IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 10, Issue 1, October 2021
Impact Factor: 5.731

Planning, Analysing and Designing A (G+1) Bank Building

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Abstract: *The primary goal of this project is to develop adequate knowledge of building planning, analysis and design. The Business building plan is drafted using Auto CAD by considering the norms of NBC (National Building Code). The structure is analyzed using STAADPro. Based on the analysis and results the structural members are designed. The structural elements in the building is strong and able to withstand the adverse effects of natural agencies. The locker room is secured with strong walls compared to the other walls for safety purpose. The building planned is based on National Building Code of India. The bank building has proper ventilation, it is given with sufficient doors, windows,water supply and electrification.*

Keywords: Building planning, analysing, designing, AutoCAD, STAAD Pro

I. INTRODUCTION

1.1 General

A bank is a financial establishment which accepts deposits from the public and creates credit. Lending activities may be undertaken directly or indirectly in the capital markets. Because of their significance in a country's financial stability, banks are highly regulated in most countries Most countries have a system called fractional reserve banking, under which banks hold only a portion of their liquid assets. In addition to other regulations intended to ensure liquidity, banks are generally subject to minimum capital requirements based on an international set of capital standards, known as the Basel Accords. Banks serve as payment agents by processing client checks or checking accounts, paying customer checks drawn on the bank, and collecting cheque's put on customers current accounts. Banks also allow customers to pay by other means of payment, such as Automated Clearing House (ACH), money transfers, EFTPOS and Automatic Teller Machines (ATMs).The Banks borrow money through receiving funds from current accounts, term deposits, and issuing debt securities like banknotes and bonds. Consumers are lent money by banks through a variety of techniques, including advances on current accounts, instalment loans, and investments in marketable debt securities.

1.2 Planning Considerations

The plan and detailing were drawn using Auto CAD and analysed using STAAD Pro. The building is composed of the ground and the first floor. The built-up area ofthe ground floor of a bank building is 249.39 m^2. The built-up area of the first floor is 249.39 m^2. The Proposed building area is 2940 sq.ft. The building is rectangular in shape. The plot is facing in the South direction. The parking space is provided in the East side of the building. The stairs are provided in the interior of the building.

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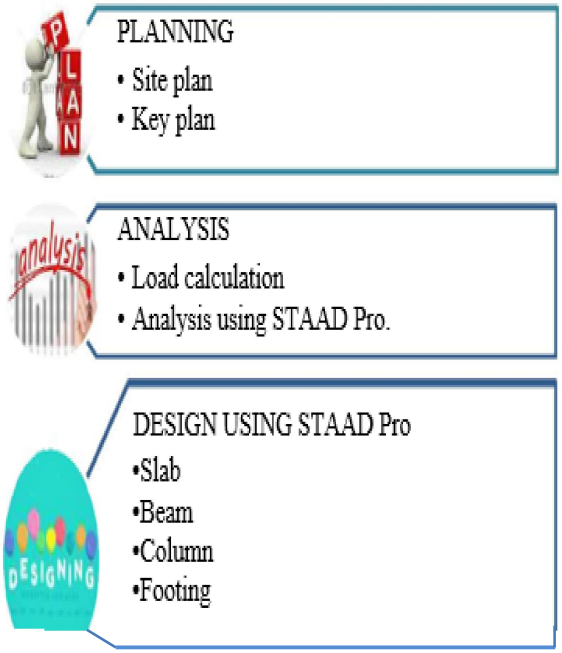
II. METHODOLOGY



