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DESIGN CALCULATION

PLAN SHOWING THE PROPOSED CONSTRUCTION OF THE RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

STRUCTURAL CONSULTANTS:-

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Structural Design Calculation for Construction of RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.

1.0 DESIGN BRIEF:

THIS DOCUMENT PLAN SHOWING THE PROPOSED CONSTRUCTION OF THE RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

2.0 GENERAL DESIGN CRITERIA

2.1. Description of the structure

The Residential Building consists of Stilt Floor + 5 Upper floors and the structure is designed as a RCC framed structure.

1. Size of the building : 244.15X 219.46M
2. Height of the building : 18.00M
3. Number of storeys above GL : Stilt Floor +5 upper floors
4. Floor to floor height of this building : Ground and First floors - 3.0m
   : Typical floor – 3.0m
5. Type of foundation : Isolated foundation as per geotechnical report

2.2. Materials Used

Following materials are generally used in the design of the various components of the structure.
For Concrete Structure

- M25 grade concrete for all reinforced concrete parts of the structure
- Fe500 grade Structural reinforcement steel
- Masonry for all walls : Brick / Block

2.3. Design Codes & Standards

Following codes and specifications have been generally used in the design of the members of the structure.

- IS 456 : 2000 Code of practice for Plain and Reinforced concrete
- SP: 16 Design Aids for Reinforced concrete
- IS 875 : 1987 Design Loads for building and structures
- IS 1893 : 2002 Criteria for Earthquake Resistant design of structures
- IS 13920: 1993 Ductile Detailing of R.C structures subjected to Seismic forces
- SP: 34 Handbook on Concrete Reinforcement & Detailing
- IS 800 : 1984 Code of practice for general construction in steel
- IS 2062 : 1999 Steel for general structural purposes specification
- IS 1786: 1985 Specification for high strength deformed bars and wires for concrete reinforcement

3.0 LOADING

Primary Load:

- Dead Load (DL)
- Live Load (LL)

3.1. Dead load (DL)

Material weight

- Density of Concrete =25 kN/m^3
- D.L. due to partitions
  (Light Partition as per IS 875) =1.50 kN/m^2
- D.L due to floor finish 50mm thick = 0.05x25 = 1.25 kN/m^2

3.2. Live load (LL)

Minimum Uniformly Distributed Live Loads:

Occupancy or use	Live Load (kn/m^2)
• All rooms and kitchens	2.00
• Toilet and bath rooms	3.00
• Corridors, passages, staircases	3.00
• Balconies	3.00
• Terrace Floor	1.50
• Basic wind speed	=50 m/sec
• Seismic Zone	=Zone III

3.5 Loading Combinations

The following combinations of Loads as per IS 1893 is considered in the STAAD Analysis

- 1.5(DL +LL)
- 1.2(DL + LL)

The below load combinations are used to check the structure in serviceability condition.

- 1.0(DL +LL)

4.0 STRUCTURAL MATERIAL:

4.1 Concrete Material Specifications:

Concrete compressive cube strength	- 25 N/mm^2
Minimum cement content	- Refer standard drawings for general & Legends
Cement type	- OPC
Free water cement ratio	- 0.5 (Maximum)
Nominal maximum size of aggregate	- 20mm UNO

4.2 Reinforcement:

Steel reinforcement shall be deformed bars, the characteristic of reinforcement bars shall conform to the following specification:

Grade of Steel	Actual Yield Strength (MPa)
Grade Fe500	Minimum 500 MPa,

4.4 Concrete cover:

Cover for Reinforcement is considered as per Table 16A of NBC, for a Fire resistance of 2 hrs.

- Raft Slab = 50mm
- Footing = 50mm
- RC Wall = 30mm
- Columns = 40mm
- Beams = 30mm
- Slabs = 25mm

5.0 Structural Description

5.1. Method of analysis

Structure analysis & design:

The structure is analyzed as a Space frame structure in STADD Pro Vi8. Columns, Footing, Basement walls, slabs, Beams and Staircases are designed as reinforced concrete members.

5.2. Framing System, Analysis and Design

Limit State concept of design will be used as per IS: 456-2000 & SP - 16. The detailing of reinforcement shall be done satisfying the requirements of IS: 456-2000, SP-16, IS: 13920, IS: 4326-1993 and SP-34.

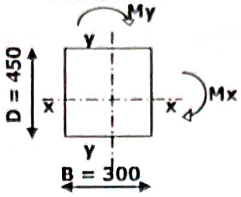
The Slabs and beams are checked for deflection as per IS 456:2000. Cover for Reinforcement is considered as per Table 16A of NBC, for a Fire resistance of 2 hrs.

APPENDIX I

Design Calculations

Column Design

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO	DATE	DESIGNED	DATE
TITLE	Design for a Short Column with Biaxial Bending	REVISION	DATE	CHECKED	DATE

CL. NO.	DESIGN CALCULATIONS	REFERENCES
	Column No:  **CRITICAL LOAD CASE:**	
1.0	**Basic Data**	
1.1	**Material Data**	
	Grade of Concrete = M 25	
	Grade of Steel = Fe 500	
1.2	**Codal Data**	
	Nominal Cover = 40 mm	Cl 26.4.2.1,IS456:2000
	Diameter of the Bar = 25 mm ≥ 12 mm	
	d' = 52.5 mm	
1.3	**Basic Dimensions**	
	Unsupported Length of the Column L_{ox} = 3000 mm	
	L_{oy} = 3000 mm	
	L_{ex} = 3000 mm	Table 28 , IS456:2000
	L_{ey} = 3000 mm	
	Size of the Column B X D = 300 x 450 mm	
1.4	**Analysis Results**	
	Factored Axial Load P_u = 780.0 kN	STAAD OUTPUT
	Factored Moment M_{ux} = 22.00 kNm	
	Factored Moment M_{uy} = 71.00 kNm	
2.0	**Check for Slenderness**	
	Slenderness Ratio about Major Axis L_{ex} / D = 6.667	
	Slenderness Ratio about Minor Axis L_{ey} / B = 10.000	
	Since Leff / LLD <12 Designed as Short Column	Cl 25.1.2, IS456:2000
3.0	**Check for Eccentricity**	
	Minimum Eccentricity e_x = L_{ox} / 500 + D / 30 = 21.0 mm >20	Cl 25.4 IS456:2000
	e_y = L_{oy} / 500 + B / 30 = 16.0 mm <20	
3.1	**Moments Due to Minimum Eccentricity**	
	Me_x = 16.38 kN.m	
	Me_y = 15.60 kN.m	
4.0	**Design Moment**	
	Design Moment about X axis M_{ux} = 22.00 kN.m	
	Design Moment about Y axis M_{uy} = 71.00 kN.m	

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO	DATE	DESIGNED	DATE
TITLE	Design for a Short Column with Biaxial Bending	REVISION	DATE	CHECKED	DATE

CL. NO.	DESIGN CALCULATIONS	REFERENCES
5.0	**Uniaxial Moment Carrying capacity of the Section about X & Y- axis**	
	d' / D = 0.117	
	d' / B = 0.175	
	Assume the Reinforcement Percentage p = **2.00**	
	p / f_{ck} = 0.080	
	$p_u / f_{ck}BD$ = 0.231	
	Reinforcement distributed equally on four sides **4**	
	$M_{ux1} / f_{ck}BD^2$ = 0.137	Chart 43 - 46
	$M_{uy1} / f_{ck}DB^2$ = 0.119	SP 16 : 1980
	Moment carrying capacity about X axis M_{ux1} = 207.89 kN.m	
	Moment carrying capacity about Y axis M_{uy1} = 120.61 kN.m	
6.0	**Calculation of P_{uz}**	
	$P_{uz} = 0.45 f_{ck} A_c + 0.75 f_y A_{sc}$ = 2500.88 kN	Cl 39.6 , IS456:2000
	P_u/P_{uz} = 0.312	
	α_n = 1.186	Cl 39.6 , IS456:2000
7.0	**Criteria for Biaxial Bending (Bresler's Formulation)**	
	$(M_{ux}/M_{ux1})^{\alpha n} + (M_{uy}/M_{uy1})^{\alpha n}$ = **0.603** < 1 **Hence Safe**	Cl 39.6 , IS456:2000
8.0	**Longitudinal Reinforcement**	
	Area of compression Steel $A_{sc,reqd}$ = **2700** mm^2	
	10 Nos Y20 + Nos Y20 $A_{sc,pro}$ = **3142** mm^2	
8.1	**Check for Minimum & Maximum Area of Steel**	
	Minimum Area of steel (0.8 % of A_g,dir) = **441** mm^2	Cl 26.5.3.1 a & b ,
	(Based on the area of concrete reqd to resist direct stress)	IS 456 : 2000
	Maximum Area of steel (4 % of A_g) = **5400** mm^2	
	441 < **3142** < **5400** mm^2	
	Area of Steel is with in the permissible limit ; Hence O.K	
9.0	**Transverse Reinforcement**	
9.1	Diameter of Transverse Reinforcement = **8** mm ≥ 6 mm	Cl 26.5.3.2 c 2) ,
9.2	**Spacing of Lateral Ties :**	
	i) Least Lateral Dimension of the column = 300 mm	Cl 26.5.3.2 c 1) ,
	ii) 16 times the Smallest dia of Longitudinal Steel = 320 mm	IS 456 : 2000
	iii) = 300 mm	
	Reqd. Spacing of Ties (Minimum of the above) = 300 mm	
	Provide 8 mm dia Lateral Ties @ **300** mm Spacing	
	Provide closer spacing on either side of the column above and below beam / slab.	

Footing Design

RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.

Design of Isolated Footing F3 **Node :** 38

Basic Data:

Net Safe Bearing Capacity	150	kN/m^2
Unit wieght of Soil	18	kN/m^3
Unit wieght of Concrete	25	kN/m^3
Grade of Concrete	25	N/mm^2
Grade of Steel	500	N/mm^2
Clear Cover to Reinforcement	50	mm
Earth Fill above FGL	0	mm
Base Area of Footing	3.78	m^2
Ixx	1.02	m^4
Izz	1.39	m^4
Weight of Footing	47.25	kN
Weight of soil	98.42	kN

Gross Bearing Pressure Calculation (kN/m^2)

Critical Load Combinations	Pmax	Pmin
200	157.58	157.5833333
0	38.54	38.54

Gross SBC (w/o increase) 186 kN/m^2

Hence **OK**

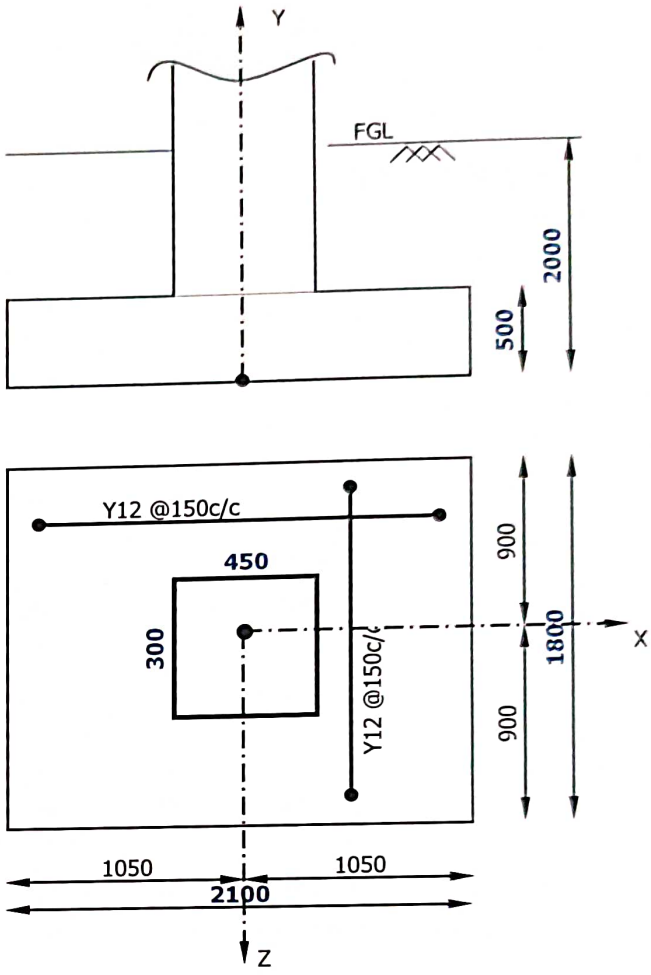
Factored Net Upward Pressure Calculation

Load Factor for Design 1.5

Critical Load Combinations	Pmax	Pmin
200	178.57	178.5714286
0	0.00	0.0

Dsgn.(+ve) BM abt. X-axis Mux	50.22	kN.m
Dsgn.(+ve) BM abt. Z-axis Muz	60.77	kN.m
Dsgn.(-ve) BM abt. X-axis Mux	0.00	kN.m
Dsgn.(-ve) BM abt. Z-axis Muz	0.00	kN.m
Provided Eff. depth for Mux	432.00	mm
Provided Eff. depth for Muz	444.00	mm
Mu,lim	621	kN.m

Depth provided is **OK**



Bottom Reinforcement

						Ast Provided	Ast Required		
Provide	12	@	150	C/C	along Z	754	600.0	mm^2	Hence
Provide	12	@	150	C/C	along X	754	600.0	mm^2	**OK**

Bottom Reinforcement

Ast Required for Mux	270.6	mm^2
Ast Required for Muz	319.2	mm^2
Min. Ast Reqd.	600	mm^2

Top Reinforcement

Ast Required for Mux	0.00	mm^2
Ast Required for Muz	0.00	mm^2
Min. Ast Reqd.	Not Reqd.	mm^2

RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.

Design of Isolated Footing F3 **Node :** 38

Check For Flexural / Oneway Shear

	Actual	Allowable		Hence
Shear Stress (Plane II to X)	0.131	0.311	N/mm^2	OK
Shear Stress (Plane II to Z)	0.153	0.308	N/mm^2	OK

Check For Punching / Twoway Shear

Allowable Shear Stress		1.25	N/mm^2	
Actual Shear Stress		0.46	N/mm^2	Hence **OK**

Check For Overturning

Co-efficient of friction	=	0.57				
Factor of safety for overturning, sliding	=	1.4				
Net Moments acting at Pad Level, M_{xx}	=	0.00	kNm			
Net Moments acting at Pad Level, M_{zz}	=	0.00	kNm			
Weight of pad	=	47.25	kN			
Weight of Over burden Earth	=	98.42	kN			
Total downward Load	=	595.67	kN			
Stabilizing moment along X-Dir	=	595.67	x	1.05		
	=	625.45	kNm			
Actuating moment, M_{zz}	=	0.00	kNm			
Factor of Safety (Along X-Dir)	=	625.45	/	0.0		
		-	>	1.40	Hence	**OK**

Check For Sliding

Resistance against Sliding	=	339.5291	kN			
Max. Shear Load @ Pad level in X-Dir.	=	2.5	kN			
Max. Shear Load @ Pad level in Z-Dir.	=	5.3	kN			
Factor of Safety (Along X-Dir)	=	339.5	/	2.5		
		133.67	>	1.40	Hence	**OK**
Factor of Safety (Along Z-Dir)	=	339.5	/	5.3		
		64.06	>	1.4	Hence	**OK**

Plinth Beam Design

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
TITLE		REVISION	DATE	CHECKED RMK	DATE

CL. NO.	BEAM DESIGN CALCULATIONS					REFERENCES
1.1	**Geomentry Data**					
	Beam Number		=	PB1		
	Type of Beam		=	Rectangular Beam		
	Support Condition		=	Continuous Beam		
	Width of beam	b	=	230	mm	
	Overall Depth of Beam	D	=	380	mm	
	Dia of bar	Φ	=	25	mm	
	Nominal Cover	cc	=	30	mm	IS 456:2000 Table 19
	Effective Depth	d	=	337.5	mm	IS 456:2000
	Effective Cover		=	42.5	mm	Cl 23.0
	Effective Span of beam	l_{eff}	=	4500	mm	
	Concrete grade		=	M 25		
	Steel Grade		=	Fe 500		
	$p_{t,lim}$		=	0.944 %		
	$p_{t,min}$		=	0.170 %		IS 456:2000
	p_t & p_{cmax}		=	4.00 %		Cl 26.5.1.1
1.2	**Force Input**					
	Left negative moment (Support 1)		=	84	kNm	
	Mid span positive moment		=	84	kNm	
	Right negative momer (Support 2)		=	84	kNm	
	Shear @ (Support 1)		=	149	kN	
	Shear @ (Span)		=	149	kN	
	Shear @ (Support 2)		=	149	kN	
1.3	**Limiting Moment**					
	M_{ulim} = 0.133 f_{ck} b d^2		=	87.11	kNm	
1.4	**Area of Steel**					
	Minimum Area of S = 0.17% b d		=	131.9625	mm^2	
	Support 1					
	Negative moment (Support 1)		=	84	kNm	
	Hence the Section is designed as Singly Reinforced Section					
		M_u/bd^2	=	3.206		
	Percentage of tension steel reqd	p_t	=	0.028	%	
	Percentage of compression steel	p_c	=	0	%	
	Required Area of tension steel	$A_{st\ reqd}$	=	131.96	mm^2	
	Required Area of compression ste	$A_{sc\ reqd}$	=	0.00	mm^2	
	Detail of bars					
		I st Layer		**II nd Layer**		
		Nos	Dia	Nos	Dia	
	Tension Reinforcemer	**3**	#			
		A_{st} provide	=	603.19	mm^2	
		Nos	Dia	Nos	Dia	
	Compression Reinforc	**3**	#	**0**		
		A_{sc} provide	=	603.19	mm^2	
	Percentage of tension steel provi	p_t	=	0.777	%	**Hence O.K**
	Percentage of compression steel	p_c	=	0.777	%	**Hence O.K**

