water Company to pump Then to upper tank 2
- From ground tank To pump then to Upper tank 1



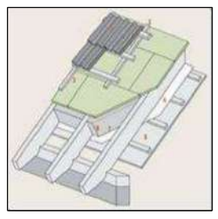


FLOOR SLABS



Composite in-situ concrete and steel deck (permanent shuttering)
120mm
488 MJ/m2

ROOF CONSTRUCTION



Clay Roofing Tiles on Steel Rafters
100mm
244 MJ/m2

EXTERNAL WALLS

Medium Weight Hollow Concrete Blocks
150mm
175 MJ/m2

INTERNAL WALLS

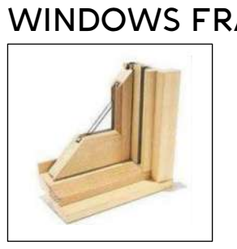
Medium Weight Hollow Concrete Blocks
100mm
117 MJ/m2

FLOORING

Finished Concrete Floor 37%
35mm
70 MJ/m2

Terrazzo Tiles 63%
10mm
99 MJ/m2

WINDOWS FRAMES



Timber 100%
367 MJ/m2

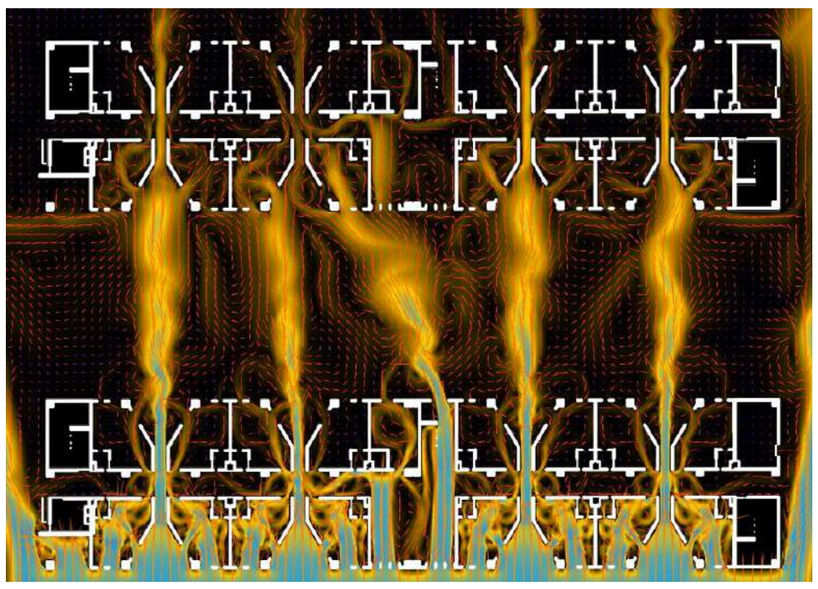
ROOF INSULATION

Air Gap > 100mm
0 MJ/m2

67.22%
MATERIAL SAVING

*Material consideration is based on the easiness to be find and capability to execute the design in Yogyakarta. The cost to build also contribute in decision making.

WIND SIMULATION



The opening design can help sharing wind for other building. The jalousie design at the hallway also helps cross ventilation, not only for the individual building, but also for the next building. Prof. Satwiko ventilation also contribute for cross ventilation in bedrooms without worrying about noise/ privacy

UAJY SIGNATURE PLANT

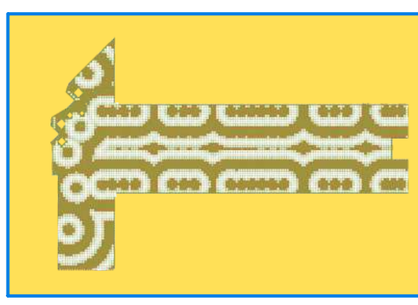
2 of UAJY signature plant is matoa and kepel tree. However, the growth of UAJY reduce their apperance, especially in new student center. Dormitory will help bring UAJY signature plant back.

RECYCLED TIRE

Recycled tire at the east site will be used as a pot as a media to plant vines plant and flowers. It also act as noise barrier between neighbor. Students might have noise activity.

