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Proposed Construction of Residential Non - High Rise Group Development consists of 2 Blocks; Block 1& 2 Combined First Floor, Block 1: 5 Floors + terrace floor (Height - 18.30M) With 75 Dwelling Units with clubhouse, Stilt + 5 upper floors + terrace floor, Swimming pool on the first floor level; Block 2- 5 upper floors + terrace floor (Height-18.30 M) With 85 Dwelling Units, Totally 160 Dwelling Units for Affordable Housing benefit At Madambakkam Village, Madambakkam, Chennai, Comprised In Old Survey No. 771/1A, 771/2A, New patta Survey No.771/1A2, Shrudhi sai nagar Main Road, Madambakkam, Madambakkam Village, Tambaram Taluk, Chengalpattu District, Chennai, Tamil Nadu – 600126.

STRUCTURAL DESIGN BRIEF REPORT

CLIENT : **DRA Aadithya South City Projects Private Limited,**
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PROJECT : **DRA VENKAT RICHBURG,**
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ARCHITECT : **SRISHTI DESIGN CONSULTANTS,**
3, 2ND Main Rd, Sabai Colony, Maruthi Nagar,
Sembakkam, Rajakilpakkam,
Chennai, Tamil Nadu-600073.

STRUCTURAL CONSULTANT'S : **VISION STRUCTURAL DESIGN AID**
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VISDA engineering thoughts Vision Structural Design Aid

JOB NO. : **VISDA-STR-2274**

ISSUE RECORD

DATE	ISSUE	PREPARED	CHECKED	REVISION
09.10.2025	R0	YOGESH	AMARNATH	R0

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AMARNATH R. BORAIAH
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A.0 INTRODUCTION

M/s Proposed Construction of Residential Non - High Rise Group Development consists of 2 Blocks; Block 1& 2 Combined First Floor, Block 1: 5 Floors + terrace floor (Height - 18.30M) With 75 Dwelling Units with clubhouse, Stilt + 5 upper floors + terrace floor, Swimming pool on the first floor level; Block 2- 5 upper floors + terrace floor (Height-18.30 M) With 85 Dwelling Units, Totally 160 Dwelling Units for Affordable Housing benefit At Shrudhi Sai Nagar Main Road, Madambakkam,Chennai, Comprised In Old Survey No. 771/1A, 771/2A, New patta Survey No.771/1A2, Shrudhi sai nagar Main Road, Madambakkam, Madambakkam Village, Tambaram Taluk, Chengalpattu District.
Structural Engineering service is provided by M/s VISION STRUCTURAL DESIGN AID, Bangalore. The approximate built-up area of the building is about **18111.98 SQM**.

The proposed multi storied building consists of 2 blocks in which each block has the following:

Stilt floor + 5 floors + Terrace and Above Terrace floor.

The criteria furnished in this document shall govern the design of civil and structural works of the proposed project. This document covers the general description of the applicable design codes and standards, characteristics of the building, specific building materials, design criteria, design loads and combination, design methodology adopted for the structures.

A.1 STATUTORY REQUIREMENTS:

The design of structural and other building services will comply with the following requirements:

- National Building Code
- The Building Regulations Act
- The Environmental Protection Act in liaison with the Environmental Agency.
- Fire prevention and detection in compliance with the local Fire Regulation.
- ASHRAE.
- Any other applicable laws as advised by the client.
- Bureau of Indian Standard Codes.

B.0 DESIGN STANDARDS:

Specific applicable codes and standards will be identified and adopted in the design philosophies as appropriate to the structural elements. The latest editions of the Codes and Standards will be used in designs. All design work shall be based on Indian Standards and Codes with latest revision, with amendments if any, as on date.

Loads:
IS: 875(PART-1)-1987-Code of Practice for Design Loads (Other than earthquake) for Buildings and structure.
PART-1 DEAD LOADS - Unit Weights of Building Materials and Stored Materials.
PART-2 - IMPOSED LOADS
PART-4 - SNOW LOADS.
PART-5 - SPECIAL LOADS AND COMBINATIONS.

