

# Planning and Modelling of a Shopping Mall

Samyuktha.R<sup>1</sup>, Karthikeyan.S<sup>2</sup>, Arunmozhi.K<sup>3</sup>, Bhuvaneshwari.T<sup>4</sup>

1(Civil Engineering, Anjalai Ammal Mahalingam Engineering College, Thiruvavur.  
samyuktha010605@gmail.com )

2(Civil Engineering, Anjalai Ammal Mahalingam Engineering College, Thiruvavur.  
karthiselvam1108@gmail.com )

3(Civil Engineering, Anjalai Ammal Mahalingam Engineering College, Thiruvavur.  
arunmozhi.k003@gmail.com )

4(Assistant Professor, Civil Engineering, Anjalai Ammal Mahalingam Engineering College, Thiruvavur.  
tbhuvaneshwari@aamec.edu.in)

## Abstract:

The planning and modelling of a shopping mall involve an integrated approach combining architecture, structural design, and consumer behaviour analysis. Key aspects include site selection, accessibility, spatial organization, and efficient circulation patterns to ensure smooth movement and enhanced user experience. Proper zoning of retail areas, food courts, entertainment spaces, and service facilities enables optimal space utilization. The use of 2D and 3D modelling tools supports layout visualization, crowd flow simulation, and safety planning. Sustainability is achieved through energy-efficient systems, natural lighting, ventilation, and waste management. Additionally, economic feasibility and market analysis ensure the project's viability and profitability.

The outcome of this study demonstrates how effective planning and modelling contribute to the successful development of a shopping mall that meets both consumer demands and business objectives while adhering to modern design and environmental standards.

**Keywords** — Shopping Mall Planning, Spatial Organization, Circulation Patterns, Retail Zoning, Parking Facilities, Natural Lighting and Ventilation.

## I. INTRODUCTION

Modern urban planning has shifted from viewing shopping malls as mere commercial enclosures to seeing them as critical components of the city's social fabric. As urban density increases, the challenge for architects and structural engineers is to design multi-story structures that do not alienate the pedestrian. This paper explores the "**2D & 3D Modelling**" concept, which prioritizes high-density retail efficiency (G+4 structure) while maintaining a basement for essential utility and parking. By integrating **Green spaces Principles**—such as permeability and visual connectivity—the design

transcends traditional "big box" retail, creating a landmark that enhances the surrounding streetscape rather than isolating itself from it.

## II. LITERATURE REVIEW

Planning and modelling of shopping malls have become significant areas of study due to rapid urbanization and changing consumer behavior. Various researchers have focused on design principles, spatial planning, and user experience to improve mall performance and functionality.

Hasan Burak Çavka (2023) stated that shopping mall planning mainly depends on proper zoning, circulation, and flexible design. The study explains

that integrating retail, entertainment, and open spaces improves mall performance.

Ye Yuan et al. (2021) explained that architectural factors such as lighting, ventilation, accessibility, and interior layout influence customer satisfaction and increase the time spent in malls.

Astri Anindya Sari et al. emphasized that location, tenant mix, and consumer behaviour are important in planning a successful shopping mall.

Tarun Kushwaha et al. (2017) found that accessibility, parking, store variety, and mall ambiance strongly affect customer preference.

These studies show that effective shopping mall modelling requires good spatial planning, customer-oriented design, and proper circulation.

### III. METHODOLOGY

The methodology adopted in this study follows a systematic and well-structured approach to ensure efficient planning, design, and implementation of the shopping mall project.

#### A. Site Planning and Analysis

The initial phase involves analysing spatial requirements, accessibility, and environmental conditions to determine the optimal layout.