RAIN GARDEN

It increase site endurance when facing heavy rain. It also increase groundwater aquifer and reduce pollutant level that permeable to soil.



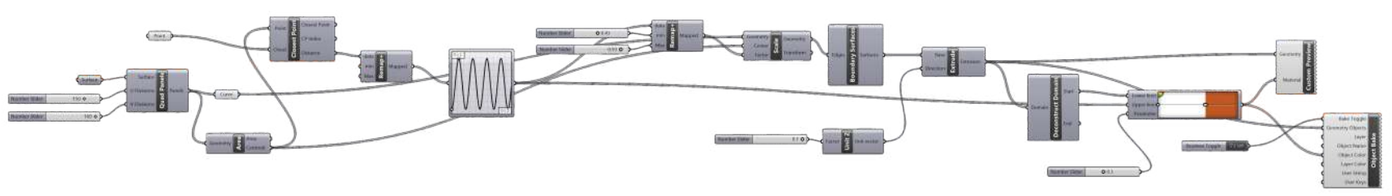
LANDSCAPE PATTERN

The parametric pattern (using grasshopper) can increase water permeability into the soil and optimized root path on soil surface. The pattern can increase water permeability into the soil and optimized root path on soil surface.

PARKING CAPACITY

50 2 135

Dormitory parking support UAJY Go Bike program



LANDSCAPE PARAMETER GRASSHOPPER LOGIC

ALL BUILDING HISTORY DATA

SCHEME	Energy	Water	Materials	Final Energy Use (kWh/Month)	Final Water Use (m³/Month)	Base Utility Cost (Thousand Rp/Month)	Utility Cost Reduction (Thousand Rp/Month)	Incremental Cost (Thousand Rp)	Payback in Years	Operational CO2 Saving (tCo2/Year)	Embodied Energy Savings (MJ/m²)	Energy Savings (MWh/Year)	Water Savings (m³/Year)	Carbon Emission (tCO2/Year)
Base Case	0%	0.00%	0.14%	16426	619.00	25925.28	0.00	0.00	N/A	-0.22	3.99	0.00	0.00	316.90
Reduced Window to Wall Ratio - WWR of 29%	6.76%	0%	0.52%	16426	619.00	25925.28	0.00	-160388.74	N/A	-0.22	14.63	0.00	0.00	316.90
External Shading Devices - Annual Average Shading Factor (AASF) of 0.6	25.64%	0%	0.52%	16426	619.00	25925.28	0.00	-297095.20	N/A	-0.22	14.63	0.00	0.00	316.90
Insulation of Roof : U-value of 0.18	31.97%	0%	0.52%	16426	619.00	25925.28	0.00	-354976.75	N/A	-0.22	14.63	0.00	0.00	316.90
Low-E Coated Glass : U-value of 1.6 W/m².K and SHGC of 0.37	42.90%	0%	-1.22%	16426	619.00	25925.28	0.00	-391026.31	N/A	-0.22	-34.12	0.00	0.00	316.90
Natural Ventilation - Corridors	49.36%	0%	-1.22%	16426	619.00	25925.28	0.00	-415323.79	N/A	-0.22	-34.12	0.00	0.00	316.90
Natural Ventilation - Guest Rooms/Apartment Area with Auto Controls	56.16%	0%	-1.22%	16426	619.00	25925.28	0.00	-335139.61	N/A	-0.22	-34.12	0.00	0.00	316.90
Energy-Saving Light Bulbs - Internal Spaces	59.01%	0%	-1.22%	15291	619.00	25925.28	1534.21	248807.51	13.51	-34.12	-34.12	27.23	0.00	292.98
Energy-Saving Light Bulbs - External Spaces	59.66%	0%	-1.22%	14844	619.00	25925.28	2138.58	264463.15	10.31	16.45	-34.12	37.96	0.00	283.56
Lighting Controls for Corridors	60.65%	0%	-1.22%	14161	619.00	25925.28	3063.44	269703.95	7.34	23.66	-34.12	54.37	0.00	269.14
Occupancy Sensors in Bathrooms	63.49%	0%	-1.22%	13403	619.00	25925.28	4087.57	309596.56	6.31	31.64	-34.12	72.55	0.00	253.17
Solar Photovoltaics - 157% of Total Energy Use	77.49%	0%	-1.22%	1394	619.00	25925.28	20326.42	1328096.83	5.44	158.23	-34.12	360.75	0.00	0.00
