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ADVANCE TRANSFUSION CENTER FOR A BETTER TOMORROW.

## TRANSFUSION MEDICINE RESEARCH CENTER.

**SUBMITTED BY**

MOMIN ARIB MUDASSIR

**A REPORT**

Submitted in partial fulfillment of the requirements for  
the degree of Bachelor of Architecture.



**University of Mumbai**

2020-2021

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## CERTIFICATE

This is to certify that the Design Dissertation titled

\_\_\_\_\_ Transfusion Medicine Research Center. \_\_\_\_\_ is the bonafide work of the student \_\_\_\_\_ Momin Arib Mudassir \_\_\_\_\_ from Final Year B. Arch of AIKTC School of Architecture and was carried out in college under my guidance.

Sign of the guide:

Name of the guide : **Prof. Raj Mahtre**

Sign of the Dean: **Prof. Raj Mahtre**

Date : **12<sup>th</sup> December 2020**

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**TRANSFUSION MEDICINE RESEARCH CENTER.**

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## ACKNOWLEDGEMENT

Gratitude is the attitude that takes you to your altitude

- Marcus

On this moment of dissertation, I would like to extend my sincere gratitude and obligations to all the individuals who played an important role of mentoring me for successful completion.

I take this opportunity to express my gratitude to my mentor, **Prof. Raj Mhatre** who helped me throughout the thesis for his ideal guidance, monitoring and constant encouragement. The guidance, blessings and help conveyed by his undoubtedly carried me a long way from this point forth. It can be certainly said, without his supervision and support, this report would not stand where it does at today.

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**ABSTRACT**

Aim  
Objective  
Scope  
Limitation  
Research Methodology  
Hypothesis

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The scarcity of blood in the country remains a big question in our Indian society. Unlike western countries, voluntary blood donations in the country reflect abysmal figures. Some modern blood banks in the country have ascended and have come a long way in completing this gap and improving the awareness and importance of voluntary blood donations. One such case is that of India's largest modern blood bank, Prathama Blood Centre of Ahmedabad.

They have the biggest facility in the country with the latest technology which supports in componentalisation of blood into different parts which are used in various indications. The bank is against auxiliary during blood distribution unlike the status of other blood banks or allied organizations. Prathama is also the first bank to introduce the concept of public marketing in blood banking in the country. Overall, it is appealed that their activities are worthy as they are doing a great service to the society. Those who organize and distribute blood for the needy are doing a commendable job. They are doing for a noble cause.

However, over the years the very noble cause has taken a commercial turn as perceived by the general public. Today the public observation is that in the name of a good cause such organizations are making money. There are certain sections of the public who are doubtful about the activities of blood banks. It is supposed that the entire process is commercialized and there is not much to talk about their philosophical services. In this light, this paper is an attempt to highlight the current state of blood banking in the country with a focus on the operations of Research Transfusion Medicine.

The objective of the study was to find out about peoples' views about the process of blood donation. To succeed the objective, To investigate many concern regarding scarcity of blood bank. And analyzed different age groups and there factors effecting blood bank.

### **AIM :**

To create a center which act as a device having a collection information form of transfusion medicine, which helps to aware citizens, which creates an impact of being responsible to donate blood. A center which creates a welcoming environment, attracts human attention, reduce anxiety and promote positive emotions toward Blood Bank.

### **OBJECTIVE :**

- To understand the importance of Blood Transfusion.
- Why India don't having a sufficient amount of blood storage?
- Number of Blood units collected Annually in overall India.
- Factors causing the need of a Blood Bank.
- Identifying the human psychology towards blood transfusion.
- Current situation of a government blood banks.
- Blood transfusion programs in India.
- What is it that makes people feel at ease in blood donation?
- Understanding interaction between human health and the built environment.

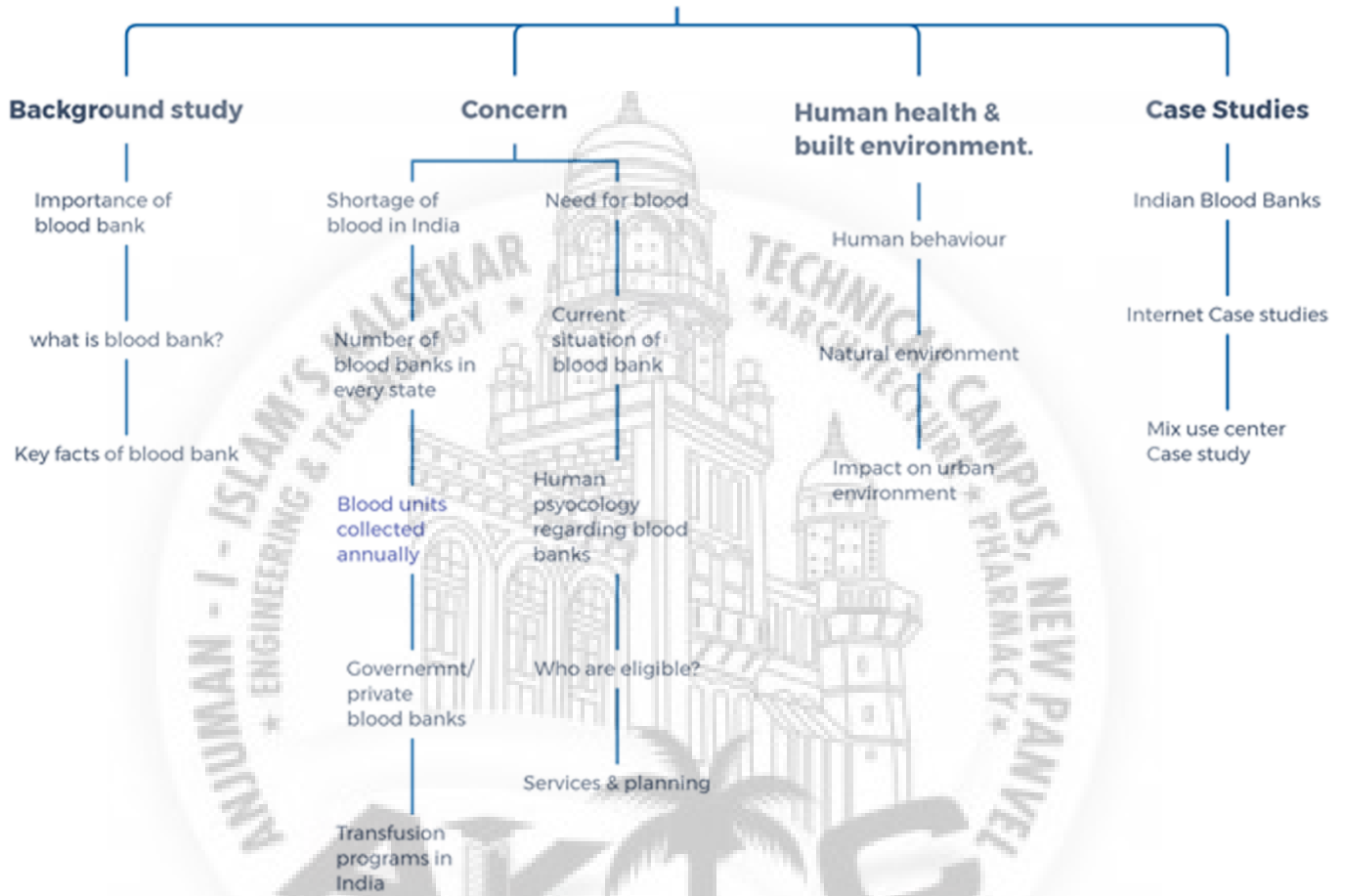
### **SCOPE :**

Transfusion Medicine is not, yet developed in India. The scope is to enhance the overall idea of blood bank. To form a build environment which invites toward donation of blood and a visitor center which, helps to get information or to aware about the importance of blood donation.

### **LIMITATION:**

The research will not be of treatment or surgeries, which mostly occurs in hospital, but a place where research of transfusion medicine will be, done.

**Blood Transfusion  
Research Center**



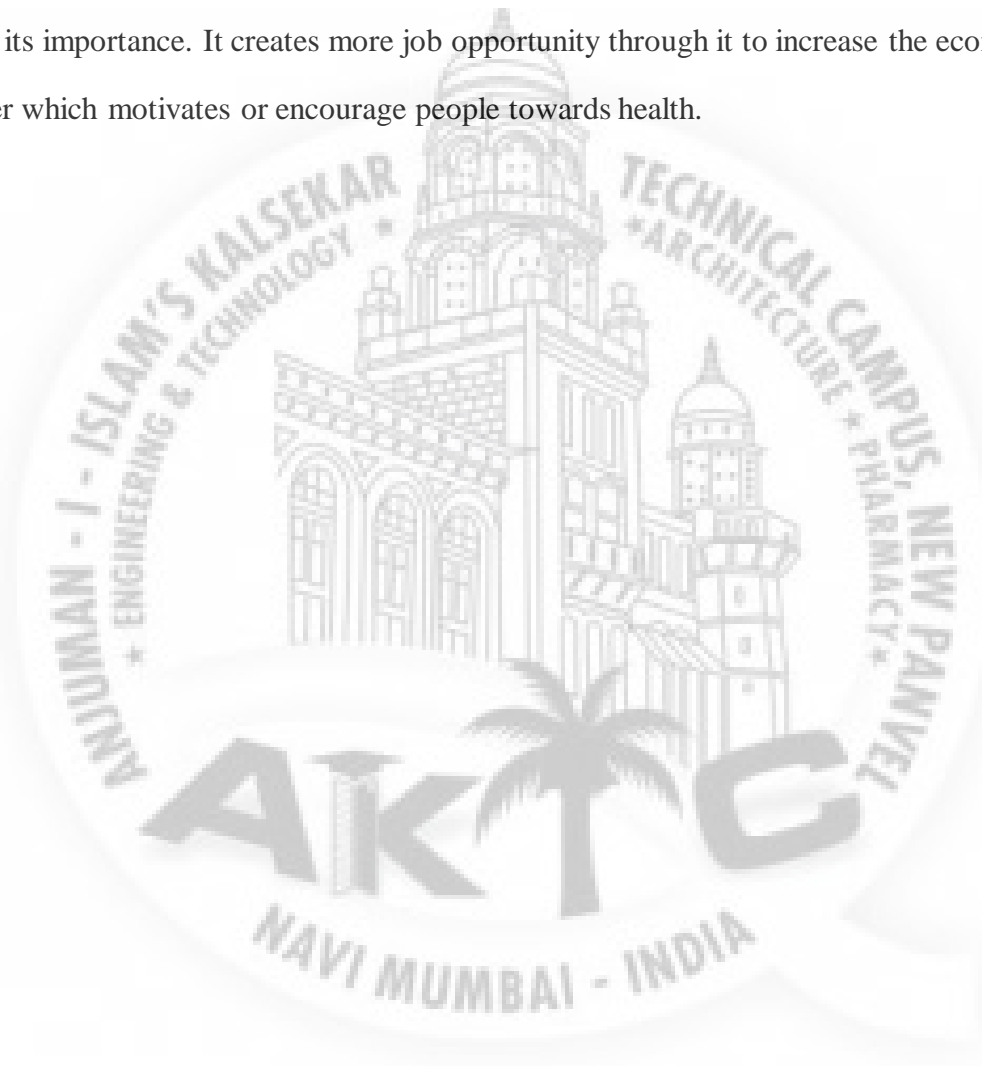
Flow chart of research methodology

Source: Author

To give the user a comfortable and a pleasant place where they can experience a awareness of blood donation by donating blood. It includes many allied activities which promotes health or a healthy environment. Having many physical activities like cycling track, swimming, exercise space for mixed use, some art and craft activities for disable peoples, where they can also be a part of a society.

A place having a healthy environment and a positive emotion which encourage visitors to visit and understand its importance. It creates more job opportunity through it to increase the economy of India.

It is a center which motivates or encourage people towards health.





***“You can’t live a perfect day,  
Without doing something for someone,  
Who will be never able to repay you.”***





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## CHAPTER 01: INTRODUCTION

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### (1.1) BACKGROUND STUDY

A blood bank is a collection of blood or blood components, brought about as a result of blood donation. They are stored and preserved for later use in blood transfusions. It was in 1915 an institution was taking place by Richard Lewison of Mount Sinai Hospital, New York, initiating the use of sodium citrate as an anticoagulant. This actually led to the development and establishment of blood banks. This discovery changed the blood transfusion process from direct (vein-to-vein) to indirect. In the same year, Richard Weil demonstrated the feasibility of refrigerated storage of anticoagulated blood. The introduction of a citrate-glucose solution by Francis Peyton Rous and JR Turner two years later allowed storage of blood in containers for several days. This path-breaking really led to the opening of the first "blood depot" established in Britain during the World War I. Oswald Hope Robertson, a medical researcher and U.S. Army officer by that time who established the depots, is now recognized as the creator of the first blood bank. By the mid-1930s, the past Soviet Union had set up least sixty large blood centers and more than 500 subsidiaries. They stored "canned" blood and shipped it to all corners of the country. America derived to know about this Soviet experience where in 1937 one Bernard Fantus, director of therapeutics at the Cook County Hospital in Chicago, inspired by the Soviets established the first hospital blood bank. The establishment of a hospital laboratory that conserved and stored blood led Fantus to originate the term "blood bank." Within a few years, hospital and blood banks were established across America. An important breakthrough came in 1939-40 when Karl Landsteiner, Alex Wiener, Philip Levine, and R.E. Stetson discovered the Rh blood group system. It was found to be the cause of the majority of transfusion reactions up to that time. In 1942-43, J.F. Loutit and Patrick L. Mollison introduced acid citrate dextrose (ACD) solution, which reduces the volume of anticoagulant. This permitted greater volumes of transfusions and created longer storage life. It was Carl Walter and W.P. Murphy, Jr., who presented the plastic bag for blood collection in 1950. It replaced breakable glass bottles allowing for the evolution of a collection system capable of safe and easy preparation of multiple blood components. Introduced in 1979, it was meant to extend the shelf life of stored blood. It was an anticoagulant preservative, CPDA-1. It increased the blood supply and facilitated resource sharing among blood banks. Freezing of Red Blood Cells is done by joining them with a solution of glycerol to prevent ice crystal formation. And as such frozen Red Blood Cells have a stated shelf life of ten years. The down side of frozen blood cells is that the process is expensive and time-consuming. Very few blood banks maintain such stocks.

## (1.2) WHAT IS BLOOD DONATION?



Fig. 1

Source :<https://www.google.com/search?q=save+blood+illustration&tbm>

It is a process by which an individual voluntarily has blood drained for storage in a blood bank or for subsequent use in a blood transfusion. The individual in this case would be raised to as a blood donor.

Blood donations may be scheduled at local centres, or at times a "drive" is started to collect blood. These are events where a blood bank will set up in a suitable location for people to approach without appointment during their daily routine to donate blood. Sometimes a blood mobile van is used to run a blood drive. Usually a changed large vehicle (for example, a bus), it is an easy place to run a blood drive because it is already set up for the process of blood donation. Many blood banks have several blood-mobiles so they can serve many people at once.

The process of giving blood includes screening the donor, then the actual donation, and a recovery period of short duration. This applies to both whole blood donations and plasmapheresis (donating only one's plasma). As far as storage is worried, Cryopreservation of red blood cells is done to store special, rare red blood cells for up to 10 years. The cells are first incubated in a 40% glycerol solution which acts as a cryoprotectant or what is known as "antifreeze" within the cells. The units are then placed in special sterile containers in a deep freezer at a sub-zero temperature of  $-60^{\circ}\text{C}$ .

### (1.3) WHAT IS BLOOD BANKS ?

Today, Blood bank collect blood and separate it into its various components so they can be used most effectively according to the needs of the patient. Red blood cells carry oxygen, platelets help the blood clot, and blood plasma has specific proteins that allow proper regulation of coagulation and healing.

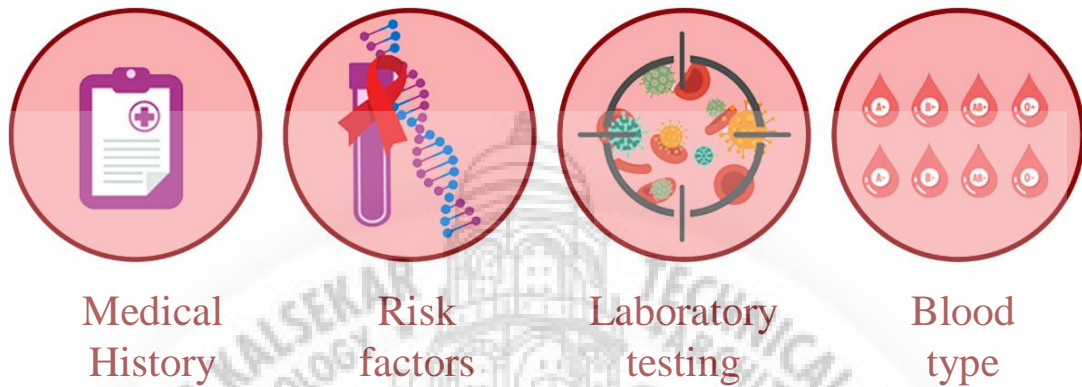


Fig. 2 Source : Author



Fig. 3 Source : Author

**(1.4) KEY FACTS – WHO (World Health Organization)**

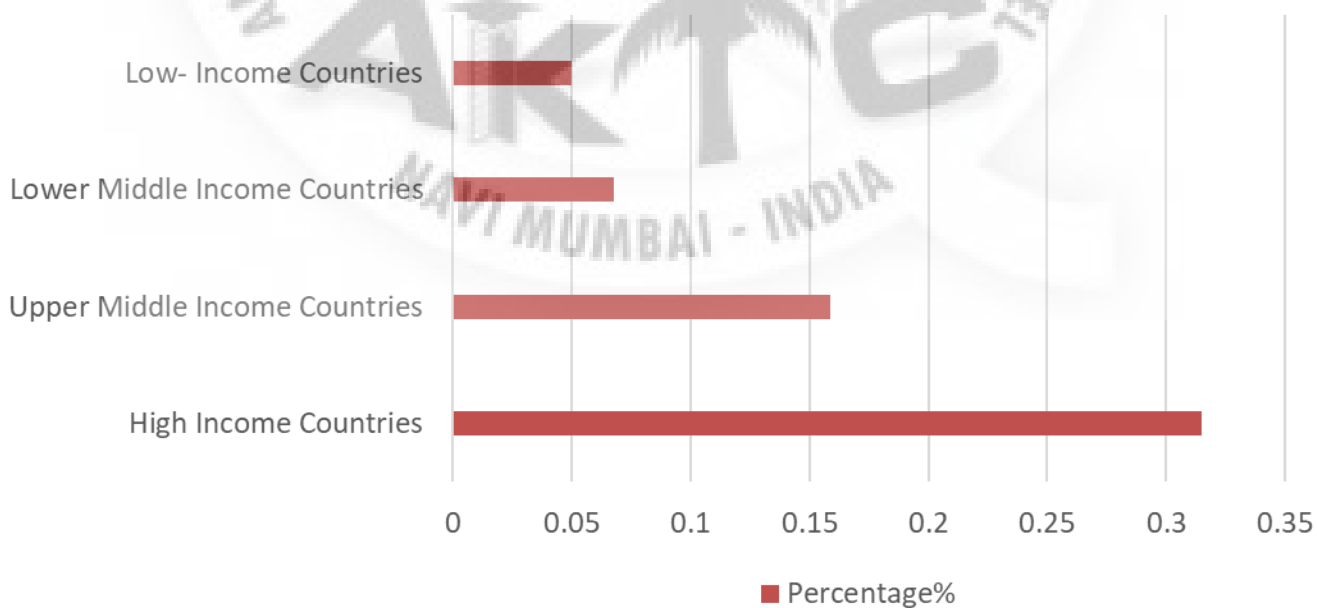


Fig. 4 Source : Author

**118.5 MILLION BLOOD DONATION COLLECTED GLOBALLY**



**40% of these are collected in high income countries, home to 16% of the Worlds population**

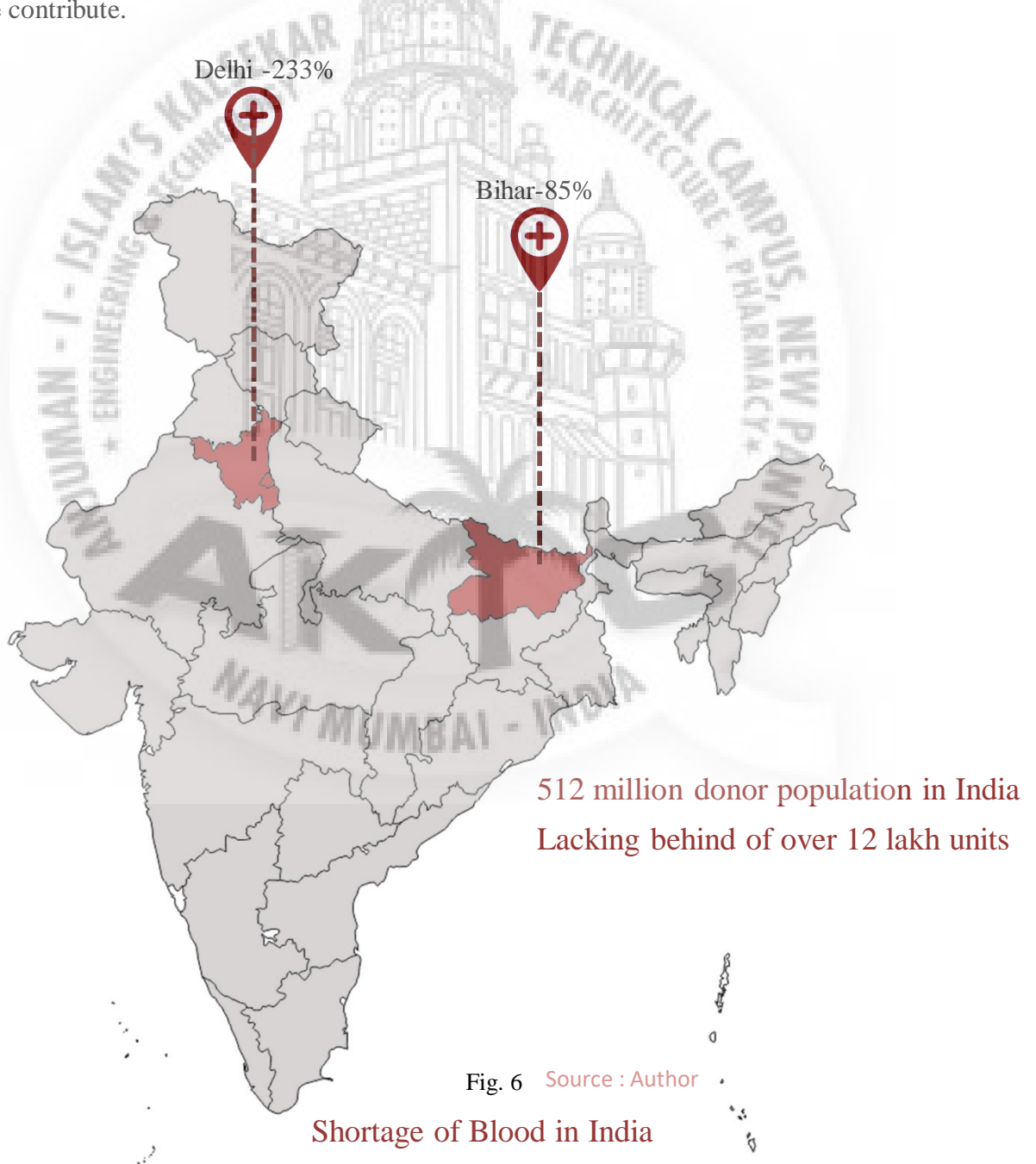


**Based on samples of 1000 people**

Fig. 5 Source : Author

## CHAPTER 02: REASON BEHIND THE SHORTAGE OF BLOOD IN INDIA

Awareness about blood donation in India is suddenly skewed. While some states, like Delhi are able to accumulate 233% extra blood than what is required, other needy states like Bihar face a deficit of as much as 85%. The cause for this wide variance in blood donation is primarily the lack of knowledge around its simple process in the lesser-developed states and the various unfounded myths that people have harboured over the centuries. On the whole, India today faces a shortage of 10% relative to its blood requirements. In complete terms, this means that we require to cope up a shortfall of over 12 lakh units. Given that the eligible donor population of India is more than 512 million, this deficit is surprising. But it also means that the shortage of blood supply can be covered within a day. If only we contribute.





**(2.1) NUMBER OF BLOOD BANK IN STATES**

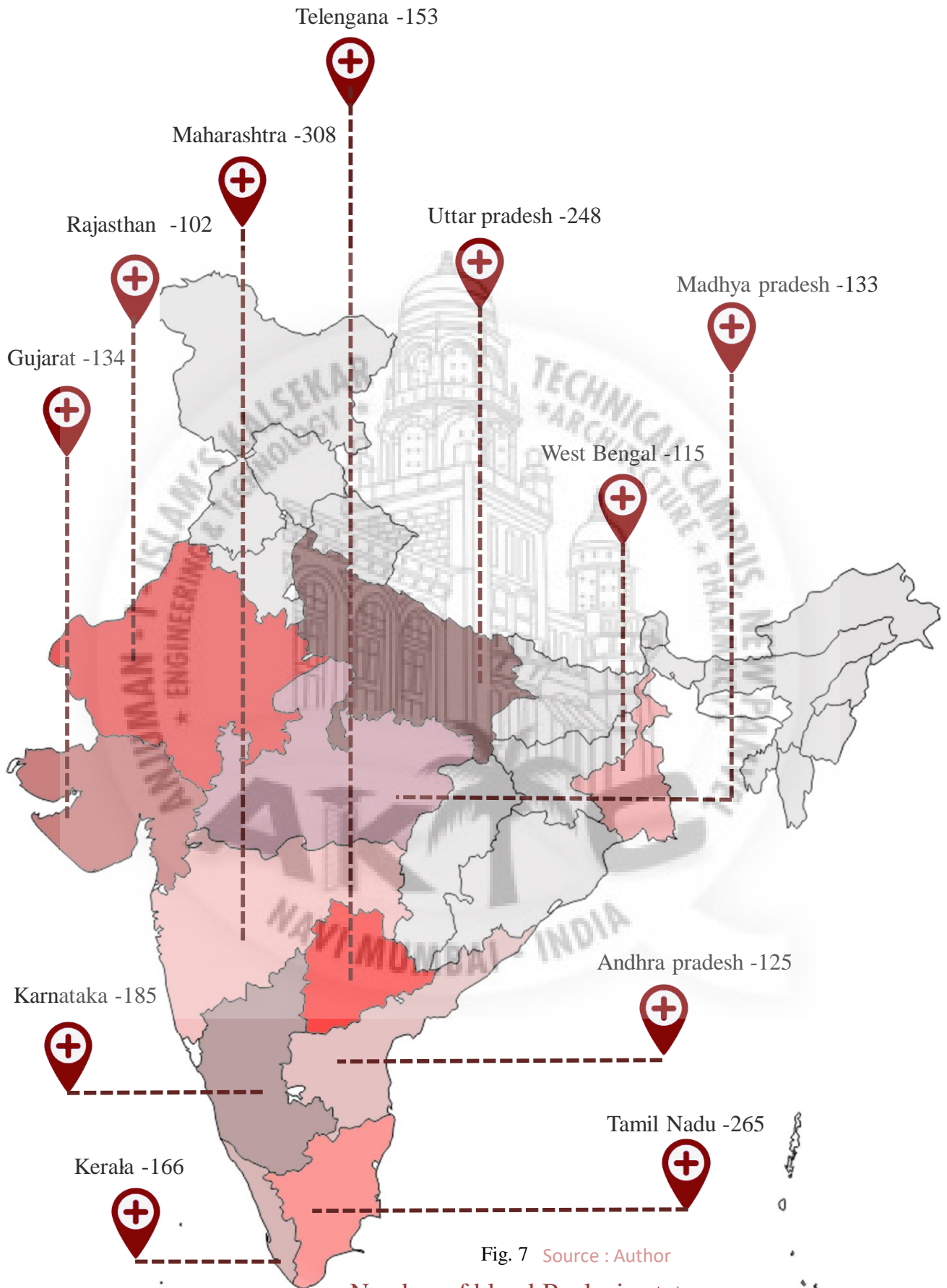


Fig. 7 Source : Author

Number of blood Banks in states

**(2.2) NUMBER OF PERCENTAGE BLOOD BANKS IN OVER ALL INDIA**

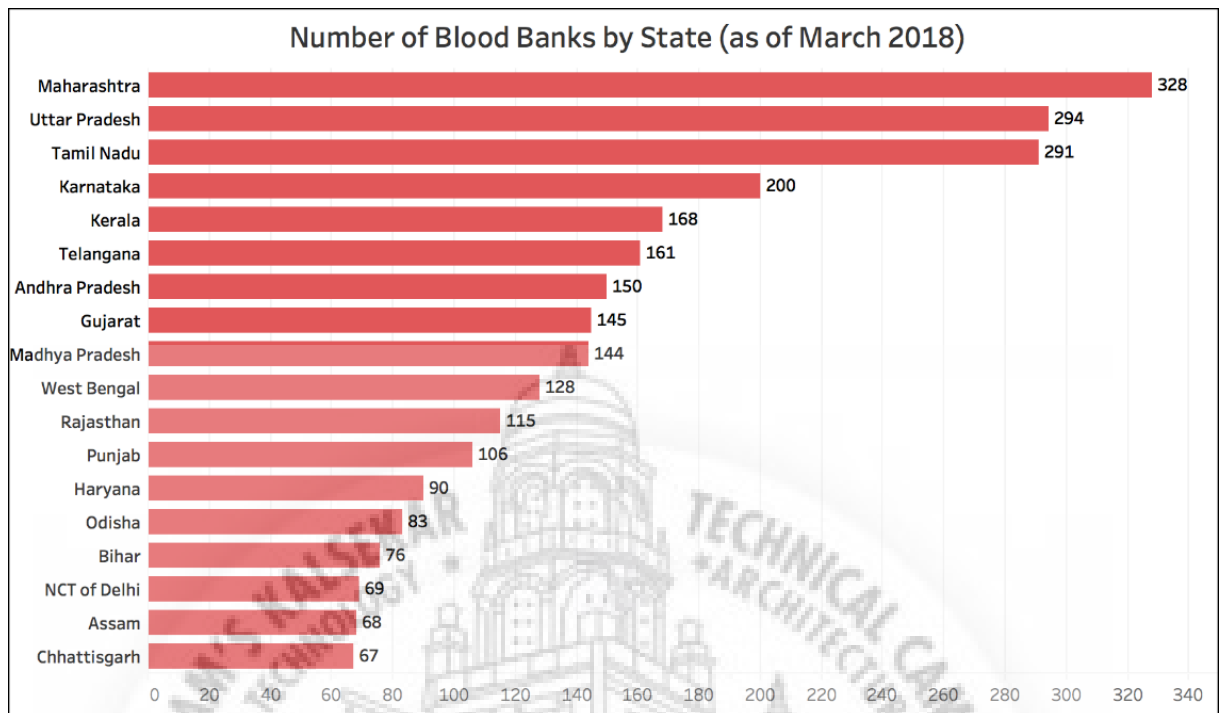


Fig. 8

Source: [https://www.google.com/number of blood bank in state](https://www.google.com/number%20of%20blood%20bank%20in%20state)

