

SCIENCE CITY

A THESIS

Submitted in partial fulfillment of the requirements for the award of

Bachelor of Architecture degree

By

SANJAY V

(39210075)



**DEPARTMENT OF ARCHITECTURE
SCHOOL OF BUILDING AND ENVIRONMENT**

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY) Accredited

With Grade “A++” by NAAC

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CHENNAI - 600 119**

MAY 2024



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BONAFIDE CERTIFICATE

This is to certify that Thesis Report is the bonafide work of **Sanjay V(39210075)** who carried out the Thesis entitled "**Science City**" under our supervision from December 2023 to May 2024.

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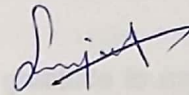
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DECLARATION

I, **SANJAY V** hereby declare that the Thesis Report entitled "Science City" done by me under the guidance of **Ar. Juvilasri Vignesh**(Internal Guide), **Ar. Catherine Selvaraj**(Internal Review Member) and **Ar. Sriram Ganapathy**(External Guide) Sathyabama Institute of Science and Technology is submitted in partial fulfillment of the requirements for the award of Bachelor of Architecture Degree.

DATE: 24/05/2024



PLACE: Chennai

SIGNATURE OF THE CANDIDATE

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I am pleased to acknowledge my sincere thanks to Board of Management of **Sathyabama Institute of Science and Technology** for their kind encouragement in doing this Thesis and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. Devyani Gangopadhyay**, Dean and Head of the Department, School of Building and Environment, Our Design Chair **Ar. Sarath C Kanth**, Thesis Coordinator **Ar. Gopiraj** for providing me necessary support and details at the right time during the progressive reviews.

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SANJAY V

THESIS SYNOPSIS

The proposed thesis focuses on the conceptualization, planning, and development of a Science City at Suttur, Karnataka. Suttur, known for its cultural heritage and educational initiatives, provides a unique opportunity to blend science and technology with local traditions and community engagement.

An extensive review of existing Science Cities and similar projects worldwide will be conducted. This will include case studies from leading Science Cities like those in Singapore, Kolkata, and Ahmadabad, focusing on their design, educational programs, visitor engagement, and economic impact. The review will also cover sustainable architectural practices and the role of public-private partnerships in large-scale educational projects.

With a focus on combining contemporary science with traditional values and sustainable practices, Suttur Science City seeks to be an example in scientific innovation and education. It will make a major contribution to the intellectual and economic development of the area by encouraging a culture of curiosity and exploration.

TABLE OF CONTENTS

CHAPTER No.	TITLE	PAGE No.
	THESIS SYNOPSIS	v
	LIST OF FIGURES	viii
	LIST OF PLATES	x
1	INTRODUCTION	1
1.1	INTRODUCTION	1
1.2	NEED OF THE PROJECT	1
1.3	AIM AND OBJECTIVE	1
1.4	METHODOLOGY	2
2	LITERATURE CASE STUDIES	3
2.1	PUSHPA GUJRAL SCIENCE CITY – PUNJAB	3
2.2	ASTRONOMY SCIENCE CENTER – SHANGHAI	6
2.3	SINGAPORE SCIENCE CENTER	12
2.4	GUJARAT SCIENCE CITY – AHMADABAD	17
2.5	KOLKATA SCIENCE CITY	26
3	DATA COLLECTION AND STANDARDS	32
4	SITE STUDY AND ANALYSIS	46
4.1	SITE STUDY	46
4.2	SITE JUSTIFICATION	47
4.3	SITE ANALYSIS	48
5	ARCHITECTURAL DESIGN	50

5.1	SPATIAL REQUIREMENTS	50
5.2	CONCEPT	51
5.3	DETAILED DRAWINGS	52
6	REFERENCES	57

LIST OF FIGURES

FIGURE No.	TITLE	PAGE No.
2.1	Dome – shaped space theatre	3
2.2	Man-made River	4
2.3	water circulation	4
2.4	Master plan	4
2.5	Shanghai astronomy science center	6
2.6	Design inspiration	7
2.7	Sphere half submerged in the building	8
2.8	Sphere house	8
2.9	Ground floor plan	9
2.10	1 st floor plan	9
2.11	2 nd floor plan	10
2.12	Terrace plan	10
2.13	Section	10
2.14	Building Zoning	12
2.15	Building focusing lake view	13
2.16	Vegetation pathway circulation	14
2.17	Floor plan	14
2.18	Master plan	15
2.19	Circulation plan	15
2.20	Building form to the site context	18
2.21	Five Zone concept	19
2.22	Master plan	20
2.23	Evolution of Space Science Gallery	21
2.24	Space Science Gallery Plan and section	22
2.25	Evolution of Aquatic gallery	23
2.26	Site Concept	27
2.27	On-site Circulation	29
3.1	a): Parking area percentage	32
	(b): Parking area percentage.	33

3.2	Indicators for Disabled People	34
3.3	Staircase and Ramp	35
3.4	Planetarium	36
3.5	Anthropometry	37
3.6	Circulation and Accessibility	38
3.7	Natural Light	39
3.8	Artificial Light	40
3.9	Toilet	41
3.10	Bus Parking	42
3.11	Toilet (NBC rules, 2016)	43
3.12	Parking (NBC rules, 2016)	44
3.13	Driveway (NBC rules, 2016)	44
3.14	Parking Dimension (NBC rules, 2016)	45
3.15	Bangalore Mahanagara Palike Building Bye-Laws 2003	45
4.1	Site at Suttur,Mysore	46
4.1	Article related to site	47
4.2	Climatic data of Suttur,Mysore.	48
5.1	Area requirements	50
5.2	Site view	52
5.3	Section-BB'	53
5.4	Planetarium Block Section	53
5.5	Train Station Section	53

LIST OF PLATES

PLATE No.	TITLE	PAGE No.
2.1	Study of pushpa gujral science city	5
2.2	Study of Shanghai astronomy science center	11
2.3	Study of Singapore Science center	16
2.4	Study of Gujarat Science City	24
2.5	Study of Gujarat Science City	25
2.6	Study of Kolkata Science City	30
2.7	Study of Kolkata Science City	31
4.1	Site Analysis	48
4.1	Site Analysis	49
5.1	Design Concept	51
5.2	Site Plan	52
5.3	Aquarium Ground Floor Plan	54
5.4	Aquarium Basement-1 Floor Plan	54
5.5	Aquarium Basement-2 Floor Plan	55
5.6	Aquarium Section	55
5.7	Aquarium Section	56

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

A Science City is usually a complex or facility devoted to advancing science and technology awareness, education, and innovation. These are frequently interactive museums or centers whose goal is to increase public interest in and accessibility to science. Size and concentration can vary, but in general, science cities consist of a mix of interactive exhibits, educational displays, demonstrations, and occasionally even research.

1.2 NEED OF THE PROJECT

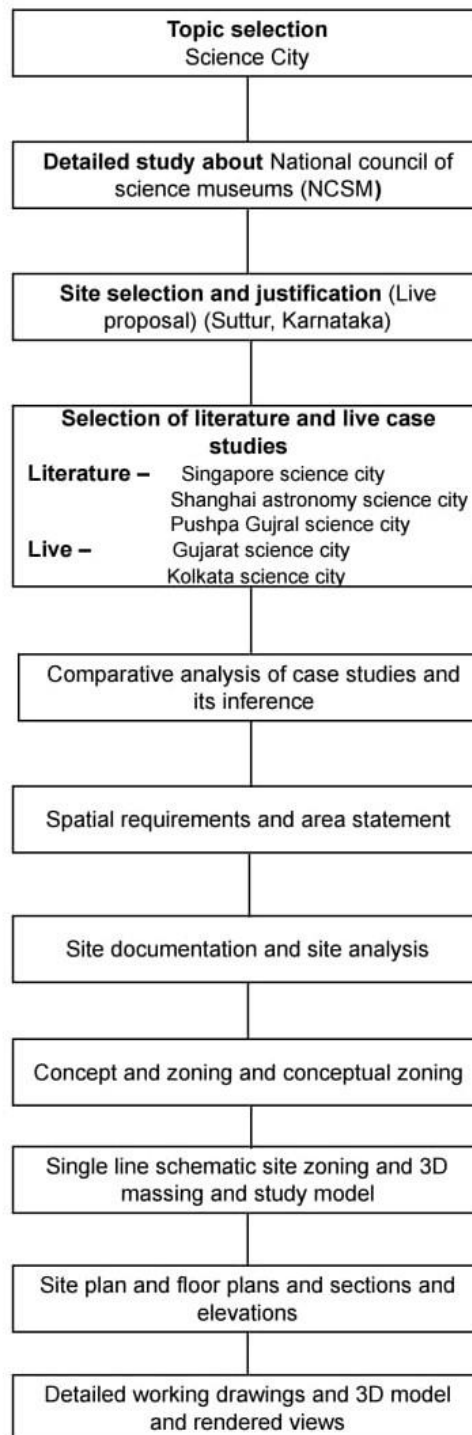
An engaging and interactive environment for the promotion of scientific knowledge, education, and research is what a science city is all about. Numerous advantages of a science city can benefit people individually, in their communities, and in society at large.

1.3 AIM AND OBJECTIVE

To design a science city to educate people through entertainment and hands on.

- (a) To keep people flowing through the circulation.
- (b) To make display arrangements for accessible learning.
- (c) To connect through real experience.
- (d) To present the latest developments in science.

1.4 METHODOLOGY



CHAPTER 2

LITERATURE CASE STUDIES

2.1 PUSHPA GUJRAL SCIENCE CITY - PUNJAB

Location - Punjab, India

Site area - 2 acres

Architect - Development and Consultants, a firm based in Kolkata.

2.1.1 SITE CONTEXT ANALYSIS

Pushpa Gujral Science City is a science park and museum located on the outskirts of Kapurthala, Punjab. It is named after the mother of former Prime Minister of India, Inder Kumar Gujral. It was inaugurated on 19 March 2005 and is jointly funded by the Government of India and the Punjab Government. It aims to promote science education and awareness among the public, especially the youth, through fun and interactive exhibits, shows, and events.



Fig 2.1:Dome – shaped space theatre.

The context of Pushpa Gujral Science City is that it is one of the largest and most advanced science centers in India, covering a range of subjects from the physical to the social sciences, engineering, evolution, health, nuclear science and robotics. It also showcases the achievements of India in space and aviation sectors. It has various attractions such as theatres,

simulators, parks, and galleries that provide a hands-on learning experience for the visitors. It also organizes various activities such as workshops, camps, competitions, and festivals to engage the students and teachers in science and technology.

2.1.2 SITE CONCEPT ANALYSIS:



Fig 2.2: Man-made River Fig 2.3: water circulation.

Topography created Lake that was planned to artificial river for boating lovers, a large artificial lake has been set up in the center of the Science City with a rowing distance of about 1 kilometer. There are manual paddle operating boats for the visitors to move through the lake and to have a look at the Dinosaurs Park which is made on an island surrounded by the lake.



Fig 2.4: Master plan



LOCATION

PUSHPA GUJRAL SCIENCE CITY, JALANDHAR, PUNJAB
AREA: 72 ACRE

CONTEXT

THE ARCHITECT OF PUSHPA GUJRAL SCIENCE CITY IS DEVELOPMENT AND CONSULTANTS, A FIRM BASED IN KOLKATA.
PUSHPA GUJRAL SCIENCE CITY IS A SCIENCE PARK AND THE FIRST OF ITS KIND IN THE NORTH INDIA. PUNJAB GOVERNMENT AND THE MINISTRY OF SCIENCE, PUNE. IT WAS LAUNCHED BY THE PRIME MINISTER OF INDIA, JAWAHAR KALAS GUJRAL. IT WAS INAUGURATED ON 19 MARCH 2005 AND IS JOINTLY FUNDED BY THE GOVERNMENT OF INDIA AND THE PUNJAB GOVERNMENT. IT AIMS TO PROMOTE SCIENCE EDUCATION AND AWARENESS AMONG THE PUBLIC, ESPECIALLY THE YOUTH, THROUGH TV, AND INTERACTIVE EXHIBITS, SHOWS, AND EVENTS.

THE CONTEXT OF PUSHPA GUJRAL SCIENCE CITY IS THAT IT IS ONE OF THE LARGEST AND MOST ADVANCED SCIENCE CENTRES IN INDIA, COVERING A RANGE OF SUBJECTS FROM THE PHYSICAL TO THE SOCIAL SCIENCES, ENGINEERING, EVOLUTION, HEALTH, NUCLEAR SCIENCE AND ROBOTICS. IT ALSO SHOWCASES THE ACHIEVEMENTS OF INDIA IN SPACE AND AVIATION SECTORS. IT HAS VARIOUS ATTRACTIONS SUCH AS THEATRES, SIMULATORS, PARKS, AND GALLERIES THAT PROVIDE A HANDS-ON LEARNING EXPERIENCE FOR THE VISITORS. IT ALSO OFFERS A RANGE OF ACTIVITIES SUCH AS WORKSHOPS, CAMPS, COMPETITIONS, AND FESTIVALS TO ENGAGE THE STUDENTS AND TEACHERS IN SCIENCE AND TECHNOLOGY.

CONCEPT

THE DESIGN CONCEPT REFLECTS THE THEME OF BLENDING THE TRADITIONAL AND MODERN, AS WELL AS THE HARMONY OF NATURE AND HUMAN CREATIVITY.



THE DESIGN CONCEPT ALSO INCORPORATES THE VARIOUS ELEMENTS OF SCIENCE AND TECHNOLOGY IN THE ARCHITECTURE, SUCH AS THE DOME-SHAPED SPACE THEATRE, THE SOLAR PANELS, THE COOL ROOF, AND THE RAINWATER HARVESTING SYSTEM.



SITE CONCEPT

TOPOGRAPHY CREATED LAKE THAT WAS PLANNED TO ARTIFICIAL RIVER



Lake

For boating lovers, a large artificial lake has been set up in the centre of the Science City with a rowing distance of about 1 kilometre. This is a place where visitors to move through the lake and to have a look at the Dinosaurs Park which is made on an island surrounded by the lake.

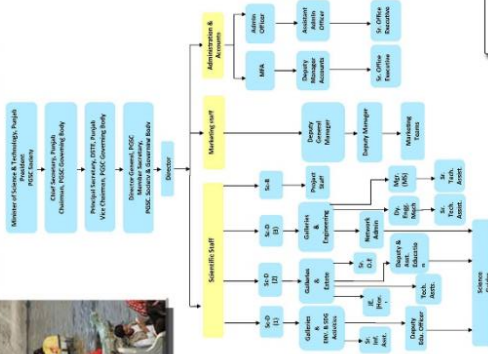


AIRCRAFT ORIGINAL SCALE MODEL EXHIBITION



MASTER PLAN

ORGANISATIONAL STRUCTURE



CASE STUDY 5

NAME: V.SANJAY

BATCH: 2019-2024

REG NO: 39210075

B.Arch, X SEM

PUSHPA GUJRAL SCIENCE CITY

Plate 2.1: Study of pushpa gujral science city.

2.2 ASTRONOMY SCIENCE CENTER –SHANGHAI, CHINA

Location –Shanghai, China

Site area – 39000 Sq.mts (9.6 Acres)

Architect – Thomas Wong

2.2.1 SITE CONTEXT ANALYSIS:

The Shanghai Astronomy Museum is located at 380 Lingang Avenue, near the Dishui Lake, the largest artificial lake in China. It is a branch of the Shanghai Science and Technology Museum, which also operates the Shanghai Natural History Museum and the Shanghai Planetarium. The museum was designed by Ennead Architects, who won an international competition in 2014.

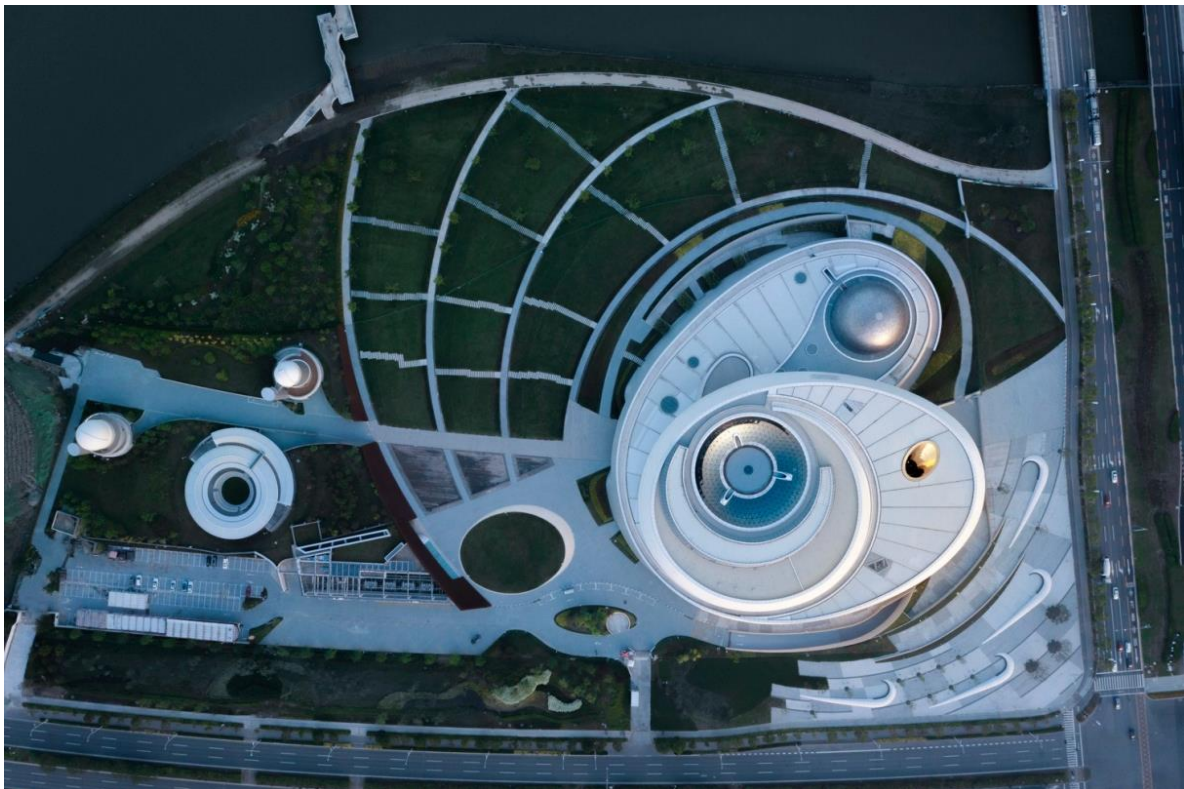


Fig 2.5 Shanghai astronomy science center

The design is inspired by astronomical principles and phenomena, such as orbital motion, gravitational attraction, and celestial bodies. The museum consists of three main architectural elements: the Oculus, the Sphere, and the Inverted Dome, which act as functioning astronomical instruments that track the sun, moon, and stars. The museum also features various exhibits, artifacts, and educational programs that aim to illuminate the history and future of astronomy and space exploration.

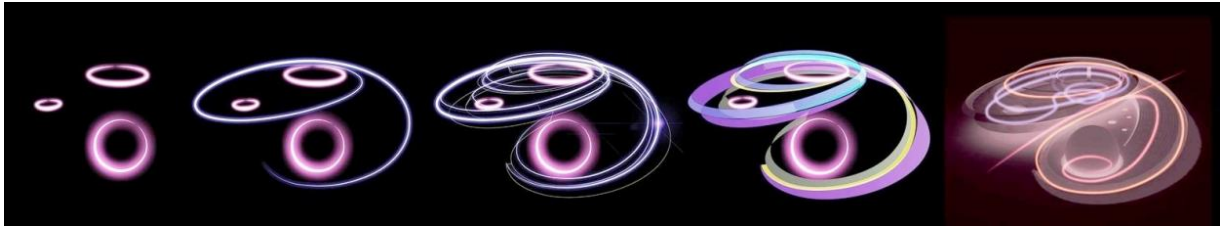


Fig 2.6 Design inspiration

2.2.2 CONCEPT ANALYSIS:

The Oculus, suspended above the main entrance to the Museum, demonstrates the passage of time by tracking a circle of sunlight on the ground across the entry plaza and reflecting pool. At noon during the summer solstice, there is a full circle, which aligns with a circular platform within the Museum's entry plaza. The Oculus creates a veritable timepiece in the civic square.

The Sphere houses the planetarium theater, which is half-submerged in the building. With minimally visible support, it evokes an illusion of weightlessness or anti-gravity. The pure spherical form references the primordial shapes in our universe and, like the orientation we yield from our position relative to the sun or moon, becomes an ever-present reference point for the visitor. The Sphere derives its shape not only from the requirements of the programmatic element it contains but as an abstract manifestation of a primary celestial form.



Fig 2.7 Sphere half submerged in the building

Embedded in the roof plane of the lower Museum wing, as if rising out of the Earth-bound horizon, the sphere gradually emerges into view as one round the building, the drama unfolding as though one were approaching a planet from one of its moons, allowing visitors to experience it as a weightless mass from below.