Low-Flow Showerheads - 6 L/min	77.49%	18.19%	-1.22%	1394	506.00	25925.28	21211.47	1373035.19	5.39	158.23	-34.12	360.75	2702.00	0.00
Low-Flow Faucets in Guest Rooms/Apartment Area - 2 L/min	77.49%	23.39%	-1.22%	1394	474.00	25925.28	21464.33	1406159.42	5.46	158.23	-34.12	360.75	3474.01	0.00
Dual Flush for Water Closets in Guest Rooms/Apartment Area - 4.8 L/first flush and 3 L/second flush	77.49%	29.10%	-1.22%	1394	439.00	25925.28	21742.49	1450113.33	5.56	158.23	-34.12	360.75	4323.21	0.00
Water-Efficient Front Loading Washing Machine - 6 L/kg. of clothes	77.49%	31.99%	-1.22%	1394	421.00	25925.28	21882.97	1544170.93	5.88	158.23	-34.12	360.75	4752.1	0.00
Dual Flush for Water Closets in All Other Bathrooms - 6 L/first flush and 3 L/second flush	77.49%	32.16%	-1.22%	1394	420.00	25925.28	21891.01	1544745.15	5.88	158.23	-34.12	360.75	4776.62	0.00
Aerators & Auto Shut-off Faucets in All Other Bathrooms -2 L/min	77.49%	33.15%	-1.22%	1394	414.00	25925.28	21939.21	1545130.88	5.87	158.23	-34.12	360.75	4923.79	0.00
Water-Efficient Landscaping - 4 L/m²/day	77.49%	38.53%	-1.22%	1394	380.00	25925.28	22201.28	1564566.45	5.87	158.23	-34.12	360.75	5723.87	0.00
Rainwater Harvesting System - 89% of Roof Area Used for Rainwater Collection	77.49%	45.64%	-1.22%	1394	336.00	25925.28	22546.93	1670181.5	6.17	158.23	-34.12	360.75	6779.15	0.00
Grey Water Treatment and Recycling System	77.49%	62.05%	-1.22%	1394	235.00	25925.28	23345.66	1693185.36	6.04	158.23	-34.12	360.75	9217.62	0.00
Floor Slabs - Composite in-situ concrete and steel deck (permanent shuttering) 120mm	77.49%	62.05%	23.17%	1394	235.00	25925.28	23345.66	1693185.36	6.04	158.23	646.74	360.75	9217.62	0.00
Roof Construction - Clay Roofing Tiles on Steel Rafters 100mm	77.49%	62.05%	30.12%	1394	235.00	25925.28	23345.66	1693185.36	6.04	158.23	840.61	360.75	9217.62	0.00
External Walls - Medium Weight Hollow Concrete Blocks 150mm	77.49%	62.05%	47.25%	1394	235.00	25925.28	23345.66	1729441.97	6.17	158.23	1318.9	360.75	9217.62	0.00
Internal Walls - Medium Weight Hollow Concrete Blocks 100mm	77.49%	62.05%	57.04%	1394	235.00	25925.28	23345.66	1729441.97	6.17	158.23	1592.05	360.75	9217.62	0.00
Flooring - Finished Concrete Floor 37%, Terrazzo Tiles 63%	77.49%	62.05%	61.00%	1394	235.00	25925.28	23345.66	1729441.97	6.17	158.23	1702.7	360.75	9217.62	0.00
Window Frames - Timber 100%	77.49%	62.05%	67.22%	1394	235.00	25925.28	23345.66	1729441.97	6.17	158.23	1876.36	360.75	9217.62	0.00
Roof Insulation - Air Gap > 100mm	77.49%	62.05%	67.22%	1394	235.00	25925.28	23345.66	1729441.97	6.17	158.23	1876.36	360.75	9217.62	0.00