



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

Course Title- Building planning & drawing with cadcourse Code -313009

Programme Name -Civil Engineering

Semester-Third

Unit	Title	COs	Learning hours	R Level	U Level	A Level	Total Marks
III	Planning of Buildings	CO3	12	-	-	-	-

Syllabus:-

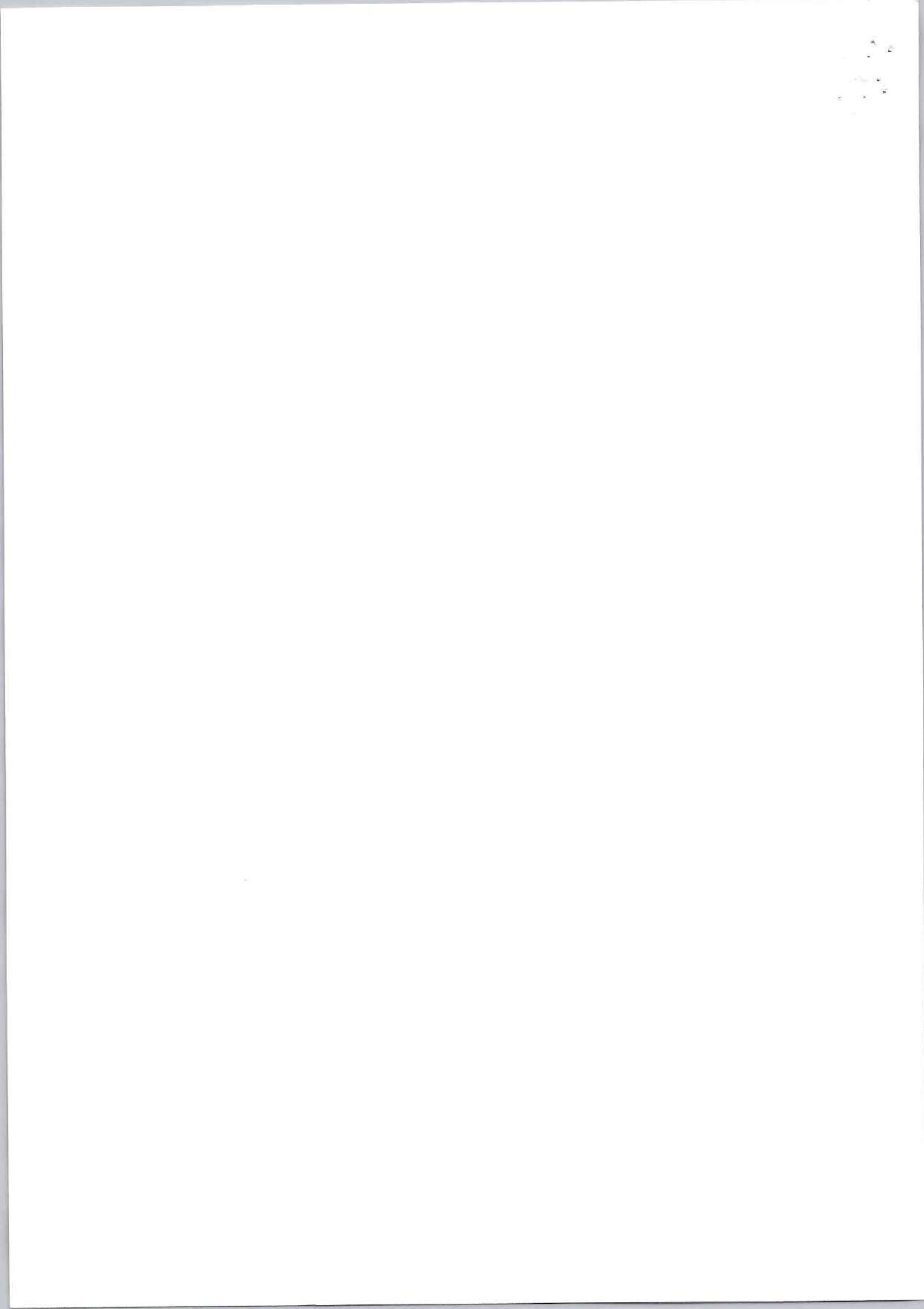
3.1 Data drawing (for Load bearing and framed structure): Developed

plan, elevation, section, site plan, schedule of openings, construction notes with specifications, area statement. Planning of staircase- Rise and Tread for residential building.

3.2 Working drawing: Developed plan, elevation, section passing through staircase or Sanitary Block.

3.3 Foundation plan of Load bearing and Framed structure.

3.4 Details of RCC Components: Footing, column, Beam, Chajjas, Lintel, Staircase and slab.



DEVELOPED PLAN!— is a detailed drawing prepared from a line plan it shows the actual dimensions, doors, windows, column, staircase, with their units with suitable construction details and location details required for execution of construction work.

NECESSITY OF DEVELOPED PLAN!—

- It helps in accurate estimation of materials and total cost of building.
- To manage construction work on site.
- To promote proper utilization of space.
- It required for approval of local authority.

Details is to be shown in developed plan!—

- Actual wall thickness.
- positions of doors and windows.
- Dimensions of units.
- details of stair case.
- sanitary spaces.
- orientation
- Building bye-laws and principles of planning.

SCALES:-1. Full scale:- [1:1]

Dimension on
drawing = Dimension on
site

ex:- 1 cm = 1 cm.

2. Reducing scale:-

Dimension on
drawing < Dimension on
site.

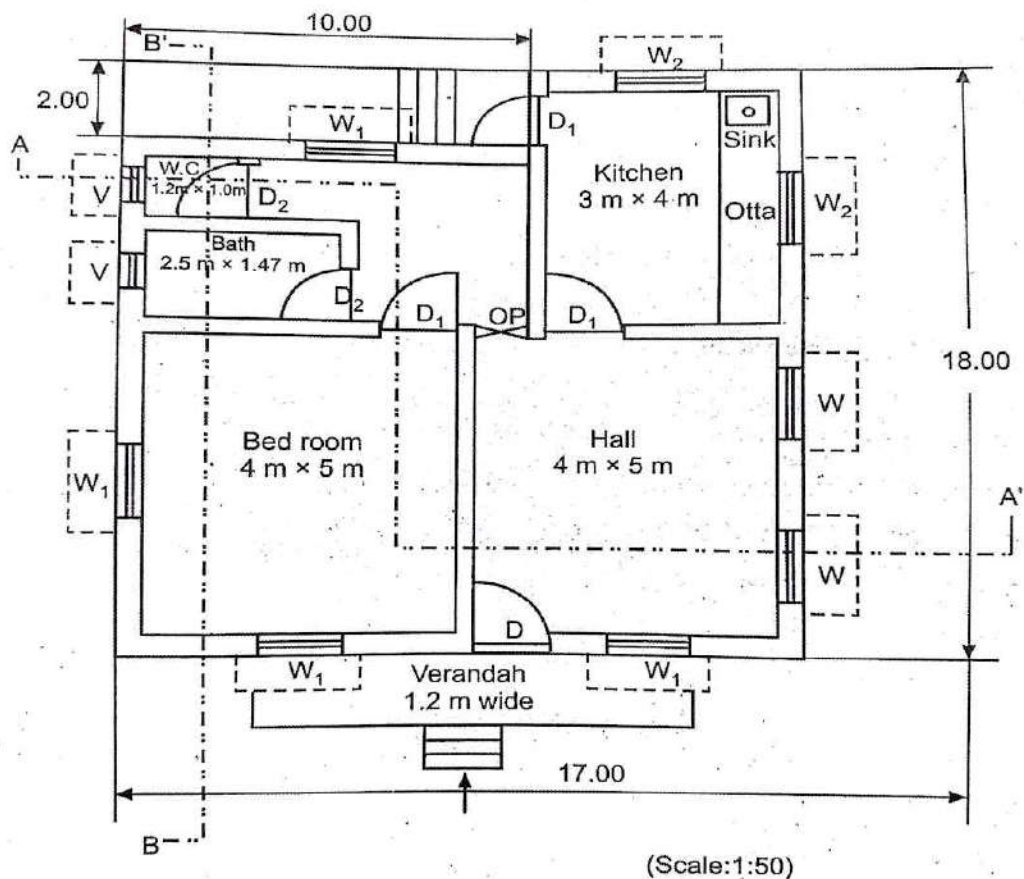
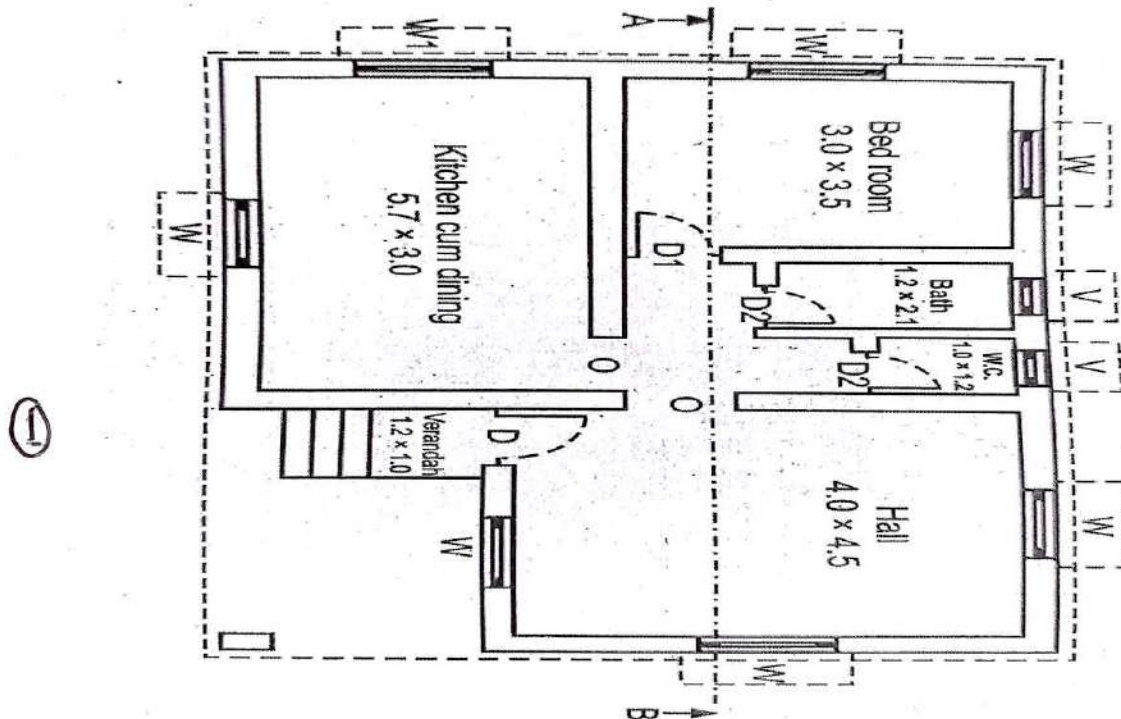
[it is used for large buildings, roads, bridges]

