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STRUCTURAL STABILITY CERTIFICATE

Name of work:

The Proposed Construction Of Residential Building Consisting Of Stilt + 5 Upper Floors At Block No. 14, R. Survey No. 563/1, Door No. 64, Arathoon Road, Royapuram, Chennai- 600 013

Preamble:

1. I hereby certify that the structural design sheet is done for column, Foundation, Slab and beam.

2. The usage of the building is Stilt floor + 5 upper Floors.

3. The Super Structure is built on outer 200mm walls and inner 100mm walls.

4. All concrete for RCC members in Stilt + 5 Floors are M30 concrete.

5. The structural design includes the Earthquake Criteria as per IS: 1893(part 1)-latest revision.

ADDITIONAL CRITERIA

1. The structure is idealized as Special RC-Moment Resisting Frame (SMRF) and analyzed using software package (STAAD PRO) for both vertical and lateral loads.
2. The lateral load includes wind load and earthquake load, Seismic load of medium and moderate intensity of ZONE-III considered is for design and analysis purpose.
3. The Foundation is designed for critical un-Factored load combinations.
4. The Superstructure members are designed for actual flexure, shear and forces.
5. The structure is analyzed for specific loads (Dead and Live Loads) and for the load combinations given in relevant loads.
6. The design of the structure is **structurally sound and safe**.

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This is to certify that the Structural Design of the proposed construction of residential building at above said site has been DESIGNED on the basis of EARTHQUAKE RESISTANT DESIGN OF STRUCTURES IS 1893 (Part1): 2002 General Provisions & Buildings, with latest declaration of Seismic Zone III, Zone factor 0.16 and according to I.S. Loading standards I.S. – 875 All precautions have been taken as per the CONTENTS OF REPORT FOUNDATION ANALYSIS.. This Report has recommendations for effect of Seismic Condition for this Soil.

CALCULATION OFSEISMIC CO-EFFICIENT

Name of city	: Chennai
Type of Building	: Residential Building
Building Frame System	: Special RC-Moment resisting frame (SMRF)
Fundamental Natural Period (Ts)	: (0.075)h ^3/4 =0.761sec.
Soil conditions	: medium
Zone Factor (Refer Table:2) (Z)	: 0.16 (moderate)
Importance Factor (Refer Table:6) (I)	: 1
Response Reduction (Refer Table:7)	: 5.0
Average response acceleration Co-efficient (Sa/g)	: 2.35

EARTH QUAKE ANALYSIS:

Horizontal Seismic Co-efficient (Ah)	= (Z/2)(I / R)(Sa/g) =(0.16/2) (1/5.0) (2.35) = 0.038
Design value of Ah	= 0.038
Type of Foundation	: Combined footing

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1. GENERAL LOADING CONDITIONS:

(a) Imposed loads on Roof - 1.50kN/m^2

(b) Imposed loads on Hall, Kitchen. & Bed, Residential - 2.00kN/m^2

(d) Dead weight of R.C.C - 25kN/m^3

(e) Dead weight of Brick Work - 20kN/m^3

2.LOADING ON SLABS:

2.1 Loading on Roof slab:

Roof finished with lime concrete terracing =(0.10)(20) =2.000kN/m^2

S/W of slab 125mm thick =(.125)(25) =3.125kN/m^2

Dead load =5.125kN/m^2

Live load =1.50kN/m^2

Total load on Roof = 6.625kN/m^2

2.2 Loading on Floor slabs:

Floor finish = 1.00kN/m^2

S/w of slab 125mm thick = 3.125kN/m^2

Dead load =4.125kN/m^2

Live load =2.00kN/m^2

Total load on Roof = 6.125kN/m^2

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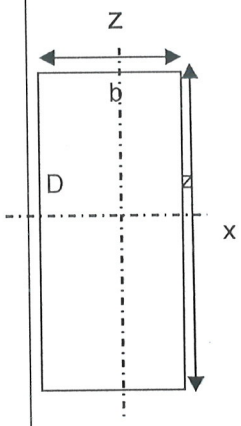
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3DESIGN:

3.1 COLUMN DESIGN

Grade of Concrete			M 30	
Characteristic Strength of Reinf.		N/mm^2	500	
Width of Column	b	mm	300	
Depth of Column	D	mm	600	
Unsupported Length of Column	l_x	mm	3000	
Unsupported Length of Column	l_y	mm	3000	
Clear Cover to Reinf.		mm	40	
Diameter of Bar		mm	20	
Load		T		
Moment	M_{xx}	T.m		
Moment	M_{zz}	T.m		
Factored Load	P_u	kN	770.000	1
Factored Moment	M_{ux}	kN.m	89.950	1
Factored Moment	M_{uz}	kN.m	32.510	1
Effective Length of Column	l_{ex}	mm	3600	1.2
	l_{ez}	mm	3600	1.2
	l_{ex}/D		6	0
			<12- Short Column	
	l_{ey}/b		12	0
			<12- Short Column	
Additional Moment due to Slender	M_{ax}	kN.m	0	
Additional Moment due to Slender	M_{az}	kN.m	0	
Percentage of Reinf.	p	%	2	
Gross Area of Cross Section	A_g	mm^2	180000	
Ultimate Axial Load	P_{uz}	kN	3731.4	



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d'/D (about x-x axis)			0.084	0.1	
d'/D (about y-y axis)			0.167	0.2	
(Table 60)	k1		0.207		
	k2		0.328		
	P_{bx}	kN	1235.880		
	k1		0.184		
	k2		0.028		
	P_{bz}	kN	1003.680		
	k_x		1.000		
	k_y		1.000		
Minimum Eccentricity	e_x	mm	26		
	e_y	mm	16		
Moments due to min. eccentricity	M_{ex}	kN.m	20.02	< 89.950	kN.m
Moments due to min. eccentricity	M_{ez}	kN.m	12.32	< 32.510	kN.m