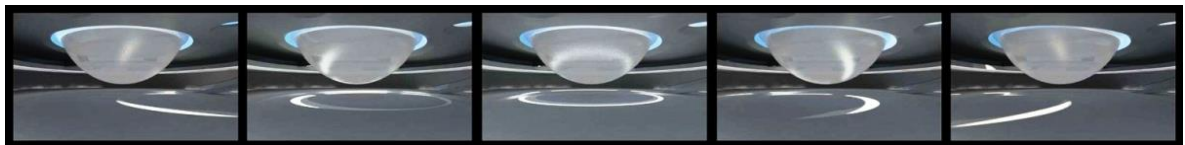


Fig 2.8: Sphere house

2.2.3PLAN AND SECTION:

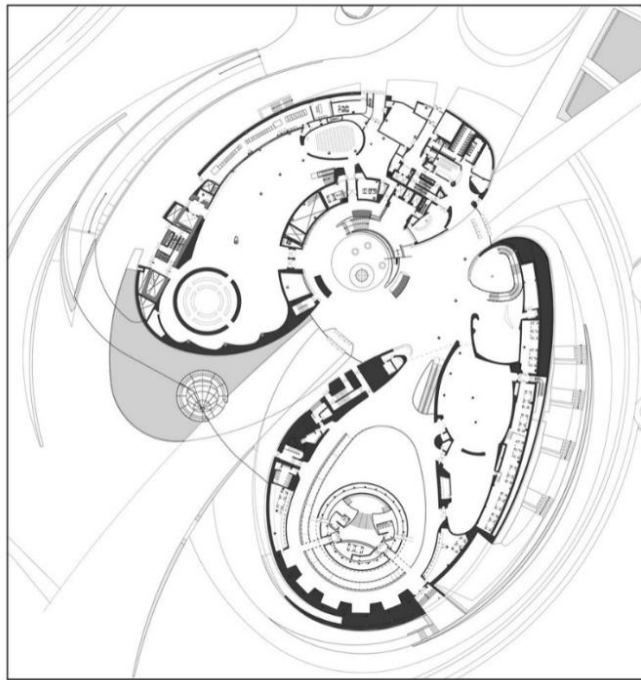


Fig 2.9 Ground floor plan

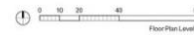
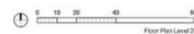


Fig 2.10 1st floor plan



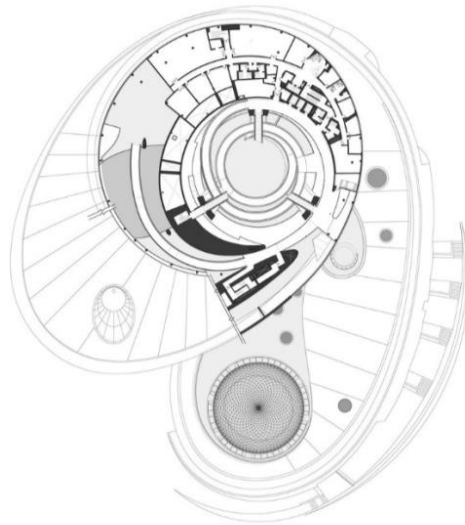


Fig 2.11 2nd floor plan

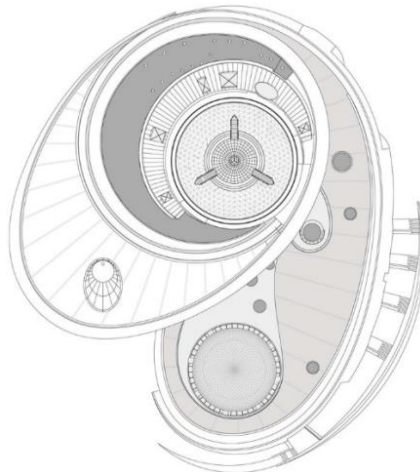


Fig 2.12 Terrace plan

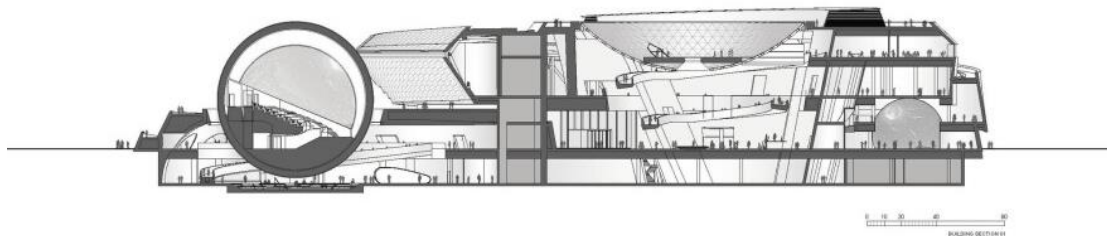


Fig 2.13 Section



LOCATION

SHANGHAI CHINA, ILIANGH, West 3 Rd, CN

CONTEXT

ARCHITECTS: LUNEAAD ARCHITECTS
AREA: 39,000 m² (9.6 ACRES)
LEAD ARCHITECT: THOMAS WONG

THE SHANGHAI ASTRONOMY MUSEUM IS LOCATED AT 380 LINGANG AVENUE, NEAR THE DUSHU LAKE, THE LARGEST ARTIFICIAL LAKE IN CHINA. IT IS A BRANCH OF THE SHANGHAI SCIENCE AND TECHNOLOGY MUSEUM, WHICH ALSO OPERATES THE SHANGHAI PLANETARIUM. THE MUSEUM WAS DESIGNED BY LUNEAAD ARCHITECTS, WHO WON AN INTERNATIONAL COMPETITION IN 2014.

THE DESIGN IS INSPIRED BY ASTRONOMICAL PRINCIPLES AND PHENOMENA, SUCH AS ORBITAL MOTION, GRAVITATIONAL ATTRACTION, AND THE CYCLIC NATURE OF TIME. THE DESIGN FEATURES THREE MAIN ARCHITECTURAL ELEMENTS: THE OCTULUS, THE SPHERE, AND THE INVERTED DOME, WHICH ACT AS FUNCTIONING ASTRONOMICAL INSTRUMENTS THAT TRACK THE SUN, MOON, AND STARS. THE MUSEUM ALSO FEATURES VARIOUS EXHIBITS, ARCHITECTS, AND EDUCATIONAL PROGRAMS THAT AIM TO ILLUMINATE THE HISTORY AND FUTURE OF ASTRONOMY AND SPACE EXPLORATION.



CONCEPT

THE OCTULUS, SUSPENDED ABOVE THE MAIN ENTRANCE PLAZA, TRACKS THE SUN'S TIME BY TRACKING A CIRCLE OF SUNLIGHT ON THE PLAZA AND REFLECTING THE POOL AT NOON DURING THE EQUINOXES. THE OCTULUS, WITH A CIRCULAR PLATFORM WITHIN THE MUSEUM'S ENTRY PLAZA, THE OCTULUS CREATES A VARIABLE TIMEPIECE IN THE CIVIC SQUARE.

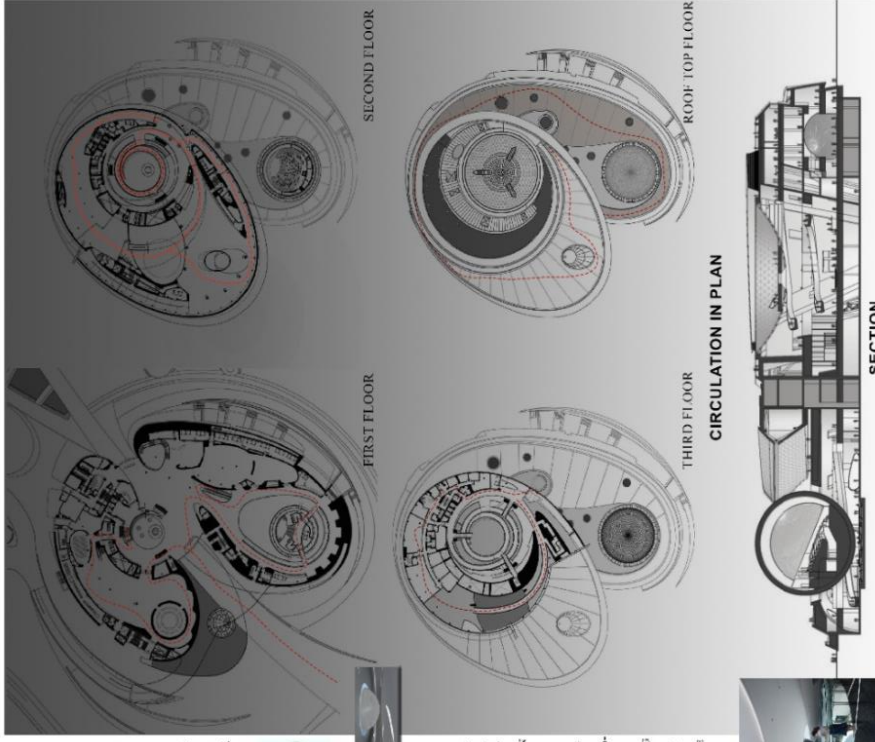


SPHERE HOUSES

THE SPHERE HOUSES, WHICH IS HALF-SUBMERGED IN THE BUILDING, WITH MINIMALLY VISIBLE SUPPORT, IT TURNS AN ILLUSION OF WEIGHTLESSNESS OR ANCESTRAL WISDOM. THE SPHERE HOUSES, WHICH ARE CIRCULAR, ARE DESIGNED TO TRACK THE SUN AND MOON. THE SPHERE HOUSES, WHICH ARE CIRCULAR, ARE DESIGNED TO TRACK THE SUN AND MOON. THE SPHERE HOUSES, WHICH ARE CIRCULAR, ARE DESIGNED TO TRACK THE SUN AND MOON.

THE SPHERE DERIVES ITS SHAPE NOT ONLY FROM THE REQUIREMENTS OF THE PROGRAMMATIC ELEMENT IT CONTAINS BUT AS AN ABSTRACT MANIFESTATION OF A PRIMARY CELESTIAL FORM. THE SPHERE DERIVES ITS SHAPE NOT ONLY FROM THE REQUIREMENTS OF THE PROGRAMMATIC ELEMENT IT CONTAINS BUT AS AN ABSTRACT MANIFESTATION OF A PRIMARY CELESTIAL FORM.

MUSEUM WING, AS IF RISING OUT OF THE EARTH-BOUND HORIZON, THE SPHERE GRADUALLY EMERGES INTO VIEW AS ONE ROUNDS THE BUILDING. THE SPHERE, APPROACHING A PLANET FROM ONE OF ITS MOONS, ALLOWING VISITORS TO EXPERIENCE IT AS A WEIGHTLESS MASS FROM BELOW.



CASE STUDY 4

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SHANGHAI ASTRONOMY SCIENCE CENTER



Plate 2.2: Study of Shanghai astronomy science center

2.3 SINGAPORE SCIENCE CENTER

Location - Singapore

Site area – 14.8 Acres

Architect - Zaha Hadid

2.3.1 SITE CONTEXT ANALYSIS:

The Science Centre Observatory is situated at 15.27 meters (50.1 ft) above mean sea level at Area of 14.8 Acres and is one of the few observatories in the world located next to the equator. Its unique position allows constellations in both the northern and southern celestial hemispheres to be observed.

The Science Centre Singapore is a scientific institution that promotes STEM education and experiences for the general public. It has various attractions and programmers that cater to different interests and ages. Some of the attractions are Kids stop, Snow City, Omni-Theatre and Butterflies Up-Close.



Fig 2.14 Building Zoning

Jurong East is one of the largest commercial hubs outside the Central Area, with several shopping malls, office buildings, hotels, and entertainment venues. It is also home to the Jurong Lake District, a mixed-use development that aims to be the second Central Business District of Singapore.

Jurong East is well-connected by public transport, with four MRT stations, two bus interchanges, and several major roads and expressways. It is also close to the Jurong Bird Park, the Chinese Garden, and the Japanese Garden, which are popular attractions for nature lovers and tourists.

2.3.2 SITE CONCEPT ANALYSIS:

To integrate with the natural landscape and lake of the Jurong Lake Gardens, and to achieve high standards of sustainability and energy efficiency. Sustainability of design by focusing on the ecology environment and using a lake view.



Fig 2.15 Building focusing lake view

Gallery Pathways have been designed to enhance students' understanding and application of science concepts taught in the primary school, secondary school and junior college science

curriculum.

These pathways also complement the exhibits in the exhibitions and are designed to guide students as they learn how to better visualize abstract ideas such as force, infection and transmission of infections, genetics, nanotechnology, environmental impact etc.



Fig 2.16 Vegetation pathway circulation

2.2.3 PLAN AND CIRCULATION:

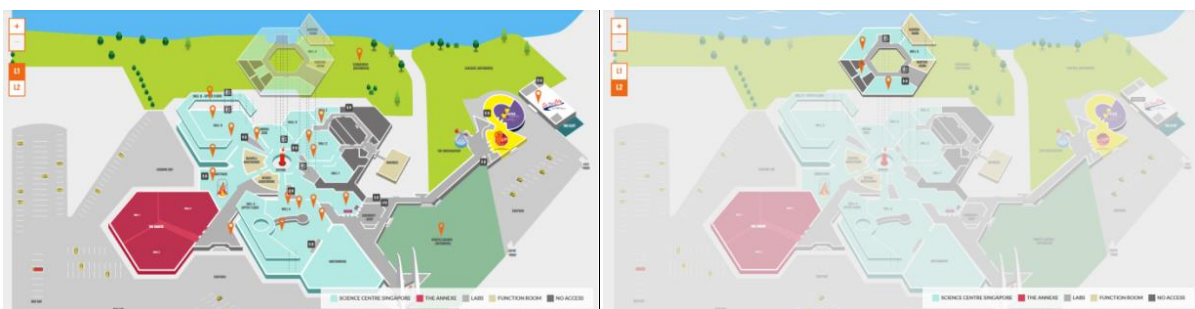


Fig 2.17 Floor plan

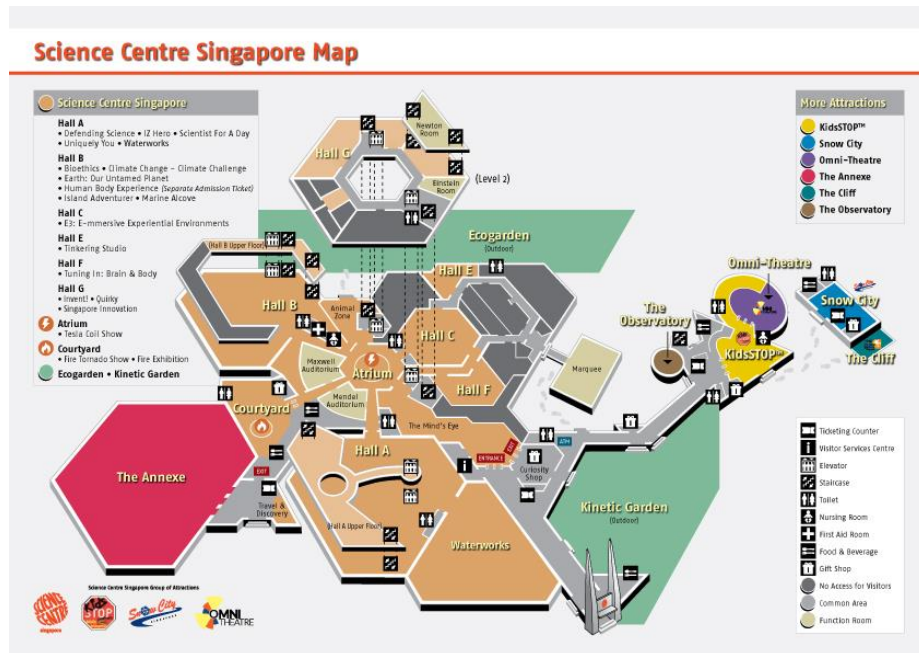


Fig 2.18 Master plan

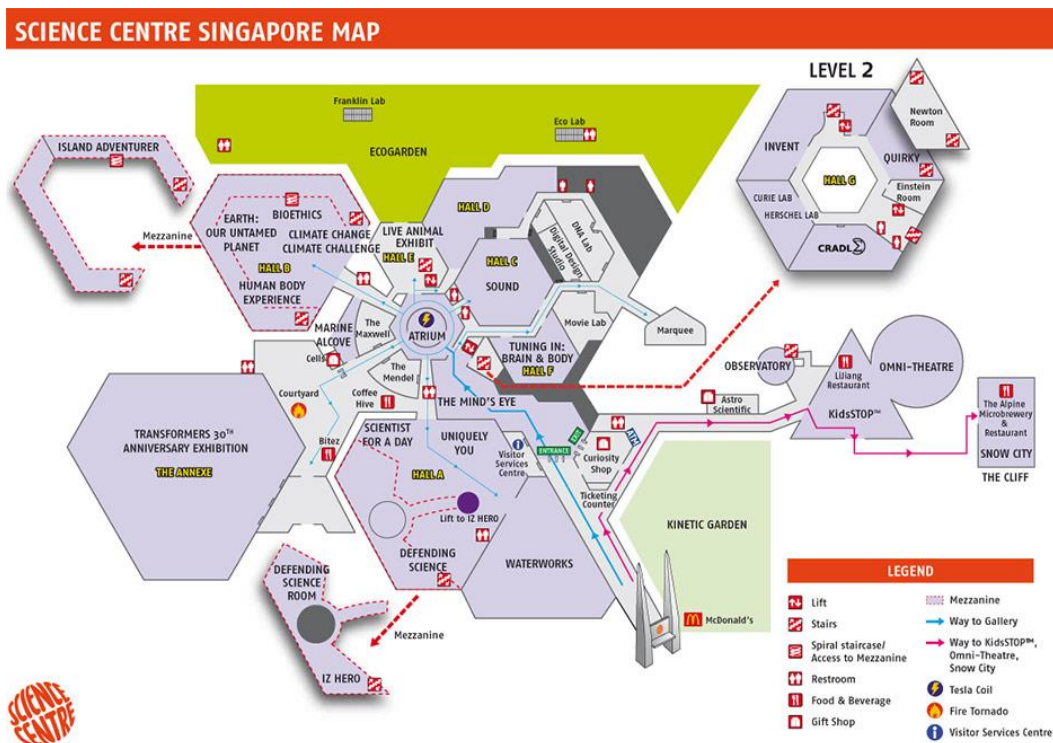


Fig 2.19 Circulation plan

LOCATION

CONCEPT

TO INTEGRATE WITH THE NATURAL LANDSCAPE AND LAKE OF THE JURONG LAKE GARDENS, AND TO ACHIEVE HIGH STANDARDS OF SUSTAINABILITY AND ENERGY EFFICIENCY.

CONTEXT

THE SCIENCE CENTRE OPERATORY IS SITUATED AT 15.27 NORTH 101.17 EAST, MEANS SE AT THE JUNCTION OF 14.8 ACRES AND A ONE OF THE FIVE OBSERVATORIES IN THE WORLD LOCATED NEXT TO THE EQUATOR. ITS UNIQUE POSITION ALLOWS CONSTELLATIONS IN BOTH THE NORTHERN AND SOUTHERN CELESTIAL HEMISPHERES TO BE OBSERVED.

THE SCIENCE CENTRE SINGAPORE IS A SCIENTIFIC INSTITUTION THAT PROVIDES STUDENTS AND THE PUBLIC WITH EDUCATIONAL AND RECREATIONAL OPPORTUNITIES. IT HAS VARIOUS ATTRACTIONS AND PROGRAMS THAT CATER TO DIFFERENT INTERESTS AND AGES. SOME OF THE ATTRACTIONS ARE KIDS STOP, SNOW CITY, OMNI-THEATRE AND BUTTERFLIES UP-CLOSE.

JURONG EAST IS ONE OF THE LARGEST COMMERCIAL HUBS IN SINGAPORE, WITH A MIXED-USE DEVELOPMENT THAT INCLUDES HOTELS, OFFICE BUILDINGS, HOTELS, AND ENTERTAINMENT VENUES. IT IS ALSO HOME TO THE JURONG LAKE DISTRICT, A MIXED-USE DEVELOPMENT THAT AIMS TO BE THE SECOND CENTRAL BUSINESS DISTRICT OF SINGAPORE.

JURONG EAST IS WELL-CONNECTED BY PUBLIC TRANSPORTATION, INCLUDING THE SINGAPORE METRO, EXPRESSWAYS, AND SEVERAL MAJOR ROADS AND EXPRESSWAYS. IT IS ALSO CLOSE TO THE JURONG BIRD PARK, THE CHINESE GARDEN, AND THE JAPANESE GARDEN, WHICH ARE POPULAR ATTRACTIONS FOR NATURE LOVERS AND TOURISTS.

