

STRUCTURAL DESIGN BASIS REPORT

For
Mr. K.Balachandar
Chennai

PROJECT NAME

Plan Showing The Proposed Construction Of Stilt Floor + 4 Floors + 5th Floor (Part) (Height ~ 18.30m) Residential Building With 9 Dwelling Units Availing Premium Fsi At Plot Nos.37 (Approved Layout – 26/2001), River View Avenue And Enclave 5th Main Road, Manapakkam, Chennai Comprised In Old S.No.124/1b (Pt) & 124/2 (Document), S.No.124/1b2 & 124/2b (Patta) Of Manapakkam Village, Within The Limit Of Greater Chennai Corporation
Zone: 12 Division: 157

Structural Design Basis Report

Structural Consultants : M/s. V Cad Consulting Engineers

1. PREAMBLE

We have design for The Proposed Construction Of Stilt Floor + 4 Floors + 5th Floor (Part) (Height – 18.30m) Residential Building With 9 Dwelling Units Availing Premium Fsi At Plot Nos.37 (Approved Layout – 26/2001), River View Avenue And Enclave 5th Main Road, Manapakkam, Chennai Comprised In Old S.No.124/1b (Pt) & 124/2 (Document), S.No.124/1b2 & 124/2b (Patta) Of Manapakkam Village, Within The Limit Of Greater Chennai Corporation.

Greater Chennai Corporation. Division -157, Zone – 12.

This building is a RCC structure. The deflection as per the as built drawing is very much less than the approval drawing. Hence structurally safe and sound and fit for the occupation.

We hereby certify that

- The usage of the building is for Residential (stilt+5 floors) purpose.
- The superstructure is built on 9" thick brick wall and 4 1/2" brick wall
- The safe bearing capacity of soil is 24.00 ton/m², depth of foundation =3.00m, below the existing ground level.

2. DESIGN LOADS

2.1 Super Imposed Dead Loads

The self-weight of the various elements are computed based on the built weight of materials as given below.

Materials	Unit Weight in KN/m ³
Brick wall	20.00
Steel	78.50
Plain	24.00
Reinforced Concrete	25.00
Soil	18.00

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Water	10.00
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The Super Imposed Loads that are envisaged to act permanently (wherever applicable) are as following.

Item	Intensity in KN/m ² of plan area
Floor finish	1.00
Weathering proof course on Terrace-150 thick brickbat coba with IPS finish	3.00
Sunk-Brick bat coba	2.5

2.2 Live Loads

The superimposed load or otherwise Live load is assessed on the basis of occupancy. classifications as per IS:875(part-2) - 1987 and are listed as below.

Type of Structure-Residential Building

Occupancy Classification	UDL(Kn/m ²)
Living Rooms, Bed rooms and Dormitories	3.0
Store rooms	5.0
Baths and toilets	2.0
Corridors, Passages, Staircase including fire escapes, lobbies - as per the floor serviced excluding stores and the like but not less than	5.0
Balconies	4.0
Open terrace	1.5
Parking - for vehicles not exceeding 2.5 tones 3.125 weight. (including access ways & ramps).	3.125

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2.3 Wind Loads

The wind pressure is calculated on the basis of data furnished below and other provisions laid in IS 875 (Part-3)- 1987.

Basic Wind Speed	V_b	= 50m/sec
Risk Coefficient	K_1	= 1
	K_2	= As per height.
Terrain Category		= II
Structure Class		= B and C class as per Building dimensions
Design Wind speed (V_z)		= $V_b \times K_1 \times K_2 \times K_3$

Where,

K_1 = Risk Co- efficient for different classes of Structures in different wind speed zones.

K_2 = To obtain design wind speed variation with height in different terrains for different classes of buildings.

K_3 = Topography factor.

Design Wind Pressure

$$P_z = 0.6V_z^2$$

2.4 Earthquake Load

The loading due to earthquake is assessed as per the provisions of IS:1893 (Part - 1):2002

Seismic Zone = III

Soil Type = I

Table - 2 Zone factor (Z) = 0.16

Table-6 Importance Factor (1) = 1.00

Table-7 Response Reduction factor(R) = 3.0

Fundamental Natural time period (T_s) with INFILL WALLS for Taurus, Claudius A, Magnus, Cladius B, Atrium,

$$T_s = 0.09H/d^{\circ} \text{ from CL 7.6.2 - 181893 (part-1): 2002}$$

Fundamental natural time period (T_s) without INFILL WALLS for Block EWS (Augustus)

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$T_s = 0.075 H^{0.75}$ from CL 7.6.1 -151893 (part -1) :2002

S_a/g from FIG-2 IS 1893(part I): 2002.