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IS: 875-2015 (PART-3) - Wind Loads – Code of Practice for design loads (other than earthquake) for Buildings and structure.

Foundations:

IS: 1080 Code of Practice for design and construction of shallow foundations on soils (Other than raft, ring and shell)
IS: 1904 Code of Practice for design and construction of foundations in soils general requirement
IS: 2950 Code of Practice for design and construction of raft foundations
IS: 2974 Code of Practice for design and construction of machine foundations (All parts)
IS: 8009 Code of Practice for calculation of settlement of foundations (All parts)
IS: 11089 Code of Practice for design and construction of ring foundation
IS2911- PART2 Code of Practice for design and construction of Pile foundation.

RCC:

IS: 456 Code of Practice for plain and reinforced concrete
IS: 458 Specification for precast concrete pipes
IS: 3370 Code of Practice for concrete structures for the storage of liquids: (All parts)
IS: 3414 Code of Practice for design and installation of joints in buildings
IS: 3935 Code of Practice for composite construction
IS: 4326 Code of Practice for earthquake resistant design and construction of buildings
IS: 5525 Recommendation for detailing of reinforced concrete works
IS: 1786 Specification for high strength deformed steel bars and wires for concrete Reinforcement
IS: 10262 recommended guidelines for concrete mix design
IS: 11384 Code of Practice for composite construction in structural steel and concrete
IS: 1893-2016 (Part-1) Criteria for earthquake resistant design of structures (General Provisions and building).
IS: 1893(Part-4) Criteria for earthquake resistant design of structures (Industrial structures Including stack-like structures).
IS: 13920 Ductile Detailing of reinforced concrete structures subjected to seismic forces
IS: 16700-2017 Criteria for Structural Safety of Tall concrete

Structural steel:

IS: 800 Code of Practice for general construction in steel
IS: 806 Code of Practice for use of steel tubes in general building construction
IS: 808 Dimensions for hot rolled steel beam, column channel and angle section
IS: 813 Scheme of symbols for welding
IS: 816 Code of Practice for use of metal arc welding for general construction in mild Steel
IS: 1161 Steel tubes for structural purposes
IS: 2062 Structural steel (fusion welding quality)
IS: 4000 High Strength bolts in steel structures – Code of Practice
IS: 7215 Tolerances for fabrication of steel structures
IS: 9595 Recommendation for Metal arc welding of carbon and carbon manganese steel
IS: 12843 Tolerances for erection of steel structures

Miscellaneous:

IS: 432(part 2) Specification for mild steel and medium tensile steel bars and hard-drawn

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Steel wire for concrete reinforcement
IS: 8112 43 grade Ordinary Portland cement specification.
IS: 6313(part II) Standards for anti-termite treatment
IS: 2751 Code of practice for welding of mild steel bars used for reinforced concrete construction
IS: 1346 Code of Practice for water proofing of roofs with bitumen felts
IS: 1742 Code of Practice for building drainage
IS: 1905 Code of Practice for structural use of unreinforced masonry
IS: 2470 Code of Practice for installation of septic tank:
(Part 1) Design criteria and construction
(Part 2) Secondary treatment and disposal of septic tank effluent
IS: 3067 Code of Practice for general design details and preparatory works for damp Proofing and water proofing of buildings
SP: 6 Handbook for structural engineers (all parts)
SP: 7 National Building Code of India
SP: 16 Design Aids for reinforced concrete to IS: 456-1978
SP: 20 Handbook on masonry design and construction
SP: 22 Explanatory handbooks on codes for earthquake engineering (IS: 1983-1975 and IS: 4326-1976)
SP: 24 Explanatory handbook on Indian Standard code of Practice for plain and Reinforced concrete
SP: 25 Handbook on causes and prevention of cracks in buildings
SP: 32 Handbook on functional requirements of industrial buildings
SP: 34 Handbook of concrete reinforcement and detailing (SCIP)

C.0 DESIGN DATA

C.1.1 DEAD LOADS

Dead load shall include weight of all Structural and Architectural components. Self-weight of the materials shall be calculated on the basis of unit weights given in IS: 875.