CONCEPT

TO INTEGRATE WITH THE NATURAL LANDSCAPE AND LAKE OF THE JURONG LAKE GARDENS, AND TO ACHIEVE HIGH STANDARDS OF SUSTAINABILITY AND ENERGY EFFICIENCY.

PATHWAYS

GALLERY PATHWAYS HAVE BEEN DESIGNED TO ENHANCE STUDENTS' UNDERSTANDING AND APPLICATION OF SCIENCE CONCEPTS TAUGHT IN THE PRIMARY SCHOOL, SECONDARY SCHOOL, AND JUNIOR COLLEGE SCIENCE CURRICULUM.

THESE PATHWAYS ALSO COMPLEMENT THE EXHIBITS IN THE EXHIBITIONS AND ARE DESIGNED TO HELP STUDENTS AS THEY LEARN HOW TO BETTER VISUALISE ABSTRACT IDEAS SUCH AS FORCE, INFECTION AND TRANSMISSION OF DISEASE, GENETICS, GENOMICS, ETC.

BUILDING ZONING

SCIENCE CENTRE SINGAPORE MAP

LEVEL 2

CIRCULATION

SINGAPORE SCIENCE CENTER

CASE STUDY 3

NAME: V.SANJAY BATCH: 2019-2024
REG NO: 39210075 BARCH, X SEM

Plate 2.3: Study of Singapore Science center

2.4 GUJARAT SCIENCE CITY

Location - Ahmadabad, Gujarat

Total site - 155 Acres

Built up area - 17, 20,955 Sq.ft

Design By - design firm HCP Design, Planning and Management Pvt. Ltd. (HCP).

2.4.1 SITE CONTEXT ANALYSIS:

Gujarat Science City, situated in Ahmadabad, Gujarat, India, is a well-known hub for science and technology. It is a government program designed to advance scientific literacy and knowledge. Please be aware that things might have changed since then, so it's a good idea to find out the most recent details.





Fig 2.20 Building form to the site context.

2.4.2 SITE CONCEPT ANALYSIS:

The Gujarat Science City is separated into various "zones." Still, zoning or thematic divisions are frequently used by significant science and technology centers for organizational and educational reasons. Gujarat Science City may have been zoned for a number of reasons.

1. **Thematic Specialization:** specific branch of science, like physics, biology, astronomy, or technology.
2. **Content Appropriate for All Ages:** Schoolchildren, college students, and the general public.
3. **Interactive Learning:** By enabling visitors to actively interact with exhibits and demonstrations related to particular scientific concepts.
4. **Ease of Navigation:** zones can help visitors get around and explore more easily. Visitors can find sites of interest more easily and effectively with the aid of clear zoning.
5. **Operational Management:** Creating zones within Science City may help with operational management. Having a separate staff and resource set for each zone can simplify administration and maintenance.

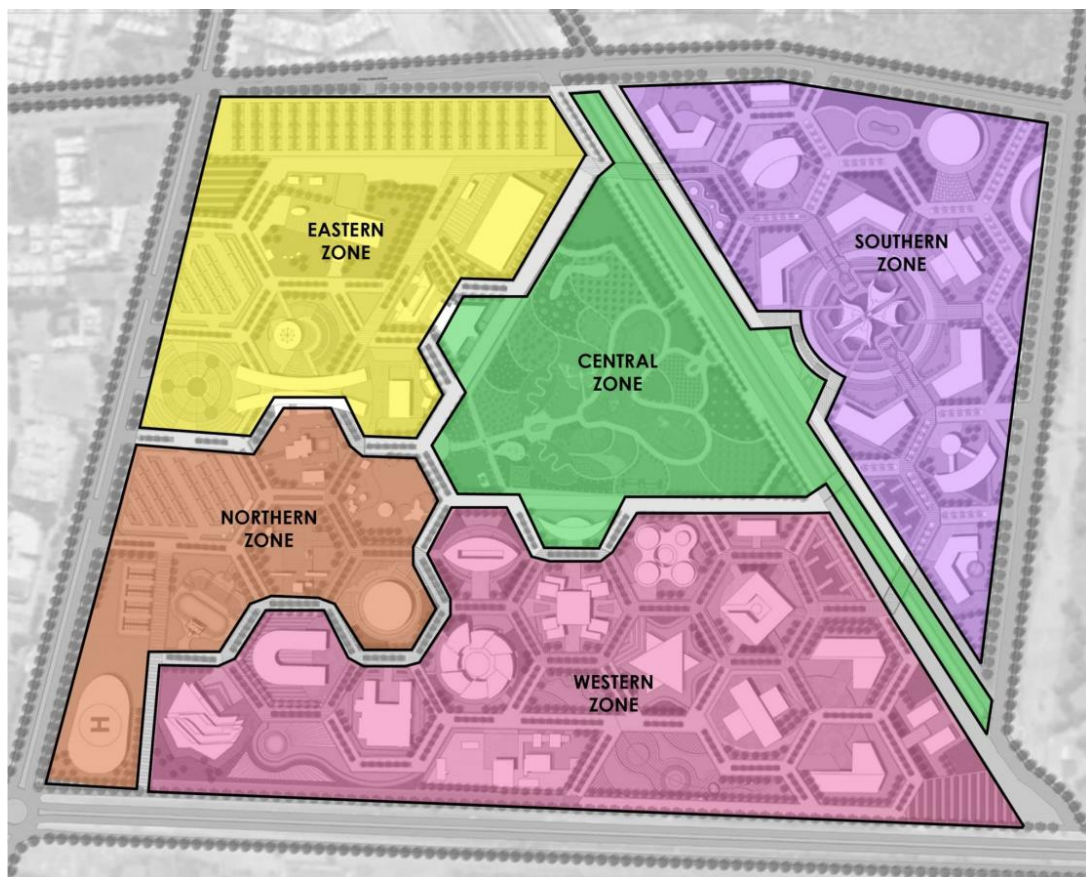


Fig 2.21 Five Zone concept.



MASTER PLAN

EXISTING AREAS

01. ENTRY
02. TIERED PARKING WITH SOLAR ROOF
03. ARRIVAL
04. I MAX
05. AMPHITHEATER
06. AUDITORIUM
07. KUND
08. LIFE SCIENCE PARK
09. ENERGY PARK
10. MUSICAL FOUNTAIN
11. GEOLOGY & BIO CHEMISTRY
12. PLANET EARTH

13. NATURE PARK
14. TEMPORARY EXHIBITIONS / WORKSHOP PAVILIONS
15. EXHIBITION HALL

UPCOMING GALLERIES

16. ROBOTICS GALLERY
17. AQUATIC GALLERY
18. ASTRONOMY & SPACE SCIENCE GALLERY

FUTURE GALLERIES

19. MARINE GALLERY
20. SPACE PARK
21. AVIATION GALLERY

22. ISRO GALLERY
23. AR GALLERY
24. VR GALLERY
25. GLASS & CERAMIC MUSEUM
26. TEXTILE MUSEUM
27. PHYSICS & ENERGY MUSEUM
28. AUTOMOBILE GALLERY
29. HUMAN SCIENCE
30. BIO SCIENCE
31. FUTURISTIC & EMERGING TECHNOLOGIES
32. AGRO SCIENCE & NANO SCIENCE

33. VEDIC & MATHAMETICS
34. AMENITY
35. RESIDENTIAL
36. UTILITY
37. CHILDREN'S MUSEUM
38. ADVENTURE PARK
39. CANAL DEVELOPMENT
40. ADMINISTRATIVE BUILDING WITH HELIPAD
41. SCIENCE TOWER

Fig 2.22 Master plan.

2.4.2 DESIGN EVOLUTION:

The design dispenses the gallery in 5 blocks, 4 of them surrounding the central three floors high atrium block enveloped in transparent glazing system inside which a massive brass-plated globe representing the sun is housed, visible from the surrounding landscaped exteriors.

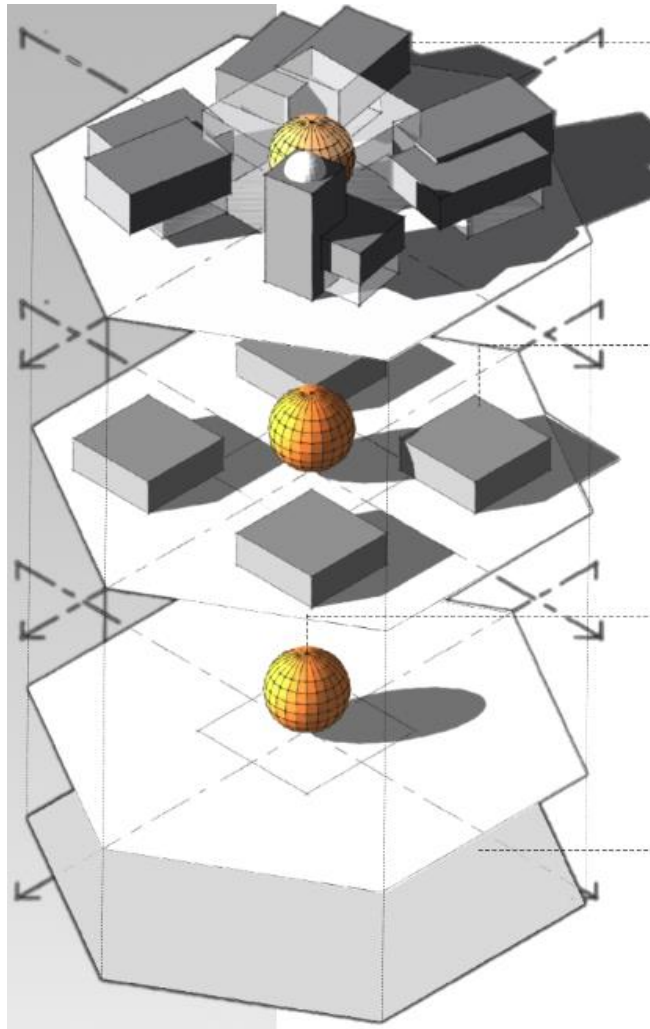


Fig 2.23 Evolution of Astronomy and Space Science Gallery.

The Astronomy and Space Science Museum has a diverse program including a Planetarium with 200 seat capacity, an Observatory (with 40 Inch Aperture Telescope) and Retractable Dome, Solar Telescope (with 10 Inch Aperture Telescope), 2 Simulators for Virtual

Experience, a Photo Booth, an Intro- Projection Hall, Cockpit Simulators, Virtual Reality Exhibits and Large Exhibits with Thematic, Scientific Content and Originality. The designs of the galleries are driven by the basic understanding of the purpose a theme-based gallery serves in society in general. The interactive exhibits in galleries serve as a starter for a discussion between students, student and teacher or between a parent and a child.

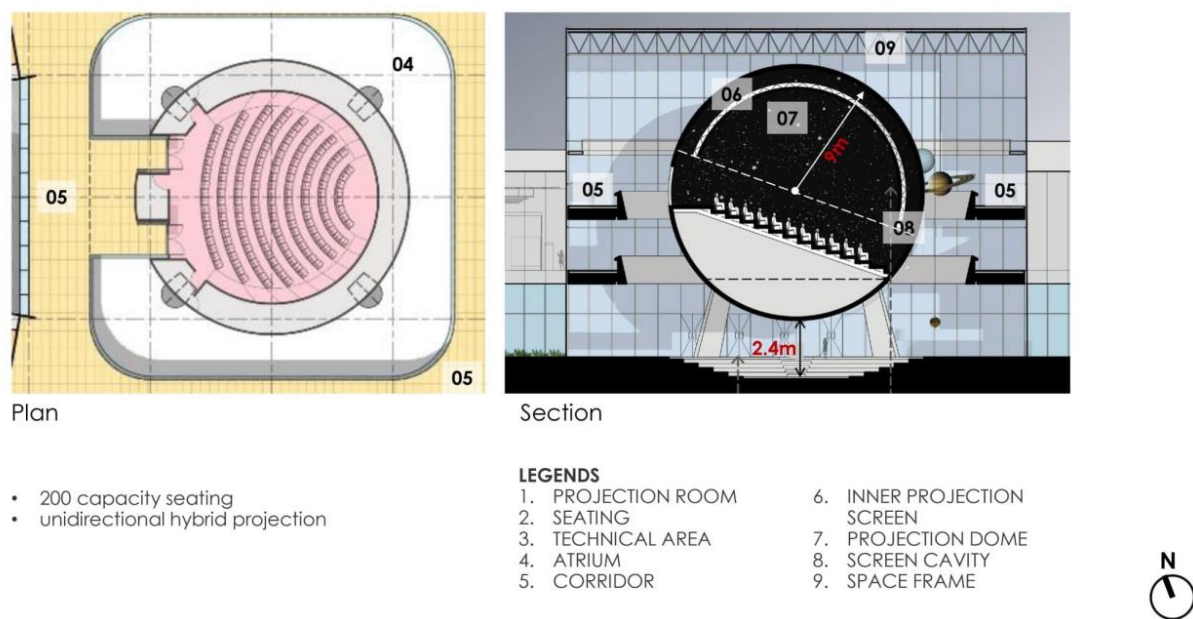


Fig 2.24 Astronomy and Space Science Gallery Plan and section.

An outstanding example that is innovative architectural design that combines science instruction with entertainment is the Aquarium at Ahmadabad Science City. This project's design evolution shows a dedication to sustainability and visitor engagement along with a thorough understanding of aquatic life and its ecosystems. The shell form, which represents aquatic life, served as inspiration for the building's design. The shape is sculptural, with various volumes rising to various heights according to use and placement.

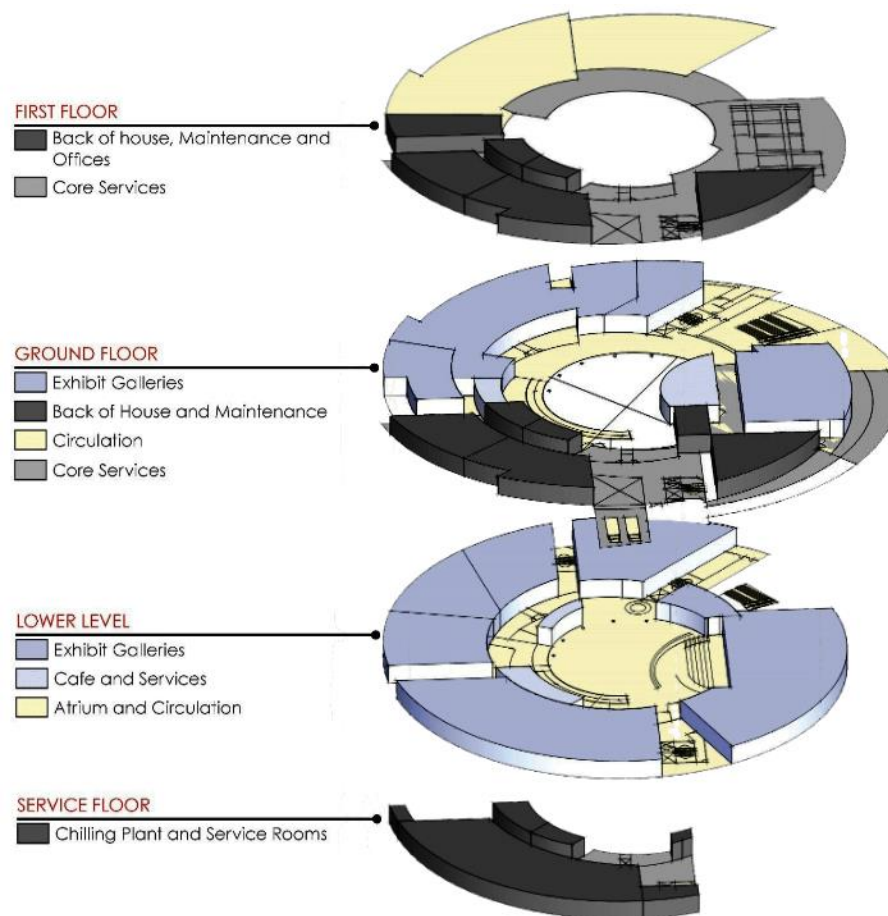


Fig 2.25 Evolution of Aquatic gallery.

The layout features various aquatic galleries nested in multiple wings, swirling out from around a central circular atrium, which serves as the visitors' arrival lobby. The Aquatic Gallery at Ahmadabad Science City stands as a testament to the power of design in creating spaces that educate and inspire while respecting and showcasing the diversity of aquatic life.



LOCATION

THALTEJ, AHMEDABAD, GUJARAT

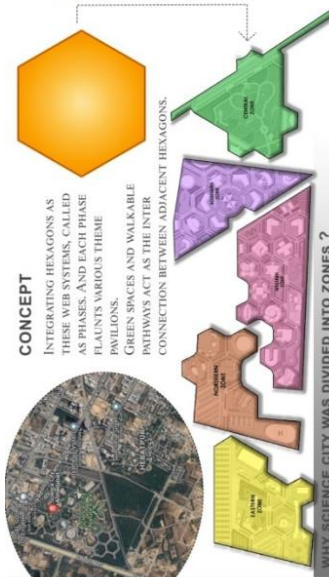
CONTEXT

Site Area : 155 Acres
Builtup Area : 17,20,955 Sq.ft
Design By: design firm HCP Design, Planning and Management Pvt. Ltd. (HCP).

GUJARAT SCIENCE CITY, SITUATED IN AHMEDABAD, GUJARAT, INDIA, IS A WELL-KNOWN HUB FOR SCIENCE AND TECHNOLOGY. IT IS A GOVERNMENT PROGRAM DESIGNED TO ADVANCE SCIENTIFIC LITERACY AND KNOWLEDGE. PLEASE BE AWARE THAT THINGS MIGHT HAVE CHANGED SINCE THEN, SO IT'S A GOOD IDEA TO FIND OUT THE MOST RECENT DETAILS.



REGARDING GUJARAT SCIENCE CITY'S SITE CONTEXT, IT IS LOCATED ON A LARGE CAMPUS INTENDED TO HOUSE A RANGE OF SCIENCE-RELATED EVENTS, DISPLAYS, AND EDUCATIONAL INITIATIVES. IT COULD ADD A DISTINCTIVE AND INSTRUCTIVE ELEMENT TO THE CITY'S OFFERINGS AND ENHANCE THE CULTURAL LANDSCAPE OF THE SURROUNDING AREA. SCIENCE CITY'S ABILITY TO DRAW TOURISTS MAY BENEFIT THE LOCAL ECONOMY BY BRINGING IN BUSINESS AND SERVICES RELATED TO THE TOURISM INDUSTRY.



CONCEPT

INTEGRATING HEXAGONS AS THESE WEB SYSTEMS, CALLED AS PHASES, AND EACH PHASE PLANTS VARIOUS THEME PAVILIONS. GREEN SPACES AND WALKABLE PATHWAYS ACT AS THE INTER CONNECTION BETWEEN ADJACENT HEXAGONS.

WHY SCIENCE CITY WAS DIVIDED INTO ZONES ?

The Gujarat Science City is separated into various "zones," still, zoning or thematic divisions are frequently used by significant science and technology centers for organizational and educational reasons. Gujarat Science City may have been zoned for a number of reasons.

- 1. Thematic Specialization:**
specific branch of science, like physics, biology, astronomy, or technology.
- 2. Content Appropriate for All Ages:** Schoolchildren, college students, and the general public.
- 3. Interactive Learning:**
By enabling visitors to actively interact with exhibits and demonstrations related to particular scientific concepts.
- 4. Ease of Navigation:**
zones can help visitors get around and explore more easily. Visitors can find sites of interest more easily and effectively with the aid of clear zoning.
- 5. Operational Management:** Creating zones within Science City may help with operational management. Having a separate staff and resource set for each zone can simplify administration and maintenance.



MASTER PLAN

- | | | | |
|-------------------------------------|--|------------------------|---------------------------|
| EXISTING AREAS | 13. NATURE PARK | 22. SRO GALLERY | 33. VEDIC & MATHEMATICS |
| 01. ENTRY | 14. TEMPORARY EXHIBITIONS / WORKSHOP PAVILIONS | 23. AIR GALLERY | 34. AMENITY |
| 02. BEED PARKING WITH 50000 SQ.FOOT | 15. EMERGENCY HALL | 24. 9F GALLERY | 35. RESIDENTIAL |
| 03. ARRIVAL | 16. MUSEUM | 25. CERAMIC MUSEUM | 36. CHILDREN'S MUSEUM |
| 04. IMAX THEATRE | 17. TEXTILE MUSEUM | 26. ENERGY MUSEUM | 37. ADVENTURE PARK |
| 05. AUDITORIUM | 18. AQUATIC GALLERY | 27. MUSEUM | 38. PARKING LOT |
| 06. KINO GALLERY | 19. ASTROLOGY & SPACE SCIENCE GALLERY | 28. AUTOMOBILE GALLERY | 39. ADMINISTRATION |
| 07. KINO GALLERY | 20. SCIENCE GALLERY | 29. FUTURE GALLERY | 40. BUILDING WITH HELIPAD |
| 08. ENERGY PARK | 21. AVANTION GALLERY | 30. NO SCIENCE | 41. SCIENCE TOWER |
| 09. MUSICAL FOUNTAIN | | | |
| 10. GEOLOGY & BIO | | | |
| 11. PLANET EARTH | | | |



GUJARAT SCIENCE CITY

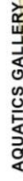
CASE STUDY 2

NAME: V.SANJAY
REG NO: 39210075
BATCH: 2019-2024
BARCH, X SEM

Plate 2.4: Study of Gujarat Science city.

