GOVERNMENT POLYTECHNIC FOR GIRLS , AHMEDABAD

Civil Engineering Department

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L.C.E.

Subject:- Estimating, Costing and Valuation
Subject Code:- 3350604
Semester:- 5th
Year:2020

- **Unit– I** **Th and Lab**

- **Estimation and Modes of Measurement**

- **PRACTICE -5 TERM WORK**
- **METHODS OF ESTIMATION:**
- **QUANTITY CALCULATION**
- **USE OF METHOD -** Center Line method
  - Long wall and Short wall method
    - Examples of One and Two Room Building Plan

1. DEFINITIONS:(overview)

- **ESTIMATE:**

An estimate is a calculation of the quantities of various items of work, and the expenses likely to be incurred thereon.

- It is defined as the process of determining the amount required for proposed work. And,
- It is prepared by calculating the quantities of different items of work with the help of measurements or dimensions from working drawing i.e. Plan, Elevation and Section of the work and by multiplying the unit rate of the items concerned.

ESTIMATION OR ESTIMATING:

- The process calculating the quantities of items of works and materials involved in the project is called as or estimating
- The documents prepared for the this details is called an ‘ Estimate’.
- **QUANTITY SURVEYOR or ENGINEER….. Able to do**

- Taking out Quantities
- Finding of missing Dimension And Calculating the Quantity
- Data (Calculation of Rate Per Unit) and use of SOR
- Measurement Sheet and Abstract Sheet (Estimate)
- Billing of work

COSTING

- It is the total cost of proposed work obtained by multiplying the quantity of item with prevailing rate of construction of that item and sum of cost of all such item including the various charges .
- Costing = Qty. of item x Rate of construction

DATA REQUIRE FOR ESTIMATION

- The following requirement are necessary for preparing an estimate.

1. Detailed Drawings-Working drawing like plan, elevation and sections of important points.

2. Detailed specifications about workmanship& properties of materials

   etc.

3. Standard schedule of rates of the current year. (S.O.R.)

- **DETAILED PLAN**

This plan indicates a plan of a construction drawn to a definite scale, showing all detailed information required for its execution. Various sections and elevations are clearly drawn on this plan.

- **CENTRE LINE PLAN**

This is actually a layout plan drawn to facilitate the laying out of foundation lines and other features. It is generally fixed on the entrance or at exit in the central place of the colony for the guidance of the inhabitants and outsiders.

PROCEDURE OF ESTIMATING:

Estimating involves the following operations

- 1. Preparing detailed Estimate.
- 2. Calculating the rate of each unit of work
- 3. Preparing abstract of estimate

- Steps of details Estimate:

1. Taking out quantities of items of works
2. Costing of each items and calculating total cost
3. Adding other charges @ % of total cost

METHODS OF TAKING OUT QUANTITIES

- The quantities like earth work, foundation concrete, brickwork in plinth and super structure etc., can be workout by any of following two methods:

I) Centre line method.

(with wall junction consideration)

II) Long wall - short wall method

OR

Out to Out and In to In method

I. CENTRE LINE METHOD

- This method is suitable only if the offsets are symmetrical and the building is more or less rectangular in shape. The center line of the building is determined carefully after doing deductions for repeated measurements. This center line acts as length for the complete calculations of the estimate. If the deduction is not cared for the results of estimates may be wrong. All the walls should have the same section.

- This method is suitable for walls of similar cross sections. Here the total center line length is multiplied by breadth and depth of respective item to get the total quantity at a time. When cross walls or partitions or verandah walls join with main all, the center line Length gets reduced by half of breadth for each junction. Such junction or joints are studied carefully while calculating total center line length. The estimates prepared by this method are most accurate and quick.
- **For one room, L =Total center length C/L**
- For more than two type of wall of different thickness, the junction of wall are considered and net center length is calculated by
- **L= Total C/L – ½ x Width x (No. of junction)**
- **L= Total C/L- ½ x W x Nj**

II. LONG WALL-SHORT WALL METHOD

OR Out to out & in to in Method

- In this method, the wall along the length of room is considered to be longwall while the wall perpendicular to long wall is said to be short wall.
- L/W-To get the length of long wall, calculate first the center line lengths of individual walls. Then the length of long wall, (out to out) may be calculated after **adding** half breadth at each end to its center line length.

L= center length +1/2 width at each end (for each coarse of item of works)

= C.L. + one full width (if same width on both side or at end) on both side or at each end)

- S/ The length of short wall is measured in to in and may be found by **deducting** half breadth from its center line length at each end. The length of long wall usually decreases from earth work to brick work in super structure while the short wall increases. These lengths are multiplied by breadth and depth to get quantities.
- L= center length -1/2 width /breadth at each end(for each coarse of item of works)

  = C.L. - one full width/breadth (if width is same)

REMEMBER:

- L/W- Long wall (out-to-out) = c/c length + 1/2 breadth on one side + 1/2 breadth on the other side OR

  L = c/c length + one breadth.(if width is same)
- S/W- Short wall length in-to-in = c/c length – 1/2 breadth on one side – 1/2 breadth on the other side OR

  L = c/c length – one breadth. (if width is same)

Details of measurements Sheet:

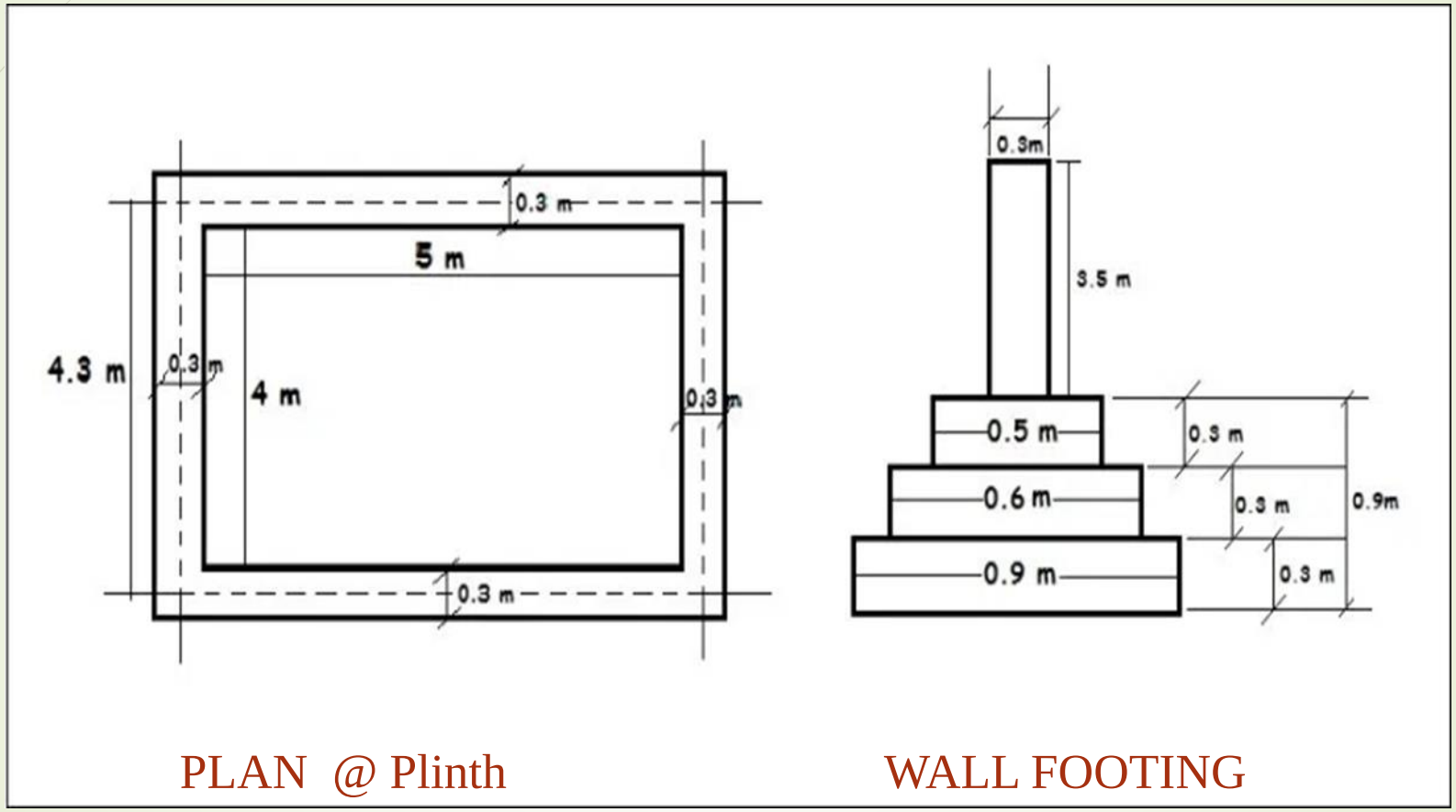
Sr. No.	Description	No.	Length L (m)	Breadth B (m)	Depth/ Th. (m)	Qty.	Total Qty.
1	Excavation in foundation						
2	BBCC or PCC in foundation for footing						
3	1st class brick masonry in foundation (a) Up to G.L. (b) Above G.L.to P.L.						
4							

ABSTARCT SHEET:

The cost of each item of work is worked out from the quantities that already computed in the details measurement form at workable rate. But the total cost is worked out in the prescribed form is known as abstract of estimated form.

Sr. No.	Description	QTY.	Rate Rs. Ps.	Unit	Amount Rs. Ps.
1	Excavation for foundation				
2	BBCC or PCC in foundation for footing				
3	1st class brick masonry in foundation (a) Up to G.L. (b) Above G.L.to P.L.				