Materials	Unit weight kN/m³
Steel	78.50
Plain Concrete	24.00
Reinforced Concrete	25.00
Brickwork	20.00
Solid Block work	20.00
Cement plaster	21.00
Roof treatment (7 course bituminous)	1.25
Floor finish	24.00
Aerated block masonry	8.65
Soil	18.00
Water	10.00
Glass	0.167
Dry Partition Walls	As Per Actuals

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C.1.2 LIVE LOADS

The imposed loads shall be calculated in accordance with IS: 875(Part-2)-1987 based on Occupancy Classification. For multiple occupancies of use in the building, it shall be referred with the other appropriate comparable occupancy classification as per Table.1 of IS 875(Part-2)-1987.

1. Living rooms, Dining rooms	:	2.0	kN / sq.m
2. Bedrooms	:	2.0	kN / sq.m
3. Kitchen	:	2.0	kN / sq.m
4. Toilets	:	2.0	kN / sq.m
5. Store rooms	:	3.0	kN / sq.m
6. Foyer	:	3.0	kN / sq.m
7. Balconies	:	3.0	kN / sq.m
8. Corridors	:	3.0	kN / sq.m
9. Staircases	:	3.0	kN / sq.m
10. Passages	:	3.0	kN / sq.m
11. Lobbies	:	3.0	kN / sq.m
12. Salon/Spa	:	4.0	kN / sq.m
13. Kid play area	:	4.0	kN / sq.m
14. Multi-purpose hall	:	4.0	kN / sq.m
15. Gymnasium	:	5.0	kN / sq.m
16. Terraces	:	2.0	kN / sq.m
17. Solar panels at terrace level	:	1.0	kN / sq.m
18. OHT	:	20.0	kN / sq.m
19. Deck slab	:	4.0	kN / sq.m
20. Indoor games	:	4.0	kN / sq.m
21. Video games	:	4.0	kN / sq.m
22. Mini theater	:	5.0	kN / sq.m

C.1.2 a. Details of Dead Loads & Live Loads Considered for DRA Aadithya South City Projects, The following are the imposed gravity loads adopted in additional to the self-weight (Self Weight of Slab / beam /columns are calculated as per the dimensions adopted in the Respective drawings).

1. Stilt Floor:

a. Super Imposed Load

LOAD COMPONENT	THICKNESS(mm)	LOAD INTENSITY
WALL LOADS (200mmthk wall Light Weight BLOCK). Height of the floor is taken as 2.85mts as per Architectural Elevation. (Density = 10kN/m^3)	200	5.7 KN/m

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2. Typical Floor:

a. Super Imposed Load

LOAD COMPONENT	THICKNESS(mm)	LOAD INTENSITY
WALL LOADS (200mmthk wall Light Weight BLOCK). Height of the floor is taken as 2.55mts as per Architectural Elevation. (Density = 10kN/m^3)	200	5.1 KN/m
WALL LOADS (100mmthk wall Light Weight BLOCK). Height of the floor is taken as 2.55mts as per Architectural Elevation. (Density = 10kN/m^3)	100	2.55 KN/m

3.Terrace Floor's

a. Super Imposed Load

LOAD COMPONENT	THICKNESS(mm)	LOAD INTENSITY
Finishes (Density Should not exceed 24kN/CUM)	150	3.6 KN/m

b. Live Load

LOAD COMPONENT	LOAD INTENSITY (KN/SQMT)
Terrace Area	2 kN/sqm

C.1.3 SUPER DEAD LOADS

The super dead loads (SDL) are considered to have floor finishes, plastering, in addition with the toilet and balcony sunken slabs.

