R.C.Patel College Of Engineering & Polytechnic, Shirpur
Department of Civil Engineering

Course Title- Building planning &Drawing with CAD

Course Code -313308 **Programme Name** -Civil Engineering

Semester-Third

Unit	Title	COs	Learning hours	R Level	U Level	A Level	Total Marks
I	Principles of Planning	CO1	6	0	0	0	N.A.

Subject Teacher
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PRINCIPLES OF PLANNING OF RESEDENTIAL AND PUBLIC BUILDING:

- The main objective of planning of Building is to arrange the required units of a building at various floors according to their functional requirements.
- It ensures the best possible use of the space available for building.

Following are the principles

ASPECT :- It means the arrangement of doors and Windows in the outside of wall, which allows the gifts of Nature such as sunshine, breeze, views of the Landscape

- Aspect is a very important principles in planning as it provides not only comfort and good environment but also it ensures the Hygenic condition of units.

Following aspects for various rooms in a building are preffered.

BED ROOM	S-W or W
KITCHEN	E
DINING ROOM	S
LIVING ROOM	S or S-E
READING ROOM	N
VERANDAHS	S-W or W

S- SOUTH
N - NORTH
E- EAST
W - WEST

PROSPECT:- Prospect is the impression that the building is likely to make on a person who looks at it from the outside. It includes the attainment of pleasing appearance by the use of Natural beauties

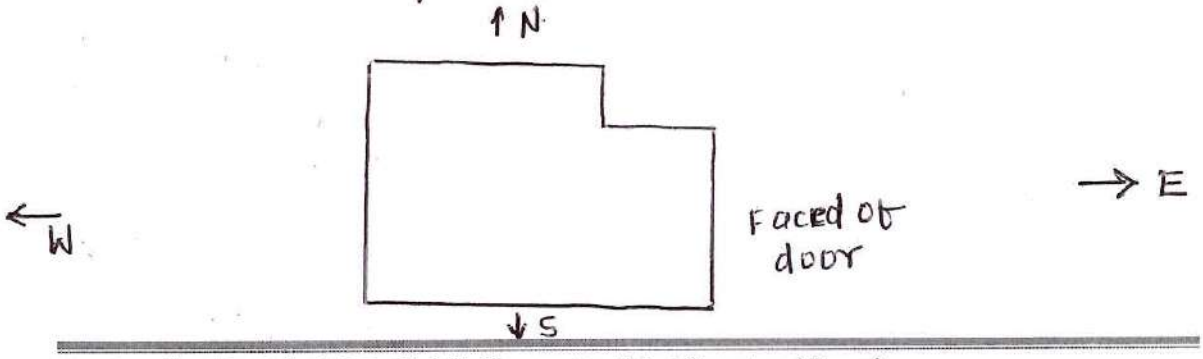
- it enhance the beauty and aesthetic value.
- it improves the mental comfort of occupants.
- Attractive elevation and land scaping should be provided.

ORIENTATION:- orientation is the process of fixing the direction of the plan of the building in a such way that Ample Natural element should be accessed such as Wind, sunlight etc.

- orientation of Non-square buildings is indicated by the direction of the Normal to the longer axis.

For ex. if the length of building is east-West, it's orientation Must be North-South.

- In summer longer Walls must be faced North and south
- openings should be provided in the direction of prevailing winds.



GROUPING :-

Grouping means arrangement of corresponding units of building together for efficient use of space and for convenience

- Dinning room and kitchen should be near to each other
- Bedroom and Bathroom should be closed.
- living areas and service areas are seperated from each other
- study room should far from kitchen.

PRIVACY :-

privacy plays an important role in principles of planning, it ensures that to get rid of Noise, disturbance and unwanted visibility, it is deplorable fault which cannot be compensated for by a host of other merits.

Types of privacy -

1] External privacy - In this privacy seperation of whole building from extra outsiders and neighboring building.

2] Internal privacy - seperation of units of building inside

ELEGANCE :- it means that Building has attractive and pleasing appearance ~~of building~~.

Factors affected to elegance - proper proportion
- Architectural design - doors and windows.
- Colors and finishes

FLEXIBILITY :-

-This means making a room, originally designed for a specific purpose to serve other overlapping purposes also.

- flexibility ensures future changes or modification without structural changes.

e.g. - Future expansion of building.
- provide multi purpose units.

ROOMINESS :-

Every unit of built-up area must be utilized to maximum. maximum benefits must be derived from the minimum possible dimension.

- It creates a comfort feeling within limited space requirement.
- in each rooms or units their is minimum unnecessary partitions must be required.
- To avoid overcrowding of furniture
- To maintain proper circulation space.

