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Structural Stability Certificate

Project Name : STILT + 03 FLOORS—5 DWELL-ING UNITS AT MADHA NAGAR MAIN ROAD OF MADHANANDHAPURAM

Location : PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT + 3 FLOORS WITH 12.0M HEIGHT RESIDENTIAL BUILDING WITH 15 DWELL-ING UNITS AT MADHA NAGAR MAIN ROAD OF MADHANANDHAPURAM CHEN-NAI IN S.NO: 212/2 OF MADHANANDHAPURAM VILLAGE WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION DIVISION 156, ZONE 12

Type of structure : R.C.C Framed Structure

- Material Used:

  For Concrete M25 and for steel Structure Fe 500
- The loading is taken as per the requirements of Code of practice IS-875
- Wind forces as per the latest code IS-875 part III
- Seismic Force as per the latest code IS 1893
- The design of the Structure is done as per the latest code IS-456.

Structure analysis & design:

The structure is analyzed as a Space frame structure in STAAD Vi8. Footings, Columns, Lift lobby slabs, Staircase are designed as conventional beam and slabs.

Accordingly , we hereby issue the **Structure is "Sound and Safe".**

Accordingly , we hereby issue the **'Structural Stability Certificate'**

R. Manikandan

R. MANIKANDAN, M.Tech, (Structures)
Registered Structural Engineer Grade I
SE/GR-I/19/06/154 (CMDA), RSE 100692019 (GCC)
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For Aura Engineering Consultants

aura

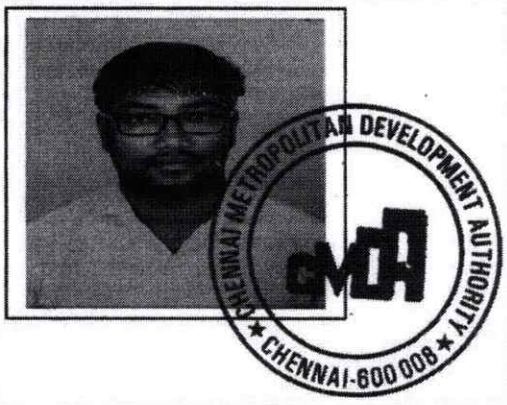
CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
'Thalamuthu Natarajan Building', No.1, Gandhi Irwin Road,
Egmore, Chennai-600 008.

PROFESSIONAL REGISTRATION CERTIFICATE

This is to certify that the **Thiru. R.MANIKANDAN** has enrolled as **Registered Structural Engineer Grade-I (SE)** with Chennai Metropolitan Development Authority (CMDA) who has the qualification of **M.Tech., (Structural Engg.)** and experience in the relevant field for **5 years**.

He has been given the Registration No.**SE/GR-I/19/06/154** on **10.06.2019.** He shall be required to comply with the duties and responsibilities prescribed by the Government of Tamil Nadu in Part-V, "Registration of Professionals", Tamil Nadu Combined Development and Building Rules, 2019 approved vide G.O.(Ms) No.18 MAWS (MA1) Dept. dated 04.02.2019.

This Registration is valid upto **09.06.2024**.



10.6.19
N. MUNIPRASAD
ASSISTANT PLANNER
CHENNAI METROPOLITAN DEVELOPMENT AUTHORITY
CHENNAI - 600 008.

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DESIGN CALCULATION

PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT + 3 FLOORS WITH 12.0M HEIGHT RESIDENTIAL BUILDING WITH 15 DWELLING UNITS AT MADHA NAGAR MAIN ROAD OF MADHANANDHAPURAM CHENNAI IN S.NO: 212/2 OF MADHANANDHAPURAM VILLAGE WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION DIVISION 156, ZONE 12.

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1.0 DESIGN BRIEF:

THIS DOCUMENT FURNISHES THE STRUCTURAL DESIGN CALCULATION FOR PLAN SHOWING THE PROPOSED CONSTRUCTION OF STILT + 3 FLOORS WITH 12.0M HEIGHT RESIDENTIAL BUILDING WITH 15 DWELLING UNITS AT MADHA NAGAR MAIN ROAD OF MADHANANDHAPURAM CHENNAI IN S.NO: 212/2 OF MADHANANDHAPURAM VILLAGE WITHIN THE LIMIT OF GREATER CHENNAI CORPORATION DIVISION 156, ZONE 12

1.0 GENERAL DESIGN CRITERIA

2.1. Description of the structure

The Residential Building consists of Ground Floor + 3 Upper floors and the structure is designed as a RCC framed structure.

1. Size of the building : 46.26 x 8.32
2. Height of the building : 12.0m
3. Number of storeys above GL : Stilt Floor + 3 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.

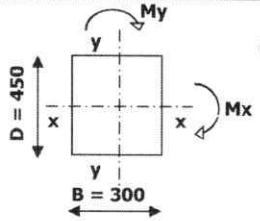
The Slabs and beams are checked for deflection as per IS 456:2000. Cover for Reinforcement is considered as per Table 16A of NBC, for a Fire resistance of 2 hrs.

APPENDIX I

Design Calculations

Column Design

PROJECT	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	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 ,
	L_{ey} = **3000** mm	IS456:2000
	Size of the Column B X D = **300** x **450** mm	
1.4	**Analysis Results**	
	Factored Axial Load P_u = **780.0** kN	STAAD
	Factored Moment M_{ux} = **22.00** kNm	OUTPUT
	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
	e_y = L_{oy} / 500 + B / 30 = 16.0 mm <20	IS456:2000
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	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	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	Cl 39.6 , IS456:2000
	Hence Safe	
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 n 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

at S.No:212/2 Madha Nagar main road of Madhanandhapuram

Design of Isolated Footing F2 **Node :** 38

Basic Data:

Net Safe Bearing Capacity	180	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	51.98	kN
Weight of soil	82.01	kN

Gross Bearing Pressure Calculation (kN/m^2)

Critical Load Combinations	Pmax	Pmin
200	128.04	128.0390212
0	35.45	35.45

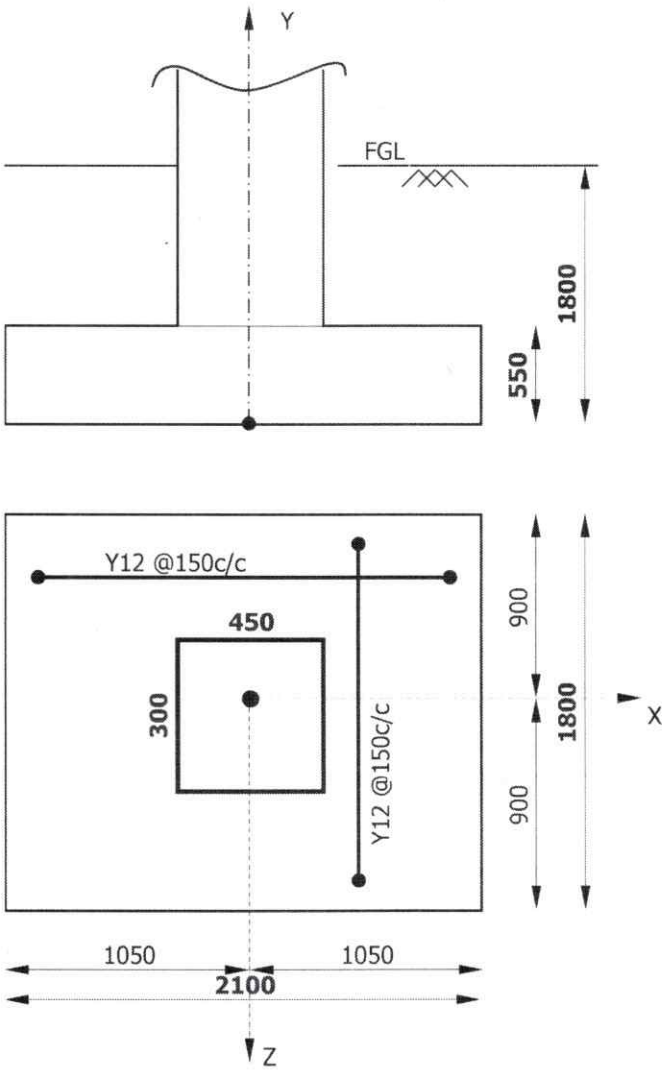
Gross SBC (w/o increase) 212.4 kN/m^2

Hence **OK**

Factored Net Upward Pressure Calculation

Load Factor for Design 1.5

Critical Load Combinations	Pmax	Pmin
200	138.89	138.8888889
0	0.00	0.0



Dsgn.(+ve) BM abt. X-axis Mux	39.06	kN.m
Dsgn.(+ve) BM abt. Z-axis Muz	47.27	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	482.00	mm
Provided Eff. depth for Muz	494.00	mm
Mu,lim	773	kN.m

Depth provided is **OK**

Bottom Reinforcement

Ast Required for Mux	187.8	mm^2
Ast Required for Muz	221.9	mm^2
Min. Ast Reqd.	660	mm^2

Bottom Reinforcement

						Ast Provided	Ast Required		
Provide	12	@	150	C/C	along Z	754	660.0	mm^2	Hence
Provide	12	@	150	C/C	along X	754	660.0	mm^2	**OK**