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
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CL. NO.	BEAM DESIGN CALCULATIONS	REFERENCES

Check for Shear

Shear = 149 kN

Nominal Shear Stress	τv	=	1.92	N/mm^2	Cl 40.1, IS456:2000
Permissible Shear Stress	τc	=	0.92	N/mm^2	β = 1.000
Maximum Shear Stress	$\tau c,max$	=	2.5	N/mm^2	Table 19, IS456:2000
Diameter of the Stirrup bar		=	8	mm	Table 20, IS456:2000
Number of Legs		=	2		
Spacing of Shear reinforcement Required		=	190.0		Cl 40.4, IS456:2000
Maximum Spacing of Shear Reinforcemer		=	250		Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stirrups @ 190mm c/c spacing

Support 2

Negative moment = 84 kNm

Hence the Section is designed as Doubly Reinforced Section

	M_u/bd^2	=	3.206	
Percentage of tension steel reqd	p_t	=	0.028	%
Percentage of compression steel	p_c	=	0	%
Required Area of tension steel	$A_{st\ reqd}$	=	131.96	mm^2
Required Area of compression ste	$A_{sc\ reqd}$	=	0	mm^2

Detail of bars

	I st Layer		II nd Layer	
	Nos	Dia	Nos	Dia
Tension Reinforcemer	3	#	0	0

A_{st} provide = 603.186 mm^2

	I st Layer		II nd Layer	
	Nos	Dia	Nos	Dia
Compression Reinforc	3	#	0	0

A_{sc} provide = 603.19 mm^2

Percentage of tension steel provi	p_t	=	0.777	%	**Hence O.K**
Percentage of compression steel	p_c	=	0.777	%	**Hence O.K**

Check for Shear

Shear = 149 kN

Nominal Shear Stress	τv	=	1.92	N/mm^2	Cl 40.1, IS456:2000
Permissible Shear Stress	τc	=	0.92	N/mm^2	β = 1.000
Maximum Shear Stress	$\tau c,max$	=	2.5	N/mm^2	Table 19, IS456:2000
Diameter of the Stirrup bar		=	8	mm	Table 20, IS456:2000
Number of Legs		=	2		
Spacing of Shear reinforcement Required		=	190.0		Cl 40.4, IS456:2000
Maximum Spacing of Shear Reinforcemer		=	250		Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stirrups @ 190mm c/c spacing

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
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CL. NO.	BEAM DESIGN CALCULATIONS	REFERENCES

Span

Positive moment (Span) = 84 kNm

Hence the Section is designed as Singly Reinforced Section

M_u/bd^2 = 3.325

Percentage of tension steel reqd p_t = 0.029 %

Percentage of compression steel p_c = 0 %

Required Area of tension steel $A_{st\ reqd}$ = 131.96 mm^2

Required Area of compression ste $A_{sc\ reqd}$ = 0 mm^2

Detail of bars

	I st Layer Nos	Dia	II nd Layer Nos	Dia
Tension Reinforcemer	3	#	0	0

A_{st} provide = 603.19 mm^2

	Nos	Dia	Nos	Dia
Compression Reinforc	3	#	0	0

A_{sc} provide = 603.19 mm^2

Percentage of tension steel provi p_t = 0.777 % **Hence O.K**

Percentage of compression steel p_c = 0.777 % **Hence O.K**

Check for Shear

Shear = 149 kN

Nominal Shear Stress	τv	=	1.92	N/mm^2
Permissible Shear Stress	τc	=	0.92	N/mm^2
Maximum Shear Stress	τc,max	=	2.5	N/mm^2
Diameter of the Stirrup bar		=	8	mm
Number of Legs		=	2	
Spacing of Shear reinforcement Required		=	190.0	
Maximum Spacing of Shear Reinforcemer		=	250	

Cl 40.1, IS456:2000

β = 1.000

Table 19, IS456:2000

Table 20, IS456:2000

Cl 40.4, IS456:2000

Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stirrups @ 190mm c/c spacing

Check For Deflection

Basic Value		=	26	
Service Stress in Steel	f_s	=	63.44	N/mm^2
Modification Factor(Tension Reinforcemer	F_1	=	2.00	
Allowable Span/Depth		=	52.00	
Actual Span/Depth		=	13.33	**Hence Safe**

Cl.23.2, IS456:2000

Floor Beam Design

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
TITLE		REVISION	DATE	CHECKED RMK	DATE

CL. NO.	BEAM DESIGN CALCULATIONS					REFERENCES
1.1	**Geomentry Data**					
	Beam Number		=	B3		
	Type of Beam		=	Rectangular Beam		
	Support Condition		=	Continuous Beam		
	Width of beam	b	=	300	mm	
	Overall Depth of Beam	D	=	525	mm	
	Dia of bar	Φ	=	25	mm	
	Nominal Cover	cc	=	30	mm	S 456:2000 Table 19
	Effective Depth	d	=	482.5	mm	S 456:2000
	Effective Cover		=	42.5	mm	Cl 23.0
	Effective Span of beam	l_{eff}	=	3700	mm	
	Concrete grade		=	M 25		
	Steel Grade		=	Fe 500		
	$p_{t,lim}$		=	0.944 %		
	$p_{t,min}$		=	0.170 %		S 456:2000
	p_t & p_{cmax}		=	4.00 %		Cl 26.5.1.1
1.2	**Force Input**					
	Left negative moment (Support 1)		=	254	kNm	
	Mid span positive moment		=	254	kNm	
	Right negative moment (Support 2)		=	254	kNm	
	Shear @ (Support 1)		=	241	kN	
	Shear @ (Span)		=	241	kN	
	Shear @ (Support 2)		=	241	kN	
1.3	**Limiting Moment**					
	M_{ulim} = 0.133 f_{ck} b d^2		=	232.22	kNm	
1.4	**Area of Steel**					
	Minimum Area of S = 0.17% b d		=	246.075	mm^2	
	Support 1					
	Negative moment (Support 1)		=	254	kNm	
	Hence the Section is designed as Doubly Reinforced Section					
		M_u/bd^2	=	3.637		
	Percentage of tension steel reqd	p_t	=	1.023	%	
	Percentage of compression steel reqd	p_c	=	0.085	%	
	Required Area of tension steel	$A_{st\ reqd}$	=	1480.79	mm^2	
	Required Area of compression steel	$A_{sc\ reqd}$	=	123.04	mm^2	

Detail of bars

	I st Layer		II nd Layer			
	Nos	Dia	Nos	Dia		
Tension Reinforcement	3	20	3	20		
	A_{st} provided	=	1884.96	mm^2		
	Nos	Dia	Nos	Dia		
Compression Reinforcem	3	20	3	20		
	A_{sc} provided	=	1884.96	mm^2		
Percentage of tension steel provided	p_t	=	1.302	%	Hence O.K	
Percentage of compression steel provic	p_c	=	1.302	%	Hence O.K	

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
TITLE		REVISION	DATE	CHECKED RMK	DATE

CL. NO.	BEAM DESIGN CALCULATIONS	REFERENCES

Check for Shear

Shear = 241 kN

Nominal Shear Stress	τ_v	=	1.66	N/mm^2	Cl 40.1, IS456:2000
Permissible Shear Stress	τ_c	=	0.92	N/mm^2	β = 1.000
Maximum Shear Stress	$\tau_{c,max}$	=	2.5	N/mm^2	Table 19, IS456:2000
Diameter of the Stirrup bar		=	8	mm	Table 20, IS456:2000
Number of Legs		=	2		
Spacing of Shear reinforcement Required		=	190.0		Cl 40.4, IS456:2000
Maximum Spacing of Shear Reinforcement		=	300		Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stirrups @ 190mm c/c spacing

Support 2

Negative moment = 254 kNm

Hence the Section is designed as Doubly Reinforced Section

M_u/bd^2	=	3.637		
Percentage of tension steel reqd	p_t	=	1.023	%
Percentage of compression steel reqd	p_c	=	0.085	%
Required Area of tension steel	$A_{st\ reqd}$	=	1480.79	mm^2
Required Area of compression steel	$A_{sc\ reqd}$	=	123.04	mm^2

Detail of bars

	I st Layer		II nd Layer	
	Nos	Dia	Nos	Dia
Tension Reinforcement	3	20	3	20

A_{st} provided = 1884.956 mm^2

	I st Layer		II nd Layer	
	Nos	Dia	Nos	Dia
Compression Reinforcem	3	20	3	20

A_{sc} provided = 1884.96 mm^2

Percentage of tension steel provided	p_t	=	1.302	%	Hence O.K
Percentage of compression steel provic	p_c	=	1.302	%	Hence O.K

Check for Shear

Shear = 241 kN

Nominal Shear Stress	τ_v	=	1.66	N/mm^2	Cl 40.1, IS456:2000
Permissible Shear Stress	τ_c	=	0.92	N/mm^2	β = 1.000
Maximum Shear Stress	$\tau_{c,max}$	=	2.5	N/mm^2	Table 19, IS456:2000
Diameter of the Stirrup bar		=	8	mm	Table 20, IS456:2000
Number of Legs		=	2		
Spacing of Shear reinforcement Required		=	190.0		Cl 40.4, IS456:2000
Maximum Spacing of Shear Reinforcement		=	300		Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stirrups @ 190mm c/c spacing

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
TITLE		REVISION	DATE	CHECKED RMK	DATE

CL. NO.	BEAM DESIGN CALCULATIONS	REFERENCES

Check for Shear

Shear = 241 kN

Nominal Shear Stress	τ_v	=	1.66	N/mm²	Cl 40.1, IS456:2000
Permissible Shear Stress	τ_c	=	0.92	N/mm²	β = 1.000
Maximum Shear Stress	$\tau_{c,max}$	=	2.5	N/mm²	Table 19, IS456:2000
Diameter of the Stirrup bar		=	8	mm	Table 20, IS456:2000
Number of Legs		=	2		
Spacing of Shear reinforcement Required		=	190.0		Cl 40.4, IS456:2000
Maximum Spacing of Shear Reinforcement		=	300		Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stirrups @ 190mm c/c spacing

Support 2

Negative moment = 254 kNm

Hence the Section is designed as Doubly Reinforced Section

	M_u/bd^2	=	3.637		
Percentage of tension steel reqd	p_t	=	1.023	%	
Percentage of compression steel reqd	p_c	=	0.085	%	
Required Area of tension steel	$A_{st\ reqd}$	=	1480.79	mm²	
Required Area of compression steel	$A_{sc\ reqd}$	=	123.04	mm²	

Detail of bars

	I st Layer		II nd Layer	
	Nos	Dia	Nos	Dia
Tension Reinforcement	3	20	3	20

A_{st} provided = 1884.956 mm²

	Nos	Dia	Nos	Dia
Compression Reinforcem	3	20	3	20

A_{sc} provided = 1884.96 mm²

Percentage of tension steel provided	p_t	=	1.302	%	**Hence O.K**
Percentage of compression steel provic	p_c	=	1.302	%	**Hence O.K**

Check for Shear

Shear = 241 kN

Nominal Shear Stress	τ_v	=	1.66	N/mm²	Cl 40.1, IS456:2000
Permissible Shear Stress	τ_c	=	0.92	N/mm²	β = 1.000
Maximum Shear Stress	$\tau_{c,max}$	=	2.5	N/mm²	Table 19, IS456:2000
Diameter of the Stirrup bar		=	8	mm	Table 20, IS456:2000
Number of Legs		=	2		
Spacing of Shear reinforcement Required		=	190.0		Cl 40.4, IS456:2000
Maximum Spacing of Shear Reinforcement		=	300		Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stirrups @ 190mm c/c spacing

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT. NO.	DATE	DESIGNE RMK	DATE
TITLE		REVISION	DATE	CHECKED RMK	DATE

CL. NO.	BEAM DESIGN CALCULATIONS	REFERENCES

Span

Positive moment (Span) = 254 kNm

Hence the Section is designed as Doubly Reinforced Section

M_u/bd^2 = 3.325

Percentage of tension steel reqd p_t = 1.023 %

Percentage of compression steel reqd p_c = 0.085 %

Required Area of tension steel $A_{st\ reqd}$ = 1480.79 mm^2

Required Area of compression steel $A_{sc\ reqd}$ = 123.04 mm^2

Detail of bars

	I st Layer		II nd Layer	
	Nos	Dia	Nos	Dia
Tension Reinforcement	3	20	3	20

A_{st} provided = 1884.96 mm^2

	Nos	Dia	Nos	Dia
Compression Reinforcen	3	20	3	20

A_{sc} provided = 1884.96 mm^2

Percentage of tension steel provided p_t = 1.302 % **Hence O.K**

Percentage of compression steel provic p_c = 1.302 % **Hence O.K**

Check for Shear

Shear = 241 kN

Nominal Shear Stress	τv	=	1.66	N/mm^2	Cl 40.1, IS456:2000
Permissible Shear Stress	τc	=	0.92	N/mm^2	β = 1.000
Maximum Shear Stress	$\tau c,max$	=	2.5	N/mm^2	Table 19, IS456:2000
Diameter of the Stirrup bar		=	8	mm	Table 20, IS456:2000
Number of Legs		=	2		
Spacing of Shear reinforcement Required		=	190.0		Cl 40.4, IS456:2000
Maximum Spacing of Shear Reinforcement		=	300		Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stirrups @ 190mm c/c spacing

Check For Deflection

Basic Value		=	26		Cl.23.2, IS456:2000
Service Stress in Steel	f_s	=	227.82	N/mm^2	
Modification Factor(Tension Reinforcement)	F_1	=	0.97		
Allowable Span/Depth		=	25.22		
Actual Span/Depth		=	7.67	**Hence Safe**	

Floor Slab Design

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT.NO.	DATE	DESIGNED	DATE
TITLE	TWO WAY SLAB DESIGN	REVISION	DATE	CHECKED	DATE

CL. NO.	DESIGN CALCULATIONS	REFERENCES

1.0 Design of Two Way Slab S3

1.0.1 Basic Input Data

Grade of concrete		=	**M 25**		
Grade of steel		=	**Fe 500**		
Thickness of slab	D	=	**150**	mm	
Clear cover	cc	=	**25**	mm	Table 16 Cl.26.4.2 ,
Effective thickness of slab (d_{eff})	= 150 - 25 - 5	=	120	mm	IS 456 -2000
Unit weight of concrete		=	25	KN/m^3	Cl 19.2.1, IS 456-2000
Effective Shorter Span	L_x	=	**5**	m	
Effective Longer Span	L_y	=	**7.7**	m	
Aspect ratio	L_y/L_x	=	1.54	< 2	

Hence designed as Two way slab — Cl D-1.11, IS 456-2000

Edge Condition : **One Long edge Discontinuous**

1.0.2 Load Data

Self Weight of Slab	= 0.150 x 25	=	3.750	KN/m^2
Floor finish		=	**1.500**	KN/m^2
Partition Load		=	**0.000**	KN/m^2
Sunken Filling		=	**0.000**	KN/m^2
Imposed Load		=	**3.000**	KN/m^2
Extra Load, (if Any)		=	**0.000**	KN/m^2
Total load		=	8.250	KN/m^2
Design load (Wu) = 1.5 x 8.25		=	**12.375**	KN/m^2

IS 875 (Part 2) -1987

Table 18 Cl 36.4.1 IS 456 -2000

1.0.3 Moment and Shear Calculations

Short Span Direction

α_x for positive moment		1.5	→	0.051	Table 26 Cl D-1.1,
		1.75	→	0.059	IS 456 -2000
	for	1.54	α_x	= 0.052	
Positive moment M_x	: 0.052 x 12.38 x	5 ^2	=	**16.17** KN-m	
α_x for negative moment		1.5	→	0.067	Table 26 Cl D-1.1,
		1.75	→	0.077	IS 456 -2000
	for	1.54	α_x	= 0.069	
Negative moment M_x	: 0.069 x 12.38 x	5 ^2	=	**21.22** KN-m	

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT.NO.	DATE	DESIGNED	DATE
TITLE	TWO WAY SLAB DESIGN	REVISION	DATE	CHECKED	DATE

CL. NO.	DESIGN CALCULATIONS	REFERENCES
	Long Span Direction	
	For positive moment α_y = 0.028	Table 26 Cl D-1.1,
	Positive moment M_y : 0.028 x 12.38 x 5 ^2 = **8.66** KN-m	IS 456 -2000
	For negative moment α_y = 0.037	Table 26 Cl D-1.1,
	Negative moment M_y : 0.037 x 12.38 x 5 ^2 = **11.45** KN-m	IS 456 -2000
	Shear force V_u = 12.38 x 5 x 0.5 = **30.94** KN	
1.0.4	**Check Effective Depth for Max.Bending Moment**	
	Depth required = $(M_x, (0.133x\ fck \times b))^{1/2}$ = 79.89 mm	Table C,SP 16 :1980
	Depth provided = 150 - 25 - 10 /2 = 120 mm > 79.89 mm	Cl 2.3
	Hence the section is Safe against Bending	
1.0.5	**Check Depth for Shear**	
	Nominal Shear Stress : $\tau_v = V_u / b\ d$ = 0.26 N/mm^2	Cl.40.1, IS 456:2000
	Design shear strength (τ_c) = 0.46 N/mm^2	Table 19 , IS 456:2000
	k = 1.30	Cl.40.2.1.1,
	k * τ_c = 0.60 N/mm^2	IS 456:2000
	τ_v < k * τ_c **Hence the section is Safe against Shear**	
1.0.6	**Check for Maximum Shear Stress:**	
	Nominal Shear Stress : $\tau_v = V_u / b\ d$ = 0.26 N/mm^2	Cl.40.1, IS 456:2000
	Maximum Shear Stress ($\tau_{c,max}$) = 3.1 N/mm^2	Table 20 , IS 456:2000
	0.5 $\tau_{c,max}$ = 1.55 N/mm^2	
	τ_v < 0.5 $\tau_{c,max}$ **Hence the section is Safe against Max.Shear Stress**	Cl.40.2.3.1, IS 456:200
1.0.7	**Reinforcement calculations**	
	Short Span Direction @ Support	
	Mu/bd^2 = $\frac{21.22 \times 10 \wedge 6}{1000 \times 120 \times 120}$ = **1.474**	
	Pt = **0.37** %	Table 2-4, SP16 :1980

