



Department of Electrical and Electronic Engineering

Electrical Wiring and Drafting

EEE 2200

Trimester – Fall 2023

Sec - A

Project Report

Submitted to

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Submitted by

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Calculation For Switchboard

Switchboard – 1
1. Light – 4*40W
2. Fan – 1*80W
3. Tv Socket – 1*500w
4. 2pin Socket (SS) - 1*500w
Total – 1240W
P=V I* 0.9
Here,
I = $1240 / (230 \times 0.9) = 6A$

Switchboard – 2
1. Light –1*40W
2. 2pin Socket (SS) - 1*500w
3. Exhaust Fan –1*60W
Total – 600W
P=V I* 0.9
Here,
I = $600 / (230 \times 0.9) = 2.9A$

Switchboard – 3
1. Light –1*40W
2. 2pin Socket (SS) - 1*500w
3. Exhaust Fan –1*60W
Total –540W
P=V I* 0.9
Here,
I = $540 / (230 \times 0.9) = 2.61A$

Switchboard – 4
5. Light – 4*40W
6. Fan – 1*80W
7. Tv Socket – 1*500w
8. 2pin Socket (SS) - 1*500w
Total –1240W
P=V I* 0.9
Here,
I = $1240 / (230 \times 0.9) = 6A$

Switchboard – 5
3. Light –1*40W
4. 2pin Socket (SS) - 1*500w
Total –540W
P=V I* 0.9
Here,
I = $540 / (230 \times 0.9) = 2.61A$

Switchboard – 6
4. Light –1*40W
5. 2pin Socket (SS) - 1*500w
6. Exhaust Fan –1*60W
Total – 600W
P=V I* 0.9
Here,
I = $600 / (230 \times 0.9) = 2.9A$

Switchboard – 7
5. Light –1*40W
6. 2pin Socket (SS) - 1*500w
Total –540W
P=V I* 0.9
Here,
I = $540 / (230 \times 0.9) = 2.61A$

Switchboard – 8
7. Light –1*40W
8. 2pin Socket (SS) - 1*500w
9. Exhaust Fan –1*60W
Total – 600W
P=V I* 0.9
Here,
I = $600 / (230 \times 0.9) = 2.9A$

Switchboard – 9
1. Light – 2*40W
2. Fan – 1*80W
3. 2pin Socket (SS) - 1*500w
Total –660W
P=V I* 0.9
Here,
I = $660 / (230 \times 0.9) = 3.19A$

Switchboard – 10
1. Light –1*40W
2. 2pin Socket (SS) - 1*500w
Total –540W
P=V I* 0.9
Here,
I = $540 / (230 \times 0.9) = 2.61A$

Switchboard – 11
1. Light –2*40W
2. 2pin Socket (SS) - 1*500w
Total –580W
P=V I* 0.9
Here,
I = $580 / (230 \times 0.9) = 2.8A$

Switchboard – 12
1. Light –1*40W
2. 2pin Socket (SS) - 1*500w
3. Tv Socket – 1*500W
Total –1080W
P=V I* 0.9
Here,
I = $1080 / (230 \times 0.9) = 5.2A$

Switchboard – 13
1. Light –3*40W
2. 2pin Socket (SS) - 1*500w
3. Fan – 1*80W
Total –700W
P=V I* 0.9
Here,
I = $700 / (230 \times 0.9) = 3.38A$

Switchboard – 14
1. Light – 2*40W
2. Fan – 1*80W
3. 2pin Socket (SS) - 1*500w
Total –660W
P=V I* 0.9
Here,
I = $660 / (230 \times 0.9) = 3.19A$

Switchboard – 15
1. Light – 2*40W
2. Exhaust Fan – 1*60W
3. 2pin Socket (SS) - 1*500w
Total –640W
P=V I* 0.9
Here,
I = $640 / (230 \times 0.9) = 3.09A$

Switchboard – 16

1. Light – 2*40W
2. Fan – 1*80W
3. 2pin Socket (SS) - 1*500w

Total –660W

$$P=V I * 0.9$$

Here,

$$I = 660 / (230 * 0.9) = 3.19A$$

Switchboard – 17

1. Light – 4*40W
2. Fan – 1*80W
3. Tv Socket – 1*500w
4. 2pin Socket (SS) - 1*500w

Total –1240W

$$P=V I * 0.9$$

Here,

$$I = 1240 / (230 * 0.9) = 6A$$

Switchboard – 18

1. Light – 2*40W
2. Fan – 1*80W
3. 2pin Socket (SS) - 1*500w

Total –660W

$$P=V I * 0.9$$

Here,

$$I = 660 / (230 * 0.9) = 3.19A$$

Switchboard – 19

1. Light – 3*40W
2. 2pin Socket (SS) - 1*500w

Total –620W

$$P=V I * 0.9$$

Here,

$$I = 620 / (230 * 0.9) = 3A$$

Switchboard – 20

1. Light –3*40W
2. 2pin Socket (SS) - 1*500w
3. Fan – 1*80W

Total –700W

$$P=V I * 0.9$$

Here,

$$I = 700 / (230 * 0.9) = 3.38A$$

Switchboard – 21

1. Light –1*40W
2. 2pin Socket (SS) - 1*500w
3. Exhaust Fan – 1*60W

Total –600W

$$P=V I * 0.9$$

Here,

$$I = 600 / (230 * 0.9) = 2.9A$$

Switchboard – 22

1. Light –1*40W
2. 2pin Socket (SS) - 1*500w

Total –540W

$$P=V I * 0.9$$

Here,

$$I = 540 / (230 * 0.9) = 2.61A$$

Circuit Breaker Selection for Grouping

Group-1

$$\begin{aligned} \text{SB- } &1, 2, 12, 13 \\ = &(6+2.9+5.2+3.38) \text{ A} \\ = & 17.48 \text{ A} \end{aligned}$$

So, 20 A Circuit Breaker chosen.

Group-2

$$\begin{aligned} \text{SB- } &3, 6, 7 \\ = &(2.61+2.9+2.61) \text{ A} \\ = & 8.61 \text{ A} \end{aligned}$$

So, 15 A Circuit Breaker chosen.

Group-3

$$\begin{aligned} \text{SB- } &4, 5, 8, 9 \\ = &(6+2.61+2.9+3.19) \text{ A} \\ = & 14.7 \text{ A} \end{aligned}$$

So, 20 A Circuit Breaker chosen.

Group-4

$$\begin{aligned} \text{SB- } &10, 11, 15, 16, 19 \\ = &(2.61+2.8+3.09+3.19+3) \text{ A} \\ = & 11.69 \text{ A} \end{aligned}$$

So, 15 A Circuit Breaker chosen.

Group-5

$$\begin{aligned} \text{SB- } &14, 17, 18, 22 \\ = &(3.19+6+3.19+2.61) \text{ A} \\ = & 14.99 \text{ A} \end{aligned}$$

So, 20 A Circuit Breaker chosen.

Group-6

$$\begin{aligned} \text{SB- } &20, 21 \\ = &(3.38+2.9) \text{ A} \\ = & 6.28 \text{ A} \end{aligned}$$

So, 10 A Circuit Breaker chosen.

Calculation for SDB

3-Pin Socket 15 A

$$\begin{aligned}22 \times 3S &= 1500 \times 22 \text{ W} \\&= 33000 \text{ W}\end{aligned}$$

AC 20A

$$\begin{aligned}8 \times M &= 8 \times 2500 \text{ W} \\&= 20000 \text{ W}\end{aligned}$$

Hitter 15A

$$\begin{aligned}5 \times H &= 5 \times 2000 \text{ W} \\&= 10000 \text{ W}\end{aligned}$$

$$\begin{aligned}\mathbf{P \ Total} &= 15780 \times 0.6 + 33000 \times 0.7 + 20000 \times 1 + \\&10000 \times 1 \\&= 62568 \text{ W}\end{aligned}$$

If $9 \text{ KW} < P \ Total$ then supply must be 415 L-L.

$$P = 1.73 \times V_L \times I_L \times 0.9 \quad [\text{PF}=0.9]$$

$$I_L = 62568 / (1.73 \times 415 \times 0.9) = 96.83 \text{ A}$$

With Safety Factor

$$I = I_L \times \text{S.F.} + I_{\text{spare}}$$

$$I = 96.83 \times 1.5 + 15$$

$$= 160.245 \text{ A}$$

So, 170A TP circuit breaker chosen.