III. PLAN, ELEVATION AND SECTION OF A BANK BUILDING

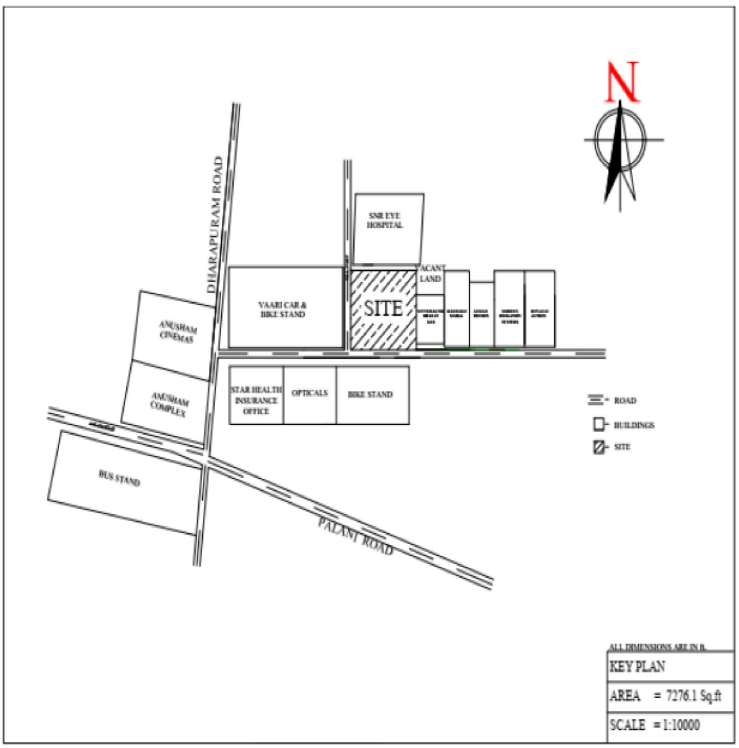


Figure 3.1: Key plan

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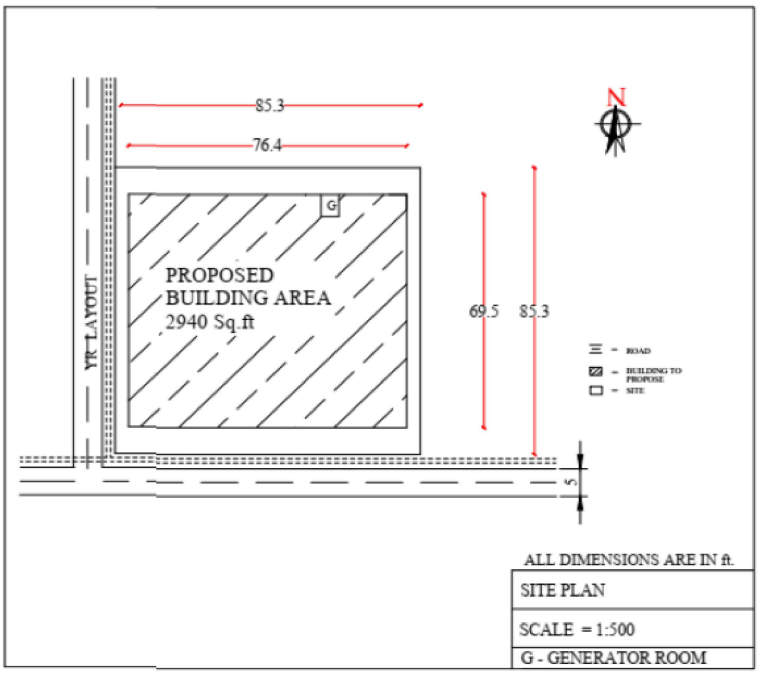