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT.NO.	DATE	DESIGNED	DATE
TITLE	TWO WAY SLAB DESIGN	REVISION	DATE	CHECKED	DATE

CL. NO.	DESIGN CALCULATIONS	REFERENCES
	Area of steel Ast = 0.0037 x 1000 x 120 = 438.88 mm^2	
	Minimum area of steel: 0.0012 x 1000 x 150 = 180.00 mm^2	Cl:26.5.2.1
	Spacing of Y **10** bars 78.54 x 1000 / 438.88 = 178.86 mm	IS 456 -2000
	Check for Spacing	
	Minimum of 1) 3d = 360 mm	
	2) = 300 mm	Cl:26.3.3.(b).1
	3) = 178.86 mm	IS 456 -2000
	Therefore provide Y **10** @ **170** mm C/C	
	Short Span Direction @ Mid Span	
	$Mu/bd^2 = \frac{16.17 \times 10 \wedge 6}{1000 \times 120 \times 120} = 1.123$	
	Pt = 0.273 %	SP16 :1980 Table 2-4
	Area of steel Ast = 0.0027 x 1000 x 120 = 327.93 mm^2	IS 456:2000
	Minimum area of steel: 0.0012 x 1000 x 150 = 180.00 mm^2	Cl:26.5.2.1
	Spacing of Y **10** bars 78.54 x 1000 / 327.93 = 239.38 mm	
	Check for Spacing	
	Minimum of 1) 3d = 360 mm	IS 456:2000
	2) = 300 mm	Cl:26.3.3.(b).1
	3) = 239.38 mm	
	Therefore provide Y **10** @ **150** mm C/C 150	
	Provided % of Tension Reinforcement (pt) = **0.436** %	
	Long Span Direction @ Support	
	$Mu/bd^2 = \frac{11.45 \times 10 \wedge 6}{1000 \times 120 \times 120} = 0.795$	
	Pt = 0.190 %	SP16 :1980 Table 2-4
	Area of steel Ast = 0.0019 x 1000 x 120 = 228.07 mm^2	IS 456:2000
	Minimum area of steel: 0.0012 x 1000 x 150 = 180.00 mm^2	Cl:26.5.2.1
	Spacing of Y **10** bars 78.54 x 1000 / 228.07 = 344.2 mm	

PROJECT	RESIDENTIAL BUILDING (S+05), AT URAPAKKAM.	DOCUMENT.NO	DATE	DESIGNED	DATE
TITLE	TWO WAY SLAB DESIGN	REVISION	DATE	CHECKED	DATE

CL. NO.	DESIGN CALCULATIONS	REFERENCES

Check for Spacing

Minimum of
1) 3d = 360 mm
2) = 300 mm
3) = 344.20 mm

IS 456:2000 Cl:26.3.3.(b).1

Therefore provide Y **10** @ **300** mm C/C

Long Span Direction @ mid Span

$Mu/bd^2 = \frac{8.66 \times 10 \wedge 6}{1000 \times 120 \times 120} = 0.602$

Pt = 0.142 %

SP16 :1980 Table 2-4

Area of steel Ast = 0.0014 x 1000 x 120 = 170.9 mm^2
Minimum area of steel: 0.0012 x 1000 x 150 = 180.00 mm^2

IS 456:2000 Cl:26.5.2.1

Spacing of Y **10** bars 78.54 x 1000 / 180.00 = 436.11 mm

Check for Spacing

Minimum of
1) 3d = 360 mm
2) = 300 mm
3) = 436.11 mm

IS 456:2000 Cl:26.3.3.(b).1

Therefore provide Y **10** @ **300** mm C/C

1.0.8 **Check for Deflection: (Simplified Approach)**

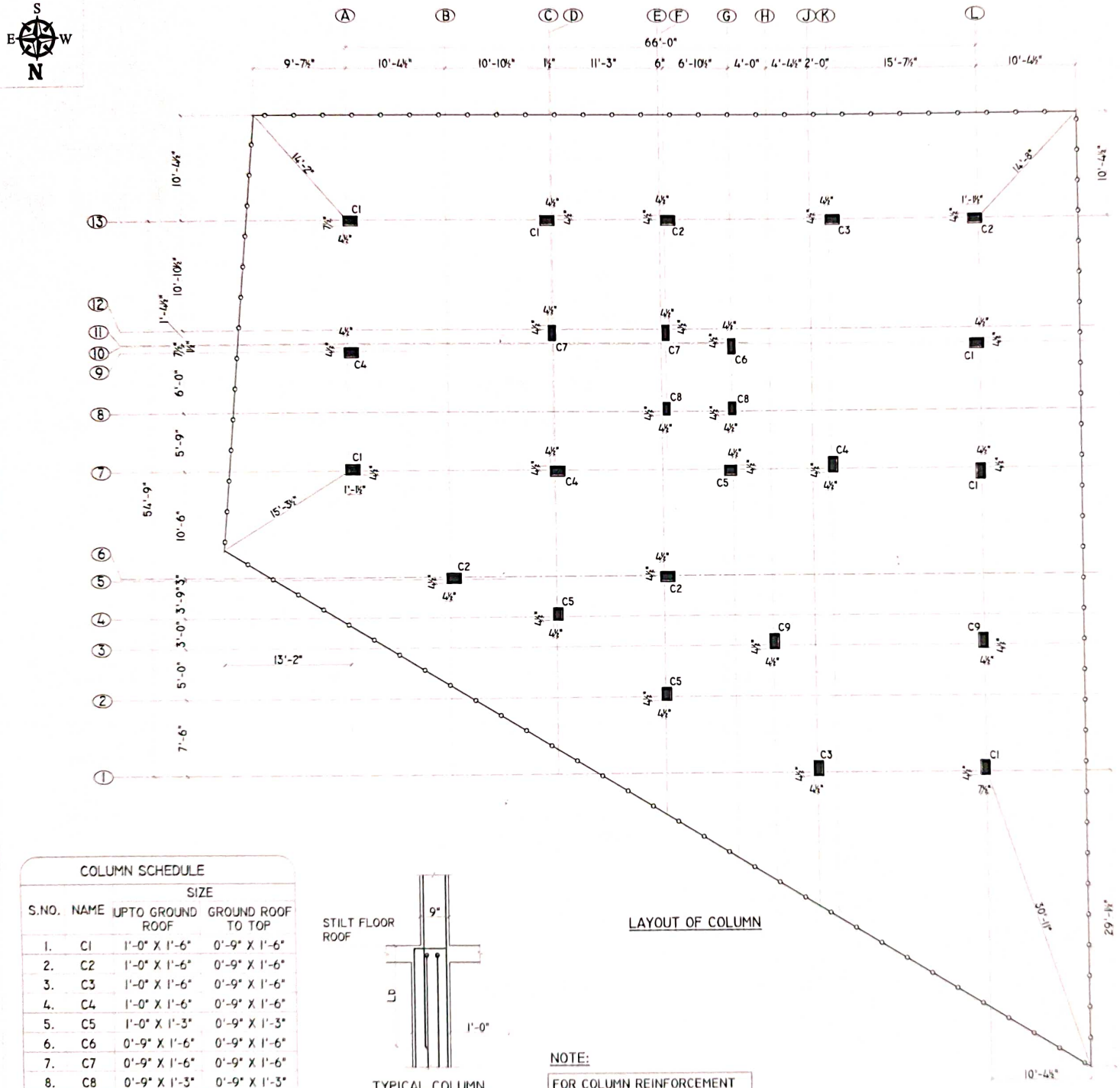
Basic Span/depth Ratio	=	**26**	IS 456:2000 Cl:23.2.1
% of Tension Reinforcement provided (p_t)	=	0.436 %	
Service stress of steel (fs) : 0.58 fy (Ast_R/Ast_P)	=	181.63 N/mm^2	IS456:2000 Fig 4
Modification Factor for Tension Reinforcement (F_1)	=	1.71	Page 38
Allowable Span / Effective Depth Ratio	=	44.47	IS 456:2000 Cl:23.2.1
Actual Span/Eff Depth Ratic = 5 x 1000 / 120	=	41.67	

Hence Safe against Deflection

APPENDIX II

GENERAL ARRANGEMENT DRAWINGS

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LAYOUT OF COLUMN

COLUMN SCHEDULE			
		SIZE	
S.NO.	NAME	UPTO GROUND ROOF	GROUND ROOF TO TOP
1.	C1	1'-0" X 1'-6"	0'-9" X 1'-6"
2.	C2	1'-0" X 1'-6"	0'-9" X 1'-6"
3.	C3	1'-0" X 1'-6"	0'-9" X 1'-6"
4.	C4	1'-0" X 1'-6"	0'-9" X 1'-6"
5.	C5	1'-0" X 1'-3"	0'-9" X 1'-3"
6.	C6	0'-9" X 1'-6"	0'-9" X 1'-6"
7.	C7	0'-9" X 1'-6"	0'-9" X 1'-6"
8.	C8	0'-9" X 1'-3"	0'-9" X 1'-3"
9.	C9	1'-0" X 1'-6"	0'-9" X 1'-6"

TYPICAL COLUMN REDUCTION DETAILS

NOTE:

FOR COLUMN REINFORCEMENT DETAILS REFER DWG.NO : 001A

GENERAL NOTES:

REMOVAL OF FORMWORK(SHUTTERING) :

SHUTTERING OF ANY PART OF THE STRUCTURE SHALL NOT BE REMOVED UNTIL THE CONCRETE ATTAINS 70% THE SPECIFIED STRENGTH OF CONCRETE HOWEVER THE FOLLOWING MINIMUM PERIOD (AFTER FINAL POUR) SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3.1 IS 456-2000

a) VERTICAL SIDE OF SHUTTERING OF
COLUMNS AND WALLS

LAP JOINTS FOR REINFORCEMENT BARS :

i) AT ANY CROSS SECTION OF THE MEMBER NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED

ii) LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.5 TIMES LAP LENGTH OF THE BAR FOR TENSION & COMPRESSION MEMBERS

iii) DEVELOPMENT LENGTH (Ld) SHALL BE AS PER IS 456-2000 AS BELOW

a) DEVELOPMENT LENGTH FOR COLUMN BARS -40D
b) DEVELOPMENT LENGTH FOR BEAM BARS - 50D

iv) LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT SLAB LEVEL

v) BENDING OF REBARS SHALL CONFORM TO SP-34 & IS 2502

EXCAVATION AND BACKFILL :

i) BACKFILL FOR FOUNDATIONS AND PITS SHALL BE PLACED IN THIN LAYERS OF 200 mm THICKNESS AND SHALL BE WELL COMPACTED. THE FILL SHALL CONTAIN NO LUMPS WITH A DIAMETER GREATER THAN 100 MM. FOR DEGREE OF COMPACTION OF BACKFILL SHALL BE 95% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT OBTAINED BY THE MODIFIED PROCTOR COMPACTION TEST

ii) UNSUITABLE MATERIALS (LIKE ROCKS) EXISTING FOOTINGS ARE DETECTED BELOW FOUNDATION LEVEL, IN AREAS OF CUT SHALL BE EXCAVATED TO FIRM GROUND. THE RESULTANT EXCAVATION SHALL BE FILLED TO THE REQUIRED LEVEL WITH MASS CONCRETE GRADE M10 OR RICHER MIX. ALSO WHERE NO EXCAVATION OCCURS BELOW THE FOUNDATION LEVEL STATED ON THE VERSION DRAWING THE DETAILS THIS VOID SHALL BE MADE FILLED WITH MASS CONCRETE GRADE M10

iii) BEFORE CASTING FOUNDATIONS, ANY IMMEDIATE OR ADJACENT AREAS OF DISTURBED OR SOFT SOIL MUST BE REMOVED AND REPLACED WITH MASS CONCRETE OF GRADE M10

iv) A LAYER OF PLAIN CONCRETE OF M10 GRADE SHALL BE PLACED UNDER ALL FOUNDATIONS. PLAINING CONCRETE SHALL HAVE A CHARACTERISTIC STRENGTH OF 10 N/mm² AT 28 DAYS

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FOOT UNITS.
2. CONCRETE GRADE SHALL BE M25 CONFIRMING TO IS 456:2000
3. GRADE OF REINFORCEMENT MARKED THUS (Y) SHALL BE Fe 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
   a) COLUMN = 1½"
5. THIS DRG. READ IN CONJECTION WITH ARCH DRGS.
6. COLUMNS AND FOOTINGS ARE DESIGNED FOR S+5 FLOOR LOADS AND SBC OF THE SOIL IS 200KN/SQM. @ 10'-0" BELOW N.G.L.
7. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR CONSTRUCTION	M.R	R.M	26.02.24

PROJECT :-

PLAN SHOWING THE PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING STILT+05 FLOORS AT URAPAKKAM.

DRAWING TITLE :-

LAYOUT OF COLUMN

DATE	SCALE	JOB.NO	DRG.NO
26.02.2024	1" : 9'	———	001

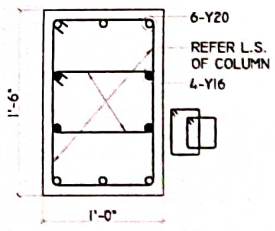
ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

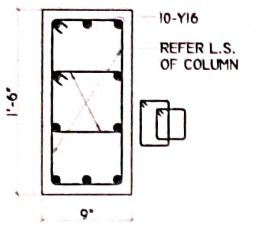
AURA ENGINEERING CONSULTANTS
#8, 50th St, Sowramangala Colony, 7th Avenue,
ASHOK NAGAR, CHENNAI- 600 083.
Phone Line :- 044 4859 7100
projects.auraengg@gmail.com
projects@auraengineers.co.in
http://auraengineers.co.in/
aura Engineering Consultants

A3

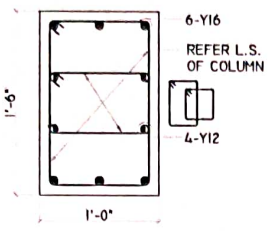
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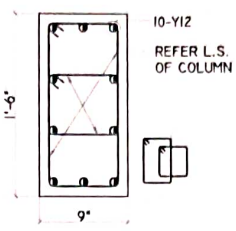
C.S. OF COLUMN "C1"
(1'-0" x 1'-6")
(UPTO GFR)



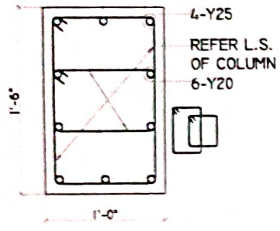
C.S. OF COLUMN "C1"
(0'-9" x 1'-6")
(GFR TO TOP)



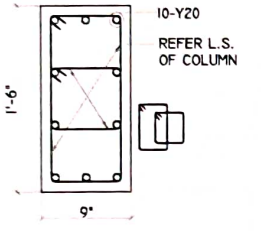
C.S. OF COLUMN "C2"
(1'-0" x 1'-6")
(UPTO GFR)



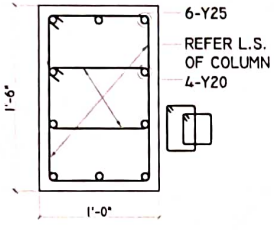
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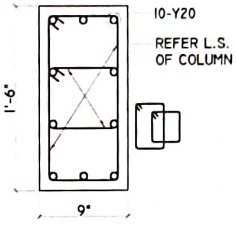
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(1'-0" x 1'-6")
(UPTO GFR)



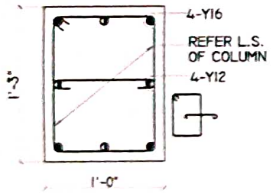
C.S. OF COLUMN "C3"
(0'-9" x 1'-6")
(GFR TO TOP)



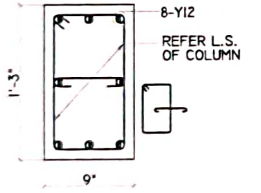
C.S. OF COLUMN "C4"
(1'-0" x 1'-6")
(UPTO GFR)



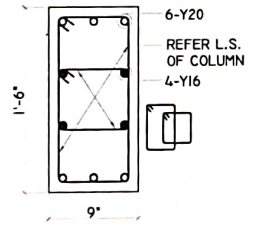
C.S. OF COLUMN "C4"
(0'-9" x 1'-6")
(GFR TO TOP)



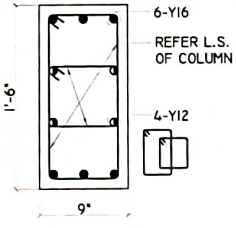
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(1'-0" x 1'-3")
(UPTO GFR)



