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DHANAA SUNDARARAJULU AND ASSOCIATES

Structural Engineering Consultant

DSA

Er. G. DHANA LAKSHMI, CEng.,
M.Tech(Struct.,)B.Tech(Civil), AMIA Struct E, AMIE,
Registered Structural Engineer- (CMDA, GCC,)

Plot No.1&2, Kabilar Street, Senthil Nagar,
Thirumullaivoyal, Chennai – 600 062.
Mob.: 98406 22035, Email: dhanastructural@gmail.com
dhanaasassociates@gmail.com

CERTIFICATE FOR STRUCTURAL DESIGN SUFFICIENCY & SAFE & SOUND

With respect to the Proposed Construction of Residential Non - High Rise Apartment, Stilt + 3 Floors in site Sivagangai District, Town and Country Planning Office – Sivagangai and Karaikudi Municipal Local Planning Area Ward No.3, Block No.1, T.S.No.464, Jawhar Street, New Town Karaikudi, We certify that the designs are being done after detailed Soil Investigation and the Design is being done to meet all the Structural Stability requirements as stipulated in IS 456, IS 875 and other relevant codes and it is Structurally safe and sound.

V. EZHILARASAN, ME,M.S.(Valu)
Govt. Approved Valuer, Chartered Engineer
Registered Engineer Class-I in CMDA, GCC & DTCP
Flat No.14/3, First Floor, Welcome Colony,
Ambattur Estate Road, Anna Nagar West Ext,
Chennai - 600101, Cell : 9444017383
E-mail : ezhilenterprises@gmail.com

STRUCTURAL STABILITY CERTIFICATE

Proposed Construction of a Residential Building which is situated in the site or plot of land, T.S.No.464, Jawhar Street, Karaikudi New Town, Karaikudi, Karaikudi Municipality Ward No.3, Block No.1, Sivagangai District

The Proposed Building referred to above is a framed structure with Stilt + Three Floors only. The Structural Design and Drawing for Building are being prepared by us conforming to the relevant Bureau of Indian Standard Viz. IS 456: 2000 for Plain and Reinforced Concrete, IS 875 (Part II) – 1987 for imposed loads.

We certified that the building when constructed according to our Structural Designs and Drawings will be structurally safe and fit for occupation.

1. The least Dimension of the Column is 230 mm for Lift.
2. The least Dimension of the Column is 300 mm wherever necessary as per design requirement.
3. The Minimum Grade of Concrete is M 25
4. The Minimum Grade of steel is Fe -500

PREAMBLE:

1. I hereby certify that the Structural Design Calculation is done for Critical Footings, Columns, Beams and Slabs for the Building.
2. The usage of the building is for Residential Purpose.
3. The building is designed for Stilt + Three Floors Only.
4. The Super Structure is built with 230 mm thick outer walls and 115 mm thick inner walls.

V. EZHILARASAN, M.E., M.I.S. (Valu)
Civil Engineer (Retd.) Govt. of Tamil Nadu
Registered Electrical Contractor (Lic. No. 1/2 of 1987-88)
Flat No. 1, 1, 2nd Floor, 10th Street,
Ambattur Estate Road, Padi,
Chennai - 600 101, Cell : 9444
E-mail : ezhilarasan_

REPORT FOR THE PROPOSED CONSTRUCTION OF A RESIDENTIAL BUILDING COMPRISED IN T.S. No.464, JAWHAR STREET, KARAIKUDI NEW TOWN, KARAIKUDI, KARAIKUDI MUNICIPALITY WARD No.3, BLOCK No.1, SIVAGANGAI DISTRICT.

INTRODUCTION

The Report has been prepared for the Proposed Construction of a Residential Building at Plot T.S.No.464, Jawhar Street, Karaikudi New Town, Karaikudi, Karaikudi Municipality Ward No.3, Block No.1, Sivagangai District

This Report deals with the Detailed Analysis and Design of a Residential Building.

GEOMETRY :

The Proposed Building is a R.C.C Framed Structure. The building consists of Stilt + Three Floors only. The usage of the building is enabled for Residential purpose.

MATERIAL :

Reinforced Cement Concrete :

Grade of Concrete - M 25 (Deign Mix) for Footings and Columns.

Grade of Concrete - M 25 (Deign Mix) for RCC Beams, Slabs, etc.,

Grade of steel – Fe 500

LOADINGS

a. **Dead Load :**

Unit weight of Concrete	=	25 kN/m^3
Unit weight of Brick Work	=	20 kN/m^3
Unit weight of Aerocon Block	=	8.0 kN/m^3
Weathering Course	=	1.5 kN/m^2

b. Live Load :

Live Load on Floor = 2.00 kN/m^2

c. Seismic Load:

Seismic loads are considered as per IS 1893 2002.

Seismic Zone	- II
Zone Factor	- 0.10
Importance Factor	- 1
Soil Type	- Medium Type II
Response Reduction factor	- 1.5

All other Dead & Live loads are given as gravity loads. The seismic detailing of reinforcement is done as per IS 456-2000, IS 13920:1993 and SP 34. The entire structure is analyzed for each load and Load combinations.

d. Load Combinations :

1. 1.5 Dead Load + 1.5 Live Load
2. 0.9 Dead Load + 1.5 Earthquake X
3. 0.9 Dead Load + 1.5 Earthquake -X
4. 0.9 Dead Load + 1.5 Earthquake Z
5. 0.9 Dead Load + 1.5 Earthquake -Z
6. 0.9 Dead Load + 1.5 Windload X
7. 0.9 Dead Load + 1.5 Windload -X
8. 0.9 Dead Load + 1.5 Windload Z
9. 0.9 Dead Load + 1.5 Windload -Z

c. **Loads due to Slab :**

Self Weight of Slab	-	(0.15 * 2500)	-	375 kg / sq m
Live Load	-		-	200 kg / sq m
Floor Finish	-		-	100 kg / sq m
Unforseen Load	-		-	25 kg / sq m
Total Load	-		-	**700 kg / sq m**

ANALYSIS

The entire analysis is carried out using finite element method using the program of Staad Pro package for a Residential building as per approval drawing. The beams and columns are modeled as frame elements and the slabs are modeled as shell element. The columns are assumed to be Fixed at the base. Seismic Analysis is carried out for seismic forces corresponding to Zone II of seismic zones of India maps per IS 1893 -2002. Auto generation of lateral loads is done by the program itself for the corresponding seismic factors.

LOAD CASES :

1. Dead Load (DL) : Loads from Self-weight of Slab, Beams, Walls, Staircase and Water Tank are taken as Dead Load of the structure.

2. Live Load (LL) : The Live Load of this structure is calculated as per IS:875 (Part 2) for all types of Residential Building should be taken as 2 kn/sqm.

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Ambattur Estate Road, Annu Nagar West Ext,
Chennai - 600 101, Cell : 9[illegible]53
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COVER FOR REINFORCEMENT:

Cover for reinforcement is considered as per table 16A of NBC, for a fire resistance of 2 hours

1. Footing = 50 mm
2. Columns = 40 mm
3. Roof Beams = 30 mm
4. Roof Slabs = 20 mm

Design for Stilt + Three Floors Only.

CODES REFERRED :

- I.S. 875 - 1987 CODE OF PRACTICES for design loads (Part 1,2 & 3)
- I.S. 456 - 2000 & SP – 16 CODES OF PRACTICES for Plain and Reinforced Concrete
- I.S. 1786 - 1985 CODE PRACTICES specified for high strength deformed steel bars & wires for concrete reinforcement.
- IS 13920:1993 CODE OF PRACTICES for Ductile Detailing.
- I.S. 1904 - 1986 CODE OF PRACTICES for design of construction of foundation in soils.

DESIGN CONCEPT :

- 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 465-2000
- SP-16, IS : 13920, IS 4326-1993, SP-34 and IS: 2911(Part1/Sec2)
- 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 Hours.

V. EZHILA
Govt. Approved
Registered
Flat
Annai
Chennai
Email

DHANAA SUNDARARAJULU AND ASSOCIATES

Structural Engineering Consultant

DSA

Er. G. DHANA LAKSHMI, CEng.,
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dhanaasassociates@gmail.com

STATEMENT ACCOMPANYING FORM –"A"

1.	Applicant	: Mr.N.Sabarathinam
2.	Door No./S.No of the building	: T.S.No.464,Jawahar Street,
3.	Name &Location: Street/Ward No.	: Karaikudi Municipality Ward No.3, Karaikudi New Town, Karaikudi.
4.	Year of Construction	: Proposed Construction
5.	Approximate Cost of construction as per Current rates	: Rs.4,37,00,000/-
6.	Purpose for which the Building is Being used Or proposed to be used	: Enabled for residential purpose
7.	Purpose for which the Building has (in there to) been used	: Enabled for residential purpose

V. E.DHANA LAKSHMI, M.E.,M.I.E (India)
Govt. Approved Valuer, Town and Country Planning
Registered Engineer CMDA/DTCP/GCC
Flat No.14/3, Tirupathi Apartments, Ivory
Ambattur Estate Post, Ambattur Area, Chennai - 600101, Cell: 9444014303
E-mail : ezhilenterprises@gmail.com

8. Details of Construction of the Building (particulars)
of the foundation, soil Specification of the various parts as under.

(i)	Foundation	: Isolated Column/ Combined Footing
(ii)	Basement	: Yes, R.C.C. Framed Structure with Brick Masonry 1: 5
(iii)	Superstructure	: R.C.C. Framed Structure with Brick Masonry
(iv)	Floor and Roof are to be given	: Beams & Slabs are provided
(v)	Period for which the license required	: Three Years (Proposed Building) **(From 21.03.2024 to 20.03.2027)**

Date:21.03.2024

Signature of the Engineer

V. EZHILARASAN, ME,M.S.(Valu)
Govt. Approved Valuer, Chartered Engineer
Registered Engineer Class-I in CMDA, GCC & DTCP
Flat No 14/3, First Floor, Welcome Colony,
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9.(a) "CERTIFIED that no addition or alteration has been made to the existing or portion of a building for which this application has been made. I undertake to obtain a fresh license in case any addition of alteration is made to the existing or portion of building. I also undertake to obtain fresh license if the purpose for which the license was granted for the use of the building or a portion of the building originally is changed or altered subsequently.

Date:

Signature of the Owner of the Building

DHANAA SUNDARARAJULU AND ASSOCIATES

Structural Engineering Consultant

DSA

Er. G. DHANA LAKSHMI, CEng.,
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FORM - B

[Form of certificate of structural soundness under sub-section(4) of the Tamil Nadu Public Buildings(Licensing) Act,1965 (Tamil Nadu Act XIII of 1965) referred to in rule 4 of the Tamil Nadu Public Buildings (Licensing) Rules,1966.]

I certified that I have gone through the Plan of the Proposed Additional & Alteration of the Public building mentioned in the statement and furnish below its Salient Technical Features.

STATEMENT TO ACCOMPANY THE CERTIFICATE OF STRUCTURAL SOUNDNESS

1.	Location of the Building	:	T.S.No.464,Jawahar Street, Karaikudi Municipality Ward No.3, Karaikudi New Town, Karaikudi.
2.	Age of the Building	:	Proposed Building
3.	Purpose for which the Building is to be proposed	:	Proposed Construction of a Residential Building and it is Enable for Residential Purpose.
4.	The Period for which the building will be structural sound	:	60 Years
5.	Remarks	:	Designed as per latest design codes of IS-456 and IS – 875 are followed with SP – 16 Design Aid Books for the purpose of calculations. It is designed by us. It will be safe and stable against all possible Dead loads, live loads and other combination of loads as per IS Code, the Structure is intended to carry.