Figure 3.2: Site plan

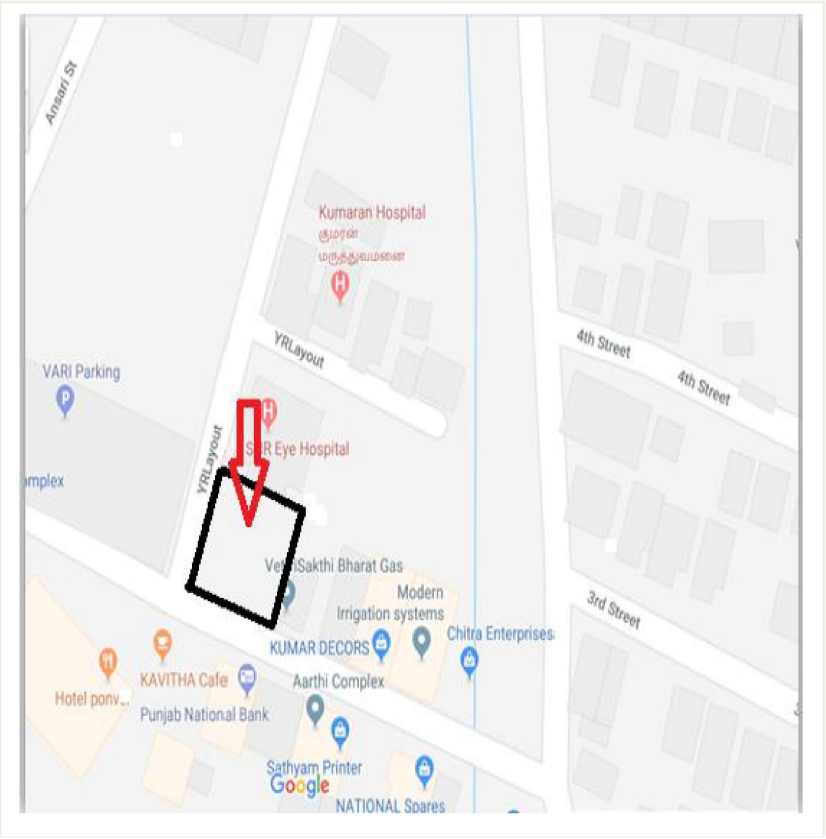

Figure 3.3: Site location in 2D view

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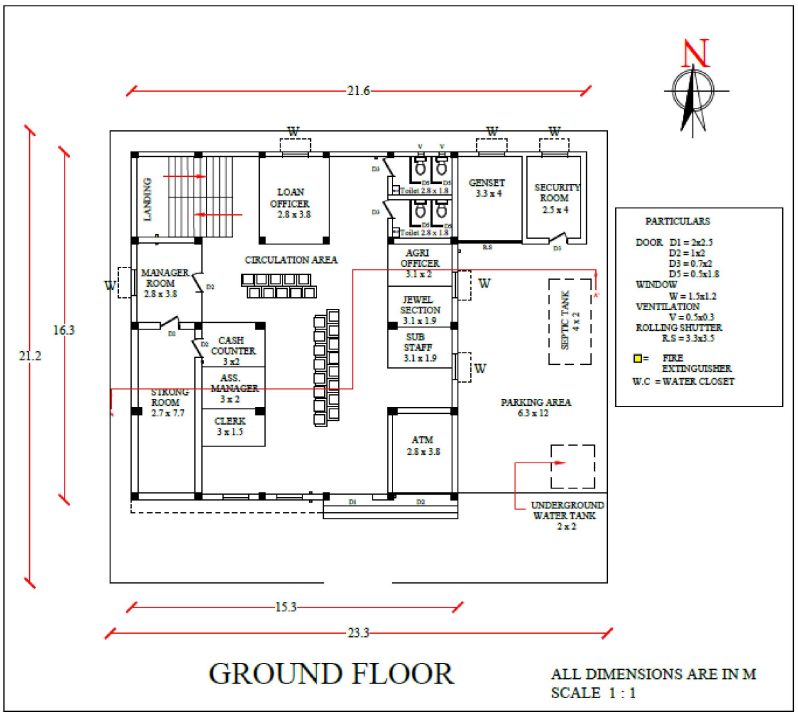