Horizontal Seismic Co-Efficient

$$A_h = Z \times I \times S_a \times R_g / 2 \times R$$

3 CHECK FOR LATERAL SWAY AS PER IS -456-2000

The allowable lateral sway at top due to wind force should not exceed $H/500$, where H is total height of Building.

4 CHECK FOR LATERAL SWAY (STOREY DRIFT) AS PER IS-1893-2002

The allowable lateral sway (storey drift) due to earthquake force should not exceed $L/250$, where L is the storey height

5 BASIC LOADS AND LOAD COMBINATIONS

The various loads are combined in accordance with the stipulations in IS:875 (part 5)-1987. wherever imposed load is combined with earthquake load the appropriate part of the imposed load as specified in IS:1893-2002 is adopted both for evaluating earthquake effect and for combined load effects, used in such combination.

6 BASIC LOADS AND LOAD COMBINATIONS

The various loads are combined in accordance with the stipulations in IS:875 (part 5) -1987. Wherever imposed load is combined with earthquake load the appropriate part of the imposed load as specified in IS:1893-2002 is adopted both for evaluating earthquake effect and for combined load effects, used in such combination.

Type	Load Combinations
Primary	DEAD LOAD (DL)
Primary	WALL LOAD (WL)
Primary	SUPERIMPOSED DEAD LOAD (SDL)
Primary	LIVE LOAD(LL)
Primary	WIND LOAD X(+) WLX
Primary	WIND LOAD Z(+) WLZ
Primary	SEISMIC LOAD ALONG-X SLX
Primary	SEISMIC LOAD ALONG-Z SLZ
Primary	TEMPERATURE LOAD (TEMP)
Combination	DL+WAL+SDL
Combination	DL+WAL+SDL+LL

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Combination	DL+WAL+SDL+LL+WLX
Combination	DL+WAL+SDL+LL+WLZ
Combination	DL+WAL+SDL+LL-WLX
Combination	DL+WAL+SDL+LL-WLZ
Combination	DL+WAL+SDL+LL+SLZ
Combination	DL+WAL+SDL+LL+SLX
Combination	DL+WAL+SDL+LL-SLX
Combination	DL+WAL+SDL+LL-SLZ
Combination	DL+WAL+SDL+WLX
Combination	DL+WAL+SDL+WLZ
Combination	DL+WAL+SDL-WLX
Combination	DL+WAL+SDL-WLZ
Combination	DL+WAT+SDL+SLX
Combination	DL+WAL+SDL+SLZ
Combination	DL+WAL+SDL-SLX
Combination	DL+WAL+SDL+TEMP
Combination	DL+WAL+SDL+LL+TEMP
Combination	DL+WAL+SDL+LL+WLX+TEMP
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Combination	DL+WAL+SDL+LL+SLZ-TEMP
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Combination	DL+WAL+SDL+LL-SLZ-TEMP
Combination	DL+WAL+SDL+WLX-TEMP


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All structural members will be designed according to the Limit State Method as specified in IS:456-2000. Appropriate loads and its combinations, as per relevant clauses in Code IS 456:2000 Code IS 875 (PART-5) 1987, for the most unfavorable effects are chosen for design.

10. MATERIAL

Reinforced cement concrete
Grade of concrete = M25 (Design mix)
Grade of steel = Fe 500

11.EXPOSURE CONDITION

Structural elements below ground level and Exterior External faces of walls are designed for Moderate exposure condition and internal faces of walls, floor beams and slabs are designed for Mild exposure conditions per Table 16 of IS 456-2000.

8.COVER TO REINFORCEMENT

As per Table 16A -IS:456-2000

Member	Clear Cover (mm)
Pile Foundations	75 mm
Footing or Raft Foundations	50 mm
Raft slab	30 mm
Column	40 mm
Shear Walls thickness	25 mm
Retaining Wall on earth facing side	40 mm
Retaining Wall on non-earth facing side	25 mm
Beams	30 mm
Slabs	20 mm
Water Tanks	25 mm

9.FOUNDATION SYSTEM

Isolated /Combined /Raft foundations /Pile foundation with are proposed based on the safe bearing capacities as per soil investigation report.