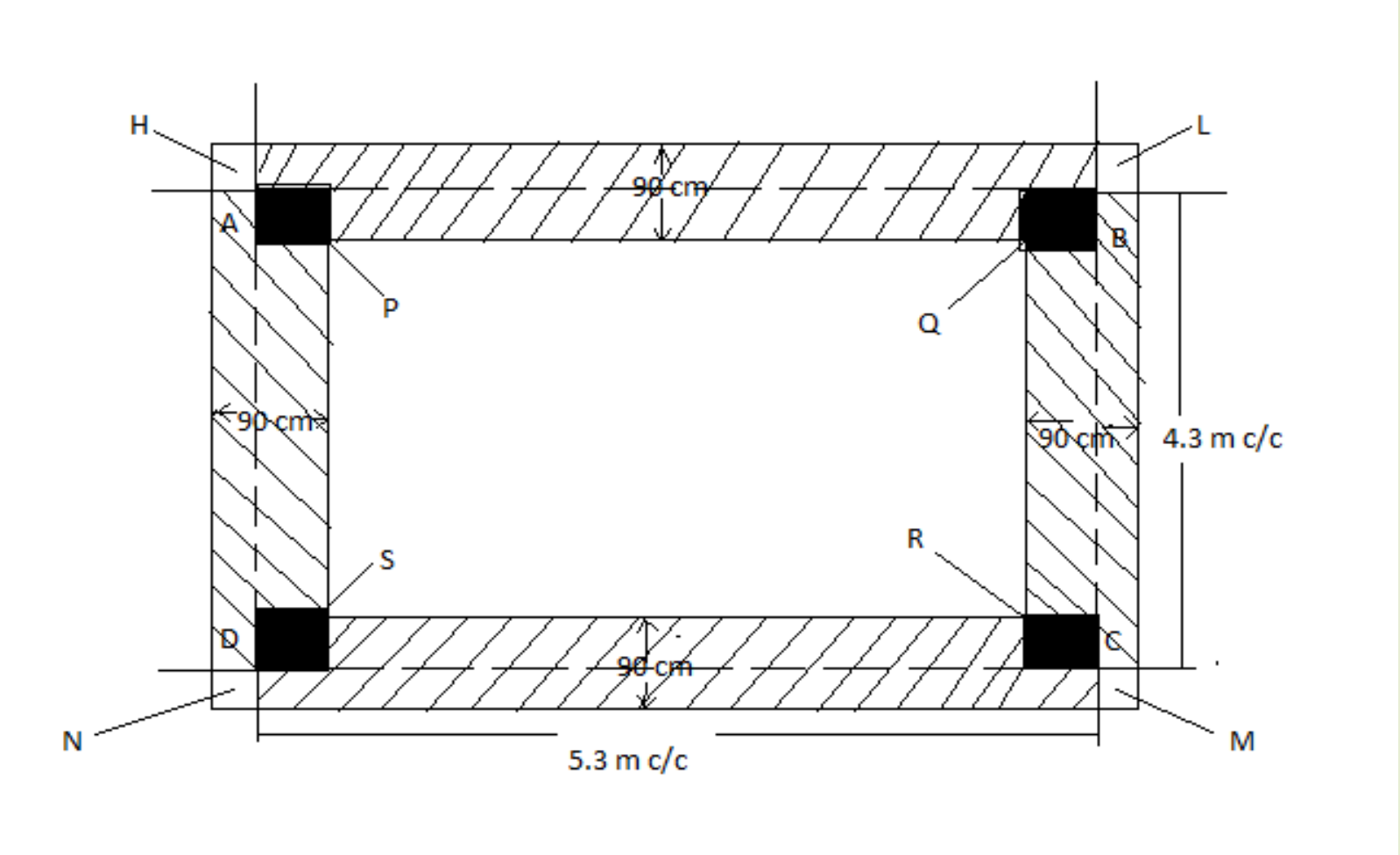
1. One Room house plan : Calculation of quantity by Center Line method:



PLAN @ Plinth WALL FOOTING

Total C/L = 2 x 5.3 + 2 x 4.3 = 19.2 m.

Net Length = C/L , because there no Junction



When we calculate the center length or area for quantity of items along center line of one room foundation plan, the **BLACK DOT part (A,B,C,D)** are counted twice while out side of **corners part(H,L,M,N)** are not counted at all ..i.e. Area of A is equal to area of H. Hence this quantity of each item is balanced and result remain unaffected. This method is used for closed wall with uniform section detail.

E.C.V. (3350604)

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Eg.1 Find the quantities of following items of work of one room house plan.

(1) Excavation for foundation

(2) B.B.C.C. C1:5:10) in foundation

(3) Brick masonry work up to plinth in 1:6 CM.

Solution:

~~STEP~~ 1: Method of Taking out quantity

X 2: Costing

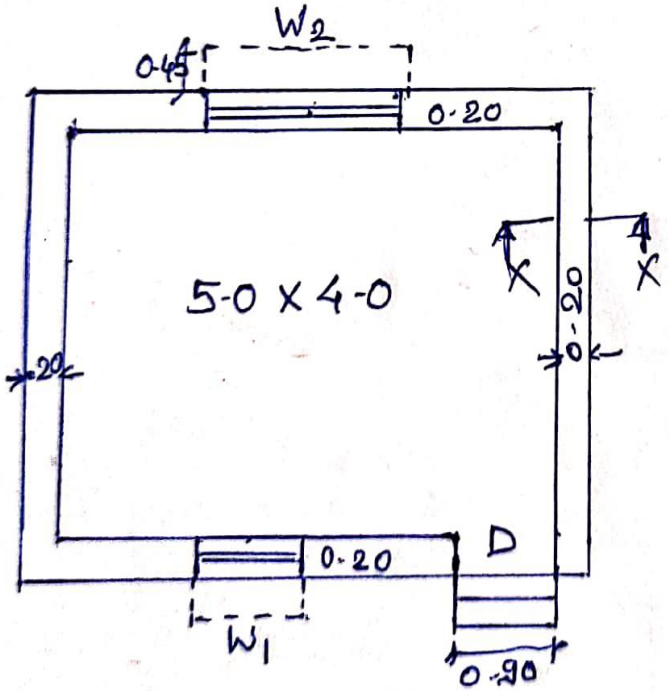
Methods: 1. Center line method

2. long wall & short wall method

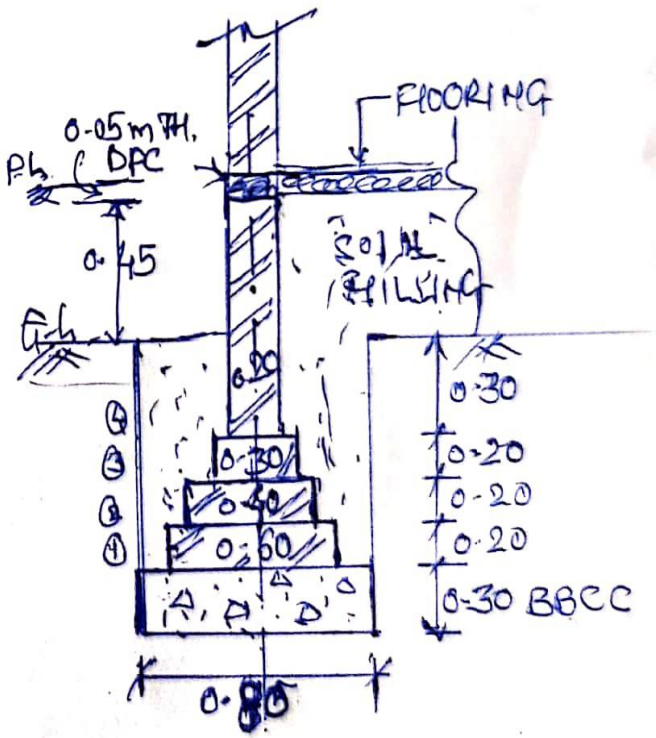
OR (Out to Out & In to In method)

⇒ L/W & S/W OR O/O & I/I

→ first draw foundation plan ⇒ Center line plan



G.F PLAN



CROSS SECTION -XX

WALL FOOTING

- 1st draw C/L plan.
- Read the C/S of Footing

Concept of C/L Method :