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

at S.No:212/2 Madha Nagar main road of Madhanandhapuram

Design of Isolated Footing **F2** **Node :** **38**

Check For Flexural / Oneway Shear

	Actual	Allowable		Hence
Shear Stress (Plane ll to X)	0.077	0.296	N/mm^2	OK
Shear Stress (Plane ll to Z)	0.093	0.293	N/mm^2	OK

Check For Punching / Twoway Shear

Allowable Shear Stress	1.25	N/mm^2	
Actual Shear Stress	0.30	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	=	51.98	kN			
Weight of Over burden Earth	=	82.01	kN			
Total downward Load	=	483.99	kN			
Stabilizing moment along X-Dir	=	483.99	x	1.05		
	=	508.19	kNm			
Actuating moment, M_{zz}	=	0.00	kNm			
Factor of Safety (Along X-Dir)	=	508.19	/	0.0		
		-	>	1.40	Hence	**OK**

Check For Sliding

Resistance against Sliding	=	275.8729	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)	=	275.9	/	2.5		
		108.61	>	1.40	Hence	**OK**
Factor of Safety (Along Z-Dir)	=	275.9	/	5.3		
		52.05	>	1.4	Hence	**OK**

Plinth Beam Design

PROJECT	**at S.No:212/2 Madha Nagar main road of Madhanandhapuram**	**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 moment (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 Stee = 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 reqd	p_c	=	0	%	
	Required Area of tension steel	$A_{st\ reqd}$	=	131.96	mm^2	
	Required Area of compression steel	$A_{sc\ reqd}$	=	0.00	mm^2	

PROJECT	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
TITLE		REVISION	DATE	CHECKED RMK	DATE

CL. NO.	BEAM DESIGN CALCULATIONS	REFERENCES

Detail of bars

	I st Layer Nos	I st Layer Dia	II nd Layer Nos	II nd Layer Dia
Tension Reinforcement	3	16		

A_{st} provided = 603.19 mm^2

	Nos	Dia	Nos	Dia
Compression Reinforcemer	3	16	0	

A_{sc} provided = 603.19 mm^2

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

Percentage of compression steel provide 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 Reinforcement	=	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 reqd	p_c =	0	%
Required Area of tension steel	$A_{st\ reqd}$ =	131.96	mm^2
Required Area of compression steel	$A_{sc\ reqd}$ =	0	mm^2

Detail of bars

	I st Layer Nos	I st Layer Dia	II nd Layer Nos	II nd Layer Dia
Tension Reinforcement	3	16	0	0

A_{st} provided = 603.1858 mm^2

PROJECT	**at S.No:212/2 Madha Nagar main road of Madhanandhapuram**	**DOCUMENT. NO.**	**DATE**	**DESIGNED** **RMK**	**DATE**
TITLE		**REVISION**	**DATE**	**CHECKED** **RMK**	**DATE**
CL. NO.	**BEAM DESIGN CALCULATIONS**			**REFERENCES**	

	Nos	Dia	Nos	Dia
Compression Reinforcemer	**3**	**16**	**0**	**0**

A_{sc} provided = 603.19 mm^2

Percentage of tension steel provided	p_t	=	0.777	%	**Hence O.K**
Percentage of compression steel provide	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 Reinforcement		=	250		Cl 26.5.1.5,IS456:2000

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

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 reqd	p_c	=	0	%	
Required Area of tension steel	$A_{st\ reqd}$	=	131.96	mm^2	
Required Area of compression steel	$A_{sc\ reqd}$	=	0	mm^2	

Detail of bars

	I st Layer		**II nd Layer**	
	Nos	Dia	Nos	Dia
Tension Reinforcement	**3**	**16**	**0**	**0**

A_{st} provided = 603.19 mm^2

	Nos	Dia	Nos	Dia
Compression Reinforcemer	**3**	**16**	**0**	**0**

A_{sc} provided = 603.19 mm^2

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

PROJECT	**at S.No:212/2 Madha Nagar main road of Madhanandhapuram**	**DOCUMENT. NO.**	**DATE**	**DESIGNED** RMK	**DATE**
TITLE		**REVISION**	**DATE**	**CHECKED** RMK	**DATE**
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 Reinforcement		=	250		Cl 26.5.1.5,IS456:2000

Provide 8 mm dia 2 legged stir ups @ 190mm c/c spacing

Check For Deflection

Basic Value		=	**26**		Cl.23.2, IS456:2000
Service Stress in Steel	f_s	=	**63.44**	N/mm^2	
Modification Factor(Tension Reinforcement)	F_1	=	2.00		
Allowable Span/Depth		=	52.00		
Actual Span/Depth		=	13.33	**Hence Safe**	

Floor Beam Design

PROJECT	**at S.No:212/2 Madha Nagar main road of Madhanandhapuram**	**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	IS 456:2000 Table 19
Effective Depth	d	=	482.5	mm	IS 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 %		IS 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 Stee = 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

PROJECT	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
TITLE		REVISION	DATE	CHECKED RMK	DATE

CL. NO.	BEAM DESIGN CALCULATIONS	REFERENCES

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 Reinforcemer	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 provide p_c = 1.302 % **Hence O.K**

Check for Shear

Shear = 241 kN

Nominal Shear Stress	τv	=	1.66	N/mm^2
Permissible Shear Stress	τc	=	0.92	N/mm^2
Maximum Shear Stress	$\tau c,max$	=	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 Reinforcement		=	300	

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

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

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

	Nos	Dia	Nos	Dia
Compression Reinforcemer	3	20	3	20

A_{sc} provided = 1884.96 mm^2

PROJECT	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	DOCUMENT. NO.	DATE	DESIGNED RMK	DATE
TITLE		REVISION	DATE	CHECKED RMK	DATE
CL. NO.	BEAM DESIGN CALCULATIONS			REFERENCES	

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

Percentage of compression steel provide 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

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 Reinforcemer	**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 provide p_c = 1.302 % **Hence O.K**

PROJECT	**at S.No:212/2 Madha Nagar main road of Madhanandhapuram**	**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	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	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	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 = **125** mm	
	Clear cover cc = **25** mm	Table 16 Cl.26.4.2 ,
	Effective thickness of slab (d_{eff}) = 125 - 25 - 4 = 96 mm	IS 456 -2000
	Unit weight of concrete = 25 KN/m^3	Cl 19.2.1, IS 456-2000
	Effective Shorter Span L_x = **3.2** m	
	Effective Longer Span L_y = **6.4** m	
	Aspect ratio L_y/L_x = 2.00 = 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 = 0.125 x 25 = 3.125 KN/m^2	
	Floor finish = **1.500** KN/m^2	
	Partition Load = **1.500** KN/m^2	
	Sunken Filling = **0.000** KN/m^2	
	Imposed Load = **2.000** KN/m^2	IS 875 (Part 2) -1987
	Extra Load, (if Any) = **0.000** KN/m^2	
	Total load = 8.125 KN/m^2	
	Design load (Wu) = 1.5 x 8.125 = **12.188** KN/m^2	Table 18 Cl 36.4.1 IS 456 -2000
1.0.3	**Moment and Shear Calculations**	
	Short Span Direction	
	α_x for positive moment 1.75 → 0.059	Table 26 Cl D-1.1,
	2 → 0.065	IS 456 -2000
	for 2.00 α_x = 0.065	
	Positive moment M_x 0.065 x 12.19 x 3.2 ^2 = **8.11** KN-m	
	α_x for negative moment 1.75 → 0.077	Table 26 Cl D-1.1,
	2 → 0.085	IS 456 -2000
	for 2.00 α_x = 0.085	
	Negative moment M_x : 0.085 x 12.19 x 3.2 ^2 = **10.61** KN-m	

PROJECT	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	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 12.19 x 3.2 ^2 = **3.49** 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 12.19 x 3.2 ^2 = **4.62** KN-m	IS 456 -2000
	Shear force V_u = 12.19 x 3.2 x 0.5 = **19.50** KN	
1.0.4	**Check Effective Depth for Max.Bending Moment**	
	Depth required = $(M_x, (0.133x\ fck \times b))^{1/2}$ = 56.48 mm	Table C,SP 16 :1980
	Depth provided = 125 - 25 - 8 /2 = 96 mm > 56.48 mm	Cl 2.3
	Hence the section is Safe against Bending	
1.0.5	**Check Depth for Shear**	
	Nominal Shear Stress : $\tau_v = V_u / b\ d$ = 0.20 N/mm^2	Cl.40.1, IS 456:2000
	Design shear strength (τ_c) = 0.42 N/mm^2	Table 19 , IS 456:2000
	k = 1.30	Cl.40.2.1.1,
	k * τ_c = 0.55 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 : $\tau_v = V_u / b\ d$ = 0.20 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 Stres**	Cl.40.2.3.1, IS 456:200
1.0.7	**Reinforcement calculations**	
	Short Span Direction @ Support	
	Mu/bd^2 = $\frac{10.61 \times 10 \wedge 6}{1000 \times 96 \times 96}$ = **1.151**	
	Pt = **0.28** %	Table 2-4, SP16 :1980

PROJECT	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	DOCUMENT.NO	DATE	DESIGNED	DATE
TITLE	TWO WAY SLAB DESIGN	REVISION	DATE	CHECKED	DATE