ex . 1 cm = 50 cm.
1 cm = 200 cm

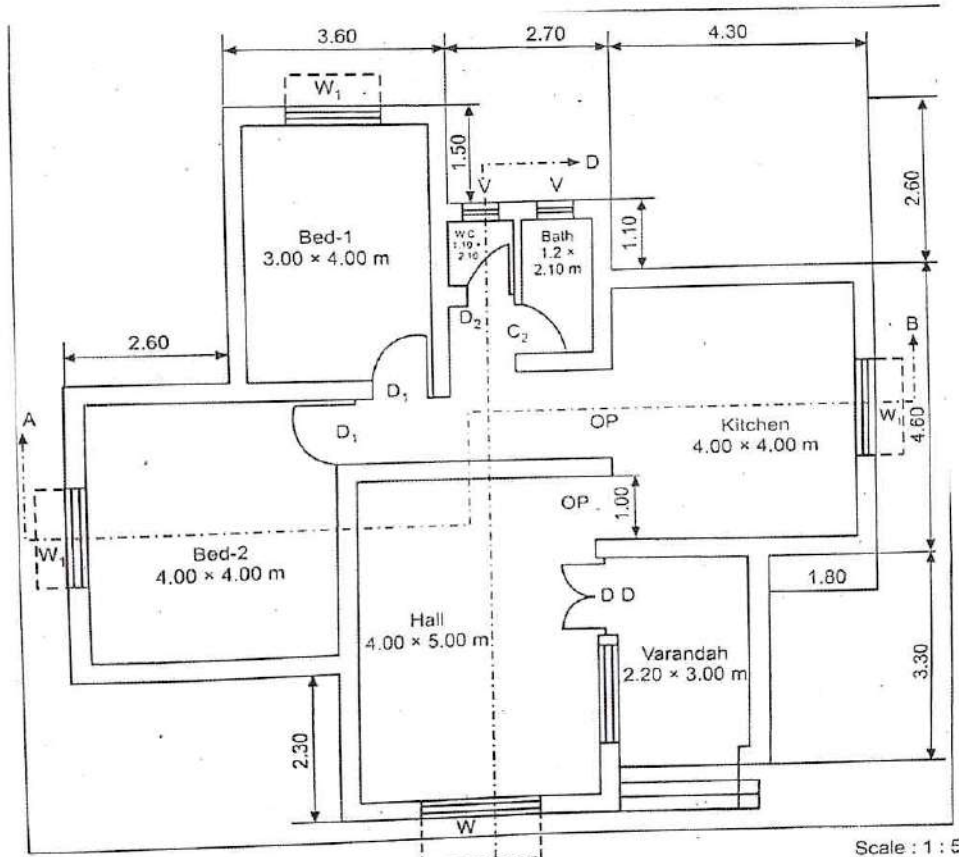
3. Enlarging scale:-

Dimension on
drawing > Dimension on
site.

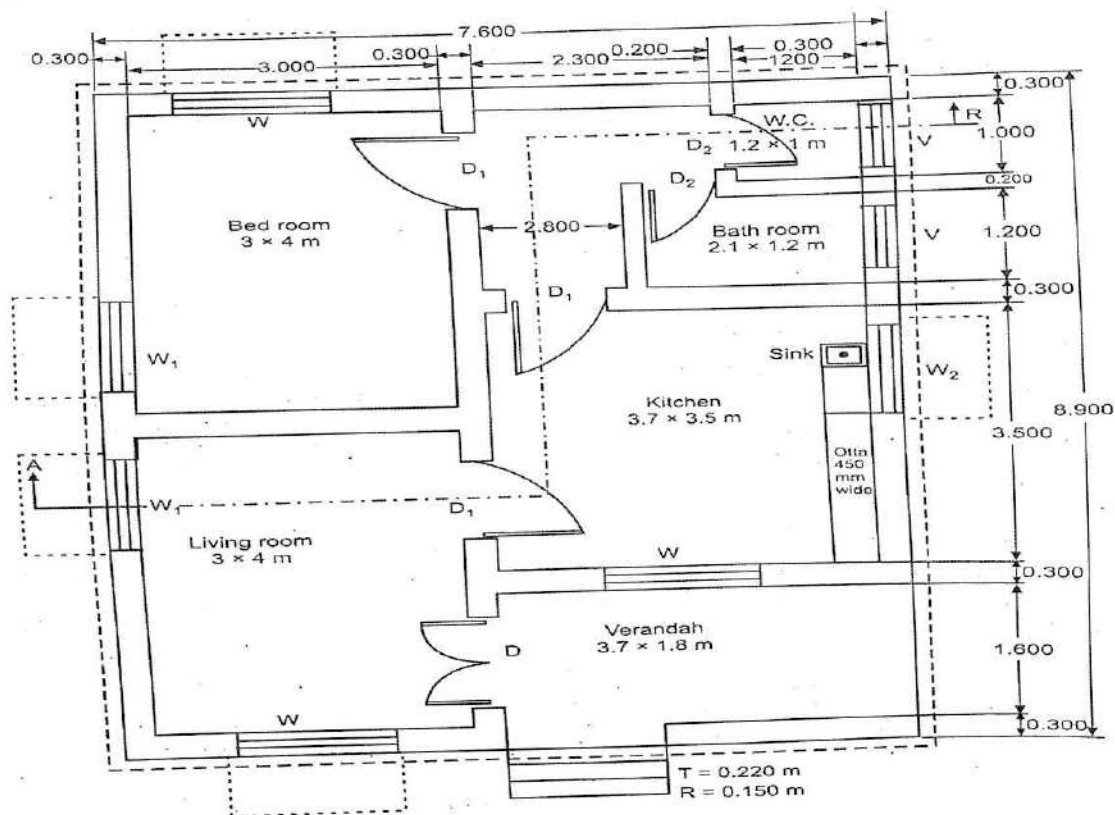
ex - 2 cm = 1 cm.
5 cm = 1 cm.



