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RE REGULATORY RECORD

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# HARMONY RESIDENCES PVT. LTD.

DESIGN CALCULATION

FOR

## RESIDENTIAL BUILDING

STILT + 5 FLOORS 15 DWELLING UNITS IN SINGLE BLOCK

AT NEW NO. 12, OLD NO. 179, RANGARAJAPURAM MAIN ROAD, KODAMBAKKAM, CHENNAI – 600 024 COMPRISED IN T. S. NO. 66, BLOCK 37, PULIYUR VILLAGE, EGMORE TALUK, WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION, DIVISION 134, NEW DIVISION NO. N132, ZONE 10, TAMILNADU.

M. PUNITHAN B.Sc.,M.I.E.
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CMDA Reg. No. SE/GR II/19/04/044
Renewed 10-04-2024. Valid upto 09-04-2029
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## RESIDENTIAL FLATS

### COLUMN A1

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of floors | = | 1 | + | 5 | = | 6 | | | | | | |
| Foundation depth | = | 1.8 | m | | | | | | | | | |
| Ground to floor level | = | 1 | m | | | | | | | | | |
| GFloor to floor height | = | 3.00 | m | | | | | | | | | |
| FFloor to floor height | = | 3.00 | m | | | | | | | | | |
| Thickness of slab assumed | = | 0.125 | m | | | | | | | | | |
| Slab loading t/ sqm | = | 0.623 | t | | | | | | | | | |
| Breadth of beams | = | 0.23 | m | | | | | | | | | |
| Depth of beams assumed | = | 0.681 | m | | | | | | | | | |
| Parapet wall height | = | 1 | m | | | | | | | | | |
| Plinth beams assumed | = | 0.34 | m | | | | | | | | | |
| Total height of wall | = | 15.17 | m | | | | | | | | | |
| Total height of column | = | 21.8 | m | | | | | | | | | |
| Size of column | = | 0.45 | x | 0.3 | m | | | | | | | |

**Total load:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Due to slab | = | 6 | x | 3.43 | x | 3.375 | x | 0.623 | | | = | 43.24 t |
| Wall | = | 2 | x | 0.23 | x | 6.805 | x | 15.17 | | | = | 47.48 t |
| Roof beams | = | 2.5 | x | 0.23 | x | 0.556 | x | 0.34 | x | 6 | = | 0.652 t |
| Plinth beam | = | 2.5 | x | 0.23 | x | 0.34 | x | 0.34 | x | 1 | = | 0.067 t |
| Self wt | = | 2.5 | x | 0.45 | x | 0.3 | x | 21.8 | | | = | 7.358 t |
| | | | | | | | | | | | | 98.79 t |
| | | | | | | Total | | | | | = | **98.79 t** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Using size of column to be** | = | **450** | **X** | **300** | **mm** | | | | | | |
| **With 10/20 + 0/12 Rods, Ast** | = | 10 | x | 201 | + | 4 | x | 113 | = | 2462 | sqmm |
| Capacity of column | = | 450 | x | 300 | x | 6 | + | 2462 | x | 190 | |
| | = | **127.8 t** | | > | | **148 t** | | | | | |
| Minimum Reinforcement | = | 0.008 | x | 45 | x | 30 | = | 10.8 | sqcm | < | 24.62 sqcm |
| % of Reinforcement | = | 2462 | / | 45 | x | 30 | = | 1.824 | < | 4 | |

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**COLUMN N4**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of floors | = | 1 | + | 5 | = | 6 | | | | | | |
| Foundation depth | = | 1.8 | m | | | | | | | | | |
| Ground to floor level | = | 1 | m | | | | | | | | | |
| GFloor to floor height | = | 3.00 | m | | | | | | | | | |
| FFloor to floor height | = | 3.00 | m | | | | | | | | | |
| Thickness of slab assumed | = | 0.125 | m | | | | | | | | | |
| Slab loading t/ sqm | = | 0.623 | t | | | | | | | | | |
| Breadth of beams | = | 0.23 | m | | | | | | | | | |
| Depth of beams assumed | = | 0.413 | m | | | | | | | | | |
| Parapet wall height | = | 1 | m | | | | | | | | | |
| Plinth beams assumed | = | 0.413 | m | | | | | | | | | |
| Total height of wall | = | 16.77 | m | | | | | | | | | |
| Total height of column | = | 21.8 | m | | | | | | | | | |
| Size of column | = | 0.45 | x | 0.3 | m | | | | | | | |

**Total load:**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Due to slab | = | 6 | x | 3.43 | x | 4.823 | x | 0.623 | | | = | 61.78 | t |
| Wall | = | 2 | x | 0.23 | x | 8.253 | x | 16.77 | | | = | 63.68 | t |
| Roof beams | = | 2.5 | x | 0.23 | x | 0.288 | x | 0.413 | x | 6 | = | 0.409 | t |
| Plinth beam | = | 2.5 | x | 0.23 | x | 0.413 | x | 0.413 | x | 1 | = | 0.098 | t |
| Self wt | = | 2.5 | x | 0.45 | x | 0.3 | x | 21.8 | | | = | 7.358 | t |
| | | | | | | | | | | | | 133.3 | t |
| | | | | | | Total | | | | | = | **133.3** | **t** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Using size of column to be** | = | **450** | **X** | **300** | **mm** | | | | | | |
| **With 8/20 + 4/12 Rods, Ast** | = | 8 | x | 314 | + | 3 | x | 113 | = | 2851 | sqmm |
| Capacity of column | = | 450 | x | 300 | x | 6 | + | 2851 | x | 190 | |
| | = | **135.2 t** | | > | | **200 t** | | | | | |
| Minimum Reinforcement | = | 0.008 | x | 45 | x | 30 | = | 10.8 | sqcm | < | 28.51 sqcm |
| % of Reinforcement | = | 2851 | / | 45 | x | 30 | = | 2.112 | < | 4 | |

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**COLUMN N4**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of floors | = | 1 | + | 5 | = | 6 | | | | | | |
| Foundation depth | = | 1.8 | m | | | | | | | | | |
| Ground to floor level | = | 1 | m | | | | | | | | | |
| GFloor to floor height | = | 3.00 | m | | | | | | | | | |
| FFloor to floor height | = | 3.00 | m | | | | | | | | | |
| Thickness of slab assumed | = | 0.125 | m | | | | | | | | | |
| Slab loading t/ sqm | = | 0.623 | t | | | | | | | | | |
| Breadth of beams | = | 0.23 | m | | | | | | | | | |
| Depth of beams assumed | = | 0.314 | m | | | | | | | | | |
| Parapet wall height | = | 1 | m | | | | | | | | | |
| Plinth beams assumed | = | 0.243 | m | | | | | | | | | |
| Total height of wall | = | 17.36 | m | | | | | | | | | |
| Total height of column | = | 21.8 | m | | | | | | | | | |
| Size of column | = | 0.45 | x | 0.23 | m | | | | | | | |

**Total load:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Due to slab | = | 6 | x | 3.43 | x | 2.855 | x | 0.623 | | | = | 36.58 t |
| Wall | = | 2 | x | 0.23 | x | 4.858 | x | 17.36 | | | = | 38.8 t |
| Roof beams | = | 2.5 | x | 0.2 | x | 0.189 | x | 0.243 | x | 6 | = | 0.138 t |
| Plinth beam | = | 2.5 | x | 0.2 | x | 0.243 | x | 0.243 | x | 1 | = | 0.029 t |
| Self wt | = | 2.5 | x | 0.45 | x | 0.23 | x | 21.8 | | | = | 5.641 t |
| | | | | | | | | | | | | 81.18 t |
| | | | | | | Total | | | | | = | **81.18 t** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Using size of column to be** | = | **450** | **X** | **230** | **mm** | | | | | | |
| **With 10/32 Rods, Ast** | = | 8 | x | 314 | + | 3 | x | 113 | = | 2851 | sqmm |
| | | | | D | | | | | | | |
| Capacity of column | = | 450 | x | 230 | x | 6 | + | 2851 | x | 190 | |
| | = | **116.3 t** | | > | | **122 t** | | | | | |
| Minimum Reinforcement | = | 0.008 | x | 45 | x | 23 | = | 8.28 | sqcm | < | 28.51 sqcm |
| % of Reinforcement | = | 2851 | / | 45 | x | 23 | = | 2.755 | < | 4 | |

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**Design of sections**

**Piles**

Using M30 concrete and TMT bars 500 grade

| | | | |
|---|---|---|---|
| σ ac in concrete | = | 81.6 | kg/sq-cm |
| σ bc in concrete | = | 102 | kg/sq-cm |
| σ ac in steel | = | 1938 | kg/sq-cm |

Vertical load, V ( t ) 220 / 2 = 110

**I. For 500 dia. pile with end bearing**

a) Safe bearing capacity of pile ( t ) = 3.142 x 0.5 x 0.5 x 750 / 4 = 147.3

b) Bearing load / sq-m. 110 / 0.785

140 < 147.3 o.k

c) V / bc d d = 110 x 1500 / 250000 x 30 = 0.022

d) Ve / bc d d d = 0 x 1500 / 1.25E+08 x 30 = 0.000

Using 16 dia HSD rods d'/D = 83 / 450 = 0.184

Using chart 57 & 58 of SP:16-1980

e) As required (sq-cm.) 0 x 3.142 x 450 x 450 x 30 / 400 = 0.0

Min area of reinforcement = 0.004 x 3.142 x 45 x 45 / 4 = 6.362 sq-cm

Use 6/16 dia. HSD rods = 6 x 2.011 = 12.06 sq-cm > 6.36 sq-cm

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## Pile cap

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Column size | | | 300 | x | 450 | | | |
| Pedestal size | | | 650 | x | 1775 | | | |
| Area of pedestal | = | 65 | x | 177.5 | = | 11537.5 | sq-cm | |
| Actual stress | = | 110 | x | 1500 | / | 11537.5 | | |
| | = | 14.3 | kg/sq-cm | | | | | |
| Permissible stress | = | 0.45 | x | 300 | / | 11537.5 | / | 1350 |
| | = | 135 | x | 2.923 | = | 395 | kg/sq-cm | |

So use plain concrete pedestal of 30cm all around

Coinciding the critical section for shear with outerface of the pile in each direction

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0.5 | / | 2 | + | 0.225 | + | d/2 | = | 0.63 | + 0.25 |
| | | | 0.475 | + | d/2 | = | 0.875 | | | | | |
| | d/2 | = | 0.875 | - | 0.475 | = | 0.4 | | | | | |
| | d | = | 0.8 | | | | | | | | | |
| Provide | d | = | 0.715 | | | | | | | | | |
| | D | = | 0.8 | | | | | | | | | |
| BM | | = | 1 | x | 110 | ( | 0.75 | - | 0.3 | ) | | |
| | | = | 49.5 | m-t | | | | | | | | |
| Mu/bd2 | | = | 49.5 | x | 1.5 | x | 100000 | /( | 225.0 | x | 71.5 | x 71.5 x 300 ) |
| | | = | 0.022 | x | 30 | = | 0.65 | | | | | |
| Area of steel required | | = | 0.09 | x | 225.0 | x | 71.5 | / | 100 | | | |
| | | = | 14.8 | sq-cm | | | | | | | | |
| Min steel required | | = | 0.0012 | x | 90 | x | 225 | | | | | |
| | | = | 24.3 | sq-cm | | | | | | | | |
| Use 20dia. HSD bars At 100 | | = | 10 | x | 3.14 | = | 31.40 | | | | | |

## Shear

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Critical section for shear | = | 250 | + | 300 | + | 357.5 | = | 907.5 mm |
| The pile outer edge | = | 625 | + | 250 | = | 875 | < | 907.5 |

So shear reinforcement is not provided

For top of pile cap and pedestal use nominal Reinforcement
Use 16 dia. At 200 crs

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## DESIGN OF PLINTH BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 5.525 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | | | | | | |
| **Load /m :** | | | | | | | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.45 | = | 0.26 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 2.400 | = | 1.10 | t | | |
| | | | | | | | | **1.36** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Design negative B.M | = | 1.36 | x | 5.525 | x | 5.525 | x | 0.100 | = | 4.16 | t-m |
| Mu/ fck bdd | = | 4.16 | x | 1.5 | x | 100000 | | | = | 0.062 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0905 | x | 250 | x | 23.00 | x | 41.70 | = | 4.34 | sqcm |
| | | | | 5000 | | | | | | | |
| **Use 2/12 + 2/16 dia hsd rods,** | | | | **Ast** | = | **8.54** | **sqcm** | | > | **4.34** | **sqcm** |
| Design Positive B.M | = | 1.36 | x | 5.525 | x | 5.525 | x | 0.08333 | = | 3.47 | t-m |
| Mu/ fck bdd | = | 3.47 | x | 1.5 | x | 100000 | | | = | 0.052 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0754 | x | 250 | x | 23.00 | x | 41.70 | = | 4.30 | sqcm |
| | | | | 4200 | | | | | | | |
| **Use 2/12 + 2/16 dia hsd rods,** | | | | **Ast** | = | **6.28** | **sqcm** | | > | **4.30** | **sqcm** |
| Shear force | = | 1.36 | x | 1.000 | / | 1.00 | = | 1.36 | t | | |
| Shear stress | = | 1.36 | x | 1.00 | x | 10000 | / | 230 | x | 417 = | 0.14 N/sqmm |
| 100As/ bd | = | 100 | x | 8.54 | / | 23.00 | x | 41.70 | = | 0.89 | |
| Permissible shear stress | = | 0.44 | N/sqmm | | < | 0.14 | N/sqmm | | | | |
| Unbalanced shear stress | = | 0.14 | - | 0.442 | = | -0.30 | N/sqmm | | | | |
| Unbalanced shear force | = | -0.30 | x | 230 | x | 417 | / | 10000 | = | -2.88 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 100 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 415 | x | 100.48 | x | 417 | / | 100 x | 10000 |
| | = | 15.1 | t | > | -3 | t | | | | | |

**RESULT :**

**Beam section** = **230 X 450 mm**

**Use 2/12 + 2/16 dia hsd rods, at top**

**Use 2/12 + 2/16 dia hsd rods, at bottom**

Using 8 dia TMT 2 legged stirrups at **100 crs**

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## DESIGN OF PLINTH BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 8.041 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | | | | | | |
| **Load /m :** | | | | | | | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.45 | = | 0.26 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 1.500 | = | 0.69 | t | | |
| | | | | | | | | **0.95** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Design negative B.M | = | 0.95 | x | 8.041 | x | 8.041 | x | 0.100 | = | 6.14 | t-m |
| | = | 6.14 | x | 1.5 | x | 100000 | | | = | 0.092 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.1335 | x | 250 | x | 23.00 | x | 41.70 | = | 6.40 | sqcm |
| | | | | 5000 | | | | | | | |
| **Use 2/12+4/16 dia hsd rods,** | | | | **Ast** | = | **10.30** | **sqcm** | | > | **6.40** | **sqcm** |
| Design Positive B.M | = | 0.95 | x | 8.041 | x | 8.041 | x | 0.08333 | = | 5.11 | t-m |
| Mu/ fck bdd | = | 5.11 | x | 1.5 | x | 100000 | | | = | 0.077 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.1112 | x | 250 | x | 23.00 | x | 41.70 | = | 6.35 | sqcm |
| | | | | 4200 | | | | | | | |
| **Use 2/12+4/16 dia hsd rods,** | | | | **Ast** | = | **10.30** | **sqcm** | | > | **6.35** | **sqcm** |
| Shear force | = | 0.95 | x | 8.041 | / | 2.00 | = | 3.81 | t | | |
| Shear stress | = | 3.81 | x | 1.50 | x | 10000 | / | 230 | x | 417 = | 0.60 N/sqmm |
| 100As/ bd | = | 100 | x | 10.30 | / | 23.00 | x | 41.70 | = | 1.07 | |
| Permissible shear stress | = | 0.44 | N/sqmm | | < | 0.60 | N/sqmm | | | | |
| Unbalanced shear stress | = | 0.60 | - | 0.442 | = | 0.15 | N/sqmm | | | | |
| Unbalanced shear force | = | 0.15 | x | 230 | x | 417 | / | 10000 | = | 1.48 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 100 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 415 | x | 100.48 | x | 417 | / | 100 x | 10000 |
| | = | 15.1 | t | > | 1 | t | | | | | |