**Number of percent blood bank in over all India**

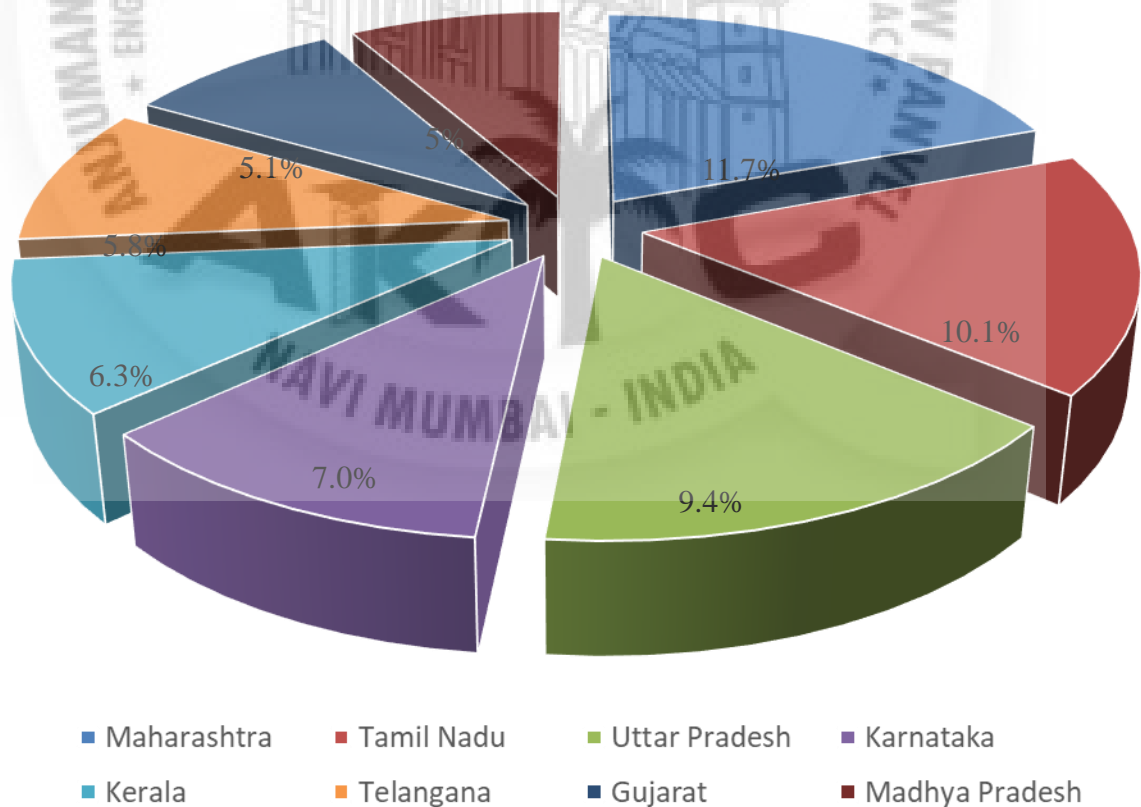


Fig. 9 Source : Author

### (2.3) VOLUME OF BLOOD COLLECTED IN OVERALL INDIA

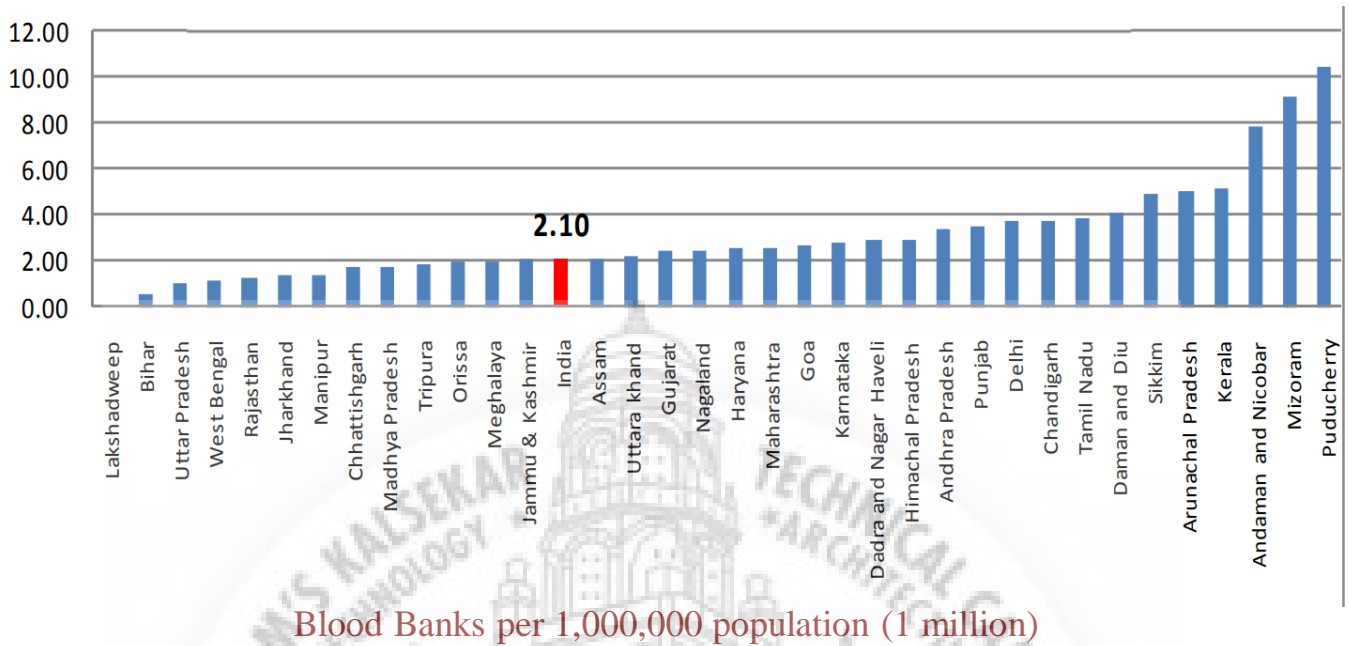
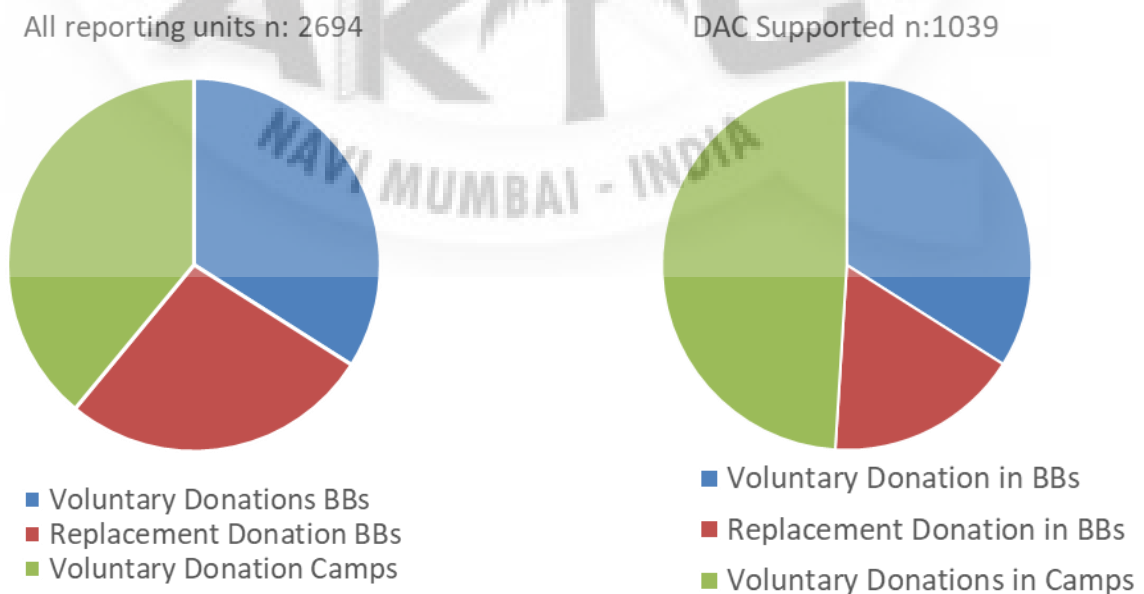


Fig. 10 Source: [https://www.google.com/volume of blood collected overall in India](https://www.google.com/volume%20of%20blood%20collected%20overall%20in%20India)

According to SIMS data(2012-13), the total units of blood collected in 2012-13 was 7,106,884 from all reporting units across the country, of which, 73% were from voluntary donation (34% (2,394,363) from voluntary donation in blood banks, 39% (2,764,192) from voluntary donation in camps and a significant 27%(1,948,329) was from replacement donations in Blood banks. The DAC supported blood banks recorded a higher proportion of voluntary blood donation of 83% (fig 11). The Total blood units per 100,000 populations for the country were 587.3 units in 2012-13.

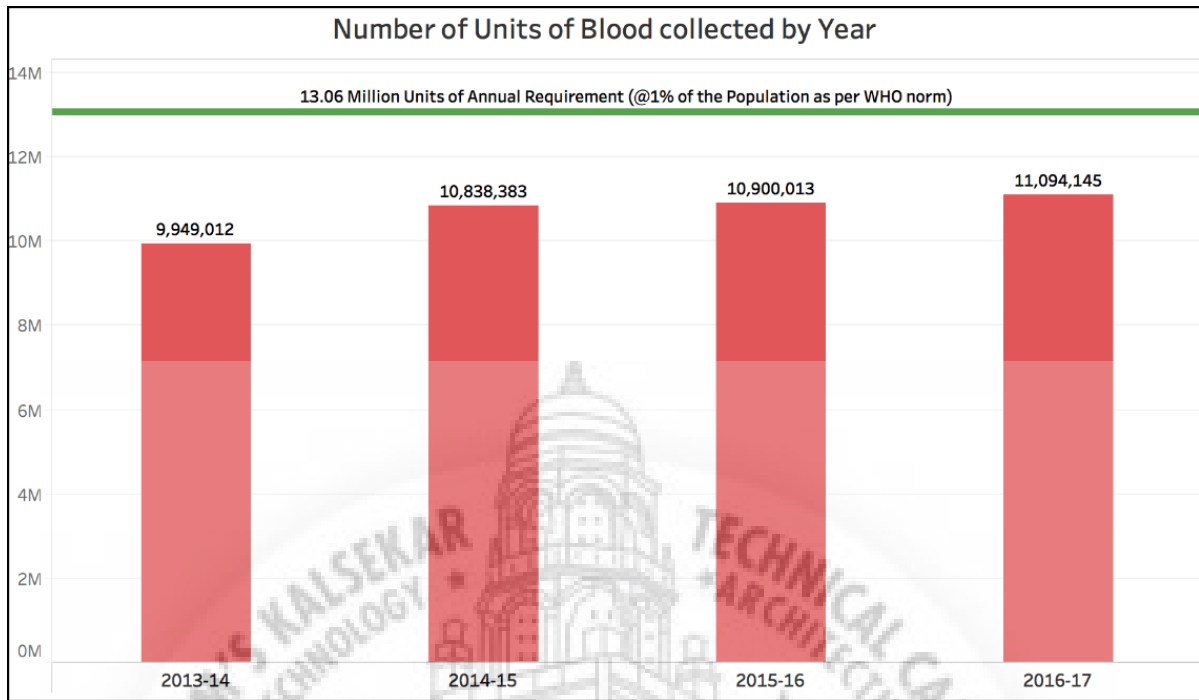


### Blood Collection 2012 - 2013

Fig. 11 Source: [https://www.google.com/blood collection 2012-2013](https://www.google.com/blood%20collection%202012-2013)

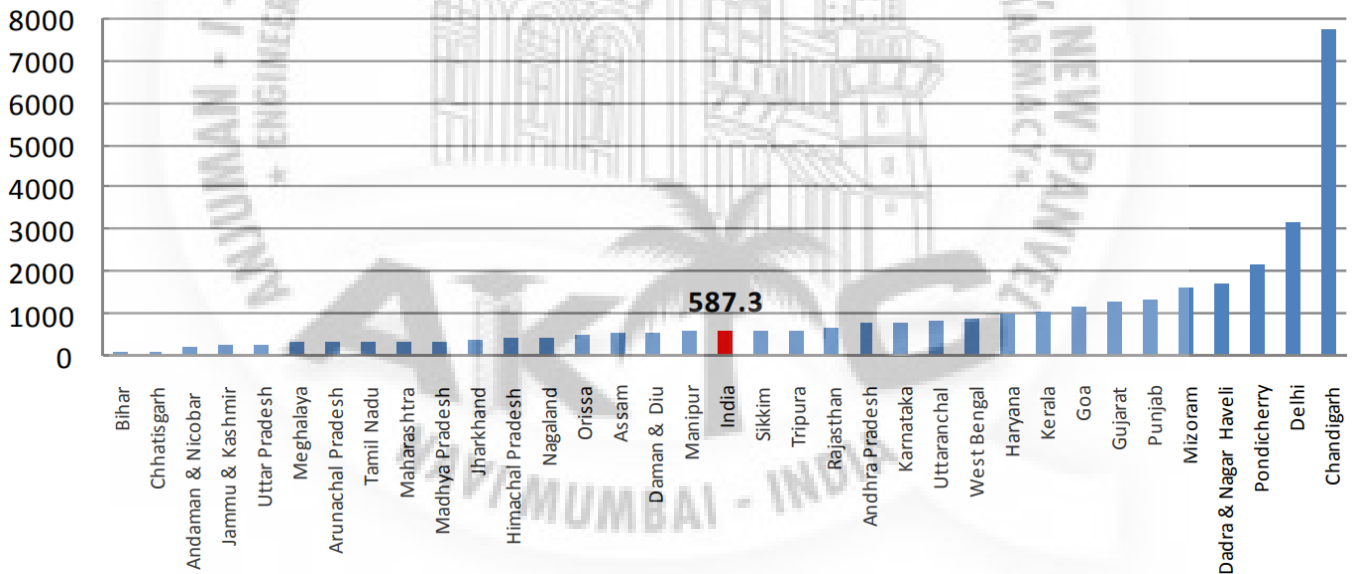


## (2.4) NUMBER OF BLOOD UNITS COLLECTED IN YEAR



Number of Units of Blood collected by Year

Fig. 12 Source: <https://www.google.com/volume of blood collected overall in India>



Total Blood Units per 100,000 population – state wise

Fig. 13

Source: <https://www.google.com/volume of blood collected overall in India>

The SIMS Data 2012-13 indicated that the Government Blood banks recorded around 49% (3,487,571) of the total blood collection in the country followed by private (32.4% - 2,302,134) and voluntary/charitable blood banks 18.5% (1,317,179).

All Reporting units

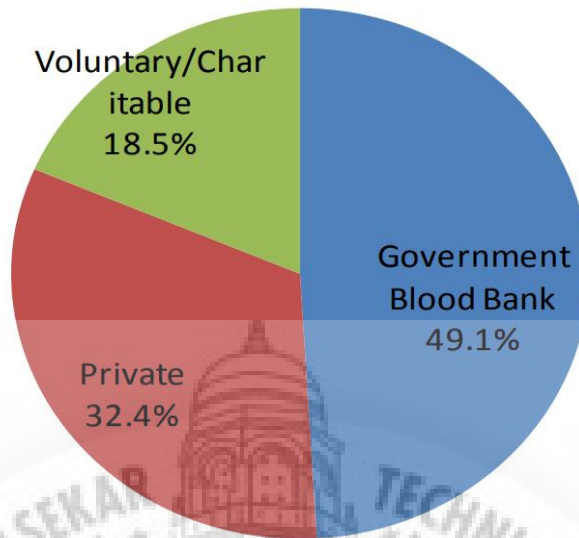
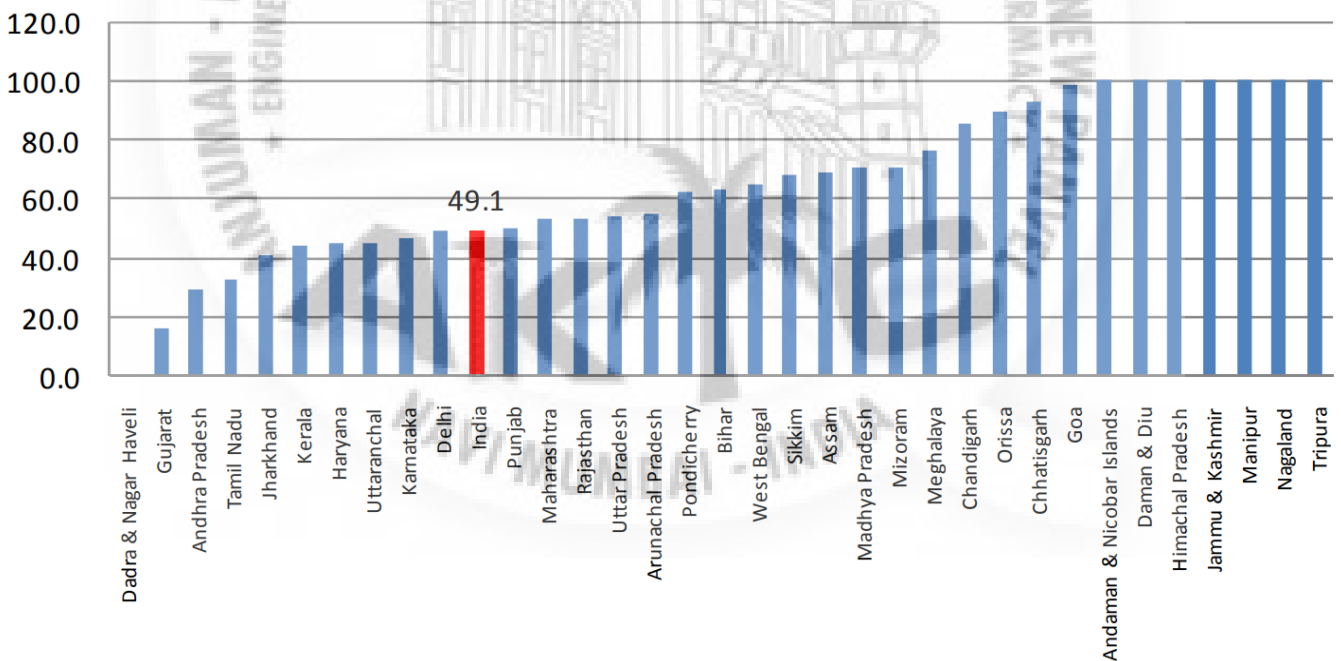


Fig. 14 Source: [https://www.google.com/blood collected overall in India](https://www.google.com/blood%20collected%20overall%20in%20India)

A greater amount of blood collection was from private and voluntary/charitable blood banks in states such as, Delhi, Karnataka, Uttaranchal, Haryana, Kerala, Jharkand, Tamil Nadu and Gujarat.a



% of Blood Collection in Government Blood Bank (state wise)

Fig. 15

Source: [https://www.google.com/volume of blood collected overall in India](https://www.google.com/volume%20of%20blood%20collected%20overall%20in%20India)

### (2.5) THE NEED FOR BLOOD



Fig. 16.a

More than 1200 Road crashes occurs every day in India

. The 230 million major operations



Fig. 16.b

60 million trauma induced surgeries are performed in the country every year



Fig. 16.c

5 million population suffers from a terrorist attack



Fig. 16.d

Source: <https://www.google.com/search?q=need+for+blood>

## THE NEED FOR BLOOD



Fig. 16.e

331 million cancer related procedures like chemotherapy

10 million pregnancy complications



Fig. 16.f



Fig. 16.g

338 million patients being treated for sickle cell anemia, thalassemia

Sport injured players



Fig. 16.h

Source: <https://www.google.com/search?q=need+for+blood>

## (2.6) CURRENT SITUATION OF BLOOD BANKS

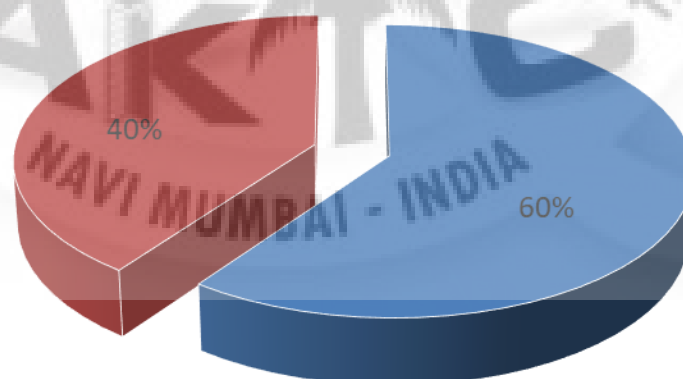
The state of blood banks in India led to the genesis of Prathama Blood Centre. Blood banks in India were characterized with the following features:

1. Small scale in terms of operation, poor infrastructure, economically unstable and lack of hygiene.
2. Acute shortage of blood and dependence on replacement donors.
3. No awareness and use of blood components.
4. Part of the hospital.
5. No concept of Societal Marketing.
6. Mistrust and corruption related image.
7. Lack of Management systems and expertise.
8. Quality of testing questionable.



Fig. 17

Source: <https://www.google.com/search?q=current+situation+of+blood+bank>



- Not donating blood
- Blood donation

1854 blood banks in India collect 6 million units of blood each year

Fig. 18 Source : Author



## CHAPTER 03: HUMAN PSYCHOLOGY ABOUT BLOOD DONATION

### 1. “I’M AFRAID OF NEEDLES.”

Most of the times, the hardest part about deciding to donate blood is overcoming the panic of the needle stick. Many people actually choose to donate to help get over their fear of needles. The actual drawing procedure should cause very little, if any, discomfort. The finger hole during the preliminary interview process (required to test your iron level) is usually the only slight anxiety encountered by a blood donor.

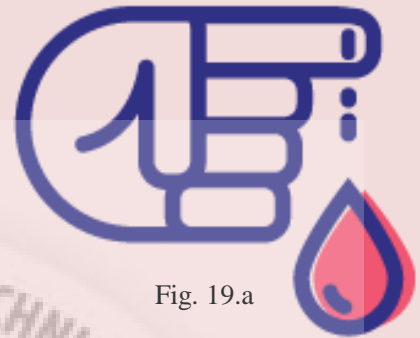


Fig. 19.a

Source: <https://www.giveapint.org/what-are-the-top-10-excuses-for-not-donating-blood>



Fig. 19.b

### 2. “OTHERS ARE DONATING ENOUGH.”

If only it were true. Although approximately 60% of the population qualifies to donate blood, less than 5% actually do so.

### 3. “MY BLOOD TYPE IS NOT IN DEMAND.”

Blood centers regularly run short of type O, A and B blood, but shortages of all types occur during the summer and winter holidays. If all adequate donors gave at least twice a year, it would help prevent blood shortages.

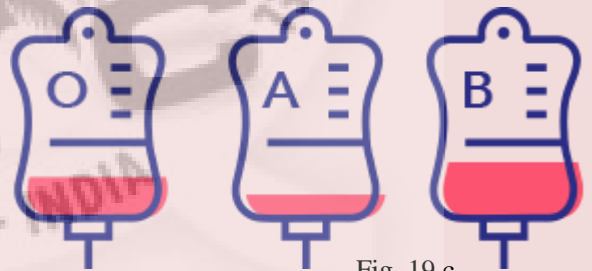


Fig. 19.c

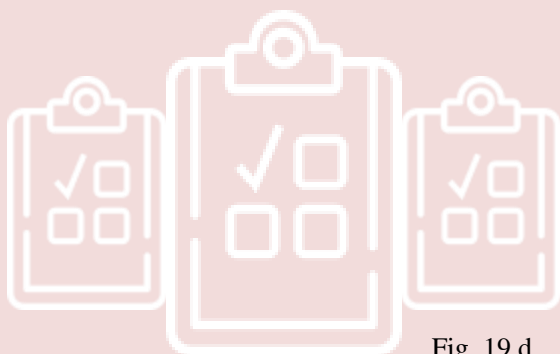


Fig. 19.d

### 4. “BLOOD BANK ASK EMBARRASSING QUESTION.”

Some of the questions are personal, but they have to be. The screening personnel are very professional and are not judgmental. Their only goal is to ensure a safe blood supply for patients and a safe donation experience for the donors.

### 5. "I'M AFRAID OF CATCHING A DISEASE."

Donating blood is safer today than it was before. Blood centers follow five layers of safety procedures:

1. Careful blood donor eligibility standards
2. An individual screening process
3. Laboratory testing of all blood samples
4. Confidential exclusion of all ineligible donations
5. Donor record checks



Fig. 19.e

Source: <https://www.giveapint.org/what-are-the-top-10-excuses-for-not-donating-blood>

### 6. "I DON'T HAVE ANY SPARE TO DONATE."

Blood makes up about seven percent 7% of your bodys weight, and the average adult has approximately two pints of blood foe every 25 pounds of body weight. The body is constantly manufacturing blood. After your whole blood donation, you will note be eligible to donate for 56 days (eight weeks), during which time your body will completely replenish the blood.

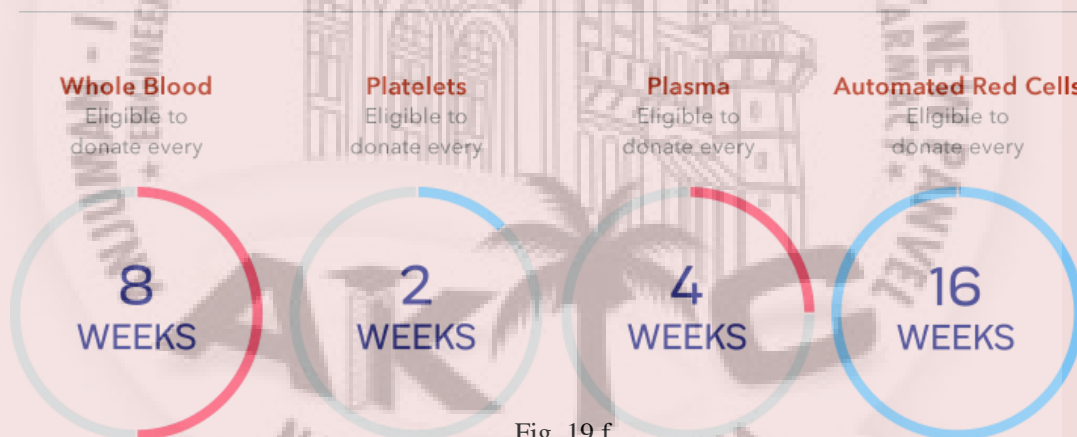


Fig. 19.f

THE MINIMUM IRON LEVEL TO DONATE BLOOD

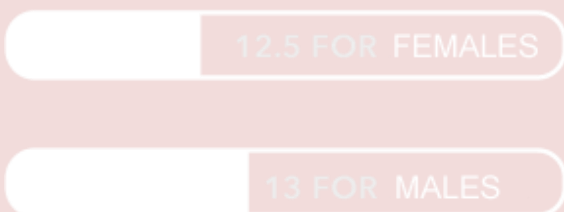


Fig. 19.g

### 7. "MY BLOOD IS NOT RICH ENOUGH."

The minimum hematocrit (iron) level to donate blood is 12.5 for females and 13.0 for males. If you are deferred for low hemoglobin, your collections specialist can review ways in which to rise your iron level. In many cases, your iron level can be amplified significantly by some simple changes to your diet.

## 8. “I’M AFRAID OF BEING TURNED DOWN.”

There are many reasons why you might be deferred from donating blood. Some of these deferrals are permanent, while many of them are only temporary. The deferral criteria for blood donors is constantly changing, which means that if you were turned down for donation in the past, you may now be eligible to donate.



Fig. 19.h

Source: <https://www.giveapint.org/what-are-the-top-10-excuses-for-not-donating-blood>

## 9. “THEY WILL TAKE TOO MUCH BLOOD AND MAKE ME FEEL WEAK.”

Directly after your blood donation, you will also be requested to spend a few moments in our canteen area, where you will be served refreshments, cookies and other snacks. This will help refill some of the sugar and liquids in your body, and help us to ensure that you are feeling well after your donation.



Fig. 19.i

## 10. “I’M TOO BUSY.”

If you, a family member, a co-worker, a neighbour or a friend were in need of a blood transfusion. Would you want to hear this excuse? It doesn't take long: about 45 minutes in all from arrival to departure and just 10 minutes to draw the blood. Most other large employers allow employees to donate on company time. Most employers understand the importance of supporting the blood supply on which patients depend, and even encourage employees to take advantage of this.



Fig. 19.j



### (3.1) WHO ARE ELIGIBLE TO DONATE BLOOD

Any healthy adult, both male and female, can donate blood. Men can donate securely once in every three months while women can donate every four months.

Good health of the donor must be fully certified. The universally accepted criteria for donor selection are:

- Age between 18 and 60 years
- Haemoglobin - not less than 12.5 g/dL
- Pulse - between 50 and 100/minute with no irregularities
- Blood Pressure -Systolic 100-180 mm Hg and Diastolic 50 - 100 mm Hg
- Temperature - Normal (oral temperature not exceeding 37.50 C) \
- Body weight - not less than 45 Kg Health conditions: The donor should be in a well state of mind and body.

They should fulfill the following criteria:

1. Past one year - not been treated for Rabies or received Hepatitis B immune globulin.
2. Past six months - not had a tattoo, ear or skin piercing or acupuncture, not received blood or blood products, no serious illness or major surgery, no contact with a person with hepatitis or yellow jaundice.
3. Past three months - not donated blood or been treated for Malaria.
4. Past one month - had any immunizations.
5. Past 48 hours - taken any antibiotics or any other medications (Allopathic or Ayurveda or Sidha or Homeo)
6. Past 24 hours - taken alcoholic beverages
7. Past 72 hours - had dental work or taken Aspirin
8. Present - not suffering from cough, influenza or sore throat, common cold
9. Women should not be pregnant or breast feeding her child
10. Women donor should not donate during her menstrual cycles
11. Free from Diabetes, not suffering from chest pain, heart disease or high BP, cancer, blood clotting problem or blood disease, unexplained fever, weight loss, fatigue, night sweats, enlarged lymph nodes in armpits, neck or groin, white patches in the mouth etc.
12. Ever had TB, bronchial asthma or allergic disorder, liver disease, kidney disease, fits or fainting, blue or purple spots on the skin or mucous membranes, received human pituitary - growth hormones etc

---

## CHAPTER 04: CURRENT BLOOD TRANSFUSION PROGRAMMS IN INDIA

---

### (4.1) The Structure and systems of blood Transfusion services in India

The Blood Safety Program in India has established as a component of the National AIDS Control Programme that has led to numerous advancements in terms of better policies, increased infrastructure, facilities, quality and access to blood transfusion services. In contrast to many western countries, Blood services have been a highly dispersed and fragmented structures and operations in India.

Functionally, blood transfusion services may be broadly categorized as,

- Hospital based blood bank
- Stand-alone blood bank
- Blood storage centres.

The key structures and their key function are mentioned below

### (4.2) National Blood Transfusion Council

The National Blood Transfusion Council (NBTC), established and registered as societies in 1996, has the major advisory role in the creation of policy on safe blood-transfusion services in India, and it is supported by the Department of AIDS Control(DAC). The NBTC is responsible for,

- Promoting Accreditation of blood banks
- Establishment of proper institutional mechanism for planning and implementation of blood security such as Regional Blood Transfusion Centres in every state
- Development of guidelines for constitution of hospital transfusion committee & development of guidelines for operationalization of plasma fractionation facility in the country (NACO, 2007d). The national council in collaboration with the state blood transfusion councils reviews all the blood banks at Public and Private sector facilities regularly for implementation of "National Blood Safety Programme.

### (4.3) State Blood Transfusion Council

The State Blood Transfusion Council (SBTC) is also an independent body that is responsible for formulation of policy, regulation and operation of the entire range of activities related to operation and requirements of blood banking system in the state and blood transfusion services starting from grouping, cross matching, donor selection, collection of blood, proper preservation, transportation, utilization, component separation and apheresis (GOO, 2014);(GOM, 2005).

### (4.4) Regional Blood Transfusion Centers

RBTC is a blood bank approved by the SBTC taking into concern the regional needs of blood & components and the ability of RBTC in terms of premises, personnel and equipment (Ramani et al., 2007). The objective of a regional blood transfusion centre (RBTC) is to ensure a safe and quality blood and blood components to meet the wants of the patients in the region.

Type of Facility	2008 -09	2009-10	2010 -11	2011-12	2012 - 13	2013 -2014
Blood Bank	1092	1103	1127	1,149	1118	1137
Model blood Bank	10	10	28	28	34	34
Blood Component Separation Units	104	130	155	171	175	258
Major Blood Bank	0	0	0	0	167	180
District level blood bank	0	0	0	0	742	665

Types of Blood Transfusion Facilities

Table 1

Source: <https://www.Structure and system of BT in India>

### (4.5) DAC supported Blood Banks

Based on the volume, geographical coverage and the availability of blood transfusion facilities, the DAC supported facilities are categorized as follows,

- Model blood Bank
- Blood Component Separation Units
- Major Blood Bank
- District level blood bank
- Regional Blood Transfusion Centre

#### **(4.6) Model Blood Banks**

Model Blood Banks are advanced level structures in the blood banking system which functions as demonstration centres for the State in that they are set-up. According to DAC, blood banks, which collect more than 10,000 blood units per annum with training facilities for Medical officers, Technicians and Nurses, can be considered as Model Blood Banks.

#### **(4.7) Blood Components Separation Units**

Blood banks that collect 5000 to 10000 blood units per annum with facilities for component separation are branded as BCSUs. The Blood Component Separation Units are primarily aimed at component separation.