V. EZHILARASAN
Civil Engineer
Registered Structural Engineer
Firka No.
Ambattur Region
Chennai District
Encadrement

DHANAA SUNDARARAJULU AND ASSOCIATES

Structural Engineering Consultant

DSA

Er. G. DHANA LAKSHMI, CEng.,
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dhanaasassociates@gmail.com

FORM – C

[Form of Opinion under sub-section I of Section 5 of the Tamil Nadu Public Buildings (Licensing) Act,1965 (Tamil Nadu Act XIII of 1965) referred to in rule 5 of the Tamil Nadu Public Buildings (Licensing) Rules,1966.]

I have gone through the Plan of the Proposed Construction of a Residential Building specified in the statement below and I have satisfied myself that the Proposed Building is Structurally Sound if it is Constructed as per Structural Design and Plan prepared and supervised by the Qualified Structural Engineer and to be used as Public Building for the purpose noted in the statement, the structural – Soundness of the Building has been verified, taking into account, the loading as per the latest Indian Standard 875, I am therefore the opinion that the License may be granted for the period from **21.03.2024 to 20.03.2027 (Three Years)** inclusive.

Signature of the Engineer

V. EZHILARASAN, ME.M.S (Valu)
Govt. Approved Valuer, Chartered Engineer
Registered Engineer Class-I in CMDA, DTCP
Flat No.14/3, First Floor, Vellore [illegible],
Ambattur Estate Road, Anna Nagar, Chennai,
Chennai - 600101, Cell : [illegible]
E-mail : ezhilenterprises@gmail.com

1. FOUNDATION :

a)	Depth below Ground Level	:	2.00 m below Natural Ground Level
b)	Nature of soil met with at foundation level	:	Soft Disintegrated rock
c)	Pressure at Foundation	:	Vide Soil Report From M/s. Geomatrix Consultancy Report No. 71/RB/GMC/23-24 Dt.22.06.2023
d)	Probable safe bearing capacity of the Strata met with foundation		

e) Safe Bearing Capacity of the soil met with at 2.00 m : 26 t / sq m

f) Load to be transmitted by column to foundation : **370 t (Critical)**

2. SUPERSTRUCTURES :

I)	Maximum Compressive stress in the most Critical Section of masonry	:	5 kg/sq.cm
	Permissible maximum compressive stress in Masonry (BW in CM 1:5, 23cm thick), for (the crushing strength of 80 kg / cm^2) as per Table 4 of IS 1905		7 kg/sq.cm
II.	Maximum Compressive stress in the most Critical Section of concrete for M 25 Grade	:	a) Bending : 6 N/mm^2 (60 kg/cm^2) b) Direct : 4 N/mm^2 (40 kg/cm^2)
	Maximum Permissible compressive stress for concrete M25 Grade as per Table 21 of IS 456-2000	:	a) Bending : 8.5 N/mm^2 (85 kg/cm^2) b) Direct : 6 N/mm^2 (60 kg/cm^2)

The Structural Soundness of the Proposed Construction of a Residential Building loading as per latest Indian Standard -875 (Latest Version and other relevant Indian Standard Code of Practice and I declare that the Proposed Building is Structurally Sound if it is constructed as per Plan and Structural Design prepared by the Qualified Structural Engineer and his regular supervision and to be used as Public Building for the purpose noted in the statement.

A License may be granted for the period from **21.03.2024 to 20.03.2027 (Three Years)** inclusive.

Signature of the Engineer

V. EZHILARASAN, M.E.,M.I.S (Valu)
Govt. Approved Valu
Registered Engineer Class
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Ambattur Estate Road,
Chennai - 600 101, Cell
E-mail : ezhilcivilengineer

STATEMENT TO ACCOMPANY THE CERTIFICATE OF STRUCTURAL SOUNDNESS

Location of the building, Door No. Street Name & Name of the place (1)	Age of the building (2)	Value of the building in Rs. (3)	No. of Storeys (4)	Short description of Structure, Steel, R.C.C framed or Load Bearing Masonry (5)
THE PROPOSED CONSTRUCTION OF STILT FLOOR + FIRST FLOOR+ SECOND FLOOR +THIRD FLOOR OF RESIDENTIAL BUILDING AT T.S.NO. 464, JAWHAR STREET, KARAIKUDI NEW TOWN, KARAIKUDI, KARAIKUDI MUNICIPALITY WARD NO.3, BLOCK NO.1, SIVAGANGAI DISTRICT	**Proposed**	**4,37,00,000**	**Stilt+ Three Floors only**	**RCC Structure with M25 concrete.**

Purpose for which the building is certified For use (6)	The period for which the building will be structurally sound (7)	No. of persons accommodated (8)	Remarks (9)
Enabled for Residential Purpose	**From 21.03.2024 to 20.03.2027 (Three Years)**	12 Dwelling units	Stability should be checked up once in every Three Years

Signature of the Engineer / Designation

V. EZHILARASAN, ME,M.S.(Valu)
Govt. Approved Valuer, Chartered Engineer
Registered Engineer Class-I in CMDA, GCC & DTCP
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FORM E

Form of report to be made to the competent authority by inspecting authorities or officers appointed under other act under section 25 of the Madras Public Building Licensing) Act 1965(Madras act 13 of 1965) referred to in rule 7 of the Madras Public Buildings Licensing rule 1966.

1 Name and designation of inspecting Authority Or officer appointed or Having Jurisdiction Under any other Act or law	:	Er.V.Ezhilarasan, B.Tech Civil, M.Tech (Struct.,) Chartered Engineer Professional Engineer Registered Struct., Er - CMDA Registered Struct., Er - GCC Registered Struct., Er - DTCP Approved by Collector of Chennai – for issue of stability certificate Government Registered Valuer
2. Location of the building inspected D.No / Street / locality /Municipality / Panchayat / Panchayat Union / Township / Cantonment	:	The Proposed Construction Stilt Floor + First Floor + Second Floor + Third Floor of Residential Building At T.S.No. 464, Jawhar Street, Karaikudi New Town, Karaikudi, Karaikudi Municipality Ward No.3, Block No.1, Sivagangai District.
3. Purpose for which the building is used	:	Enabled for Residential Building
4. Nature of defects noticed	:	None
5. Suggestion for rectifying defects	:	Not applicable
6. If in a dangerous condition Immediate action Recommended be taken	:	Not applicable

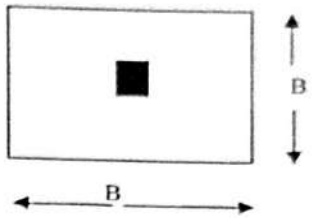
Date: 21.03.2024

Signature of Inspecting Authority / Officer
Appointed or having jurisdiction



1. DESIGN OF REINFORCED ISOLATED SQUARE FOOTING

COLUMN SIZE a =	0.30	m	Enter the value for Short Side Column Dimension
b =	0.90	m	Enter the value for long Side Column Dimension
SBC OF SOIL w =	250	KN/ m^2	
AXIAL LOAD P =	3700	KN	Enter value for Axial load
10 % AXIAL LOAD =	370	KN	
TOTAL LOAD Pu =	4070	KN	
AREA REQUIRED A =	16.28	m^2	
SIZE OF FOOTING REQUIRED B =	4.03	m	
LET SIZE OF FOOTING B =	4.03	m	Enter value for breadth
AREA PROVIDED A=	16.28	m^2	



CHECK FOR SOIL PRESSURE = P/A = 227.27273 KN/ m^2

Hence it is Safe

MOMENT CALCULATION

Shorter side length B = 1.5674241 m

Longer side length L = 1.8674241 m

Moment at critical section,Mxx= 594.42149 KNm

Depth required d = 847.29001 mm

Provide overall depth D = 850 Enter valve for Depth

Say Overall Depth D = 850 mm

Effective depth d = 800 mm

REINFORCEMENT

M/bd^2 = 0.93

% Ast required pt = 0.229 Enter valve from Table3 of IS 456 - 1978

V. EZHILARASAN, M.E., M.S. (Valuer)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V/2/30607/2022
Ae Chartered Engineer, Valuer

2. DESIGN OF REINFORCED CONCRETE COLUMN

Column size = 305 mm x 900 mm (or) 12" x 3'-0"

Grade of concrete = M 25

Grade of steel = Fe 500

Column Load from Staad Analysis,

P_u = 370 t (or) 3700 kn

M_{ux} = -1.808 knm

M_{uz} = -5.617 knm

d^1/D = 40 / 305 = 0.13 (say 0.20)

$$\frac{P_u}{Fck \times b \times d} = \frac{3700 \times 10^3}{25 \times 305 \times 900} = 0.539$$

$$\frac{M_{uz}}{Fck \times b \times d^2} = \frac{5.617 \times 10^6}{25 \times 305 \times (900)^2} = 0.90945 \times 10^{-3}$$

As per reference from chart 50, from SP 16 for percentage of steel.

Therefore, Percentage of steel, P = 3.80%

Area of steel, Ast = 10260 mm^2

Provide 20mm diameter bars of 25 Nos.

Lateral Ties :

Spacing of the lateral ties should be minimum of the following:

a. Least lateral dimension = 305 mm

b. 16 d = 16 x 25 = 400 mm

Therefore, Provide lateral ties Y 10 @ 130 mm c/c

Result :

Size or the Column	:	305 mm x 900 mm
Longitudinal Main Reinforcement	:	25 Nos. Of 20 mm Diameter Rods
Ties	:	Y 10 @ 130 mm c/c (3 Ties+2Links)

V. EZHILARASAN, M.E., M.S (Valu)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Valuer

3. DESIGN OF REINFORCED CONCRETE ROOF BEAM

Sl. No	Decription		Nos	Length	Breadth	Depth	Density	Total Kg	Remarks
	S/W of Beam	1.00	1.00	7.77	0.23	0.6	2500	2681	
	B/w of load	1.00	1.00	7.77	0.12	3.05	1900	5403	
	R/S of load	1.00	0.50	3.78	1.89	-	1160	4153	
		1.00	0.50	4.00	2.00	-	700	2800	
		1.00	0.50	2.67	1.33	-	700	1245	
		1.00	0.50	1.60	0.80	-	700	448	
		1.00	0.50	3.62	1.81	-	700	2292	
	Total							**19023**	Kg
	Point Load - 1								
	S/W of Beam	1.00	1.00	5.41	0.23	0.38	2500	1182	
	B/w of load	1.00	1.00	5.41	0.23	3.05	1900	7211	
	R/S of load	1.00	1.00	2.30	1.89	-	700	3045	
	R/S of load	1.00	0.50	1.45	0.72	-	700	367	
		1.00	0.50	4.00	2.00	-	700	2800	
		1.00	0.50	1.52	0.76	-	700	404	
	Total							15009	
							P1	**7504**	Kg
	Point Load - 2								
	S/W of Beam	1.00	1.00	4.27	0.23	0.38	2500	932	
	B/w of load	1.00	1.00	4.27	0.12	3.05	1900	2969	
	R/S of load	1.00	1.00	2.40	1.87	-	700	3140	
		1.00	0.50	1.30	0.65	-	700	294	
	R/S of load	1.00	1.00	1.64	0.80	-	700	917	
	Total							8253	
							P2	**4127**	Kg
	Point Load -3								
	S/W of Beam	1.0	1.0	4.27	0.23	0.15	2500	368	
	B/w of load	1.0	1.0	4.27	0.23	3.05	1900	5691	
	R/S of load	1.00	0.50	1.30	0.65	-	700	294	
	R/S of load	1.00	1.00	1.64	0.80	-	700	917	
		1.00	0.50	1.03	0.51	-	700	185	
		1.00	1.00	1.94	1.33	-	700	1814	
	Total							9269	
							P3	**4635**	Kg
	Main Beam		**19023**	Kg					
	Point Load - 1		**7504**	Kg					



	Point Load - 2		4127	Kg					
	Point Load - 3		4635	Kg					
				FS	MB	P1	P2	P3	
				1.5	12321	7499	4502	5333	44481
	Mu	=		44481	Kg.m				
	Ast	=		2146	mm^2		Nos	4.37	491
d =	717.5							Dia	25
BEAM	*Provide @*		*4*	*25*	*Size*	*230*	*760*	150	610
			NOS	DIA		mm	mm	Slab Thick	Beam depth

