ELECTRICAL PLAN

GENERAL NOTES :

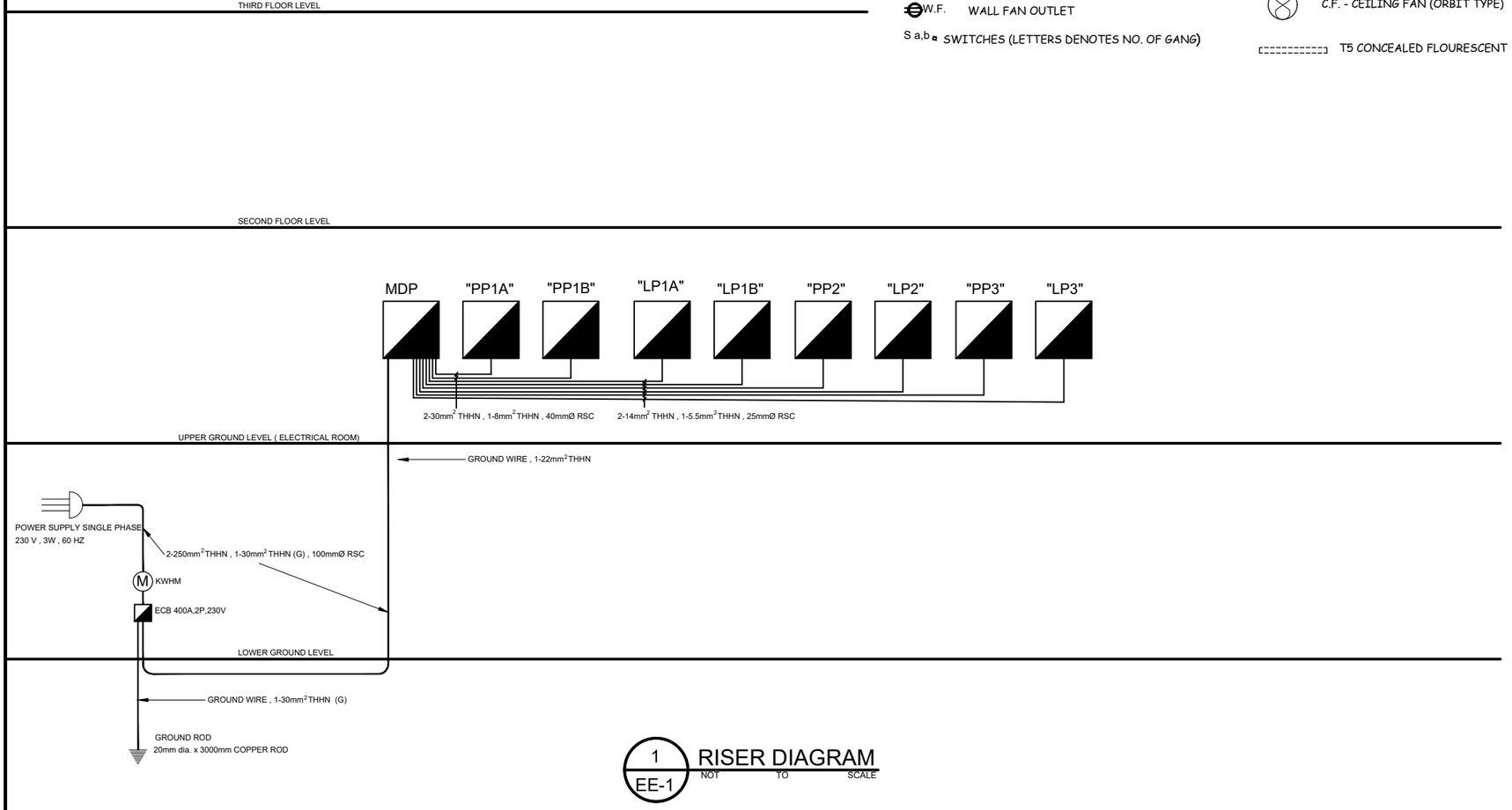
- ALL ELECTRICAL WORKS AND INSTALLATIONS SHALL CONFORM WITH THE LATEST EDITION OF THE PHILIPPINE ELECTRICAL CODE, NATIONAL ELECTRICAL CODE RULES AND REGULATIONS OF THE ENFORCING AUTHORITY AND POWER COMPANY.
- SERVICE ENTRANCE SHALL BE SINGLE - PHASE , 60 HZ. SYSTEM
- ALL CONDUITS SHALL BE IN POLYVINYL CHLORIDE (PVC) EXCEPT FOR MAIN SERVICE ENTRANCE WHICH IS RSC PIPE
- ALL WIRINGS SHALL BE INSTALLED IN CONDUIT PIPES EMBEDDED INSIDE HOLLOW BLOCK STRUCTURES, SLABS, WALLS, COLUMNS, PARTITIONS AND /OR RUN CONCEALED BETWEEN DOUBLE WALL WOODEN PARTITIONS AND INSIDE THE CEILING SPACES WHERE THE USE OF CONCEALED CONDUIT WIRING IS IMPRACTICABLE, SURFACE METAL WIRING MAY BE USED.
- UNLESS OTHERWISE SPECIFIED, THE SMALLEST WIRE AND CONDUIT PIPE TO BE USED SHALL BE NO. 3.5 MM² THW AND 20 MM² DIA. PVC, RESPECTIVELY.
- WHEREVER REQUIRED AND NECESSARY, JUNCTION BOXES AND FULL BOXES OF PROPER SIZES SHALL BE INSTALLED AT CONVENIENT AND INCONSPICOUS LOCATION, ALTHOUGH SUCH BOXES ARE NOT SHOWN IN THE PLANS NOR MENTIONED IN THE SPECIFICATIONS.
- ALL WALL OUTLETS SHALL BE INSTALLED AT THE FOLLOWING HEIGHTS ABOVE THE FINISHED FLOOR LINE, UNLESS OTHERWISE NOTED :

WALL SWITCHES	1200 MM.
DUPLEX CONVENIENCE OUTLET	300 MM. 0R 150 MM ABOVE WORKTABLE
AIRCONDITIONING UNIT OUTLET	AT CONV. HEIGHT NEAR THE EQPT.
TEL. & CABLE TV OUTLET	300 MM. OR 150 MM. ABOVE WORKTABLE
WATERHEATER OUTLET	AT CONV. HEIGHT NEAR THE EQPT.
PANEL BOARD	1800 MM. FROM CENTER OF PANEL TO F.F.L.

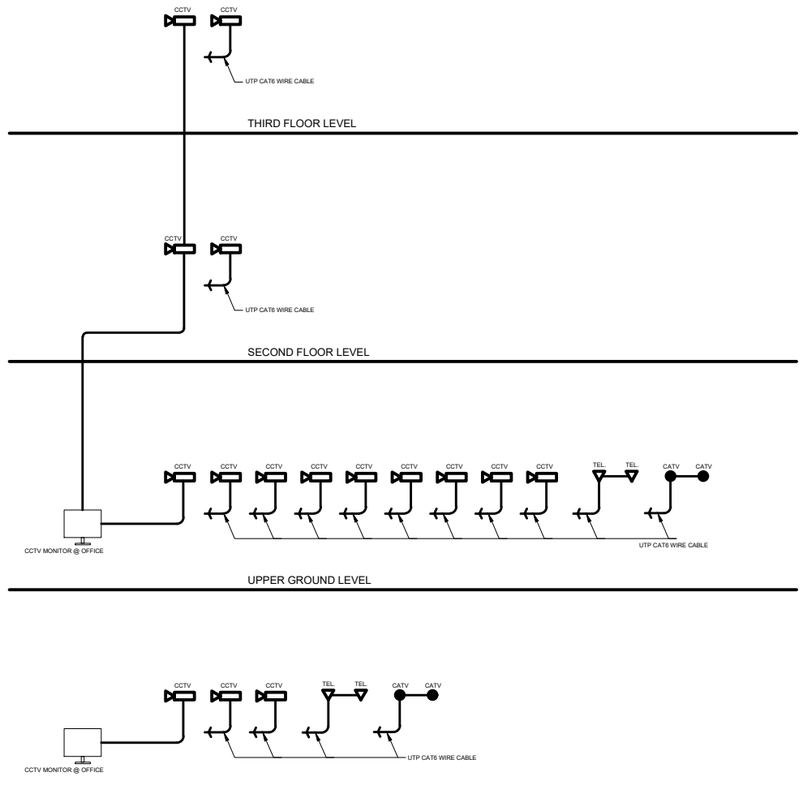
- ALL WORKS AND INSTALLATIONS SHALL BE DONE UNDER CLOSE SUPERVISION OF A REGISTERED ELECTRICAL ENGINEER.

ELECTRICAL SYMBOLS :

- KILOWATT HOUR METER
- SERVICE ENTRANCE
- BRANCH CIRCUIT HOMERUNTO PANELBOARD
- "LP" PANELBOARD
- PORCELAIN RECEPTACLE WITH 9 WATTS LED BULB
- PINLIGHT WITH LED BULB (5 WATTS)
- ENCLOSED AIR CIRCUIT BREAKER (RATED AS INDICATED ON THE PLANS)
- DUPLEX CONVENIENCE OUTLET
- ACU AIRCONDITIONING OUTLET
- WP WEATHER PROOF OUTLET
- R RANGE OUTLET
- REF REFREGERATOR OUTLET
- W.F. WALL FAN OUTLET
- S a,b,c SWITCHES (LETTERS DENOTES NO. OF GANG)
- CTV CABLE TV OUTLET
- T TELEPHONE OUTLET
- FM FLOOR MOUNTED CONDUIT OUTLET
- WP WEATHERPROOF OUTLET
- R RANGE OUTLET
- REF REFRIGERATOR OUTLET
- HD HAND DRYER
- EMBEDDED CONDUIT
- CONCEALED CONDUIT
- WL WALL LAMP
- EX CEILING MOUNTED EXHAUST FAN
- CCTV MONITOR
- P.B - PULL BOX / SQUARE BOX
- F.B - EXHAUST FAN
- C.F. - CEILING FAN (ORBIT TYPE)
- T5 CONCEALED FLOURESCENT



1 / EE-1 RISER DIAGRAM
NOT TO SCALE



2 / EE-1 TELEPHONE,CATV & CCTV DIAGRAM
NOT TO SCALE

SCHEDULE OF LOADS : MDP

CKT. NO.	LOAD DESCRIPTION	VA PER CKT.	VOLTS	BRANCH / CKT. BREAKER			SIZE OF HOMERUN (WIRES & CONDUITS)
				AF	P	AT	
1	PP1A	15760	230	100	2	100	2 - 30 mm² THHN +1-8mm² THHN (G) , 40 mm Ø PVC
2	PP1B	18440	230	100	2	100	2 - 30 mm² THHN +1-8mm² THHN (G) , 40 mm Ø PVC
3	LP1A	9600	230	60	2	100	2 - 14 mm² THHN +1-5.5mm² THHN (G) , 25 mm Ø PVC
4	LP1B	10700	230	60	2	100	2 - 14 mm² THHN +1-5.5mm² THHN (G) , 25 mm Ø PVC
5	LP2	14800	230	60	2	100	2 - 14 mm² THHN +1-5.5mm² THHN (G) , 25 mm Ø PVC
6	LP3	14800	230	60	2	100	2 - 14 mm² THHN +1-5.5mm² THHN (G) , 25 mm Ø PVC
7	PP2	10240	230	60	2	100	2 - 14 mm² THHN +1-5.5mm² THHN (G) , 25 mm Ø PVC
8	PP3	10240	230	60	2	100	2 - 14 mm² THHN +1-5.5mm² THHN (G) , 25 mm Ø PVC
	TOTAL	104580					

TOTAL CONNECTED LOAD = 104580VA USE : 2 - 250 mm²THHN, 1-30 mm² THHN (G) IN 75 mmØ RSC.

I @ 80 % D. F. = $\frac{104580(.80)}{230}$ = 363.76 AMPS. MCCB : 400AT, 2P, 230V, 400AF
Use minimum of 10kAIC for all MCCB

SCHEDULE OF LOADS : LIGHTING "LP1A"

CKT. NO.	LOAD DESCRIPTION	VA PER CKT.	VOLTS	BRANCH / CKT. BREAKER			SIZE OF HOMERUN (WIRES & CONDUITS)
				AF	P	AT	
1	LIGHTING OUTLET	1700	230	50	2	20	2 - 3.5 mm² THHN, 20 mm ØC PVC
2	↓	1700	↓	↓	↓	↓	↓
3	↓	1000	↓	↓	↓	↓	↓
4	↓	1200	↓	↓	↓	↓	↓
5	SPARE	1000					—
6	SPARE	1500					—
7	SPARE	1500	↓	↓	↓	↓	—
	TOTAL	9600					

TOTAL CONNECTED LOAD = 9600 VA USE : 2 - 14 mm²THHN, 1-5.5 mm² THHN (G) IN 32 mmØ RSC.

