THESIS REPORT ON

“-------(AEROSPACE MUSEUM)----------, --------(PALAM,NEW DELHI)----------“

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF:

BACHELOR OF ARCHITECTURE

BY

(SUPRIYA BAJPAI)

(1180101043)

THESIS GUIDE

(PROF. SANGEETA SHARMA)

SESSION

2022-2023

TO THE

SCHOOL OF ARCHITECTURE AND PLANNING

BABU BANARASI DAS UNIVERSITY

LUCKNOW.

SCHOOL OF ARCHITECTURE AND PLANNING
BABU BANARASI DAS UNIVERSITY, LUCKNOW (U.P.).

CERTIFICATE

I hereby recommend that the thesis entitled"-------(AEROSPACE MUSEUM)----------, --------(PALAM , NEW DELHI)----------" under the supervision, is the bonafide work of the students and can be accepted as partial fulfillment of the requirement for the degree of Bachelor's degree in architecture, school of Architecture and Planning, BBDU, Lucknow.

Prof. Mohit Kumar Agarwal Dean of Department	Prof. Sangeeta Sharma Head of Department

Recommendation Accepted

Not Accepted

External Examiner	External Examiner

BABU BANARASI DAS UNIVERSITY, LUCKNOW (U.P.).

Certificate of thesis submission for evaluation

1. **Name** **:SUPRIYA BAJPAI ….……**
2. **Roll No.** **: 1180101043...……**
3. **Thesis Title** **: AEROSPACE MUSEUM...……**
4. **Degree for which the thesis is submitted: BACHELOR OF ARCHITECTURE.……**
5. **Faculty of University to which the thesis is submitted:** **Yes / No**
6. **Thesis preparation guide was referred to for preparing the thesis.** **Yes / No**
7. **Specification regarding thesis format have been closely followed.** **Yes / No**
8. **The content of the thesis have been organized based on the guidelines.** **Yes / No**
9. **The thesis has been prepared without resorting to plagiarism** **Yes / No**
10. **All the sources used have been cited appropriately** **Yes / No**
11. **The thesis has not been submitted elsewhere for a degree.** **Yes / No**
12. **Submitted 3 hard bound copied plus one CD** **Yes / No**

…….....
(Signature(s) of the supervisor)
Name:

…….....
(Signature of the Candidate)
Name: SUPRIYA BAJPAI
Roll No.:1180101043

Contents

1. AEROSPACE MUSEUM, NEW DELHI

. IAF(INDIAN AIR FORCE PALAM) presently have a museum near the technical area of AIR FORCE STATION PALAM. It was established in 1967.The site (AEROSPACE MUSEUM) is located on the main road to the domestic airport terminal and further to Dwarka. The a new Aerospace Museum will be developed soon, focusing mostly on the country's rich aviation history. The new Aerospace Museum would be coming up at Air Force Station that is located in South West Delhi District, Delhi and would be a one of a kind museum it shear it's boundary with; RAKSHA SAMPAD BHAWAN, CONTROLLER GENERAL DEFENCE ACCOUNT AND, SPORT VIEW COMPLEX.

1.2 WHAT IS AEROSPACE MUSEUM

An aviation museum, air museum, or air and space museum is a museum exhibiting the history and artifacts of aviation. In addition to actual, replica or accurate reproduction aircraft, exhibits can include photographs, maps, models, dioramas, clothing and equipment used by aviators.

AIM OF THE PROJECT :-

IAF(INDIAN AIR FORCE PALAM) presently have a museum near the technical area of AIR FORCE STATION PALAM. It was established in 1967.The site (AEROSPACE MUSEUM) is located on the main road to the domestic airport terminal and further to Dwarka. The a new Aerospace Museum will be developed soon, focusing mostly on the country's rich aviation history. The new Aerospace Museum would be coming up at Air Force Station that is located in South West Delhi District, Delhi and would be a one of a kind museum it shear it's boundary with; RAKSHA SAMPAD BHAWAN, CONTROLLER GENERAL DEFENCE ACCOUNT AND, SPORT VIEW COMPLEX.

OBJECTIVES:-

Develope and interactive network of communication by co-operation and self-help between participating volunteer- based aviation museum in INDIA

SCOPE OF PROJECT:-

- Involvement of a greater number of people to gain knowledge of a Aerospace heritage.
- Making attractive Architecture elements in the museum
- To preserve the tradition of IAF
- Create employment opportunity
- Display vintage aircraft.

AIM OF THE PROJECT :-

To design an AEROSPACE MUSEUM at a proposed site of NEW DELHI, INDIA. To study and understand the basic of museum. To study some already designed museum in order to understand their functioning.

OBJECTIVES:-

Develope and interactive network of communication by co-operation and self-help between participating volunteer- based aviation museum in INDIA

SCOPE OF PROJECT:-

- Involvement of a greater number of people to gain knowledge of a
- Aerospace heritage.
- Making attractive Architecture elements in the museum
- To preserve the tradition of IAF
- Create employment opportunity
- Display vintage aircraft.

