



Your trusted partner for buying, selling, and managing property,
ensuring hassle-free service with 100% transparency.

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate

+91 9996 12 9996

Official Property Record

Digitally Verified Record - Powered by Verified  RealEstate™



PROJECT NAME: MP KUMUDHAM ENCLAVE
DESIGN ANALYSIS OF “MP KUMUDHAM ENCLAVE” 17 BLOCKS,
G+2 FLOORS RESIDENTIAL APARTMENT AT S.NO 143/1A,
KUNDRATHUR ‘B’ VILLAGE, KUNDRATHUR TALUK,
KANCHEEPURAM DISTRICT, KUNDRATHUR MUNICIPALITY
LIMIT.


A.N.MAGESH RAJA, M.E.,(Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-III(RSE)
CMDA REG.No:SE/GR-I/2022/06/325
GCC REG.No:RSE101432021
CELL:97870 72100
magistructure@gmail.com

STABILITY CERTIFICATE

Date:07/05/2024

Site Location at Plot No: 1,2,3,4,5,6,7,8,9,10,11,12,13,18,19,20,21,22,23,24,25,26,27, 28,29 & 30 Comprised in S.NO 143/1A, Kundrathur 'B' Village, Kundrathur Taluk, Kancheepuram District, Kundrathur Municipality Limit.

It is Certificate that the proposed MP KUMUDHAM ENCLAVE 17 blocks Residential Apartment Ground + 2 only Owned by **M/s MP DEVELOPERS** is designed as per the Indian code of practice for Concrete Construction IS 456:2000, where the grade of concrete used for all Structural elements is M20. Loading standards followed for design are IS875 part-I (DEAD LOAD), IS-875 part-II (LIVE LOAD). Thus, analysis check has been made and we found it is structurally stable and safe for construction.


A.N.MAGESH IYER, M.E., (Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-III (RSE)
CMDA REG.No:SE/GR-I/2022/06/325
GCC REG.No:RSE101432021
CELL:97870 72100
magiststructure@gmail.com

CERTIFICATE

This is Certified that the construction of MP KUMUDHAM ENCLAVE 17 blocks Residential Apartments Ground +2 Floors at Site Location at Plot No: 1,2,3,4,5,6,7,8,9,10,11,12,13,18,19,20, 21,22,23,24,25,26,27, 28,29 & 30 Comprised in S.NO 143/1A, Kundrathur 'B' Village, Kundrathur Taluk, Kancheepuram District, Kundrathur Municipality Limit is designed to resist Dead load and Live load, check has been made and found safe and

I hereby certify that,

1. The least dimension of the column is 230mm
2. The min, grade of concrete is M20
3. The design analysis using the code of practice for loading Standards as per IS-875 part I & II and IS 456-2000.


A.N.MAGESH RAJA, M.E.,(Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-I(RSE)
CMDA REG.No:SE/GR-I/2022/06/325
GCC REG.No:RSE101432021
CELL:97870 72100
magistructure@gmail.com

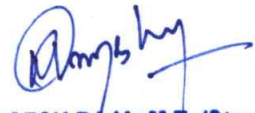
DESIGN CALCULATION:

BEAM DESIGN

GRID	: 3/C-G
Beam No	: RB10
Analysis Reference (Member)	6 : 151,206,20 m : 3
Beam Length	: 4500 mm
Breadth (B)	: 230 mm
Depth (D)	: 380 mm
Effective Depth (d)	: 345 mm
Design Code	: IS 456
Beam Type	: Regular Beam
Grade Of Concrete (Fck)	: M25 N/sqmm
Grade Of Steel	: Fe500 N/sqmm
Clear Cover (Cmin)	: 25 mm
Es	: 2×10^5 N/sqmm