#### **(4.8) Major Blood Banks**

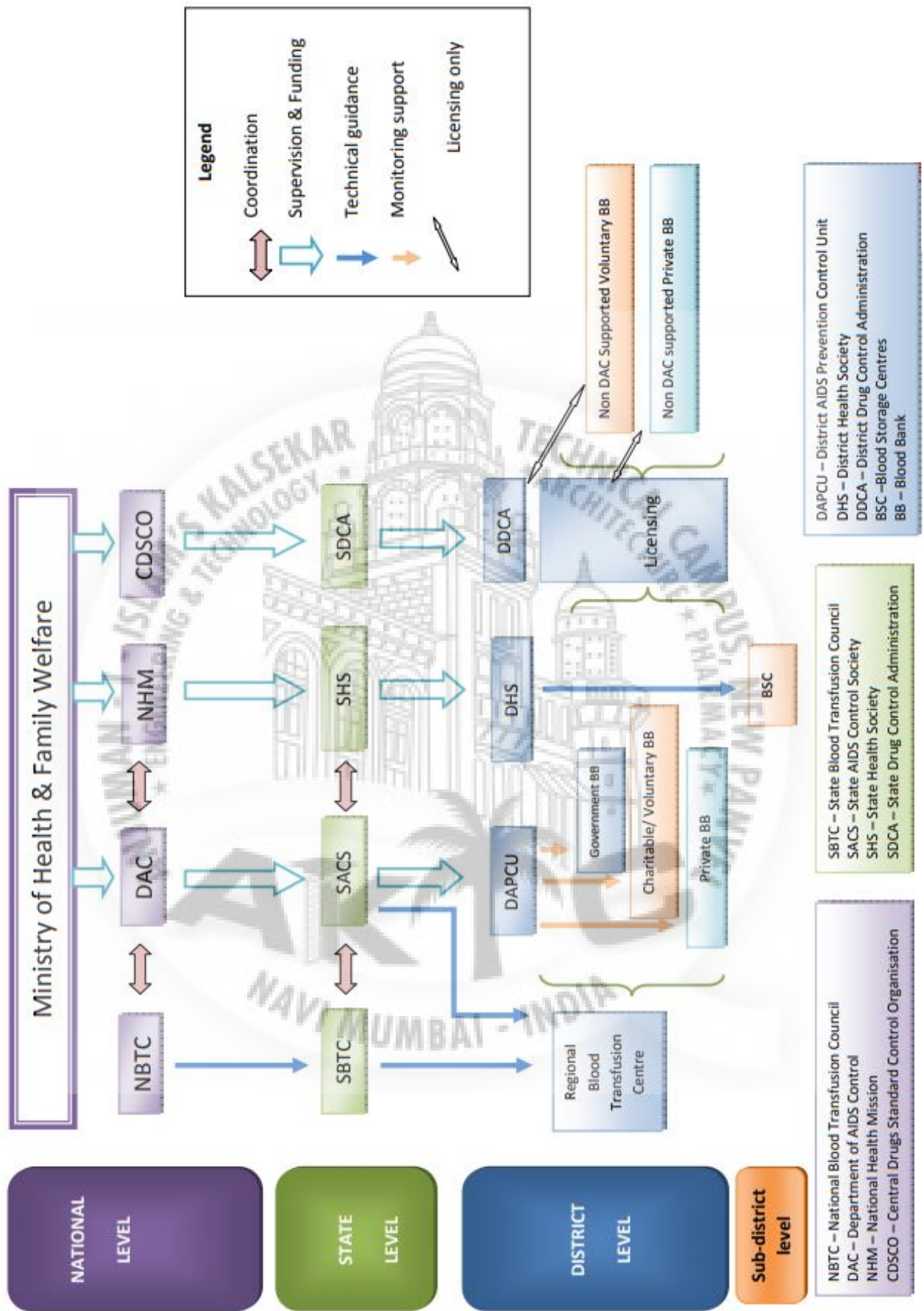
Blood banks that collect 3000 to 5000 blood units per annum are categorized as major blood banks. The number of Major Blood Banks (MBB) enlarged from 167 in 2012-13 to 180 in 2013-14.

#### **(4.9) District Level Blood Banks**

Blood banks that collect less than 3000 blood units are categorized as District level Blood banks, usually placed at district hospitals. During NACP-I and NACP-II, blood banks in all districts of the country were taken up under the scheme for modernization of blood banks. Currently, 665 district level blood banks are works throughout the country. Chandigarh, Dadra and Nagar Haveli still do not have District level Blood Bank (DLBB) supported by DAC.

#### **(4.10) Metro Blood Banks**

DAC has proposed to set up four Metro Blood Banks as Centres of Quality in transfusion medicine, in the cities of New Delhi, Mumbai, Kolkata and Chennai to improve the BTS in India. These develop blood banks will have State of the Art facilities with 100% Voluntary Blood Donation, 100% blood components preparation, and capacity to process more than one lakh units of blood annually



The Structure and systems of blood Transfusion services in India

Fig. 20 Source: <https://www.Structure and system of BT in India>



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## CHAPTER 05: PLANNING & DESIGNING A TRANSFUSION SERVICE

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The occasion to plan and create a new transfusion service operation may not present itself regularly, but when it does, allowing a full understanding of the scope of required functions will help create the basis for a ample and completely transfusion service that meets the near- and long-term needs of the organization. By working together with experienced health care architectural and design consultants, transfusion service department managers can plan and create a high functioning and workflow-driven transfusion service.

In 2012, Geisinger Health System, headquartered in Danville, Pennsylvania, decided the construction of a new, full-service laboratory that include a robust transfusion services operation. During the year-long planning and design process, the transfusion team was vital in providing their vital workflow knowledge and ideas for improvement over previous operations, and in directing the architects and designers on desired physical layout. During this procedure, the combined teams developed a common set of functions that supported in influential the best design to support the various transfusion service workflows.

### (5.1) Transfusion Service Functions

There is a set of common functions that can be modified to the individual facility when planning and designing a new or new blood transfusion service. These functions contain:

- Receipt of blood products
- Storage of blood products
- Receipt of patient specimens
- Testing of specimens and products
- Preparation and distribution of blood products
- Integration into supply chain
- Proper management of waste stream

# Hospital Transfusion Services Process Flow

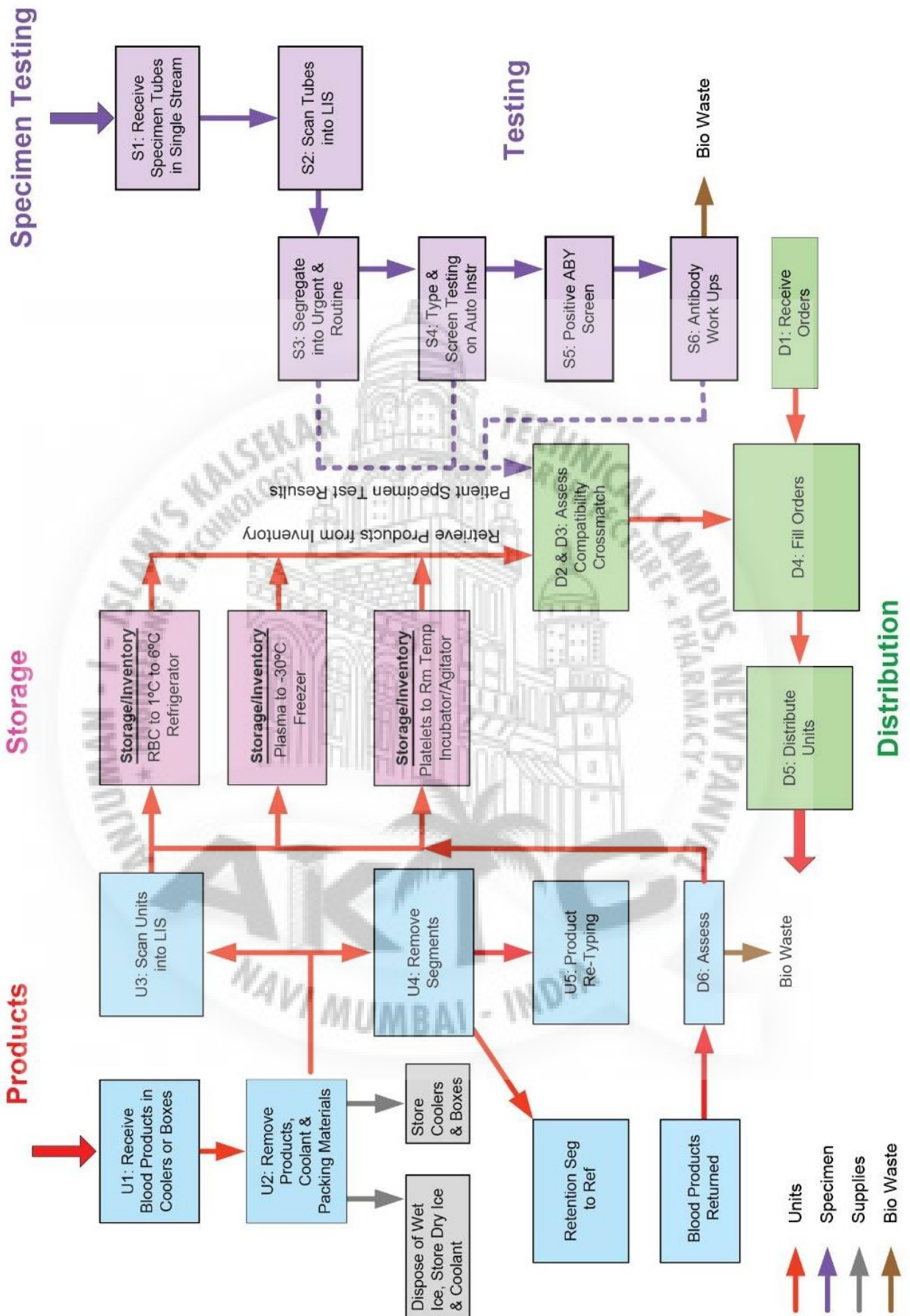


Fig. 21

Source: <https://www.medlabmag.com/article/1305>

An investigation of workflow diagrams can aid in the development of correct relationships among the major functions.

### **Receiving:**

- a. Areas are designated for receiving blood and blood products from couriers or pneumatic tube stations with donor segments, products are logged in, routing to product storage or to ABO testing area is designated, transport vessel coolant and waste are disposed, and empty containers are routed back to the entry area
- b. To inspire lean, efficient operations, the receiving area is best located contiguous to product storage and testing areas

### **Product Storage:**

- a. Workspace is selected for in-processing activities related to product storage
- b. Products are placed in refrigerators, freezers, and platelet incubator/rotators for storage under proper conditions.

### **Testing:**

- a. Ideally, testing areas are along to test preparation areas and nearby to product storage areas
- b. Preliminary testing is completed using automated instruments when possible
- i: If additional testing is not required, specimens are stored (refrigeration)
- ii: If additional testing is required, specimens are transported to non-automated testing areas

### **Distribution:**

- a. Blood product orders are succumbed from critical locations in the hospital, such as surgery and the ED, to the blood bank through the LIS
- b. Crossmatch testing is performed
- c. Compatible units are retrieved from blood product storage and are labeled for



(5.2) CONCEPT OF BLOCKS

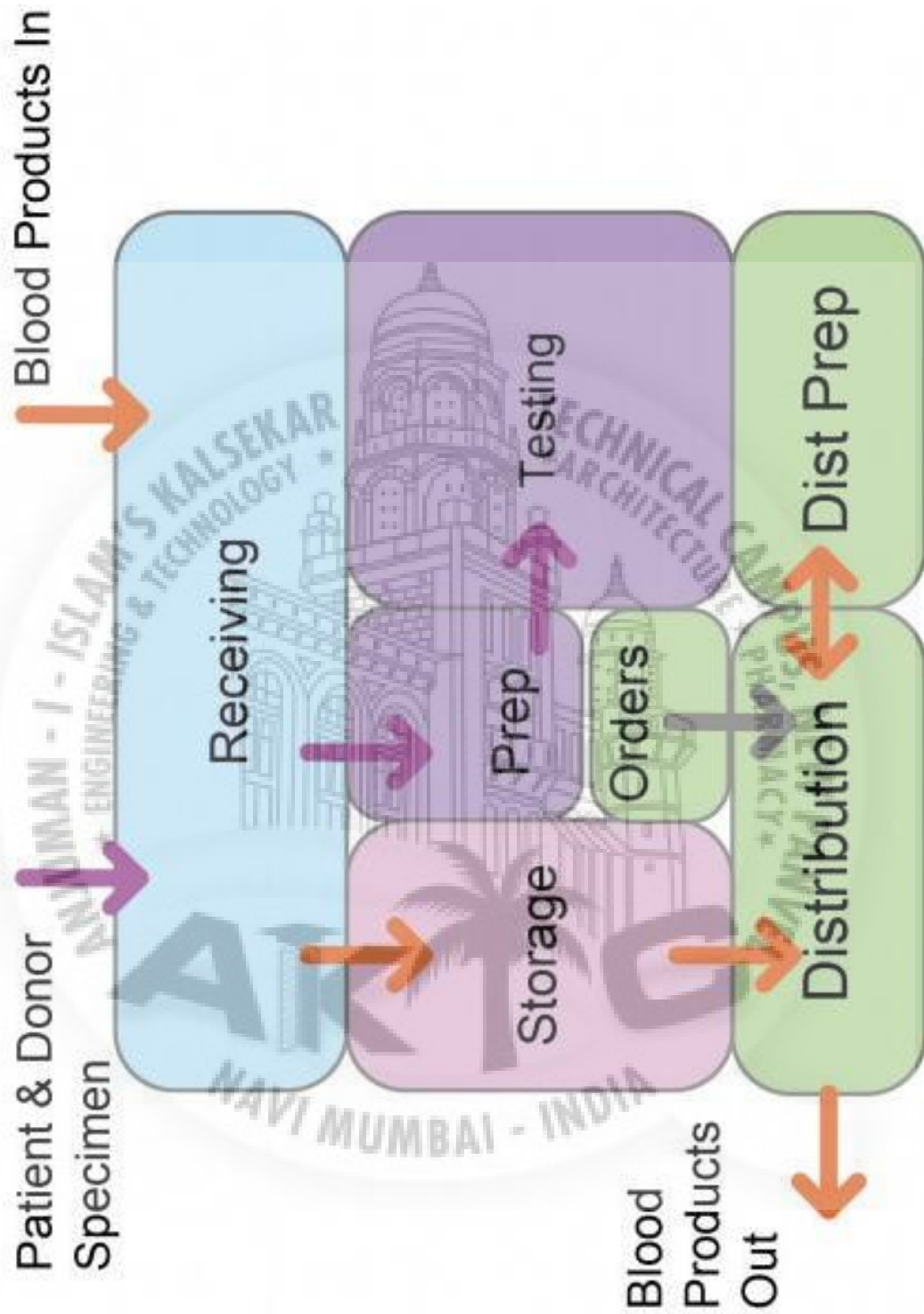


Fig. 22

Source: <https://www.medlabmag.com/article/1305>

(5.3) INSTITUTING THE DESIGN CONCEPT

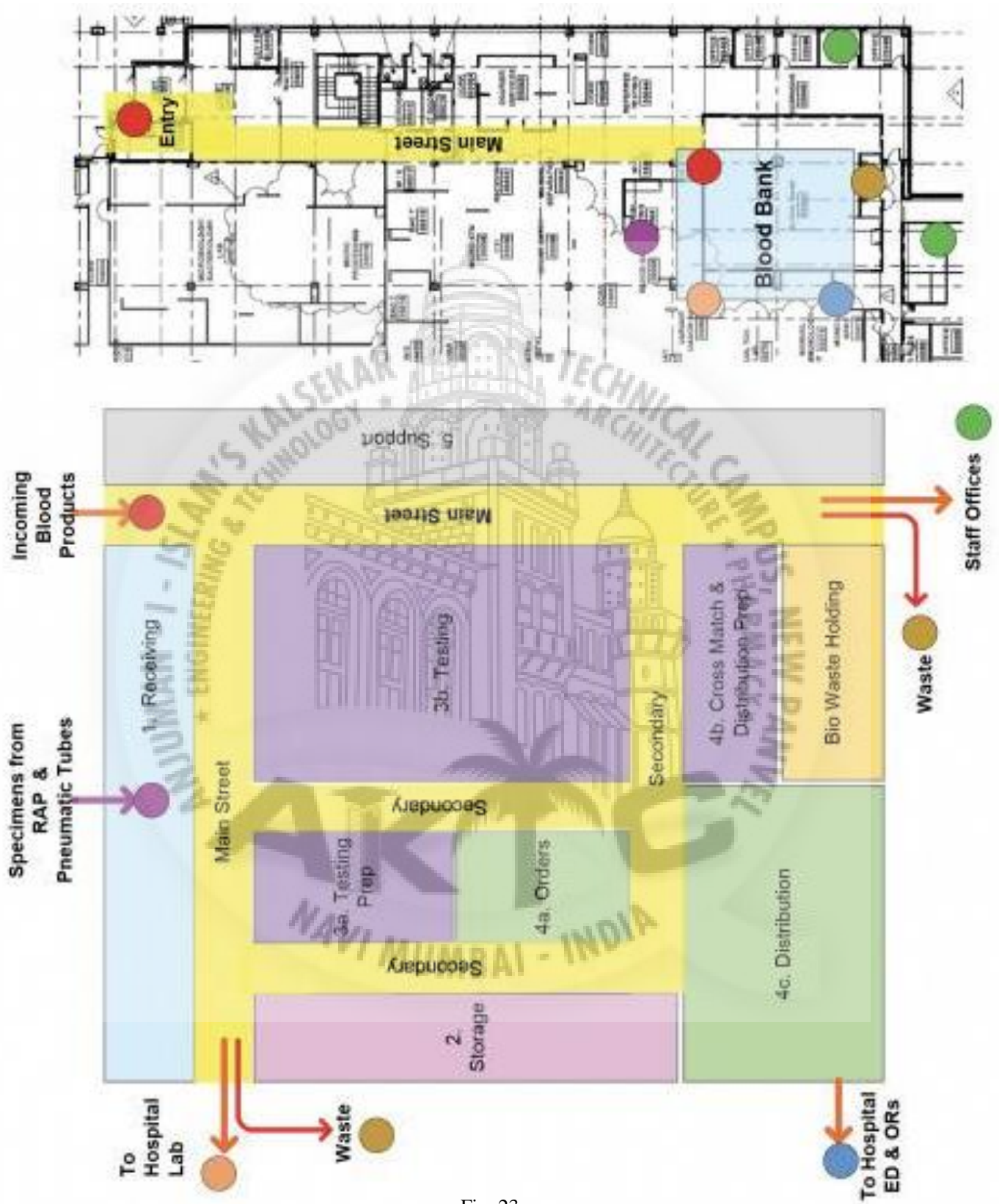


Fig. 23

Source: <https://www.medlabmag.com/article/1305>

## (5.4) DETAILED LAYOUT

Architectural floor plan layouts are established by following the workflow diagrams to offer a series of defined spaces for each activity in the classification of the workflow. In reviewing a detailed plan of the getting workplace, for example (see FIGURE 24), blood products are received at the Log In workstation on an In Cart, are scanned into the computer and are placed on an Out Cart moving from right to left. This kindness to process supports meet regulatory requirements to avoid mix ups and errors. A similar way is used for testing and distribution.

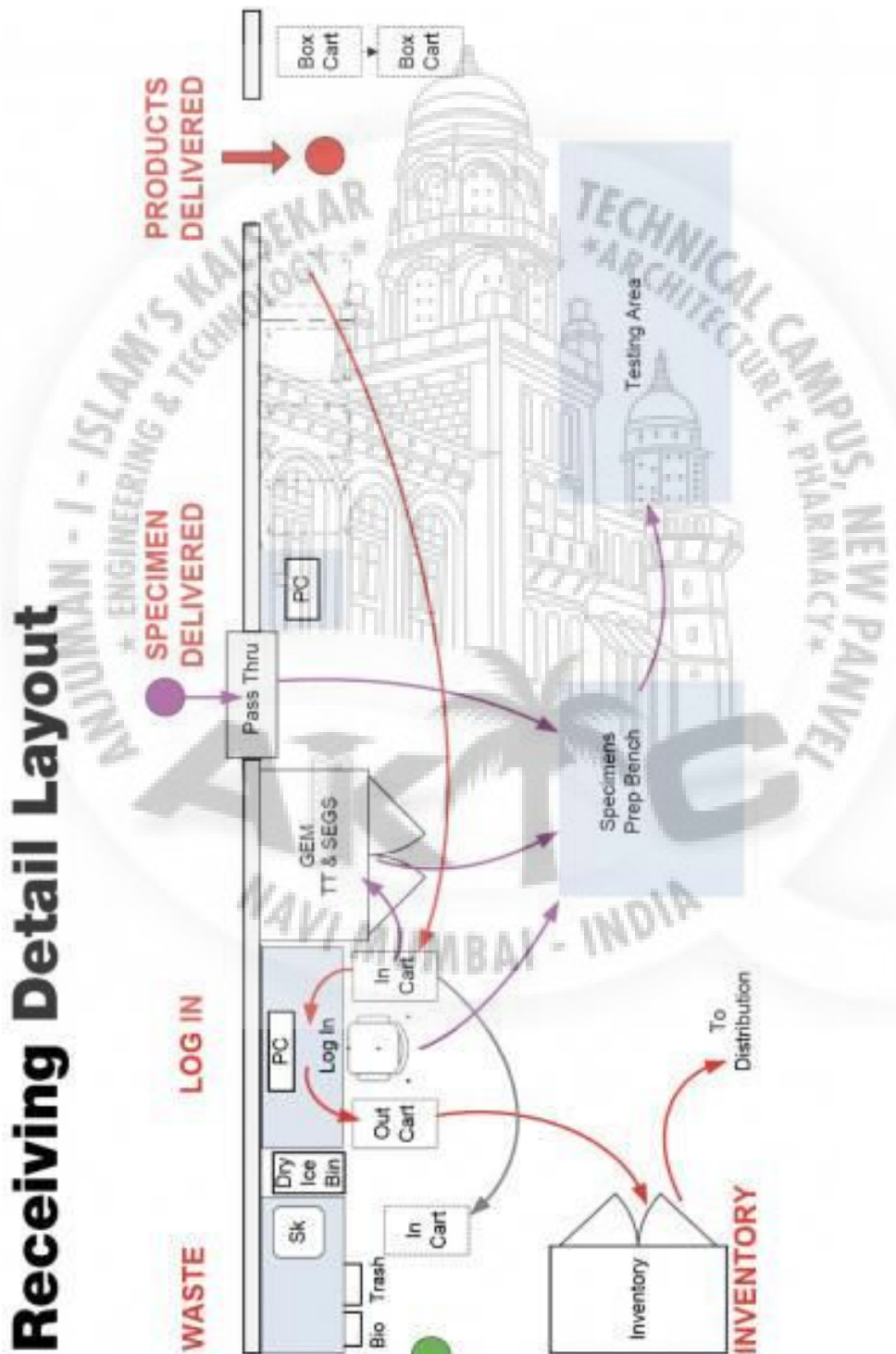


Fig. 24 Source: <https://www.medlabmag.com/article/1305>



As each detailed layout is wisely placed back into the concept plan, attention to the connections to the other parts of the plan is important to confirm the reliability of the overall concept (see FIGURE 25).

### FLOOR PLAN

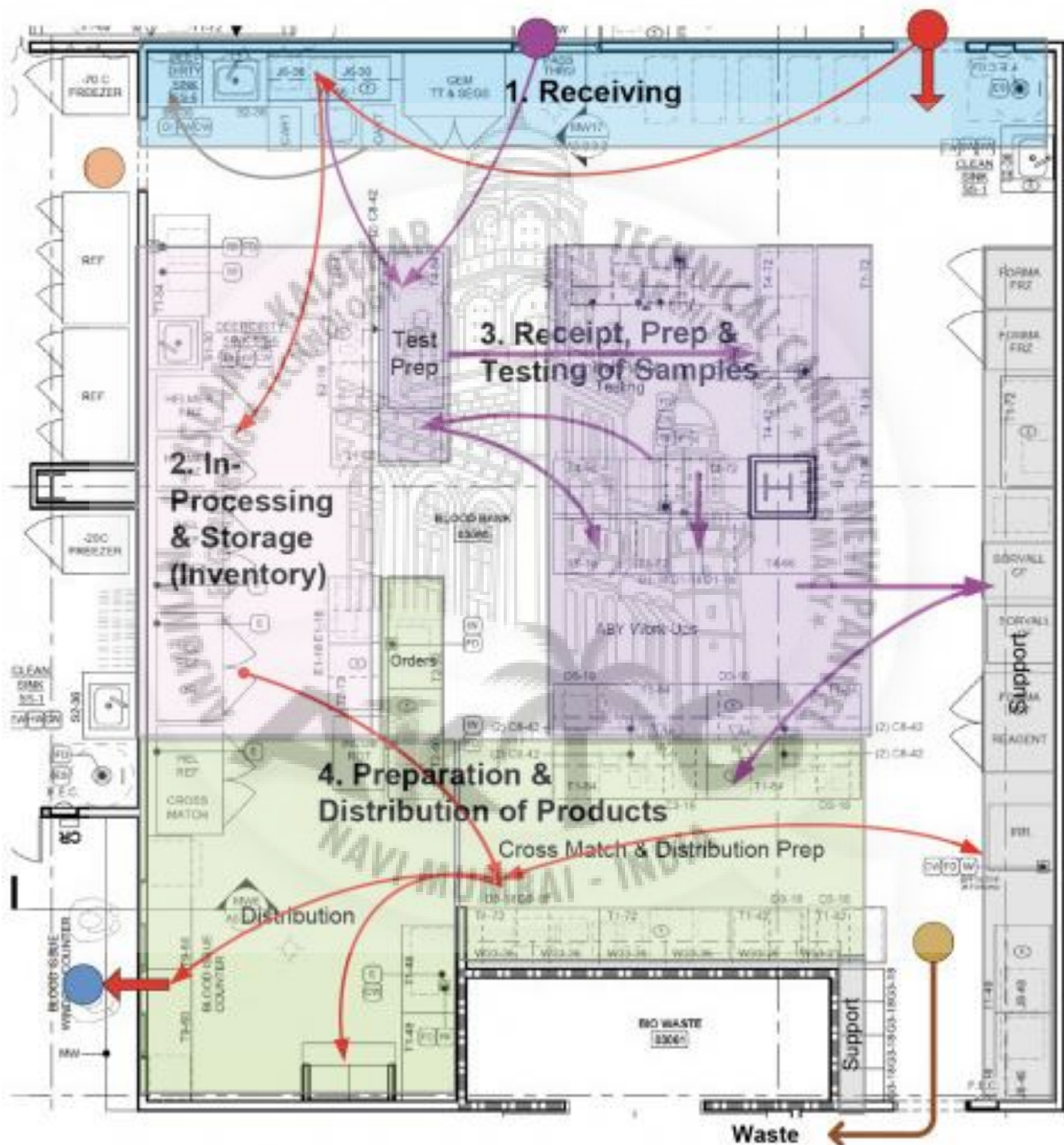


Fig. 25

Source: <https://www.medlabmag.com/article/1305>

## CHAPTER 06: RELATION BETWEEN HUMAN HEALTH & BUILT ENVIRONMENT



Fig. 26.a

**HUMAN HEALTH**



Fig. 26.b

**ARCHITECTURE**



Fig. 26.c

Source: <https://relation between natural & human environment>



Fig. 27

Source: <https://www.humanbehaviour.com>

### ( 6.1 ) Human Behaviour

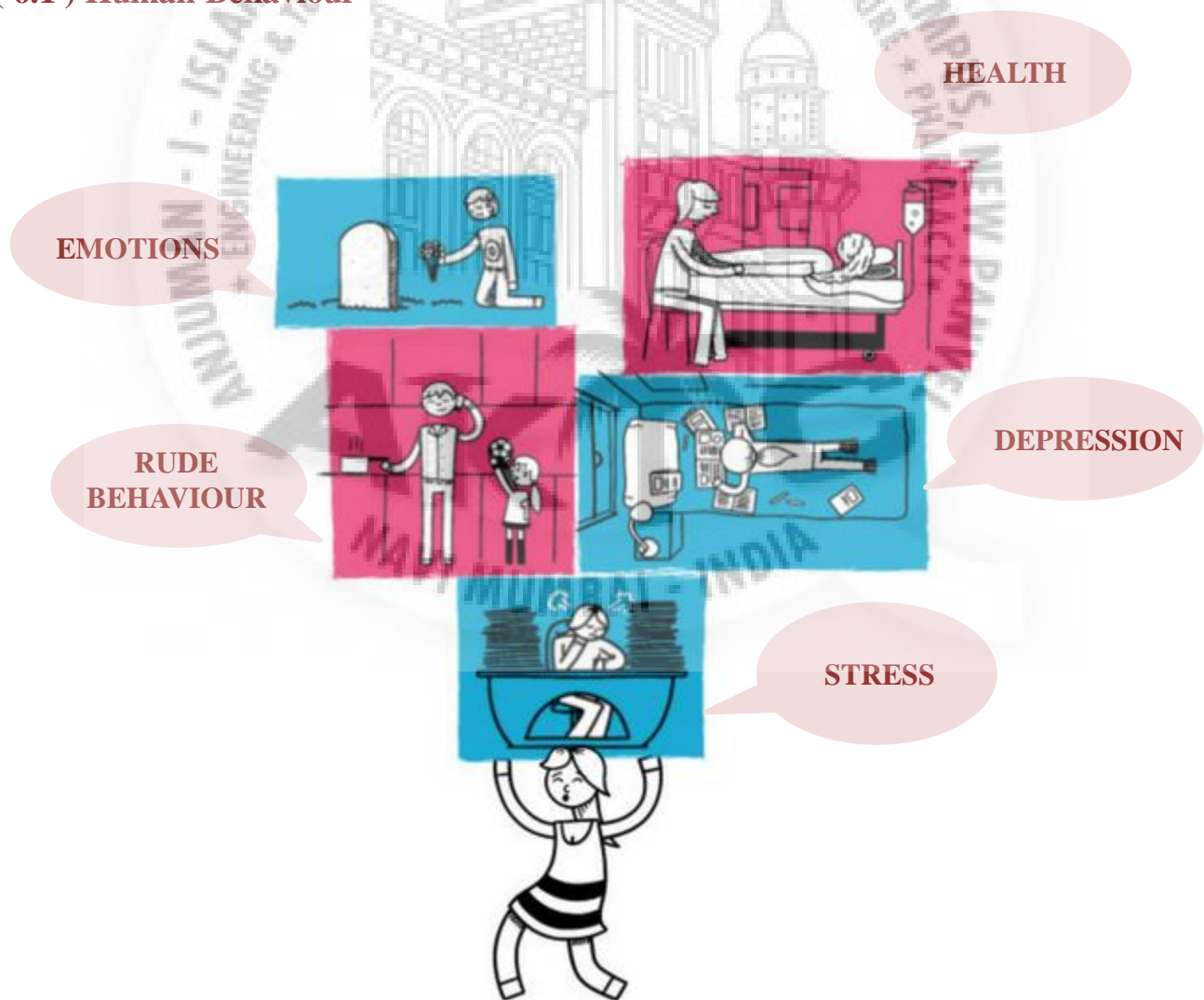


Fig. 28





Fig. 29

Source: <https://www.impactofurbanenvironment.com>

## ( 6.2 ) The Impact of the Urban environment

In order to produce supportive physical environments it is essential to understand an individual's fundamental needs. It is also necessary for different professional disciplines to willingly cooperate in creating the best conditions for humans.

Before a zoo is built, it is common practice for architects, designers, biologists, landscape architects, animal psychologists and building authorities to work in partnership in creating an environment that optimises both users and developer.

The physical environment is not only vibrant for good health, but can be a dangerous stressor for the individual. Physical elements in an organisation can donate to stress, and are therefore vital factors for increasing comfort. Most people in the western world spend the majority of their time in indoor environments. There is a lack of knowledge about how these environments harm health and wellbeing. There is a general faith that humans are always adapting to the environment. This theory of adaptation indicates that people become less conscious of the environment the longer they reside or work in that given environment. A general faith is that if one lets oneself be affected by the physical ambiances then it is a sign of faintness.

### (6.3) Understanding interaction, between human health and, the built environment

The physical environment is not only vibrant for good health, but can be a dangerous stressor for the individual. Physical elements in an organisation can donate to stress, and are therefore vital factors for increasing comfort. Most people in the western world spend the majority of their time in indoor environments. There is a lack of knowledge about how these environments harm health and wellbeing. There is a general faith that humans are always adapting to the environment. This theory of adaptation indicates that people become less conscious of the environment the longer they reside or work in that given environment. A general faith is that if one lets oneself be affected by the physical ambiances then it is a sign of faintness.

In order to produce supportive physical environments it is essential to understand an individual's fundamental needs. It is also necessary for different professional disciplines to willingly cooperate in creating the best conditions for humans.

Before a zoo is built, it is common practice for architects, designers, biologists, landscape architects, animal psychologists and building authorities to work in partnership in creating an environment that optimises both users and developer.



Fig. 30

Source: <https://www.natue>



## ( 6.4 ) HUMAN INTERACTION WITH NATURAL RESOURCES

Humans want to interact with the environment to gain our food, water, fuel, medicines, building materials and many other things. Improvements in science and technology have helped us to reaching the environment for our benefit, but we have also introduced pollution and caused environmental harm.

*Use of natural resources* such as land, food, water, soils, minerals, plants and animals



Fig. 31 Source: <https://www.naturalresources>

Our environment means our physical surroundings and the features of the place in which we live. It also states to the wider natural world of land, sea and atmosphere. Humans have been convey with their environment since people first walked the Earth

A good climate, manageable clean water, fertile soil, etc. are aspects of the physical environment that allow people to live and thrive. However, harsh environments, such as a very hot climate, limited water and infertile land, make it more tough for people to survive. We are also, affected by major environmental events such as earthquakes, floods and drought that damage homes, property and agriculture.