## RESULT :

**Beam section** = **230 X 450 mm**
**Use 2/12+4/16 dia hsd rods, at top**
**Use 2/12+4/16 dia hsd rods, at bottom**
Using 8 dia TMT 2 legged stirrups at **100 crs**

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## DESIGN OF PLINTH BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 4.382 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | | | | | | |
| **Load /m :** | | | | | | | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.45 | = | 0.26 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 3.900 | = | 1.79 | t | | |
| | | | | | | | | **2.05** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Design negative B.M | = | 2.05 | x | 4.382 | x | 4.382 | x | 0.083 | = | 3.28 | t-m |
| Mu/ fck bdd | = | 3.28 | x | 1.5 | x | 100000 | | | = | 0.049 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0714 | x | 250 | x | 23.00 | x | 41.70 | = | 4.08 | sqcm |
| | | | | 4200 | | | | | | | |
| **Use 2/12+1/16 dia hsd rods,** | | | | **Ast** | **=** | **4.27** | **sqcm** | | **>** | **4.08** | **sqcm** |
| Design Positive B.M | = | 2.05 | x | 4.382 | x | 4.382 | x | 0.08333 | = | 3.28 | t-m |
| Mu/ fck bdd | = | 3.28 | x | 1.5 | x | 100000 | | | = | 0.049 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0714 | x | 250 | x | 23.00 | x | 41.70 | = | 4.08 | sqcm |
| | | | | 4200 | | | | | | | |
| **Use 2/12+1/16 dia hsd rods,** | | | | **Ast** | **=** | **4.27** | **sqcm** | | **>** | **4.08** | **sqcm** |
| Shear force | = | 2.05 | x | 4.382 | / | 2.00 | = | 4.50 | t | | |
| Shear stress | = | 4.50 | x | 1.50 | x | 10000 | / | 230 | x | 417 = | 0.70 N/sqmm |
| 100As/ bd | = | 100 | x | 4.27 | / | 23.00 | x | 41.70 | = | 0.45 | |
| Permissible shear stress | = | 0.44 | N/sqmm | | < | 0.70 | N/sqmm | | | | |
| Unbalanced shear stress | = | 0.70 | - | 0.442 | = | 0.26 | N/sqmm | | | | |
| Unbalanced shear force | = | 0.26 | x | 230 | x | 417 | / | 10000 | = | 2.51 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 150 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 415 | x | 100.48 | x | 417 | / | 150 x | 10000 |
| | = | 10.1 | t | > | 3 | t | | | | | |

## RESULT :

**Beam section** = **230 X 450 mm**

**Use 2/12+1/16 dia hsd rods, at top**

**Use 2/12+1/16 dia hsd rods, at bottom**

Using 8 dia TMT 2 legged stirrups at **150 crs**

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## DESIGN OF ROOF BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 5.525 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | 2.76225 | | | | | |
| **Load /m :** | | | | | | 7.63003 | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.325 | = | 0.19 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 2.591 | = | 1.19 | t | | |
| Slab | = | 0.71 | x | 2.40 | / | 1.000 | = | 1.71 | t | | |
| | | | | | | | | **3.09** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Breadth of flange | = | 3867 / 12 | + | 230 | + | 3 | x | 150 | | | |
| | = | 1002 | mm | | | | | | | | |
| Design negative B.M | = | 3.09 | x | 5.525 | x | 5.525 | x | 0.100 | = | 9.43 | t-m |
| Mu/ fck bdd | = | 9.43 | x | 1.5 | x | 100000 | | | = | 0.141 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.2121 | x | 250 | x | 23.00 | x | 41.70 | = | 10.17 | sqcm |
| | | | | 5000 | | | | | | | |
| **Use 6/16 dia hsd rods,** | | | | **Ast** | = | **12.06** | **sqcm** | | > | **10.17** | **sqcm** |
| Design Positive B.M | = | 3.09 | x | 5.525 | x | 5.525 | x | 0.1 | = | 9.43 | t-m |
| Mu/ fck bdd | = | 9.43 | x | 1.5 | x | 100000 | | | = | 0.041 | |
| | | 200 | x | 100.2263 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0588 | x | 200 | x | 100.23 | x | 41.70 | = | 9.83 | sqcm |
| | | | | 5000 | | | | | | | |
| **Use 6/16 dia hsd rods,** | | | | **Ast** | = | **12.06** | **sqcm** | | > | **9.83** | **sqcm** |
| Shear force | = | 3.09 | x | 5.525 | / | 2.00 | = | 8.53 | t | | |
| Shear stress | = | 8.53 | x | 1.50 | x | 10000 | / | 230 | x | 417 = | 1.33 N/sqmm |
| 100As/ bd | = | 100 | x | 12.06 | / | 23.00 | x | 41.70 | = | 1.26 | |
| Permissible shear stress | = | 0.53 | N/sqmm | | < | 1.33 | N/sqmm | | | | |
| Unbalanced shear stress | = | 1.33 | - | 0.525 | = | 0.81 | N/sqmm | | | | |
| Unbalanced shear force | = | 0.81 | x | 230 | x | 417 | / | 10000 | = | 7.76 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 150 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 500 | x | 100.48 | x | 417 / | | 150 x | 10000 |
| | = | 12.2 | t | > | 8 | t | | | | | |

**RESULT :**

**Beam section** = **230 X 450 mm**

**Use 6/16 dia hsd rods, at top**

**Use 6/16 dia hsd rods, at bottom**

Using 8 dia TMT 2 legged stirrups at **150 crs**

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## DESIGN OF ROOF BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 7.584 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | 3.792069 | | | | | |
| **Load /m :** | | | | | | 14.3798 | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.325 | = | 0.19 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 2.591 | = | 1.19 | t | | |
| Slab | = | 0.91 | x | 2.40 | / | 1.000 | = | 2.19 | t | | |
| | | | | | | | | **3.57** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Breadth of flange | = | 5309 / 12 | + | 230 | + | 3 | x | 150 | | | |
| | = | 1122 | mm | | | | | | | | |
| Design negative B.M | = | 3.57 | x | 7.584 | x | 7.584 | x | 0.100 | = | 20.53 | t-m |
| Mu/ fck bdd | = | 10.00 | x | 1 | x | 100000 | | | = | 0.100 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.1450 | x | 250 / 5000 | x | 23.00 | x | 41.70 | = | 6.95 | sqcm |
| **Use 2/16+4/32 dia hsd rods,** | | | | **Ast** | = | **25.91** | **sqcm** | | > | **6.95** | **sqcm** |
| Design Positive B.M | = | 3.57 | x | 7.584 | x | 7.584 | x | 0.1 | = | 20.53 | t-m |
| Mu/ fck bdd | = | 20.53 | x | 1.5 | x | 100000 | | | = | 0.063 | |
| | | 250 | x | 112.2408 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0915 | x | 250 / 5000 | x | 112.24 | x | 41.70 | = | 21.41 | sqcm |
| **Use 2/16+4/25 dia hsd rods,** | | | | **Ast** | = | **23.64** | **sqcm** | | > | **21.41** | **sqcm** |
| Shear force | = | 3.57 | x | 7.584 | / | 2.00 | = | 13.53 | t | | |
| Shear stress | = | 13.53 | x | 1.50 | x | 10000 | / | 230 | x | 417 = | 2.12 N/sqmm |
| 100As/ bd | = | 100 | x | 25.91 | / | 23.00 | x | 41.70 | = | 2.70 | |
| Permissible shear stress | = | 0.75 | N/sqmm | | < | 2.12 | N/sqmm | | | | |
| Unbalanced shear stress | = | 2.12 | - | 0.75 | = | 1.37 | N/sqmm | | | | |
| *Unbalanced shear force* | = | 1.37 | x | 230 | x | 417 | / | 10000 | = | 13.11 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 125 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 500 | x | 100.48 | x | 417 / | | 125 x | 10000 |
| | = | 14.6 | t | > | 13 | t | | | | | |

**RESULT :**

**Beam section** = **230 X 450 mm**

**Use 2/16+4/32 dia hsd rods, at top**

**Use 2/16+4/25 dia hsd rods, at bottom**

Using 8 dia TMT 2 legged stirrups at **125 crs**

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## DESIGN OF ROOF BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 4.382 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | 2.19075 | | | | | |
| **Load /m :** | | | | | | 4.79939 | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.325 | = | 0.19 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 3.150 | = | 1.45 | t | | |
| Slab | = | 0.91 | x | 4.19 | / | 1.000 | = | 3.82 | t | | |
| | | | | | | | | **5.46** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Breadth of flange | = | 3067 / 12 | + | 230 | + | 3 | x | 150 | | | |
| | = | 936 | mm | | | | | | | | |
| Design negative B.M | = | 5.46 | x | 4.382 | x | 4.382 | x | 0.083 | = | 8.73 | t-m |
| Mu/ fck bdd | = | 8.73 | x | 1.5 | x | 100000 | | | = | 0.151 | |
| | | 250 | x | 20 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.2260 | x | 250 / 5000 | x | 20.00 | x | 41.70 | = | 9.42 | sqcm |
| **Use 2/25 + 6/32 dia hsd rods,** | | | | **Ast** | = | **58.04** | **sqcm** | | > | **9.42** | **sqcm** |
| Design Positive B.M | = | 5.46 | x | 4.382 | x | 4.382 | x | 0.1 | = | 10.48 | t-m |
| Mu/ fck bdd | = | 10.48 | x | 1.5 | x | 100000 | | | = | 0.039 | |
| | | 250 | x | 93.55875 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0560 | x | 250 / 4200 | x | 93.56 | x | 41.70 | = | 13.02 | sqcm |
| **Use 2/25 + 6/32 dia hsd rods,** | | | | **Ast** | = | **58.04** | **sqcm** | | > | **13.02** | **sqcm** |
| Shear force | = | 5.46 | x | 4.382 | / | 2.00 | = | 11.96 | t | | |
| Shear stress | = | 11.96 | x | 1.50 | x | 10000 | / | 230 | x | 417 = | 1.87 N/sqmm |
| 100As/ bd | = | 100 | x | 58.04 | / | 23.00 | x | 41.70 | = | 6.05 | |
| Permissible shear stress | = | 0.53 | N/sqmm | | < | 1.87 | N/sqmm | | | | |
| Unbalanced shear stress | = | 1.87 | - | 0.525 | = | 1.35 | N/sqmm | | | | |
| Unbalanced shear force | = | 1.35 | x | 230 | x | 417 | / | 10000 | = | 12.90 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 150 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 415 | x | 100.48 | x | 417 | / | 150 x | 10000 |
| | = | 10.1 | t | > | 13 | t | | | | | |

**RESULT :**

**Beam section** = **230 X 450 mm**

**Use 2/25 + 6/32 dia hsd rods, at top**

**Use 2/25 + 6/32 dia hsd rods, at bottom**

Using 8 dia TMT 2 legged stirrups at **150 crs**

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## ROOF SLAB DESIGN

**LOAD/ m2**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Clear short span | = | 3950 | mm | | 3.95 | | | | | | |
| | = | 5220 | mm | | 5.22 | | | | | | |
| Ly / Lx | = | 1.3215 | | < | 1.50 | **DESIGN AS TWO WAY SLAB** | | | | | |
| Slab Thickness Assumed | = | 125 | mm | | | | | | | | |
| Self weight of slab | = | 2.4 | | x | 0.125 | = | 0.3 | t | | | |
| LIVE LOAD | = | | | | | = | 0.50 | t | | | |
| Floor finish | = | 0.1 | | x | 2.00 | = | 0.20 | t | | | |
| | | | | | **Total** | = | 1.000 | or | **1.00** | t | |
| Effective Depth of slab | = | 125 | | - | 25 | - | 4 | = | 96 | mm | |
| Effective short span | = | 3950 | | + | 96 | = | 4046 | mm | | | |
| Effective long span | = | 5220 | | + | 96 | = | 5316 | mm | | | |

Three edges discontinuous, one short edge continuous

**B.M. due to UDL**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Negative short span B.M | = | 0.054 | x | 4.046 | x | 4.046 | x | 1.00 | = | 0.884 | m.t | | |
| positive short span B.M | = | 0.076 | x | 4.046 | x | 4.046 | x | 1.00 | = | 1.244 | m.t | | |
| Negative long span B.M | = | 0.057 | x | 4.046 | x | 4.046 | x | 1.00 | = | 0.933 | m.t | | |
| positive long span B.M | = | 0.043 | x | 4.046 | x | 4.046 | x | 1.00 | = | 0.704 | m.t | | |

**Short span**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.88 | x | 1.00 | x | 100000 | | | = | 0.98 | | | |
| | | 9.807 | x | 100 | x | 9.60 | x | 9.6 | = | | | | |
| Ast Required | = | 0.2400 | x | 1.00 | x | 100.00 | x | 9.60 | = | 2.3 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.3 Sqcm** |
| Mu / bdd | = | 1.24 | x | 1.00 | x | 100000 | | | = | 1.38 | | | |
| | | 9.807 | x | 100 | x | 9.60 | x | 9.6 | = | | | | |
| Ast Required | = | 0.2400 | x | 1.00 | x | 100.00 | x | 9.60 | = | 2.3 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.3 Sqcm** |

**Long span**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.93 | x | 1.50 | x | 100000 | | | = | 1.84 | | | |
| | | 9.807 | x | 100.00 | x | 8.80 | x | 8.8 | = | | | | |
| Ast Required | = | 0.3250 | x | 1.00 | x | 100.00 | x | 8.80 | = | 2.9 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.9 Sqcm** |
| Mu / bdd | = | 0.70 | x | 1.50 | x | 100000 | | | = | 1.39 | | | |
| | | 9.807 | x | 100.00 | x | 8.80 | x | 8.8 | = | | | | |
| Ast Required | = | 0.2430 | x | 1.00 | x | 100.00 | x | 8.80 | = | 2.1 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.1 Sqcm** |

**RESULT :**

| | | | | |
|---|---|---|---|---|
| **Use Thickness of Slab** | = | **125** | **mm** | |
| **Main rods** | = | **Use 8 dia hsd rods at** | **150** | **crs** |
| **Distributors** | = | **Use 8 dia hsd rods at** | **150** | **crs** |

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**LOAD/ m2**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Clear short span | = | 3950 | mm | | 3.95 | | | | | | |
| | = | 10475 | mm | | 10.48 | | | | | | |
| Ly / Lx | = | 2.6519 | | < | 1.00 | **DESIGN AS One WAY SLAB** | | | | | |
| Slab Thickness Assumed | = | 125 | mm | | | | | | | | |
| Self weight of slab | = | 2.4 | | x | 0.115 | = | 0.276 | t | | | |
| LIVE LOAD | = | | | | | = | 0.75 | t | | | |
| Floor finish | = | 0.1 | | x | 2.00 | = | 0.20 | t | | | |
| | | | | | **Total** | = | 1.226 | or | **1.25** | t | |
| Effective Depth of slab | = | 115 | | - | 20 | - | 5 | = | 90 | mm | |
| Effective short span | = | 3950 | | + | 90 | = | 4040 | mm | | | |
| Effective long span | = | 10475 | | + | 90 | = | 10565 | mm | | | |