1. Floor finishes : 1.2 kN/sq. MT
2. Ceiling plastering (15mm) : 0.3 kN/sq. MT
3. Total SDL : 1.5 kN/sq. MT
4. For Sunk 50mm, Total SDL : (0.050*20) + 1.5 = 2.5 kN / sq.mt
5. For Sunk 100mm, Total SDL : (0.100*20) + 1.5 = 3.5 kN / sq.mt
6. For Sunk 150mm, Total SDL : (0.150*20) + 1.5 = 4.5 kN / sq.mt

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Fig.2 Basic Wind Speed

The proposed project is located at, **Madambakkam, Chennai** in Tamilnadu and the wind loads as per IS 875 part 3-2015 has been considered. The following parameters are considered for the calculation of wind pressure for the proposed residential apartment,

Basic Wind Speed (Vb)	:	50 m/sec
Risk Coefficient (k1)	:	1.0
Terrain, category and class	:	Category 2
Size factor (k2) Structure)	:	1.0 (Calculated by considering the actual height of the
Topography factor (k3)	:	1.0
Importance Factor (k4)	:	1.0
Design wind speed, Vz	:	***Vb x k1 x k2 x k3 x k4***
Design wind pressure, Pz	:	***0.6 x Vz^2***

The external and internal pressure co-efficient shall be as per respective clause of IS: 875 (Part 3)

C.1.5 SEISMIC FORCES

Madambakkam, Chennai comes under **Seismic zone III** as per **IS 1893-2016** (Part 1) (Sixth Revision) and has the following factors to be considered for designs:

Seismic Zone	: III
Seismic Zone factor, Z	: 0.16 (As per Table 3-IS: 1893-2016)
Importance factor, I	: 1.2 (As per Table 8-IS: 1893-2016)
Response reduction Factor, R	: 4 (Buildings with ductile RC Structural walls, As per Table 7 – IS 1893-2016)

Time Period is being calculated by considering RC structural walls, i.e. as per Clause 7.6.2 of IS 1893-2016

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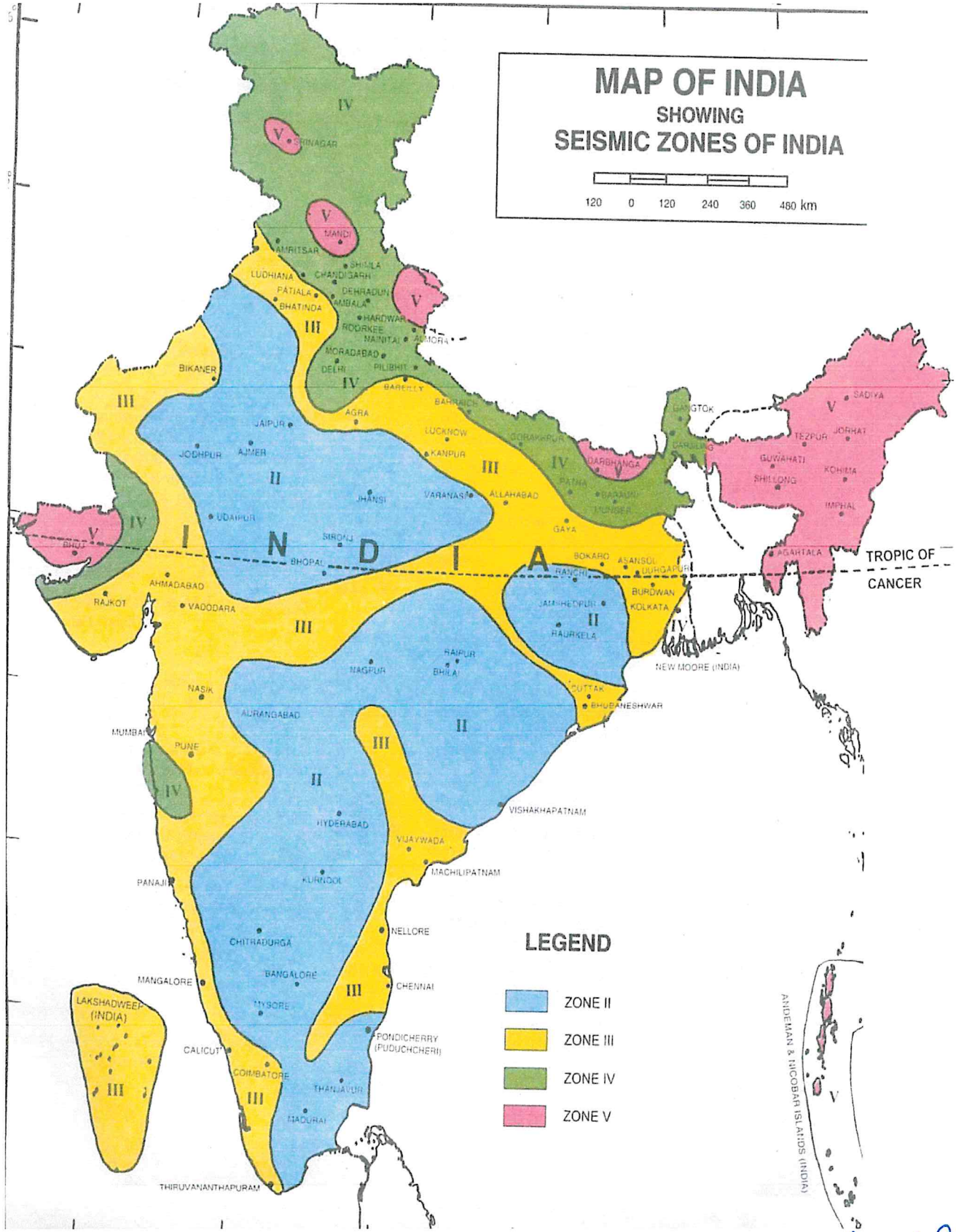


