

**RESEARCH DEVELOPMENT AND EXTENSION PHASE II PROJECT
AIR CONDITIONING and VENTILATION SYSTEM**

1. AIR CONDITIONING SYSTEM.

The Air Conditioning system of the Research Development and Extension Building Phase III is an Air-Cooled Variable Refrigerant Flow (VRF) system.

A VRF system has a one or two outdoor units with a multiple indoor units combined in one system and enables to control each room with different indoor unit cooling capacities.

2. DESIGN PARAMETERS

For accuracy the cooling load calculation was performed using Carrier HAP (Hourly Analysis Program) V4.90 developed by Carrier, the building orientation, building materials and construction method were considered including the internal loads such as number of people, electrical equipment and lightings.

The net exposed area of the external wall, windows, doors are calculated with the corresponding orientation or cardinal direction, this is also used in the calculation of load envelope for solar heat gain, solar transmission, wall heat gain, roof heat gain and door heat gain.

The outdoor unit capacity was calculated using LATSHVAC software developed by LG of South Korea. The indoor unit cooling capacity and indoor unit location were plotted in the LATSHVAC.

The Outside air and exhaust air requirement is calculated based from the minimum rates required in breathing zone of ASHRAE 62.1 Ventilation for Acceptable Indoor Air Quality.

2.1. WEATHER PROPERTIES

The weather properties are based from ASHRAE Climatic Data of Laoag City, Philippines and located as follows:

Latitude	18.178 N
Longitude	120.532 E
Elevation	8.00 Meters ASL
STD Pressure	101.325 KPA
Time Zone	8.00

The Carrier HAP software will automatically use the weather data such as design temperature based from the above data.

2.2. OTHER DESIGN PARAMETERS

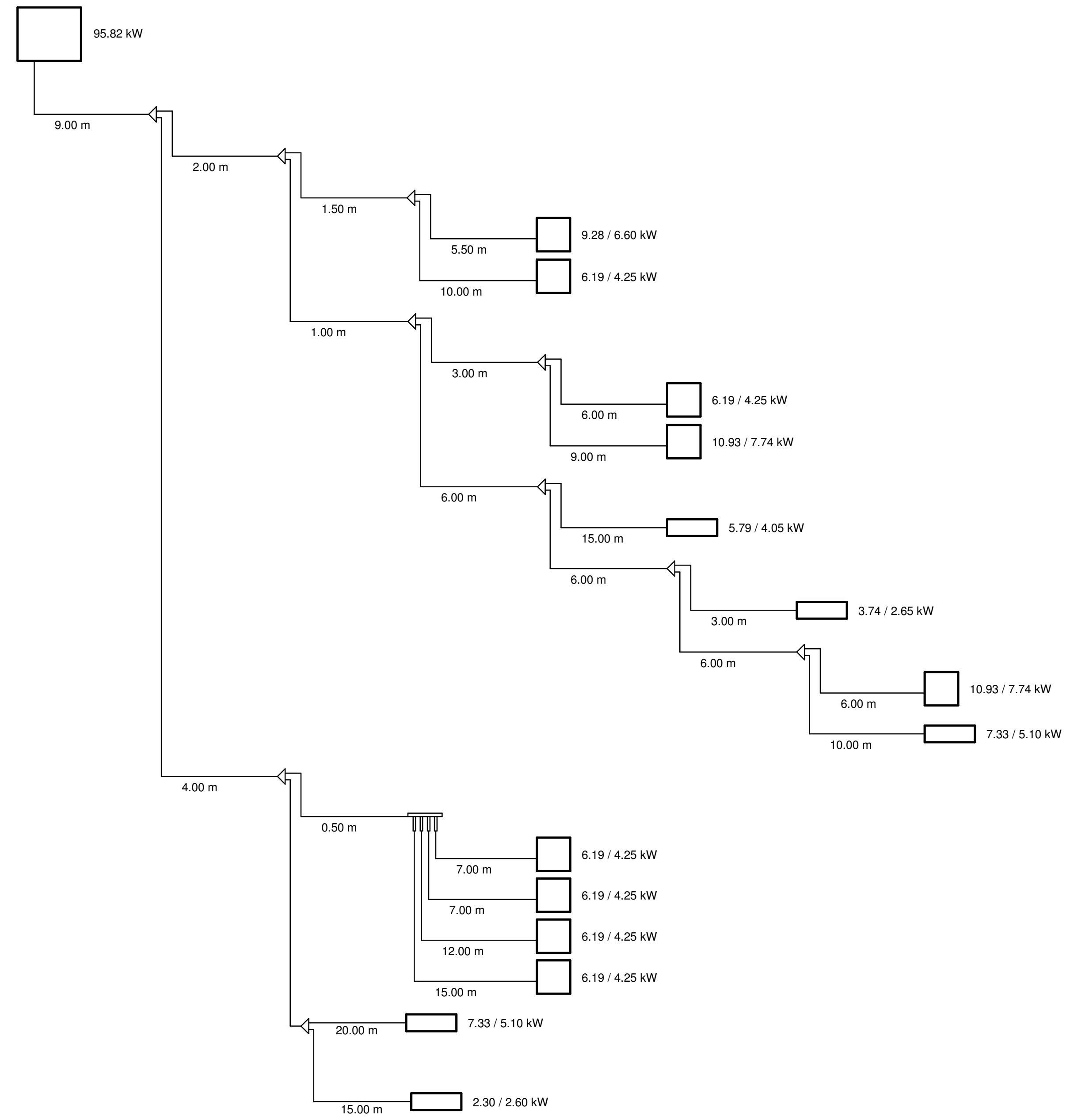
Atmospheric clearness number = 1.0
Average Ground Reflectance = 0.25 (Bright Green Grass Surroundings)
Soil Conductivity = 0.80 W/m/K (Default Value)

2.3. THERMAL RESISTANCE CALCULATION AND U-VALUES.

2.3.1 The U-Values were calculated based from the thermal resistance of each material including the inside and outside resistance of Air.

Code	Type	Construction	U-Value
CB-1	Wall	1" Plaster + 5" Filled CHB + 1" Plaster	2.053 W/m ² - K
CB-2	Wall	1" Plaster + 5" Filled CHB + 1" Plaster + 1" Brick	1.914 W/m ² - K
Slab	Slab	5" Concrete Slab + Air Space + 10 mm Gypsum Board Ceiling	2.063 W/m ² - K
Partition	Wall Partition	1" Plaster + 4" Filled CHB + 1" Plaster	2.194 W/m ² - K
D-2	Door	Steel	3.603 W/m ² - K
Glass	Glass	Flat Glass, Single Glass, Clear, No Shade, Aluminum Frame without Thermal Break	5.915 W/m ² - K

1 GENERAL NOTES



2 SYSTEM DIAGRAM