Two long edges discontinuous

**B.M. due to UDL**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Negative short span B.M | = | 0.100 | x | 4.040 | x | 4.04 | x | 1.25 | = | 2.04 | m.t | | |
| positive short span B.M | = | 0.056 | x | 4.040 | x | 4.04 | x | 1.25 | = | 1.143 | m.t | | |
| Negative long span B.M | = | 0.000 | x | 4.040 | x | 4.04 | x | 1.25 | = | 0 | m.t | | |
| positive long span B.M | = | 0.056 | x | 4.040 | x | 4.04 | x | 1.25 | = | 1.143 | m.t | | |

**Short span**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 2.04 | x | 1.00 | x | 100000 | | | = | 2.57 | | | |
| | | 9.807 | x | 100 | x | 9.00 | x | 9.0 | = | | | | |
| Ast Required | = | 0.3600 | x | 1.00 | x | 100.00 | x | 9.00 | = | 3.2 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **3.2 Sqcm** |
| Mu / bdd | = | 1.14 | x | 1.00 | x | 100000 | | | = | 1.44 | | | |
| | | 9.807 | x | 100 | x | 9.00 | x | 9.0 | = | | | | |
| Ast Required | = | 0.2590 | x | 1.00 | x | 100.00 | x | 9.00 | = | 2.3 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.3 Sqcm** |

**Long span**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.00 | x | 1.50 | x | 100000 | | | = | 0.00 | | | |
| | | 9.807 | x | 100.00 | x | 8.20 | x | 8.2 | = | | | | |
| Ast Required | = | 0.2520 | x | 1.00 | x | 100.00 | x | 8.20 | = | 2.1 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.1 Sqcm** |
| Mu / bdd | = | 1.14 | x | 1.50 | x | 100000 | | | = | 2.60 | | | |
| | | 9.807 | x | 100.00 | x | 8.20 | x | 8.2 | = | | | | |
| Ast Required | = | 0.1950 | x | 1.00 | x | 100.00 | x | 8.20 | = | 1.6 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **1.6 Sqcm** |

**RESULT :**

| | | | | |
|---|---|---|---|---|
| ***Use Thickness of Slab*** | = | ***125 mm*** | | |
| **Main rods** | = | **Use 8 dia hsd rods at** | **150** | **crs** |
| **Distributors** | = | **Use 8 dia hsd rods at** | **150** | **crs** |

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**LOAD/ m2**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clear short span | = | 3.77 | mm | | 0.00 | | | | | | | |
| | = | 6900 | mm | | 6.90 | | | | | | | |
| Ly / Lx | = | 1830.2 | | < | 1.20 | **DESIGN AS TWO WAY SLAB** | | | | | | |
| Slab Thickness Assumed | = | 125 | mm | | | | | | | | | |
| Self weight of slab | = | 2.4 | | x | 0.175 | = | 0.42 | t | | | | |
| LIVE LOAD | = | | | | | = | 0.20 | t | | | | |
| Floor finish | = | 0.05 | | x | 2.00 | = | 0.10 | t | | | | |
| | | | | | **Total** | = | 0.720 | or | **0.72** | t | | |
| Effective Depth of slab | = | 175 | | - | 20 | - | 5 | = | 150 | mm | | |
| Effective short span | = | 4 | | + | 150 | = | 154 | mm | | | | |
| Effective long span | = | 6900 | | + | 150 | = | 7050 | mm | | | | |

one long edges continuous

**B.M. due to UDL**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Negative short span B.M | = | 0.071 | x | | 0.154 | x | 0.15377 | x | 0.72 | = | 0.001 | m.t | | |
| positive short span B.M | = | 0.053 | x | | 0.154 | x | 0.15377 | x | 0.72 | = | 9E-04 | m.t | | |
| Negative long span B.M | = | 0.000 | x | | 0.154 | x | 0.15377 | x | 0.72 | = | 0 | m.t | | |
| positive long span B.M | = | 0.043 | x | | 0.154 | x | 0.15377 | x | 0.72 | = | 7E-04 | m.t | | |

**Short span**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.00 | x | | 1.50 | x | 100000 | | | = | 0.00 | | | |
| | | 9.807 | x | | 100 | x | 15.00 | x | 15.0 | = | | | | |
| Ast Required | = | 0.3590 | x | | 1.00 | x | 100.00 | x | 15.00 | = | 5.4 | sqcm | | |
| | | | | | | 100 | | | | | | | | |
| **Use 10 dia hsd rods at** | **150** | **crs** | | **Ast** | | **=** | **78.50** | **/** | **15.00** | **=** | **5.2** | **Sqcm** | **>** | **5.4 Sqcm** |
| Mu / bdd | = | 0.00 | x | | 1.50 | x | 100000 | | | = | 0.00 | | | |
| | | 9.807 | x | | 100 | x | 15.00 | x | 15.0 | = | | | | |
| Ast Required | = | 0.2590 | x | | 1.00 | x | 100.00 | x | 15.00 | = | 3.9 | sqcm | | |
| | | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **3.9 Sqcm** |

**Long span**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.00 | x | | 1.50 | x | 100000 | | | = | 0.00 | | | |
| | | 9.807 | x | | 100.00 | x | 14.20 | x | 14.2 | = | | | | |
| Ast Required | = | 0.2520 | x | | 1.00 | x | 100.00 | x | 14.20 | = | 3.6 | sqcm | | |
| | | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **3.6 Sqcm** |
| Mu / bdd | = | 0.00 | x | | 1.50 | x | 100000 | | | = | 0.00 | | | |
| | | 9.807 | x | | 100.00 | x | 14.20 | x | 14.2 | = | | | | |
| Ast Required | = | 0.1950 | x | | 1.00 | x | 100.00 | x | 14.20 | = | 2.8 | sqcm | | |
| | | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.8 Sqcm** |

**RESULT :**

| | | | | |
|---|---|---|---|---|
| **Use Thickness of Slab** | = | **125 mm** | | |
| **Main rods** | = | **Use 10 dia hsd rods at** | **150** | **crs** |
| **Distributors** | = | **Use 8 dia hsd rods at** | **150** | **crs** |

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CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
'ThalamuthuNatarajan Building', No.1, Gandhi Irwin Road,
Egmore, Chennai-600 008.

# PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the **Thiru. M. PUNITHAN** has enrolled as **Registered Structural Engineer Grade-II (SE)** with Chennai Metropolitan Development Authority (CMDA) who has the qualification of **A.M.I.E.,(Civil Engg.)** and experience in the relevant field for **26 years**.

He has been given the Registration No.**SE/GR-II/2019/04/044 Renewed** on **10.04.2024.** He shall be required to comply with the duties and responsibilities prescribed by the Government of Tamil Nadu in Part-V, "Registration of Professionals", Tamil Nadu Combined Development and Building Rules, 2019 approved vide G.O.(Ms) No.18 MAWS (MA1) Dept. dated 04.02.2019.

This Registration is valid upto **09.04.2029**.



10/4/24.

**(A. MEGANATHAN)**
**Superintendent**

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# HARMONY RESIDENCES PVT. LTD.

DESIGN CALCULATION

FOR

## RESIDENTIAL BUILDING

STILT + 5 FLOORS 15 DWELLING UNITS IN SINGLE BLOCK

AT NEW NO. 12, OLD NO. 179, RANGARAJAPURAM MAIN ROAD, KODAMBAKKAM, CHENNAI – 600 024 COMPRISED IN T. S. NO. 66, BLOCK 37, PULIYUR VILLAGE, EGMORE TALUK, WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION, DIVISION 134, NEW DIVISION NO. N132, ZONE 10, TAMILNADU.

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ARCHITECTS:
*M/S Diastyle*
NO.65/55, 12th AVENUE
ASHOK NAGAR,
CHENNAI-600 083.
PHONE : 65853326

ENGINEERS:
*M/S MURUGU CONSULTANT*
NO.9A/10, UMAPATHI STREET EXT,
WEST MAMBALAM,
CHENNAI – 600 033.
PHONE : 9884400273.

# MURUGU CONSULTANT

**9A/10, Ist Floor, Umapathy Street Ext.**
**West Mambalam, Chennai – 600 033.**

**PH: 91 – 9884400273**


**To**
The Principal Cheif Engineer,
Greater Chennai Corporation,
Rippen Building, Chennai.

**Dated : 29 - 08 - 2025**

Dear Sir

**Sub : Construction of Residential Building stilt + 5 floors in Kodambakkm – Stability certificate**

The Residential buildings in the address at New door no.12, Old door no.179, Rangarajapuram Main road, Kodambakkam, Chennai – 600 024, Comprised in T. S. no- 66, Block No. 37, in Puliyur Village, Egmore Taluk, Within limits of Greater Chennai Corporation, Division 137, New Division No. N132, Zone 10, is designed as per IS : 456, 2000, IS 1893 (part 1) : 2002 for seismic zone 3 and loading has been taken from IS 875 part 1 & 2 for dead load, live load. & seismic load and for Pile foundation and found structurally sound and safe.

Thanking you

Yours truly,

For MURUGU CONSULTANT

M.PUNITHAN, B.Sc., M.I.E
M-1371961


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## RESIDENTIAL FLATS

### COLUMN A1

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of floors | = | 1 | + | 5 | = | 6 | | | | | | |
| Foundation depth | = | 1.8 | m | | | | | | | | | |
| Ground to floor level | = | 1 | m | | | | | | | | | |
| GFloor to floor height | = | 3.00 | m | | | | | | | | | |
| FFloor to floor height | = | 3.00 | m | | | | | | | | | |
| Thickness of slab assumed | = | 0.125 | m | | | | | | | | | |
| Slab loading t/ sqm | = | 0.623 | t | | | | | | | | | |
| Breadth of beams | = | 0.23 | m | | | | | | | | | |
| Depth of beams assumed | = | 0.681 | m | | | | | | | | | |
| Parapet wall height | = | 1 | m | | | | | | | | | |
| *Plinth beams assumed* | = | 0.34 | m | | | | | | | | | |
| Total height of wall | = | 15.17 | m | | | | | | | | | |
| Total height of column | = | 21.8 | m | | | | | | | | | |
| Size of column | = | 0.45 | x | 0.3 | m | | | | | | | |

**Total load:**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Due to slab | = | 6 | x | 3.43 | x | 3.375 | x | 0.623 | | | = | 43.24 | t |
| Wall | = | 2 | x | 0.23 | x | 6.805 | x | 15.17 | | | = | 47.48 | t |
| Roof beams | = | 2.5 | x | 0.23 | x | 0.556 | x | 0.34 | x | 6 | = | 0.652 | t |
| Plinth beam | = | 2.5 | x | 0.23 | x | 0.34 | x | 0.34 | x | 1 | = | 0.067 | t |
| Self wt | = | 2.5 | x | 0.45 | x | 0.3 | x | 21.8 | | | = | 7.358 | t |
| | | | | | | | | | | | | 98.79 | t |
| | | | | | | Total | | | | | = | **98.79** | t |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Using size of column to be** | = | **450** | **X** | **300** | **mm** | | | | | | |
| **With 10/20 + 0/12 Rods, Ast** | = | 10 | x | 201 | + | 4 | x | 113 | = | 2462 | sqmm |
| Capacity of column | = | 450 | x | 300 | x | 6 | + | 2462 | x | 190 | |
| | = | **127.8** | **t** | > | | **148** | **t** | | | | |
| Minimum Reinforcement | = | 0.008 | x | 45 | x | 30 | = | 10.8 | sqcm | < | 24.62 sqcm |
| % of Reinforcement | = | 2462 | / | 45 | x | 30 | = | 1.824 | < | 4 | |

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**COLUMN N4**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of floors | = | 1 | + | 5 | = | 6 | | | | | | |
| Foundation depth | = | 1.8 | m | | | | | | | | | |
| Ground to floor level | = | 1 | m | | | | | | | | | |
| GFloor to floor height | = | 3.00 | m | | | | | | | | | |
| FFloor to floor height | = | 3.00 | m | | | | | | | | | |
| Thickness of slab assumed | = | 0.125 | m | | | | | | | | | |
| Slab loading t/ sqm | = | 0.623 | t | | | | | | | | | |
| Breadth of beams | = | 0.23 | m | | | | | | | | | |
| Depth of beams assumed | = | 0.413 | m | | | | | | | | | |
| Parapet wall height | = | 1 | m | | | | | | | | | |
| Plinth beams assumed | = | 0.413 | m | | | | | | | | | |
| Total height of wall | = | 16.77 | m | | | | | | | | | |
| Total height of column | = | 21.8 | m | | | | | | | | | |
| Size of column | = | 0.45 | x | 0.3 | m | | | | | | | |

**Total load:**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Due to slab | = | 6 | x | 3.43 | x | 4.823 | x | 0.623 | | | = | 61.78 | t |
| Wall | = | 2 | x | 0.23 | x | 8.253 | x | 16.77 | | | = | 63.68 | t |
| Roof beams | = | 2.5 | x | 0.23 | x | 0.288 | x | 0.413 | x | 6 | = | 0.409 | t |
| Plinth beam | = | 2.5 | x | 0.23 | x | 0.413 | x | 0.413 | x | 1 | = | 0.098 | t |
| Self wt | = | 2.5 | x | 0.45 | x | 0.3 | x | 21.8 | | | = | 7.358 | t |
| | | | | | | | | | | | | 133.3 | t |
| | | | | | | Total | | | | | = | **133.3** | t |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Using size of column to be** | = | **450** | **X** | **300** | **mm** | | | | | | |
| **With 8/20 + 4/12 Rods, Ast** | = | 8 | x | 314 | + | 3 | x | 113 | = | 2851 | sqmm |
| Capacity of column | = | 450 | x | 300 | x | 6 | + | 2851 | x | 190 | |
| | = | **135.2** | **t** | > | | **200** | **t** | | | | |
| Minimum Reinforcement | = | 0.008 | x | 45 | x | 30 | = | 10.8 | sqcm | < | 28.51 sqcm |
| % of Reinforcement | = | 2851 | / | 45 | x | 30 | = | 2.112 | < | 4 | |

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**COLUMN N4**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. of floors | = | 1 | + | 5 | = | 6 | | | | | | |
| Foundation depth | = | 1.8 | m | | | | | | | | | |
| Ground to floor level | = | 1 | m | | | | | | | | | |
| GFloor to floor height | = | 3.00 | m | | | | | | | | | |
| FFloor to floor height | = | 3.00 | m | | | | | | | | | |
| Thickness of slab assumed | = | 0.125 | m | | | | | | | | | |
| Slab loading t/ sqm | = | 0.623 | t | | | | | | | | | |
| Breadth of beams | = | 0.23 | m | | | | | | | | | |
| Depth of beams assumed | = | 0.314 | m | | | | | | | | | |
| Parapet wall height | = | 1 | m | | | | | | | | | |
| Plinth beams assumed | = | 0.243 | m | | | | | | | | | |
| Total height of wall | = | 17.36 | m | | | | | | | | | |
| Total height of column | = | 21.8 | m | | | | | | | | | |
| Size of column | = | 0.45 | x | 0.23 | m | | | | | | | |