Total Moments for which the column is to be designed are

	M_{ux}	kN.m	89.950
	M_{uz}	kN.m	32.510

The section is to be checked for biaxial bending

	$P_u/f_{ck}bD$		0.143	
	p/f_{ck}		0.0666667	
Referring (d'/D is0.1)	$M_u/f_{ck}bD^2$		0.1	
	M_{ux1}	kN.m	324.000	
Referring to (d'/D = 0.2)	$M_u/f_{ck}bD^2$		0.100	
	M_{uy1}	kN.m	162.000	
	M_{ux}/M_{ux1}		0.278	
	M_{uy}/M_{uy1}		0.201	
	P_u/P_{uz}		0.207	
		a	1	1.0117
Mux/Mux1 + Muy/Muy1			0.470	< 1 OK

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Area of Reinforcement	As	mm^2	3600	
Minimum no of to be provided			6	
No of Bars to be provided	Nos.		12	
Provide 12 Nos of 20 Diameter				

3.2 FOUNDATION DESIGN

3.2.1 COMBINED FOOTING DESIGN

1 **Footing Size Design**

Load 1	Pu1	770 KN
Load 2	Pu2	750 KN
Combine load	Pcu	1520 KN
Design Load	Pc	1115 KN
Moment in x dir	Mux	40 KN-m
Moment in y dir	Muy	40 KN-m
c/c dist b/w col in x dir		2.650 meters
c/c dist b/w col in y dir		0.000 meters
Col Dim	x dir	0.60 meters
	y dir	0.30 meters
SBC	q	200 KNm2
Footing Size required	A req	5.57 sqmm
Footing Size Provided	L	**4.45 meters**
	B	**2.50 meters**
Area Provided	A prvd	**11.13 meters**
	x bar	1.308
	y bar	0.000
	Zx	4.64
	Zx	8.25

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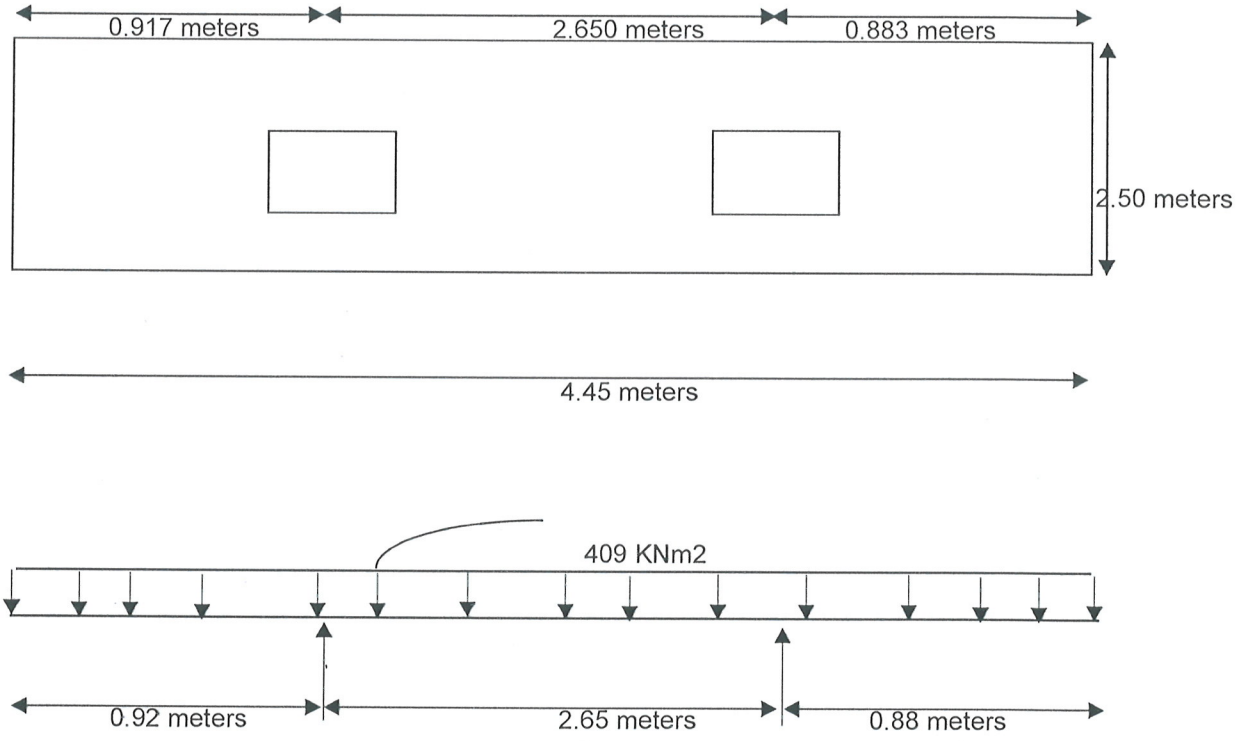
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Nup		109 KNm2

Footing Size OK

2 Beam Design

Total Load	W	109 KNm2
Factored Load	Wu	409 KNm2



Beam Size	width	600 mm
	depth	900 mm
Moment	Mb	898 KN-m

Design the beam from the BEAM DESIGN SHEET

Bottom Reinforcement

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Type	Bar dia	Nos	Area of Steel
Layer 1	25 mm	6	2945 sqmm
Layer 2	-		
Layer 3	-		
Total Steel Provided			2945 sqmm
Percentage of Steel			0.574 %

Top Reinforcement

Type	Bar dia	Nos	Area of Steel
Layer 1	25 mm	6	2945 sqmm
Layer 2	-		
Layer 3	-		
Total Steel Provided			2945 sqmm