Calculation for MDB

$$\mathbf{Every \ Unit} = 62568 \text{ W}$$

$$\begin{aligned}\mathbf{10 \ Units} &= 10 \times 62568 \text{ W} \\&= 625.68 \text{ KW}\end{aligned}$$

Choosing 1 water pump of 7 HP.

$$\begin{aligned}1 \text{ water pump} &= 7 \times 746 \text{ W} \\&= 5222 \text{ W}\end{aligned}$$

For 1 Lift:

Choosing 800kg lift (Around 8 persons) each
Speed = 1.8m/s

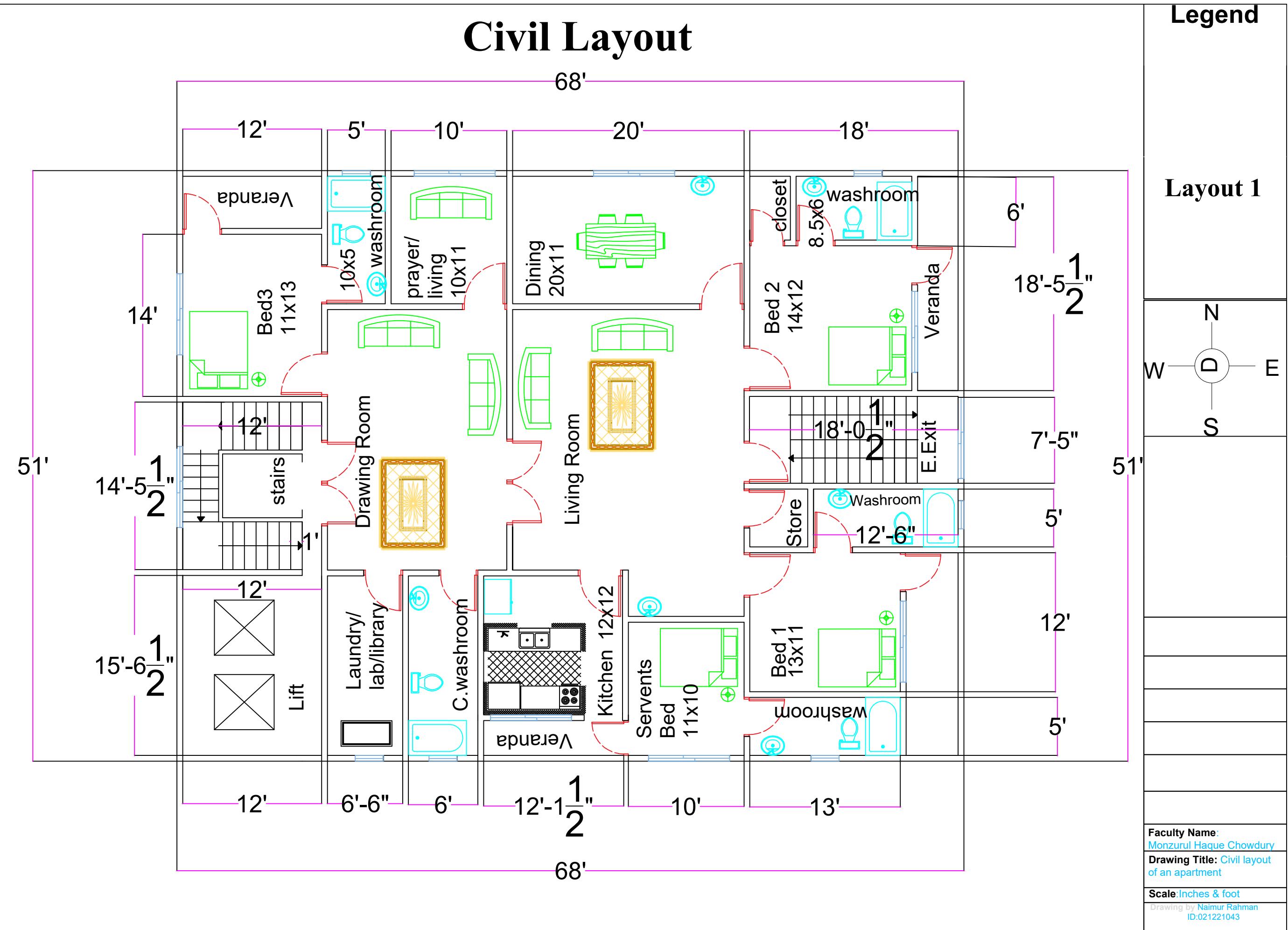
Motor Capacity, $P=9 \text{ kW}$
MCCB capacity = 30A

$$\begin{aligned}\mathbf{P_Total} &= 625.68 \text{ KW} + 5.222 \text{ KW} + 2 \times 9 \text{ KW} \\&= 648.902 \text{ KW}\end{aligned}$$

$$\begin{aligned}IL &= (648.902 \times 1000) / (1.73 \times 415 \times 0.9) \\&= 1004.25 + 9 \text{ A} \\&= 1013.25 \text{ A}\end{aligned}$$

So that, 1100 A TP MCCB chosen.