## CHAPTER 07: LITERATURE REVIEW

### (7.1) Centre to open 79 new blood banks to address shortfall Centre to open 79 new blood banks to address shortfall

*India requires 12 million units of blood for its 1.2-billion strong population. However, only nine million units are collected every year.*

- Centre plans to open 79 new blood banks across states.
- India currently facing blood shortage of three million units every year.
- Govt also strategies to boost voluntary blood donations with the help of awareness programmes

The Union health ministry is coming with 79 new blood banks in different states such as Uttar Pradesh, J&K, Chhattisgarh and Andhra Pradesh, to address the shortfall.

last two years, the ministry has proposed 1,135 government blood banks in the country and planned to operationalise 780 blood banks, out of which 300 blood banks could be made fully operational.

The other existing blood banks still have to get upgraded and lack manpower and the latest equipment to help needy in case of emergency



Fig. 32

Source: Indian Today, (2017), Centre to open 79 new blood banks to address shortfall, 27-07-2020

## (7.2) Lockdown effect Hospitals flag fall in blood bank reserves

**New Delhi:** India is facing a severe shortage of blood in hospitals and blood banks as donations dry up due to the lockdown.

Blood banks across the country have listed a sharp fall in voluntary and replacement donations after the 21-day nationwide lockdown was announced last month to counter the extent of coronavirus. The government have also stopped voluntary bodies from organising blood donation camps.

Some of the large hospital chains ET spoke with said there is a dangerous need to work out a mechanism to permit voluntary donations as their network hospitals across the country have blood to meet requirement for the next 20 to 30 days only. “The voluntary as well as and spare blood donations have both sensitively gone down since the time of a complete lockdown... At the current rate, our blood bank can support services for the next 25-30 days if situations are as of today,” Sangeeta Patha ..

Even though hospitals have stopped all elective surgeries, there is daily need for blood for thalassemia and haemophilia patients, oncology patients, cardiac surgeries, accident victims and cancer patients undergoing chemotherapy.



Fig. 33

Source: <https://www.theconmintimes.indiatime.com>

At the same time, blood also has a small life. While the donations have dried up, stock is failing daily and hospitals are falling into their reserves.

Sangeeta Agarwal, head of department of transfusion medicine at Fortis Memorial Research Institute in Gurgaon, said, “Voluntary organisations like Red Cross, Rotary Club, etc., which are the core blood resources, are also not able to catch any blood donation camps due to the lockdown.” Requirement of blood in hospitals could also going up if there is a surge in Covid-19 cases, said Pathak of Max hospital. According to her, Covid-19 patients in critical state would need intensive care and what is called platelet-rich concentrates (PRCs) and fresh frozen plasmas (FFPs)

Source: <https://www.theconmintimes.indiatime.com>



### (7.3) Metro Blood Bank Project yet to take off

The central government had declared setting up of MBBs in Chennai, Delhi, Mumbai and Kolkata. These were to act as centres of excellence in processing blood modules.

The blood bank in Chennai was to supply to five southern States and three union territories: Tamil Nadu, Andhra Pradesh, Telangana, Kerala and Karnataka, and Puducherry, Andaman and Nicobar Islands, and Lakshadweep.

However, the Centre is still to release ₹213 crore earmarked for the project, said official sources. The State government acknowledged land to setup the facility at the King Institute, Guindy, and a few other locations, but the final decision is still to take.



Fig. 34

Source: <https://www.newsindianexpress.com>



#### (7.4) 80 districts do not have a blood bank: Government

NEW DELHI: More than 80 districts in the country have a shortage of blood bank, the government today told even as it noted that most of these districts have been newly drafted.

"There is no shortage of blood banks in the country and there are a total of 2,708 blood banks in the country. There are 81 districts in the country that do not have a blood bank," Minister of State Shripad Yesso Naik said in a written reply in Lok Sabha.

The 81 districts which do not have blood banks fall in states and UTs like Andaman and Nicobar Islands, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Madhya Pradesh and Manipur.

"A large number of these districts are new and have recently been crafted out," Naik said



Fig. 35

Source: <https://www.theconmintimes.indiatime.com>

### (7.5) Four central blood banks proposed in Karnataka

BENGALURU: To contact with blood shortage in several hospitals, the health and family welfare department has planned setting up four centres of excellence which will help as central blood bank repositories. While there are some governments and private blood banks, patients still face issues in securing blood. The centres have been proposed in Bengaluru, Hubballi, Ballari and Mangaluru.

“It will be a hub and spoke model with the mother blood banks managing with all the other blood banks in cities and towns. The collection from these centres will be distributed to areas where there is a requirement. This can increase the collection of platelets as well. We are waiting for a cabinet agreement from the state,” said Pankaj Kumar Pandey, commissioner of the department.

“Technology will be upgraded at these centres with randomised testing done for quality assurance. The centres are proposed in Victoria Hospital in Bengaluru, Karnataka Institute of Medical Sciences in Hubballi, Vijayanagar Institute of Medical Sciences in Ballari, Wenlock District Hospital in Mangaluru. Altogether Rs 10 crore has already been assigned in the budget for this and we have asked for an further Rs 22 crore from the state government as money will be needed for human resources. Blood collected can be redirected from the centres to wherever there is a shortage,” an official said.

Randomised testing of blood samples will be done by these centres to check for diseases such as HIV, syphilis and other transfusion-transmissible infections.



Fig. 36 Source: <https://www.newsindianexpress.com>

# CHAPTER 09: CASE STUDY PRATHAMA BLOOD BANK

## INTRODUCTION

- Prathama Blood Bank at Ahmedabad is an industry of advanced transfusion medicine research foundation.
- Roughly 50,000 voluntary blood donors donate blood annually at Prathama which is Indians first fully automated blood center.
- The blood centre design to enlarge in a modular manner to accommodate 150,000 units of blood per annum. Prathama blood center is non profit ganizationor registered as Section – 25 company and charitable trust

**LOCATION :** Ahmedabad

**AREA :** 1500 M<sup>2</sup>

**YEAR COMPLETED :** 2000

**CLIMATE :** HOT, SEMI-ARID

**CLIMATE.**



**1**

**100% Voluntary Blood Donation**  
Self motivated, voluntary blood donors are the safest donors as they undergo self deferral if need be. A structured societal awareness program, unique blood mobile vans with built in blood donation facility and special donor care has endeared Prathama to such blood donors. More than 45,000 volunteers donate blood at Prathama annually.

**2**

**Stringent Pre-donation Screening**  
Donations are accepted only after rigorous screening of medical & risk behaviour history. Donors with 12.5 or more Hemoglobin & weight 50kg and above are accepted. This ensures optimization of red cells in every unit along with safety. Our donor deferral rate is almost 30% to ensure donor's & Patient's safety.

**3**

**Regular Donor – Safe Donor**  
Repeat donors are the safest and the best donors. Prathama has a cohesive program to initiate the habit of regular blood donation in the society. Already 40% donors are regular which we hope would reach 75% in next 5 years time.

**4**

**Automated Blood Collection Monitors**  
We collect 350 ml to 450 ml of blood depending on donor's weight in automated blood collection monitors;

Fig. 37



## PURPOSE OF DESIGN

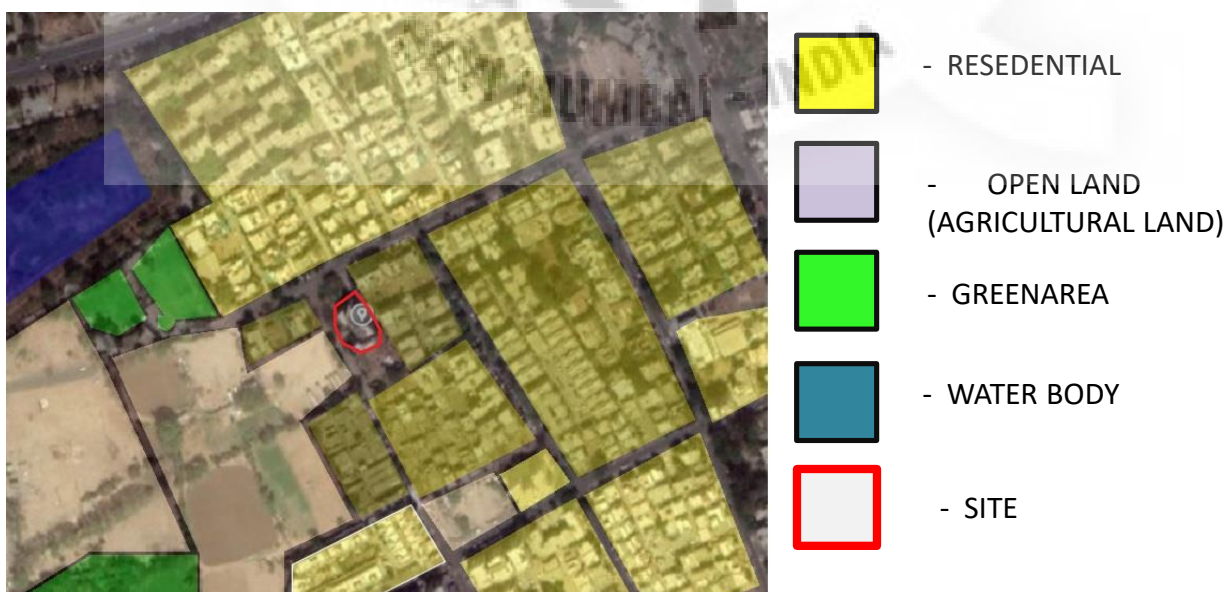
- Prathama was hypothesized in late 90s. That was the retro when Indian blood banking was going through a very difficult patch.
- Requirement of blood by patients and patient's relatives was seen as an emergency, anywhere in the country.
- Transfused blood was primary to an increase in infections.



Fig. 38

## SITE CONTEXT

- The site is located in compact residential zones creating it a good location for health care center.
- The open agricultural land on the south west makes the overall environment of the locality peaceful.
- Also, having open land on the south west meant a design need to challenge the hot summer winds.
- The site is located in the edge of the plot. Hence providing two side road access.

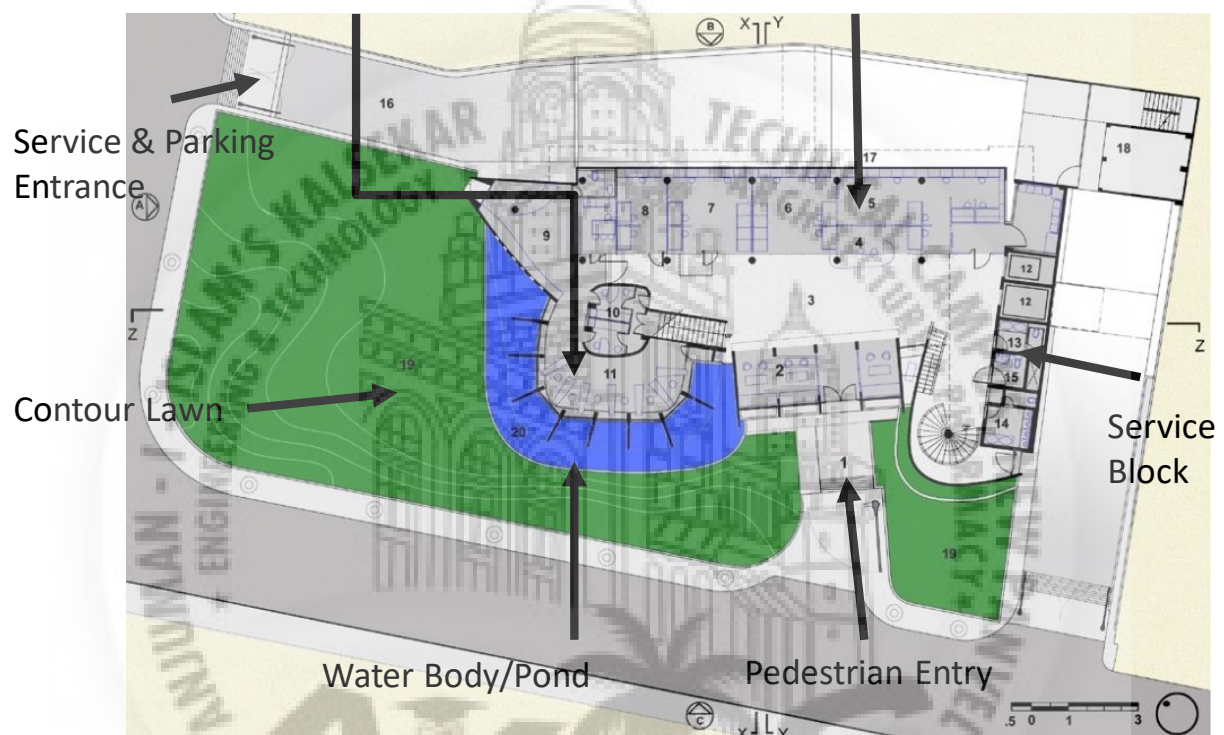


## STRUCTURAL ZONING

- The structural zoning is divided in to definite parts as user requirement
- There is a rectangular blocks for labs and services back
- The atrium space covering the lab block
- The donor room and the administration area in the front two grab the heat
- Where there is a small pond laying in front of the donor room to have a cool nature view for donor
- The landscape have lawn having small land profile contour

Blood donor room

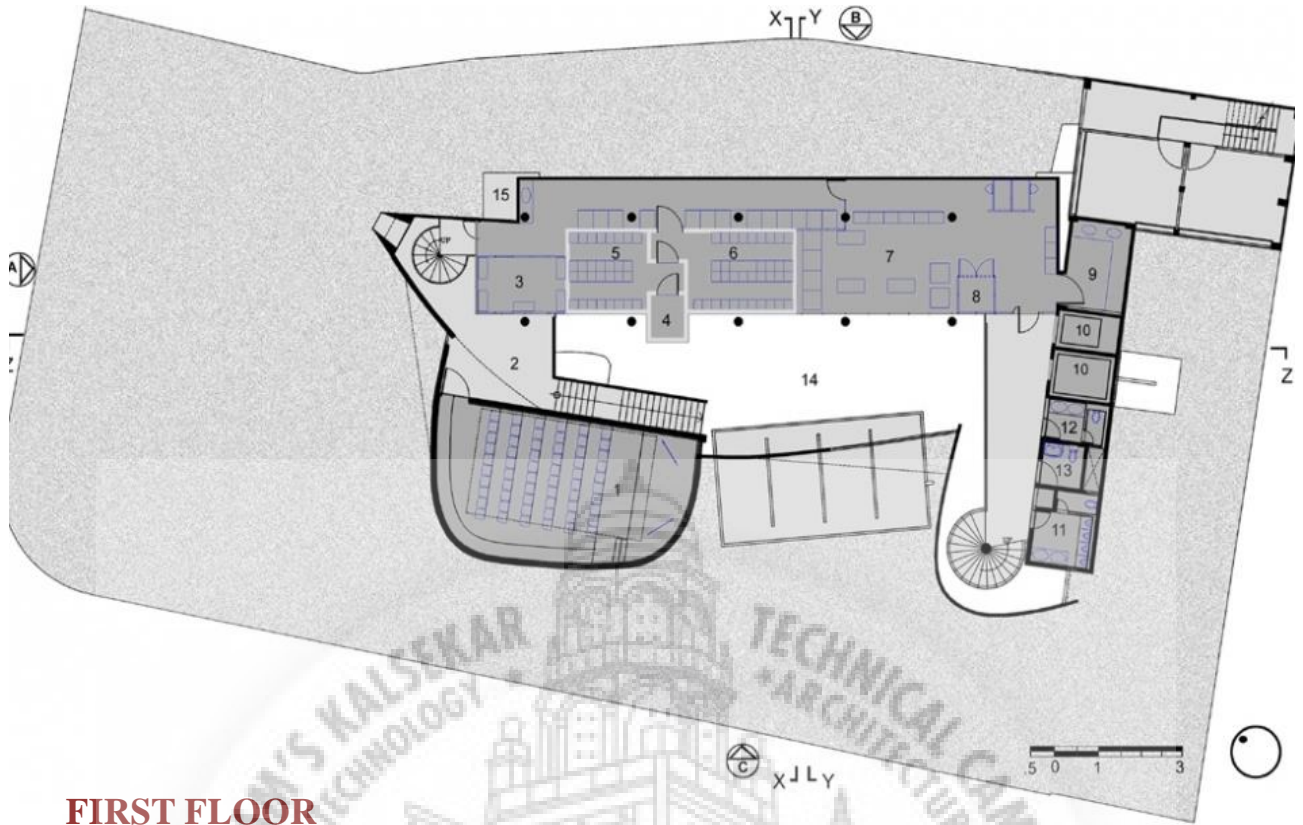
Process Block/ Laboratories



**GROUND FLOOR**

## **STRUCTURAL ZONING**

- |                      |                       |
|----------------------|-----------------------|
| 1. ENTRY             | 14. LAWN              |
| 2. WAITING           | 15. WATERBODY         |
| 3. ATRIUM            | 16. VAN ENTRY/PARKING |
| 4. VIROLOGY LAB      | 17. PARKING BELOW     |
| 5. CROSS CUM LAB     | 18. SERVICES          |
| 6. BLOOD GROUP LAB   | 19. LAWN              |
| 7. DOCTOR'S CHAMBER  |                       |
| 8. REFRESHMENT ROOMS |                       |
| 9. LOBBY             |                       |
| 10. EXAMINATION ROOM |                       |
| 11. DONOR'S ROOM     |                       |
| 12. LIFT             |                       |
| 13. WASHROOM ROOM    |                       |



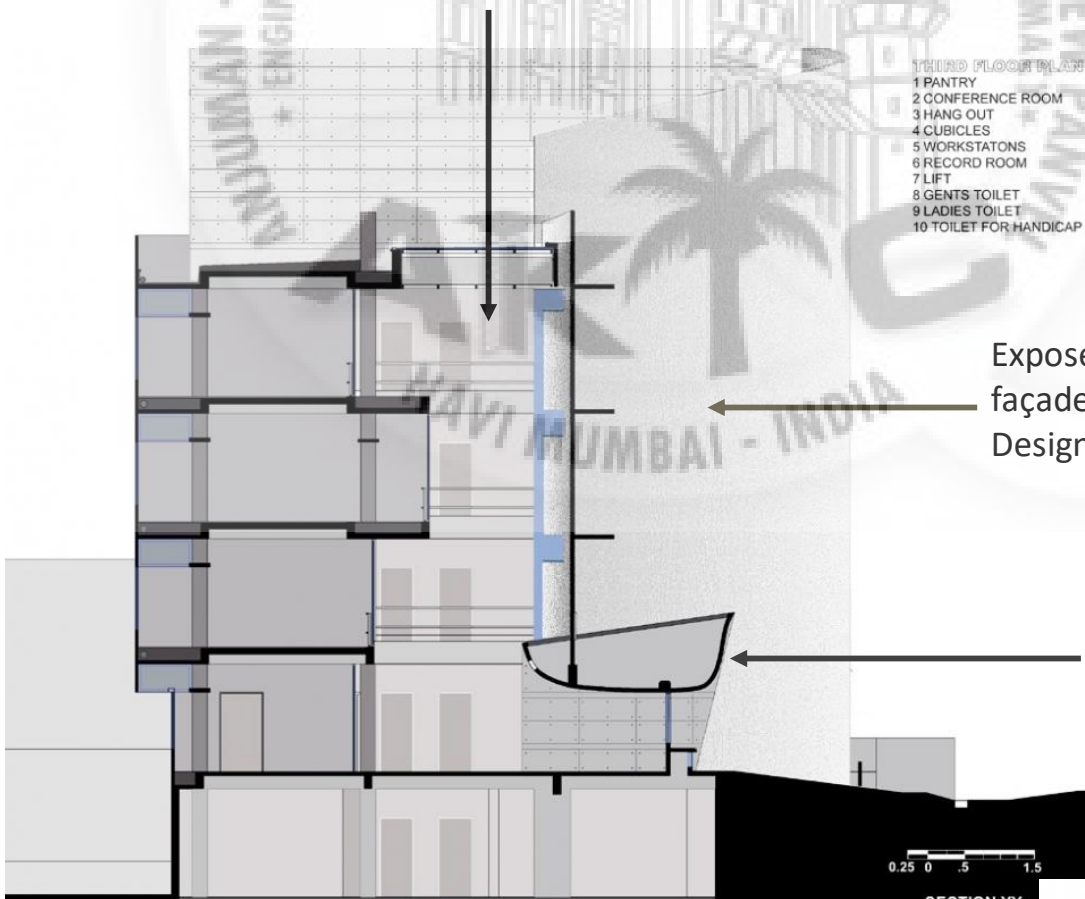
**FIRST FLOOR**

Atrium space open sky lightning

- THIRD FLOOR PLAN
- 1 PANTRY
  - 2 CONFERENCE ROOM
  - 3 HANG OUT
  - 4 CUBICLES
  - 5 WORKSTATONS
  - 6 RECORD ROOM
  - 7 LIFT
  - 8 GENTS TOILET
  - 9 LADIES TOILET
  - 10 TOILET FOR HANDICAP

Expose concrete façade curve wall  
Design element

Entry foyer  
Design element

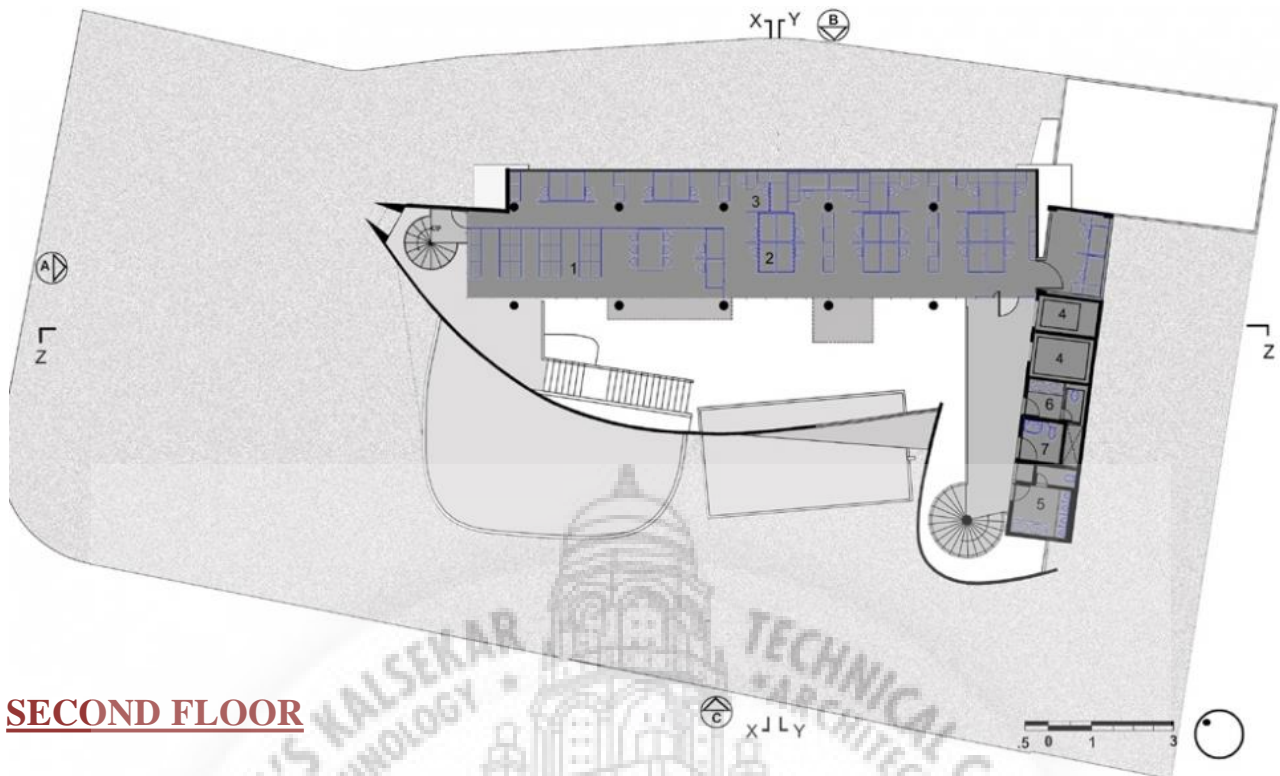


PRATHAMA BLOOD CENTER , AHMEDABAD.

ARCHITECTS: MATHAROO ASSOCIAT

**SECTION - AA'**





## SECOND FLOOR

### DESIGN DETAIL

- The costs have been kept terribly low by custom designing and locally producing all doors, windows, modular furniture including steel work stations, press metal storages, double glazed partitions, even door handles.
- Large fixed furniture like conference, reception and pantry tables are all place cast in situ concrete as also the 5 m long entrance gates.
- The staircases are composed of precast concrete units.



Fig. 39.a

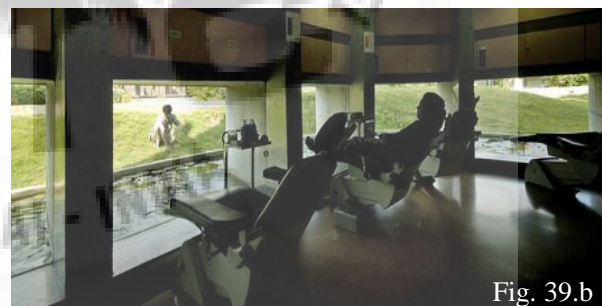


Fig. 39.b

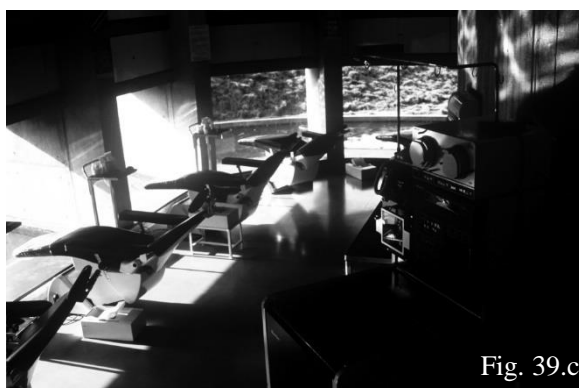
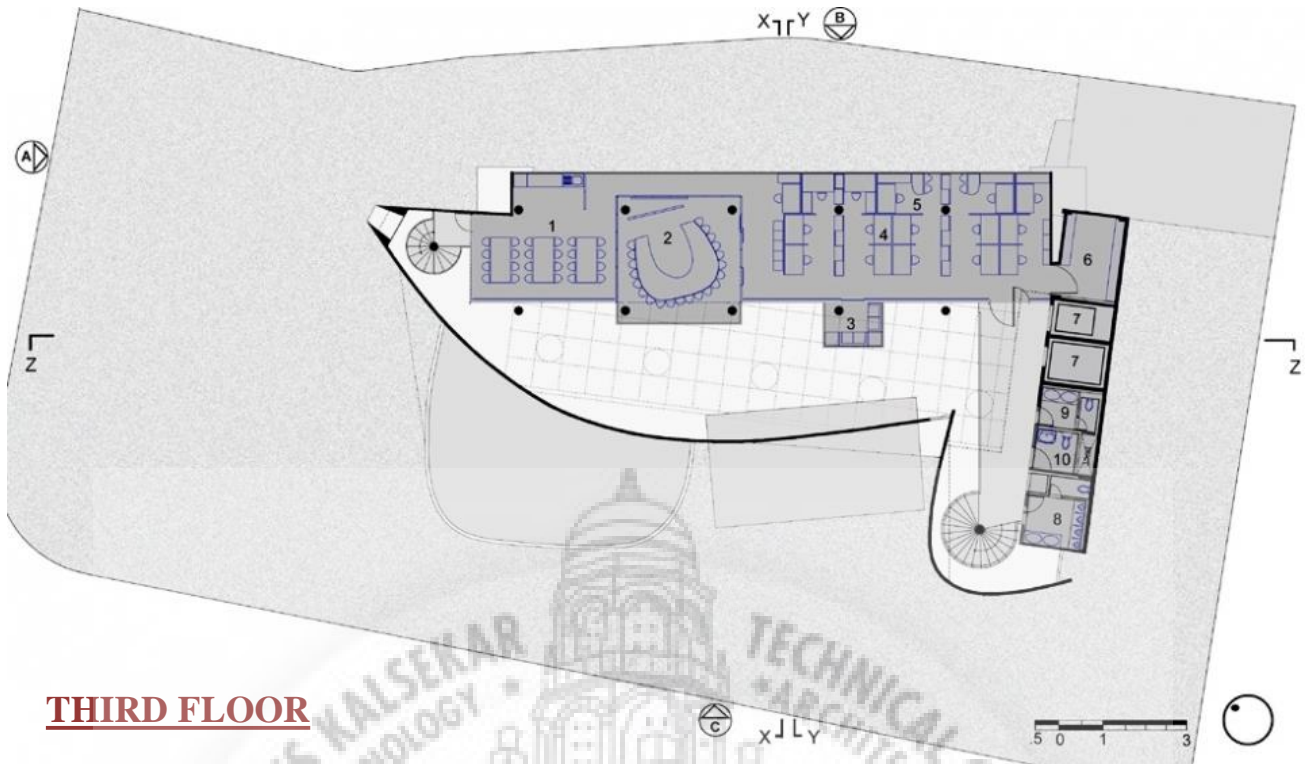


Fig. 39.c



Fig. 39.d



**THIRD FLOOR**

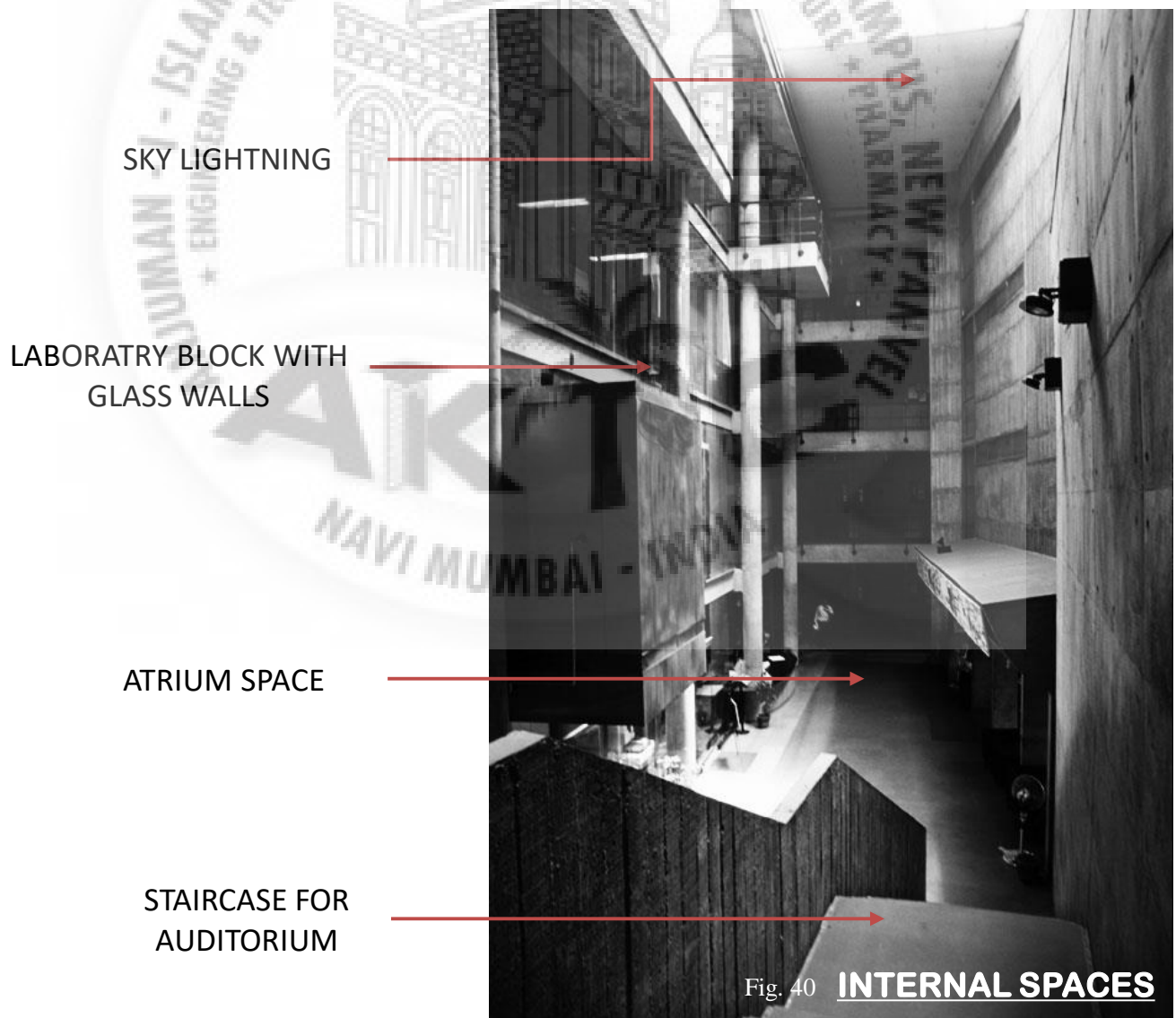
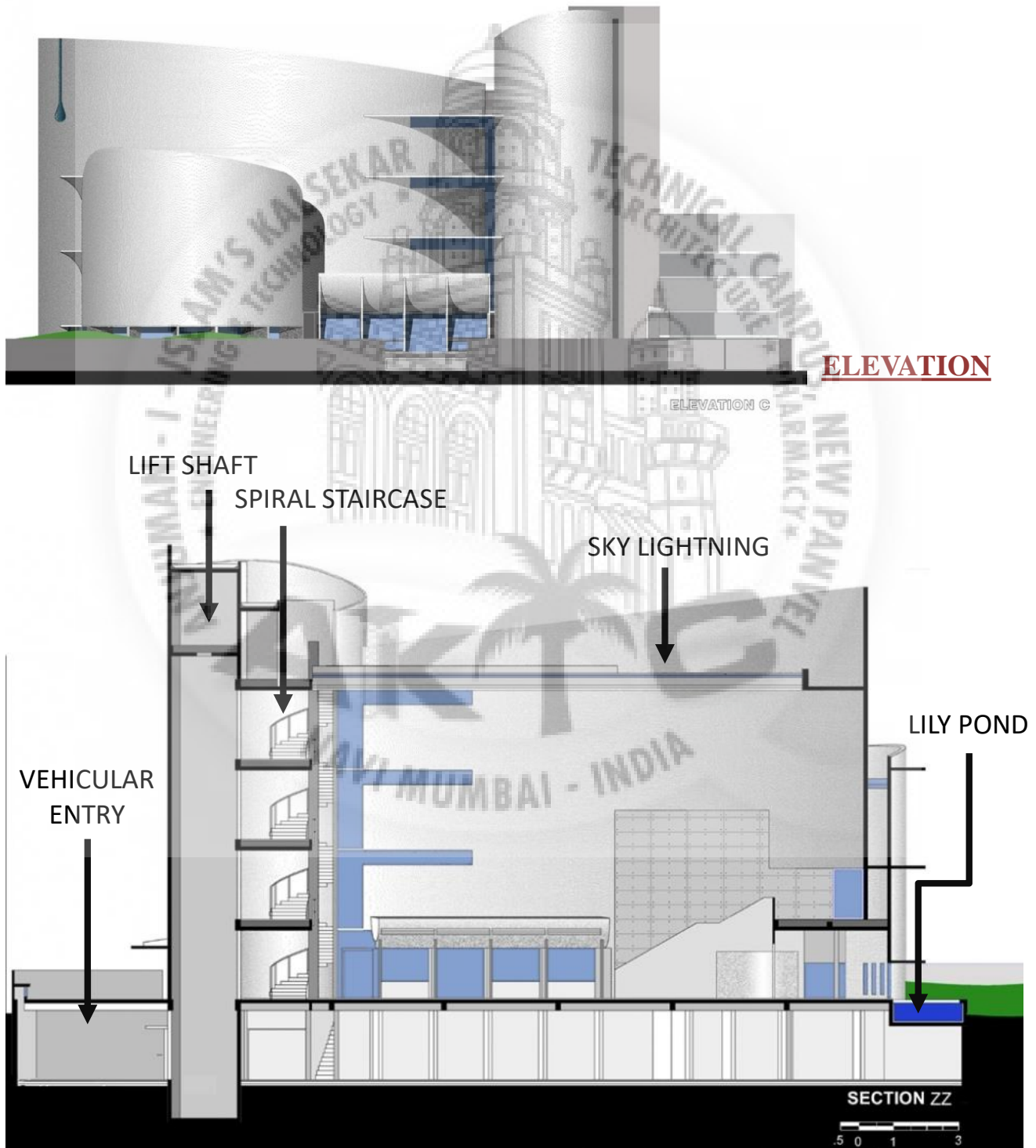


Fig. 40 **INTERNAL SPACES**



- A section showing the atrium space unlocked on top for sky lighting.
- Exposed concrete wall in elevation curved near the entrance giving a sense of entry.
- Foyer space at the entrance have curved roof having a sense of arrival.