CIRCULATION :-

circulation means movement of occupants into the building from one unit to another unit of building.

i) Horizontal circulation — movement through passages corridors, halls

ii) Vertical circulation — movement through stairs, escalators, lift from one floor to another floor

SANITATION :-

sanitation means, to carry the used water which is coming from water closets, Bathroom, kitchens by human activity and to maintain the hygenic condition of building.

Requirements for proper sanitation –

i) Drainage system must be efficient.
ii) Disposal of sewage should be proper
iii) To maintain proper ventilation.
iv) supply of water should be adequate.
v) Maintainance of plumbing system should proper.

SPACE REQUIRMENTS AND NORMS FOR MINIMUM DIMENTIONS OF DIFFERENT COMPONENTS

OBJECTIVES :–

i) Habitability and comfort –
sufficient area should essential for human activities, Furniture and privacy.

ii) sanitation – TO avoid disease and its spreading

iii) safety – It allows designed clearance and exit to less casualty during Fire and Natural disasters

AS PER IS-962-1989

Minimum Size and Width of Different Components of Residential Premises

Sl. No.	Component of Building	Min. Requirement for Plots up to 50 sq.m.	Min. Requirement for Plots above 50 sq.m.
1	Habitable Room	Area – 7.50 sq.m. Width – 2.10 m Height – 2.75 m	Area – 9.50 sq.m. Width – 2.40 m Height – 2.75 m
2	Kitchen	Area – 3.30 sq.m. Width – 1.50 m Height – 2.75 m	Area – 4.50 sq.m. Width – 1.50 m Height – 2.75 m
3	Pantry	Area – Not applicable Width – Not applicable Height – Not applicable	Area – 3.00 sq.m. Width – 1.40 m Height – 2.75 m
4	Bathroom	Area – 1.20 sq.m Width – 1.00 m Height – 2.20 m	Area – 1.80 sq.m. Width – 1.20 m Height – 2.20 m
5	W.C.	Area – 1.00 sq.m. Width – 0.90 m Height – 2.20 m	Area – 1.10 sq.m Width – 0.90 m Height – 2.20 m
6	Combined Bath & W.C. (Toilet)	Area – 1.80 sq.m Width – 1.00 m Height – 2.20 m	Area – 2.80 sq.m. Width – 1.20 m Height – 2.20 m
7	Store	Area – No restriction Width – No restriction Height – 2.20 m	Area – No restriction Width – No restriction Height – 2.2 m
8	Projections	Permitted within the setbacks up to 0.75 m width	Permitted within the setbacks up to 0.75 m width
9	Garage	--	Area – 14.85 sq.m. Width – 2.75 m Length – 5.40 m Height – 2.40 m
10	Passage	--	Width – 1.00 m
11	Doorways – Habitable rooms	Width – 0.80 m Height – 2.00 m	Width – 0.90 m Height – 2.20 m
12	Doorways – For kitchen, bath, W.C. etc.	Width – 0.75 m Height – 2.00 m	Width – 0.75 m Height – 2.00 m

PRINCIPLES OF PLANNING *of* RESIDENTIAL AND PUBLIC BUILDING

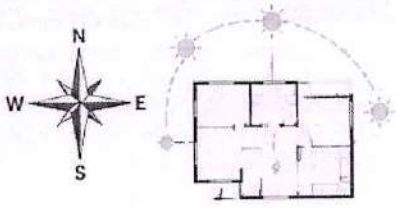
1 ASPECT

- Rooms should be placed to enjoy pleasant views.
- Living spaces to open side; avoid unfavorable views.

2 PROSPECT

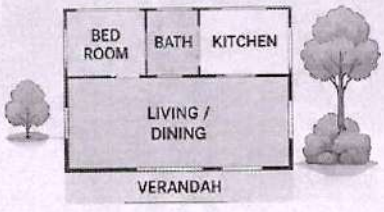
- Building should have an attractive approach and frontage.
- Good prospect adds to the value and appearance.

3 ORIENTATION



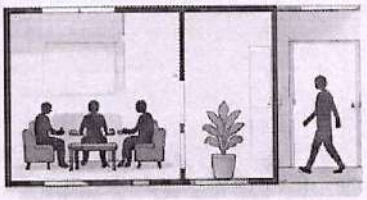
- Plan rooms for proper sunlight, ventilation and climate.
- Living and bedrooms—preferably North or East.

4 GROUPING



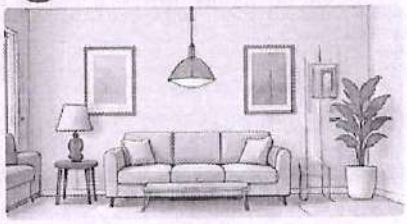
- Rooms with similar functions should be grouped together.
- Ensure convenience and short circulation.