②



④



ELEVATION:-

It represents the various Aesthetic views from different directions while constructing a building. It includes the heights of various components of buildings such as plinth, sill, ceiling, window, door, lintel, slab, parapet etc.

How to draw Elevation:-

1. To set Ground level:-

- Draw the horizontal line at the bottom of building. It shows the G.L.

2. To draw plinth level:-

- To draw again horizontal line parallel to previous line and placed it at suitable height.

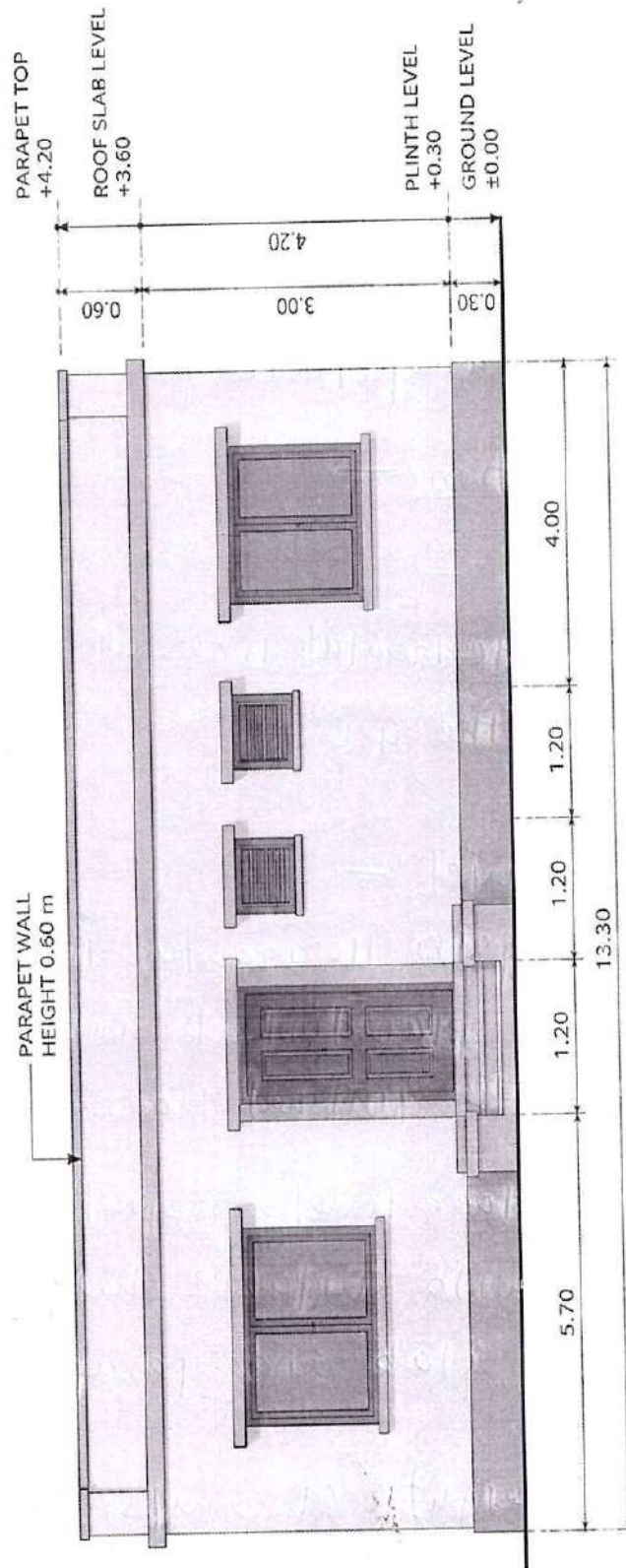
- It shows the finished floor level (FFL)

3. After projecting floor level, project the each units of building with suitable height such as doors, windows, lintel, slab and parapet.

4. To set vertical heights of units, drawn from floor level.

FRONT ELEVATION

(ALL DIMENSIONS IN METER)



NOTES:

- ALL DIMENSIONS ARE IN METER
- WALL THICKNESS (EXTERNAL) : 0.23 m
- PARAPET WALL HEIGHT : 0.60 m
- FLOOR TO FLOOR HEIGHT : 3.00 m
- PLINTH HEIGHT : 0.30 m
- TOTAL HEIGHT (GROUND TO PARAPET TOP) : 4.20 m

STRUCTURE TYPE	: LOAD BEARING
WALL MATERIAL	: BRICK MASONRY
ROOF	: RCC SLAB
FINISH	: PLASTERED & PAINTED

SECTION!—

- To getting various details from plan we draw a elevation.

- some details are not provided into detail plan or not in elevations. are drawn in sections by suitable section line in plan.

- To get maximum details or interior data section line should passes through W.C., bath and stair case. such as Rise and tread, landing, height and thickness of lintel.

- sections are drawn into two ways.

- ① longitudinal section (along the length)
- ② cross-section (along the width).

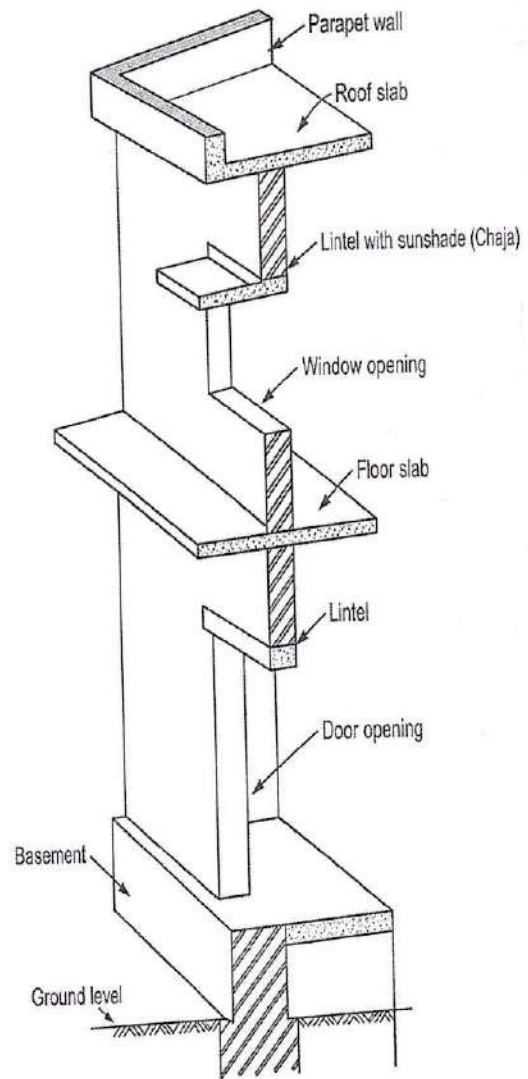
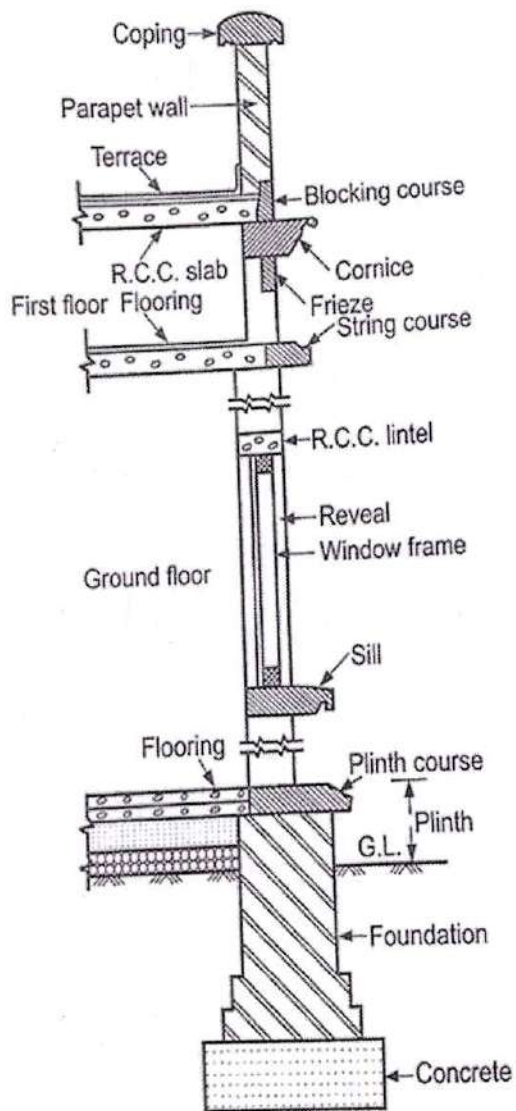


