DOTE TAMILNADU
Directorate of Technical Education
Government of Tamil Nadu

CIVIL ENGINEERING DRAWING - I

DIPLOMA IN CIVIL ENGINEERING

THIRD SEMESTER / SECOND YEAR

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(NOT FOR SALE)

Untouchability is a sin

Untouchability is a crime

Untouchability is a inhuman

DIRECTORATE OF TECHNICAL EDUCATION
GOVERNMENT OF TAMIL NADU

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PREFACE

We are in much happiest occasion to present CIVIL ENGINEERING DRAWING - I book for Diploma in Civil Engineering under Directorate of Technical Education, Tamil Nadu. An attempt has been made in this text learning material to meet the requirements and standards of M-Scheme curriculum of Civil Engineering Drawing -I of Third Semester Diploma in Civil Engineering prescribed by DOTE.

It is important to every Civil Engineer to have knowledge of Building Drawings. This book deals about the introduction to building drawings and bye laws in first unit, planning of residential, industrial and public buildings in second unit, third unit contains some of the basic drawings and fourth unit contains few residential, industrial and public building drawings.

It is hoped that with the content exposed in this text, the readers and learners will be able to understand and pursue further in their studies. This book is written in simple and easily understandable manner.

The convener, authors and reviewer are very much grateful to the Commissioner of Technical Education Chennai for his deep involvement and encouragement in preparing this syllabus based learning material. Thanks are due to officials of DOTE, Chennai for their timely help whenever needed. Further suggestions and fair criticisms are welcome for fine tuning in future

CONVENER, AUTHORS and REVIEWER

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CIVIL ENGINEERING DRAWING I

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IV	**BUILDING DRAWINGS** Preparation of plan, section and elevation of buildings with specifications for the given line drawing to suitable Scale: 1. A Reading room with R.C.C flat roof 2. A House with single bed room and attached bathroom with R.C.C. flat roof. 3. A residential building with two bed rooms with R.C.C. flat roof 4. A house with single bed and hall with partly tiled and partly R.C.C flat roof. 5. A Two roomed house with RCC slope roof with gable ends 6. A House with fully tiled roof with hips and valleys 7 . A Small workshop with north light steel roof truss (6 to 10m Span) over R.C.C. Columns. 8. A Primary health center for rural area with R.C.C roof. 9. A Village Library building with R.C.C flat roof 10. A small Restaurant building with R.C.C flat roof 11. A Single storeyed School building with R.C.C flat roof 12. A Bank building with R.C.C flat roof

UNIT – 1

INTRODUCTION

1.1. CONVENTIONS AND SYMBOLS

General

The ideas of an architect are converted through the language of drawings. It is therefore necessary to have some uniform pattern of preparing drawings and for this purpose, IS: 962-1967 has been framed for architectural and building drawings.

The site supervisors, engineers, contractors and all others attached with the civil engineering profession are well conversant with the standard conventions, symbols etc..

1.1.1 Conventions

The term conversions us used to indicate customary rules or methods and they are adopted in the architectural drawings to serve the following purpose

1. To achieve quick identification of the drawing scale.
2. To avoid confusion and misunderstandings.
3. To increase speed in the preparation of drawings
4. To save the time by avoiding misinterpretation of the details by site supervisors etc..

1.1.2 Title Block

The title block is an important element found in professional architectural drawings that contains data about the drawing, such as the title, its number, and the name of the architect. It may also have a company logo, copyright information, and data on the date it was completed. Basically, title block is a rectangle that contains all the information needed to identify, verify, interpret, and archive any architectural schematic. A typical title block is subdivided into

numerous areas that contain different types of information, and it is usually found on the bottom or lower right-hand corner of any drawing.

One section in the block is used to note down the drawing title and the drawing number; these are important for filing and verification purposes. The drawing number is unique to a particular schematic and is usually a code containing critical data about the drawing. The information may include data on the type of drawing, revision details, and details about the site. It may also have the sheet number, which is important in understanding whether a drawing is spread out over numerous sheets or is a stand-alone drawing. The schematics are mostly filed according to the unique drawing number because the title may be shared by numerous architectural prints.

a. Architect

The title block should be exhibited at proper place including the name of the firm of architects.

b. Date

The date of original drawing and the dates of subsequent amendments should be mentioned in the space of date column in the title block.

c. Drawing title

The space provided for drawing title in the title block should be used to give information about the detailed exhibited in the drawing.

d. Job title

At the commencement of job, the title of job in sheet should be decided and it should be accommodated in the title block for convenience of easy identification.

e. Scale

The details regarding uniform scale for the whole drawing (OR) different scales for various parts of the drawing should be recorded in the space in the title block.

f. Simplicity

The title block should be made as simple as possible

g. Space for staff

The title block should contain space for the dated initial of technical staff employed for preparing, checking and tracing of the drawings. It should also provided space for the signature of authorized persons approving the drawings.

1.1.3 Scales

Usually the word scale is used for an instrument used for drawing straight lines. But actually in Engineer's language scale means the proportion or ratio between the dimensions adopted for the drawing and the corresponding dimensions of the object. It can be indicated in two different ways. Example: The actual dimensions of the room say 10m x 8m cannot be adopted on the drawing. In suitable proportion the dimensions should be reduced in order to adopt conveniently on the drawing sheet. If the room is represented by a rectangle of 10cm x 8cm size on the drawing sheet that means the actual size is reduced by 100 times.

a. Selection of scale

Scales arte made in variety of graduations to meet the requirement of drawing in metric scales. Both the longer edges of the scales are

marked with divisions of centimetres and millimetres. Selection of scales is dependent of the requirement of the user. The following scales are recommended for use.

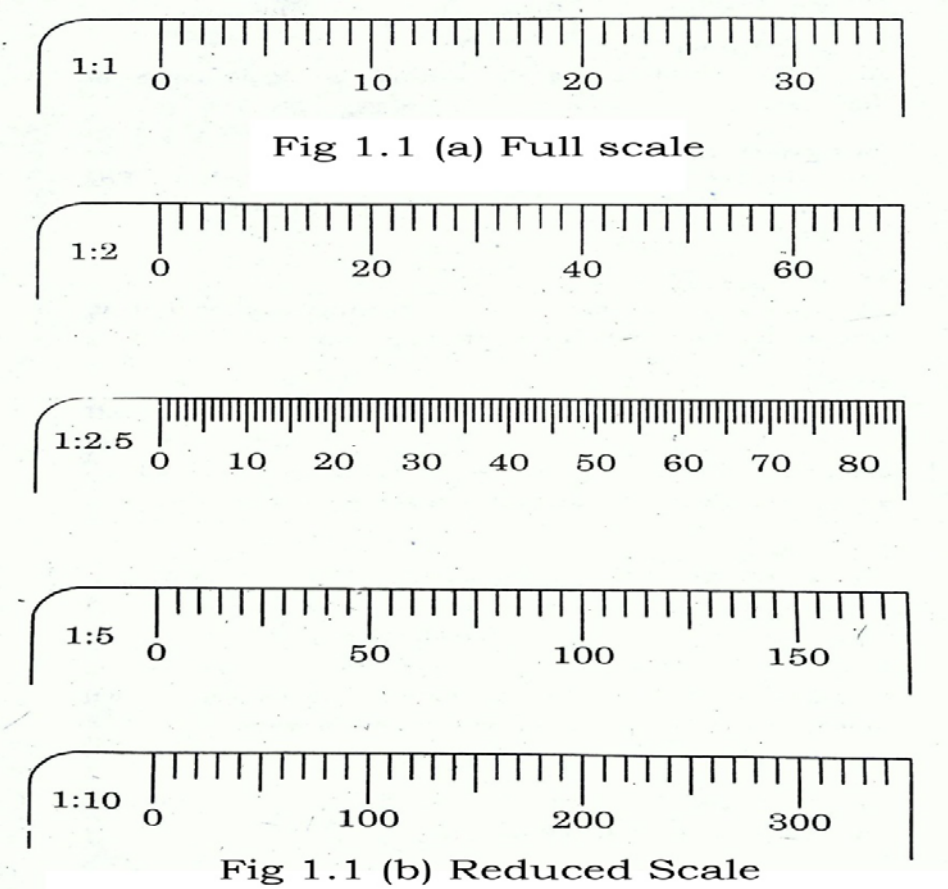


Fig 1.1 (a) Full scale

Fig 1.1 (b) Reduced Scale

b. Reducing scale

When the dimensions on the drawing are smaller than the actual dimensions of the object. It is represented by the scale and RF as

Scale: - 1cm=100cm or 1:100 and by RF=1/100 (less than one)

c. Full scale

Sometimes the actual dimensions of the object will be adopted on the drawing then in that case it is represented by the scale and RF as

Scale: - 1cm = 1cm or 1:1 and by R.F=1/1 (equal to one).

d. Enlarging scale

In some cases when the objects are very small like inside parts of a wrist watch, the dimensions adopted on the drawing will be bigger than the actual dimensions of the objects then in that case it is represented by scale and RF as

Scale: - 10cm=1cm or 10:1 and by R.F= 10/1 (greater than one)

1.1.4 Line work

It is necessary to follow certain rules for the line work on the drawings. The line work for some of the purpose should comply with the following requirements.

a. Visible Lines.

A heavyweight unbroken line is used for the primary feature of a drawing. For drawings of objects, this line convention represents the edges, the intersection of two surfaces, or the surface limit that is visible from the viewing angle of the drawing. This lines is often called the outline.

b. Hidden Lines.

A medium weight line of evenly spaced short dashes represents an edge, the intersection of two surfaces, or the surface limit which is not visible from the viewing angle of the drawing.

c. Centre Lines.

A thin (light) line composed of alternate long and short dashes of consistent length is called a centre line. It is used to signify the centre of a circle or arc and to divide object into equal or symmetrical parts.

d. Dimension Lines.

A solid, continuous line terminating in arrowheads at each end. Dimension lines are broken only to permit writing in dimension. On construction drawings, the dimension lines are unbroken. The points of the arrowheads touch the extension lines which mark the limits of the dimension. The dimension is expressed in feet and inches on architectural drawings and in feet and decimal fractions of a foot on engineering drawings.

e. Extension lines.

An extension line is a thin (light), unbroken line that indicates the extent of the dimension lines. The extension line extends the visible lines of an object when it is not convenient to draw a dimension line directly between the visible lines. There is always a small space between the extension line and the visible line.

1.1.5 Lettering

The lettering on the architectural and building drawings forms a significant factor in improving the aspect of the drawings with respect to utility, appearance, etc., following points should be noted in this connection.

a. Clear of lines

All the letters and numerals should be kept clear of dimensions and other lines.

b. Designation

The letters are designed by their heights. For obtaining uniformity, stencils and letter guides are available

c. Main requirements

The main requirements for lettering are legibility, uniformity, ease and rapidity in execution.

d. Photographic reproduction

When the drawings are to be reproduced to a small scale by a photographic process, the letters on the original drawing should be suitably accentuated to ensure sufficient legibility after reduction.

e. Reading

The lettering should be done on the drawing in such a manner that it may be read the drawings are viewed from the bottom edge. For lettering written in a direction at right angles to the bottom edge of the drawing, it should be so written as to be read when viewed from the right hand edge of the drawing.

f. Sizes

The recommended sizes of letters to suit different purposes are mentioned in the table.

No	Purpose	Sizes of letters & numerals in 'mm'
1.	Main title and drawing	6,8,10 and 12
2.	Sub titles and headings	3,4,5 and 6
3.	Notes, schedules, materials and dimensions	2,3,4 and 5

g. Types

For general use, sloping as well as vertical types of letters and numerals can be adopted. All letters should be written in capitals except where they are required in international usage for abbreviations. The inclination for sloping type letters is about 75 degree.

h. Underlines

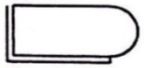
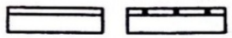
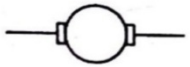
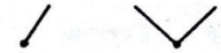
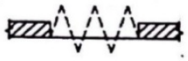
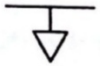
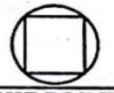
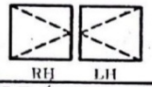
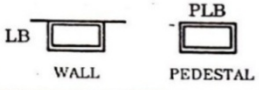
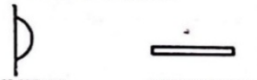
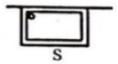
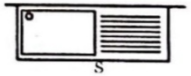
The words may me underlined, where preferred.

CONVENTIONAL SIGNS & SYMBOLS

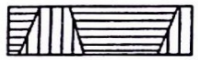
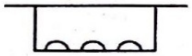
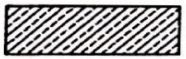
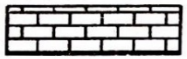
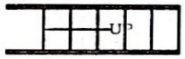
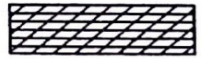
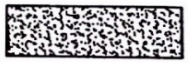
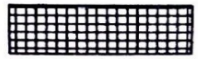
AND

STANDARD ABBREVIATIONS

1.1.6 CONVENTIONAL SIGNS

TOP HUNG WINDOW 	DOUBLE SWING DOOR 	BATH TUB 	DRINKING FOUNTAIN 	FUSE BOARD 	ALARM 
HORIZONTAL CENTRE HUNG 	FOLDING DOOR 	SHOWER STALL 	WATER METER 	MAIN SWITCH 	SWITCH 
VERTICAL CENTRE HUNG 	FOLDING DOOR 	WATER CLOSET 	FIRE EXTINGUISHER 	METER 	CEILING FAN 
SIDE HUNG WINDOW IN ELEVATION 	FOLDING DOOR 	URINAL 	PUMP 	LIGHT POINT 	EXHAUST FAN 
SINGLE SWING DOOR 	SLIDING DOOR 	LAVATORY BASIN 	WASHING MACHINE 	LIGHT POINT 	ELE. HEATER 
SINGLE SWING DOOR 	ROLLING DOOR 	PLAIN KITCHEN SINK 	VENT OUTLET 	PIN SOCKET 	TELEPHONE 
DOUBLE SWING DOOR 	REVOLVING DOOR 	SINK WITH DRAINAGE BOARD 	RAIN WATER OUTLET 	BELL PUSH	EARTHING
SYMBOLS FOR DOORS & WINDOWS		SYMBOLS FOR SANITARY FITTINGS		SYMBOLS FOR ELECTRICAL FITTINGS	

1.1.7. SYMBOL

MATERIAL	SYMBOL	MATERIAL	SYMBOL	MATERIAL	SYMBOL	MATERIAL	SYMBOL
EARTJ		REINFORCED CEMENT CONCRETE		INDIAN TYPE W.C		SPECIAL BRICK	
SAND		TIMBER IN CROSS SECTION		PEDESTAL TYPE URINALS		ROCK	
BRICK		TIMBER IN LONGITUDINAL SECTION		URINAL STALL		LEAD, ZINC	
STONE		GLASS		CEILING FAN		STEE, COPPER ALUMINIUM	
BRICK WORK IN ELEVATION		STAIR CASE		WATER PIPE LINE		ASBESTOS FELT, ETC	
PLAIN CEMENT CONCRETE		PLAIN KITCHEN SINK		PLASTER		PARTITION BLOCK	

STANDARD ABBREVIATIONS

A

Aggregate	AGG
Aluminium	AL
Angle	Angle
Approved	APPD
Asbestos	ASPH
At	AT; @
Average	avg

B

Beam	I
Bench mark	BM
Bitumen	BITM
Break horse power	BHP
Brick work	BWK

C

Cast iron	CI
Cast steel	CS
Cement	CEM
Cement Concrete	CC
Centre line	CL
Centre to centre	C to C: C/C
Centimetre	cm
Chain	CH
Channel	[
Checked	CHD
Circular plate	CP
Circumference	Oce
Concrete	CONC
Colum	COL
Copper	CU
Counter suck	CSK
Crossing over	X ING
Cross section	CS
Cubic Centimetre	cm^3
Cubic foot	CFt^3
Cubic inch	In^3
Cubic metre	m^3
Cubic millimetres	mm^3
Cylinders Cylindrical	CYL
Cement mortar	CM
Coursed Rubble	CR

D

Damp proof course	DPC
Degree (angle)	deg
Degree centigrade	^{0}C
Degree Fahrenheit	^{0}F
Diameter	Dia;
Diameter pitch	DP
Direct current	DC
Drawing	DRG
Drawn	DRN

E

Earth closet	E
Elevator	El
Embankment	EMB
Enamelled	ENAM
Expanded metal	XPM
External	EXT

F

Figure	FIG
Finishing floor level	FFL
Flushing cistern	FC
Foot	ft
Forced draught	FD
Forged steel	FS
Formation level	FL
Fresh air inlet	FAL
Full Tank Level	FTL
Full Supply Level	FSL
Flush out latrine	FOL

G

Galvanised iron	GI
Glazed ware pipe	GWP
Grease trap	g
Ground level	GL
Ground sink	GS
Gully	G
Gunmetal	GM

H

Hardened and Tempered	H&T
Height	HT
Heating surface	HS
Hexagon or hexagonal	HEX
High floor level	HFL
High tensile steel	HTS
High Water Mark	HWM
Horse Power	hp
Hour	hr
Hundred weights	CWt

I

Imperial	SWG
Inch	in
Indian Rubber	IR
Indicator draught	IDR
Inside diameter	ID
Inspection chamber	ICH
Intercepting trap	IT
Indian Standard Specification	ISS
Indian Standard Insulation	ISI
Internal Combustion	IC
Insulated or Insulation	INSU

K

Kilogram	kg
Kilometre	Km
Kilo volt	KV
Kilo volt ampere	kVA
Kilo watt	Kw

L

Latitude	LAT
Lavatory	LAV
Left hand	LH
Length	L
Low water level	LWC
Lime mortar	LM

M

Macadam	MAC
Malleable iron	MI
Manhole	MH
Maximum floor level	MFL
Mean sea level	MSL
Metre	M
Miles per hour	mile/h:mph
Minimum	MIN
Mild steel rod	MS rod
Mild steel bar	MS bar

N

Naval brass	NBr
Nickel steel	Ni.s
Nickel chromium steel	NI.Cr.S
North	N
Not to scale	NTS

O

Ohm	OHM
Oil circuit breaker	OCB
Ounce	OZ

P

Paper insulated	PI
Pattern number	PTT.NO
Per	PER
Percent	Percent%
Phosper bronze	PH.BRZ
Pitch Circle	PC
Pitch circle diameter	PCD
Plate	PL
Pound	IB
Plain Cement Concrete	PCC
Plinth Level	PL
Pillamarudu Wood	PM Wood

R

Radius	R
Rail way	RLY
Random rubble	RR
Rain water pipe	RWP
Reduce level	RL
Reference	REF
Rain forced cement concrete	RCC
Required	REQD
Revolution per minute	rpm
Right hand	RH
Rising main	RM
Rivet	RVT
Road level	Rdl
Rolled section	RS
Round	RD
Rolled steel joist or I section	RSJI
Round head	RDHD

S

British Standard Pipe	BSpipe
British Standard White words	BSW
Screqed	SCR
Second	S
Sheet	SH
Shower bath	SB
Sink	S
Sketch	SK
Sluice valve	SV
Soil and Vent pipe	S&VP
Specification	SPEC
Soil pipe	Sp
Specific gravity	Sp. gr
Spigot and socket	S&S
Spot faced	SF
Square	SQR
Square centimetre	cm2
Standard pip	SP

Stone ware pipe	SWP
Standard wire gauge (imperial)	SWG
Standard level	SL
Stop valve	SV
Street gully	SG
Survey of Indian Bench Mark	BM
Switch	SW

T

Tee n	T
Telegraphic post	T P
Temperature	TEMP
Tonne	t
Tongued & Goved	T&G
Tor steel rod	TS rod;#
Traced	TCD
Teak wood	TK WOOD

V

Vacuum	VAC
Vent pipe	VP
Volt	V
Volume	voL
Vulcanized Indian Rubber	VIR

W

Water pipe	WP
Waste and vent pipe	W&VP
Water closet	WC
Watt	W
Watt hour	Wh
Weight	wt
White metal	Wm
Wrought iron	WI
Water level	WL

1.2. BUILDING BYE-LAWS AND SUBMISSION DRAWING

General

Bye Law is a local law framed by a subordinate authority. Every locality has peculiarities of its own and with respect to its weather conditions, availability of materials and labour, other local factors, etc., It becomes economical to construct residential building and other structures in a definite planned way.

1.2.1 Objects of bye Laws

The Bye Laws are necessary to achieve the following 3 main purposes on object.

1. It becomes easier to pre-plan the building activities and provisions of bye –laws give guide lines to the designing architect or engineer.
2. The building Bye laws prevent haphazard development without any resemblances to the development of the area as a whole.
3. The provisions of building Bye - laws usually afford safety to human beings who work and live in against fire, noise, heath hazard and structural failure.

1.2.2 Importance of Bye-Laws

The importance of enforcing building Bye-Laws by law is quite evident from the fact that unless prevented by law, the house owners, with profit as the only motive, will construct residences lacking in amenities and healthy conditions. In the absence of suitable building Bye-Laws and machinery to enforce them, the poor people with be left at the mercy of well-to –do people.

The contents of the building Bye-laws should be framed in a scientific way. It is desirable to take assistance while framing building Bye-laws

of experts on various subjects such as town planning, law, civil engineering health, traffic, general administration, etc. The consultation by in the local authority is desired on following three grounds.

a. Consultation with superior authority

The local authority should take into confidence the superior authority, usually higher level of government, before attempting to change, modify or after its Bye-laws. Such a consultation is necessary for keeping smooth harmony between national or regional policies and the local government.

b. Consultation with subordinate authority

It is necessary for the local authority to consultation subordinate neighbouring or independent public authorities who are likely to be affected or influenced by the Bye-laws of the local authority. Such a policy will lead to some degree of consistency in collective public policy.

c. Consultation with interested groups

The local authority should try to secure support of its policy by consulting interested groups such as chambers of commerce, professional bodies, etc.

1.2.3 Functions of local authority

A local authority is a body created by law and it has to carry out various functions and obligations in connection with community life.

One of the important duty of a local authority is to frame suitable building. Bye - laws and to provide suitable machinery for its successful implementation. For this purpose, it should form a development to receive plans of proposed buildings.

The department checks every details on the plan and defects. If any, pertaining to prevailing Bye-laws, are pointed out for rectification. Only those plans are approved which comply with the requirements of prevailing Bye-laws. The approval of plan means the acceptance of local authority of the following requirements only.

1. Arrangements of stairs, lifts, corridors, doors, windows and parking.
2. Height of building and its various storeys.
3. Minimum requirements of high-rise building (or) low-rise building as the case may be.
4. Minimum requirements of sanitary facility.
5. Minimum requirements with respect to area of rooms.
6. Permissible built-up –area.
7. Permissible FSI.
8. Permissible open spaces and set- back.
9. Permissible use of building.
10. Provision for light and ventilation.

However the approval of plan by the concerned local authority does not mean the following.

1. Easement rights.
2. Structural reports and structural drawings.
3. Title of the building.
4. Variation in area from recorded area of a plot or a building.
5. Workmanship and soundness of materials in construction of building.

a. Delay in sanctioning of plans

1. It leads to increase in housing. Shortage which might result in shooting of house rents.
2. It may lead to the function of more slums and more financial burden on the local authority for their removal or improvement.
3. The enthusiasm of the owner who wants to construct the building quickly may show down because of changes in circumstances due to passage of time.
4. The local authority may also suffer loss in revenue from various taxes such as water tax, sanitation tax, betterment chares, etc.
5. The open land remains idle for a long time resulting in undue hardship and loss of revenue to the land owner.
6. Thus is considerable depression in the construction industry as a whole.

b. Important points to be remembered in the construction with the building Bye-laws can be enlisted as follows.

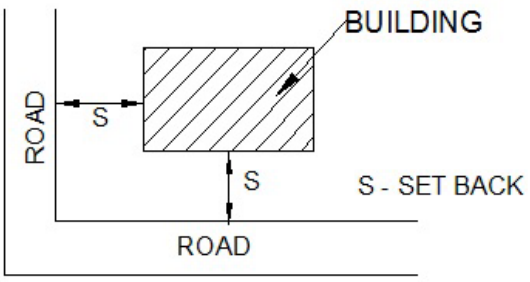
1. The authority concerned should provide more field staff for the effective implementation of Bye-laws.
2. The Bye-laws causing undue hardship public at large should be immediately removed or rectified.
3. The procedural requirement should be brought down to the minimum possible extent.
4. The professional institutions, engineers and staff should be consulted at the time of framed or changing the Bye-laws.
5. There should not be frequent changes, in the basic requirements of the Bye-laws.
6. They should aim at social- economic housing conditions.
7. They should be given proper publicity through various popular mediums.

1.2.4 Set backs

A set back may be defined as frontage margin or open space in front of the abutting street on road as shown in fig. The land contain a set-back belongs to the owner property. But he is prohibited from putting any structure in the set back portion. The width of set-back various from 1.00m to 1.50m for congested area to 4.50m to 6.00m for new undeveloped area. A set-back is also referred to as a building line. In connection with light plane, the horizontal distance to be left from vertical face of the building is also known as set-back shown in fig.

Advantages of set back

1. If absolutely necessary, part of the set-back may be acquired for the purpose of widening the road.
2. If the set-back is uniform the building one constructed in one line parallel to the axis of road resulting in improvement of appearance of road.
3. The provision of set-back results into better conditions of air light and ventilation of the building.
4. The set-back at street corners improves visibility and import safety to traffic.
5. The space of setbacks can be conveniently used as aparking place or for development as garden.
6. They are necessary for the protection of the building from noise and dust of the streets.
7. The reduce danger of fire by increasing the distance between opposites building.



1.2.5. Plot coverage

Plot coverage is the extent of plot covered by the building(s) or structure and this is expressed in terms of percentage. It is actually a ratio of the built-up area over plot area.

As per the rules of CMDA (Chennai Metro), for special buildings, the normal permissible Plot Coverage is 65 percent. It means that the plinth area of the construction proposed should not exceed 65 percent of the plot area. By this, it is implied that at least 35 percent of the plot area is to be left open to the sky permanently.

The concept behind imposing a ceiling on the footprint of the proposed construction is to ensure that every plot gets sufficient sunlight, air, privacy and rainwater. Rain water harvesting will facilitate recharge of aquifer and help in promoting greenery around. The plot coverage is computed by taking into account all the projections at upper levels. Broadly speaking, it is the area of the shadow of the proposed building at noon, which is expressed in percentage of the plot area. It is to be noted that the plot coverage restriction has no bearing on the profile of a building.

1.2.6. Number of floors

The limitation on number of floors in a multi-storeyed building can be related to Floor Space Index – FAR.

FAR – Floor area ratio is the ratio of a building's total area to the size of the piece of land upon which it is built. As a formula,

$$\text{FAR} = \frac{Total\ covered\ \ area\ \ on\ all\ \ floors\ \ of\ \ all\ buildings\ \ \ on\ a\ plot}{area\ \ of\ \ the\ plot}$$

For example an FAR of 1.0 means one can allowed to built the equivalent of a one story building over the entire plot or two story over half of the plot and an FAR of 2.0 means 2 stories over entire plot or 4 stories over half of the plot and it goes on.

Therefore higher the FAR, it is more likely to indicate a dense urban construction.

1.2.7 Height of building

It is the vertical distance from the street to the surface of a flat roof or the average height of a pitched roof, without taking into account roof structures, air handling equipment, antennas, or satellite dishes.

The term is most often significant when attempting to meet zoning restrictions, which usually contain their own definitional sections. If so, then it is irrelevant what the general public considers as the true measurement of building height; the method of measurement specified in the statute will control.

1.2.8 Build up area (As per NBC)

Area of plots	**Maximum permissible built up or covered area of plot**
More than 1000sq.m	33.3%
Between 500-1000sq.m	40%
Between 200-500sq.m	50%
Below 200sq.m	60%

1.2.9. Floor space index

The ratio of the total build – up area inclusive of walls of the entire floor to the area of the land on which the building stands is known as floor space index (or) FSI. It is also sometimes referred to a floor area ratio (or) FAR.

The following table shows the tentative figures of FSI for a typical town

S.NO	USE	AREA	FSI	REMARKS
1	Residential	Scheme area	1	Maximum allowed on GF 0.40
2	Residential	City area	4	Facing street of more than 12m width
3	Residential	City only	3	Facing street less than 12m width
4	Industrial	Scheme area	1.5	Maximum allowed on GI 0.5
5	Commercial	Scheme area	1.33	Maximum allowed on GF 0.4

1.2.10. Views and detail necessary for drawings

Flowing are the three views to be accommodated on submission or working drawings.

i. Plan
ii. Elevation
iii. Section

i) Plan

The floor plan indicates the appearance of section cut horizontally through the building somewhere between the floor level and its ceiling. The plan indicates the wall thickness, location of opening, stairs, rooms, etc.

ii) Elevation

The view of a building as seen from the front of sides is known as elevation. It gives the appearance of the exterior of the building.

iii) Section

The section indicates an interior exposed view of the building in vertical direction. It describes height of floors, interior wall, doors, window, stairways, etc.

1.2.10 Site plan

The plan showing the boundary of plot is known as site plan, and it is to be studied carefully before attempting the design of the building. The overall dimensions and shape of site plan are to be checked and verified from the authorized records and if necessary, a surveyor may be appointed to fix the boundary of plot on site.

The site plan also indicates the compound wall, compound gates, landscape features, etc. It also contains adjoining streets and there width surrounding properties, existing buildings, portion of the proposed building, etc.

It is drawn to a much different scale then the building plane, the usual being 1cm=5m

The North line is invariably shown near the site plan very accurately so that the orientation of the building can immediately be known from the study of site plan.

1.2.11. Necessity for approval of plans from local authority

Before starting the construction of a building it is necessary to get the plan approved by the concerned local authorities in the prescribed format. Failing to which may rise the risk of paying penalties and fines in the future. It may even lead to the demolishing of the building.

1.2.12 Layout plan and key plan

If a big plot of land is to be develop a layout plan showing the internal roads and sub-plots is prepared and it has to be approved by the concerned authority with respect to sizes of sub-plots, widths of approach roads etc.,

If one of such sub plot is to be developed, it becomes necessary to possess the approved copy of the entire layout plan. It will assist in locating the sub-plot under reference and it will provide information about the adjoining properties on the sub plot to be developed. The term key plan (or) location plan is used to mean the plan showing the important features like major roads temples, monumental buildings, etc.,

1.2.13 Requirements for submission of drawing for approval

Every person who intends to construct, reconstruct, alter or add to a building shall submit an application to the executive authority in the form specified with the following:

1. The plan of the building in triplicate.
2. The site plan in triplicate.
3. The purpose, for which the building is proposed to be constructed, reconstructed, altered or added.
4. No objection which may lawfully be taken to the grant of permission.
5. Document copy.
6. Affidavit and indemnity bond.