5 PRIVACY



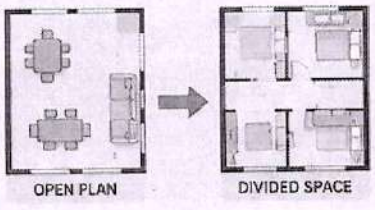
- Ensure privacy in bedrooms and private spaces.
- Separate public and private areas clearly.

6 ELEGANCE



- Good proportions, pleasing forms and fine details.
- Use quality materials and finishes for aesthetic appeal.

7 FLEXIBILITY

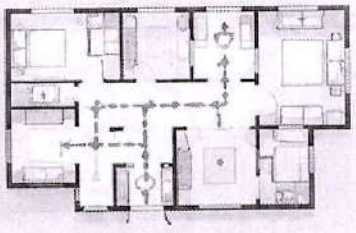


- Plan spaces that can adapt to changing needs.
- Use movable partitions and multifunctional spaces.

8 ROOMINESS

- Provide adequate space and good proportions.
- Avoid overcrowding; allow comfortable living.

9 CIRCULATION

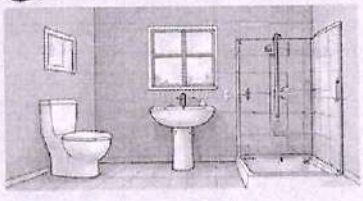


- Ensure easy and convenient movement.
- Keep corridors short, direct and unobstructed.

10 FURNITURE REQUIREMENTS

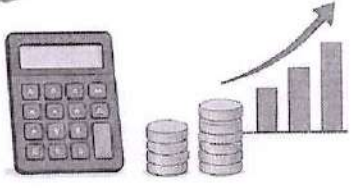
- Provide space as per furniture size and arrangements.
- Ensure comfort, convenience and proper placement.

11 SANITATION



- Ensure cleanliness, ventilation and proper drainage.
- Provide hygienic toilets, bathrooms and waste disposal.

12 ECONOMY



- Plan for optimum use of space, materials and resources.
- Aim for low cost, easy maintenance and long life.

GOOD PLANNING • BETTER LIVING • SUSTAINABLE FUTURE

RULES AND BYE-LAWS OF SACTIONING AUTHORITIES

Building bye-laws play an essential legal instrument employed to govern and control various aspects of construction, including parameters such as Building coverage, Height, set back etc. Building bye laws are regulations established by local authorities to govern building construction and development within their jurisdictions.

OBJECTIVES:-

1) TO ensure safety in construction.
2) TO regulate building design and size
3) TO prevent unplanned development.
4) TO promote environmental considerations.
5) TO enhance urban aesthetics.
6) TO Address emerging technologies.

ASPECTS OF BYE LAWS:-

1) set back distance — minimum open space required in front of buildings facing a road known as set back distance or building line. This aims to maintain street aesthetics, prevent overcrowding. set back distance can also be repurposed as parking spaces or green areas.

2) FLOOR SPACE RATIO (FAR) :-

It expressed as the ratio of total floor area to the land area. it used to control intensity of development

- It regulate the population density within area.

$$FAR = \frac{\text{Built up area}}{\text{Total area.}}$$

3) BUILT UP AREA :-

- the Built up area is the plot area minus the space allocated for open areas.
- It means the total area covered by building
- It also called as plinth area.

Components included in built up area -

- Thickness of walls
- Rooms
- Kitchen
- Bathrooms and toilets
- Staircase
- Store room
- Verandahs
- lift

Built up area = carpet area + Area of walls

4) HEIGHT OF BUILDING :-

- The Height of Building is determined based on street width, to maintain urban aesthetic and safety
- Narrower streets have lower height allowances.
- High rised buildings required Fire NOC, Lift permission, structural safety approval.

⑤ VENTILATION AND LIGHTING :-

- This is mandatory provision in Building code to ensures sufficient room lighting and ventilation
- The minimum opening areas are specified for different climatic conditions.

⑥ WATER SUPPLY AND SANITARY PROVISIONS :-

- Building codes set standards for water supply and sanitation facilities, such as taps, sinks, water closets and wash basins, based on the type of building.
- According to requirements building should have proper toilets, drainage system, septic tank, sewer connection, waste disposal system.

⑦ FIRE SAFETY :-

- It is mandatory for public and high rise Buildings.
- It requires Five exits, staircase width, Fire extinguishers, water tank, emergency access.