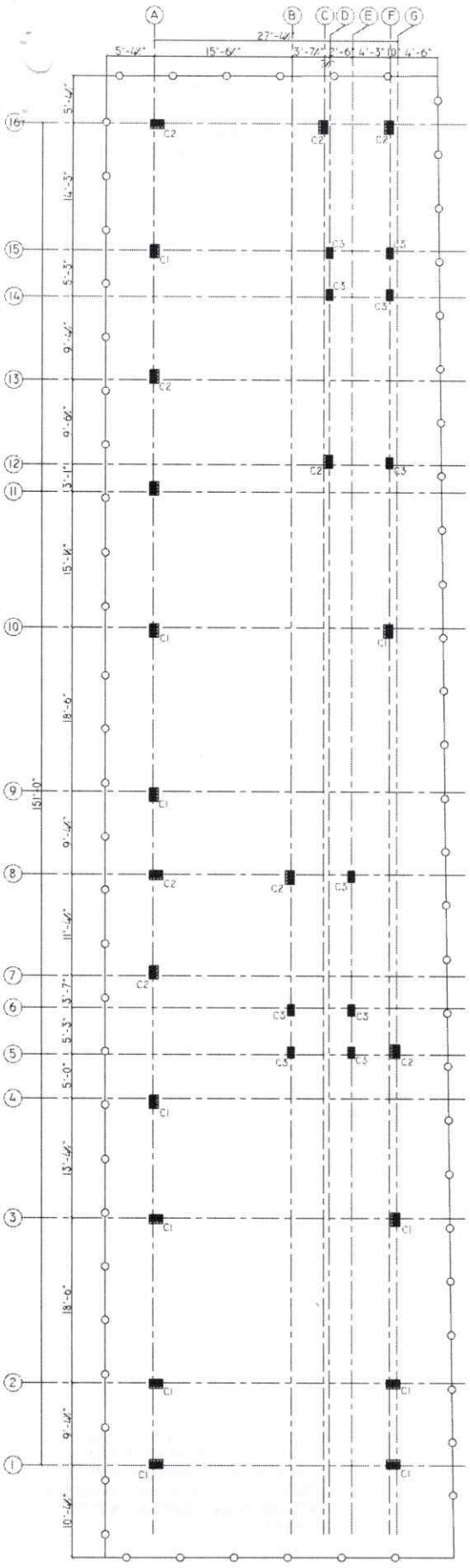
CL. NO.	DESIGN CALCULATIONS	REFERENCES
	Area of steel Ast = 0.0028 x 1000 x 96 = 269.25 mm^2	
	Minimum area of steel 0.0012 x 1000 x 125 = 150.00 mm^2	Cl:26.5.2.1
	Spacing of Y **8** bars 50.27 x 1000 / 269.25 = 186.59 mm	IS 456 -2000
	Check for Spacing	
	Minimum of 1) 3d = 288 mm	
	2) = 300 mm	Cl:26.3.3.(b).1
	3) = 186.59 mm	IS 456 -2000
	Therefore provide Y **8** @ **180** mm C/C	
	Short Span Direction @ Mid Span	
	Mu/bd^2 = 8.11 x 10 ^ 6 / (1000 x 96 x 96) = 0.880	
	Pt = 0.211 %	SP16 :1980 Table 2-4
	Area of steel Ast = 0.0021 x 1000 x 96 = 202.93 mm^2	IS 456:2000
	Minimum area of steel 0.0012 x 1000 x 125 = 150.00 mm^2	Cl:26.5.2.1
	Spacing of Y **8** bars 50.27 x 1000 / 202.93 = 247.57 mm	
	Check for Spacing	
	Minimum of 1) 3d = 288 mm	IS 456:2000
	2) = 300 mm	Cl:26.3.3.(b).1
	3) = 247.57 mm	
	Therefore provide Y **8** @ **150** mm C/C 150	
	Provided % of Tension Reinforcement (pt) = **0.349** %	
	Long Span Direction @ Support	
	Mu/bd^2 = 4.62 x 10 ^ 6 / (1000 x 96 x 96) = 0.501	
	Pt = 0.118 %	SP16 :1980 Table 2-4
	Area of steel Ast = 0.0012 x 1000 x 96 = 113.3 mm^2	IS 456:2000
	Minimum area of steel 0.0012 x 1000 x 125 = 150.00 mm^2	Cl:26.5.2.1
	Spacing of Y **8** bars 50.27 x 1000 / 150.00 = 334.93 mm	

PROJECT	at S.No:212/2 Madha Nagar main road of Madhanandhapuram	DOCUMENT.NO	DATE	DESIGNED	DATE
TITLE	TWO WAY SLAB DESIGN	REVISION	DATE	CHECKED	DATE

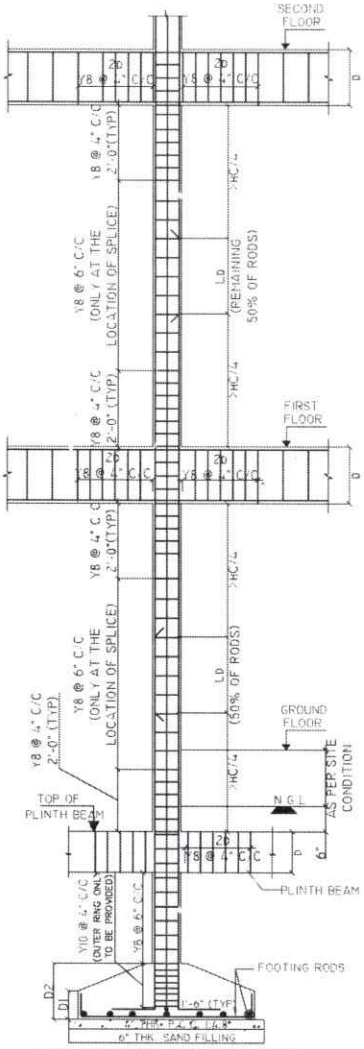
CL. NO.	DESIGN CALCULATIONS	REFERENCES
	Check for Spacing	
	Minimum of 1) 3d = 288 mm	IS 456:2000
	2) = 300 mm	Cl:26.3.3.(b).1
	3) = 334.93 mm	
	Therefore provide Y **8** @ **280** mm C/C	
	Long Span Direction @ mid Span	
	$Mu/bd^2 = \frac{3.49 \times 10 \wedge 6}{1000 \times 96 \times 96} = 0.379$	
	Pt = 0.089 %	SP16 :1980 Table 2-4
	Area of steel Ast = 0.0009 x 1000 x 96 = 85.233 mm^2	IS 456:2000
	Minimum area of steel 0.0012 x 1000 x 125 = 150.00 mm^2	Cl:26.5.2.1
	Spacing of Y **8** bars 50.27 x 1000 / 150.00 = 334.93 mm	
	Check for Spacing	
	Minimum of 1) 3d = 288 mm	IS 456:2000
	2) = 300 mm	Cl:26.3.3.(b).1
	3) = 334.93 mm	
	Therefore provide Y **8** @ **280** 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) = 0.349 %	
	Service stress of steel (fs) 0.58 fy (Ast_R/Ast_P) = 175.62 N/mm^2	IS456:2000 Fig 4
	Modification Factor for Tension Reinforcement (F_1 = 1.98	Page 38
	Allowable Span / Effective Depth Rat o = 51.51	IS 456:2000 Cl:23.2.1
	Actual Span/Eff Depth Rati = 3.2 x 1000 / 96 = 33.33	
	Hence Safe against Deflection	

APPENDIX II

GENERAL ARRANGEMENT DRAWINGS



LAYOUT OF COLUMN



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

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, 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 1.3 TIMES LAP LENGTH OF THE BAR FOR TENSION & COMPRESSION MEMBERS

iii) DEVELOPMENT LENGTH (Ld) SHALL BE AS PER (SP 34-1999) TABLE BELOW

a) DEVELOPMENT LENGTH FOR COLUMN BARS	45D
b) DEVELOPMENT LENGTH FOR BEAM BARS	57D

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

vi) DETAILING OF REBARS SHALL CONFIRM TO SP-34 & IS (1826)

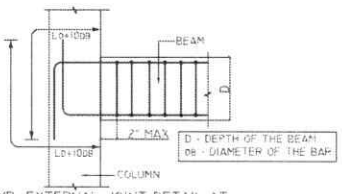
EXCAVATION AND BACKFILL:

i) BACKFILL FOR FOUNDATIONS AND PITS SHALL BE PLACED EVENLY 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 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 LEVELS WITH MASS CONCRETE GRADE M10. ALSO WHEREVER EXCAVATION OCCURS BELOW THE FOUNDATION LEVEL STATED ON THE DESIGN DRAWING THE RESULTING VOID SHALL BE BACK FILLED WITH MASS CONCRETE GRADE-10.

iii) BEFORE CASTING FOUNDATIONS, ANY IMMEDIATE OR ADJACENT AREAS OF DISTURBED OR SOFT SOIL MUST BE REMOVED AND REPLACED WITH MASS CONCRETE OF GRADE 10.