Site Area : 10,000 SM
Builtup Area : 8,500 SM

The Astronomy and Space Science Museum has a diverse collection, including a Planetarium with 200 seat capacity, an Observatory (with 8-inch Aperture Telescope) and Reflecting Telescope, Solar Telescope, 2 Simulators for Virtual Experience, a Photo Booth, an Intro-Projection Hall, Cockpit Simulators, Virtual Reality Exhibits and Large Exhibits with Thematic, Scientific Content and Originality. The designs of the galleries are driven by the basic understanding of the purpose a theme-based gallery serves in society. In general, the interactive exhibits in galleries serve as a starting point for discussion between a parent and teacher or between a parent and child.



4 BLOCK COVERING THE CENTER SHPERE
.....TO FORM A BUILDING

SPHERE-SHAPED PLANETARIUM AS
CORE DESIGN.

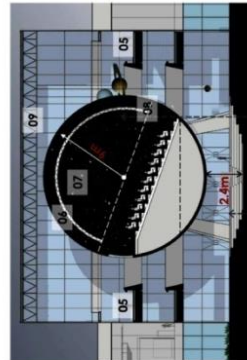
BASE HEXAGON AS ORGANIZED FROM
CIRCULATION CONCEPT

BASE HEXAGON AS ORGANIZATION
CIRCULATION CONCEPT

SERVICE FLOOR
Chilling Plant and Service Rooms

1

DESIGN EVOLUTION



LEGENDS

- LEGENDS**
1. PROJECTION ROOM
2. SEATING
3. TECHNICAL AREA
4. ATRIUM
5. CORRIDOR
6. INNER PROJECTION
SCREEN
7. PROJECTION DOME
8. SCREEN CAVITY
9. SPACE FRAME



LOWER FLOOR PROGRAM DIAGRAM

UPPER FLOOR PROGRAM DIAGRAM

CASE STUDY 2

NAME: V.SANJAY BATCH: 2019-2024
REG NO: 39210075 B.A.RCH, X SEM

NAME: V.SANJAY
REG NO: 39210075
BATCH: 2019-2024
B.ARCH. XSEM

GUJARAT SCIENCE CITY

Plate 2.5: Study of Gujarat Science city.

2.5 KOLKATA SCIENCE CITY

Location – Topsia, Kolkata

Total site - 50 Acres

2.5.1 SITE CONTEXT ANALYSIS:

Since it opened on July 1st, 1997, the science city has grown to become a popular destination for both locals and the National Council of Science Museums. The Indian government's ministry of culture. The science city, which covers an area of roughly 50 acres, offers science and technology to visitors in an engaging and motivating way that is both educational and entertaining.

“The site is formed on a barren garbage dump land with degraded soil on top covering up to 6 meters”.

- Nearest Railway station: Sealdah Junction, 5Km.
- Nearest Metro station: Dum Dum, 13km.
- Nearest Bus stand: Central bus terminal, 7.5 km.
- Nearest Airport: Netaji Subhash Chandra Bose International Airport, 18km.

2.5.2 SITE CONCEPT ANALYSIS:

1. Usage of lake and pond

The rainwater flows towards Mirania Lake on the west and also water gets collected in the pond which is on-site in the north. Water in the pond is treated and later used for service purposes. Mirania Lake is used as the view positive sign for the semi-public area which is covered with trees at the edge of the site so that the people have a partial view of the lake while walking.

2. Usage of Vegetation

Vegetations are focused at the boundaries of the site. Mostly vegetation-like trees are focused on circulation paths to provide shadows and block the outside noise. Short plants are used at parks and grounds for safety purposes. Vegetation mostly used as a sanctuary for visitors' view.

3. Usage of Building as a barrier

Buildings are orientated around the site creating a wider space at the center of the site for public movement. this keeps them away from distractions from vehicle movement and spend their time without any distractions from outside. the center space creates a large opening for the park.

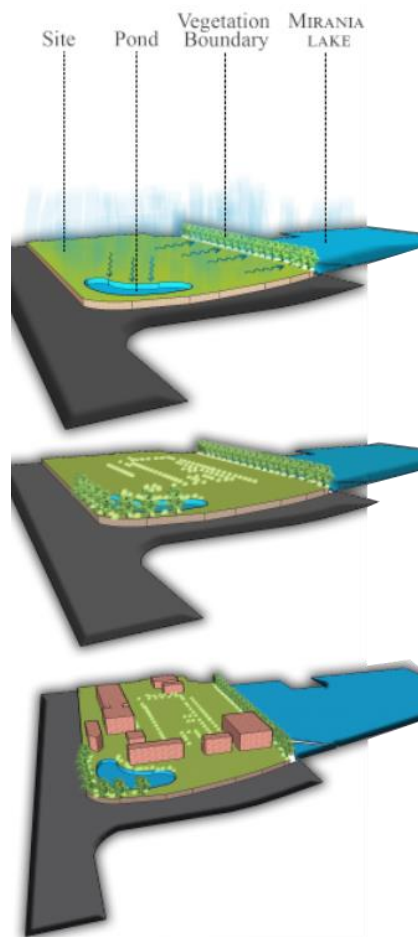


Fig 2.26 Site Concept.

2.5.3 SITE CIRCULATION:

1. Pedestrian movement:

A network of sandstone paved pathways of 3.5m; 2.5m & 1.8m wide are used by the visitors to access various buildings.

2. By Toy train:

Runs throughout the site. Useful to persons who avoid walking especially elderly people.

3. By Ropeway:

It was introduced to provide a panoramic view of the site from the gate complex to the end of the site.

4. Main Plaza:

The huge plaza is carefully planted with low heighted plants & non foliage trees. Major part is covered with maze hedges enclosing open exhibits. Low height creeper shrubs are used near kiosks for shading seating benches. Musical fountain is the main attraction feature of the plaza. Royal palms are planted near parking & service lane.

5. Convention Centre:

The plaza is landscaped with potted plants, flower beds, water channels and fountains. A combination of changing levels with steps, ramps and fountains exaggerates the function and beauty of the plaza.

6. Entrance Plaza:

The entrance plaza is lush green enclosing fountains; it forms patterns with sandstone pathways.

7. vehicular movement:

Directions that provide guidance for visitors regarding parking areas, drop-off zones, and traffic flow within the Science City premises. Mostly buses are parked at the back side of the buildings.

8. By Monorail:

Runs on elevated tracks throughout the site.

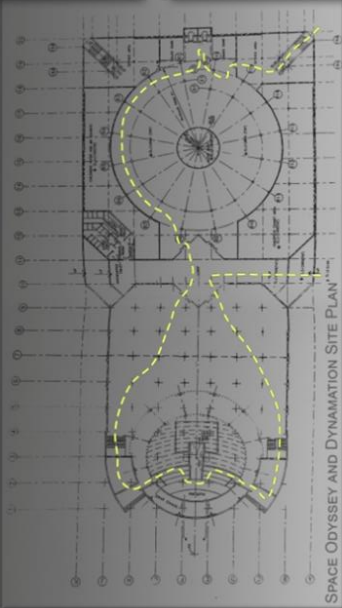


Fig 2.27 On-site Circulation.

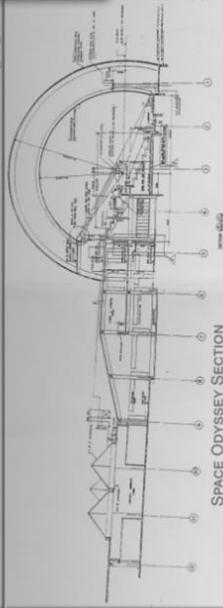
Plate 2.6: Study of Kolkata Science city.



BUILDING LEVEL STUDY DYNAMATION AND SPACE ODYSSEY



SPACE ODYSSEY AND DYNAMATION SITE PLAN



SPACE ODYSSEY SECTION



DYNAMATION SECTION

LIGHTING:

The atrium's steel and glass skylight provides a broad expanse of glare-free natural light. Nevertheless, deeper areas and galleries, particularly the aquarium, are lighted as needed with halogen lamps and fluorescent tube lights. The ramp is illuminated by structural glazing positioned at different angles, providing glare-free light and acting as a focal point for visitors. Some areas are lit by recessed lighting. Six windows used to be on the upper floor, but they are insufficient to light the entire hall. Little raised windows on top of the galleries help to partially fill the interiors with natural light.

SPACE THEATRE:

- Using the Astro vision 70 large format film projection system, movies are shown in this 23-meter-diameter dome theater.
- It is a 360-person planetarium and tilted dome with a uni-directional seating arrangement.
- It features two double doors for entry and exit, with a buffer zone between them.
- The terrace on the upper floor and the outdoors on the ground floor are considered by the designers as spaces and exits.
- Dark interiors guarantee high-quality projection.
- To allow for multiple uses of the hall, the theater features a small stage that is 3 meters wide and 0.2 meters high.
- Four aisles on 1100mm treads in front, 1000mm in the middle, and 900mm at the back are symmetrically arranged around the seats.
- The 0.4 m-tall risers can be reached by 3 intermediate 0.1m risers.



INFERENCES:

- The steel and glazed skylight in the central atrium provides a significant portion of the light.
- It gives the entire building enough light.
- The display ramp system is an effective technique.
- It makes sense to build a parallel ramp for service and fire escape.
- Where there is a significant public movement, segregation of entries and overall zoning are necessary. The building's grit finish helps it blend in with the Space Odyssey.
- The displays are easily comprehensible and accessible.
- The area is well-planned overall, with pleasant walking spaces.



CIRCULATION:

- Throughout the exhibition area, a 4.5-meter-wide, undirected, descending circulation ramp enforces a forced circulation pattern.
- The ramp is 38 meters high, spiral-shaped, and 4.5 meters wide.
 - The exit is via the staircase that descends from the first floor to the ground.
 - The visitor's entry and the service entry are similar.
 - After viewing the exhibits on the ground floor, visitors ride the elevator to the top floor, which is located at a height of 24.6 meters.
 - The structure is designed without any barriers.



CASE STUDY 1

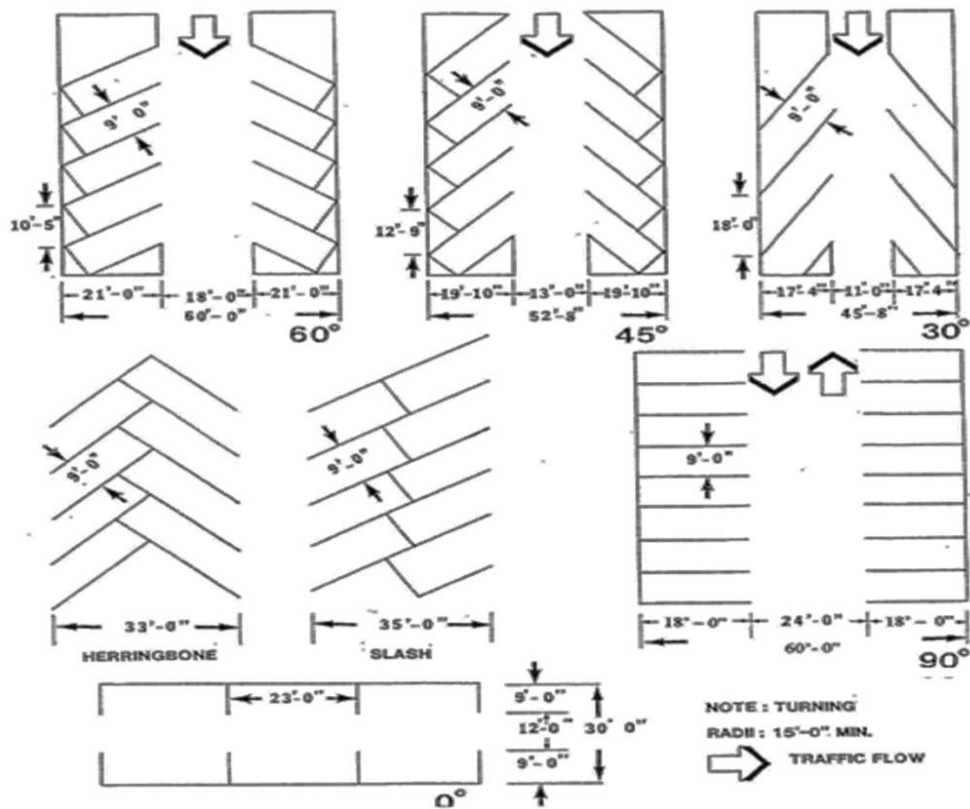
NAME: V SANJAY BATCH: 2019-2024
REG NO: 39210075 B.Arch, X SEM

Plate 2.7: Study of Kolkata Science city.

CHAPTER 3

DATA COLLECTION AND STANDARDS

3.1 STANDARDS FROM TSS AND NBC:



Parking	Width of Stall	Minimum Depth of Stall	Driveway Width	Length of Curb Per Car
0	9'	23'-0"	12'	23'-0"
30 degree	9'	17'-4"	11'	18'-0"
45 degree	9'	19'-10"	13'	12'-9"
60 degree	9'	21'-0"	18'	10'-5"
90 degree	9'	18'-0"	24'	9'-0"

PARKING LOT DIMENSIONS

Angle of Parking	Stall width	Stall length per car	Stall depth	Minimum driveway width	Lot width 1 row + 1 driveway	Sq ft per car	Lot width 2 rows + 1 driveway	Sq ft per car	Lot width 3 rows + 2 driveways	Sq ft per car	Lot width 4 rows + 2 driveways	Sq ft per car
Along curb = 0°	9'	23'	9'	12'	21'	483	30'	345	51'	391	60'	345
	10'	23'	10'	12'	22'	506	32'	368	54'	414	64'	368
30°	9'	18'	17'-4"	11'	28'-4"	510	45'-8"	411	66'-2"	397	83'-6"	376
	10'	20'	18'-3"	11'	29'-3"	585	47'-6"	475	68'-0"	453	86'-2"	431
45°	9'	12'-9"	19'-10"	13'	32'-10"	420	52'-8"	336	79'-0"	376	98'-10"	315
	10'	14'-2"	20'-6"	13'	33'-6"	490	54'-0"	383	80'-4"	379	100'-10"	358
60°	9'	10'-5"	21'-0"	18'	39'-0"	407	60'	313	95'-0"	330	116'-0"	305
	10'	11'-6"	21'-6"	18'	39'-6"	455	61'	351	95'-6"	366	116'-6"	335
90°	9'	9'	19'	24'	43'	387	62'	279	105'	315	124'	279
	10'	10'	19'	24'	43'	430	62'	310	105'	350	124'	310

Fig – 3.1(a): Parking area percentage.

RAMP LENGTH FOR STRAIGHT RAMPS (TO THE NEAREST FOOT)

Angle, degrees	Ramp grade, percent	Floor-to-floor height					Split-level floors	
		8 ft	9 ft	10 ft	11 ft	12 ft	4 ft	5 ft
3	5	160	180	200	220	240	80	100
3½	6	133	150	167	183	200	67	88
4	7	114	128	143	157	172	57	77
4½	8	100	112	125	138	150	50	63
5	9	89	100	111	122	134	45	55
6	10	80	90	100	110	120	40	50
6½	11	73	82	91	100	109	37	46
7	12	67	75	83	92	100	34	42
7½	13	61	69	77	85	92	31	39
8	14	57	64	72	79	86	29	36
8½	15	53	60	66	73	80	27	33

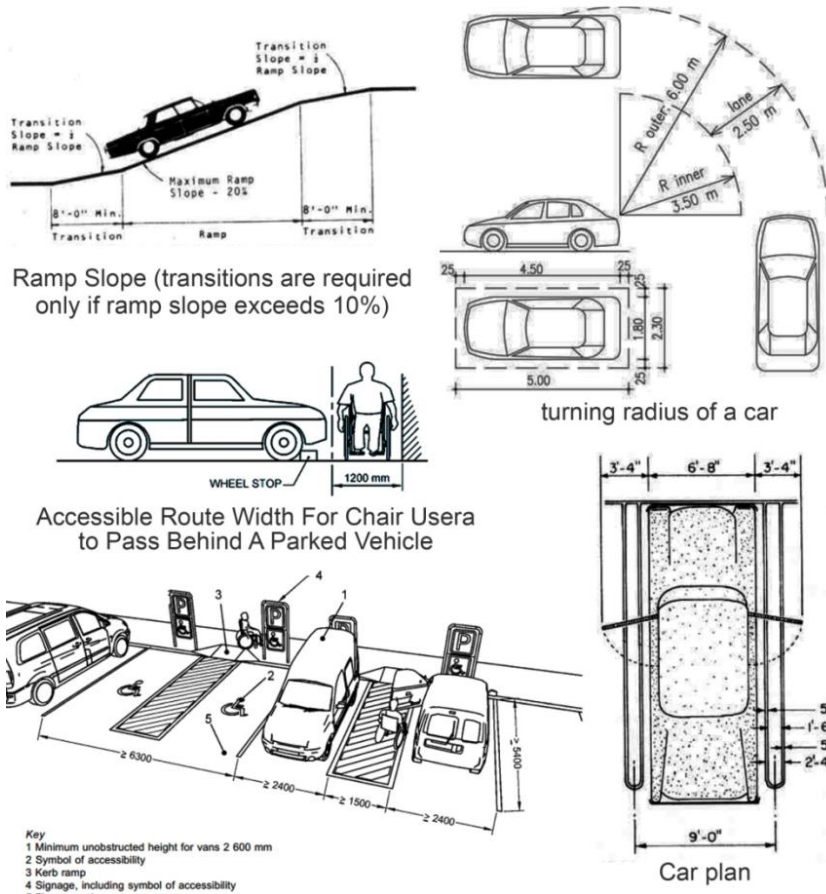


Fig – 3.1(b): Parking area percentage.

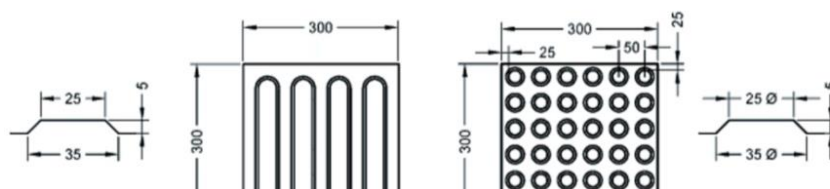
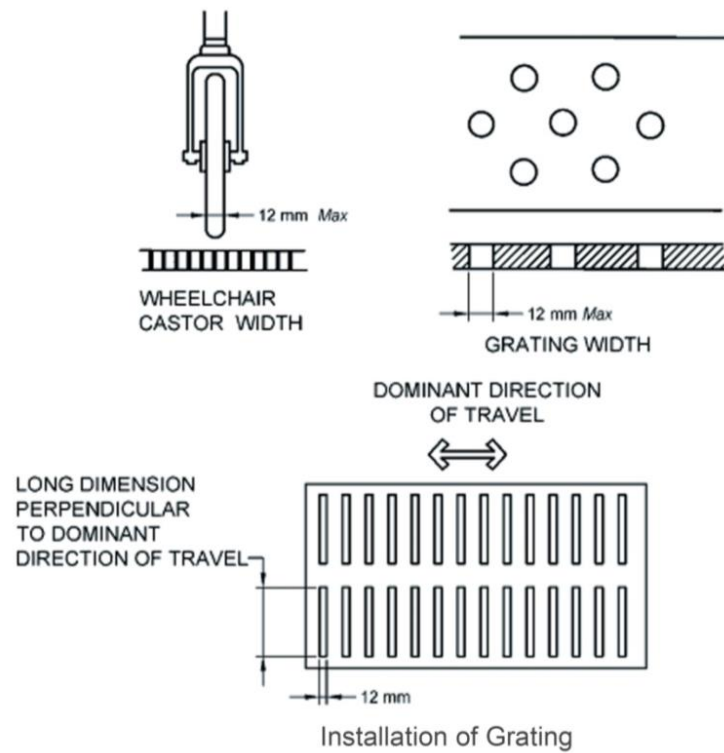
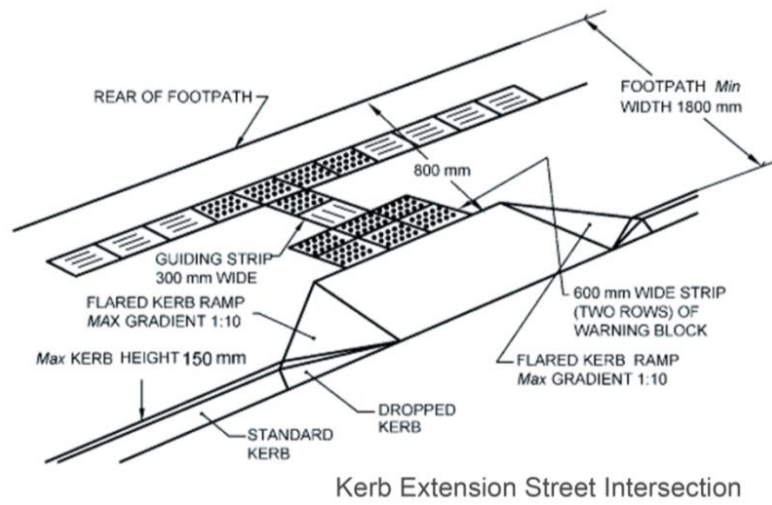
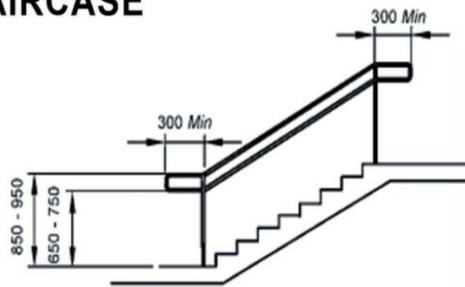


Fig – 3.2: Indicators for Disabled People.