⑧ structural design :-

- Structures to be designed to withstand safe loads, earthquakes, and other enviromental factors
- General guidelines for foundation depth, widths and concrete usage are provided.

Per Capita water requirement for various Occupancies/Uses

Sl. No.	Type of Occupancy	Consumption per Head per Day (in lt.)
1	Residential – In living units	135
	Residential – Hostels	135
	Residential – Hotels with lodging accommodation (per bed)	180
	Residential – Hotels (5 star and above)	340
2	Educational – Day schools	45
	Educational – Boarding Schools	135
3	Institutional (Medical Hospitals) – No. of beds not exceeding 100	340
	Institutional (Medical Hospitals) – No. of beds exceeding 100	450
	Institutional – Medical quarters and hostels	135
4	Assembly – Cinema theatres, auditoria, etc. (per seat accommodation)	15
5	Government or Semi Public business	45
6	Segregated toilet facilities for Visitors in Public Buildings – Each use of toilet (including washing hands and floors)	7
	Segregated toilet facilities – Flushing urinals	0.20
7	Mercantile (Commercial) – Restaurants (per seat)	70
	Mercantile (Commercial) – Other business building	45
8	Industrial – Factories where bathrooms are to be provided	45
	Industrial – Factories where bathrooms are not to be provided	30
9	Storage (including Warehouses)	30
10	Hazardous	30
11	Intermediate Stations (excluding mail and express stops)	45 (25)*
12	Junction Station	70 (45)*
13	Terminal Stations	45
14	International and Domestic Airports	70

Provision of Exterior Open Spaces around the Residential Buildings:

Sl. No.	Height of the Building (m)	Exterior Open Spaces to be Left on All Sides (Front, Rear and Sides) in m
1	10	3
2	15	5
3	18	6
4	21	7
5	24	8
6	27	9
7	30	10
8	35	11
9	40	12
10	45	13
11	50	14
12	55 and above	16

Ventilation Shaft: For ventilating the spaces for water closets and bathrooms

Height of Building (m)	Size of Ventilation Shaft (sq m)	Minimum Size of Shaft (m)
Upto 10.0	1.2	0.9
Upto 12.0	2.8	1.2
Upto 18.0	4.0	1.5
Upto 24.0	5.4	1.8
Upto 30.0	8.0	2.4
Above 30.0	9.0	3.0

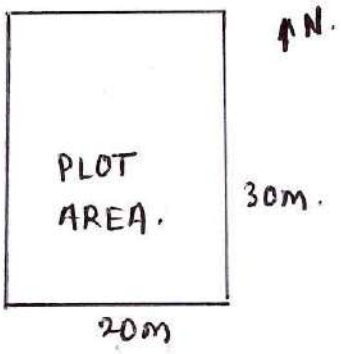
AREA CACULATIONS :-

1. PLOT AREA :- The total Horizontal area of piece of land enclosed within the property boundaries. is called as PLOT area.

∴ Plot area = Length of plot x Breadth of plot.

Ex. Dimension - (20x30) m.

∴ Plot area = 20x30
= 600 m^2



2. BUILT-UP AREA :- It refers to the total area covered by the building i.e area of all the floors of building. it is also called plinth area.

- The permissible built up area should not exceed $\frac{1}{3}^{rd}$ of plot area.
- It is generally more than carpet area.

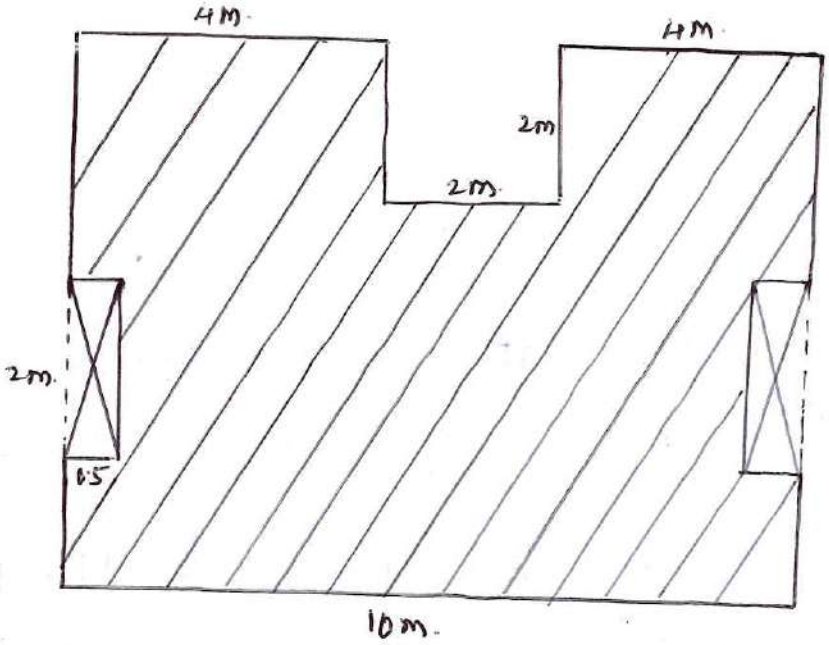
3. SUPER BUILT-UP AREA :- It means proportionate common area which is offered by Builders to the occupants for use such as club house, lobbies, lift, stair case.