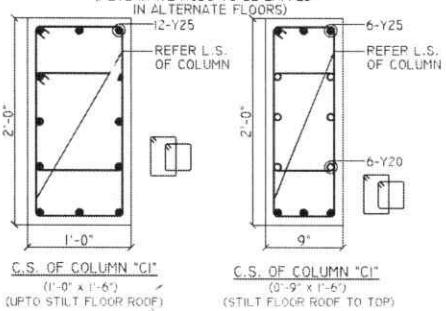
iv) A LAYER OF BLINDING CONCRETE 100 MM THICK SHALL BE PLACED UNDER ALL FOUNDATIONS. BLINDING CONCRETE SHALL HAVE A CHARACTERISTIC STRENGTH OF 10 N/MM² AT 28 DAYS.



TYP. EXTERNAL JOINT DETAIL AT BEAM-COLUMN JUNCTION

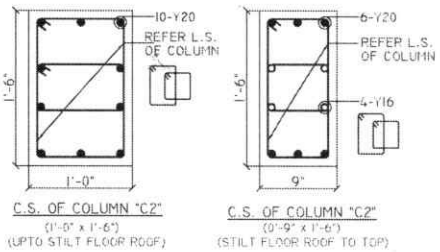
COLUMN SCHEDULE

S.NO.	NAME	SIZE	
		UPTO STILT ROOF	STILT ROOF TO TOP
1.	C1	1'-0" X 2'-0"	0'-9" X 2'-0"
2.	C2	1'-0" X 1'-6"	0'-9" X 1'-6"
3.	C3	0'-9" X 1'-3"	0'-9" X 1'-3"



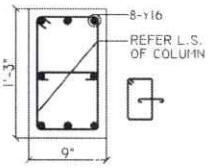
C.S. OF COLUMN "C1" (1'-0" X 1'-6") (UPTO STILT FLOOR ROOF)

C.S. OF COLUMN "C1" (0'-9" X 1'-6") (STILT FLOOR ROOF TO TOP)

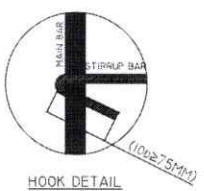


C.S. OF COLUMN "C2" (1'-0" X 1'-6") (UPTO STILT FLOOR ROOF)

C.S. OF COLUMN "C2" (0'-9" X 1'-6") (STILT FLOOR ROOF TO TOP)



C.S. OF COLUMN "C3" (0'-9" X 1'-3") (UPTO TOP)



HOOK DETAIL

NOTE:

N.G.L - NATURAL GROUND LEVEL.

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

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) COLUMN = 1"
5. THIS DRG. READ IN CONJECTION WITH ARCH DRGS.
6. COLUMNS AND FOOTINGS ARE DESIGNED FOR G+3 FLOOR LOADS AND SBC OF THE SOIL IS 200KN/SQM. @ 6'-6" 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
	ISSUE FOR CONSTRUCTION	M.R	R.M	09.06.21

PROJECT :-

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING (STILT+03) AT S.NO :212/2, MADHA NAGAR MAIN ROAD, MADHANANDHAPURAM VILLAGE, SRIPERUMBUDUR TALUK, KANCHEEPURAM DISTRICT, GREATER CHENNAI CORPORATION, DIVISION :158, ZONE:12.

DRAWING TITLE :-

LAYOUT & R.C DETAILS OF COLUMN

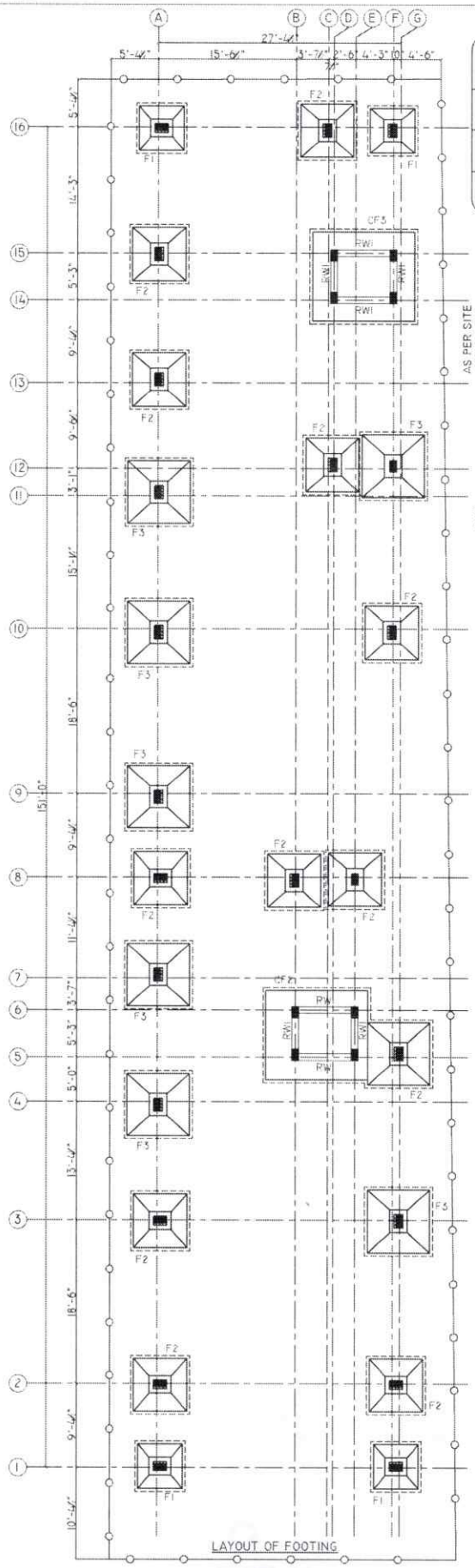
DATE	SCALE	JOB.NO	DRG NO
09.06.21	1" : 10'	----------	001

ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

AURA ENGINEERING CONSULTANTS
NO:13/27, 66th STREET
R.V NAGAR, ASHOK NAGAR, CHENNAI- 600 083.
Fixed Line :- 044 4859 7100
projects.auraengg@gmail.com
projects@auraengineers.co.in
http://auraengineers.co.in/
aura Engineering Consultants

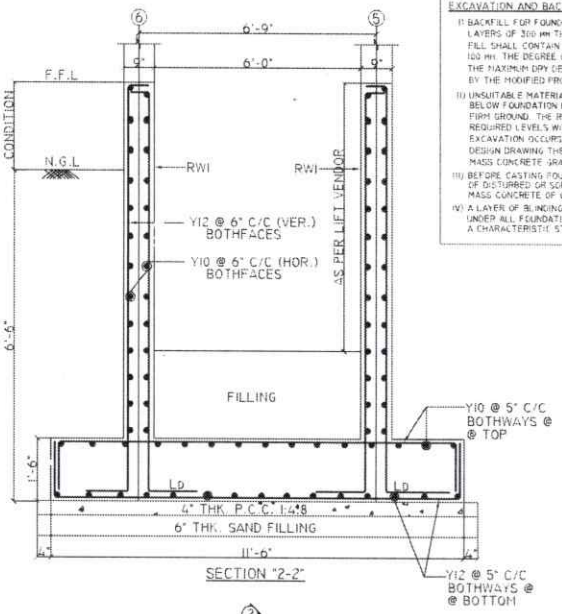
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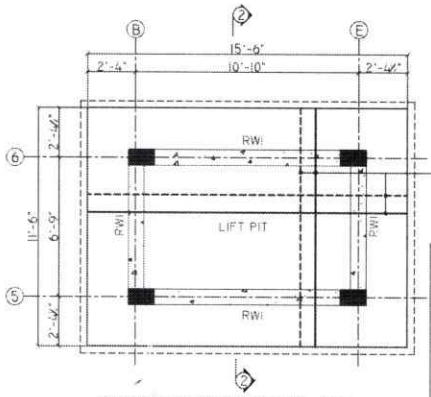
LAYOUT OF FOOTING

FOOTINGS SCHEDULE:-

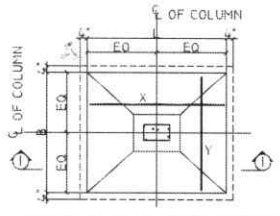
SI.	FOOTING NAME	FOOTING SIZE	FOOTING REINFORCEMENT
01	F1	6'-0" X 6'-0" D=1'-6" SLOPED FOOTING	Y10 @ 6" C/C @ BOTHWAYS
02	F2	8'-0" X 8'-0" D1=1'-0" D2=1'-6" SLOPED FOOTING	Y12 @ 6" C/C @ BOTHWAYS
03	F3	10'-0" X 10'-0" D1=1'-0" D2=1'-6" SLOPED FOOTING	Y12 @ 6" C/C @ BOTHWAYS



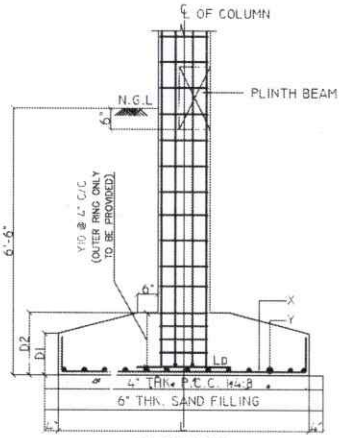
SECTION "2-2"



PLAN OF COMBINED FOOTING -"CF1"