Provide 5 - Y 25



4. DESIGN OF REINFORCED CONCRETE SLAB

DATA:

Floor		Stilt Floor		
S. No.	=	S1		
Grade of concrete	=	25	N/mm2	
Grade of steel	=	500	N/mm2	
Cover	=	20	mm	
Ly (Long span)	=	6.02	m	
Lx (Short span)	=	5.41	m	
Ly/Lx	=	1.11	<	2

Slab

Slab thickness D	=	0.17	m	
d	=	145	mm	
Sunkan depth	=	0	m	

LOAD:

Dead load	=	4.25	kN/m2
F.Finish	=	1.00	kN/m2
Wall load	=	0.75	kN/m2
Sunkan load	=	0	kN/m2
Live load	=	2.00	kN/m2
(DL+LL)	=	**8.00**	**kN/m2**

DESIGN:

Edge conditions = **9**

Short span mid span co.eff. Msx = **0.064**

Long span mid span co.eff. Msx = **0.056**

Moment

				say	
Mx	(+ve)	=	22.477	23.477	kNm
My	(+ve)	=	19.668	20.668	kNm

Depth check

Short span Effective depth d = 75.50 < 145 mm

Hence Safe

Deflection

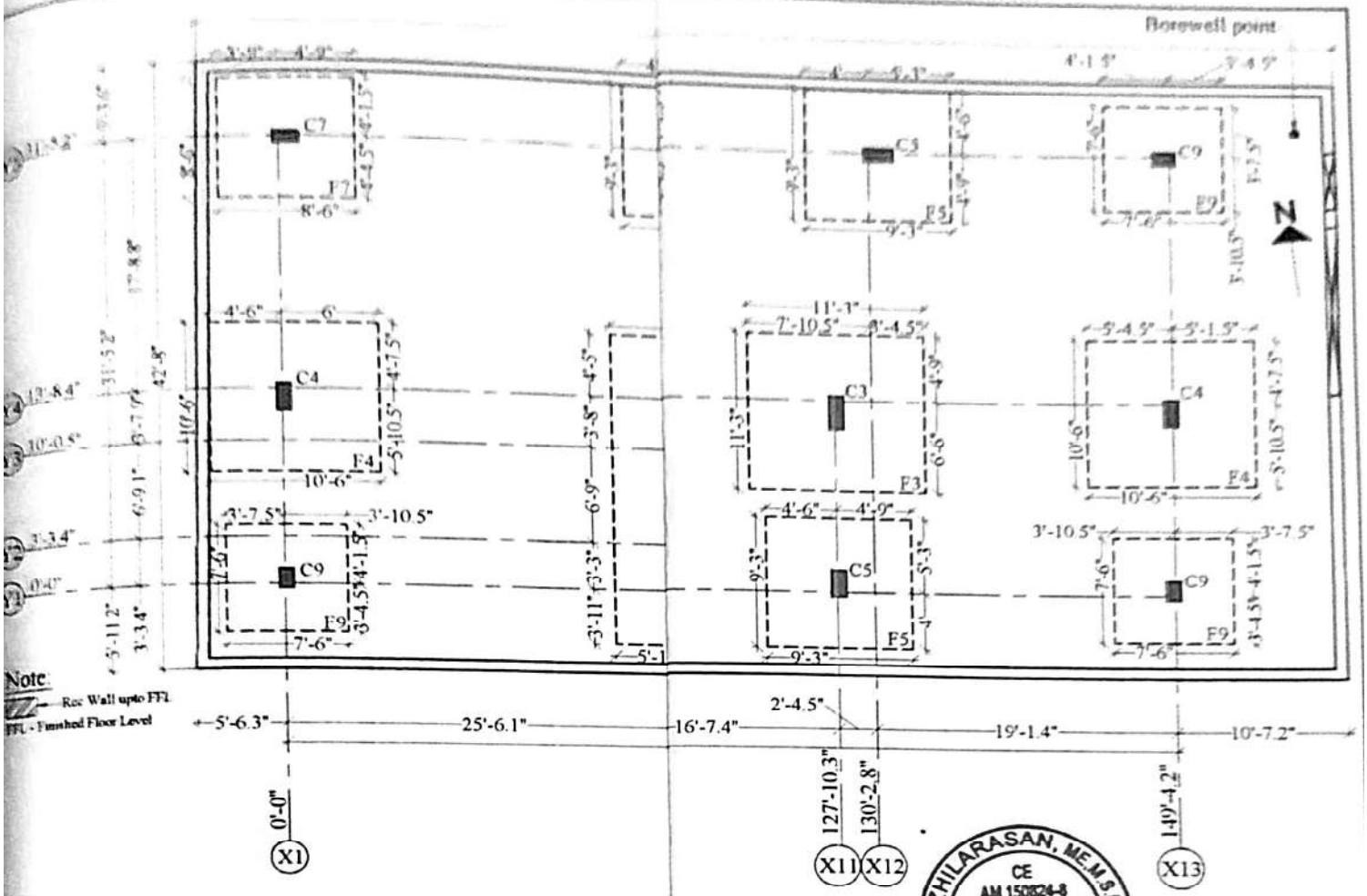
Basic	L/d	=	20			M.F	=	1.52
Allowable	L/d	=	30.420	<	Actual	L/d	=	37.310

REINFORCEMENT

		Ast req	Min Ast	st provided		dia of bar	Spacing	
		(mm2/m)	(mm2/m)	(mm2/m)		mm	mm	inch
Mx	(+ve)	465.27	204	**604**		10	130	5
My	(+ve)	409.59	204	**524**		10	150	6

Main Rod	Distributor
10Y-130mm	10Y-150mm

V. EZHILARASAN, M.E., M.I.S.(Valu)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30807/2022
Chartered Engineer, Valuer



V. EZHILARASAN, ME.M.S (Valu)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer, Valuer

itle :

Footing Marking Layout

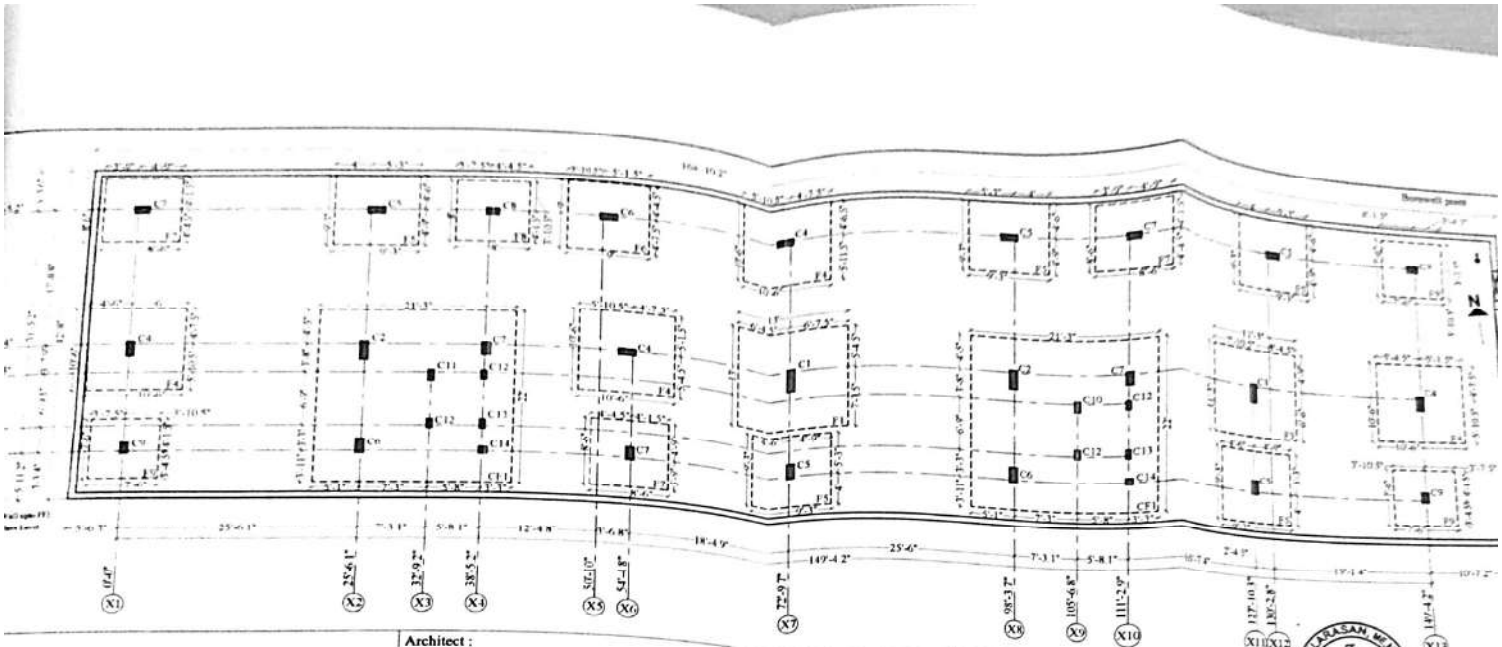
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Plot No.56, Karaikudi, Sivagnagai District

DARARAJULU AND ASSOCIATES
urvey & Structural Engineering Consultant

DSA

.1 & 2, Kabilar Street, Senthil Nagar,
lvoyal, Chennai - 62. Mob.: 98406 22035
ail : dhanastructural@gmail.com
dhanaasassociates@gmail.com



ooting Marking Layout

Plot No.56, Karaikudi,
Sivagnagai District

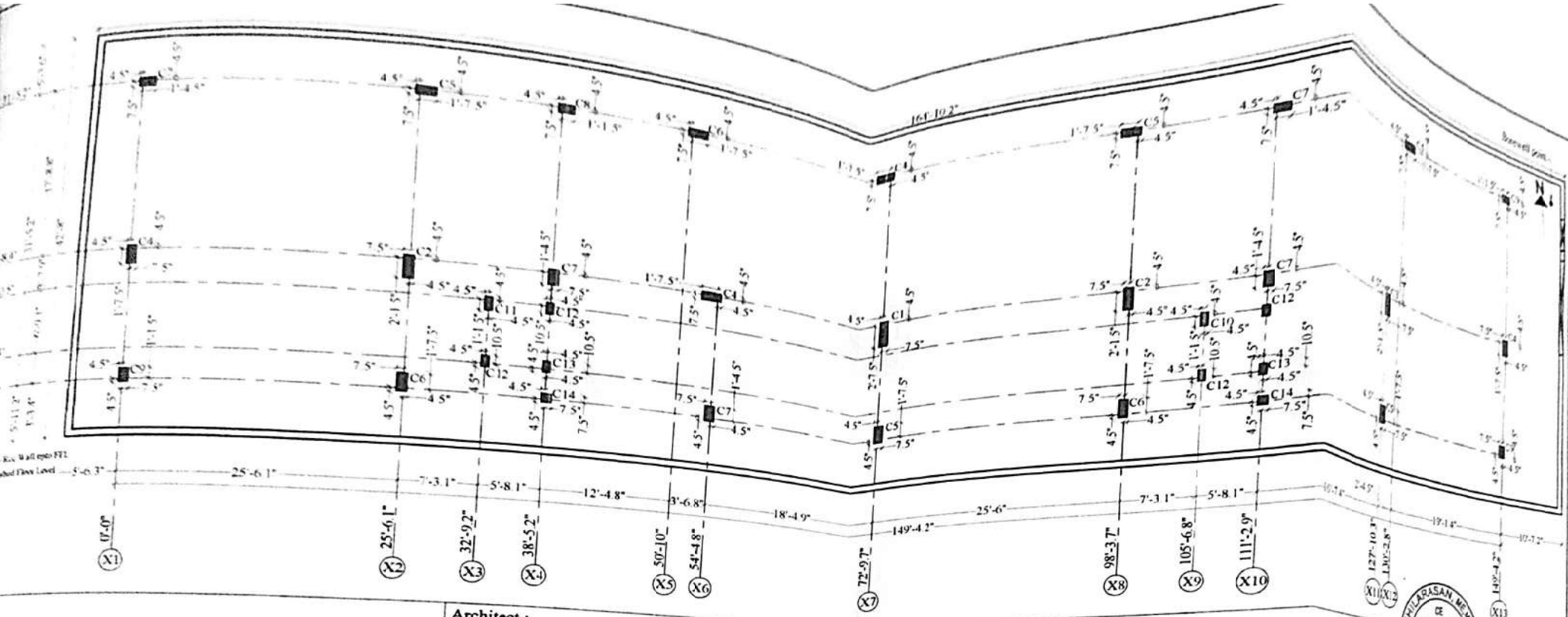
Architect :
M/s.A K Architects

Client :
Mr.N.SABARATHINAM,

Scale : 1" = 10'-0"	File no : Dwg.- 07 / 2024
Date : 20.03.2024	Sheet no : 1 / 14
Dsgn. by : G.D	Drn. by : G.D