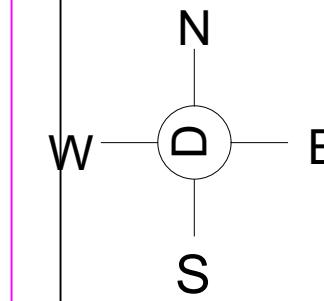
Civil Layout



Fittings and Fixtures Layout

Legend

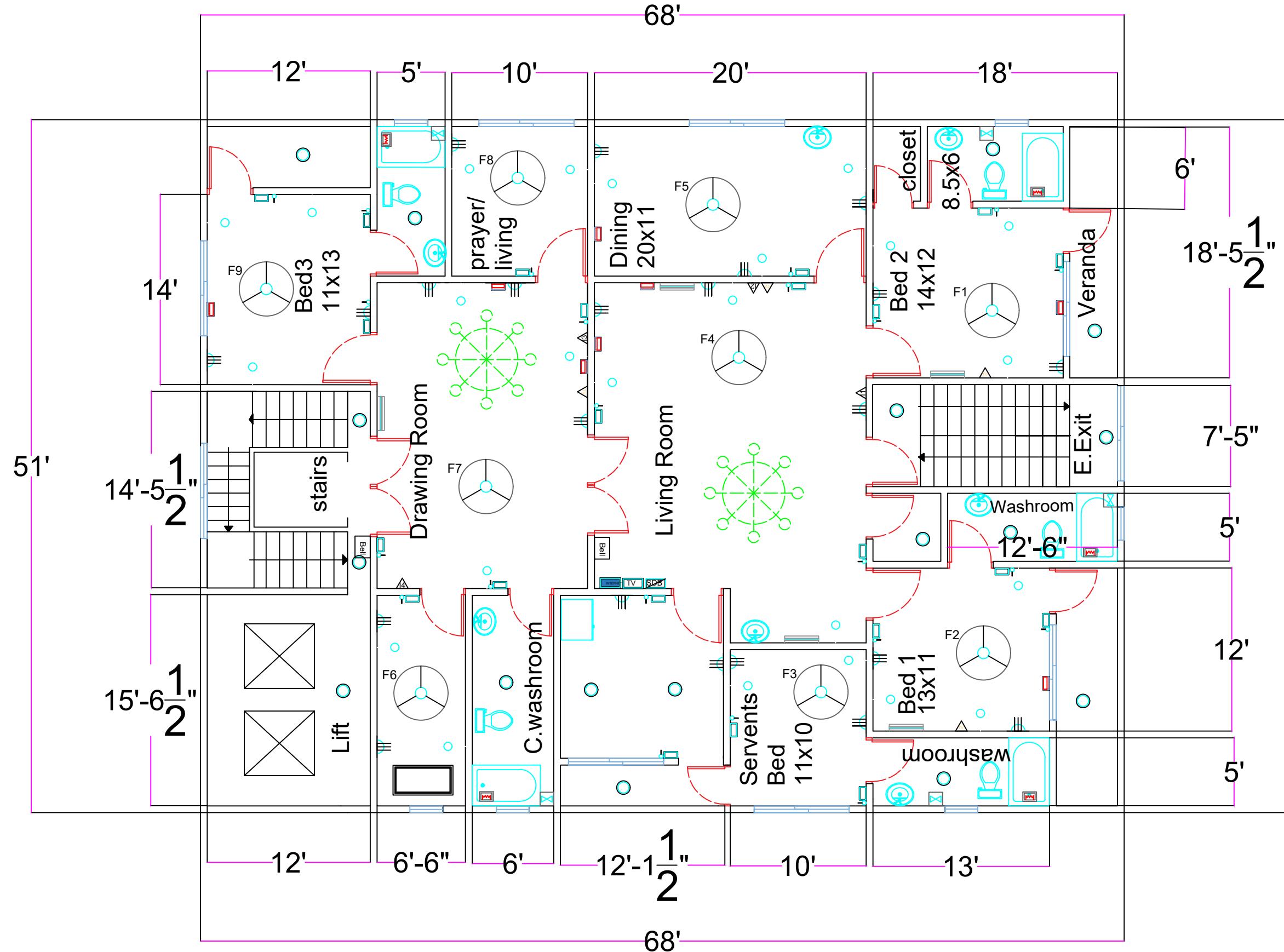
Layout 2



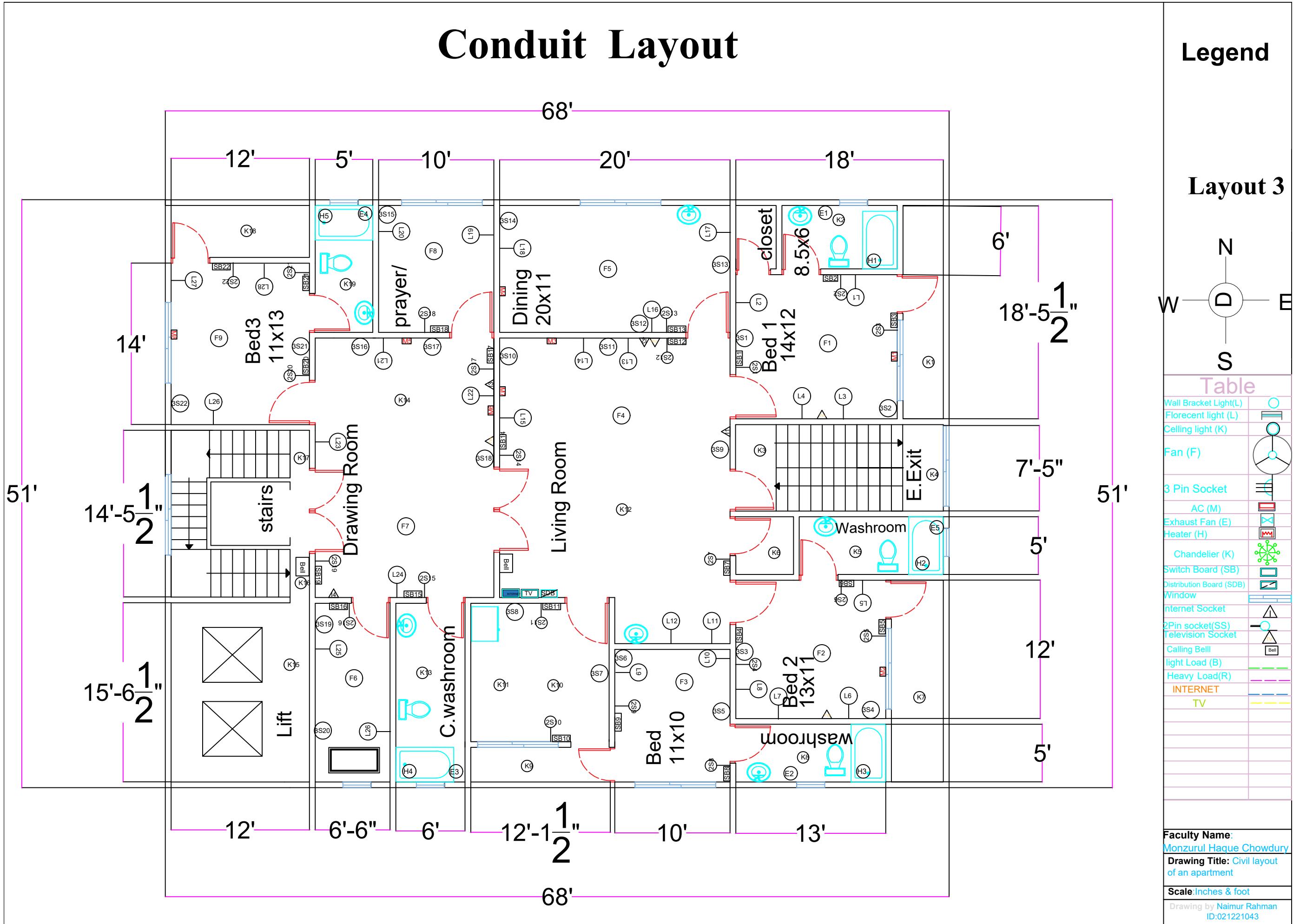
Wall Bracket Light(L)
Florecent light (L)
Ceiling light (K)
Fan (F)
3 Pin Socket
AC(M)
Exhaust Fan (E)
Heater (H)
Chandelier (K)
Switch Board (SB)
Distribution Board (SDB)
Window
Internet Socket
2Pin socket(SS)
Television Socket
Calling Bell
Light Load (B)
Heavy Load(R)
INTERNET
TV

Faculty Name:
Monzurul Haque Chowdhury
Drawing Title: Civil layout
of an apartment

Scale:Inches & foot
Drawing by Naimur Rahman
ID:021221043

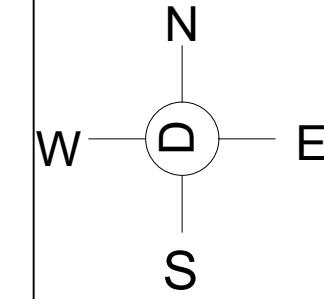


Conduit Layout



Legend

Layout 4



Table

Wall Bracket Light(L)	
Florecent light (C)	
Celling light (K)	
Fan (F)	
3 Pin Socket	
AC(M)	
Exhaust Fan (E)	
Heater (H)	
Chandelier (K)	
Switch Board (SB)	
Distribution Board (SDB)	
Window	
Internet Socket	
2Pin socket(SS)	
Television Socket	
Calling Bell	
light Load (B)	
Heavy Load(R)	
INTERNET	
C1=2x1.5mm ² ,1C	
C3=6x1.5mm ² ,1C	
C5=2x4mm ² ,1C	
C52=4x4mm ² ,1C	
C252=2xC52,2c	
C5,252=C5+2xC52	
C5,52=C5+C52,2c	
C6=2x6mm ² ,1c	
C26=2xC6,2c	
C6,C26=C6+C26,3	

C1=2x1.5mm²,1C
 C3=6x1.5mm²,1C
 C5=2x4mm²,1C
 C52=4x4mm²,1C
 C252=2xC52,2c
 C5,252=C5+2xC52
 C5,52=C5+C52,2c
 C6=2x6mm²,1c
 C26=2xC6,2c
 C6,C26=C6+C26,3

Faculty Name:

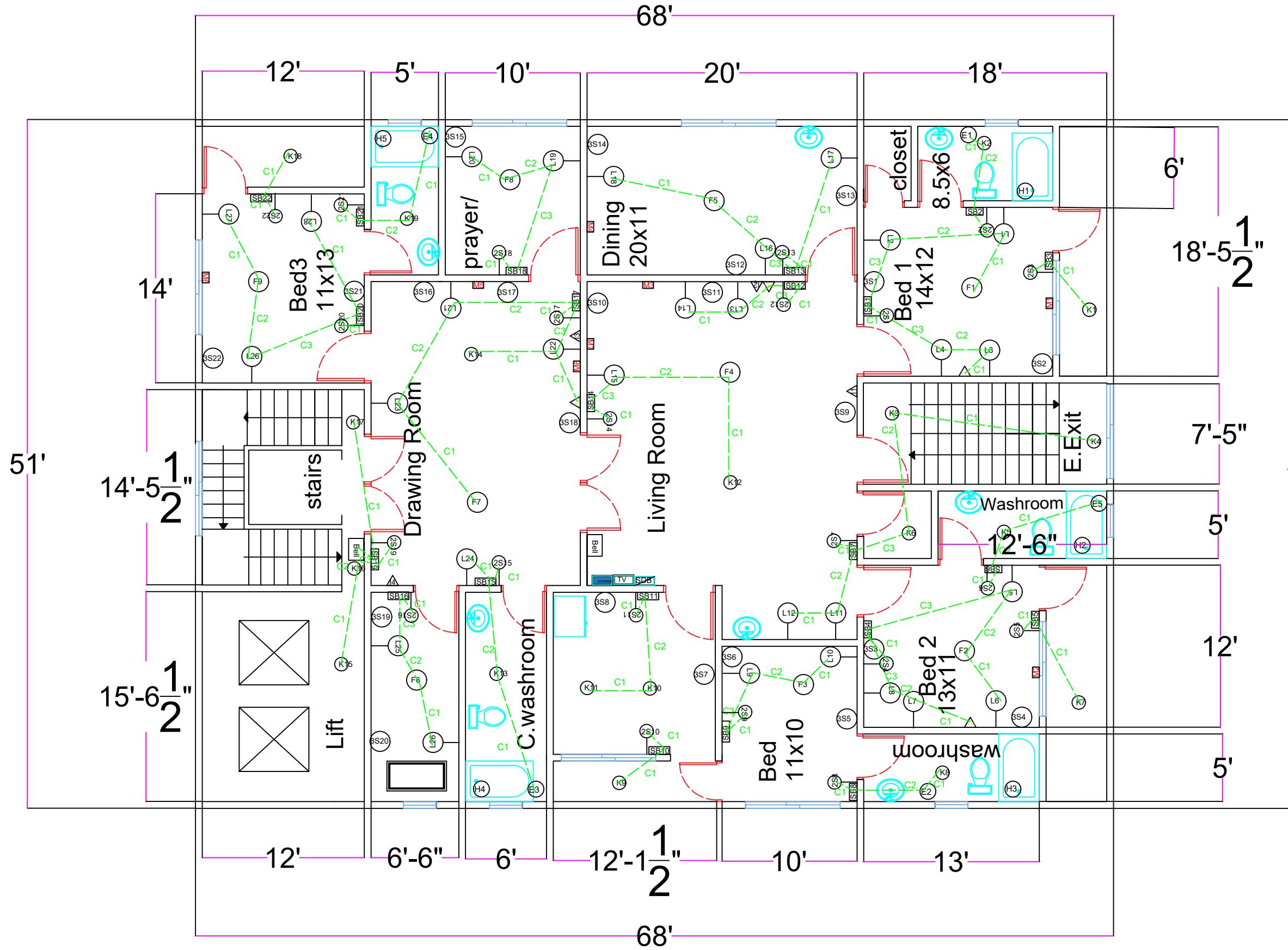
Monzurul Haque Chowdhury

Drawing Title: Civil layout of an apartment

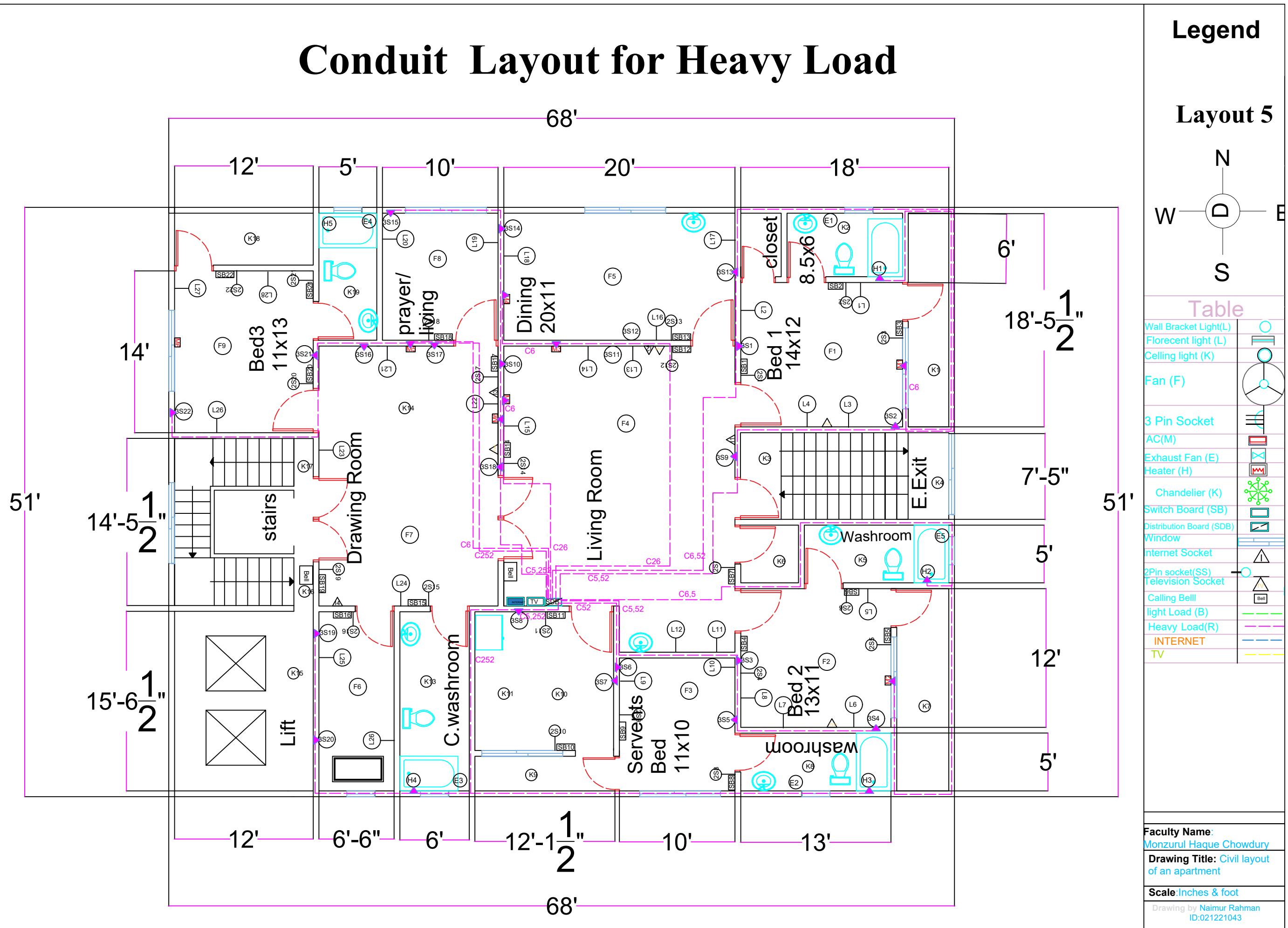
Scale Inches & foot

Drawing by Naimur Rahman
ID:021221043

Conduit Layout for Light Load

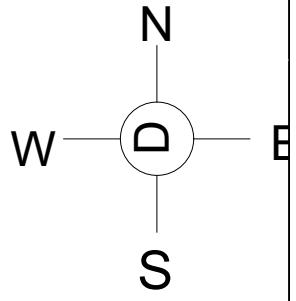


Conduit Layout for Heavy Load



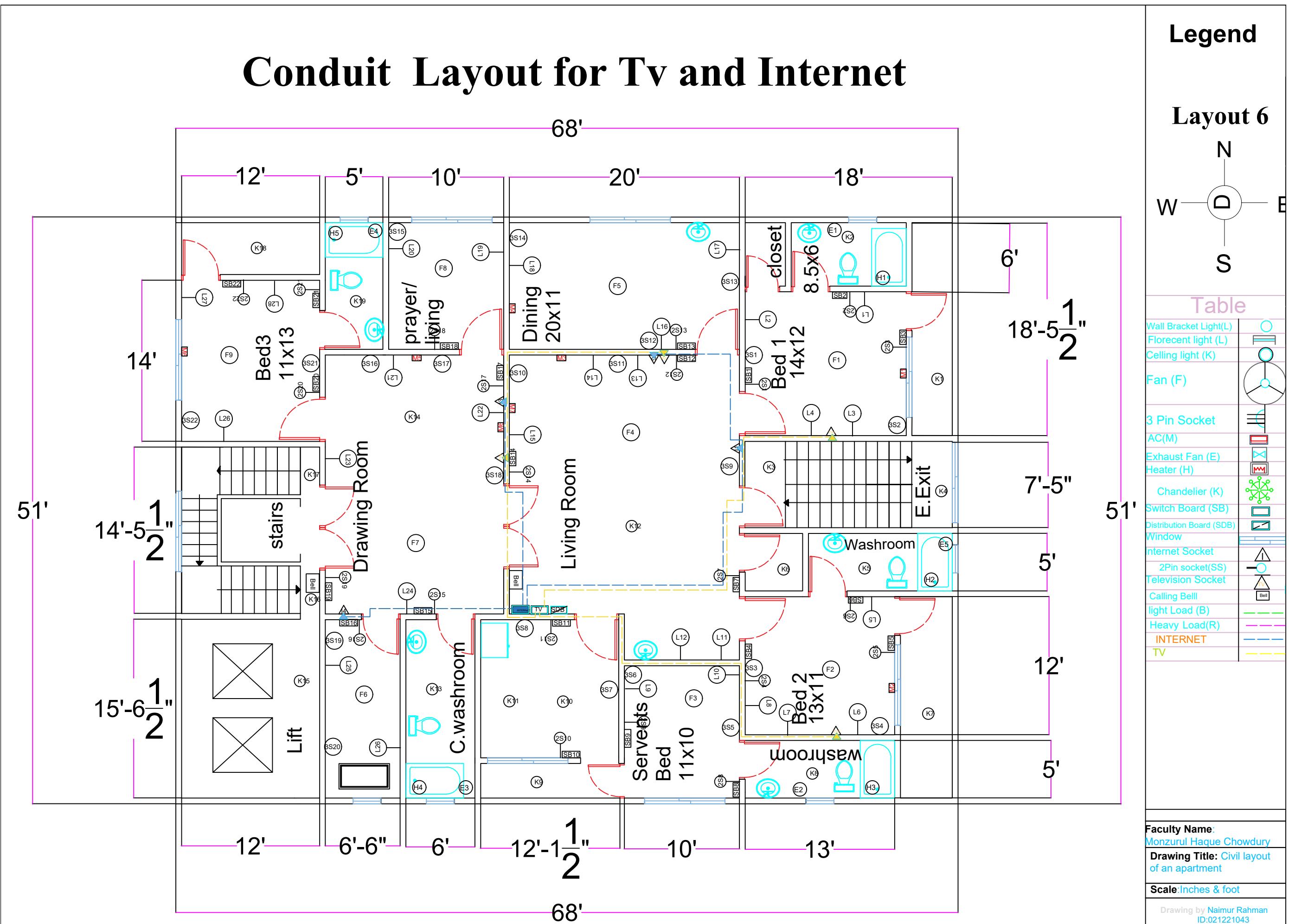
Legend

