

SANGANER HANDMADE PAPER MAKING AND EXPERIENCE CENTRE

Handmade paper production is among the most efficient and environmentally sustainable methods of papermaking, utilizing over **40 recyclable raw materials** such as cotton rags, agricultural waste, and discarded textiles, without relying on wood or chemical-intensive processes.

Sanganer, near Jaipur, is recognized as one of the **world's largest hubs of handmade paper production, sustained for over 500 years by the Kagzi community**, whose craft knowledge has been passed down through generations. Despite its global significance, the handmade paper industry is currently overshadowed by the rapid growth of textile printing, wooden carving industries, and machine-made paper boards, which dominate contemporary markets and urban investment. Today, only a handful of handmade paper units and centers remain, struggling with limited visibility and lack of dedicated infrastructure.

The gradual disappearance of this unique craft endangers the cultural legacy of the Kagzis. Therefore, this project becomes crucial as **an architectural and social intervention aimed at preserving re-integrating this craft and its community** into the contemporary urban fabric.

WHAT IS HANDMADE PAPER?

Handmade paper is an **eco-friendly paper produced manually from recycled materials using traditional techniques**, valued for its durability, texture and sustainability.

Unlike conventional processes, handmade papers are made from **waste materials, rather than wood pulp, formed individually by hand** using a mould and deckle.



WHAT?



- A **production facility** for handmade paper, preserving traditional methods.
- An interactive **co-creative unit & exhibit unit** for visitors to observe and participate in paper-making processes and heritage crafts.
- Training Centre** for Unemployed People and Women in paper-making and allied crafts.
- Retail areas** for selling paper & Sanganer crafts, connecting artisans directly with consumers.
- A **guest house** for accommodating artisans and supporting long-term engagement in craft activities and business training programmes.

KAGZI CENTER

AIM

Aim of this project is to design a **community-oriented handmade paper production and experience center in Sanganer that preserves and revitalizes the 500-year-old Kagzi papermaking tradition**, while promoting tourism and social engagement.

OBJECTIVE

- To promote and preserve the traditional handmade paper-making techniques practiced by the Kagzis
- To create interactive experience zones for visitors and retail platform for selling and publicity.
- To provide training spaces and community areas for cultural exchange and employment upliftment.

CASE STUDIES

Live case studies:

- Living and Learning design center, Bhuj, Gujarat
- Khamir craft resource center, Bhuj, Gujarat

literature case study:

- Echizen Washi paper village, Japan
- National crafts museum and hashtakalashala, Delhi

WHY?

How One Town Keeps India's 500-year-old Papermaking Industry Alive | Still Standing

7.3m views 3 yr ago #Papermaking ...more

BI Business Insider 10.3m

Sanganer, Rajasthan: The Printmaking And Papermaking Hub Older Than The Pink City

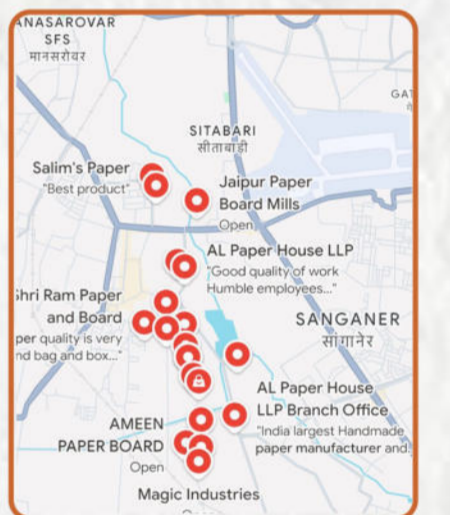
Author : OT Staff
Updated: 26th May, 2025 at 4:36 PM

KVIC Gets Patent For its Innovative Plastic-Mixed Handmade Paper

Curated By : Buzz Staff Trending Desk
Last Updated: August 07, 2021, 15:09 IST

Production is presently **limited to ~10-20 centers** compared to other crafts **due to lack of infrastructure, training programmes and family business patterns**

The J. C. Kumarappa Research Institute near Sanganer in Rajasthan, has found **nearly 40 different waste materials that can produce paper**, including damaged currency notes.