The exposed concrete structure is made so as to have its own identity. The comprehensive massed structure from outside looks like a single unit but one can only see 2 blocks connected through a void only once the enter inside.



### SECTION – BB'

## CHAPTER 09: CASE STUDY REGIONAL BLOOD CENTER

**ARCHITECTS :** FAAB

**AREA :** 2771 SQ.M







**YEAR :** 2013

**PHOTOGRAPHS :** BARTOMIEJ SENKOWSKI

Investment divided into three phases, including

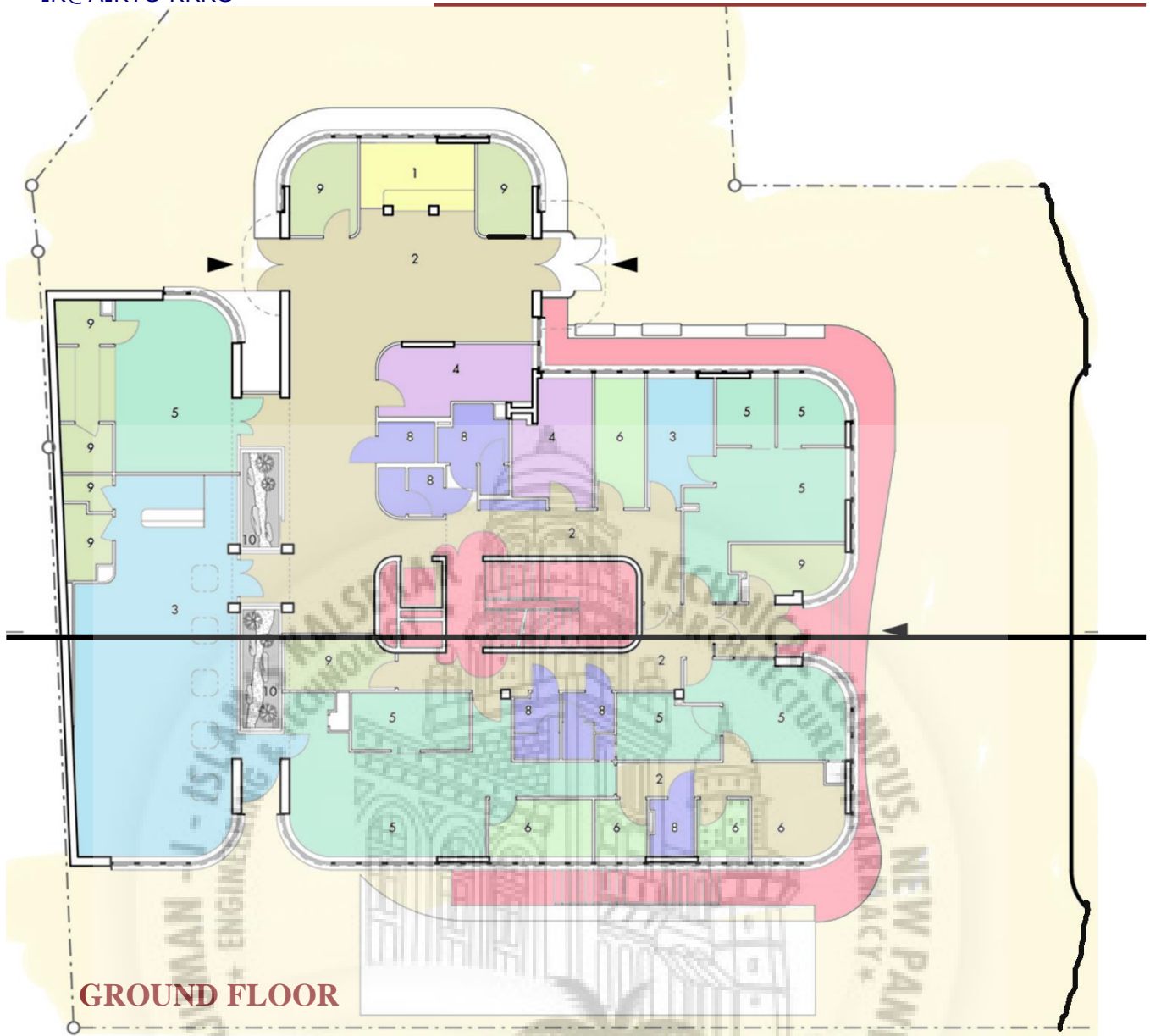
- (1) construction of the new Regional Blood Center building,
- (2) shelter for the mobile blood center [bus] and
- (3) the first in Poland focused Center for Blood Cancer Diagnostics to be located within the existing building. At the moment, the first phase has been completed.

SITE PLAN / MAPA SYTUACYJNA 1:3000

-  new building  
nowy budynek
-  shelter for mobile blood center (bus)  
garaz na ambulans do pobierania krwi (autobus)
-  existing building to be remodeled  
budynek istniejący do przebudowy
-  site boundary  
granice działki
-  substructure outline  
obrys piwnicy
-  existing surrounding buildings  
istniejące budynki







**GROUND FLOOR**

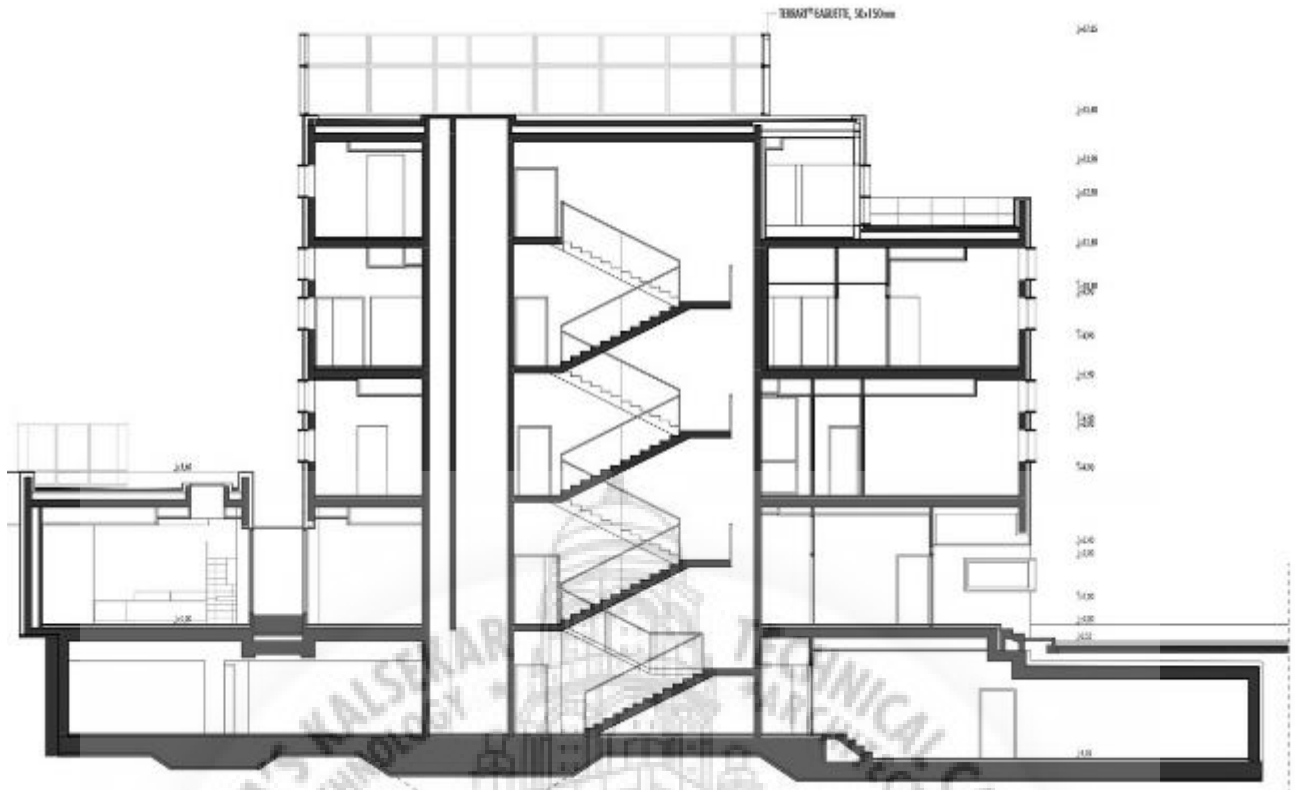
**PROGRAMM**

- RECEPTION
- HALLWAY / LOBBY
- BLOOD DONATION
- MEDICAL OFFICE
- MEDICAL LABORATORY
- OFFICE
- CONFERENCE
- TOILET
- AUXILIARY ROOM

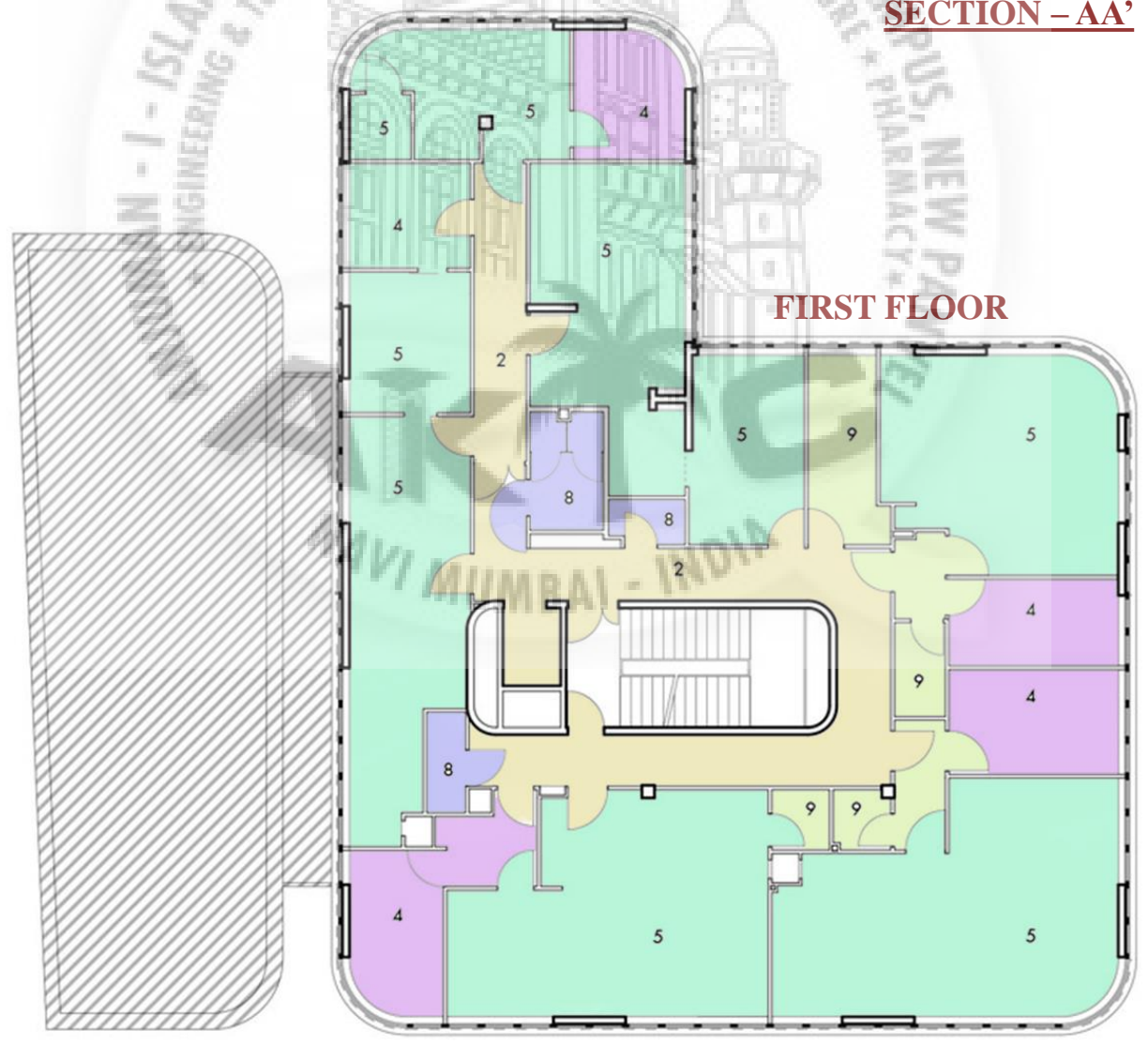


Fig. 41

The building's location is beneath the protection of the national historic preservation office. The first phase building houses modern cool rooms and storages, blood gathering unit, a complex of innovative medical laboratories and blood radiation laboratory, offices and conference center. Within the building blood is being collected, tested, processed to divide into blood elements and cleansed with the technology based on radioactive materials



**SECTION - AA'**



**FIRST FLOOR**

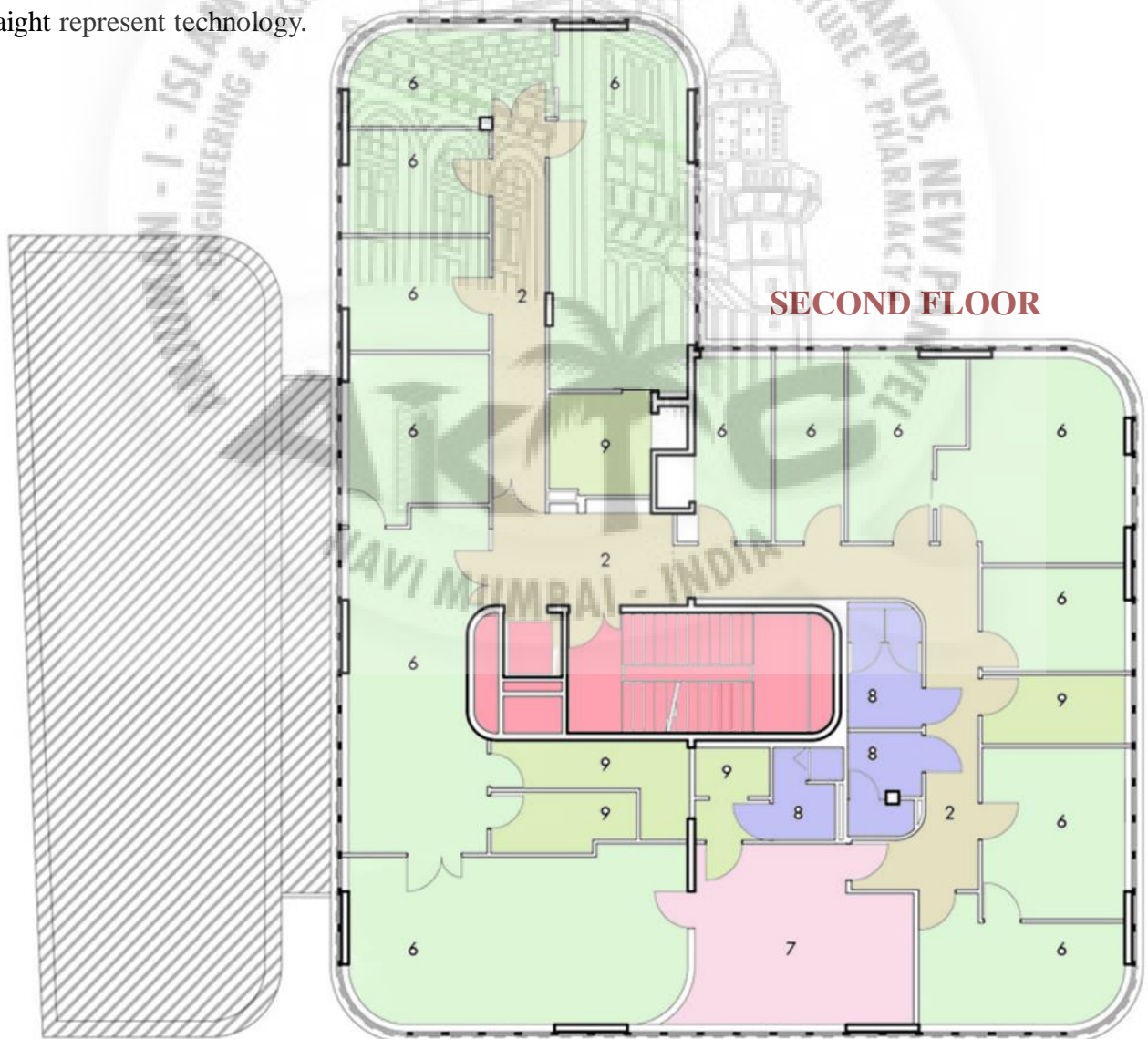


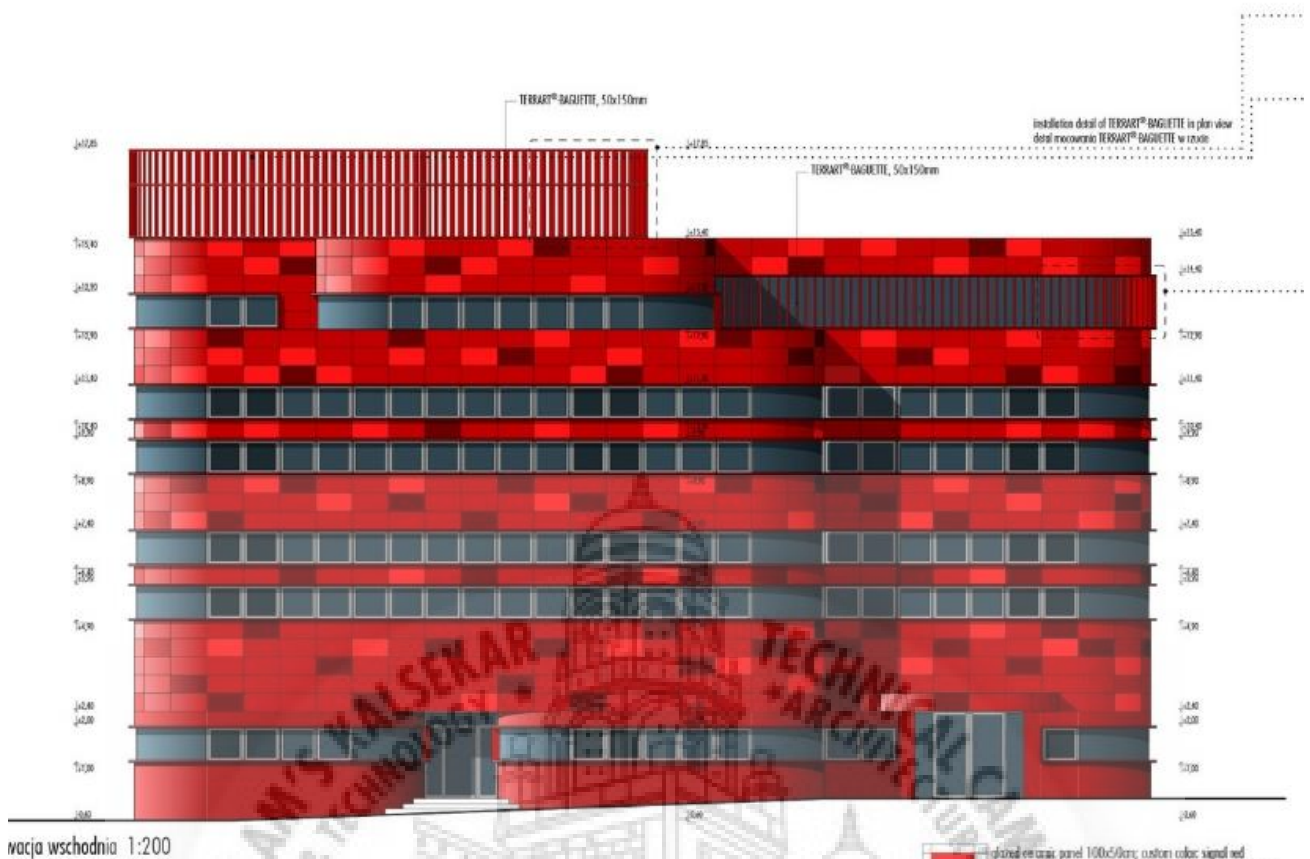


**INTERNAL SPACES**

Fig. 42

The color scheme, the irregularity of the elevation element and the panel's glossiness signify the richness of blood, frequently described as the gift of life. The geometry is motivated by the function of the blood center, the clash of biology with technology. Rounded elements represent biology, straight represent technology.





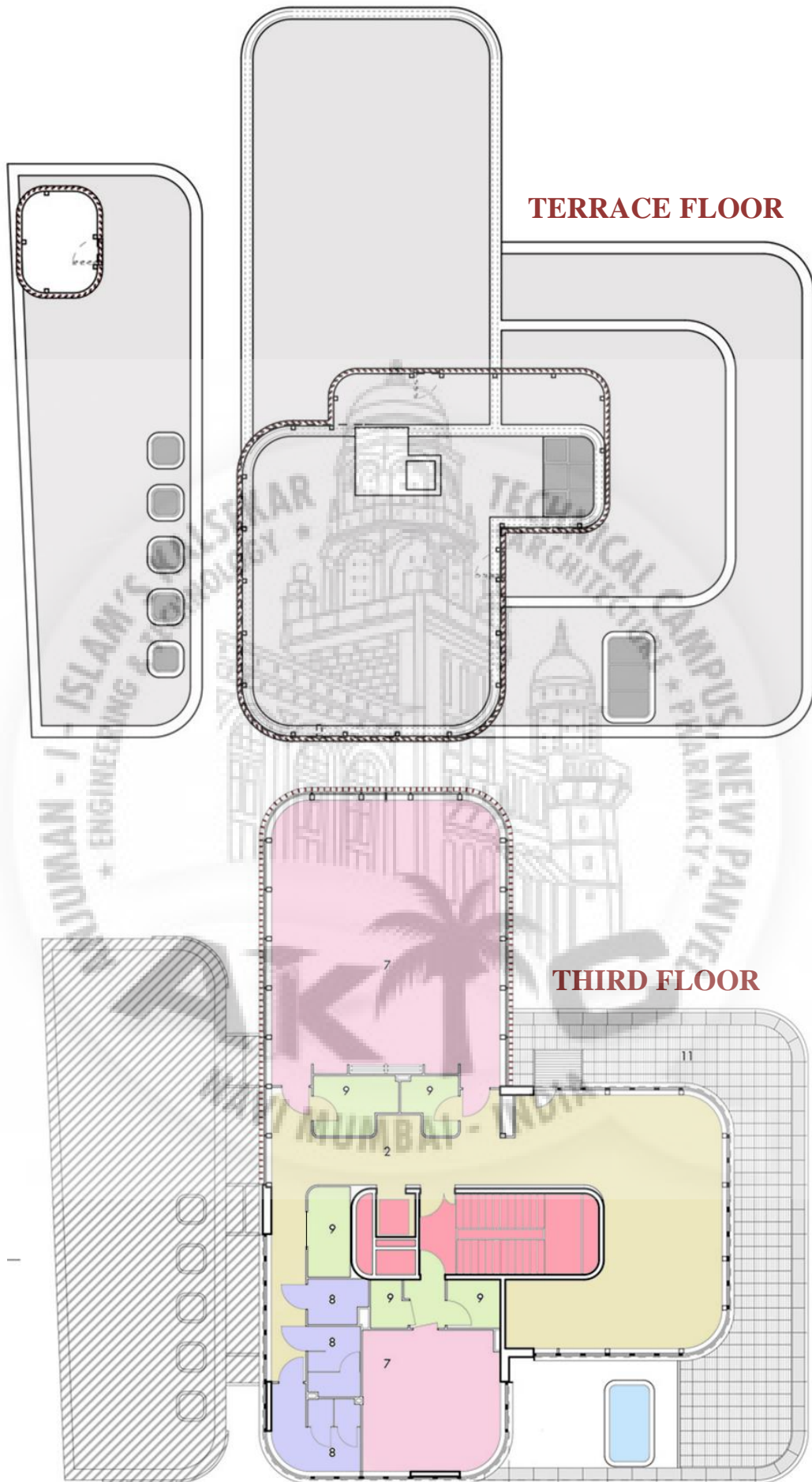
wzacja wschodnia 1:200

The building elevation is ended with ceramics, containing small ceramic tiles on the ground level and glazed ceramic panels on the upper floor levels. The upper levels comprise of more than 2000 ceramic elements. Among them 50x100cm flat panels, vertical blinds and (for the first time in Poland) curved panels of 145cm and 195 cm radius.

Three different shades of red were applied to create irregularity on the surface of the all four elevations. Ceramic pipes (TERRART®-BAGUETTE), sited at the uppermost level, guard the conference room from overheating as well as hide complex and massive technological systems located at the roof level. These ceramic pipes add detail and make the attachment lighter in its appearance.

Red color is present on floors and walls as an inflection.

Most rooms are lit by two belts of windows. The lower window belt irradiates laboratory worktops placed along the outer walls while the upper belt, just below the ceiling, allows the penetration of natural light to the remotest parts of the rooms. Thanks to glazed internal walls, the corridors are also lit with natural sunlight.





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## CHAPTER 09: CASE STUDY COIMBRA BLOOD BANK

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Fig. 43

**ARCHITECTS :** ARX PORTUGAL

**AREA :** 4100 SQ.M

**YEAR :** 2009

**PHOTOGRAPHS :** FERNANDO GUERRA

A Regional Blood Centre is really a highly complex laboratory building, where the donated blood is detached into its three major components and transformed for medicinal purposes.

This being the second Centre we design (the first one was in Porto), it reveals a bigger tranquillity and come to terms with the treatment to be given to the complex technical paraphernalia proper of these buildings. This understanding has brought us, this second chance around, a bottomless feeling of freedom. The concept of the building clearly reflects a will to stand up to that "displaced", odd and unexpected character. It is a big grey volume, completely wrapped in zinc, whose only connection to the space seems to be a reaction to the wavy properties of the ground, tracing along with its form the undulation of the topography.





Fig. 44

The land for its establishment is of a beauty that prompts us of landscapes more combo in the north of Europe: a thick forest of 147 feet-tall pine trees, only 6 or 9 feet apart from each other. Inside the forest there is a huge trees under the skies, which is seen only briefly, piercing the green "canvas" made by the tree-tops

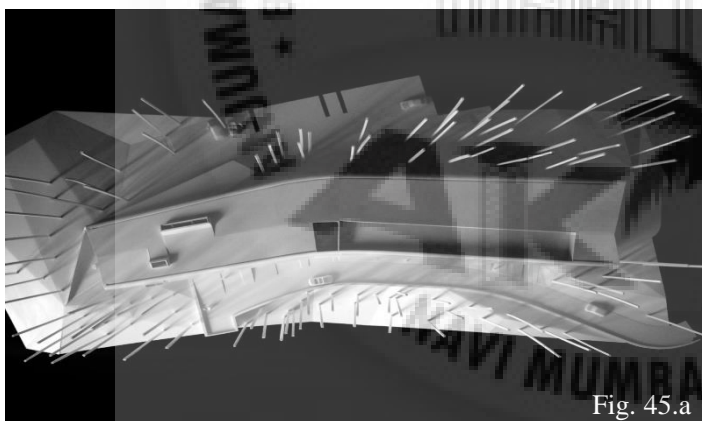


Fig. 45.a

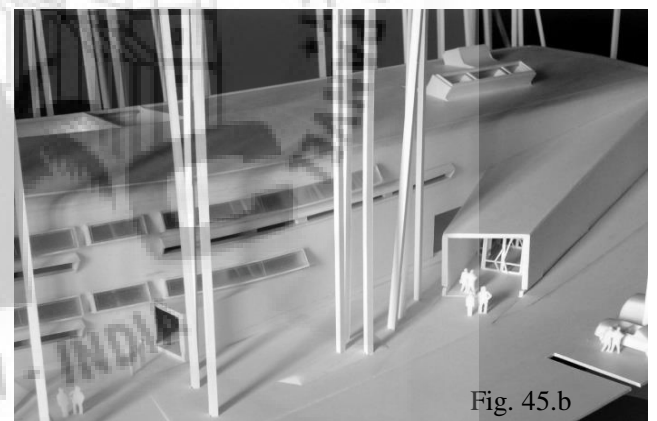


Fig. 45.b

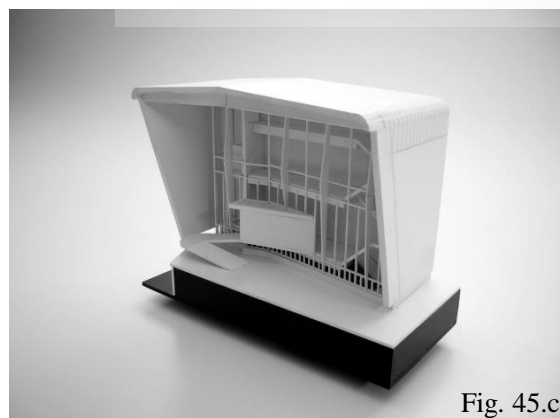


Fig. 45.c



Fig. 45.d



Fig. 45.e

The entrances, as well as all the openings, windows and skylights, are like ridges or grooves that highlight the ensuing tension of the folded volume: on the curved side they project out; on the conclave side they are the same plan of the building's body. In both cases, they expose the inside, warm and bright.