**Total load:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Due to slab | = | 6 | x | 3.43 | x | 2.855 | x | 0.623 | | | = | 36.58 t |
| Wall | = | 2 | x | 0.23 | x | 4.858 | x | 17.36 | | | = | 38.8 t |
| Roof beams | = | 2.5 | x | 0.2 | x | 0.189 | x | 0.243 | x | 6 | = | 0.138 t |
| Plinth beam | = | 2.5 | x | 0.2 | x | 0.243 | x | 0.243 | x | 1 | = | 0.029 t |
| Self wt | = | 2.5 | x | 0.45 | x | 0.23 | x | 21.8 | | | = | 5.641 t |
| | | | | | | | | | | | | 81.18 t |
| | | | | | | Total | | | | | = | **81.18 t** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Using size of column to be** | = | **450** | **X** | **230** | **mm** | | | | | | |
| **With 10/32 Rods, Ast** | = | 8 | x | 314 | + | 3 | x | 113 | = | 2851 | sqmm |
| | | | | D | | | | | | | |
| Capacity of column | = | 450 | x | 230 | x | 6 | + | 2851 | x | 190 | |
| | = | **116.3 t** | | > | | **122 t** | | | | | |
| Minimum Reinforcement | = | 0.008 | x | 45 | x | 23 | = | 8.28 | sqcm | < | 28.51 sqcm |
| % of Reinforcement | = | 2851 | / | 45 | x | 23 | = | 2.755 | < | 4 | |

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**Design of sections**

**Piles**

Using M30 concrete and TMT bars 500 grade

| | | | |
|---|---|---|---|
| σ ac in concrete | = | 81.6 | kg/sq-cm |
| σ bc in concrete | = | 102 | kg/sq-cm |
| σ ac in steel | = | 1938 | kg/sq-cm |

Vertical load, V ( t ) 220 / 2 = 110

**I. For 500 dia. pile with end bearing**

a) Safe bearing capacity of pile ( t ) = 3.142 x 0.5 x 0.5 x 750 / 4
= 147.3

b) Bearing load / sq-m. 110 / 0.785
140 < 147.3 o.k

c) V / bc d d = 110 x 1500 / 250000 x 30
= 0.022

d) Ve / bc d d d = 0 x 1500 / 1.25E+08 x 30
= 0.000

Using 16 dia HSD rods d'/D = 83 / 450 = 0.184
Using chart 57 & 58 of SP:16-1980

e) As required (sq-cm.) 0 x 3.142 x 450 x 450 x 30 / 400
0.0

Min area of reinforcement = 0.004 x 3.142 x 45 x 45 / 4
= 6.362 sq-cm

Use 6/16 dia. HSD rods = 6 x 2.011
= 12.06 sq-cm > 6.36 sq-cm

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## Pile cap

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Column size | | | 300 | x | 450 | | | |
| Pedestal size | | | 650 | x | 1775 | | | |
| Area of pedestal | = | 65 | x | 177.5 | = | 11537.5 | sq-cm | |
| Actual stress | = | 110 | x | 1500 | / | 11537.5 | | |
| | = | 14.3 | kg/sq-cm | | | | | |
| Permissible stress | = | 0.45 | x | 300 | / | 11537.5 | / | 1350 |
| | = | 135 | x | 2.923 | = | 395 | kg/sq-cm | |

So use plain concrete pedestal of 30cm all around

Coinciding the critical section for shear with outerface of the pile in each direction

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0.5 | / | 2 | + | 0.225 | + | d/2 | = | 0.63 | + 0.25 |
| | | | 0.475 | + | d/2 | = | 0.875 | | | | | |
| | d/2 | = | 0.875 | - | 0.475 | = | 0.4 | | | | | |
| | d | = | 0.8 | | | | | | | | | |
| Provide | d | = | 0.715 | | | | | | | | | |
| | D | = | 0.8 | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BM | = | 1 | x | 110 | ( | 0.75 | - | 0.3 | ) | | | |
| | = | 49.5 | m-t | | | | | | | | | |
| Mu/bd2 | = | 49.5 | x | 1.5 | x | 100000 | /( | 225.0 | x | 71.5 | x | 71.5 x 300 ) |
| | = | 0.022 | x | 30 | = | 0.65 | | | | | | |
| Area of steel required | = | 0.09 | x | 225.0 | x | 71.5 | / | 100 | | | | |
| | = | 14.8 | sq-cm | | | | | | | | | |
| Min steel required | = | 0.0012 | x | 90 | x | 225 | | | | | | |
| | = | 24.3 | sq-cm | | | | | | | | | |
| Use 20dia. HSD bars At 100 | = | 10 | x | 3.14 | = | 31.40 | | | | | | |

## Shear

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Critical section for shear | = | 250 | + | 300 | + | 357.5 | = | 907.5 mm |
| The pile outer edge | = | 625 | + | 250 | = | 875 | < | 907.5 |

So shear reinforcement is not provided

For top of pile cap and pedestal use nominal Reinforcement
Use 16 dia. At 200 crs

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## DESIGN OF PLINTH BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 5.525 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | | | | | | |
| **Load /m :** | | | | | | | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.45 | = | 0.26 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 2.400 | = | 1.10 | t | | |
| | | | | | | | | **1.36** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Design negative B.M | = | 1.36 | x | 5.525 | x | 5.525 | x | 0.100 | = | 4.16 | t-m |
| Mu/ fck bdd | = | 4.16 | x | 1.5 | x | 100000 | | | = | 0.062 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0905 | x | 250 | x | 23.00 | x | 41.70 | = | 4.34 | sqcm |
| | | | | 5000 | | | | | | | |
| **Use 2/12 + 2/16 dia hsd rods,** | | | | **Ast** | = | **8.54** | **sqcm** | | > | **4.34** | **sqcm** |
| Design Positive B.M | = | 1.36 | x | 5.525 | x | 5.525 | x | 0.08333 | = | 3.47 | t-m |
| Mu/ fck bdd | = | 3.47 | x | 1.5 | x | 100000 | | | = | 0.052 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0754 | x | 250 | x | 23.00 | x | 41.70 | = | 4.30 | sqcm |
| | | | | 4200 | | | | | | | |
| **Use 2/12 + 2/16 dia hsd rods,** | | | | **Ast** | = | **6.28** | **sqcm** | | > | **4.30** | **sqcm** |
| Shear force | = | 1.36 | x | 1.000 | / | 1.00 | = | 1.36 | t | | |
| Shear stress | = | 1.36 | x | 1.00 | x | 10000 | / | 230 | x | 417 | = 0.14 N/sqmm |
| 100As/ bd | = | 100 | x | 8.54 | / | 23.00 | x | 41.70 | = | 0.89 | |
| Permissible shear stress | = | 0.44 | N/sqmm | | < | 0.14 | N/sqmm | | | | |
| Unbalanced shear stress | = | 0.14 | - | 0.442 | = | -0.30 | N/sqmm | | | | |
| Unbalanced shear force | = | -0.30 | x | 230 | x | 417 | / | 10000 | = | -2.88 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 100 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 415 | x | 100.48 | x | 417 | / | 100 | x 10000 |
| | = | 15.1 | t | > | -3 | t | | | | | |

## RESULT :

| | | |
|---|---|---|
| **Beam section** | = | **230 X 450 mm** |
| **Use 2/12 + 2/16 dia hsd rods,** | | **at top** |
| **Use 2/12 + 2/16 dia hsd rods,** | | **at bottom** |
| Using 8 dia TMT 2 legged stirrups at | | **100 crs** |

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## DESIGN OF PLINTH BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 8.041 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | | | | | | |
| **Load /m :** | | | | | | | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.45 | = | 0.26 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 1.500 | = | 0.69 | t | | |
| | | | | | | | | **0.95** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Design negative B.M | = | 0.95 | x | 8.041 | x | 8.041 | x | 0.100 | = | 6.14 | t-m |
| | = | 6.14 | x | 1.5 | x | 100000 | | | = | 0.092 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.1335 | x | 250 | x | 23.00 | x | 41.70 | = | 6.40 | sqcm |
| | | | | 5000 | | | | | | | |
| **Use 2/12+4/16 dia hsd rods,** | | | | **Ast** | = | **10.30** | **sqcm** | | > | **6.40** | **sqcm** |
| Design Positive B.M | = | 0.95 | x | 8.041 | x | 8.041 | x | 0.08333 | = | 5.11 | t-m |
| Mu/ fck bdd | = | 5.11 | x | 1.5 | x | 100000 | | | = | 0.077 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.1112 | x | 250 | x | 23.00 | x | 41.70 | = | 6.35 | sqcm |
| | | | | 4200 | | | | | | | |
| **Use 2/12+4/16 dia hsd rods,** | | | | **Ast** | = | **10.30** | **sqcm** | | > | **6.35** | **sqcm** |
| Shear force | = | 0.95 | x | 8.041 | / | 2.00 | = | 3.81 | t | | |
| Shear stress | = | 3.81 | x | 1.50 | x | 10000 | / | 230 | x | 417 = | 0.60 N/sqmm |
| 100As/ bd | = | 100 | x | 10.30 | / | 23.00 | x | 41.70 | = | 1.07 | |
| Permissible shear stress | = | 0.44 | N/sqmm | | < | 0.60 | N/sqmm | | | | |
| Unbalanced shear stress | = | 0.60 | - | 0.442 | = | 0.15 | N/sqmm | | | | |
| Unbalanced shear force | = | 0.15 | x | 230 | x | 417 | / | 10000 | = | 1.48 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 100 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 415 | x | 100.48 | x | 417 | / | 100 x | 10000 |
| | = | 15.1 | t | > | 1 | t | | | | | |

## RESULT :

| | | |
|---|---|---|
| **Beam section** | = | **230 X 450 mm** |
| **Use 2/12+4/16 dia hsd rods,** | | **at top** |
| **Use 2/12+4/16 dia hsd rods,** | | **at bottom** |
| Using 8 dia TMT 2 legged stirrups at | | **100 crs** |

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## DESIGN OF PLINTH BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 4.382 m | | | | | | | | | |
| Assuming beam size to be | | 230 x | 450 | mm | | | | | | | |
| **Load /m :** | | | | | | | | | | | |
| Self wt. of beam | = | 2.5 x | 0.23 | x | 0.45 | = | 0.26 t | | | | |
| Wall | = | 2.0 x | 0.23 | x | 3.900 | = | 1.79 t | | | | |
| | | | | | | | **2.05** t | | | | |
| Effective Depth of beam | = | 450 - | 25 | - | 8 | = | 417 mm | | | | |
| Design negative B.M | = | 2.05 x | 4.382 | x | 4.382 | x | 0.083 = | 3.28 t-m | | | |
| Mu/ fck bdd | = | 3.28 x | 1.5 | x | 100000 | | = | 0.049 | | | |
| | | 250 x | 23 | x | 41.70 | x | 41.70 | | | | |
| Ast required | = | 0.0714 x | 250 | x | 23.00 | x | 41.70 = | 4.08 sqcm | | | |
| | | | 4200 | | | | | | | | |
| **Use 2/12+1/16 dia hsd rods,** | | | **Ast** | **=** | **4.27 sqcm** | | **>** | **4.08 sqcm** | | | |
| Design Positive B.M | = | 2.05 x | 4.382 | x | 4.382 | x | 0.08333 = | 3.28 t-m | | | |
| Mu/ fck bdd | = | 3.28 x | 1.5 | x | 100000 | | = | 0.049 | | | |
| | | 250 x | 23 | x | 41.70 | x | 41.70 | | | | |
| Ast required | = | 0.0714 x | 250 | x | 23.00 | x | 41.70 = | 4.08 sqcm | | | |
| | | | 4200 | | | | | | | | |
| **Use 2/12+1/16 dia hsd rods,** | | | **Ast** | **=** | **4.27 sqcm** | | **>** | **4.08 sqcm** | | | |
| Shear force | = | 2.05 x | 4.382 | / | 2.00 | = | 4.50 t | | | | |
| Shear stress | = | 4.50 x | 1.50 | x | 10000 | / | 230 x | 417 = | 0.70 N/sqmm | | |
| 100As/ bd | = | 100 x | 4.27 | / | 23.00 | x | 41.70 = | 0.45 | | | |
| Permissible shear stress | = | 0.44 N/sqmm | | < | 0.70 N/sqmm | | | | | | |
| Unbalanced shear stress | = | 0.70 - | 0.442 | = | 0.26 N/sqmm | | | | | | |
| Unbalanced shear force | = | 0.26 x | 230 | x | 417 | / | 10000 = | 2.51 t | | | |
| Using 8 dia TMT 2 legged stirrups at | | | 150 | crs | | | | | | | |
| Shear Capacity | = | 0.87 x | 415 | x | 100.48 | x | 417 / | 150 x | 10000 | | |
| | = | 10.1 t | > | 3 | t | | | | | | |

## RESULT :

**Beam section** = **230 X 450 mm**
**Use 2/12+1/16 dia hsd rods, at top**
**Use 2/12+1/16 dia hsd rods, at bottom**
Using 8 dia TMT 2 legged stirrups at **150 crs**

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## DESIGN OF ROOF BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 5.525 m | | | | | | | | | |
| Assuming beam size to be | | 230 x | 450 | mm | 2.76225 | | | | | | |
| **Load /m :** | | | | | 7.63003 | | | | | | |
| Self wt. of beam | = | 2.5 x | 0.23 | x | 0.325 | = | 0.19 t | | | | |
| Wall | = | 2.0 x | 0.23 | x | 2.591 | = | 1.19 t | | | | |
| Slab | = | 0.71 x | 2.40 | / | 1.000 | = | 1.71 t | | | | |
| | | | | | | | **3.09** t | | | | |
| Effective Depth of beam | = | 450 - | 25 | - | 8 | = | 417 mm | | | | |
| Breadth of flange | = | 3867 / 12 + | 230 | + | 3 | x | 150 | | | | |
| | = | 1002 mm | | | | | | | | | |
| Design negative B.M | = | 3.09 x | 5.525 | x | 5.525 | x | 0.100 = | 9.43 t-m | | | |
| Mu/ fck bdd | = | 9.43 x | 1.5 | x | 100000 | | = | 0.141 | | | |
| | | 250 x | 23 | x | 41.70 | x | 41.70 | | | | |
| Ast required | = | 0.2121 x | 250 | x | 23.00 | x | 41.70 = | 10.17 sqcm | | | |
| | | | 5000 | | | | | | | | |
| **Use 6/16 dia hsd rods,** | | | **Ast** | = | **12.06 sqcm** | | > | **10.17 sqcm** | | | |
| Design Positive B.M | = | 3.09 x | 5.525 | x | 5.525 | x | 0.1 = | 9.43 t-m | | | |
| Mu/ fck bdd | = | 9.43 x | 1.5 | x | 100000 | | = | 0.041 | | | |
| | | 200 x | 100.2263 | x | 41.70 | x | 41.70 | | | | |
| Ast required | = | 0.0588 x | 200 | x | 100.23 | x | 41.70 = | 9.83 sqcm | | | |
| | | | 5000 | | | | | | | | |
| **Use 6/16 dia hsd rods,** | | | **Ast** | = | **12.06 sqcm** | | > | **9.83 sqcm** | | | |
| Shear force | = | 3.09 x | 5.525 | / | 2.00 | = | 8.53 t | | | | |
| Shear stress | = | 8.53 x | 1.50 | x | 10000 | / | 230 x | 417 = | 1.33 N/sqmm | | |
| 100As/ bd | = | 100 x | 12.06 | / | 23.00 | x | 41.70 = | 1.26 | | | |
| Permissible shear stress | = | 0.53 N/sqmm | | < | 1.33 N/sqmm | | | | | | |
| Unbalanced shear stress | = | 1.33 - | 0.525 | = | 0.81 N/sqmm | | | | | | |
| *Unbalanced shear force* | = | 0.81 x | 230 | x | 417 | / | 10000 = | 7.76 *t* | | | |
| Using 8 dia TMT 2 legged stirrups at | | | 150 | crs | | | | | | | |
| Shear Capacity | = | 0.87 x | 500 | x | 100.48 | x | 417 / | 150 x | 10000 | | |
| | = | 12.2 t | > | 8 | t | | | | | | |

## RESULT :

**Beam section** = **230 X 450 mm**
**Use 6/16 dia hsd rods, at top**
**Use 6/16 dia hsd rods, at bottom**
Using 8 dia TMT 2 legged stirrups at **150 crs**