10. CODES AND STANDARDS

All the designs are conforming to the relevant Indian Standards , Some of the relevant Indian Standard Codes, which have been followed for the structural designs , are given below.

Code	Description
IS:875 (Part-1) - 1987	Code of Practice for Design Loads (Other

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Combination	DL+WAL+SDL+WIZ-TEMP
Combination	DL+WAL+SDL-WIX-TEMP
Combination	DL+WAL+SDL-WLZ-TEMP
Combination	DL+WAL+SDL+SLX-TEMP
Combination	DL+WAL+SDL+SLZ-TEMP
Combination	DL+WAL+SDL-SLX-TEMP
Combination	DL+WAL+SDL-SLZ-TEMP

7:LOAD FACTORS FOR DESIGN

Description of Load Combination	Load Factor for primary Load Cases				
	Dead Load	Live Load	Wind Load	Seismic Load	Temp Load
Dead load	1.5	0.0	0.0	0.0	0.0
Dead load + Live load	1.5	1.5	0.0	0.0	0.0
Dead load + Wind load	1.5	0.0	± 1.5	0.0	0.0
Dead load + Seismic load	1.5	0.0	0.0	± 1.5	0.0
Dead load + Live load + Wind load	1.2	1.2	± 1.2	0.0	0.0
Dead load + Live load + Seismic	1.2	1.2	0.0	± 1.2	0.0
Dead load + Wind Load	0.9	0.0	± 1.5	0.0	0.0
Dead Load + Seismic Load	0.9	0.0	0.0	± 1.5	0.0
Dead load + Temp	1.4	0.0	0.0	0.0	± 1.4
Dead load + Live load +Temp	1.05	1.28	0.0	0.0	± 1.05
Dead load +Wind load + Temp	1.05	0.0	± 1.28	0.0	± 1.05
Dead load + Seismic load + Temp	1.05	0.0	0.0	± 1.28	± 1.05
Dead load +Live load + Wind	1.05	1.28	± 1.28	0.0	± 1.05
Dead load + Live load + Seismic	1.05	1.28	0	± 1.28	± 1.05
Dead Load + Wind Load + Temp	0.9	0.0	± 1.28	0.0	± 1.05
Dead load + Seismic load + Temp	0.9	0.0	0.0	± 1.28	± 1.05

8.ANALYSIS METHOD

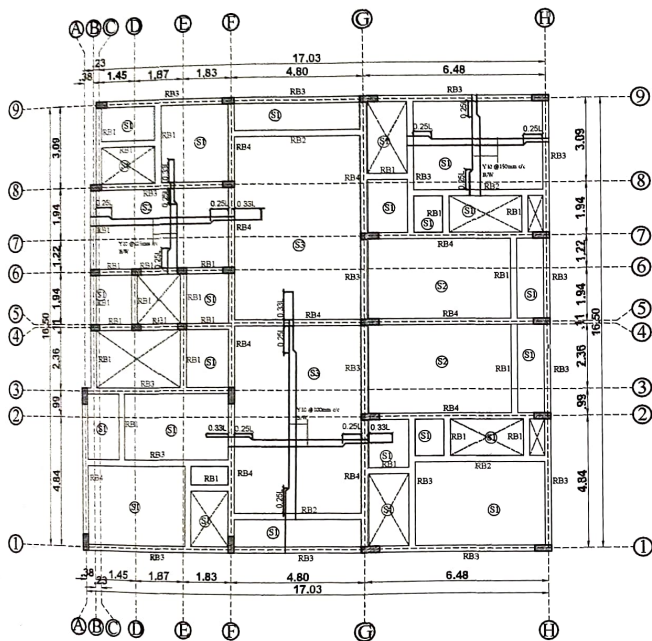
The modeling has been generated in E -TABS for analysis . The structure will be analyzed for static and Lateral Loads due to Earthquake/Wind loads and its combinations E-TABS Software used-In house interlinked package with E.TABS.