∴ super Built up area = Built up area + common area.

4. PLINTH AREA :-

It includes the area of all the components with their wall thickness upto plinth level is called plinth area.

i.e plinth area = Wall thickness + internal partition + staircase + Rooms + verandahs.



∴ plinth area = $(10 \times 9) - (2 \times 0.5) - (2 \times 0.5) - (2 \times 2)$

$= 84\ m^2$

5. CARPET AREA :- It is total usable area at each floor level i.e the area which is covered by carpet.

- It excludes Balconies, lift, common area, sanitary accomodation etc.

6. FLOOR AREA :- It includes with the area of all the usable units of building. with WC, bath.

7. FAR (FLOOR AREA RATIO / FLOOR SPACE INDEX) :-

It is the ratio of total built-up area of all the floors to the plot area.

$$\therefore \text{FSI} = \frac{\text{Total area of floors}}{\text{Area of plot}}$$

Importance of FSI :-

1. To control density of population and construction.
2. To prevent overcrowding.
3. To ensures ventilation and light.

ex- If plot area = $700 m^2$

total built up area = $1150 m^2$

$$\therefore \text{FSI} = \frac{1150}{700}$$

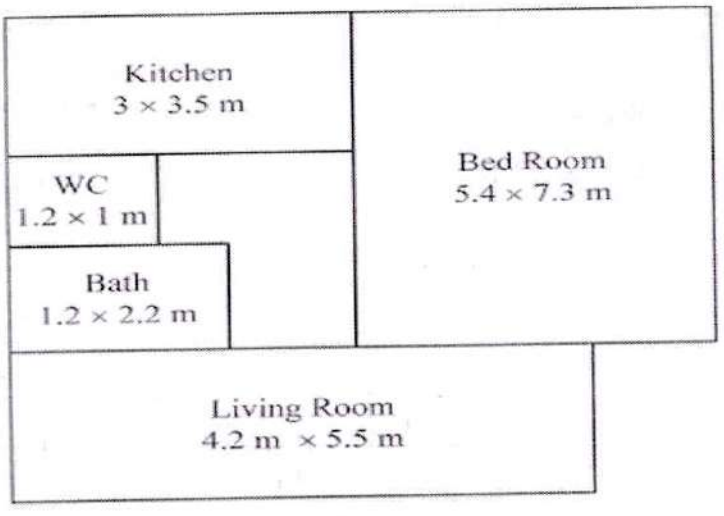
$$\text{FSI} = 1.64.$$

So, the permissible construction is 1.64 times the plot area.

Line plans for residential building of minimum three rooms including w/c, bath and staircase

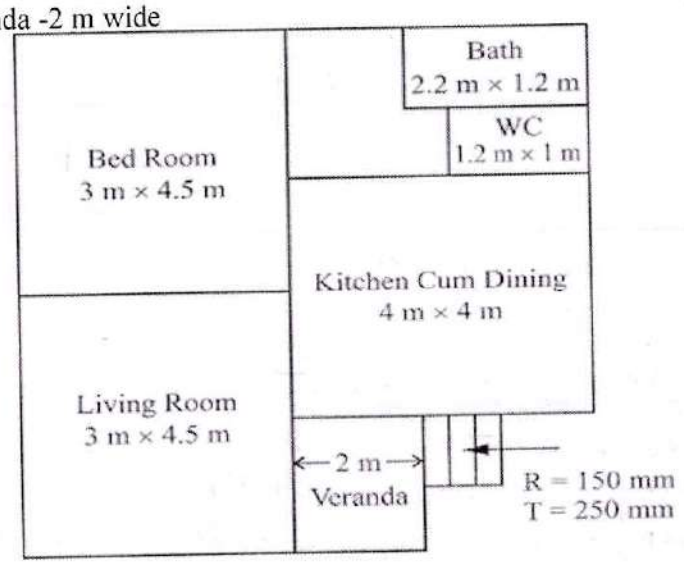
Example:

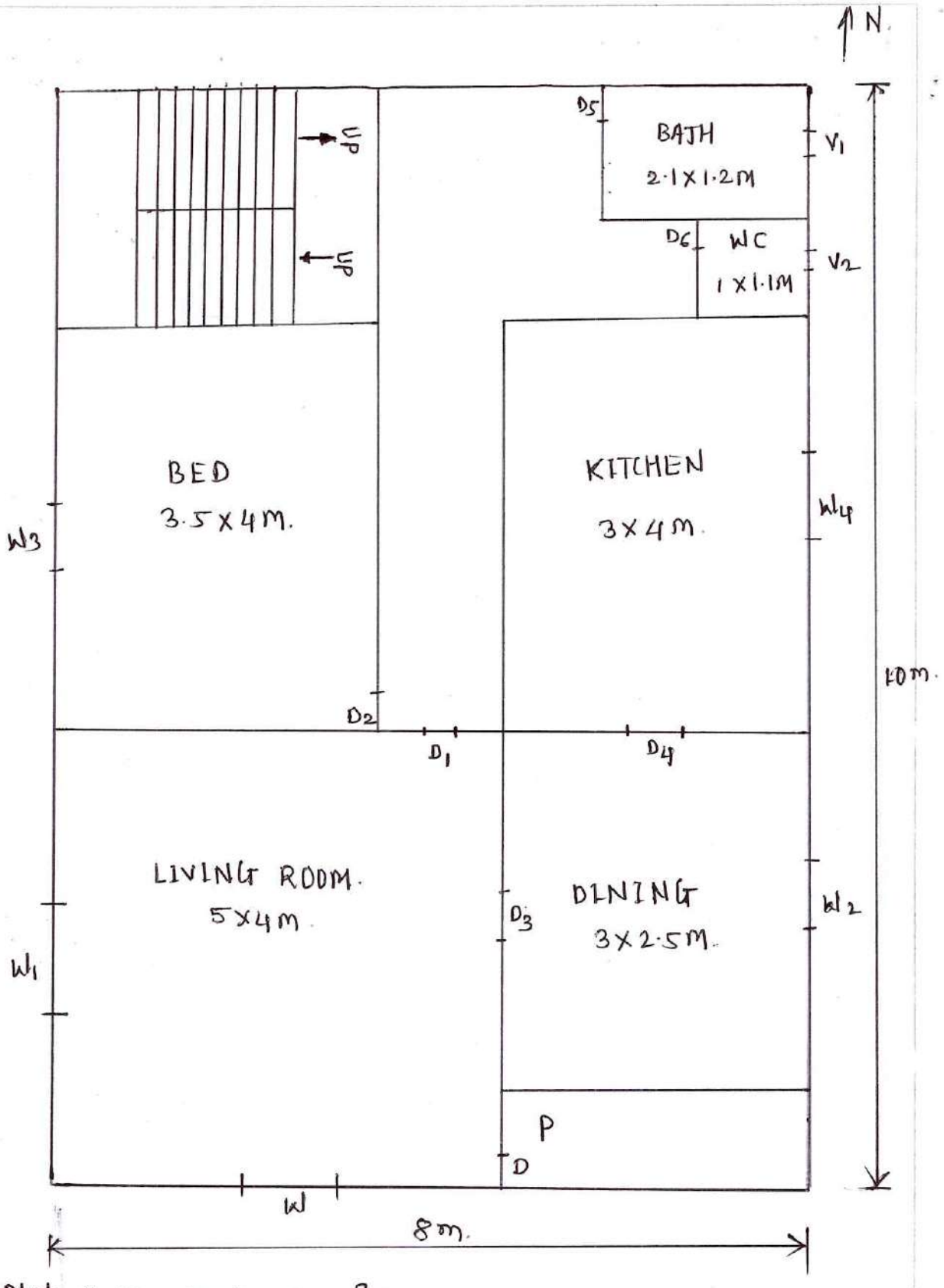
1) Living Room- 4.2 × 5.5 m
2) Bedroom- 5.4 × 7.3 m
3) Kitchen- 3 × 3.5 m
4) Bath - 1.2 × 2.2 m
5) WC- 1.2 × 1 m



Example:

1. Bedroom - 3 × 4.5 m
2. Living Room -3 × 4.5 m
3. Kitchen Cum Dining -4 × 4 m
4. Bath - 2.2 × 1.2 m
5. WC - 1.2 × 1 m
6. Veranda -2 m wide