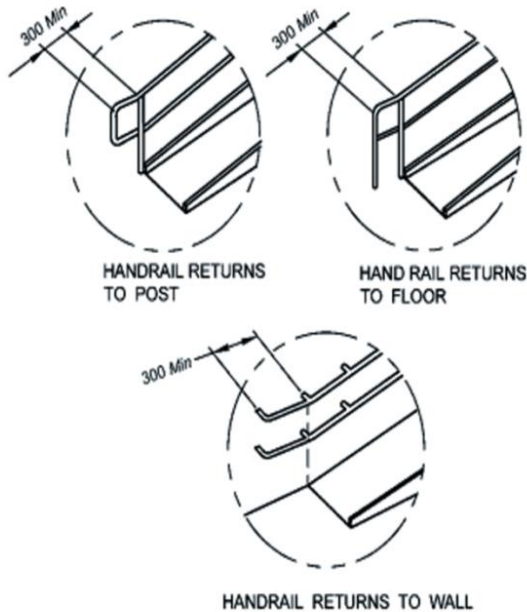
STAIRCASE



All dimensions in millimetres.

HANDRAILS FOR STEPS AND STAIRS

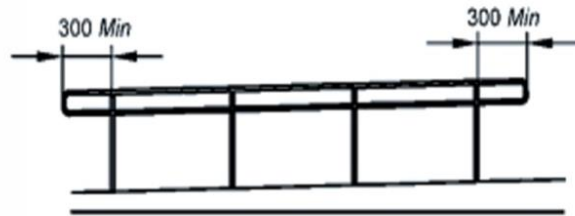
	Children's Museum (CM)	Science Museum (SM)	Student Union (SU)
Views from the stairs	Partial	Yes	Yes
Tread edge contrast	Only on one side	No	Yes
Tread depth	12 in (305 mm)	≥ 11 in (279 mm)	11 in (279 mm)
Riser height	5.8 in (149 mm)	6.7 in (171 mm)	8 in (203 mm)
Riser count (top)	16	n/a	10
Riser count (bottom)	16	15	13
Handrail width	1.5 in (38 mm)	3.5 in (89 mm)	2.25 in (57 mm)



All dimensions in millimetres.

TYPICAL HANDRAIL EXTENSIONS

RAMP

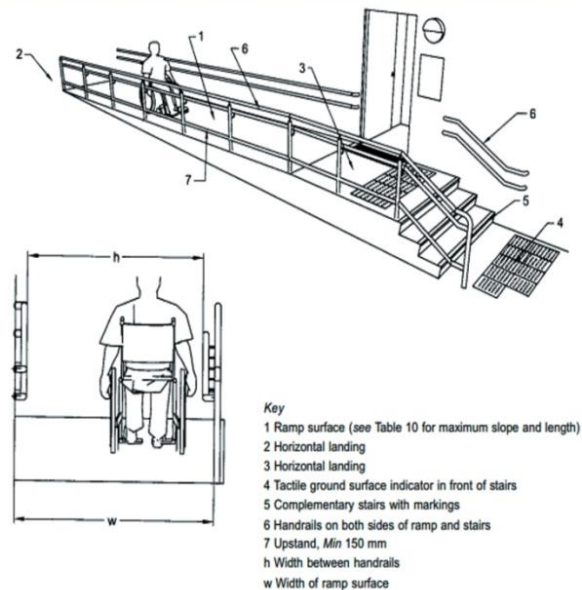


All dimensions in millimetres.

HANDRAILS FOR RAMP

Table 10 Requirements for Ramp
(Clause B-6.2.2)

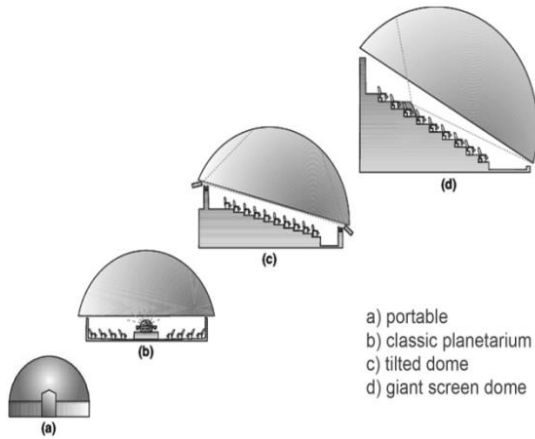
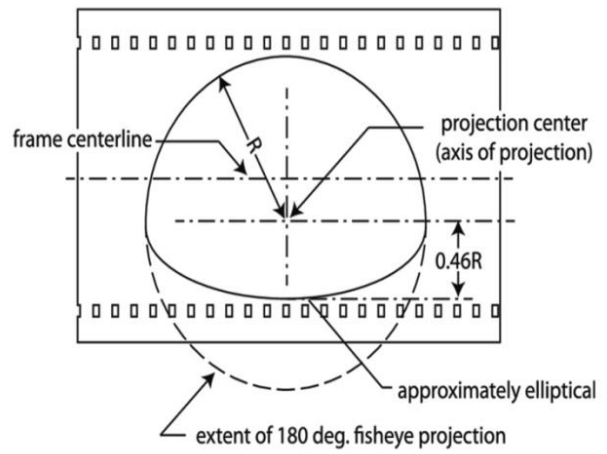
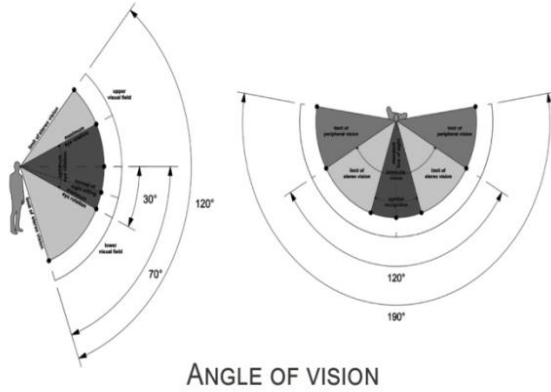
Sl No.	Level Difference	Maximum Gradient of Ramp	Ramp Width mm	Handrail on Both Sides	Other Requirements
(1)	(2)	(3)	(4)	(5)	(6)
i)	150 mm to 300 mm	1:12	1 200	✓	---
ii)	301 mm to 750 mm	1:12	1 500	✓	Landings after every 5 m of ramp run
iii)	751 mm to 3 000 mm	1:15	1 800	✓	Landings after every 9 m of ramp run
iv)	More than 3 000 mm	1:20	1 800	✓	Landings after every 9 m of ramp run



EXAMPLE OF RAMP WITH SLOPE 1:20 AND HORIZONTAL LANDING AT BEGINNING AND END

Fig – 3.3: Staircase and Ramp.

PLANETARIUM



TYPES OF PLANETARIUM DOMES

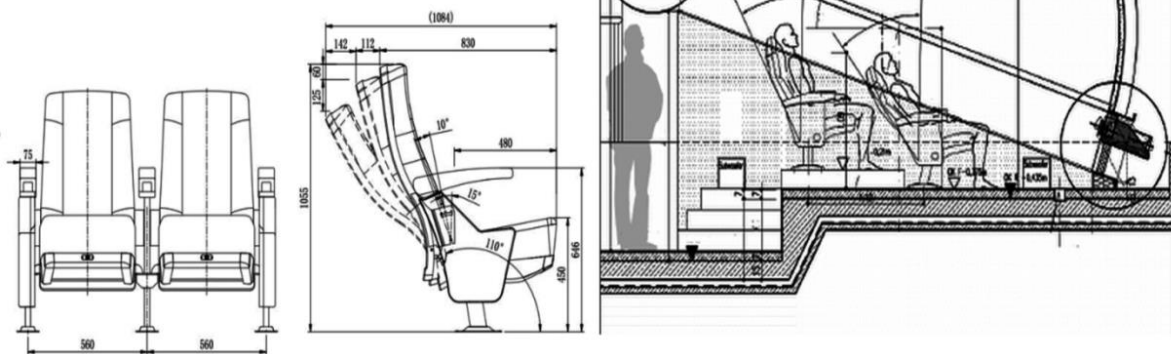
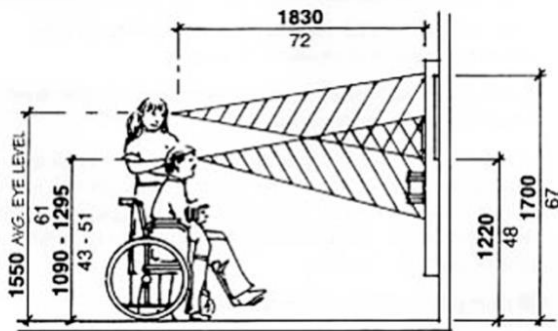
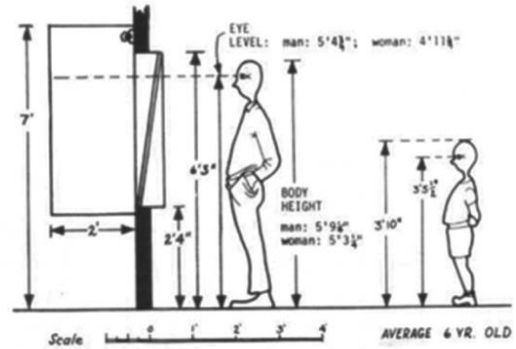


Fig – 3.4: Planetarium.

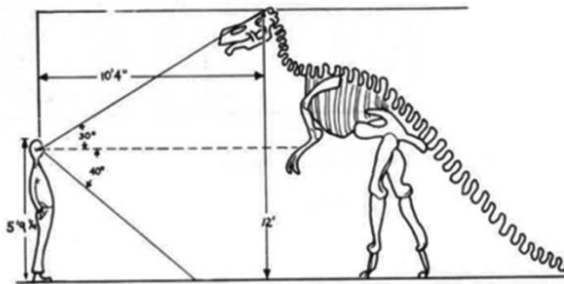
ANTHROPOMETRY



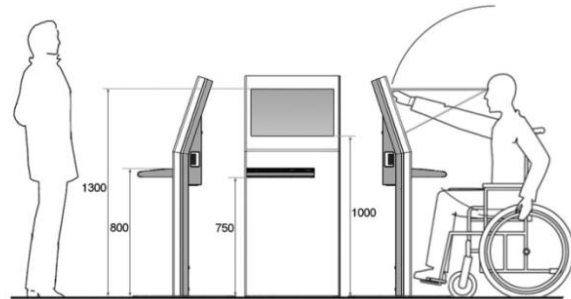
AVERAGE VIEWING SIGHTLINES



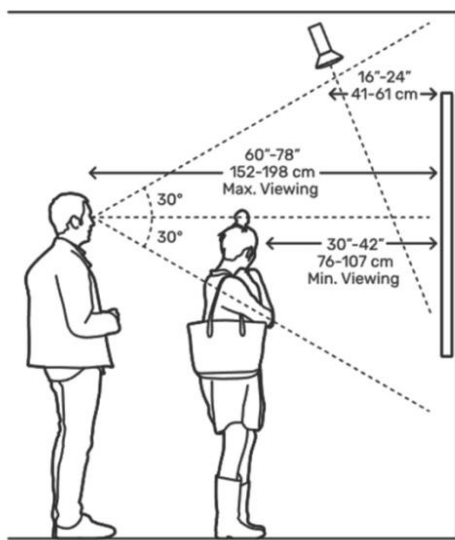
MEASUREMENTS OF ADULT AND SIX-YEAR-OLD VISITORS IN RELATION TO CASES.



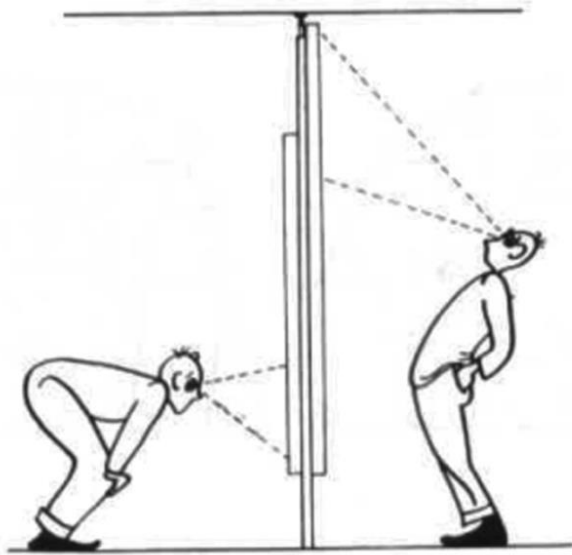
VIEWING DISTANCE SHOULD INCREASE WITH GREATER SIZE OF OBJECT.



HANDICAP REACHING OPERATING



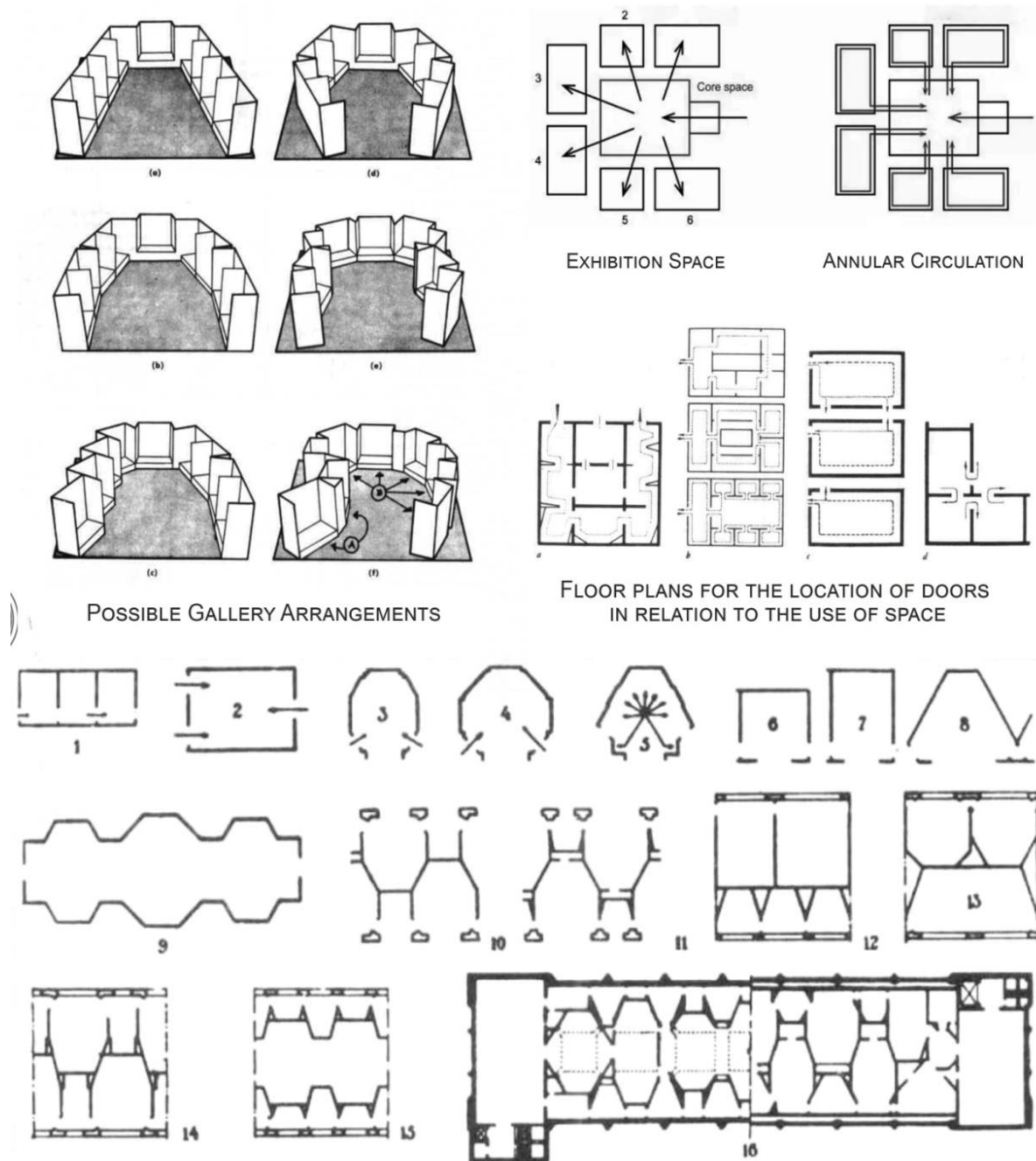
VIEWING DISTANCE FROM EXHIBIT



DIFFICULTIES ENCOUNTERED IN VIEWING DETAILS MORE THAN 3FT BELOW OR 1FT ABOVE ONE'S EYE LEVEL.

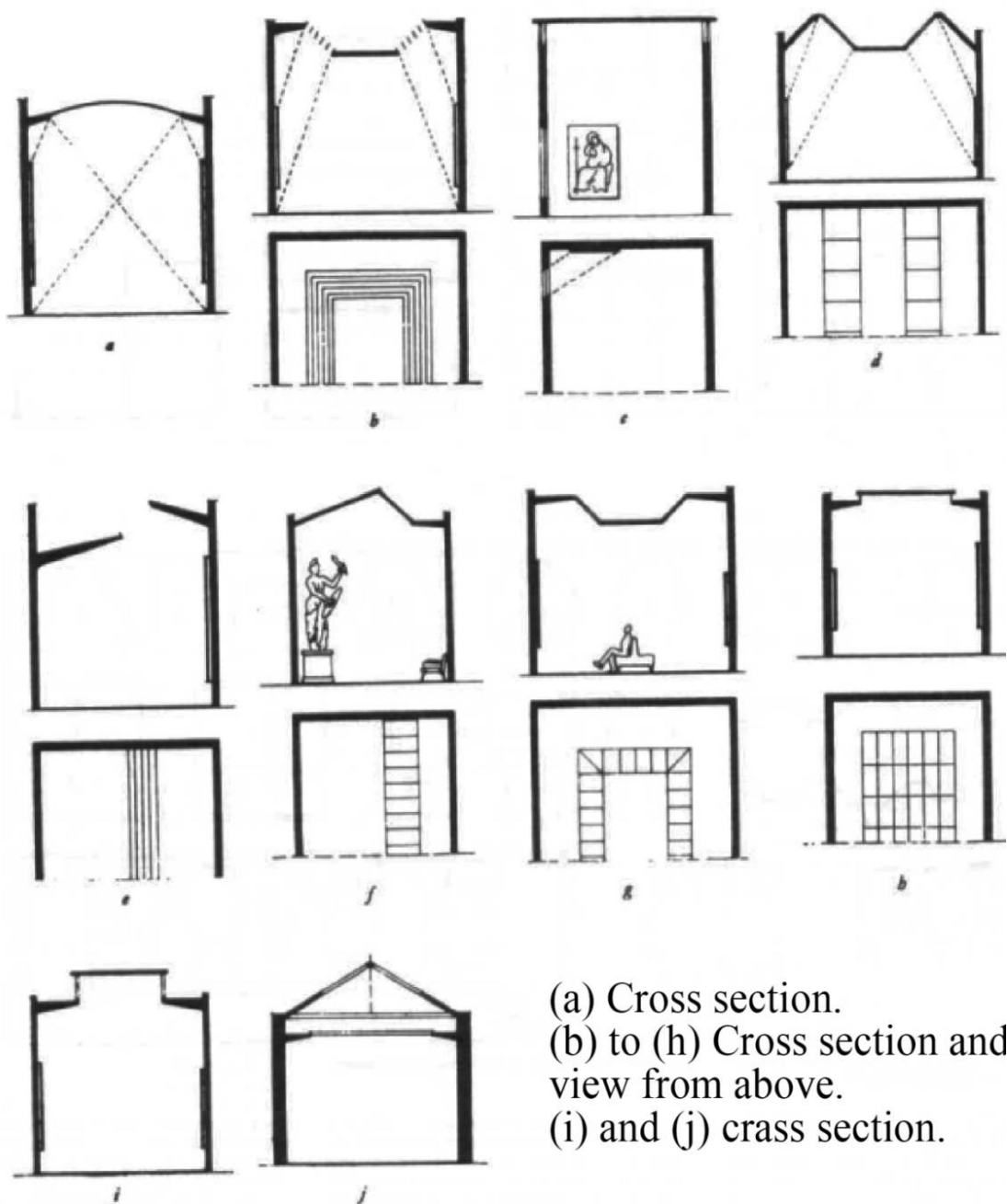
Fig – 3.5: Anthropometry

CIRCULATION AND ACCESSIBILITY



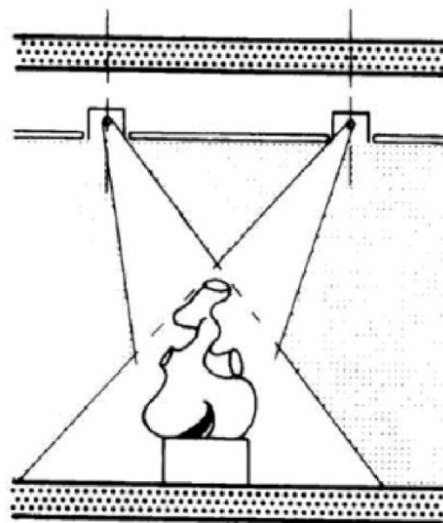
1 -TRADITIONAL LOCATION OF DOORS . 2 TO 8 - SECONDARY DOORS .
9 TO 15 - POLYGONAL ENCLOSURES .