I @ 80 % D. F. = $\frac{9600(.80)}{230}$ = 33.39 AMPS. MCCB : 60AT, 2P, 230V, 100AF, BOLT ON TYPE
Use minimum of 10kAIC for all MCCB

SCHEDULE OF LOADS : LIGHTING "LP1B"

CKT. NO.	LOAD DESCRIPTION	VA PER CKT.	VOLTS	BRANCH / CKT. BREAKER			SIZE OF HOMERUN (WIRES & CONDUITS)
				AF	P	AT	
1	LIGHTING OUTLET	1600	230	50	2	20	2 - 3.5 mm² THHN, 20 mm ØC PVC
2	↓	1600	↓	↓	↓	↓	↓
3	↓	1400	↓	↓	↓	↓	↓
4	↓	1700	↓	↓	↓	↓	↓
5	↓	1400	↓	↓	↓	↓	↓
6	↓	1500	↓	↓	↓	↓	↓
7	SPARE	1500	↓	↓	↓	↓	—
	TOTAL	10700					

TOTAL CONNECTED LOAD = 10700 VA USE : 2 - 14 mm²THHN, 1-5.5 mm² THHN (G) IN 32 mmØ RSC.

I @ 80 % D. F. = $\frac{10700(.80)}{230}$ = 37.22 AMPS. MCCB : 60AT, 2P, 230V, 100AF, BOLT ON TYPE
Use minimum of 10kAIC for all MCCB

SCHEDULE OF LOADS : TYPICAL LIGHTING "LP2" & "LP3"

CKT. NO.	LOAD DESCRIPTION	VA PER CKT.	VOLTS	BRANCH / CKT. BREAKER			SIZE OF HOMERUN (WIRES & CONDUITS)
				AF	P	AT	
1	LIGHTING OUTLET	1600	230	50	2	20	2 - 3.5 mm² THHN, 20 mm ØC PVC
2	↓	1600	↓	↓	↓	↓	↓
3	↓	1600	↓	↓	↓	↓	↓
4	↓	1600	↓	↓	↓	↓	↓
5	↓	1600	↓	↓	↓	↓	↓
6	↓	1600	↓	↓	↓	↓	↓
7	↓	1600	↓	↓	↓	↓	↓
8	↓	1600	↓	↓	↓	↓	↓
9	↓	1000	↓	↓	↓	↓	↓
10	SPARE	1000	↓	↓	↓	↓	—
	TOTAL	14800					

TOTAL CONNECTED LOAD = 14800 VA USE : 2 - 14 mm²THHN, 1-5.5 mm² THHN (G) IN 32 mmØ RSC.

I @ 80 % D. F. = $\frac{14800(.80)}{230}$ = 51.48 AMPS. MCCB : 60AT, 2P, 230V, 100AF, BOLT ON TYPE
Use minimum of 10kAIC for all MCCB

SCHEDULE OF LOADS : POWER "PP1A"

CKT. NO.	LOAD DESCRIPTION	VA PER CKT.	VOLTS	BRANCH / CKT. BREAKER			SIZE OF HOMERUN (WIRES & CONDUITS)
				AF	P	AT	
1	CONVENIENCE OUTLET	1620	230	50	2	20	2 - 3.5 mm² THHN, 20 mm ØC PVC
2	↓	1260	↓	↓	↓	↓	↓
3	↓	1260	↓	↓	↓	↓	↓
4	EXHAUST FAN FULL BOX	1000	↓	↓	↓	↓	↓
5	CEILING FAN	600	↓	↓	↓	↓	↓
6	CEILING FAN	800	↓	↓	↓	↓	↓
7	SPLIT TYPE (1.5 TR)	3220	↓	↓	↓	30	2 - 5.5 mm² THHN,1-3.5mm² THHN, 25 mm ØC
8	MOTOR PUMP	3000	↓	↓	↓	30	2 - 5.5 mm² THHN,1-3.5mm² THHN, 25 mm ØC
9	MOTOR PUMP	3000	↓	↓	↓	30	2 - 5.5 mm² THHN,1-3.5mm² THHN, 25 mm ØC
10	SPARE		↓	↓	↓		—
11	SPARE		↓	↓	↓		—
	TOTAL	15760					

TOTAL CONNECTED LOAD = 15760 VA USE : 2 - 30 mm²THHN, 1-8 mm² THHN (G) IN 40 mmØ RSC.

I @ 80 % D. F. = $\frac{15760(.80)}{230}$ +.25 (14) = 58.32 AMPS. MCCB : 100AT, 2P, 230V, 100AF,BOLT ON TYPE
Use minimum of 10kAIC for all MCCB

SCHEDULE OF LOADS : POWER "PP1B"

CKT. NO.	LOAD DESCRIPTION	VA PER CKT.	VOLTS	BRANCH / CKT. BREAKER			SIZE OF HOMERUN (WIRES & CONDUITS)
				AF	P	AT	
1	CONVENIENCE OUTLET	1620	230	50	2	20	2 - 3.5 mm² THHN, 20 mm ØC PVC
2	↓	1620	↓	↓	↓	↓	↓
3	↓	1260	↓	↓	↓	↓	↓
4	↓	1080	↓	↓	↓	↓	↓
5	↓	1080	↓	↓	↓	↓	↓
6	↓	720	↓	↓	↓	↓	↓
7	SPLIT TYPE (1.5 TR)	3220	↓	↓	↓	30	2 - 5.5 mm² THHN,1-3.5mm² THHN, 25 mm ØC
8	SPLIT TYPE (1.5 TR)	3220	↓	↓	↓	30	2 - 5.5 mm² THHN,1-3.5mm² THHN, 25 mm ØC
9	SPLIT TYPE (1.5 TR)	3220	↓	↓	↓	30	2 - 5.5 mm² THHN,1-3.5mm² THHN, 25 mm ØC
10	CEILING FAN	700	↓	↓	↓	20	—
11	CEILING FAN	700	↓	↓	↓	20	—
12	SPARE		↓	↓	↓		—
	TOTAL	18440					

TOTAL CONNECTED LOAD = 18440 VA USE : 2 - 30 mm²THHN, 1-8 mm² THHN (G) IN 40 mmØ RSC.

I @ 80 % D. F. = $\frac{18440(.80)}{230}$ +.25 (14) = 67.64 AMPS. MCCB : 100AT, 2P, 230V, 100AF, BOLT ON TYPE
Use minimum of 10kAIC for all MCCB

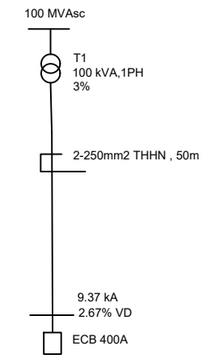
SCHEDULE OF LOADS : TYPICAL POWER "PP2" & "PP3"

CKT. NO.	LOAD DESCRIPTION	VA PER CKT.	VOLTS	BRANCH / CKT. BREAKER			SIZE OF HOMERUN (WIRES & CONDUITS)
				AF	P	AT	
1	CONVENIENCE OUTLET	1620	230	50	2	20	2 - 3.5 mm² THHN, 20 mm ØC PVC
2	↓	1620	↓	↓	↓	↓	↓
3	↓	1080	↓	↓	↓	↓	↓
4	↓	1620	↓	↓	↓	↓	↓
5	↓	1620	↓	↓	↓	↓	↓
6	↓	1080	↓	↓	↓	↓	↓
7	CEILING FAN	800	↓	↓	↓	↓	↓
8	CEILING FAN	800	↓	↓	↓	↓	↓
9	SPARE		↓	↓	↓	↓	—
	TOTAL	10240					

TOTAL CONNECTED LOAD = 10240VA USE : 2 - 14 mm²THHN, 1-5.5 mm² THHN (G) IN 32 mmØ RSC.

I @ 80 % D. F. = $\frac{10240(.80)}{230}$ +.25 (14) = 39.12 AMPS. MCCB : 60AT, 2P, 230V, 100AF, BOLT ON TYPE
Use minimum of 10kAIC for all MCCB

VOLTAGE DROP & SHORT CIRCUIT CALCULATION



SHORT CIRCUIT CALCULATION

MVAb = 100

Calculate Short Circuit Fault at ECB:

$Xu = \frac{MVAb}{MVAsc.} = \frac{100}{100} = 1$ p.u.

$XT1 = \%Zt1 \times \frac{MVAb}{MVAt1.} = 0.03 \times \frac{100}{0.10} = 30$ p.u.

$Xc = Zc/305m \times L \times \frac{MVAb}{kV^2} = 0.05/305 \times 50 \times \frac{100}{0.23^2} = 15.4$ p.u.

Zth = Xu + Xt1 + Xc = 1 + 30 + 15.4 = 46.4 p.u.

$Ifsc = \frac{MVAb \times 10^6}{V \times Zth} = \frac{100 \times 10^6}{230 \times 46.4} = 9{,}370$ Amps or 9.37 kA

Calculate Votage Drop at ECB:

E = IR

I = 363 Amp.

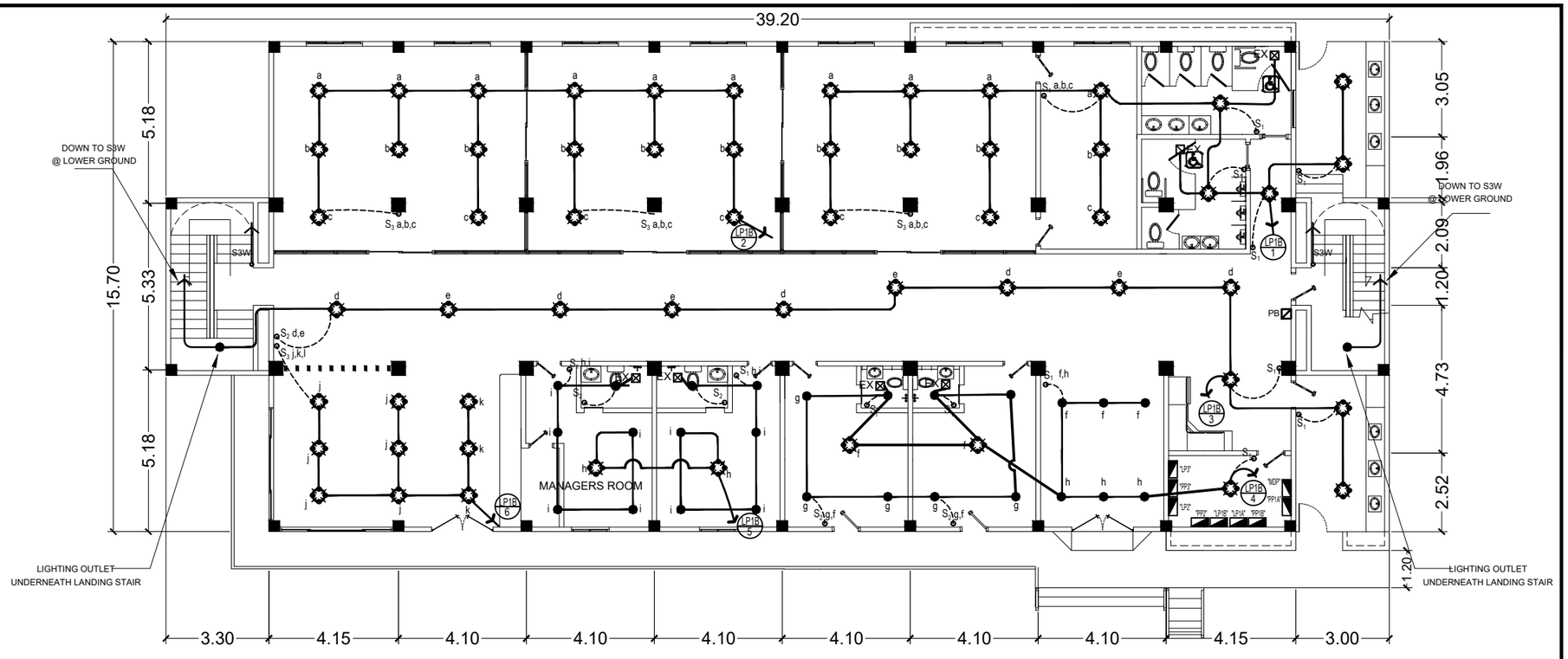
Conductor : 250 mm2 , Z = 0.050/305m (Table 9.1.1.9 PEC)