TYPICAL PLAN OF SLOPED FOOTING



SECTION "1-1"

COMBINED FOOTINGS SCHEDULE:-

SI.	FOOTING NAME	FOOTING SIZE	FOOTING REINFORCEMENT
01	CF1	11'-6"X15'-6"X1'-6"	REFER SECTION
01	CF2	11'-6"X11'-6"X1'-6"	REFER SECTION

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,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 1.3 TIMES LAP LENGTH OF THE BAR FOR TENSION & COMPRESSION MEMBERS

iii) DEVELOPMENT LENGTH (LD) SHALL BE AS PER (SP 34-1999) 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 CONFIRM TO SP-34 & IS 13920

EXCAVATION AND BACKFILL :

i) BACKFILL FOR FOUNDATIONS AND PITS SHALL BE PLACED EVENLY 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 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 LEVELS WITH MASS CONCRETE GRADE M10. ALSO WHEREVER EXCAVATION OCCURS BELOW THE FOUNDATION LEVEL STATED ON THE DESIGN DRAWING THE RESULTING VOID SHALL BE BACK FILLED WITH MASS CONCRETE GRADE-10.

iii) BEFORE CASTING FOUNDATIONS, ANY IMMEDIATE OR ADJACENT AREAS OF DISTURBED OR SOFT SOIL MUST BE REMOVED AND REPLACED WITH MASS CONCRETE OF GRADE 10

iv) A LAYER OF BLINDING CONCRETE 100 mm THICK SHALL BE PLACED UNDER ALL FOUNDATIONS. BLINDING CONCRETE SHALL HAVE A CHARACTERISTIC STRENGTH OF 10 N/mm² AT 28 DAYS.

NOTE:

N.G.L - NATURAL GROUND LEVEL.

F.F.L - FLOOR FINISH LEVEL

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) COLUMN = 1"
5. THIS DRG. READ IN CONJECTION WITH ARCH DRGS.
6. COLUMNS AND FOOTINGS ARE DESIGNED FOR G+3 FLOOR LOADS AND SBC OF THE SOIL IS 200KN/SQM. @ 6'-6" 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
	ISSUE FOR CONSTRUCTION	M.R	R.M	09.06.21

PROJECT :-

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING (STILT+03) AT S.NO :212/2, MADHA NAGAR MAIN ROAD, MADHANANDHAPURAM VILLAGE, SRIPERUMBUDUR TALUK, KANCHEEPURAM DISTRICT, GREATER CHENNAI CORPORATION, DIVISION :156, ZONE:12.

DRAWING TITLE :-

LAYOUT & R.C DETAILS OF FOOTING

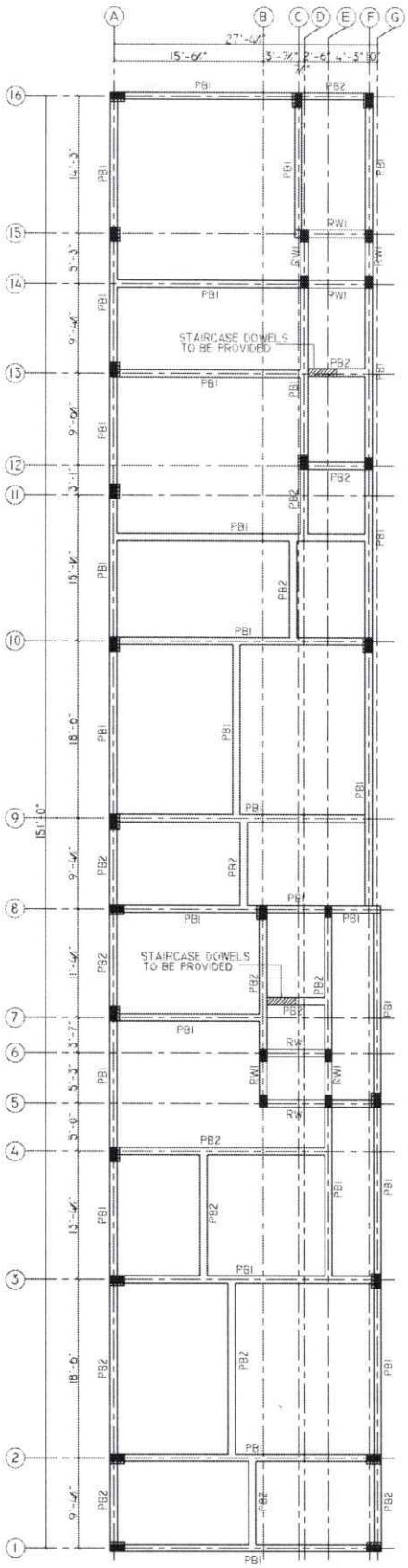
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09.06.21	1" : 10'	----------	002

ARCHITECT / CONSULTANTS :-

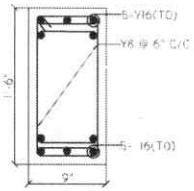
STRUCTURAL CONSULTANTS :-

AURA ENGINEERING CONSULTANTS
NO:19/27, 66th STREET
R.V NAGAR, ASHOK NAGAR,CHENNAI- 600 083.
Fixed Line :- 044 4859 7100
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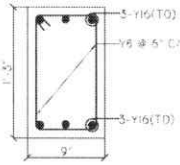
A3



LAYOUT OF PLINTH BEAM

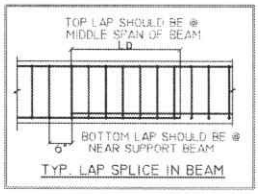


PLINTH BEAM "PB1"
(0'-9" x 1'-3")

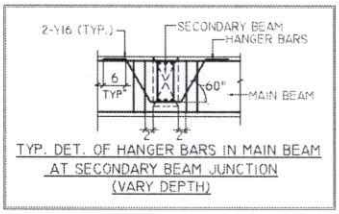


PLINTH BEAM "PB2"
(0'-9" x 1'-3")

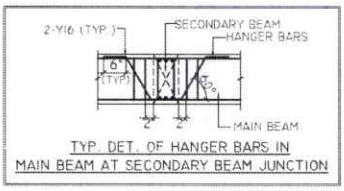
BEAM SCHEDULE		
SL.NO	NAME	SIZE
01	PB1	0'-9" x 1'-6"
02	PB2	0'-9" x 1'-3"



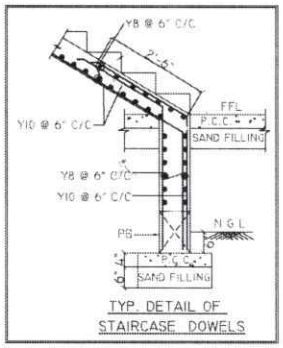
TYP. LAP SPLICE IN BEAM



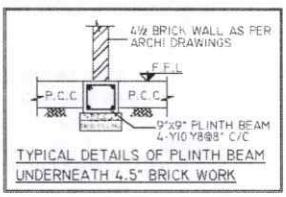
TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION (VARY DEPTH)



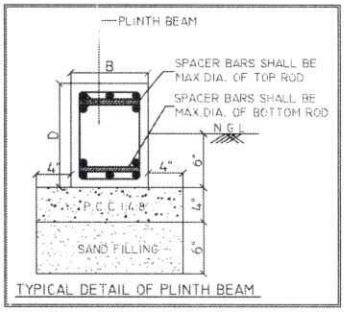
TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION



TYP. DETAIL OF STAIRCASE DOWELS



TYPICAL DETAILS OF PLINTH BEAM UNDERNEATH 4.5" BRICK WORK



TYPICAL DETAIL OF PLINTH BEAM

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 COLUMN/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 1.3 TIMES LAP LENGTH OF THE BAR FOR TENSION & COMPRESSION MEMBERS

iii) DEVELOPMENT LENGTH (LD) SHALL BE AS PER (SP 34-1999) TABLE BELOW

A) DEVELOPMENT LENGTH FOR COLUMN BARS -40D

B) DEVELOPMENT LENGTH FOR BEAM BARS -45D

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

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

EXCAVATION AND BACKFILL

i) BACKFILL FOR FOUNDATIONS AND PITS SHALL BE PLACED EVENLY 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 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 LEVELS WITH MASS CONCRETE GRADE M10. ALSO WHEREVER EXCAVATION OCCURS BELOW THE FOUNDATION LEVEL STATED ON THE DESIGN DRAWING THE RESULTING VOID SHALL BE BACK FILLED WITH MASS CONCRETE GRADE-10.

iii) BEFORE CASTING FOUNDATIONS, ANY IMMEDIATE OR ADJACENT AREAS OF DISTURBED OR SOFT SOIL MUST BE REMOVED AND REPLACED WITH MASS CONCRETE OF GRADE 10.

iv) A LAYER OF BLINDING CONCRETE 100 mm THICK SHALL BE PLACED UNDER ALL FOUNDATIONS. BLINDING 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) FOOTING = 2" B) COLUMN = 1"
5. THIS DRG. READ IN CONJECTION WITH ARCH DRGS.
6. COLUMNS AND FOOTINGS ARE DESIGNED FOR G+3 FLOOR LOADS AND SBC OF THE SOIL IS 200KN/SQM. @ 6'-6" 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
	ISSUE FOR CONSTRUCTION	M.R	R.M	09.06.21

PROJECT :-

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING (STILT+03) AT S.NO :212/2, MADHA NAGAR MAIN ROAD, MADHANANDHAPURAM VILLAGE, SRIPERUMBUDUR TALUK, KANCHEEPURAM DISTRICT, GREATER CHENNAI CORPORATION, DIVISION :156, ZONE:12.