Layout 6

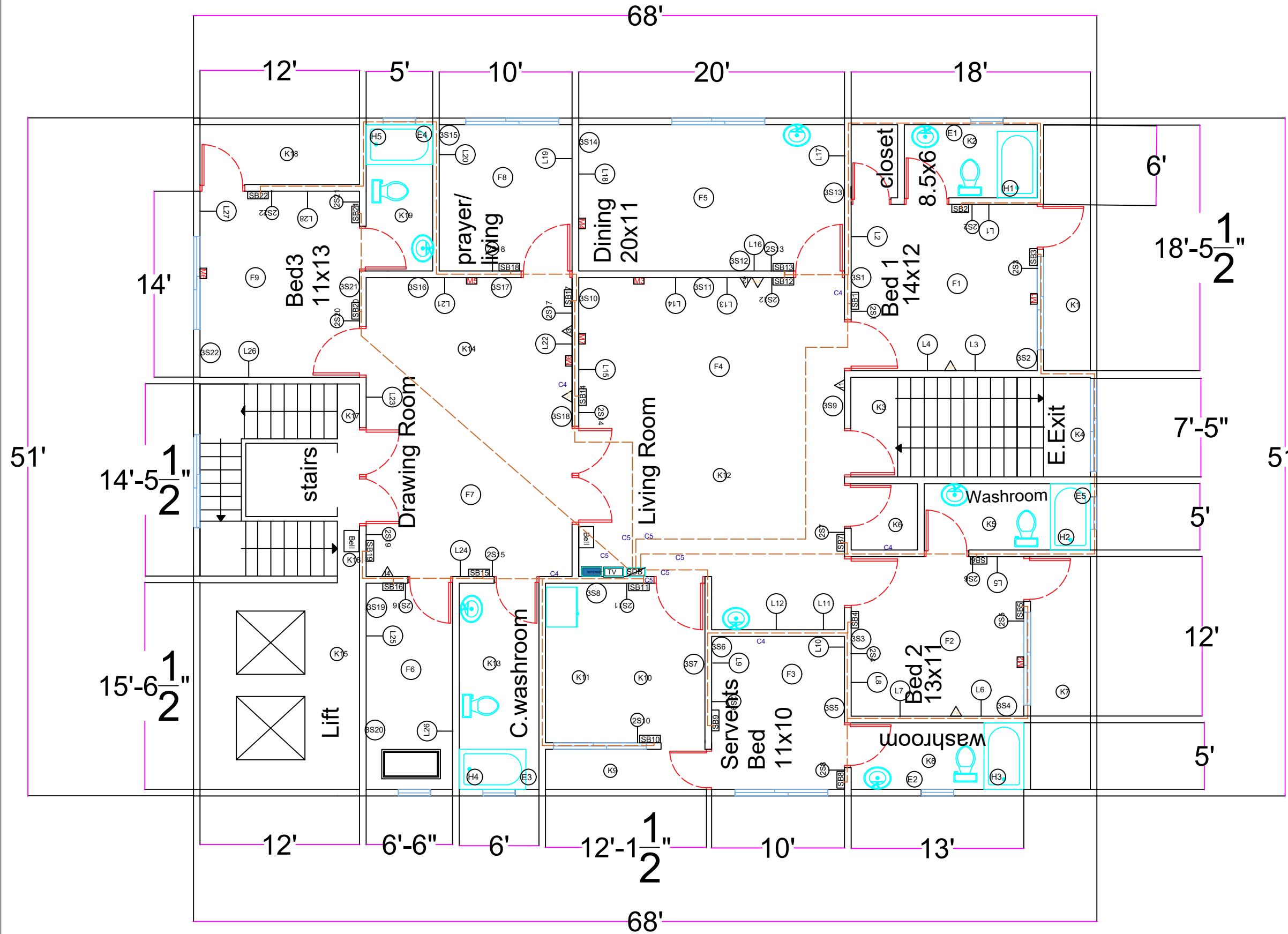


Table

Wall Bracket Light(L)	
Florecent light (L)	
Celling light (K)	
Fan (F)	
3 Pin Socket	
AC(M)	
Exhaust Fan (E)	
Heater (H)	
Chandelier (K)	
Switch Board (SB)	
Distribution Board (SDB)	
Window	
Internet Socket	
2Pin socket(SS)	
Television Socket	
Calling Bell	
light Load (B)	
Heavy Load(R)	
INTERNET	
TV	