2. PLANNING OF BUILDINGS

2.1 PLANNING OF RESIDENTIAL BUILDINGS:

Types of Residential Buildings:

1. Rural Housing
2. Urban Housing
    - *a.* Detached Buildings
    - *b.* Flats or Appartments
    - *c.* Row Houses
    - *d.* Semi-detached Houses
    - *e.* Row Houses

Usual Requirements of a residential Building:

The minimum requirements in a residential building for a family are

1. Living Room
2. Kitchen
3. Bath room and Water Closet

Types of Rooms in a Residential Building:

1. Living Room
    a. Entrance Foyer
    b. Drawing Room
    c. Dining Room
2. Service Room
    a. Kitchen
    b. Store Room

c. Staircase
d. Bathroom
e. Water Closet
f. Garage

3. Sleeping Room
    a. Bedroom
    b. Dressing Room
    c. Guest Room

Minimum size required for each types of room:

Types of room	**Minimum Area (sq.m)**	**Minimum Dimension (m)**	**Minimum Height (m)** (max. not more than 1.25 times min. height)
Living Room, Bedroom, Drawing Room, Dining Room, Study Room	9.5	2.4	2.75
Kitchen	5.0 (7.5 for kitchen cum dining) (4.5 for kitchen with separate store)	1.8 (2.1 for kitchen cum dining)	2.75
Store Room	3.0	1.5	2.2
Bath Room, Water Closets	1.8	1.2	2.1
Garage	18	3	2.4

Furniture Arrangement:

While designing a particular room furniture location should be determined and the available area is checked for circulation. To justify the size of the rooms in a residential building, furniture arrangements should be shown in a building drawing. The pieces of furniture are to be placed along the side

walls of the rooms in such a way that there should not be any obstructions like doors, windows, cupboards etc...

The approximate allowable space which may be covered by the furniture in certain rooms is as follows

1. Bedroom : 40%
2. Living Room : 35%
3. Kitchen and Dining areas : 55%

The approximate sizes of various common furniture pieces are listed below

Furniture Pieces	Size (in mm)
Chairs without arms	450x450
Sofa	750x1400
Coffee table	1000x1000
Dressing Table	450x900
End Table	600x300
Writing Table	1350x750
Single Cot	900x2000
Double Cot	1400x2100

Position of Stairs:

While planning the position of the stairs in a building, ease of access should be considered in all grounds. We should also take into account the future expansions, if any. The following factors should be considered for the position of stairs in a building.

1. It should be easily accessed from all the rooms of the building.
2. Privacy of the rooms should not be disturbed.
3. Approach should be very spacious.
4. Good light and ventilation should be available to the staircases.

5. The staircase should be provided satisfying the following conditions.
    a. The minimum width of staircase shall be 1.0m
    b. The minimum width of tread without nosing shall be 250mm.
    c. The maximum height of riser shall be 190 mm and these shall be limited to 12 per flight.
    d. The minimum head-room in a passage under the landing of a staircase shall be 2.2 m. The minimum clear head-room in any staircase shall be 2.2 m.
    e. The angle of inclination of the stair shall not exceed 50°.
    f. Hand rails should be provided on both sides of the staircase.

Position of Lifts:

A thorough investigation should be made for assessing the most suitable position for lift(s) while planning the building. The following factors should be considered for the position of Lifts in a building.

1. The lifts should be easily accessible from all entrances to the building. For maximum efficiency, they should be grouped near the centre of the building.
2. Where a lift is arranged to serve two, three or four flats per floor, the lift may be placed adjoining a staircase, with the lift entrances serving direct on to the landings.
3. Where the lift is to serve a considerable number of flats having access to balconies or corridors, it may be conveniently placed in a well ventilated tower adjoining the building.

Position of Doors:

The position of doors should meet the functional requirements of the room and it also should ensure maximum utility area. The following factors are considered for the position of the doors.

1. The door should be provided at the end of the wall in that room.
2. If two doors are to be provided for a room, they shall be provided opposite to each other to restrict circulation area.
3. Door arrangement should provide good light and ventilation.
4. The size of the door should be sufficient for the entry of larger objects into the room.

Position of Windows:

The doors and windows should be positioned to ensure cross ventilation in the rooms of the building. The following factors are considered for the position of the doors.

1. Window area should be 15 to 20 % of the floor area.
2. Every 30 m^3 of internal volume should have 1 m^2 of window opening.
3. Windows should be located at a height of 0.75 to 0.90m above floor level in habitable rooms. In case of bathrooms and toilets, to ensure privacy windows should be located at a height of 2m above outside ground level.
4. Window arrangement should provide good light and ventilation.
5. In order to get diffused light in the rooms, preferably walls in the northern region shall have maximum number of window openings.

Housing Drainage:

Sewers are laid across the public roads to serve the plots in the regions on its either side. Plot holders construct sewer lines in their plot and connect it the public sewer line.For proper house drainage system, following principles should be adopted.

1. Sewers should be laid at the sides of the building rather than below the building.
2. Drains should be straight. Sharp bends and junctions shall be avoided.
3. House drain should be provided above the level of public sewer to avoid reverse flow.
4. The entire house drainage system should be properly ventilated, traps should be laid to avoid entry of foul smell from public sewer.
5. The drain pipes should not have any leakages. The lateral drains should have flow of sewage with self cleansing velocity.

Sanitary Fittings:

The sanitary fittings are the fittings used in the house drainage systems, for efficient collection and removal of waste water from house to the house drains. The following are the common sanitary fittings.

1. Water Closets
2. Flushing Cisterns
3. Urinals
4. Sink
5. Wash basin
6. Drinking Fountains
7. Bath Tub

Sump/ Water Tanks:

The storage of water is carried out either using underground water storage tanks (sump) or using overhead water storage tanks.

The underground water storage tanks are filled up by gravity from the connection obtained from nearby water line provided by local authority.

They can be pumped up to the over head water tank when required in order to supply water to all pipeline for usage at kitchen, bath etc...

The storage of water is required depending upon the number of consumers and the availability of adequate sanitary fittings for the following purposes.

1. Fire fighting
2. During non-supply hours of intermitted water supply system.
3. Demand for supply through main lines.

Plumbing Pipes:

Highly used plumbing pipes are GI Pipes (Galvanized Iron) and PVC Pipes (Poly Vinyl Chloride).

GI Pipes are not used in direct contact with grounds to avoid corrosion. In that case, PVC Pipes are preferred to use below ground level.

PVC Pipes are not used in areas directly exposed to sunlight since they have high coefficient of thermal expansion. In that case, PVC pipes shall be used with loose fixtures allowing longitudinal movement or GI Pipes shall be preferred.

The various other materials used to make plumbing pipes are as follows.

1. Asbestos cement
2. Cast Iron
3. Cement Concrete
4. Copper
5. Lead
6. Steel
7. Wood
8. Wrought Iron

Preparation of Line Plan for residential building drawings:

Line plan is nothing but a simple sketch of plan of a building showing the location and inner dimensions of all the rooms proposed to construct for the building. It does not show the wall thickness and column positions. This Line plan will aid for the preparation of Plan, Elevation and Section of the building. Some of the Line Plans for residential buildings are discussed in Chapters 4.1 to 4.6

2.2 PLANNING OF INDUSTRIAL BUILDINGS:

Planning Aspects:

The main factors to be considered while planning an industrial building are listed below.

1. Functional Aspect
2. Lighting and Ventilation
3. Materials of Construction
4. Mechanical Layout
5. Number of Floors
6. Site Conditions

Requirements of Industrial Units:

The size of an industrial unit is decided based on the number of workers employed by that unit. According to the size of the unit the following facilities has to be provided for smooth functioning of the industry.

1. Canteen
2. Cloak – room
3. Drinking Water
4. Entrance
5. Loading and Unloading Platforms
6. Medical Aid
7. Office
8. Sanitary Block
9. Storage

Sheets for pitched roof coverings:

The industrial units are mainly provided with pitched roofing. Pitched roofing is provided with the help of sheets made of different materials. The

commonly used sheets for pitched roof coverings are AC Sheets (Asbestos cement) and GI Sheets (Galvanized Iron). AC sheets are highly advantageous compared to the GI sheets over fire resistance, cost, durability, sound proofing etc.

Comparison of GI Sheets with AC Sheets		
S. No.	**GI Sheets**	**AC Sheets**
1	Thin	Thick
2	Light Weight	Slightly Heavy
3	Less damage during handling	Chance for more damage during handling
4	Corrosive	Non Corrosive
5	If something fall over them, more noisy	Less noisy
6	Less resistant to fire, acid and fumes	More resistant to fire, acid and fumes
7	more expensive	Less expensive

Rolling Shutters:

Rolling shutter consists of a frame, a drum and a shutter made of steel plates. The width of the shutter may be 2m to 3m. The shutter moves on steel guides and rolls up and down. Centre balance is provided with helical springs on the drum to make the operation of the door easier.

Ramps:

1. A ramp shall have a surface that is non-slip surface. All ramps should have minimum width of 1.20 m, excluding edge protection. If length is 3500 mm, the minimum width shall be 1500 mm.
2. The cross slope of ramp should not exceed 1 in 50 and longitudinal slope of ramp should not exceed 1 in 12. (A ramp when provided should not have a slope greater than 1 in 20 or maximum of 1 in 12 for short distance up to 9 000 mm.)

3. A ramp shall have handrails on at least one side, and preferably two sides, that are 900 mm high, measured from the surface of the ramp, that are smooth, and that extend 300 mm beyond the top and bottom of the ramp.
4. All ramp and landing should be designed so that water does not collect on the surface of the ramp or landing.
5. A ramp shall have a level platform at the top which is at least 1800mm long, if a door swings out onto the platform or toward the ramp. This platform shall extend at least 300 mm beyond each side of the doorway. Each ramp shall have at least 1800 mm of straight clearance at the bottom.
6. Ramps shall have level platforms at 10 m to 12 m intervals for purposes of rest and safety, and shall have platforms minimum 1.5 m length wherever they turn.

Stores:

For storage of the raw materials and also the finished goods, an industrial unit should have sufficient number of stores (Godowns). The suitable places where the stores shall be accommodated must be specified in the layout of the industrial building. The stores should be easily accessible from any place of the industrial unit. It should be constructed by taking care of Fire safety, Lighting and Ventilations.

Public Toilets/Bathrooms:

The industrial unit should provide sanitary blocks for the workers of both genders. Separate sanitary block should be provided for the differently-abled workers. Extreme care should be taken to provide clean and neat toilet facilities for the officers and staff members. The sanitary blocks should be readily accessible and well ventilated.

Dining Halls:

The size of the dining hall shall be decided based on the number of workers going to get facilitated. The dining halls are usually constructed with a kitchen and a service unit. The dining hall should have well organized and well arranged furniture (tables and chairs) and also should have adequate lighting and ventilation.

Resting Halls:

The resting hall should be provided near the entry/exit zone. It is essential to provide resting halls for workers of both genders separately for relaxing, changing their dresses etc. Lockers and racks should be provided to safeguard the belongings of the workers against theft and mischief. Adequate lighting and ventilation should be available.

Ventilation:

The term ventilation is used to indicate circulation of air. By providing ventilation, polluted air gets frequently replaced by the fresh air. The ventilation may be natural or artificial. Controllable ventilators are preferable to avoid excess ventilation which results in discomfort. Depending upon the type of industry, operating conditions etc.., the air changes may differ and accordingly proper and adequate ventilation should be planned for the respective industrial unit.

Lighting:

The maximum benefit of daylighting shall be utilized effectively by the industrial units. The duration of natural light during daytime may vary throughout the year. Also for shifts having working hours other than daytime, adequate illumination of natural light shall not be available. Hence

artificial lighting should be provided free from glare, well diffused and indirect as far as possible.

Preparation of Line Plan for industrial building drawings:

The size of an industrial unit is approximately estimated by applying a thumb rule of 125 to 150 workers per hectare.

Consider an industrial unit with following specification. The Engineering workshop shall be provided for a size of 30mx20m. Store shall be of size 5m x 3m. Officer cabin shall be 3m x 3m. Toilet for officers shall be provided with size 1.77m x 3m. Sanitary block shall be provided for a size of 5m x 3m. A Cloak Room/Dressing room shall be provided for 5mx3m. The line plan for the above specification is discussed in chapter 4.7.

2.3 PLANNING OF PUBLIC BUILDINGS:

Types of public building:

1. Banks
2. Commercial Centres
3. Educational Institutions
4. Hotels
5. Libraries
6. Temples
7. Theatres

Miscellaneous public buildings:

1. Bus Stations
2. Club Houses
3. Hospitals
4. Hostels
5. Post Offices
6. Town Halls

General requirements of Public Buildings:

1. Entrance or Reception
2. Security Guards Room
3. Public Telephone
4. Circulation
5. Parking Space
6. Sanitary Blocks

Landscape Architecture:

Planting grass, plants and trees around the buildings is known as landscaping. Landscape design is the job of landscape architect who is specially trained for exploiting fully the potentialities of open spaces. Lawns, creepers, plants and trees planted around a building shall carry out following functions.

1. Attract with their colour
2. Flowers offer fragrance
3. Supply Oxygen
4. Offer Shade
5. Act as Sound Barrier
6. Keep surroundings cool
7. Provide privacy.

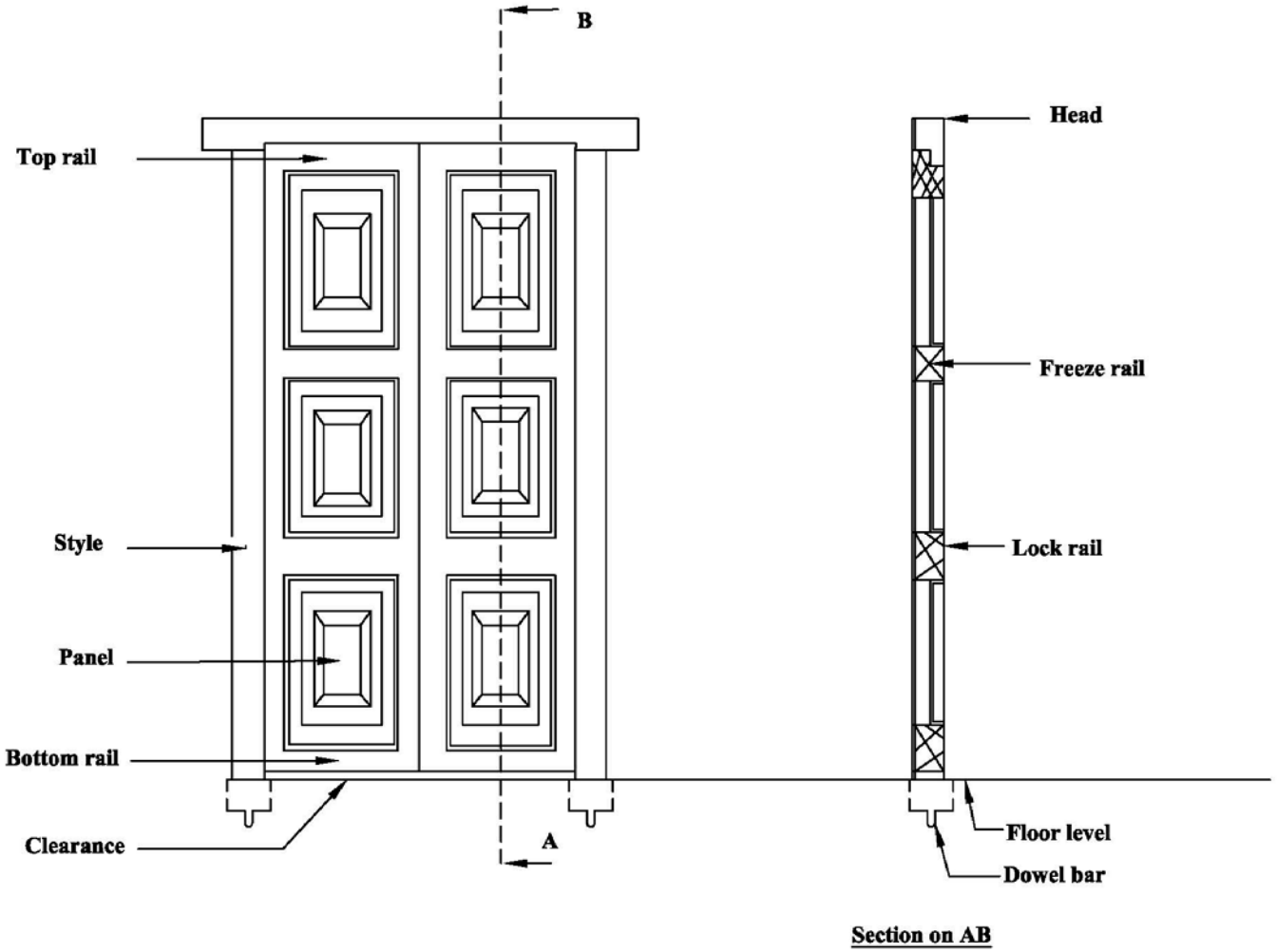
Preparation of line plan with dimensions for the given requirements:

The line plan for public buildings like bank, school, hospital, library and restaurant are discussed in chapter 4.8 to 4.12.

3. BASIC DRAWINGS

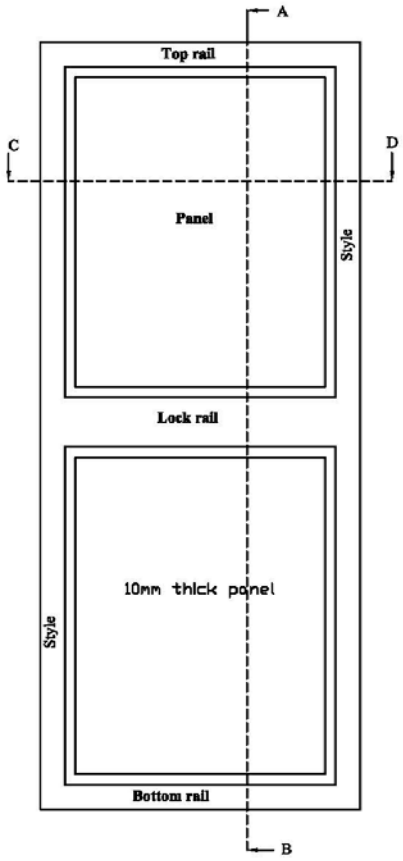
The standards symbols used in civil engineering drawing are discussed earlier in introduction phase. In this chapter, elevations of particulars listed below are discussed further respectively.

1. Fully panelled double leaf door.
2. Fully Panelled single leaf door
3. Flush door
4. Fully Panelled window with grill
5. Partly glazed and partly panelled window
6. Lean- to – roof
7. King post roof truss
8. Steel roof truss
9. Rain water Harvesting– Recharging into the ground -Shallow well system
10. Rain water Harvesting– Recharging into the ground -Percolation pit system.