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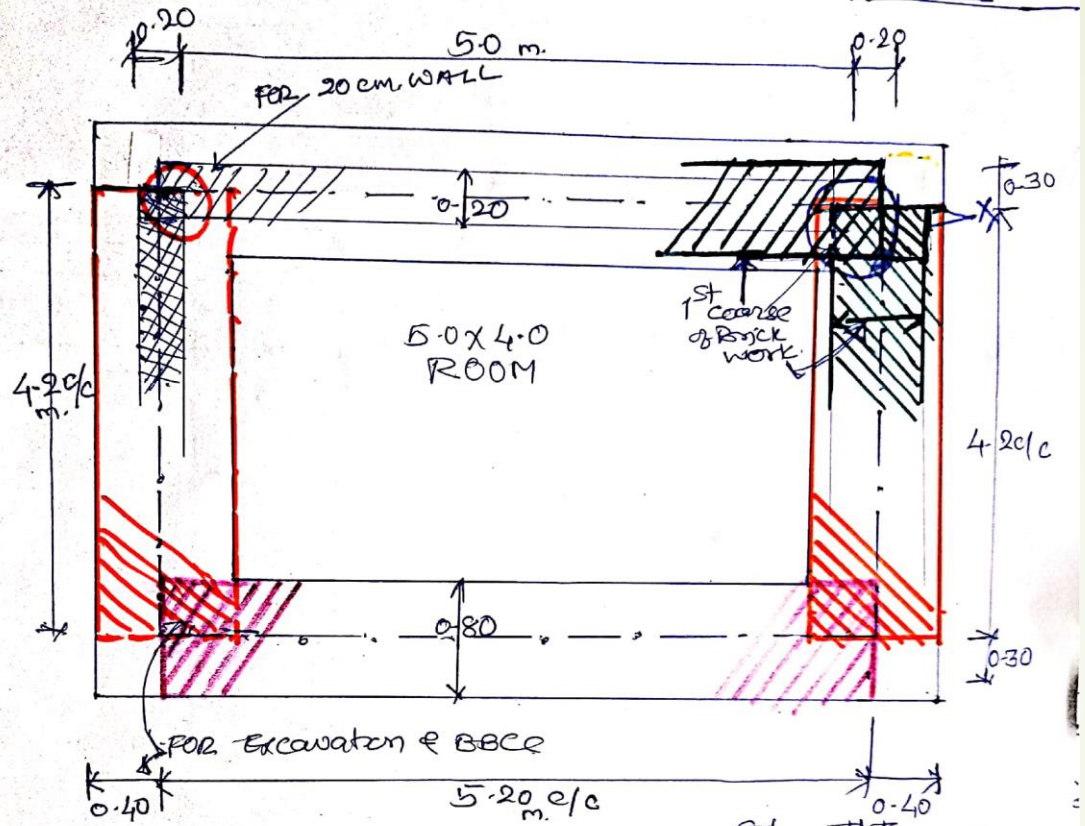
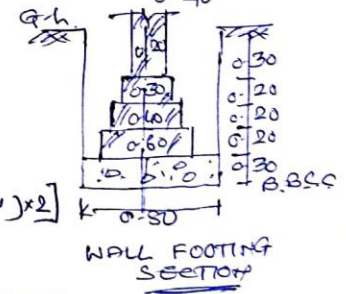


C/L PLAN @
FOUNDATION LEVEL



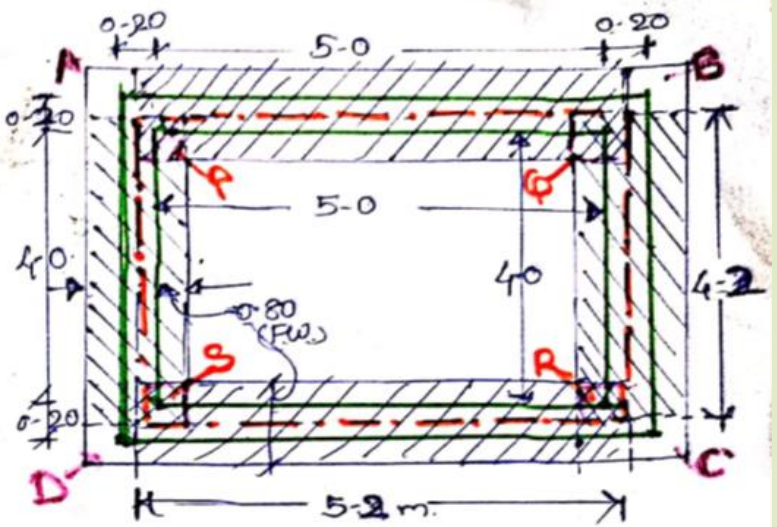
Total length of C/L =
$[(5.0 + 0.10 + 0.10) \times 2 + (4.0 + 0.10 + 0.10) \times 2]$
$= 18.8$ m.

Imp.:
- Length for all items of works remain same which are constructed along C/L.
- Only width & depth changes.
- Dimensions as measurement are taken according to unit of measurement.

Quantity sheet / measurement sheet : One Room PLAN

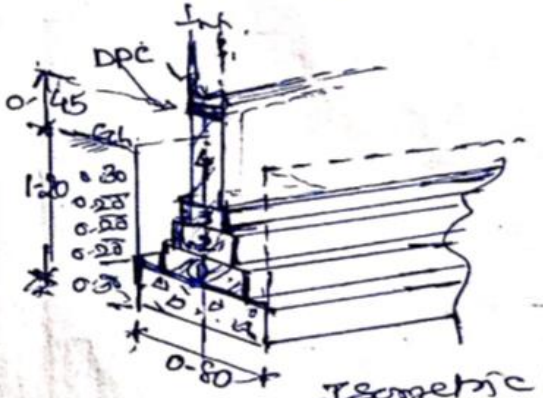
(1) Center Line Method,

Sl. No.	Description of item of works	No.	L (m)	B (m)	D or Th. (cm)	Qty	Total Qty
1.							



C/L PLAN @ Foundation Level

C/L length = [5·0 + 0·10 + 0·10] * 2 +
[4·0 + 0·10 + 0·10] × 2
= 18·8 m.



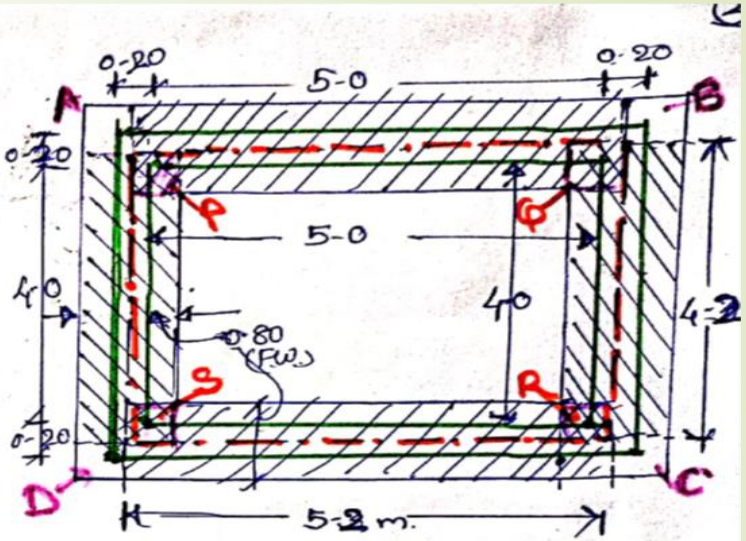
Isometric view of Brickwall

EX.1 One room house plan ---(I) Center Line method

Quantity sheet / measurement sheet : One Room.

① Center Line Method.

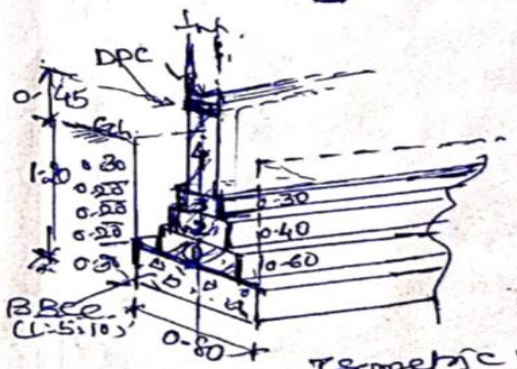
Sr No.	Description of item of work	No	L (m)	B (m)	D or Th. (m)	Qty	Total Qty
1.	Excavation for foundation :	1	18·8	0·80	1·20	18·048	18·048 m^3
2.	B.B.C-C. (1:5:10)	1	18·8	0·80	0·30	4·51	4·51 m^3
3.	Brick Masonry in 1:6 CM in foundation & Plinth						
	ⓐ up to G.L.						
	1st footing (0·60 m)	1	18·8	0·60	0·20	2·256	
	2nd " (0·40 m)	1	18·8	0·40	0·20	1·504	
	3rd " (0·30 m)	1	18·8	0·30	0·20	1·128	
	4th " (0·20 m.) (up to G.L.)	1	18·8	0·20	0·30	1·128	
						6·016	
	ⓑ Above G.L. to P.L.						
	4th footing/Course (0·20 m.)	1	18·8	0·20	0·45	1·692	7·708 m^3
4.	Earth filling (Back filling) in foundation trench.						
	V. = Excavation − B.B.C.C − Brick Masonry upto G.L.						
	= Qty of Item No. 1 − 2 − 3		[18·048 − 4·51 − 6·016]			−	7·522 m^3
5.	D.P.C. at Plinth level (0·05 m Th.)	1	18·8	0·20	−	3·76	3·76 m^2