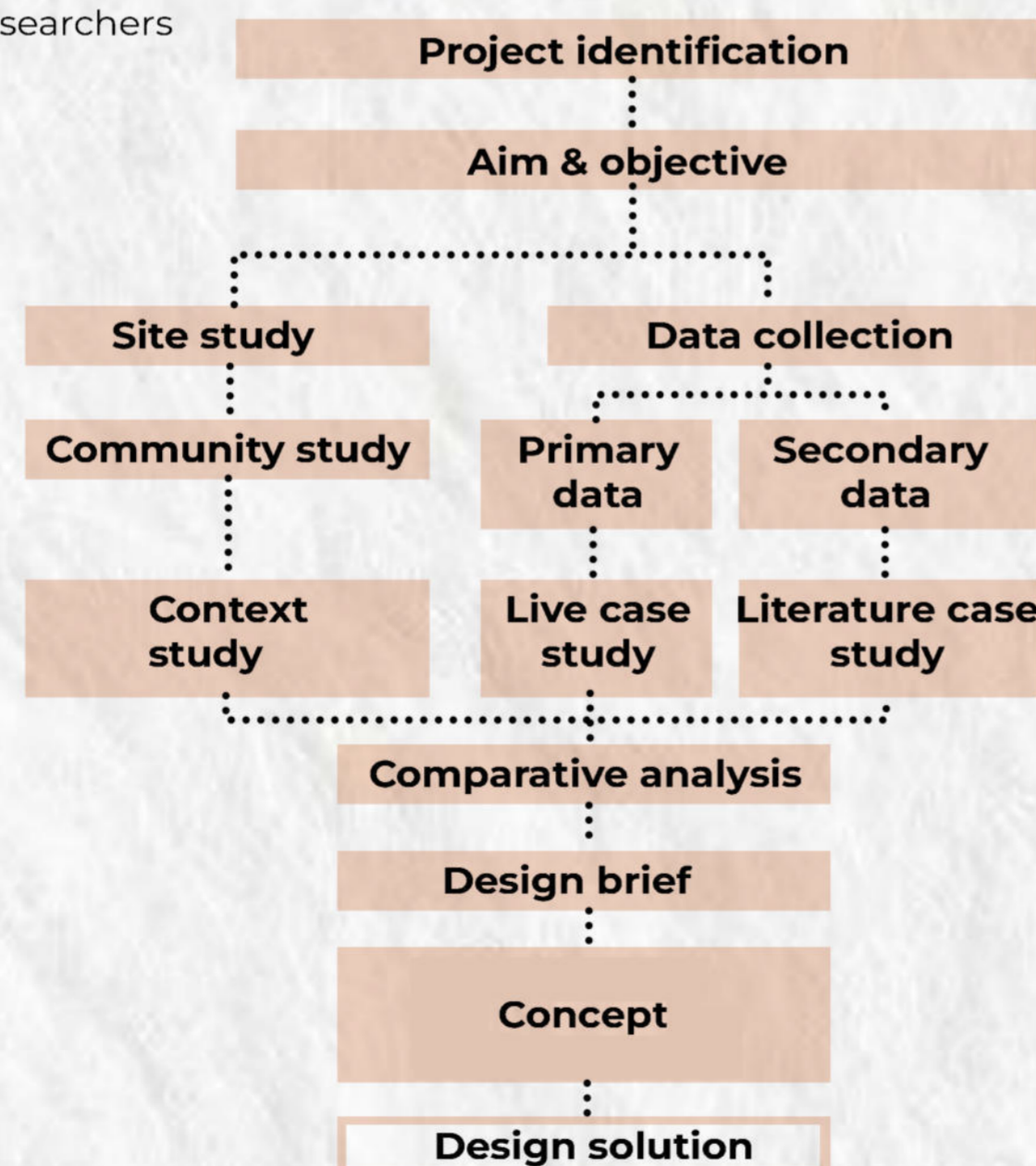
Product that has high value in domestic and international market due to its sustainability



USER GROUP

- Kagzi workers
- Tourists
- Students & researchers
- Staff

METHODOLOGY



SCOPE

- Sustaining cultural legacy of the community
- Economic impact
- Environmental impact
- Artisans welfare and upliftment
- Tourism promotion