Structural Consultant :

DHANAA SUNDARARAJULU AND ASSOCIATE
Survey, Quantity Survey & Structural Engineering Consultant
DSA
Plot No.1 & 2, Kabilar Street, Senthil Nagar,
Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035
E-mail : dhanastructural@gmail.com
dhanaasassociates@gmail.com



Column Marking Layout

Plot No.56, Karaikudi,
Sivagnagai District

Architect :

M/s.A K Architects

Client :

Mr.N.SABARATHINAM,

Scale : 1" = 10'-0"	File no : Dwg.- 07 / 2024
Date : 20.02.2024	Sheet no : 2 / 14
Dsgn. by : G.D	Drn. by : G.D

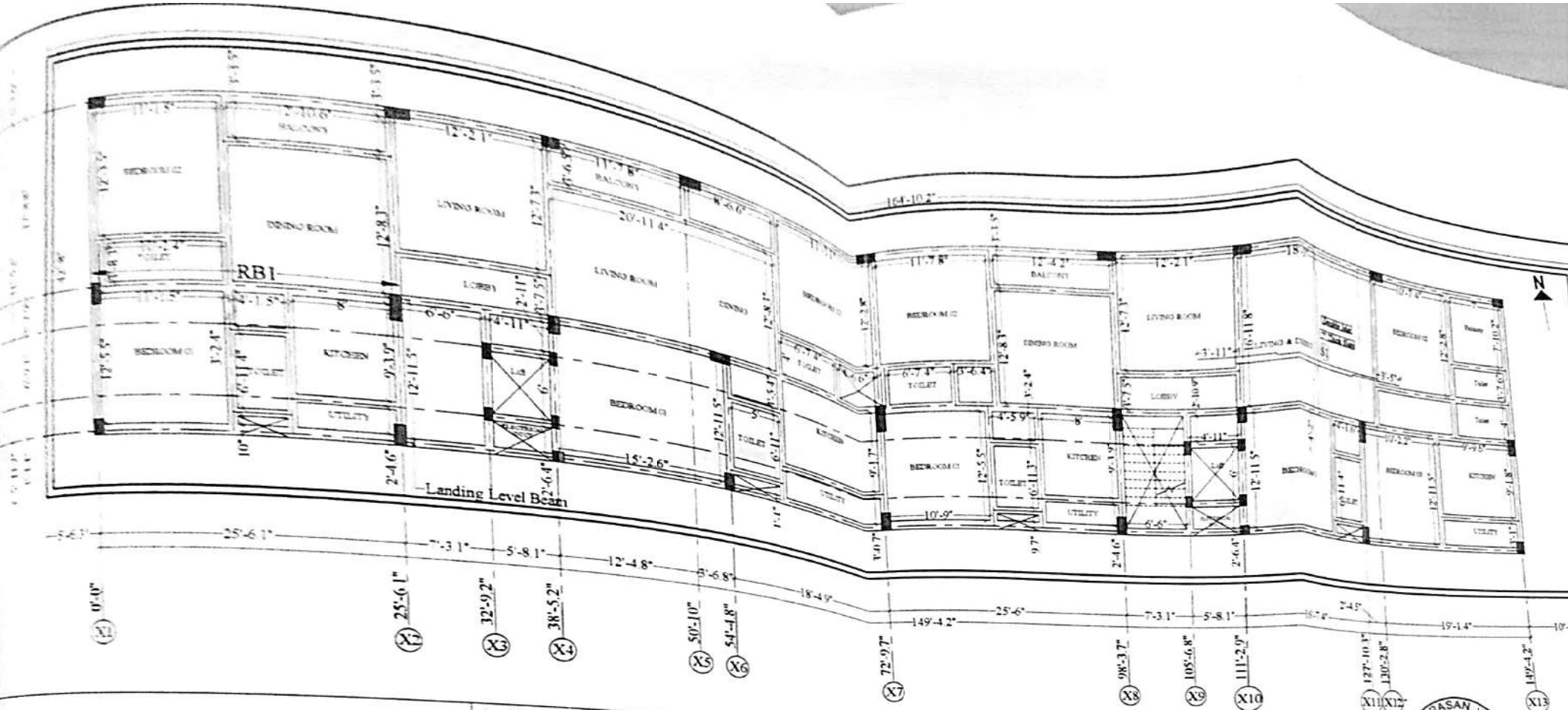
Structural Consultant :

DHANAA SUNDARARAJULU AND ASSOCIATES

Survey, Quantity Survey & Structural Engineering Consultant

DSA

Plot No.1 & 2, Kabilar Street, Senthil Nagar,
Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035
E-mail : dhanastructural@gmail.com
dhanaasassociates@gmail.com



al Floor Roof Beam Layout

Plot No.56, Karaikudi,
Sivagnagai District

Architect :
M/s.A K Architects

Client :
Mr.N.SABARATHINAM,

Scale : 1" = 10'-0"	File no : Dwg.- 07 / 2024
Date : 20.03.2024	Sheet no : 3 / 14
Dsgn. by : G.D	Drn. by : G.D

Structural Consultant :

DHANAA SUNDARARAJULU AND ASSOCI
Survey, Quantity Survey & Structural Engineering Consulta
DSA
Plot No.1 & 2, Kabilar Street, Senthil Nagar,
Thirumullaivoyal, Chennai - 62. Mob.: 98406 2203
E-mail : dhanastructural@gmail.com
dhanaasassociates@gmail.com

Schedule of Footings (Concrete Edge)

Footings	SIZES						Bending Length BL	Reinforcement on each direction R1
	W	L	D	H1	CC	S		
F1	13'-0"	13'-0"	6'-0"	3'-0"	4"	6"	1'-0"	Y 16 @ 4" c/c
F2	11'-6"	11'-6"	6'-0"	3'-0"	4"	6"	1'-0"	Y 16 @ 5"c/c
F3	11'-3"	11'-3"	6'-0"	2'-9"	4"	6"	1'-0"	Y 16 @ 5.5" c/c
F4	10'-6"	10'-6"	6'-0"	2'-9"	4"	6"	1'-0"	Y 16 @ 6" c/c
F5	9'-3"	9'-3"	6'-0"	2'-6"	4"	6"	1'-0"	Y 16 @ 6.5" c/c
F6	9'-0"	9'-0"	6'-0"	2'-6"	4"	6"	1'-0"	Y 16 @ 7" c/c
F7	8'-6"	8'-6"	6'-0"	2'-3"	4"	6"	1'-0"	Y 16 @ 7.5" c/c
F8	8'-0"	8'-0"	6'-0"	2'-0"	4"	6"	1'-0"	Y 12 @ 4.5" c/c
F9	7'-6"	7'-6"	6'-0"	2'-0"	4"	6"	1'-0"	Y 12 @ 5" c/c
F10	7'-3"	7'-3"	6'-0"	2'-0"	4"	6"	1'-0"	Y 12 @ 5.5" c/c
F11	7'-0"	7'-0"	6'-0"	2'-0"	4"	6"	1'-0"	Y 12 @ 5.5" c/c
F12	6'-3"	6'-3"	6'-0"	1'-9"	4"	6"	1'-0"	Y 12 @ 6" c/c

Title: Schedule Of Footings

Site: Plot No.56, Karaikudi, Sivagnagai District

Architect: M/s.A K Architects

Client: Mr.N.SABARATHINAM,

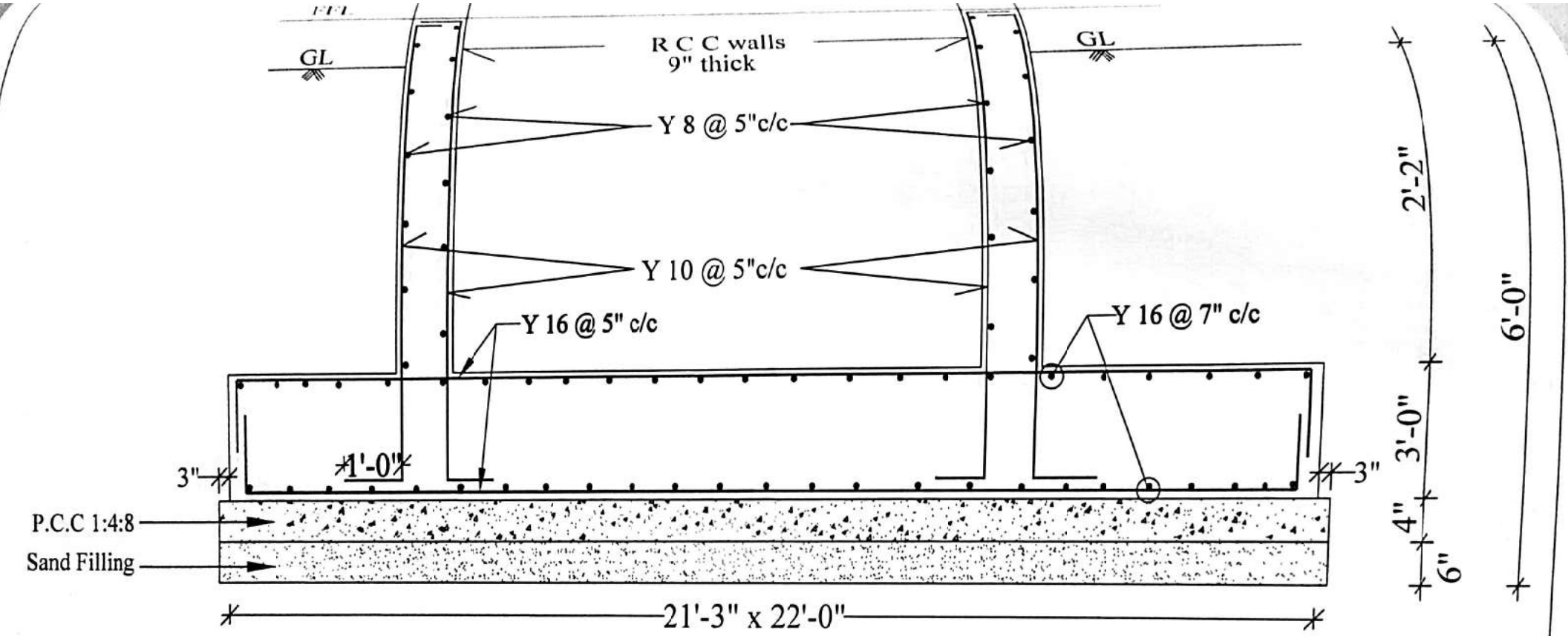
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Date : 20.03.2024 | Sheet no : 4 / 14

Dsgn. by : G.D | Drn. by : GD

Structural Consultant: DHANAA SUNDARARAJULU AND ASSOCIATES
Survey, Quantity Survey & Structural Engineering Consultant
(ISA)
Plot No.1 & 2, Kalaivar Street, Santhi Nagar, Thiruvanmiyur, Chennai - 41. Mob : 98406 22011
E-mail : dhanaastructural@gmail.com