Flexure Design						
	Beam Bottom			Beam Top		
	Left	Mid	Right	Left	Mid	Right
Critical L/C - Analysis	4	4	4	4	4	4
Critical L/C - RCDC	2	2	2	2	2	2
Mu (kNm)	-	66.98	18.2	79.02	7.41	40.28
Tu (kNm)	0.65	0.65	0.65	0.65	0.65	0.65
M _{Tu} (kNm)	1.02	1.02	1.02	1.02	1.02	1.02
Mud (kNm)	1.02	68	19.22	81.36	8.43	41.3
MuLim (kNm)	91	91	91	91	91	91
R	0.037	2.484	0.702	3.448	0.308	1.509
Ptmin (%)	0.2	0.2	0.2	0.2	0.2	0.2
Ptcl (%)	0.2	0.658	0.2	0.975	0.2	0.375
Pccl (%)	0.009	0	0	0.034	0	0
PtPrv (%)	0.507	0.76	0.507	1.237	0.507	0.507
AstCalc (sqmm)	158.7	522.18	158.7	773.35	158.7	297.66
AstPrv (sqmm)	402.12	603.18	402.12	981.74	402.12	402.12
Reinforcement Provided	2-T16	3-T16	2-T16	4-T16	2-T16	2-T16

Shear Design			
	Left	Mid	Right
Critical L/C - Analysis	4	4	4
Critical L/C - RCDC	2	2	2
PtPrv (%)	1.237	0.76	0.507
Vu (kN)	125.96	62.58	81.19


A.N. MAGESH RAJA, M.E., (Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-I (RSE)
CMDA REG.No: SE/GR-I/2022/06/325
GCC REG.No: RSE101432021
CELL: 97870 72100
magistructure@gmail.com

Tu (kNm)	0.65	0.65	0.65
V _{Tu} (kN)	4.55	4.55	4.55
V _{ut} (kN)	130.51	67.13	85.74
T _v (N/sqmm)	1.64	0.85	1.08
T _c (N/sqmm)	0.69	0.58	0.49
V _c (kN)	55.03	45.85	39.01
V _{us} =V _{ut} -V _c (kN)	75.48	21.28	46.73
Legs	2	2	2
Stirrup Rebar	8	8	8
Asv Torsion (sqmm)	495.822	255.965	321.606
Asv Torsion Prv (sqmm)	773.38	773.38	773.38
Asv Reqd (sqmm/m)	605.96	254.81	375.15
SvCalc (mm)	130	130	130
SvPrv (mm)	130	130	130
Asv Total Prv (sqmm)	773.38	773.38	773.38

Maximum Spacing Criteria

Basic

Spc1 = 0.75d = 259 mm

Spc2 = 300 mm

For Torsion

(X1 = 190, Y1 = 340)

Spc3 = X1 = 190 mm

Spc4 = (X1+Y1)/4 = 130 mm

SFR Design

Beam Width = 230 mm

Beam Depth = 380 mm

Web Depth = 380 <= 750 mm

Side Face Reinforcement not required.

A.N.MAGESH RAJA, M.E., (Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-I (RSE)
CMDA REG.No:SE/GR-I/2022/06/325
GCC REG.No:RSE101432021
CELL:97870 72100
magiststructure@gmail.com

COLUMN DESIGN

General Data

Column No.	:	C9 (GRID2/F)	
Level	:	7.5 m To 9 m	
Frame Type	=	Non-Ductile	
Response Reduction Factor	=	3	
Design Code	=	IS 456 + IS 13920 - 2016	
Grade Of Concrete	=	M20	N/sqmm
Grade Of Steel	=	Fe500	N/sqmm
Column B	=	230	mm
Column D	=	450	mm
Clear Cover	=	40	mm
Clear Floor Height @ B	=	2700	mm
Clear Floor Height @ D	=	2400	mm
No Of Floors	=	1	
No Of Columns In Group	=	1	
Column Type	:	Braced	
Minimum eccentricity check	:	Simultaneously (Both Axis)	
Code defined D/B ratio	:	4	
D/B Ratio	:	1.96 $\leq$ 4 Hence, Design as Column	

Flexural Design (Analysis Forces)

Analysis Reference No.	=	57	
Critical Analysis Load Combination	:	4	
Load Combination	=	[2] : 1.5 (LOAD 1: DL) +1.5 (LOAD 2: LL)	
Critical Location	=	Top Joint	
Put (top joint)	=	497.44	kN
Muxt (top joint)	=	-120.06	kNm
Muyt (top joint)	=	-3.95	kNm
Vuxt (top joint)	=	-2.47	kN
Vuyt (top joint)	=	47.25	kN
Pub (bottom joint)	=	508.42	kN
Muxb (bottom joint)	=	21.64	kNm
Muyb (bottom joint)	=	3.45	kNm
Vuxb (bottom joint)	=	-2.47	kN
Vuyb (bottom joint)	=	47.25	kN