Figure 3.4: Ground floor of Bank building

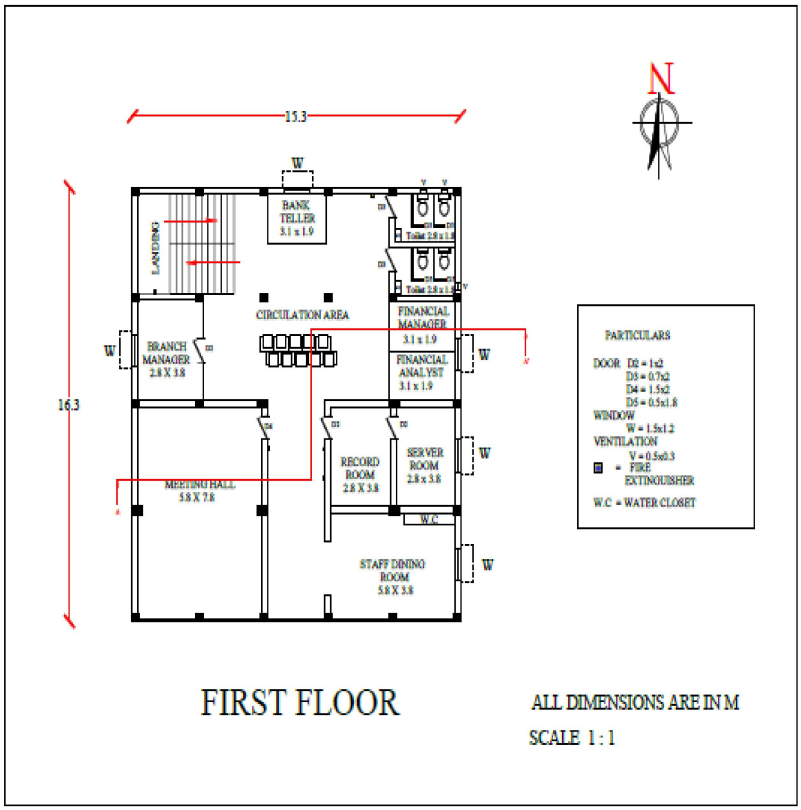

Figure 3.5: First floor of Bank building

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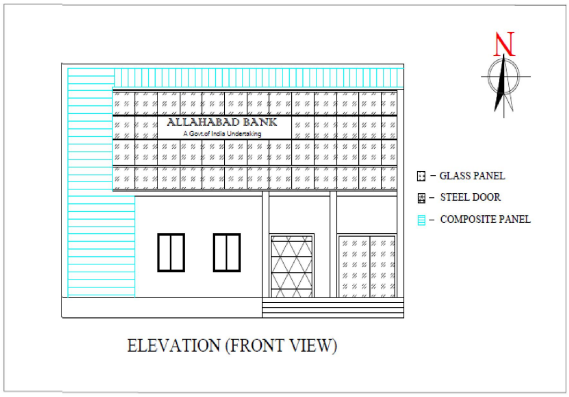