3 Slab Design

Net upward pressure	Nup	109 KNm2	
	l	0.95 meters	*/=width of footing from col face*
Bending Moment	Ms	49 KN-m	$M=Nup*l^2/2$
Factored Moment	Mus	74 KN-m	*1.5*Ms*
Concrete	fck	20 MPa	
Steel	fy	415 MPa	
Minimum Depth Required	dmin	164	*d=sqrt(Ms/Rumax*1000*b)*
Depth Provided	D	600 mm	
Clear Cover	c	50 mm	
Effective Cover	d'	58 mm	
Effective Depth	d	542 mm	

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Area of Steel across x dir	Spacing c/c in mm		
	12#	16#	20#
650 sqmm	174 c/c	309 c/c	483 c/c

Minimum Ast required across x direcion

Ast across x direction	**16 mm dia**	**@ 100 mm c/c**	**2011 sqmm**
Dist Ast across y direction	**10 mm dia**	**@ 175 mm c/c**	**449 sqmm**

4 **Shear Check for Slab**

Vu1	67 KN
ζv	0.123 MPa
ζc	0.260 MPa

Shear Check OK

3.3 BEAM DESIGN

Beam Design

Beam Data

width	200 mm
depth	600 mm
clear cover to main reinf.	30 mm
Slab Thickness	125 mm

d' 48 mm *= cc+ sdia + mdia/2*
eff depth 552 mm *= d - d'*

Material Grades

Concrete	30 MPa
Steel	500 MPa

			Span Moment	Support Moment
Span Moment	240 KN-m	Mu/bd²	3.94	3.12
		xumax	252	252
		Mulim	243	243
Support Moment	190 KN-m	Mulim/bd²	3.99	3.99
	190 KN-m			
	0 KN-m			

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Span Reinforcement
Beam is designed as Singly Reinforced Beam

Area of Steel	Tension (Ast)	Compr (Asc)
Percentage	1.113 %	-------
Area of Steel	1228 sqmm	

Refer Table 2 SP 16 pg 48

430 KN-m

Tension Reinforcement

Type	Bar dia	Nos	Area of Steel
Layer 1	20 mm	3	942 sqmm
Layer 2	20 mm	3	942 sqmm
Layer 3	-		
Total Steel Provided			1885 sqmm

1850 sqmm

1.707 %

Provided Steel OK

Compression Reinforcement

Type	Bar dia	Nos	Area of Steel
Layer 1	-		
Layer 2	-		
Layer 3			
Total Steel Provided			

#VALUE!

Support Reinforcement
Beam is designed as Singly Reinforced Beam

Area of Steel	Tension (Ast)	Compr (Asc)
Percentage	0.833 %	-------
Area of Steel	920 sqmm	

Refer Table 2 SP 16 pg 48

3.41477462346717
-0.594645229954950
0.279801150692533

Tension Reinforcement

Type	Bar dia	Nos	Area of Steel
Layer 1	20 mm	3	942 sqmm
Layer 2	20 mm	3	942 sqmm

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Layer 3	-				
		Total Steel Provided	1885 sqmm	1.707 %	
		Provided Steel OK			1640 sqmm
					1281 sqmm
					2322 sqmm

Compression Reinforcement

Type	Bar dia	Nos	Area of Steel
Layer 1	-		
Layer 2	-		
Layer 3			
Total Steel Provided			

#VALUE!

Shear Force (Vu)	**170 KN**		
ζv	1.540	*.=Vu / (b * d)*	
ζc	0.798	*Refer Table 61 SP 16 pg 179*	*or =(0.85*√(0.8*fck)*√(1+5β)-1)) / (6β)*
ζcmax	3.5	*Refer Table J SP 16 pg 175*	

Type	Bar Dia	Nos	Area of Steel	
Layer 1	**12 mm**	**0**	0 sqmm	
Layer 2	**25 mm**	**0**	0 sqmm	
Layer 3	**20 mm**	**0**	0 sqmm	
			0 sqmm	0.000 %

Sectional Dimensions OK
Shear Reinforcements required

Steel	**415 MPa**	Vus/d	1.483 kN/cm	1.483
Type of stirrup	**2 legged**			
Stirrup diameter	**8 mm**			
Spacing	295 c/c	Safe		

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3.4 TWO WAY SLAB DESIGN

Slab thickness	t	125 mm
Concrete	fck	30 MPa
Steel	fy	500 MPa

Sunken Depth	0 mm

Loading

Slab Load

Dead Load	DL	3.125 KN/m
Live Load	LL	2.000 KN/m
Finishes Load	WL	1.000 KN/m
Total Load	Ws	6.125 KN/m
Factored Load	Wsu	9 KN/m

Sunken Slab Load

Dead Load	DL	3.125 KN/m
Filler Load	FL	0 KN/m
Live Load	LL	3.0 KN/m
Finishes Load	WL	1.0 KN/m
Total Load	Wsk	7.13 KN/m
Factored Load	Wsku	11 KN/m

Slab Data

Slab Type	Regular
Load	9 KN/m
Longer Span (ly)	6 .30 m
Shorter Span (lx)	3.645 m

ly/lx ratio	1.77
Slab type	+

Loading on edges

		one way	two way
W_{longer}	**12 KN/m**	$=w*lx/2$	$=(w*lx/2) + (1-(1/3)*(lx/ly)^2)$
$W_{shorter}$	**9 KN/m**		$=w*lx/3$

Moments		one way	two way
Mx	7 KN-m	$=w*lx^2/8$	$=ax * w*lx^2$
My	5 KN-m		$=ay * w*lx^2$

