



**Er.S.Pradeep,ME.,**

**STABILITY CERTIFICATE**

1. The detailed engineering and structure design of the proposed building comprising of **Block 1 Residential Block(Stilt, First, Second, Third, Fourth, Fifth floor & Terrace floor), Block 2 Residential Block (Stilt, First, Second, Third, Fourth, Fifth floor & Terrace floor), Block 3 Commercial Block (Stilt, First, Second, Third) in S.F No.422/4A2, 422/5A2 & 422/5B2 at Keeranatham village, Annur Taluk, Coimbatore District, and Total 85 dwellings** has been done by me/us based on the report of Geotechnical investigation (soil test) done by **SRI KRISHNA GEOTECH, Coimbatore-641039,** Report No.**SKG/GIR/89/2024-2025** Dated **28.12.2024-30.12.2024** and considering the functional requirement of the building.
2. It is certified that among other factors, the proposed building has been designed to resist earthquake. I/We have checked various parameters and found that the proposed building would be safe.
3. I/We further certify that:
  - (i) The minimum grade of concrete is **M20.**
  - (ii) The design and analysis has been done using the code of practice for plain and reinforce concrete as per IS 456, design loads as per IS Codes No **456** and design of earthquake resistant structure as per IS code No.**456**
4. The building will be safe and sound when used for the purpose for which it is designed.

Stamp and Signature

**Date:04/03/2026**

  
**Er.S.PRADEEP, B.E.,M.E(IST)**  
**REGISTERED STRUCTURAL ENGINEER Grade-II,**  
**Reg.No:DTCP/NAMAKKAL/RSE-II/001/2022**  
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Encl.: Structural Design Calculation

**No.55/2A, Near Ganapathy Fire Station, Gandhi Maa Nagar,  
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**DIRECTORATE OF TOWN & COUNTRY PLANNING**  
**OFFICE OF THE ASSISTANT DIRECTOR OF TOWN & COUNTRY PLANNING**  
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**PROFESSIONAL REGISTRATION**  
**CERTIFICATE**



This is to certify that **Thiru.S.PRADEEP** has enrolled as **REGISTERED STRUCTURAL ENGINEER GRADE-II(SE-II)** with Directorate of Town & Country Planning (DTCP) Who has the qualification of **B.E. (CIVIL ENGINEERING)** and experience in the relevant field for **THREE** Years and **SIX** Month.

He/She has been given the Registration No. **DTCP/NAMAKKAL/RSE-II/001/2022**. He/She Shall be required to comply with the duties and responsibilities prescribed by the Government of Tamil Nadu in Part V, "Registration of Professionals ", Tamil Nadu Combined Development and Building Rules,2019, approved vide G.O.(MS) No.18 Municipal Administration and water Supply (MA1) Department, Dated 04.02.2019.

This Registration is Valid up to: 24.03.2027



Place: Namakkal-01

Date: 25.3.22

  
ASSITANT DIRECTOR  
DISTRICT TOWN & COUNTRY  
PLANNING OFFICE, NAMAKKAL DISTRICT  
NAMAKKAL-637001.

## **STRUCTURAL DESIGN REPORT**

**" PROPOSED RESIDENTIAL APARTMENT BUILDINGSTILT, FIRST, SECOND, THIRD, FOURTH, FIFTH FLOOR & TERRACE FLOOR OF G+5 FLOORS IN SF.NO. 422/4A2, 422/5A2 & 422/5B2 AT KEERANATHAM VILLAGE, ANNUR TALUK, COIMBATORE**

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## FOREWORD

### -Description of Project

PROPOSED RESIDENTIAL APARTMENT BUILDING STILT, FIRST, SECOND, THIRD, FOURTH, FIFTH FLOOR & TERRACE FLOOR OF G+5 FLOORS IN SF.NO. 422/4A2, 422/5A2 & 422/5B2 AT KEERANATHAM VILLAGE, ANNUR TALUK, COIMBATORE

**-Objective of the Report.** The objective of the report is to provide and furnish details related to Project and structural considerations.

### -Scope of the Report.

The Structural Report covers the complete Structural Elements design (column) considerations for analysis of lateral loads & gravity loads.

## CODES, STANDARDS

### AN DREFERENCES Statutory Requirements:

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

- Nation I Building Code
- The Building Regulations
- The Environmental Protection Act in line with the Environmental Agency.
- Fire prevention and detection in compliance with the local Fire Regulation.