A.N.MAGESH RAJA, M.E., (Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-III (RSE)
CMDA REG.No: SE/GR-I/2022/06/325
GCC REG.No: RSE101432021
CELL: 97870 72100
magiststructure@gmail.com

Minimum Eccentricity Check

Since Axial Force is compressive, Min. Eccentricity check to be performed

Minimum Eccentricity Along D:

$$\begin{aligned}\text{Minimum Eccentricity} &= \frac{\text{Unsupported Length}}{500 + D} \times 30 \\ &= 19.8 \text{ mm} \\ M_{\min x} (\text{top}) &= P_u \times \text{Minimum Eccentricity} \\ &= 9.95 \text{ kNm} \\ M_{\min x} (\text{bottom}) &= P_u \times \text{Minimum Eccentricity} \\ &= 10.17 \text{ kNm}\end{aligned}$$

Minimum Eccentricity Along B :

$$\begin{aligned}\text{Minimum Eccentricity} &= \frac{\text{Unsupported Length}}{500 + B} \times 30 \\ &= 13.07 \text{ mm} \\ M_{\min Y} (\text{top}) &= P_u \times \text{Minimum Eccentricity} \\ &= 9.95 \text{ kNm} \\ M_{\min Y} (\text{bottom}) &= P_u \times \text{Minimum Eccentricity} \\ &= 10.17 \text{ kNm}\end{aligned}$$

Slenderness Check

$$\begin{aligned}\text{Max Slenderness Ratio}(L/B) &= 11.74 \\ &< 60 \quad (\text{Hence Ok})\end{aligned}$$

Column Is Braced Along D

Slenderness Check Along D:

$$\begin{aligned}\text{Effective Length Factor} &= 1 \\ \text{Slenderness Ratio} &= \frac{\text{Effective Length}}{D} \\ &= 5.33, \text{ Column not Slender Along D}\end{aligned}$$

Column Is Braced Along B

Slenderness Check Along B:

$$\begin{aligned}\text{Effective Length Factor} &= 1 \\ \text{Slenderness Ratio} &= \frac{\text{Effective Length}}{B} \\ &= 11.74, \text{ Column not Slender Along B}\end{aligned}$$

Calculation of Design Moment

Direction	M _{analysis}	M _{min} (Abs)	M _{design}	M _{init}	M _{sldnx} (Abs)	M _{design-final}
	A	B	C	D	E	F
Major Axis Mux (top)	-120.06	9.95	-120.06	---	0	-120.06
Major Axis Mux (bottom)	21.64	10.17	21.64	---	0	21.64
Minor Axis Muy (top)	-3.95	9.95	-9.95	---	0	-9.95
Minor Axis Muy (bottom)	3.45	10.17	10.17	---	0	10.17

A.N.MAGESH RAJA, M.E., (Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-I (RSE)
CMDA REG.No: SE/GR-I/2022/06/325
GCC REG.No: RSE101432021
CELL: 97870 72100
magiststructure@gmail.com

Where

- A = Moments directly from analysis
 B = Moments due to minimum eccentricity
 C = Maximum of analysis moment and min. eccentricity = Max (A,B)
 D = Initial moment = $0.4 \times \text{Min (top, bottom)} \pm 0.6 \times \text{Max (top, bottom)}$ [As per sign requirement]
 E = Moment due to slenderness effect
 F = Final design Moment = $\text{Max}(C - \text{Top Bottom}, D - \text{Top Bottom}) + E$

Final Critical Design Forces

Pu	=	497.44	kN
Mux	=	-120.06	kNm
Muy	=	-9.95	kNm

Resultant Moment (Combined Action)**Moment Capacity Check**

Pt Calculated	=	1.99	
Reinforcement Provided	=	4-T20 + 4-T16	
Load Angle	=	$\tan^{-1}(M_{uy}/M_{ux})$	
	=	4.74	deg
MRes	=	120.47	kNm
MCap	=	141.44	kNm
Capacity Ratio	=	MRes/ MCap	
	=	0.85 <= 1	