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## DESIGN OF ROOF BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 7.584 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | 3.792069 | | | | | |
| **Load /m :** | | | | | | 14.3798 | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.325 | = | 0.19 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 2.591 | = | 1.19 | t | | |
| Slab | = | 0.91 | x | 2.40 | / | 1.000 | = | 2.19 | t | | |
| | | | | | | | | **3.57** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Breadth of flange | = | 5309 / 12 | + | 230 | + | 3 | x | 150 | | | |
| | = | 1122 | mm | | | | | | | | |
| Design negative B.M | = | 3.57 | x | 7.584 | x | 7.584 | x | 0.100 | = | 20.53 | t-m |
| Mu/ fck bdd | = | 10.00 | x | 1 | x | 100000 | | | = | 0.100 | |
| | | 250 | x | 23 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.1450 | x | 250 / 5000 | x | 23.00 | x | 41.70 | = | 6.95 | sqcm |
| **Use 2/16+4/32 dia hsd rods,** | | | | **Ast** | = | **25.91** | **sqcm** | | > | **6.95** | **sqcm** |
| Design Positive B.M | = | 3.57 | x | 7.584 | x | 7.584 | x | 0.1 | = | 20.53 | t-m |
| Mu/ fck bdd | = | 20.53 | x | 1.5 | x | 100000 | | | = | 0.063 | |
| | | 250 | x | 112.2408 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0915 | x | 250 / 5000 | x | 112.24 | x | 41.70 | = | 21.41 | sqcm |
| **Use 2/16+4/25 dia hsd rods,** | | | | **Ast** | = | **23.64** | **sqcm** | | > | **21.41** | **sqcm** |
| Shear force | = | 3.57 | x | 7.584 | / | 2.00 | = | 13.53 | t | | |
| Shear stress | = | 13.53 | x | 1.50 | x | 10000 | / | 230 | x | 417 = | 2.12 N/sqmm |
| 100As/ bd | = | 100 | x | 25.91 | / | 23.00 | x | 41.70 | = | 2.70 | |
| Permissible shear stress | = | 0.75 | N/sqmm | | < | 2.12 | N/sqmm | | | | |
| Unbalanced shear stress | = | 2.12 | - | 0.75 | = | 1.37 | N/sqmm | | | | |
| Unbalanced shear force | = | 1.37 | x | 230 | x | 417 | / | 10000 | = | 13.11 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 125 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 500 | x | 100.48 | x | 417 / | | 125 x | 10000 |
| | = | 14.6 | t | > | 13 | t | | | | | |

**RESULT :**

**Beam section** = **230 X 450 mm**

**Use 2/16+4/32 dia hsd rods, at top**

**Use 2/16+4/25 dia hsd rods, at bottom**

Using 8 dia TMT 2 legged stirrups at **125 crs**



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## DESIGN OF ROOF BEAM

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Span considered | = | 4.382 | m | | | | | | | | |
| Assuming beam size to be | | 230 | x | 450 | mm | 2.19075 | | | | | |
| **Load /m :** | | | | | | 4.79939 | | | | | |
| Self wt. of beam | = | 2.5 | x | 0.23 | x | 0.325 | = | 0.19 | t | | |
| Wall | = | 2.0 | x | 0.23 | x | 3.150 | = | 1.45 | t | | |
| Slab | = | 0.91 | x | 4.19 | / | 1.000 | = | 3.82 | t | | |
| | | | | | | | | **5.46** | t | | |
| Effective Depth of beam | = | 450 | - | 25 | - | 8 | = | 417 | mm | | |
| Breadth of flange | = | 3067 | + | 230 | + | 3 | x | 150 | | | |
| | | 12 | | | | | | | | | |
| | = | 936 | mm | | | | | | | | |
| Design negative B.M | = | 5.46 | x | 4.382 | x | 4.382 | x | 0.083 | = | 8.73 | t-m |
| Mu/ fck bdd | = | 8.73 | x | 1.5 | x | 100000 | | | = | 0.151 | |
| | | 250 | x | 20 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.2260 | x | 250 | x | 20.00 | x | 41.70 | = | 9.42 | sqcm |
| | | | | 5000 | | | | | | | |
| **Use 2/25 + 6/32 dia hsd rods,** | | | | **Ast** | = | **58.04** | **sqcm** | | > | **9.42** | **sqcm** |
| Design Positive B.M | = | 5.46 | x | 4.382 | x | 4.382 | x | 0.1 | = | 10.48 | t-m |
| Mu/ fck bdd | = | 10.48 | x | 1.5 | x | 100000 | | | = | 0.039 | |
| | | 250 | x | 93.55875 | x | 41.70 | x | 41.70 | | | |
| Ast required | = | 0.0560 | x | 250 | x | 93.56 | x | 41.70 | = | 13.02 | sqcm |
| | | | | 4200 | | | | | | | |
| **Use 2/25 + 6/32 dia hsd rods,** | | | | **Ast** | = | **58.04** | **sqcm** | | > | **13.02** | **sqcm** |
| Shear force | = | 5.46 | x | 4.382 | / | 2.00 | = | 11.96 | t | | |
| Shear stress | = | 11.96 | x | 1.50 | x | 10000 | / | 230 | x | 417 = | 1.87 N/sqmm |
| 100As/ bd | = | 100 | x | 58.04 | / | 23.00 | x | 41.70 | = | 6.05 | |
| Permissible shear stress | = | 0.53 | N/sqmm | | < | 1.87 | N/sqmm | | | | |
| Unbalanced shear stress | = | 1.87 | - | 0.525 | = | 1.35 | N/sqmm | | | | |
| Unbalanced shear force | = | 1.35 | x | 230 | x | 417 | / | 10000 | = | 12.90 | t |
| Using 8 dia TMT 2 legged stirrups at | | | | 150 | crs | | | | | | |
| Shear Capacity | = | 0.87 | x | 415 | x | 100.48 | x | 417 | / | 150 x | 10000 |
| | = | 10.1 | t | > | 13 | t | | | | | |

**RESULT :**

**Beam section** = **230 X 450 mm**

**Use 2/25 + 6/32 dia hsd rods, at top**

**Use 2/25 + 6/32 dia hsd rods, at bottom**

Using 8 dia TMT 2 legged stirrups at **150 crs**

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## ROOF SLAB DESIGN

**LOAD/ m2**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Clear short span | = | 3950 | mm | | 3.95 | | | | | | |
| | = | 5220 | mm | | 5.22 | | | | | | |
| Ly / Lx | = | 1.3215 | | < | 1.50 | DESIGN AS TWO WAY SLAB | | | | | |
| Slab Thickness Assumed | = | 125 | mm | | | | | | | | |
| Self weight of slab | = | 2.4 | | x | 0.125 | = | 0.3 | t | | | |
| LIVE LOAD | = | | | | | = | 0.50 | t | | | |
| Floor finish | = | 0.1 | | x | 2.00 | = | 0.20 | t | | | |
| | | | | | **Total** | = | 1.000 | or | **1.00** | t | |
| Effective Depth of slab | = | 125 | | - | 25 | - | 4 | = | 96 | mm | |
| Effective short span | = | 3950 | | + | 96 | = | 4046 | mm | | | |
| Effective long span | = | 5220 | | + | 96 | = | 5316 | mm | | | |

Three edges discontinuous, one short edge continuous

**B.M. due to UDL**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Negative short span B.M | = | 0.054 | x | 4.046 | x | 4.046 | x | 1.00 | = | 0.884 | m.t | | |
| positive short span B.M | = | 0.076 | x | 4.046 | x | 4.046 | x | 1.00 | = | 1.244 | m.t | | |
| Negative long span B.M | = | 0.057 | x | 4.046 | x | 4.046 | x | 1.00 | = | 0.933 | m.t | | |
| positive long span B.M | = | 0.043 | x | 4.046 | x | 4.046 | x | 1.00 | = | 0.704 | m.t | | |

**Short span**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.88 | x | 1.00 | x | 100000 | | | = | 0.98 | | | |
| | | 9.807 | x | 100 | x | 9.60 | x | 9.6 | = | | | | |
| Ast Required | = | 0.2400 | x | 1.00 | x | 100.00 | x | 9.60 | = | 2.3 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.3 Sqcm** |
| Mu / bdd | = | 1.24 | x | 1.00 | x | 100000 | | | = | 1.38 | | | |
| | | 9.807 | x | 100 | x | 9.60 | x | 9.6 | = | | | | |
| Ast Required | = | 0.2400 | x | 1.00 | x | 100.00 | x | 9.60 | = | 2.3 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.3 Sqcm** |

**Long span**

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.93 | x | 1.50 | x | 100000 | | | = | 1.84 | | | |
| | | 9.807 | x | 100.00 | x | 8.80 | x | 8.8 | = | | | | |
| Ast Required | = | 0.3250 | x | 1.00 | x | 100.00 | x | 8.80 | = | 2.9 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.9 Sqcm** |
| Mu / bdd | = | 0.70 | x | 1.50 | x | 100000 | | | = | 1.39 | | | |
| | | 9.807 | x | 100.00 | x | 8.80 | x | 8.8 | = | | | | |
| Ast Required | = | 0.2430 | x | 1.00 | x | 100.00 | x | 8.80 | = | 2.1 | sqcm | | |
| | | | | | 100 | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.1 Sqcm** |

**RESULT :**

| | | | | |
|---|---|---|---|---|
| **Use Thickness of Slab** | = | **125** | **mm** | |
| **Main rods** | = | **Use 8 dia hsd rods at** | **150** | **crs** |
| **Distributors** | = | **Use 8 dia hsd rods at** | **150** | **crs** |

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**LOAD/ m2**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clear short span | = | 3950 | mm | | 3.95 | | | | | | | |
| | = | 10475 | mm | | 10.48 | | | | | | | |
| Ly / Lx | = | 2.6519 | | < | 1.00 | **DESIGN AS One WAY SLAB** | | | | | | |
| Slab Thickness Assumed | = | 125 | mm | | | | | | | | | |
| Self weight of slab | = | 2.4 | | x | 0.115 | = | 0.276 | t | | | | |
| LIVE LOAD | = | | | | | = | 0.75 | t | | | | |
| *Floor finish* | = | 0.1 | | x | 2.00 | = | 0.20 | t | | | | |
| | | | | | **Total** | = | 1.226 | or | **1.25** | t | | |
| Effective Depth of slab | = | 115 | | - | 20 | - | 5 | = | 90 | mm | | |
| Effective short span | = | 3950 | | + | 90 | = | 4040 | mm | | | | |
| Effective long span | = | 10475 | | + | 90 | = | 10565 | mm | | | | |

Two long edges discontinuous

**B.M. due to UDL**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Negative short span B.M | = | 0.100 | x | 4.040 | x | 4.04 | x | 1.25 | = | 2.04 | m.t | | | |
| positive short span B.M | = | 0.056 | x | 4.040 | x | 4.04 | x | 1.25 | = | 1.143 | m.t | | | |
| Negative long span B.M | = | 0.000 | x | 4.040 | x | 4.04 | x | 1.25 | = | 0 | m.t | | | |
| positive long span B.M | = | 0.056 | x | 4.040 | x | 4.04 | x | 1.25 | = | 1.143 | m.t | | | |

**Short span**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 2.04 | x | 1.00 | x | 100000 | | | = | 2.57 | | | | |
| | | 9.807 | x | 100 | x | 9.00 | x | 9.0 | = | | | | | |
| Ast Required | = | 0.3600 | x | 1.00 | x | 100.00 | x | 9.00 | = | 3.2 | sqcm | | | |
| | | | | | 100 | | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **3.2** | **Sqcm** |
| Mu / bdd | = | 1.14 | x | 1.00 | x | 100000 | | | = | 1.44 | | | | |
| | | 9.807 | x | 100 | x | 9.00 | x | 9.0 | = | | | | | |
| Ast Required | = | 0.2590 | x | 1.00 | x | 100.00 | x | 9.00 | = | 2.3 | sqcm | | | |
| | | | | | 100 | | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.3** | **Sqcm** |

**Long span**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.00 | x | 1.50 | x | 100000 | | | = | 0.00 | | | | |
| | | 9.807 | x | 100.00 | x | 8.20 | x | 8.2 | = | | | | | |
| Ast Required | = | 0.2520 | x | 1.00 | x | 100.00 | x | 8.20 | = | 2.1 | sqcm | | | |
| | | | | | 100 | | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.1** | **Sqcm** |
| Mu / bdd | = | 1.14 | x | 1.50 | x | 100000 | | | = | 2.60 | | | | |
| | | 9.807 | x | 100.00 | x | 8.20 | x | 8.2 | = | | | | | |
| Ast Required | = | 0.1950 | x | 1.00 | x | 100.00 | x | 8.20 | = | 1.6 | sqcm | | | |
| | | | | | 100 | | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **1.6** | **Sqcm** |

**RESULT :**

| | | | | |
|---|---|---|---|---|
| ***Use Thickness of Slab*** | = | ***125 mm*** | | |
| **Main rods** | = | **Use 8 dia hsd rods at** | **150** | **crs** |
| **Distributors** | = | **Use 8 dia hsd rods at** | **150** | **crs** |

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**LOAD/ m2**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clear short span | = | 3.77 | mm | | 0.00 | | | | | | | |
| | = | 6900 | mm | | 6.90 | | | | | | | |
| Ly / Lx | = | 1830.2 | | < | 1.20 | **DESIGN AS TWO WAY SLAB** | | | | | | |
| Slab Thickness Assumed | = | 125 | mm | | | | | | | | | |
| Self weight of slab | = | 2.4 | | x | 0.175 | = | 0.42 | t | | | | |
| LIVE LOAD | = | | | | | = | 0.20 | t | | | | |
| *Floor finish* | = | 0.05 | | x | 2.00 | = | 0.10 | t | | | | |
| | | | | | **Total** | = | 0.720 | or | **0.72** | t | | |
| Effective Depth of slab | = | 175 | | - | 20 | - | 5 | = | 150 | mm | | |
| Effective short span | = | 4 | | + | 150 | = | 154 | mm | | | | |
| Effective long span | = | 6900 | | + | 150 | = | 7050 | mm | | | | |

one long edges continuous

**B.M. due to UDL**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Negative short span B.M | = | 0.071 | x | 0.154 | x | 0.15377 | x | 0.72 | = | 0.001 | m.t | | | |
| positive short span B.M | = | 0.053 | x | 0.154 | x | 0.15377 | x | 0.72 | = | 9E-04 | m.t | | | |
| Negative long span B.M | = | 0.000 | x | 0.154 | x | 0.15377 | x | 0.72 | = | 0 | m.t | | | |
| positive long span B.M | = | 0.043 | x | 0.154 | x | 0.15377 | x | 0.72 | = | 7E-04 | m.t | | | |

**Short span**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.00 | x | 1.50 | x | 100000 | | | = | 0.00 | | | | |
| | | 9.807 | x | 100 | x | 15.00 | x | 15.0 | = | | | | | |
| Ast Required | = | 0.3590 | x | 1.00 | x | 100.00 | x | 15.00 | = | 5.4 | sqcm | | | |
| | | | | | 100 | | | | | | | | | |
| **Use 10 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **78.50** | **/** | **15.00** | **=** | **5.2** | **Sqcm** | **>** | **5.4** | **Sqcm** |
| Mu / bdd | = | 0.00 | x | 1.50 | x | 100000 | | | = | 0.00 | | | | |
| | | 9.807 | x | 100 | x | 15.00 | x | 15.0 | = | | | | | |
| Ast Required | = | 0.2590 | x | 1.00 | x | 100.00 | x | 15.00 | = | 3.9 | sqcm | | | |
| | | | | | 100 | | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **3.9** | **Sqcm** |