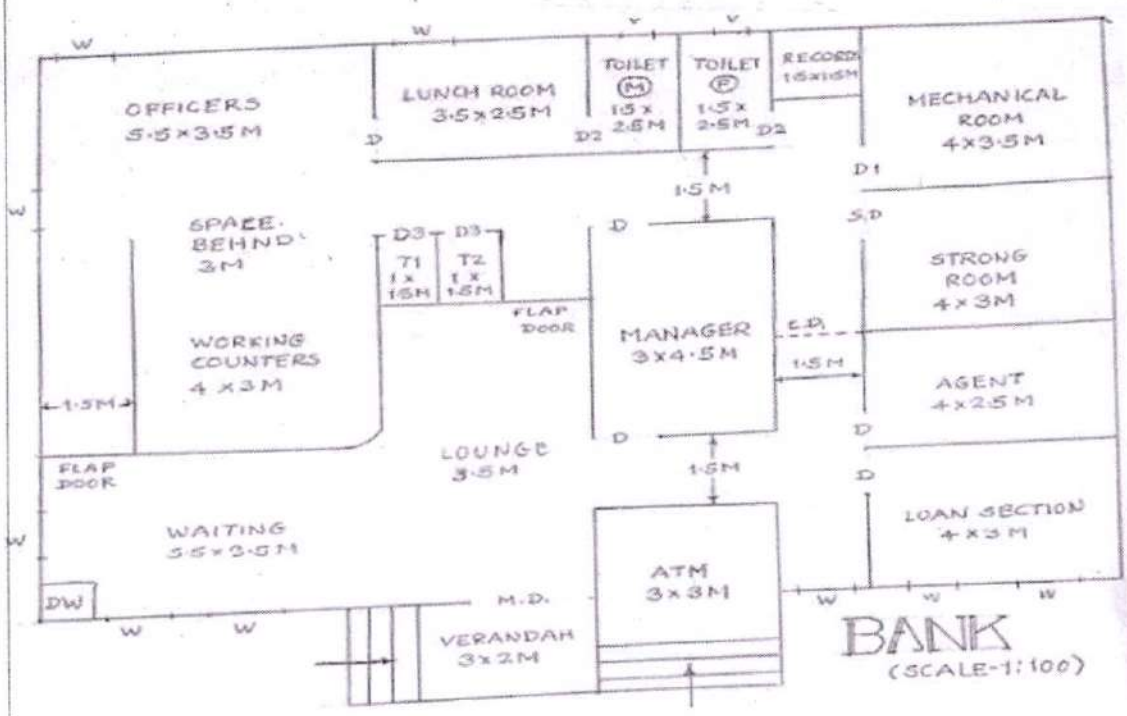
Plot Area = 10×8 = 80m²

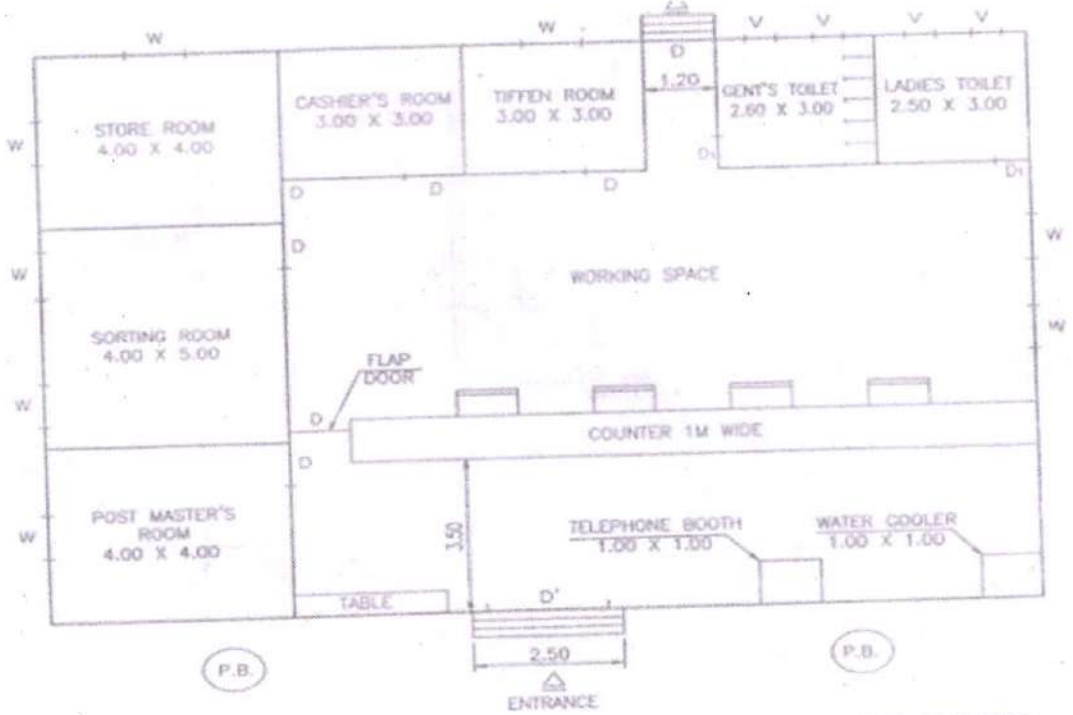
Details of units –

Dining = 3×2.5m. Kitchen = 3×4m.