Shear Design (Analysis Forces)**Design for shear along D**

Critical Analysis Load Combination	:	4	
Critical Load Combination	=	[2] : 1.5 (LOAD 1: DL) +1.5 (LOAD 2: LL)	
Design shear force, Vuy	=	47.2459	kN
Pu	=	497.44	kN
Deff	=	400	mm
Design shear stress, Tv	=	$V_{uy} / (B \times D_{eff})$	N/sqmm
	=	0.5135	N/sqmm
Pt	=	0.996	%
Design shear strength, Tc	=	0.6216	N/sqmm
Shear Strength Enhancement Factor	=	$1 + 3 \times P_u / (B \times D \times F_{ck})$	
	=	1.7209	
Shear Strength Enhancement Factor (max)	=	1.5	

A.N.MAGESH RAJA, M.E., (Structural Engineer)
 CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-I (RSE)
 CMDA REG.No: SE/GR-I/2022/06/325
 GCC REG.No: RSE101432021
 CELL: 97870 72100
 magiststructure@gmail.com

Shear Strength Enhancement Factor	=	1.5	
Enhanced shear strength, T_{c-e}	=	0.9323	N/sqmm
Design shear check	=	$T_{vy} < T_c \times \text{Enhancement factor}$	

Link for Shear Design along D are not required

Design for shear along B

Critical Analysis Load Combination	:	4	
Critical Load Combination	=	[2] : 1.5 (LOAD 1: DL) +1.5 (LOAD 2: LL)	
Design shear force, V_{ux}	=	-2.4682	kN
P_u	=	497.44	kN
B_{eff}	=	180	mm
Design shear stress, T_{vx}	=	$V_{ux} / (D \times B_{eff})$	kN
	=	0.0305	N/sqmm
P_t	=	0.996	%
Design shear strength, T_c	=	0.6216	N/sqmm
Shear Strength Enhancement Factor	=	$1 + 3 \times P_u / (B \times D \times F_{ck})$	
	=	1.7209	
Shear Strength Enhancement Factor (max)	=	1.5	
Shear Strength Enhancement Factor	=	1.5	
Enhanced shear strength, T_{c-e}	=	0.9323	N/sqmm
Design shear check	=	$T_{vx} < T_c \times \text{Enhancement factor}$	

Link for Shear Design along B are not required

Design Of Links

Links in the zone where special confining links are not required

Normal Links

Diameter of link	=	8	mm
	>	Max. longitudinal bar dia / 4	
	=	5	mm
Criterion for spacing of normal links			
Min. Longitudinal Bar dia X 16	=	256	mm
Min. dimension of column	=	230	mm
Max. 300 mm	=	300	mm
Provided spacing	=	225	mm

A.N.MAGESH RAJA, M.E., (Structural Engineer)
 CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-I(RSE)
 CMDA REG.No:SE/GR-I/2022/06/325
 GCC REG.No:RSE101432021
 CELL:97870 72100
 magistructure@gmail.com

Table For Links

	Required			Provided	
	Normal Design	Shear Design	Ductile Design	Normal Zone	Ductile Zone
Link Dia.	8	---	---	8	---
Spacing	225	---	---	225	---

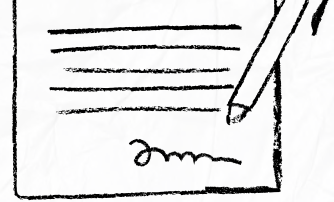
A.N.MAGESH RAJA, M.E.,(Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-III(RSE)
CMDA REG.No:SE/GR-I/2022/06/325
GCC REG.No:RSE101432021
CELL:97870 72100
magiststructure@gmail.com