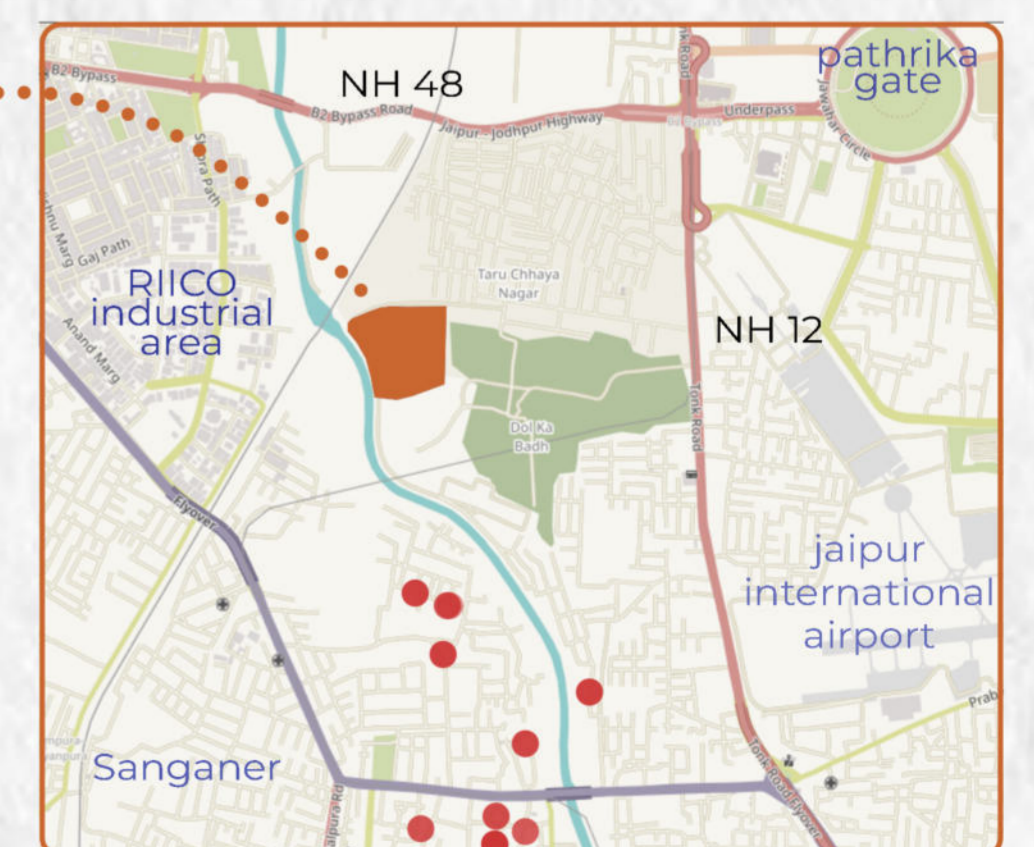
WHERE?



SANGANER, JAIPUR, RAJASTHAN

Tourism of Rajasthan has grown from **~1.51 crore in 2020 to nearly 18 crore in 2023. 26.82 lakh visitors to Jaipur's major sites accounted for about 95% of the state's monument revenue** and 88% of recorded tourist arrivals. Sanganer is 15km from the walled city (Heart of Rajasthan) in Jaipur.

The selected site falls under RIICO industrial land in close proximity to the industrial area promoting Sanganer crafts. The site is surrounded by National Highways, providing easy access from the Kagzi residential areas and tourist locations like Patrika gate and Jaipur airport.



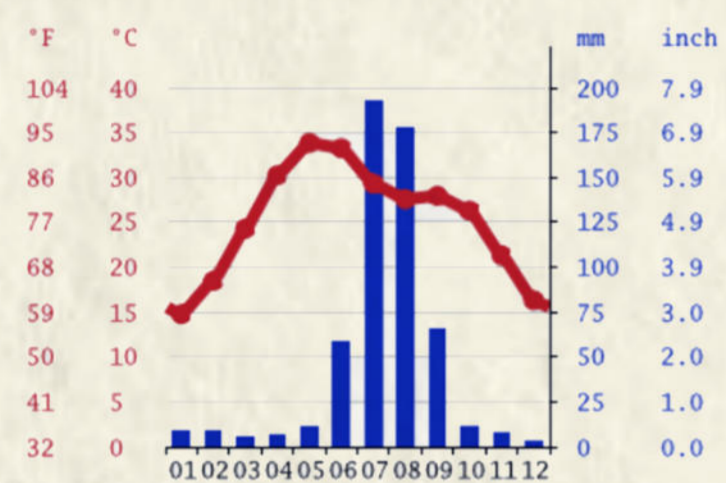
LOCATION:



KAGZI COMMUNITY STUDY

- The name **Kagzi** literally comes from the Hindi/Urdu word "kagaz" (paper), signifying their association with paper production.
- The Kagzis are a **Muslim artisan community**. They are endogamous, typically **marry within their own community** and maintain distinct familial ties centered around shared trade and status.
- Their primary **traditional occupation is handmade paper production**, making Sanganer one of the world's major centers for handcrafted paper.
- They are geographically concentrated in certain localities of Sanganer, often referred to locally as **Kagzi Mohalla**.