V. EZHILARASAN, M.E., M.I.S.T.E.
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer, Valsaravakkam

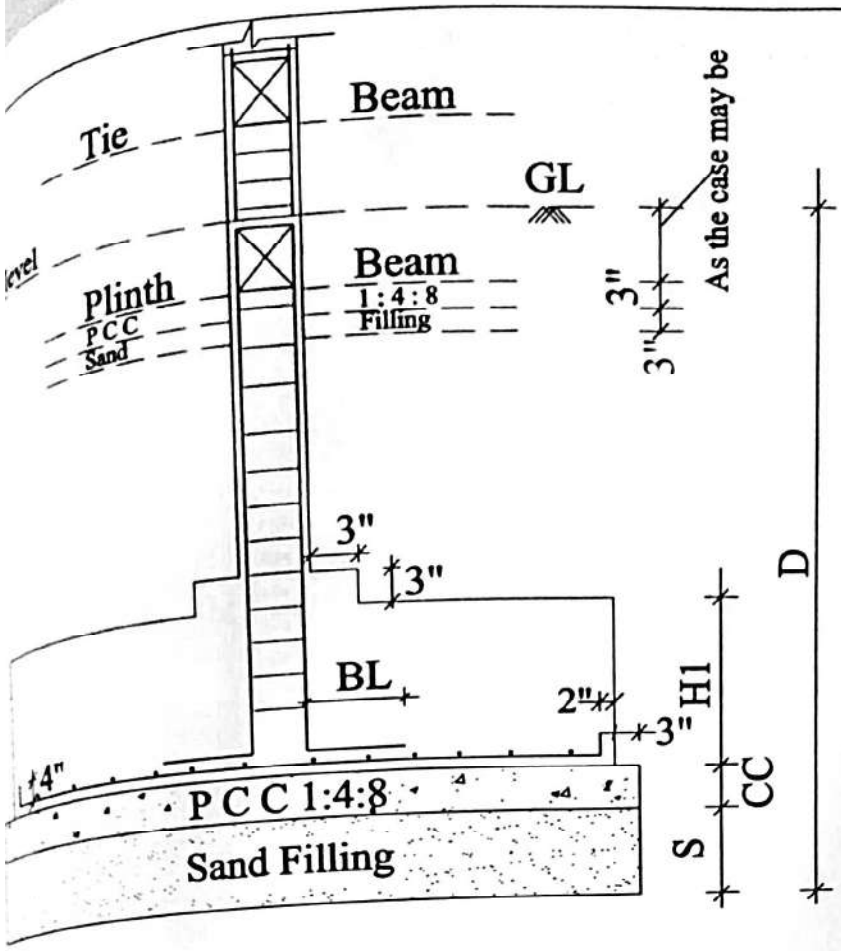


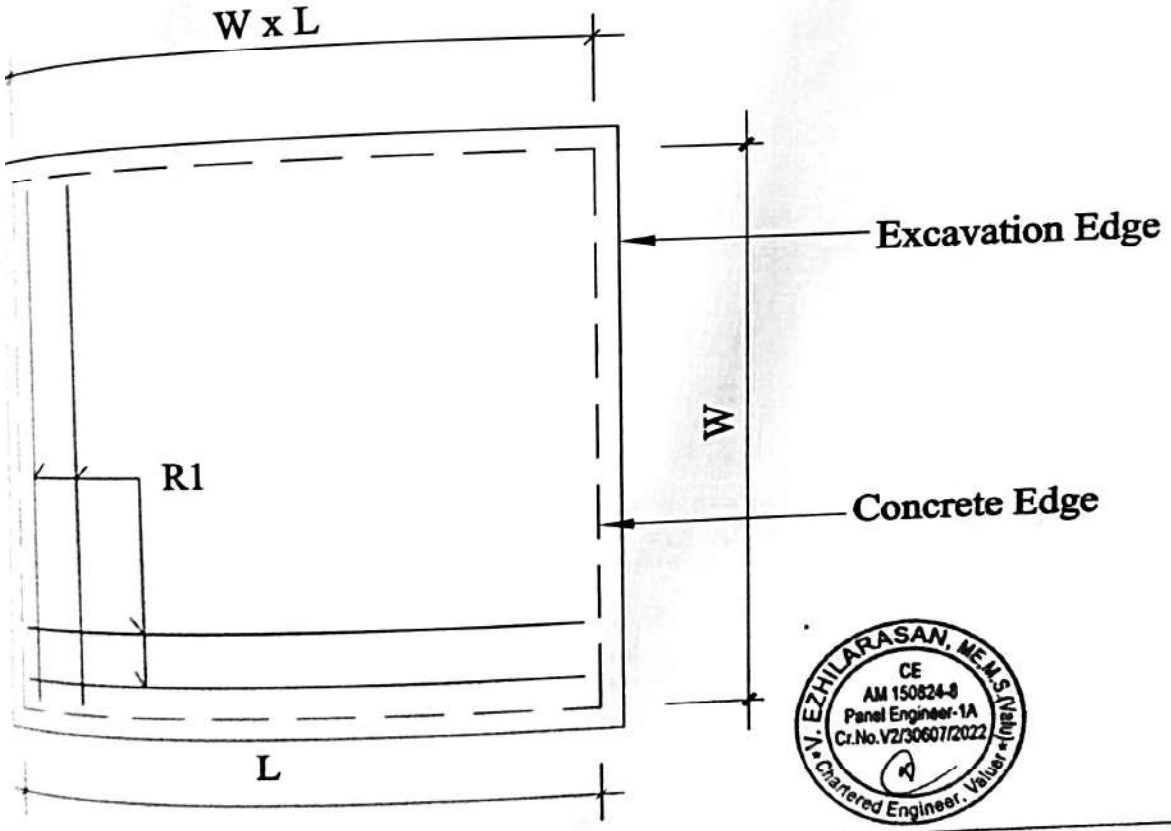
Details of Liftwell - (CF1)

V. EZHILARASAN, ME.M.S (Valu)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer, Valuer

Note :
Main Rod in Shorter Span
FFL - Finished Floor Level

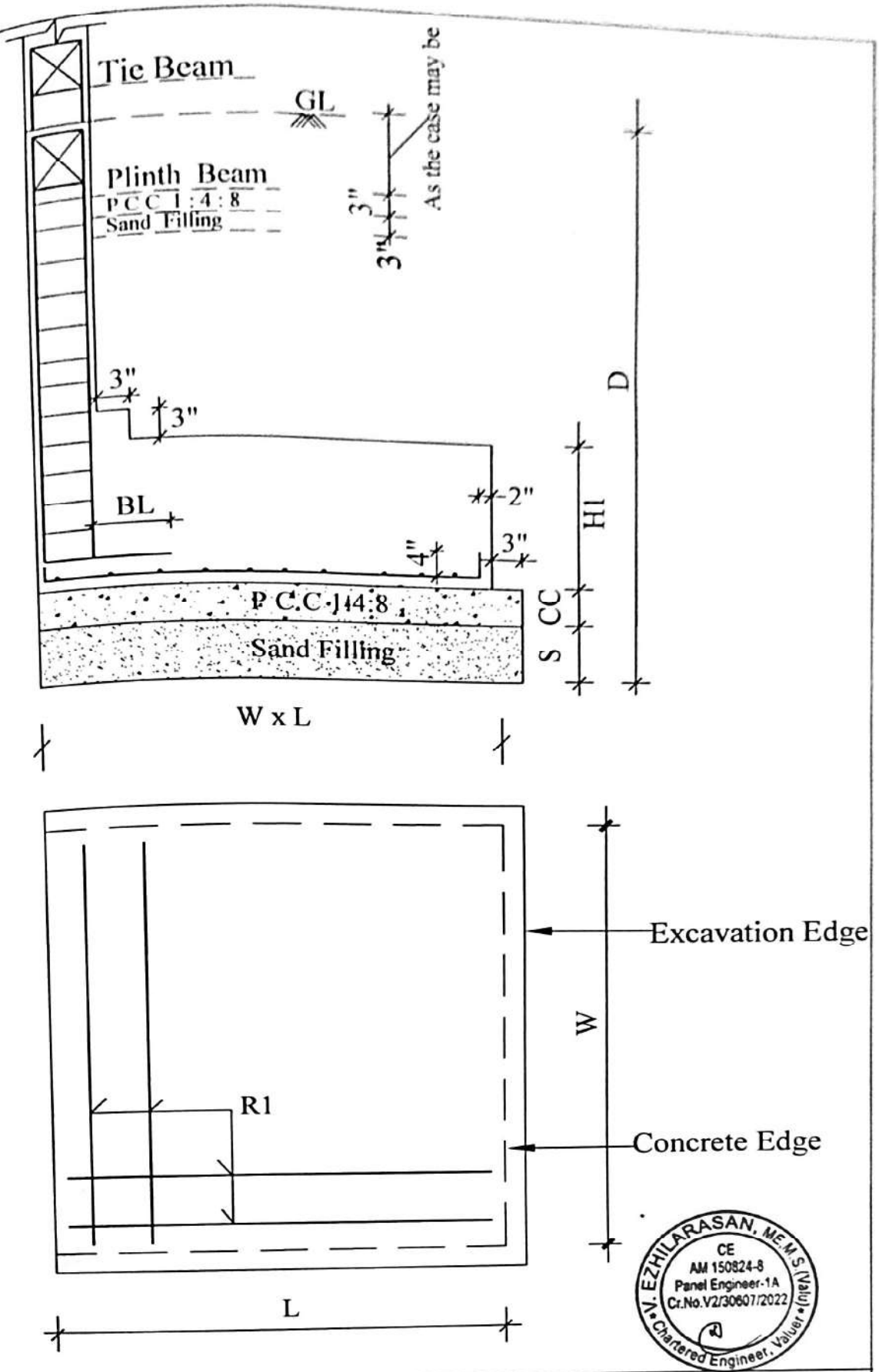
Title : Details of Combined Footing (CF1)	Architect : M/s.A K Architects		Structural Consultant : DHANAA SUNDARARAJULU AND ASSOCIATES Survey, Quantity Survey & Structural Engineering Consultant DSA Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035 E-mail : dhanastructural@gmail.com dhanaasassociates@gmail.com
	Client : Mr.N.SABARATHINAM,		
Site : Plot No.56, Karaikudi, Sivagnagai District	Scale : NTS	File no : Dwg.- 07 / 2024	
	Date : 20.03.2024	Sheet no : 5 / 14	
	Dsgn. by : G.D	Drn. by : G.D	