### DESIGN STANDARDS:

Specific applicable code 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-

1893 Code of Practice for design loads (other than earthquake) for Buildings and structure (All parts)

IS:1893-2016 Criteria for earthquake resistant design of structure

  
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**Foundations:**

IS:1080-1985(2016)Code of Practice for design and construction of  
Shallow foundations on soils (other than raft, ring and shell)

IS:1904-

1986(2015)Code of Practice for design and construction of foundations in soils general  
requirement

IS:2950-1981(2013)Code of Practice for design and construction of raft foundationIS:2974-

1998(2013/2015)Code of Practice for design and construction of machine foundations(All parts  
)

IS:8009-1976/1980(2013/2015)Code of Practice for calculation of settlement of  
foundations (All parts)

**RCC:**

IS:456-2000:Code of Practice for plain and reinforced concreteIS:458-1988 Specification for precast  
concrete pipes

IS:3370-2009Code of Practice for concrete structures for the storage of liquids:(All

parts)IS:4326-2013 Code of Practice for earthquake resistant design and construction of

buildings IS:5525-1969(2013) Recommendation for detailing of reinforced concrete works

IS:1786- 2008Specification for high strength deformed steel bars and wires for concrete

reinforcement IS:10262-2009 Recommended guide lines for concrete mix design

IS:1893 (Part-1)-2016 Criteria for earthquake resistant design of  
structures(General provisions and building).

IS:13920-1993:Ductile detailing of reinforced concrete structures.

  
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**Miscellaneous:**

IS:432(part 2)-1995 Specification for mild steel and medium tensile steel bars and hard- drawn steel wire for concrete reinforcement

IS:6313 (partII)-2001Standardsforanti-termitetreatment

IS:1905-1998Code of Practice for structural use of un reinforced masonry IS:3067-

1995 Code of Practice for general design details and preparatory works for damp proofing and water proofing of buildings

SP:6-1998 Hand book for structural engineers(all parts)SP:7- 2005 Nationa I

Building Code of India

SP:16-1999 Design Aids for reinforced concrete to IS:456-1978

SP:22-1982 Explanatory handbook on codes for earthquake engineering (IS:1982- 1975andIS:4326-1976)

SP:24-

1983 Explanatory handbook on Indian Standard code of Practice for plain and reinforced concrete

SP:34-1987Handbook of concrete reinforcement and detailing(SCIP)

Wherever appropriate Indian Regulation does not exist for any particular item, appropriate British standards will be used.

**Material:**

IS:269-2015 Specification for Ordinary, rapid hardening and low heat Port land cement. IS:455-1995 Specification for Portland blast furnaces lag cement.IS:1489-

1991Specification for Portland pozzolana cement

IS:4031-1991Method of physical tests for Portland cement.

IS:383-2016 Specification for coarse and fine aggregates from natural sources for concrete.IS:516-1999 Method of test for strength of concrete.

IS:1199-1999 Method of sampling and analysis of concrete.

IS:1566-2000 Specification for plain hard drawn steel wire fabric for con crete reinforcement.

IS:4990-1998 Specification for ply wood for concrete shuttering works.

IS:2645-1999 Specification for integral cement water proofing compounds.

  
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## **-DESCRIPTION OF STRUCTURE**

### **-Location**

G+5 FLOORS IN SF.NO. 422/4A2, 422/5A2 & 422/5B2 AT KEERANATHAM VILLAGE, ANNUR TALUK, COIMBATORE

**-Building Description.** The Residential Building Consists of the following: Kindly study the architectural drawings for better understanding

❖ Stilt+5floors+Terrace

### **-Structural Arrangement:**

- The Structural Systemize RCC framed Structure comprising of Conventional RCC Slab& RCC Beam supported by RC structural columns/walls with Primary & Secondary beams. Flat slabs beam sand Columns Are considered to act as a rigid diaphragm to transfer the lateral forces to the lateral load resisting elements.