When designing the interiors, we specified our appeal for the necessity of linear and antiseptic spaces, but now communicating with a radical aesthetic interpretation, of merely functional obsessions, that we found in other laboratories we visited for this project



Fig. 46.a



Fig. 46.b

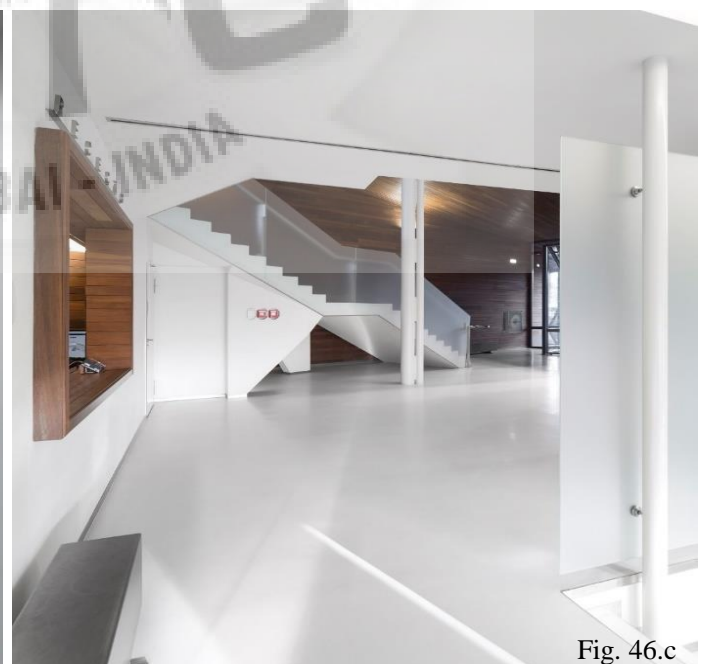
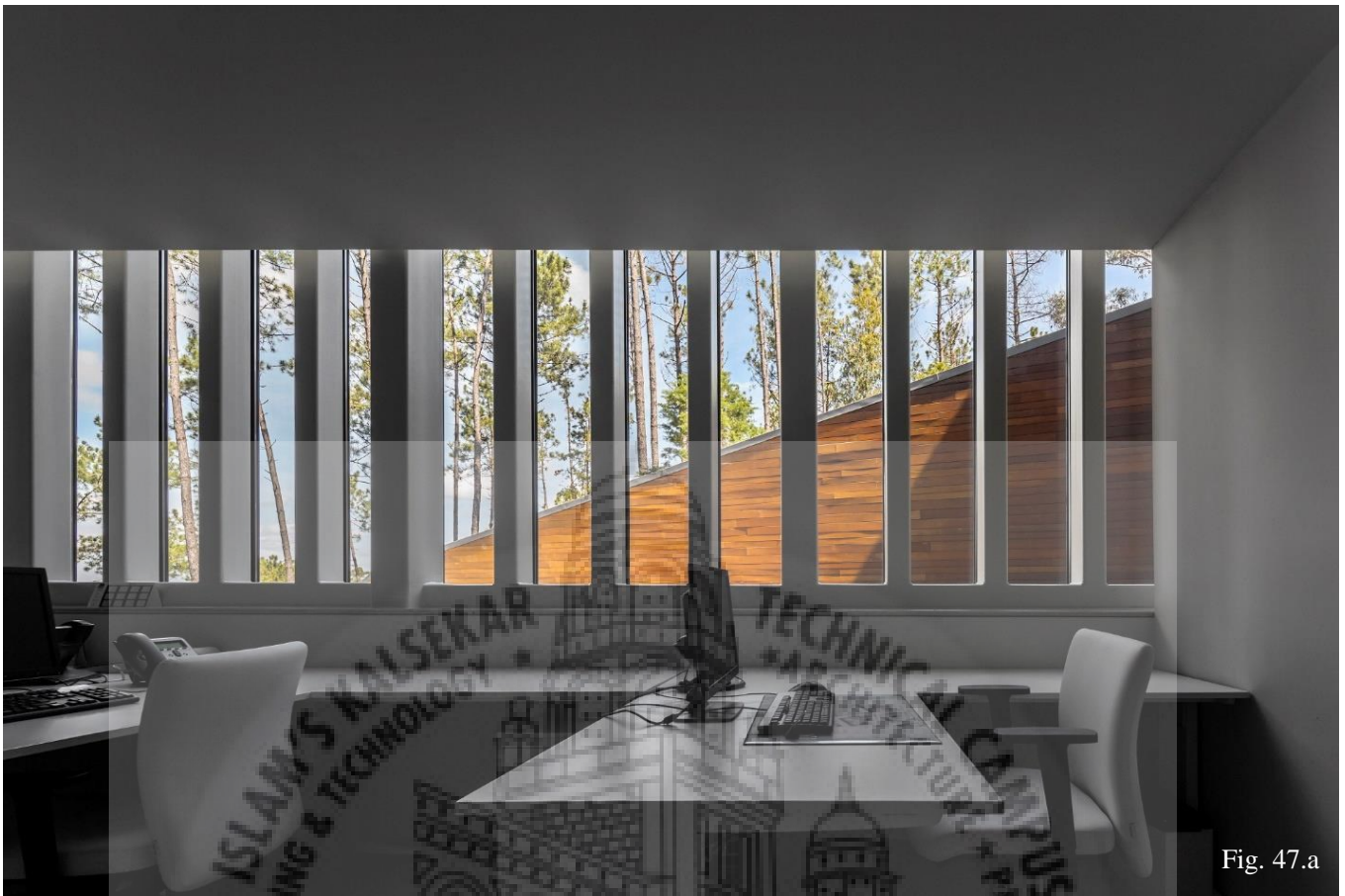
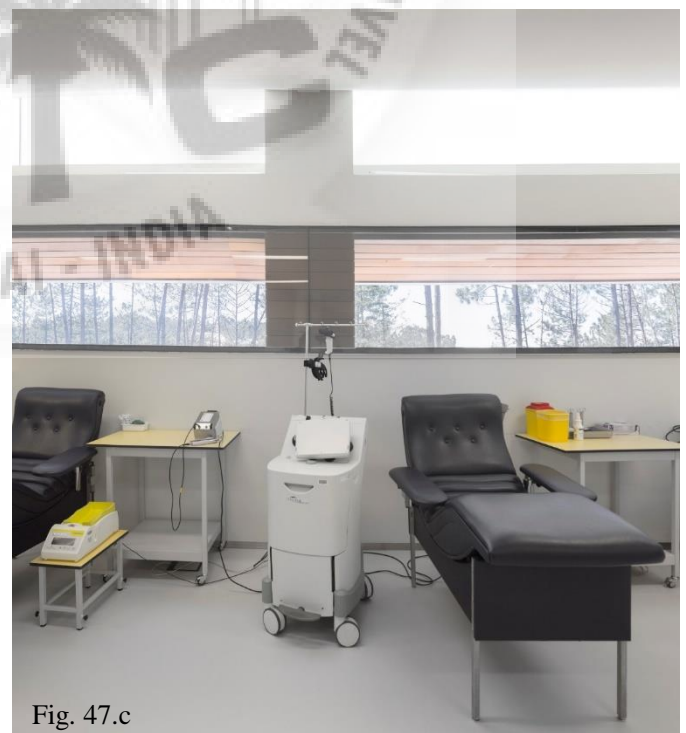


Fig. 46.c





Although there are many area which is urbanized surrounded with site those site is kind of isolated , like we had crossed somewhere a sort of filter. This land is located on the wavy line atop of a hill, suddenly falling down a very inclined slope.



## CHAPTER 09: CASE STUDY SINUOUS ORDINANCE BLOOD BANK

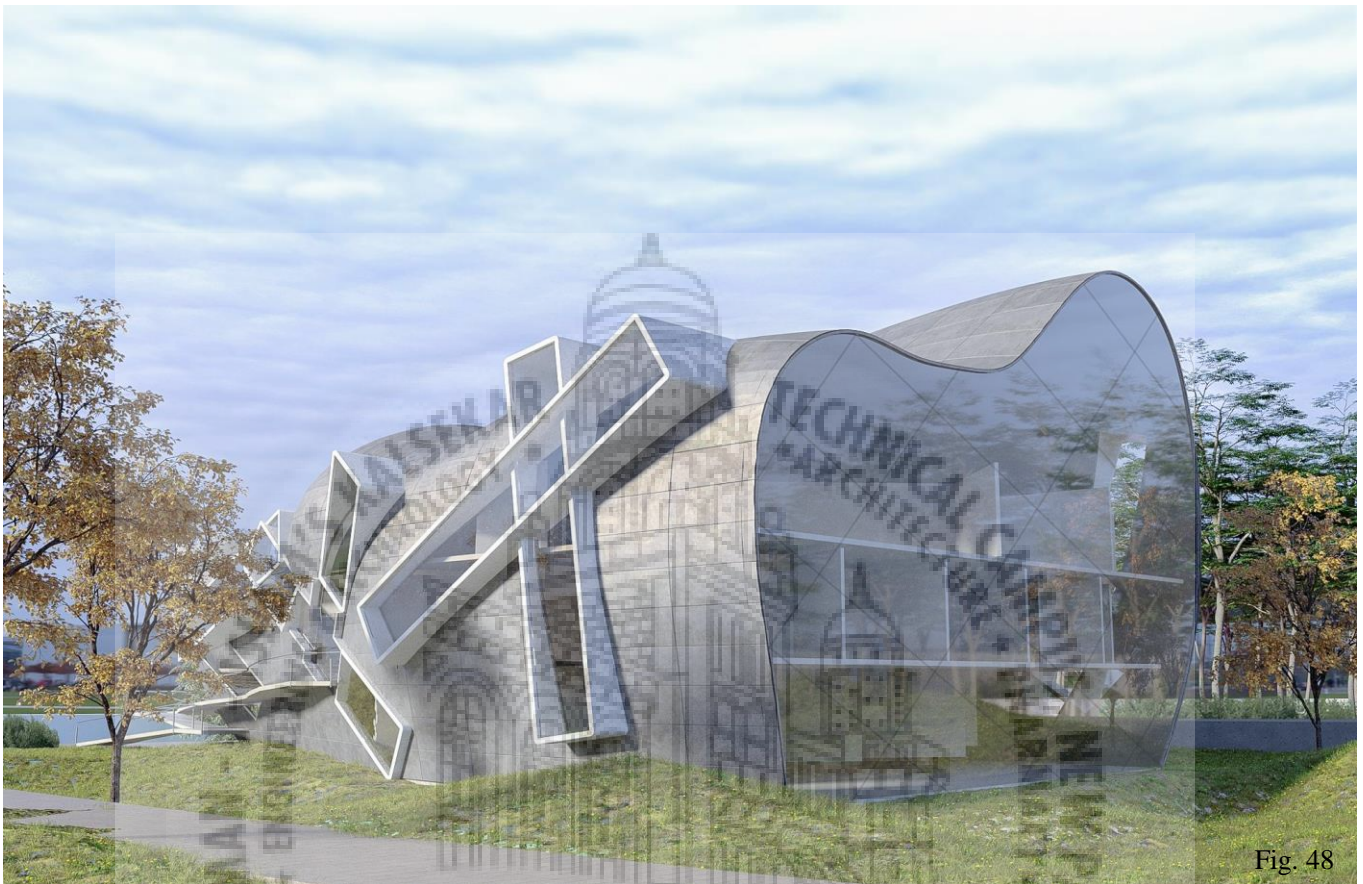
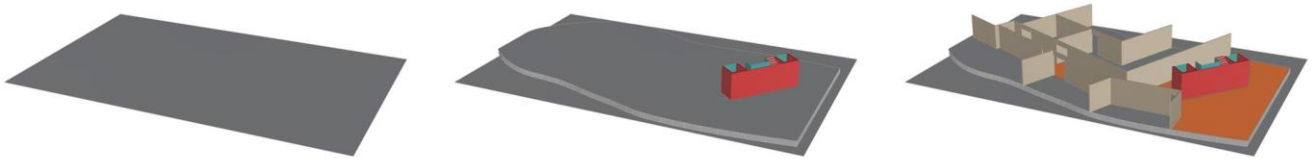


Fig. 48

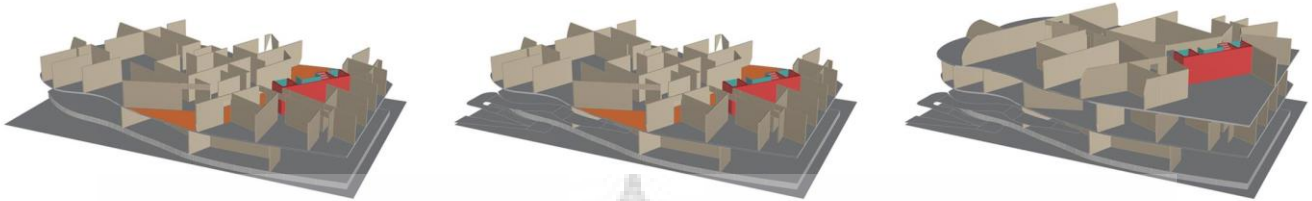
This project is a blood bank built in the campus of the Medical college of Goa. Goa's heritage, culture, architecture, Client's Functions, concept and Site herd the design. Blood donation is a trauma attach to it. The design should be like that will remove the trauma and welcome the donor towards the structure, that would reflect all of Goa's culture but still bring in a whiff of nuance. The curves of the building are designed considering the climate of Goa which has torrential rainfall. The curves are carefully calculated so that the water always flows down and never stagnates and hence would never percolate or leak inside the building.



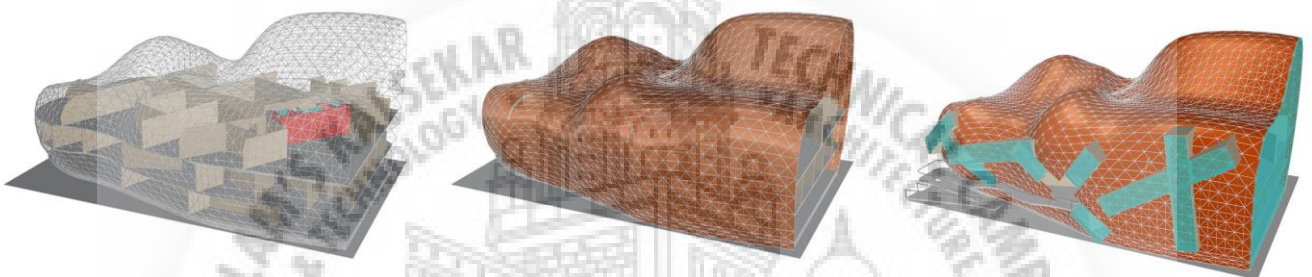




### INITIAL STAGE ZONNING



### FUNCTIONING



### FROM WORK

Fig. 49

The windows are large and across the whole built form designed to create sure that every space has sufficient ventilation, spectacular round about views of the sea and closes the spaces which need to be completely covered in a medical facility. It also follows the functional net flow of the interiors which is designed according to the firm norms of WHO and FDA. The ground floor which is opened by a ramp in the front and lift has the main donor functions so that it gets great views of the sea which is just below the slope of the site. We have also planned a skating and sledding park on the roof of the building which would not only bring extra revenue to the blood bank, as they are supposed to rely on government funding and donations, but also would interest more people to the building.

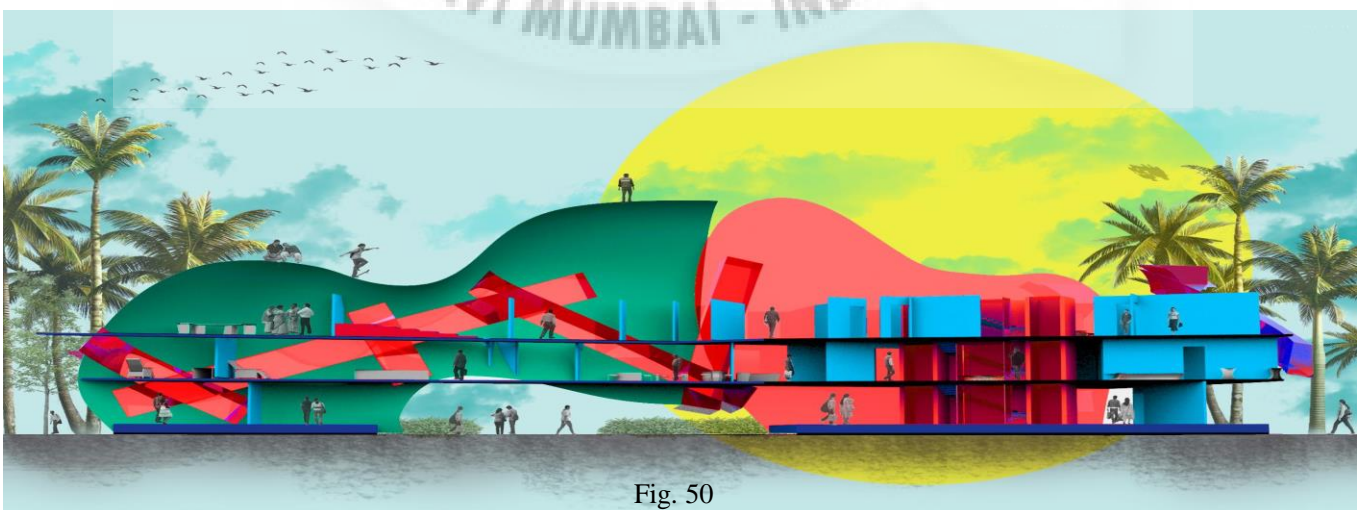
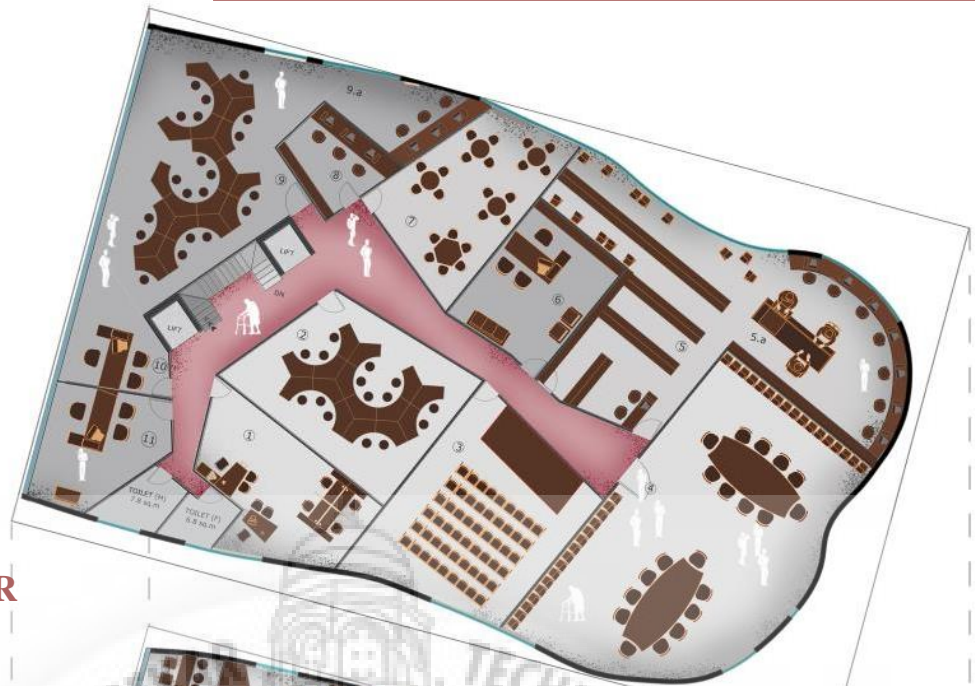


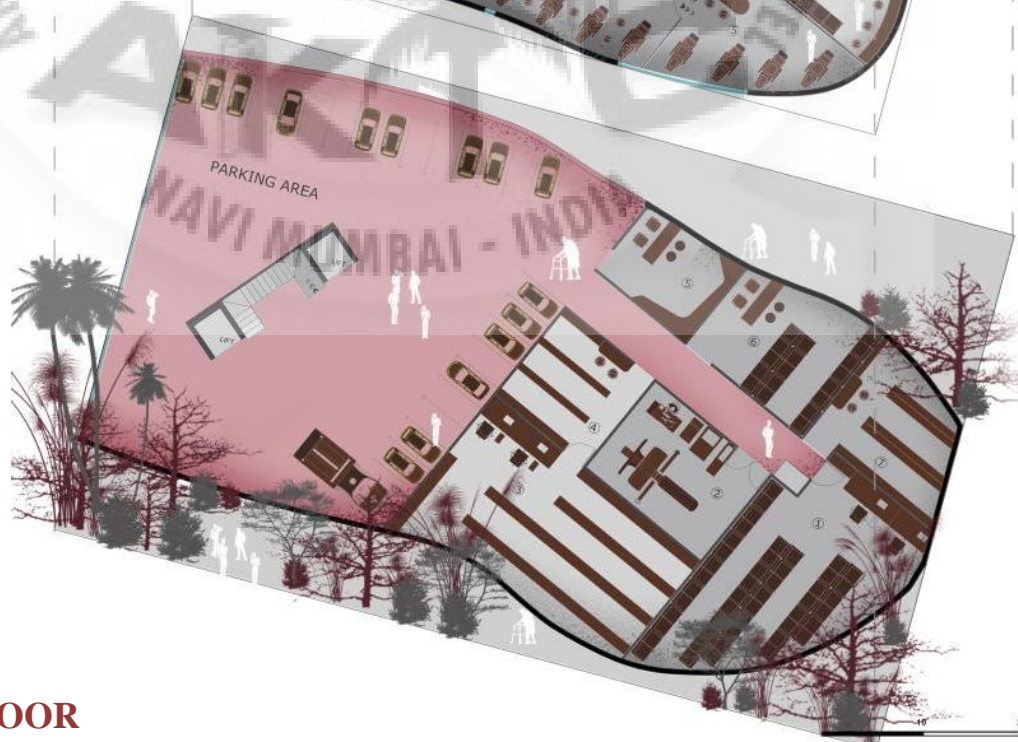
Fig. 50



**SECOND FLOOR**



**FIRST FLOOR**



**GROUND FLOOR**



## TECHNICAL DATA

The curves of the building are designed seeing the climate of Goa which has heavy rainfall. The curves are carefully calculated so that the water always flows down and never deteriorates and hence would never penetrate or leak inside the building. The windows are large and across the whole built form designed to make sure that every space has sufficient ventilation, spectacular round about views of the sea and closes the spaces which need to be completely covered in a medical facility.



Fig. 51



## CHAPTER 09: CASE STUDY YIFANG COMMUNITY CENTER



Fig. 52

**ARCHITECTS :** YIHE ARCHITECTURE  
**AREA :** 10000 SQ.M  
**YEAR :** 2019  
**PHOTOGRAPHS :** ARCH-EXIST

The project is in a renewed developed Dazhulin district in the north of Chongqing downtown. It needs an unfinished concrete structure from prior developments. The clue to develop Dazhulin as a new TOD project. Surrounded by future mixed-use developments, the goal is to use again and redesign the empty concrete structure as a new community core. It will supply for nearby residents and visitors in daily use and host events for special occasions. This new community center has four levels including an indoor swimming pool, a gym, various community amenity rooms, a sky bar, and an art gallery. Stairs and elevators are used for circulation between levels.



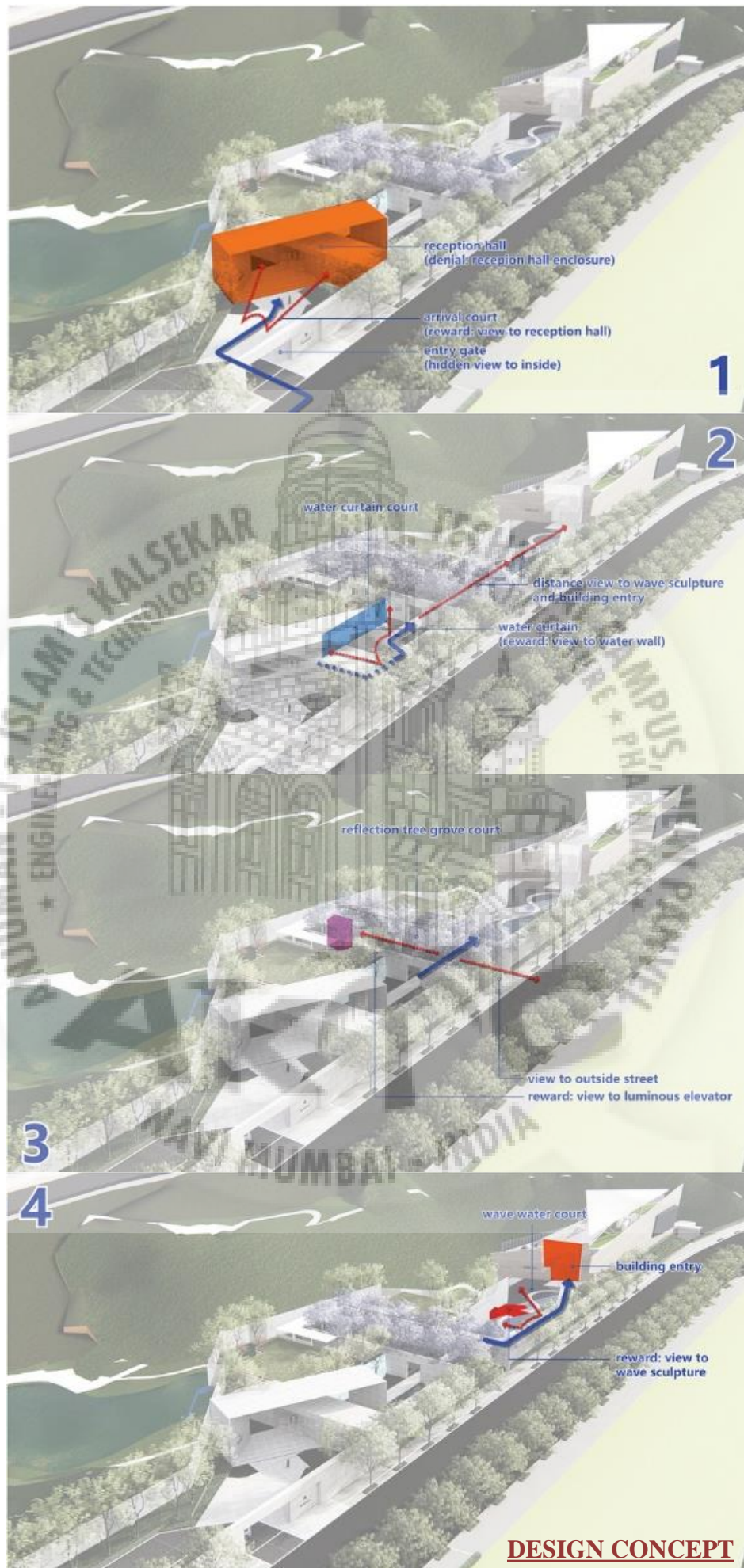


Fig. 53



Fig. 54

As guests move through the entrance gate, the reception lobby (two rectangular-shaped overlapping structures) is exposed. Reception lobby roles as first fenced “denial “at the starting point of the spatial order, which provides visitors a moment to slow down the step while noticing the water sounds from the next space. 3

After going through the lobby, visitors enter a series of gardens.

The journey with the attention exhibition of each room, interesting views, and the sense of connects and openness are slowly exposed as rewarding surprises before the arrival of a community center.



PLAN



## SPACE DISTRIBUTION

The idea was to design the core concrete deck as an “outdoor gallery”. 30x190 meter shape concrete deck got detached by walls into a series of “exhibition rooms”. The involvement from the parking lot to building entrance is enclosed by going through the “rooms “as visiting an art gallery. Each room has an exhibition feature. A cascading waterfall, luminous elevator, wave sculpture will be the central point of each room.

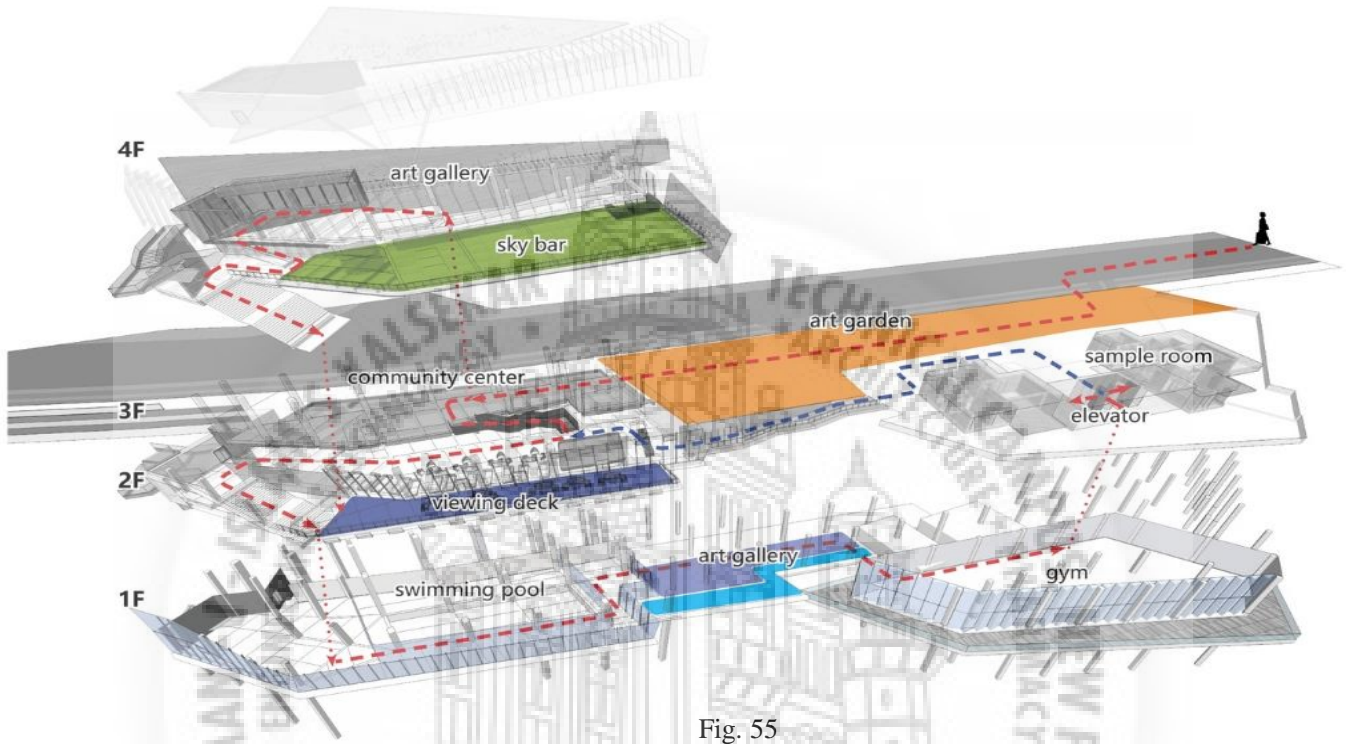
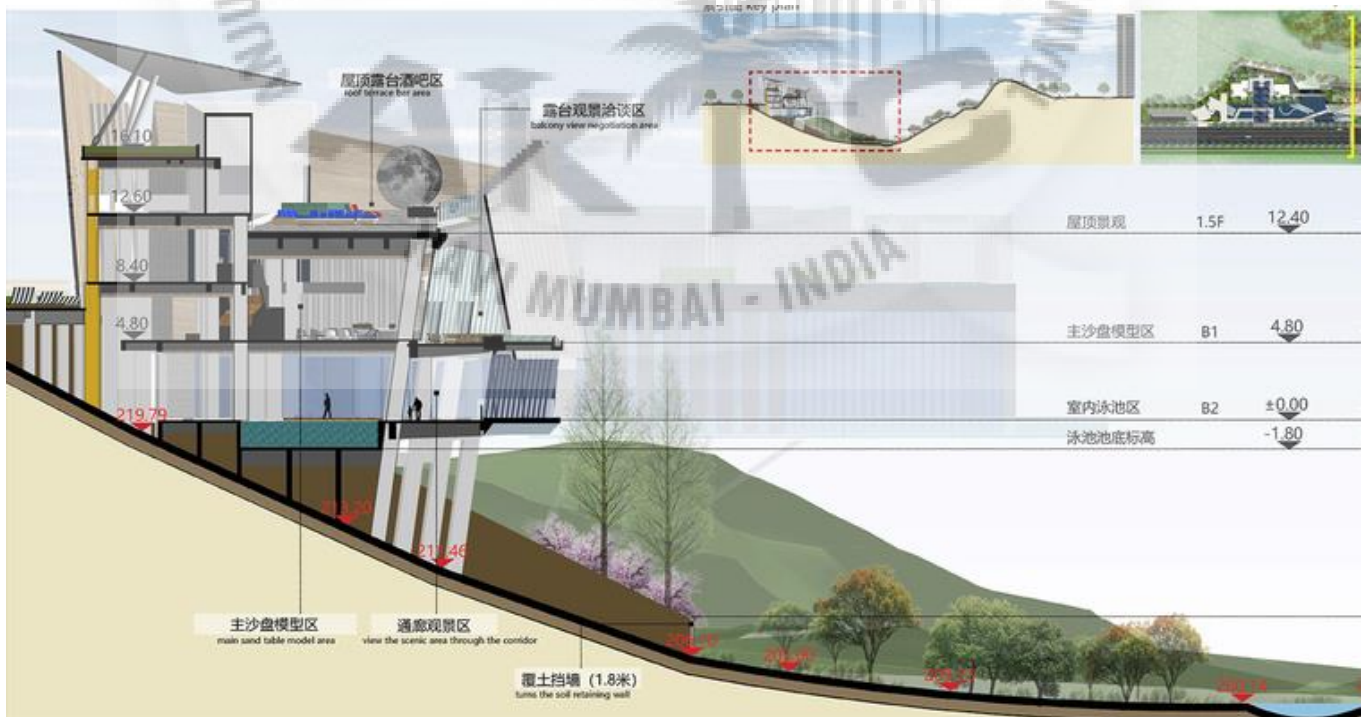


Fig. 55





*Seeing and being seen.* The assortment of vision and movement inspires visitors to explore and interconnect with the landscape and other visitors. The unexpected walkway is carefully placed to create additional conspiracy or even momentary lostness for visitors. The design of the walkway and the walls allow visitors to suddenly appear in each room.