Length - 50 m

R = 0.050/305m x 50m = 0.0082 ohm

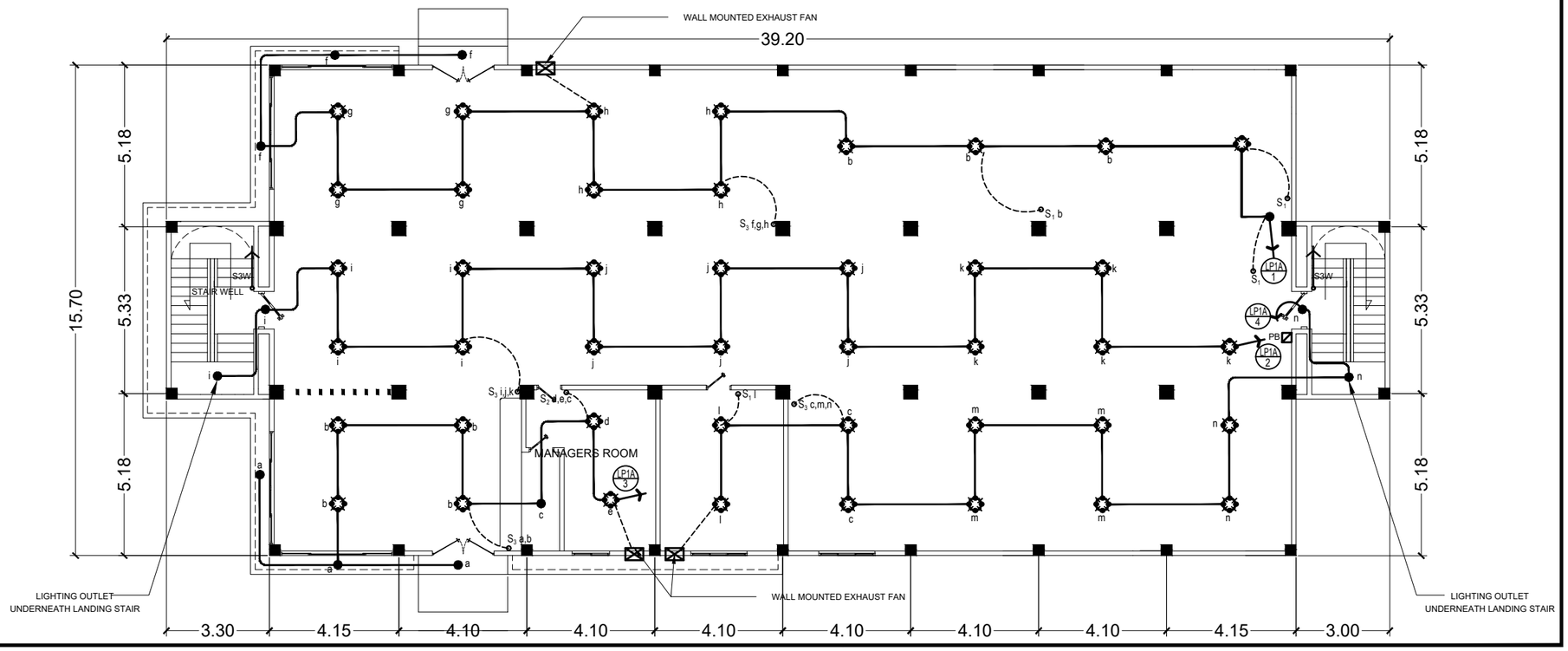
VD = 2 IR = 2 x 374 x 0.0082 = 6.13 volts

$\%VD = \frac{6.13 \times 100\ \%}{230} = 2.67\%$



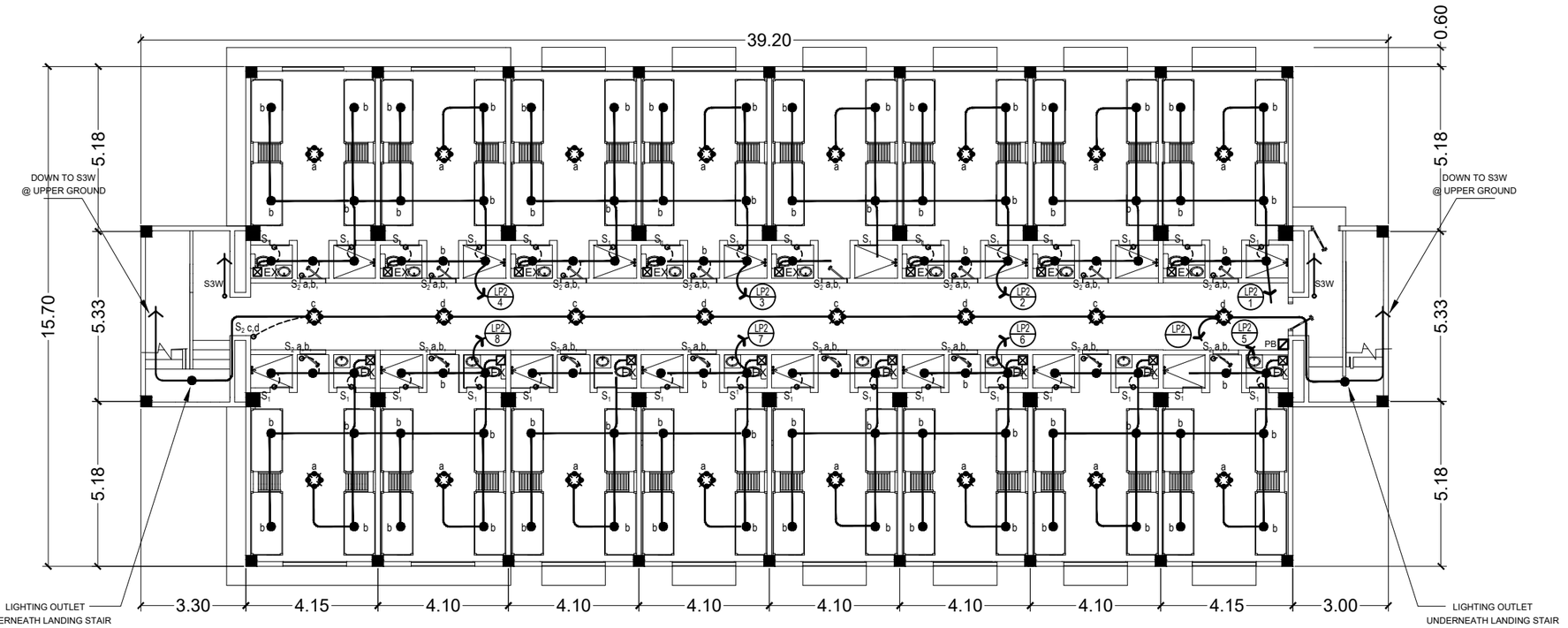
2 / EE-3 UPPER GROUND FLOOR LIGHTING LAYOUT

SCALE 1:100 M.



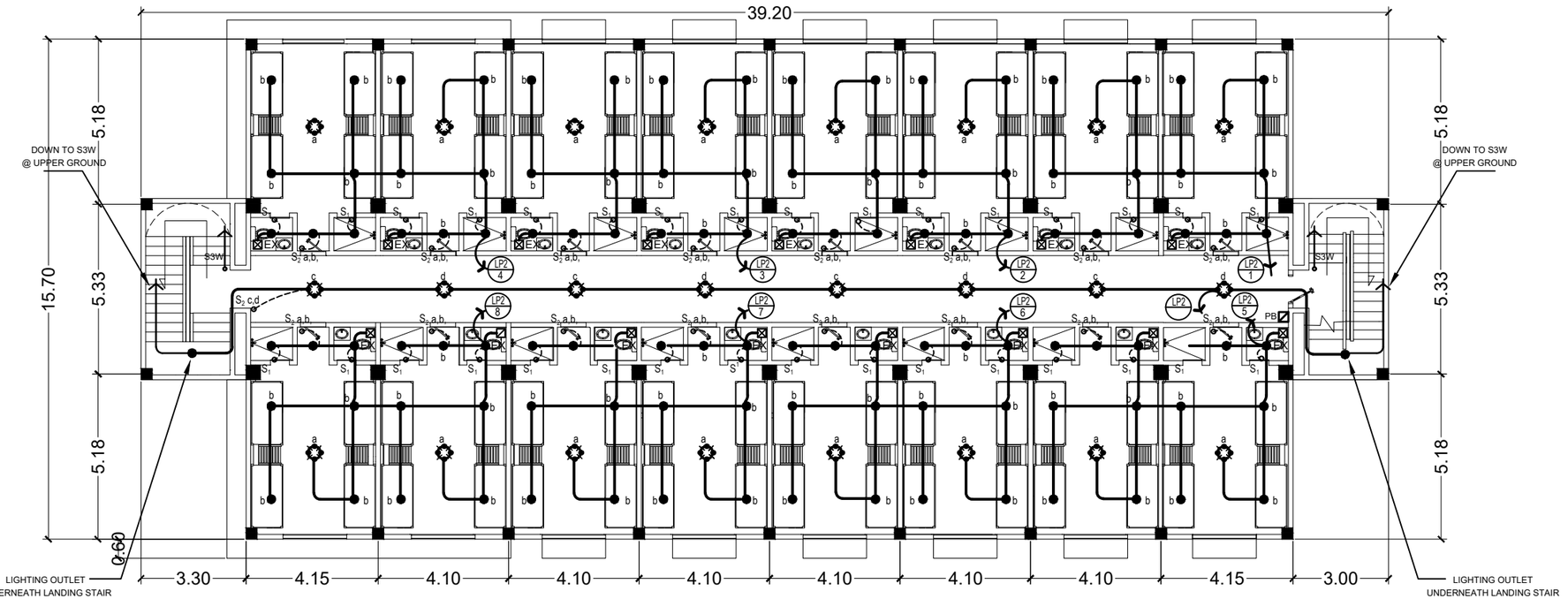
1 / EE-3 LOWER GROUND FLOOR LIGHTING LAYOUT

SCALE 1:100 M.



2 / EE-4 THIRD FLOOR LIGHTING LAYOUT

SCALE 1:100 M.