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Thickness Check	OK	.=Mulim > Mux or Muy
Deflection	21 mm	.= $5*W*l^4/(384EI)$

Area of Steel	Astx	Asty	
	168 sqmm	**150 sqmm**	*Refer Chart 4 SP 16 pg 21* *Refer Table 5-44 SP 16 pg 51-80*

or

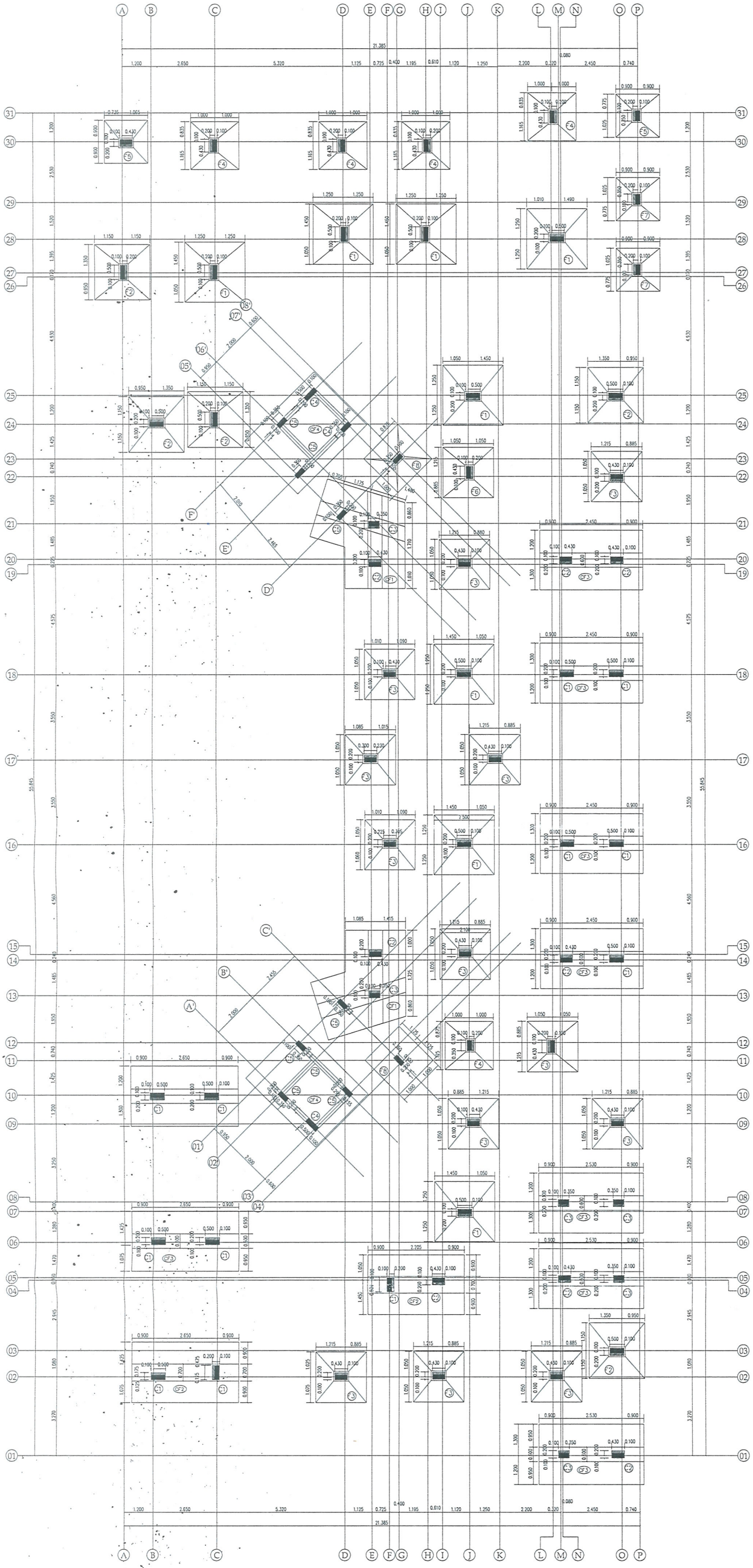
Spacing required in mm

8#		10#		12#		16#	
x	y	x	y	x	y	x	x
300 c/c	**335 c/c**	**468 c/c**	**524 c/c**	**674 c/c**	**754 c/c**	**###### #**	**1340 c/c**

*.=ast of bar*1000/ast req*

Final Ast provided	x	y
	10# @ 150c/c	**10# @ 150c/c**

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FOUNDATION LAYOUT

NOTES:

1. All dimensions are in millimetres.
2. This drg shall be read in conjunction with relevant architectural drawings
3. All dimensions shall be checked and verified before execution of works.
4. Concrete mix :–
   For columns : M30.
   (Cement Content –360 kg/m3)
   * Contractor / Client shall send us cube test results to substantiate the concrete mix grade.
   * If ready mixed concrete is being used, client/contractor cube results thus obtained to us.
5. Maximum water cement ratio :
   for 1:2:4 – 0.50
   for 1:1 1/2:3 – 0.45
   shall cast concrete cubes independently at site and send
6. REINFORCEMENT :
   TOR STEEL for ø8mm & above conforming to IS 1786 (latest revision)
7. Clear concrete cover to main bars :
   For columns : 40mm ,For rc wall : 25mm
   For footings&raft slab : 50mm, Raft Beam: 75mm
8. Use stone aggregates and sand conforming to IS 383 (latest revision)
   Stone aggregates size – 20mm and down grade
9. Use good water for concrete mixing and curing conforming to IS 456 (latest revision)
10. Use ordinary portland cement conforming to IS 8112 (latest revision) for 43 grade cement & IS 12269 for 53 grade cement.
11. S.B.C of soil is assumed as 20t/sq.m
12. Foundation is designed for STILT+5floor
13. The centering and shuttering to support structural concrete must be sufficiently strong and rigidly braced.Horizontal ties shall be provided at every 1.5m height.
14. The stability of supports and strength of the centering and formwork should be ensured by the Contractor and Site Engineer before placing concrete.