CLIMATE:



Climate: Subtropical steppe climate (Bsh). The mean yearly temperature is 25.6 °C. Annually, precipitation of 554 mm. **Summer- end of June- September.** The month with **highest relative humidity is August** (75.76), and lowest is **April** (20.68). The **wettest month is August** (18.33 days). The **driest month is December** (0.77 days)

Light and heat plays a major role in paper making and its drying stage. Design should utilize natural lighting without it affecting the users.

Dry and hot arid climate of Rajasthan should be taken into consideration for material selection and designing.

ACTIVITY MAPPING:

Women prepare breakfast, fetch water, children go to school.



Streets begin to see two-wheeler and cycle traffic, with informal pedestrian movement and street vendors

8-9 AM

Residents leave for work, artisans and shopkeepers.



Local dhabaas are busy with lunch

9-1 PM

Daily shoppers and trader exchanges. Paper makers finish work



1-2 PM

Some local eateries and tea stalls stay open late, near main roads for long travellers and late workers.



People gather at small roadside tea stalls for afternoon chats. Residents socialize in chowks, parks, or in front of houses.

10-5 AM

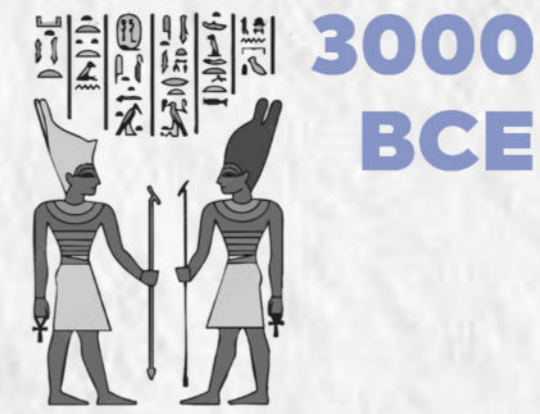
KEY TAKEAWAYS:

Kagzi's engages in community oriented living with communication, gathering and social engagement at local level. The industry is what holds them together and requires to be sustained through community and event spaces.

KEY TAKEAWAYS:

The demographic profile reveals a community-based ecosystem that relies on **experiential knowledge, family labour, and informal learning**. However, **limited youth involvement** and economic vulnerability **threaten its continuity**. This indicates need for an architectural intervention for skill transfer, cultural identity, and economic resilience.

TIMELINE OF PAPER MAKERS



3000 BCE

The Egyptians, Greeks and Romans wrote on "Papyrus", a paper - like material which was considered the first form of paper made by man.

They claimed that they were **originally from Turkey** and from there moved to China and then finally settled in India.



He established a paper industry in Saikot

1586

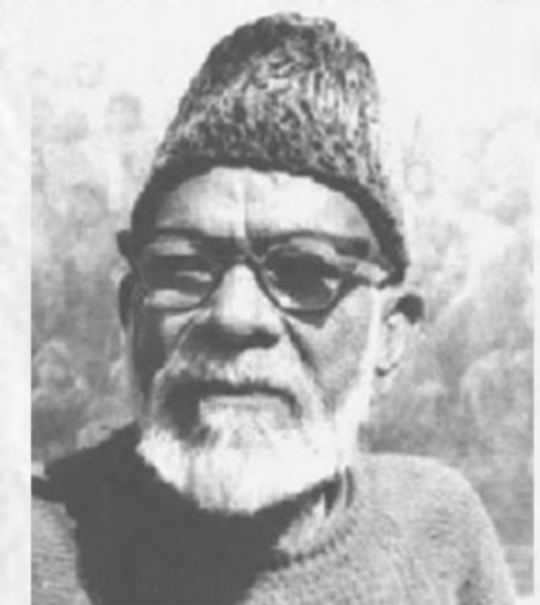


1930

handmade paper received a serious setback as the **British encouraged the import of mill-made paper** from the Western countries.

Janab Allahbux Kagzi, a master craftsman of Sanganer under the guidance of Gandhi, demonstrated the handmade paper-making process to revive and promote the Kagzi tradition of Sanganer.

1938



105 CE



Today's kind of paper was first developed and used in China.