Fig. 3.7: Wall section showing lintels over wall openings

The diagram illustrates a cross-section of a building wall and floor assembly. The wall is 3000 mm high and 120 mm thick. It features a living room at the bottom, a passage in the middle, and a bath room at the top. The floor is made of lime concrete, rubble soil, hard strata, and compact murrum. The wall is made of P.C.C. bed, 150 mm thick, and 100 mm wide. The diagram includes labels for various components: Ceiling, Slab 120 thick, V_1 , Dado, L, P.C.C. bed, 150 thk., 100 wide, Compact murrum, Hard strata, Rubble soil, Lime concrete, Ground, Plinth, Sill, W, Lintel, Living room, Passage, Bath room, D_1 , D_2 , 1.2 m, 1200, 800, 600, 1000, 3000, 120.

Fig. 3.28 (b)

SITE PLAN:-

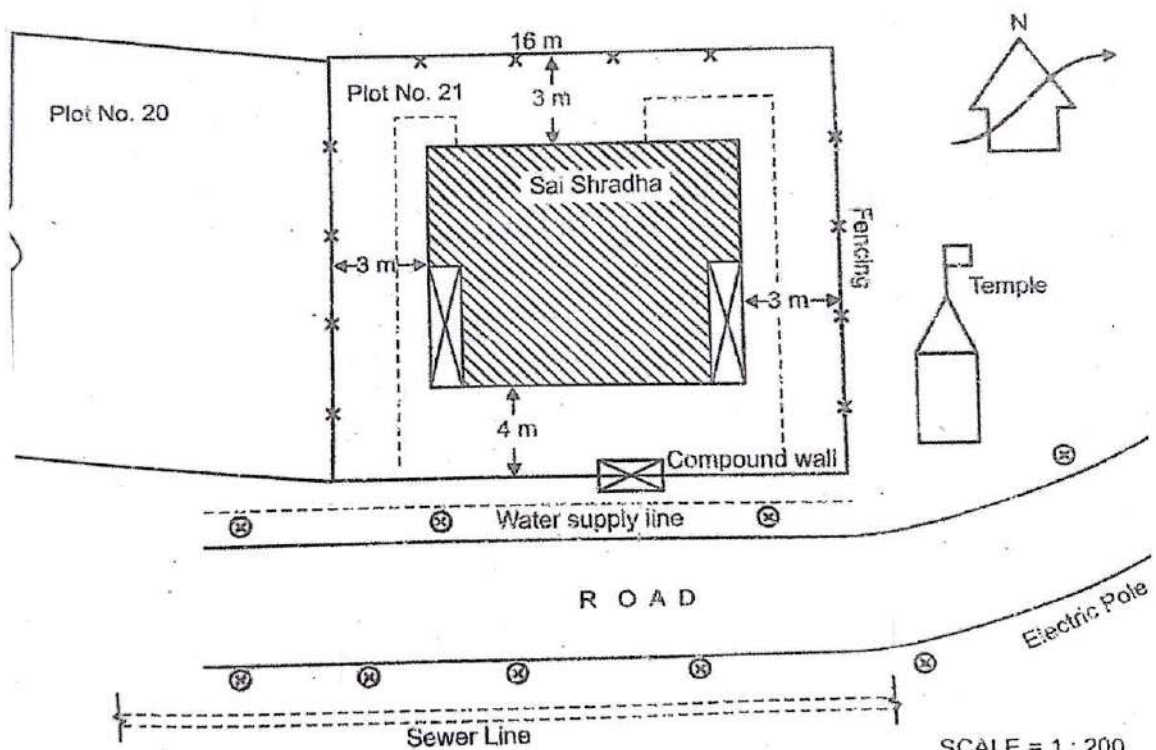
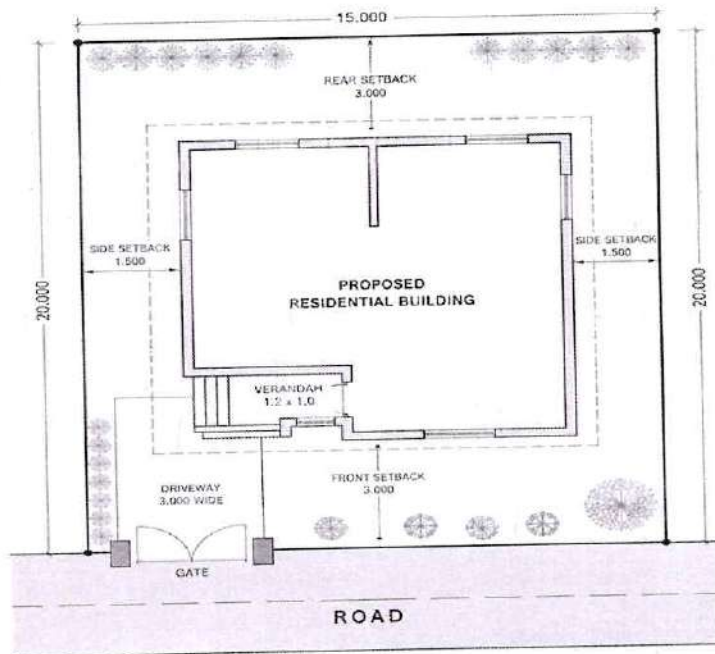
site plan is a plan in which we can show all the permanent details and location along with all the features and dimensions with scaled. such as boundaries, Roads, sewer line, Neighboring propesty and open spaces.

- In the site plan plan of building must shown with hatching.

- Major objective of siteplan is to give an Idea about proposed site.

* Following details are shown into siteplan.

1. orientation of building (North)
2. Location of building.
3. Roads, sewer, trees etc.
4. set back distances.
5. Water supply line.
6. compound wall, electric pole
7. septic tanks.
8. scale and plot area.



SCHEDULE OF OPENINGS:-

- To get access for buildings there is provision of doors and windows.
- windows are provided for ventilation and lighting in different rooms.
- maximum doors provided as two.
- as per climatic situation $\frac{1}{10}$ to $\frac{1}{20}$ th floor area should be provided.

Types of Windows-

Sr. No.	Type of Window	Typical Size (Width × Height) in m	Common Use
1	Fixed Window	0.60 × 0.60 to 1.20 × 1.20	Lighting and decoration
2	Casement Window	0.60 × 1.20 to 1.20 × 1.50	Residential buildings
3	Sliding Window	1.20 × 1.20 to 2.40 × 1.50	Modern houses and offices
4	Pivoted Window	0.90 × 1.20	Offices and commercial buildings
5	Double-Hung Window	0.90 × 1.20 to 1.20 × 1.50	Residential buildings
6	Louvered Window	0.60 × 0.90 to 1.20 × 1.20	Toilets and bathrooms
7	Bay Window	1.50 × 1.50 to 2.40 × 1.80	Living rooms
8	Corner Window	1.20 × 1.20	Residential buildings
9	Dormer Window	0.90 × 1.20	Sloping roofs
10	Clerestory Window	0.60 × 1.20	Factories, halls
11	Skylight Window	0.60 × 0.90 to 1.20 × 1.20	Roof lighting
12	Lantern Window	1.20 × 1.20 to 2.40 × 2.40	Industrial buildings
13	Metal Window	1.20 × 1.20	Commercial buildings

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13	Metal Window	1.20 × 1.20	Commercial buildings
14	UPVC Window	1.20 × 1.20 to 1.50 × 1.50	Modern residential buildings
15	Ventilator Window	0.60 × 0.45	Bathrooms, W.C., kitchens

Sr. No.	Fixture / Fastening	Purpose
1	Hinges	Allow the door to swing open and close
2	Tower Bolt	Fastens the door from inside
3	Aldrop	Locks the door from outside using a padlock
4	Door Latch	Keeps the door closed
5	Mortise Lock	Provides security and locking arrangement
6	Handle	Used to open and close the door
7	Door Stopper	Prevents excessive opening of the door
8	Door Closer	Automatically closes the door
9	Hook and Eye	Holds the door in a fixed position
10	Sliding Bolt	Secures the door from inside
11	Padlock	External locking arrangement
12	Pull Handle	Used for pulling doors
13	Push Plate	Protects door surface while pushing
14	Door Chain	Provides partial opening for safety
15	Panic Bar	Emergency exit hardware in public buildings

Schedule of Openings for Doors and Windows:-

Mark	Size (m) (W × H)	No.	Location
D	1.00 × 2.10	1	Main Entrance
D1	0.90 × 2.10	2	Bedrooms
D2	0.90 × 2.10	1	Kitchen
D3	0.75 × 2.00	1	Bathroom
D4	0.70 × 2.00	1	W.C.