REV.	DATE	REVISION NOTE NO	SIGN	CHKD

FOUNDATION LAYOUT

JOB NO :	–	DRAWN :	–
DRG.NO:	S–01	DESIGNED :	–
DATE :	–		

PROJECT :

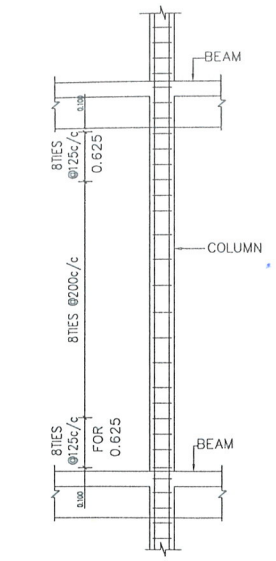
PROPOSED BY RESIDENTIAL DEVELOPMENT AT ROYAPURAM , CHENNAI

STRUCTURAL CONSULTANT

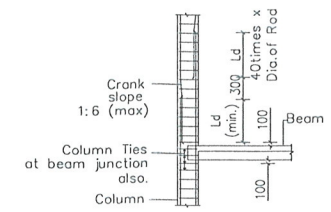
Er. P. RAMAN, B.E (CIVIL), M.E (Struct), M.I.E., C.Engg.,
Registered Structural Engineer Grade - I (SE)
CMDA Registration No: SE/GR - I/19/02/006
S.S Manians Apartments,
No.5/13, Thambiah Road Extn.,
West Mambalam, Chennai-600 033.

SCHEDULE OF FOOTING & SCHEDULE OF COLUMNS (MIX: 30)

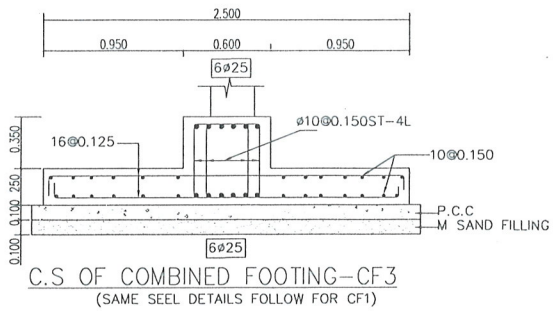
TYPE	FOOTING SIZE	DEPTH h1	DEPTH h2	FOOTING REINFORCEMENT L	FOOTING REINFORCEMENT B	COLUMN REINFORCEMENT GROUND FLOOR	1st FLOOR	2nd FLOOR	3nd FLOOR	4th FLOOR	5th FLOOR	STIRRUPS
F1	2500x2500	230	600	ø16Tor@125	ø16Tor@125	12–ø20 0.300 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	ø8Tor
F2	2300x2300	230	600	ø16Tor@125	ø16Tor@125	12–ø20 0.300 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	ø8Tor
F3	2100x2100	230	600	ø12Tor@125	ø12Tor@125	10–ø20 0.300 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	ø8Tor
F4	2000x2000	230	600	ø12Tor@125	ø12Tor@125	10–ø20 0.300 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	ø8Tor
F5	1800x1800	230	600	ø12Tor@125	ø12Tor@125	10–ø20 0.300 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	ø8Tor
F6	2000x2000	230	600	ø12Tor@125	ø12Tor@125	8–ø20 0.300 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	ø8Tor
F7	1800x1800	230	600	ø12Tor@125	ø12Tor@125	8–ø20 0.300 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	ø8Tor
F8	2000x2000	230	600	ø12Tor@125	ø12Tor@125	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	ø8Tor
C1	LIFT&COMBINED FOOTING					12–ø20 0.300 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	ø8Tor
C2						10–ø20 0.300 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	10–ø20 0.200 / 0.530	ø8Tor
C3						8–ø20 0.300 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	ø8Tor
C4						12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	12–ø20 0.200 / 0.600	ø8Tor
C5						8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	8–ø20 0.200 / 0.450	ø8Tor