9. DESIGN METHODOLOGY

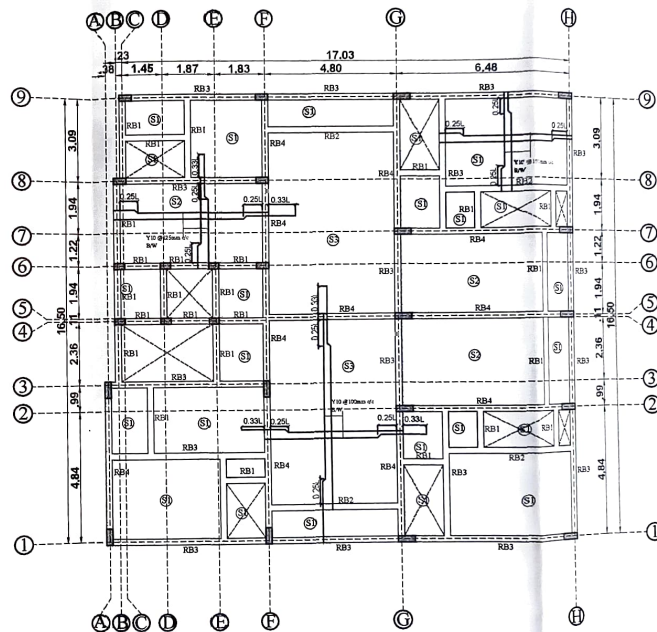
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	than Earth quake) for Building and Structures - Unit Weights of Buildings Materials and Stored Material.
IS:875 (Part-2) - 1987	Code of Practice for Design Loads (Other than Earthquake) for Building and Structures -Imposed loads.
IS:875 (Part-3) - 1987	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures - Wind Load.
IS:875 (Part-5) - 1987	Code of Practice for Design Loads (Other than Earthquake) for Buildings and Structures - Special Loads and Load Combinations
IS:456-2000	Code of Practice for Plain and Reinforced Concrete
IS:1893 (Part -1) -2002	Indian Standard Criteria for Earthquake Resistant Design of structures
IS:1893 (Part - 2) -2002	Specification of Mild Steel and Medium Tensile Steel bars and Hard drawn Steel Wire for concrete reinforcement-Mild Steel and Medium Tensile Steel Bars
IS:1786 - 1985	Specification for High Strength Deformed Steel Bars and Wires for Concrete Reinforcement
IS:13920 - 1993	Ductile Detailing of reinforced concrete structures subjected to seismic forces - code of practice
IS:1904	Indian Standard Code of practice for Design & Construction foundations in Soil: General Requirements
IS:1642 - 1989	Indian Standard Code of practice for Fire Safety of Buildings (General): Details of Construction.
IS:3370 - 2009	Indian Standard Code of practice for Concrete Structures for Storage of Liquids
IS:1343 - 1980	Indian Standard Code of practice for Pre-stressed Concrete.


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STILT FLOOR ROOF SLAB & BEAM LAYOUT
ALL SLAB 150 MM THK



TYPICAL FLOOR ROOF SLAB & BEAM LAYOUT.
ALL SLAB 150 MM THK

Notes:

- This drawing should be read along with architectural drawings.
- Grade of R.C.C. items shall be M25 (1:1.2) by design mix conforming to IS 456-2000 unless otherwise specified.
- Y Spirals (TOR) Steel conforming to IS 1786 - 1985, Grade - Fe 500.
- Clear cover to the main steel:
2" for Footings, Raft Beam, Built Slab.
15" for Columns.
1" for Wall Beams, Lintel & Beams.
0.5" for Staircase & Sub.
- Lap length shall be 50 d (max. 450) for all bars.
- Bottom Reinforcement
- Top Reinforcement
- Provide Continuous Chairs to keep the Top Reinforcement in position.
- Provide #8 at 12" on lap/development steel for all Top Reinforcement.
- Support Bar to be Provided in Between Two Layers of Reinforcement of Same Dia in Every 3'-0" c/c.
- Not more than 40% of Reinforcement shall be Lapped at any particular junction.
- Foundation is designed As per Architectural Drawing.
- 5.8 C.C. Soil is taken as 24.0 kN/m² Depth - 3.00M.
- Continuity laps should not be necessary until the soil is completed.
- Removal of formwork:
i) for walls
a. Slabs spanning over 4.5 m (15'-0") - 7 days
b. Slabs spanning over 4.5 m (15'-0") - 14 days
ii) for beams and slabs:
a. Beams and slabs spanning over 6 m (20'-0") - 14 days
b. Beams and slabs spanning over 6 m (20'-0") - 21 days
- For Window openings 12" or 24" Slab Ends Should be Provided at Sill (if with 12" Bearing on either side of opening).
- All Reinforcement steel Should be coated with Anti-rust/Paint before Use.
- Portable drinking water should be used for Complete Structure.