DRAWING TITLE :-

LAYOUT & R.C DETAILS OF PLINTH BEAM

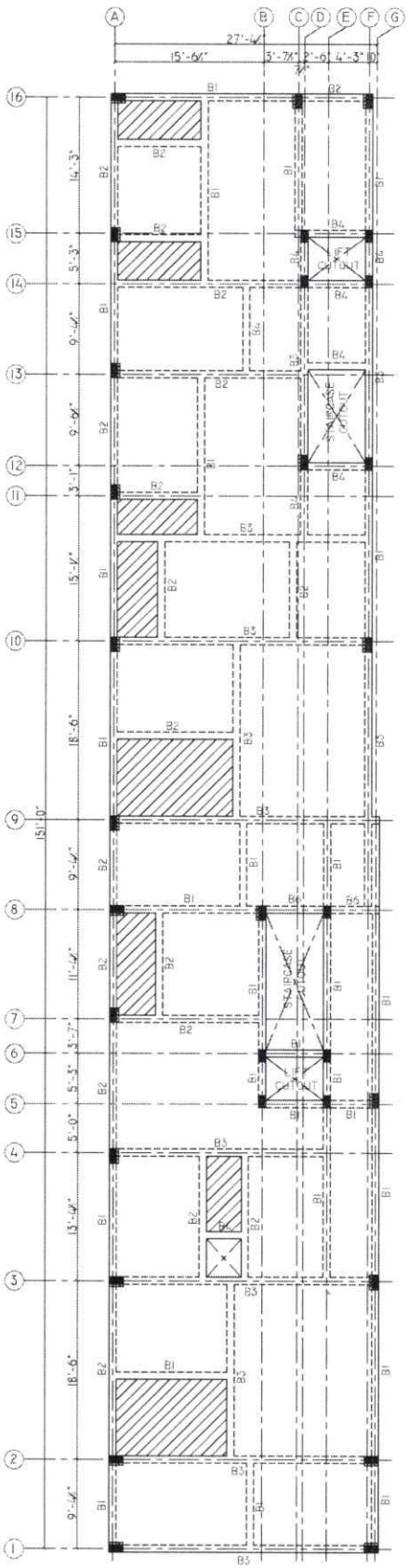
DATE	SCALE	JOB.NO	DRG.NO
09.06.21	1" : 10'	----------	003

ARCHITECT / CONSULTANTS :-

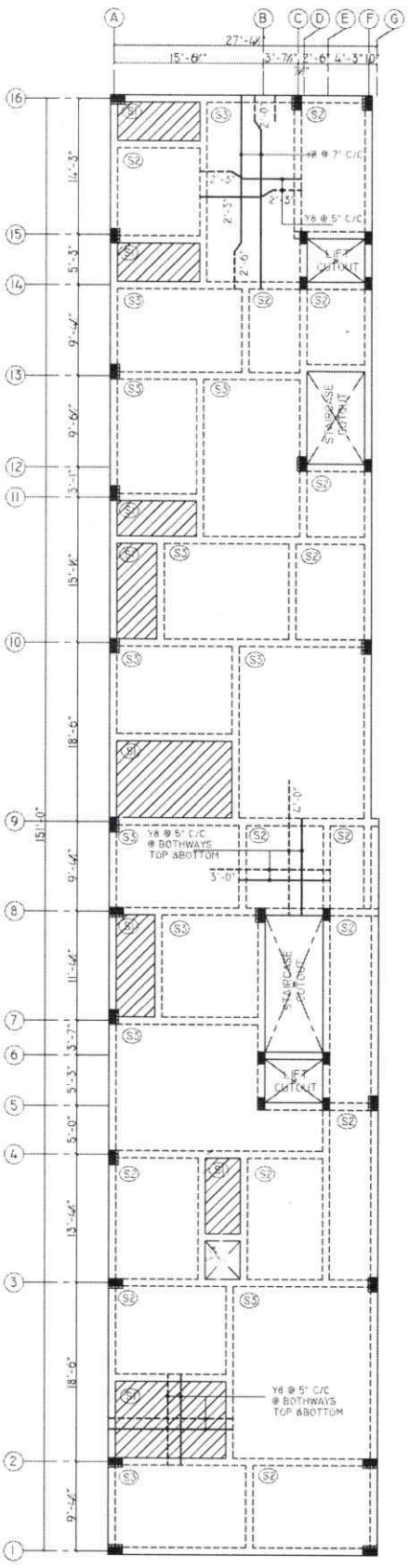
STRUCTURAL CONSULTANTS :-

AURA ENGINEERING CONSULTANTS
NO:13/27, 66th STREET
R.V NAGAR, ASHOK NAGAR,CHENNAI- 600 083.
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http://auraengineers.co.in/
aura
Engineering Consultants

A3



LAYOUT OF STILT FLOOR ROOF BEAM & SLAB



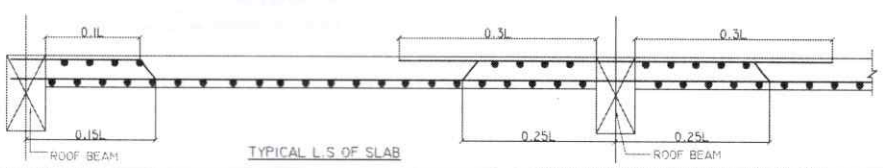
R.C LAYOUT OF STILT FLOOR ROOF BEAM & SLAB

NOTE:

SLAB SUNK BY 0'-10"

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

FOR BEAM REINFORCEMENT DETAILS REFER DWG NO : 005



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 11.3.1 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 4.50M ----------7 DAYS.
ii) SPANNING OVER 4.50M ----------14 DAYS.

E. BOTTOM PROPS TO BEAMS
i) SPANNING UP TO 6.00M ----------14 DAYS.
ii) SPANNING OVER 6.00M ----------21DAYS.

LAP JOINTS FOR REINFORCEMENT BARS:

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

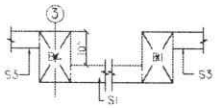
II). LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.3 TIMES THE LAP LENGTH OF THE BAR FOR TENSION AND COMPRESSION MEMBERS.

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



SECTION "1-1"

SLAB SCHEDULE		
SL.NO	NAME	THICK
01	S1	5" THK.
02	S2	5" THK.
03	S3	5" THK.

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

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) 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
	ISSUE FOR CONSTRUCTION	M.R	R.M	09.06.21

PROJECT :-

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING (STILT+03) AT S.NO :212/2, MADHA NAGAR MAIN ROAD, MADHANANDHAPURAM VILLAGE, SRIPERUMBUDUR TALUK, KANCHEEPURAM DISTRICT, GREATER CHENNAI CORPORATION, DIVISION :156, ZONE:12.

DRAWING TITLE :-

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

DATE	SCALE	JOB.NO	DRG NO
09.06.21	1" : 10'	---------	004

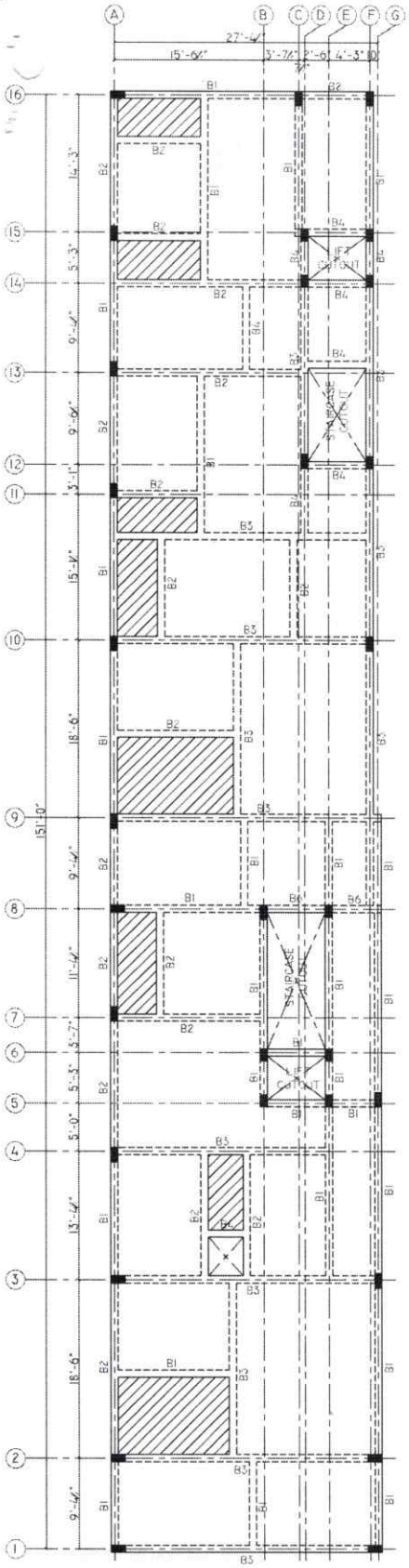
ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