C/L PLAN @ Foundation level

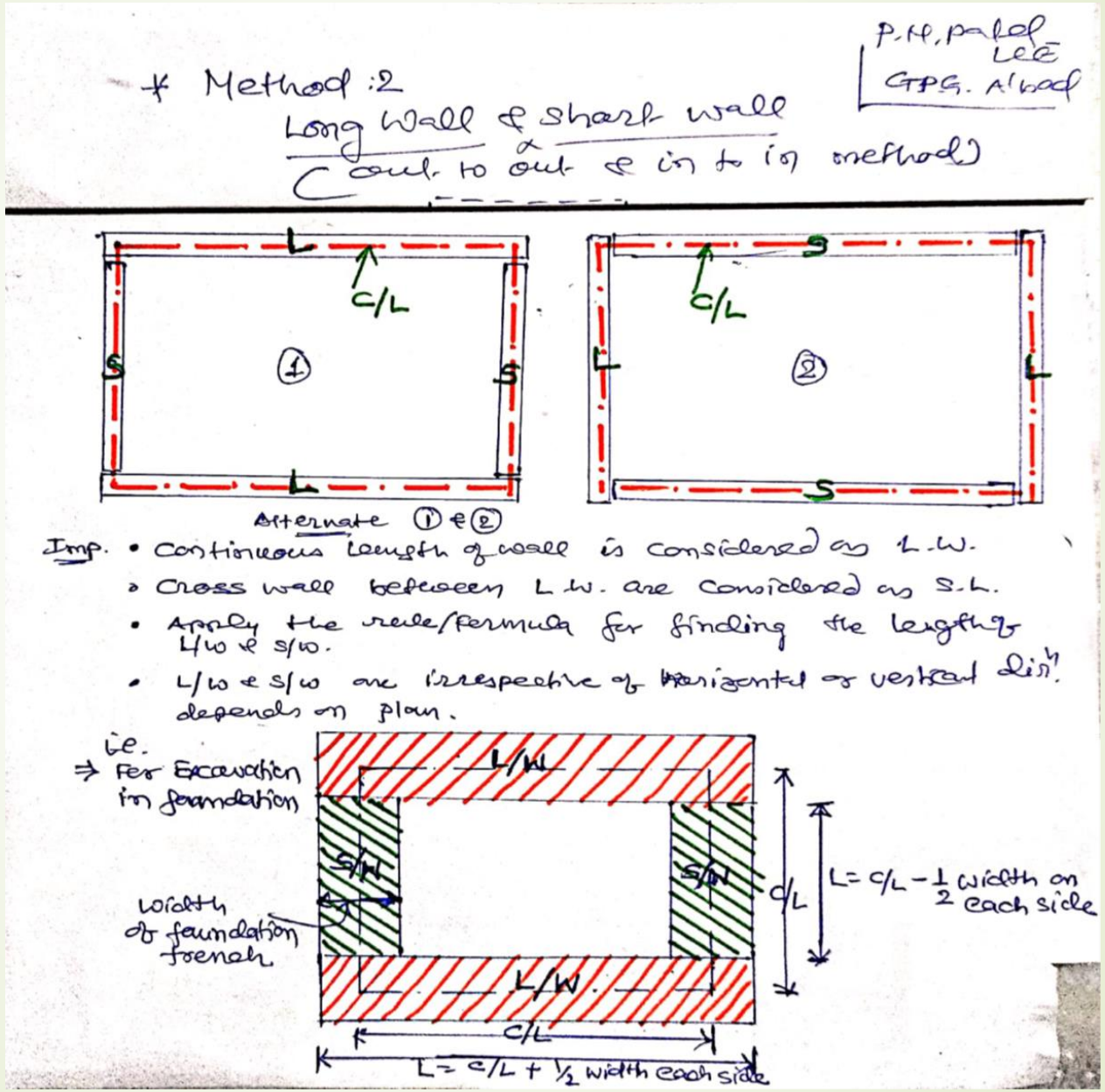
C/L length = [5·0 + 0·10 + 0·10] × 2 + [4·0 + 0·10 + 0·10] × 2

= 18·8 m.



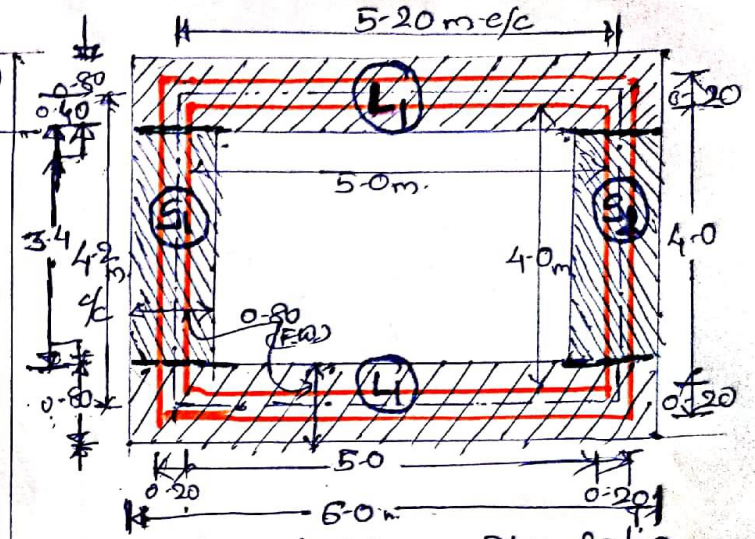
Isometric view of Brick wall

(II)Long wall & Short wall method – calculation of length

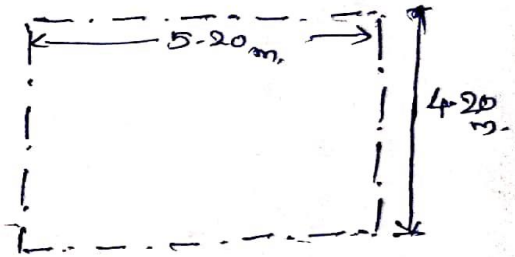


Ex- Method-2: Long wall & short wall Method

Sl No	Description	No	L (m)	B (m)	D or TH m	Qty.	Total Qty



C/L Plan @ Foundation



Simple c/L plan

Steps:

① c/L b/w = 5-0 + 0-10 + 0-10 = 5-2 m.

" s/w = 4-0 + 0-10 + 0-1 = 4-2 m.

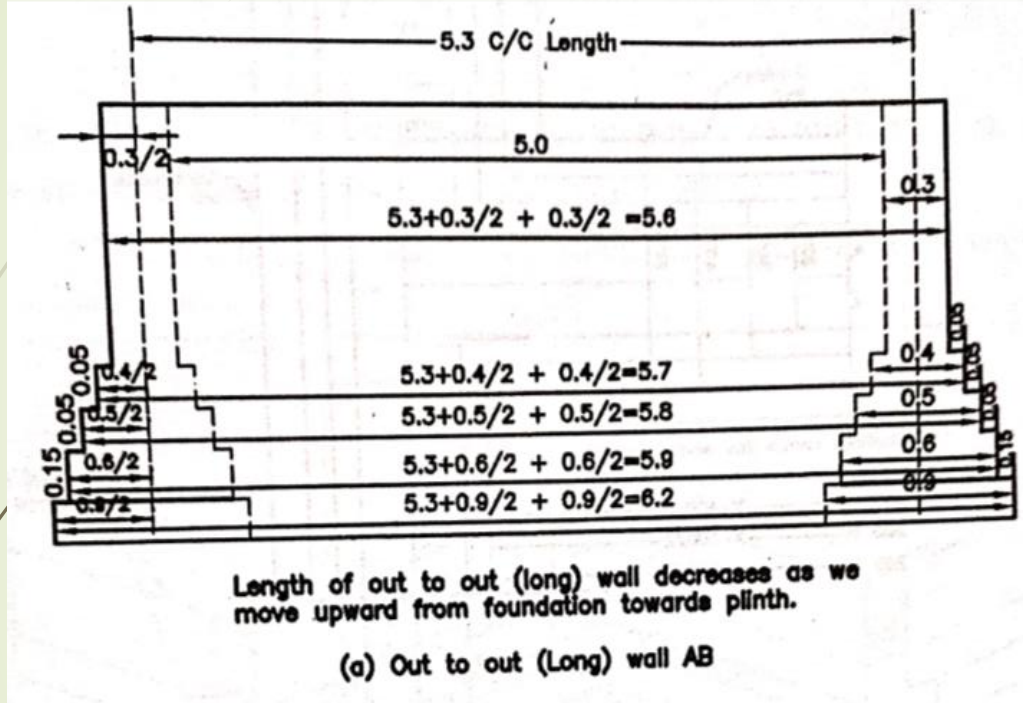
② calculation of Length of item.

For L/W = c/L + ½ x width of that item on each side

" s/w = c/L − ½ x " " "

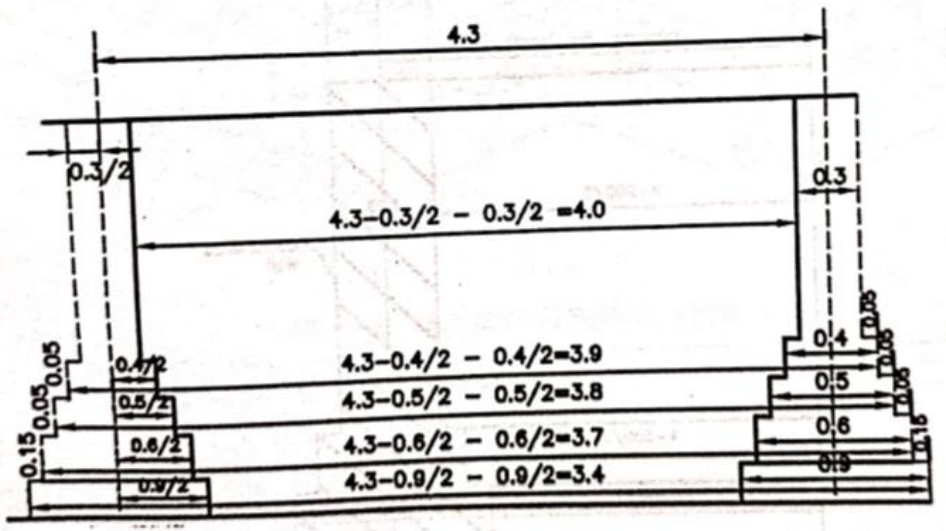
[No. of Junctions are zero]

Calculation of length for L/W and S/W



Length of out to out (long) wall decreases as we move upward from foundation towards plinth.