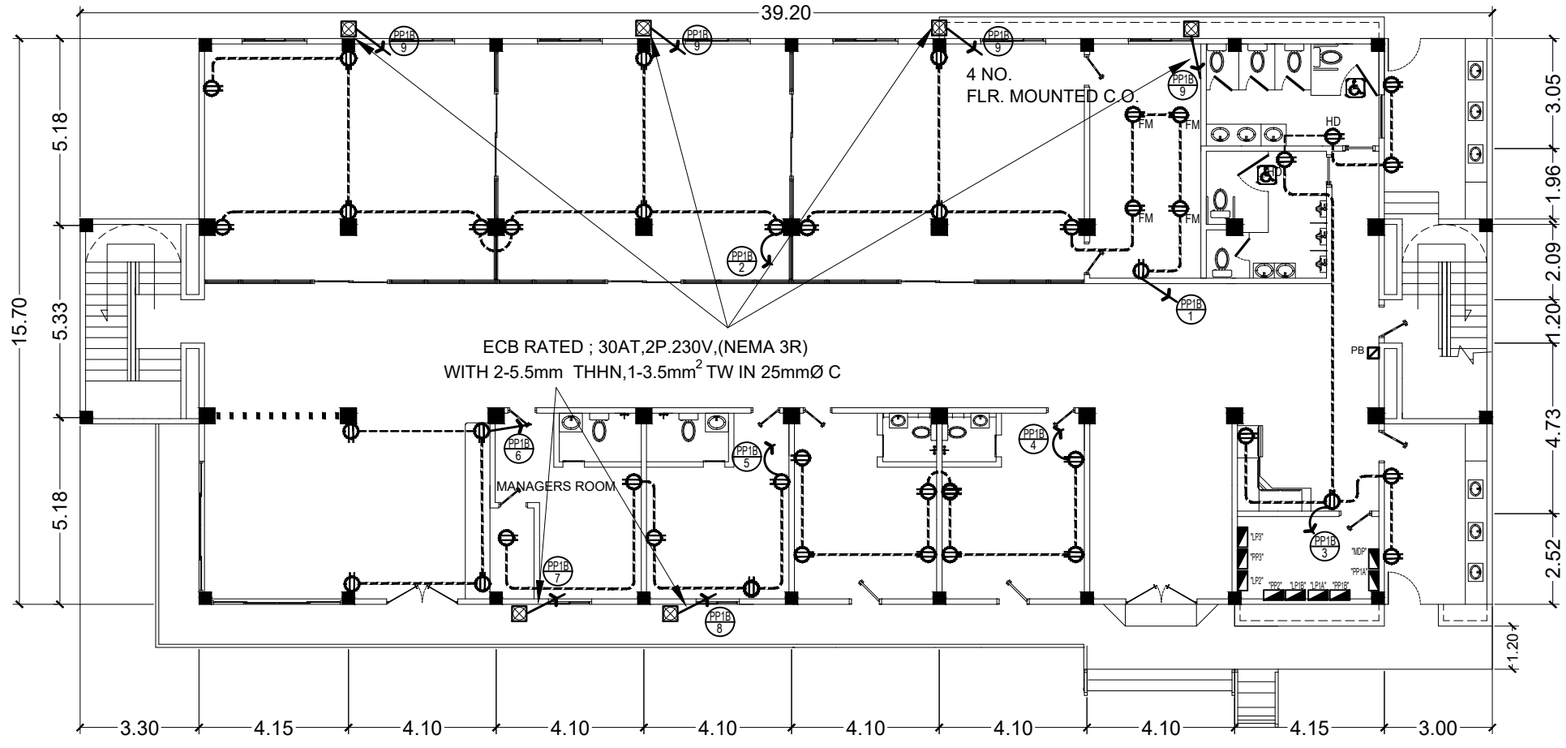


1 / EE-4 SECOND FLOOR LIGHTING LAYOUT

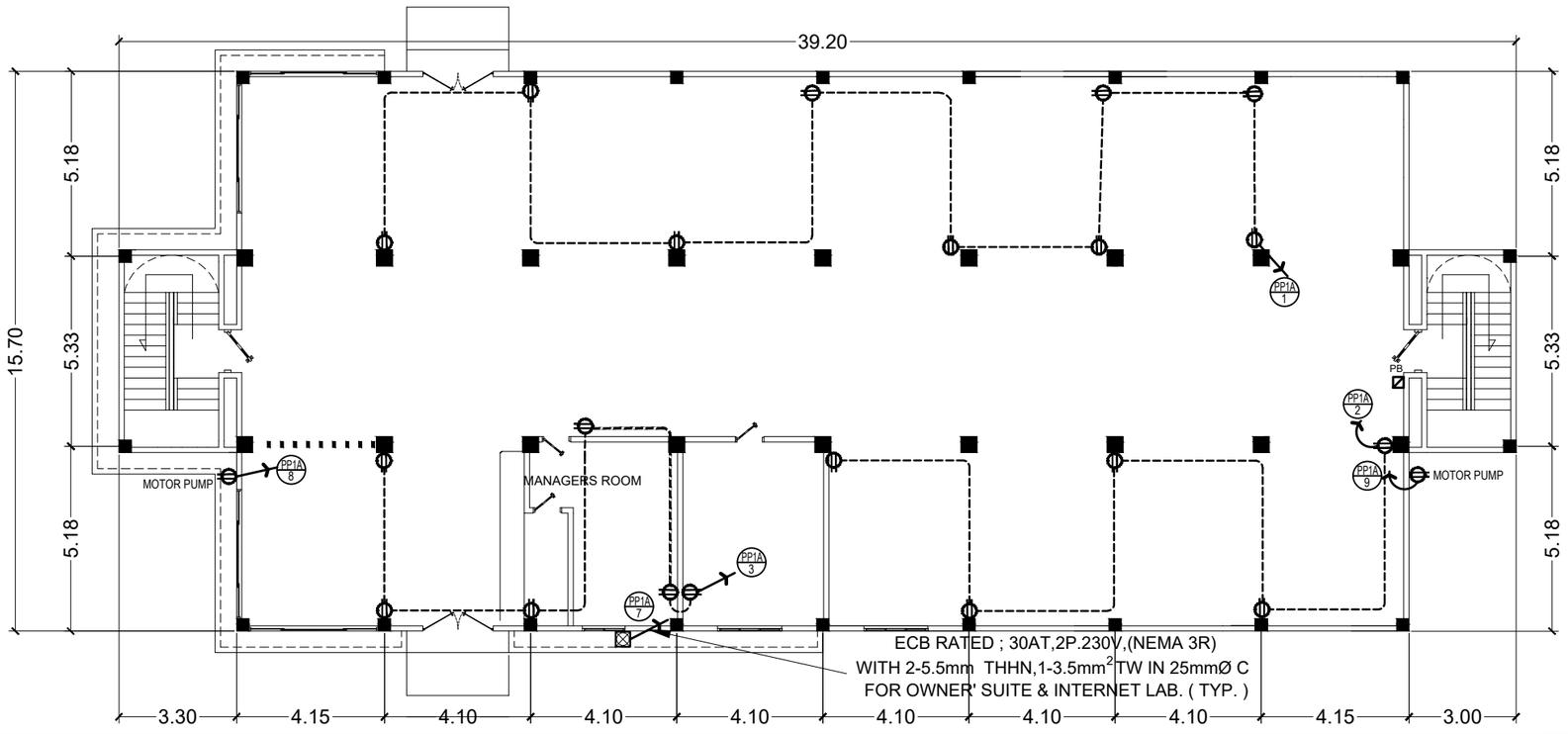
SCALE 1:100 M.

NOTES :

- IN EVERY BUNKBEDS AT THE DORMERS' ROOM(TWO OUTLETS), 1 @ THE STUDY TABLE AND 1 @ THE BED AREA.



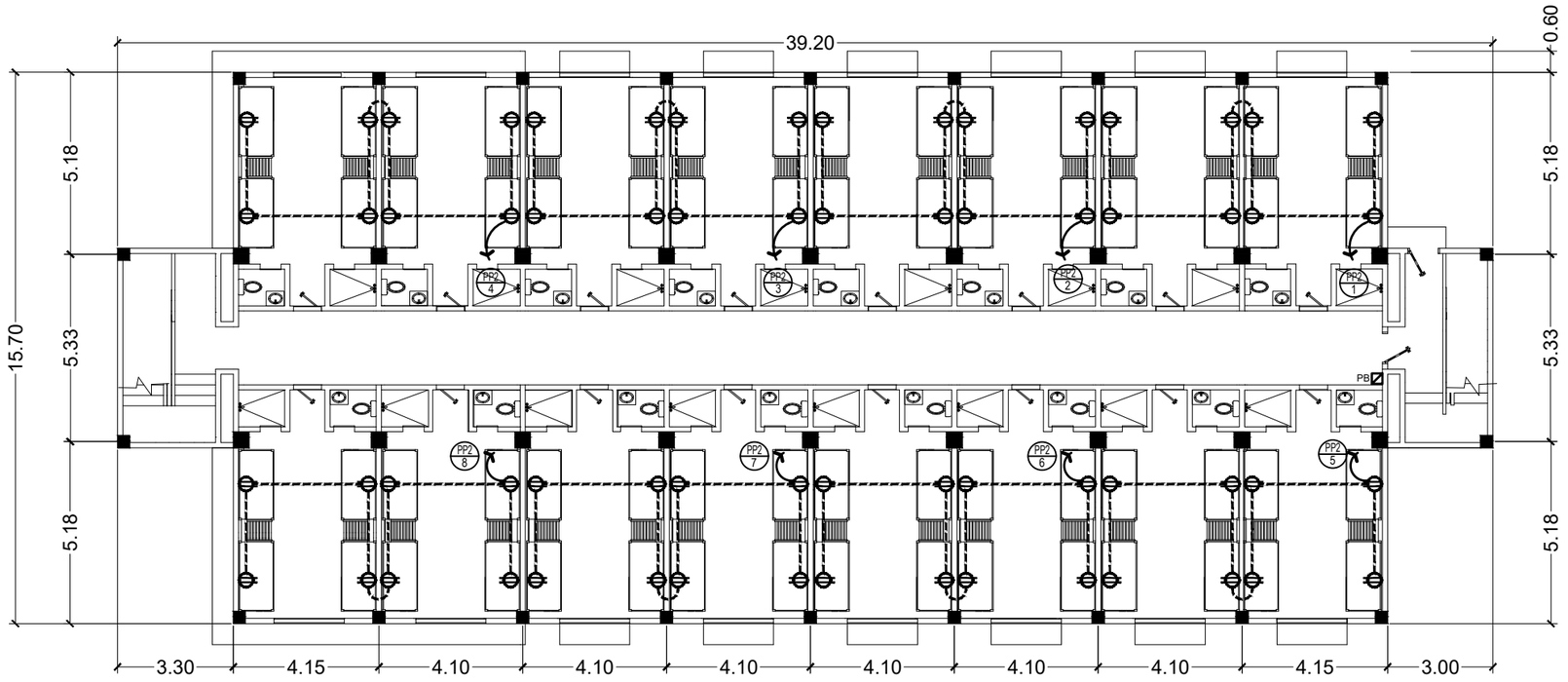
2 / EE-5 UPPER GROUND FLOOR POWER LAYOUT
SCALE 1:100 M.



1 / EE-5 LOWER GROUND FLOOR POWER LAYOUT
SCALE 1:100 M.

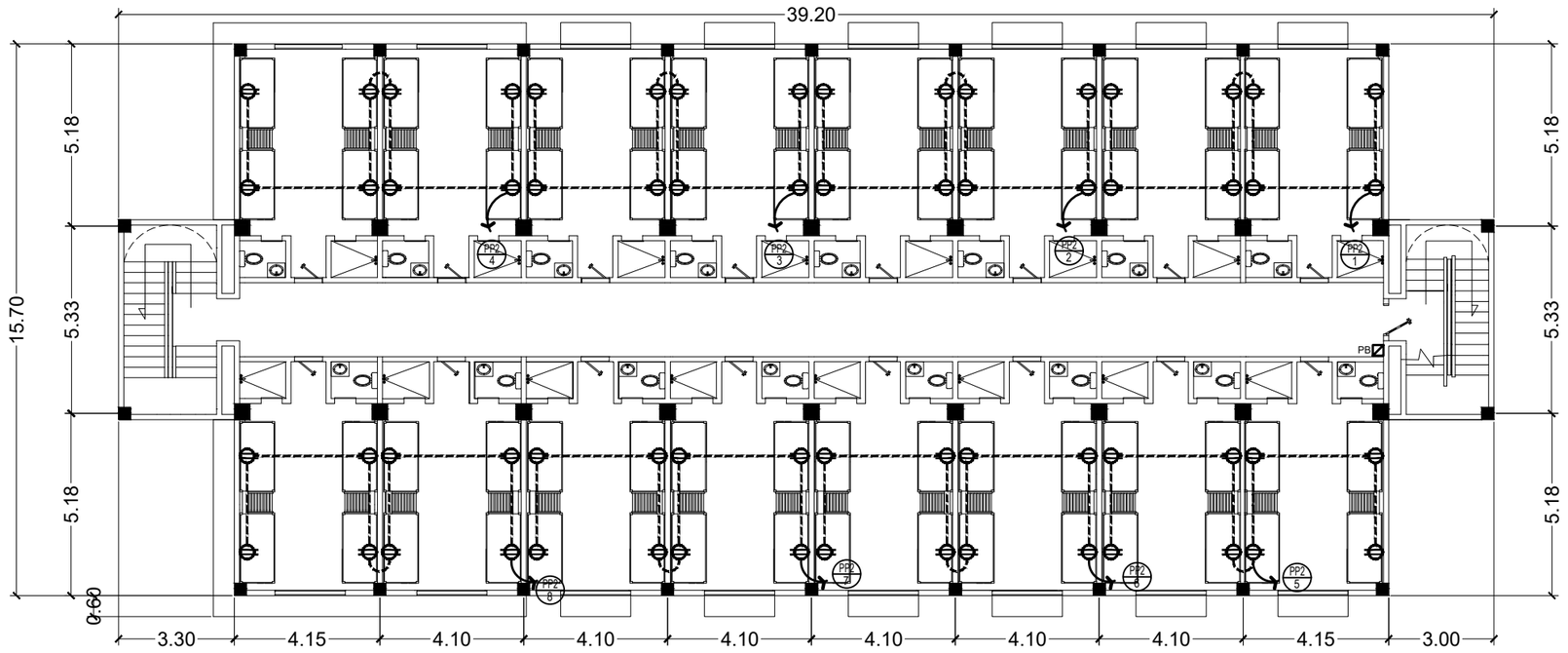
NOTES :

- IN EVERY BUNKBEDS AT THE DORMERS' ROOM(TWO OUTLETS), 1 @ THE STUDY TABLE AND 1 @ THE BED AREA.