Mark	Size (m) (W × H)	No.	Location
W1	1.50 × 1.20	2	Living Room
W2	1.20 × 1.20	2	Bedrooms
W3	1.00 × 1.20	1	Kitchen
W4	1.20 × 1.20	1	Staircase

Construction Notes with Specifications:-

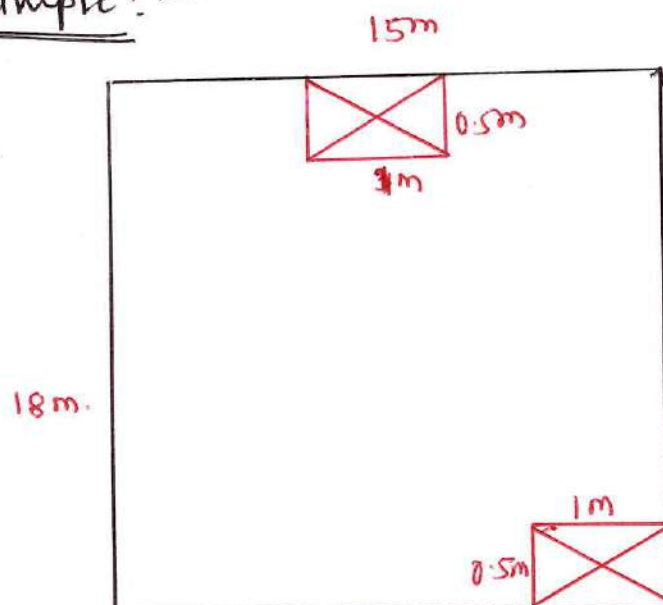
Sr. No.	Item	Specification
1	Foundation	Foundation depth 1.20 m below ground level or as per soil bearing capacity.
2	PCC in Foundation	PCC 1:4:8 (Cement : Sand : Aggregate), 100 mm thick.
3	Footing	RCC M20 grade concrete with Fe-500 steel reinforcement.
4	Plinth Height	0.45 m to 0.60 m above ground level.
5	Damp Proof Course (DPC)	25 mm thick CC 1:2:4 with waterproofing compound.
6	Superstructure Wall	Brick masonry in CM 1:6, wall thickness 230 mm.
7	Internal Partition Wall	Brick masonry in CM 1:6, wall thickness 115 mm.
8	Lintel	RCC M20 grade, 150 mm thick over openings.
9	Chajja/Sunshade	RCC M20 grade, projection 0.60 m.
10	Roof Slab	RCC M20 grade, slab thickness 125 mm.
11	Staircase	RCC staircase with 150 mm rise and 250 mm tread.
12	Flooring	20 mm thick vitrified tiles over 75 mm PCC bed.
13	Internal Plaster	12 mm thick cement plaster in CM 1:6.
14	External Plaster	15 mm thick cement plaster in CM 1:4.
15	Doors	Flush/panelled doors with approved fittings and fixtures.
16	Windows	Aluminum/UPVC glazed windows with safety grills.
17	Painting	Two coats primer and two coats synthetic enamel/emulsion

Sr. No.	Item	Specification
		paint.
18	Water Supply	CPVC pipes of approved make and quality.
19	Sanitary Work	ISI-marked sanitary fixtures and PVC drainage pipes.
20	Electrical Work	Concealed copper wiring in PVC conduits.
21	Terrace Waterproofing	Waterproof treatment as per approved specifications.
22	Parapet Wall	115 mm thick brick masonry, 0.90 m high.
23	Compound Wall	230 mm thick brick masonry with RCC columns.
24	Ventilation	Adequate ventilation to all rooms as per building bylaws.
25	Materials	All materials shall conform to relevant IS codes and specifications.

Area Statement:-

Sr. No.	Particulars	Area (sq.m.)	Remarks
1	Plot Area	200.00	Total area of plot (10 m × 20 m)
2	Ground Floor Built-up Area	120.00	Area covered at ground floor
3	First Floor Built-up Area	120.00	Area covered at first floor
4	Total Built-up Area	240.00	Sum of all floor areas
5	Carpet Area	180.00	Net usable floor area
6	Plinth Area	120.00	Covered area at floor level

For example! -



$$\begin{aligned}
 &\text{Plinth Total area.} \\
 &= (18 \times 15) - \\
 &\quad (3 \times 0.5) - \\
 &\quad (1 \times 0.5) \\
 &= 269 \text{ m}^2 \\
 &\text{Builtup area} = \\
 &\quad \frac{1}{3} \times (18 \times 15) \\
 &\quad = 90 \text{ m}^2
 \end{aligned}$$

PLANNING OF STAIRCASE! —

- staircase is an essential component of building. it gives access vertically.
- it requires careful consideration while design.
- major aspect of staircase is its location because the purpose of staircase is fully used. while in public building it locates centrally to provide easy access from all the units of building.

TYPES OF STAIRCASE! —**According to Material-**

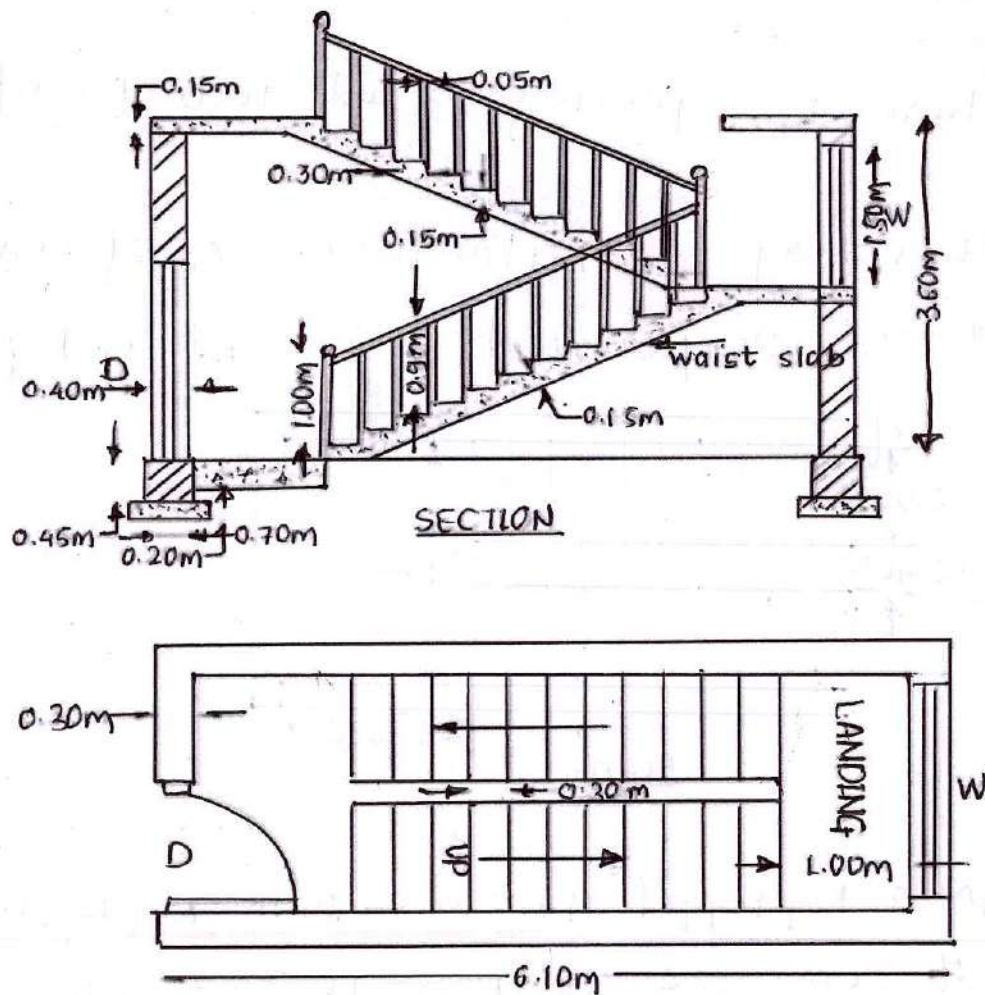
Sr. No.	Type of Staircase	Description
1	Timber (Wooden) Staircase	Made of wood; used in residential buildings.
2	RCC Staircase	Constructed using reinforced cement concrete; most common in modern buildings.
3	Steel Staircase	Made of steel sections; used in industries and fire escapes.
4	Stone Staircase	Constructed using granite, marble, or stone slabs.
5	Brick Staircase	Built with brick masonry; suitable for low-rise structures.
6	Glass Staircase	Made with toughened glass; used for modern architectural designs.
7	Aluminum Staircase	Lightweight and corrosion-resistant.