Living room = 5×4 Bath = 2.1×1.2m.

Bed = 3.5×4m. W/C = 1×1.1m.



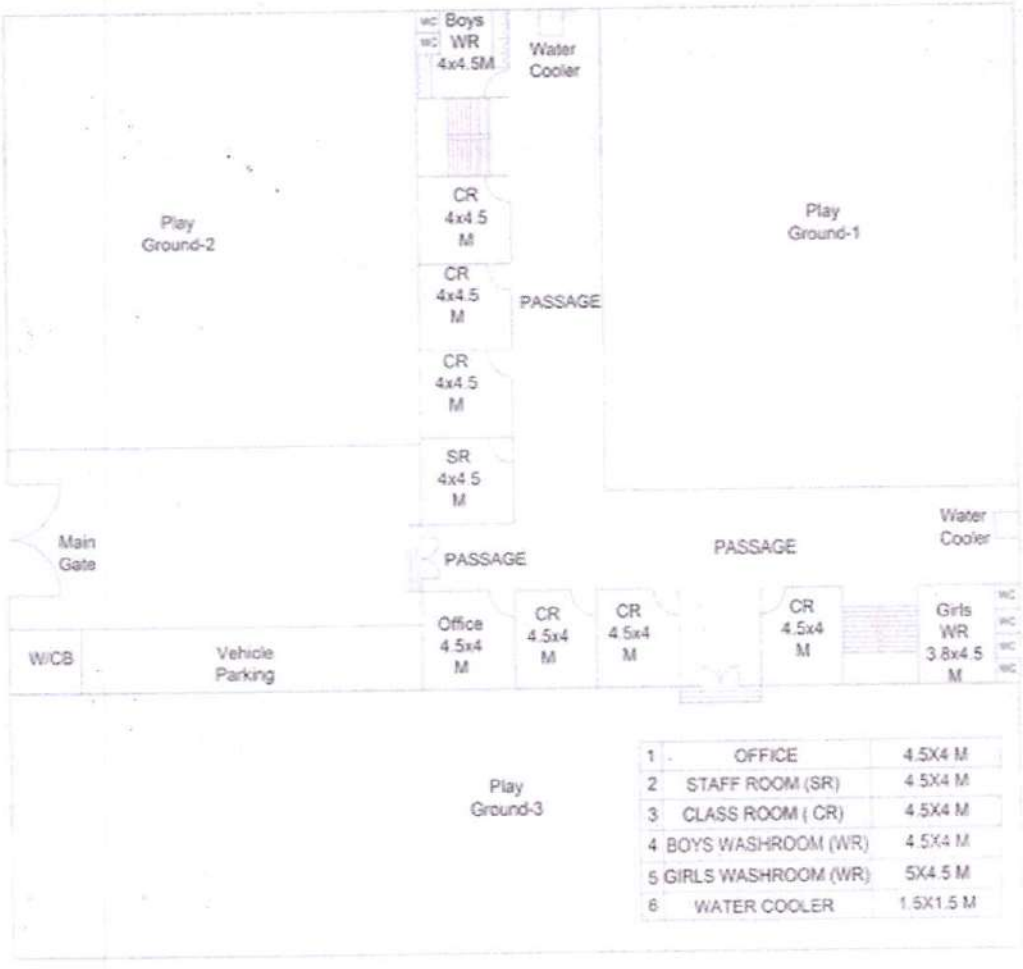


SIZES OF OPENING

D'=	2.00X2.50
D=	1.00X2.50
D1=	0.70X2.10
W=	1.40X1.50
V=	0.60X0.70
P.B.=	POST BOX

NOTE:-
ALL DIMENSIONS ARE IN METER

PRIMARY HEALTH CENTRE :-



1	OFFICE	4.5X4 M
2	STAFF ROOM (SR)	4.5X4 M
3	CLASS ROOM (CR)	4.5X4 M
4	BOYS WASHROOM (WR)	4.5X4 M
5	GIRLS WASHROOM (WR)	5X4.5 M
6	WATER COOLER	1.5X1.5 M