Conduit Layout for Switchboard Grouping and Connections



Faculty Name:

Monzurul Haque Chowdury

Drawing Title:

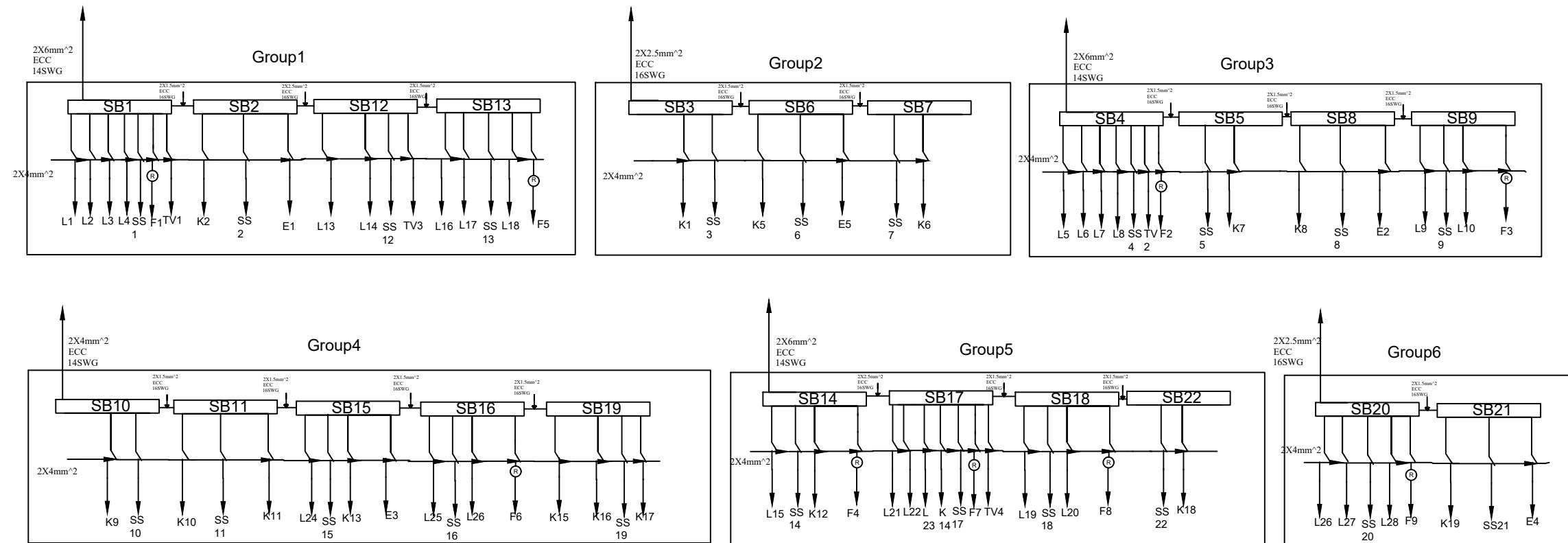
Civil layout
of an apartment

Scale:

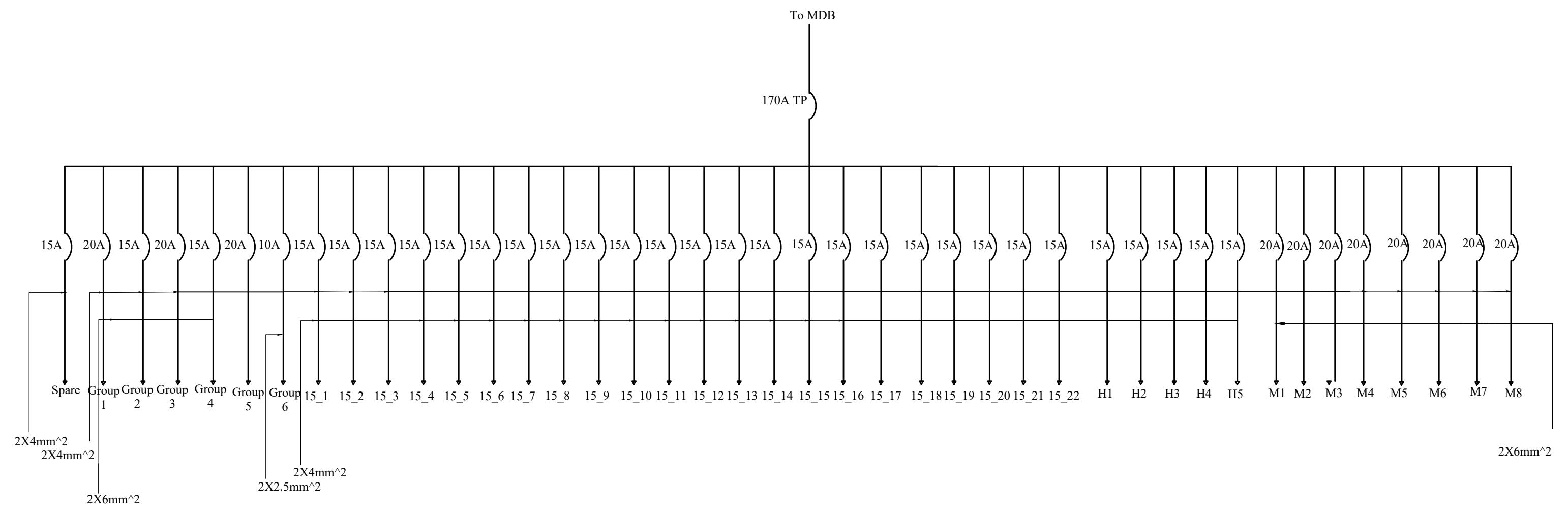
Inches & foot

Drawing by Naimur Rahman
ID: 021221043

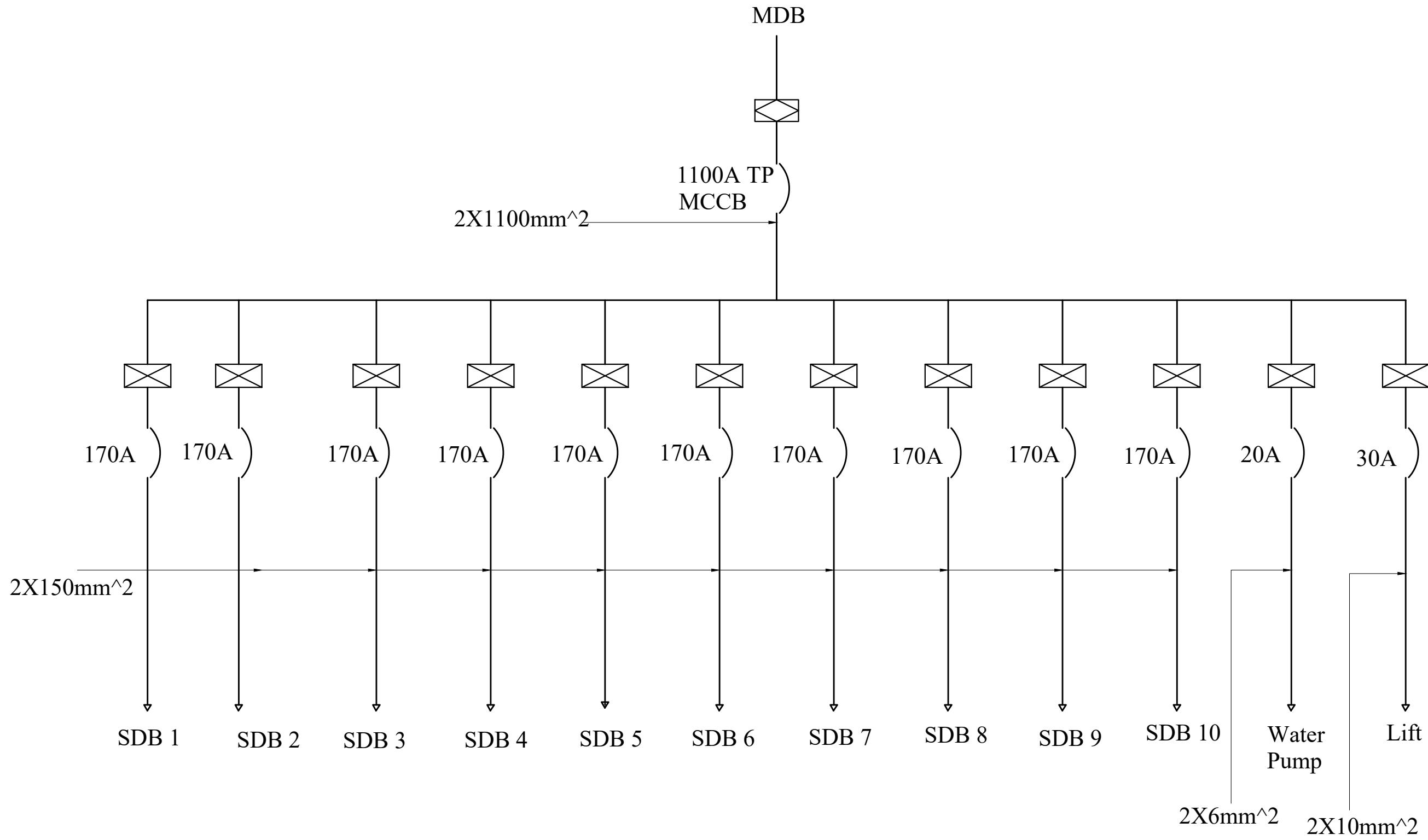
Switch Board Grouping

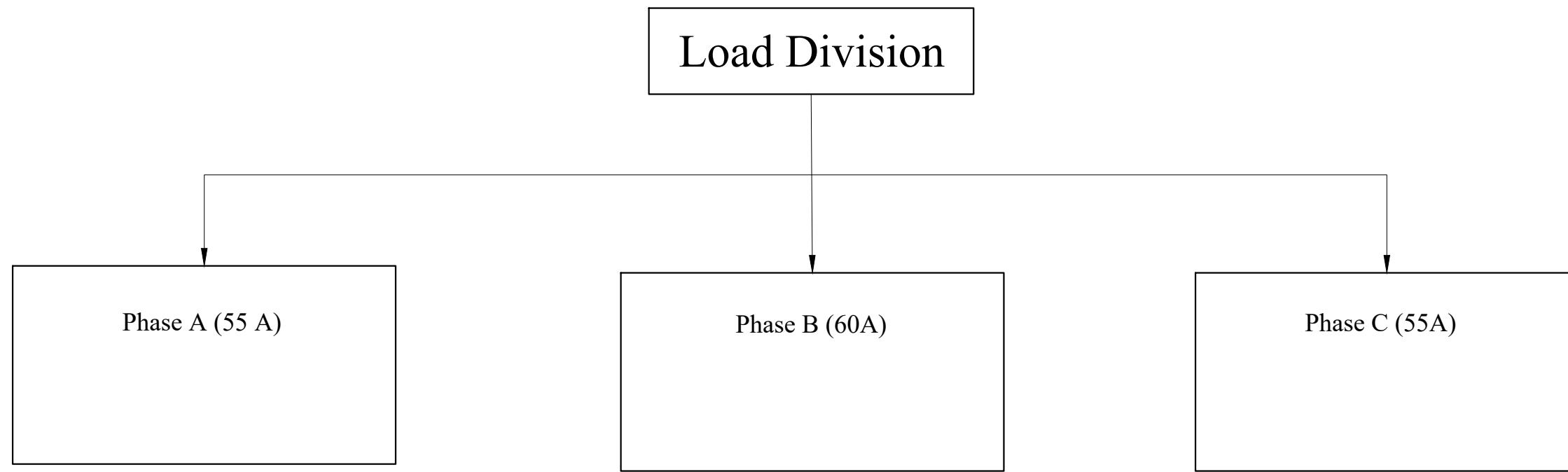


Sub-Distribution Board Diagram

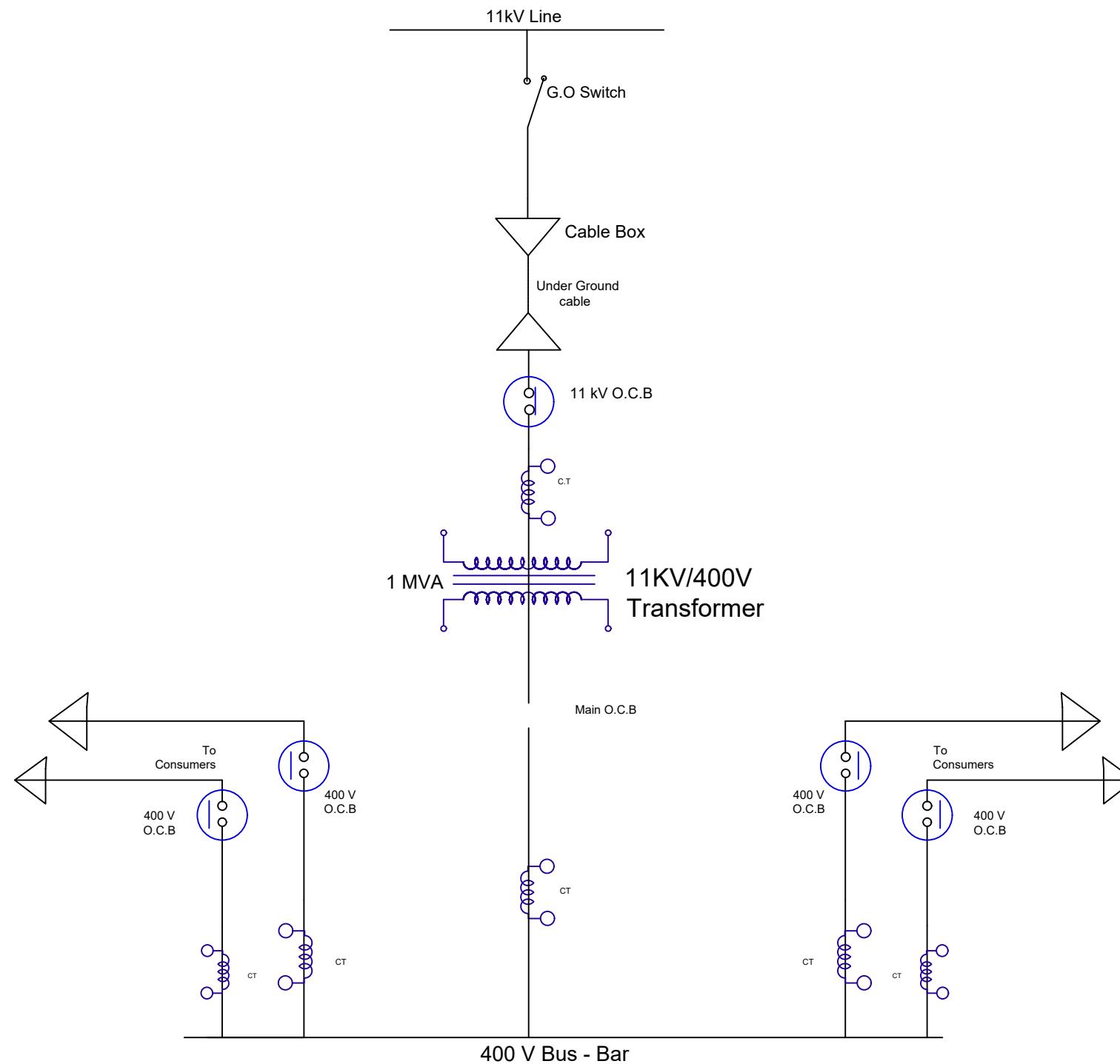