Fig.3 Earthquake zones of INDIA

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C.1.6 Temperature Loads

Temperature Load Calculation:

Average Annual Minimum Temperature: 22 degree

Average Annual Maximum Temperature: 45 degree
(Considered Avg. annual Min / Max Temp)

Design Temperature Differential: ((45 - 22) x 2/3) x 0.5 = 7.67deg

Temperature variation has been considered as 2/3 of the average annual variation and designed for 50% of the Temperature variation

C.2 ENVIRONMENTAL CONDITIONS, CORROSION AND FIRE PROTECTION FOR CONCRETE AND STRUCTURAL STEEL

C.2.1

- **Environment** : Moderate for all structures other than water retaining structure
- **Exposure conditions** : Concrete surfaces protected against weather or aggressive Condition except those situated in coastal area.
- **Fire protection** : Thickness of the structural elements as per cl.21.0 of IS456:2000

Fire Resistance h	*Minimum Beam Width b*	*Rib Width of Slabs b_w*	*Minimum Thickness of Floors D*	*Column Dimension (b or D)*			*Minimum Wall Thickness*		
				Fully Exposed	50% Exposed	One Face Exposed	$p<0.4\%$	$0.4\% \le p \le 1\%$	$p>1\%$
	mm	mm	mm	mm	mm	mm	mm	mm	mm
0.5	200	125	75	150	125	100	150	100	100
1	200	125	95	200	160	120	150	120	100
1.5	200	125	110	250	200	140	175	140	100
2	200	125	125	300	200	160	–	160	100
3	240	150	150	400	300	200	–	200	150
4	280	175	170	450	350	240	–	240	180

NOTES

1 These minimum dimensions relate specifically to the covers given in Table 16A.

2 p is the percentage of steel reinforcement.

FIG. 1 MINIMUM DIMENSIONS OF REINFORCED CONCRETE MEMBERS FOR FIRE RESISTANCE

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- **Minimum grade of concrete** : Severe exposure – M30
- **Nominal cover to reinforcement** : For Sever Exposure Nominal cover should Not be less than 30 mm.

Type of Structural element	Min. Cover to reinforcement
Footing	50 mm

For 2.0 hr. Fire Resistance Beams, Slabs and Columns Shall have the min Cover as Specified Below:
Ref: (Table 16 A of IS456:2000)

Type of Structural element	Min. Cover to reinforcement
Beam	30 mm
Slabs	25mm
Columns	40 mm

C.3 TEMPERATURE AND SHRINKAGE EFFECT:

Horizontal floor displacement due to differential temperatures and shrinkage is of importance in long concrete buildings. It can be taken care of by either providing expansion joints at an appropriate spacing or designing structural members for the additional moments caused by the temperature and shrinkage effects.