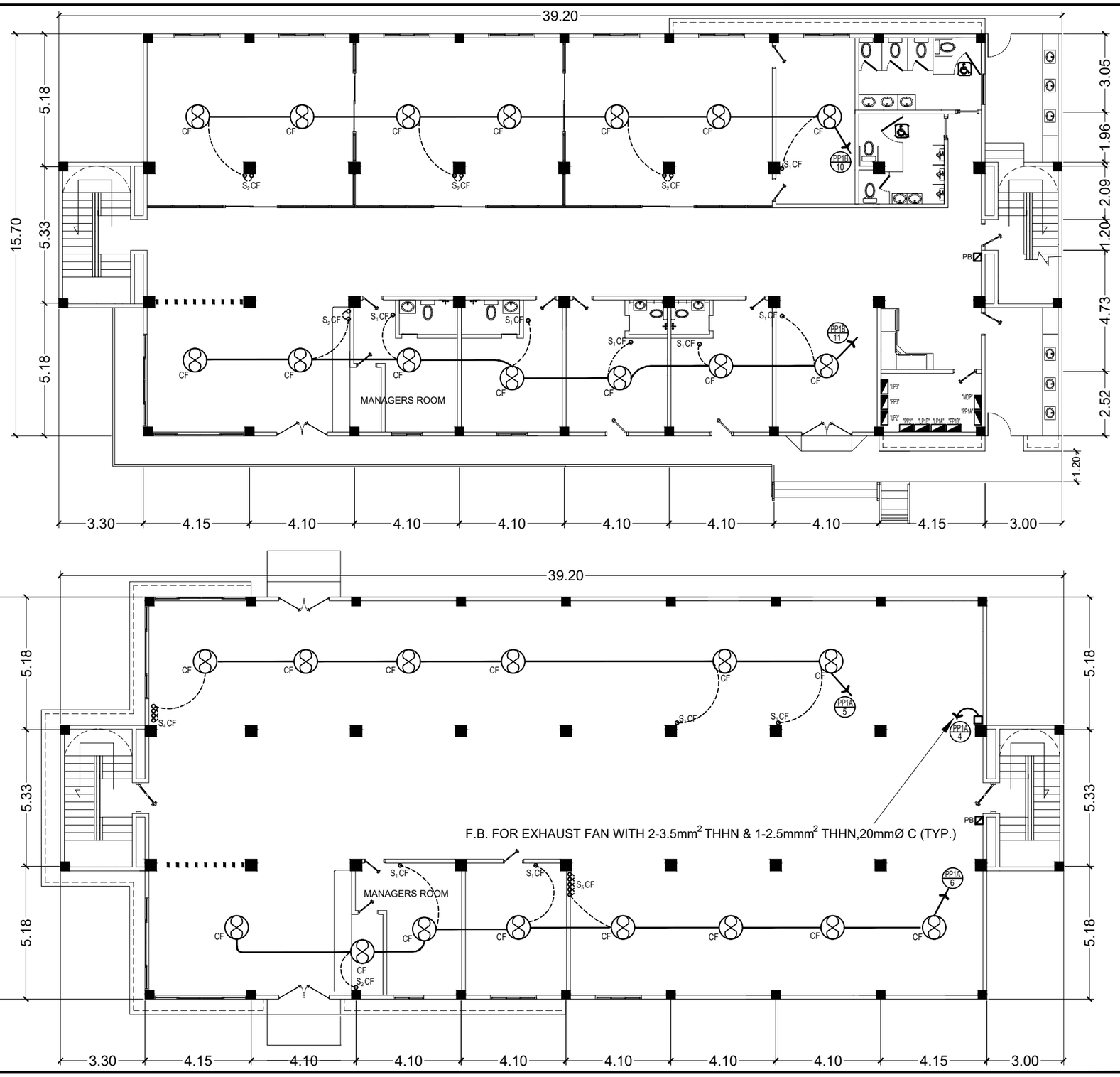
2 EE-6 THIRD FLOOR POWER LAYOUT

SCALE 1:100 M.



1 EE-6 SECOND FLOOR POWER LAYOUT

SCALE 1:100 M.

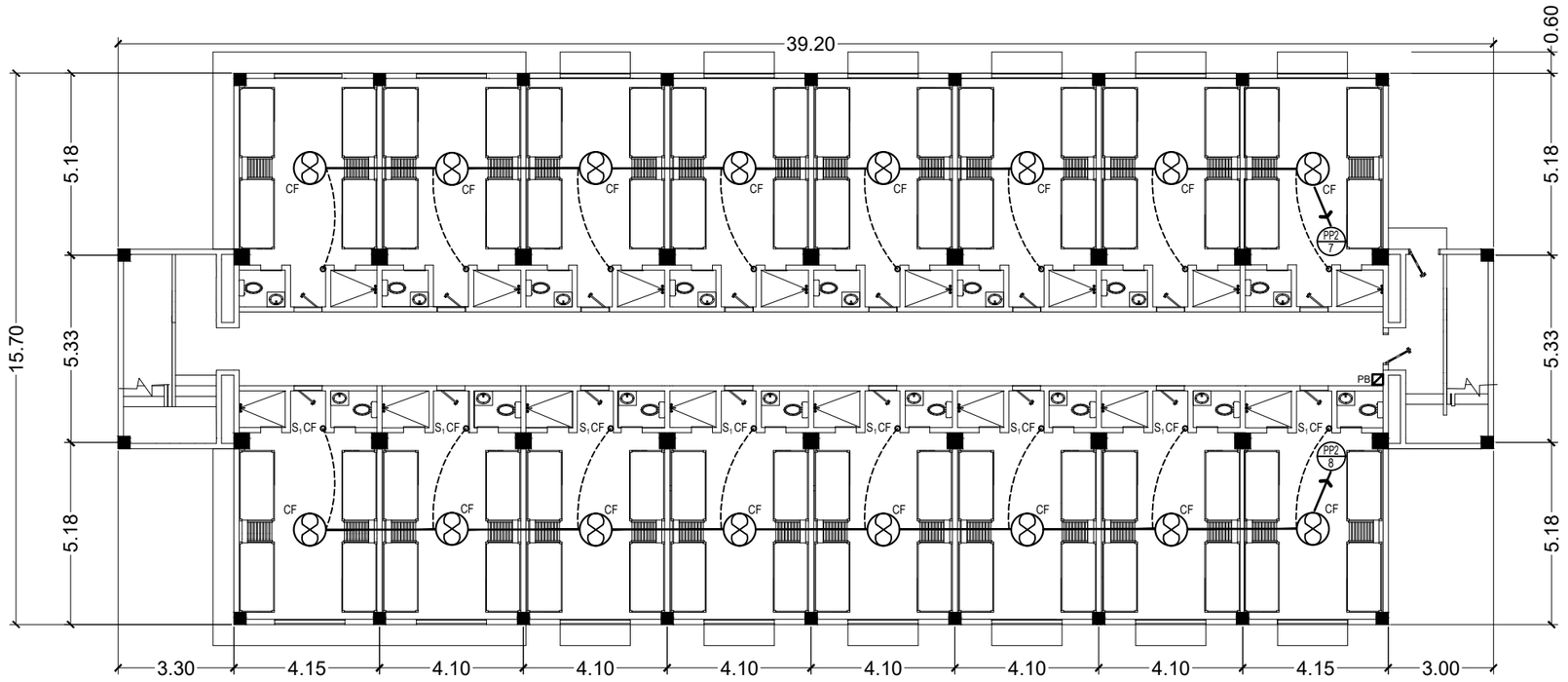


2 / EE-7 UPPER GROUND FLOOR CEILING FAN LAYOUT

SCALE 1:100 M.

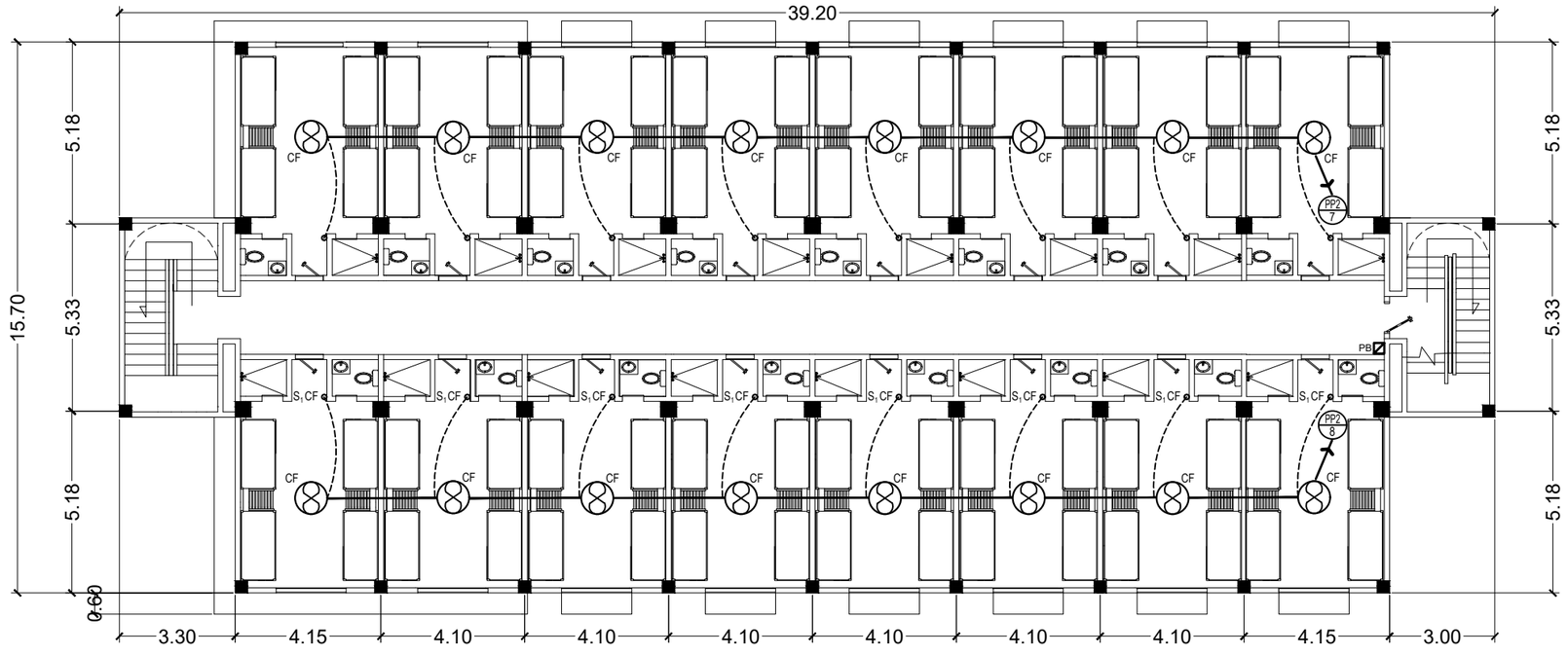
1 / EE-7 LOWER GROUND FLOOR CEILING FAN LAYOUT

SCALE 1:100 M.



2 EE-8 THIRD FLOOR CEILING FAN LAYOUT

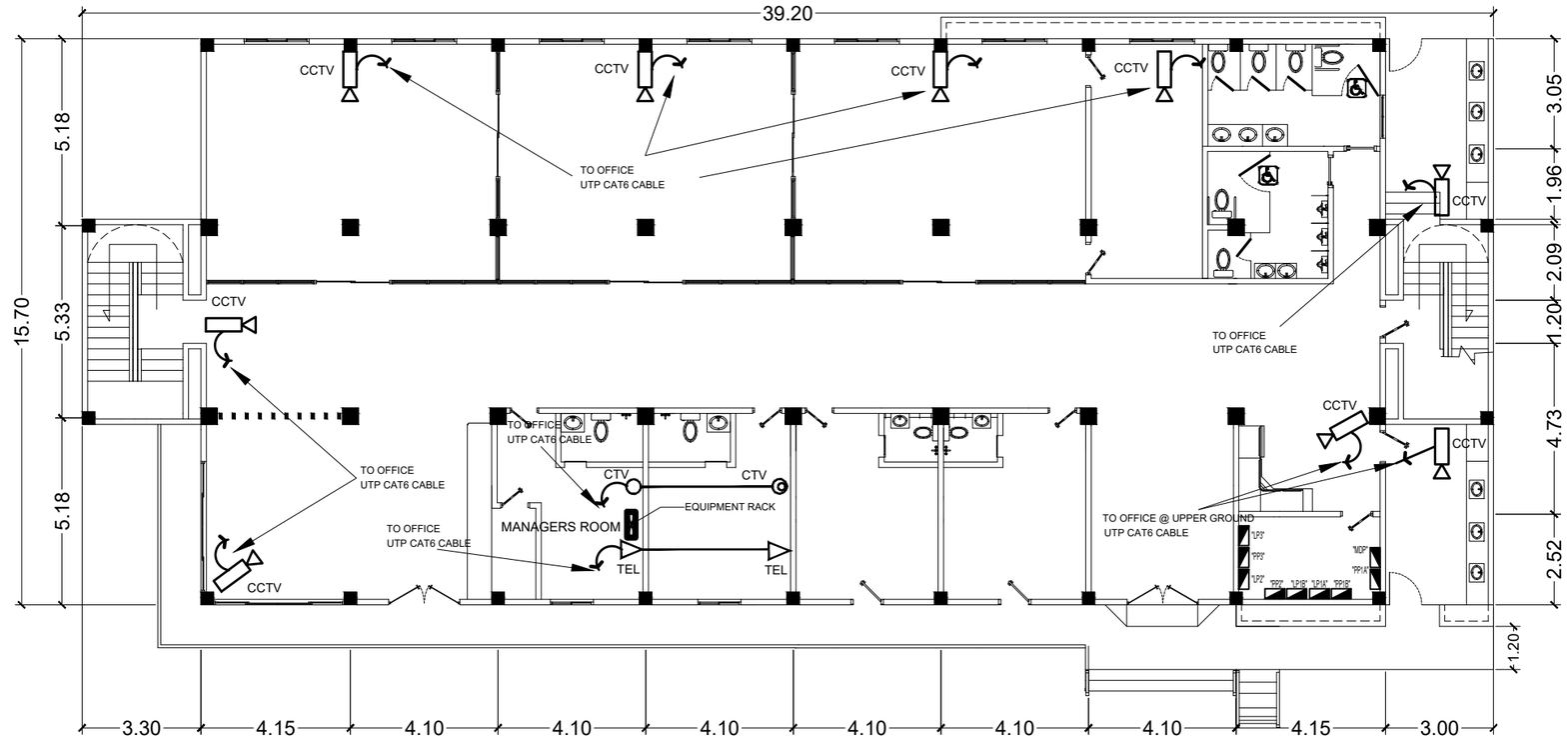
SCALE 1:100 M.