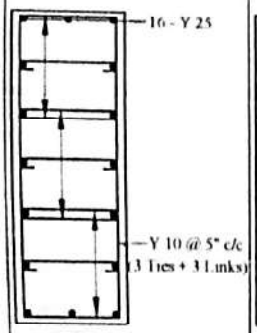
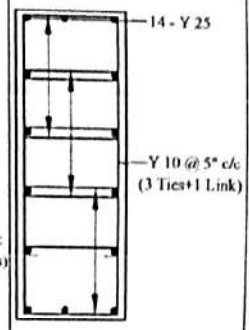
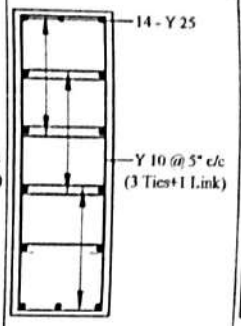
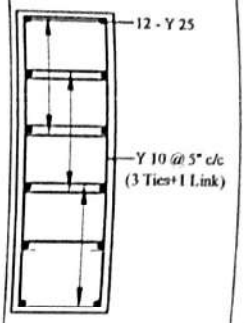
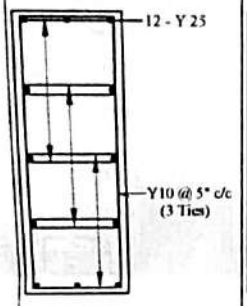
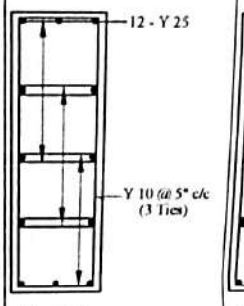
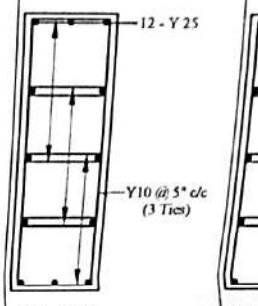
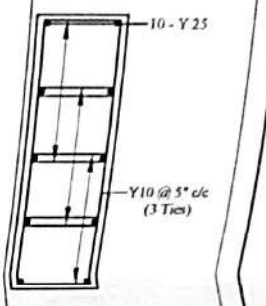
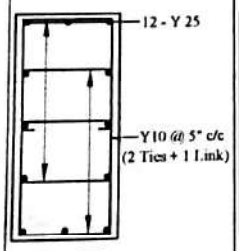
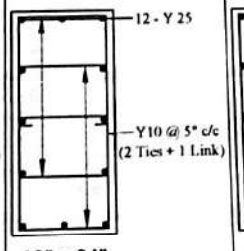
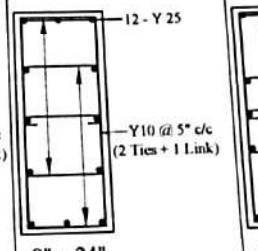
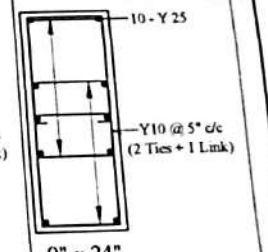
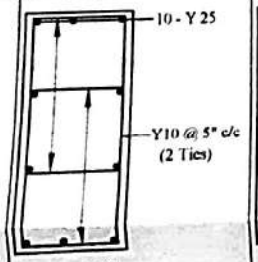
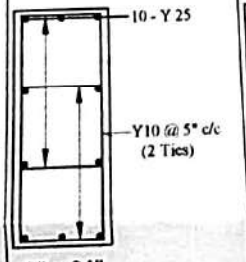
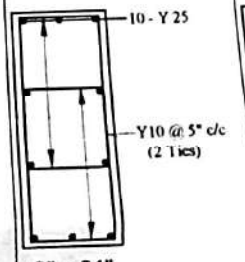
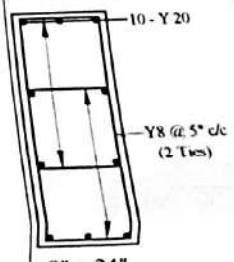
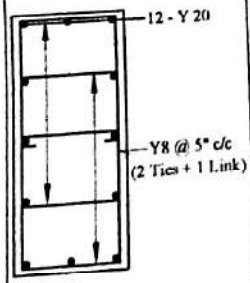
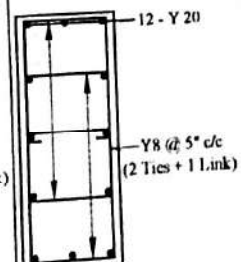
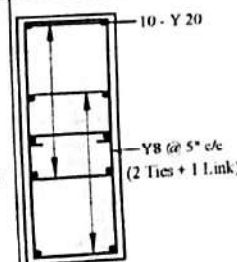
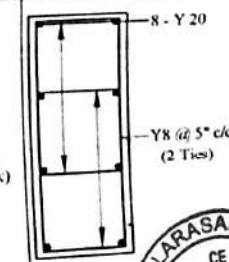
V. EZHILARASAN, M.E.M.S.(Hon)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer, Valuer

...g Details - I	Architect : M/s.A K Architects		Structural Consultant : DHANAA SUNDARARAJULU AND ASSOCIATES Survey, Quantity Survey & Structural Engineering Consultant DSA Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035 E-mail : dhanastructural@gmail.com dhanaasssociates@gmail.com
..., Karaikudi, ...gu District	Client : Mr.N.SABARATHINAM,		
	Scale : NTS	File no : Dwg.- 07 / 2024	
	Date : 23.03.2024	Sheet no : 6 / 14	
	Dsgn. by : G.D	Drn. by : G.D	



V. EZHILARASAN, M.E., M.S (Valu)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer, Valuer

...ooting Details - II	Architect : M/s.A K Architects	Structural Consultant : DHANAA SUNDARARAJULU AND ASSOCIATES Survey, Quantity Survey & Structural Engineering Consultant DSA
	Client : Mr.N.SABARATHINAM,	
...o.56, Karaikudi, ...gnagai District	Scale : NTS / File no : Dwg.- 07 / 2024 Date : 20.03.2024 / Sheet no : 7 / 14 Dsgn. by : G.D / Drn. by : G.D	Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035 E-mail : dhanastructural@gmail.com dhanaassociates@gmail.com

	12" x 36"	12" x 36"	12" x 36"	12" x 36"
C2 (2 Nos.)	 12" x 30"	 12" x 30"	 9" x 30"	 9" x 30"
C3 (1 No.)	 12" x 30"	 9" x 30"	 9" x 30"	 9" x 30"
C4 (4 Nos.)	 12" x 24"	 12" x 24"	 9" x 24"	 9" x 24"
C5 (5 Nos.)	 12" x 24"	 9" x 24"	 9" x 24"	 9" x 24"
C6 (3 Nos.)	 12" x 24"	 9" x 24"	 9" x 24"	 9" x 24"

Title : Schedule of Columns

Architect : M/s.A K Architects

Client : Mr.N.SABARATHINAM,

Site : Plot No.56, Karaikudi,

Scale : NTS | File no : Dwg.- 07 / 2024

Date : 20.03.2024 | Sheet no : 8 / 14

Dsgn. by : G.D | Drn. by : G.D

Structural Consultant :

DHANAA SUNDARARAJULU AND ASSOCIATES

Survey, Quantity Survey & Structural Engineering Consultants

DSA

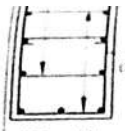
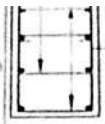
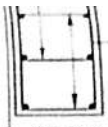
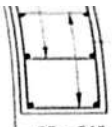
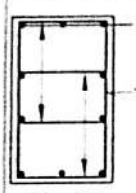
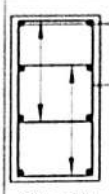
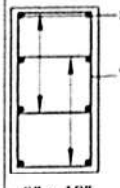
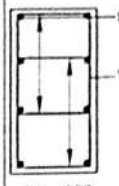
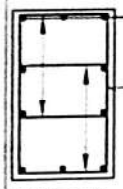
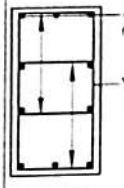
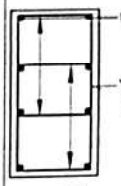
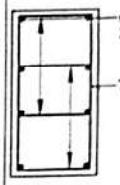
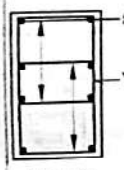
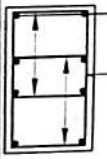
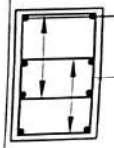
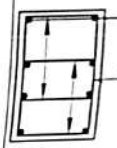
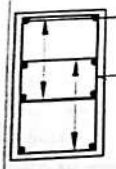
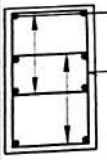
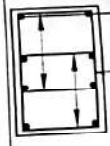
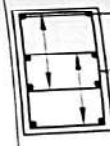
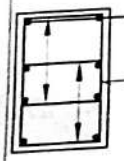
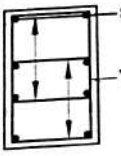
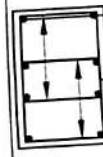
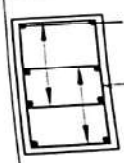
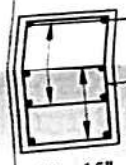
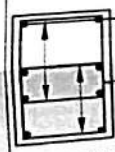
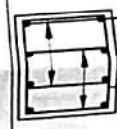
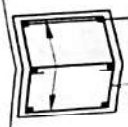
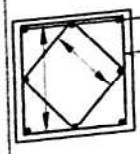
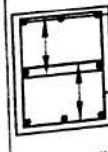
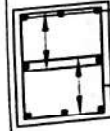
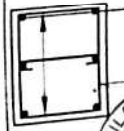
Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035

E-mail : dhanastructural@gmail.com

N. EZHILARASAN, ME.M.S.(Struct.)

CE AM-150824-8 Panel Engineer-1A Cr.No.V/3/0407/2022

Civil & Structural Engineering Consultant

C7 (5 Nos.)	 12" x 21"	 9" x 21"	 9" x 21"	 9" x 21"
C8 (1 No.)	 10 - Y 20 Y 8 @ 5" c/c (2 Ties) 12" x 18"	 8 - Y 20 Y 8 @ 5" c/c (2 Ties) 9" x 18"	 8 - Y 20 Y 8 @ 5" c/c (2 Ties) 9" x 18"	 8 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 18"
C9 (3 Nos.)	 4 - Y 20 + 6 - Y 16 Y 8 @ 5" c/c (2 Ties) 12" x 18"	 4 - Y 20 + 6 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 18"	 8 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 18"	 6 - Y 16 + 2 - Y 12 Y 8 @ 5" c/c (2 Ties) 9" x 18"
C10 (1 No.)	 8 - Y 25 Y 10 @ 5" c/c (2 Ties) 9" x 18"	 8 - Y 20 Y 8 @ 5" c/c (2 Ties) 9" x 18"	 4 - Y 20 + 4 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 15"	 8 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 15"
C11 (1 No.)	 8 - Y 20 Y 8 @ 5" c/c (2 Ties) 9" x 18"	 4 - Y 20 + 4 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 18"	 8 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 15"	 8 - Y 12 Y 8 @ 5" c/c (2 Ties) 9" x 15"
C12 (4 Nos.)	 8 - Y 20 Y 8 @ 5" c/c (2 Ties) 9" x 15"	 8 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 15"	 8 - Y 12 Y 8 @ 5" c/c (2 Ties) 9" x 15"	 8 - Y 12 Y 8 @ 5" c/c (2 Ties) 9" x 15"
C13 (2 Nos.)	 8 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 15"	 8 - Y 12 Y 8 @ 5" c/c (2 Ties) 9" x 15"	 8 - Y 12 Y 8 @ 5" c/c (2 Ties) 9" x 12"	 6 - Y 12 Y 8 @ 5" c/c (1 Tie + 1 Link) 9" x 12"
C14 (2 Nos.)	 8 - Y 16 Y 8 @ 5" c/c (2 Ties) 12" x 12"	 8 - Y 16 Y 8 @ 5" c/c (2 Ties) 9" x 12"	 8 - Y 12 Y 8 @ 5" c/c (2 Ties) 9" x 12"	 6 - Y 12 Y 8 @ 5" c/c 9" x 12"

V. EZHILARASAM, B.E., M.S.(Struct.)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer & Valuer

Title : Schedule of Columns

Site :