  
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## **-DESIGN APPROACH**

### **1.4.1-**

#### **Design data Loads:**

##### **Dead loads:**

Dead loads 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.

|                                      |                           |
|--------------------------------------|---------------------------|
| ❖ Floor finish of 75mm thickness     |                           |
| For floors                           | : 180kg/sq.m (1.8kN/sq.m) |
| ❖ False ceiling/ducting + Sprinklers | : 20kg/sq.m (0.2kN/sq.m)  |
| ❖ Dry Partition                      | : 100kg/sq.m (1.0kN/sq.m) |
| ❖ Self-weight of Plain concrete      | : 2400kg/cu.m (24kN/cu.m) |
| ❖ Self-weight of RCC                 | : 2500kg/cu.m (25kN/cu.m) |
| ❖ Solid block masonry                | : 2500kg/cu.m (25kN/cu.m) |
| ❖ Soil (Dry)                         | : 1800kg/cu.m (18kN/cu.m) |
| ❖ Soil (Wet)                         | : 2000kg/cu.m (20kN/cu.m) |
| ❖ Water                              | : 1000kg/cu.m (10kN/cu.m) |

##### **Live loads:**

The superimposed loads shall be calculated in accordance with IS:875 (Part-2) based on Occupancy Classification. For multiple occupancies of use in the building shall be referred with the other appropriate comparable occupancy classification as per Table.1 of IS875 (Part-2)-1987.

Following live loads are considered while designing the structural elements apart from the dead loads

##### **Floors**

|                  |                           |
|------------------|---------------------------|
| ❖ Typical floors | : 200kg/sq.m (2.0kN/sq.m) |
| ❖ Terrace        | : 150kg/sq.m (1.5kN/sq.m) |

Actual loading due to lifts loads shall be ascertained and design live loads are suitably modified (if required) and considered.

  
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**Load calculation:**

| Roof Slab Load                   |  | Thickness<br>n m      | Unit<br>Weight-<br>kN/m <sup>3</sup> | Load  |         |
|----------------------------------|--|-----------------------|--------------------------------------|-------|---------|
| <b>Dead Load-Floor</b>           |  |                       |                                      |       |         |
| False ceiling                    |  |                       |                                      | 0.200 | kN/sq.m |
| Partition                        |  |                       |                                      | 1     |         |
| Floor finishes                   |  | 0.075                 | 24                                   | 1.800 | kN/sq.m |
|                                  |  |                       | Total=                               | 3     | kN/sq.m |
| <b>Live Load-Floor</b>           |  | a) For Typical floors |                                      | 2.0   | kN/sq.m |
| <b>Live Load-Roof accessible</b> |  |                       |                                      | 1.5   | kN/sq.m |

All sunken are as additional sunken filling load of  $0.75 \text{ kN/m}^2$  is considered in Dead load.

200mm Solid Block wall Load on Grade Beam  $= (4.114 - 0.3) \times 0.2 \times 25 = 19.1 \text{ kN/m}$  Solid Block wall @ Typical floor  $= (3 - 0.3) \times 0.2 \times 25 = 13.5 \text{ kN/m}$

Parapet wall load on terrace  $= 1.2 \times 0.2 \times 25 = 6.0 \text{ kN/m}$

Head room load  $= 2.5 \times 0.2 \times 25 = 12.5 \text{ kN/m}$

**Wind Loads**

The Wind pressures shall be calculated in accordance with IS: 875 (Part-3)- 2015. For Coimbatore, the basic wind speeds are considered at 39m/sec.

Basic Wind  $V_b$  : 39m/s

Speed Risk  $k_1$  : 1 ( $k_1$  corresponds to 50 years Mean Probable Design Life of Structure)

Terrain, height, structure size factor  $k_2$  : To suit the height of the structure for terrain category 2