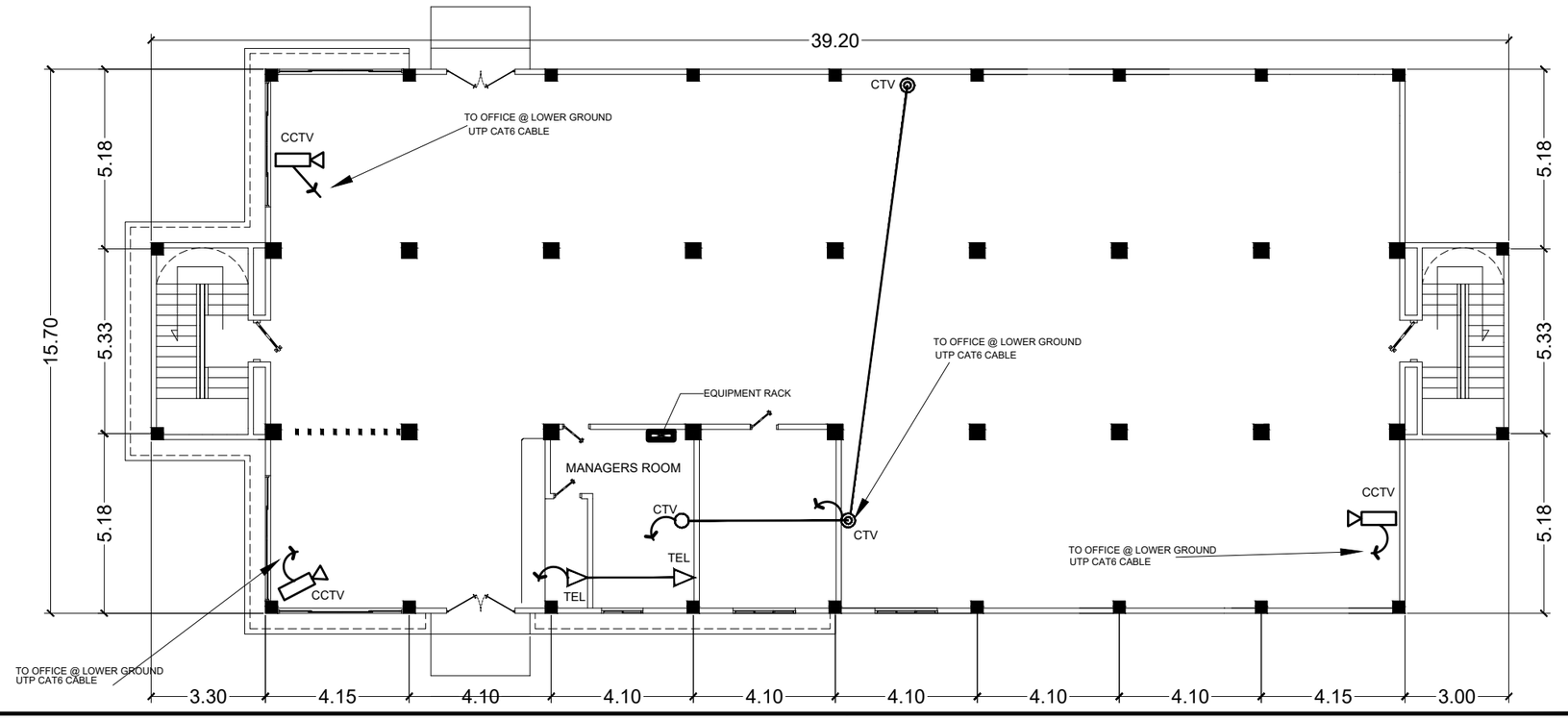
1 EE-8 SECOND FLOOR CEILING FAN LAYOUT

SCALE 1:100 M.

NOTE:
- USE UTP CAT6 TO ALL CONNECTION CABLE.

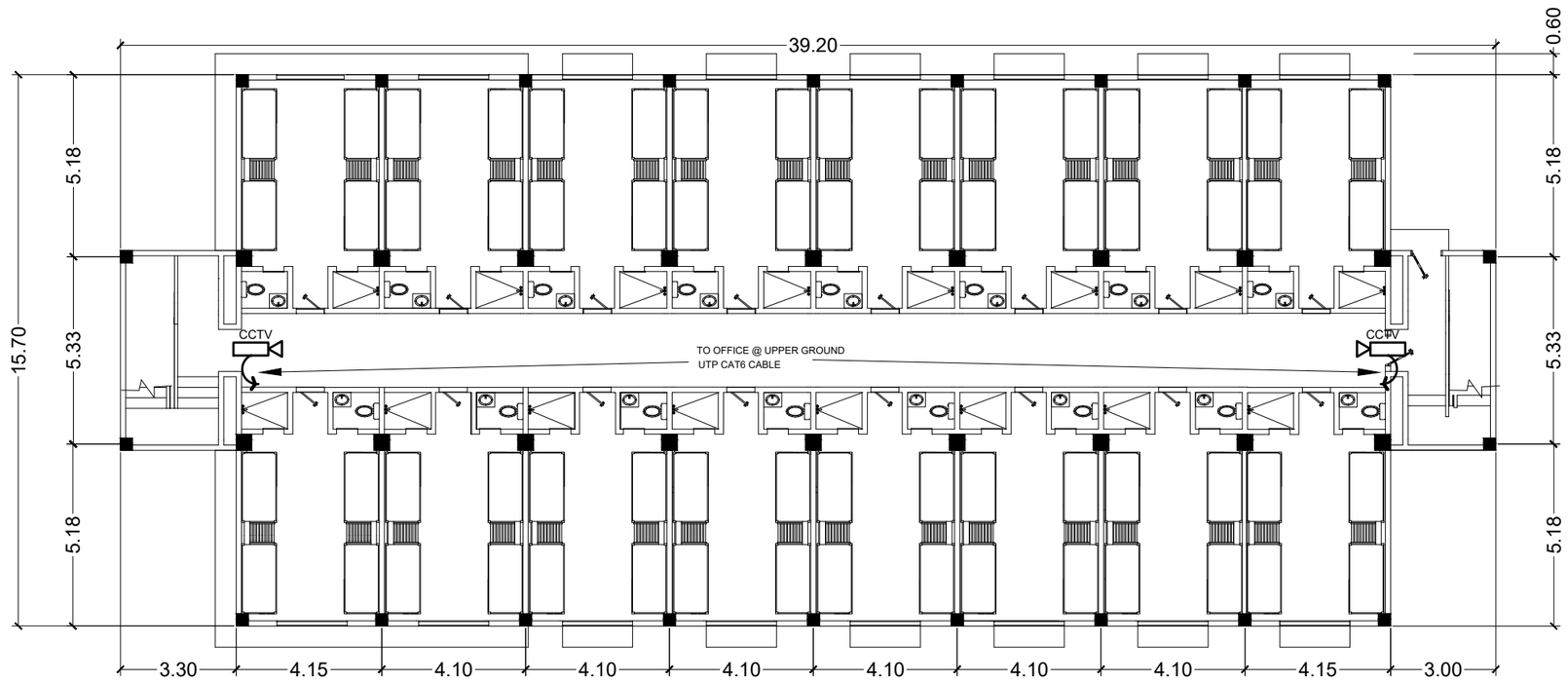


2 AUX-1 UPPER GROUND FLOOR TEL.,CATV & CCTV LAYOUT
SCALE 1:100 M.

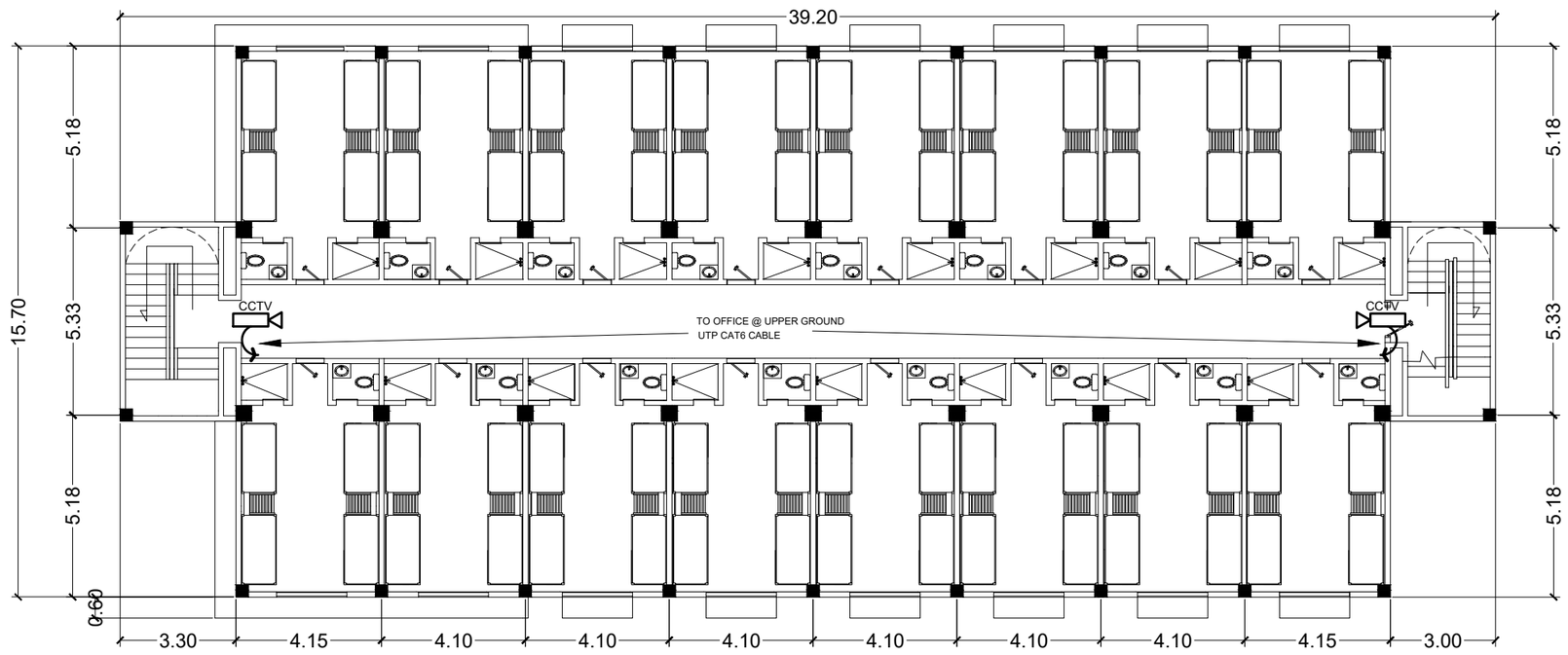


1 AUX-1 LOWER GROUND FLOOR TEL.,CATV & CCTV LAYOUT
SCALE 1:100 M.

NOTE:
- USE UTP CAT6 TO ALL CONNECTION CABLE.