Fully Paneled Double Leaf Door

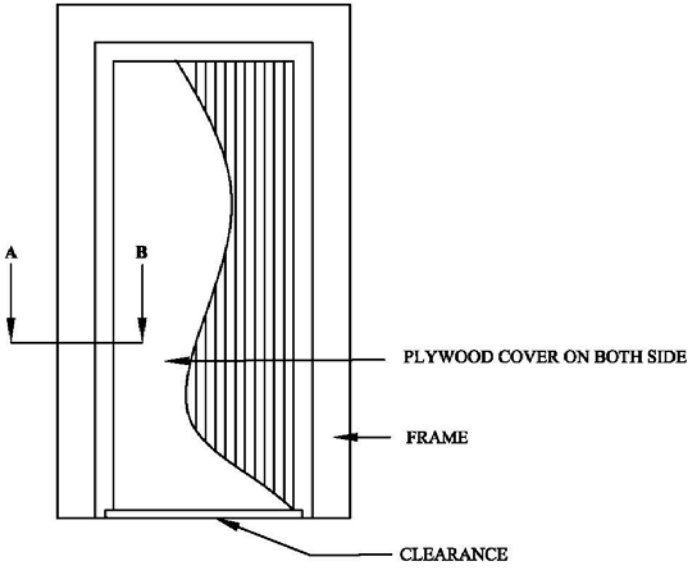
FULLY PANELED SINGLE LEAF DOOR

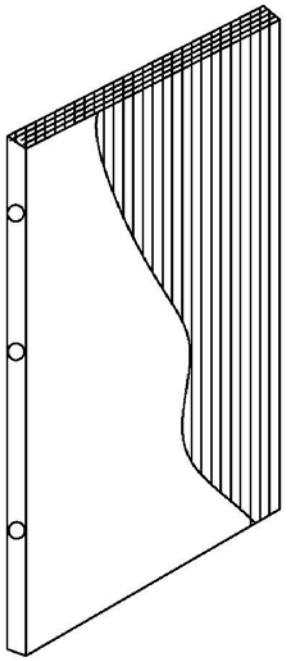


Section on AB

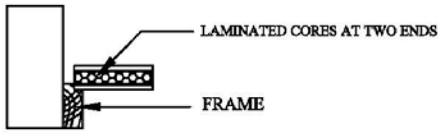
Section on CD

FLUSH DOOR

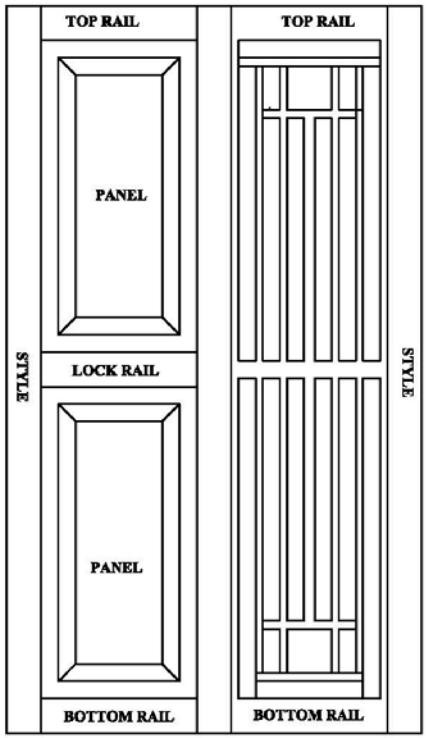




ISOMETRIC VIEW

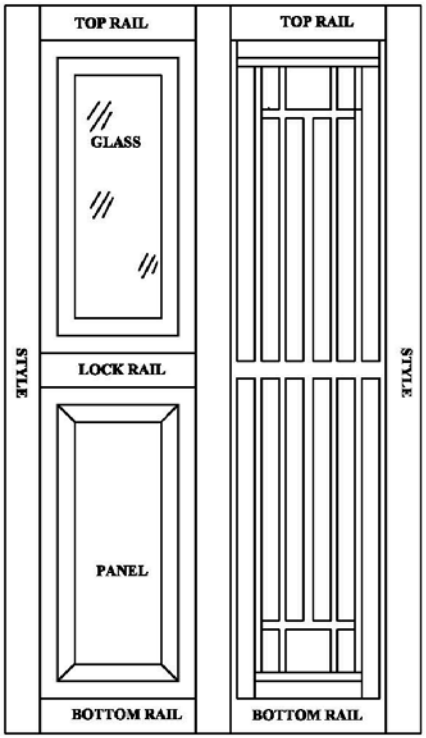


SECTION ON AB



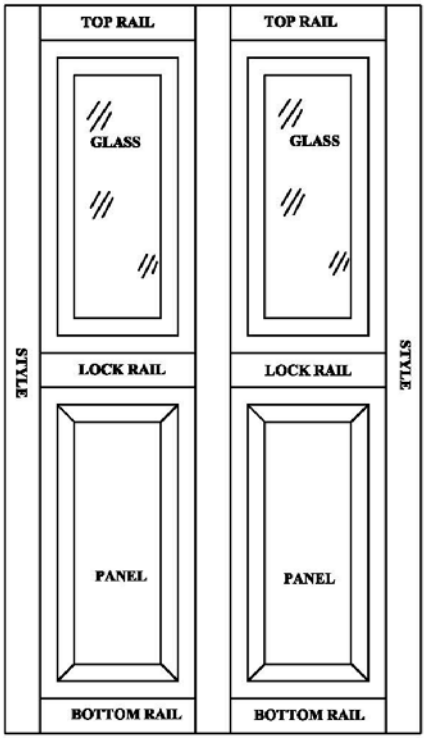
SHUTTER CLOSED SHUTTER OPENED

FULLY PANELLED WINDOW WITH GRILL



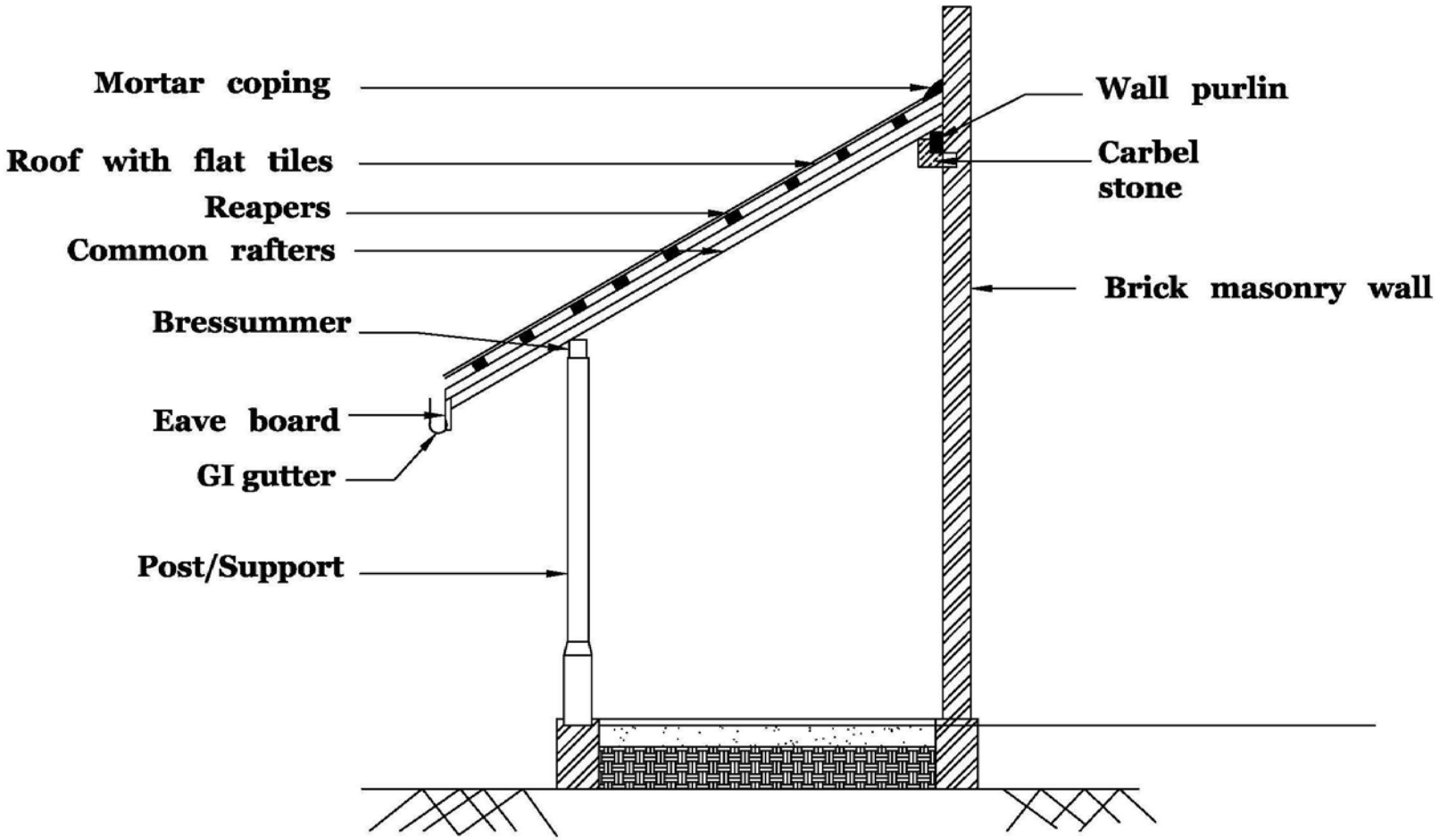
SHUTTER CLOSED SHUTTER OPENED

PARTLY GLAZED AND PARTLY PANELLED WINDOW

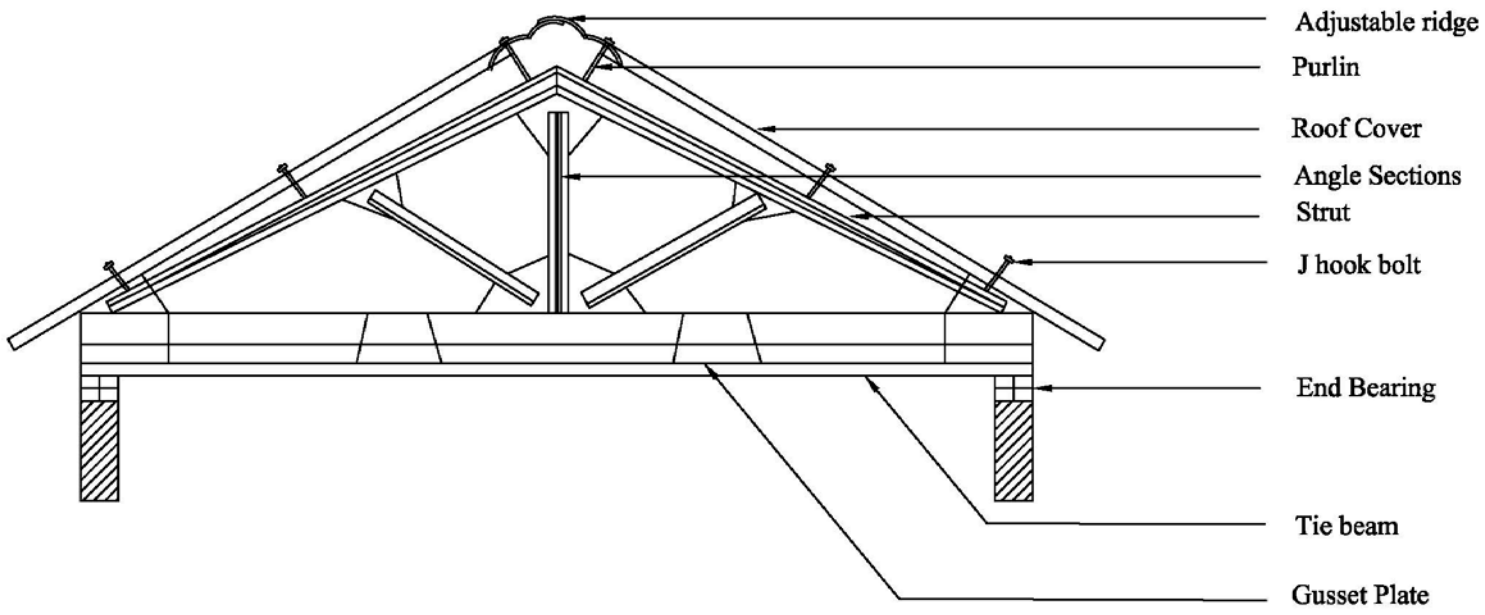


PARTLY GLAZED AND PARTLY PANELLED WINDOW

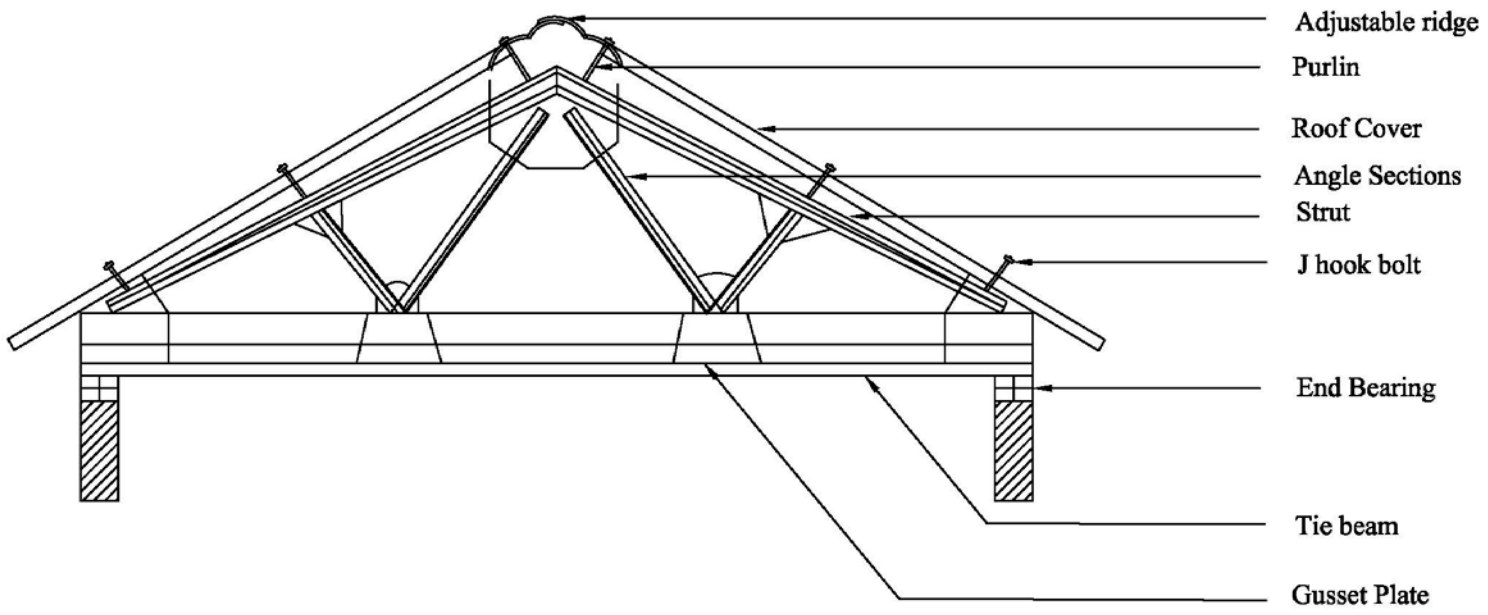
LEAN TO ROOF MODEL

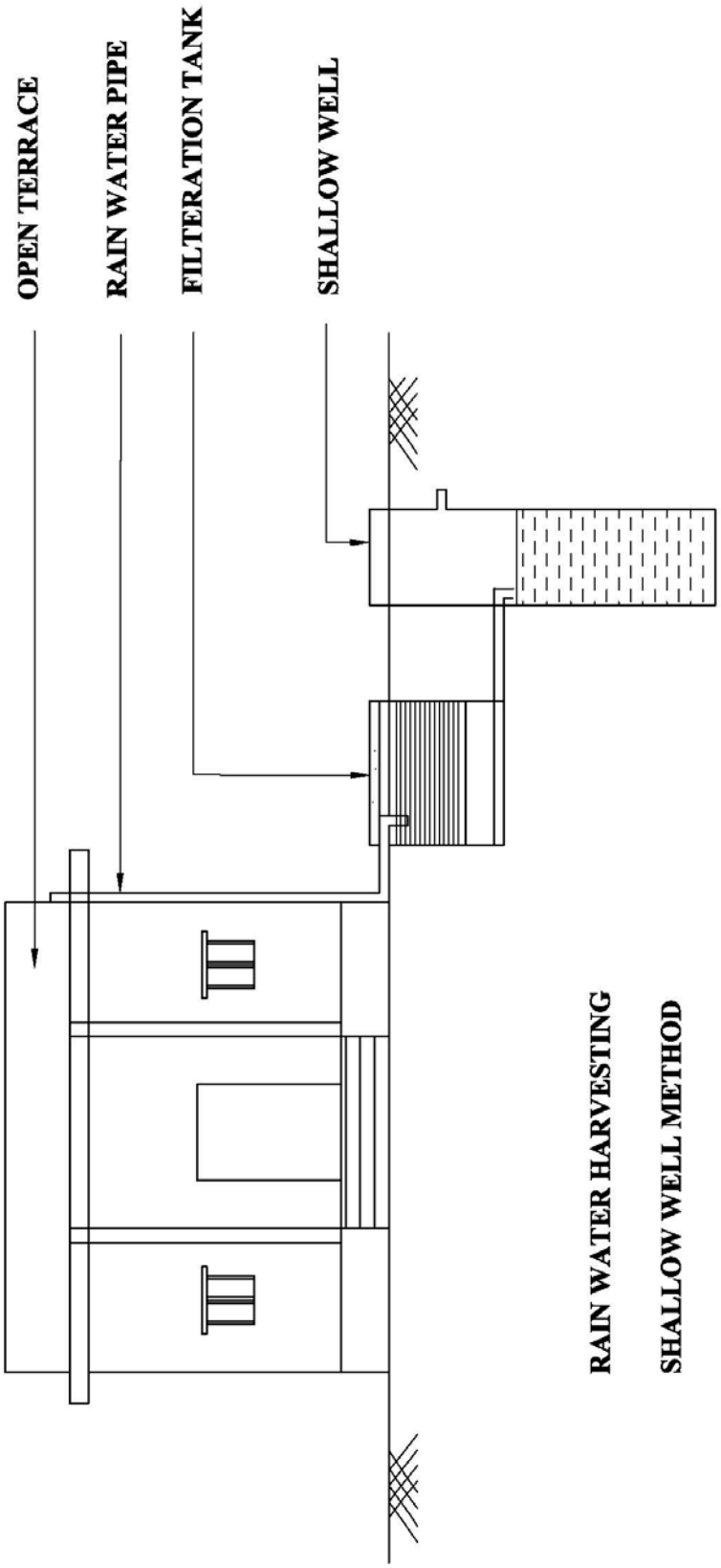


Typical King Post Roof Truss



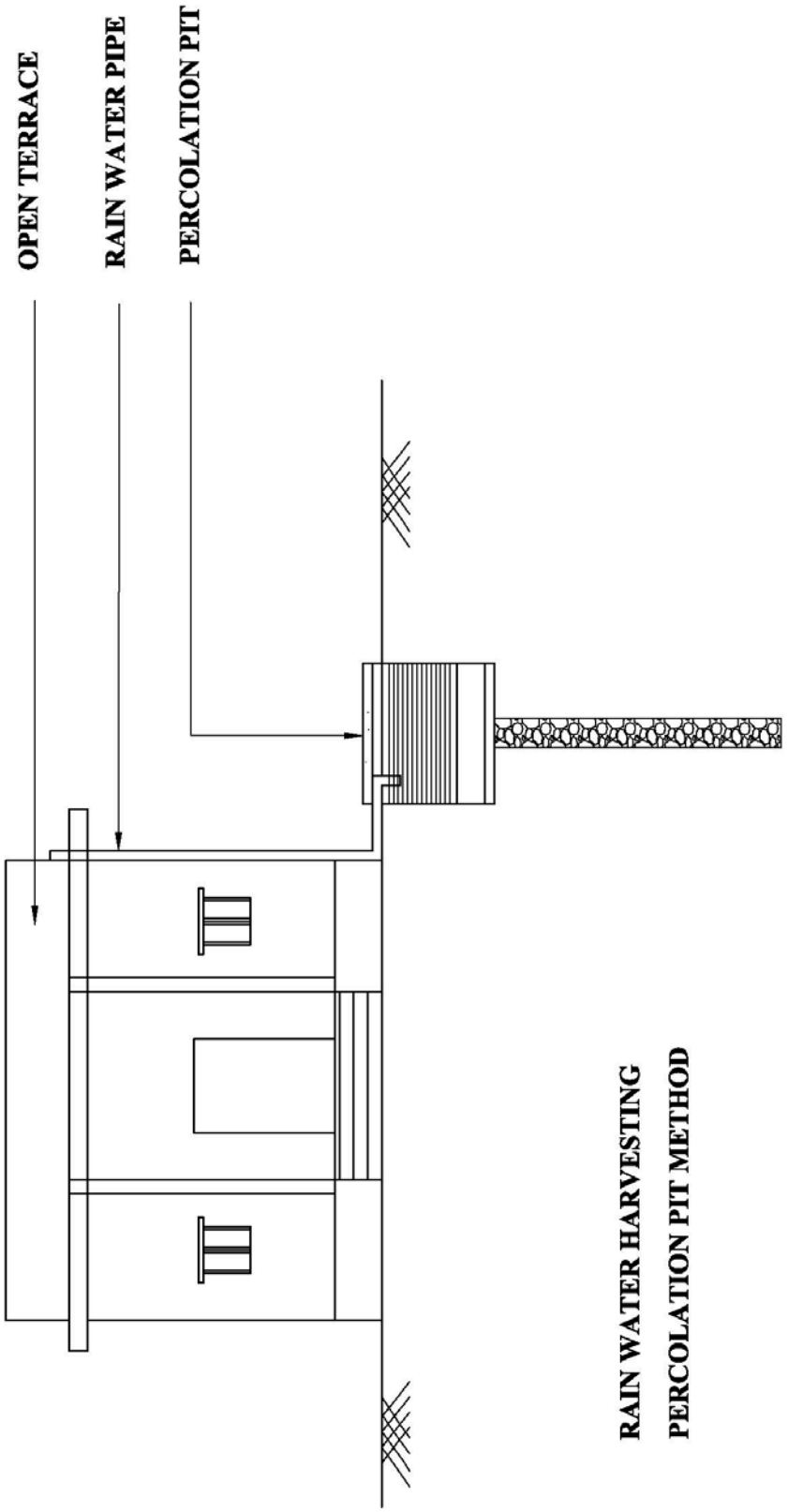
Elevation of steel roof truss





RAIN WATER HARVESTING

SHALLOW WELL METHOD



RAIN WATER HARVESTING
PERCOLATION PIT METHOD

4. BUILDING DRAWINGS

The building drawings should be submitted with the key plan, site plan, Floor plan, elevation, sectional views, construction details, general notes, Schedules etc… as discussed in earlier chapters.

From the following construction details, specification for building drawings shall be framed and the plan, elevation and sectional views shall be prepared with the help of given line plan.

Construction Details and Technical Details

RC Element:

- Roofing shall be made using RCC flat/sloped slabmade up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- For Pitched roofing, Mangalore tiles shall be placed over country wood reapers of size 50x25 mm @ 250mm c/c. The reapers are placed over 50x100mm common rafter placed at 500mm c/c. The common rafters are rests on wall plates of size 100x100mm and the end of common rafters are fixed with eaves board of size 20x200mm with an eaves projection of 600mm.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. To reduce the cost of construction, the partition walls shall be constructed with 115 mm thick brick wall near toilets, passages etc… The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.
- For Framed Structures, Beams shall be provided with overall size300x500mm and column shall be provided with overall size 300x300mm. Footings shall be provided for 1500x1500mm size.

- For factories and workshops, North light steel roof truss shall be used. The roof shall be covered with AC sheets. The truss height shall be 1500mm and span shall be 10m.

General Notes:

Colour Notes:

Proposed work shown thus –

Existing work shown thus –

Work not to be done shown thus –

Work to be removed shown thus –

Plot boundary shown thus –

Road line shown thus –

Area Table:

Plot area	:	m^2
Built-up area of GF	:	m^2
Built-up area of FF	:	m^2
Total Built-up area	:	m^2
Permissible Built-up area	:	m^2

General:

Foundation should be taken up-to hard strata.

Depth of excavation should not less than 1 m below GL.

Basement should be provided with DPC

Drain lines should be laid longitudinally straight along edge of the building.

Schedules:

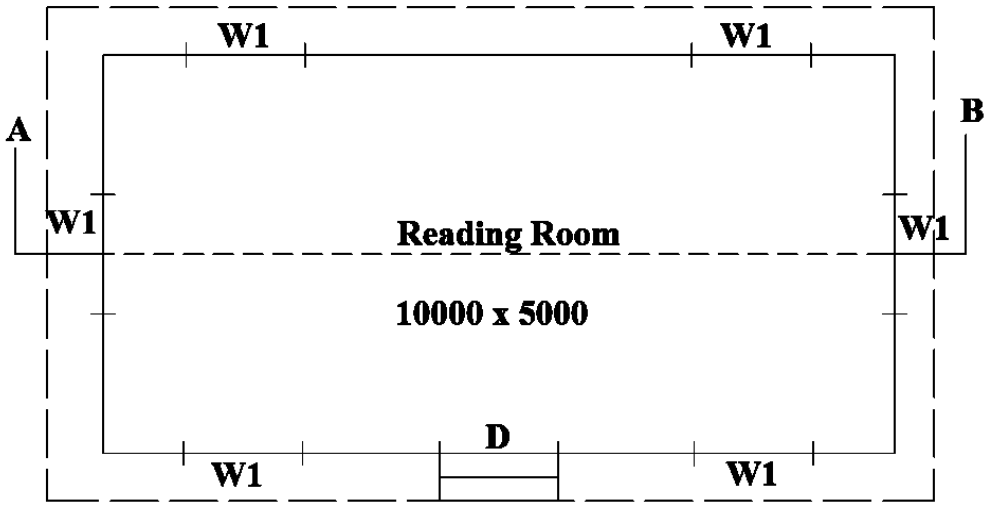
Doors	D1	1200x2100mm
	D2	900x2100mm
	D3	750x2100mm
Windows	W	1200x1200mm
	W1	1500x1200mm
Ventilators	V	900x300 mm
Rolling Shutter	RS	3000x3500 mm

4.1 A READING ROOM WITH RCC FLAT ROOF

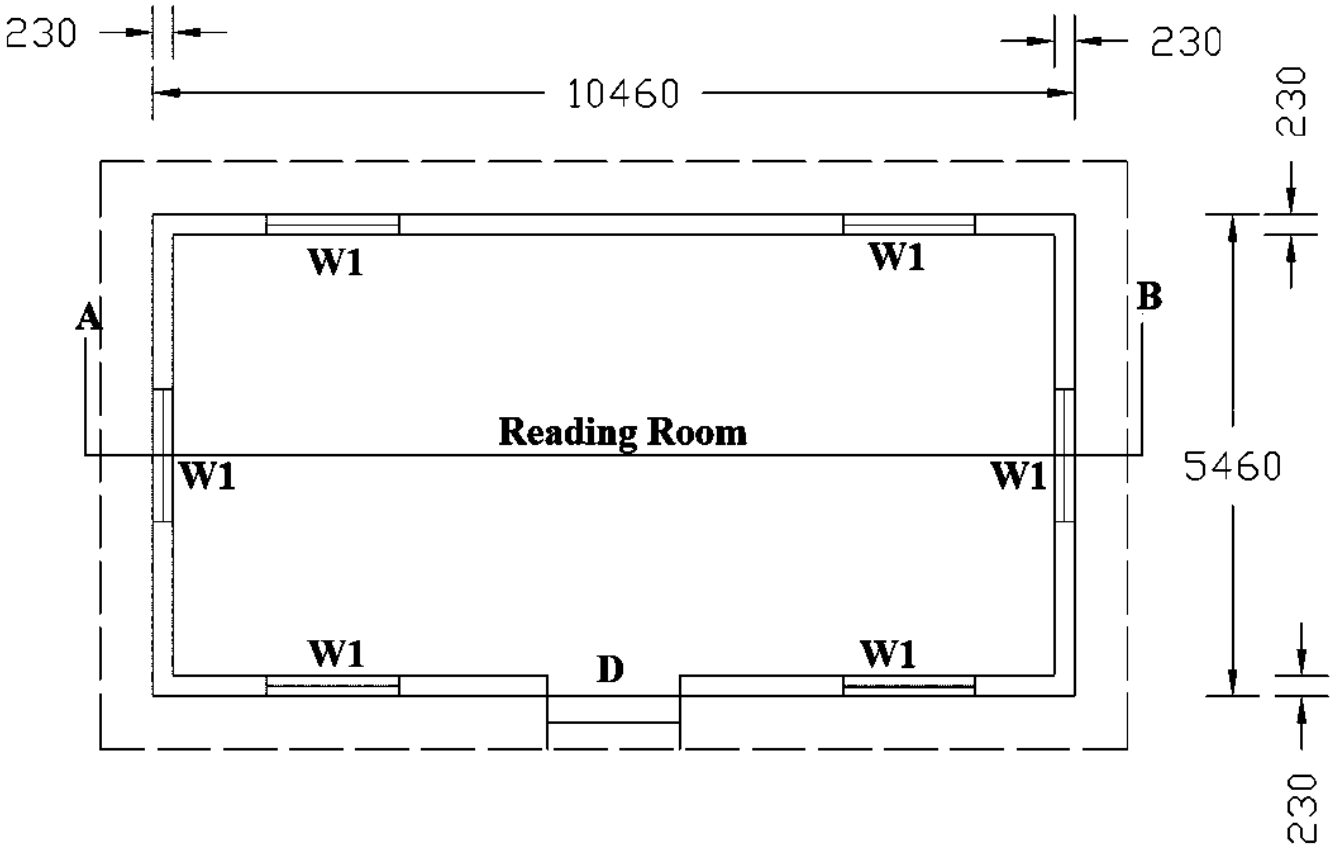
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

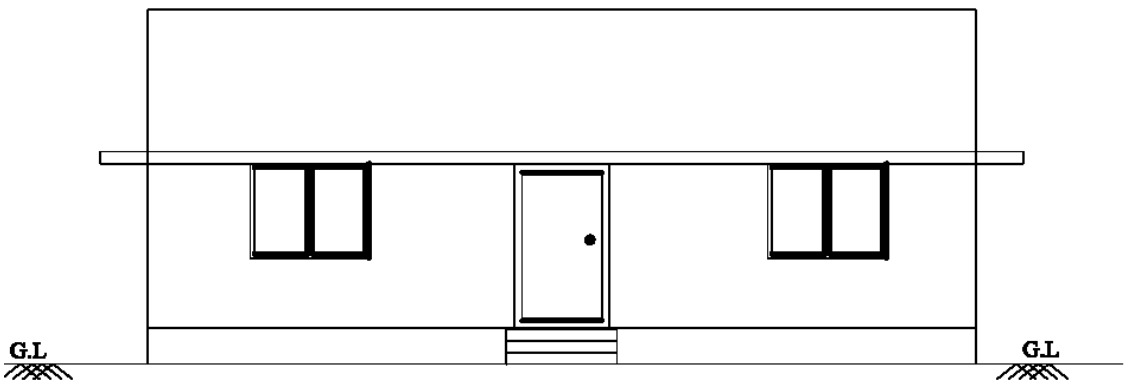
Line Plan:



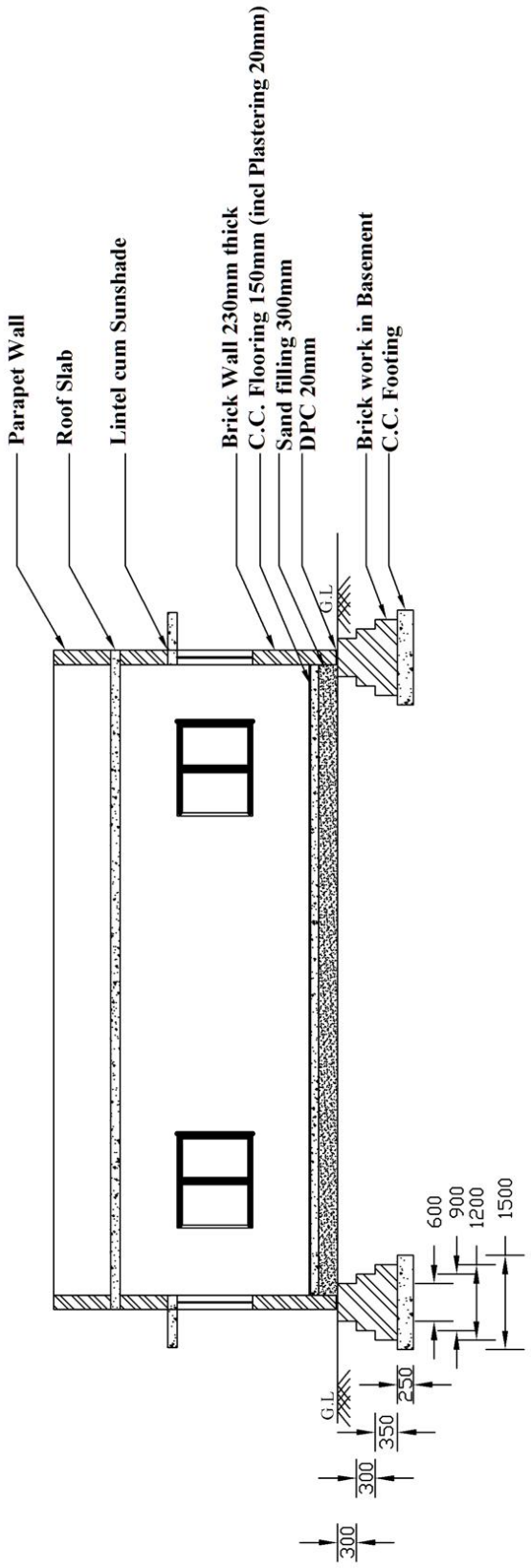
Plan:

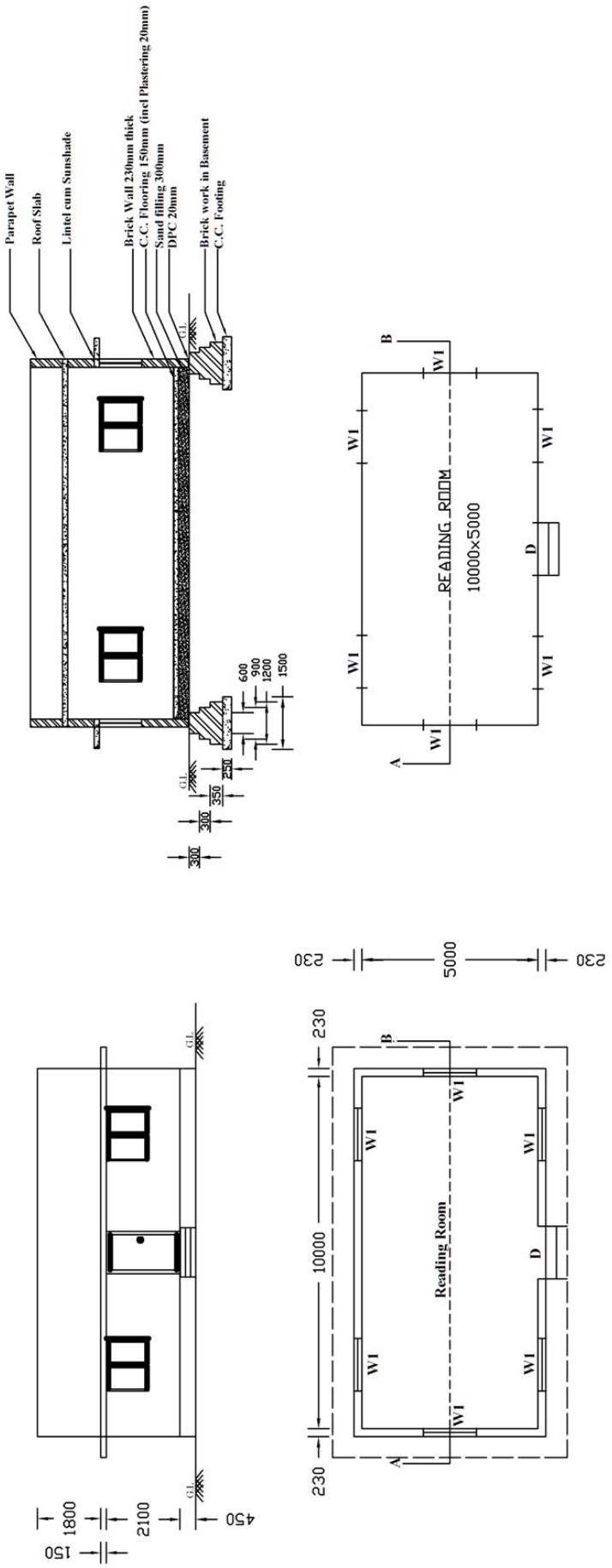


Elevation:



Section:


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
600
900
1200
1500
250
350
300
300


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
GL
600
900
1200
1500
300
350
230
READING ROOM
10000×5000
W1
D
A
B
230
5000
10000
Reading Room
1800
2100
450
150

Hints:

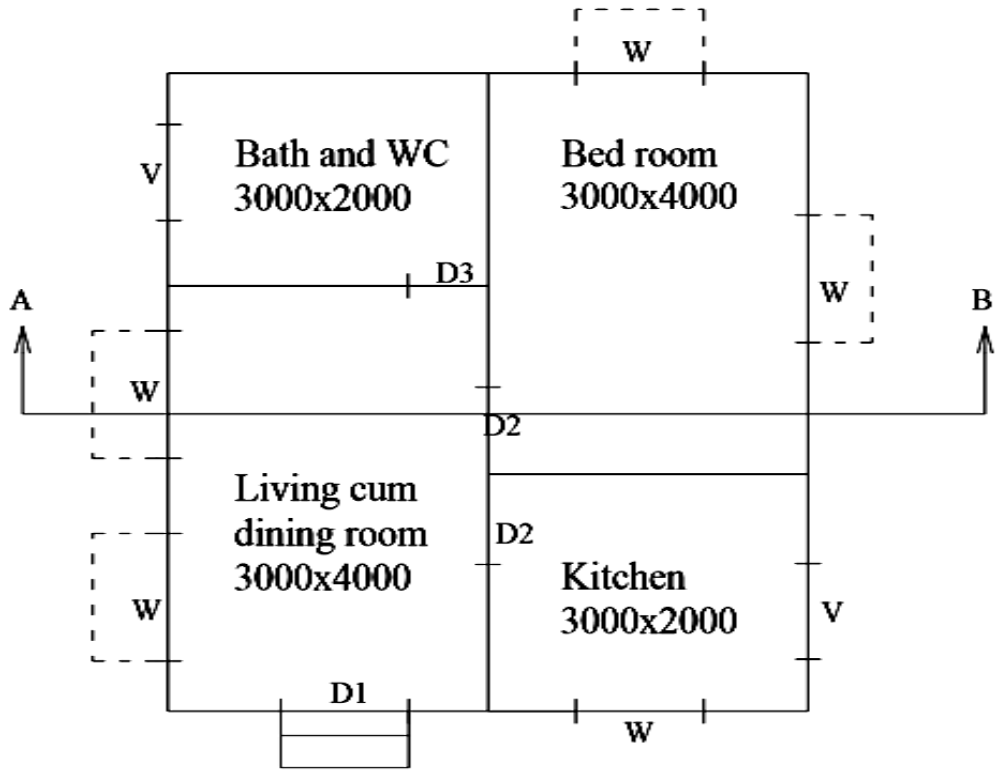
1. First draw the outer wall of the room 10460x5460 mm (230+10000+230)x (230+5000+230)
2. Then draw the inner wall of the room 10000x5000 mm.
3. Now do the window and door markings in the drawing.
4. Then mark the dimensions in both vertical and horizontal directions.
5. Extrude the plan upward to plot outer dimension of the elevation view.
6. Mark the top and bottom line of elevation above GL (0 to 4050 mm) (floor + room height + roof + parapet = 450 + 3000 +150+900)
7. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door with two windows each on either sides and an outer sunshade are visible)
8. Mark the parts below the floor level (steps)
9. Extrude the elevation to its right side.
10. Mark the views available at the cutting section.
11. At the Cutting Section, from the left we can see a brick wall with a window, lintel cum sunshade, a parapet wall, then two windows on the back wall, then RCC slab, then again a brick wall with a window, lintel cum sunshade, a parapet wall. Below the GL, the Flooring between outer walls, then sand filling, then the basement masonry below both the walls, then the footing below basement masonry.
12. Mark the parts of sectional view and the dimensions.