#### B. Zoning and Functional Distribution

The mall is divided into distinct zones, including:

- Anchor stores
- Retail shops (small, medium, large)
- Food courts and restaurants
- Entertainment zones (cinema, play areas)
- Service and utility areas

TABLE I

| Types           | Sales area           | No of shops |
|-----------------|----------------------|-------------|
| Small shops     | 50 sq.m to 75 sq.m   | 50          |
| Kishok shops    | Less than 25 sq.m    | 13          |
| Medium shops    | At least 100 sq.m    | 50          |
| Big shops       | 150 sq.m to 175 sq.m | 32          |
| Anchor shops    | 200 sq.m to 400 sq.m | 12          |
| Men & Women spa | 100 sq.m             | 2           |

|              |                    |    |
|--------------|--------------------|----|
| Play zone    | 210 sq.m           | 2  |
| Restaurant   | 100 sq.m           | 2  |
| Small stall  | 25 sq.m            | 15 |
| Medium stall | 50 sq.m to 80 sq.m | 9  |

#### C. Circulation Planning

Efficient movement systems are designed using:

- Horizontal circulation (corridors)
- Vertical circulation (lifts, escalators, service lifts)

#### D. Architectural Modelling



Fig. 1 3D View

The layout is developed using Revit arch tools, incorporating multi-floor planning and spatial hierarchy.

#### E. Sustainable Design Integration

Green building concepts such as natural ventilation, atriums, and energy-efficient systems are incorporated.

#### F. Smart Technology Integration

Conceptual inclusion of AI-based systems for monitoring, safety, and operational optimization.

## IV. PLANNING AND DESIGN FRAMEWORK

Central atriums are introduced to enhance visual connectivity, natural lighting, and ventilation.

### A. Zoning Strategy

The zoning approach ensures efficient space utilization. Anchor stores are placed strategically to attract maximum footfall, while smaller retail units are positioned along corridors to enhance visibility.

TABLE II  
Area Statement

|                     |            |
|---------------------|------------|
| Basement            | 12500 sq.m |
| Ground floor        | 12280 sq.m |
| First floor         | 10180 sq.m |
| Second floor        | 10180 sq.m |
| Third floor         | 10180 sq.m |
| Fourth floor        | 8770 sq.m  |
| Total build-up area | 64092 sq.m |
| Total plot area     | 29929 sq.m |

### B. Spatial Organization

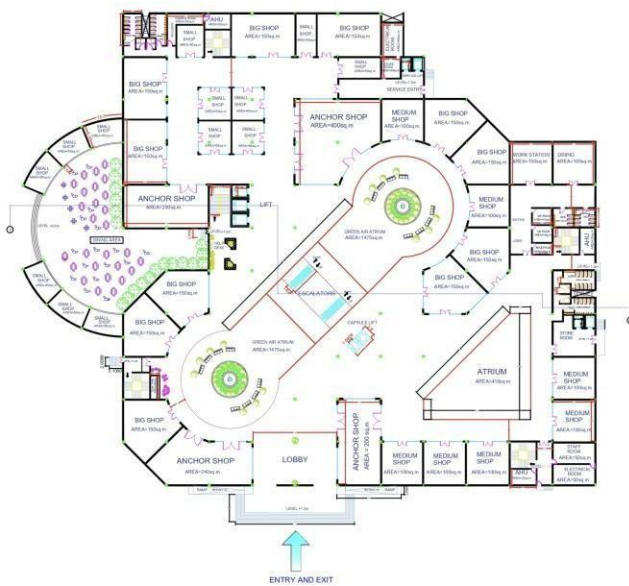


Fig. 2 Ground floor

The design incorporates multiple floors with distinct functional areas, ensuring balanced distribution of commercial and recreational spaces.