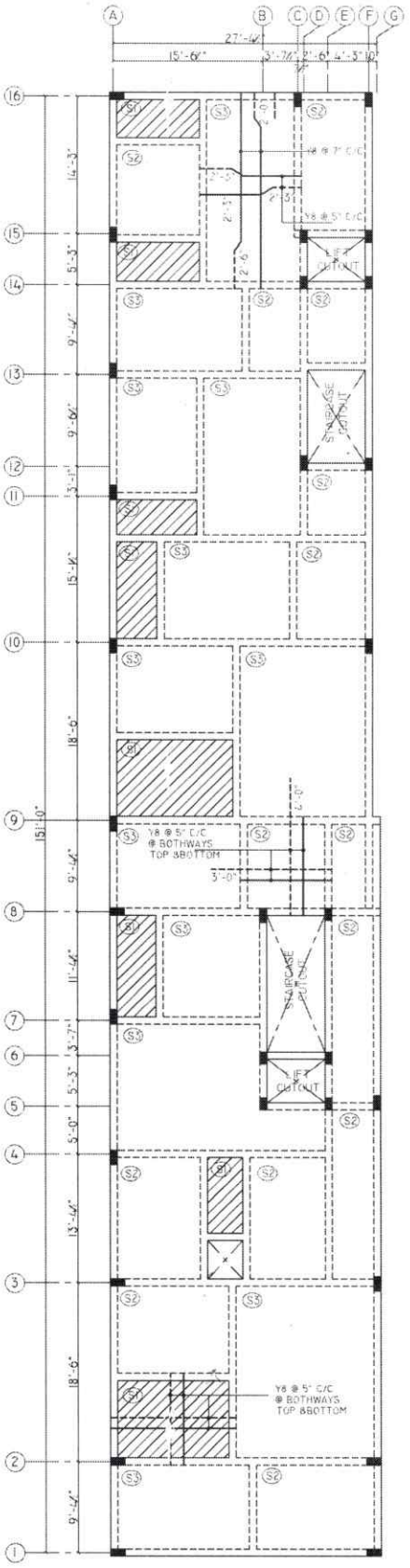
AURA ENGINEERING CONSULTANTS
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Fixed Line :- 044 4859 7100
projects.auraengg@gmail.com
projects@auraengineers.co.in
http://auraengineers.co.in/
aura Engineering Consultants

A3

147



LAYOUT OF TYPICAL FLOOR ROOF BEAM & SLAB



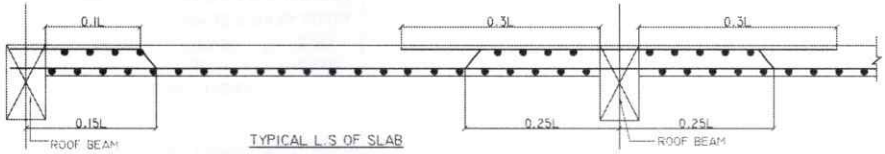
R.C LAYOUT OF TYPICAL FLOOR ROOF BEAM & SLAB

NOTE:

SLAB SUNK BY 0'-10"

PROVIDE Y8 @ 6" C/C AS DISTRIBUTORS WHERE EVER REQUIRED

FOR BEAM REINFORCEMENT DETAILS REFER DWG.NO : 007



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 11.3.1 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 4.5MM ..... 7 DAYS.
- ii) SPANNING OVER 4.5MM ..... 14 DAYS.

E. BOTTOM PROPS TO BEAMS
- i) SPANNING UP TO 6.00M ..... 14 DAYS.
- ii) SPANNING OVER 6.00M ..... 21DAYS.

LAP JOINTS FOR REINFORCEMENT BARS:

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

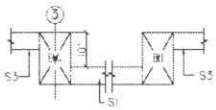
II). LAPS SHALL BE STAGGERED WITH A MINIMUM CENTRE TO CENTRE DISTANCE OF 1.5 TIMES THE LAP LENGTH OF THE BAR FOR TENSION AND COMPRESSION MEMBERS.

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



SECTION "1-1"

SLAB SCHEDULE

SL.NO	NAME	THICK
01	S1	5" THK.
02	S2	5" THK.
03	S3	5" THK.

BEAM SCHEDULE

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

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) BEAM = 1" B) SLAB = 3/4"
5. THIS DRG. READ IN CONJECTION WITH ARCH.DRGS.
6. STRUCTURAL ENGINEER RESPONSIBILITY IS LIMITED TO DESIGN & ISSUE OF STRUCTURAL DRAWING ONLY.
7. ONUS OF CONSTRUCTION LIES WITH CONTRACTOR/OWNER

REV	DESCRIPTIONS	DRN	CHK	DATE
	ISSUE FOR CONSTRUCTION	M.R	R.M	09.06.21

PROJECT :-

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING (STILT+03) AT S.NO :212/2, MADHA NAGAR MAIN ROAD, MADHANANDHAPURAM VILLAGE, SRIPERUMBUDUR TALUK, KANCHEEPURAM DISTRICT, GREATER CHENNAI CORPORATION, DIVISION :156, ZONE:12.

DRAWING TITLE :-

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

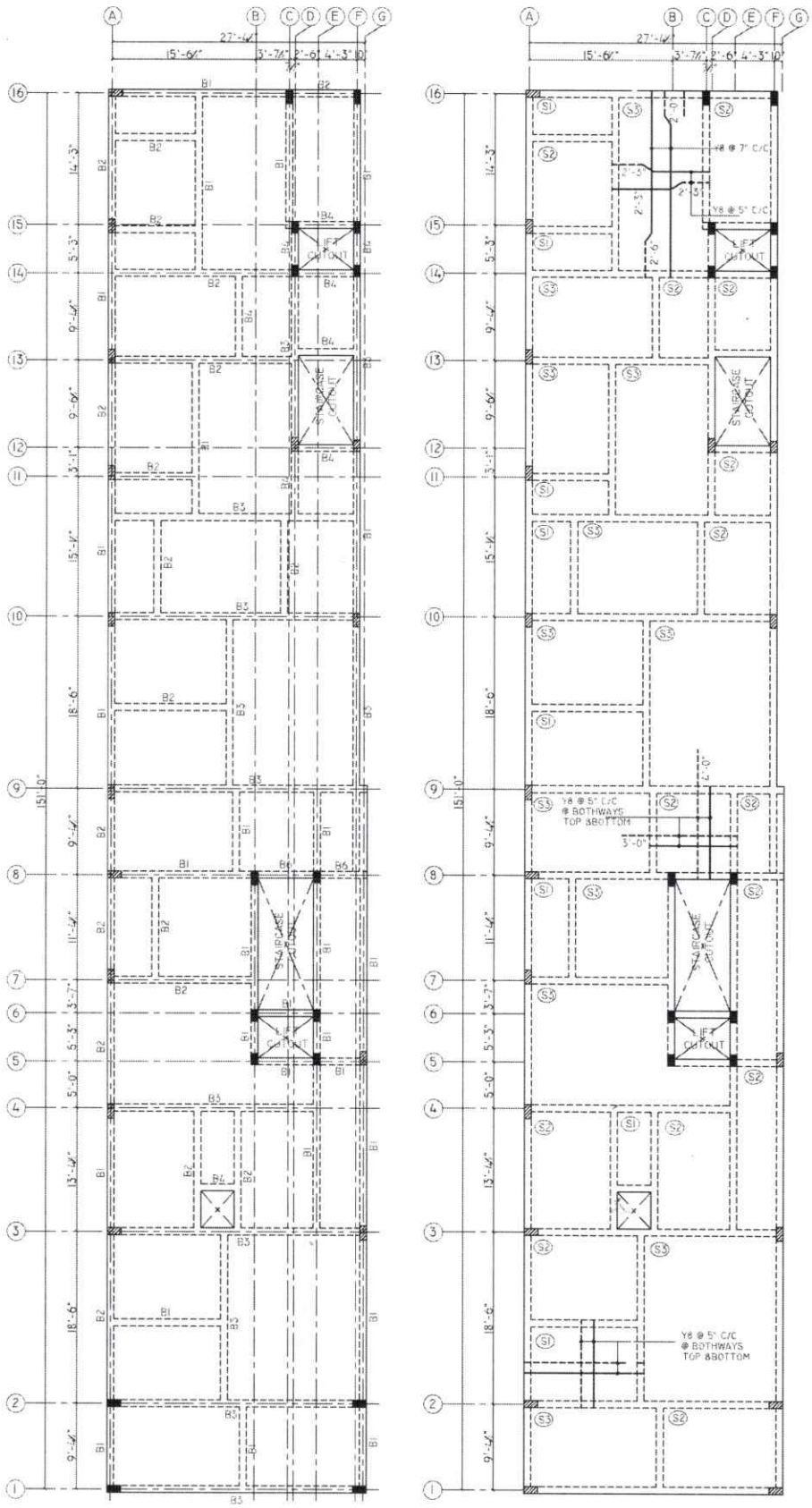
DATE	SCALE	JOB.NO	DRG.NO
09.06.21	1" : 10'	.....	006

ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

AURA ENGINEERING CONSULTANTS
NO:13/27, 66th STREET
R.V NAGAR, ASHOK NAGAR,CHENNAI- 600 083.
Fixed 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 TERRACE FLOOR BEAM & SLAB

R.C LAYOUT OF TERRACE FLOOR BEAM & 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 11.3.1 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 4.50M ----------7 DAYS
ii) SPANNING OVER 4.50M ----------14 DAYS

E. BOTTOM PROPS TO BEAMS
i) SPANNING UP TO 6.00M ----------14 DAYS
ii) SPANNING OVER 6.00M ----------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

SLAB SCHEDULE

SL.NO	NAME	THICK
01	S1	5" THK.
02	S2	5" THK.
03	S3	5" THK.