PROJECT:

PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT FLOOR + FLOORS + 5TH FLOOR (PART) (HEIGHT - 18.30M) RESIDENTIAL BUILDING WITH 9 DWELLING UNITS AVALING PREMIUM FSI AT PLOT NOS.37 (APPROVED LAYOUT - 26/201/L, RIVER VIEW AVENUE AND ENCLAVE 5TH MAIN ROAD, MANAPARKKAM, CHENNAI COMPRISED IN OLD S.NO.124/18, PT. & 124/2, DOCUMENT, S.NO.124/18 & 124/2 PARTIAL OF MANAPARKKAM VILLAGE, WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION ZONE: 12 DIVISION: 157

Title:

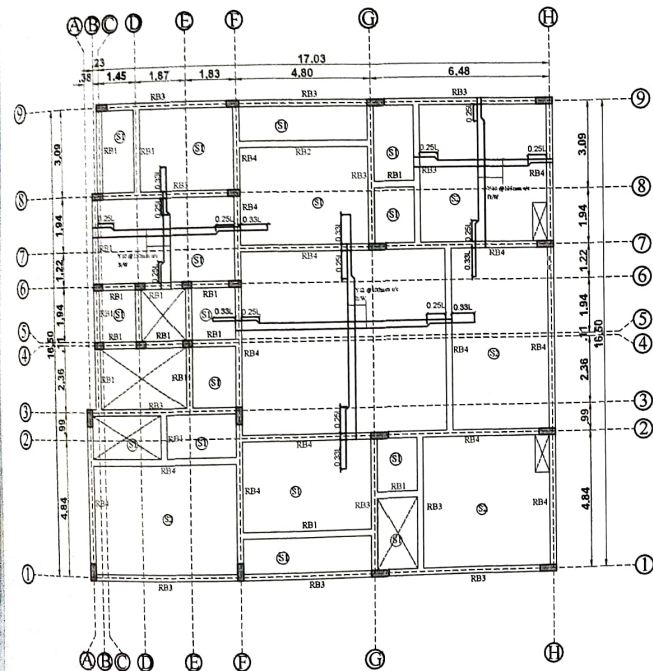
ROOF BEAM AND SLAB LAYOUT

Date : 08-01-2025

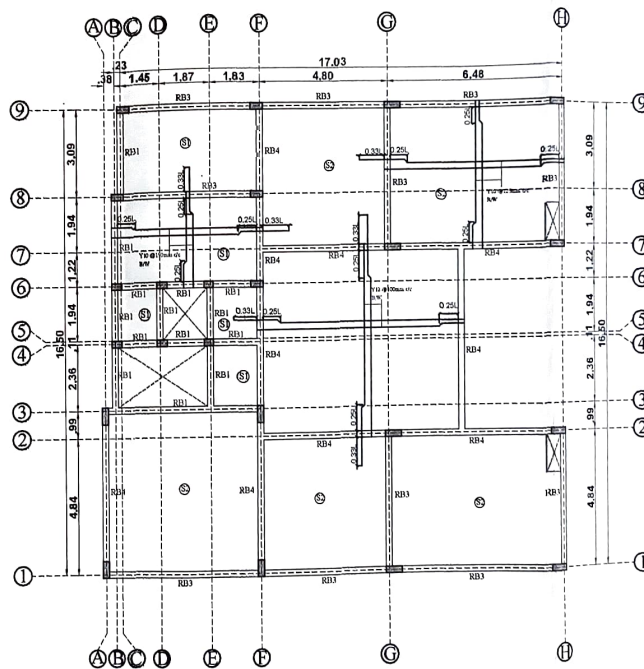
Scale: 1:100
(05)
1" = 4'-0"