SITE OVERVIEW

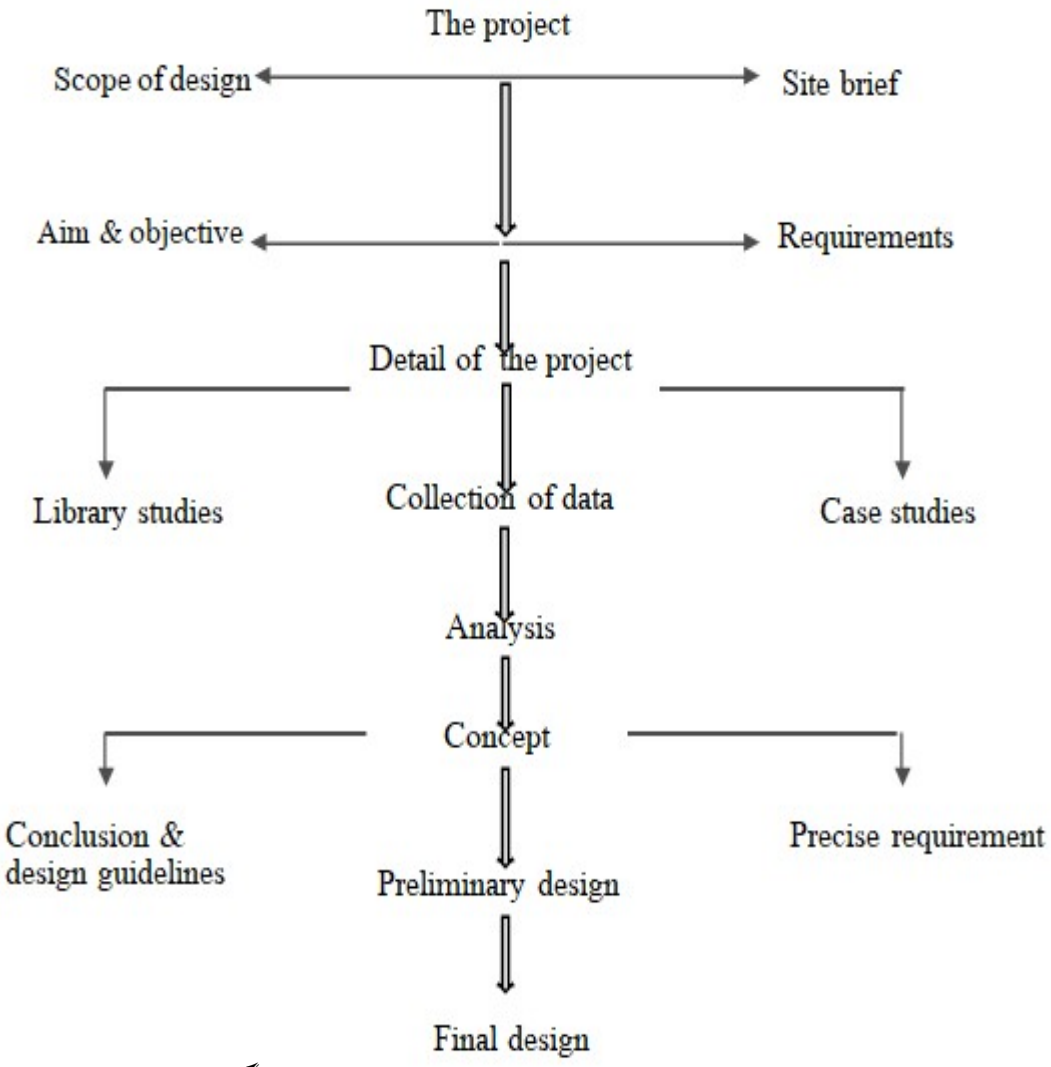
SITE AREA- 54 ACRES

SITE LOCATION – NEAR DOMESTIC AIRPORT TERMINAL

AND FURTHER TO DWARKA ROAD (NEW DELHI)

CONNECTING HIGHWAY- H4CG+4Q4, Sport View, Delhi Cantonment, New Delhi

METHODOLOGY



SITE FEASIBILITY

Site will be converted into a landmark in the capital city of India leading to positive social effects on surroundings.Will act as a drawcard to bring people to the heart of the city.It will provide preservative infrastructure to the India's rich heritage.The museum will help to generate healthy revenue which will Further be used to preserve our heritage more efficiently

SITE TOPOGRAPHY

Majorly levelled flat
Approximately 450mm below road level
Some areas has developed trees and wild plantation due to rain
SOIL: The site has rocky bedding with KOHI soil at the surface
WATER LEVEL: The water level on the site area is 35 – 40 meters below ground level.

Permissible F.A.R : 1.2

Ground coverage : 30.% max

SITE: AEROSPACE MUSEUM, PALAM

Total site area : 54 acres

Future expansion : 6.7 acres

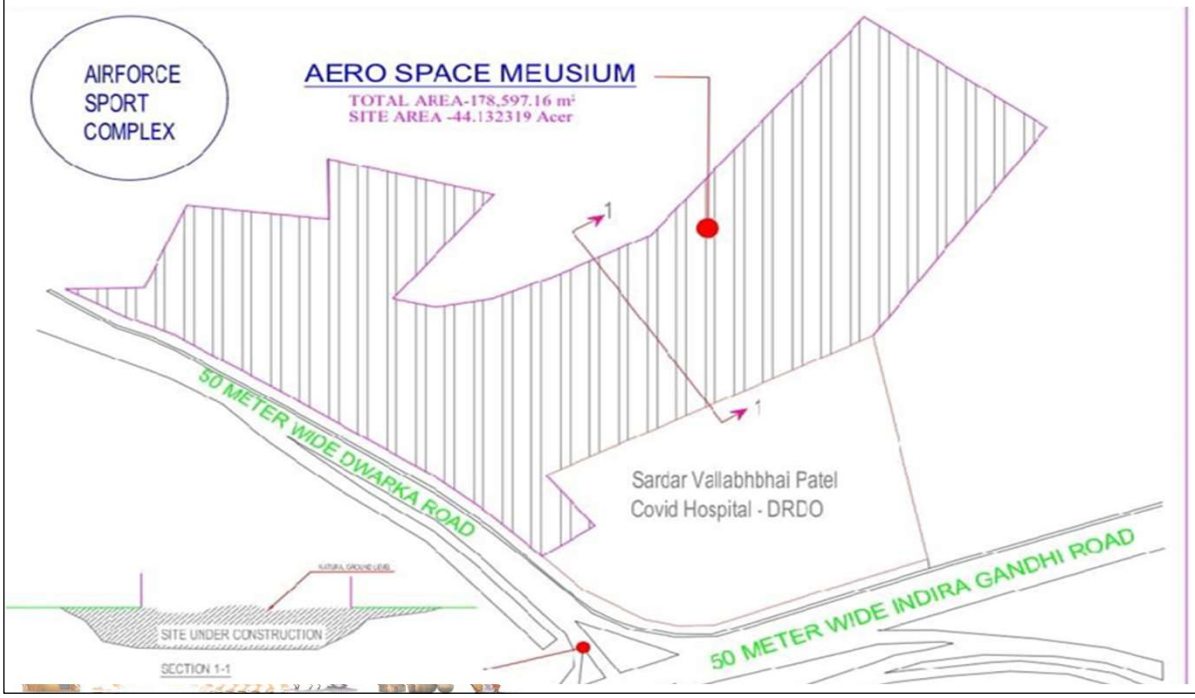
Area used : 47.3 acres

Permissible ground coverage : 30%

F.A.R : 1.2

Permissible height : 25m

Area for each car space in open parking is : 25. sq.m



2.0 Case Study & Literature Study

The Air and Space Museum maintains the world's largest collection of historic aircraft and spacecraft. It is also a vital center for historical research on aviation and spaceflight and related science and technology, and home to the Center for Earth and Planetary Studies, which performs original research.

Case study is selected which is similar to design project in context of site area, requirements, scale for the extensive research for this document and frame requirement and comparative area of requirement.

Live Case study

- Indian army air force museum ,palam
- HAL aviation museum , bangluru

Literature Case study

- Indian naval aviation museum , goa
- Poland aviation museum

3.4 INDIAN ARMY AIR FORCE MUSEUM

The IAF Museum, Palam is the first ever Aerospace museum of India. The IAF Museum has the largest collection of aircrafts. It showcases the achievements of IAF since 1930.

It is built on the property of Northern Air Command. The museum offers a insight not only into the history of the India Air Force but a complete picture of Military aviation in India. Starting From the initial days when Indian aviators flew for the Royal Flying Corps during the First World War, right up to the days of the Kargil Operations. The visitor is regaled with pictures, mementoes, souvenirs, models, and the actual aircraft themselves

Program : aviation museum

Name of Project : Indian Army air force museum
Location –palam new delhi

Site Area : 4 acres

SITE ZONNING AND CIRCULATION

The site is irregular in shape and flat with an area of around 4 acres.

It is approached from Palam road 15 m wide with entrance at a setback of 5 m from the road.

As the museum is entered, a black ceramic tiled walkway with hedges on both sides, leads to the War memorial towards right.

Further ahead lies the entrance to the museum block with indoor gallery space than opens up further to the large hangar at the end.

On the left lies the museum office and the cafeteria.

The outdoor exhibits are not very much distributed except for two parts of the site with Outdoor displays as most of the aircrafts are accommodated within the hangar.

The site orientation is such that the outdoor galleries open up towards south sun

HANGER

After crossing the entire length of Gallery-1, a door leads to the hangar that exhibits around 30 aircrafts along with few portraits and memorials.

The hangar space measures 50m x 75 m and is a vast area with enough circulation space.

The displays also include a vintage car used by Air Chief Marshall along with a statue of Flag Off. Nirmal Jit Singh Sekhon.

The circulation is not restricted linearly like the indoor galleries. They rather have a loop formation hence giving a 360 degree efficient view of the aircrafts and other exhibits.

To designate the circulation ,ropes are used along the walkway and aircrafts are placed along it.