Figure 3.6: Elevation of Bank building

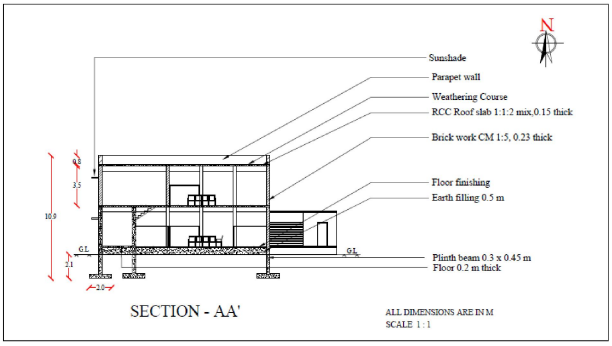

Figure 3.7: Sectional view of Bank building

IV. ANALYSIS USING STAAD PRO SOFTWARE

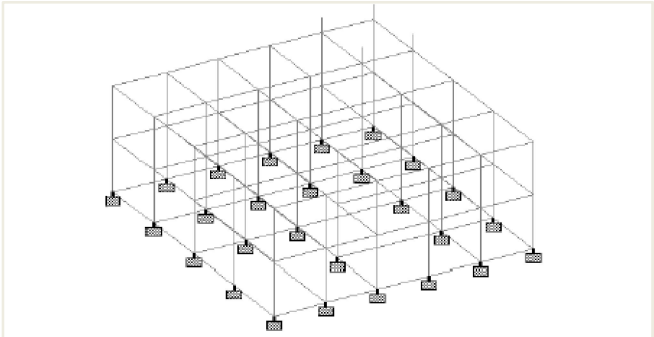

Figure 4.1: Structure

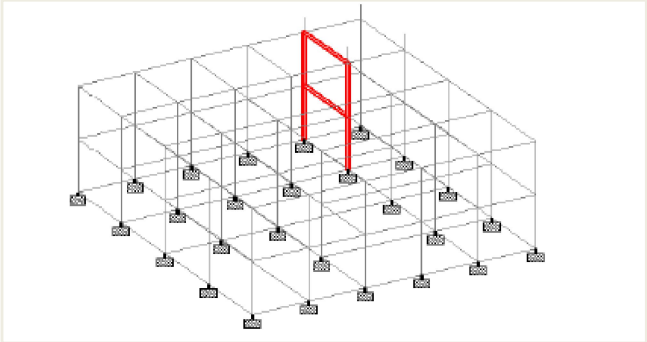

Figure 4.2: Critical section of the structure

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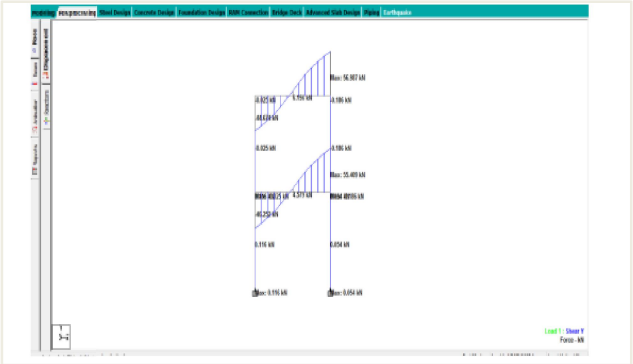