According to Forms-

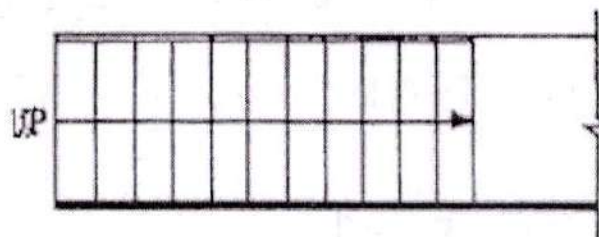
Sr. No.	Type of Staircase	Description
1	Straight Staircase	Single continuous flight without change in direction.
2	Quarter-Turn Staircase	Changes direction by 90° .
3	Half-Turn Staircase	Changes direction by 180° .
4	Dog-Legged Staircase	Two parallel flights with no open well.
5	Open-Well Staircase	Flights separated by an open well.
6	Three-Quarter Turn Staircase	Changes direction by 270° .
7	Circular Staircase	Circular in plan with larger radius.
8	Spiral Staircase	Steps arranged around a central column.
9	Helical Staircase	Curved staircase without a central column.

* Dog-legged staircase:-

- It consist of two flights running in opposite direction
- Flights are seperated by intermediate landing.
- No - open well betn the flights.
- Commonly used in R.C.C. construction.



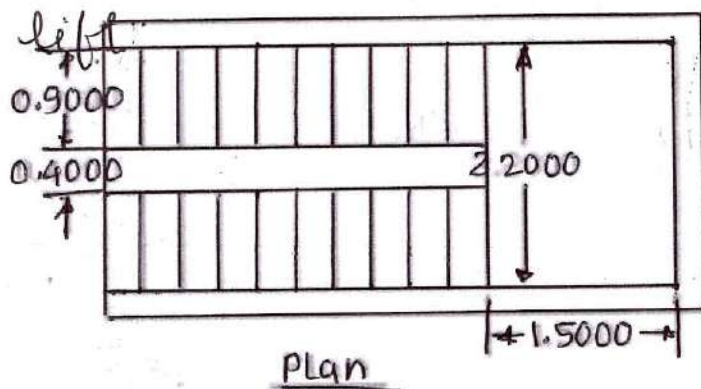
* Straight stair! — There are two stairs along which there is no change in direction of any flight. It is used where stair case hall is long and narrow.



* Open Well stair! —

— There is opening in betⁿ two flights in plan.

— This may be rectangular or of any geometrical shape and it can be used for fixing lift.



* Design a dog legged stair case with floor to floor height of 3.6m. size of room is 3m x 5.5m.

$$\Rightarrow \textcircled{1} \text{ No. of Risers} = \frac{\text{Floor height}}{\text{size of riser}} = \frac{3.6}{0.150} = \frac{3600}{150} = 24 \text{ NOS}$$

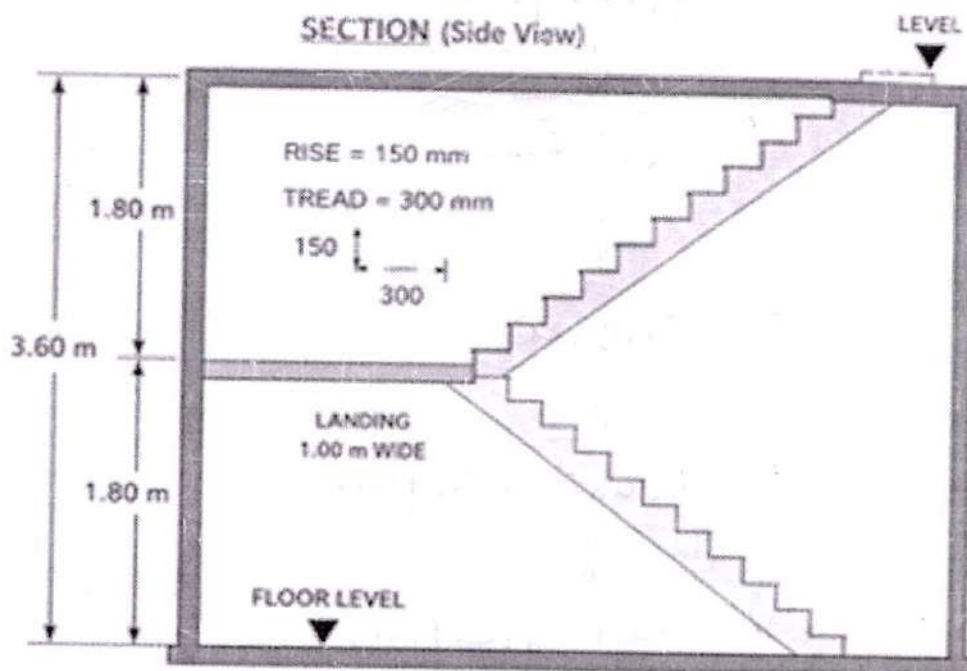
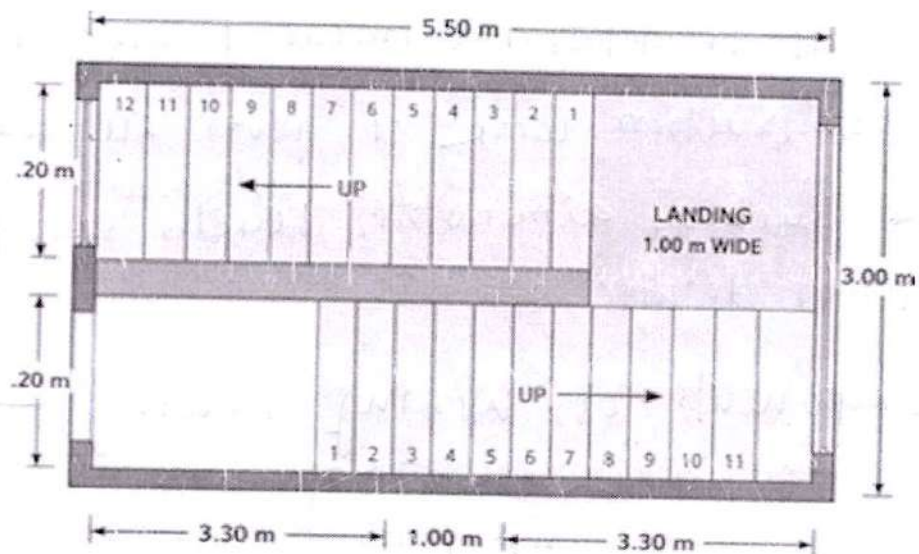
$$\therefore \text{Risers per flight} = \frac{24}{2} = 12 \text{ NOS.}$$