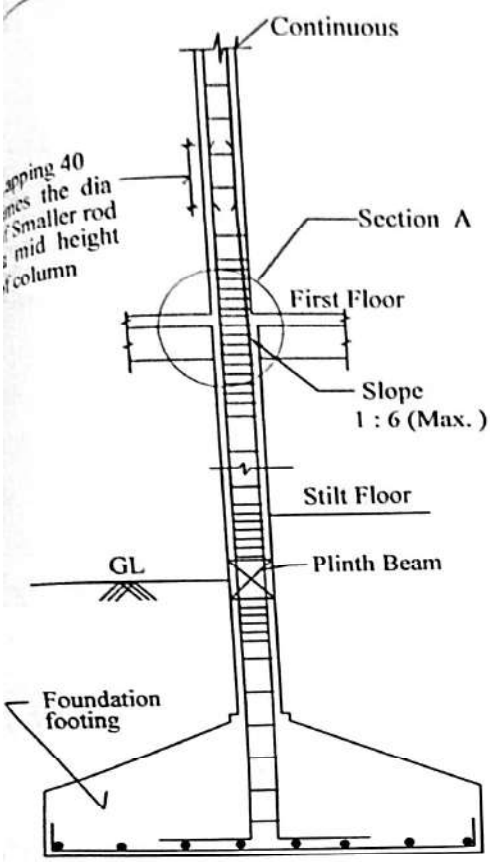
Architect : M/s.A K Architects

Client : Mr.N.SABARATHINAM,

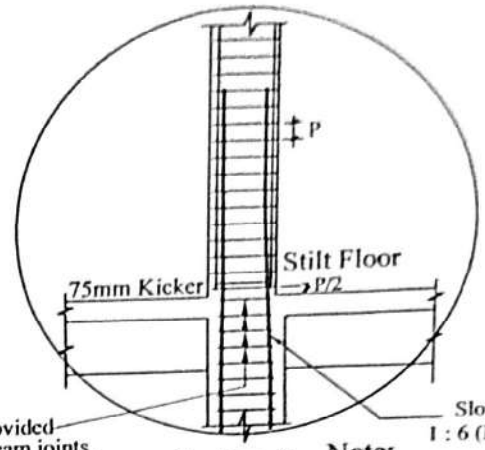
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Date : 20.03.2024 | Sheet no : 9 / 14

Structural Consultant :
DHANAA SUNDARARAJULU AND ASSOCIATES
Survey, Quantity Survey & Structural Engineering Consultant
DSA
Plot No.1 & 2, Kabilar Street, Senthil Nagar,
Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035
E-mail : dhanastructural@gmail.com
dhanaasssociates@gmail.com



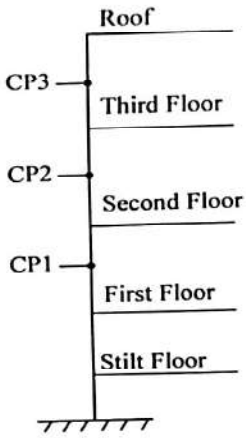
Column Curtailment Details



Rings should be continued and provided inside the columns at Column - Beam joints.

Section A

Note:
Where P - Pitch of Ties



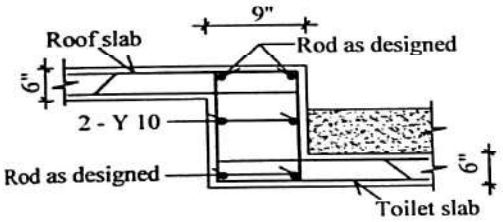
Note :

CP1 - Mid height between First floor & Second floor

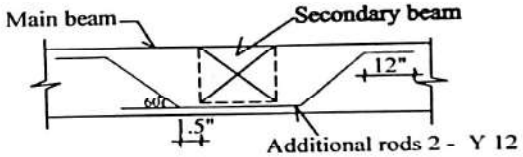
CP2 - Mid height between Second floor & Third floor

CP3 - Mid height between Third floor & Roof

* Reinforcement shall be curtailed at CP1,CP2 & CP3 in a staggered way more or less at mid height of columns all rods kinked with 1:6 slope for lapping.



Details of Toilet Sunken Portion

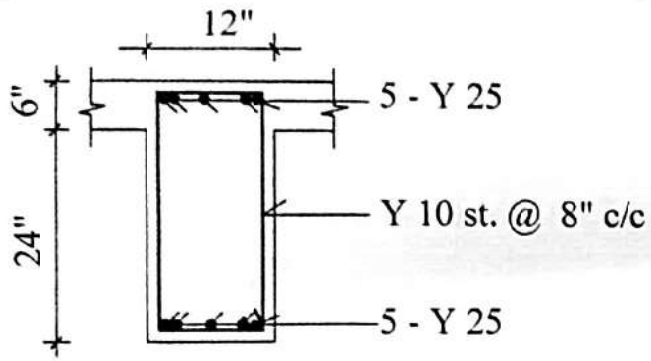


A Main & Secondary Beam Junction Details

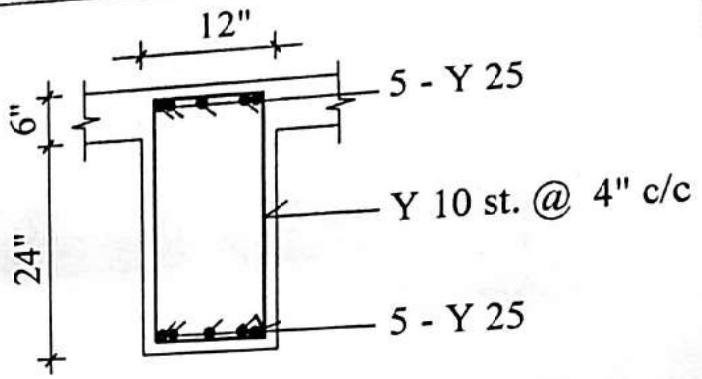
tails of Column Curtailment let Sunken & Secondary Beam	Architect : M/s.A K Architects Client : Mr.N.SABARATHINAM,	Structural Consultant : DHANAA SUNDARARAJULU AND ASSOCIATES Survey, Quantity Survey & Structural Engineering Consultant DSA Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035 E-mail : dhanastructural@gmail.com dhanaassassociates@gmail.com
Plot No.56, Karaikudi, Sivagnagai District	Scale : NTS Date : 20.03.2024 Dsgn. by : G.D	File no : Dwg.- 07 / 2024 Sheet no : 10 / 14 Drn. by : G.D

V. EZHILARASAN, ME.M.S.(Valu)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer, Valuer

Details of Roof Beam



Mid section - MM



End section - EE

Beam mkd. RB1

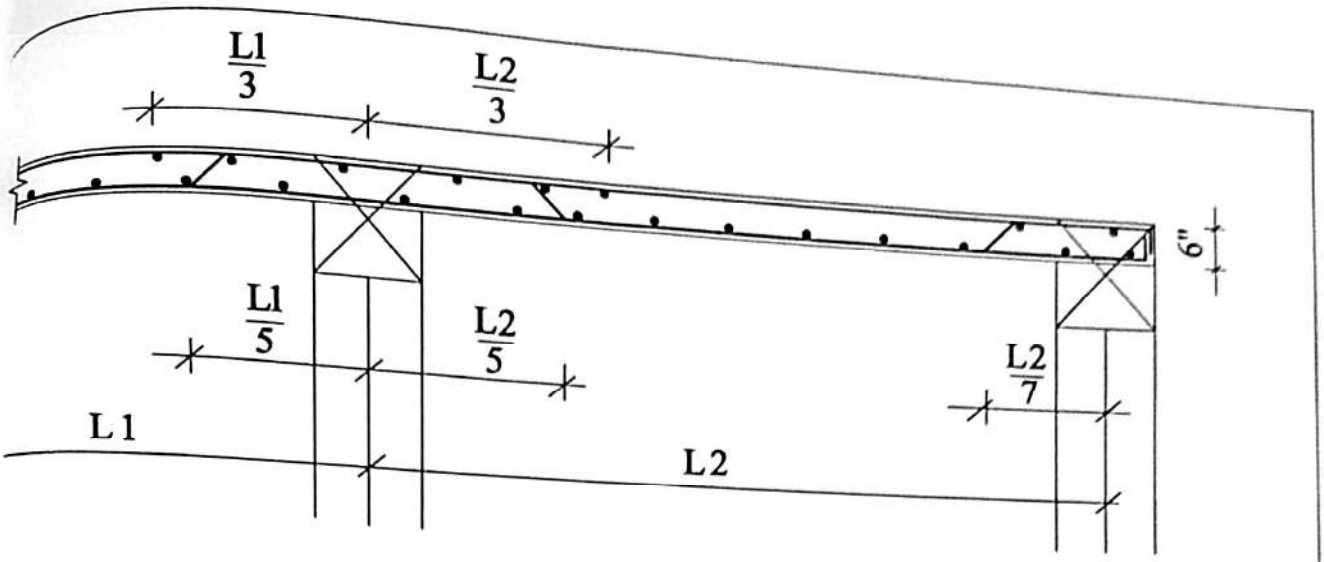
Details of Roof Slab :

* Slab Thickness = 6" Thick
  unless otherwise mentioned

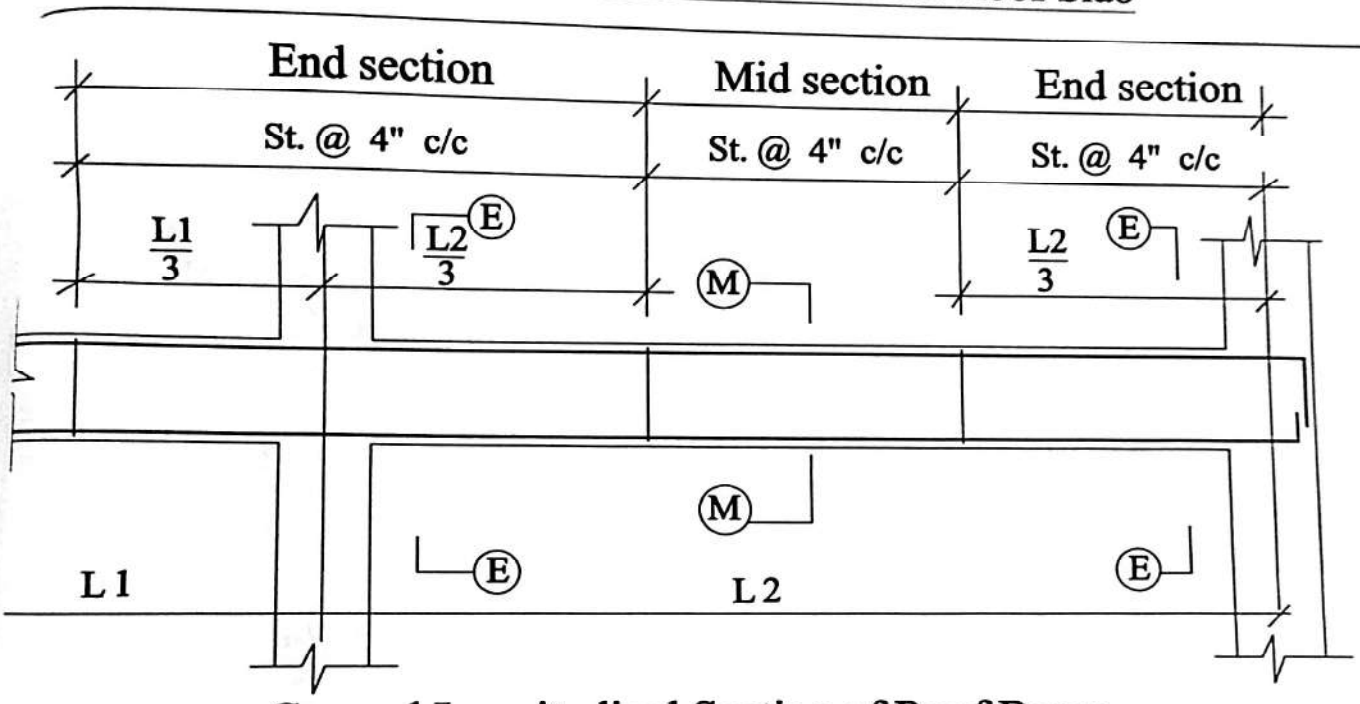
(S1) Shorter span : Y - 10 @ 5" c/c
Longer span : Y - 10 @ 6" c/c