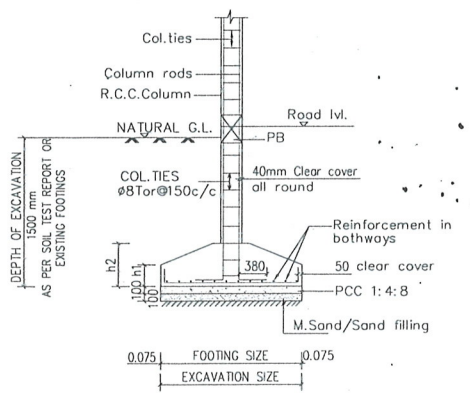
TYPICAL TIES ARRANGEMENT IN COLUMN



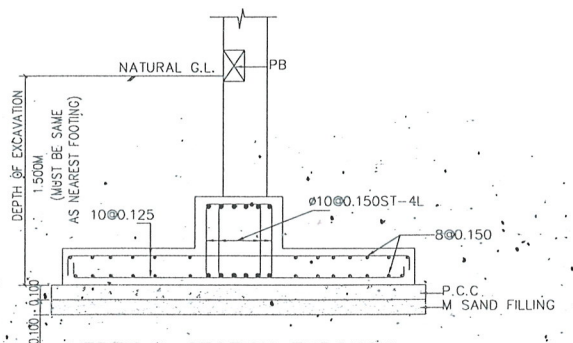
SPLICE WITH UPPER BARS CRANKED INTO POSITION INSIDE LOWER BARS



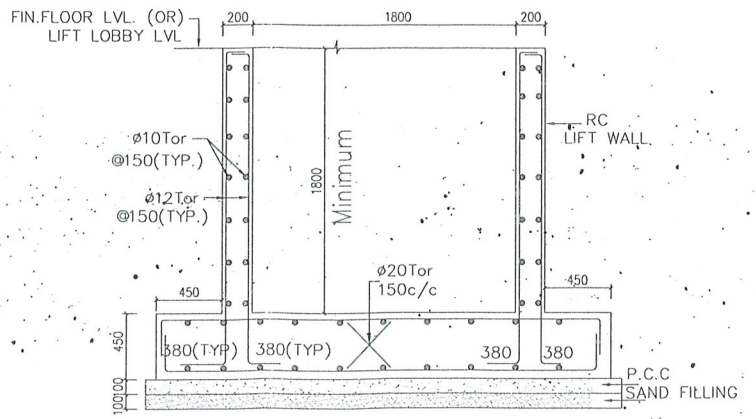
C.S OF COMBINED FOOTING-CF3
(SAME SEEL DETAILS FOLLOW FOR CF1)



VERTICAL SECTION THROUGH COLUMN FOOTING FOR TAPPER



VERTICAL SECTION THROUGH COMBINED FOOTING



TYPICAL DETAILS OF LIFT PIT COMBINED FOOTING-3

NOTES:
1. All dimensions are in millimetres.
2. This drg shall be read in conjunction with relevant architectural drawings
3. All dimensions shall be checked and verified before execution of works.
4. Concrete mix :–
   For columns : M30.
   (Cement Content –360 kg/m3)
   * Contractor / Client shall send us cube test results to substantiate the concrete mix grade.
   * If ready mixed concrete is being used, client/contractor cube results thus obtained to us.
5. Maximum water cement ratio :
   for 1:2:4 – 0.50
   for 1:1 1/2:3 – 0.45
   shall cast concrete cubes independently at site and send
6. REINFORCEMENT :–
   TOR STEEL for ø8mm & above conforming to IS 1786 (latest revision)
7. Clear concrete cover to main bars :
   For columns : 40mm ,For rc wall : 25mm
   For footings&raft slab : 50mm, Raft Beam: 75mm
8. Use stone aggregates and sand conforming to IS 383 (latest revision)
   Stone aggregates size – 20mm and down grade
9. Use good water for concrete mixing and curing conforming to IS 456 (latest revision)
10. Use ordinary portland cement conforming to IS 8112 (latest revision) for 43 grade cement & IS 12269 for 53 grade cement.
11. S.B.C of soil is assumed as 20t/sq.m
12. Foundation is designed for STILT+5floor
13. The centering and shuttering to support structural concrete must be sufficiently strong and rigidly braced.Horizontal ties shall be provided at every 1.5m height.
14. The stability of supports and strength of the centering and formwork should be ensured by the Contractor and Site Engineer before placing concrete.

REV.	DATE	REVISION NOTE NO	SIGN	CHKD

COLUMN SCHEDULE AND FOORING DETAILS.

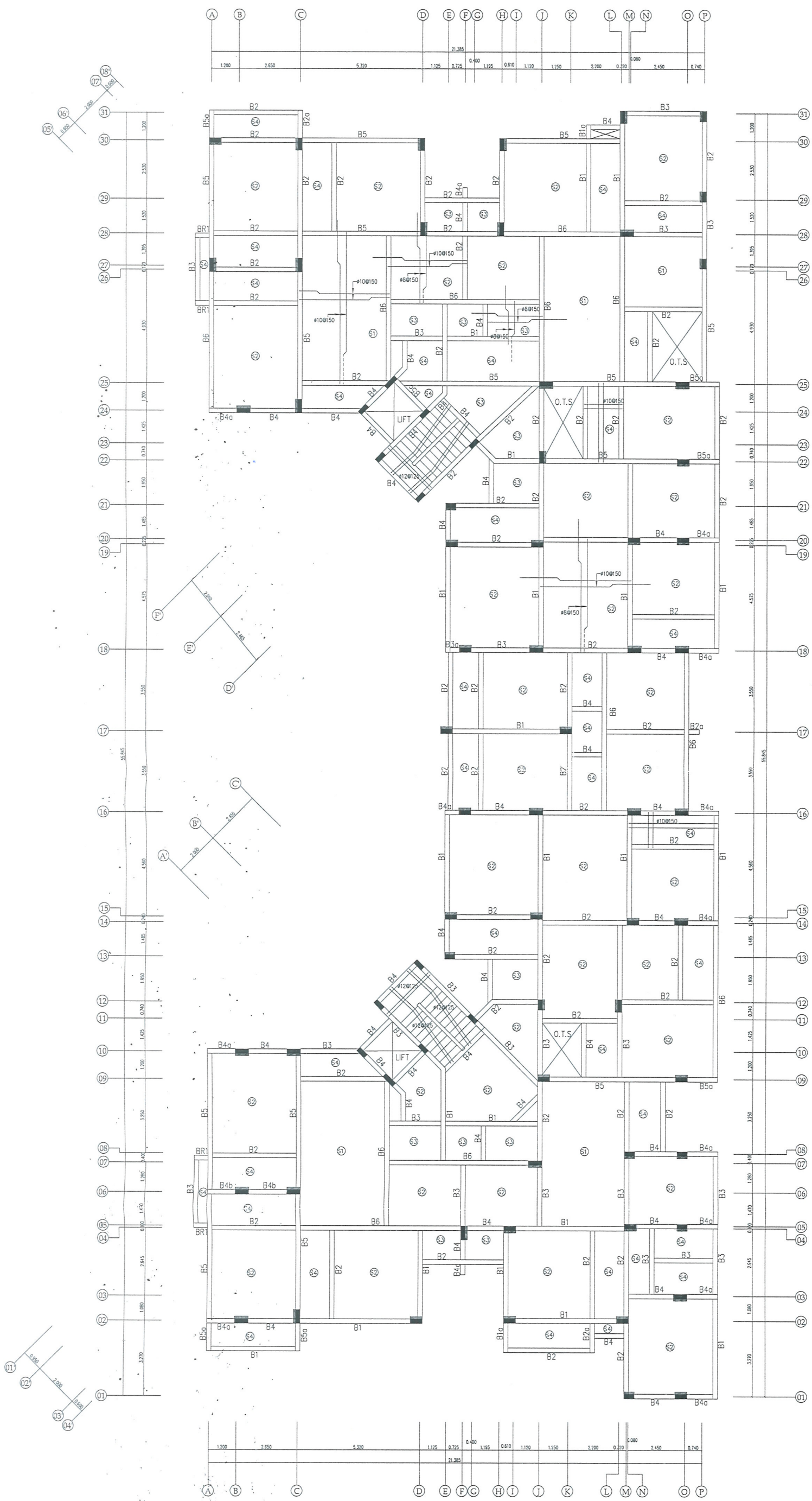
JOB NO: –	DRAWN : –
DRG.NO: S-02	DESIGNED : –
DATE : –	