C.3.1 TEMPERATURE LOADS:

The effect of temperature will be considered wherever applicable in accordance with relevant Indian Codes. The coefficient for thermal expansion and contraction will be in accordance with IS: 456 for concrete.

C.4 EXCEPTIONAL LOADS:

- Loads due to the following catastrophe scenarios are not considered in the design.
- Exceptional loads due to terrorist attacks (Explosions)
- Accidental loads (Falling of aircraft on the building)
- Accidental hitting of vehicle on the façade
- Snow Load

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E.1 STRUCTURAL CONFIGURATION

FRAMING SYSTEM

RC structural wall system as per IS 16700- 2017 consisting of

1. RC walls, Columns, Beams, and Slabs.
2. Detailing is done as per SP 34 & IS 13920 -2016 for all vertical and frame members

From foundation to First / Second floor, the structure is framed with Walls. Plinth beams at Stilt level and Transfer beams at First Floor Level. Few long RC walls are also considered from foundation to First for adequate rigidity. Above First floor level, the structure is made of RC walls and Columns of about 200thk.The walls are considered with Double layer reinforcement with the walls resisting moment only in the Major axis. Out of plane moments are not considered and Minor axis moment is released. Shear stress is checked for 0.25 Sqrt (Fck) as per IS 13920.

	DESCRIPTION	BUILDING SYSTEM
a)	Structural system	RC Structural Wall System 200/300/thk wall up to level-1 200thk wall and columns for above levels may vary as per design.
b)	Plinth beams	Varies
c)	Slab thickness	125/150/200 mm
d)	Girder Beams	varies
e)	No. of slabs	Stilt floor + 4 Upper floors + Terrace and Above Terrace floors.

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STRUCTURAL ANALYSIS AND DESIGN:

E.2.1. GENERAL

- The structural analysis is carried out by finite element method using the commercially available software tool for the load combinations as per standards.
- Forces and moments from the 3D analysis output for the worst combinations are used for the design of the structure.
- The structure is analyzed for specific loads like dead load, live load, wind and seismic loads and for the load combinations as given in the relevant codes.
- The structure shall be designed according to the Limit State Method as specified in IS: 456 – 2000.
- Construction sequence analysis is also carried out to obtain proper axial load transfer in the transfer beams at Plinth level.

E.2.2. FOUNDATION

As per soil report SBC is 300 kN/m^2 at a depth 2m from the EGL and type of foundation is isolated footing for the estimated immediate settlement of 7mm is within the allowable limit of 60mm. Hence isolated foundation shall be adopted and Some footings of proposed building may fall in site's large open well, as per soil report SBC of 200kN/m^2 considered and also footing area is made into combined footing or small raft.

E.3 DEFLECTION LIMITS:

For Reinforced concrete works:

- Limiting values of deflection (Short and Long term) as per **cl. 35.3and 23.2 of IS: 456-2000** is followed in the design.
- Limiting value for short term deflection is considered as span/250 and for the long-term deflection is considered as span/350 or 20mm whichever less as per IS 456 – 2000.
- The vertical deflection limits may generally be assumed to be satisfied provided that the span to depth ratios is not greater than the values obtained as below:
    - **Continuous**..... 26
    - **Simply Supported**.....20
    - **Cantilever**.....7
- As per IS1893 (Part1): 2016, Story drift in any story due to minimum specified design seismic lateral force shall not exceed 0.004 times the story height.
- Lateral sway due to wind load should not exceed H/500 (H is the total height of structure).

E.4 CRACKING LIMITS

- Limiting values of crack width as per cl. 35.3 of IS: 456-2000 is followed in the design.
- In general for slabs and beams, the crack width is limited to 0.3mm.

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- For water retaining structures, the water retaining portion of the structure will be designed as uncracked section.