2 AUX-2 THIRD FLOOR TEL.,CATV & CCTV LAYOUT
SCALE 1:100 M.

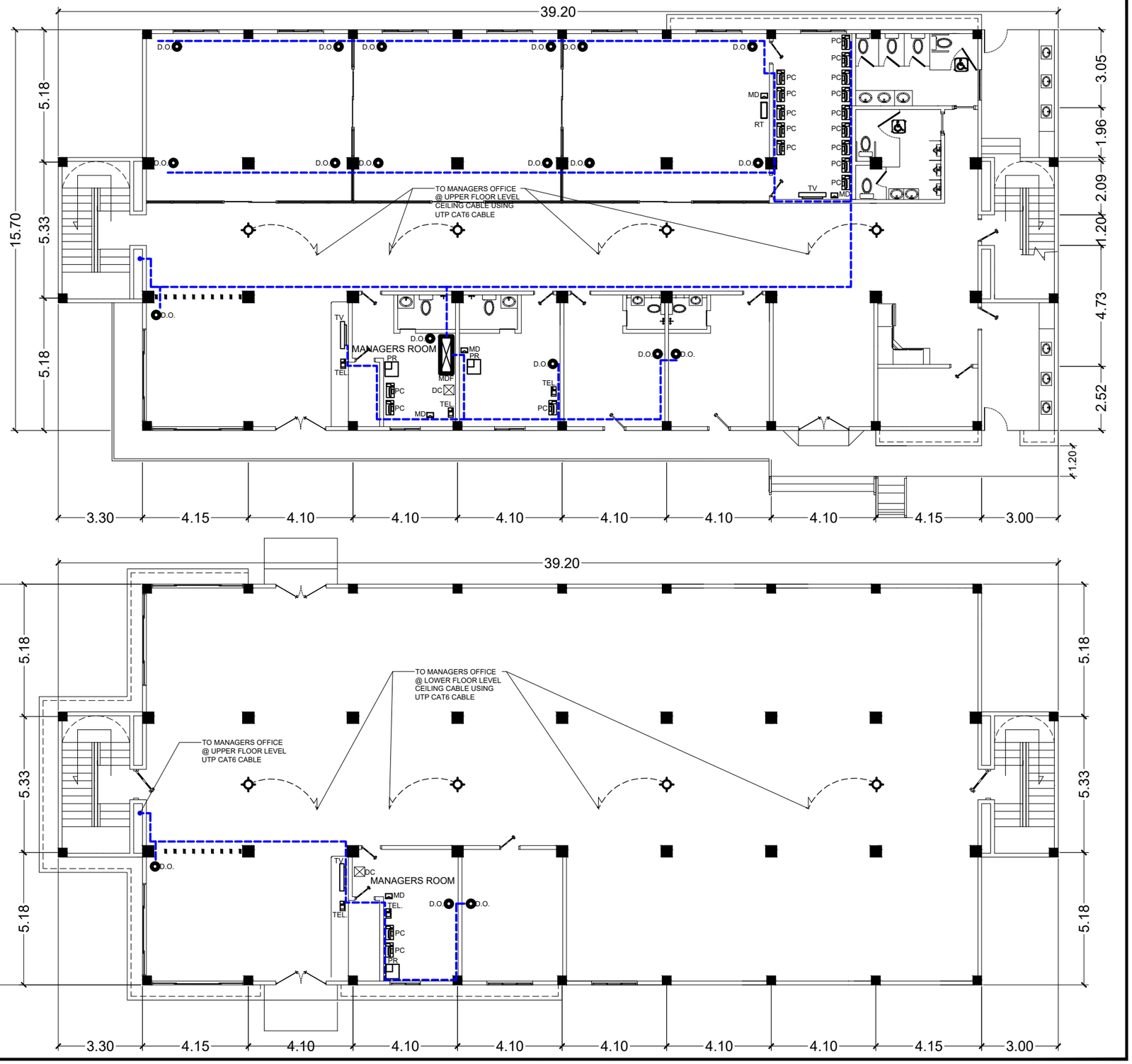


1 AUX-2 SECOND FLOOR TEL.,CATV & CCTV LAYOUT
SCALE 1:100 M.

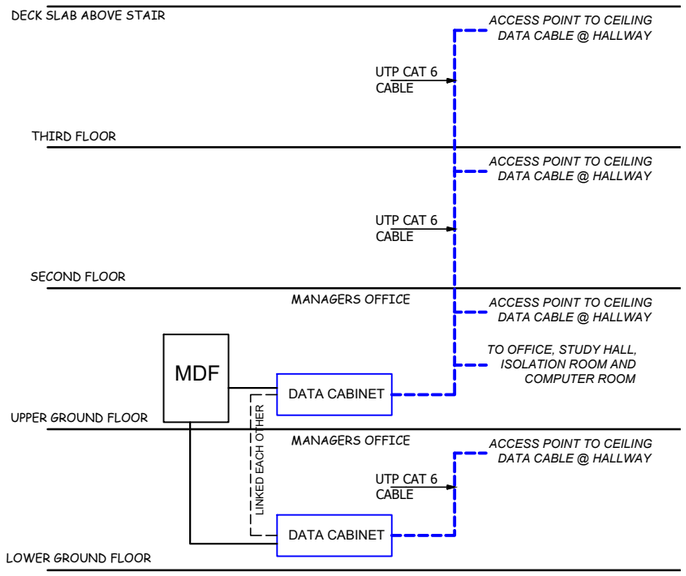
LEGEND:

- MDF MAIN DISTRIBUTION FRAME
- DC DATA CABINET
- D.O DUPLEX OUTLET
- RT ROUTER
- PR PRINTER
- PC PERSONAL COMPUTER
- MD MODEM
- TV TELEVISION
- ACCESS POINT
- UTP CAT6 CABLE
- SD CONVENTIONAL SMOKE DETECTOR

NOTE:
- USE UTP CAT6 TO ALL CONNECTION CABLE.



2 AUX-3 UPPER GROUND FLOOR NETWORK COMMUNICATION LAYOUT
SCALE 1:100 M.



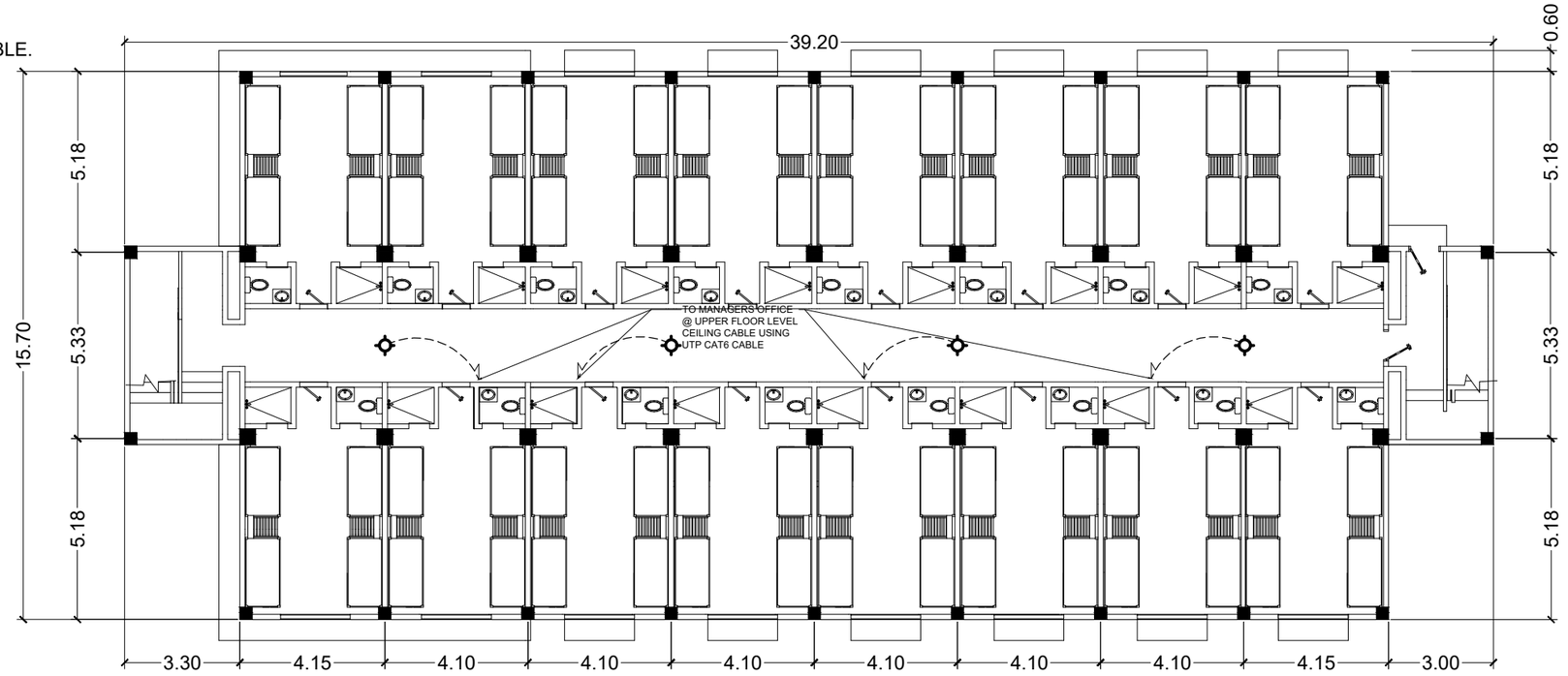
3 AUX-3 NETWORK COMMUNICATION DIAGRAM
SCALE NDTS.

1 AUX-3 LOWER GROUND FLOOR NETWORK COMMUNICATION LAYOUT
SCALE 1:100 M.

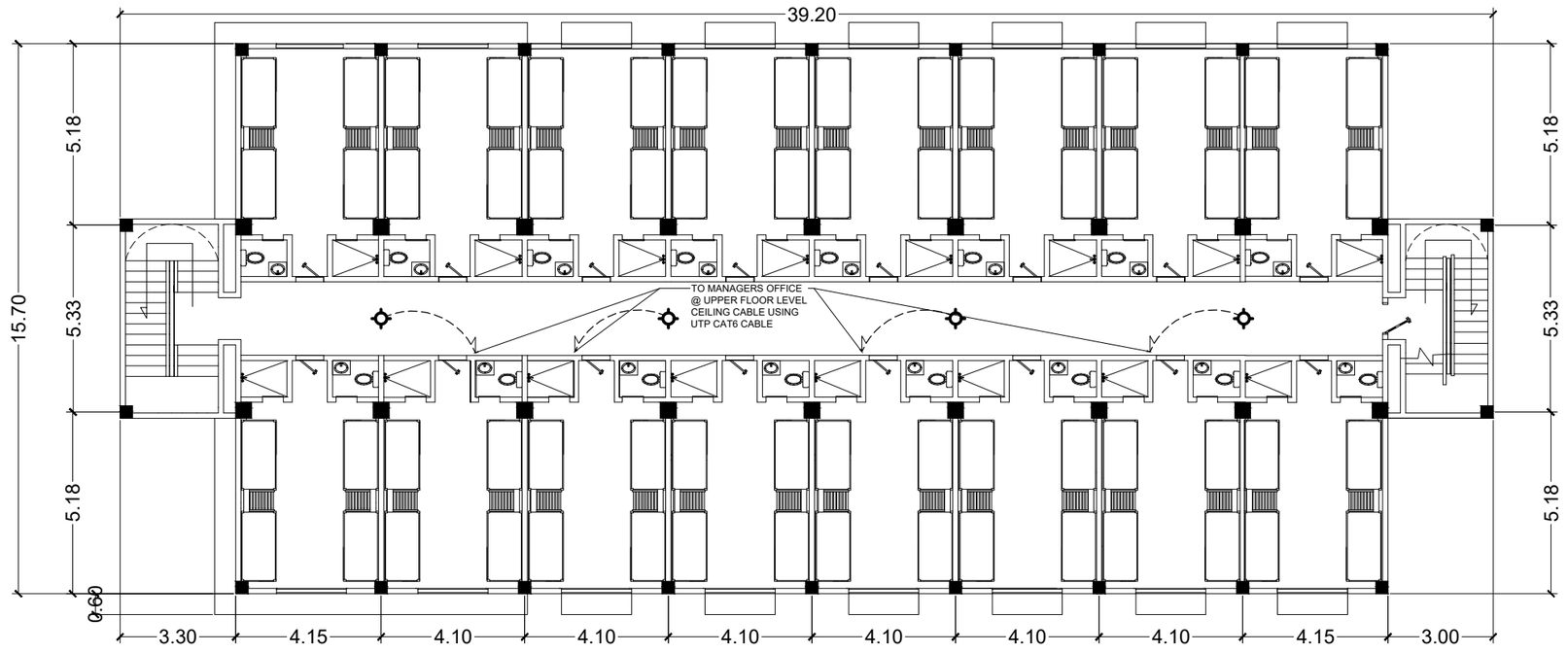
LEGEND:

- MDF MAIN DISTRIBUTION FRAME
- DC DATA CABINET
- D.O DUPLEX OUTLET
- RT ROUTER
- PR PRINTER
- PC PERSONAL COMPUTER
- MD MODEM
- TV TELEVISION
- ACCESS POINT
- UTP CAT6 CABLE
- SD CONVENTIONAL SMOKE DETECTOR

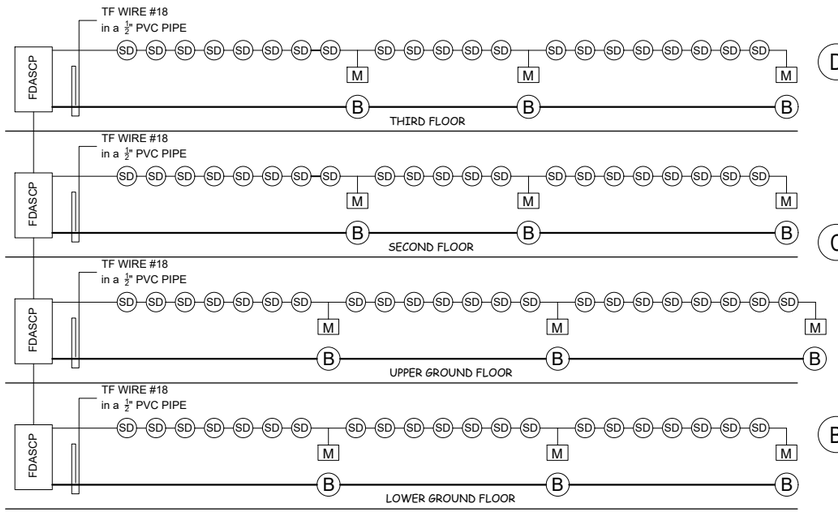
NOTE:
- USE UTP CAT6 TO ALL CONNECTION CABLE.