OUT DOOR GALLERY

There Were certain aircrafts like bombers and transport vehicles which could not be accommodated inside the hangar due to their large size. Hence these are displayed in outdoor galleries

The outdoor gallery also showcases tanks and crashed aircrafts, helicopters and armory captures from Pakistan during the Indo-Pak war 1971

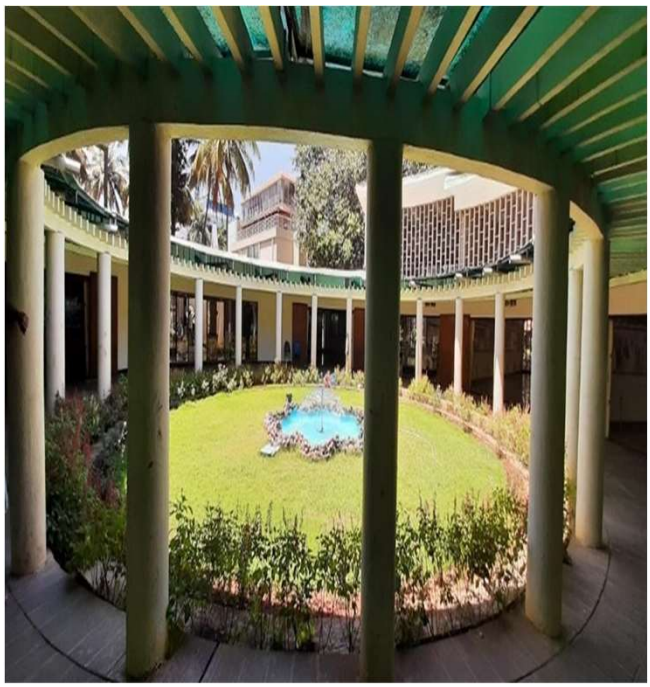
The information boards are not placed in coordination with the exhibits.

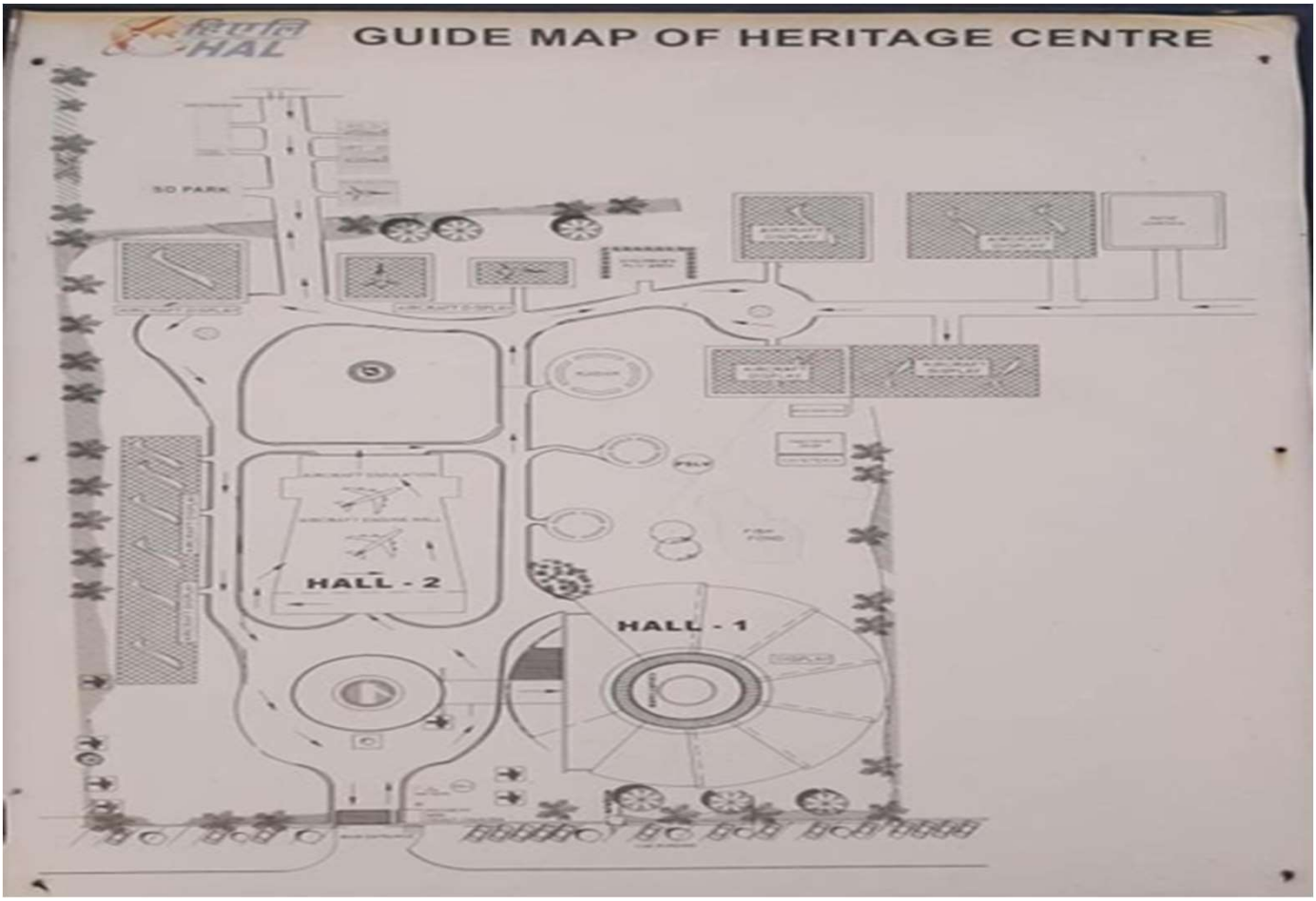
3.3 HAL AVIATION MUSEUM

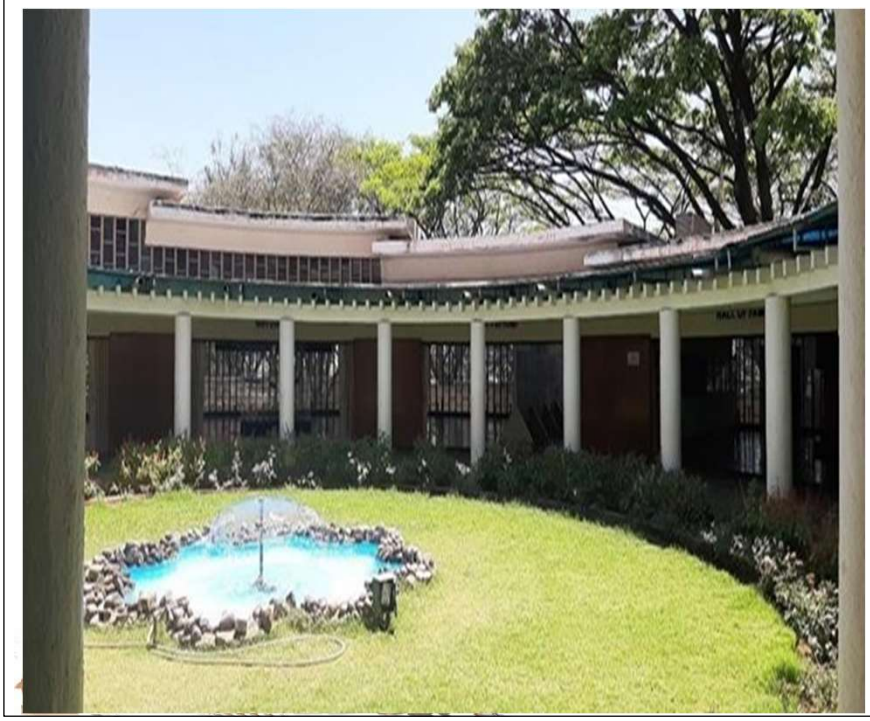
Hindustan Aeronautics Limited (HAL) Heritage Centre & Aerospace Museum, Bangalore, the first of its kind in India established in 2001, is situated at the intersection of HAL Old Airport Road & Basavanagar Road. It is about 17 Kms from the Bengaluru City Railway Station.