(a) Out to out (Long) wall AB



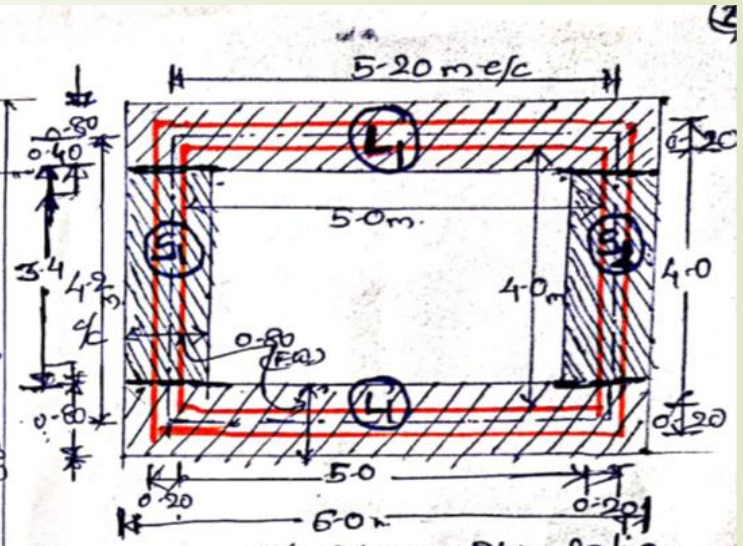
Length of in to in (short) wall increases as we move upward from foundation towards plinth

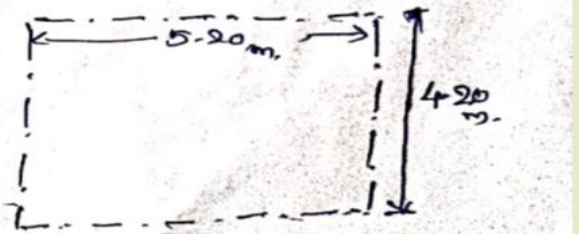
(b) In to In (Short) wall DE

(II) One Room Plan- Long wall & Short wall method

Ex- Method-2: Long wall & short wall Method

Sl No.	Description	No	L (m)	B (m)	D or TH m	Qty.	Total Qty
1.	Excavation for foundation						
	L/W → Length = = 5.2 + 0.8 = 6.00	2	6.00	0.80	1.20	11.52	
	S/W = L = 4.2 − 0.8 = 3.4	2	3.40	0.80	1.20	6.528	18.048 m³
2.	B.B.C.C. C1 : 5 : 10 in foundation						
	L/W → Length same	2	6.00	0.80	0.30	2.88	
	S/W →	2	3.40	0.80	0.30	1.632	4.512 m³
3.	Brick Masonry in foundation and plinth						
	① L/W - 1st Footing (UP to G.L) L = 5.2 + 0.6	2	5.8	0.60	0.10	1.392	
	2nd Footing L = 5.2 + 0.4	2	5.6	0.40	0.20	0.896	
	3rd " L = 5.2 + 0.3	2	5.5	0.30	0.20	0.66	
	4th " (UP to G.L) → L = 5.2 + 0.2	2	5.4	0.20	0.30	0.648	
	② S/W 1st Footing L = 4.2 − 0.6	2	3.6	0.60	0.20	0.864	
	2nd " L = 4.2 − 0.4	2	3.8	0.40	0.20	0.608	
	3rd " L = 4.2 − 0.3	2	3.9	0.30	0.20	0.468	
	4th " L = 4.2 − 0.2	2	4.0	0.20	0.30	0.48	
						6.016	
	③ Above G.L. to P.L. L/W = L = 5.2 + 0.2	2	5.4	0.20	0.45	0.972	
	S/W · L = 4.2 − 0.2	2	4.0	0.20	0.45	0.72	
						1.692	7.708 m³
4.	D.P.C at Plinth level (0.05 m TH)						
	L/W - Length as Above	2	5.4	0.20	—	2.16	
	S/W "	2	4.0	0.20	—	1.60	3.76 m²
	Earth filling in foundation		18.048	—	6.016	—	7.52 m³





Simple c/l plan

① Total c/l L/W = 5.0 + 0.1 + 0.1 = 5.2 m

" S/W = 4.0 + 0.1 + 0.1 = 4.2 m.

② calculation of length of item, per L/W = c/l + ½ × width of that item on each side

" S/W = c/l − ½ × " " "

[No. of Deductions are zero]

EX-2 (i) Two room building Plan - (I) By Center Line Method

Sub: E-C-V. (3350604)
Quantity estimation

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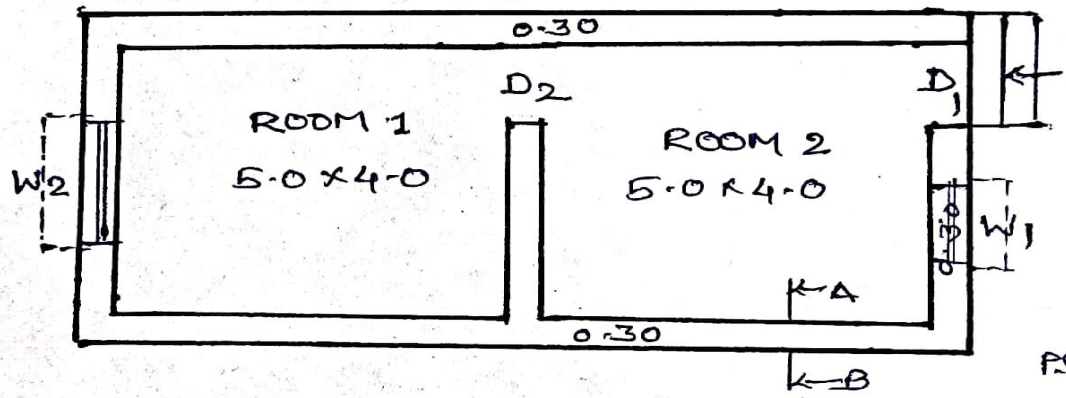
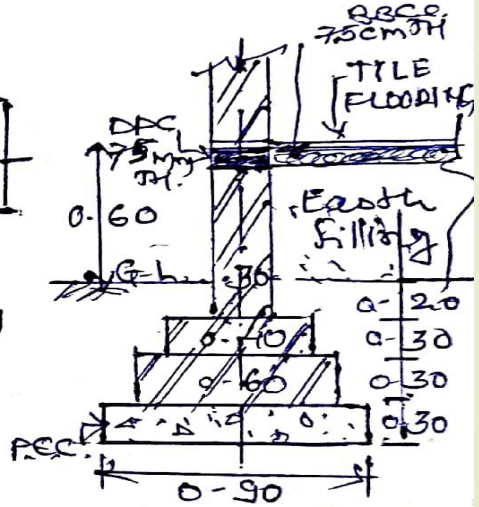
Ex.2 Calculate the quantities for following item for two room building plan,

(i) Excavation for foundation
(ii) P.C.C. (1:4:8) in foundation
(iii) 1st class Brick masonry in substructure (1:6 CM)
(iv) R.C.C. (75 mm Th.) at Plinth level
(v) Earth filling in plinth.
(vi) Flooring base i.e. (B.B.C.C. (1:4:8) in rooms.
(vii) Tile flooring in room.



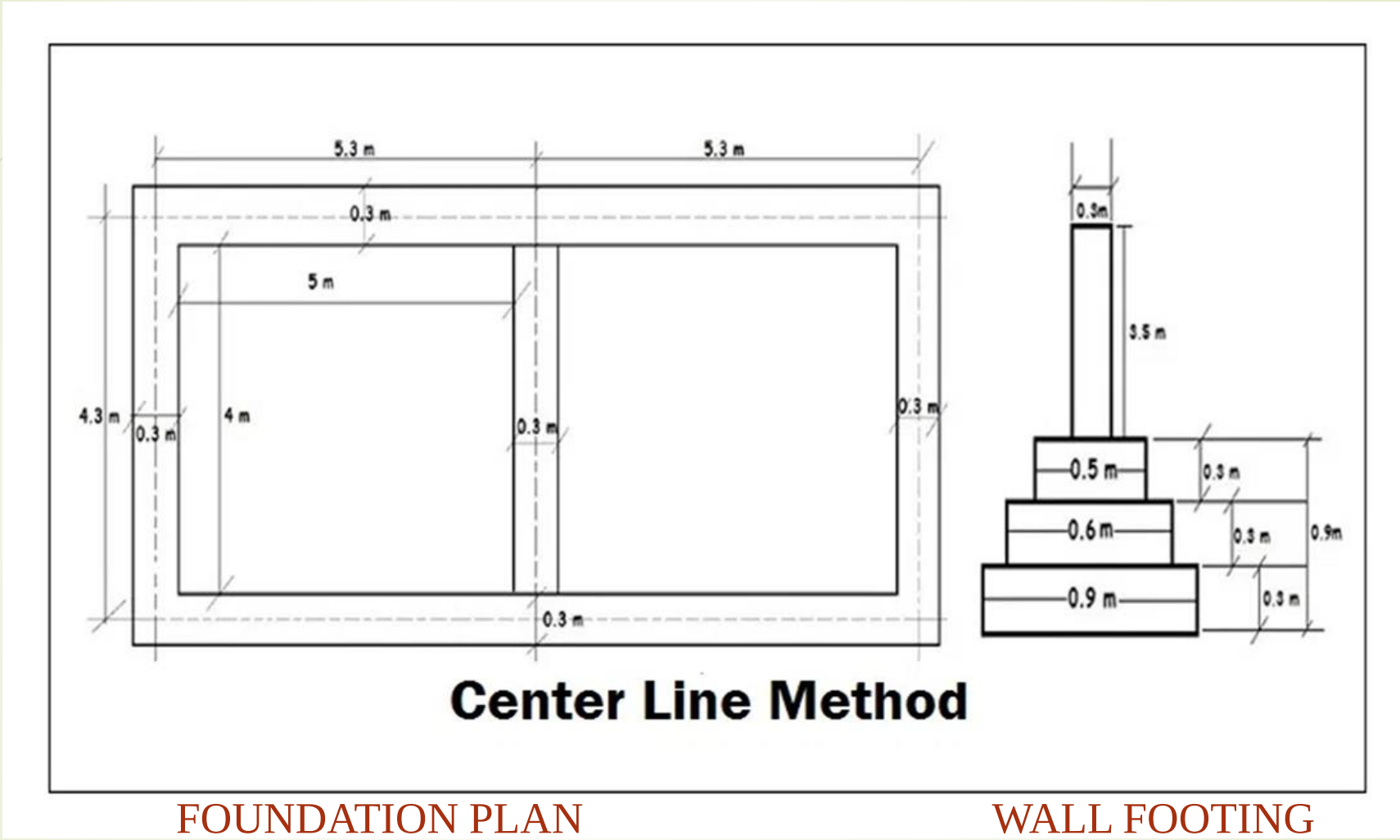
G.F. PLAN



SECTION AB'
WALL FOOTING

OPENINGS: (mm)
D1 = 0.90 x 2.10
D2 = 0.90 x 2.10
W1 = 0.90 x 1.20
W2 = 1.40 x 1.20