1 AUX-4 SECOND FLOOR NETWORK COMMUNICATION LAYOUT
SCALE 1:100 M.



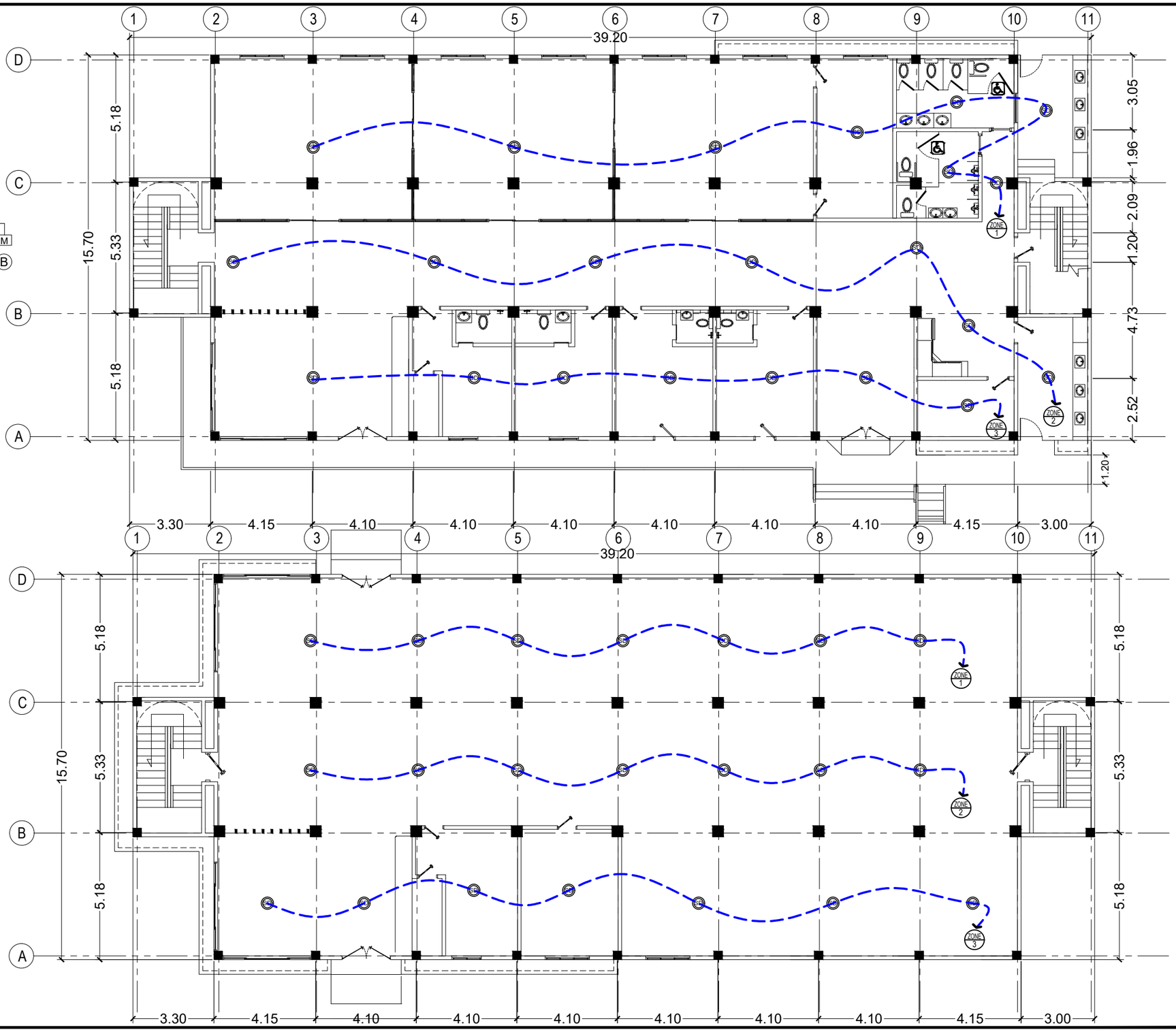
1 AUX-4 SECOND FLOOR NETWORK COMMUNICATION LAYOUT
SCALE 1:100 M.

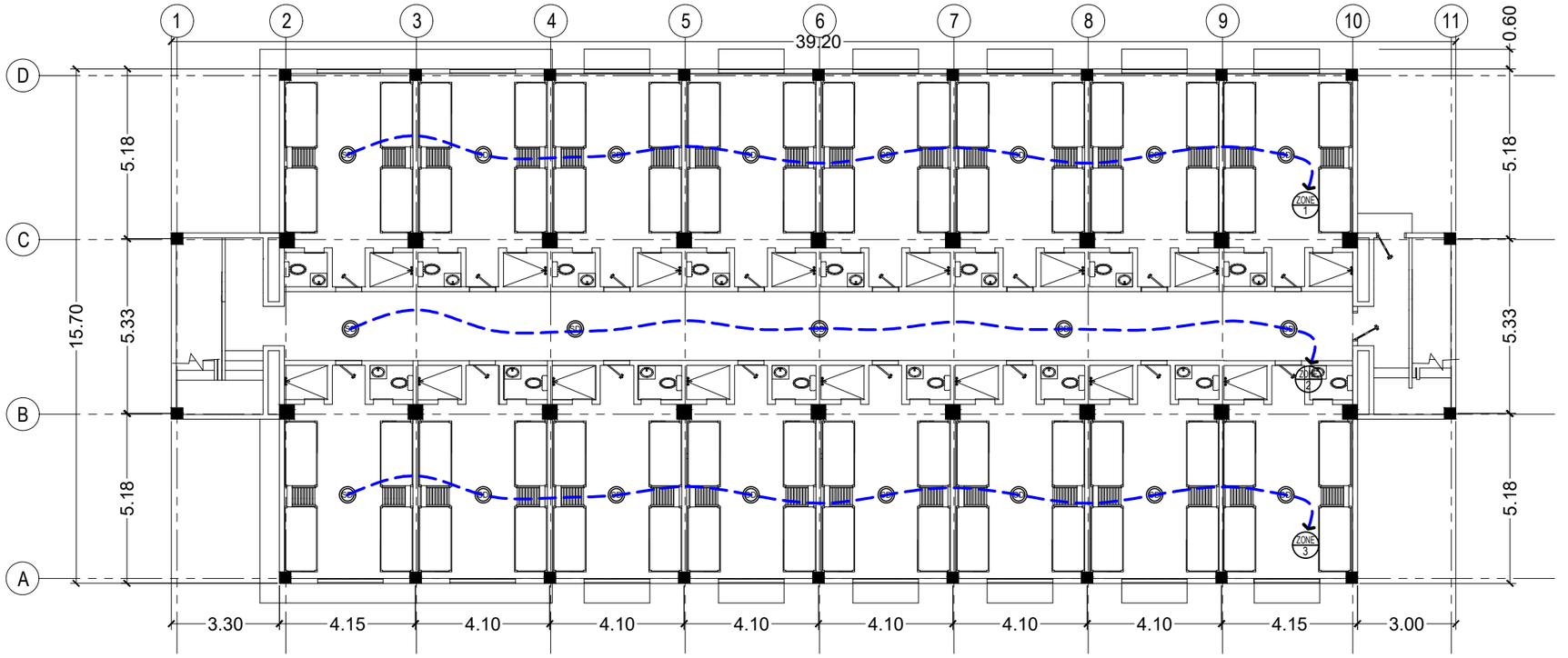


3 AUX-5 (FDAS) SINGLE LINE DIAGRAM
SCALE NDTS

2 AUX-5 UPPER GROUND FLOOR LAYOUT(FDAS)
SCALE 1:100 M.

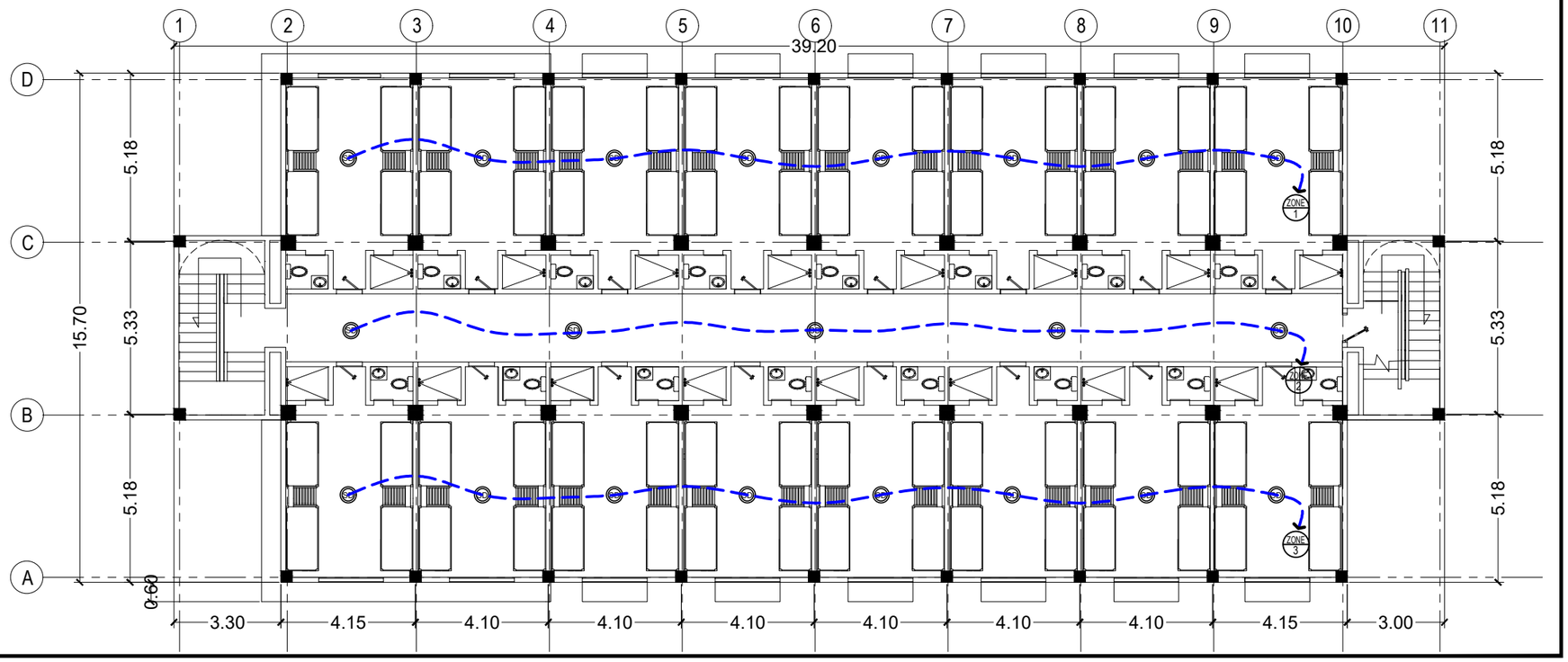
1 AUX-5 LOWER GROUND FLOOR LAYOUT(FDAS)
SCALE 1:100 M.





2 AUX-6 THIRD FLOOR LAYOUT(FDAS)

SCALE 1:100 M.



1 AUX-6 SECOND FLOOR LAYOUT(FDAS)

SCALE 1:100 M.