PROJECT :

PROPOSED BY RESIDENTIAL DEVELOPMENT AT ROYAPURAM , CHENNAI

STRUCTURAL CONSULTANT

Er. P. RAMAN B.E (CIVIL), M.E (Struct), M.I.E., C.Engg.,
Registered Structural Engineer Grade - I (SE)
CMDA Registration No: SE/GR - I/19/02/006
S.S Manians Apartments,
No.5/13, Thambiah Road Extn.,
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REV.	DATE	REVISION NOTE NO	SIGN	CHKD

SLAB BEAM LAYOUT

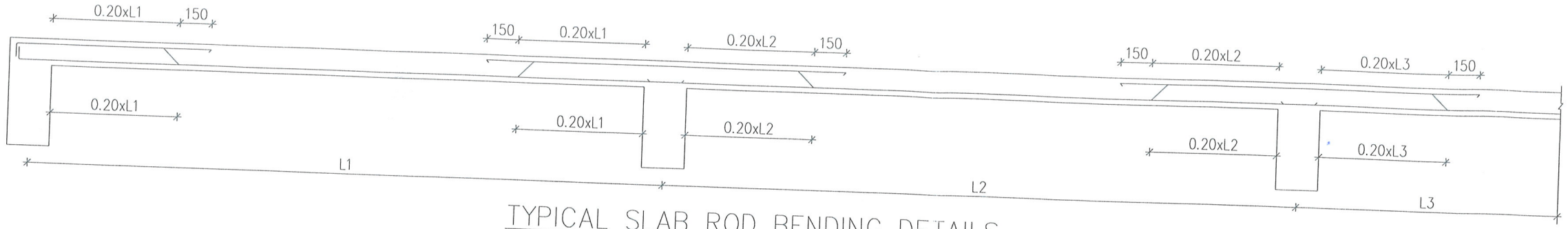
JOB NO : –	DRAWN : –
DRG.NO: S-03	DESIGNED : –
DATE : –	

PROJECT :

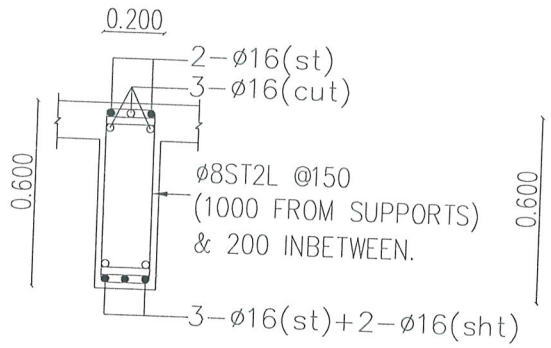
PROPOSED BY RESIDENTIAL DEVELOPMENT AT ROYAPURAM , CHENNAI

STRUCTURAL CONSULTANT

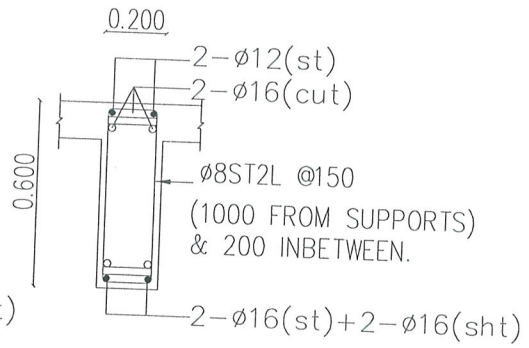
Er. P. RAMAN, B.E.(CIVIL), M.E (Struct), M.I.E., C.Engg.,
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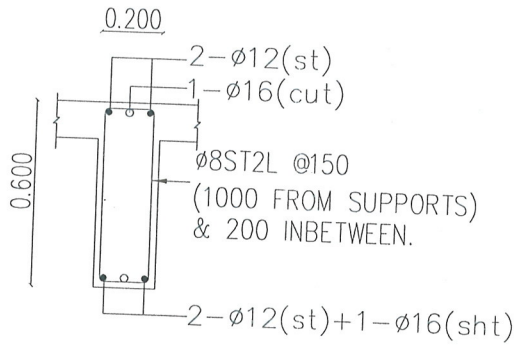
TYPICAL SLAB ROD BENDING DETAILS.