### C. Atrium Design

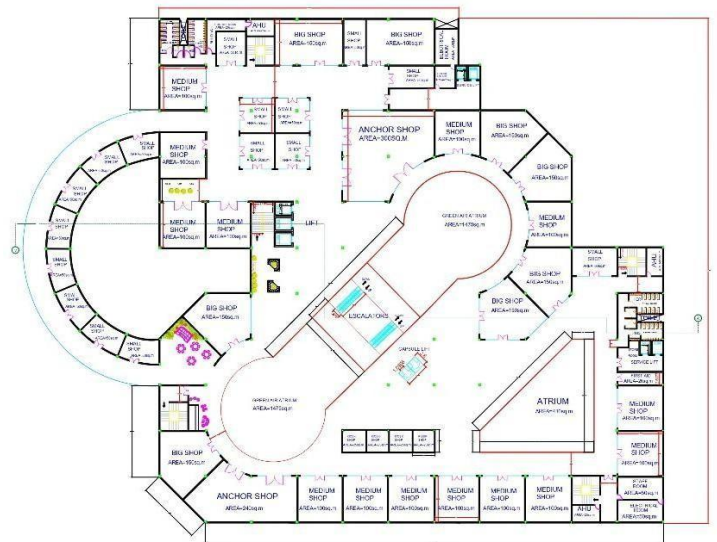


Fig. 3 First and second floor

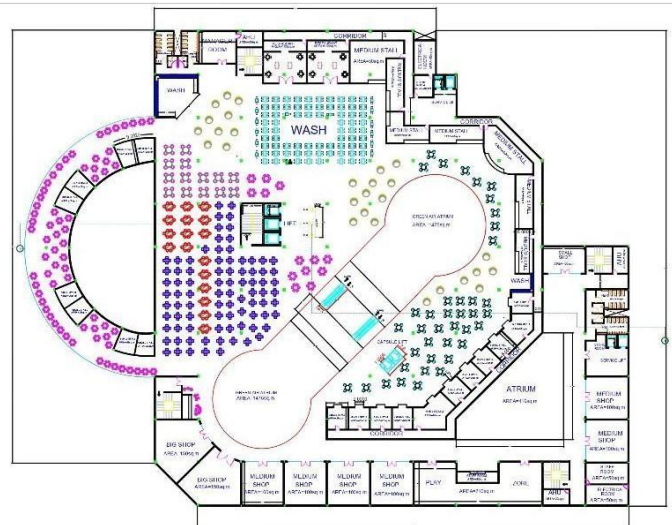


Fig. 4 Third floor

## V. CIRCULATION ANALYSIS

**The Flow Strategy:** “Proper circulation reduces congestion and improves user experience. My design segregates movement types to ensure a fluid, high-performance environment.”

**Vehicle Movement:** Separate entry/exit points for public cars vs. service trucks. A one-way loop prevents traffic tailbacks onto the main road.

**Pedestrian Flow:** Direct, safe access from drop-off zones to the Porous Edge entrances, keeping shoppers entirely away from vehicle paths.

**Vertical Circulation:** A central cluster of panoramic lifts and escalators acts as a visual magnet, pulling footfall to upper levels.

## VI. SUSTAINABLE DESIGN FEATURES

**Natural Lighting:** The central atrium acts as a Daylight Well, using skylights to cut artificial lighting needs by 40%.

**Passive Ventilation:** Uses the Stack Effect in the atrium to pull hot air up and out, reducing the load on HVAC systems.

**Energy Efficiency:** Revit-modeled shading devices and recessed glazing minimize solar heat gain.

**Green Spaces:** Rooftop gardens and vertical greenery act as thermal buffers and provide biophilic relief for shoppers.

## VII. RESULTS AND DISCUSSION

The proposed design demonstrates:

- Improved pedestrian flow due to efficient circulation planning
- Enhanced user experience through spatial organization
- Increased sustainability through green design features

The integration of urban design principles ensures a balanced and functional commercial environment.

## VIII. CONCLUSION

This study proposes an integrated approach to shopping mall design that combines efficient space planning, sustainability, and modern technology. The model improves user experience, commercial performance, and environmental impact, while incorporating smart systems for better safety and operations. Future developments can enhance adaptability through IoT, real-time data, and smart parking solutions.

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