1456



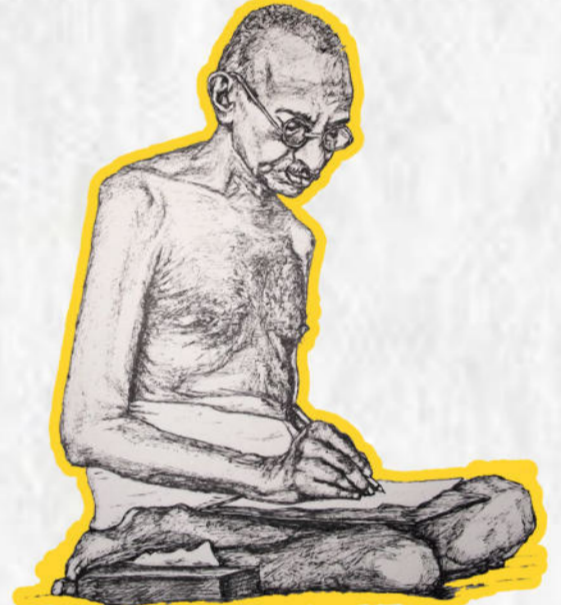
Ghiasuddin Babur was a man with a vision for a grand empire. His hordes were a team of scholars, craftsmen, designers and theologians. Among these were a **few papermakers drawn from Turkey**.

Raja Man Singh later **relocated the Kagzis to Sanganer** and settled them on the bank of the river Saraswati

1586



1931



Mahatma Gandhi provided them with the much-needed support by buying handmade paper in bulk for his Ashram and other associates. He **revived the importance of Indian crafts during the Swadeshi movement**.

After independence, the **Khadi and Village Industries Commission (KVIC)** included **handmade paper in the list of crafts to be promoted**.