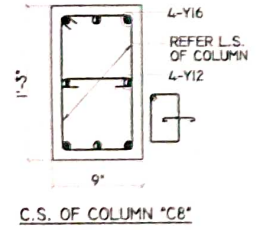
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(0'-9" x 1'-3")
(GFR TO TOP)



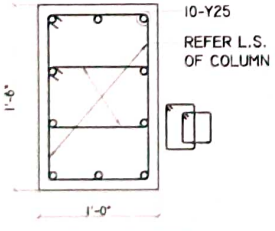
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(0'-9" x 1'-6")
(UPTO TOP)



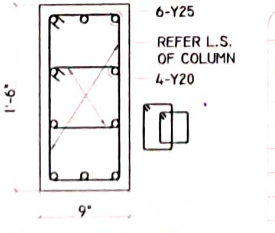
C.S. OF COLUMN "C7"
(0'-9" x 1'-6")
(UPTO TOP)



C.S. OF COLUMN "C8"
(0'-9" x 1'-3")
(UPTO TOP)



C.S. OF COLUMN "C9"
(1'-0" x 1'-6")
(UPTO GFR)



C.S. OF COLUMN "C9"
(0'-9" x 1'-6")
(GFR TO TOP)

COLUMN SCHEDULE

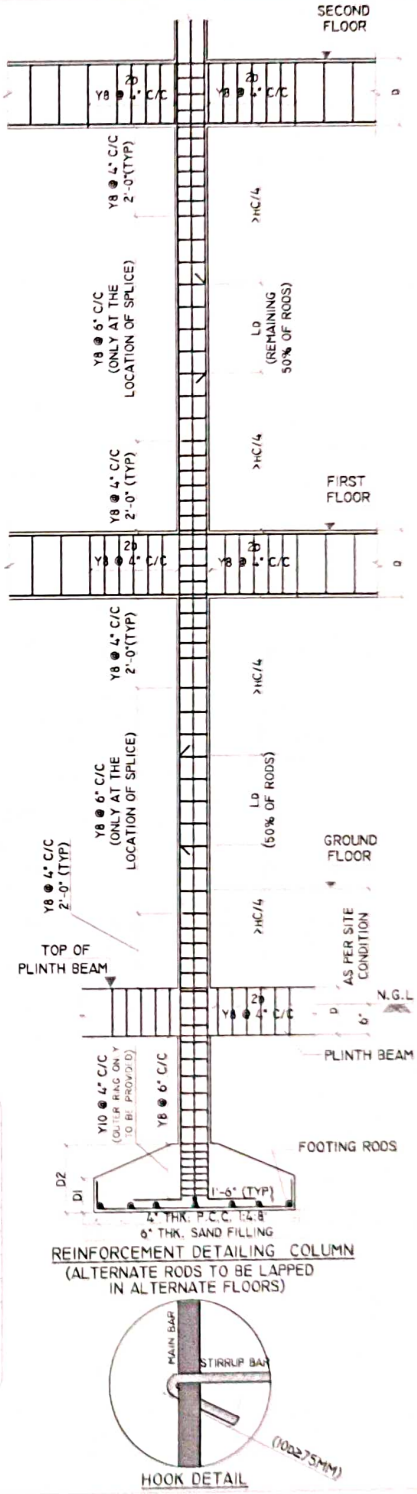
S.NO.	NAME	SIZE UPTO GROUND ROOF	SIZE GROUND ROOF TO TOP
1.	C1	1'-0" X 1'-6"	0'-9" X 1'-6"
2.	C2	1'-0" X 1'-6"	0'-9" X 1'-6"
3.	C3	1'-0" X 1'-6"	0'-9" X 1'-6"
4.	C4	1'-0" X 1'-6"	0'-9" X 1'-6"
5.	C5	1'-0" X 1'-3"	0'-9" X 1'-3"
6.	C6	0'-9" X 1'-6"	0'-9" X 1'-6"
7.	C7	0'-9" X 1'-6"	0'-9" X 1'-6"
8.	C8	0'-9" X 1'-3"	0'-9" X 1'-3"
9.	C9	1'-0" X 1'-6"	0'-9" X 1'-6"

NOTE:

N.G.L - NATURAL GROUND LEVEL.

G.F.R - GROUND FLOOR ROOF.

ALL HOOKS SHOULD BE BENT TO AN ANGLE OF 135° WITH A LENGTH NOT LESS THAN 75 MM



REINFORCEMENT DETAILING COLUMN
(ALTERNATE RODS TO BE LAPPED IN ALTERNATE FLOORS)

HOOK DETAIL

GENERAL NOTES:

REMOVAL OF FORMWORK(SHUTTERING) :

SHUTTERING OF ANY PART OF THE STRUCTURE SHALL NOT BE REMOVED UNTIL THE CONCRETE ATTAINS 70% OF THE SPECIFIED STRENGTH OF CONCRETE. HOWEVER THE FOLLOWING MINIMUM PERIOD (AFTER FINAL POUR) SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3.1 IS 456:2000

a) FOR C.S. SIDE OF SHUTTERING OF COLUMNS WALLS

LAP JOINTS FOR REINFORCEMENT BARS

i) AT ANY CROSS SECTION OF THE MEMBER NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED

ii) LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.3 TIMES LAP LENGTH OF THE BAR FOR TENSION & COMPRESSION MEMBERS.

iii) DEVELOPMENT LENGTH SHALL BE AS PER IS:456:2000 TABLE BELOW

a) DEVELOPMENT LENGTH FOR COLUMN BARS 40D
b) DEVELOPMENT LENGTH FOR BEAM BARS 50D

iv) LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT SLAB LEVEL

v) DETAILING OF REBARS SHALL COMFORM TO SP:34 & IS 13920

EXCAVATION AND BACKFILL

i) BACKFILL FOR FOUNDATIONS AND PITS SHALL BE PLACED EVENLY LAYERS OF 200 MM THICKNESS AND SHALL BE WELL COMPACTED. THE FILL SHALL CONTAIN NO STONES WITH A DIMENSION GREATER THAN 100 MM. THE DEGREE OF COMPACTION OF BACKFILL SHALL BE 95% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT OBTAINED BY THE MODIFIED COMPACTION TEST.

ii) UNSUITABLE MATERIAL S LIKE RUBBISH, EXISTING FOOTINGS ARE DETECTED DURING EXCAVATION LEVEL, IN AREAS OF FOOTINGS, SHALL BE EXCAVATED TO FORM OPENING. THE RESULTANT EXCAVATION SHALL BE FILLED TO THE REQUIRED LEVELS WITH MASS CONCRETE GRADE M20. ALL SUCH WORKS EXCAVATION DETAILS ARE ON THE FOUNDATION LEVEL ATTESTED ON THE DESIGN DRAWING. THE REMAINING VOID SHALL BE LATER FILLED WITH MASS CONCRETE GRADE M

iii) BEFORE CASTING FOUNDATIONS, ANY INCREMENTS OF ADJACENT AREAS OF DISTURBED OR SOFT SOIL MUST BE REMOVED AND REPLACED WITH MASS CONCRETE OF GRADE M

iv) A LAYER OF PLAIN CONCRETE OF 100 MM THICK SHALL BE PLACED UNDER ALL FOUNDATIONS, PLINTHS, FLOORING CONCRETE OF SLABS & CHARACTERISTIC STRENGTH OF 5 N/mm² AT 28 DAYS.

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FOOT UNITS
2. CONCRETE GRADE SHALL BE M25 CONFIRMING TO IS 456:2000
3. GRADE OF REINFORCEMENT MARKED THUS (Y) SHALL BE Fe 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
   a) COLUMN = 1½"
5. THIS DRG. READ IN CONJECTION WITH ARCH.DRGS.
6. COLUMNS AND FOOTINGS ARE DESIGNED FOR S+3 FLOOR LOADS AND SBC OF THE SOIL IS 200KN/SQM. @ 10'-0" BELOW N.G.L.
7. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR CONSTRUCTION	M.R	R.M	26.02.24

PROJECT :-

PLAN SHOWING THE PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING STILT+05 FLOORS AT URAPAKKAM.

DRAWING TITLE :-

R.C DETAILS OF COLUMN

DATE	SCALE	JOB.NO	DRG.NO
26.02.2024	1" : 10"	———	001A

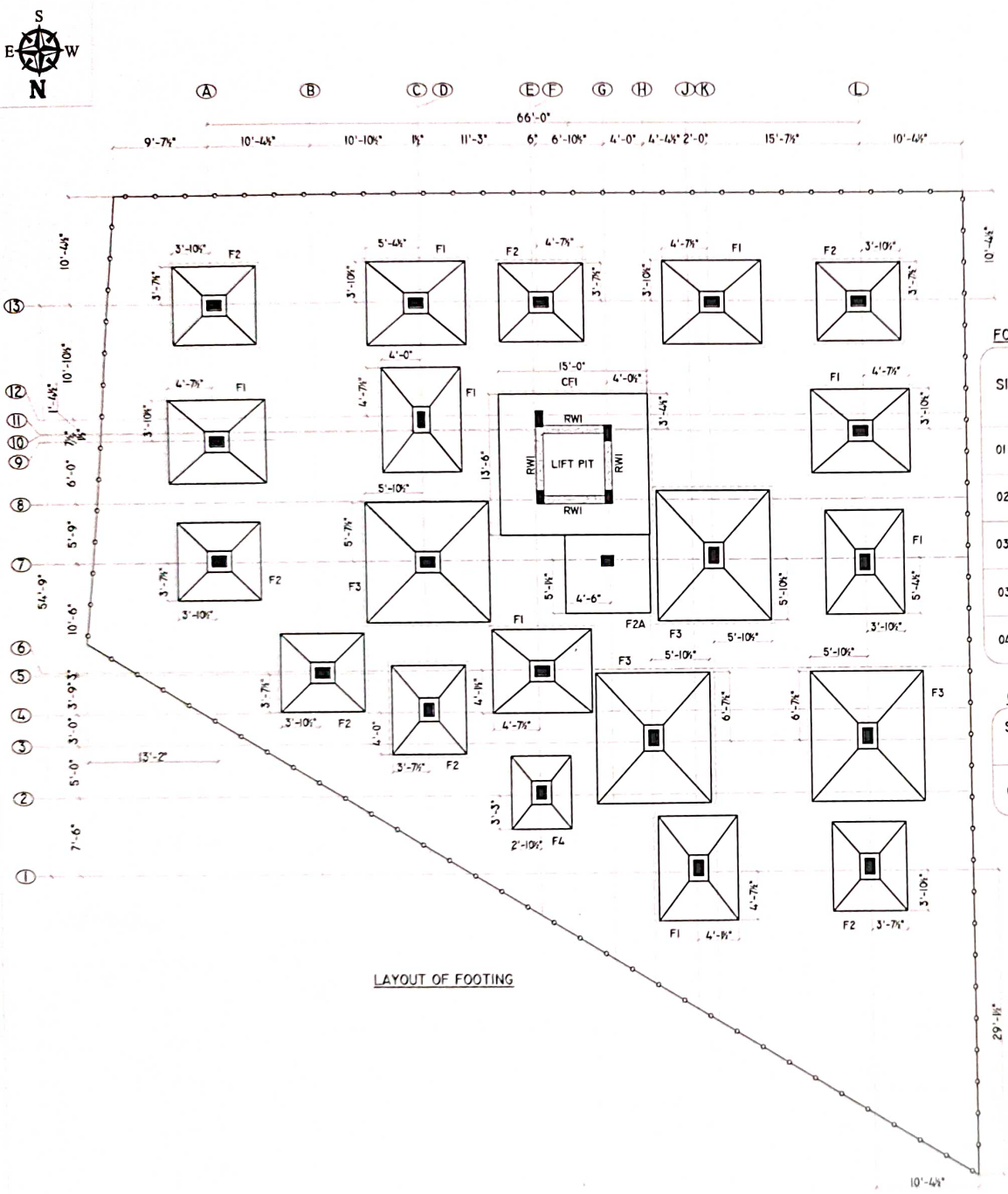
ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

ALURA ENGINEERING CONSULTANTS
#8, 50th St, Sarvamangala Colony, 7th Avenue,
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LAYOUT OF FOOTING

FOOTINGS SCHEDULE:-

SI.	FOOTING NAME	FOOTING SIZE	FOOTING REINFORCEMENT X =MAIN REINFD Y =DISTRIBUTOR REINFD
01	F1	10'-0" X 8'-0" D1=1'-3" D2=2'-0" SLOPED FOOTING	Y12 @ 5" C/C BOTHWAYS @ BOTTOM
02	F2	8'-6" X 7'-6" D1=1'-3" D2=1'-9" SLOPED FOOTING	Y12 @ 6" C/C BOTHWAYS @ BOTTOM
03	F2A	8'-6" X 7'-6" D=1'-9" FLAT FOOTING	Y12 @ 6" C/C BOTHWAYS @ TOP & BOTTOM
03	F3	12'-6" X 11'-6" D1=1'-6" D2=2'-6" SLOPED FOOTING	Y12 @ 4" C/C BOTHWAYS @ BOTTOM
04	F4	7'-0" X 6'-0" D1=1'-0" D2=1'-6" SLOPED FOOTING	Y10 @ 4" C/C BOTHWAYS @ BOTTOM

COMBINED FOOTINGS SCHEDULE:-

SI.	FOOTING NAME	FOOTING SIZE	FOOTING REINFORCEMENT
01	CF1	15'-0" X 13'-6" X 1'-9"	Y12 @ 5" C/C BOTHWAYS @ TOP & BOTTOM

GENERAL NOTES:

REMOVAL OF FORMWORK(SHUTTERING) :-

SHUTTERING OF ANY PART OF THE STRUCTURE SHALL NOT BE REMOVED UNTIL THE CONCRETE ATTAINS 70% THE SPECIFIED STRENGTH OF CONCRETE HEREIN FOR THE FOLLOWING MINIMUM PERIODS AFTER FINAL POUR | SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3.1 OF IS:456-2000

a) VERTICAL FACE OF SHUTTERING OF COLUMNS, WALLS

LAP JOINTS FOR REINFORCEMENT BARS :-

i) AT ANY CROSS SECTION OF THE MEMBER NOT MORE THAN 50% THE BARS SHALL BE LAPPED

ii) BARS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE

iii) 3 TIMES LAP LENGTH OF THE BARS FOR TENSION & COMPRESSION MEMBERS

iv) DEVELOPMENT LENGTH SHALL BE AS PER FOLLOWING TABLE BELOW

a) DEVELOPMENT LENGTH FOR COLUMN BARS -40D
b) DEVELOPMENT LENGTH FOR BEAM BARS - 50D

vi) LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT SLAB LEVEL

vii) DETAILING OF REBARS SHALL CONFORM TO SP:34 & IS 1893

EXCAVATION AND BACKFILL :-

i) BACKFILL FOR FOUNDATIONS AND PITS SHALL BE PLACED EVENLY AROUND THE STRUCTURE AND SHALL BE WELL CONSOLIDATED. THE FILL SHALL CONSIST OF SUITABLE MATERIAL FREE FROM ORGANIC MATTER AND SHALL BE COMPACTED IN LAYERS NOT EXCEEDING 15 CM IN THICKNESS. THE DEGREE OF COMPACTION OF THE BACKFILL SHALL BE 95% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT OBTAINED BY THE METHOD OF COMPACTION USED.

ii) UNSUITABLE MATERIALS LIKE ORGANIC MATTER, DEBRIS, ETC. IF ANY, FOUND DURING EXCAVATION SHALL BE REMOVED AND REPLACED WITH SUITABLE MATERIALS. IF, HOWEVER, IN THE OPINION OF THE ENGINEER, SUCH UNSUITABLE MATERIALS CANNOT BE REMOVED, THE FOUNDATION SHALL BE DESIGNED ACCORDINGLY.

iii) WHERE EXCAVATION REVEALS THE PRESENCE OF WATER TABLE, THE FOUNDATION SHALL BE LAID ONLY AFTER DEWATERING THE TRENCHES. THE WORK SHALL NOT BE CARRIED OUT UNDER WATER.

iv) BEFORE CASTING FOUNDATIONS, ANY IMPURITIES OR ADJACENT SOILS OF UNSUITABLE OR SOFT SOIL MUST BE REMOVED AND REPLACED WITH GOOD CONCRETE OF GRADE M 15.

v) A LAYER OF PLAIN CONCRETE 100 MM THICK SHALL BE PLACED UNDER ALL FOUNDATIONS. PLAIN CONCRETE SHALL HAVE A CHARACTERISTIC STRENGTH OF 5 N/mm² AT 28 DAYS

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FOOT UNITS
2. CONCRETE GRADE SHALL BE M25 CONFIRMING TO IS 456:2000
3. GRADE OF REINFORCEMENT MARKED THUS (Y) SHALL BE Fe 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
   a) FOOTING - 2" b) R.C. WALL - 1½"
5. THIS DRG. READ IN CONJECTION WITH ARCH.DRGS.
6. COLUMNS AND FOOTINGS ARE DESIGNED FOR S+5 FLOOR LOADS AND SBC OF THE SOIL IS 200KN/SQM. @ 10'-0" BELOW N.G.L.
7. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY
8. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR CONSTRUCTION	M.R	R.M	27.02.24

PROJECT :-

PLAN SHOWING CONSTRUCTION OF RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-

LAYOUT OF FOOTING

DATE	SCALE	JOB.NO	DRG.NO
27.02.24	1" : 10'	———	002

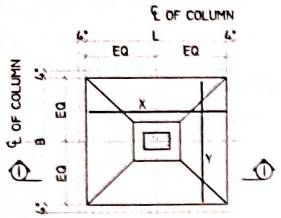
ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

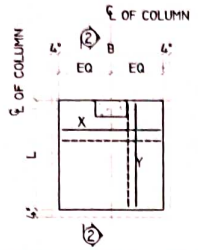
AURA ENGINEERING CONSULTANTS
#8, 50th St, Sowmiyanagalo Colony, 7th Avenue,
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aura Engineering Consultants

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TYPICAL PLAN OF SLOPED FOOTING

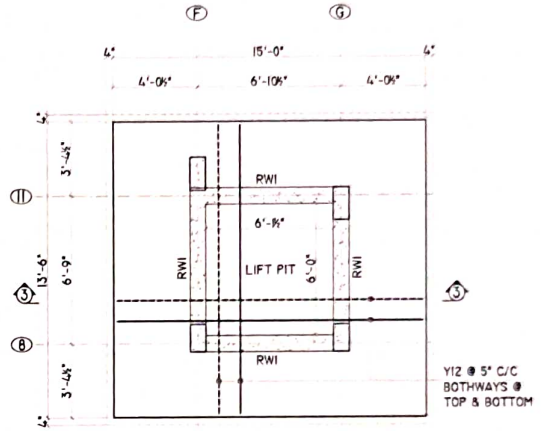


TYPICAL PLAN OF FLAT FOOTING

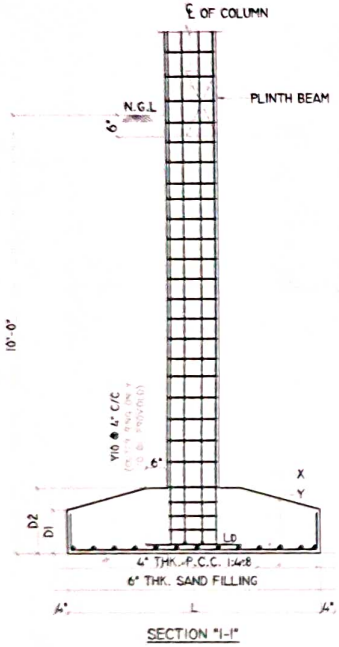
NOTE:

N.G.L - NATURAL GROUND LEVEL.