Fig – 3.6: Circulation and Accessibility.

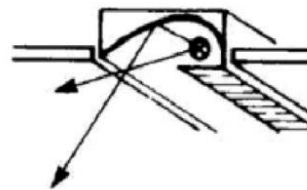


DIFFERENT METHODS OF ADMITTING NATURAL LIGHT
FROM ABOVE.

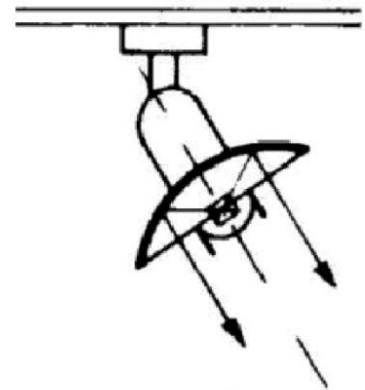
Fig – 3.7: Natural Light.



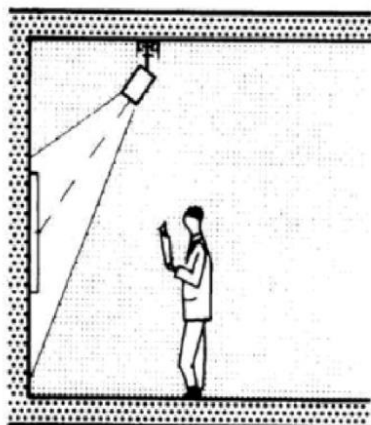
Directional spotlights



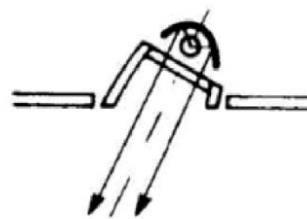
wall floodlight



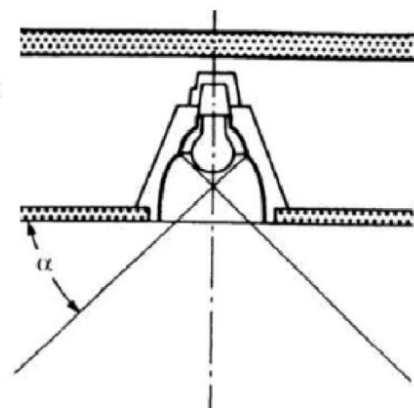
parabolic spotlight



Spotlight on power supply rail

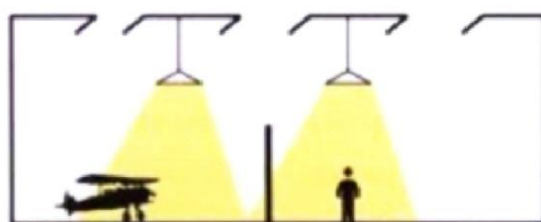


downward directional spotlight

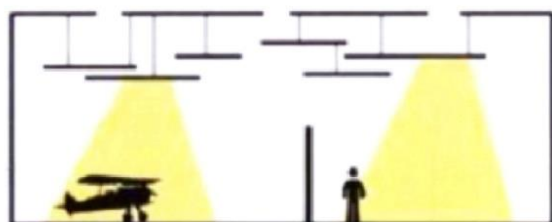


Shading angle (= 30°/40°/50°)

Light Design

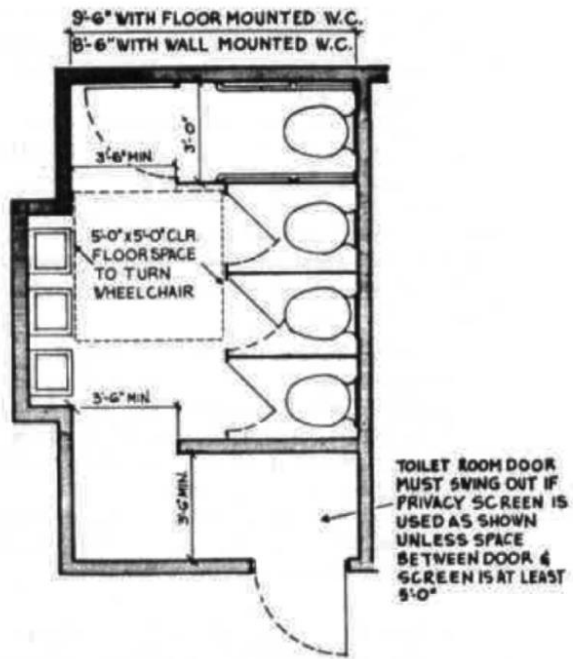


TYPE 1

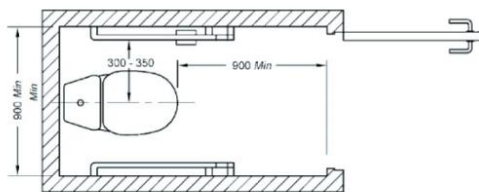


TYPE 2

Fig – 3.8: Artificial Light.

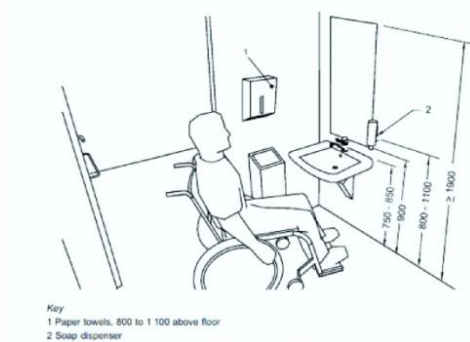


DUE TO ADDITIONAL LENGTH OF HANDICAPPED TOILET STALLS IT IS SUGGESTED THEY BE LOCATED AT END OF TOILET ROOMS AS SHOWN HERE.



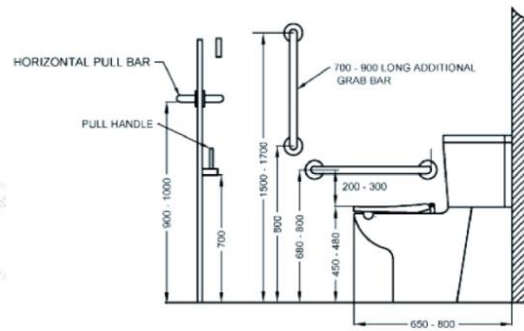
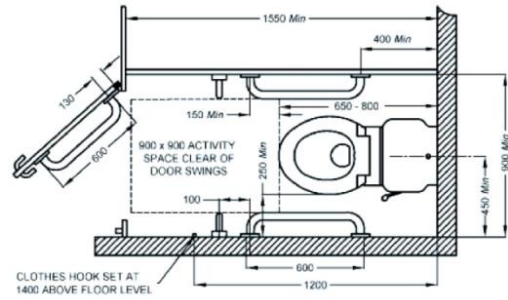
All dimensions in millimetres.

TOILET FOR AMBULANT DISABLED WITH L-SHAPED GRAB BAR



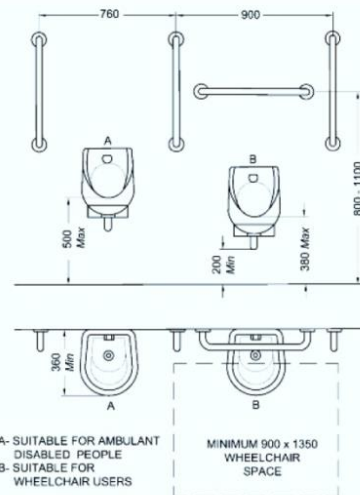
All dimensions in millimetres.

PLACEMENT OF WASHBASIN AND MIRROR ABOVE THE WASHBASIN WITH DISTANCE OF SANITARY APPLIANCES



All dimensions in millimetres.

PLACEMENT OF FIXTURES IN TOILET FOR AMBULANT DISABLED



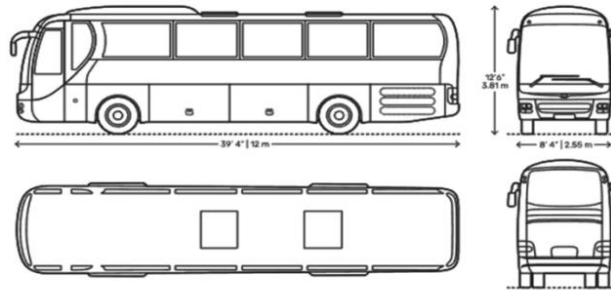
NOTE — Urinals shall be minimum 360 mm deep measured from the outer face of the urinal rim to the back of the fixture. 50 mm below the urinal set for wheelchair users should be kept free of pipework up to a height of 200 mm above floor and up to a depth of 50 mm from the outer face of the urinal rim.

All dimensions in millimetres.

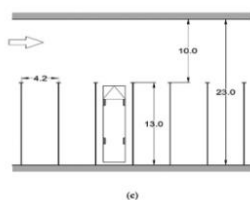
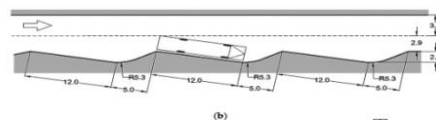
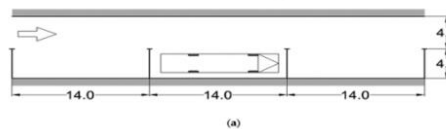
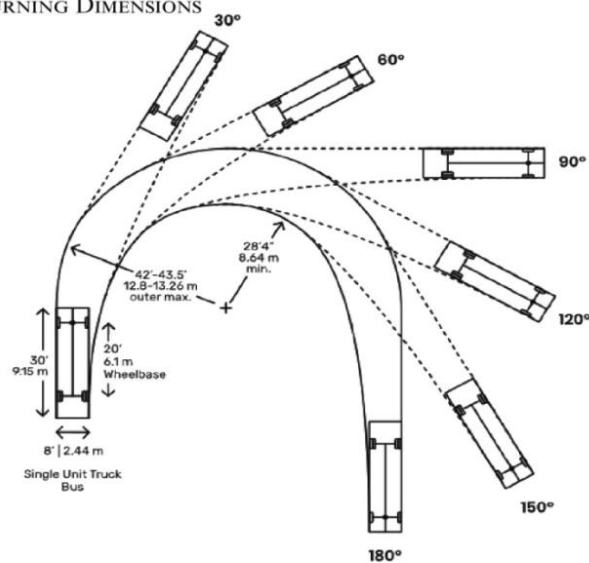
CLEAR FLOOR SPACE AND MOUNTING HEIGHTS FOR URINALS

Fig – 3.9: Toilet.

Coach Buses have average lengths of 39'4" (12 m), widths of 8'4" (2.55 m), heights of 12'6" (3.81 m), and have a capacity of 44-49 (+1) seats.



BUS TURNING DIMENSIONS



THE SCHEME OF PARKING SPACES FOR CITY BUSES
 (a) when parallel
 (b) saw tooth
 (c) a perpendicular placement in relation to the driveway or manoeuvring zone.

Fig – 3.10: Bus Parking.

3.2 STANDARDS:

Table:4 Sanitation Requirements for Educational Occupancy

Sl. No.	Sanitary Unit	Boarding Institutions		Other educational Institutions	
		Boys	Girls	Boys	Girls
1.	Water Closet (W.C.)	One for 8 boys or part thereof	One for 6 girls or part thereof	One for 40 boys or part thereof	One for 25 girls or part thereof
2.	Ablution Taps	One in each W.C.	One in each W.C.	One in each W.C.	One in each W.C.
3.	Urinals	One per every 25 pupils or part thereof	--	One per every 20 pupils or part thereof	--
4.	Wash Basins	One for every 8 pupils or part thereof	One for every 6 pupils or part thereof	One for every 40 pupils or part thereof	One for every 40 pupils or part thereof
5.	Baths	One for every 8 pupils or part thereof	One for every 6 pupils or part thereof	--	--
6.	Drinking Water Fountains	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof	One for every 50 pupils or part thereof
7.	Cleaner's Sink	One per Floor minimum	One per Floor minimum	One per Floor minimum	One per Floor minimum

Table:5 Sanitation Requirements for Nursery Schools

Sl. No.	Sanitary Unit	Requirement
1.	Water Closet	One for 15 boys, one for 6 girls
2.	Ablution Taps	One in each W.C.
3.	Urinals	one for 12 boys
4.	Wash Basins	One for every 15 pupils or part thereof
5.	Baths	One bath sink per 40 pupils
6.	Drinking Water Fountains	One for every 50 pupils or part thereof
7.	Cleaner's Sink	One per floor minimum

Note: 1. One water tap with draining arrangements shall be provided for every 50 persons or part thereof, in the vicinity of water closets and urinal.
2. For teaching staff, the schedule of sanitary units to be provided shall be the same as in case of office buildings (Table 1).

Fig 3.11: Toilet (NBC rules, 2016)

(13) **Educational Institutions**

(a) Government Schools or Local Body schools	
(A) Corporation/ Municipal Areas	(B) Panchayat Areas
1 car space for every 500sq.m of class room area or part thereof and 1 two wheeler space for every 50sq.m of class room or part thereof and one cycle space for every 10sq.m of class room area or part thereof.	1 two-wheeler space for every 50sq.m of class room area or part thereof and one cycle space for every 5sq.m of class room area or part thereof.
(b) Private Schools	
(A) Corporation or Municipal Areas	(B) Panchayat Areas
1 car space for every 100sq.m of class room area or part thereof and 1 two wheeler space for every 50sq.m of class room or part thereof and one cycle space for every 10sq.m of class room area or part thereof.	1 car space for every 300sq.m of class room area or part thereof and 1 two-wheeler space for every 50sq.m of class room area or part thereof and one cycle space for every 5sq.m. of class room area or part thereof.
Note: 50% of the car spaces specified above shall be provided in the front area abutting the road so as to act as a recessed parking area for the vehicles coming for drop/pick up for students.	

Fig 3.12: Parking (NBC rules, 2016)

(C) Driveway and Aisle Widths

Driveway:

The driveway width shall be 3.0m for one-way movement and 6.0m for two-way movement.

Aisle Widths:

Aisle is a access lane leading to/abutting the individual parking lot within a parking facility.

The aisle widths for different types of parking shall be:

Vehicle Type	Parallel Parking	All angles up to 60°	Angles above 60° & Perpendicular parking
Two Wheeler	1.5m	1.5m	1.5m
Car	3.0m	3.0m	4.5m.
LCV/Truck/Bus	7.0m	7.0m	10.0m

The width of the driveway and the aisle shall be free from kerb and other encumbrances.

(D) Width Entry and Exit Gates

The width of entry or exit gates shall be a minimum of 3.0m

(E) Gradient

Slope of parking spaces shall be not more than 4% in any direction.

Fig 3.13: Driveway (NBC rules, 2016)

(A) Stall Size:

The dimension of the parking stall for different kind of vehicles shall be:

Vehicle Type	Breadth (m)	Length (m)
Car	2.5	5.0
Two Wheelers	1.0	1.8
LCV	3.5	7.0
Lorry/Bus	3.5	10.0
Articulated Vehicles [Container Vehicles]	3.5	16.0

The stall dimensions mentioned above shall be clear of any structural members. Where a stall is adjacent to a large element such as a wall, minimum stall width shall be 2.7m for parallel parking and where cars cannot be parked by reversing, minimum stall length shall be 7.2m.

Fig 3.14: Parking Dimension (NBC rules, 2016)

TABLE 5
(Bye-law 9.2)

EXTERIOR OPEN SPACES/SET-BACKS FOR RESIDENTIAL, COMMERCIAL, PUBLIC AND
SEMI-PUBLIC, TRAFFIC & TRANSPORTATION , PUBLIC UTILITY BUILDINGS
– ABOVE 9.5 MTS. IN HEIGHT

Sl. No.	Height of Building in mtrs.	Exterior open spaces / set-backs to be left on all sides (Front, Rear and Sides) in mtrs.
1	Above 9.5 upto 12	4.5
2	Above 12 upto 15	5.0
3	Above 15 upto 18	6.0
4	Above 18 upto 21	7.0
5	Above 21 upto 24	8.0
6	Above 24 upto 27	9.0
7	Above 27 upto 30	10.0
8	Above 30 upto 35	11.0
9	Above 35 upto 40	12.0
10	Above 40 upto 45	13.0
11	Above 45 upto 50	14.0
12	Above 50	16.0

Fig 3.15: Bangalore Mahanagara Palike Building Bye-Laws 2003.

CHAPTER 4

SITE STUDY AND ANALYSIS

4.1 SITE STUDY:

Site is located in a village Suttur, Mysore. Site is in the outside of the village on the highway road. Total site is 182146 Sq.m (45 acres).

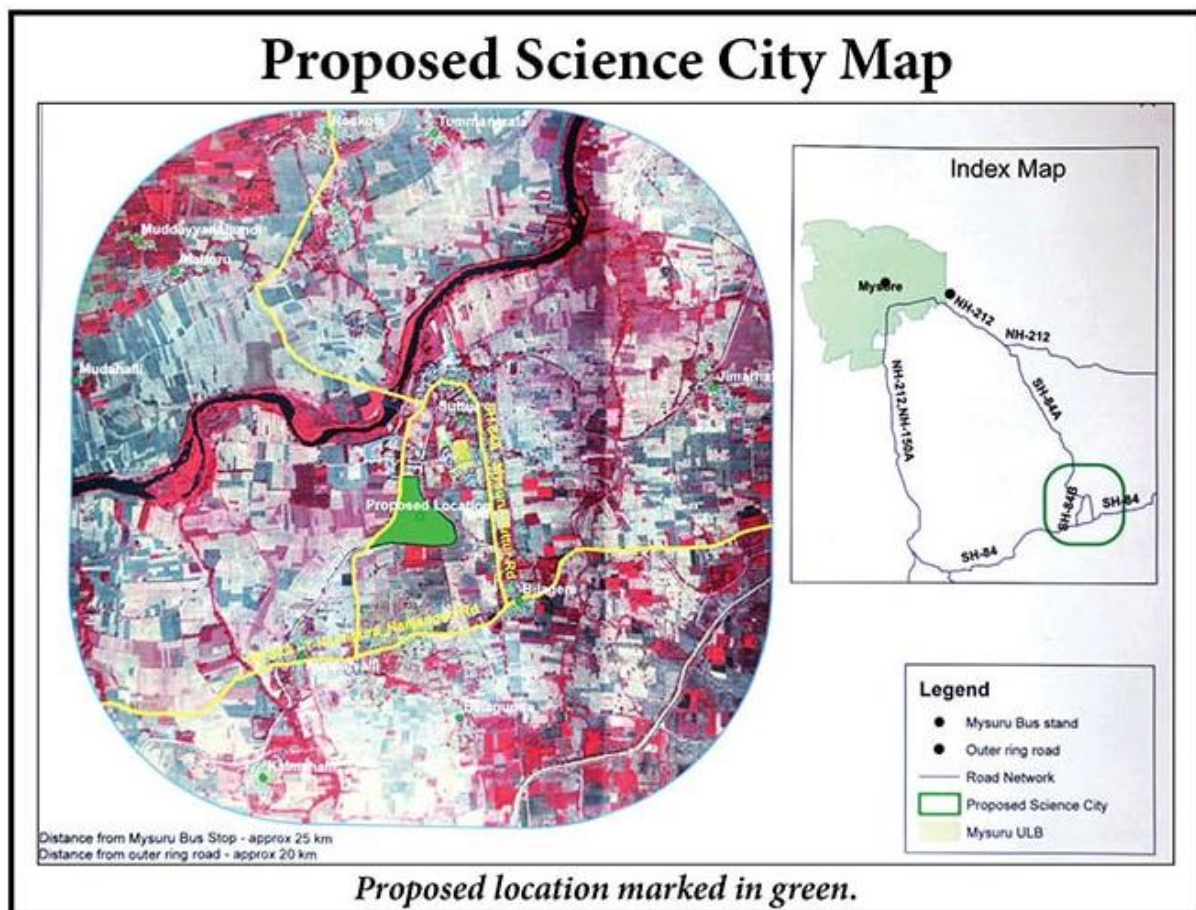


Fig 4.1 Site at Suttur, Mysore.