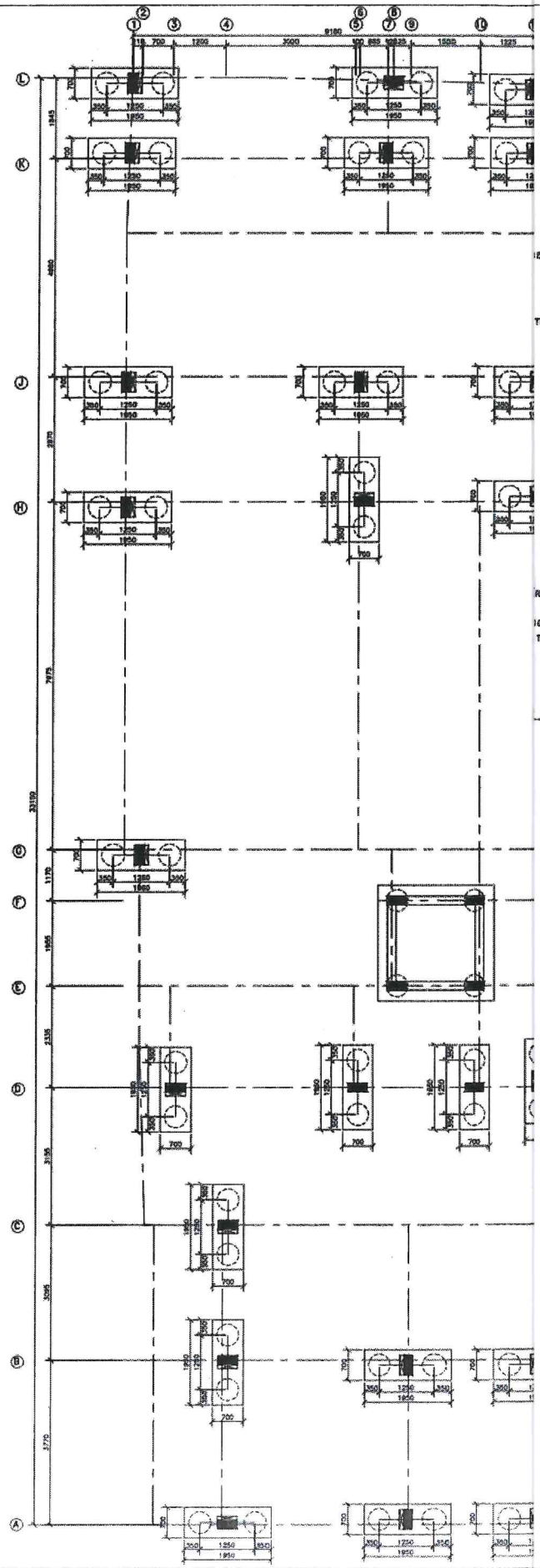
**Long span**

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mu / bdd | = | 0.00 | x | 1.50 | x | 100000 | | | = | 0.00 | | | | |
| | | 9.807 | x | 100.00 | x | 14.20 | x | 14.2 | = | | | | | |
| Ast Required | = | 0.2520 | x | 1.00 | x | 100.00 | x | 14.20 | = | 3.6 | sqcm | | | |
| | | | | | 100 | | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **3.6** | **Sqcm** |
| Mu / bdd | = | 0.00 | x | 1.50 | x | 100000 | | | = | 0.00 | | | | |
| | | 9.807 | x | 100.00 | x | 14.20 | x | 14.2 | = | | | | | |
| Ast Required | = | 0.1950 | x | 1.00 | x | 100.00 | x | 14.20 | = | 2.8 | sqcm | | | |
| | | | | | 100 | | | | | | | | | |
| **Use 8 dia hsd rods at** | **150** | **crs** | **Ast** | | **=** | **50.24** | **/** | **15.00** | **=** | **3.3** | **Sqcm** | **>** | **2.8** | **Sqcm** |

**RESULT :**

| | | | | |
|---|---|---|---|---|
| ***Use Thickness of Slab*** | = | ***125 mm*** | | |
| **Main rods** | = | **Use 10 dia hsd rods at** | **150** | **crs** |
| **Distributors** | = | **Use 8 dia hsd rods at** | **150** | **crs** |

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**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ALL RCC WORKS TO BE WITH M30 CONCRETE AND TO BE EXECUTED AS PER IS : 456 – 2000, USING 20mm GRADED GRANITE METAL, WATER CEMENT RATIO NOT EXCEEDING 0.45. HIGH YIELD STRENGTH DEFORMED BARS (TOR SHALL CONFORM TO IS: 1786 – 2008 ( Fe 500 ).
3. LAP LENGTH FOR ALL BARS TO BE 45 TIMES THE DIAMETER.
4. CONCRETE COVER FOR ALL MAIN RODS IN FOUNDATION AND PLINTH BEAMS TO BE 40 UNLESS OTHERWISE STATED.

| ALT | DATE | DESCRIPTION | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| 0 | 28/02/25 | AS DRAWN | | | |

| | |
|---|---|
| CONSULTANTS | MURUGU CONSULTANT<br>9A/10, UMAPATHY STREET EXT. W.MAMBALAM, CHENNAI – 33. Ph No.9884400273. |
| CLIENT | M/S HORMONY HOMES<br>12TH AVENUE, ASHOK NAGAR<br>CHENNAI – 600 083. |
| ARCHITECT | diastyle<br>PROP<br>CHENNAI – 600 083.<br>PHONE : 65855326, 65359407. |

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING IN KODAMBAKKAM.

LAYOUT AND RCC DETIALS PILE FOUNDATION

SCALE : 1 : 50, 1 : 25

DRG.No: MC-112/2025 SHEET 1

CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
'ThalamuthuNatarajan Building', No.1, Gandhi Irwin Road,
Egmore, Chennai-600 008.

# PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the **Thiru. M. PUNITHAN** has enrolled as **Registered Structural Engineer Grade-II (SE)** with Chennai Metropolitan Development Authority (CMDA) who has the qualification of **A.M.I.E.,(Civil Engg.)** and experience in the relevant field for **26 years**.

He has been given the Registration No.**SE/GR-II/2019/04/044 Renewed** on **10.04.2024.** He shall be required to comply with the duties and responsibilities prescribed by the Government of Tamil Nadu in Part-V, "Registration of Professionals", Tamil Nadu Combined Development and Building Rules, 2019 approved vide G.O.(Ms) No.18 MAWS (MA1) Dept. dated 04.02.2019.

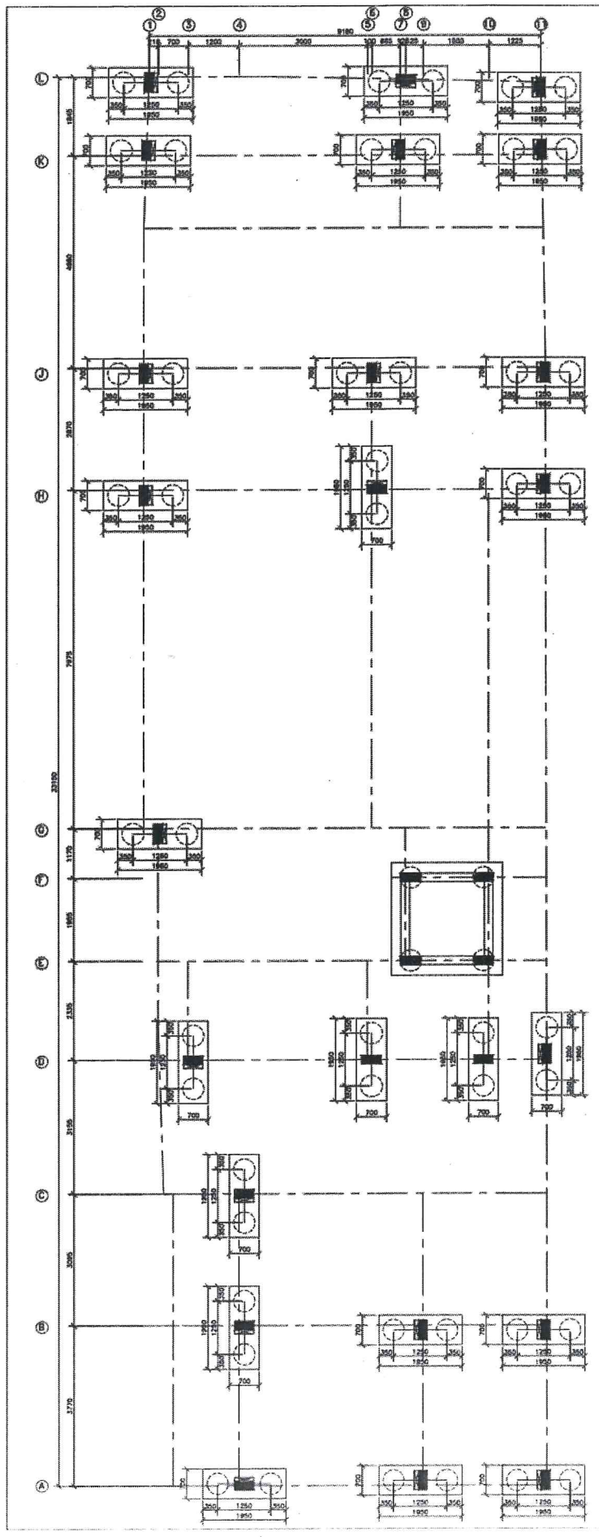
This Registration is valid upto **09.04.2029**.

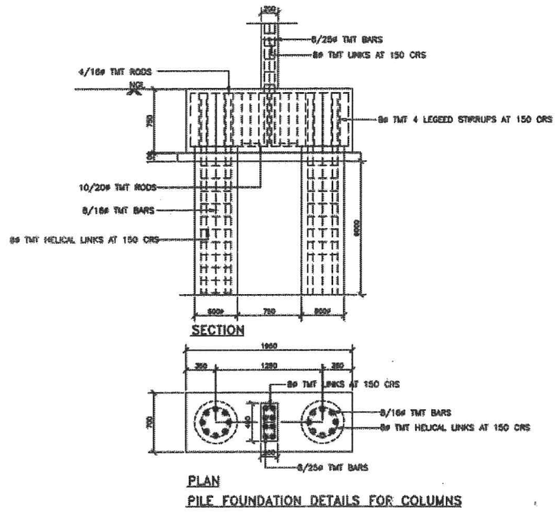


10/4/24.

**(A. MEGANATHAN)**
**Superintendent**

M. PUNITHAN B.Sc.,M.I.E.
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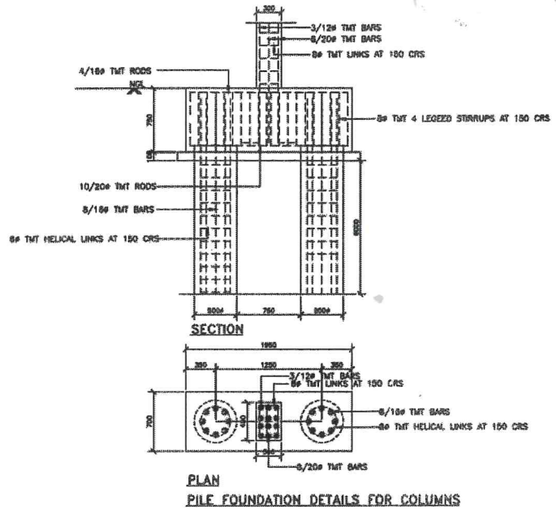





SECTION

PLAN

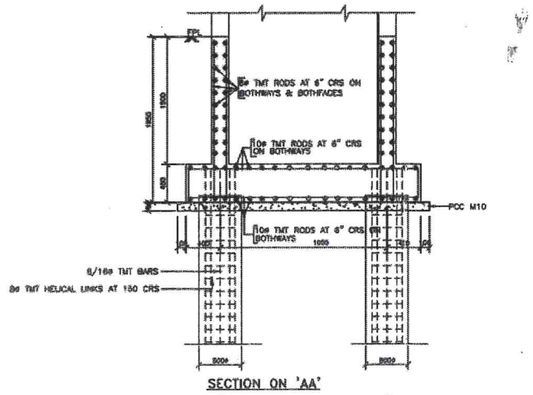
PILE FOUNDATION DETAILS FOR COLUMNS



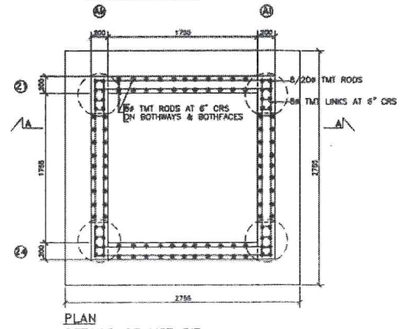

SECTION

PLAN

PILE FOUNDATION DETAILS FOR COLUMNS




SECTION ON 'AA'




PLAN

DETAILS OF LIFT PIT


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Mobile: 9884400273, Email: mpunithan@yahoo.com


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3. LAP LENGTH FOR ALL BARS TO BE 45 TIMES THE DIAMETER.
4. CONCRETE COVER FOR ALL MAIN RODS IN FOUNDATION AND PLINTH BEAMS TO BE 40 UNLESS OTHERWISE STATED.

| ALT | DATE | DESCRIPTION | DRAWN | CHECKED | APPROVED |
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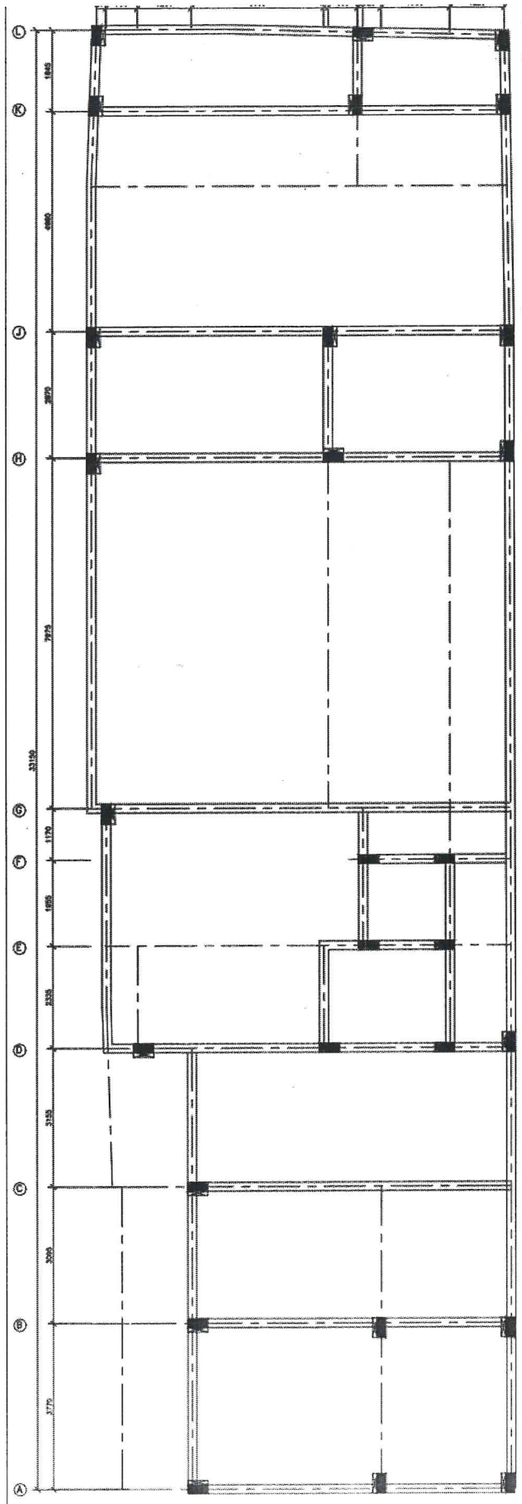
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| CONSULTANTS | MURUGU CONSULTANT<br>9A/10, UMAPATHY STREET EXT. W.MAMBALAM, CHENNAI – 33. Ph No.9884400273. |
| CLIENT | M/S HORMONY HOMES<br>12TH AVENUE, ASHOK NAGAR<br>CHENNAI – 600 083. |
| ARCHITECT | diastyle<br>PROP<br>CHENNAI – 600 083.<br>PHONE : 65855326, 65359407. |

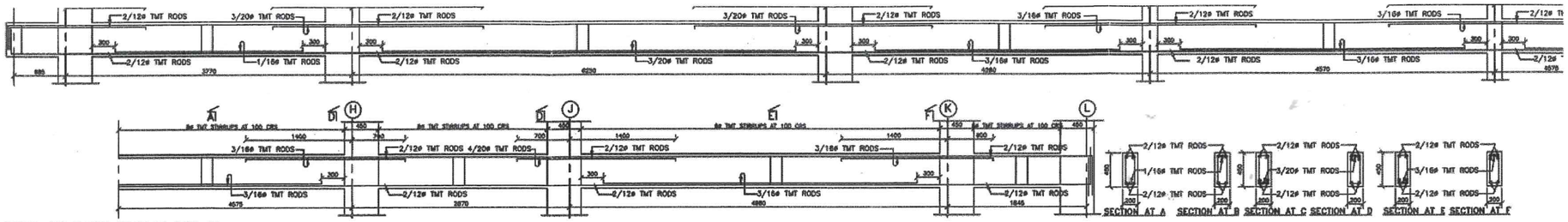
PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING IN KODAMBAKKAM.