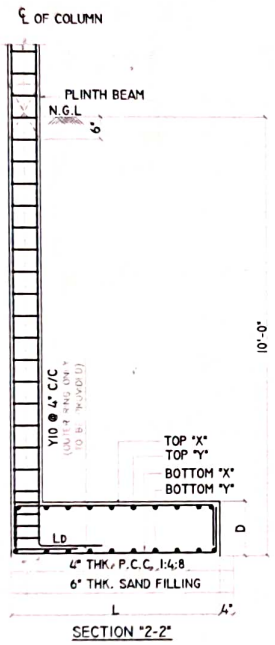
F.F.L - FLOOR FINISH LEVEL



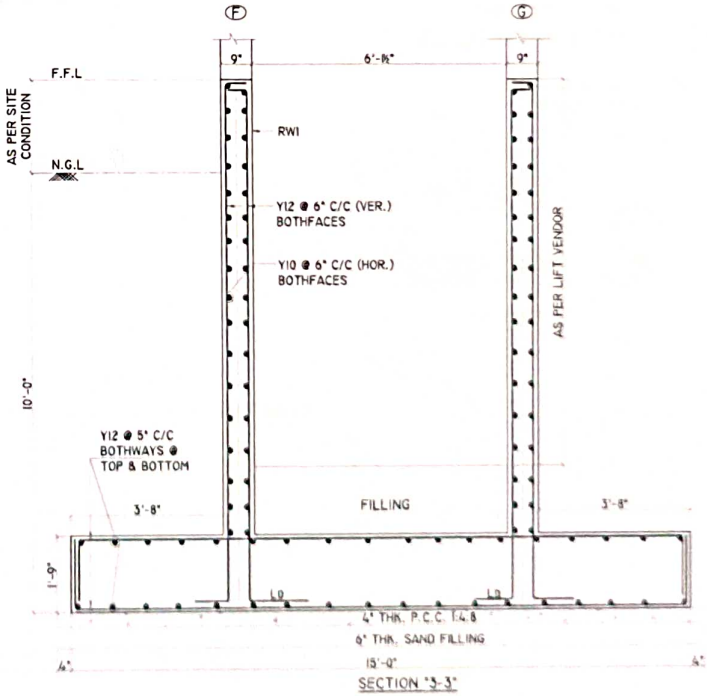
PLAN OF COMBINED FOOTING -"CF1"



SECTION "1-1"



SECTION "2-2"



SECTION "3-3"

FOOTINGS SCHEDULE:-

SI.	FOOTING NAME	FOOTING SIZE	FOOTING REINFORCEMENT X =MAIN REINFD Y =DISTRIBUTOR REINFD
01	F1	10'-0" X 8'-0" D1=1'-3" D2=2'-0" SLOPED FOOTING	Y12 @ 5" C/C BOTHWAYS @ BOTTOM
02	F2	8'-6" X 7'-6" D1=1'-3" D2=1'-9" SLOPED FOOTING	Y12 @ 6" C/C BOTHWAYS @ BOTTOM
03	F2A	8'-6" X 7'-6" D=1'-9" FLAT FOOTING	Y12 @ 6" C/C BOTHWAYS @ TOP & BOTTOM
03	F3	12'-6" X 11'-6" D1=1'-6" D2=2'-6" SLOPED FOOTING	Y12 @ 4" C/C BOTHWAYS @ BOTTOM
04	F4	7'-0" X 6'-0" D1=1'-0" D2=1'-6" SLOPED FOOTING	Y10 @ 4" C/C BOTHWAYS @ BOTTOM

COMBINED FOOTINGS SCHEDULE:-

SI.	FOOTING NAME	FOOTING SIZE	FOOTING REINFORCEMENT
01	CF1	15'-0" X 13'-6" X 1'-9"	Y12 @ 5" C/C BOTHWAYS @ TOP & BOTTOM

GENERAL NOTES:

REMOVAL OF FORMWORK (SHUTTERING) :

SHUTTERING OF ANY PART OF THE STRUCTURE SHALL NOT BE REMOVED UNTIL THE CONCRETE ATTAINS 75% THE SPECIFIED STRENGTH OF CONCRETE. WHERE THE FOLLOWING MINIMUM PERIOD (AFTER FINAL POUR) SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3.1 IS 456:2000

a) VERTICAL SIDE OF SHUTTERING OF COLUMNS, WALLS

LAP JOINTS FOR REINFORCEMENT BARS

i) AT ANY CROSS SECTION OF THE MEMBER NOT MORE THAN 50% THE BARS SHALL BE LAPPED

ii) LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.5 TIMES LAP LENGTH OF THE BAR FOR TENSION & COMPRESSION MEMBERS

iii) DEVELOPMENT LENGTH (LD) SHALL BE AS PER (M-SUNNY) TABLE BELOW

a) DEVELOPMENT LENGTH FOR COLUMN BARS 40D

a) DEVELOPMENT LENGTH FOR BEAM BARS 50D

iv) LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT FLOOR LEVEL

v) DETAILING OF REBARS SHALL CONFORM TO SP-34 & IS 1893

EXCAVATION AND BACKFILL

i) BACKFILL FOR FOUNDATIONS AND PITS SHALL BE IN AGRO ANNA 4 LAYERS OF 300 MM THICKNESS AND SHALL BE WELL COMPACTED. THE FILL SHALL CONTAIN NO STONES WITH A DIAMETER GREATER THAN 100 MM. THE DEGREE OF COMPACTION OF BACKFILL SHALL BE 95% OF THE MAXIMUM DRY DENSITY AT OPTIMUM MOISTURE CONTENT OBTAINED BY THE MODIFIED PROCTOR COMPACTION TEST

ii) UNSUITABLE MATERIALS LIKE BOULDERS EXISTING FOOTINGS ARE DETECTED BELOW FOUNDATION LEVEL IN AREAS OF CUT SHALL BE EXCAVATED TO FORM LEVELS. THE OVER EXCAVATION SHALL BE FILLED IN THE REQUIRED LAYERS WITH MASS CONCRETE GRADE M15. AS DIRECTED BY ENGINEER-INCHARGE BEFORE LAYING THE FOUNDATION CONCRETE IN THE DESIGN TRENCHES THE OPEN TRENCHES SHALL BE NEAT FILLED WITH MASS CONCRETE GRADE-15

iii) BEFORE CASTING FOUNDATIONS, SAND IMMERSE OR ADJACENT AREAS OF UNDISTURBED OR SOFT SOIL MUST BE REMOVED AND REPLACED WITH MASS CONCRETE OF GRADE 15

iv) A LAYER OF PLAINING CONCRETE 100 MM THICK SHALL BE PLACED UNDER ALL FOUNDATIONS. PLAINING CONCRETE SHALL HAVE A CHARACTERISTIC STRENGTH OF 15 N/MM SQ. AT 28 DAYS.

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FOOT UNITS.
2. CONCRETE GRADE SHALL BE M25 CONFIRMING TO IS 456:2000
3. GRADE OF REINFORCEMENT MARKED THUS (M) SHALL BE Fe 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
   a) FOOTING = 2" b) R.C WALL = 1"
5. THIS DRG. READ IN CONJECTION WITH ARCH.DRGS.
6. COLUMNS AND FOOTINGS ARE DESIGNED FOR 3+5 FLOOR LOADS AND SBC OF THE SOIL IS 200KN/SQM. @ 10'-0" BELOW N.G.L.
7. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY.

&ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR CONSTRUCTION	M.R	R.M	27.02.24

PROJECT :-

PLAN SHOWING CONSTRUCTION OF RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-

R.C DETAILS OF FOOTING

DATE	SCALE	JOB NO	DRG NO
27.02.24	1" = 9"	———	002A

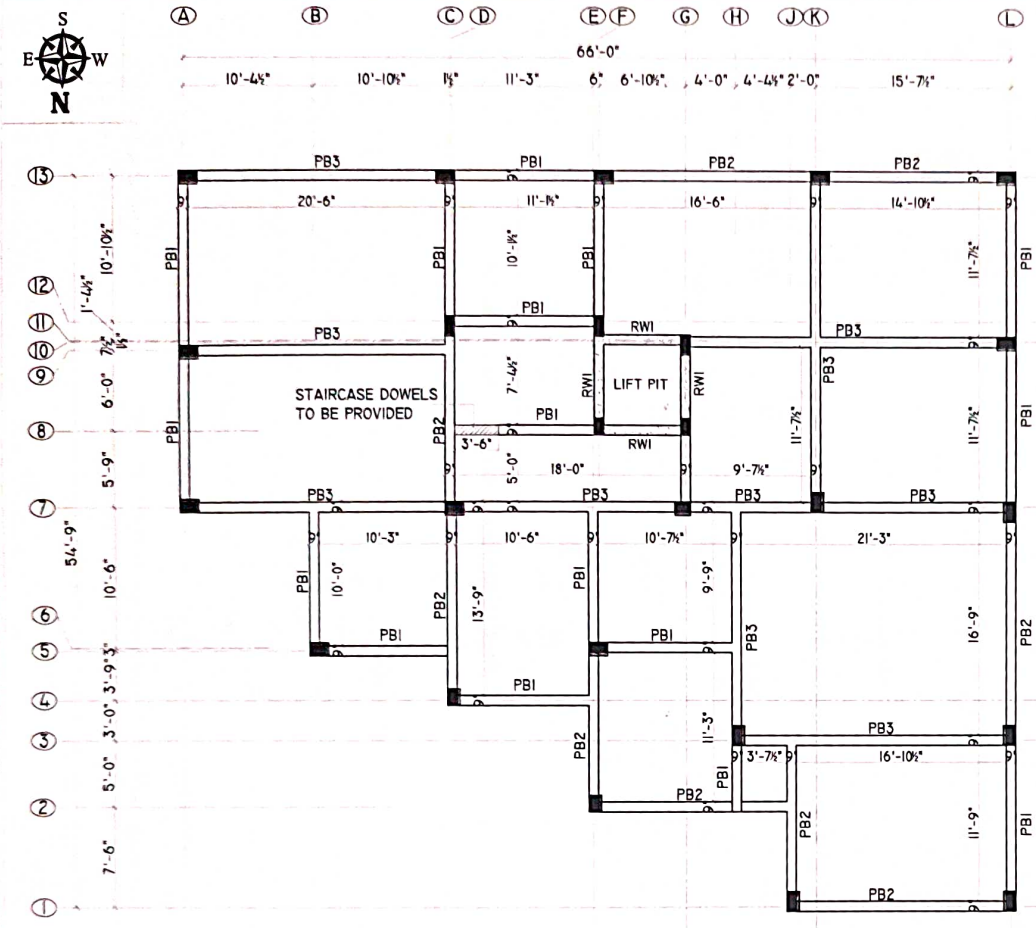
ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

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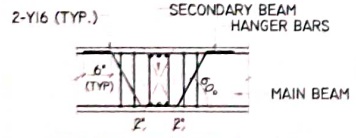


LAYOUT OF PLINTH BEAM

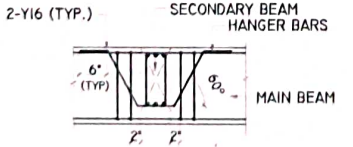
NOTE:

N.G.L - NATURAL GROUND LEVEL.

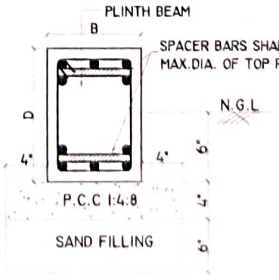
F.F.L - FLOOR FINISH LEVEL



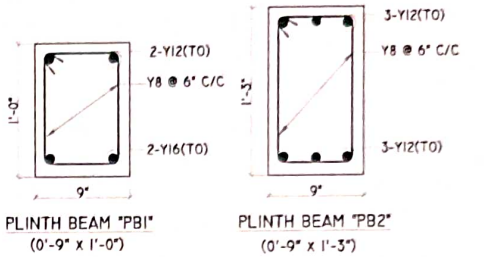
TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION



TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION (VARY DEPTH)

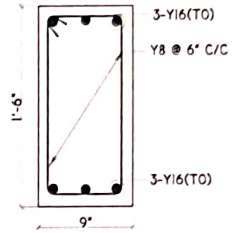


TYP. DETAIL OF PLINTH BEAM



PLINTH BEAM "PB1" (0'-9" x 1'-0")

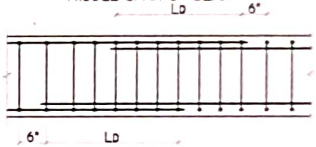
PLINTH BEAM "PB2" (0'-9" x 1'-3")



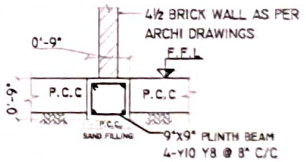
PLINTH BEAM "PB3" (0'-9" x 1'-6")

BEAM SCHEDULE

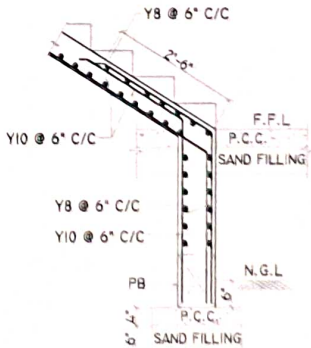
S.NO	NAME	SIZE
01.	PB1	0'-9" x 1'-0"
02.	PB2	0'-9" x 1'-3"
03.	PB3	0'-9" x 1'-6"



TYP. LAP SPLICE IN BEAM



TYPICAL DETAILS OF PLINTH BEAM UNDERNEATH 4.5" BRICK WORK



TYP. DETAIL OF STAIRCASE DOWELS

GENERAL NOTES:

REMOVAL OF FORMWORK(SHUTTERING) :

SHUTTERING OR ANY PART OF THE STRUCTURE SHALL NOT BE REMOVED UNTIL THE CONCRETE ATTAINS THE SPECIFIED STRENGTH OF CONCRETE HAVING FOR THE FOLLOWING MINIMUM PERIOD (AFTER SAND, POUR) SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3.1 IS 456:2000

a) VERTICAL SIDE OF SHUTTERING OF COLUMNS AND WALLS

LAP JOINTS FOR DEFORMED BARS :

i) AT ANY CROSS SECTION OF THE MEMBER NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED

ii) LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.3 TIMES LAP LENGTH OF THE BAR FOR TENSION & COMPRESSION MEMBERS

iii) DEVELOPMENT LENGTH SHALL BE AS PER TABLE BELOW:

a) DEVELOPMENT LENGTH FOR COLUMN BARS -40D
b) DEVELOPMENT LENGTH FOR BEAM BARS - 50D

iv) LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT SLAB LEVEL

v) DETAILING OF REBARS SHALL CONFORM TO SP:34 & IS 13920

EXCAVATION AND BACKFILL :

i) BACKFILL FOR FOUNDATIONS AND PITS SHALL BE PLACED IN HORIZONTAL LAYERS OF 300 mm THICKNESS AND SHALL BE WELL COMPACTED. THE FILL SHALL CONTAIN NO STONES WITH A DIAMETER GREATER THAN 100 mm. THE DEGREE OF COMPACTION OF BACKFILL SHALL BE 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED IN CONFORMITY WITH THE METHOD OF INSPECTION CONTAINED IN IS 2720

ii) UNSUITABLE MATERIALS LIKE ORGANIC OR SILTY MATERIALS ARE DETECTED DURING EXCAVATION, THEY SHALL BE EXCAVATED TO FIRM GROUND. THE INSTALLATION OF FOUNDATION SHALL BE LAID TO THE REQUIRED LEVEL WITH MASS CONCRETE UNDER AND ALSO WHEREVER EXCAVATION EXCEEDS ABOVE THE FOUNDATION, THIS SHALL BE DONE AS PER DESIGN ENGINEER. THE RESULTING VOID SHALL BE BACK FILLED WITH MASS CONCRETE GRADE 15

iii) BEFORE CASTING FOUNDATIONS, ANY MINERALS OR ADJACENT AREAS OF DISTURBED OR SOFT SOIL MUST BE REMOVED AND REPLACED WITH MASS CONCRETE OF GRADE M 15

iv) A LAYER OF PLAIN CONCRETE 100 mm THICK SHALL BE PLACED UNDER ALL FOUNDATIONS, PLAIN CONCRETE SHALL HAVE A CHARACTERISTIC STRENGTH OF 15 N/mm² AT 28 DAYS