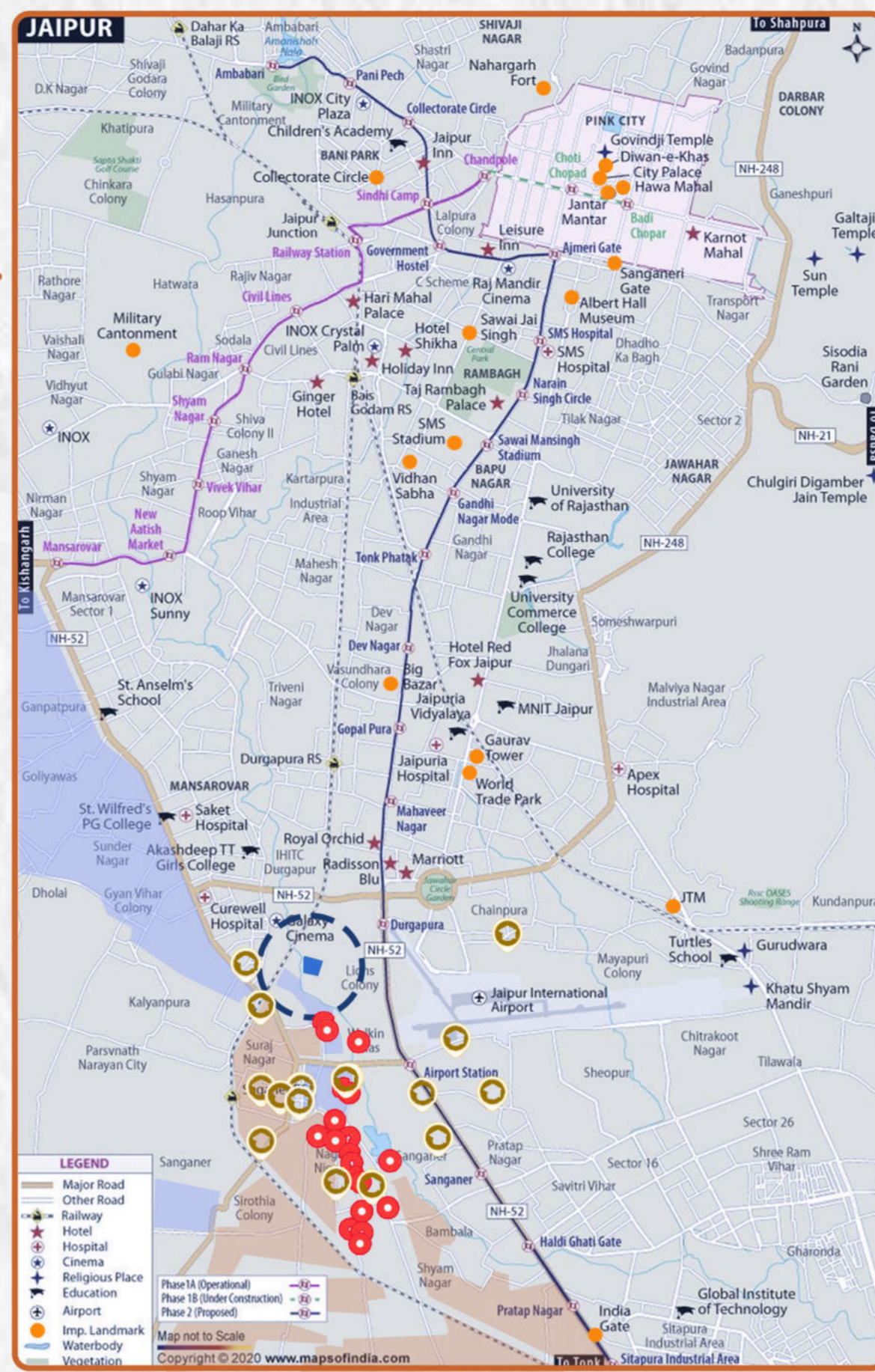
POST 1947



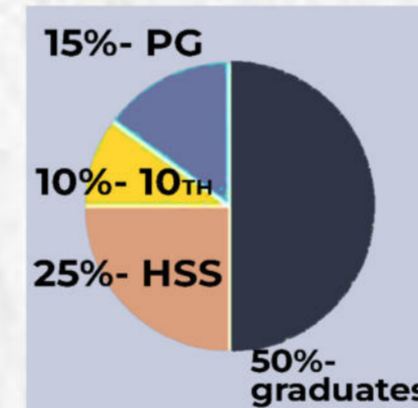
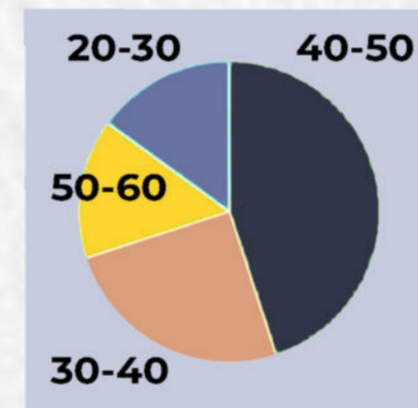
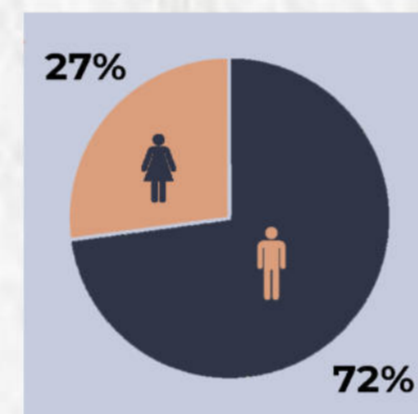
KEY TAKEAWAYS:

The timeline reveals that the decline of handmade paper in Sanganer is not merely due to technological change, but due to the **gradual loss of community-based production spaces, water-linked infrastructure, and shared learning environments**. Therefore, any architectural intervention must aim to:

- Revive **collective working spaces**
- Encourage **intergenerational learning**
- Blur boundaries between production, exhibition, and everyday life



- handmade paper making centers
- Schools
- Proposed site
- Kagzi mohalla (residential land)
- Special area



DEMOGRAPHY

Out of 20 factories, employing 925 workers, 251 (27.13%) were women and 674 (72.86%) were men. The high proportion of female employees indicates

AGE GROUP:

- 45% are 40-50 years old
- 25% are aged 30-40
- 15% are 20-30 years old
- 15% are 50-60 old

This data indicates that 70% of owners fall between 30-50 years of age.

RELIGION AND CASTE:

55% of the owners belonged to backward (Mali) castes, while 45% were from the general (Muslim) caste.

EDUCATION:

- 50% being graduates
- 25% having completed senior secondary school
- 10% completing secondary education
- 15% holding a postgraduate degree or higher.