Figure 4.3: Shear force of critical section

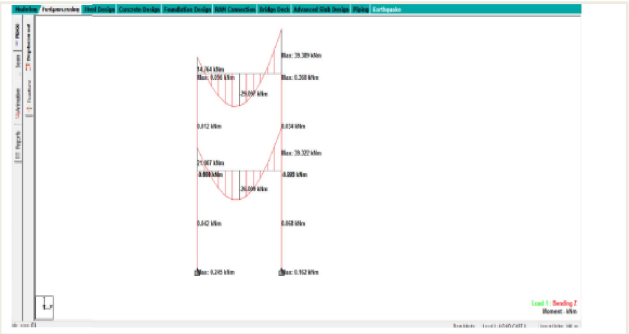

Figure 4.4: Bending moment of critical section

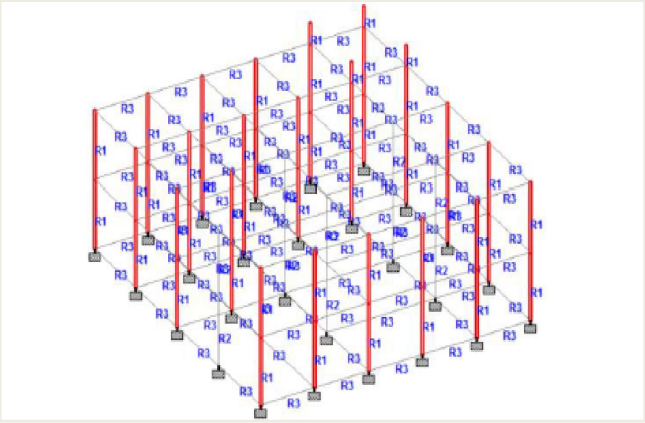

Figure 4.5: Properties of the structure

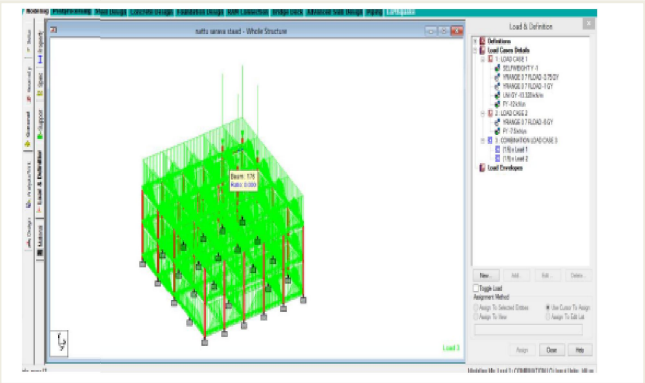

Figure 4.6: Load on structure

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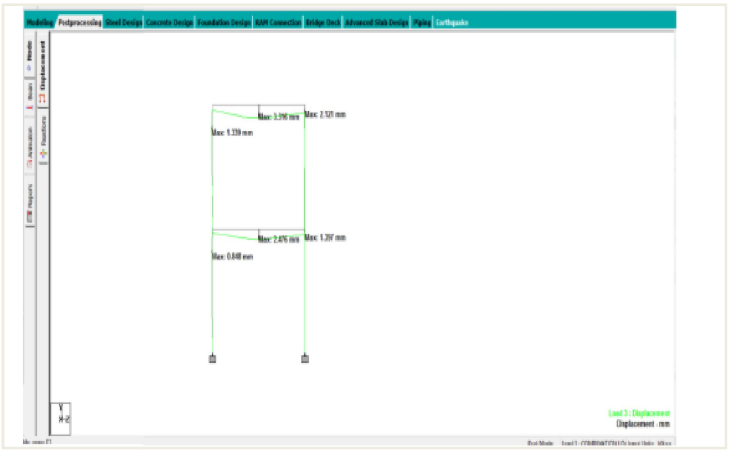