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FOOT UNITS.
2. CONCRETE GRADE SHALL BE M25 CONFIRMING TO IS 456:2000
3. GRADE OF REINFORCEMENT MARKED THUS (Y) SHALL BE FE 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
   a) FOOTING = 2" b) R.C. WALL = 1"
5. THIS DRG. READ IN CONJECTION WITH ARCHI.DRGS.
6. COLUMNS AND FOOTINGS ARE DESIGNED FOR S+5 FLOOR LOADS AND SBC OF THE SOIL IS 200KN/SQM. @ 10'-0" BELOW N.G.L.
7. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY.
8. DNUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR CONSTRUCTION	S.K	R.M	29.02.24

PROJECT :-

PLAN SHOWING THE PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-

LAYOUT OF PLINTH BEAM

DATE	SCALE	JOB.NO	DRG.NO
29.02.24	1" : 9'	———	003

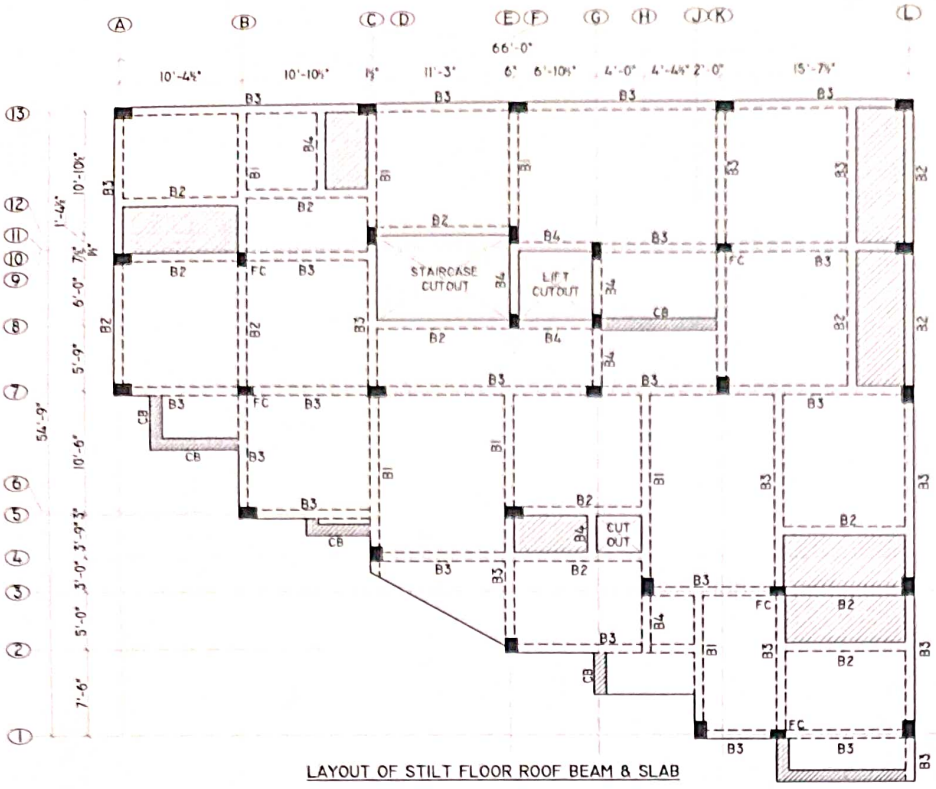
ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

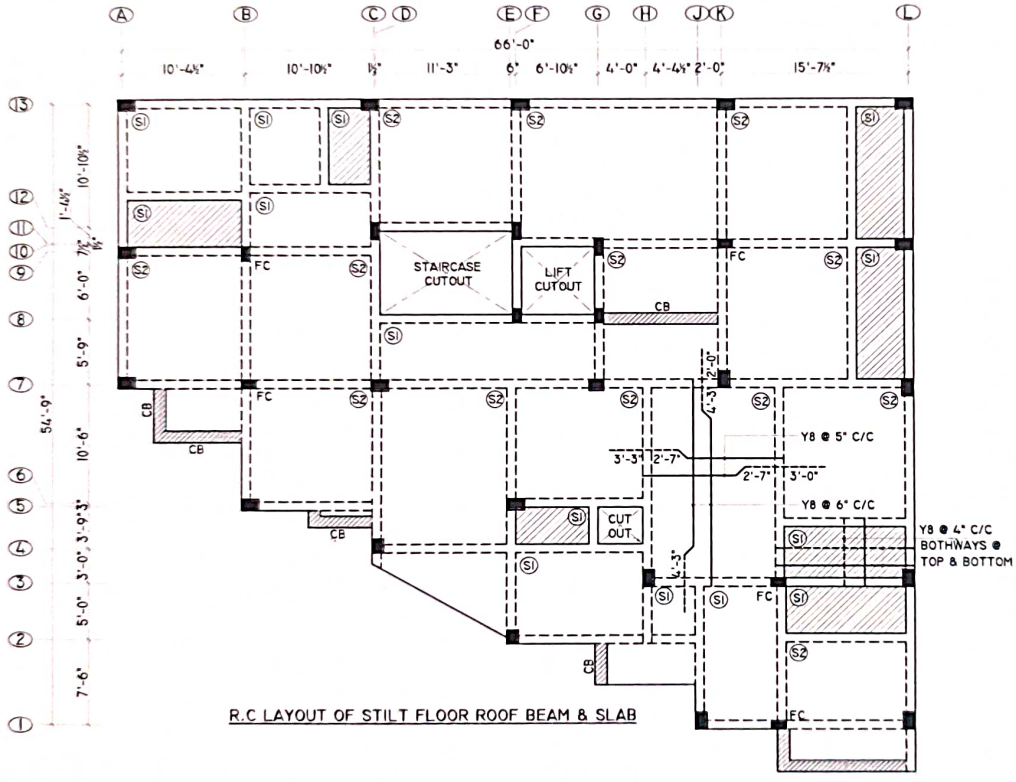
AURA ENGINEERING CONSULTANTS
#8, 50th St, Sarvamangala Colony, 7th Avenue, ASHOK NAGAR, CHENNAI- 600 083.
Phone Line :- 044 4859 7100
projects.auraengg@gmail.com
projects@auraengineers.co.in
http://auraengineers.co.in/
aura Engineering Consultants

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LAYOUT OF STILT FLOOR ROOF BEAM & SLAB



R.C LAYOUT OF STILT FLOOR ROOF BEAM & SLAB

NOTE:

SLAB SUNK BY 0'-10"

PROVIDE Y8 @ 8" C/C AS DISTRIBUTORS WHERE EVER REQUIRED

FOR BEAM REINFORCEMENT DETAILS REFER DWG.NO : 005

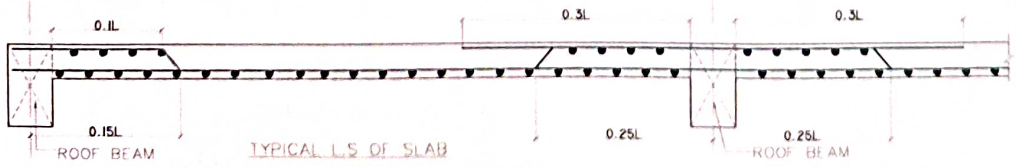
COLUMN CURTAILED TO BE BEND IN TO TOP OF THE SLAB

SLAB SCHEDULE

SL.NO	NAME	THICK
01	S1	5" THK.
02	S2	5" THK.

BEAM SCHEDULE

SL.NO	NAME	SIZE
01	B1	0'-9" x 1'-6"
02	B2	0'-9" x 1'-3"
03	B3	0'-9" x 1'-6"
04	B4	0'-9" x 1'-3"



TYPICAL L.S OF SLAB

GENERAL NOTES:
REMOVAL OF FORM WORK (SHUTTERING):

THE FOLLOWING MINIMUM PERIODS (AFTER FINAL POUR) SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3 OF IS456 : 2000

A. VERTICAL SIDE OF SHUTTERING OF COLUMNS, WALLS AND BEAMS ..... 24 HOURS

B. BOTTOM SHUTTERING OF SLABS
(KEEP THE PROPS UNDER) ..... 3 DAYS

C. BOTTOM SHUTTERING OF BEAMS
(KEEP THE PROPS UNDER) ..... 7 DAYS

D. PROPS OR PROPS TO SLAB
i) SPANNING UP TO 4.5M ..... 7 DAYS
ii) SPANNING OVER 4.5M ..... 14 DAYS

E. PROPS OR PROPS TO BEAMS
i) SPANNING UP TO 6.0M ..... 14 DAYS
ii) SPANNING OVER 6.0M 21DAYS

LAP JOINTS FOR REINFORCEMENT BARS:

i) AT ANY CROSS SECTION OF A MEMBER NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED

ii) LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 5 TIMES THE LAP LENGTH OF THE BAR FOR TENSION AND COMPRESSION MEMBERS

iii) LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT SLAB LEVEL

iv) LAPS IN BEAM AND SLAB SHALL BE PROVIDED AT THE POINT OF CONTRAFLEXURE

v) WELDING OF BARS SHALL BE DONE AS A STITCH WELD FOR 5 TIMES THE DIAMETER OF BAR AND A GAP OF 5 TIMES OF BAR AND AGAIN WELDING FOR ANOTHER 5 TIMES DIAMETER OF BAR USING ARC WELDING AND SPECIAL ELECTRODES AFTER GETTING PRIOR WRITTEN APPROVAL FROM THE STRUCTURAL CONSULTANT

vi) DETAILING OF REBARS SHALL CONFIRM TO SP 34 & IS 13920

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FOOT UNITS
2. CONCRETE GRADE SHALL BE M20 CONFIRMING TO IS 456:2000
3. GRADE OF REINFORCEMENT MARKED THUS (Y) SHALL BE Fe 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
   A) BEAM - 1" B) SLAB - ½"
5. THIS DRG. READ IN CONJECTION WITH ARCH DRGS.
6. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY
7. CAUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR APPROVAL	S.K	R.M	01.04.24

PROJECT :-

PLAN SHOWING THE PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-

LAYOUT & R.C DETAILS OF STILT FLOOR ROOF SLAB & BEAMS

DATE	SCALE	JOB.NO	DRG.NO
01.04.24	1" = 10'	———	004

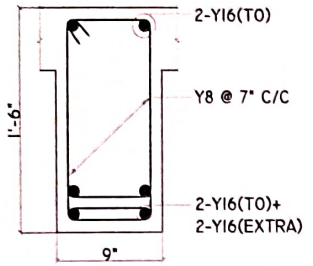
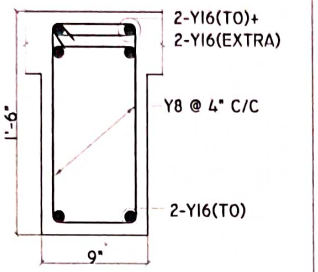
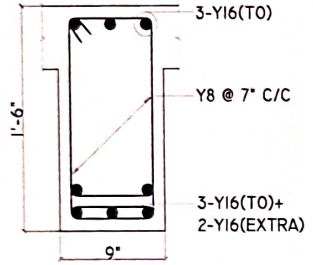
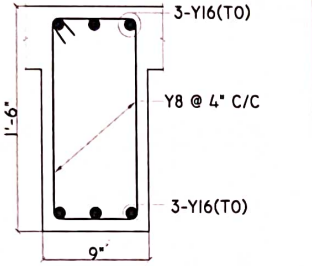
ARCHITECT / CONSULTANTS :-

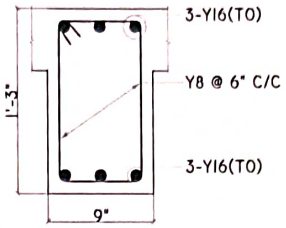
STRUCTURAL CONSULTANTS :-

AURA ENGINEERING CONSULTANTS
#8, 50th St, Sarvamangala Colony, 7th Avenue,
ASHOK NAGAR, CHENNAI- 600 083.
Head Line :- 044 4859 7100
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http://auraengineers.co.in/
aura Engineering Consultants

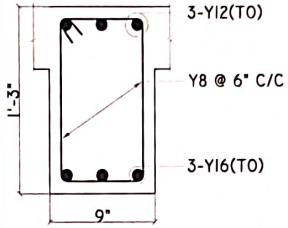
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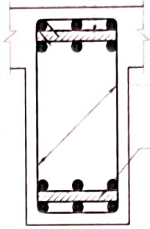
NAME	MID SPAN	END SUPPORT
B1 (0'-9" X 1'-6")		
B3 (0'-9" X 1'-6")		



C.S OF BEAM "B2"
(0'-9" X 1'-3")



C.S OF BEAM "B4"
(0'-9" X 1'-3")

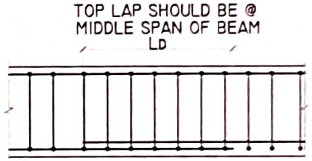


SPACER BARS SHALL BE MAX. DIA. OF TOP ROD.

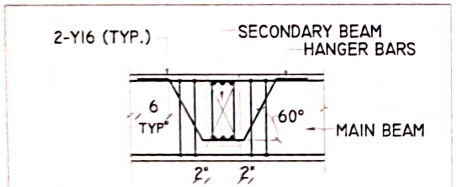
ALL STIRRUPS ARE 2 LEGGED UNLESS OTHERWISE SPECIFIED. 135° END HOOKS ALTERNATELY PLACED AS PER IS 13920 : 1993

SPACER BARS SHALL BE MAX. DIA. OF BOTTOM ROD.

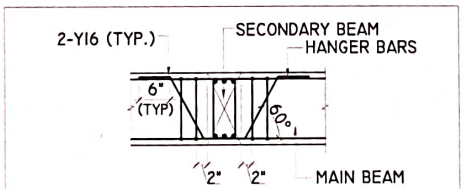
TYP. DETAIL



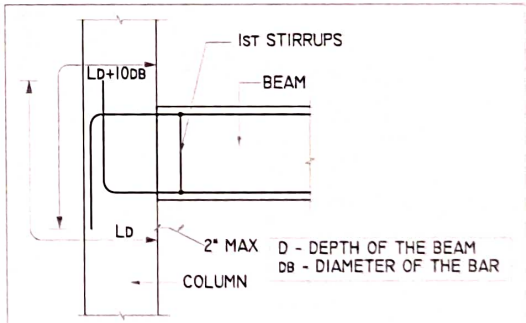
TYP. LAP SPLICE IN BEAM



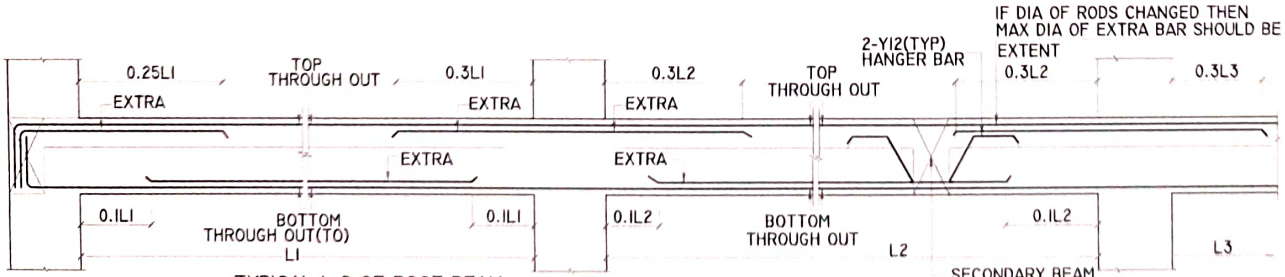
TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION (VARY DEPTH)



TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION



TYP. EXTERNAL JOINT DETAIL AT BEAM-COLUMN JUNCTION



TYPICAL L.S OF ROOF BEAM

BEAM SCHEDULE

SL.NO	NAME	SIZE
01	B1	0'-9" x 1'-6"
02	B2	0'-9" x 1'-3"
03	B3	0'-9" x 1'-6"
04	B4	0'-9" x 1'-3"

GENERAL NOTES:

REMOVAL OF FORM WORK (SHUTTERING):

THE FOLLOWING MINIMUM PERIOD (AFTER FINAL POUR) SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3 OF IS456 : 2000

A. VERTICAL SIDE OF SHUTTERING OF COLUMNS, WALLS AND B BEAMS ——— 24 HOURS.

B. BOTTOM SHUTTERING OF SLABS (KEEP THE PROPS UNDER) ——— 3 DAYS.

C. BOTTOM SHUTTERING OF BEAMS (KEEP THE PROPS UNDER) ——— 7 DAYS.

D. BOTTOM PROPS TO SLAB
i) SPANNING UP TO 4.5M ——— 7 DAYS.
ii) SPANNING OVER 4.5M ——— 14 DAYS.

E. BOTTOM PROPS TO BEAMS
i) SPANNING UP TO 6.0M ——— 14 DAYS
ii) SPANNING OVER 6.0M ——— 21DAYS.

LAP JOINTS FOR REINFORCEMENT BARS:

i) AT ANY CROSS SECTION OF A MEMBER NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED.

ii) LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.3 TIMES THE LAP LENGTH OF THE BAR FOR TENSION AND COMPRESSION MEMBERS.

iii) LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT SLAB LEVEL.

iv) LAPS IN BEAM AND SLAB SHALL BE PROVIDED AT THE POINT OF CONTRAFLEXURE.

v) WELDING OF BARS SHALL BE DONE AS A STITCH WELD FOR 5 TIMES THE DIAMETER OF BAR AND A GAP OF 5 TIMES OF BAR AND AGAIN WELDING FOR ANOTHER 5 TIMES DIAMETER OF BAR USING ARC WELDING AND SPECIAL ELECTRODES AFTER GETTING PROPER WRITTEN APPROVAL FROM THE STRUCTURAL CONSULTANT.

vi) DETAILING OF REBARS SHALL CONFIRM TO SP-34 & IS 13920.