LAYOUT AND RCC DETIALS
PILE FOUNDATION

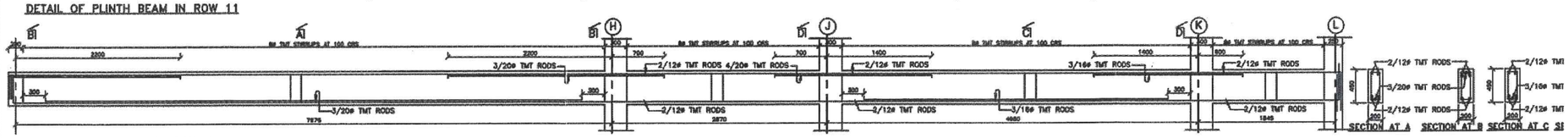
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DRG.No: MC-112/2025 SHEET 1

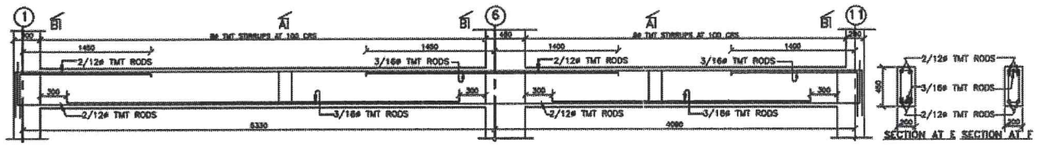




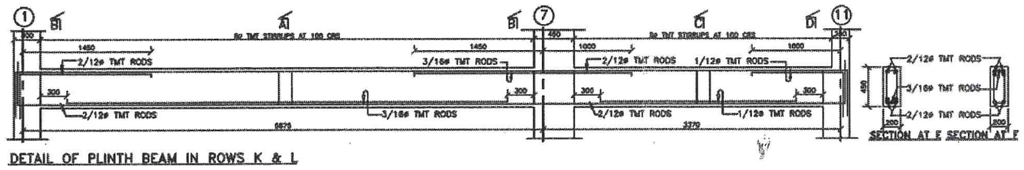

DETAIL OF PLINTH BEAM IN ROW 11



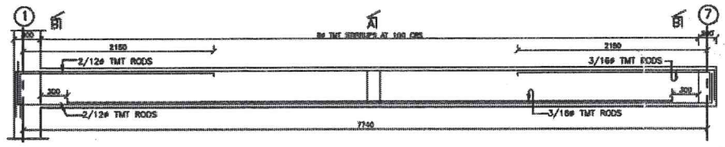

DETAIL OF PLINTH BEAM IN ROW 1



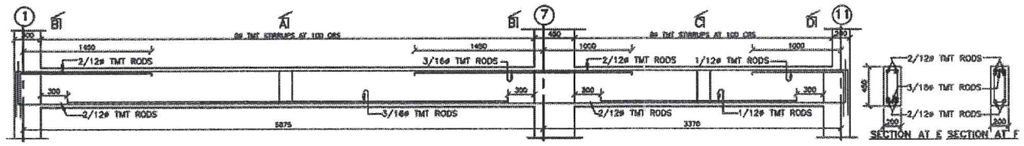

DETAIL OF PLINTH BEAM IN ROWS H & J




DETAIL OF PLINTH BEAM IN ROWS K & L




DETAIL OF PLINTH BEAM IN ROW C




DETAIL OF PLINTH BEAM IN ROWS A & B

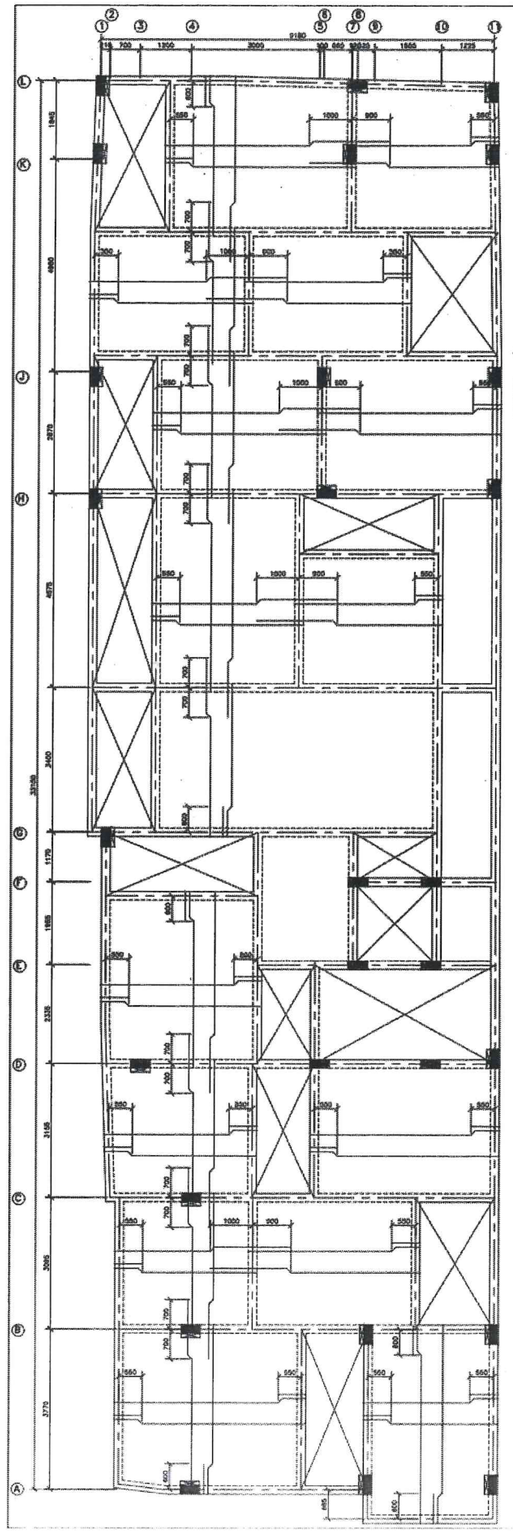

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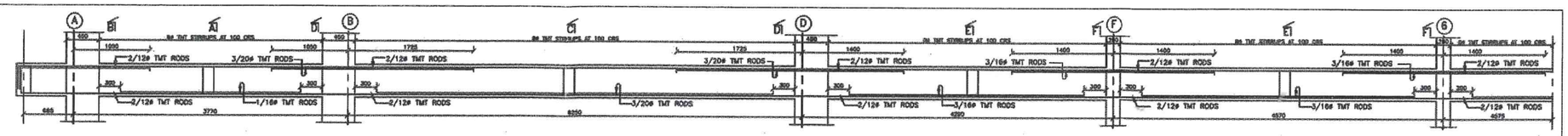

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3. LAP LENGTH FOR ALL BARS TO BE 45 TIMES THE DIAMETER.
4. CONCRETE COVER FOR ALL MAIN RODS IN FOUNDATION AND PLINTH BEAM TO BE 40 UNLESS OTHERWISE STATED.

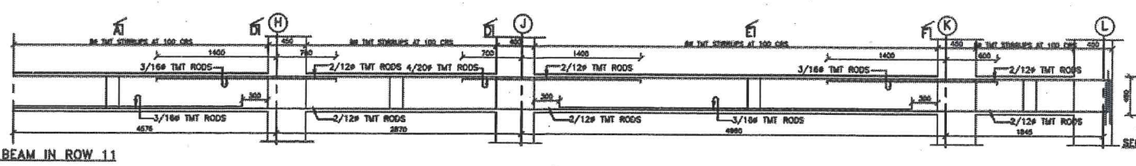
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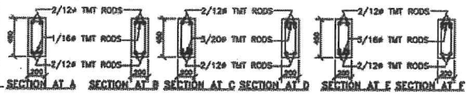
| | |
|---|---|
| CONSULTANTS | MURUGU CONSULTA<br>8A/10, UMAPATHY STREET EXT. W.MAMBALAM, CHENNAI - 33. Ph N |
| CLIENT | M/S HORMONY HOMES<br>12TH AVENUE, ASHOK NAGAR<br>CHENNAI - 600 083. |
| ARCHITECT | diastyle<br>PROP<br>CHENNAI - 600 083.<br>PHONE : 65855526, 65359407. |
| | PROPOSED CONSTRUCTION OF BUILDING IN KODAMBAKK |
| | LAYOUT AND RCC PLINTH BEAM |
| | SCALE : 1 : 50, 1 : 25 |
| | DRG.No: MC-112/2025 |

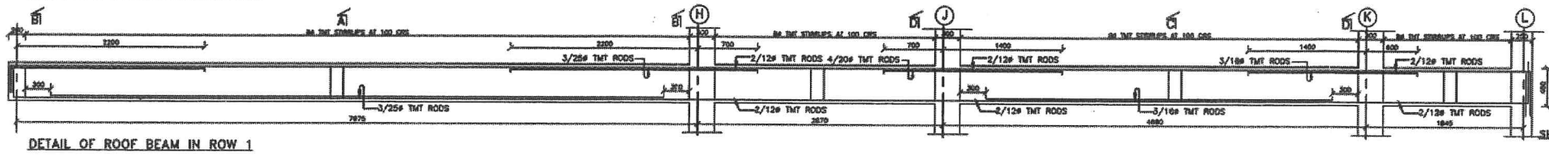




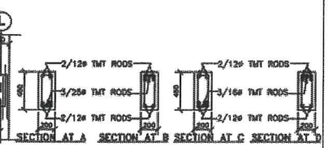

DETAIL OF ROOF BEAM IN ROW 11

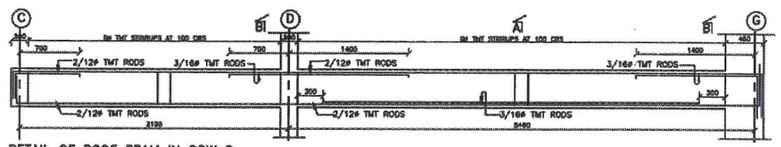


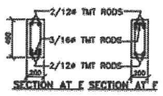



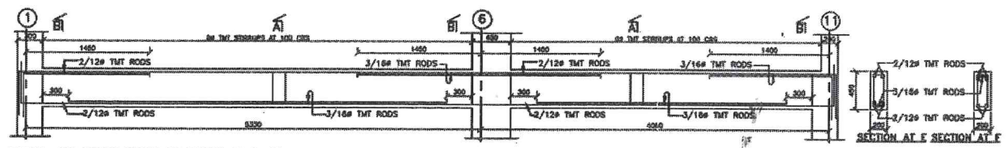

DETAIL OF ROOF BEAM IN ROW 1



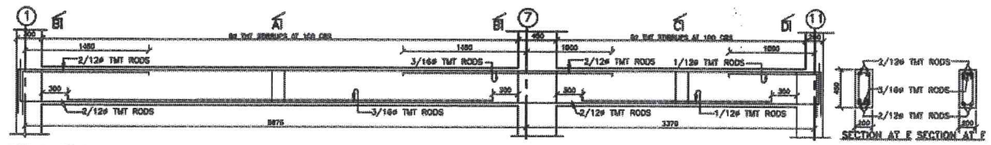

DETAIL OF ROOF BEAM IN ROW 2




DETAIL OF ROOF BEAM IN ROWS H & J




DETAIL OF ROOF BEAM IN ROW L




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West K.K. Nagar, Chennai-600 078.
Mobile: 9884400273, Email: mpunithan@yahoo.com

**NOTES:**

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ALL RCC WORKS TO BE WITH M30 CONCRETE AND TO BE EXECUTED AS PER IS : 456 – 2000, USING 20mm GRADED GRANITE METAL, WATER CEMENT RATIO NOT EXCEEDING 0.45, HIGH YIELD STRENGTH DEFORMED BARS (TOR SHALL CONFORM TO IS: 1786 – 2008 ( Fe 500 ).
3. LAP LENGTH FOR ALL BARS TO BE 45 TIMES THE DIAMETER.
4. CONCRETE COVER FOR ALL MAIN RODS IN FOUNDATION AND PLINTH BEAMS TO BE 40 UNLESS OTHERWISE STATED.

| ALT | DATE | DESCRIPTION | DRAWN | CHECKED | APPROVED |
|---|---|---|---|---|---|
| 0 | 28/02/25 | AS DRAWN | | | |

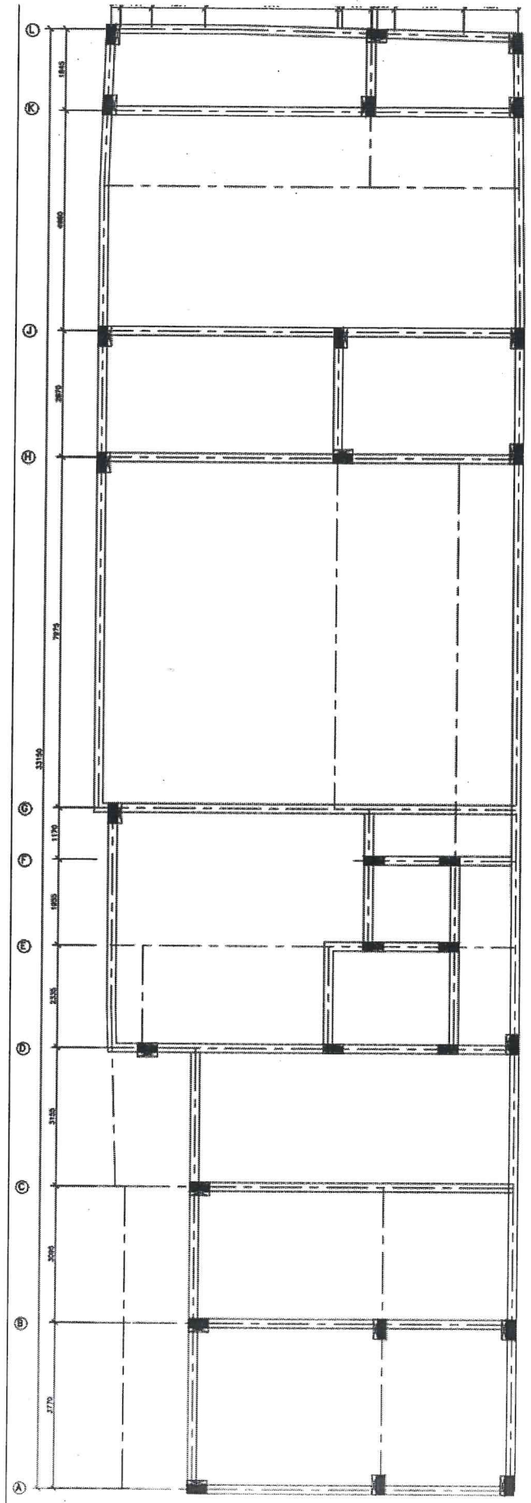
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|---|---|
| CONSULTANTS | MURUGU CONSULTANT<br>9A/10, UMAPATHY STREET EXT. W.MAMBALAM, CHENNAI – 33. Ph No.9884400273. |
| CLIENT | M/S HORMONY HOMES<br>12TH AVENUE, ASHOK NAGAR<br>CHENNAI – 600 083. |
| ARCHITECT | diastyle<br>PROP<br>CHENNAI – 600 083.<br>PHONE : 65853326, 65389407. |