Project name	: Aviation Museum
Location	: 1.5km from Old airport
Total area	: 4 acres
Established	:2001

As a static museum which basically focuses on aviation, we deal with considerably huge life size objects on display.



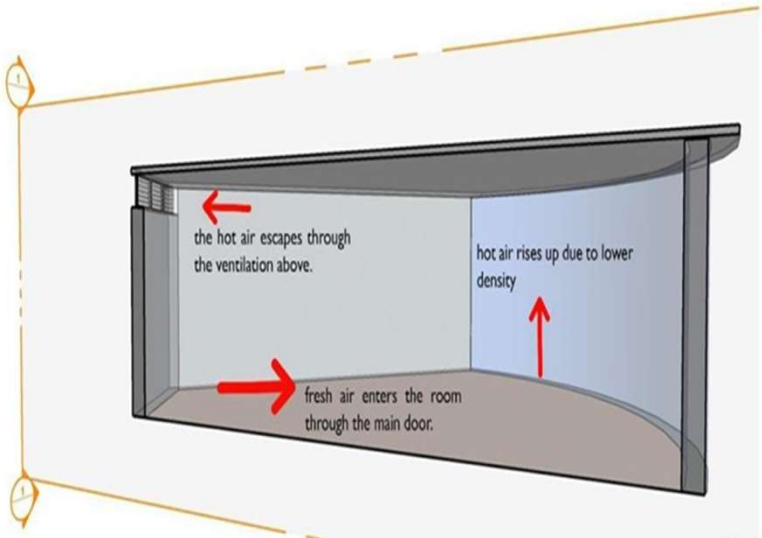

GUIDE MAP OF HERITAGE CENTRE
HAL
HALL - 2
HALL - 1



DESIGN ANALYSIS

There are two major halls, one displaying the photographs that chart the growth of aviation in each decade from 1940 till date and a Hall of Fame that takes the visitors on an exciting journey through the Heritage of Aerospace & Aviation Industry in India.
The museum consists of an interdependent relationship between the permanent structure and the semi-permanent structures.
The idea of semipermanent structures is mainly for removal, remodeling, repair, etc.
in the future on the display objects or for
changing the direction of the
movement.
As a static museum which basically focuses on aviation, we deal with considerably huge life size objects on display.
Therefore, as a basic necessary there is a considerable lot of architecture permanent structures in the campus.
The museum can be architecturally dived into four parts, the Hall 1, Hall2, aircraft and engine display hall and outdoor displays.

Analysis of hall I structure



3.1 INDIAN NAVAL AVIATION MUSEUM

The museum was founded on 12 October 1998 with a collection of 6 aircraft. The Naval Aviation Museum is a military aviation museum located in Bogmalo, 6 kilometres from Vasco da Gama, Goa, India focused on the history of the Indian Naval Air Arm. The museum is divided into two main parts, an outdoor exhibit and a two-storey indoor gallery. It's a one of a kind museum and the first Naval Aviation Museum to be set up in Asia. On the global front, only 7 such museums exist across the world, and Naval Aviation Museum Goa is one of them.

PICTURE PROFILE- INDIAN NAVAL AVIATION MUSEUME WAS STABLISHED 1998

LOCATION :- Bogmalo Road, Vasco da Gama, Goa
AREA :- 3.6 ACRES

SITE ZONNING AND CIRCULATION

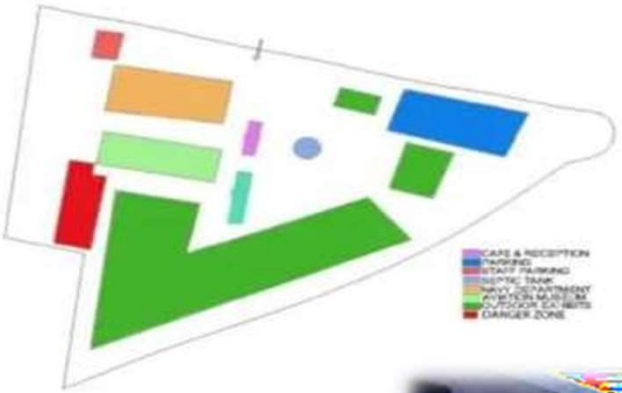
The site is irregular in shape and flat with an area of around 3.6acres.

It is approached from Bogmalo Road about 6km from the port town of Vasco da Gama, more commonly known as Vasco. As the museum is entered, The office block is located in the further entrance near the artifact room but has a smaller tourist guide space and also has ventilation absent.

The museum is built on a plateau which overlooks the popular Bogmalo beach and gives one an unimpeded look at the splendid ocean vistas.

A FATHER DAUGHTER DUO READ DESCRIPTION ABOUT MAKE AND OPERATIONS OF THIS AIRCRAFT

ENTERANCE GATE



TIME CAPSULE

ENGINE BAY

INDIVIDUAL SPACE

Museum was built as a tribute to the Indian Navy, its workforce and the key operations undertaken for the nation. A neat divide into indoor and outdoor exhibits makes it easy to navigate the museum and soak in the information. Obviously, outdoor exhibits are a lot more exciting to view.

Tickets can be purchased near the entrance where you are welcomed by the sight of decommissioned aircrafts. Sea Harrier, Hughes, Vampire and Sea Hawk are among 13 decommissioned aircrafts on display. In true-blue style, they name their
cafeteria 'Cockpit Café'. An engine bay near the cafeteria displays aircraft engines.

Indoor section is divided into ground and upper level. Sensors and Radars, Torpedoes and Missiles are displayed on modest furniture tables. Notice boards are used to share key information about Goa Liberation and search operations undertaken by Indian Navy. Multimedia Room and Hall of Silence were unfortunately closed during my visit.

Museum also shows photographs of Goa liberation and several other events related to Navy.
Lots of weapons and ammunition are also on display.

EXHIBITS ARE DISPLAYED ON MODEST TABLES

DESCRIPTIONS ON NOTICE BOARD LIKE STANDS

FAIREY FIREFLY

HAL HT-2 BEING WASHED

INFERENCE

Danger and escape routes are not clear exits. -Pathways are not clear due to less lighting in the area. -No scope for expansion. -Exhibits need shade and maintained for preservation and conserve. -Aesthetic elements in the museum and contemporary approach is missing and still remains as a nonattractive structure.