BEAM SCHEDULE

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

GENERAL NOTES:

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2. CONCRETE GRADE SHALL BE M25 CONFIRMING TO IS 456:2000
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4. CLEAR COVER FOR REINFORCEMENT
   A) BEAM = 1" B) SLAB = 3/4"
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REV	DESCRIPTIONS	DRN	CHK	DATE
	ISSUE FOR CONSTRUCTION	M.R	R.M	09.06.21

PROJECT :-

PROPOSED CONSTRUCTION OF RESIDENTIAL BUILDING (STILT+03) AT S.NO :212/2, MADHA NAGAR MAIN ROAD, MADHANANDHAPURAM VILLAGE, SRIPERUMBUDUR TALUK, KANCHEEPURAM DISTRICT, GREATER CHENNAI CORPORATION, DIVISION :156, ZONE:12.

DRAWING TITLE :-

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

DATE	SCALE	JOB.NO	DRG.NO
09.06.21	1" : 10'	---------	006

ARCHITECT / CONSULTANTS :-

STRUCTURAL CONSULTANTS :-

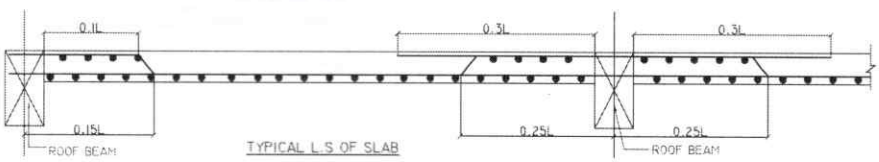
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NOTE:

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

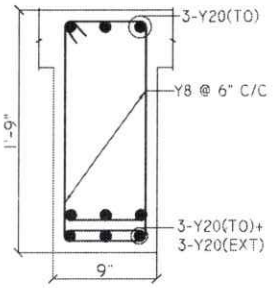
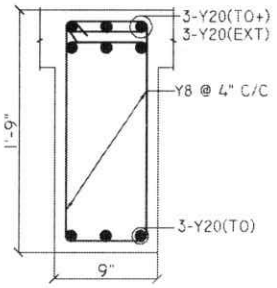
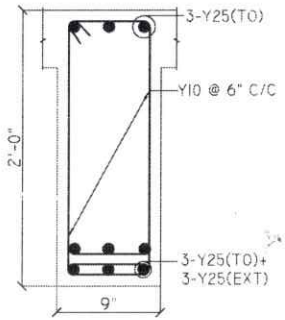
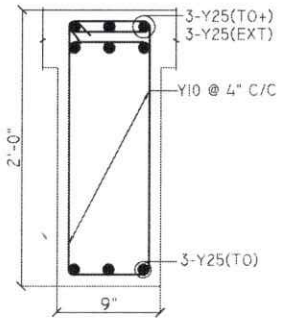
FOR BEAM REINFORCEMENT DETAILS REFER DWG.NO : 009

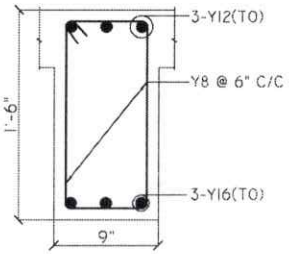


TYPICAL L.S OF SLAB

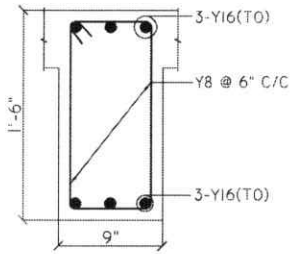
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BEAM REINFORCEMENTS

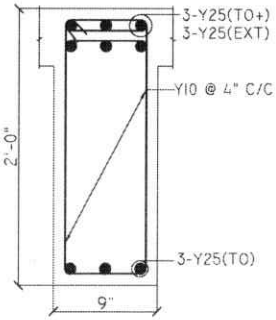
NAME	MID SPAN	END SUPPORT
B1 (0'-9" X 1'-9")		
B3 (0'-9" X 2'-0")		



C.S. OF BEAM "B2"
(0'-9" X 1'-6")



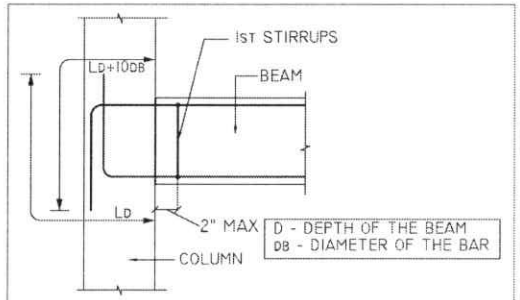
C.S. OF BEAM "B4"
(0'-9" X 1'-6")



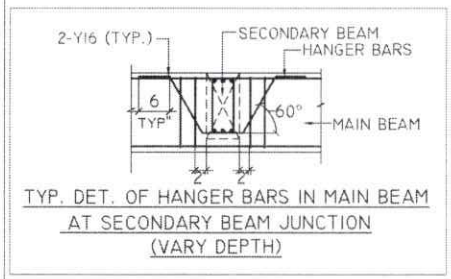
C.S. OF BEAM "B6"
(0'-9" x 2'-0")

BEAM SCHEDULE

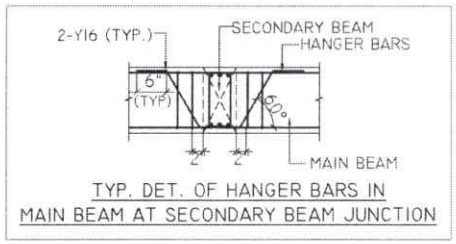
SL.NO	NAME	SIZE
01	B1	0'-9" x 1'-6"
02	B2	0'-9" x 1'-6"
03	B3	0'-9" x 2'-0"
04	B4	0'-9" x 1'-6"
04	B4	0'-9" x 2'-0"



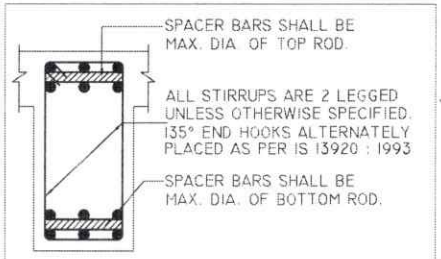
TYP. EXTERNAL JOINT DETAIL AT BEAM-COLUMN JUNCTION



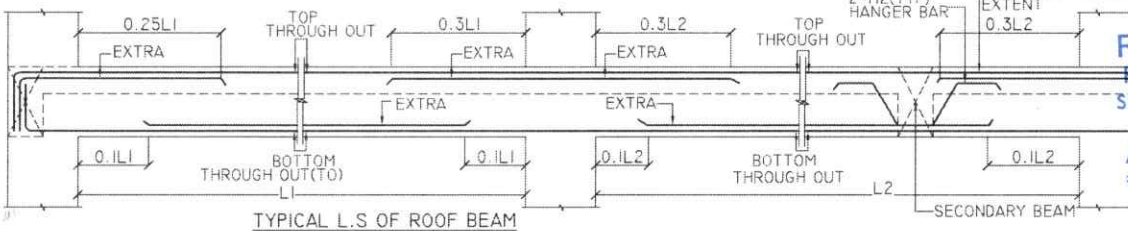
TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION (VARY DEPTH)



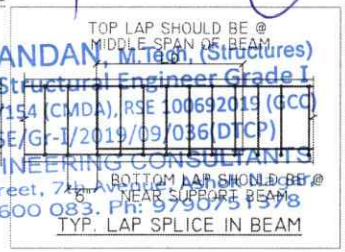
TYP. DET. OF HANGER BARS IN MAIN BEAM AT SECONDARY BEAM JUNCTION



TYP. DETAIL



TYPICAL L.S OF ROOF BEAM



TYP. LAP SPLICE IN BEAM

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REV.	DESCRIPTIONS	DRN	CHK	DATE
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PROJECT :-

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DRAWING TITLE :-

R.C DETAILS OF BEAMS (ALL FLOORS)

DATE	SCALE	JOB.NO	DRG.NO
09.06.21	1" : 9'	---	005

ARCHITECT / CONSULTANTS :-

R. MANIKANDAN, M.Tech, (Structures)
Registered Structural Engineer Grade I
SE/GR-I/19/06/154 (CMDA), RSE 100692019 (GCC)
CGLRGN/SE/Gr-I/2019/09/036(DTCP)
AURA ENGINEERING CONSULTANTS
#8, 50th Street, 7th Avenue, Ashok Nagar,
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