4.2 A HOUSE WITH SINGLE BED ROOM AND ATTACHED BATHROOM WITH R.C.C. FLAT ROOF

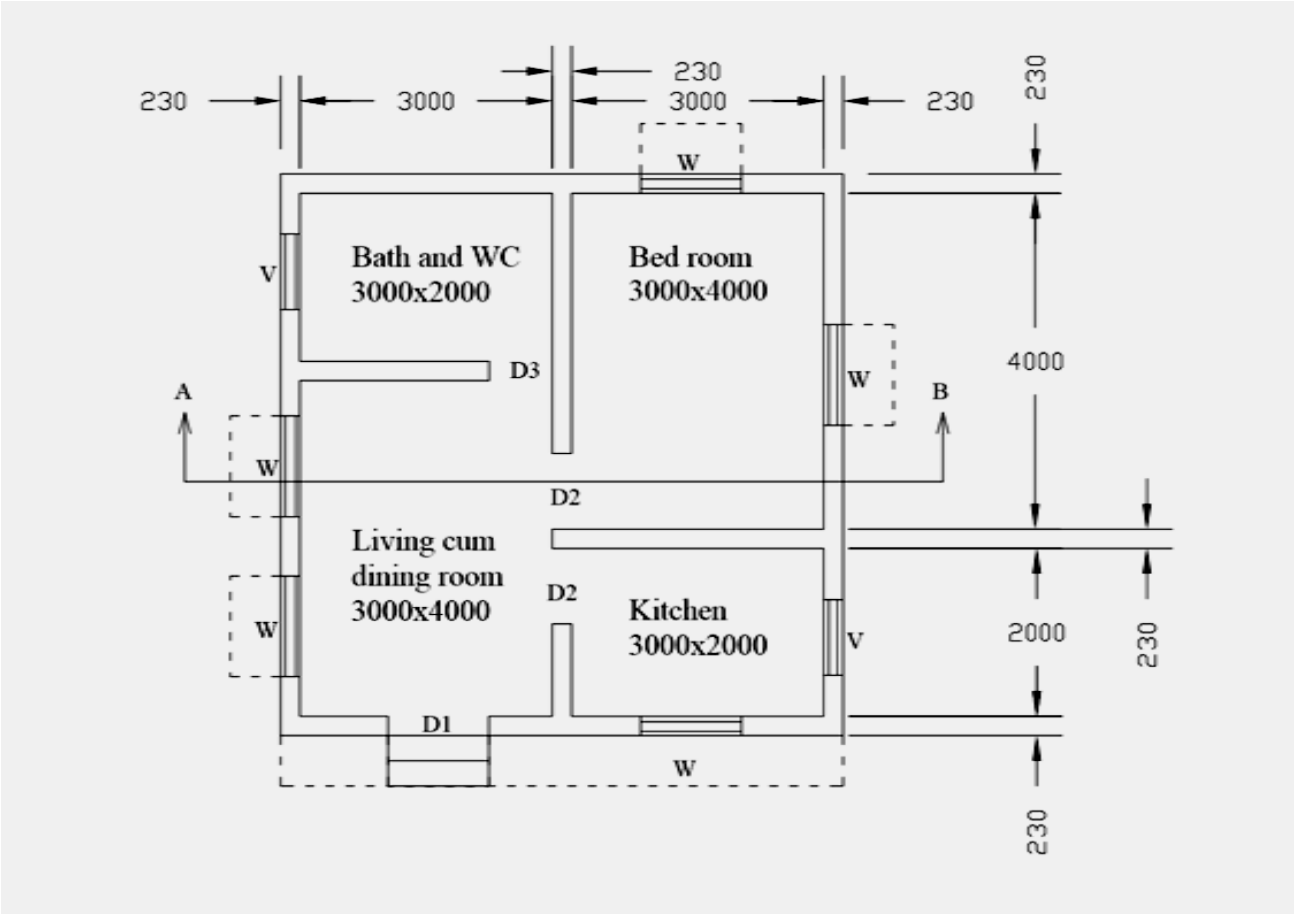
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

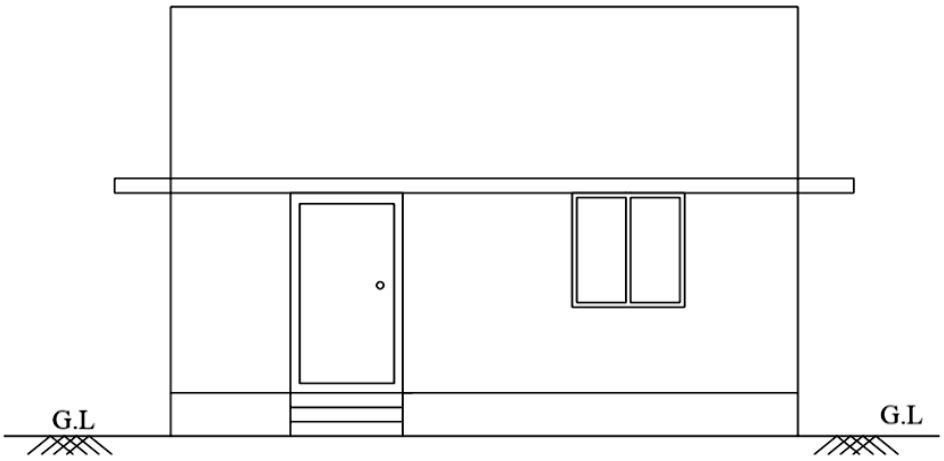
Line Plan:



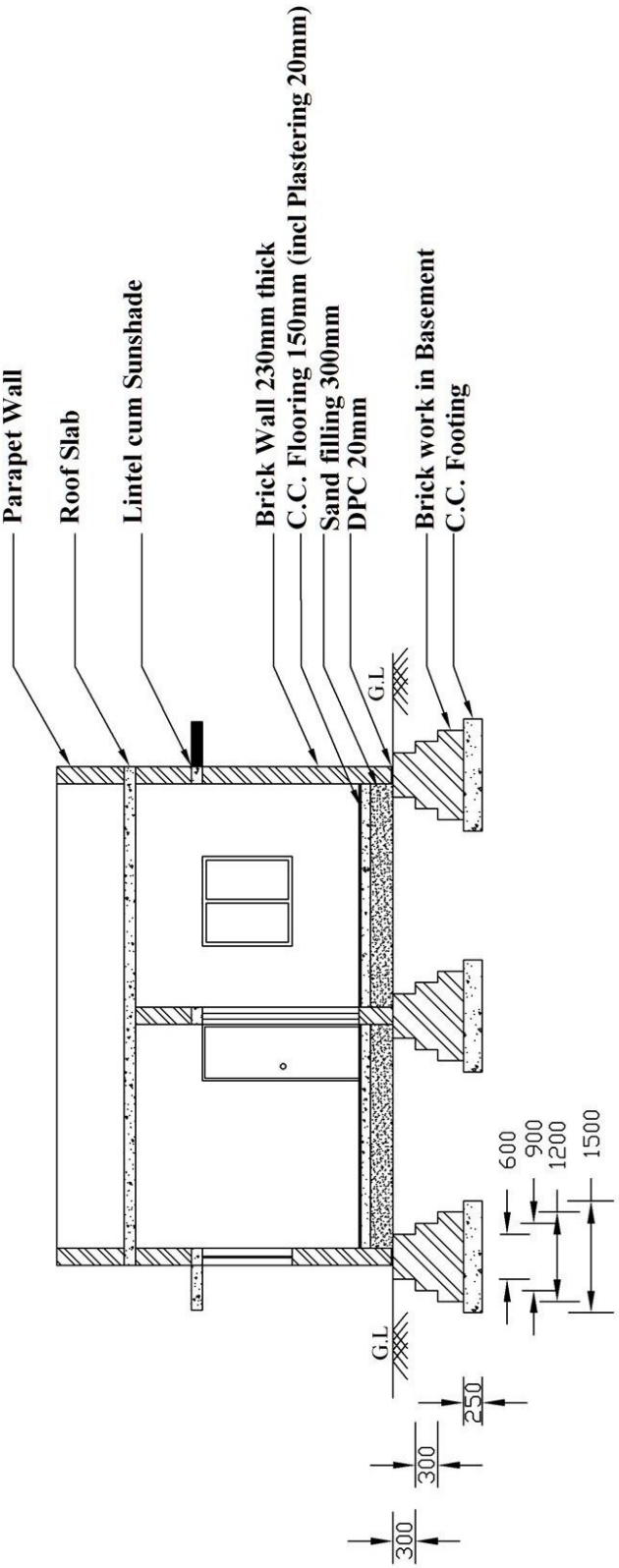
Plan:

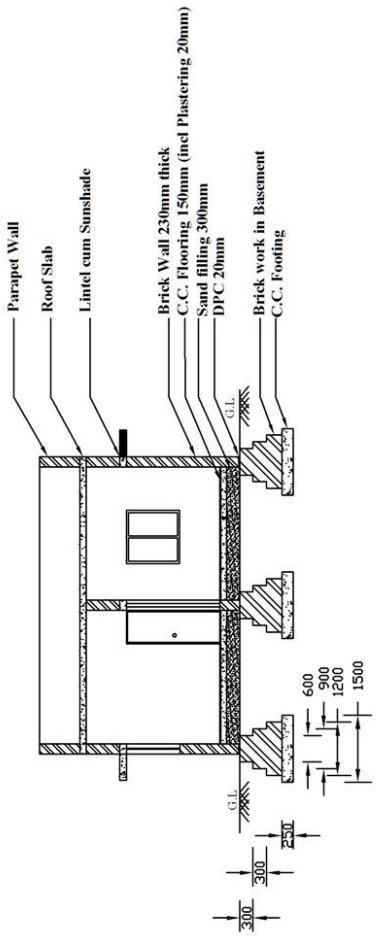


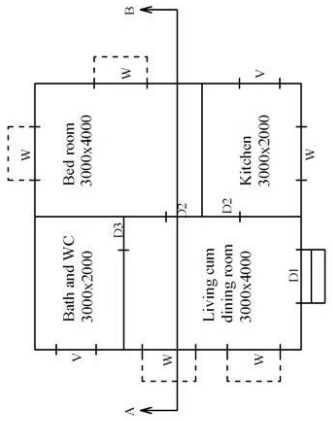
Elevation:

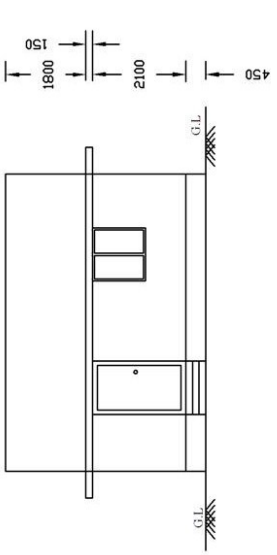


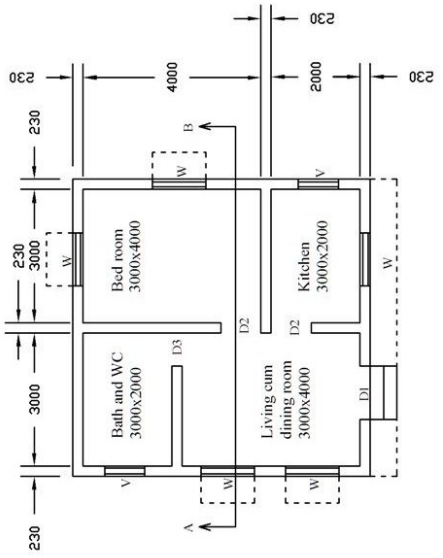
Section:


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
600
900
1200
1500
250
300
300


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (inel Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
600
900
1200
1500
250
300
300


Bed room
3000x4000
Kitchen
3000x2000
Bath and WC
3000x2000
Living cum
dining room
3000x4000
D1
D2
D3
W
V
A
B


150
1800
2100
450
G.L


230
4000
2000
3000
Bed room
3000x4000
Kitchen
3000x2000
Bath and WC
3000x2000
Living cum
dining room
3000x4000
D1
D2
D3
W
V
A
B

Hints:

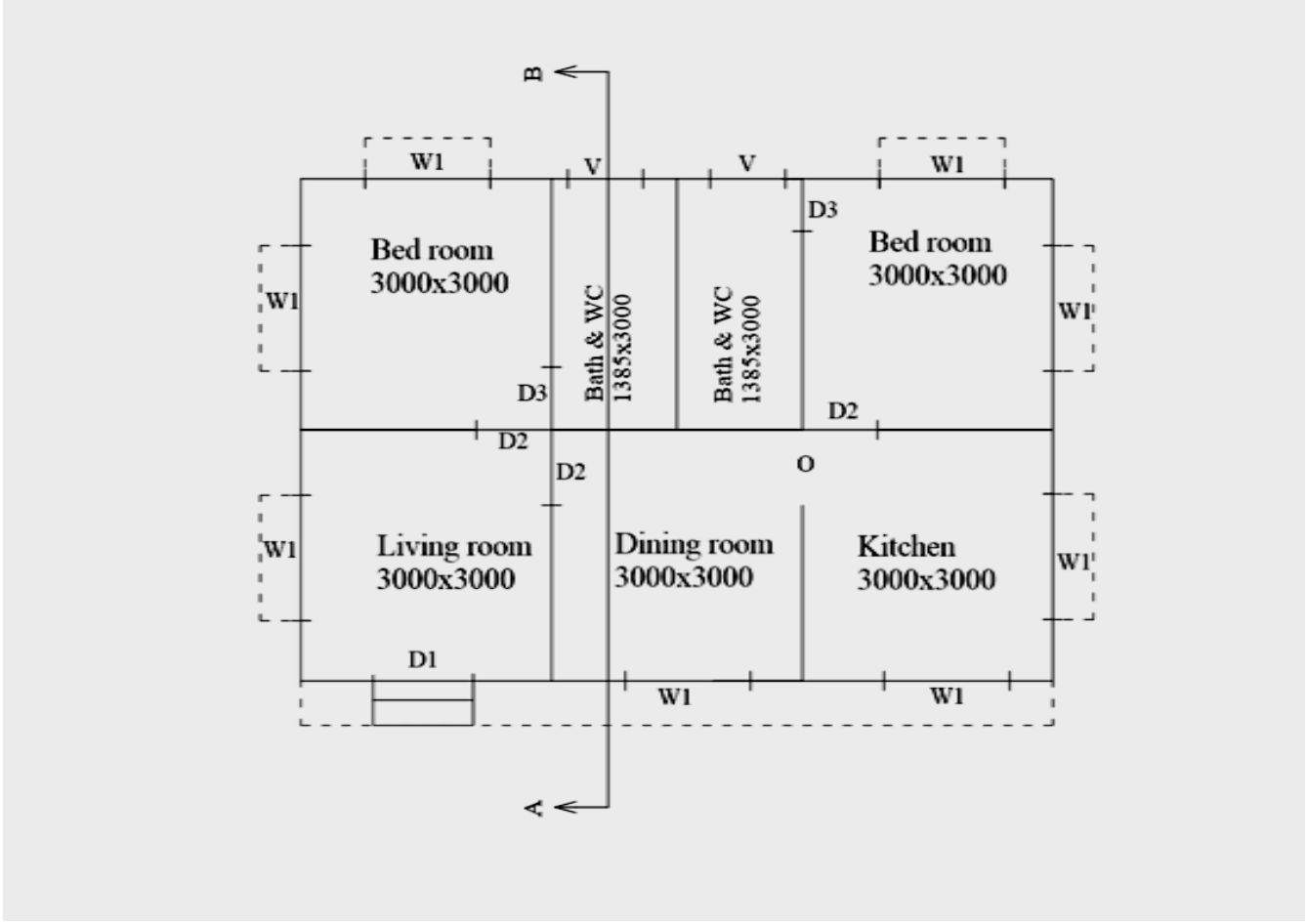
1. First draw the outer line of the wall of the room 6690x6690 mm (230+3000+230+3000+230)x (230+4000+230+2000+230)
2. Then draw the inner line of the wall of the room 6230x6230 mm.
3. Mark the partition walls
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4500 mm) (floor + room height + roof + parapet = 450 + 3000 +150+900)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door, one window and outer sunshade are visible)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a brick wall with a window, lintel cum sunshade, a parapet wall, then a door on the back wall, then a brick wall with a door, then a window on the back wall, then RCC slab, then again a brick wall, lintel cum sunshade, a parapet wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.3 A RESIDENTIAL BUILDING WITH TWO BED ROOMS WITH R.C.C. FLAT ROOF :

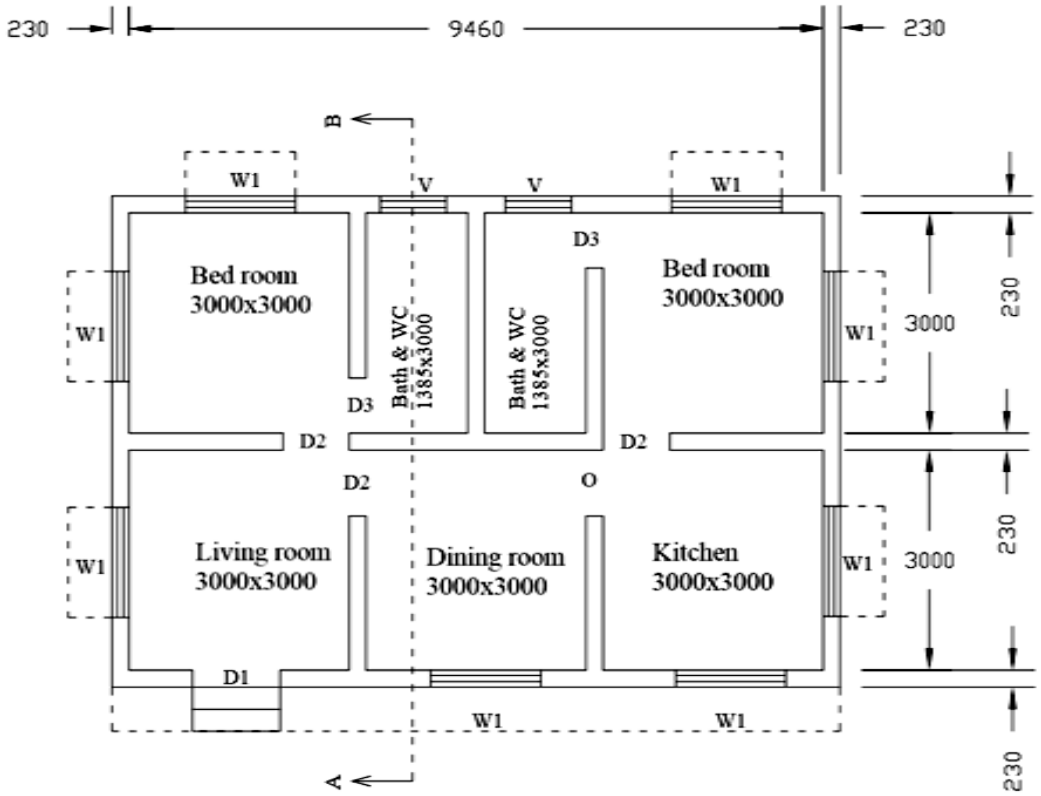
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

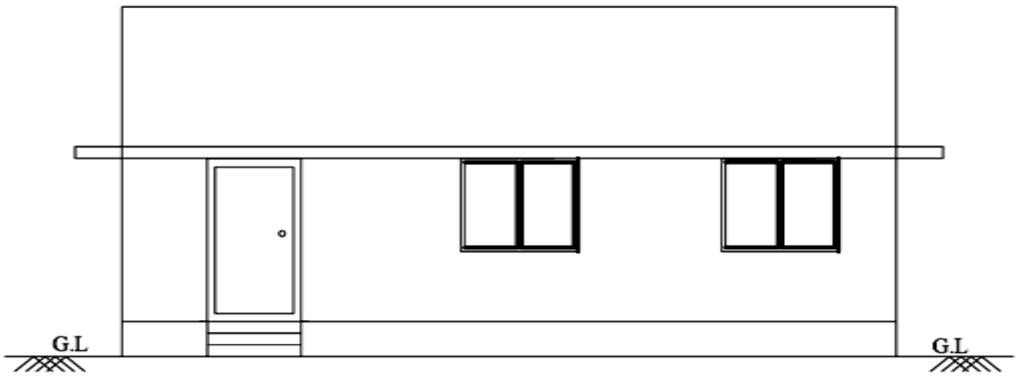
Line Plan:



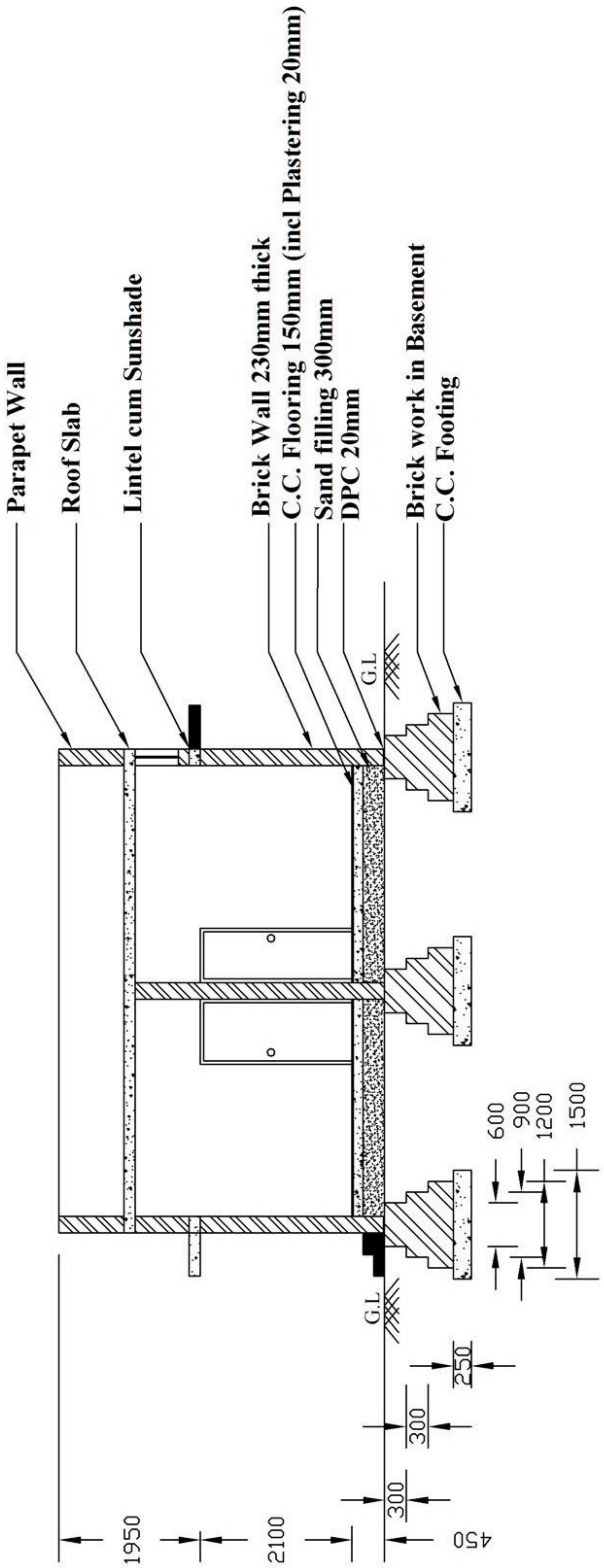
Plan:

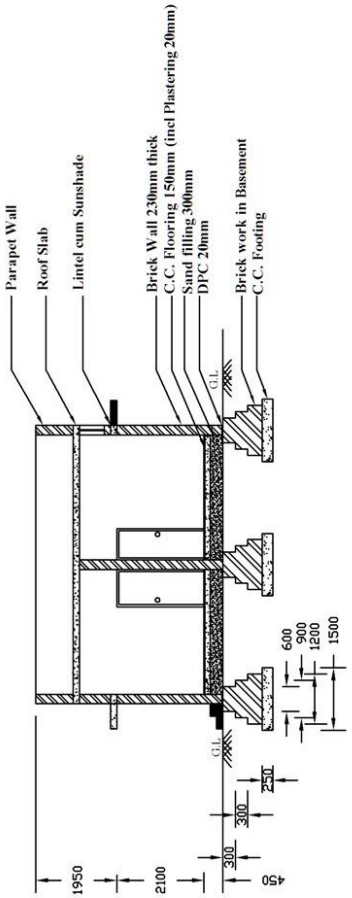


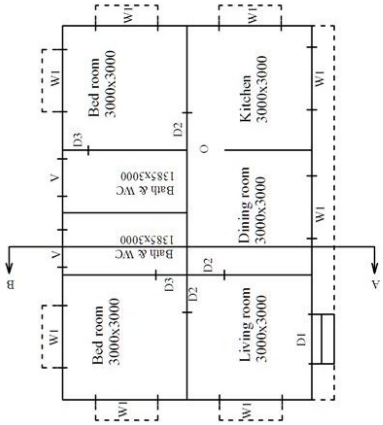
Elevation:

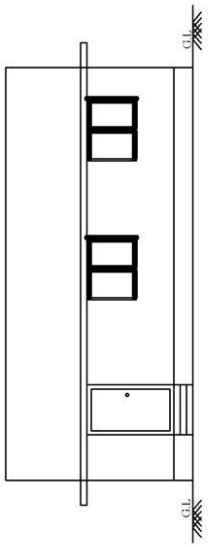


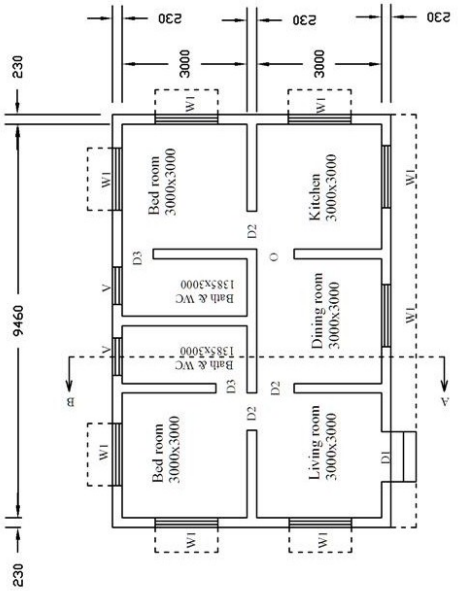
Section:


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
600
900
1200
1500
250
300
300
1950
2100
450


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
600
900
1200
1500
250
300
300
1950
2100
450


Bed room 3000x3000
Kitchen 3000x3000
Bath & WC 1385x3000
Dining room 3000x3000
Bath & WC 1385x3000
Bed room 3000x3000
Living room 3000x3000
W1
D1
D2
D3
O
V
A
B


G.L
G.L


230
3000
230
3000
230
230
9460
Bed room 3000x3000
Kitchen 3000x3000
Bath & WC 1385x3000
Dining room 3000x3000
Bath & WC 1385x3000
Bed room 3000x3000
Living room 3000x3000
W1
D1
D2
D3
O
V
A
B

Hints:

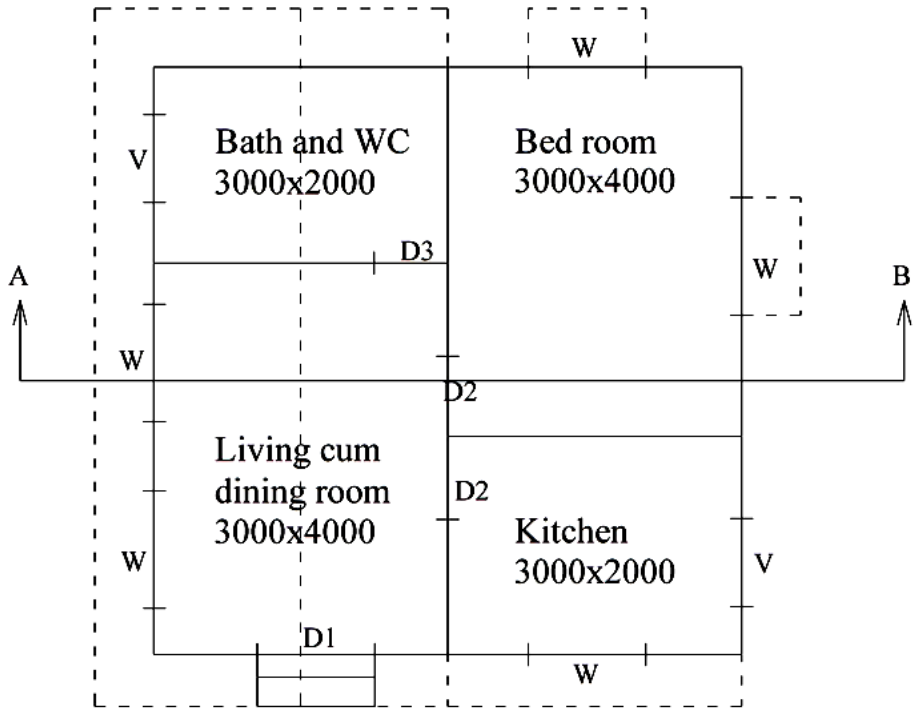
1. First draw the outer line of the wall of the room 9920x6690 mm (230+3000+230+1385+230+1385+230+3000+230)x(230+3000+230+3000+230)
2. Then draw the inner line of the wall of the room 9460x6230 mm.
3. Mark the partition walls
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4500 mm) (floor + room height + roof + parapet = 450 + 3000 +150+900)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door, two windows and outer sunshade are visible)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see the steps, then a brick wall, lintel cum sunshade, a parapet wall, then two doors on the back wall each on either side of a brick wall, then RCC slab, then again a brick wall with a ventilator, lintel cum sunshade, a parapet wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.4 A HOUSE WITH SINGLE BED AND HALL WITH PARTLY TILED AND PARTLY R.C.C FLAT ROOF

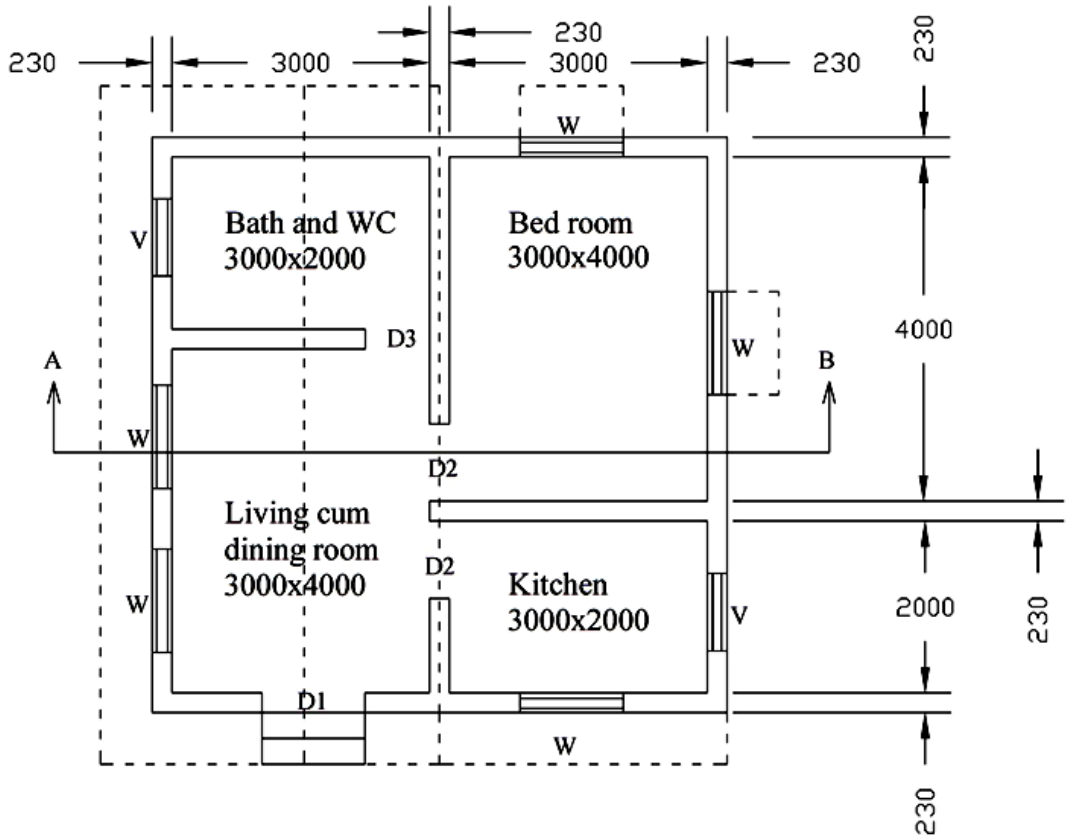
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- For Pitched roofing, Mangalore tiles shall be placed over country wood reapers of size 50x25 mm @ 250mm c/c. The reapers are placed over 50x100mm common rafter placed at 500mm c/c. The common rafters are rests on wall plates of size 100x100mm and the end of common rafters are fixed with eaves board of size 20x200mm with an eaves projection of 600mm.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

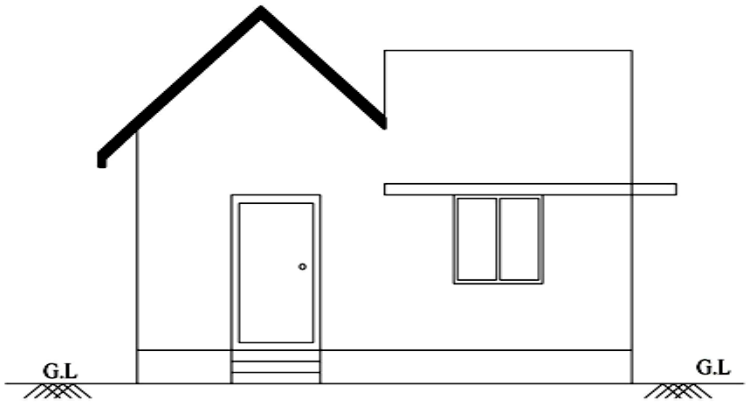
Line Plan:



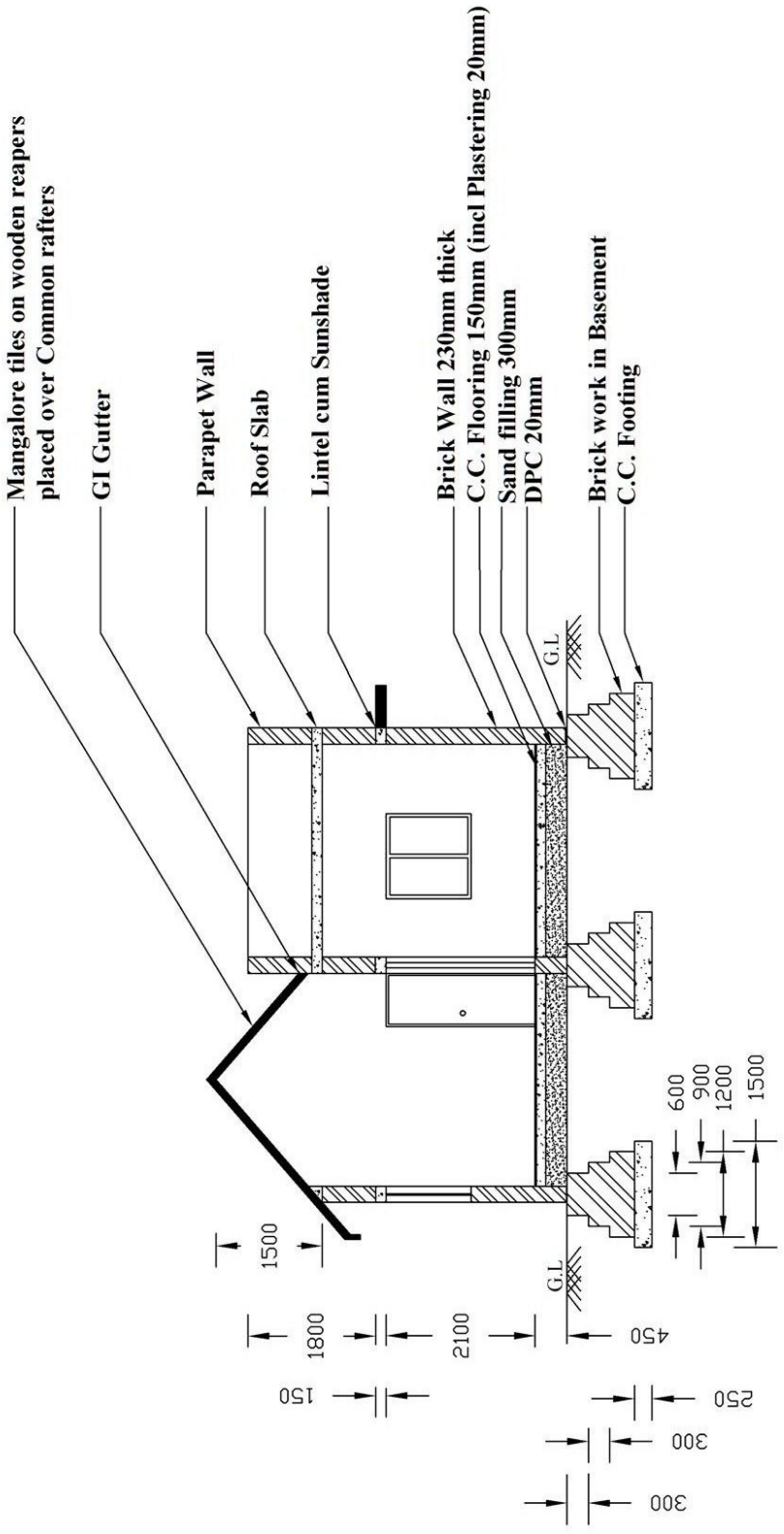
Plan:

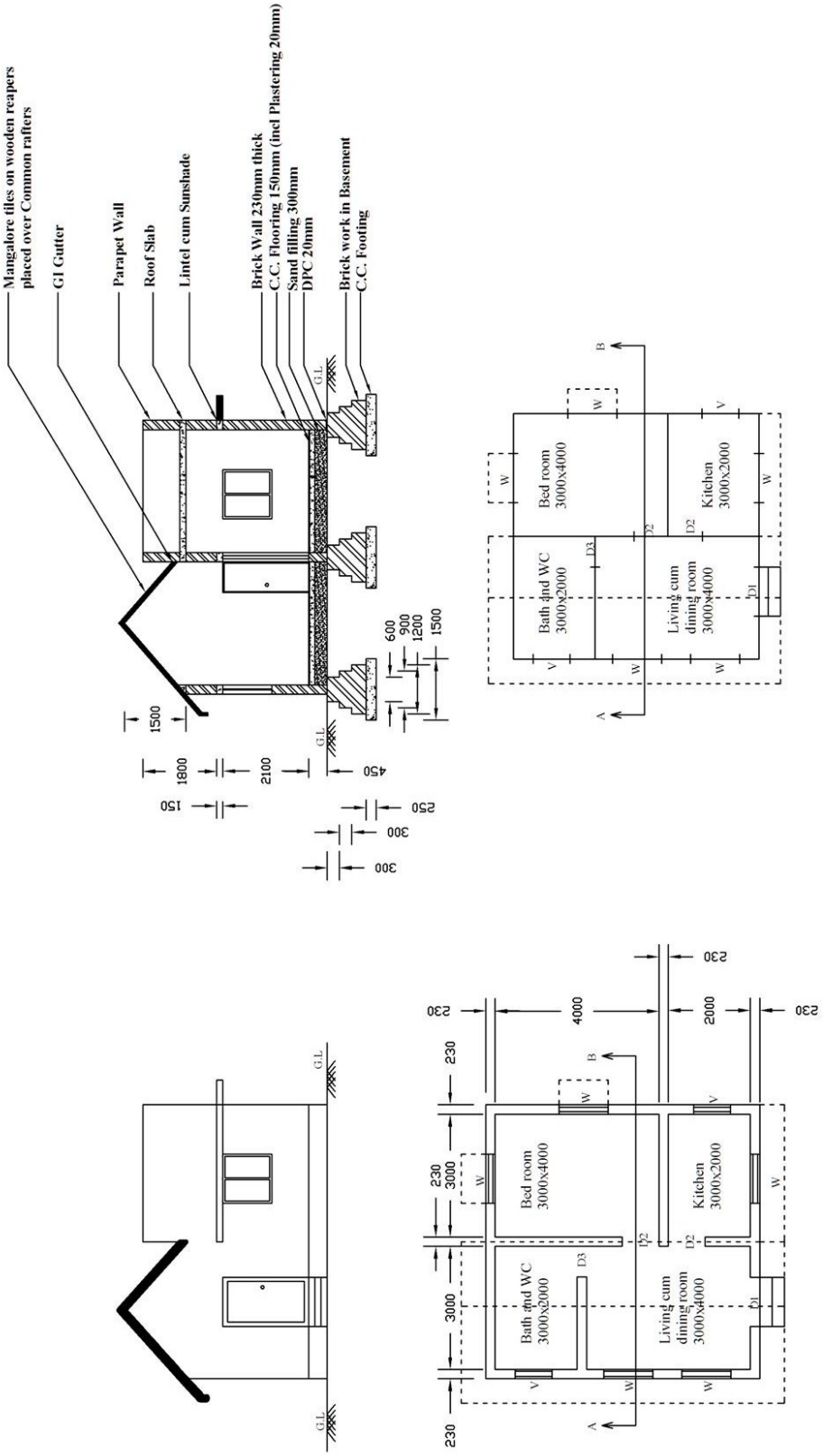


Elevation:



Section:


Mangalore tiles on wooden reapers placed over Common rafters
GI Gutter
Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
600
900
1200
1500
1500
1800
2100
450
150
250
300
300


Mangalore tiles on wooden reapers placed over Common rafters
GI Gutter
Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (inel Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
1500
1800
2100
450
150
250
300
300
600
900
1200
1500
Bed room 3000x4000
Kitchen 3000x2000
Bath and WC 3000x2000
Living cum dining room 3000x4000
W
V
D1
D2
D3
A
B
230
3000
4000
2000

Hints:

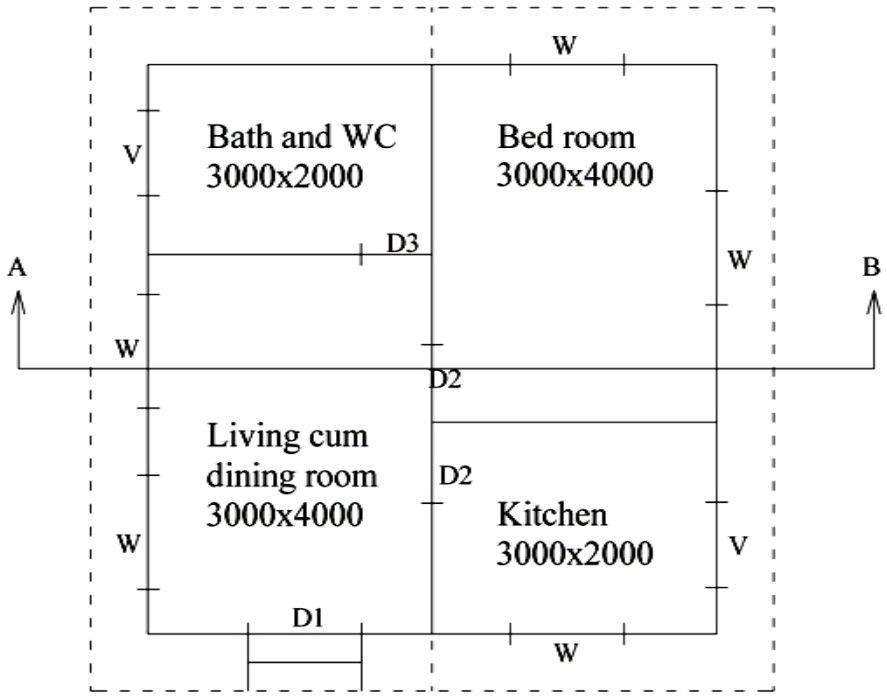
1. First draw the outer line of the wall of the room 6690x6690 mm (230+3000+230+3000+230)x(230+4000+230+2000+230)
2. Then draw the inner line of the wall of the room 6230x6230 mm.
3. Mark the partition walls
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4950/4500 mm) (floor + room height + pitched roof = 450 + 3000 +1500 / floor + room height + flat roof + parapet 450+3000+150+900)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door and one window are visible, half of the roofing will be pitched roof and the remaining will be flat RCC roof)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a brick wall with a windows, then a door on the back wall, then a brick wall with a door, then a window, then pitched roofing and flat RCC slab, then again a brick wall, a parapet wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.5 A TWO ROOMED HOUSE WITH RCC SLOPE ROOF WITH GABLE ENDS

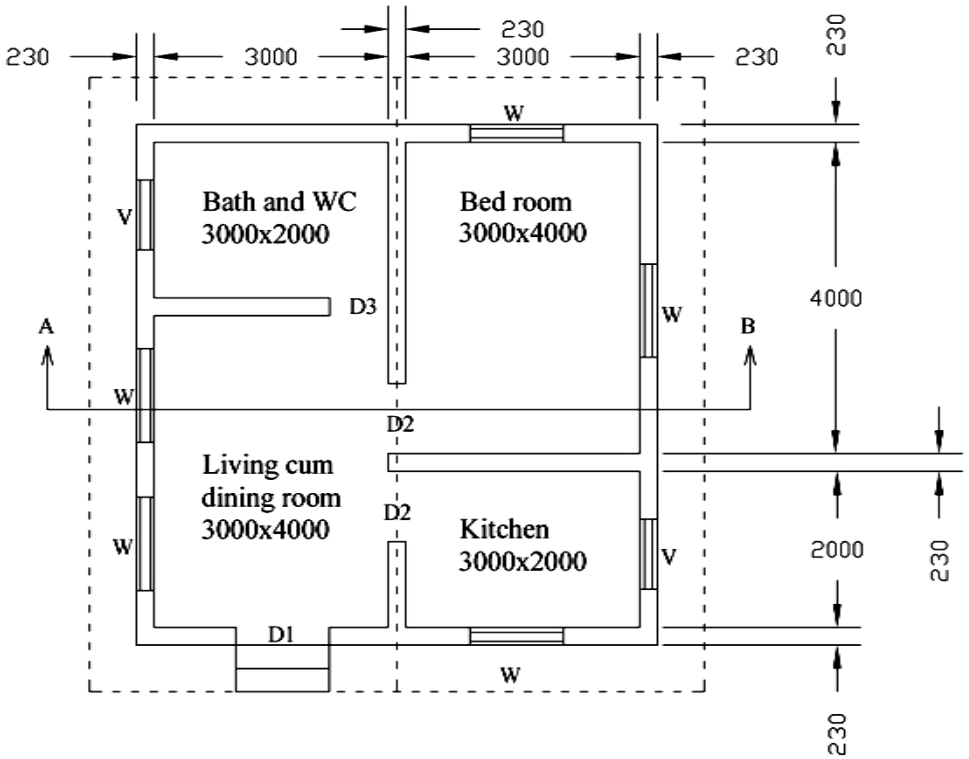
Specification:

- Roofing shall be RCC slab (Sloped) made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

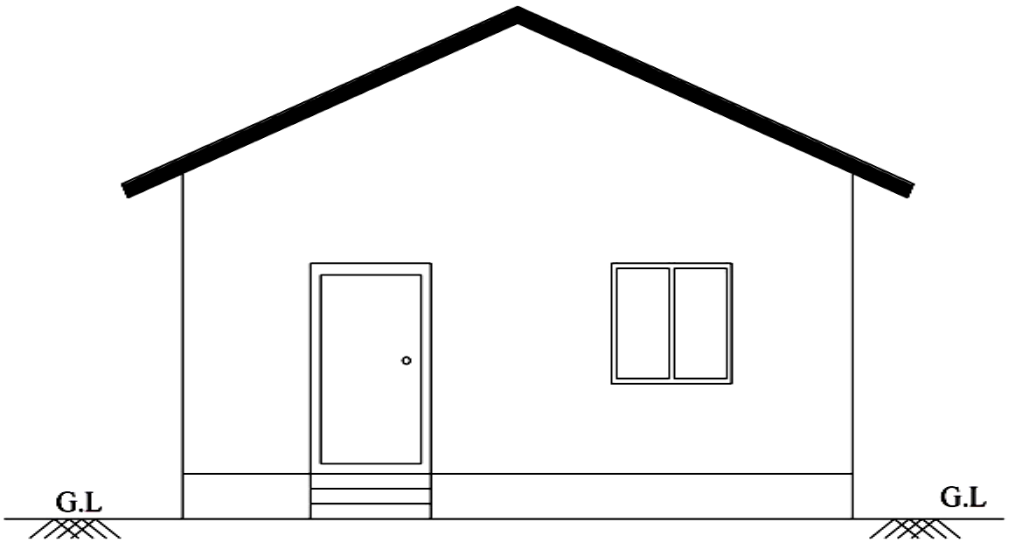
Line Plan:



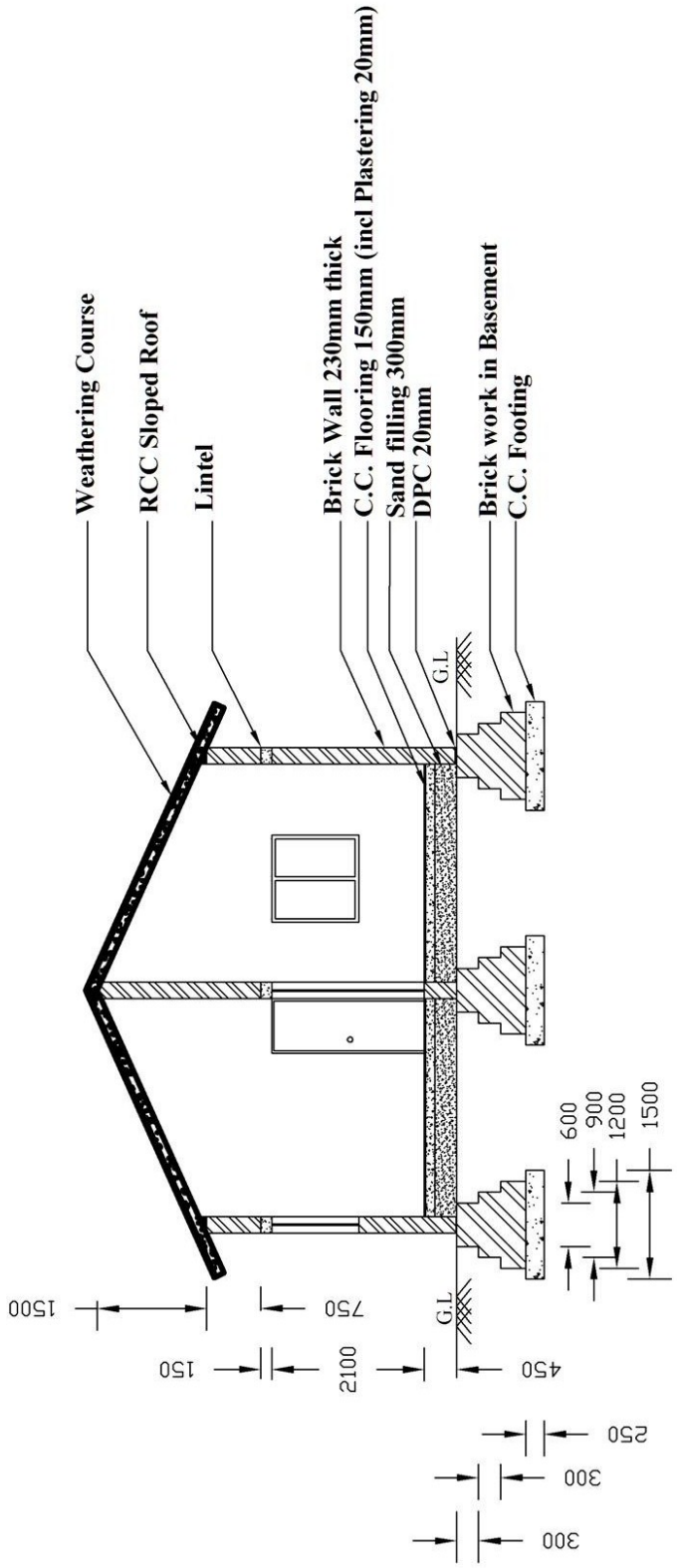
Plan:

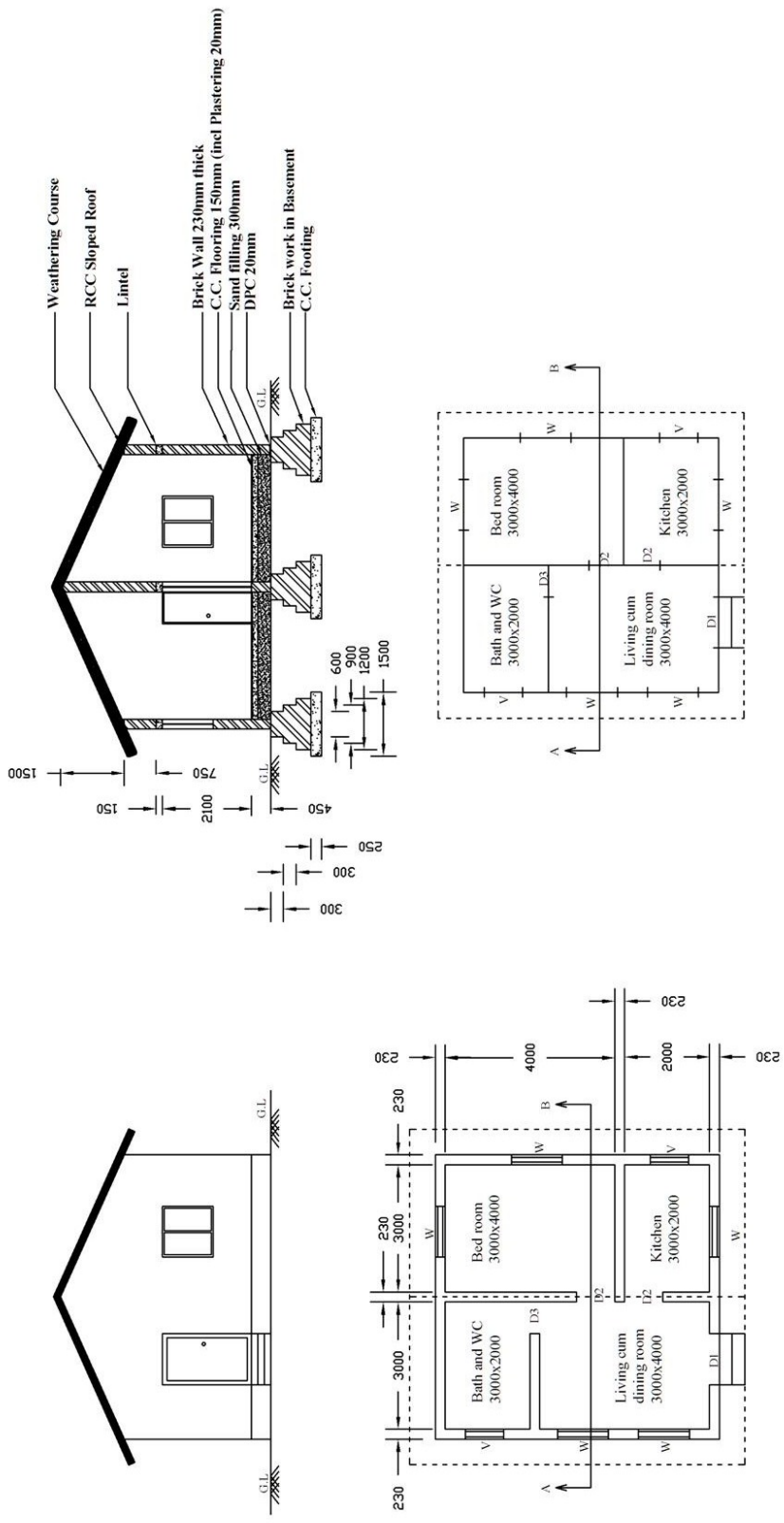


Elevation:



Section:


Weathering Course
RCC Sloped Roof
Lintel
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
600
900
1200
1500
1500
750
150
2100
450
250
300
300


Weathering Course
RCC Sloped Roof
Lintel
Brick Wall 230mm thick
C.C. Flooring 150mm (inel Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
GL
600
900
1200
1500
1500
750
150
2100
450
250
300
300
Bed room
3000x4000
Kitchen
3000x2000
Bath and WC
3000x2000
Living cum
dining room
3000x4000
D1
D2
D3
W
V
A
B
230
3000
4000
2000

Hints:

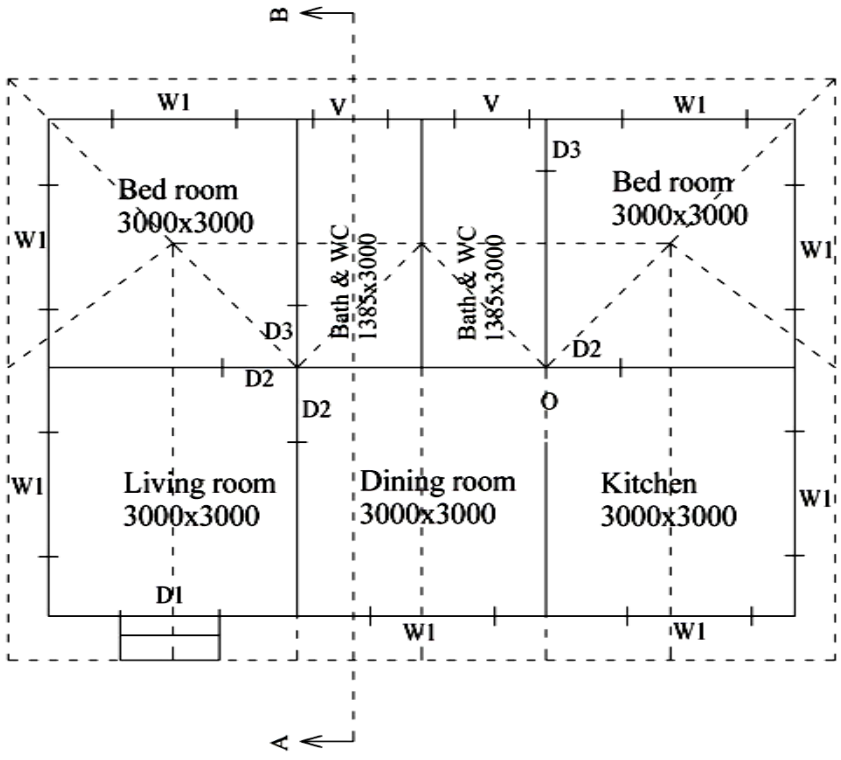
1. First draw the outer line of the wall of the room 6690x6690 mm (230+3000+230+3000+230)x(230+4000+230+2000+230)
2. Then draw the inner line of the wall of the room 6230x6230 mm.
3. Mark the partition walls
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4950 mm) (floor + room height + sloped roof = 450 + 3000 +1500)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door, one window, and sloped roof are visible)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a brick wall with a windows, then a door on the back wall, then a brick wall with a door, then a window, then sloped roofing, then again a brick wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.6 A HOUSE WITH FULLY TILED ROOF WITH HIPS AND VALLEYS

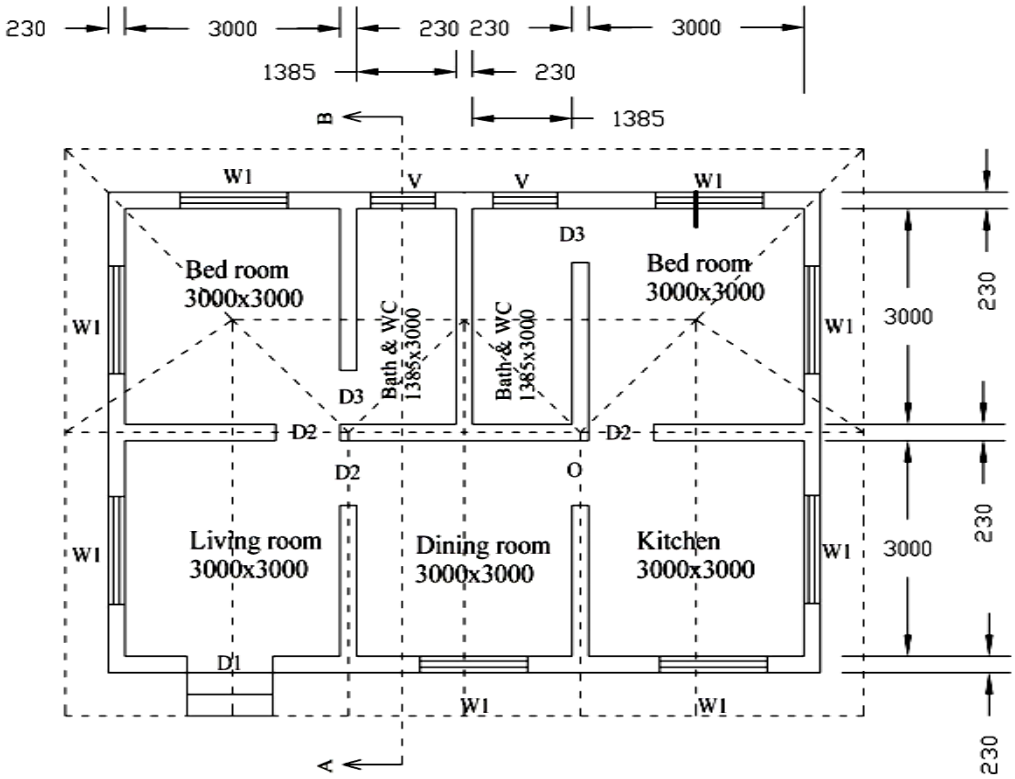
Specification:

- Roofing shall be pitched roofing. Mangalore tiles shall be placed over country wood reapers of size 50x25 mm @ 250mm c/c. The reapers are placed over 50x100mm common rafter placed at 500mm c/c. The common rafters are rests on wall plates of size 100x100mm and the end of common rafters are fixed with eaves board of size 20x200mm with an eaves projection of 600mm.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

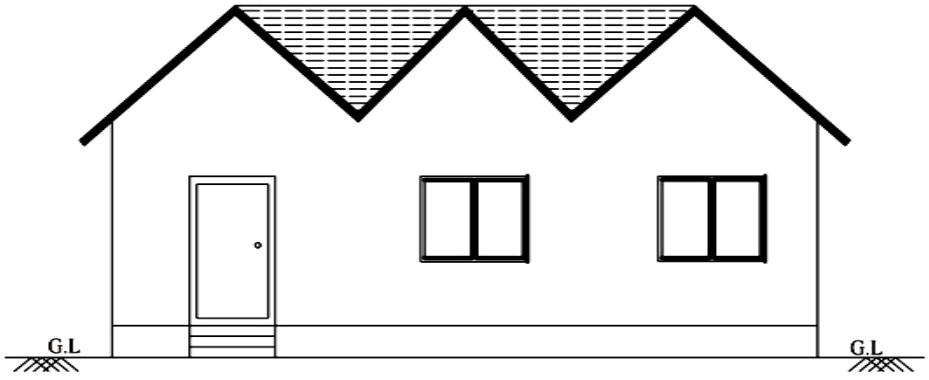
Line Plan:



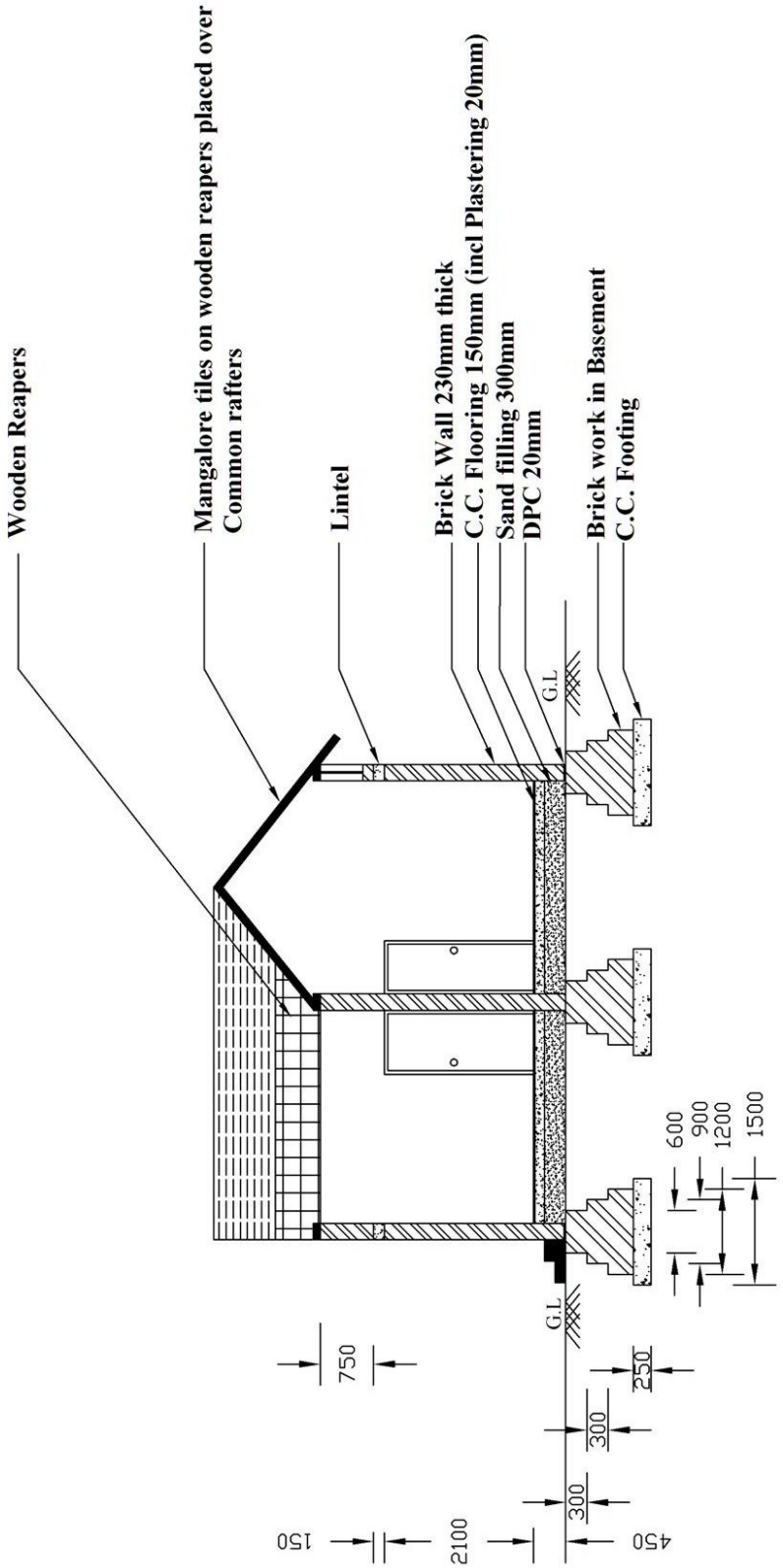
Plan:

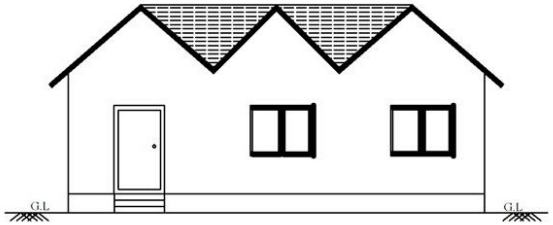


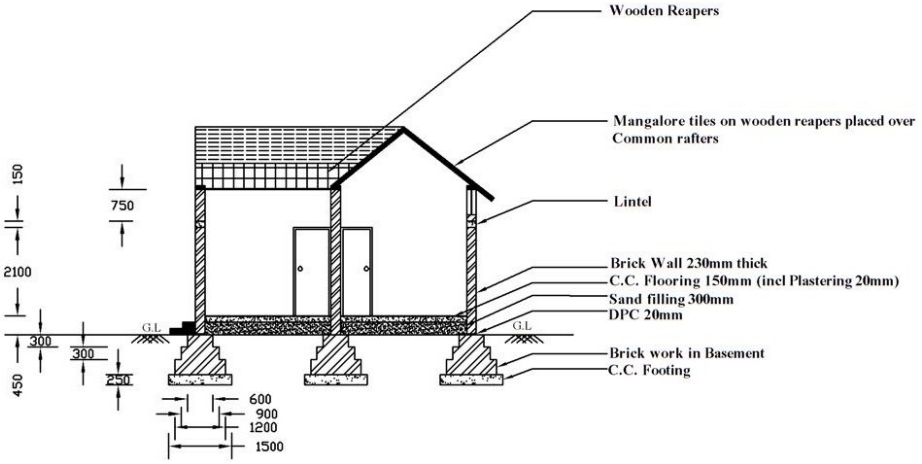
Elevation:

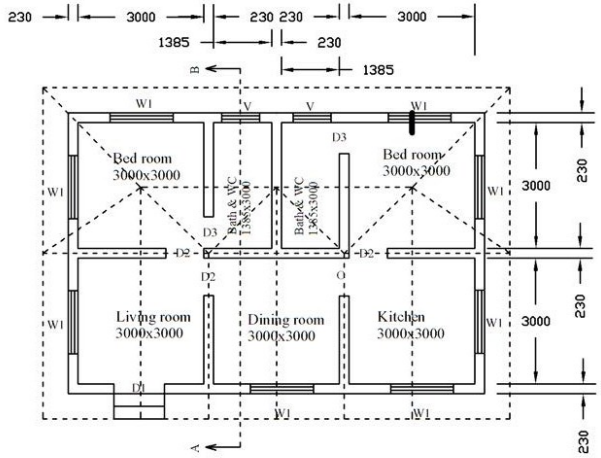


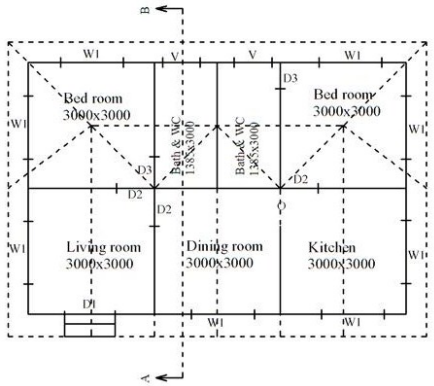
Section:


Wooden Reapers
Mangalore tiles on wooden reapers placed over Common rafters
Lintel
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
600
900
1200
1500
750
250
300
300
150
2100
450


G.L
G.L


Wooden Reapers
Mangalore tiles on wooden reapers placed over
Common rafters
Lintel
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
150
750
2100
300
300
250
450
600
900
1200
1500
G.L
G.L


230
3000
230
230
3000
1385
230
1385
B
W1
V
V
W1
D3
Bed room
3000x3000
Bath & WC
1385x3000
Bath& WC
1385x3000
Bed room
3000x3000
W1
D3
D2
D2
D2
O
3000
230
W1
Living room
3000x3000
Dining room
3000x3000
Kitchen
3000x3000
W1
3000
230
D1
W1
W1
230
A


B
W1
V
V
W1
D3
Bed room
3000x3000
Bath & WC
1385x3000
Bath& WC
1385x3000
Bed room
3000x3000
W1
D3
D2
D2
D2
O
W1
Living room
3000x3000
Dining room
3000x3000
Kitchen
3000x3000
W1
D1
W1
W1
A

Hints:

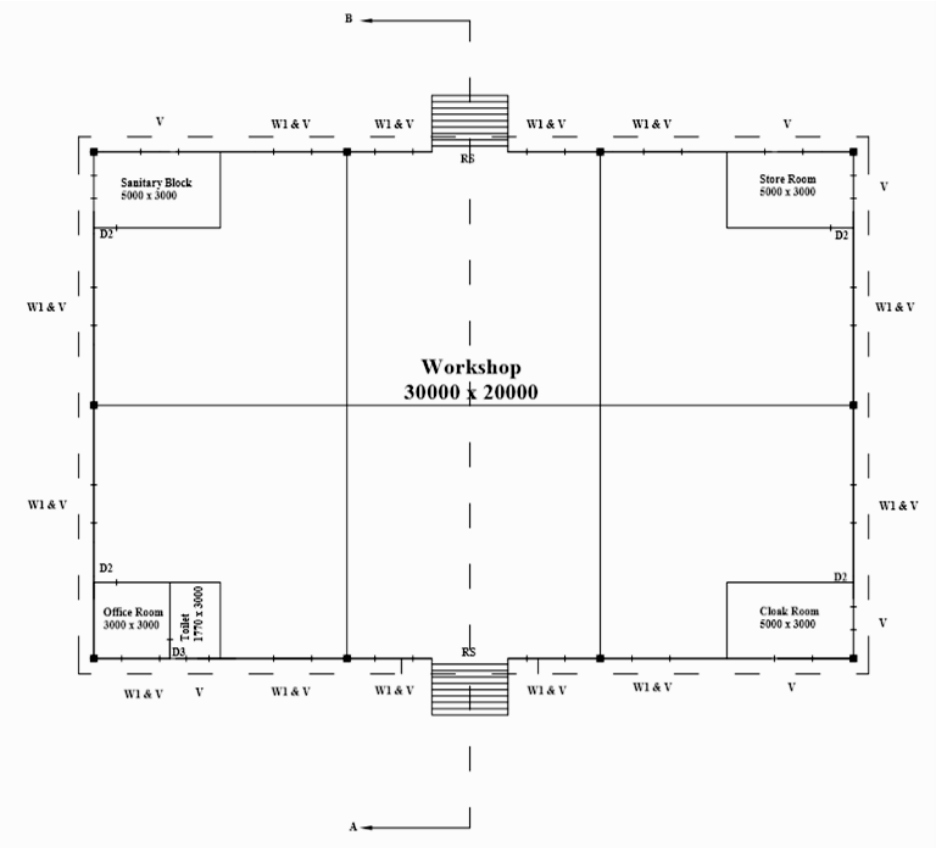
1. First draw the outer line of the wall of the rooms 9920x6690 mm (230+3000+230+1385+230+1385+230+3000+230)x(230+4000+230+2000+230)
2. Then draw the inner line of the wall of the room 9460x6230 mm.
3. Mark the partition walls
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4950 mm) (floor + room height + sloped roof = 450 + 3000 +1500)
8. Mark the doors and windows positions by extruding from the plan. (While viewing from front of the building one door, two windows, and sloped roof are visible)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a brick wall, lintel, then two doors on the back wall each on either side of a brick wall, then sloped roofing, then again a brick wall with ventilator, lintel. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.7 A SMALL WORKSHOP WITH NORTH LIGHT STEEL ROOF TRUSS (6 TO 10 M SPANS) OVER R.C.C. COLUMNS.

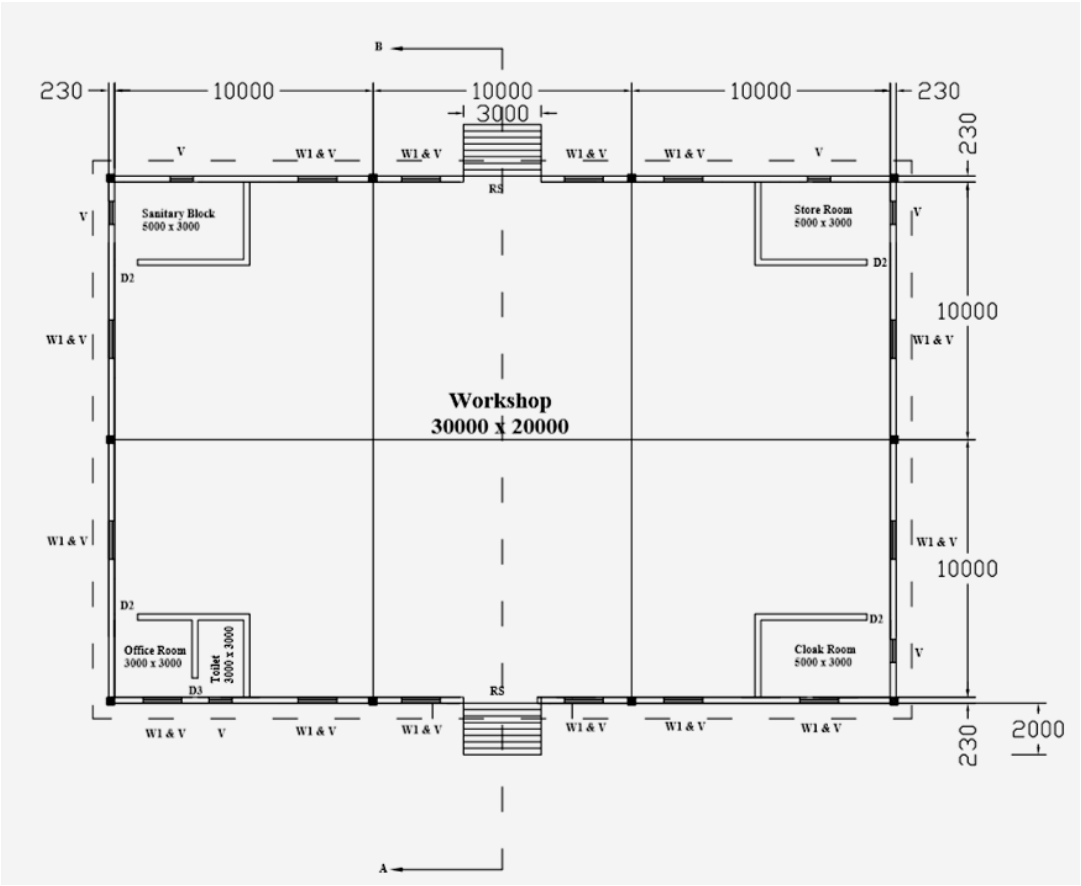
Specification:

- Roofing shall be made using 1.5 m high North light steel roof truss. The roof shall be covered with AC sheets. The truss height shall be 1500mm and span shall be 10m. The North Light Roof Truss shall be connected to 1.5m high Pratt truss spanning 30m.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls. Ramp is provided for the size 2000x500x3000 mm
- RCC column shall be provided with overall size 300x300mm.
- Footing shall be provided for 1500x1500mm size and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level.

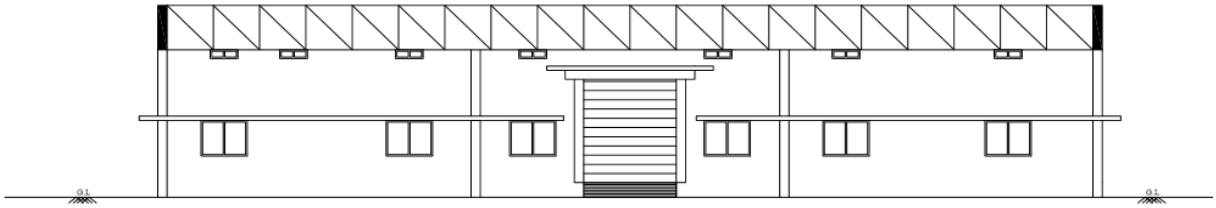
Line Plan:



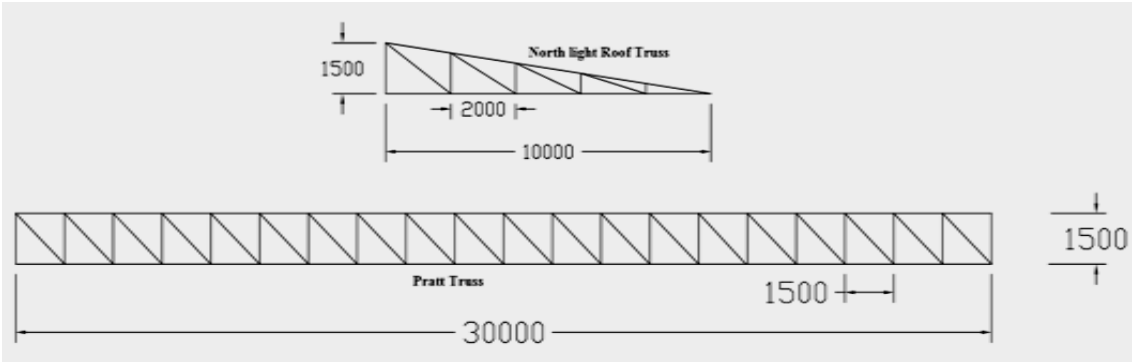
Plan:



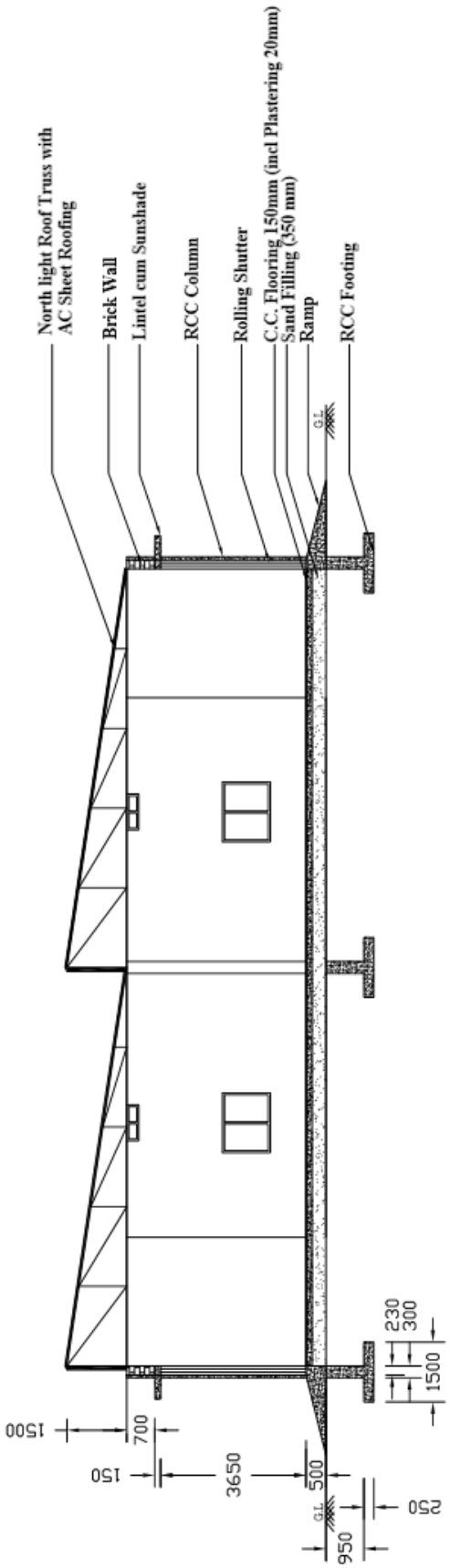
Elevation:

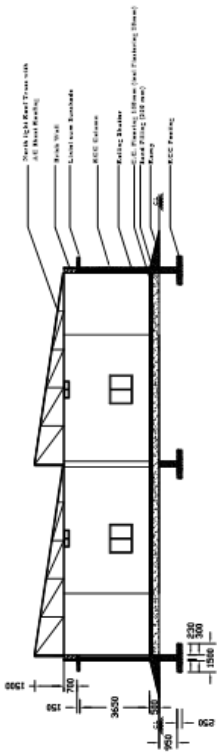


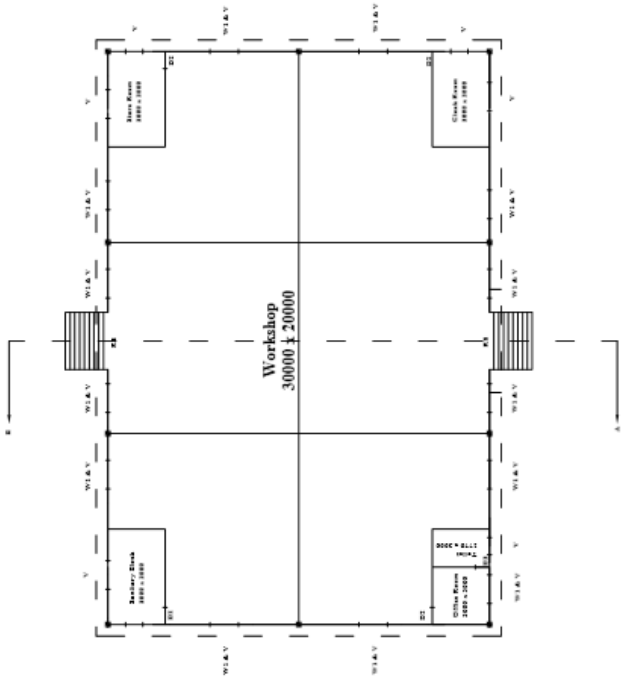
Details of truss:

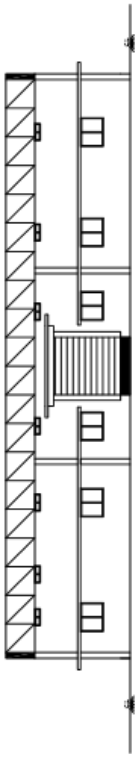


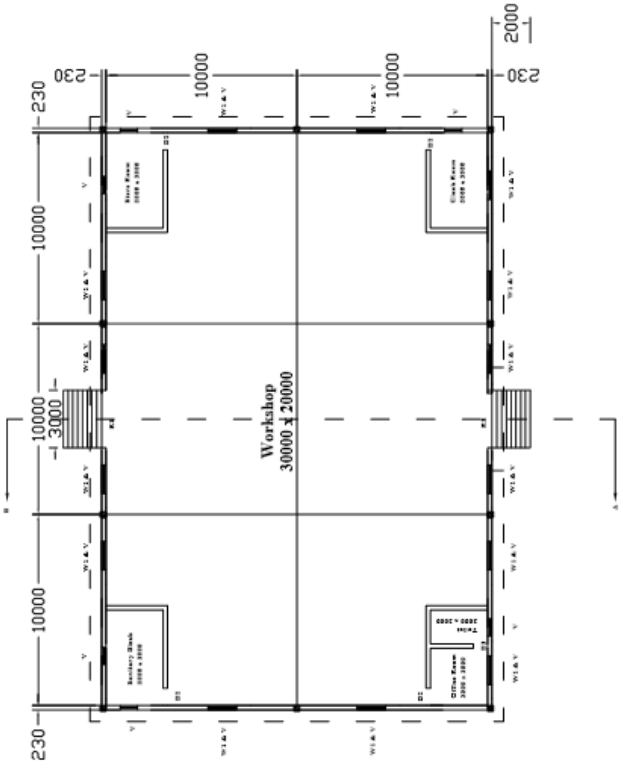
Section:


North light Roof Truss with AC Sheet Roofing
Brick Wall
Lintel cum Sunshade
RCC Column
Rolling Shutter
C.C. Flooring 150mm (incl Plastering 20mm)
Sand Filling (350 mm)
Ramp
RCC Footing
G.L
230
300
1500
1500
700
150
3650
500
250
950




Workshop
30000 x 20000




2000
230
10000
10000
230
10000
3000
10000
Workshop
30000 x 20000
10000
230

Hints:

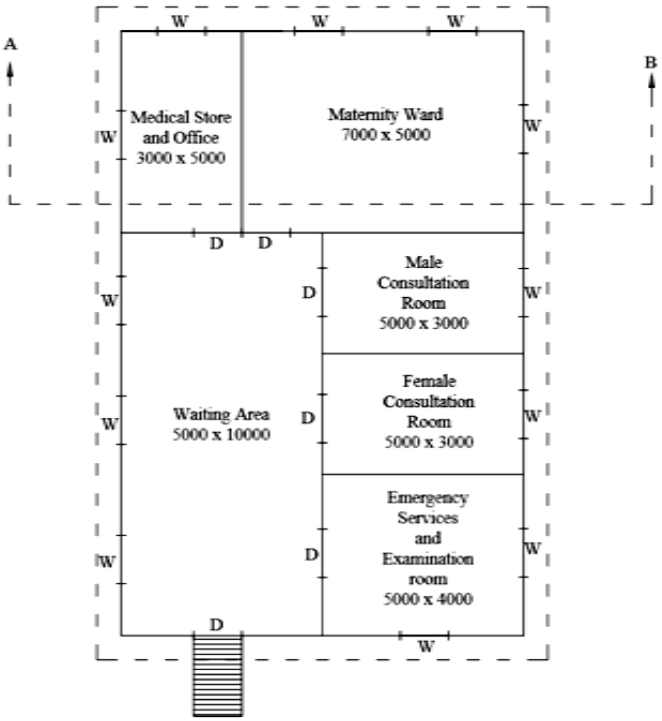
1. First draw the outer line of the wall of the rooms 30460x20460 mm (230+10000+10000+10000+230)x(230+10000+10000+230)
2. Then draw the inner line of the wall of the room 30000x20000 mm.
3. Mark the partition walls
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 6500 mm) (floor + room height + truss = 500 + 4500 +1500)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building 4 columns are visible. In-between first two columns (1, 2) two windows and three ventilators are visible. In-between second two columns (2, 3) two windows and two ventilators and a rolling shutter are visible. In-between third two columns (3, 4) two windows and two ventilators are visible. Then sunshade on either sides of rolling shutter and Pratt truss arrangement are visible)
9. Mark the parts below the floor level (Ramp)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a ramp and a brick wall with shutter, lintel cum sunshade, then a wall end line, then a window and a ventilator, then a column, again a window and a ventilator, again a wall end line, again a ramp and a brick wall with shutter, lintel cum sunshade, then two north light roof truss on the roof. Below the GL, the Flooring between the walls, then sand filling, then the footing below RCC Column.
13. Mark the parts of sectional view and the dimensions.

4.8 A PRIMARY HEALTH CENTER FOR RURAL AREA WITH R.C.C ROOF

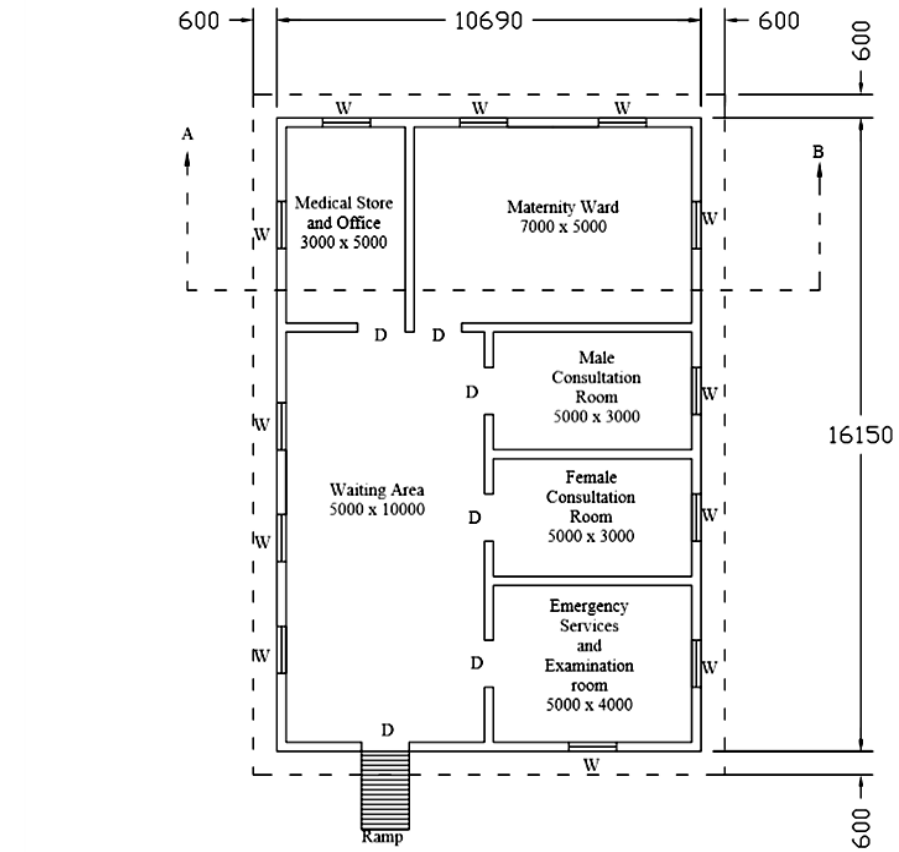
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls. Provide ramp for 2000x1200x450
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

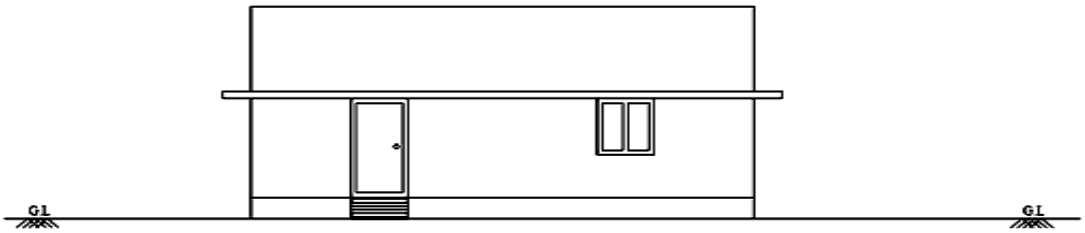
Line Plan:



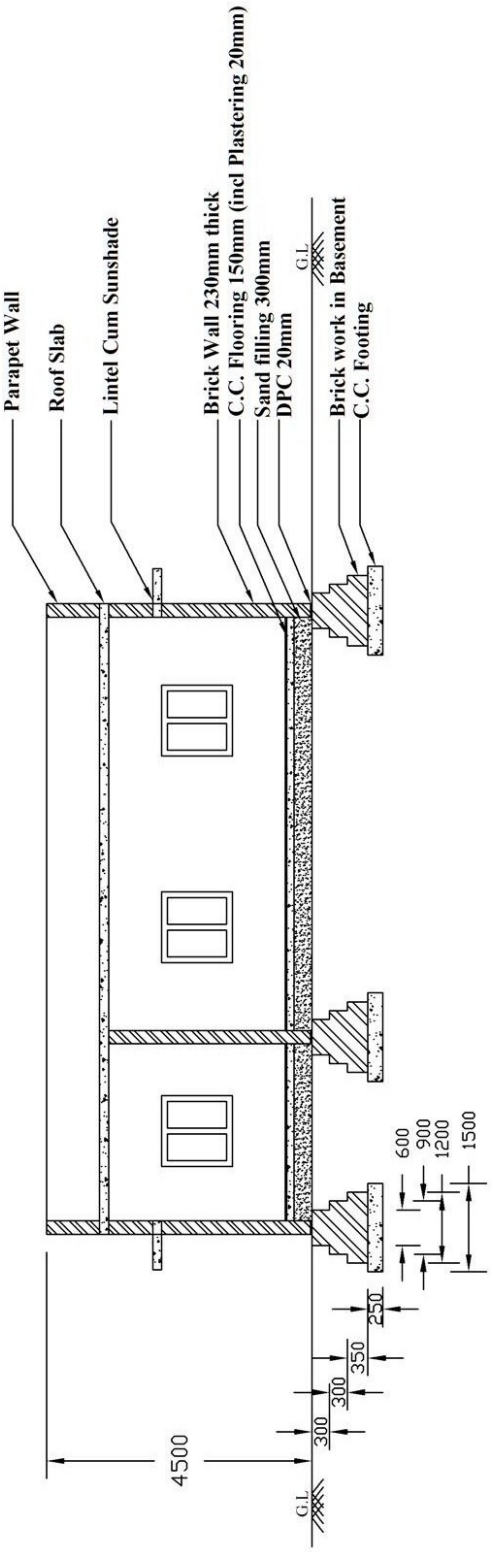
Plan:

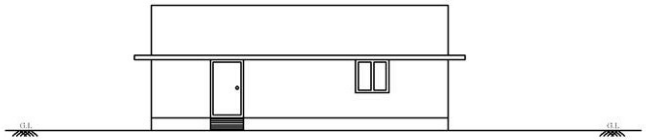


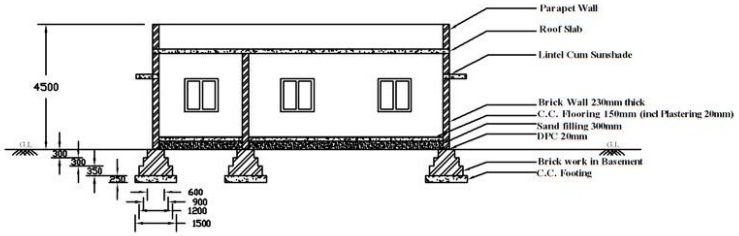
Elevation:

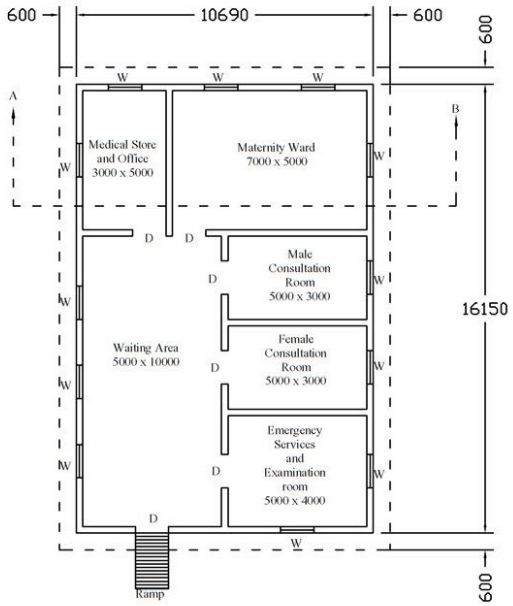


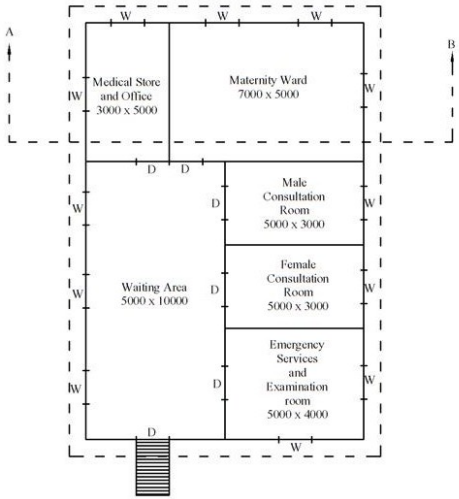
Section:


Parapet Wall
Roof Slab
Lintel Cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
4500
300
300
350
250
600
900
1200
1500


G.L
G.L


Parapet Wall
Roof Slab
Lintel Cum Sunshade
4500
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
300
200
350
600
900
1200
1500


600
10690
600
600
16150
600
A
B
W
D
Medical Store and Office 3000 x 5000
Maternity Ward 7000 x 5000
Male Consultation Room 5000 x 3000
Female Consultation Room 5000 x 3000
Emergency Services and Examination room 5000 x 4000
Waiting Area 5000 x 10000
Ramp


A
B
W
D
Medical Store and Office 3000 x 5000
Maternity Ward 7000 x 5000
Male Consultation Room 5000 x 3000
Female Consultation Room 5000 x 3000
Emergency Services and Examination room 5000 x 4000
Waiting Area 5000 x 10000

Hints:

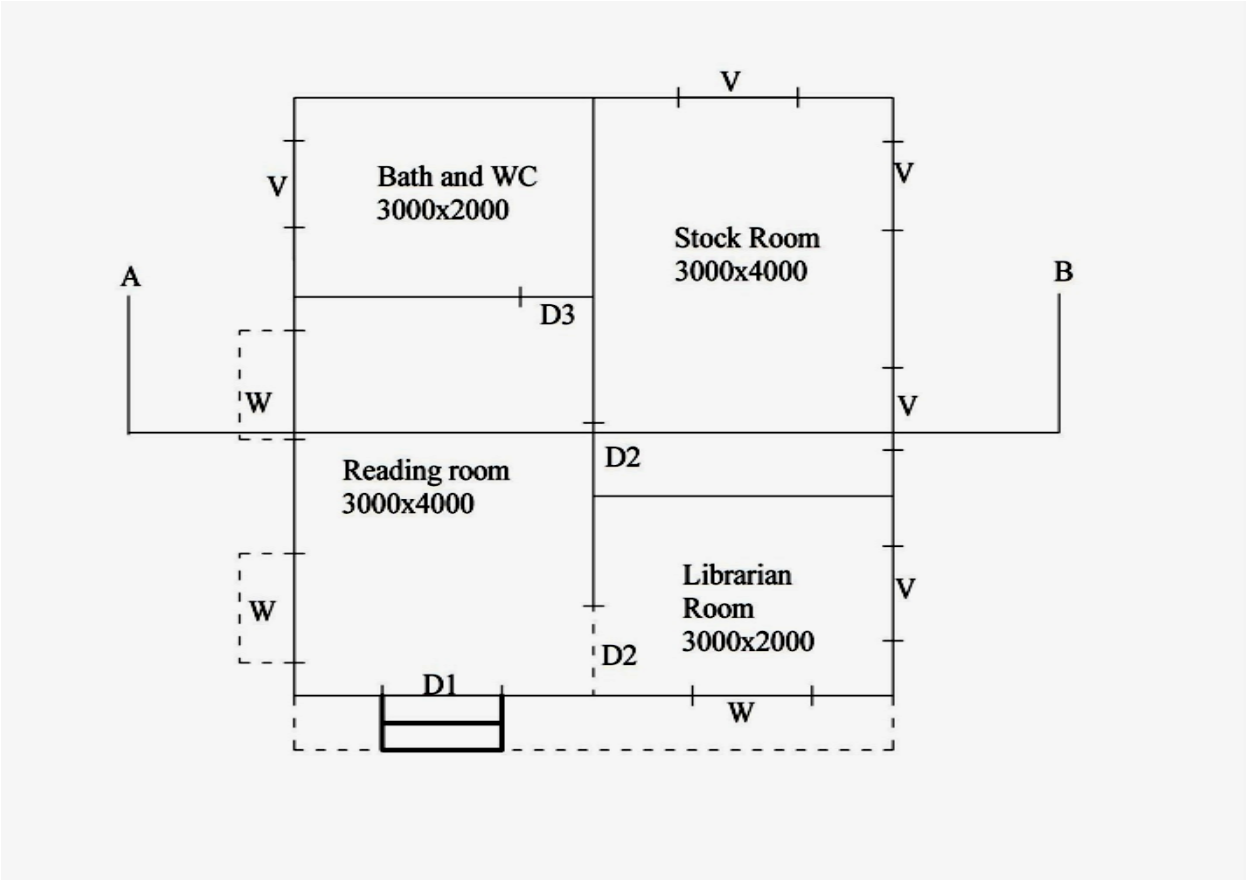
1. First draw the outer line of the wall of the room 10690x16150 mm (230+3000+230+7000+230)x(230+5000+230+3000+230+3000+230+4000+230)
2. Then draw the inner line of the wall of the room 10230x15690 mm.
3. Mark the partition walls.
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4500 mm) (floor + room height + roof + parapet = 450 + 3000 +150+900)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door, one window and outer sunshade are visible)
9. Mark the parts below the floor level (ramp)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a brick wall, lintel cum sunshade, a parapet wall, then a window on the back wall, then a brick wall, then two windows on the back wall, then RCC slab, then again a brick wall, lintel cum sunshade, a parapet wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.9 A VILLAGE LIBRARY BUILDING WITH R.C.C FLAT ROOF

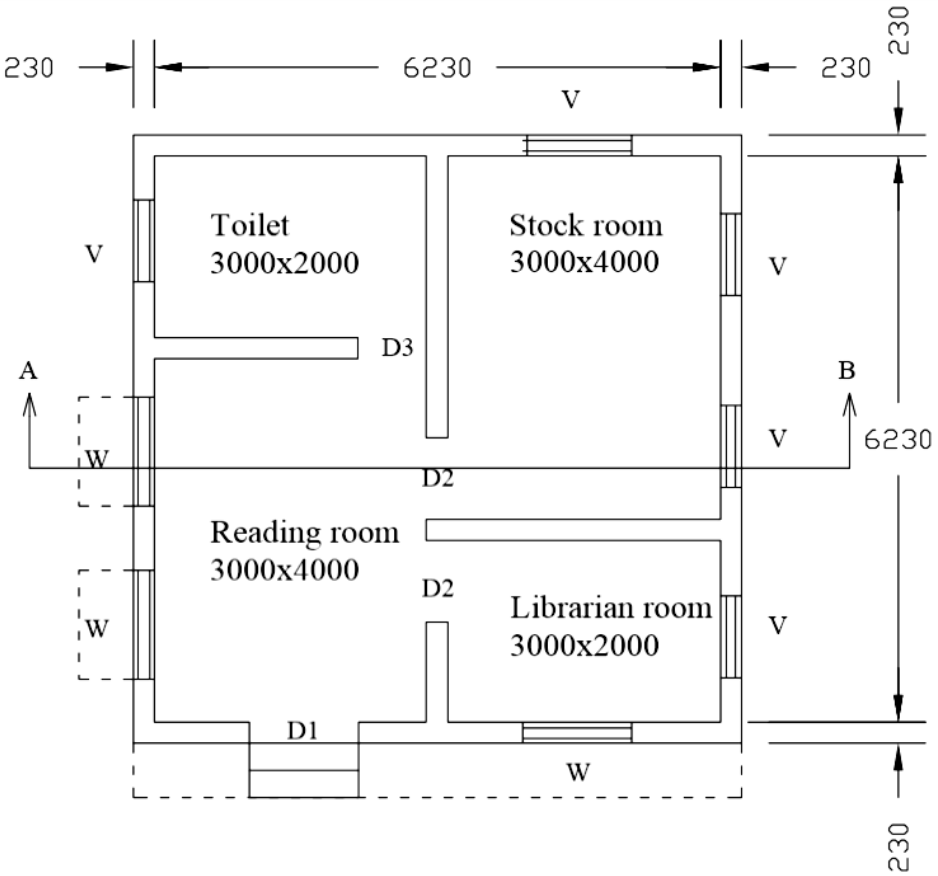
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

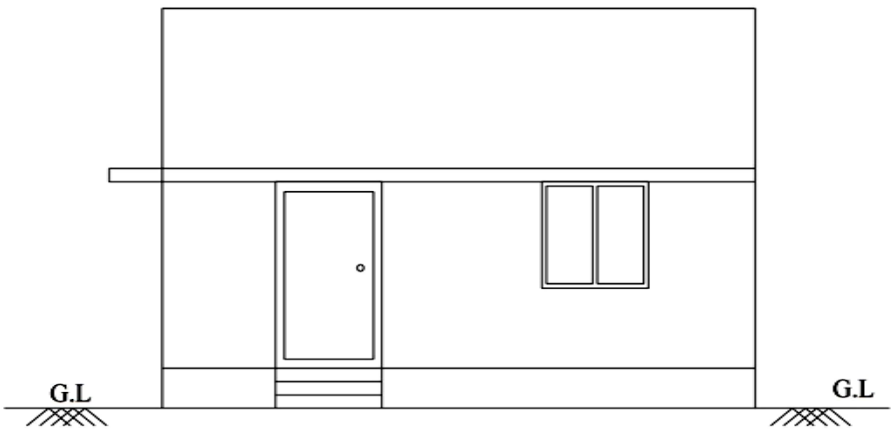
Line Plan:



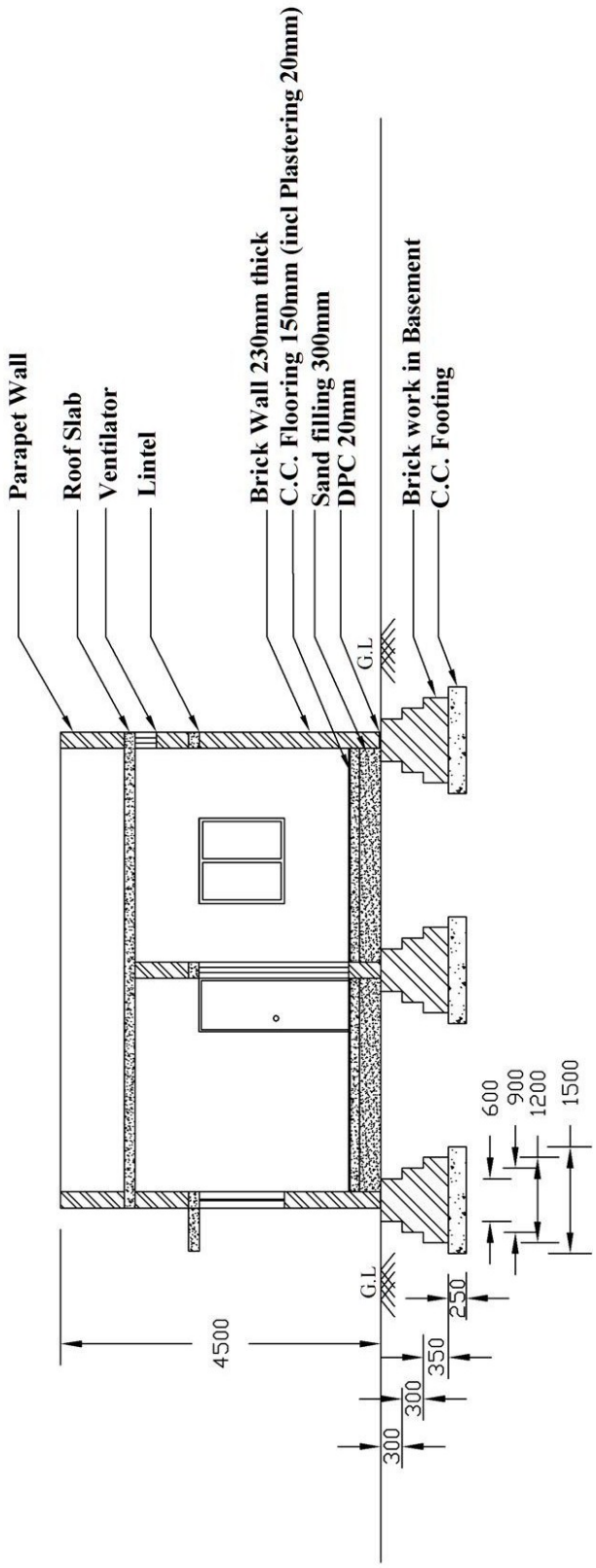
Plan:

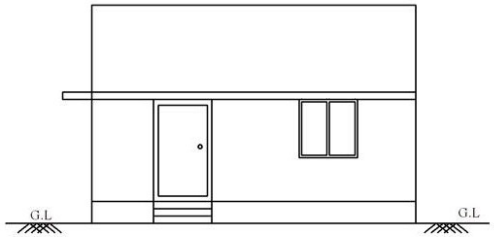


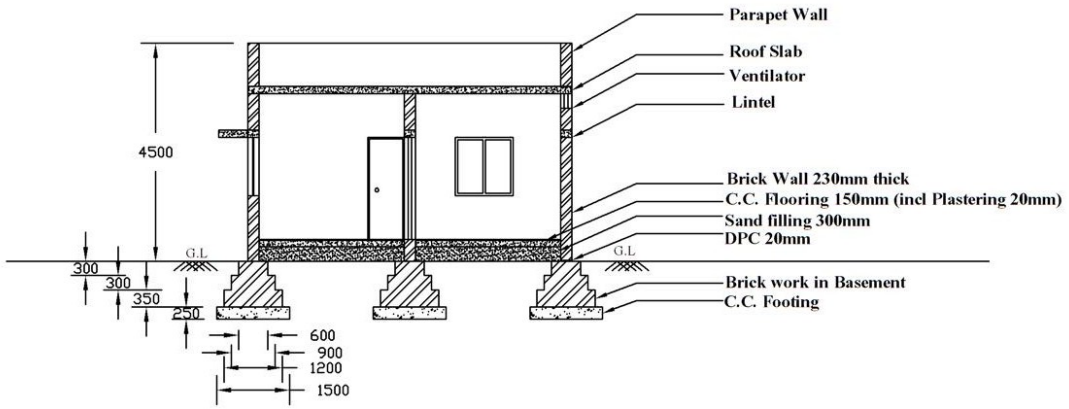
Elevation:

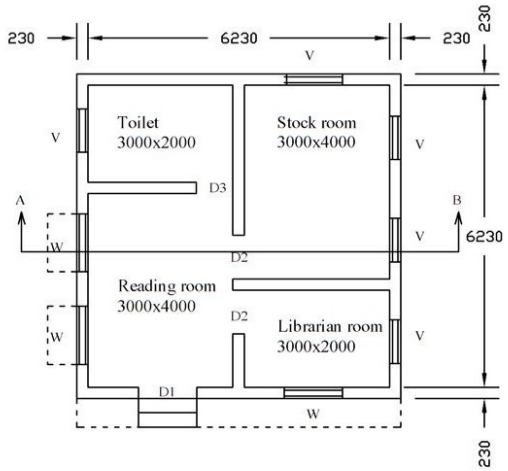


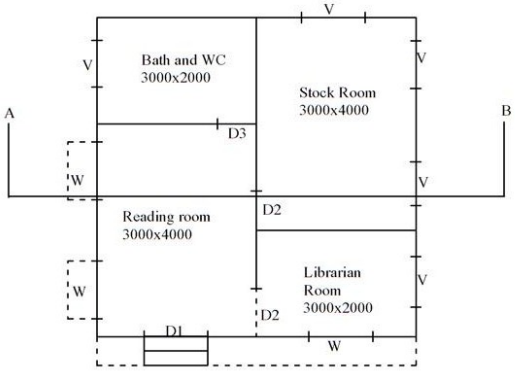
Section:


Parapet Wall
Roof Slab
Ventilator
Lintel
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
4500
600
900
1200
1500
250
350
300
300


G.L
G.L


Parapet Wall
Roof Slab
Ventilator
Lintel
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
4500
G.L
G.L
300
300
350
250
600
900
1200
1500


230
6230
230
230
6230
V
Toilet
3000x2000
Stock room
3000x4000
D3
A
B
W
D2
Reading room
3000x4000
Librarian room
3000x2000
D1
W


V
Bath and WC
3000x2000
Stock Room
3000x4000
A
B
D3
W
D2
Reading room
3000x4000
Librarian
Room
3000x2000
D1
W

Hints:

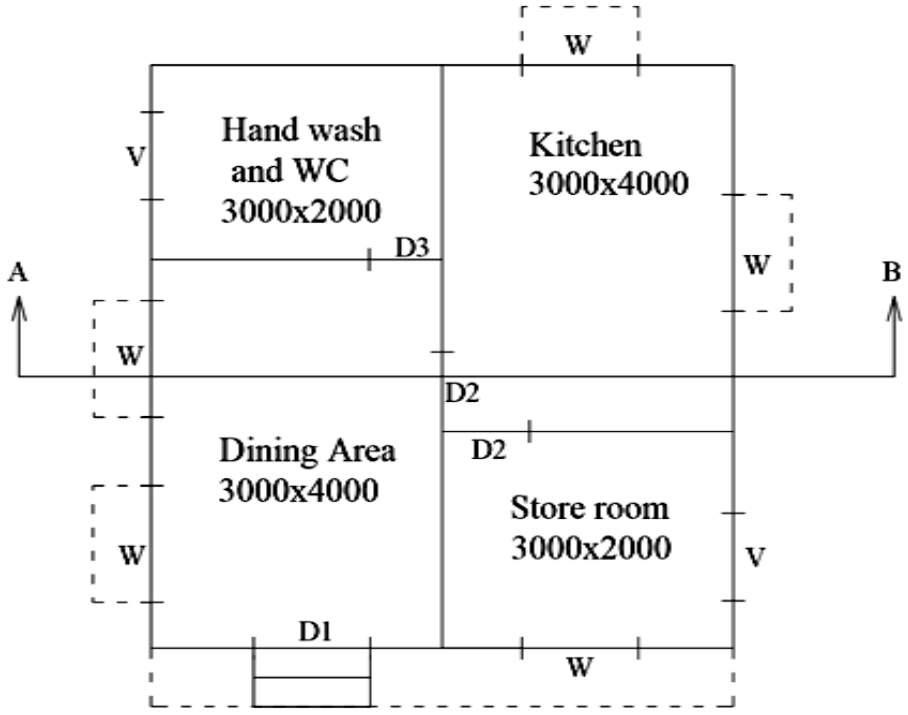
1. First draw the outer line of the wall of the room 6690x6690 mm (230+3000+230+3000+230)x(230+4000+230+2000+230)
2. Then draw the inner line of the wall of the room 6230x6230 mm.
3. Mark the partition walls.
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4500 mm) (floor + room height + roof + parapet = 450 + 3000 +150+900)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door, one window and outer sunshade are visible)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a brick wall with a window, lintel cum sunshade, a parapet wall, then a door on the back wall, then a brick wall with a door, then one window on the back wall, then RCC slab, then again a brick wall with a ventilator, a parapet wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.10 A SMALL RESTAURANT BUILDING WITH R.C.C FLAT ROOF

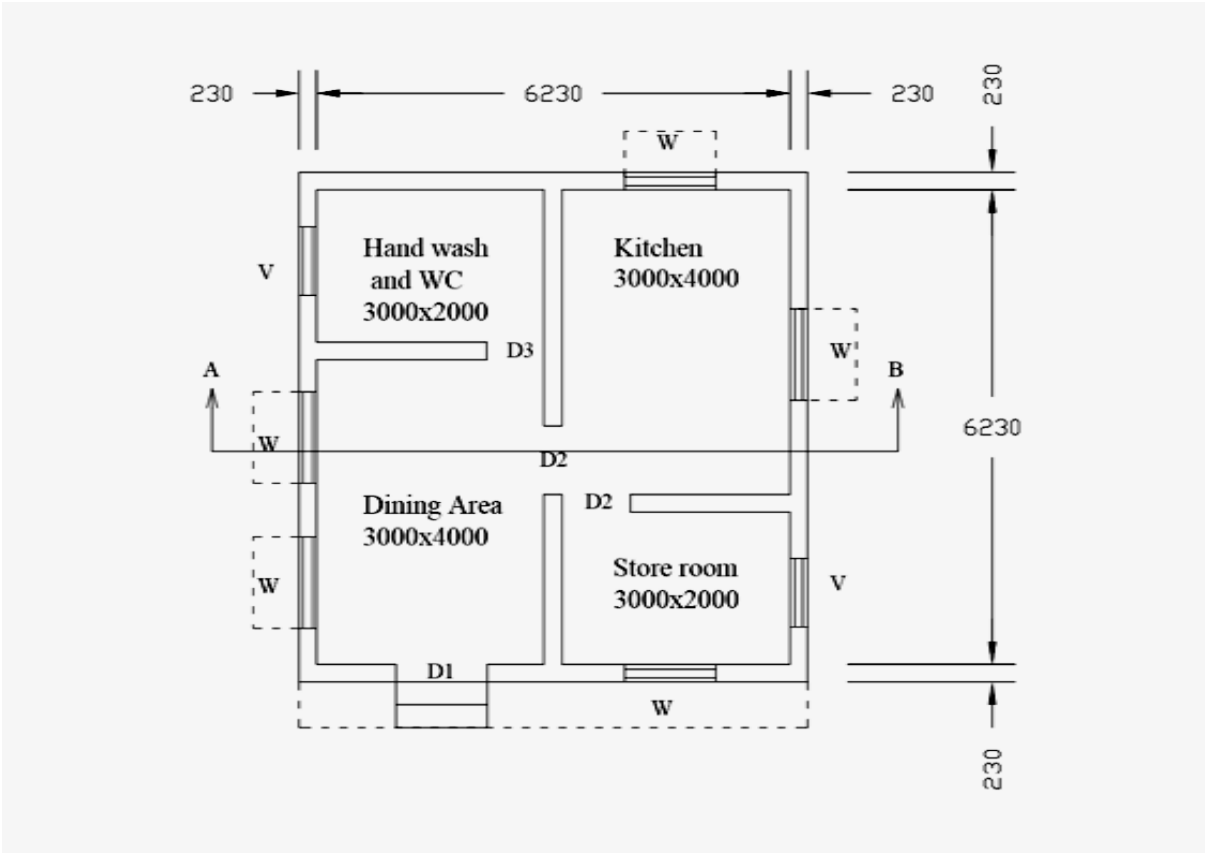
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

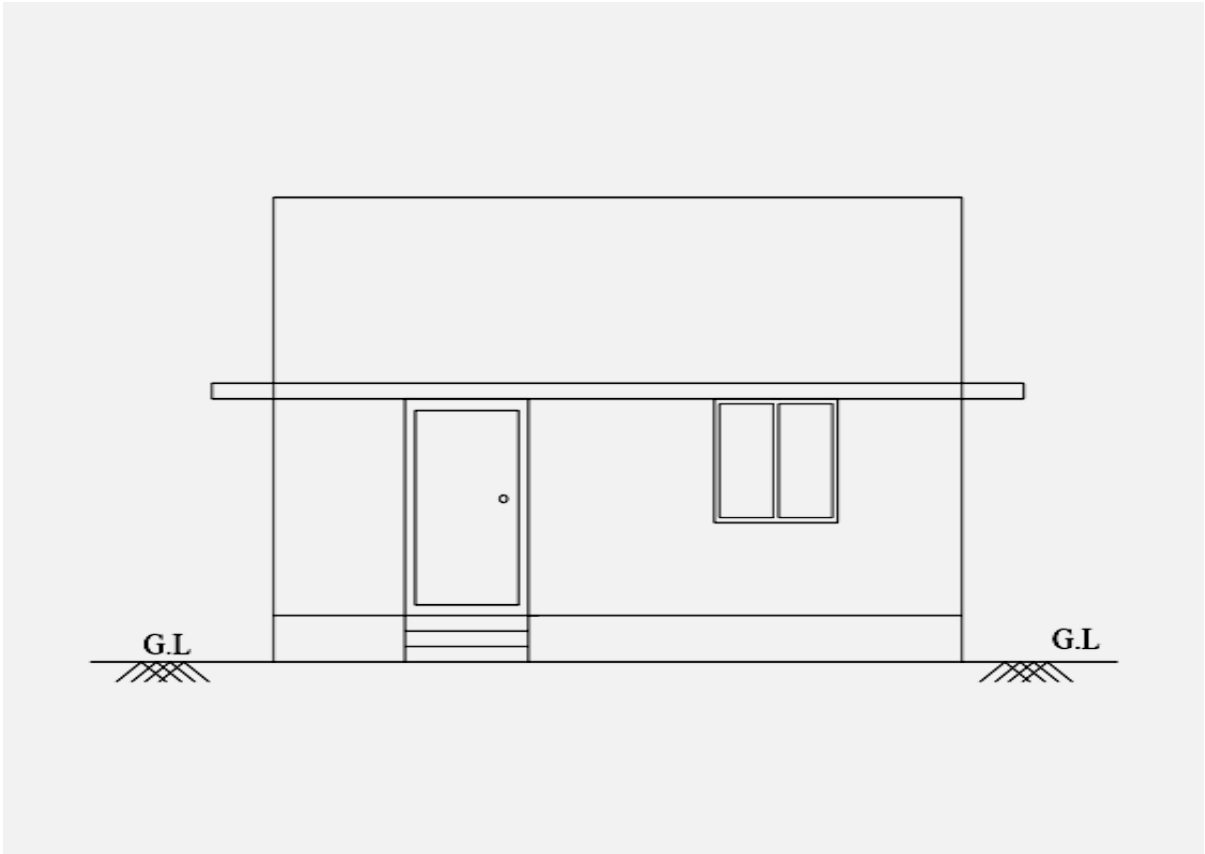
Line Plan:



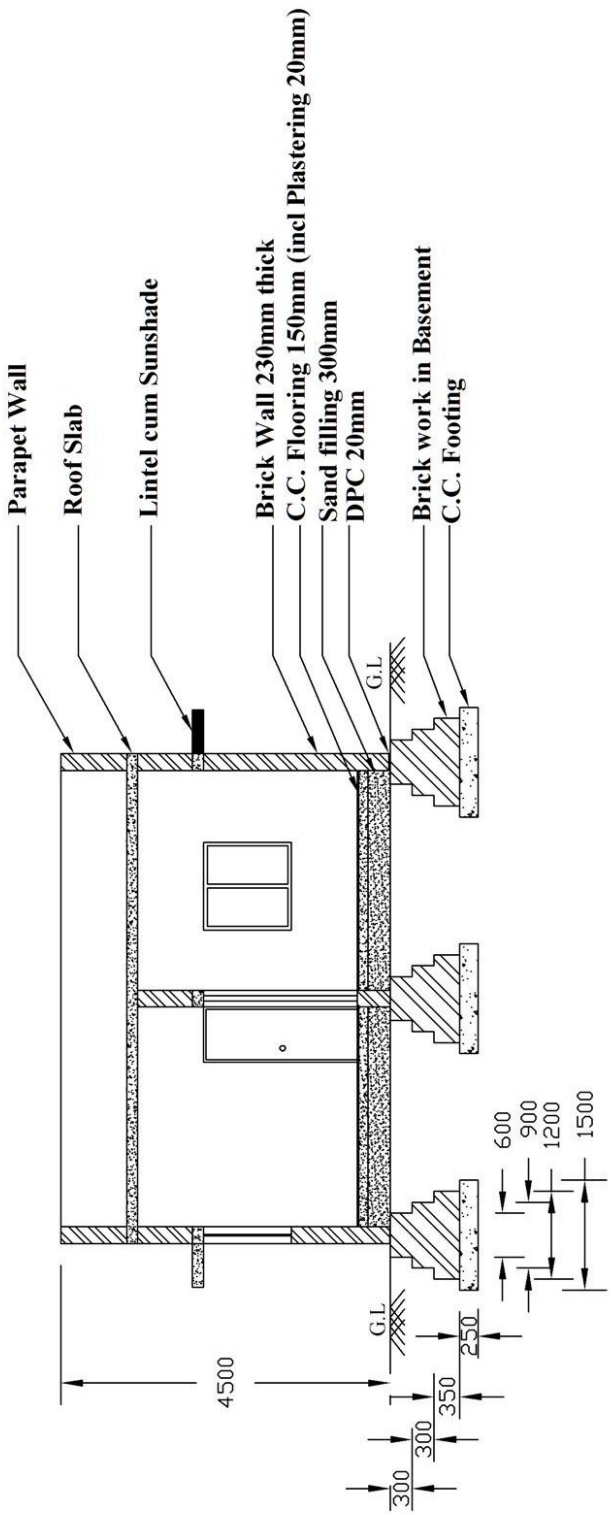
Plan:

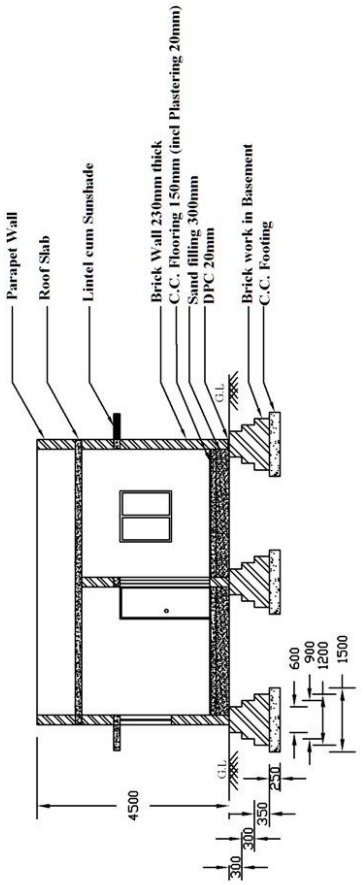


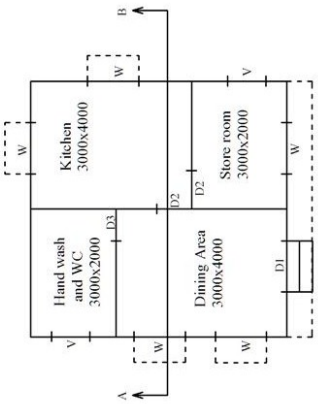
Elevation:

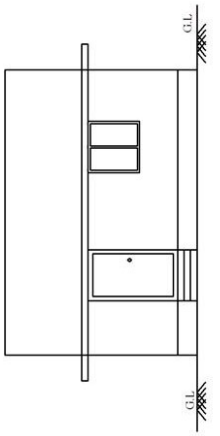


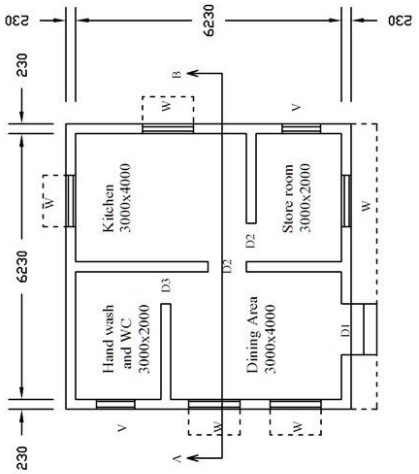
Section:


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
4500
600
900
1200
1500
250
350
300
300


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L.
4500
300
300
350
250
600
900
1200
1500


Kitchen
3000x4000
Store room
3000x2000
Hand wash
and WC
3000x2000
Dining Area
3000x4000
D1
D2
D3
W
V
A
B


G.L.
G.L.