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FOOT UNITS.
2. CONCRETE GRADE SHALL BE M20 CONFIRMING TO IS 456-2000
3. GRADE OF REINFORCEMENT MARKED THUS (Y) SHALL BE Fe 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
   A) BEAM : 1" B) SLAB : 3/4"
5. THIS DRG. READ IN CONJECTION WITH ARCH.DRGS.
6. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY.
7. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR APPROVAL	S.K	R.M	01.04.24

PROJECT :-
PLAN SHOWING THE PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-
R.C DETAILS OF STILT FLOOR ROOF BEAM

DATE	SCALE	JOB.NO	DRG.NO
01.04.24	1" : 8"	———	005

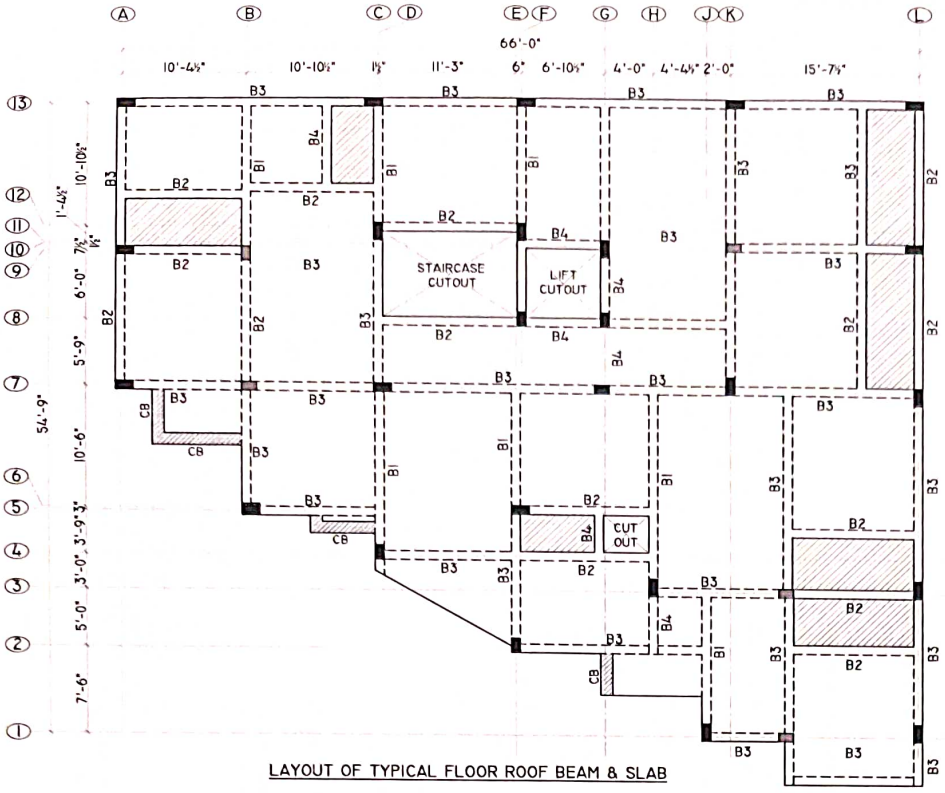
ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

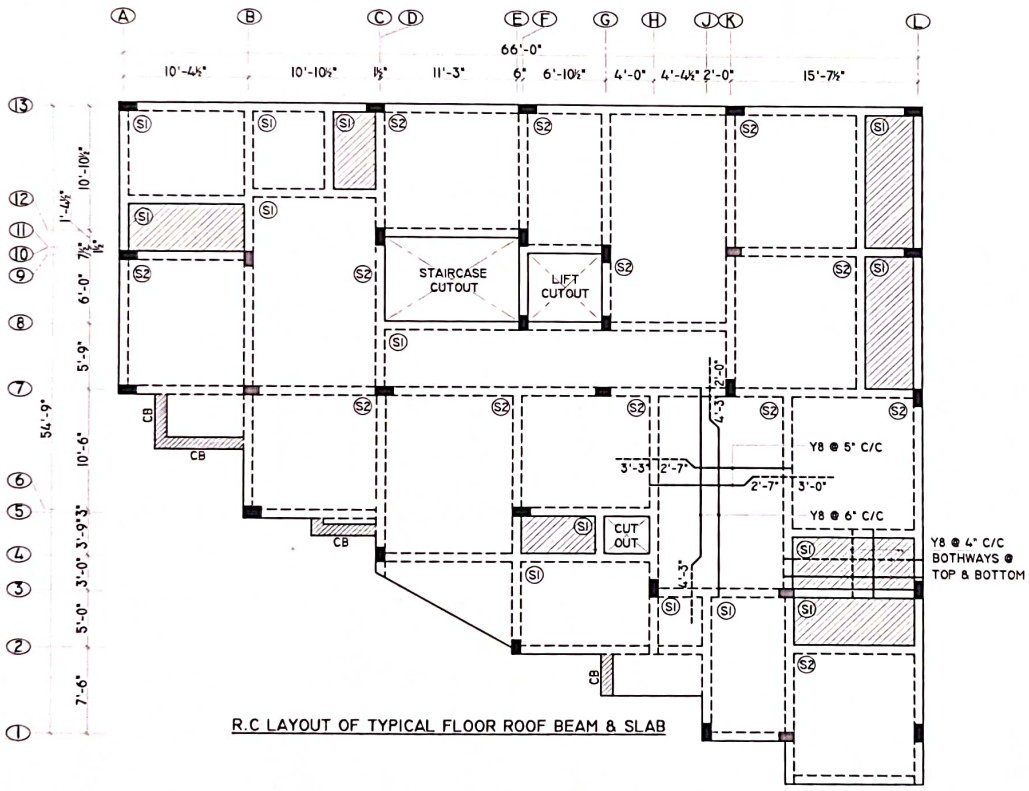
AURA ENGINEERING CONSULTANTS
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Head Line :- 044 4859 7100
projects.auraengg@gmail.com
projects@auraengineers.co.in
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aura Engineering Consultants

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LAYOUT OF TYPICAL FLOOR ROOF BEAM & SLAB



R.C LAYOUT OF TYPICAL FLOOR ROOF BEAM & SLAB

NOTE:

SLAB SUNK BY 0'-10"

PROVIDE Y8 @ 8" C/C AS DISTRIBUTORS WHERE EVER REQUIRED

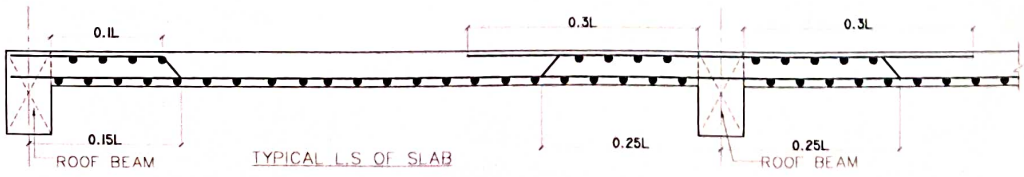
FOR BEAM REINFORCEMENT DETAILS REFER DWG.NO : 007

SLAB SCHEDULE

SL.NO	NAME	THICK
01	S1	5" THK.
02	S2	5" THK.

BEAM SCHEDULE

SL.NO	NAME	SIZE
01	B1	0'-9" x 1'-6"
02	B2	0'-9" x 1'-3"
03	B3	0'-9" x 1'-6"
04	B4	0'-9" x 1'-3"



TYPICAL L.S OF SLAB

GENERAL NOTES:
REMOVAL OF FORM WORK (SHUTTERING):

THE FOLLOWING MINIMUM PERIOD (AFTER FINAL POUR) SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3 OF IS456: 2000

A. VERTICAL SIDE OF SHUTTERING OF COLUMNS, WALLS AND BEAMS ..... 24 HOURS.
B. BOTTOM SHUTTERING OF SLABS (KEEP THE PROPS UNDER) ..... 3 DAYS
C. BOTTOM SHUTTERING OF BEAMS (KEEP THE PROPS UNDER) ..... 7 DAYS
D. BOTTOM PROPS TO SLAB
i) SPANNING UP TO 4.5M ..... 7 DAYS
ii) SPANNING OVER 4.5M ..... 14 DAYS
E. BOTTOM PROPS TO BEAMS
i) SPANNING UP TO 6.0M ..... 14 DAYS
ii) SPANNING OVER 6.0M 21DAYS

LAP JOINTS FOR REINFORCEMENT BARS:

i) AT ANY CROSS SECTION OF A MEMBER NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED.
ii) LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.3 TIMES THE LAP LENGTH OF THE BAR FOR TENSION AND COMPRESSION MEMBERS.
iii) LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT SLAB LEVEL.
iv) LAPS IN BEAM AND SLAB SHALL BE PROVIDED AT THE POINT OF CONTRAFLEXURE.
v) WELDING OF BARS SHALL BE DONE AS A STITCH WELD FOR 5 TIMES THE DIAMETER OF BAR AND A GAP OF 5 TIMES OF BAR AND AGAIN WELDING FOR ANOTHER 5 TIMES DIAMETER OF BAR USING ARC WELDING AND SPECIAL ELECTRODES AFTER GETTING PRIOR WRITTEN APPROVAL FROM THE STRUCTURAL CONSULTANT.
vi) DETAILING OF REBARS SHALL CONFIRM TO SP-34 & IS 13920.

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FOOT UNITS.
2. CONCRETE GRADE SHALL BE M20 CONFIRMING TO IS 456:2000
3. GRADE OF REINFORCEMENT MARKED THUS (Y) SHALL BE Fe 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
A) BEAM = 1" B) SLAB = 3/4"
5. THIS DRG. READ IN CONJECTION WITH ARCH DRGS.
6. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY.
7. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER.

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR APPROVAL	S.K	R.M	01.04.24

PROJECT :-

PLAN SHOWING THE PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-

LAYOUT & R.C DETAILS OF TYPICAL FLOOR ROOF SLAB & BEAMS

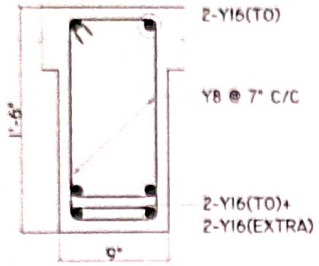
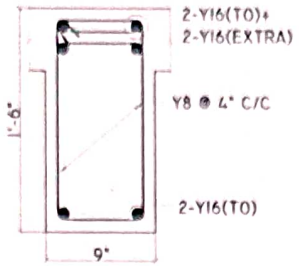
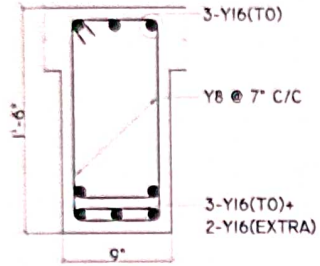
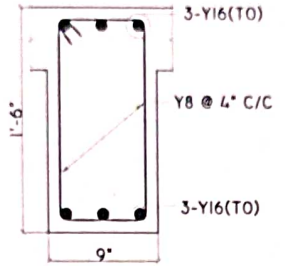
DATE	SCALE	JOB.NO	DRG.NO
01.04.24	1" : 10'	-------	006

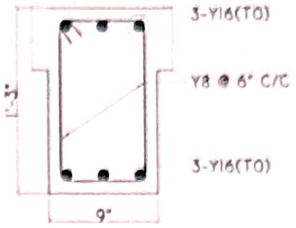
ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

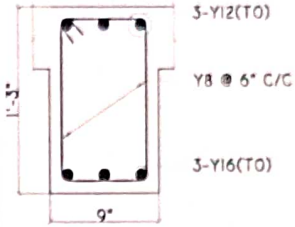
AURA ENGINEERING CONSULTANTS
#8, 50th St, Saravamangala Colony, 7th Avenue, ASHOK NAGAR, CHENNAI- 600 083.
Fixed Line :- 044 4859 7100
projects.auraengg@gmail.com
projects@auraengineers.co.in
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aura Engineering Consultants

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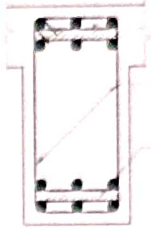
NAME	MID SPAN	END SUPPORT
B1 (0'-9" X 1'-6")		
B3 (0'-9" X 1'-6")		



C.S OF BEAM "B2"
(0'-9" X 1'-3")



C.S OF BEAM "B4"
(0'-9" X 1'-3")

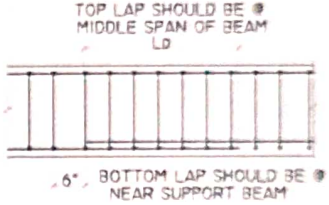


SPACER BARS SHALL BE MAX. DIA. OF TOP ROD.

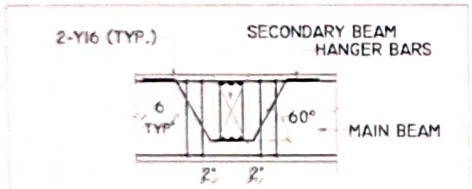
ALL STIRRUPS ARE 2 LEGGED UNLESS OTHERWISE SPECIFIED. 135° END HOOKS ALTERNATELY PLACED AS PER IS 13920 : 1993

SPACER BARS SHALL BE MAX. DIA. OF BOTTOM ROD.