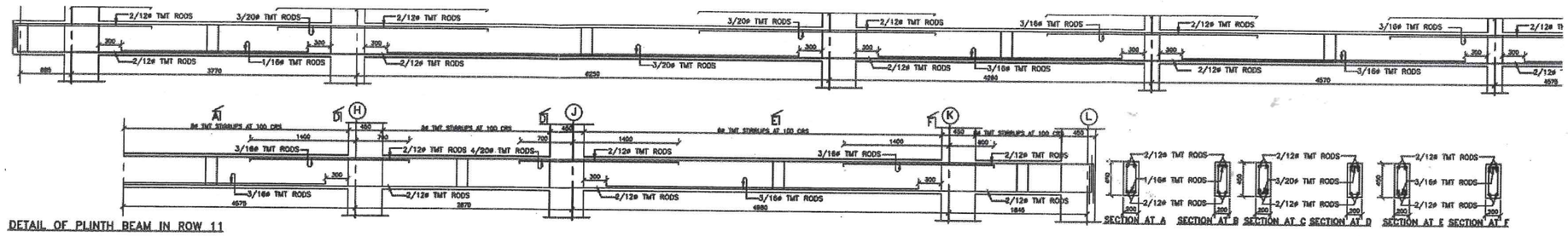
PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING IN KODAMBAKKAM.

LAYOUT AND RCC DETIALS
ROOF BEAM & SLAB

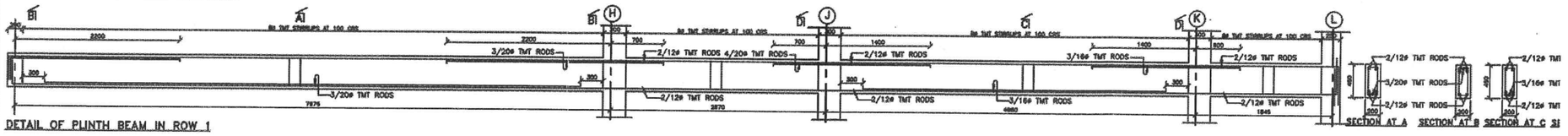
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DRG.No: MC-112/2025 SHEET 3

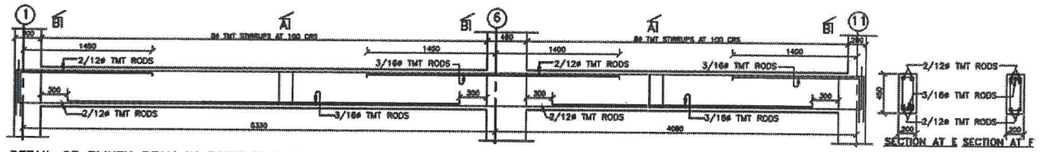




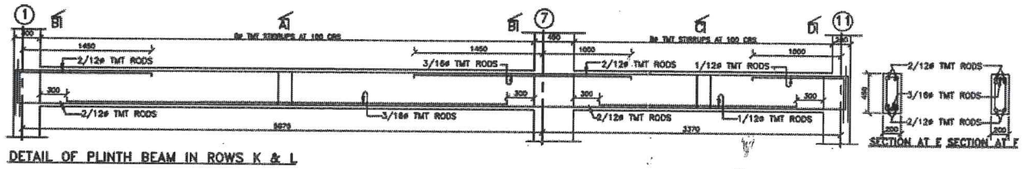

DETAIL OF PLINTH BEAM IN ROW 11



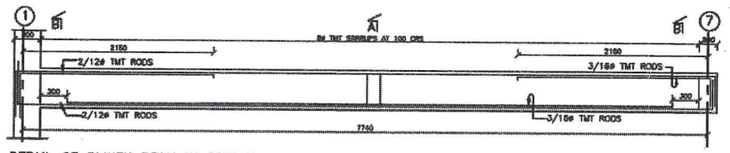

DETAIL OF PLINTH BEAM IN ROW 1



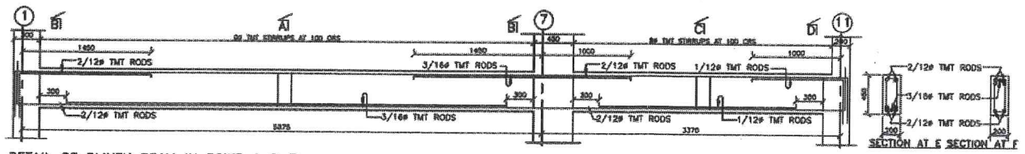

DETAIL OF PLINTH BEAM IN ROWS H & J




DETAIL OF PLINTH BEAM IN ROWS K & L




DETAIL OF PLINTH BEAM IN ROW C




DETAIL OF PLINTH BEAM IN ROWS A & B


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| 0 | 28/02/25 | AS DRAWN | | |

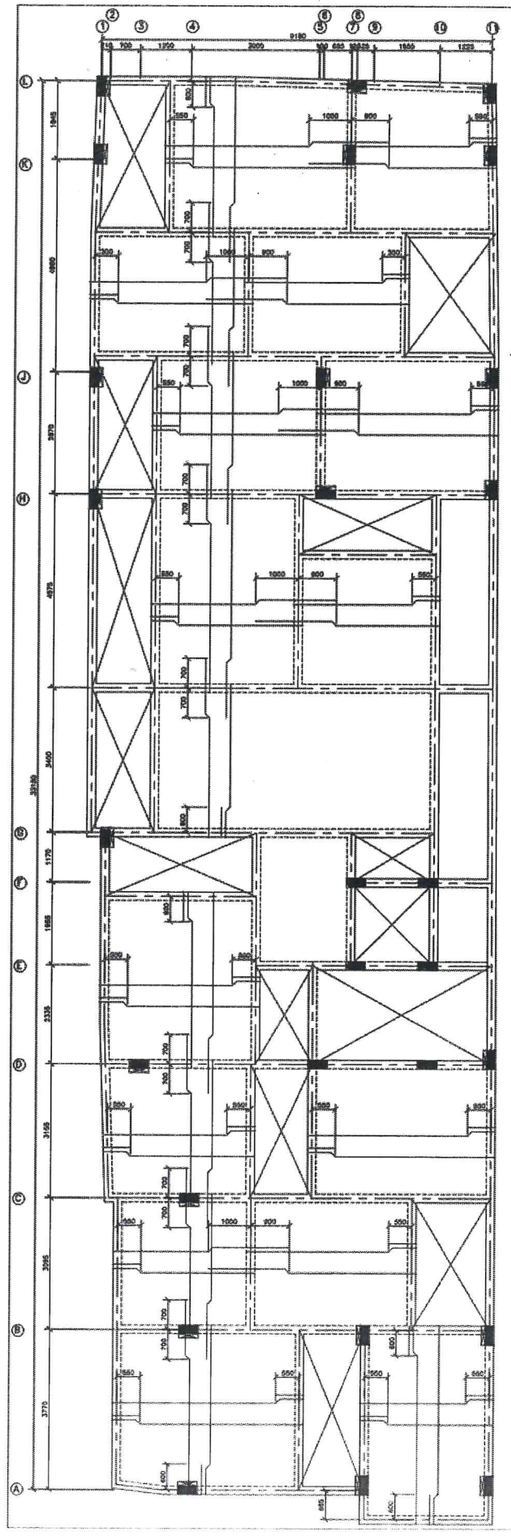
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|---|---|
| CONSULTANTS | MURUGU CONSULTA<br>8A/10, UMAPATHY STREET EXT. W.MAMBALAM, CHENNAI – 33. Ph N |
| CLIENT | M/S HORMONY HOMES<br>12TH AVENUE, ASHOK NAGAR<br>CHENNAI – 600 083. |
| ARCHITECT | diastyle<br>PROP<br>CHENNAI – 600 083.<br>PHONE : 65853325, 65359407. |

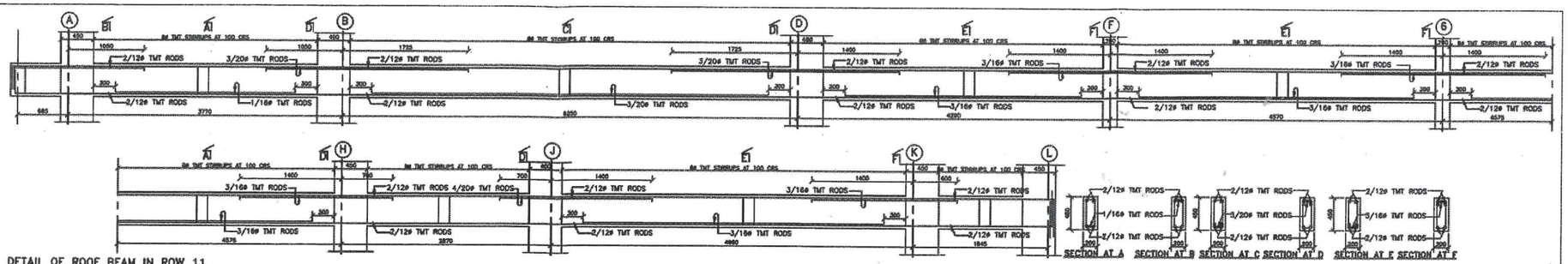
PROPOSED CONSTRUCTION OF BUILDING IN KODAMBAKK

LAYOUT AND RCC PLINTH BEAM

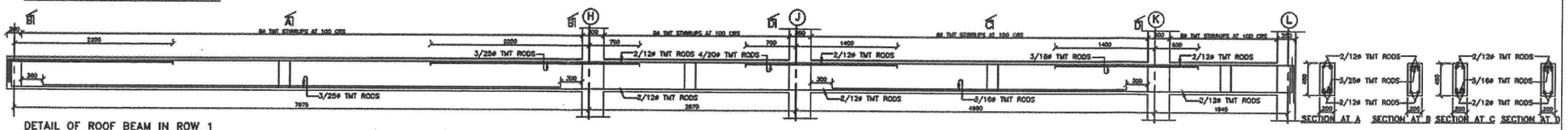
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DRG.No: MC-112/2025

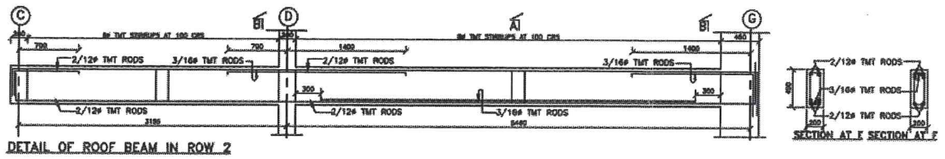




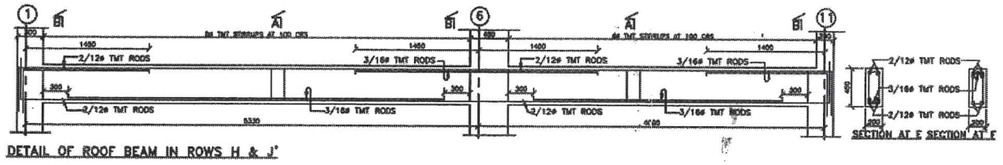

DETAIL OF ROOF BEAM IN ROW 11



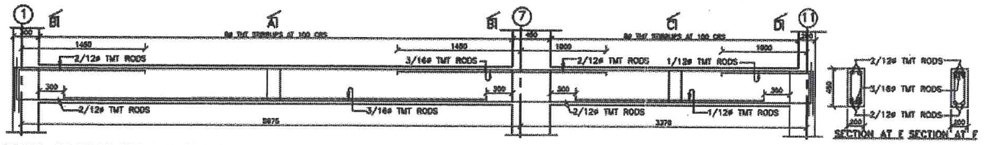

DETAIL OF ROOF BEAM IN ROW 1




DETAIL OF ROOF BEAM IN ROW 2




DETAIL OF ROOF BEAM IN ROWS H & J'




DETAIL OF ROOF BEAM IN ROW L


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| | PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING IN KODAMBAKKAM. |
| | LAYOUT AND RCC DETIALS<br>ROOF BEAM & SLAB |
| | SCALE : 1 : 50, 1 : 25 |
| | DRG.No: MC-112/2025 SHEET 5 |

THE LANDLENS SUITE

# Eight ways to know a piece of land before you pay for it.

This report covers one part of the picture. These cover the rest, drawn from the same government records, for any property in Tamil Nadu.

### LandLens One
Ask anything about a property and get an answer grounded in live government records, with the sources shown.
**/landlens/one**

### Verify My Land
Every record check run on one property and returned as a single report.
**/landlens/verify-my-land**

### Legal Opinion
An advocate's written opinion on the title, built on the records we pull for it.
**/landlens**

### One Map
Every layer on one map: the parcel, its boundary, zoning, water bodies and what sits around it.
**/landlens/one/map**

### PriceMap
What land actually changed hands for around this plot, taken from the registered deeds.
**/landlens/pricemap**

### Build Scope
What you are allowed to build here: floor space, height, coverage and setbacks.
**/landlens/build-scope**

### Property Tracker
Watch a property and hear about it when something new is registered against it.
**/landlens/property-tracker**

### Deal Room
Run the transaction in one place: documents, stamping, signatures and the parties.
**/landlens/deal-room**

FREE TOOLS · NO ACCOUNT NEEDED

# Twenty-four checks you can run yourself, at no cost.

## Records and verification

The registers themselves, read for you.

- Encumbrance Certificate
- Patta and Chitta
- Field Measurement Sketch
- EC Analyzer
- Bank charge check
- Court case search
- Seller background check
- Approval check by survey

## Value and duty

What it is worth and what it costs to register.

- Guideline value by street
- Guideline value by survey
- Stamp duty and registration fees
- Capital gains
- Floor space index
- Area unit converter

## Zoning and land use

What the plan says can happen on this land.

- Land use zone finder
- CMDA land use check
- Coastal regulation zone
- Master plan check
- Water bodies finder
- Airport height clearance

## Registers and directories

Who holds it, and which office keeps the record.

- Find your registering office
- Temple property check
- Waqf property check
- RERA register

**Every free tool**
/tools

**Services we run for you**
/services

**The LandLens suite**
/landlens/one

Verified RealEstate™

# Every claim in this document traces back to a government record.

- Legal opinions, due diligence and title verification
- Building plan, layout and sub-division approvals
- Completion and occupancy certificates, regularisation
- Escrow, negotiation and NRI property management
- Land survey, soil testing, architecture and construction

**Verified RealEstate**
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OMR Thoraipakkam,
Chennai 600 097, India
**hello@verified.realestate**
+91 9996 12 9996

Prepared from the registers named on the page each finding sits on. Where a register could not be read, this document says so in its place rather than leaving the gap to be read as a clean result.