Ex. 2. (i)Two room building plan - Center Line Method

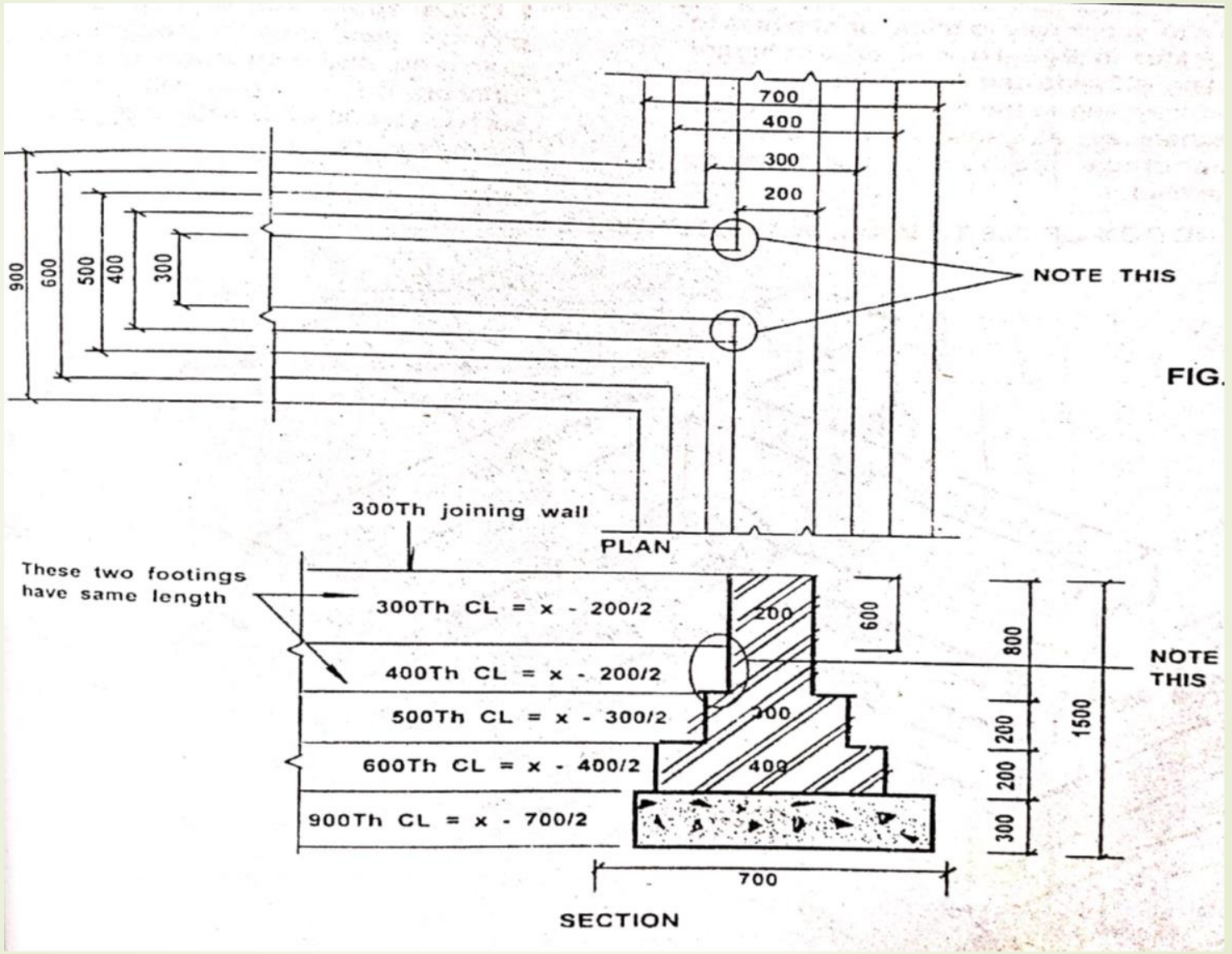


FOUNDATION PLAN WALL FOOTING

Total C/L = 2 X (5.3+ 5.3)+ 3 X4.3 =34.10 M , So, for excavation

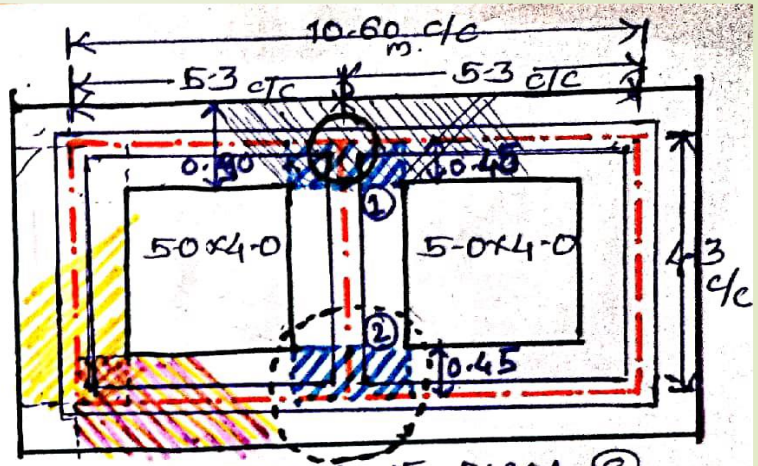
Net C/L = 34.10 – ½ x 0.9 x 2(Nj) = 33.2 m.

Junction of wall



SOLUTIONS- (1) By Center Line Method.

Sl No	DESCRIPTIONS	NOS	L (m)	B (m)	DEPTH (m)	QTY	TOTAL QTY.
1.	Excavation for foundation in Soil						
	L = 34.10 - $\frac{1}{2}$ x 0.90 x 2 = 33.2 m.	1	33.2	0.90	1.10	32.868	32.89 m^3
2.	P.C.C. (1:4:8) in found.	1	33.2	0.90	0.30	8.964	8.964 m^3
3.	1st bl. Brick Masonry in 1:6 CM for substructure (in found.)						
	(a) up to G.L.						
	1st footing: L = 34.10 - $\frac{1}{2}$ x 0.60 x 2	1	33.50	0.60	0.30	6.03	
	2nd " L = 34.10 - $\frac{1}{2}$ x 0.40 x 2	1	33.70	0.40	0.30	4.044	
	3rd " L = 34.10 - $\frac{1}{2}$ x 0.30 x 2	1	33.80	0.30	0.20	2.028	
						12.102	
	(b) Above G.L. to P.L.:					5.324	
	3rd footing: L = As above (30cm wall)	1	33.80	0.30	0.525		17.425 m^3
4.	D.P.C. (0.075 m Th.) at Plinth L = 34.10 - $\frac{1}{2}$ x 0.30 x 2	1	33.80	0.30	—	10.14	10.14 m^2
5.	Earth filling in Plinth, Room 1 & 2	2	5.00	4.00	0.525	21.00	21.00 m^3
6.	B.B.C.C (1:4:8) for flooring base Room 1 & 2	2	5.00	4.00	0.075	3.00	3.00 m^3
7.	Tile flooring in Room	2	5.00	4.00	—	40.00	40.00 m^2
8.	Back filling in found. trench. (3) Qty. of Item No. 1 - 2 - 3(a) [32.89 - 8.964 - 12.102]	1	—	—	—	—	11.824 m^3