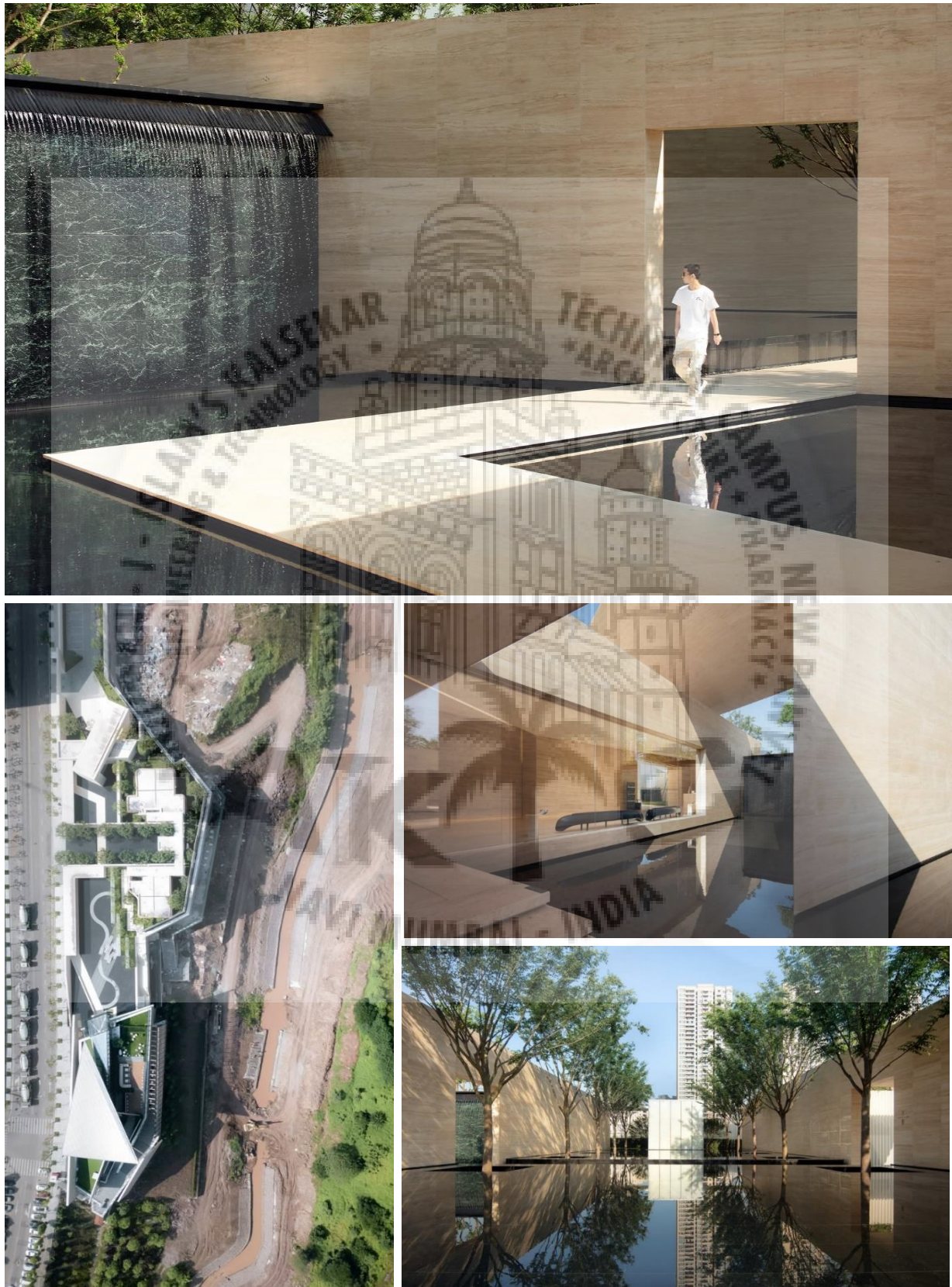
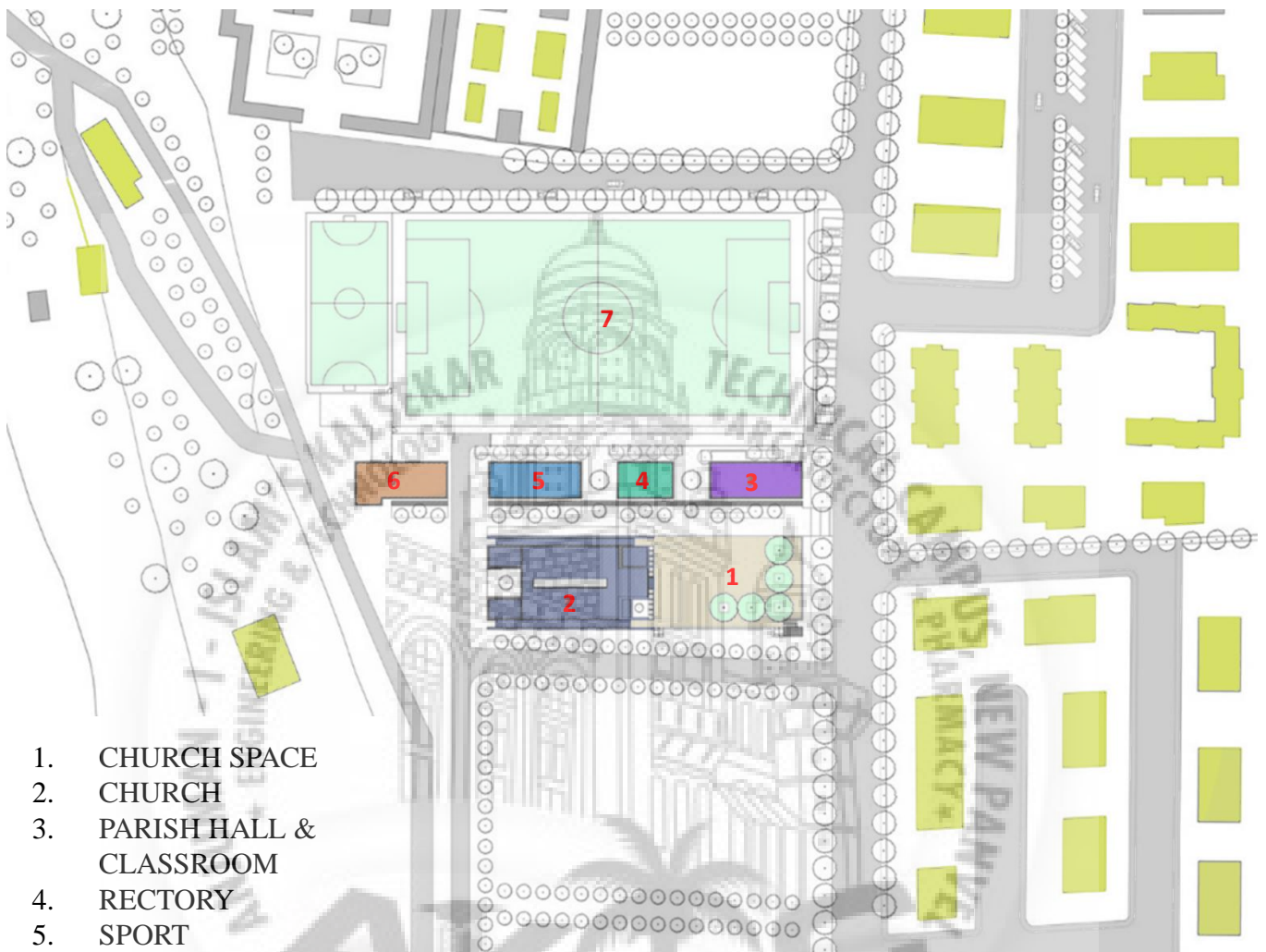


Fig. 56



## CHAPTER 09: CASE STUDY CHURCH & COMMUNITY CENTER



1. CHURCH SPACE
2. CHURCH
3. PARISH HALL & CLASSROOM
4. RECTORY
5. SPORT ASSOCIATIONS
6. SPORTS LOCKER/REST ROOM
7. FOOTBALL FIELD

**ARCHITECTS :** STUDIO CONTINI

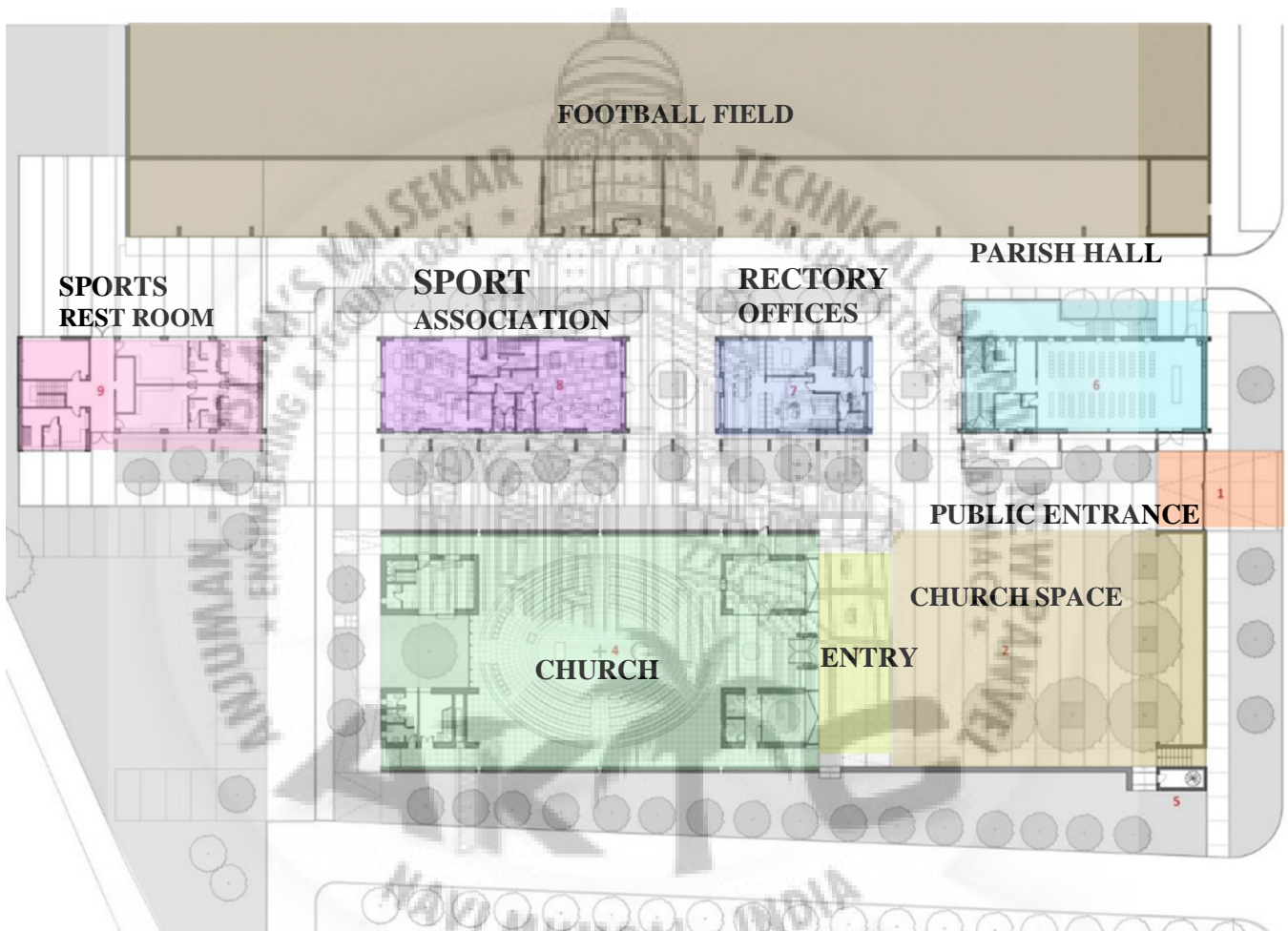
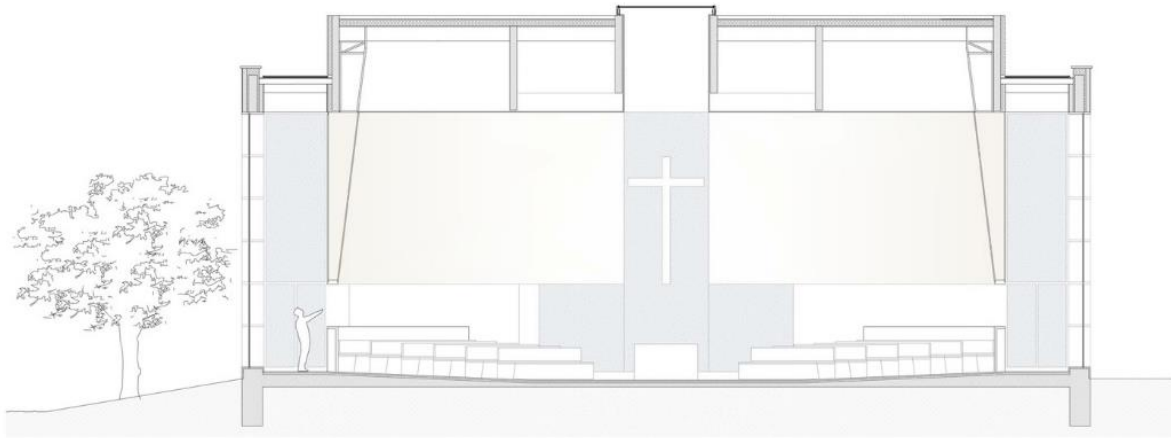
**AREA :** 15700 SQ.M

**YEAR :** 2019

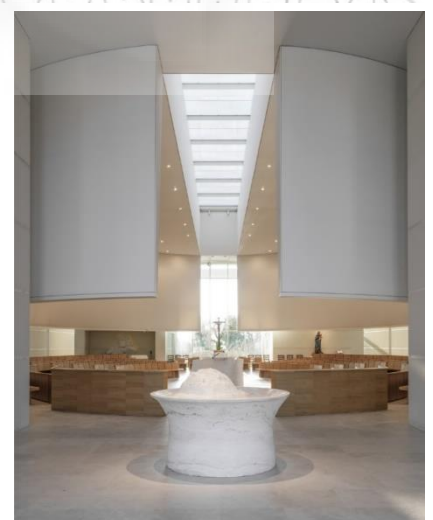
**PHOTOGRAPHS :** DOMENICO ODDI

The relations with the surrounding settlement are further improved by the pedestrian path that passes through the parvis, which enlarge in the large square garden. This space is bordered by a simple wall on the southern side and by a closed portico towards the main road. Those limits create a sense of assembly, a space that suits the needs of community life and collective meetings. A vital element of the project is





The church is the last building, in order of construction, of the parish centre designed by studio\_continiarchitettura. The composite contains sporting and recreational facilities, spaces for education and meeting places, forming an urban system that promotes community life. The project, developed from a competition happen in 2006, is deeply rooted in its context, both through the character of its volumes and the use of local materials.





The interior accommodates a large adjoined oval vivarium, place for the gathering and space for the ritual. The elements for the ritual (baptismal font, ambo, altar, seat, crucifix and tabernacle) are located along a path that cuts the chancel longitudinally and ranges a garden on the back of the church, in which an olive tree is planted. The gathering dispositions follows the orders of the Second Vatican Council, with the chancel surrounded by the seats for the believers, forming the essence of the Church.



Fig. 57



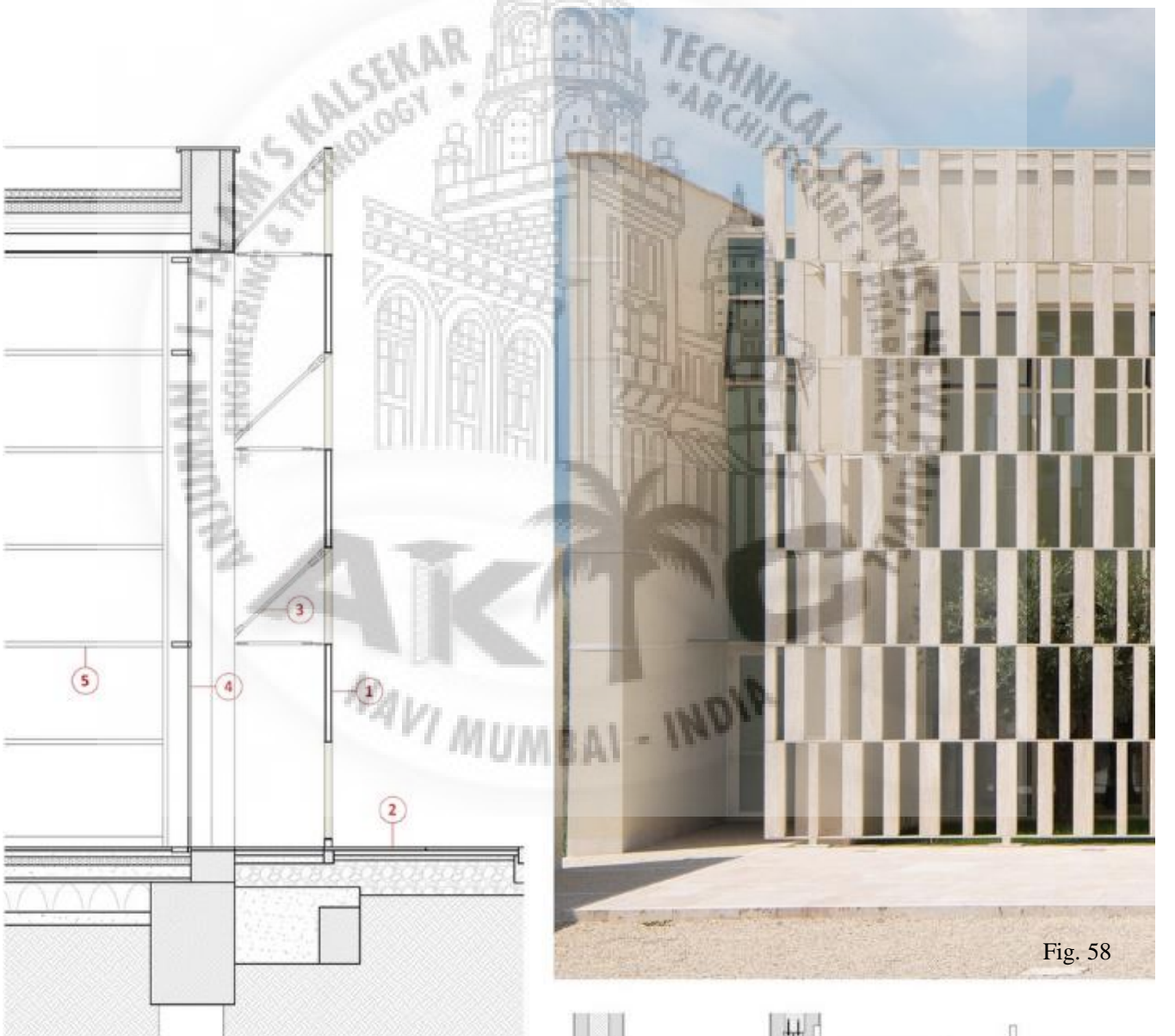
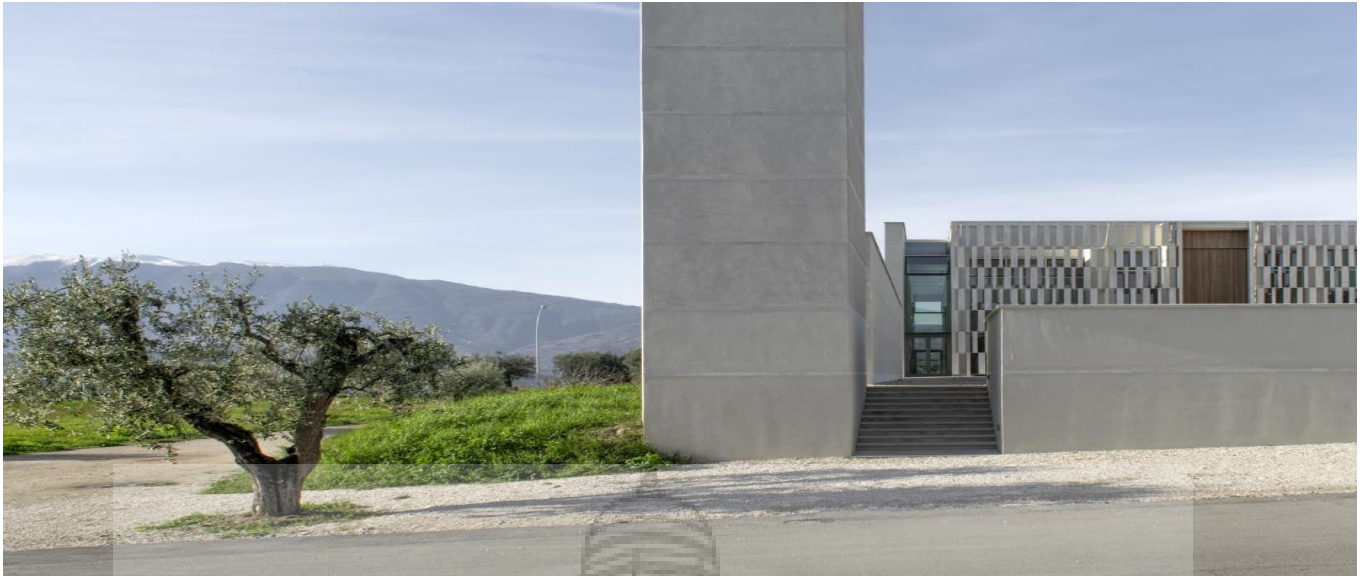
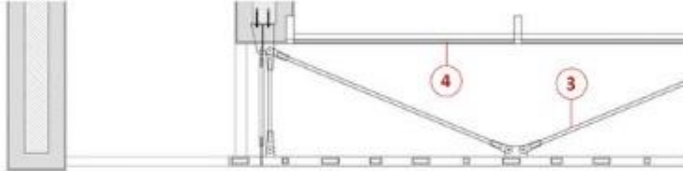


Fig. 58

Church facade - constructive details

- 1. Paired travertine slabs
- 2. Travertine slab floor
- 3. Reticular structure steel
- 4. Stained glass window
- 5. Travertine slats
- 6. Wood's doorway





## CHAPTER 10: COMPARATIVE ANALYSIS

SR. NO.	❑ PRATHAMA BLOOD BANK
CONTEXT	<ul style="list-style-type: none"> <li>• <b>TTHE SITE IS LOCATED IN DENSE RESIDENTIAL ZONE MAKING IT A GOOD LOCATION FOR HEALTH CARE CENTRE.</b></li> <li>• <b>THE OPEN AGRICULTURAL LAND ON THE SOUTH WEST MAKES THE OVERALL AMBIENCE OF THE LOCALITY PEACEFUL.</b></li> </ul>
EXPERENTIA L	<ul style="list-style-type: none"> <li>• The structural zoning is divided in to specific parts as user requirement</li> <li>• There is a rectangular blocks for labs and services back</li> <li>• The atrium space covering the lab block</li> </ul>
INNOVATION IN PROGRAM	Blood Donation have a view of Landscape which act as a healing elements.
AESTHETICS/ FORM	THE EXPOSED CONCRETE STRUCTURE IS MADE SO AS TO HAVE ITS OWN UNIQUE IDENTITY. THE HEAVILY MASSED STRUCTURE FROM OUTSIDE LOOKS LIKE A SINGLE UNIT BUT ONE CAN ONLY SEE 2 BLOCKS CONNECTED THROUGH A VOID ONLY ONCE THEY ENTER INSIDE.
INNOVATION IN TECHNOLOG Y	<ul style="list-style-type: none"> <li>• The false ceiling and acoustic paneling in auditorium is in lightweight concrete with insulating vermiculite.</li> <li>• All the wooden planks used for exposed form work was salvaged and was later used for the auditorium staging.</li> <li>• Rainwater is collected and directed into percolation tanks and the water body is a self-sustained ecosystem with Koi fishes and water lilies.</li> </ul>



SR. NO.	❑ REGIONAL BLOOD CENTER
CONTEXT	The Site is Located in City surrounded with many structures
EXPERENTIAL	The color scheme, the irregularity of the elevation leitmotif and the panel's glossiness represent the richness of blood, often decribed as the gift of life.
INNOVATION IN PROGRAM	Red color is present on floors and walls as an accent. Most rooms are lit by two belts of windows. The lower window belt illuminates laboratory worktops placed along the outer walls while the upper belt, just below the ceiling, allows the infiltration of natural light to the remotest parts of the rooms. Thanks to glazed internal walls, the corridors are also lit with natural sunlight.
AESTHETICS/ FORM	The geometry is inspired by the function of the blood center, the clash of biology with technology. Rounded elements represent biology, straight represent technology.
INNOVATION IN TECHNOLOGY	-----

SR. NO.	❑ COIMBRA BLOOD BANK
CONTEXT	A thick forest of 147 feet-tall pine trees, only 6 or 9 feet apart from each other. Inside the dense woods a world of shade rules over the sky, which is seen only briefly, piercing the green "canvas" made by the tree-tops.
EXPERENTIAL	The entrances, as well as all the openings, windows and skylights, are like ridges or furrows that highlight the resulting tension of the folded volume: on the convex side they project out; on the concavous side they are the same plan of the building's body. In both cases, they reveal the inside, warm and bright.
INNOVATION IN PROGRAM	Although there are some urbanized areas relatively near by, there is a strong feeling of isolation, like we had crossed somewhere a sort of filter. This land is located on the wavy line atop of a hill, suddenly falling down a very inclined slope.
AESTHETICS/ FORM	It is a big grey volume, completely wrapped in zinc, whose only connection to the place seems to be a reaction to the wavy properties of the ground, tracing along with its form the undulation of the topography.
INNOVATION IN TECHNOLOGY	-----

SR. NO.	❑ YIFANG COMMUNITY CENTER
CONTEXT	<p>The project is in a newly developed Dazhulin district in the north of Chongqing downtown. It had an unfinished concrete structure from previous developments. The vision to develop Dazhulin as a new TOD project. Surrounded by future mixed-use developments.</p>
EXPERENTIAL	<p>As visitors move through the entrance gate, the reception lobby (two rectangular-shaped overlapping structures) is revealed. Reception lobby functions as first enclosed “denial “at the starting point of the spatial sequence, which gives visitors a moment to slow down the pace while noticing the water sounds from the next space.</p>
INNOVATION IN PROGRAM	<p>Gardens not just provide daily use and passage interests also function as event space. The stage can be set up with a white fence background with a canopied walkway area as the main audience seating area. Various events like outdoor movies, small music performances, runway shows happen at the courtyard adjacent to building entrance.</p>
AESTHETICS/ FORM	<p>To design the main concrete deck as an “outdoor gallery”. 30x190 meter shape concrete deck got divided by walls into a series of “exhibition rooms”.</p>
INNOVATION IN TECHNOLOGY	<p>The combination of sight and movement encourages visitors to explore and interact with the landscape and other visitors.</p>



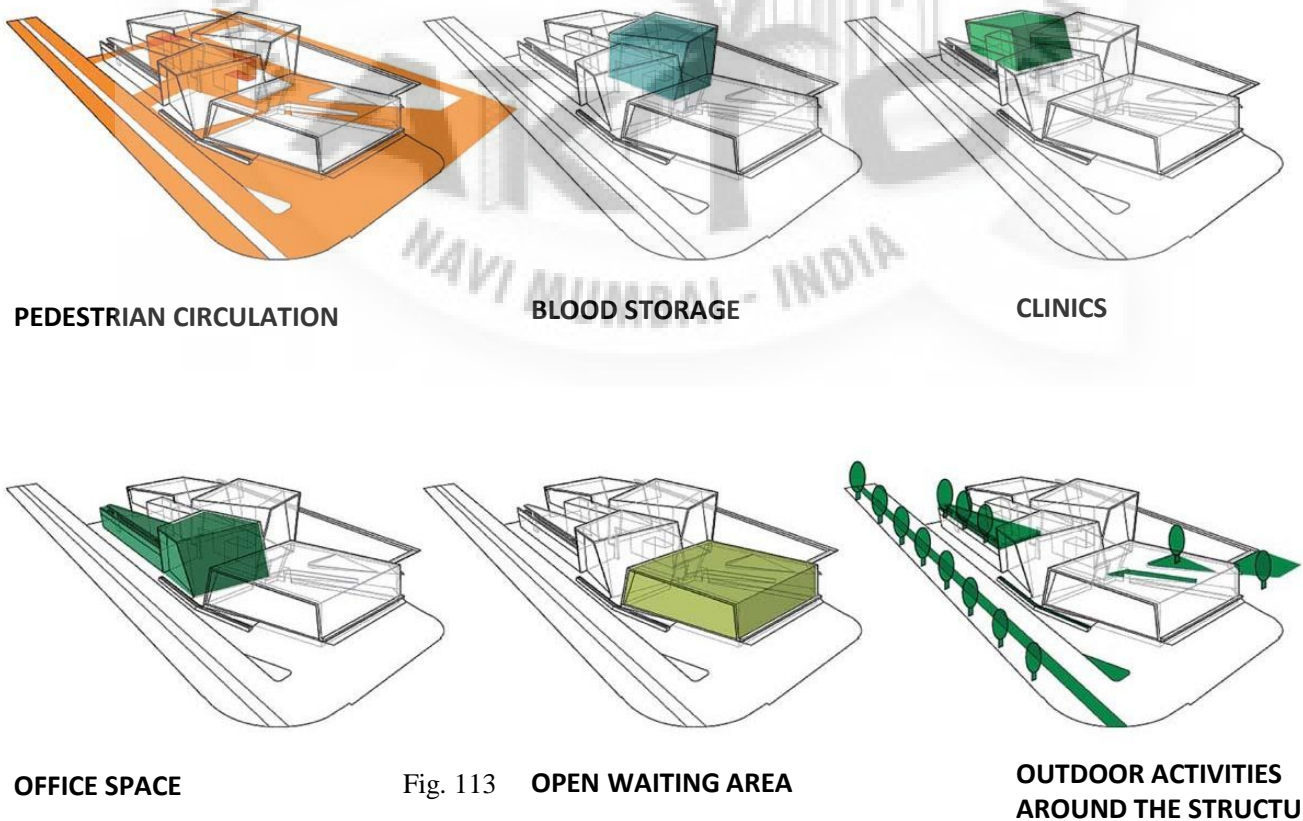
SR. NO.	❑ SINUOUS ORDINANCE BLOOD BANK
CONTEXT	The project is a blood bank built in the campus of the Medical college of Goa. Goa's heritage, culture, architecture,
EXPERENTIAL	design would make people forget this trauma and would encourage donors to do this altruistic deed and hence a building, that would reflect all of Goa's culture but still bring in a whiff of nuance. The curves of the building are designed considering the climate of Goa which has torrential rainfall.
INNOVATION IN PROGRAM	The project is a blood bank built in the campus of the Medical college.
AESTHETICS/ FORM	The curves of the building are designed considering the climate of Goa which has torrential rainfall.
INNOVATION IN TECHNOLOGY	The curves are carefully calculated so that the water always flows down and never stagnates and hence would never percolate or leak inside the building.
SR. NO.	❑ CHURCH AND COMMUNITY CENTRE
CONTEXT	<b>THE SITE IS LOCATED IN BETWEEN RESIDENTIAL ZONE.</b>
EXPERENTIAL	The relations with the surrounding settlement are further enhanced by the pedestrian path that passes through the parvis, which extends in the large square garden. the public pedestrian path that cuts through the complex, separating the church from the volumes for the parish activities .
INNOVATION IN PROGRAM	The complex includes sporting and recreational facilities, spaces for education and meeting places, creating an urban system that promotes community life.