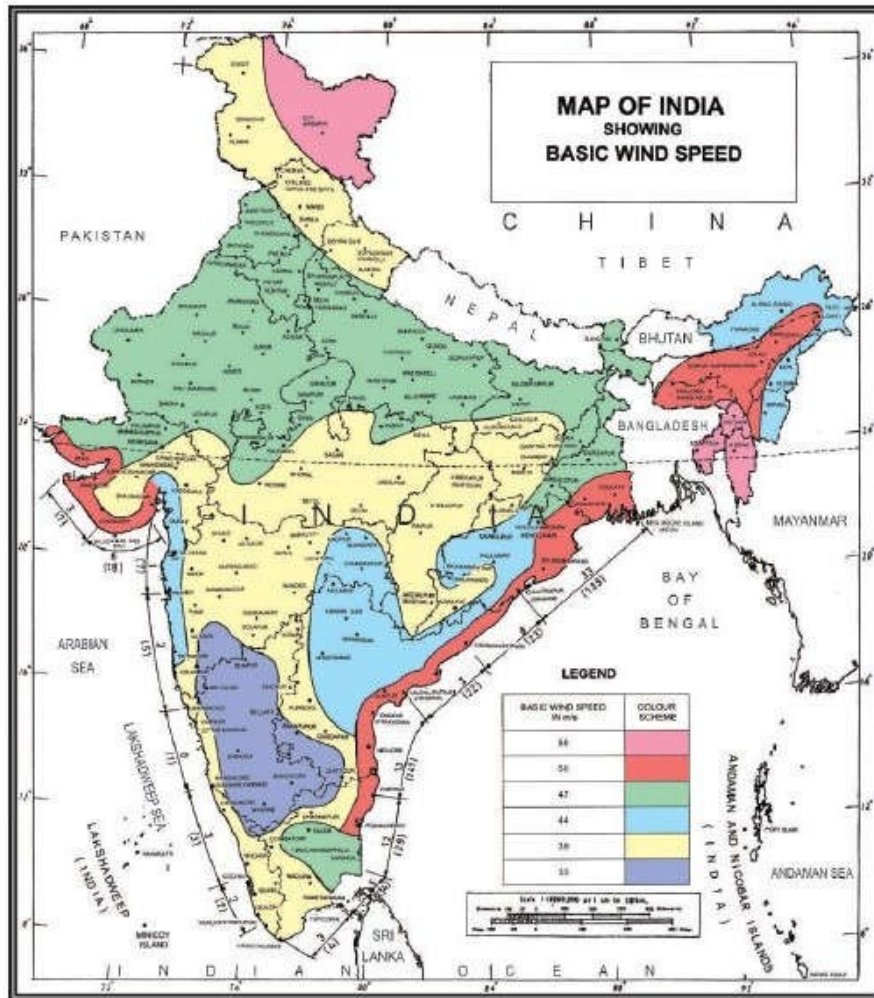
Topography factor  $k_3$  : 1.00

Cyclone region factor  $k_4$  : 1.00

Design mean hourly wind speed  $V_{h,d}$  :  $V_b \times k_2 \times k_3 \times k_4$

Design hourly wind pressure  $p_d$  :  $0.6 \times V_z^2$

  
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### Seismic Forces:

Coimbatore falls under seismic zone III as per IS 1893-2016 (Part 1) (Sixth Revision) and has the following factors to be considered for designs. Ductile detailing is required for the structural elements.

(Please refer attached map)

|                                           |                                            |
|-------------------------------------------|--------------------------------------------|
| Seismic Zone                              | III                                        |
| Seismic Zone factor (Z)                   | :0.16(As per Table 3-IS:1893-2016CL-6.4.2) |
| Design horizontal seismic coefficient(Ah) | :(Z/2)*(Sa/g)*(I/R)                        |
| Importance factor(I)                      | :1.5(Ref Table 8-IS:1893-2016CL 7.2.3)     |
| Response reduction Factor(R)              | :4(Ref Table 9(iv)-IS-1893-2016CL 7.2.6)   |
| Soil type                                 |                                            |

:1(Weighted average of N value of soil layers from depth off  
ounding is considered.)

|                                      |                                                                   |
|--------------------------------------|-------------------------------------------------------------------|
| Damping Ratio for RCC                | :5%                                                               |
| Ra s per Table 9(v) of IS: 1893-2016 | is based on Building with ductile RC structural walls with RCOMRF |

Sa/g–Average response acceleration coefficient for soil sites as per Fig.2 of IS:1893-2016 and it is arrived based on appropriate fundamental natural period of structure calculated as per clause:7.6.2.

Design horizontal seismic coefficient(Ah): $(Z/2)*(Sa/g)*(I/R)$

: $(0.16/2)*(1.5/4)*(Sa/g)$

Ah : $0.03*(Sa/g)$

Design seismic base shear, Vb :Ah\*W where, W- seismic weight of building

Time Period considered Dynamic :Building with RC Structural Walls

Analysis with P- Delta :Not considered in the analysis

effect(IS1893-2016CL 6.4.3)