4.2 SITE JUSTIFICATION:

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US PIZZA
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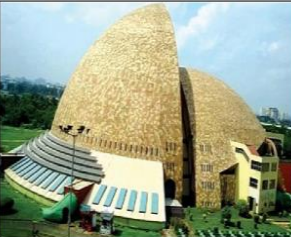
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Science City at Suttur

Deputy CM Dr. Parameshwara inspects land

Deputy Chief Minister Dr. G. Parameshwara seen during spot inspection for the proposed Science City at Suttur Srikacheta this morning. He was accompanied by Deputy Commissioner Abhiram G. Sankar, JSS Mahavidyalaya Executive Secretary Dr. C.G. Betsumath, Secretary S.P. Manjunath and other officials. Picture right shows a view of Science City at Kolkata, on the lines of which the Science City will be built at Suttur.

Mysuru, June 24 (PMBCT)- A Science City on a 25-acre land near Suttur in Nanjangud Taluk, 25 kms from Mysuru, being built in joint collaboration by the Centre and State, could be another science hub of the country. The proposed Science City, the first in South India, will be on par with the Science City in Kolkata that is one of the major tourist attractions in West Bengal.

This Science City at Suttur will create one of India's largest science hubs. The project is worth Rs. 200 crore and will be built as a joint venture by the Centre and State. The mega project is being set up following the directive from the Ministry of Science and Technology. The land for the project will be donated by Suttur Mutt free of cost.

A closed-door meeting was held this morning at the Suttur Mutt that was chaired by Deputy Chief Minister Dr. G. Parameshwara in the presence of Suttur Deer Sri Shivanthi Deshikendra Swamiji where a power-point presentation was made to the DyCM regarding the Science City. Media, however, was not allowed inside the meeting hall. Later, the DyCM inspected the land that is to be donated for the Science City.

The Suttur Viceroyshansa Mutt will have the distinction of hosting the Science City that will kindle scientific spirit among students and masses. Once the Science City becomes a reality, the Mutt, which has contributed immensely to the cause of social advancement touching the lives of millions of people with educational institutions, agricultural research centres and Co-operative Societies, will draw seekers of knowledge and scientific wisdom.

Mutt sources and Dr. Parameshwara said that the Detailed Project Report for the mega project is ready and very soon, the project will be discussed in the Cabinet and sent to the Centre for the release of Rs. 100 crore. The State, on its part, will release its share of Rs. 100 crore. (See SCIENCE on page 8)

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Extra Classes for PUPAL, PUPAL
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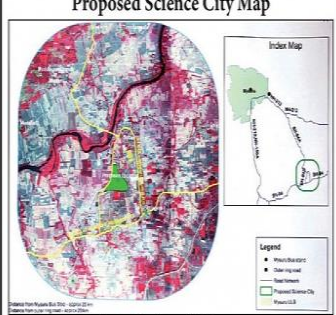
Monday 24th June 2019

Page-8

Science City at Suttur

Tigress found dead near 'Tiger Block'

Proposed Science City Map



Proposed location marked in green.

(Continued from page 1)

The works are expected to begin in six months and the project will be completed in five years. The Mutt has set a target of three years for the completion of the project. Dr. Parameshwara said, 'The Science City will popularise basic science and will have scientific galleries, planetariums, space theatres, 3-Dimension demonstrations, astronomy, biology and other scientific disciplines. In all, the Science City will have all educational tools to help illustrate Earth's dynamic processes and associated science to people of all ages. The Science City at Suttur will be on par with the Kolkata Science City that was inaugurated in 1997. The Kolkata Science City has been developed as a major attraction for the residents of Kolkata as well as for the national and international visitors to the metropolis. Developed by the National Council of Science Museums, it is one of the largest and finest in the world, presenting science and technology in a stimulating and engaging environment that is truly educational and enjoyable for the people of all ages. It has, over the years, become a place for memorable experience and enjoyment for both the young and the old. During the inspection of the Science City land, Dr. Parameshwara said that Science Centres will be established across all districts of the State and Regional Science Centres will come up at select cities. JSS Mahavidyalaya Executive Secretary Dr. C.G. Betsumath, Deputy Commissioner Abhiram G. Sankar, City Police Commissioner K.T. Balakrishna, Superintendent of Police C.B. Raghunath, MJDA Chairman P.S. Karanth and others were present.

Cases filed

(Continued from page 1)

All the cases will be launched and submitted to the Cyber Crime and Economic Offences Wing at the CCB premises on Ashoka Road and this will in turn be sent to the Special Investigation Team (SIT) in Bengaluru, probing the IMA Jewels scam, said Inspector Krishnappa, speaking to Star of Mysore here this morning. It may be recalled that Mysurens have invested more than Rs.63 crore in the Ponzi Scheme floated by IMA and this could go up further.



H.D. Kote, June 24 (MTV8K)- The carcass of a tigress aged between 9 and 10 years was found near Hebbala Lake, 'Tiger Block' in H.D. Kote taluk last evening. It is suspected that the tigress may have died about two days back and the carcass was decomposing. DCF Dr. K.C. Prashanth Kumar, Wildlife Warden Kuthala Alanshalli, RFO Madhu, Veterinarian Dr. D.N. Nagaraj and others rushed to the spot this morning and conducted an inspection. Dr. Nagaraj conducted the post-mortem. DCF Dr. Prashanth Kumar, speaking to Star of Mysore, said that old wound marks were found on the body of the tigress and added that the tigress had strayed out of the forest following an in-flight. However, the exact cause of the tigress' death would be known only after receiving the report, he added.

Rail services resume as usual



Mysuru, June 24 (RK&CM)- After a week of inconvenience to Rail passengers and daily commuters, who were dependent on trains for travel, the Rail services from the City Railway Station resumed as usual from this morning. To take up a major yard remodeling work at the City Railway Station, the Railway authorities had cancelled around 30 trains that were travelling to Bengaluru and other cities for a week from June 16 to 23. Also, 15 trains were partially cancelled and five others were diverted. This apart, a few trains like Chennai Express were departing from Pandapura, over 20 kms from the city on Mysuru-Bengaluru section. As the remodeling work was completed within the set deadline, the Rail services to and from Mysuru resumed as usual from early this morning, according to the Railway authorities. The resumption of Rail services in full has brought relief to thousands of commuters who take trains to reach their destination.

Fig 4.2: Article related to site.

4.3 SITE ANALYSIS:

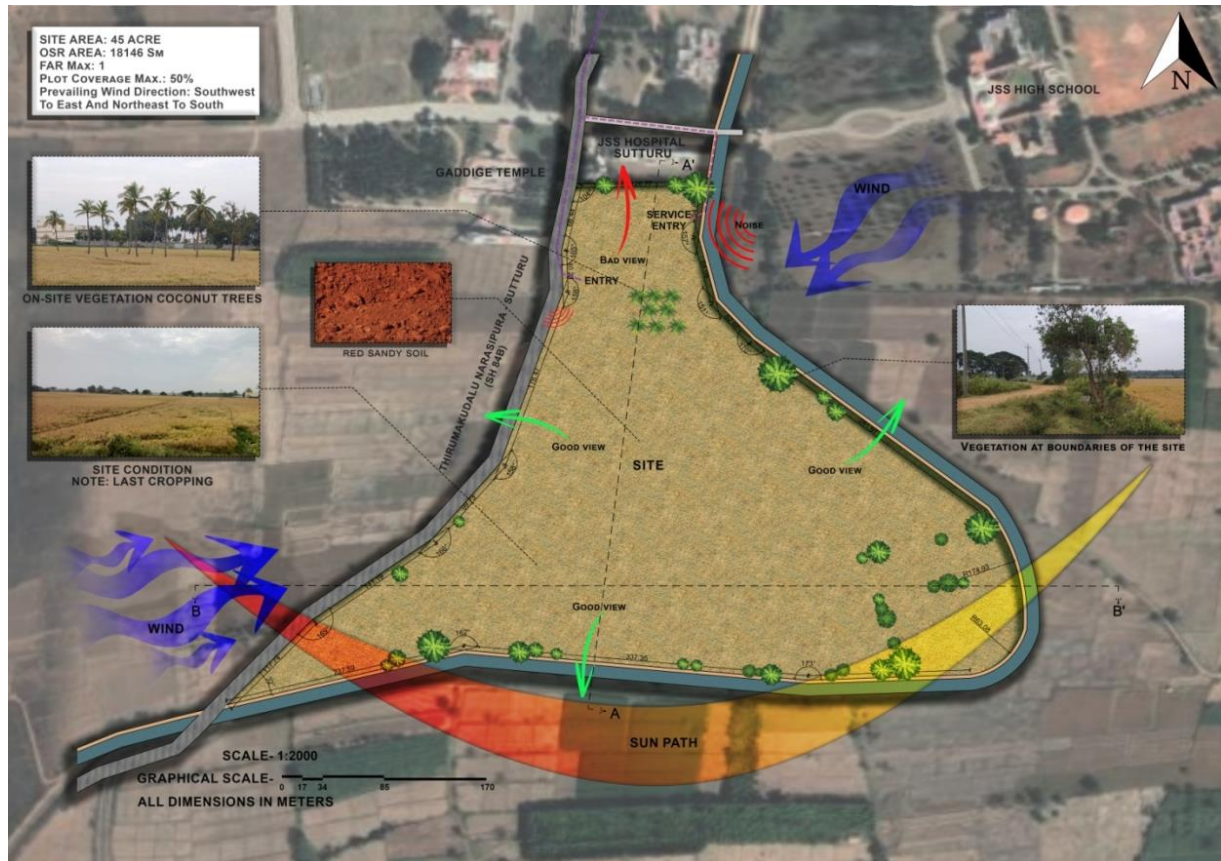


Plate 4.1: Site Analysis.

4.3.1 Climate of Suttur, Mysore:

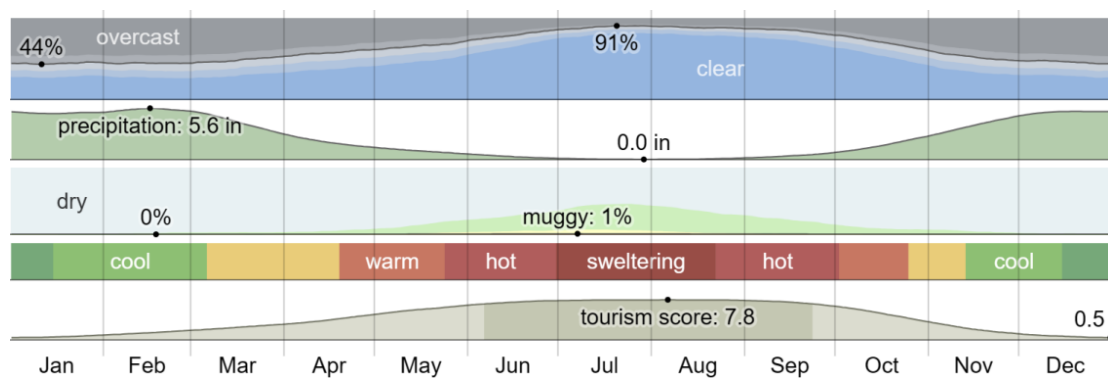
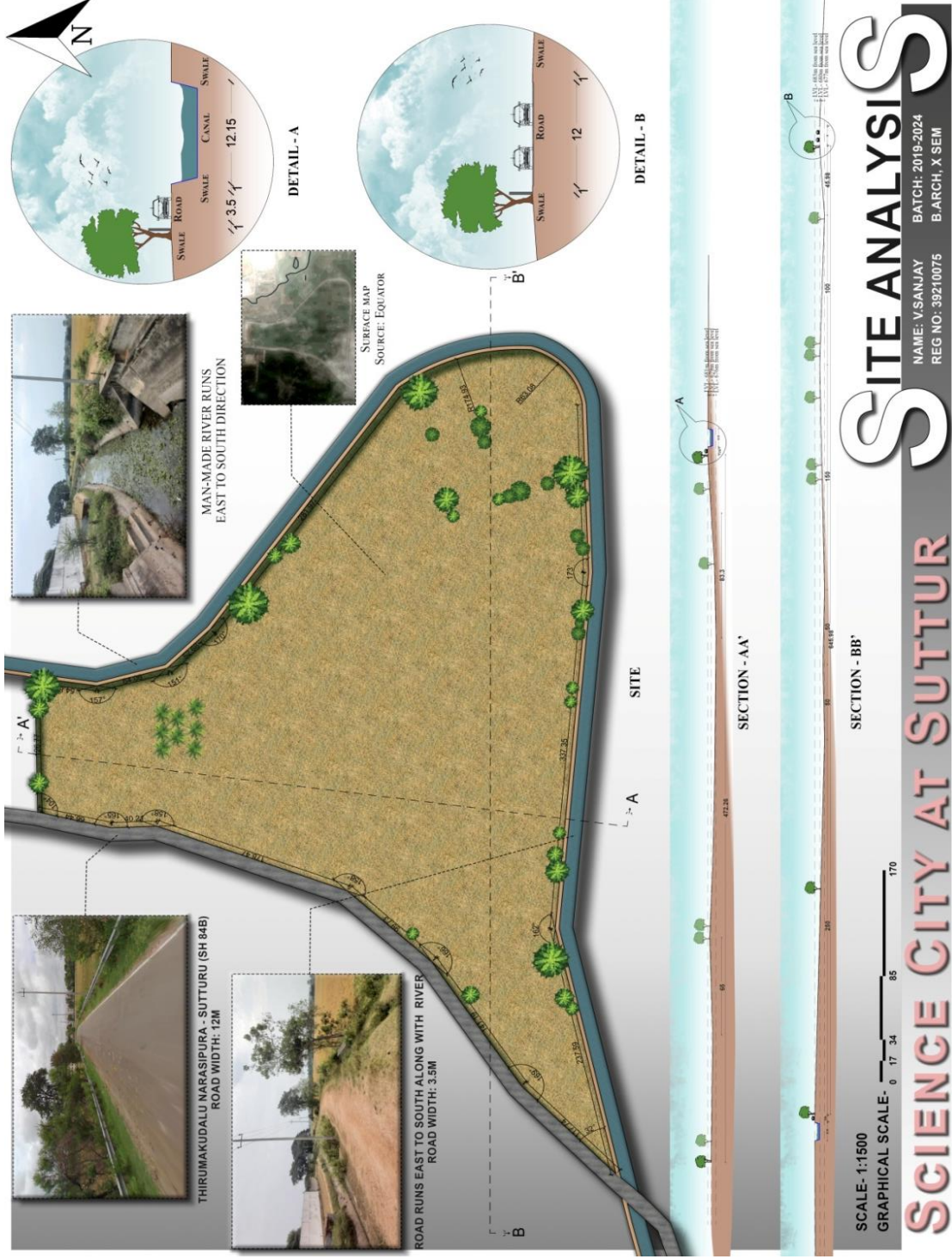


Fig 4.3: Climatic data of Suttur, Mysore. ImageSource: WeatherSpark.



CHAPTER 5

ARCHITECTURAL DESIGN

S.No	SPACES	NO. OF USERS	AREA PER PERSON (sq.m.)	AREA OF TOTAL USER (sq.m.)	CIRCULATION (20%)	AREA OF TOTAL (sq.m.)
1	Lobby	700	1.5	1050	210	1260
2	Ticket counter	6	2	12	2.4	14.4
3	CCTV room	2	4	8	1.6	9.6
4	Help Desk	2	4	8	1.6	9.6
5	Security guard room	4	1.5	6	1.2	7.2
6	Toilets- staff	18			20	
TICKET PLAZA (TOTAL AREA)						1320.8
7	Offices for Executive Director and Curators	4	2.5	10	2	80
8	General Working area for Staffs	80	1.5	120	24	144
9	Toilets- staff for men	40			20	
10	Toilets- staff for women	40			15	
11	Lunch hall	100	1.5	150	30	180
12	canteen				20	
13	conference room	15	1.5	22.5	4.5	27
14	VIP rooms/ Guest rooms for visitors	10	2.5	25	5	30
OFFICE (TOTAL AREA)						516
15	Main Lobby	1000	0.75	750	150	900
16	Auditorium	1500	1.5	2250	450	2700
17	Meeting Room-1	25	1.5	37.5	7.5	45
18	Meeting Room-2	25	1.5	37.5	7.5	45
19	IT/AC room				40	
20	EB room				30	
21	look Area	20	1.5	30	6	36
22	VIP Lounge	10	2.5	25	5	30
23	Press Lounge	13	2	26	5.2	31.2
24	Green Room-1	10	1.5	15	3	18
25	Green Room-2	10	1.5	15	3	18
26	Toilet for men	1000			100	
27	Toilet for women	1000			80	
CONVENTION CENTER (TOTAL AREA)						3993.2
28	Giant Dome Theater	300	1.5	450	90	540
29	Space Exhibit operator room	300	1.5	450	90	540
30					20	
31	Toilet for men				80	
32	Toilet for women				60	
33	EB room				30	
PLANETARIUM (TOTAL AREA)						1270
34	VFX Theater	500	1.5	750	150	900
35	Thrill Rider (3)	20	1	20	20	120
36	EB room				40	
37	Toilet for men				80	
38	Toilet for women				60	
THEATRES (TOTAL AREA)						1260
39	KIDS Exhibit					
40	Toilet for men	600			60	
41	Toilet for women	600			60	
42	Care taker room				20	
43	EB Room				30	
KIDS MUSEUM (TOTAL AREA)						1360
44	Exhibit Related to physics	700	1.5	1050	210	1260
45	Toilet for men				60	
46	Toilet for women				80	
47	Care taker room				20	
48	EB Room				30	
49	Electric Car Station				20	
MOTION SCIENCE EXHIBITION (TOTAL AREA)						1470
50	Electric Car Station				20	
51	Exhibit Related to Biology	700	1.5	1050	210	1260
52	Toilet for men				60	
53	Toilet for women				80	
54	Care taker room				20	
55	EB Room				30	
BIO SCIENCE EXHIBITION (TOTAL AREA)						1470
56	Exhibit Related to machines	700	2.5	1750	350	2100
57	Toilet for men				60	
58	Toilet for women				80	
59	Care taker room				20	
60	EB room				30	
AUTOMOBILE EXHIBITION (TOTAL AREA)						2700
61	Aquatic Exhibit	700	2.5	1750	350	2100
62	Tunnel Exhibit	300	2	600	120	720
63	scuba rooms				80	
64	Aqua swimmer shop	100	2	200	40	240
65	Toilet for men					

53

5.2 CONCEPT:

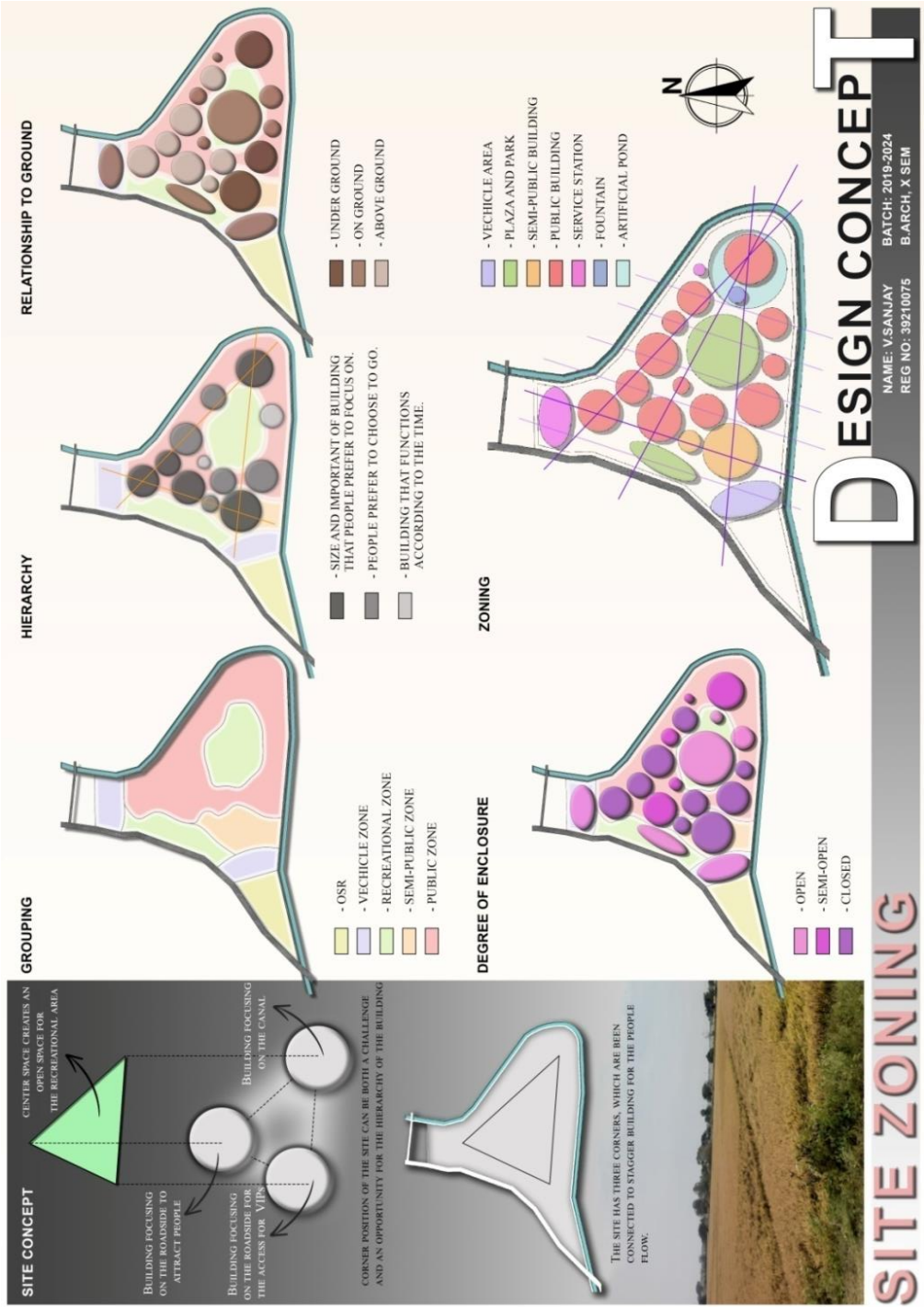


Plate 5.1: Design Concept.