$$\text{Now, No. of treads in one flight} = 12 - 1 = 11$$

Assume, 300mm tread

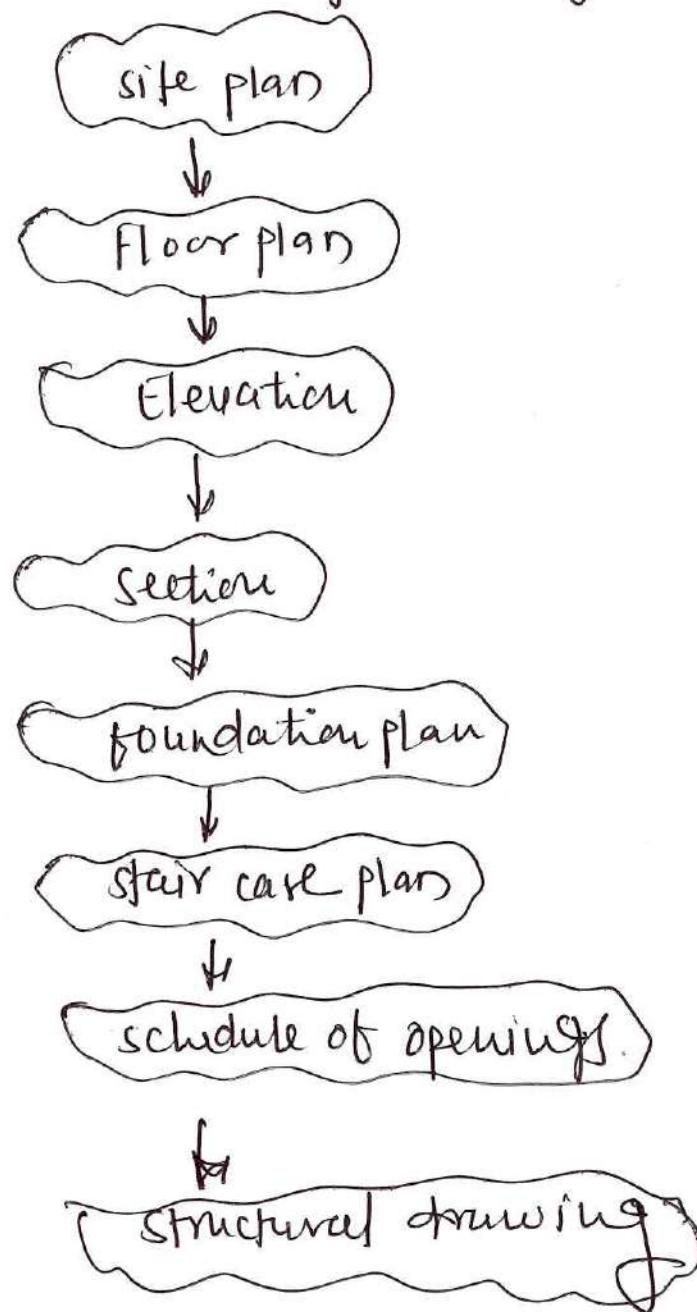
$$\therefore \text{Total distance} = 11 \times 300 = 3300 \text{ mm.}$$

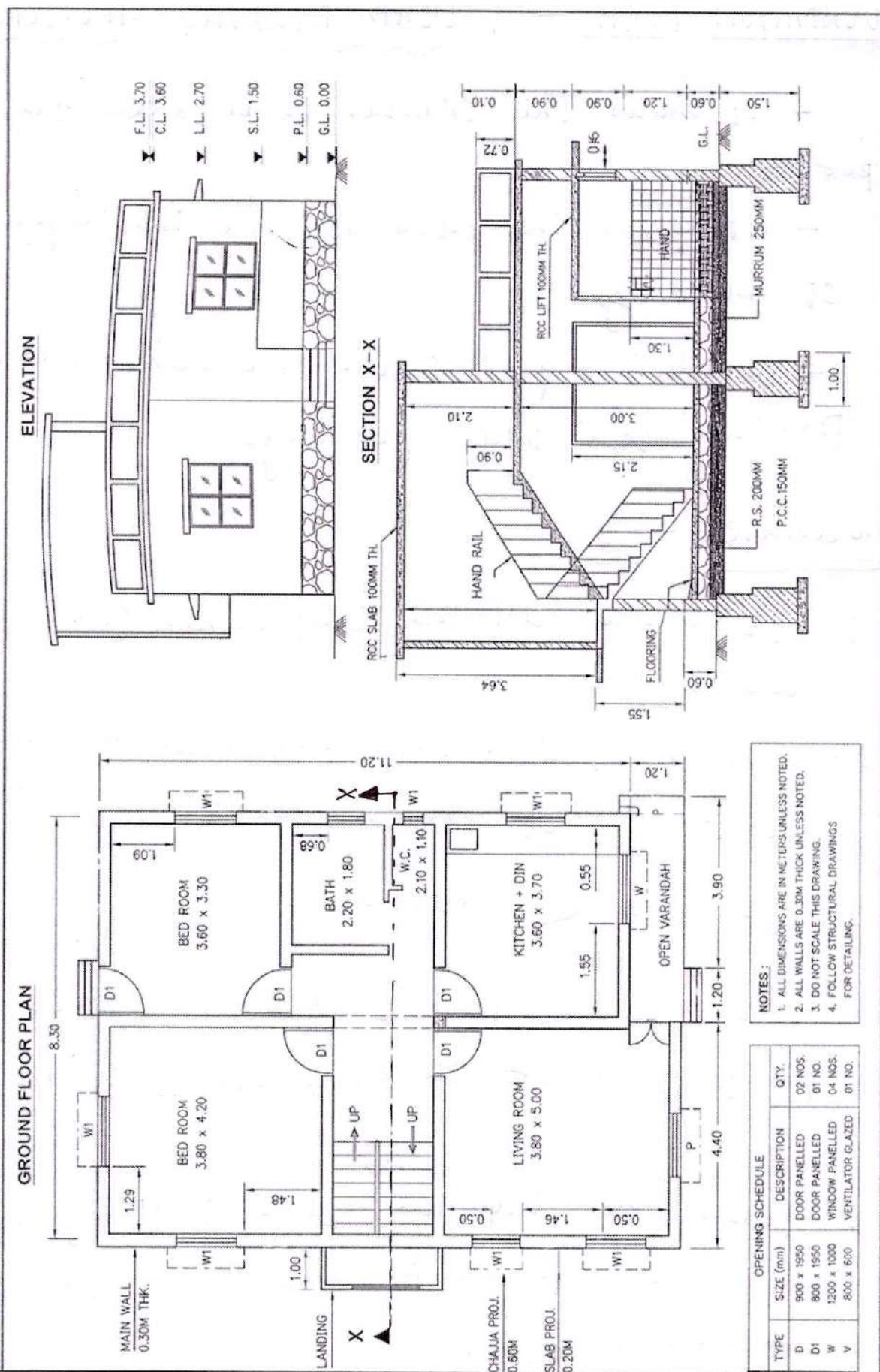
$$\text{Now, size of landing} = \frac{5500 - 3300}{2} = 1100 \text{ mm}$$



WORKING DRAWING:-

It is detailed technical drawing for execution of construction work. It gives all the necessary data such as dimensions, levels, specifications, material details etc.