AIRCRAFT ENGINES

HAWKER SEA HAWK (CENTER)

KAMOV KA-25

3.0 Site

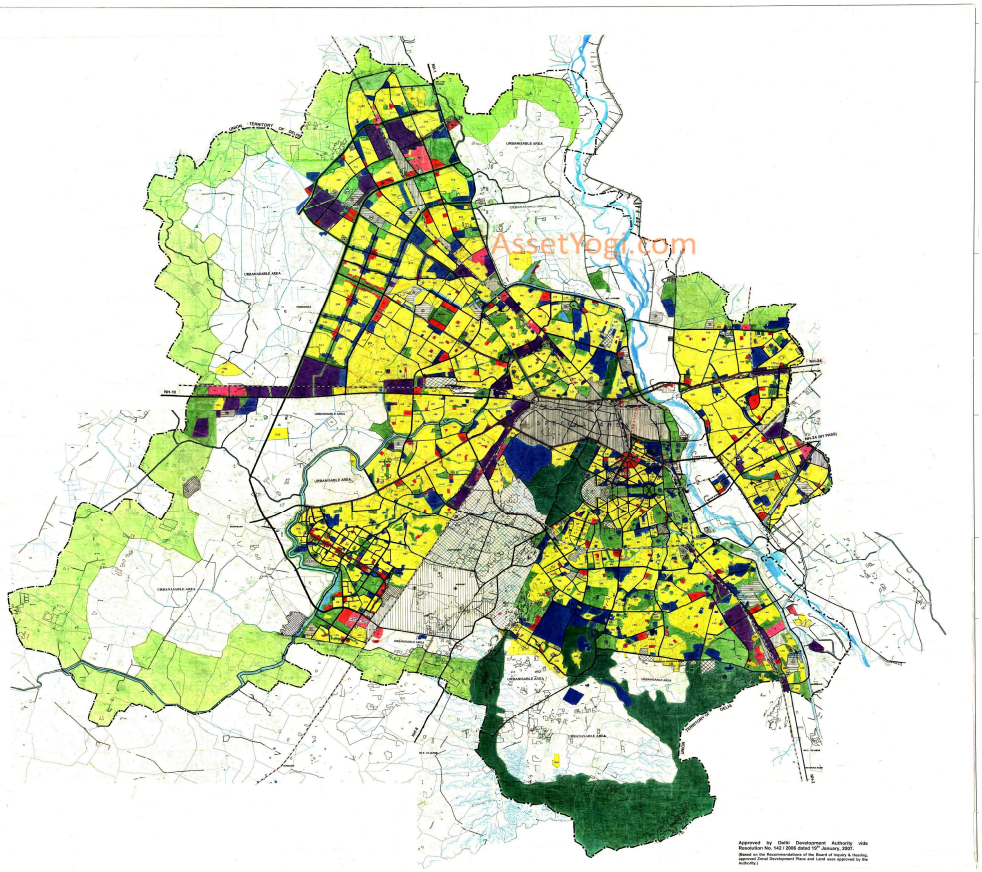
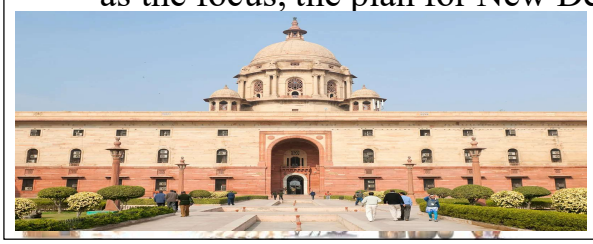


Fig.: master plan of delhi

6.1 About Delhi and its planning

The city plan of Delhi is a mixture of old and new road patterns. The street network of Old Delhi reflects the defense needs of an earlier era, with a few transverse streets leading from one major gate to another. Occasionally a street from a subsidiary gate leads directly to the main axes, but most Old Delhi streets tend to be irregular in direction, length, and width. Narrow and winding paths, culs-de-sac, alleys, and byways form an intricate matrix that renders much of Old Delhi accessible only to pedestrian traffic. Conversely, the Civil Lines (residential areas originally built by the British for senior officers) in the north and New Delhi in the south embody an element of relative openness, characterized by green grass, trees, and a sense of order.

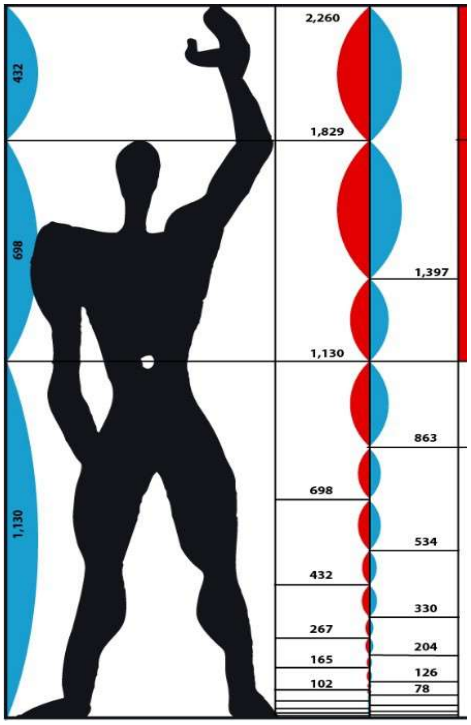
When the decision was made in 1911 to transfer the capital of British India from Calcutta (now Kolkata) to Delhi, a planning committee was formed, and a site 3 miles (5 km) south of the existing city of Delhi, around Raisina Hill, was chosen for the new administrative centre. A well-drained, healthy area between the Delhi Ridge and the Yamuna River, it provided ample room for expansion. Raisina Hill, commanding a view of the entire area, stood about 50 feet (15 metres) above the plain, but the top 20 feet (6 metres) were blasted off to make a level plateau for the major government buildings and to fill in depressions. With this low acropolis as the focus, the plan for New Delhi was laid out.



Architectural feature

The Architecture of Delhi dates back more than a thousand years. As the capital of several great empires of India, including Rajput kingdom, Delhi Sultanate, Mughal Empire, and British Raj, the city of Delhi has been a centre for art and architecture.

The few surviving structures from before the Delhi Sultanate period include Agrasen ki Baoli, Surajkund reservoir, Lal Kot and Qila Rai Pithora. There were several temples built during this period, remnants of which are still present in Qutb complex.



rajput is derived from the Hindi word "rajputra" meaning "the son of the ruler"

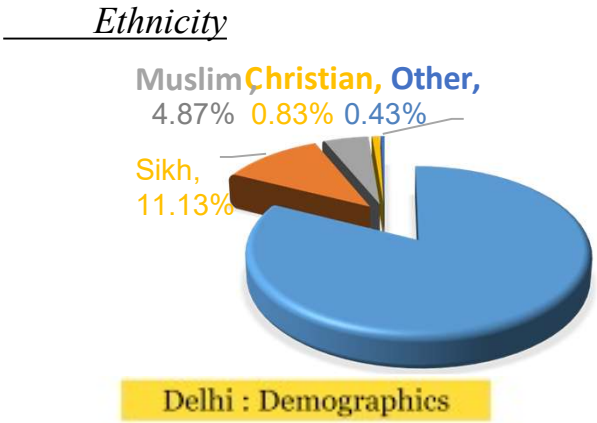
Alauddin Khilji's madrasa and Tomb in the QUTUB COMPLEX

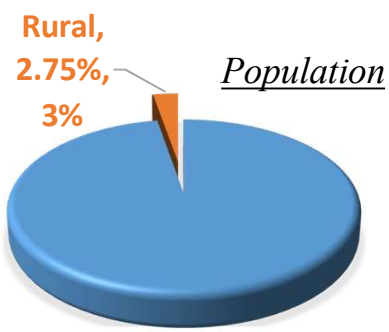
Tomb of Ghiyasuddin Tughluq within the Tughlaqabad Fort

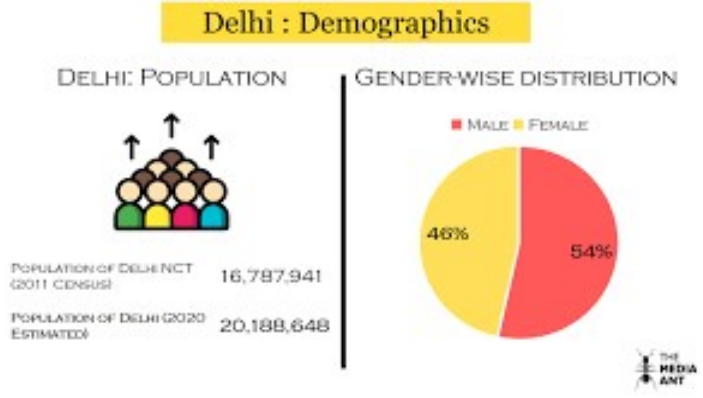
Jahaz Mahal is built during the Lodi dynasty period (1452–1526) as a pleasure resort.