5.3 DETAILED DRAWINGS

5.3.1 Site plan:



Plate 5.2: Site Plan.

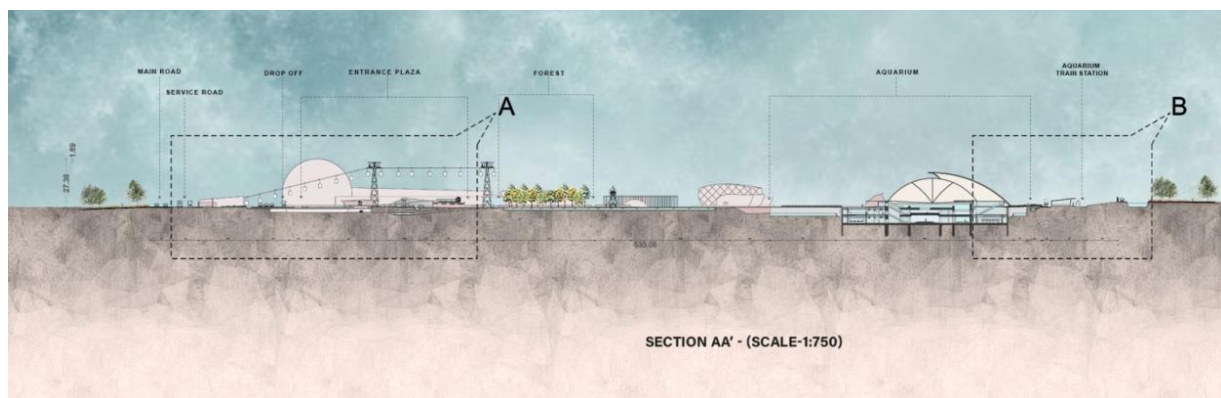


Fig 5.2: Section-AA'

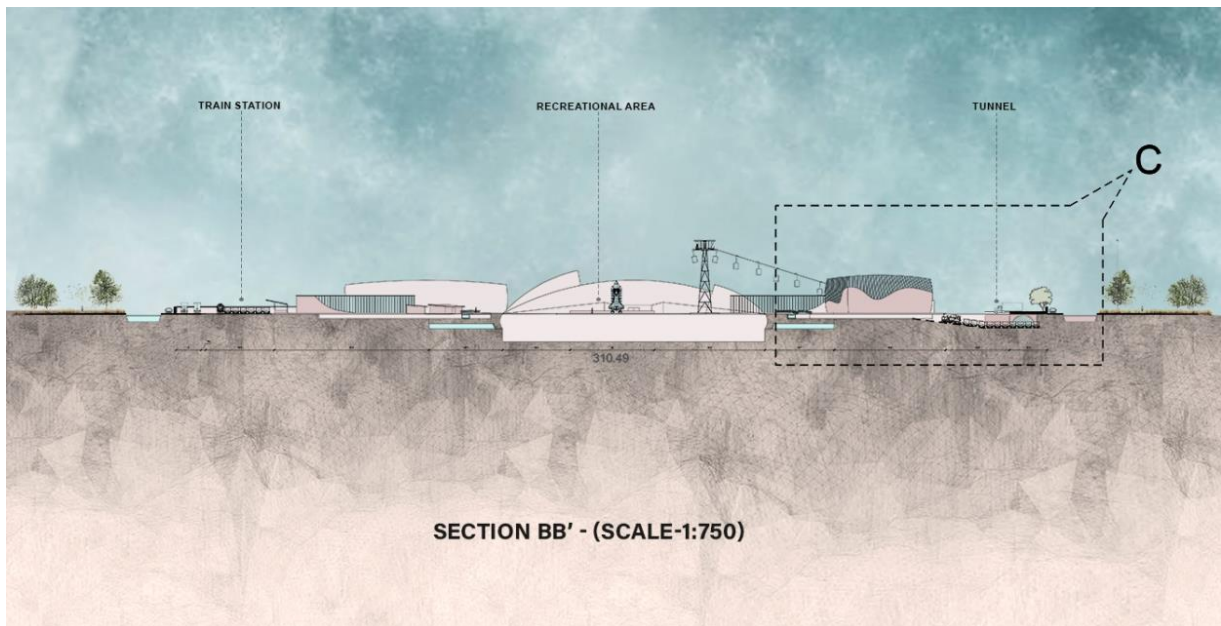


Fig 5.3: Section-BB'



Fig 5.4: Planetarium Block Section



Fig 5.4: Train Station Section

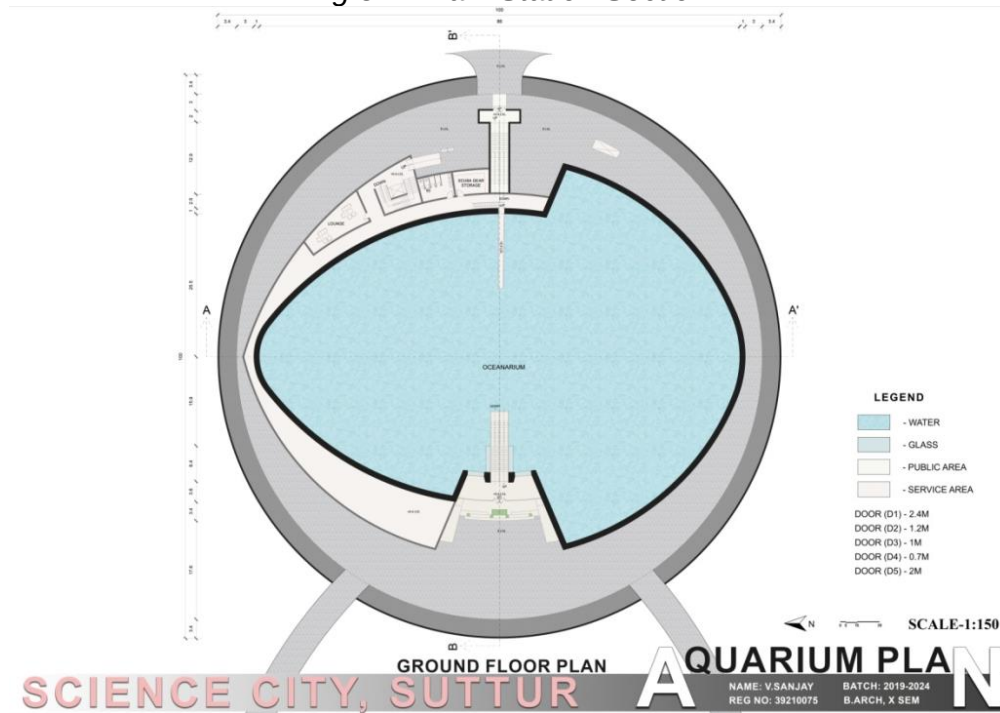


Plate 5.3: Aquarium Ground floor plan.

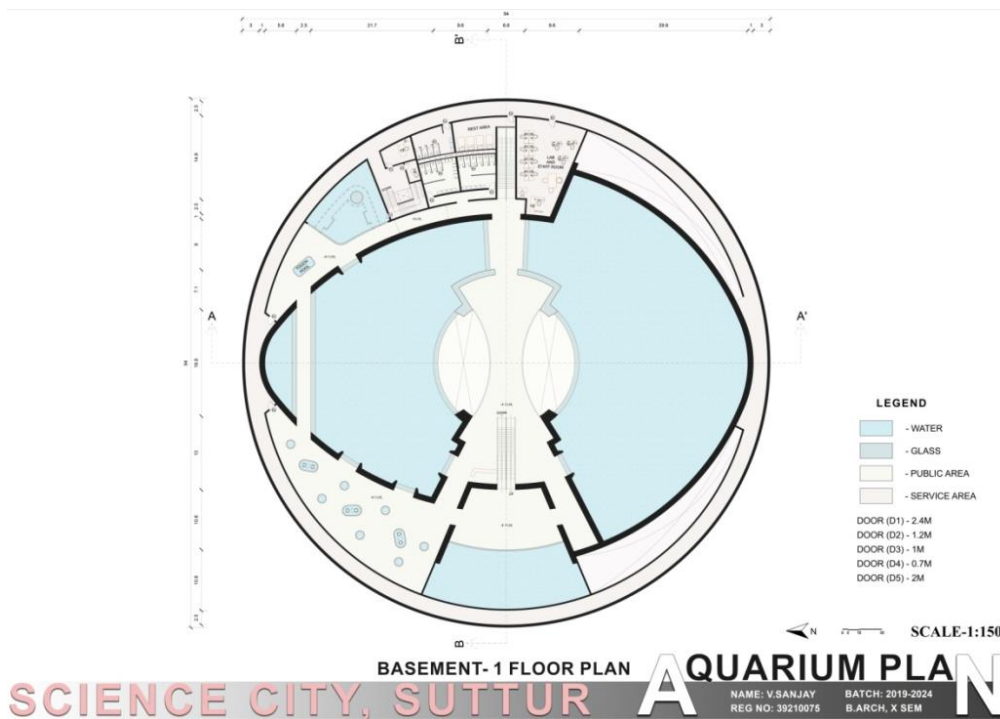


Plate 5.4: Aquarium Basement-1 floor plan.

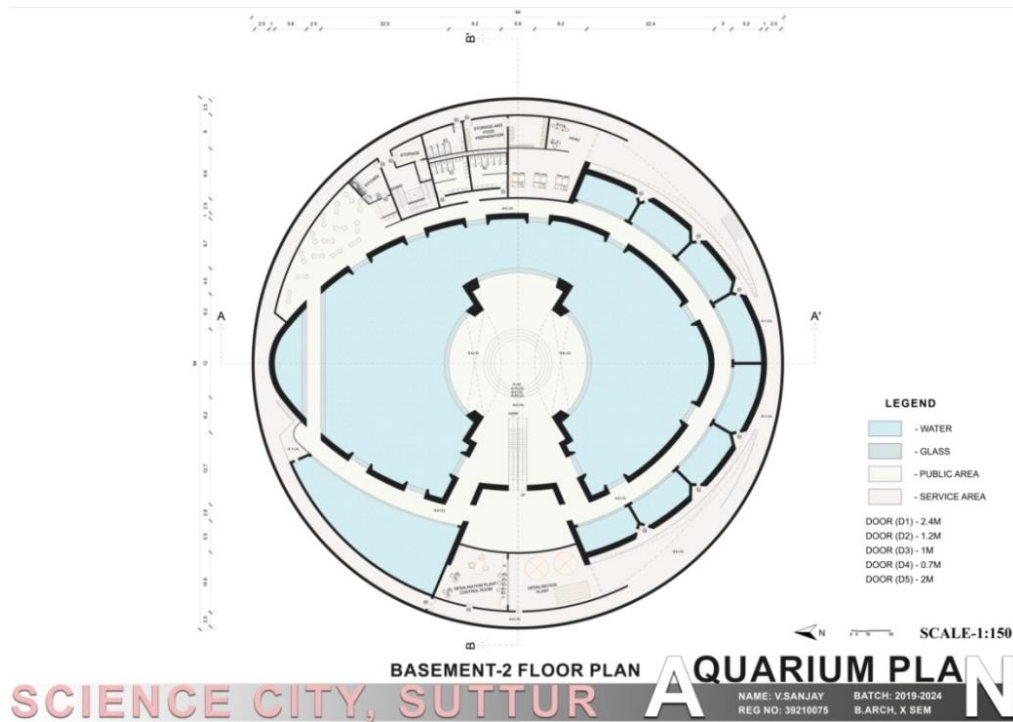


Plate 5.5: Aquarium Basement-2 floor plan.

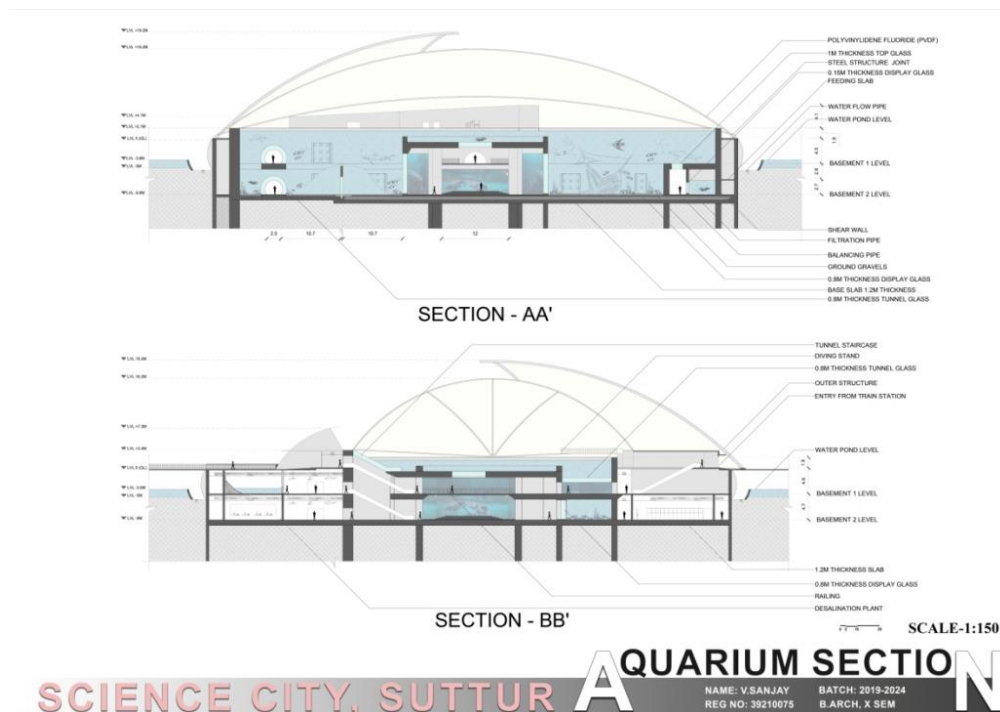


Plate 5.6: Aquarium Section.

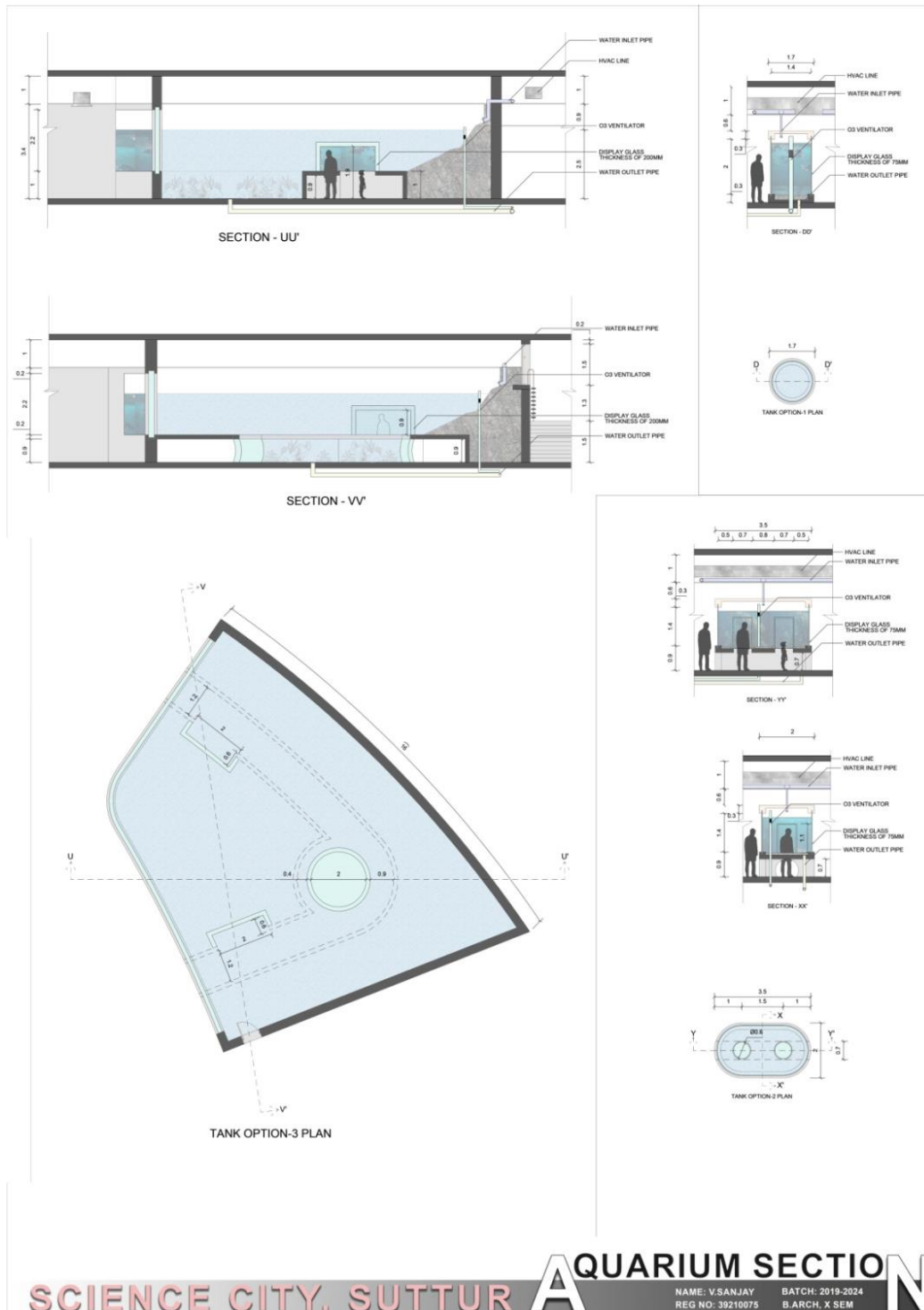


Plate 5.7: Aquarium Section.

CHAPTER 6

REFERENCES

6.1 Journals:

"Science City." *Gujarat Council of Science City*, <https://sciencecity.gujarat.gov.in/>. Accessed 19 May 2024.

"Science City." *Gujarat Tourism*, <https://www.gujarattourism.com/central-zone/ahmedabad/science-city.html>. Accessed 19 May 2024.

"Pushpa Gujral Science City." *PG Science City*, <http://www.pgsciencecity.org/>. Accessed 19 May 2024.

"Science Centre Singapore." *Science Centre Singapore*, <https://www.science.edu.sg/>. Accessed 19 May 2024.

"Shanghai Astronomy Museum / Ennead Architects." *ArchDaily*, <https://www.archdaily.com/965203/shanghai-astronomy-museum-ennead-architects>. Accessed 19 May 2024.

"Average Weather in Mysore, Karnataka, India Year Round." *WeatherSpark*, <https://weatherspark.com/y/108554/Average-Weather-in-Mysore-Karnataka-India-Year-Round>. Accessed 19 May 2024.