EMPLOYMENT AT FACTORIES:

Among 20 factories, 11 factories employed 12-25 workers, 4 employed 26-50, 3 employed 51-100, 2 employed 101-200 workers. **Small-scale factories dominate the sector.**



THE LIVING HANDMADE PAPER CENTRE, SANGANER
JAIPUR, RAJASTHAN

SCALE - NTS
COMMUNITY STUDY

NASRIN RIYAZ A

TCR21AR031 / THESIS BATCH 2021-2026 / SCHOOL OF ARCHITECTURE AND PLANNING / GOVERNMENT ENGINEERING COLLEGE THRISSUR / THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE IN BACHELOR OF ARCHITECTURE - APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

HANDMADE PAPER INDUSTRY

UNIDO "STRENGTHENING THE HANDMADE PAPER INDUSTRY IN INDIA" REPORT

The **Kumarappa National Handmade Paper Institute** was established during the implementation phase of the UNDP-UNIDO. The evaluation report published in 1997 was conducted after the institute became operational, assessing its performance and identifying unresolved gaps.

Scope of the 1997 Initiative: United Nations Industrial Development Organization (UNIDO) under the United Nations Development Programme (UNDP), in collaboration with the Khadi and Village Industries Commission (KVIC), has conducted a project "Strengthening the Handmade Paper Industry in India", which was approved in 1990. The project implementation commenced in 1991.

Unaddressed gaps: The evaluation mentioned that more specific training courses need to be developed with stress on any particular area in marketing, testing and processing with smaller duration. Over the past three decades, this has resulted in the proliferation of informal, unhygienic, and spatially inadequate units. This thesis proposes an integrated production-oriented facility that addresses these long-standing gaps.

RELEVANCE

- CONVERTS WASTE BY RECYCLING
Transforms waste into products
- WOMEN PARTICIPATION IN WORK
Empowers women through employment
- POLLUTION-FREE PRODUCTION
Environmentally friendly process
- A POPULAR ECO-FRIENDLY PRODUCT
High demand sustainable goods
- UTILISING LOCAL RAW MATERIALS
Sources materials from local areas
- EMPLOYMENT & INCOME GENERATION
Creates jobs & boosts local economy

PROJECT ALIGNMENT

The Department of Small Scale Industries under the Ministry of Industry developed and outlined the framework to address the following issues:

- rural/village industries development
- generate income in the rural population
- facilitate women participation and involvement in the growth of rural based industries
- promote social welfare and well being among the rural population
- to support industries based on local availability of raw materials, labor skills with traditional heritage and of artistic value.

- LOW TECHNOLOGY & LOW INVESTMENT
Simple and affordable methods
- PRESERVES THE HERITAGE TRADITION
Keeps traditional crafts alive
- POLLUTION-FREE PRODUCTION
Keeps traditional crafts alive
- PROMOTION OF TECHNICAL SKILLS OF LOCAL ARTISANS
Enhance craftsmanship capabilities
- LABOUR INTENSIVE

ECONOMIC VALUE:

Despite low per capita consumption, India is the second largest handmade paper and non wood pulp producer after China. Handmade paper brought in **Rs 5,00,000 in 1953. In 1993, it reached 150 million. In 1995 \$250 million in revenue was generated.**

Top 5 Non-Wood Pulp Producing Countries (Million Metric Ton in 2014)

Countries	Production	Imports	Exports	Net Consumption
World	13.2	0.41	0.4	13.2
China	7.6	0.1	0.1	7.5
India	2.0	0.0	0.0	2.0
Spain	0.90	0.0	0.0	0.88
Russia	0.40	0.0	0.0	0.41
Pakistan	0.37	0.0	0.0	0.37

(Source: <http://www.paperweb.com/Country.htm>)

Why production was missing earlier: 1997 approach:

- Craft preservation
- Low-capital model
- Production left decentralised to avoid, Risk & Large infrastructure costs

Why production is NECESSARY in 2026:

- International demands
- Urban pressure
- Quality control

In last 200 years, six million square kilometer forests have been destroyed. (Rani, N., et al 2011). Paper is one of the core industries and is linked to the basic human needs. Per capita, paper consumption is higher in developed countries like **Austria, Finland, Germany, USA, and Sweden.**

EXISTING INDUSTRIAL CONDITION:

- SALIM'S PAPER:**
 - built area- **6500 sqm (2 storey)**
 - No. of workers- **(60M, 40F) 100**
 - paper production/ day- **20,000**
 - working condition- Industrial
 - import / month- 3-4 trucks/month
 - export / month- 4 trucks/month

1 truck: 8-10 tons (7.5x2.5m)



- SHREE KRISHNA PAPER:**
 - built area- **1560 sqm**
 - No. of workers- **(32M, 9F) 41**
 - production/ day- **6000**
 - working condition- **Bad**
 - imp/month- 2 truck/month
 - exp/ month- 2 truck/month