Figure 4.7: Deflection in critical section

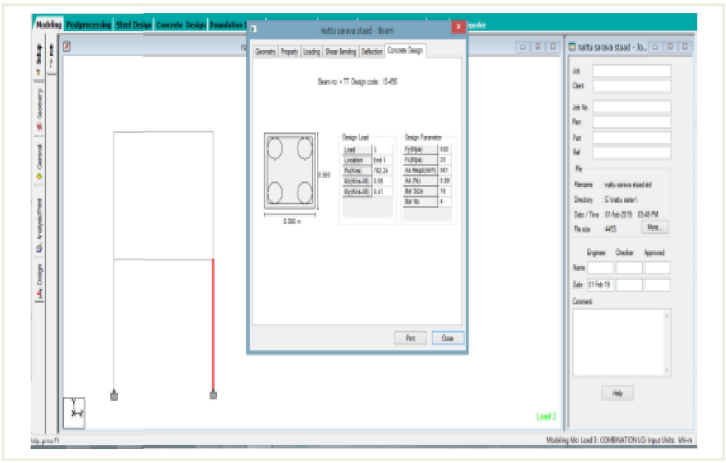

Figure 4.8: Column design for critical section

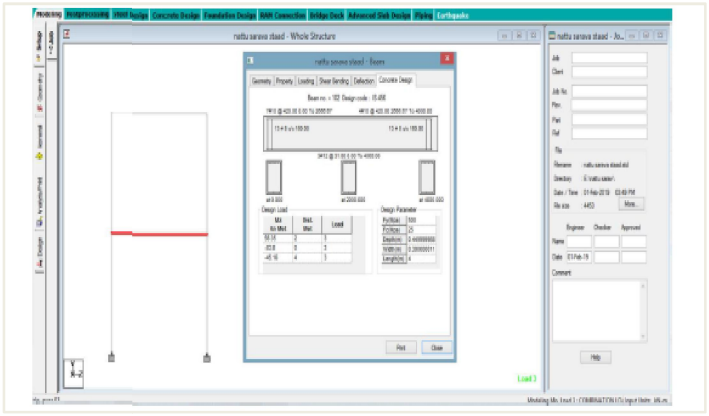

Figure 4.9: Beam design for critical section

V. DESIGN OF SLAB, BEAM, PLINTH BEAM, COLUMN, FOOTING & STAIRCASE

5.1 Design of Slab

- Slab dimension : 3m x 4m
- Grade of concrete : M 25
- Grade of steel :Fe 500

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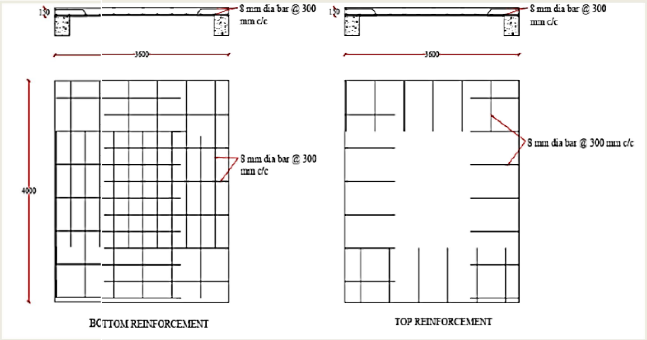

Figure 5.1: Reinforcement detailing of Slab

5.2 Design of Beam

- Beam dimension :0.3m x 0.45m
- Clear Span : 3.7m
- Grade of concrete : M 25
- Grade of steel : Fe 500

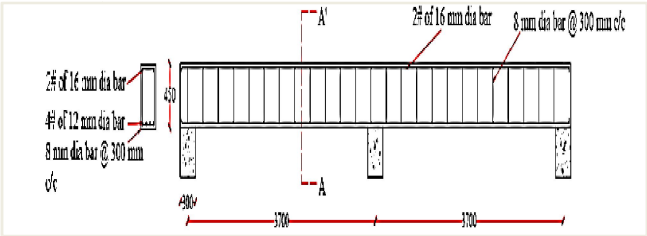

Figure 5.2: Reinforcement detailing of Beam

5.3 Design of Plinth Beam

- Plinth Beam dimension : 0.3m x 0.45m
- Clear Span : 5.7m
- Grade of concrete : M 25
- Grade of steel : Fe 500

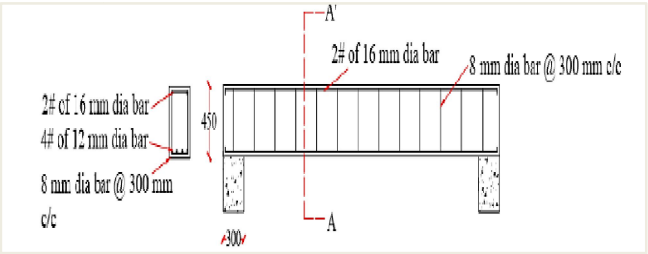

Figure 5.3: Reinforcement detailing of Plinth Beam

5.4 Design of Column

- Column dimension : 0.3m x 0.3m
- Overall length : 3.5m
- Grade of concrete : M 25
- Grade of steel : Fe 500