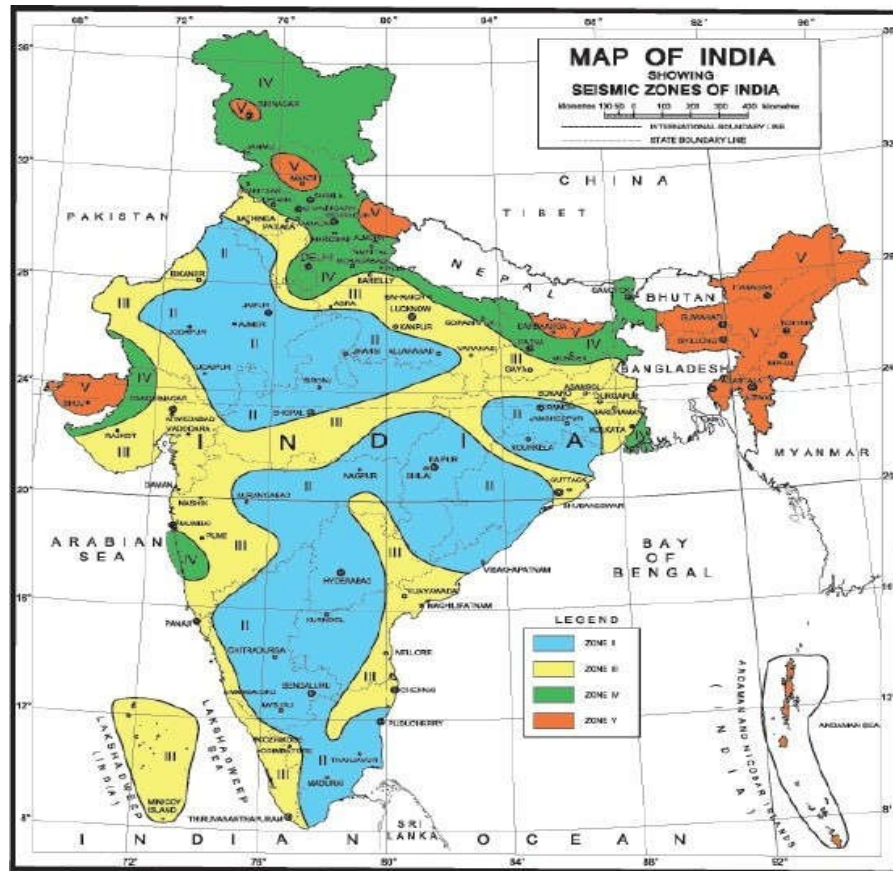
  
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TableNo:03

Zone Factor, Z

(Clause 6.4.2)

| Seismic Zone      | II   | III      | IV     | V           |
|-------------------|------|----------|--------|-------------|
| Seismic Intensity | Low  | Moderate | Severe | Very Severe |
| Z                 | 0.10 | 0.16     | 0.24   | 0.36        |



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## Expansion joint

Expansion joints are not provided in building.

### 1.4.2-DurabilityConsiderations:

Environmental conditions,

Corrosion and Fire protection for concrete and structural steel

Environment :Moderate

Exposure

conditions

:Concrete surfaces exposed to severerainor  
ccasional freezing whilst wet or severe  
Condensation.

Fire protection

:Thickness of the structural elements as per  
table15,16&16Aclause26.4ofIS456-2000.

Minimum grade of concrete

:Moderate exposure-M20

Nominal cover to reinforcement

:For Moderate Exposure Nominal cover should not be less

than30mm for walls,

50mm for footings,40mm for column,25mm for beams and 20mm for slabs.

### 1.4.3-FireRating:

- ❖ Thickness of the structural elements as per table 15, 16 & 16Aclause26.4of IS 456-2000.Two Hours fire rating is considered with wall thickness of 160mm& with minimum percentage of steel0.4%(including both vertical and horizontal reinforcement) as perIS:456-2000,Cl:21,Fig:1.
- ❖ Nominal covers for 1.5hr. fire resistance:

| Nominal Cover  |            |                  |            |                      |            |
|----------------|------------|------------------|------------|----------------------|------------|
| BEAM           |            | Slabs            |            | Columns / shear wall |            |
| Simply support | continuous | Simply supported | continuous | Simply support       | Continuous |
| mm             | mm         | mm               | mm         | mm                   | mm         |
| 20             | 20         | 25               | 20         | 35                   | 20         |

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4/3/2026

#### -ANALYSIS METHODOLOGY:

This structure has physics interface with almost all the disciplines like Geotechnical, MEP Services and Landscape etc. The Structure proposed is of cast in-situ concrete construction with shear walls suitably placed. The core walls around lifts are of cast in-situ concrete to resist lateral forces. The Structural design of the proposed project is based on Indian Standard Codes and is analyzed for Dead, Live, Wind and Seismic Load conditions taking into relevant load combinations recommended by the codes.