6.2 DEMOGRAPHIC OF DELHI

"National Capital Territory" redirects here. For the generic term, see Capital districts and territories.
Not to be confused with New Delhi, the capital of India, entirely within the limits of Delhi.
For other uses, see Delhi (disambiguation).
Delhi's population is now estimated at 32,941,308. In 1950, the population of Delhi was 1,369,369. Delhi has grown by 875,548 in the last year, which represents a 2.73% annual change. These population estimates and projections come from the latest revision of the UN World Urbanization Prospects. These estimates represent the Urban agglomeration of Delhi, which typically includes Delhi's population in addition to adjacent suburban areas.
Delhi, or the National Capital Territory (NCT) of India, is a large metropolitan area in India. Delhi is the fifth most populous city in the world and the largest city in India area-wise. Delhi has an estimated 2016 population of 18.6 million.







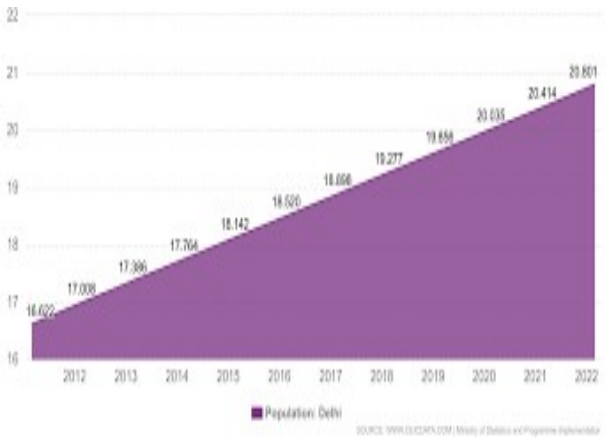


Fig.: Graph showing Temperature variation of Delhi

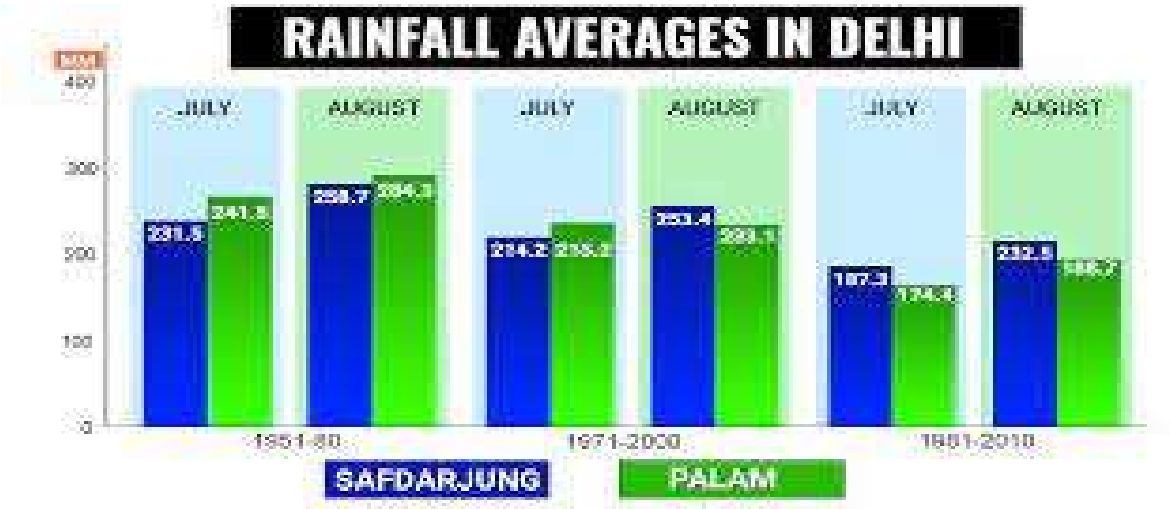


Fig.: Graph showing Rainfall of Delhi

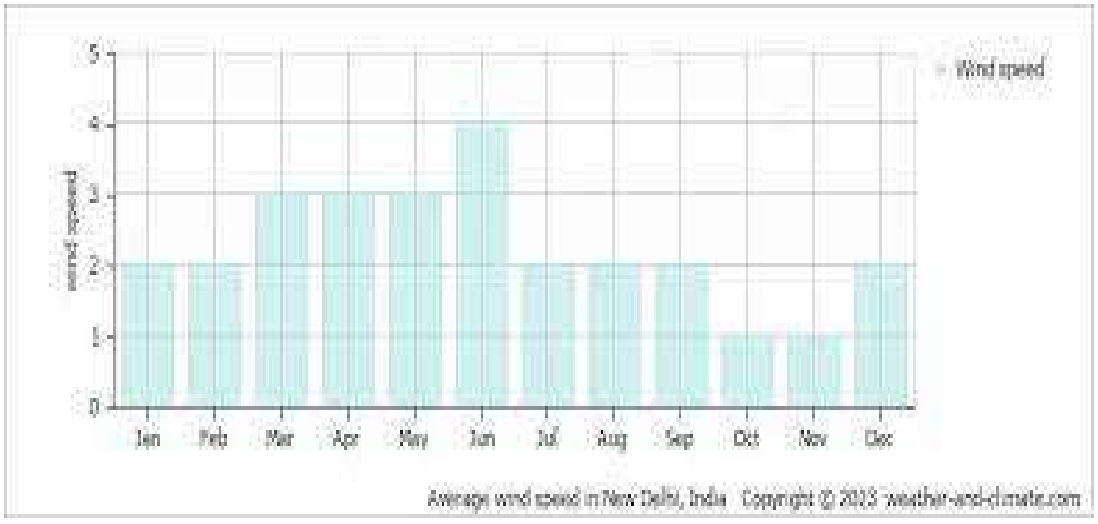


Fig.: Graph showing Wind speed of Delhi

6.3 CLIMATE

The climate of Delhi is an overlap between monsoon-influenced humid subtropical (Köppen climate classification Cwa) and semi-arid (Köppen climate classification BSh), with high variation between summer and winter temperatures and precipitation. Delhi's version of a humid subtropical climate is markedly different from many other humid subtropical cities such as São Paulo, New Orleans and Brisbane in that the city features dust storms (something more commonly seen in a desert climate) and wildfire haze (something seen in a Mediterranean climate) due to its semi-arid climate.

Teperature

The hot season , from April 22 to July 8, with an average daily high temperature above 98°F. The hottest day of the year is May 30, with an average high of 106°F and low of 80°F.

The cool, from December 3 to February 21, with an average daily high temperature below 75°F. The coldest day of the year is January 9, with an average low of 48°F and high of 68°F.

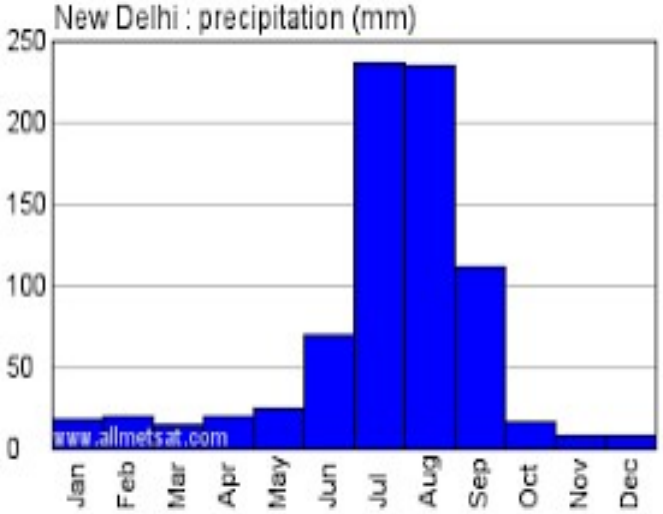
Wind

The wind experienced at any given location is highly dependent on local topography and other factors,.