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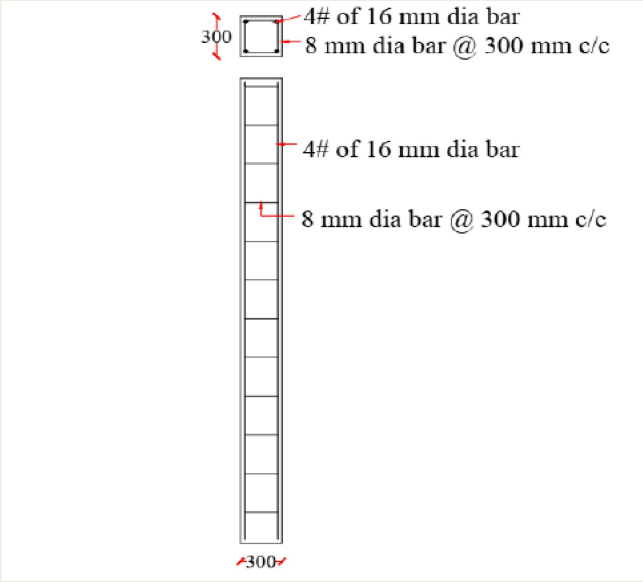

Figure 5.4: Reinforcement detailing of Column

5.5 Design of Footing

- Column dimension : 0.3m x 0.3m
- Safe bearing capacity of soil : 250 KN/m^2 Grade of concrete : M 25
- Grade of steel : Fe 500
- Total load on the footing : 1006.5 KN

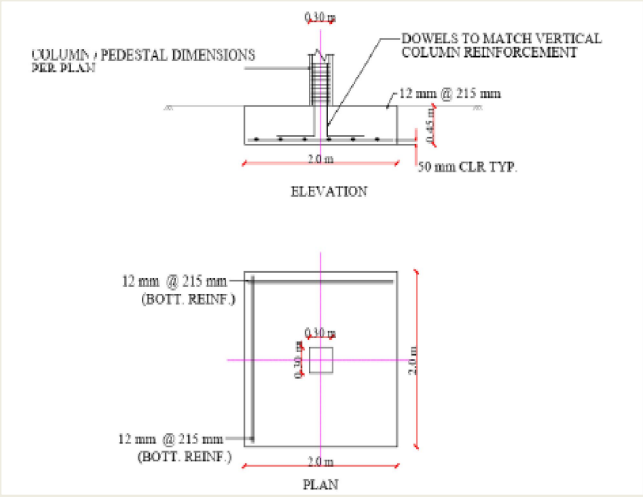

Figure 5.5: Reinforcement detailing of Footing

5.6 Design of Staircase

- Type of Staircase : Dog Legged Staircase Stair case dimension : 0.3m x 0.4m
- Grade of concrete : M 25
- Grade of steel : Fe 500
- Clear cover : 20mm
- Number of steps in the flight : 10/flight

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- Tread : 0.3 m
- Riser : 0.2 m
- Width of landing : 1.5m

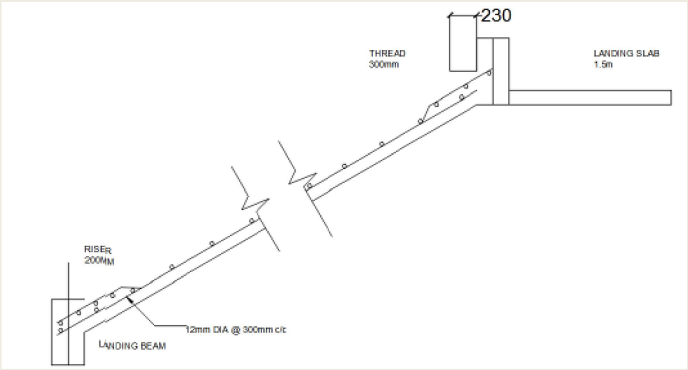

Figure 5.6: Reinforcement detailing of Staircase

VI. CONCLUSION

In building a bank building, the main thing to be considered is the structural safety and design criteria, in addition to building economics. This building is equipped with the amenities of parking cars as well as two-wheelers. In this project, the building is designed according to the National Building Code of India 2016.This interim design project, which has not been implemented in any region to date.

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