components of working drawing:-

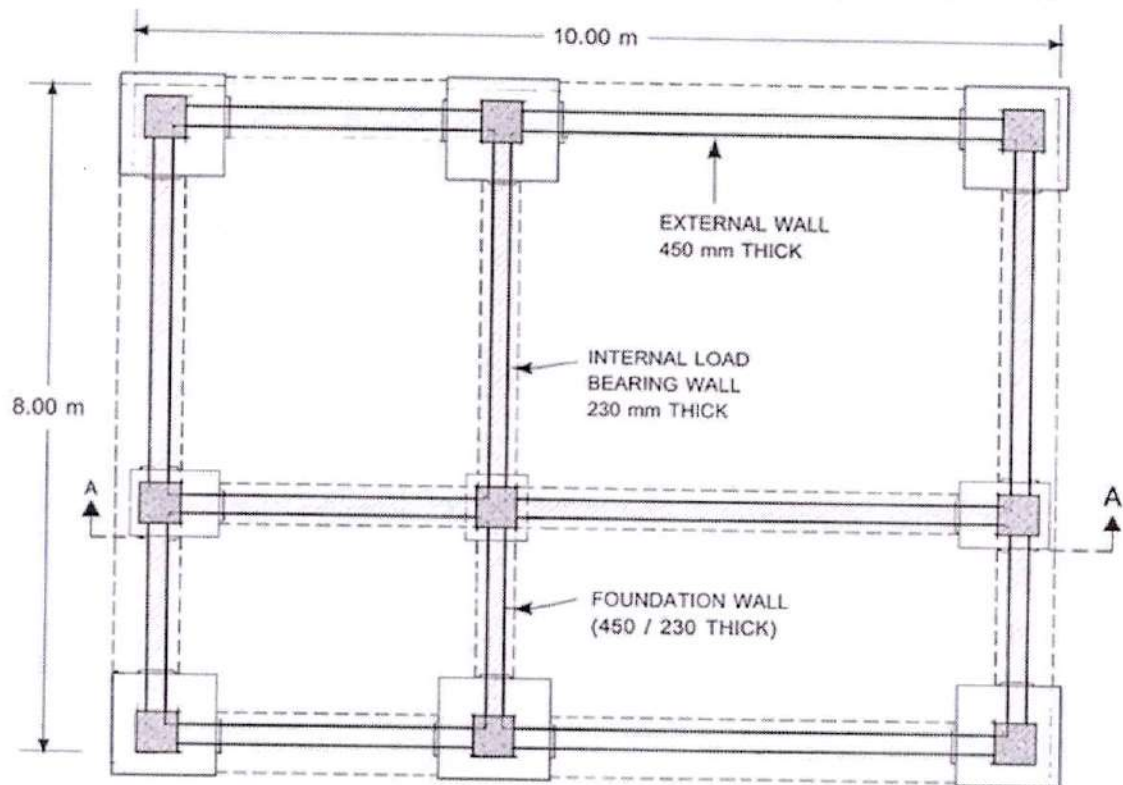
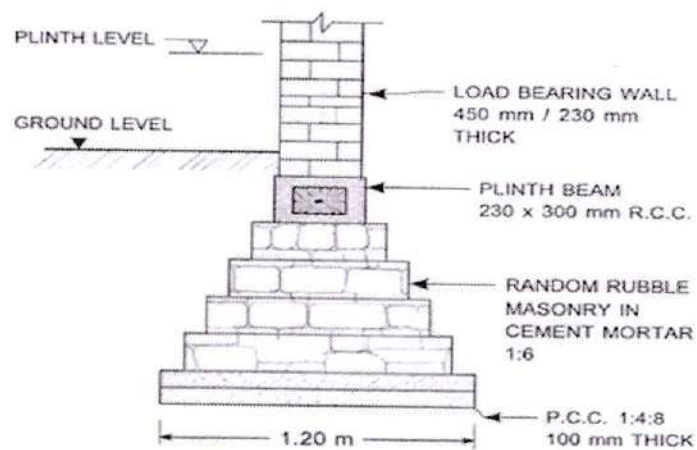
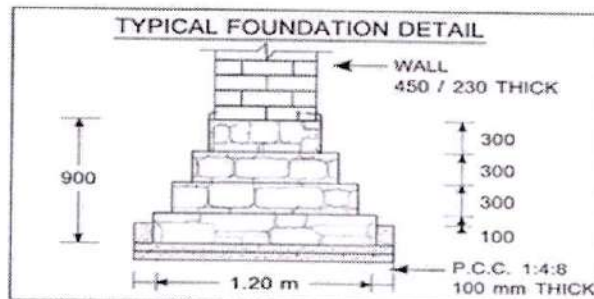


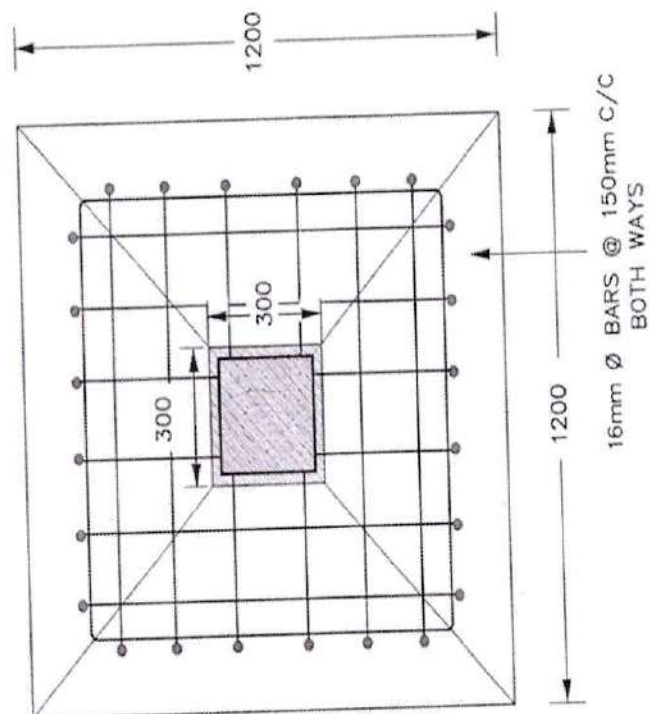
FOUNDATION PLAN:- [LOAD BEARING STRUCTURE]

- It shows the trenches to be excavate as per the plan.
- It gives the Idea to know the layout of building.
- foundation plan shows the dimensions of trenches for wall footings.

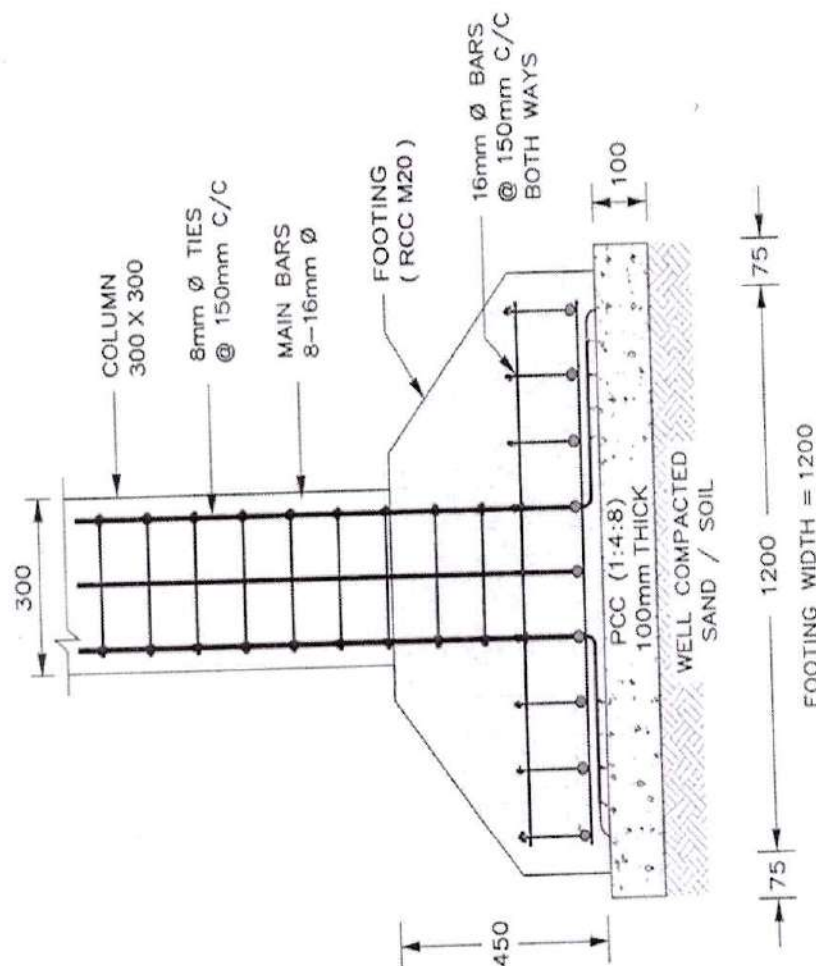
procedure:-

1. TO draw all the centerlines for all walls.
2. Width of trenches should be equal on either side of centerline.
3. TO mark excavation lines.
4. TO check the centerlines are perpendicular to each other by diagonal check.
5. Now, TO show the c/s of footing used with all dimensions along with the foundation plan.

PLANSECTION A-ATYPICAL FOUNDATION DETAIL

FOOTING PLAN

FOOTING DETAILS	
FOOTING SIZE	1200 X 1200 mm
FOOTING THICKNESS	450 mm
PCC (1:4:8)	100 mm THICK
CONCRETE GRADE	M20
MAIN STEEL	16 mm ϕ BARS
SPACING	150 mm C/C BOTH WAYS
COVER	50 mm

FOOTING SECTIONNOTES :

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. CONCRETE GRADE : M20
3. STEEL GRADE : Fe 500
4. CLEAR COVER TO STEEL : 50 mm
5. PCC 1:4:8, 100mm THICK BELOW FOOTING.