The Vertical Loads including the dead and super imposed loads are transferred to the soil through beams, core walls and footings. Footings are sized with consideration to the safe bearing capacity of soil at the level of transfer of load recommended by specialist soil investigation consultants. The Lateral loads due to wind and seismic forces are dissipated to soil through the proposed Reinforced Concrete Core Walls/columns.

#### -LOAD COMBINATIONS:

Load combinations Used for Strength, Serviceability are tabulated below:

| Load Combination | Limit State of Collapse |     |       |    | Limit State of Serviceability |     |          |
|------------------|-------------------------|-----|-------|----|-------------------------------|-----|----------|
|                  | DL+SDL                  | LL  | WL/EL | TL | DL+SDL                        | LL  | WL/EL/TL |
| DL+LL            | 1.5                     | 1.5 | —     | —  | 1                             | 1   | —        |
| DL+WL            | 1.5or0.9*               | —   | 1.5   | —  | 1                             | —   | 1        |
| DL+EL            | 1.5or0.9*               | —   | 1.5   | —  | 1                             | —   | 1        |
| DL+LL+WL         | 1.2                     | 1.2 | 1.2   | —  | 1                             | 0.8 | 0.8      |
| DL+LL+EL         | 1.2                     | 1.2 | 1.2   | —  | 1                             | 0.8 | 0.8      |

The various loads are combined in accordance with the stipulations in IS: 875(Part5)-1987; whichever combination produces the most unfavorable effect in the building foundation or structural member concerned may be adopted.

  
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#### **-DESIGN METHODOLOGY:**

- ❖ All R.C.C structures shall be designed according to the Limit State Method as specified in IS:456- 2000 and in accordance with clauses mentioned for structural element sizes in IS13920- 2016.
- ❖ Forces and moments from the 3D analysis output for the worst combinations are used for the design of the structure.
- ❖ The foundations are designed for critical load combination.
- ❖ The structure is analyzed for specific loads like dead load, live load, wind and seismic load and for the load combinations as given in the relevant codes.

#### **-ACCEPTANCE CRITERIA:**

##### **-Deflection Limits:**

For Reinforced concrete works:

- ❖ Limiting values of deflection (Short and Long term) as per clause 35.3 of IS: 456-2000 is followed in the design.
- ❖ Limiting value for long term deflection is considered as span/250 and for the long-term deflection after erection of partitions & finishes is considered as span/350 or 20mm whichever is less as per IS 456-2000.

##### **-Cracking Limits:**

- ❖ Limiting values of crack width as per clause 35.3 of IS:456-2000 is followed in the design.
- ❖ In general, for slabs and beams, the crack width is limited to 0.2mm.
- ❖ For basement retaining wall and water retaining structures, crack width is limited to 0.1mm.

##### **-Permissible Drift Limits:**

- ❖ As per IS-1893 (Part1) :2016, clause 7.11.1, Storey drift in any storey due to minimum specified design seismic lateral force shall not exceed 0.004 times the storey height design.
- ❖ As per IS-456-2000 clause 20.5, Lateral sway due to wind load should not exceed  $H/500$  (H is the total height of structure).

  
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**-Soil data:** Foundations are designed based on Geo Technical investigation report and will dissipate all the vertical and horizontal loads safely to the soil below .As per the soil investigation report received from geotechnical consultants is **Isolated Footing**.

#### 6.CONCLUSION & RECOMMENDATIONS:

- ❖ For this Site, **OPEN FOUNDATION** is recommended.
- ❖ The recommended safe bearing capacity is **379 kN/m<sup>2</sup>** for this site location.
- ❖ The depth of foundation is adopted as **3.5m to 4.0m** from Existing Ground Level to design the foundation according to load conditions and structural requirements
- ❖ If water table is exists during execution of foundation, should be laid foundation concrete in dry condition.
- ❖ Recommendations are given based on assumption that same strata or harder strata below extends below the explored depth.
- ❖ It is recommended that backfilling in the foundation should be carried out proper compaction.
- ❖ The results and recommendations given in this report are based on the results of the tests on sub-soil samples collected from boreholes.If in actual execution,any variation is found,the consultants may also be referred.

Activate  
Go to Setti

#### -Detailing Requirements:

- ❖ Detailing for the structural elements shall be done in accordance with IS:13920-2016,taking R=3 as per Table9(v) of IS:1893-2016 is based on perimeter RC Ordinary Moment-Resisting Frames
- ❖ Detailing for all structural members shall be in accordance with IS:456 & SP:34.

  
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