Design : N. Vaideeswaran
STRUCTURAL CONSULTANTS

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FOURTH FLOOR ROOF SLAB & BEAM LAYOUT.
ALL SLAB 150 MM THK



FIFTH FLOOR ROOF SLAB & BEAM LAYOUT.
ALL SLAB 150 MM THK

Notes:

1. This drawing should be read along with architectural drawings.
2. Grade of R.C.C. items shall be M25 (1:1.2) by design per conforming to IS-456-2000 unless otherwise specified.
3. Y Grades ISHA Steel conforming to IS 1788 - 1985 Grade: Fe-250.
4. Clear cover to the main steel:
2" for Footings, 25" Beams, 40" Slab.
1.5" for Columns.
1" for Slab beam (slab & beams).
0.5" for Slab edge & slab.
5. Lap length shall be 50 d (Max. 450) for all bars.
6. Bottom Reinforcement
7. Top Reinforcement
8. Provide Continuous Chairs to keep the top Reinforcement in position.
9. Provide 16 at 12" as Distribution steel for all top Reinforcement.
10. Spacer Bar to be Provided in Between Two Layers of Reinforcement of Same Size at Every 3'-0" C/C.
11. Not more than 40% of Reinforcement shall be Lapped at any particular joint.
12. Foundation is designed As per Architectural Drawing.
13. S.B.C of Soil is taken as 24.0 kN/m² Depth - 3.00m.
14. Contender straps should not be released until the wall is completed.
15. Removal of formwork:
a) for slab:
i. Slab spanning up to 4.5 m (15'-0") - 7 days
ii. Slab spanning over 4.5 m (15'-0") - 14 days
b) for beams and arches:
i. Beams and arches spanning up to 8 m (26'-0") - 14 days
ii. Beams and arches spanning over 8 m (26'-0") - 21 days
16. For all window openings 2" thick Plate should be Provided at Slab with 12" Bearing on either side of opening.
17. All Reinforcement steel should be coated with Anti-corrosive Paint before Use.
18. Portable drinking water should be used for Complete Structure.

PROJECT:

PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT FLOOR + 1 FLOOR + 5TH FLOOR (PART) (HEIGHT IS 18.50M) RESIDENTIAL BUILDING WITH 12 DWELLING UNITS AVALING PREMISES PLOT AT PLOT NOS. 17 (APPROVED LAYOUT - 20/2001), RIVER VIEW AVENUE AND ENCLANT 5TH MAIN ROAD, MANAPAKKAM, CHENNAI COMPRISED IN OLD S.NO.154/1B (PT) & 1262 (DOCUMENT), S.NO.154/1B2 & 1262B (PATTI) OF MANAPAKKAM VILLAGE, WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION ZONE: 12 DIVISION: 157

Title:

ROOF BEAM AND SLAB LAYOUT

Date: 08-01-2025

Scale: 1:100
(or)
1" = 4'-0"