CENTER LINE PLAN @ FOUNDATION LVL

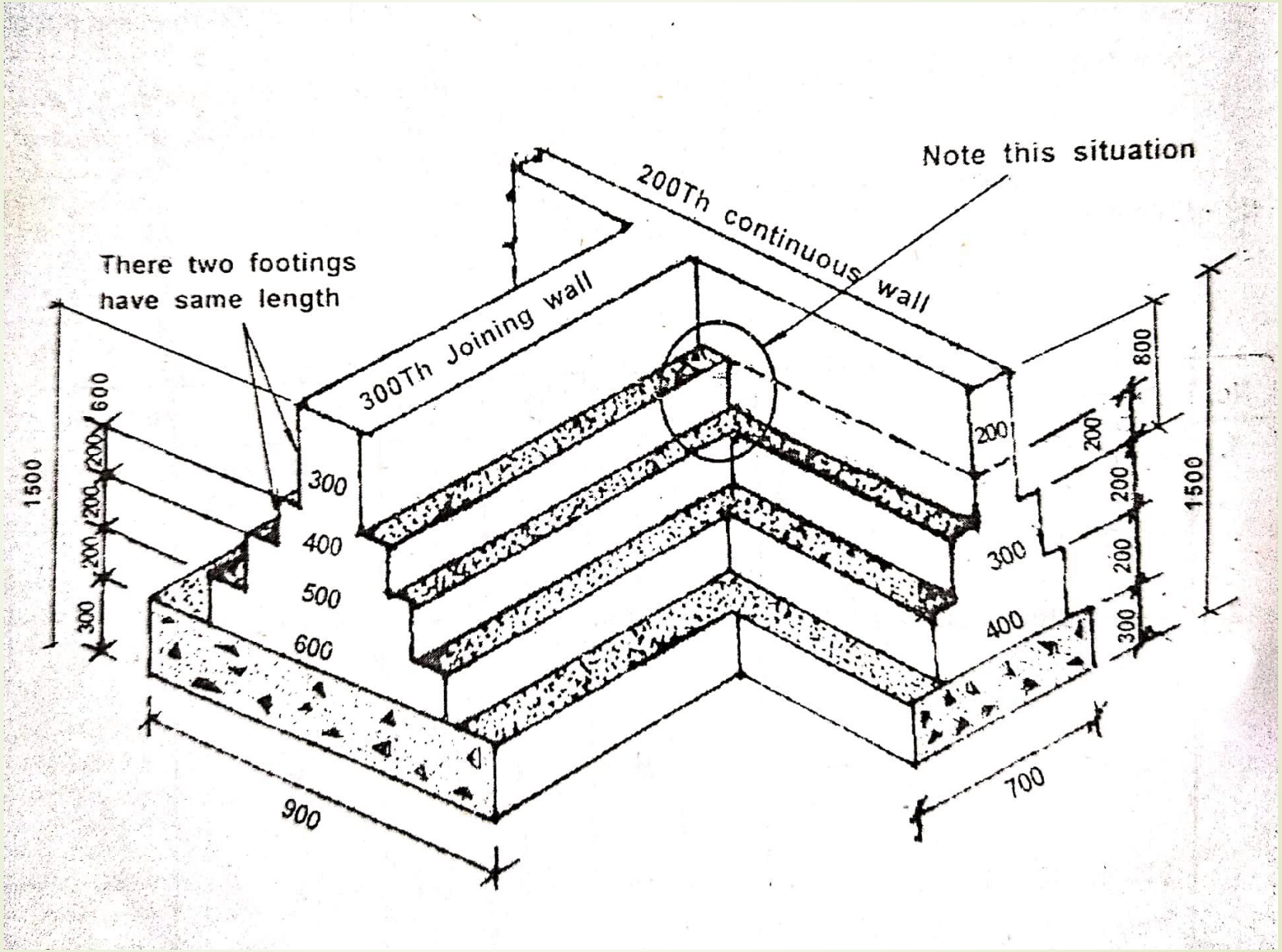
Total C/L = 5.3 x 4 + 4.3 x 3
= 34.10 m.

Net. C/L Length of = Total C/L - $\frac{1}{2}$ x W x Nj

Here Nj = 2 nos

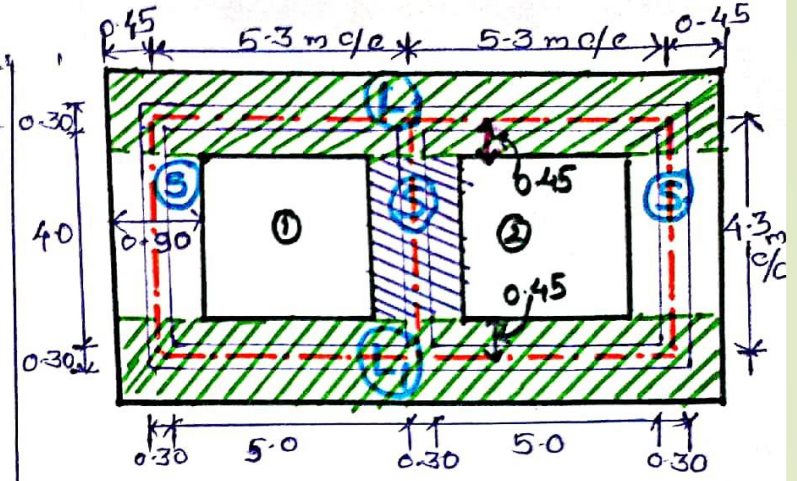
⇒ Length of C/L = 34.10 - $\frac{1}{2}$ x 0.90 x 2
For Excavation = 33.20 m.

[Wall thickness is same]


Note this situation
200Th continuous wall
There two footings
have same length
300Th Joining wall
1500
600
200
200
200
300
300
400
500
600
900
200
200
800
200
200
200
300
300
400
1500
700

[II] By Long Wall & Short-Wall Method

SR NO	DESCRIPTION	NOS	L (m)	B (m)	D m.	Qty	Total Qty.
1.	Excavation for foundation						
	Length of L/W = C/L + ½ x width						
	= 10.60 + 0.90	2	11.50	0.90	1.10		
	" S/W = 4.3 - 0.90	3	3.40	0.90	1.10		
2.	P.C.C. C1:4:8 in found.						
	For same width of item L/W = as above	2	11.50	0.90	0.30		
	" S/W = " "	3	3.40	0.90	0.30		
3.	1st class Brick Masonry C1:6 (CM) for Sub structure C in foundation up to PL						
	(a) up to G.L.:						
	1st L/W ⇒ L = 10.60 + 0.60 =	2	11.20	0.60	0.30		
	2nd " L = 10.60 + 0.40 =	2	11.00	0.40	0.30		
	3rd " L = 10.60 + 0.30 =	2	10.90	0.30	0.20		
	S/W 1st L = 4.3 - 0.60	3	3.70	0.60	0.30		
	2nd L = 4.3 - 0.40	3	3.90	0.40	0.30		
	3rd L = 4.3 - 0.30	3	4.00	0.30	0.20		
	(b) Above G.L. To P.L.						
	L/W 3rd Reading L = 10.60 + 0.3	2	10.90	0.30	0.525		
	S/W " L = 4.3 - 0.30	3	4.00	0.30	0.525		
4.	D.P.C. (0.075 M) at plinth						
	L/W ⇒ L = 10.6 + 0.30	2	10.90	0.30	—		
	S/W L = 4.3 - 0.30	3	4.00	0.30	—		
5.	Earth filling for Plinth Room i e 2						
6.	B.B.C.C. C1:4:8 for Flooring						
7-8.	Tile flooring in Room, Back filling in found. trench						



CENTER LINE PLAN @ FOUNDATION LVL.

Calculation of C/L:
= [5.3 + 5.3] x 2 + 4.3 x 3
= 34.10 m. → X

No need

METHOD

(1) Length of L/W = C/L + ½ x width or wall thickness on each side
" S/W = C/L - ½ x "

(2) C/L Length L/W = 0.15 + 5.0 + 0.30 + 5.0 + 0.15
= 10.60 m.
" " S/W = 0.15 + 4.0 + 0.15
= 4.30 m.

STEP-1

(3) Use formula for calculating Length of L/W & S/W as per No (1)