230
6230
230
Kitchen
3000x4000
Store room
3000x2000
Hand wash
and WC
3000x2000
Dining Area
3000x4000
D1
D2
D3
W
V
A
B

Hints:

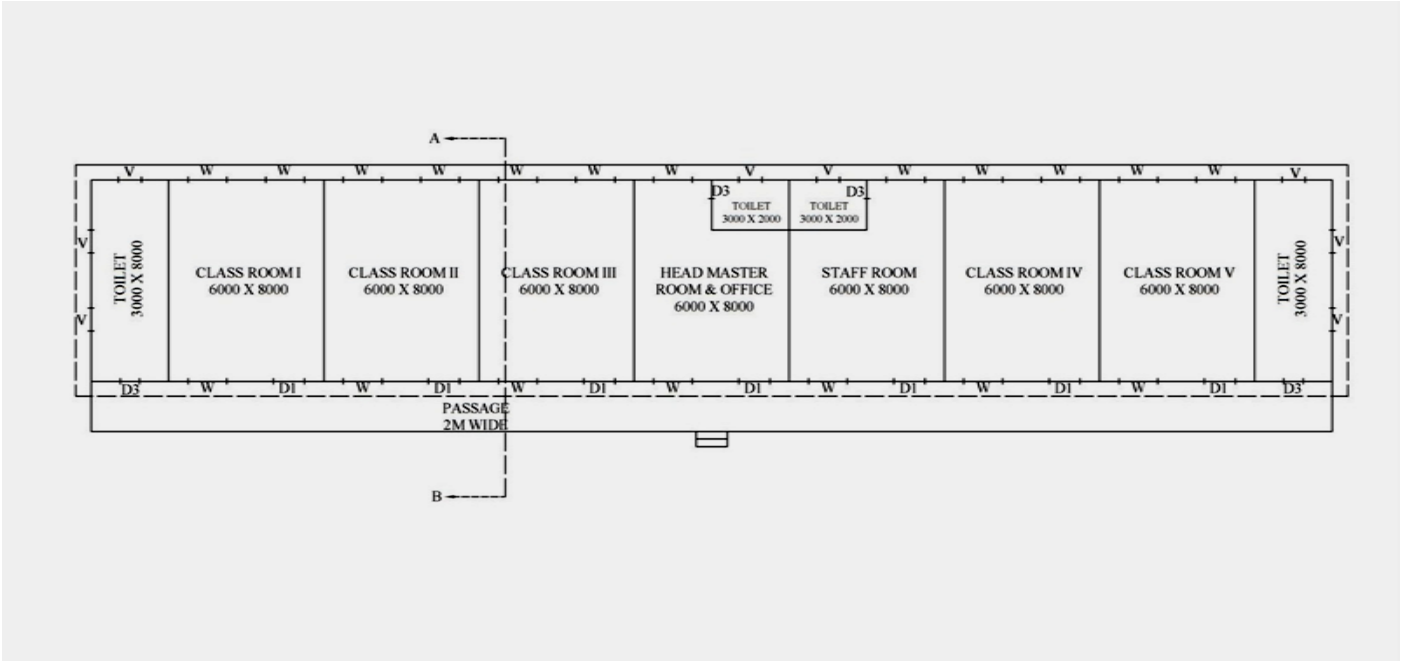
1. First draw the outer line of the wall of the room 6690x6690 mm (230+3000+230+3000+230)x(230+4000+230+2000+230)
2. Then draw the inner line of the wall of the room 6230x6230 mm.
3. Mark the partition walls.
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4500 mm) (floor + room height + roof + parapet = 450 + 3000 +150+900)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door, one window and outer sunshade are visible)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a brick wall with a window, lintel cum sunshade, a parapet wall, then a door on the back wall, then a brick wall with a door, then one window on the back wall, then RCC slab, then again a brick wall, lintel cum sunshade, a parapet wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.11 A SINGLE STOREYED SCHOOL BUILDING WITH R.C.C FLAT ROOF

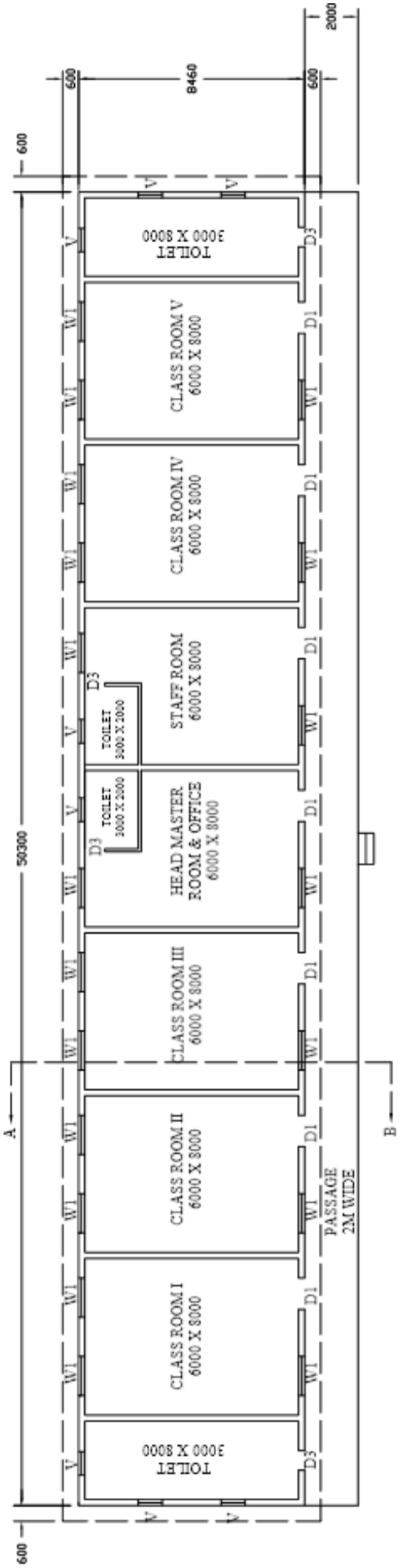
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

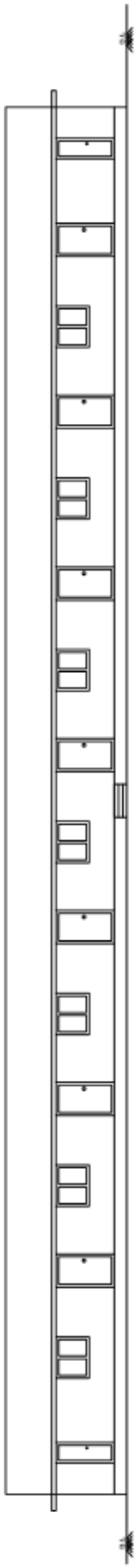
Line Plan:



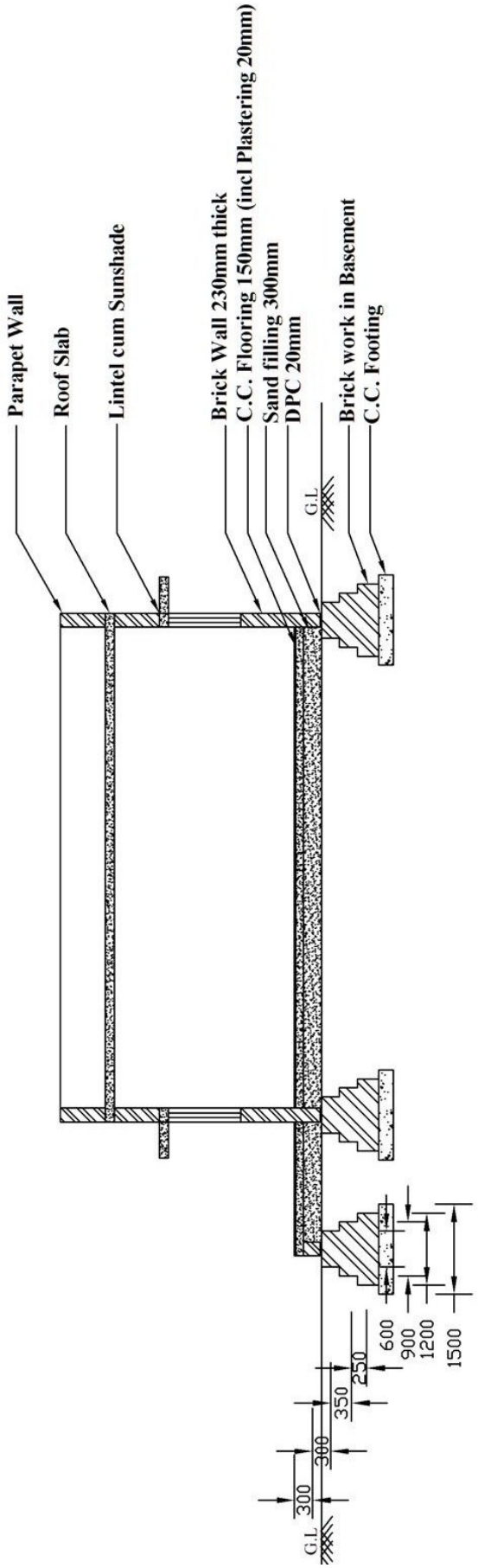
Plan:

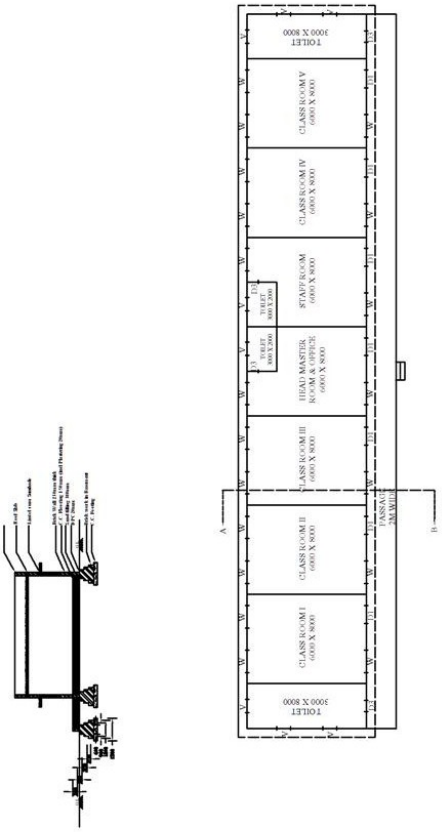

600
8460
600
2000
600
50300
TOILET
3000 X 8000
CLASS ROOM V
6000 X 8000
CLASS ROOM IV
6000 X 8000
STAFF ROOM
6000 X 8000
TOILET
3000 X 2000
HEAD MASTER
ROOM & OFFICE
6000 X 8000
TOILET
3000 X 2000
CLASS ROOM III
6000 X 8000
CLASS ROOM II
6000 X 8000
CLASS ROOM I
6000 X 8000
TOILET
3000 X 8000
PASSAGE
2M WIDE
A
B
V
W1
D1
D3

Elevation:



Section:


Parapet Wall
Roof Slab
Lintel cum Sunshade
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
300
300
350
250
600
900
1200
1500


TOILET
3000 X 8000
CLASS ROOM I
6000 X 8000
CLASS ROOM II
6000 X 8000
CLASS ROOM III
6000 X 8000
HEAD MASTER
ROOM & OFFICE
6000 X 8000
STAFF ROOM
6000 X 8000
CLASS ROOM IV
6000 X 8000
CLASS ROOM V
6000 X 8000
TOILET
3000 X 8000
TOILET
3000 X 8000
TOILET
3000 X 8000
TOILET
3000 X 8000
PASSAGE
2M WIDE
A
B

Hints:

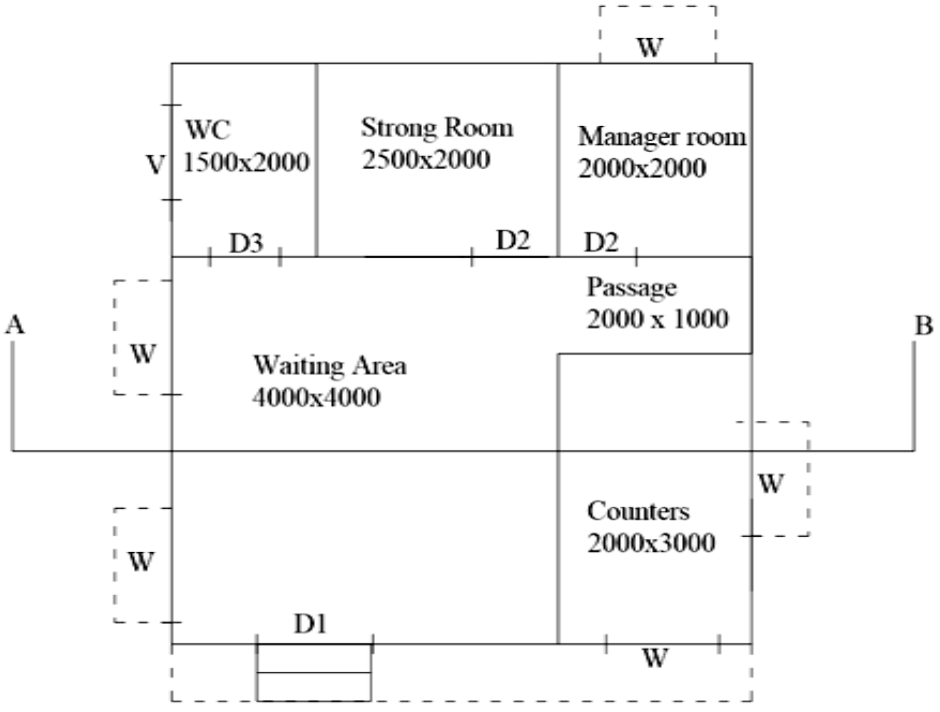
1. First draw the outer line of the wall of the room 6690x6690 mm (230+3000+230+6000+230+6000+230+6000+230+6000+230+6000+230 +6000+230+6000+230+3000+230)x(230+8000+230)
2. Then draw the inner line of the wall of the room 49840x8000 mm.
3. Mark the partition walls.
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4500 mm) (floor + room height + roof + parapet = 450 + 3000 +150+900)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building two small doors each on two ends of the building, seven windows and seven doors (one window and one door for each rooms) are visible)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a platform, then a brick wall with a window, lintel cum sunshade, a parapet wall, then again a brick wall with a window, lintel cum sunshade, a parapet wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

4.12 A BANK BUILDING WITH R.C.C FLAT ROOF

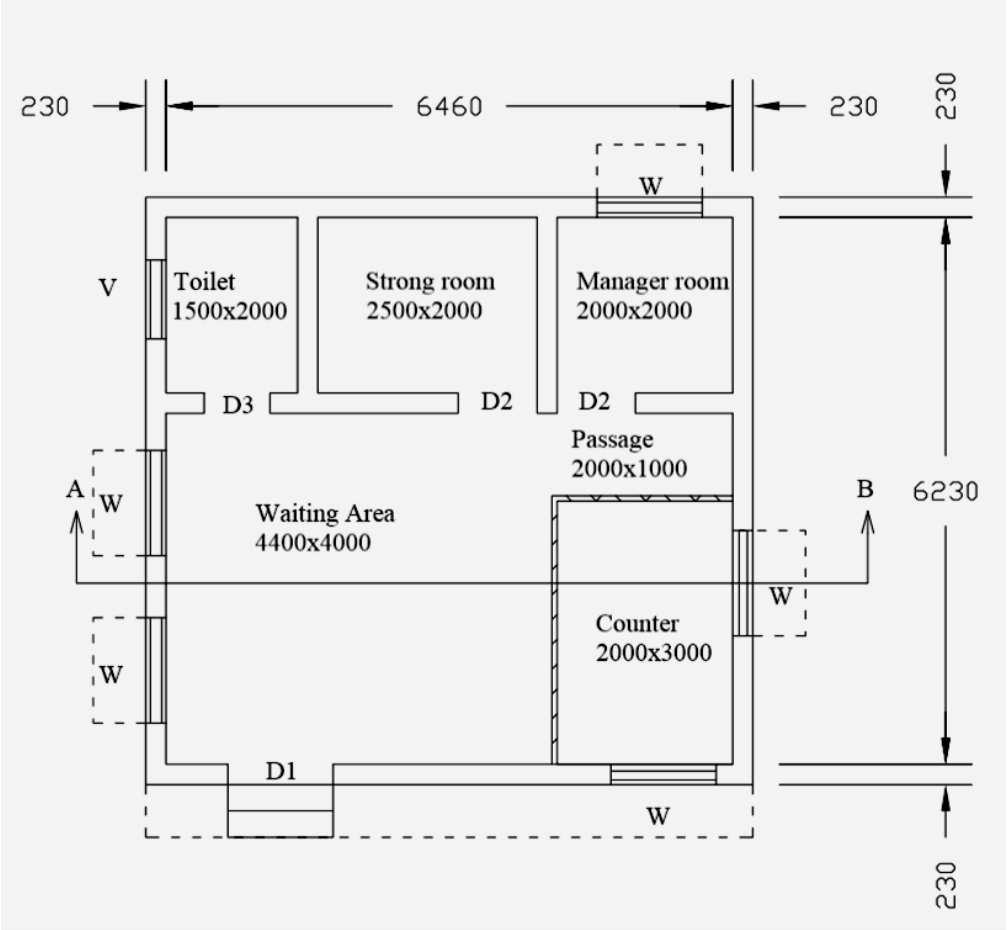
Specification:

- Roofing shall be RCC flat made up of 150mm thick concrete and reinforced with 12 mm dia Fe415 steel bars.
- Walls shall be constructed with first class bricks with CM 1:5 and 230mm thick. The height of the wall shall be 3000 mm above ground level. The parapet walls shall be constructed with 230 mm thick brick wall of height 900 mm.
- The flooring shall be made with 150mm thick Cement concrete (inclusive of 20mm thick plastering) over sand filling of 300mm depth. Damp proof course shall be provided for 20mm thick at the base of all the walls.
- Footing shall be provided with 1500mm wide and 250 mm thick cement concrete 1:1:2 at 1200mm below ground level. Over the CC footing, stepped masonry footings of sizes 1200x350mm, 900x300mm, 600x300mm shall be provided.

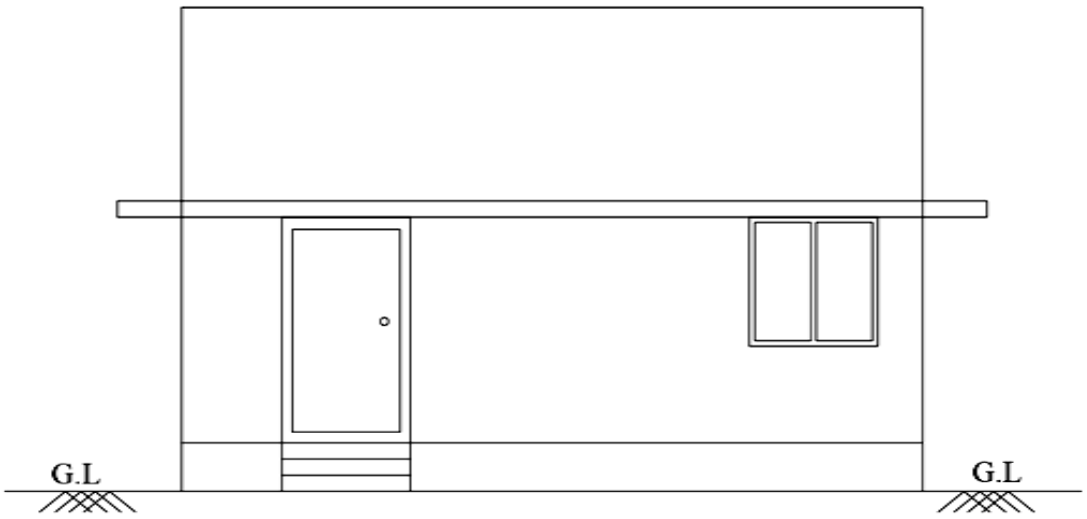
Line Plan:



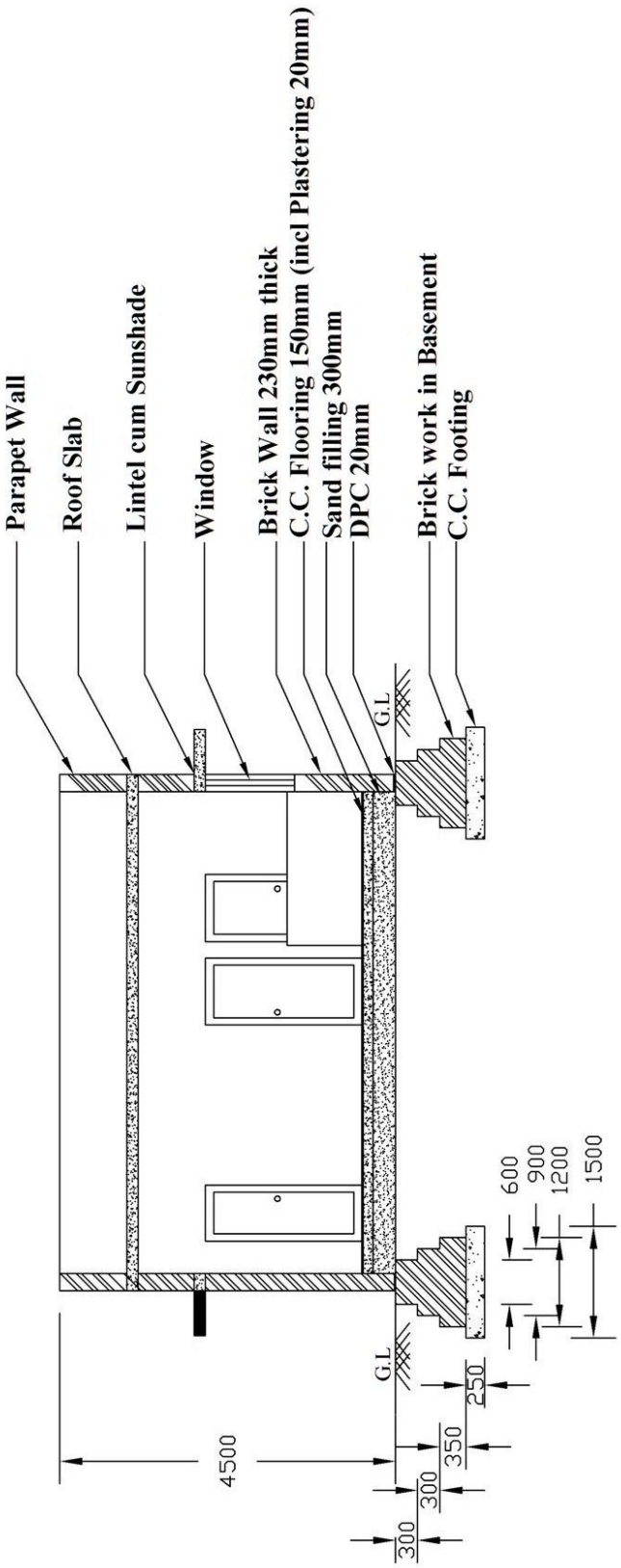
Plan:

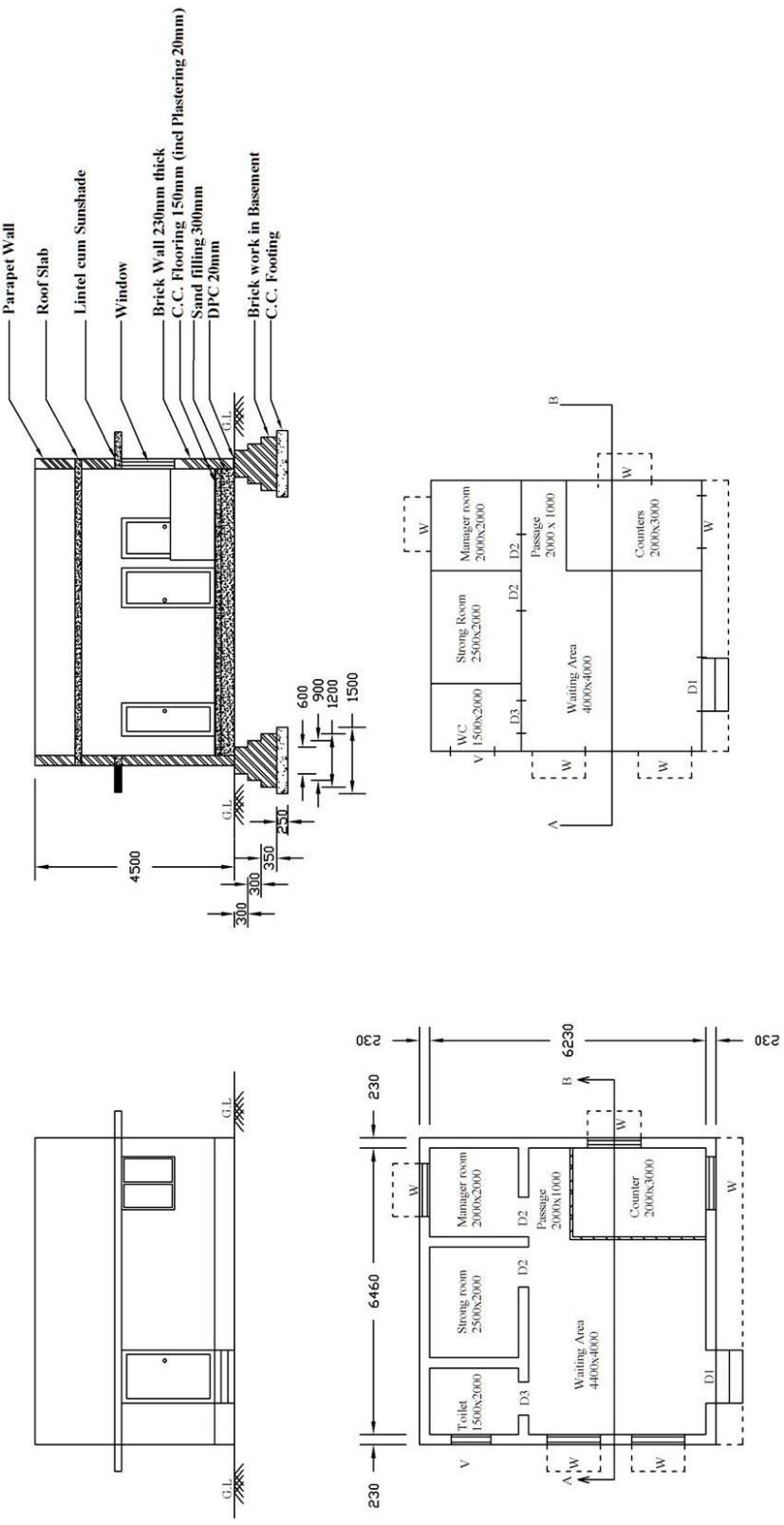


Elevation:



Section:


Parapet Wall
Roof Slab
Lintel cum Sunshade
Window
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
G.L
600
900
1200
1500
4500
250
350
300
300


Parapet Wall
Roof Slab
Lintel cum Sunshade
Window
Brick Wall 230mm thick
C.C. Flooring 150mm (incl Plastering 20mm)
Sand filling 300mm
DPC 20mm
Brick work in Basement
C.C. Footing
G.L
4500
300
300
350
250
600
900
1200
1500
Manager room 2000x2000
Passage 2000 x 1000
Counters 2000x3000
Strong Room 2500x2000
Waiting Area 4000x4000
WC 1500x2000
D1
D2
D3
W
V
A
B
6230
6460
230
Toilet 1500x2000
Strong room 2500x2000
Waiting Area 4400x4000
Passage 2000x1000
Counter 2000x3000

Hints:

1. First draw the outer line of the wall of the room 6690x6690 mm (230+1500+230+2500+230+2000+230)x(230+2000+230+1000+3000+230)
2. Then draw the inner line of the wall of the room 6460x6230 mm.
3. Mark the partition walls.
4. Now do the window and door markings in the drawing.
5. Then mark the dimensions in both vertical and horizontal directions.
6. Extrude the plan upward to plot outer dimension of the elevation view.
7. Mark the top and bottom line of elevation above GL (0 to 4500 mm) (floor + room height + roof + parapet = 450 + 3000 +150+900)
8. Mark the doors, windows and sunshade positions by extruding from the plan. (While viewing from front of the building one door, one window and outer sunshade are visible)
9. Mark the parts below the floor level (steps)
10. Extrude the elevation to its right side.
11. Mark the views available at the cutting section.
12. At the Cutting Section, from the left we can see a brick wall, lintel cum sunshade, a parapet wall, then a small door and a large door on the back wall, then a large door on the back wall partly hidden by counter cabin, then RCC slab, then again a brick wall with a window, lintel cum sunshade, a parapet wall. Below the GL, the Flooring between the walls, then sand filling, then the basement masonry below the walls, then the footing below basement masonry.
13. Mark the parts of sectional view and the dimensions.

REFERENCE

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