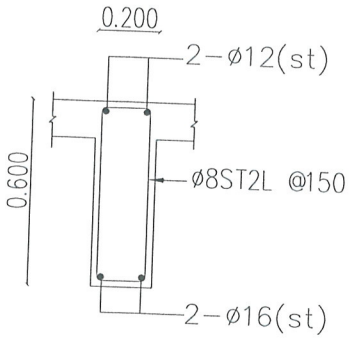
C.S OF B1



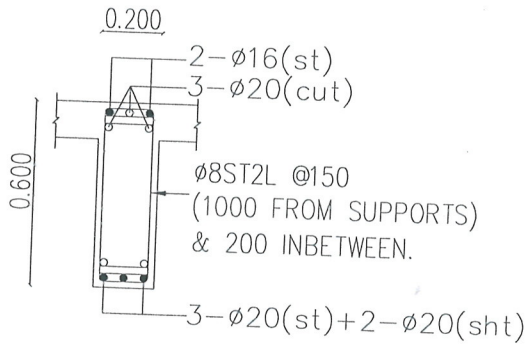
C.S OF B2



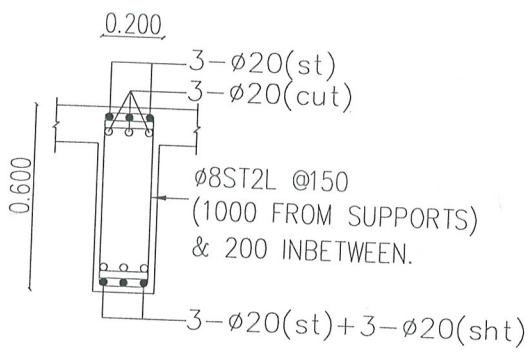
C.S OF B3



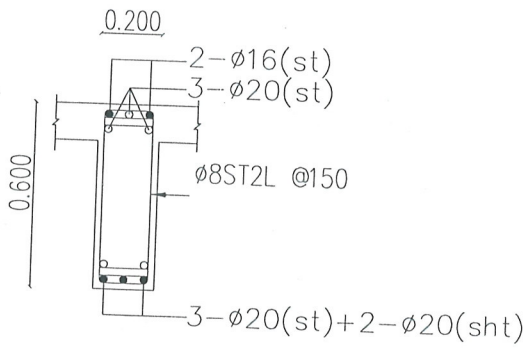
C.S OF B4



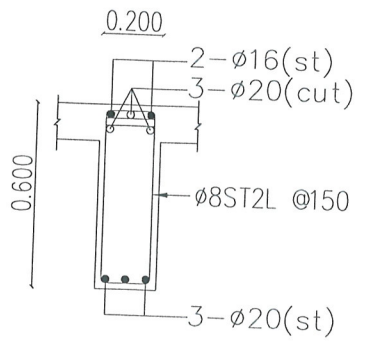
C.S OF B5



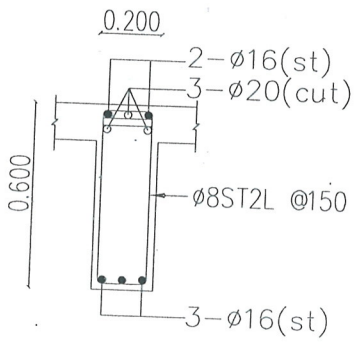
C.S OF B6



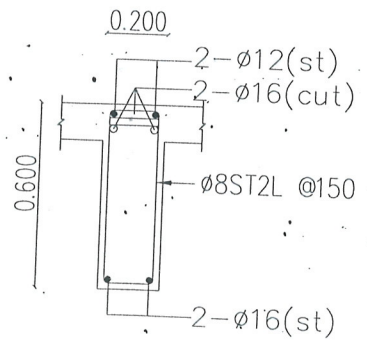
C.S OF B5c



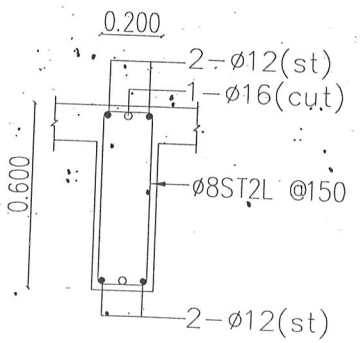
C.S OF B5a



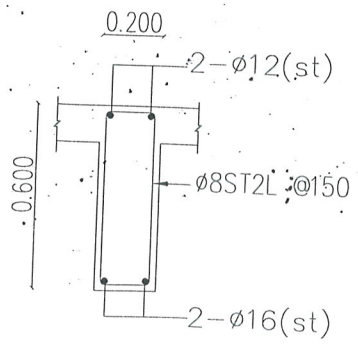
C.S OF B1a



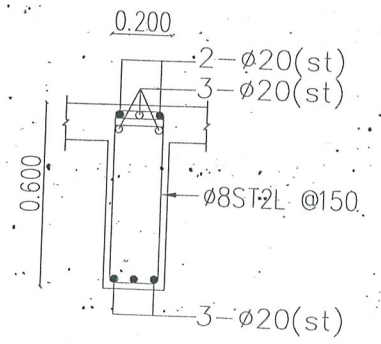
C.S OF B2a



C.S OF B3a



C.S OF B4a



C.S OF B4b

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REV.	DATE	REVISION NOTE NO	SIGN	CHKD

RCC DETAIL OF BEAM

JOB NO : -	DRAWN : -
DRG.NO: S-04	DESIGNED : -
DATE : -	

PROJECT :

PROPOSED BY RESIDENTIAL DEVELOPMENT AT ROYAPURAM , CHENNAI

STRUCTURAL CONSULTANT

Er P. RAMA[illegible], M.E (Struct), M.I.E., C.Engg.,
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S.S Manians Apartments,
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