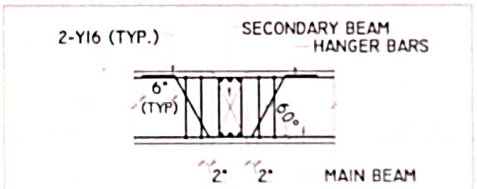
TYP. DETAIL



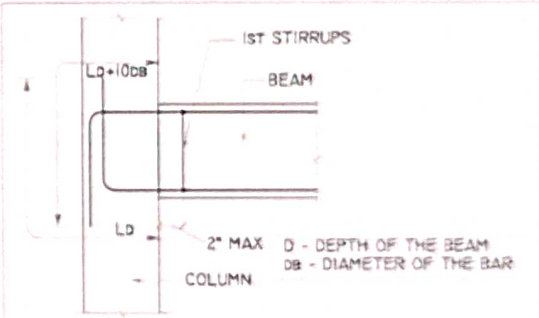
TYP. LAP SPLICE IN BEAM



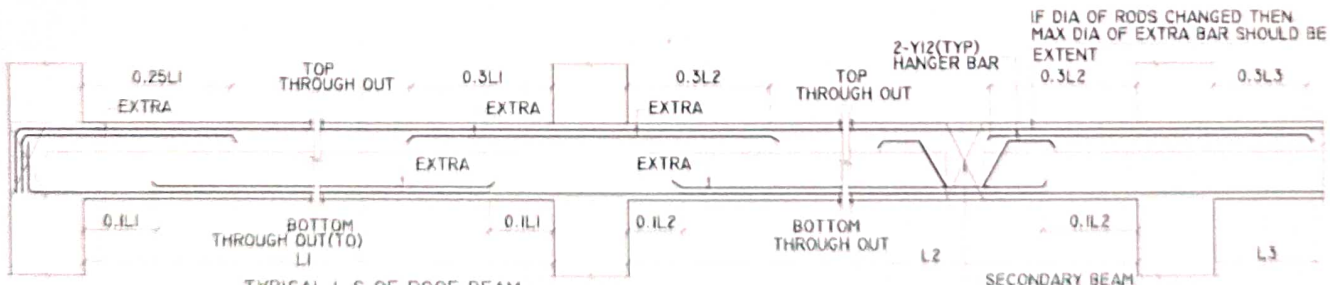
TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION (VARY DEPTH)



TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION



TYP. EXTERNAL JOINT DETAIL AT BEAM-COLUMN JUNCTION



TYPICAL L.S OF ROOF BEAM

BEAM SCHEDULE

SL.NO	NAME	SIZE
01	B1	0'-9" x 1'-6"
02	B2	0'-9" x 1'-3"
03	B3	0'-9" x 1'-6"
04	B4	0'-9" x 1'-3"

GENERAL NOTES

REMOVAL OF FORM WORK (SHUTTERING)

LAP JOINTS FOR REINFORCEMENT BARS

GENERAL NOTES

2. CONCRETE GRADE SHALL BE M25

3. GRADE OF REINFORCEMENT BARS SHALL BE FE 500 CONFORMING TO IS 1786:2008

00 ISSUE FOR APPROVAL — S.K — R.M — 01.04.24

REV. DESCRIPTIONS — DRN — CHK — DATE

PROJECT :-
PLAN SHOWING THE PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-
R.C DETAILS OF TYPICAL FLOOR ROOF BEAM

DATE	SCALE	JOB NO	DWG NO
01.04.24	1" = 1'	———	007

ARCHITECT / CONSULTANTS :-

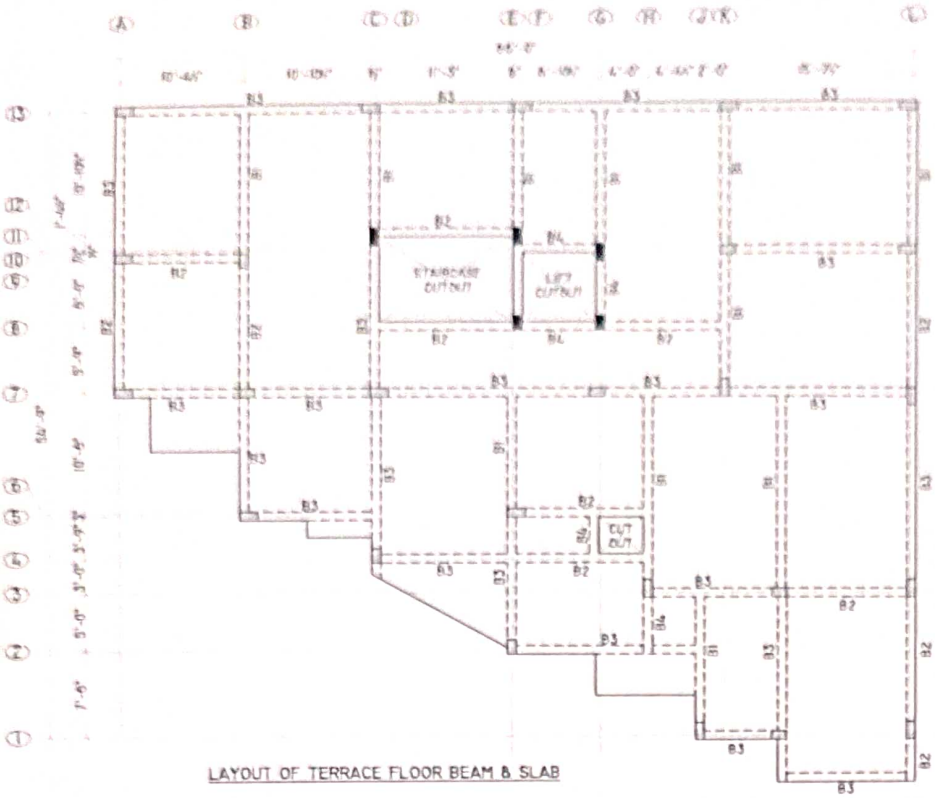
STRUCTURAL CONSULTANTS :-

AURA ENGINEERING CONSULTANTS

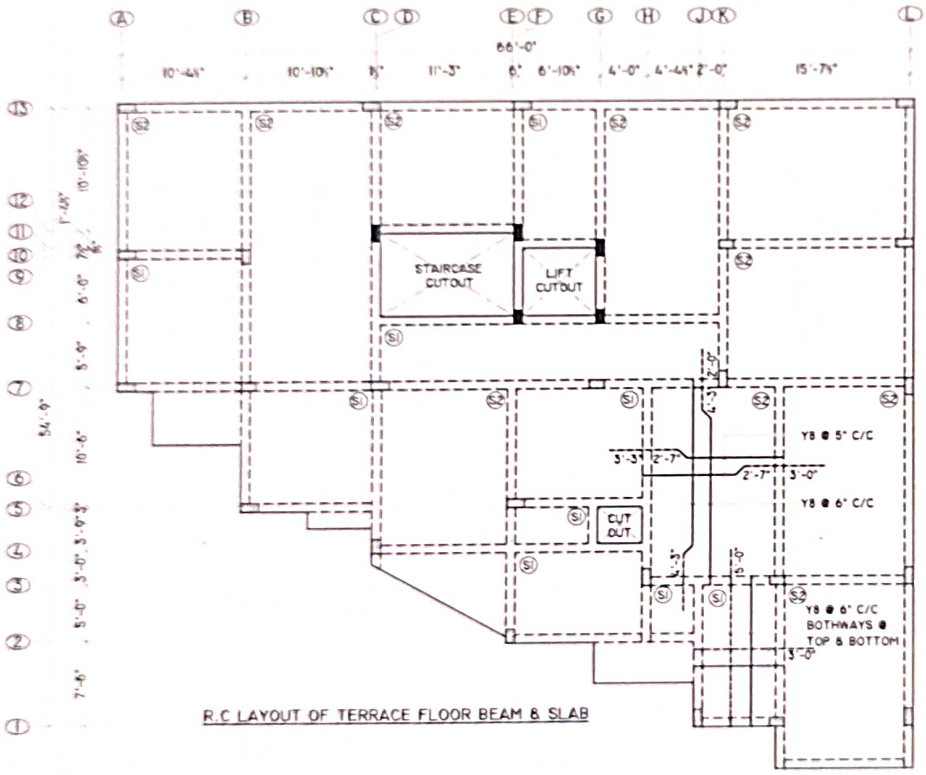
aura Engineering Consultants

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LAYOUT OF TERRACE FLOOR BEAM & SLAB



R.C LAYOUT OF TERRACE FLOOR BEAM & SLAB

NOTE:

PROVIDE Y8 @ 8" C/C AS DISTRIBUTORS WHERE EVER REQUIRED

FOR BEAM REINFORCEMENT DETAILS REFER DWG.NO : 009

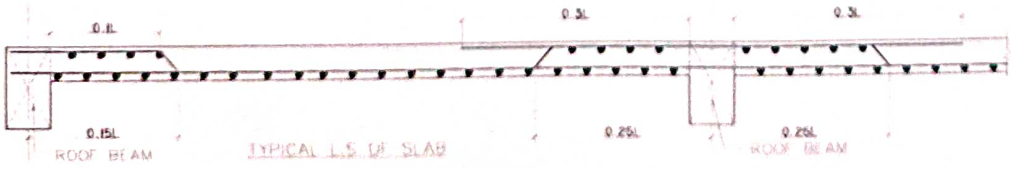
COLUMN CURTAILED TO BE BEND IN TO TOP OF THE SLAB

SLAB SCHEDULE

SL.NO	NAME	THICK
01	S1	5" THK.
02	S2	5" THK.

BEAM SCHEDULE

SL.NO	NAME	SIZE
01	B1	0'-9" x 1'-6"
02	B2	0'-9" x 1'-3"
03	B3	0'-9" x 1'-6"
04	B4	0'-9" x 1'-3"



GENERAL NOTES:

REMOVAL OF FORM WORK (SHUTTERING)

LAP JOINTS FOR REINFORCEMENT BARS:

GENERAL NOTES:

2. CONCRETE GRADE SHALL BE M20

4. GRADE OF REINFORCEMENT HARRED (HYD TYP)
SHALL BE Fe 500 CONFORMING TO IS 1786-2008

5. THIS DRG. READ IN CONJECTION WITH ARCH DRGS.

8. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUE OF STRUCTURAL DRAWING ONLY.

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR APPROVAL	S.K	R.M	01.04.24

PROJECT :-

PLAN SHOWING THE PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-

LAYOUT & R.C DETAILS OF TERRACE FLOOR SLAB & BEAMS

DATE	SCALE	JOB.NO	DRG.NO
01.04.24	1" : 10'	———	008

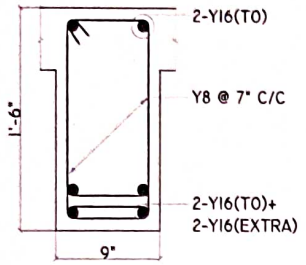
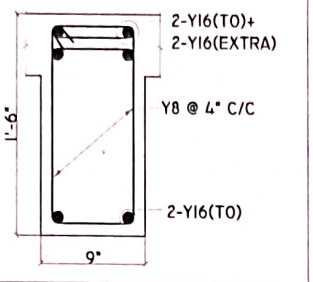
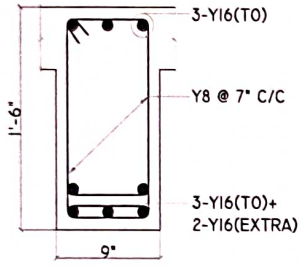
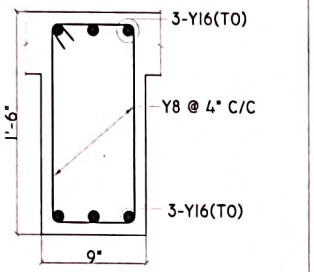
ARCHITECT / CONSULTANTS :-

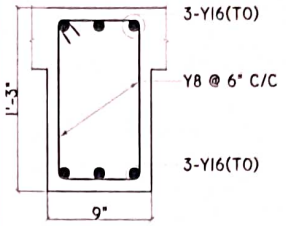
STRUCTURAL CONSULTANTS :-

AURA ENGINEERING CONSULTANTS
64, 30th St, Samarangalai Colony, 7th Avenue,
Ashok Nagar, Chennai- 600 083.
Phone Line : 044 4859 7930
projects.auraengg@gmail.com
projects@auraengineers.co.in
http://auraengineers.co.in
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Engineering Consultants

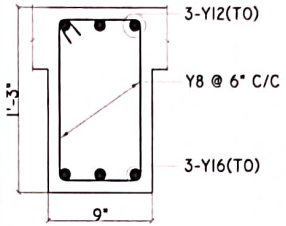
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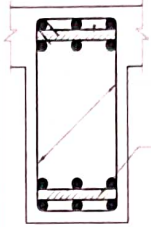
NAME	MID SPAN	END SUPPORT
B1 (0'-9" X 1'-6")		
B3 (0'-9" X 1'-6")		



C.S OF BEAM "B2"
(0'-9" X 1'-3")



C.S OF BEAM "B4"
(0'-9" X 1'-3")

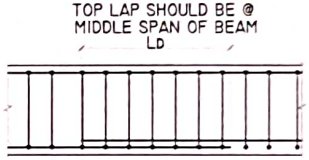


SPACER BARS SHALL BE MAX. DIA. OF TOP ROD.

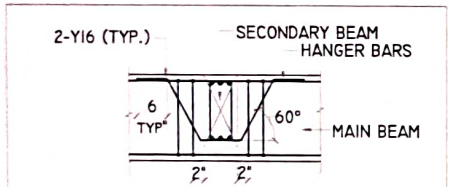
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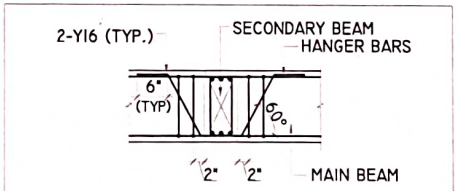
TYP. DETAIL



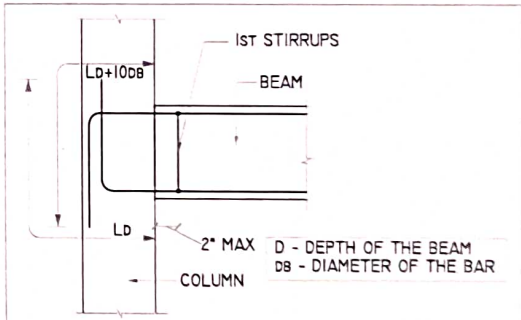
TYP. LAP SPLICE IN BEAM



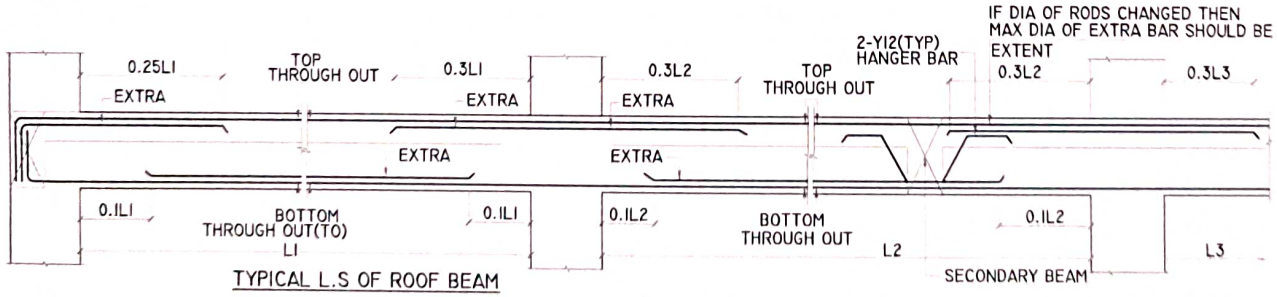
TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION (VARY DEPTH)



TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION



TYP. EXTERNAL JOINT DETAIL AT BEAM-COLUMN JUNCTION



TYPICAL L.S OF ROOF BEAM

BEAM SCHEDULE		
SL.NO	NAME	SIZE
01	B1	0'-9" x 1'-6"
02	B2	0'-9" x 1'-3"
03	B3	0'-9" x 1'-6"
04	B4	0'-9" x 1'-3"

GENERAL NOTES:

REMOVAL OF FORM WORK (SHUTTERING):

THE FOLLOWING MINIMUM PERIOD (AFTER FINAL POUR) SHALL BE ALLOWED BEFORE REMOVAL OF SHUTTERING AS PER CLAUSE 11.3.1 OF SP.456 : 2000

A. VERTICAL SIDE OF SHUTTERING OF COLUMNS, WALLS AND BEAMS ——— 24 HOURS
B. BOTTOM SHUTTERING OF SLABS (KEEP THE PROPS UNDER) ——— 3 DAYS.
C. BOTTOM SHUTTERING OF BEAMS (KEEP THE PROPS UNDER) ——— 7 DAYS
D. BOTTOM PROPS TO SLAB
i) SPANNING UP TO 4.5DM ——— 7 DAYS.
ii) SPANNING OVER 4.5DM ——— 14 DAYS.
E. BOTTOM PROPS TO BEAMS
i) SPANNING UP TO 6.0DM ——— 14 DAYS.
ii) SPANNING OVER 6.0DM ——— 21DAYS.

LAP JOINTS FOR PEINFORCEMENT BARS:

(i). AT ANY CROSS SECTION OF A MEMBER NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED.
(ii). LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.3 TIMES THE LAP LENGTH OF THE BAR FOR TENSION AND COMPRESSION MEMBERS.
(iii). LAPS IN COLUMNS SHALL BE PROVIDED AT MID HEIGHT OF FLOOR AND NOT AT SLAB LEVEL.
(iv). LAPS IN BEAM AND SLAB SHALL BE PROVIDED AT THE POINT OF CONTRAFLEXURE.
(v). WELDING OF BARS SHALL BE DONE AS A STITCH WELD FOR 5 TIMES THE DIAMETER OF BAR AND A GAP OF 5 TIMES OF BAR AND AGAIN WELDING FOR ANOTHER 5 TIMES DIAMETER OF BAR USING ARC WELDING AND SPECIAL ELECTRODES AFTER GETTING PRIOR WRITTEN APPROVAL FROM THE STRUCTURAL CONSULTANT.
(vi). DETAILING OF REBARS SHALL CONFIRM TO SP:34 & IS 13920.

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN FEET UNITS.
2. CONCRETE GRADE SHALL BE M20 CONFIRMING TO IS 456:2000
3. GRADE OF REINFORCEMENT MARKED THUS (Y) SHALL BE Fe 500 CONFIRMING TO IS 1786-2008
4. CLEAR COVER FOR REINFORCEMENT
   a) BEAM = 1" b) SLAB = 3/4"
5. THIS DRG. READ IN CONJECTION WITH ARCH DRGS.
6. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUAL OF STRUCTURAL DRAWING ONLY.
7. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV.	DESCRIPTIONS	DRN	CHK	DATE
00	ISSUE FOR APPROVAL	S.K	R.M	01.04.24

PROJECT :-
PLAN SHOWING THE PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING STILT+05 AT URAPAKKAM.

DRAWING TITLE :-
R.C DETAILS OF TERRACE FLOOR BEAM

DATE	SCALE	JOB.NO	DRG.NO
01.04.24	1" : 8"	———	009

ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

ALURA ENGINEERING CONSULTANTS
#4, 50th St, Sarvamangala Colony, 7th Avenue, ASHOK NAGAR, CHENNAI- 600 083.
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Ownership, Compliance & Legal Verification

Encumbrance Certificate (EC) Search, Find Your SRO, Temple Property Check, WAQF Property Check, View Patta/Chitta, View FMB, Patta Analyzer, EC Analyzer

Zoning & Land Use Analysis

Land Use Zone Finder, CRZ Zone Check, Aquifer Zone Check, CBA Check, EWS Check, Road Width Check, Proposed Road Widening Check, FSI Calculator

Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary

Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management

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