Design: N.Vaideswaran

STRUCTURAL CONSULTANTS

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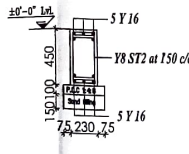
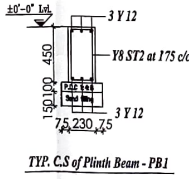
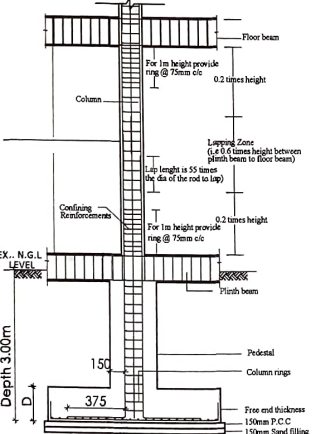
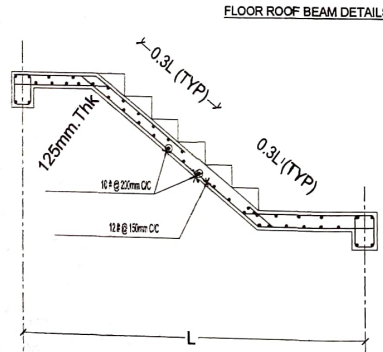
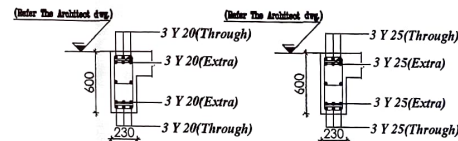
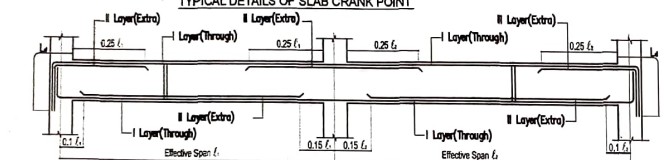
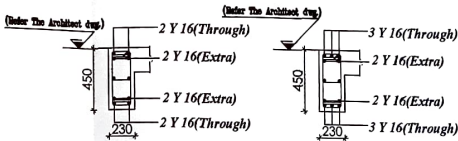
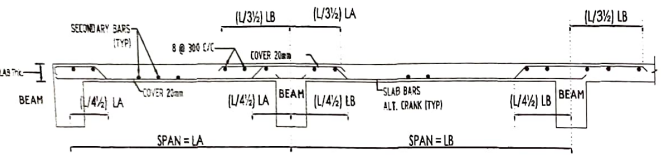
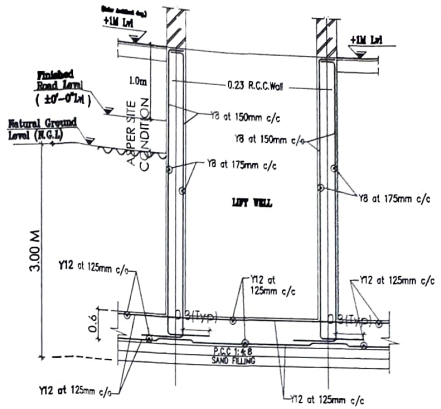
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Footing Schedule :

S.No.	Footing Details	Excavation Size	Footing Size	Depth	Footing Reinforcements
				D	
1.	F1	2.10 X 2.10	2.00 X 2.00	0.60	Y12 @ 150 c/c Both ways
2.	F2	2.20 X 2.20	2.10 X 2.10	0.60	Y12 @ 125 c/c Both ways
3.	F3	2.50 X 2.50	2.40 X 2.40	0.60	Y12 @ 125 c/c Both ways
4.	F4	2.80 X 2.80	2.70 X 2.70	0.70	Y12 @ 100 c/c Both ways
5.	F5	3.00 X 3.00	2.90 X 2.90	0.70	Y12 @ 100 c/c Both ways
6.	F6	3.20 X 3.20	3.10 X 3.10	0.75	Y12 @ 100 c/c Both ways
7.	CF1	7.40 X 4.36	7.30 X 4.26	0.60	REFER LIFT WELL DETAILS

Column Schedule :

S.No.	Column Details	Column Shape	Stirrups	S.No.	Column Details	Column Shape	Stirrups
1.	C1 230 x 375		Y8 at 200 c/c	4.	C4 300 x 600		Y8 at 125 c/c
2.	C2 300 x 450		Y8 at 150 c/c	5.	C5 300 x 600		Y8 at 125 c/c
3.	C3 300 x 450		Y8 at 150 c/c	6.	C6 300 x 600		Y8 at 125 c/c



PROJECT :
PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT FLOOR + 4 FLOORS + 5TH FLOOR (PART) (HEIGHT 18.30M) RESIDENTIAL BUILDING WITH 9 DWELLING UNITS AVAILABLE PREMIUM FSI AT PLOT NOS.37 (APPROVED LAYOUT - 26/2001), RIVER VIEW AVENUE AND ENCLAVE-5TH MAIN ROAD, MANAPAKKAM, CHENNAI COMPRISED IN OLD S.NO.124/1B (PT) & 124/2 (DOCUMENT), S.NO.124/1B2 & 124/2B (PATT) OF MANAPAKKAM VILLAGE, WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION ZONE: 12 DIVISION: 157

Title:
COLUMN, FOOTING, PLINTH BEAM, STAIRCASE, ROOF BEAM DETAILS

Date: 08-01-2025
Scale: 1:100 (or) 1" = 4'-0"

Design : N.Vaideswaran

STRUCTURAL CONSULTANTS

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