STEP-2

Ex. 3 (i) Two room building

Solve by using Center Line and L/W & S/W method as per Ex.2 item of works

LONG WALL AND SHORT WALL METHOD

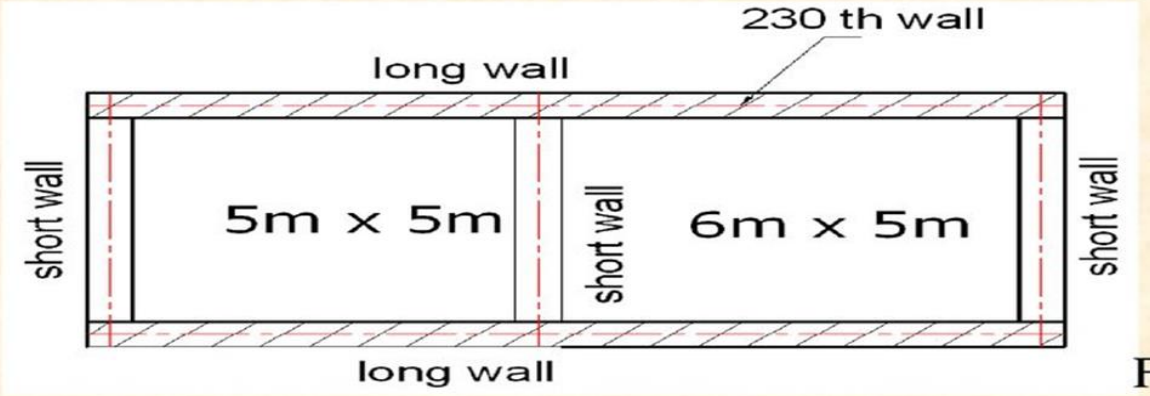


Fig 1

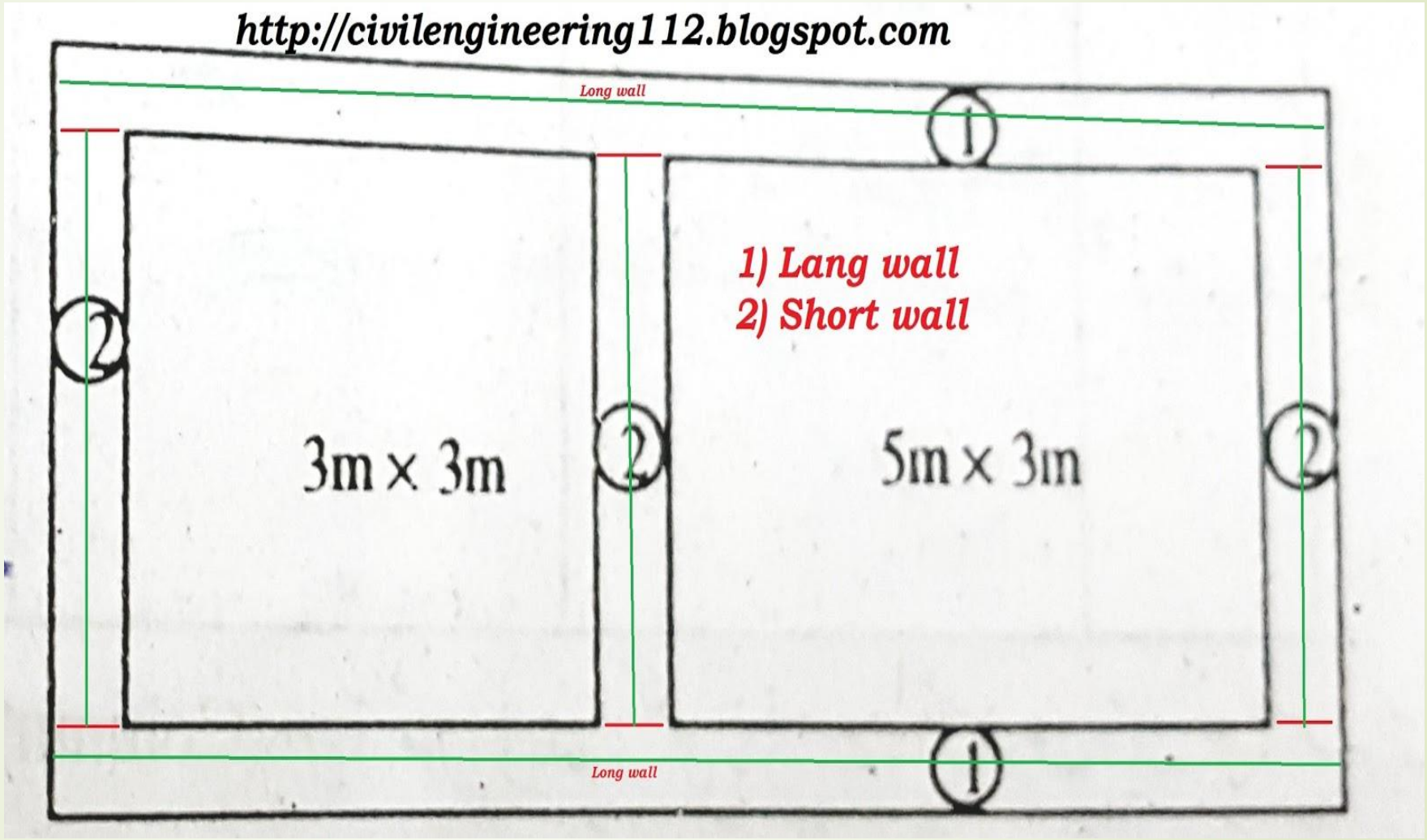
Length of long wall = c/c of longer wall + 2(1/2 width of wall)

= 11.46 + 2 x ½ x 0.23

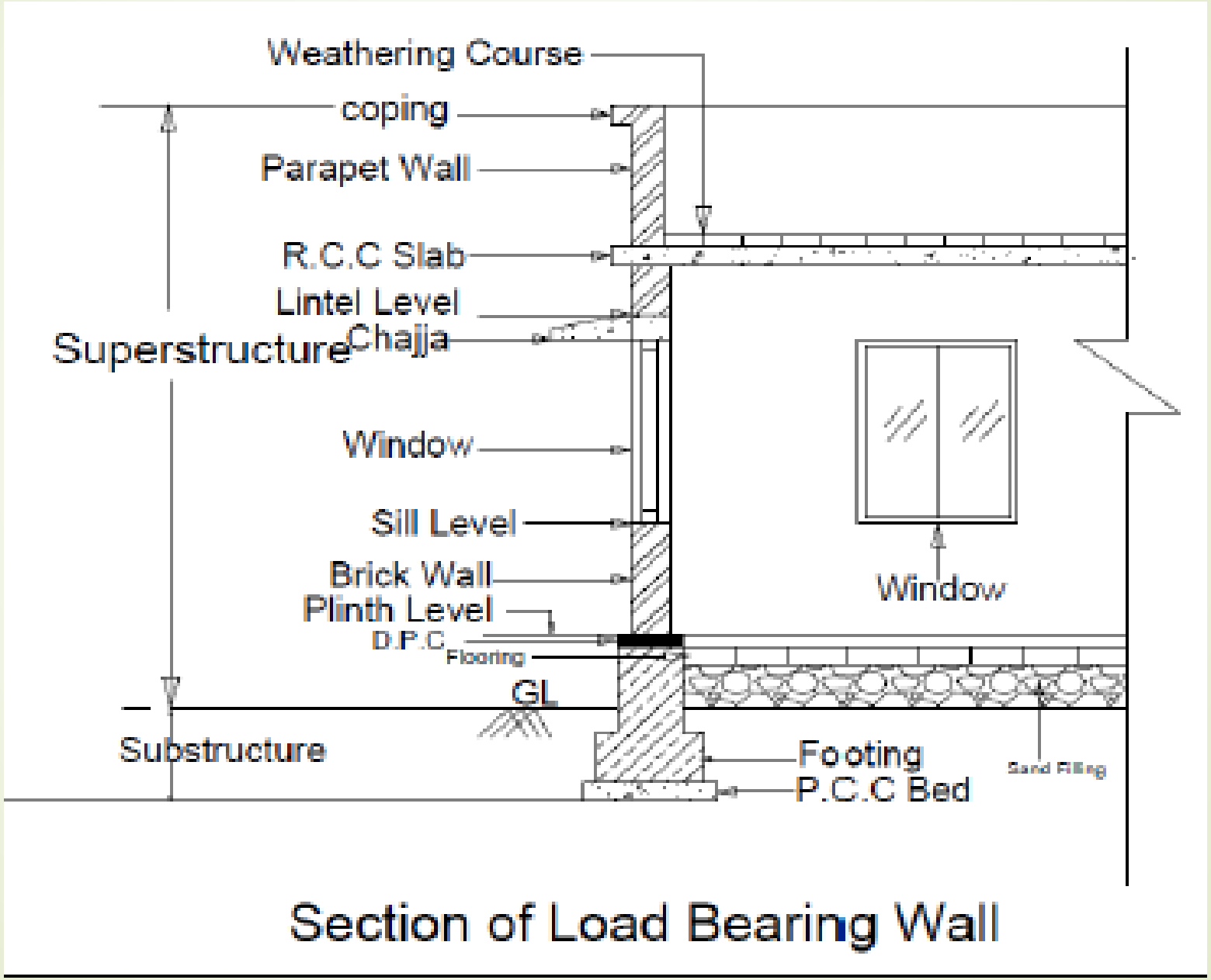
Length of short wall= c/c of shorter wall - 2(1/2 width of wall)

= 5.23 - 2 x ½ x 0.23

(ii) Solve by using Center Line and L/W & S/W method as per Ex.2 item of works



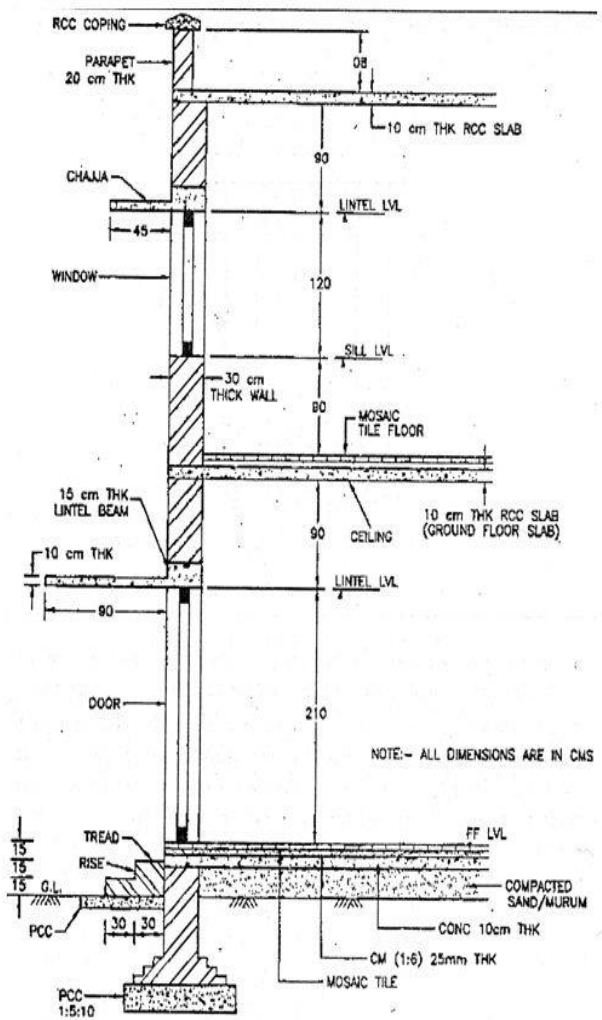
Wall section showing component parts of a single-story building



Section of Load Bearing Wall

Wall section showing component parts of Two-story building

Cross-section of a building :



THANK YOU.....