Main Distribution Board Connection Diagram

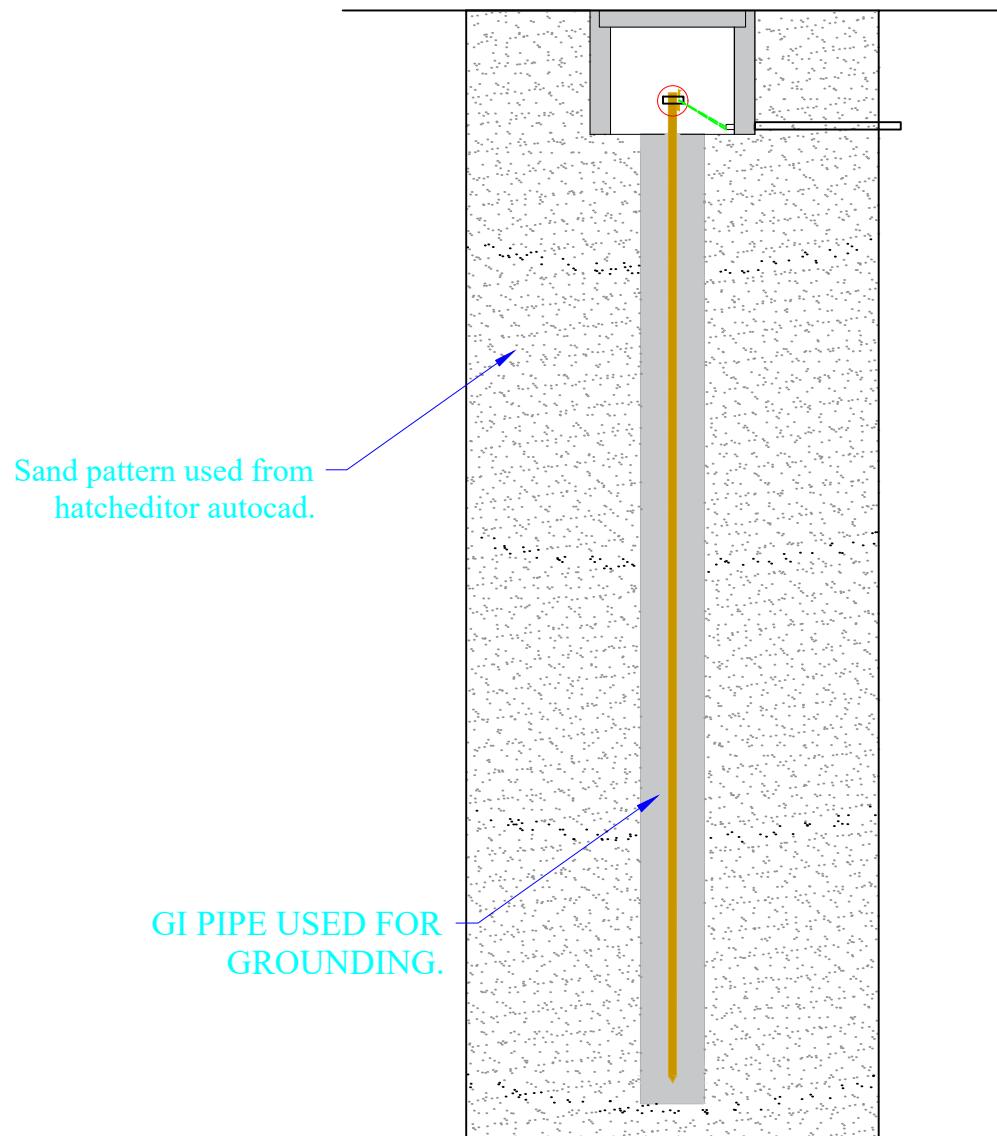




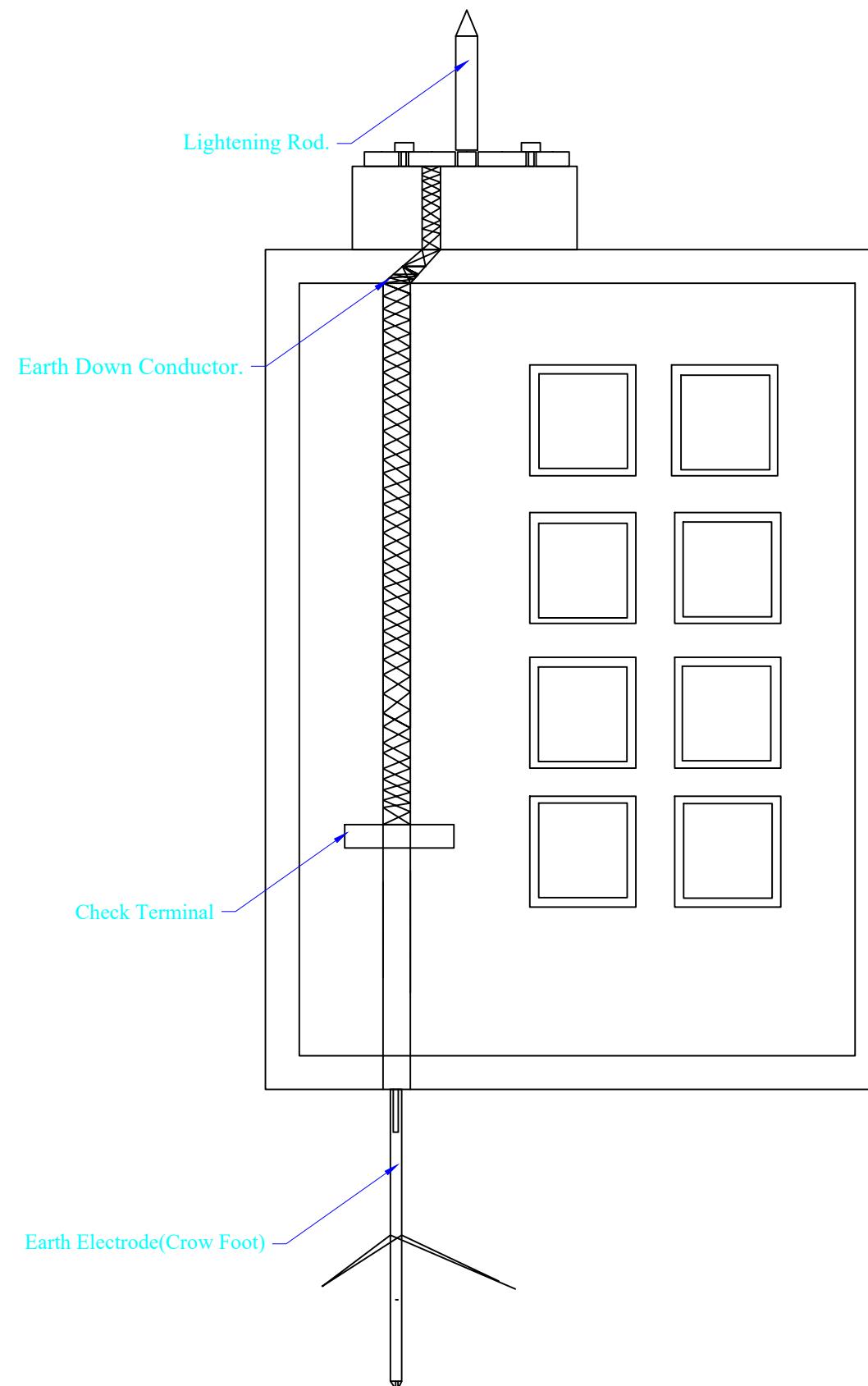
Single Line Diagram of a Typical 11KV/400V Indoor Substation 11KV LINE



Earthing



Lightening System



Emergency Fire Extingusher