E.5 LOAD COMBINATIONS

Load Combination	Limit State of Collapse			Limit State of Serviceability		
	DL	LL	WL/EL/TL	DL	LL	WL/EL/TL
DL +LL	1.5	1.5	—	1	1	—
DL +/- WL+TL	1.5	—	1.5	1	—	1
DL +/- EL+TL	1.5	—	1.5	1	—	1
DL +/- WL	0.9*	—	1.5	1	—	1
DL +/- EL	0.9*	—	1.5	1	—	1
DL+LL+/-WL+TL	1.2	1.2	1.2	1	0.8	0.8
DL+LL+/-EL+TL	1.2	1.2	1.2	1	0.8	0.8

Other than the above mentioned combinations, some more combinations are considered as specified in IS:1893-2016 / Cl. 6.3.2.2 and 6.3.4.1 for the Block 1 ,2 , 3 & 4 due to its non-parallel lateral force system.

(*This value is to be considered when stability against overturning and stress reversal is critical.)

The various loads are combined in accordance with the stipulations in IS: 875 (Part 5)-1987; whichever combination produces the most unfavorable effect in the building foundation or structural member concerned may be adopted.

Where DL/LL/WL/EL denotes,

DL- Dead Load- Includes Self Weight of Structure and Super Imposed Load (SDL)

LL- Live Load

WL- Wind Load

EL- Earthquake Load

TL- Temperature Load

Wind load and Earthquake loads are considered for both x & y directions. Whenever imposed load is combined with earthquake load, the appropriate part of imposed load as specified in IS: 1893-2016 / Cl. 7.3.1 of seismic code will be used both for evaluating earthquake effect and for combined load effects used in such combination.

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F. GEOTECHNICAL RECOMMENDATIONS:

As per soil report SBC is 300 kN/m^2 at a depth 2m from the EGL and type of foundation is isolated footing for the estimated immediate settlement of 7mm is within the allowable limit of 60mm. and Some footings of proposed building may fall in site's large open well, as per soil report SBC of 200kN/m^2 considered and also footing area is made into combined footing or small raft.

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THE LANDLENS SUITE

Eight ways to know a piece of land before you pay for it.

This report covers one part of the picture. These cover the rest, drawn from the same government records, for any property in Tamil Nadu.

LandLens One
Ask anything about a property and get an answer grounded in live government records, with the sources shown.
/landlens/one

Verify My Land
Every record check run on one property and returned as a single report.
/landlens/verify-my-land

Legal Opinion
An advocate's written opinion on the title, built on the records we pull for it.
/landlens

One Map
Every layer on one map: the parcel, its boundary, zoning, water bodies and what sits around it.
/landlens/one/map

PriceMap
What land actually changed hands for around this plot, taken from the registered deeds.
/landlens/pricemap

Build Scope
What you are allowed to build here: floor space, height, coverage and setbacks.
/landlens/build-scope

Property Tracker
Watch a property and hear about it when something new is registered against it.
/landlens/property-tracker

Deal Room
Run the transaction in one place: documents, stamping, signatures and the parties.
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FREE TOOLS · NO ACCOUNT NEEDED

Twenty-four checks you can run yourself, at no cost.

Records and verification

The registers themselves, read for you.

- Encumbrance Certificate
- Patta and Chitta
- Field Measurement Sketch
- EC Analyzer
- Bank charge check
- Court case search
- Seller background check
- Approval check by survey

Value and duty

What it is worth and what it costs to register.

- Guideline value by street
- Guideline value by survey
- Stamp duty and registration fees
- Capital gains
- Floor space index
- Area unit converter

Zoning and land use

What the plan says can happen on this land.

- Land use zone finder
- CMDA land use check
- Coastal regulation zone
- Master plan check
- Water bodies finder
- Airport height clearance

Registers and directories

Who holds it, and which office keeps the record.

- Find your registering office
- Temple property check
- Waqf property check
- RERA register

Every free tool
/tools

Services we run for you
/services

The LandLens suite
/landlens/one

Verified RealEstate™

Every claim in this document traces back to a government record.

- Legal opinions, due diligence and title verification
- Building plan, layout and sub-division approvals
- Completion and occupancy certificates, regularisation
- Escrow, negotiation and NRI property management
- Land survey, soil testing, architecture and construction

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Prepared from the registers named on the page each finding sits on. Where a register could not be read, this document says so in its place rather than leaving the gap to be read as a clean result.