The windier part of the year is, from January 20 to June 24, with average wind speeds of more than 6.4 miles per hour. The windiest day of the year is April 20, with an average hourly wind speed of 8.0 miles per hour.

The calmer time is,from June 24 to January 20. The calmest day of the year is August 22, with an average hourly wind speed of 4.8 miles per hour.

Winds are generally light and blow from **North West to South East direction** with the exception of the Easterly to South Easterly winds
which blow for some days during the summer season.



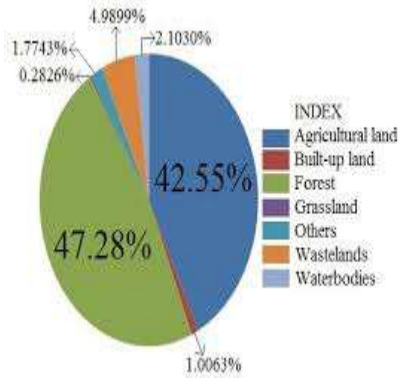
6.4 Transportation, Landuse And Environment

Transportation

Delhi has significant reliance on its transport infrastructure. The city has developed a highly efficient public transport system with the introduction of the Delhi Metro,[1] which is undergoing a rapid modernization and expansion since 2006.[2] There are 16.6 million registered vehicles in the city as of 30 June 2014, which is the highest in the world among all cities, most of which do not follow any pollution emission norm (within municipal limits), while the Delhi metropolitan region (NCR Delhi) has 11.2 million vehicles.

Landuse.

Due to increasing human intervention on the environment, most landscapes on the Earth's surface have been altered in some ways or the other. As a result there is tremendous pressure on the land environment and its components. Land use describes how a parcel of land is used such as agriculture, residences or industry, whereas land cover describes the materials such as vegetation, rocks or buildings that are present on the surface (Lillesand et al. 2003). Land Use/Land Cover (LULC) studies have become key components for managing natural resources and understanding various impacts of human activities on the environment.



Environment.

Every year the amount of air traffic increases, so does the amount of toxic exhaust out of the planes. Noise pollution is primarily a result of motorcycle and automobile traffic. Water pollution and a lack of solid waste treatment facilities have caused serious damage to the river on whose banks Delhi grew, the Yamuna.

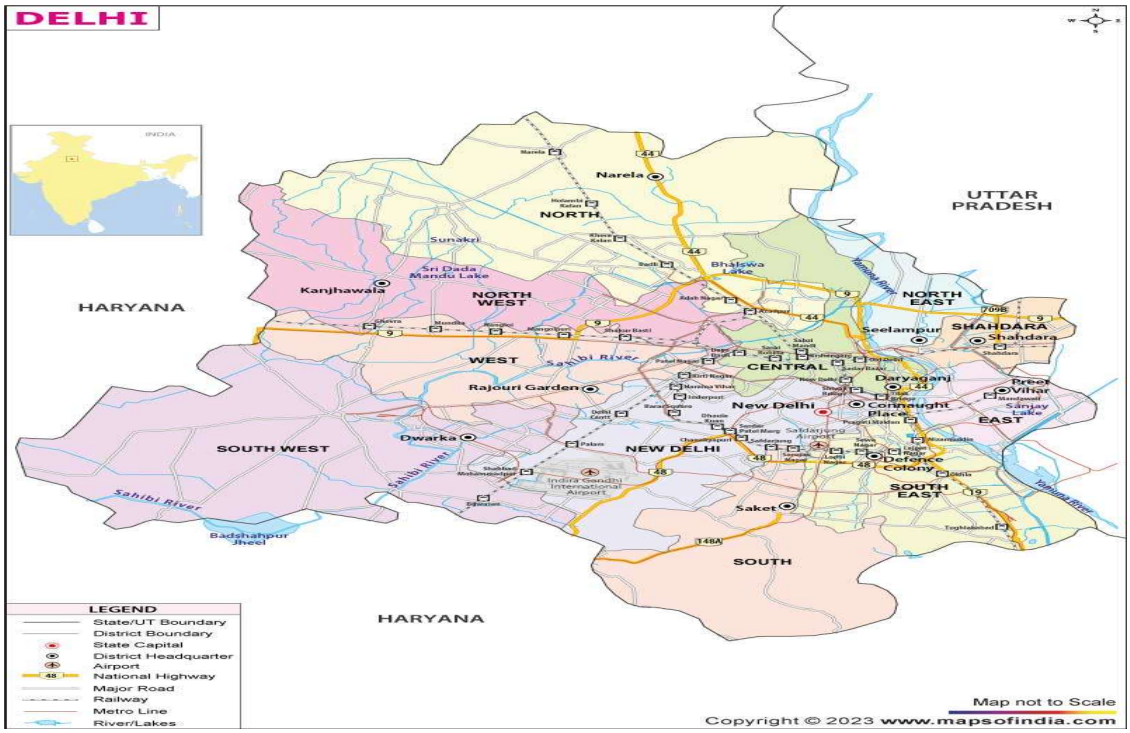


Fig.:Delhi Map

Fig.: View of site

Fig.: Location of site in Delhi Map

TYPES OF OBJECTS/EQUIPMENT TO BE DISPLAYED

INDIAN ARMY

Type of dimensions of some heavy equipment to be displayed are:

Tanks

Name of equipment	length	width	height
1. Sherman	6.0m	2.6m	2.9m
2. Stuart I	4.5m	2.3m	2.5m
3. Stuart II	4.3m	2.5m	2.6m
4. Centurion	8.6m	3.3m	3.0m
5. Vija ya nta	9.8m	3.2m	2.8m
6. Gu gun tank	5.77m	2.55m	2.68m
OTHER EQUIPMENT:			
1. Ferret scouts	3.8m	1.9m	1.9m
2. Field gun	5.3m	2.7m	2.7m
3. Armored cars	6.9m	2.4m	2.9m
4. Carrier	5.3m	2.9m	2.2m
5. Lorry (3 tons)	7.0m	2.5m	3.0m
6. Tracket dozers	6.0m	4.0m	3.0m
7. Signar vehicles	6.8m	2.3m	3.2m
8. Armored personal carrier	7.0m	3.0m	
9. Guns self-propelled	6.6m	3.0m	2.7m
10. Anti aircraft guns	6.3m	2.1m	2.1m

TYPES AND DIMENSION OF AIRCRAFT TO BE DISPLAYED ARE:

AIRCRAFT	WING SPAN	NOSE TO TAIL	HEIGHT
1. GNAT(fighter)	6.65m	8.93m	2.63m
2. Hunter	10.10m	13.75m	4.10m
(fighter bomber)			
3. Mystere	10.80m	12.60m	4.40m
(fighter bomber)			
4. Canberra(bomber)	19.70m	20.00m	4.68m
5. Dakota(carrier)		28.50m	19.50m
	5.38m		
6. Packet(outdoor		33.00m	18.30m
	8.10m		
display)			
7. Toofani		12.90m	10.60m
	4.07m		
8. Vampire		11.40m	13.05m
	1.97m		
9. H.F.24		8.85m	15.45m
	4.80m		
10.MIG		7.15m	15.76m
	4.10m		