V. EZHILARASAN, M.E., M.I.S.(Valuer)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer, Valuer

Title : Details of Roof Beam & Roof Slab	Architect : M/s.A K Architects	Structural Consultant : DHANAA SUNDARARAJULU AND ASSOCIATES Survey, Quantity Survey & Structural Engineering Consultant DSA Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035 E-mail : dhanastructural@gmail.com dhanaasassociates@gmail.com
	Client : Mr.N.SABARATHINAM,	
Site : Plot No.56, Karaikudi, Sivagnagai District	Scale : NTS / File no : Dwg.- 07 / 2024 Date : 20.03.2024 / Sheet no : 11 / 14 Dsgn. by : G.D / Drn. by : G.D	



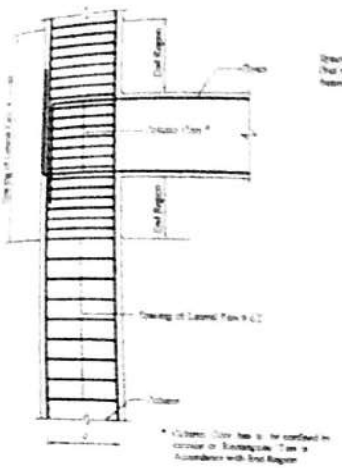
General Longitudinal Section of Roof Slab



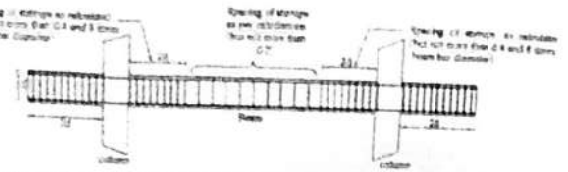
General Longitudinal Section of Roof Beam

General Longitudinal Section Of Roof Beam, Slab, Toilet Sunken Portion & Secondary Beam Junction Details	Architect : M/s.A K Architects		Structural Consultant : DHANAA SUNDARARAJULU AND ASSOCIATES Survey, Quantity Survey & Structural Engineering Consultant DSA Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035 E-mail : dhanastructural@gmail.com dhanaasassociates@gmail.com
	Client : Mr.N.SABARATHINAM,		
Plot No.56, Karaikudi, Sivagnagai District	Scale : NTS	File no : Dwg.- 07 / 2024	
	Date : 20.03.2024	Sheet no : 12 / 14	
	Dsgn. by : G.D	Drn. by : G.D	

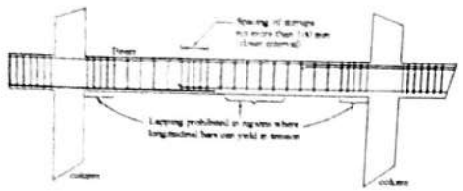
V. EZHILARASAN, M.E., M.S. (Valu)
CE
AM 150824-8
Panel Engineer-1A
Cr.No.V2/30607/2022
Chartered Engineer, Valuer



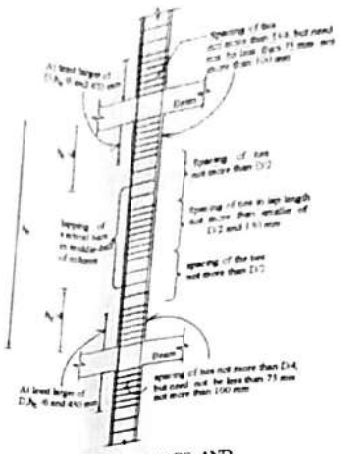
BEAM COLUMN JOINT AT EXTERNAL COLUMNS



LOCATION AND AMOUNT OF VERTICAL STIRRUPS IN BEAMS

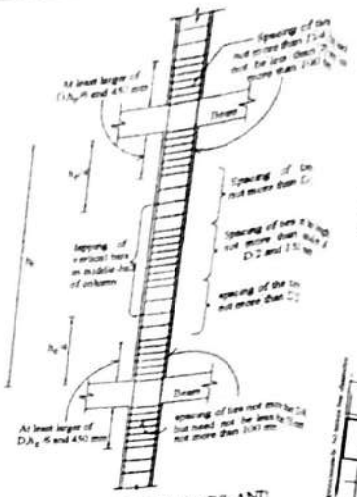


DETAILS OF LAPPING STEEL REINFORCEMENT IN SEISMIC BEAMS



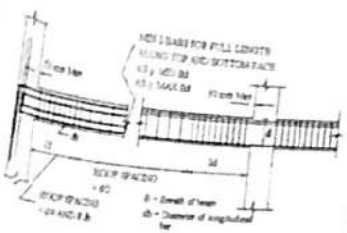
PLACING VERTICAL BARS AND CLOSED TIES IN COLUMNS

(Column ends and lap lengths are to be protected with closely spaced ties)

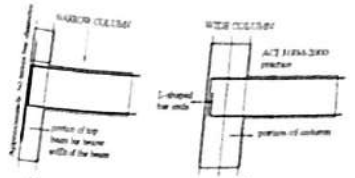


PLACING VERTICAL BARS AND CLOSED TIES IN COLUMNS

(Column ends and lap lengths are to be protected with closely spaced ties)

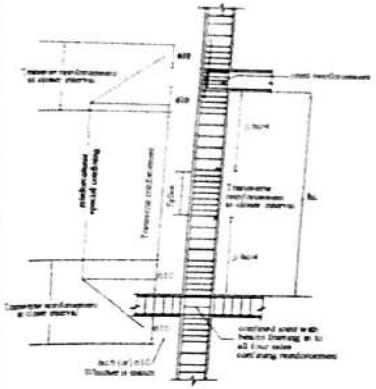


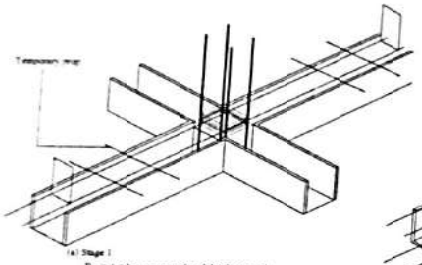
DUCTILE DETAILING



ANCHORAGE OF BEAMS BARS IN EXTERIOR JOINTS

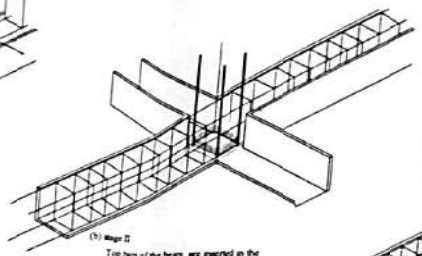
(Diagrams show elevation of joint region)





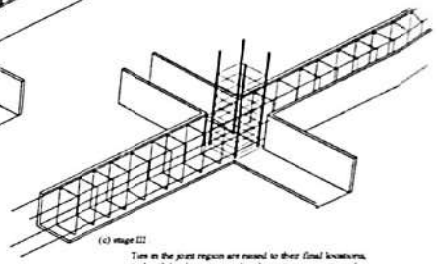
(a) Stage I

Beam top bars are not placed, but horizontal ties in the joint region are stacked up



(b) Stage II

Top bars of the beam are inserted in the beam stirrups, and beam reinforcement cage is lowered into the formwork

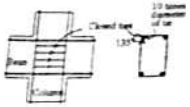


(c) stage III

Ties in the joint region are moved to their final locations, tied with binding wire, and column ties are continued

PROVIDING HORIZONDAL TIES IN THE JOINTS

(Three - Stage procedure is required)



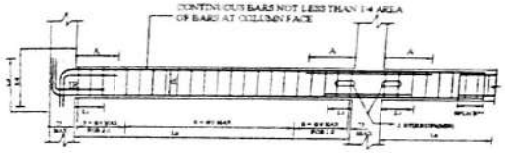
CLOSED LOOP STEEL TIES IN BEAM - COLUMN JOINTS

(Such ties with 135° hooks resist the ill effects of distortion of joints)



ANCHORAGE OF BEAM BARS IN INTERIOR JOINTS

(Diagrams (a) and (b) show column sections in plan of joint region)



TYPICAL BAR DETAILS FOR SPECIAL DUCTILE MOMENT RESISTING FRAMES

(CONCRETE DETAILING UNDER EQRD)

A = Distance to point of inflection plus anchorage length but not less than Ld. designer may cut some bars shorter than this but at least one- third the area of bars at the face of column must extend this distance

d = Effective depth of beam

IR = Interna radius = 4 db minimum, 6 db preferable

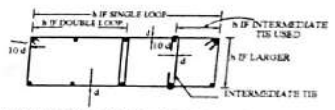
Ld = development length

db = diameter of bar

Note

1 Provide dimension A, S, d as change length, cut off points of discontinuous bars, ect., as the case may be

2 Provide not less than two stirrups throughout splice length



DETAILS OF RECTANGULAR HOOPS & LINKS FOR COLUMNS

ADDITIONAL TIPS FOR GOOD SEISMIC DETAILING

- All hooks to be of min 10 dia and of bent up bars to be 6 dia. Alternate hooks on opposite corners alternately
- Provide half the top steel at bottom at all supports
- special care to be exercised where spacing bars change. Avoid abrupt change
- 50% bars to be spliced at a section and the spacing to be avoided only in the middle half of the columns
- Adopt spacing of long. Bars at ≤ to avoid ductile stirrup dia exceeding 10mm dia. Avoid congestion of bars and a spacing < 75 mm

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Title : Seismic Detailing	Architect : M/s.A K Architects		Structural Consultant : DHANAA SUNDARARAJULU AND ASSOCIATES Survey, Quantity Survey & Structural Engineering Consultant Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22031 E-mail : dhanaastructuralengineer@gmail.com dhanaaassociates@gmail.com
	Client : Mr.N.SABARATHINAM,		
Site : Plot No.56, Karaikudi, Sivagnagai District	Scale : NTS	File no : Dwg.- 07 / 2024	
	Date : 20.03.2024	Sheet no : 13 / 14	
	Dsgn. by : G.D	Drn. by : G.D	

Notes : (To be considered during execution of work) :

* All dimensions are in Feet & inches
* Size of Footings Shown in dotted line for Concrete edge.
* Grade of concrete mix shall be M - 25 for Footings & & Columns, Plinth Beam, Lintel, Loft, Staircase etc..conforming to IS 456 - 2000
* Reinforcement shall be high strength deformed bars of grade Fe - 500 Confirming to IS 1786 - 1985
* Clear cover to the main reinforcement 2" for Foundation, 1.5" for Columns, 1.25" for Beams & 0.75" for Slabs.
* The foundation is designed for Stilt + Three Floors only.
* Potable water should be used for all the concrete works
* Use 2" needle vibrators for all RCC works
* The marked layout should be checked by a Structural Engineer
* Do not measure the drawing
* Before pouring concrete the reinforcement tied & laid should be checked by a structural engineer
* Refilling around column footings and basement may be done with quarry dust / River sand to avoid swelling of soil
* Soil : Vide Soil Report M/s. GEOMATRIX CONSULTANCY, REPORT No: 71/ RB / GMC / 23-24 DATE : 22.06.2023
* SBC : 26 t / sqm @ 6'-0" Depth.
* Lapping of rods should be avoided near the column and beam joints .
* Lap length for column 40 times of the smaller dia rod and for beam 50 times of smaller dia of the rod.
* The beam rods should be bent at all the ends
* Rings should be continued and provided inside the columns at Column - Beam joints.

REMOVING PERIOD OF FORMWORK

Type of FormWork	Min. Period for Removing Formwork.
* Vertical formwork to Columns,Walls, Beams	24 Hours
* Form work to Beams	
a) Spanning upto 5m	14 days
b) Spanning over 5m	21 days

V. EZHILARASAN, M.E.,M.S.(Valu) CE AM 150824-8 Panel Engineer-1A Cr.No.V2/30607/2022 Chartered Engineer, Valuer

General Notes	Architect : M/s.A K Architects		Structural Consultant : DHANAA SUNDARARAJULU AND ASSOCIATES Survey, Quantity Survey & Structural Engineering Consultant (DSA) Plot No.1 & 2, Kabilar Street, Senthil Nagar, Thirumullaivoyal, Chennai - 62. Mob.: 98406 22035 E-mail : dhanastructural@gmail.com dhanaasassociates@gmail.com
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