# CHAPTER 11: DESIGN CLUE & PROGRAMM



Fig. 59

THE PROGRAM CAN BE LIKE A MIXED USE SPACE WITH A BLOOD BANK ATTACH TO IT.



PEDESTRIAN CIRCULATION

BLOOD STORAGE

CLINICS

OFFICE SPACE

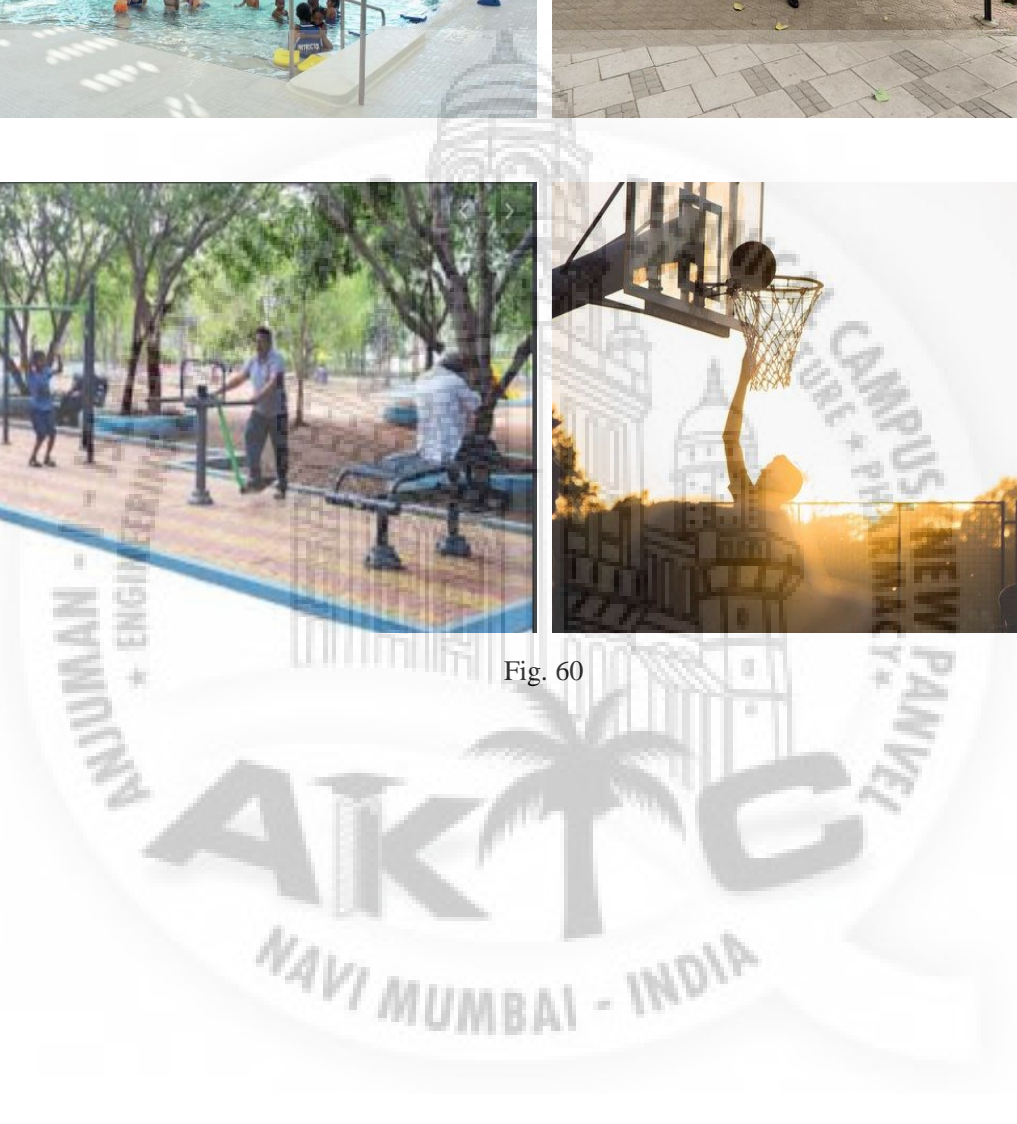
Fig. 113 OPEN WAITING AREA

OUTDOOR ACTIVITIES AROUND THE STRUCTURE

# ACTIVITIES



Fig. 60





## DESIGN PROGRAM

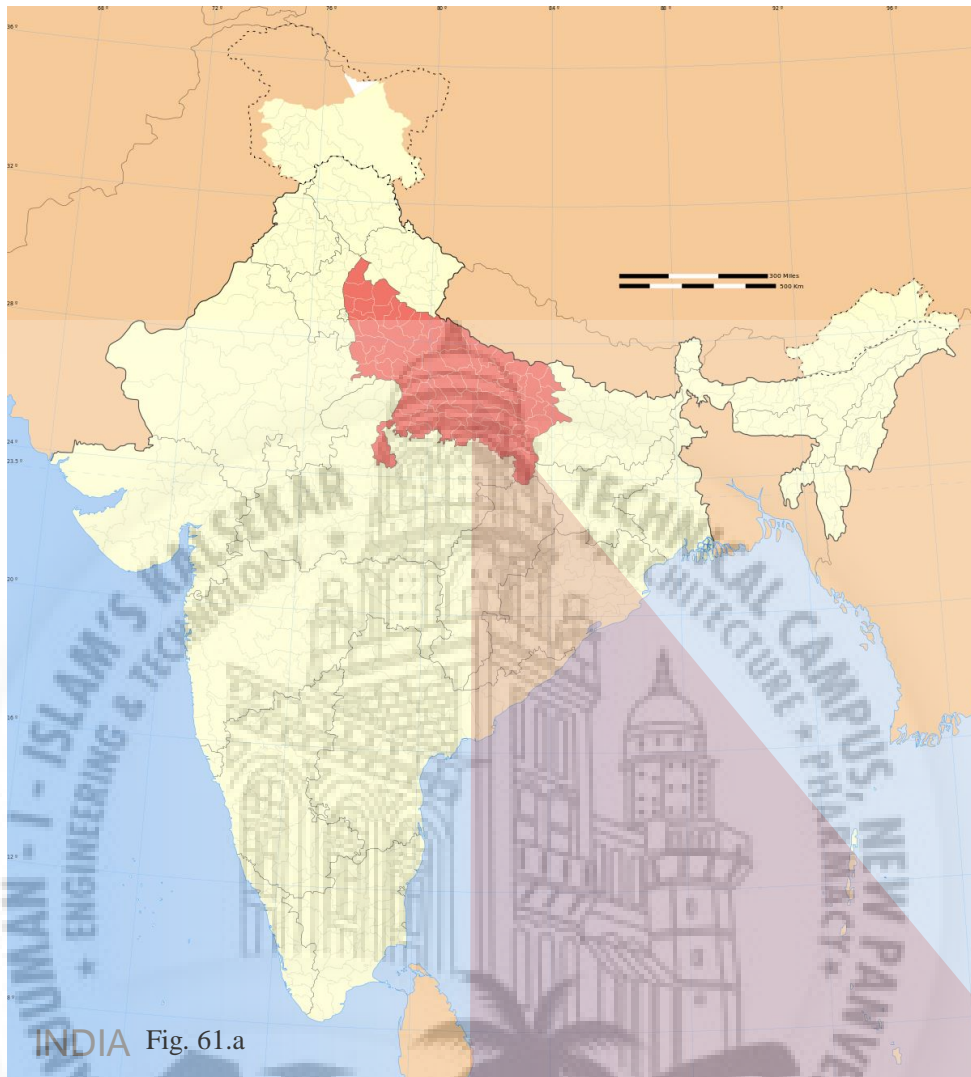
- **A Center** which promotes the awareness of blood donation. Creates an impact of being responsible to donate blood. Its an individual responsibility of every people.
- **A Social space** where many mixed use user can interact with each other, by performing many activities.
- **Training space or Educational space** where they teach about the transfusion medicine.
- **Advance Blood Bank** which have a great amount of storage to store bloods and having a research labs of testing's.
- **Research laboratories**
- **Open and close spaces**
- **Private / semi-private and public spaces.**
- **Sport activities** to promote health.
- **Art galleries** which encourage disable people to be connected with society.
- **Tourist place** which helps economy by revenue generation.

## DESIGN BRIEF

Transfusion medicine research center will full fill the gaps which India is facing of shortage of blood banks or blood units. It's a place where awareness related to health or blood donation will practice. To create an impact on health it carries many allied activities to promote better health of a society. Having many physical activities for children, young age or for the elders. Also have a art gallery where the disable people perform there art and will give a platform to connect with the society.



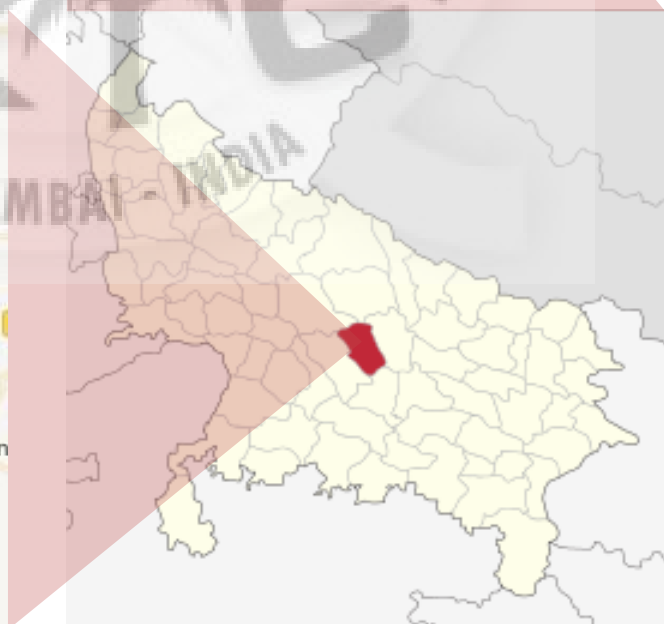
## CHAPTER 12: SITE STUDY



INDIA Fig. 61.a



LUCKNOW Fig. 61.b



UTTAR PRADESH Fig. 61.c



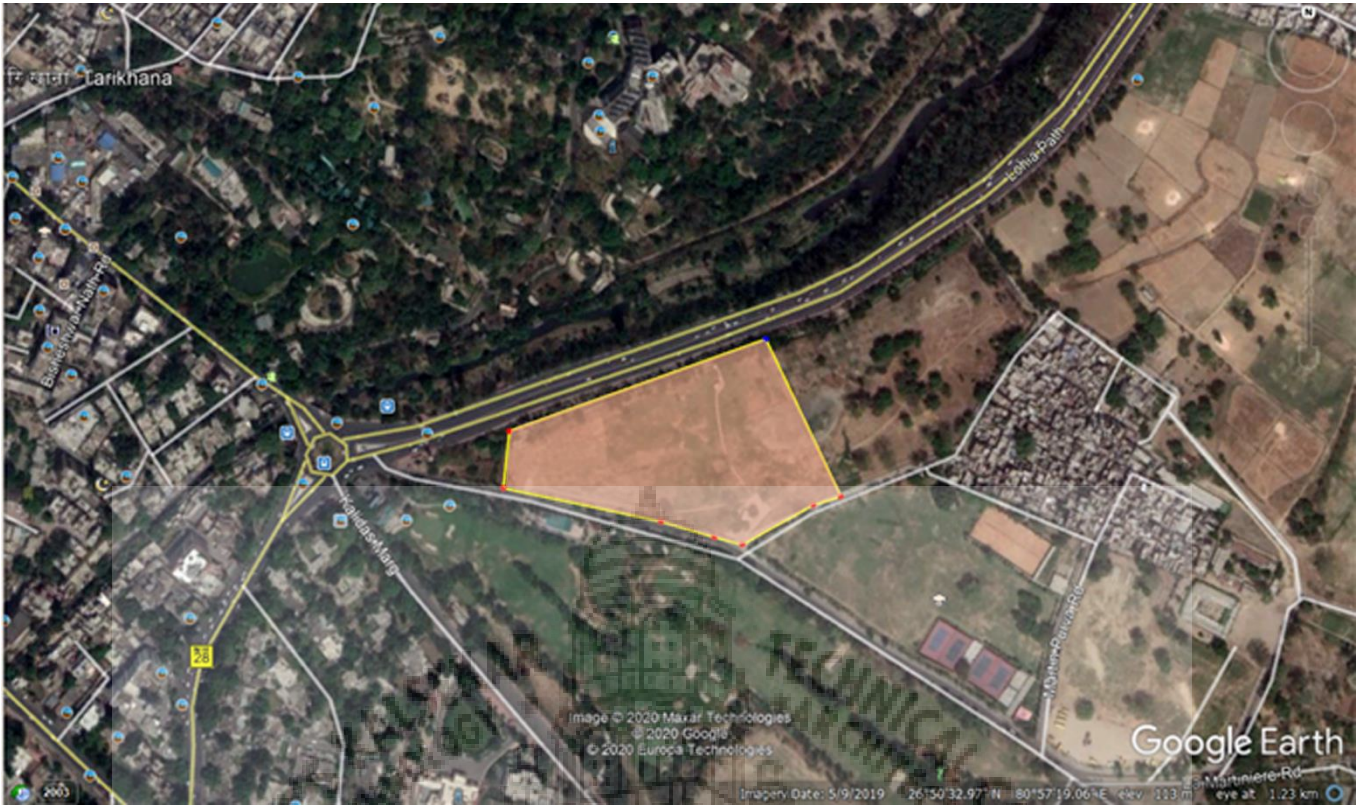
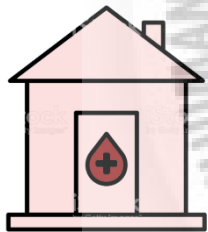


Fig. 61.d

UTTAR PRADESH, LUCKNOW, KALIDAS MARG.

SITE AREA – 7 ACRES – 28000sq.m



248 Blood Banks – 9.4% of overall India

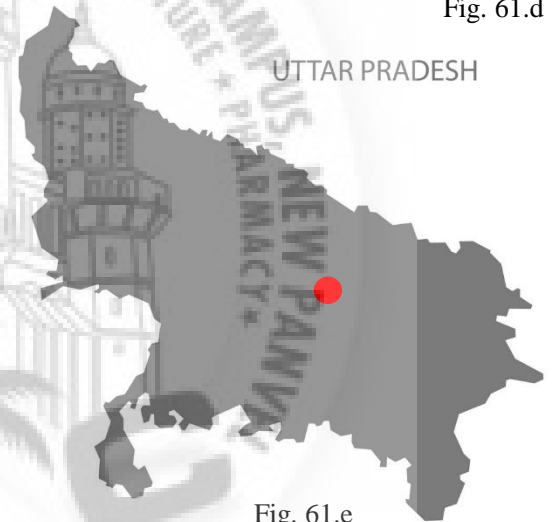


Fig. 61.e

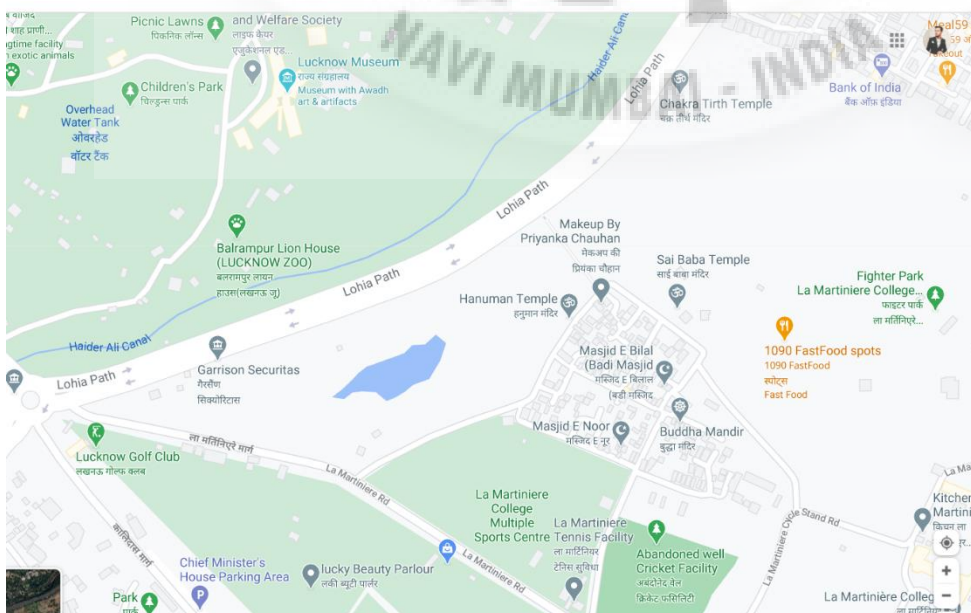


Fig. 61.f

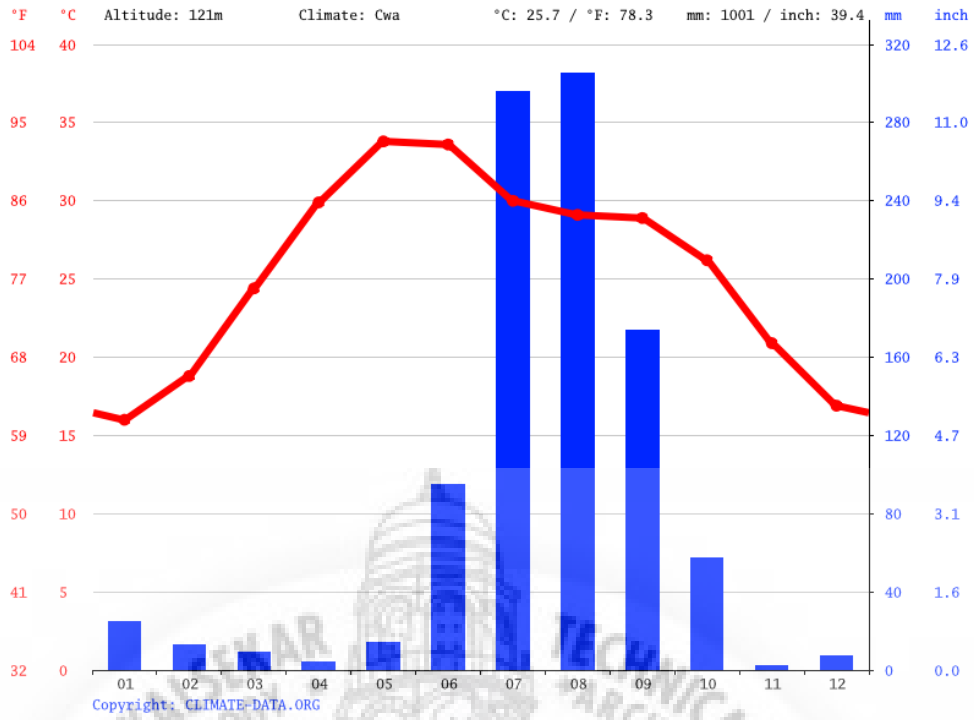


Fig. 62.a Source: <https://en.climate-data.org/asia/india/>

Precipitation is the lowest in November, with an average of 2 mm | 0.1 inch. Most precipitation falls in August, with an average of 305 mm | 12.0 inch.

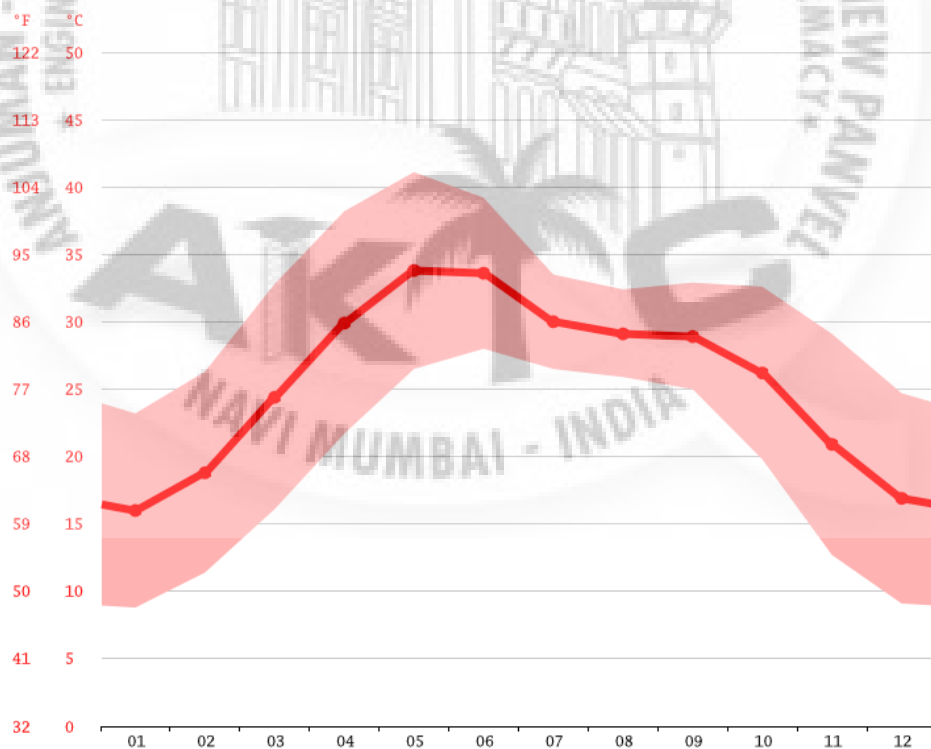
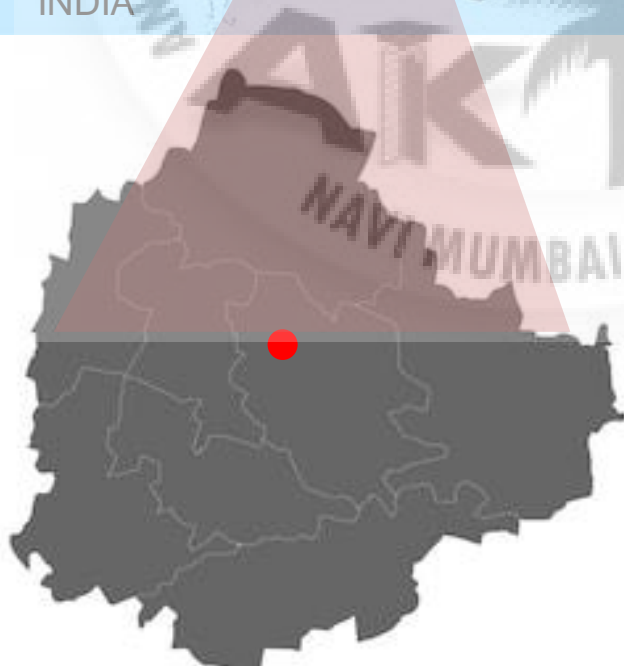


Fig. 62.b Source: <https://en.climate-data.org/asia/india/>

At an average temperature of 33.8 °C | 92.8 °F, May is the hottest month of the year. In January, the average temperature is 16.0 °C | 60.8 °F. It is the lowest average temperature of the whole year.



Fig. 63.a



BANGALURU Fig. 63.b

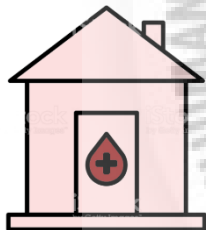




Fig. 63.c

KARNATAKA, BANGALURU, ARMANE NAGAR.

SITE AREA – 6 ACRES – 24000sq.m



185 Blood Banks – 7% of overall India

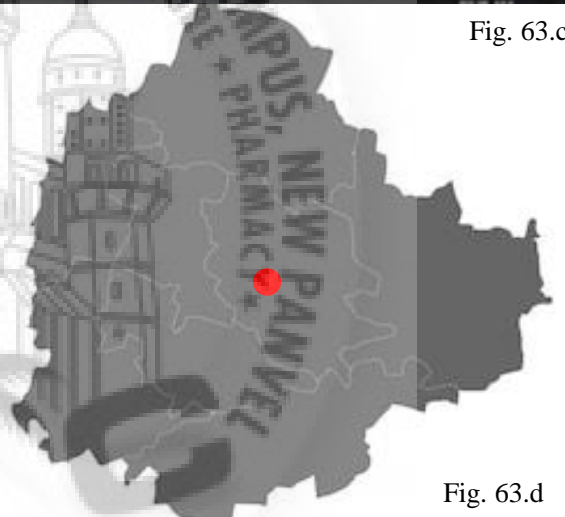


Fig. 63.d



Fig. 61.e

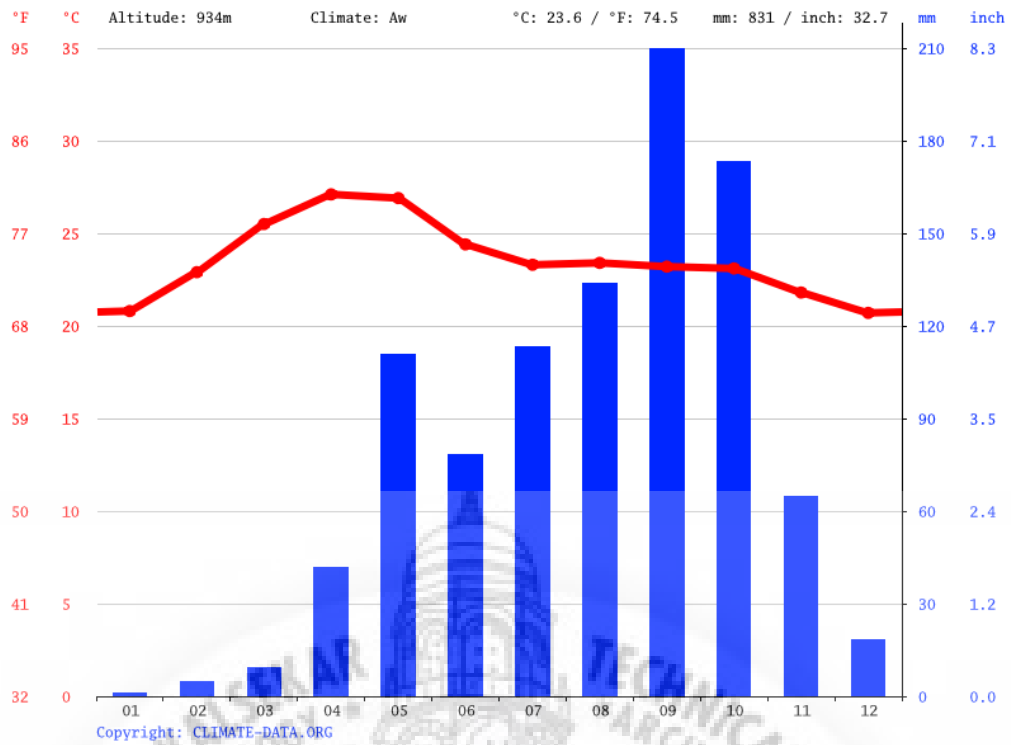


Fig. 64.a Source: <https://en.climate-data.org/asia/india/>

The driest month is January, with 1 mm | 0.0 inch of rain. The greatest amount of precipitation occurs in September, with an average of 182 mm | 7.2 inch.

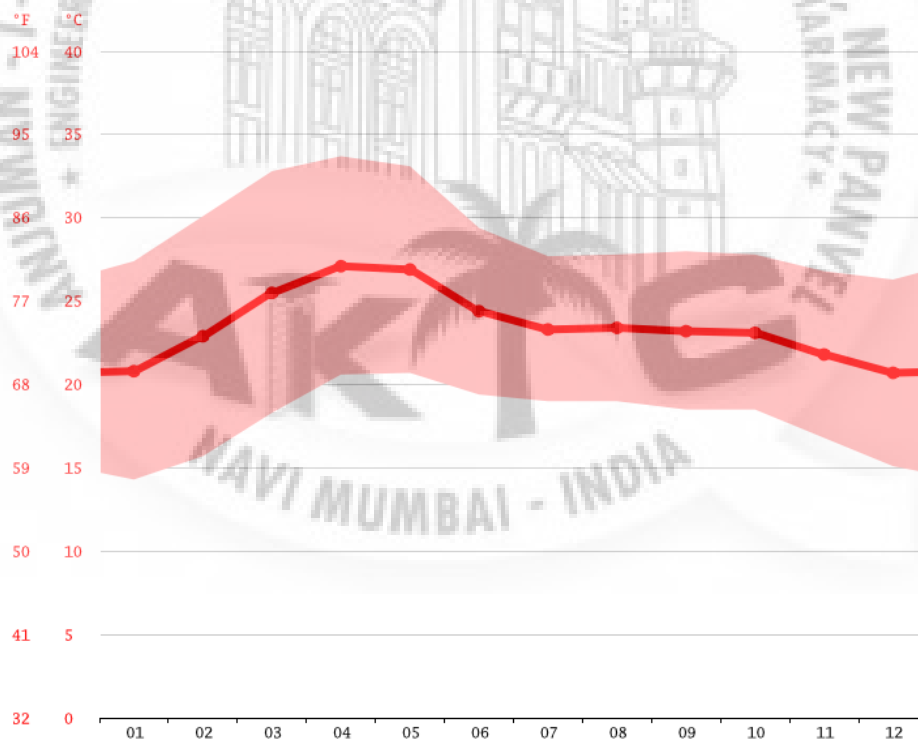


Fig. 64.b Source: <https://en.climate-data.org/asia/india/>

April is the warmest month of the year. The temperature in April averages 27.1 °C | 80.8 °F. The lowest average temperatures in the year occur in December, when it is around 20.7 °C | 69.3 °F.

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## BIBLIOGRAPHY

- <https://www.theguardian.com/healthcare-network/2018/jun/21/pathologists-the-lab-nhs-patients>
- Abhinava S. Singh, (2007), Modern Blood Banking in India, page 351
- <https://factly.in/blood-collection-increases-by-12-in-4-years-still-15-short-of-requirement>
- K.V. Ramani, (2008), Study of Blood-transfusion Services in Maharashtra and Gujarat States, 27-07-2020
- Dr. Alan Dilani, (2012), The Influence of Design and Architecture on Health, Volume 12 - Issue 4, 2012 - Cover Story: Designing the Imaging Service, page 03
- Openlearn Create, Human Interaction with the environment, 27-08-2020
- Radheshyam Jadhav, (2018), Despite shortage, India discards 1m blood units per year, 27-07-2020
- Indian Today, (2017), Centre to open 79 new blood banks to address shortfall, 27-07-2020
- Block Club (06-05-2020), Field Museum hosting Blood drives to help during coronavirus pandemic, 26-08-2020
- Indian Express, (15-06-2017), Metro Blood Bank Project Yet to take off in Mumbai Chennai Kolkata, 02-10-2020
- <https://www.researchgate.net/publication>
- <https://www.sciencedirect.com/science/ar>
- <https://www.ncbi.nlm.nih.gov/pmc/article>
- <https://www.sciencedirect.com/science/ar>
- <https://www.slideshare.net/HusseinAltame>
- [https://en.wikipedia.org/wiki/Blood\\_bank](https://en.wikipedia.org/wiki/Blood_bank)
- <https://www.redcrossblood.org/hosting-a>
- <https://www.ncbi.nlm.nih.gov/pubmed/2977>
- <https://www.livejournal.com/manage/setti>
- <https://www.transfusionguidelines.org/tr>
- <https://timesofindia.indiatimes.com/city>
- <https://en.climate-data.org/asia/india/k>
- <https://architizer.com/projects/church-a>
- [https://en.wikipedia.org/wiki/Prathama\\_B](https://en.wikipedia.org/wiki/Prathama_B)

- <https://ebuild.in/prathama-blood-centre->
- <https://www.archdaily.com/526381/blood-c>
- <https://www.architecturelab.net/regional>
- <https://www.archdaily.com/459667/coimbra>
- <https://www.ctvnews.ca/health/coronaviru>
- <https://worldarchitecture.org/architectu>
- - <https://www.archdaily.com/945697/yifang->
- <https://architizer.com/projects/church-a>
- <https://ebuild.in/prathama-blood-centre->
- <https://www.useful-community-development>
- <https://economictimes.indiatimes.com/new>
- <https://www.hindawi.com/journals/ijfm/2014/53967>  
0/
- <https://www.ndtv.com/health/why-is-there-a-blood-shortage-in-india-1712012>
- <https://www.who.int/news-room/fact-sheets/detail/blood-safety-and-availability>
- <https://www.giveapint.org/library/what-are-the-top-10-excuses-for-not-donating-blood/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3372016/>
- <https://www.medicalnewstoday.com/articles/319366>