GRID	:5/D				
Longer dimension of column L					380
Shorter dimension of column B					230
Unfactored axial load P					668
Unfactored moment in longer direction M1					3.101
Unfactored moment in shorter direction M2					1.181
Net soil bearing capacity					170
Gross safe bearing capacity					206
Height of footing below NGL					2
Unit weight of soil					18
Total load on footing					846
Gross pressures and check for tension					
P1	184	ok	} No tension		
P2	188	ok			
P3	189	ok			
P4	185	ok			
Required area					4.1
Provided area					4.5369
Longer dimension of footing L1					2.13
Shorter dimension of footing B1					2.13
Overall depth of footing D					450
Effective depth of footing d					400
Edge depth of footing ed					450
Cover to the main reinforcement					50
Grade of concrete fck					20
Grade of steel fy					500
Diameter of bars					12
LONGER MOMENTS					
Maximum pressure Pmax					150
Minimum pressure Pmin					146
Cantilever length					0.88
Average pressure					149
Moment M11					122
Effective width for moment					0.47
Mu/bd ²					2.44
Required percentage of steel					0.67
Minimum steel area					1150.2
Provided steel area Ast					1261
Spacing of reinforcement					190
SHORTER MOMENTS					
Maximum pressure Pmax					150
Minimum pressure Pmin					148
Cantilever length					0.95
Average pressure					150
Moment M22					144
Effective width for moment					0.60
Required percentage of steel					0.66
Minimum steel area					1150.2
Provided steel area Ast					1529
Spacing of reinforcement					150
CHECK FOR ONE-WAY SHEAR					
Longitudinal Direction					
Effective width at the section					1030
Effective depth at the section					400
Shear Area at the section					852000
Pressure at distance d from the face					149.0
Shear force at the section					151
Shear stress at the section Tv					0.266
pt for shear stress					0.148

A.N.MAGESH RAJA, M.E., (Structural Engineer)
 CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-I(RSE)
 CMDA REG.No:SE/GR-I/2022/06/325
 GCC REG.No:RSE101432021
 CELL:97870 72100
 magiststructure@gmail.com

Allowable shear stress Tc			0.286
Revised pt from shear requirement			0.120
Revised area of steel Ast			1022
Spacing of reinforcement			230.000
Transverse Direction			
Effective width at the section			1156
Effective depth at the section			388
Shear Area at the section			826440
Pressure at distance d from the face			150
Shear force at the section			172
Shear stress at the section Tv			0.311
pt for shear stress			0.185
Allowable shear stress Tc			0.315
Revised pt from shear requirement			0.120
Revised area of steel Ast			992
Spacing of reinforcement			240.000
CHECK FOR PUNCHING SHEAR			

A.N.MAGESH RAJA, M.E.,(Structural Engineer)
CMDA/GCC REGISTERED STRUCTURAL ENGINEER GRADE-I(RSE)
CMDA REG.No:SE/GR-I/2022/06/325
GCC REG.No:RSE101432021
CELL:97870 72100
magistructure@gmail.com



our services doesn't just end there



Buying & Selling Services

Property Buying Assistance, Property Selling Support, Market Price Analysis, Owner Outreach and Negotiation.



Legal & Documentation Services

Certified EC, Patta, legal opinions, property verification, due diligence, litigation solutions, and legal heir certificates.



Property Development & Approvals

Building plan approvals, construction, layout and sub-division approvals, zone conversion, and occupancy certification.



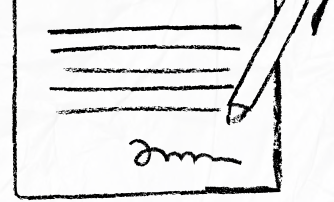
NRI & Investment Services

Escrow Services, Rentals, Litigation Solutions, Property Valuation and Property Management



Compliance & Special Services

Demolition, Vaasthu checks, regularization of unauthorized buildings, and office space solutions.



 **empowering your real estate decisions**
with smart tools



Property Valuation & Cost Estimation

Guideline Value, Apartment Composite Value, Stamp Duty & Registration Fees Calculator, Building Value Calculator, Capital Gains Calculator, Area Unit Converter, Length Unit Converter



Ownership, Compliance & Legal Verification

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



Zoning & Land Use Analysis

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



Property Documentation & Workflow Tools

Forms & Templates, Document Generator, Document Translation, Dictionary



Vastu & Property Management Tools

Home Vastu Shastra, Plot Vastu Shastra, Property Management



We're honored to be part of your
real estate journey

3/350/2 Mettukuppam,
OMR Thoraipakkam,
Chennai, India

hello@verified.realestate
[+91 9996 12 9996](tel:+919996129996)
www.verified.realestate