AREA CHART	
TOTAL SITE AREA	58.35 acre
MAIN BLOCK	26000 sqm
SERVICE BLOCK	3409 sqm
PARKING AREA	6590 sqm
MEMORIAL PARK	1735 sqm
OPEN EXHIBITION AREA	8723 sqm

SITE PLAN

NORTH

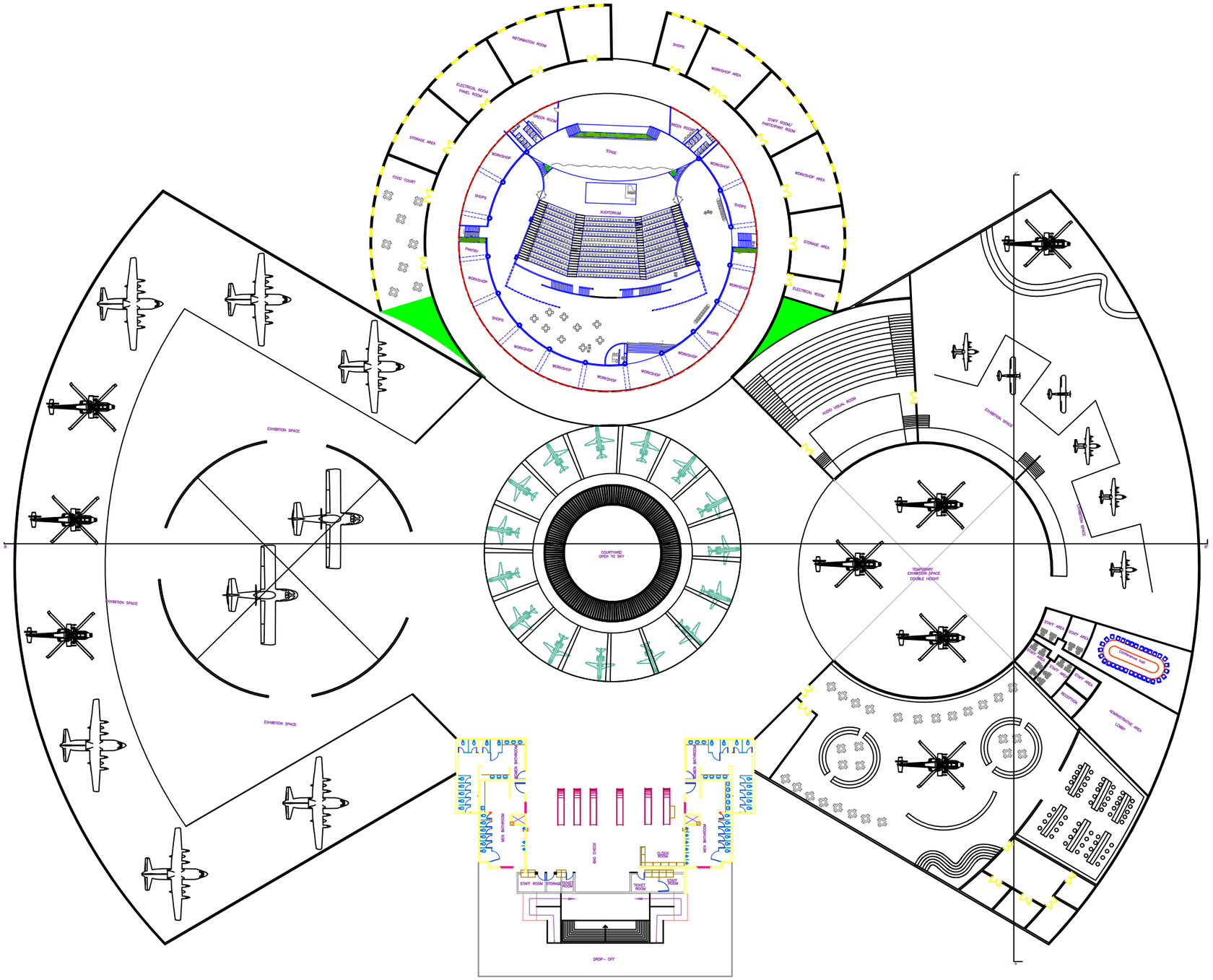
AEROSPACE MUSEUM, (DELHI)

SUBMITTED TO-

SCALE-

SHEET NO.-

SUBMITTED BY- SUPRIYA
COURSE :-
ROLL.NO:-
COLLEGE NAME :-



GROUND FLOOR PLAN

NORTH

N

SUBMITTED TO-

SUBMITTED BY- SUPRIYA

COURSE :-

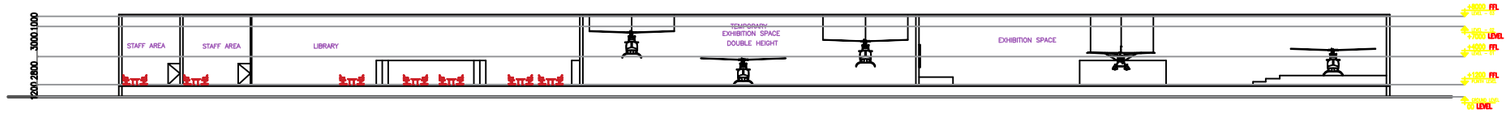
ROLL.NO:-

COLLEGE NAME :-

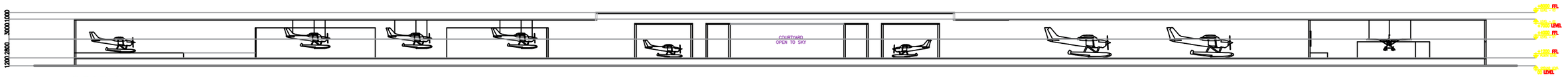
SCALE-

SHEET NO.-

AEROSPACE MUSEUM, (DELHI)

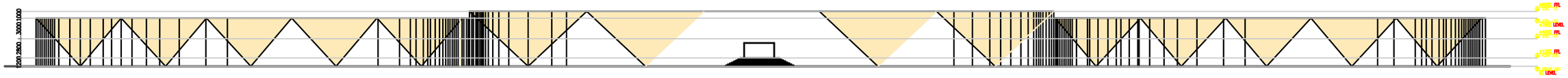


SECTION AA'

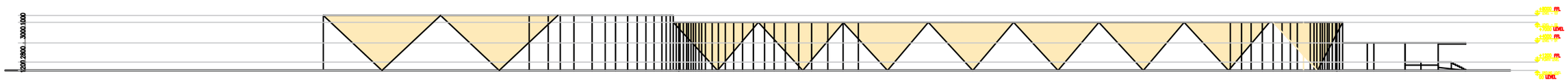


SECTION BB'

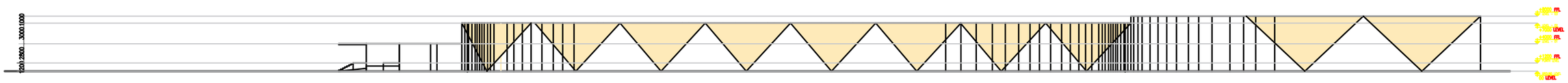
SOUTH ELEVATION



NORTH ELEVATION



WEST ELEVATION



EAST ELEVATION

SECTION & ELEVATION

NORTH

SUBMITTED TO-

SUBMITTED BY- SUPRIYA

COURSE :-

ROLL.NO:-

COLLEGE NAME :-

SCALE-

SHEET NO.-

AEROSPACE MUSEUM, (DELHI)