- KAGZI INDUSTRIES:**
 - built area- **3480 sqm (2 storey)**
 - No. of workers- **(30M, 30F) 60**
 - paper production/ day- **20,000**
 - working condition- Good condition
 - import / month- 3 truck/month
 - export / month- 3 truck/month
- KHEMRAJ PAPER PRODUCTION:**
 - built area- **450 sqm**
 - No. of workers- **(20M, 5F) 25**
 - paper production/ day- **5,500**
 - working condition- **Poor(residential)**
 - import / month- 1 truck/month
 - export / month- 1 truck/month

- A L PAPER HOUSE:**
 - built area- **4380 sqm**
 - No. of workers- **(60M, 35F) 95**
 - production/ day- **10,000**
 - working condition- **Good**
 - imp/month- 2 truck/month
 - exp/month- 3 truck/month

- POONAM HANDMADE PAPER:**
 - built area- **444 sqm**
 - No. of workers- **(18M, 6F) 24**
 - production/ day- **6000**
 - condition- **Bad(commmercial)**
 - imp/month- 1 truck/month
 - exp/month- 1 truck/month

- GOYAL HANDMADE PAPER:**
 - built area- **260 sqm**
 - No. of workers- **(18M, 5F) 23**
 - paper production/ day- **5000**
 - working condition- **Bad(commmercial)**
 - import / month- 1 truck in 2 months
 - export / month- 1 truck in 2 months

- DEEP JYOTI HANDMADE PAPER:**
 - built area- **244 sqm**
 - No. of workers- **(12M, 8F) 20**
 - paper production/ day- **5000**
 - working condition- **Bad(residential)**
 - import / month- 1 truck in 2 months
 - export / month- 1 truck in 2 months

- KRISHNA HANDMADE PAPER:**
 - built area- **1861 sqm**
 - No. of workers- **(23M, 2F) 25**
 - production/ day- **8000**
 - working condition- **Good**
 - imp/month- 2 truck/month
 - exp/ month- 1 truck/month

- CENTURY OVERSEAS:**
 - built area- **1376 sqm**
 - No. of workers- **(30M, 15F) 45**
 - production/ day- **12,000**
 - working condition- **Good**
 - imp/ month- 3 truck/month
 - exp/ month- 2 truck/month

- KALPANA HANDMADE PAPER:**
 - built area- **4625 sqm**
 - No. of workers- **(55M, 25F) 80**
 - production/ day- **10,000**
 - working condition- **Good**
 - imp/ month- 3 truck/month
 - exp/ month- 3 truck/month

- HUSSAIN HANDMADE PAPER:**
 - built area- **350 sqm**
 - No. of workers- **(12M, 5F) 17**
 - paper production/ day- **2500**
 - condition- **Bad(Residential)**
 - imp/ month- 1 truck in 2 months
 - exp/ month- 1 truck in 2 months

- TAJ PAPER UDYOG:**
 - built area- **786 sqm**
 - No. of workers- **(45M, 13F) 58**
 - paper production/ day- **8000**
 - working condition- **Good**
 - import / month- 2 truck/month
 - export / month- 1 truck/month

- BALAJI HANDMADE PAPER:**
 - built area- **2260 sqm**
 - No. of workers- **(34M, 8F) 42**
 - paper production/ day- **8500**
 - working condition- **Bad(Residential)**
 - import / month- 2 truck/month
 - export / month- 1 truck/month

Current Paper units functioning as:

- Converted houses
- Informal sheds
- Poor hygiene
- Unsafe working conditions
- No zoning separation
- No visitor engagement
- Fragmented production
- Weak marketing
- Limited employment growth

Despite early institutional recognition, the handmade paper sector in Sanganer has continued to operate largely within informal structures, leading to compromised hygiene, limited scalability, and poor public exposure.

Workers travel distance from older units - **6km**
Distance from Kagzi mohalla to site- **3.5km**
No. units to be relocated- **7**
No. of employees to be relocated- **192**
paper production- **38,500**

TOURISM AND FOOTFALL:

- Rajasthan recorded **~25.44 crore total tourists (domestic + foreign) in 2025, up about 10% from 2024.**
- 2024 **~23.22 crore** tourists
- 2023 **~179 million (~17.9 crore)** domestic visitors and **~1.7 million** international tourists.

Jaipur is the most visited district in Rajasthan for both domestic and foreign arrivals.

~88% of state revenue is from Jaipur monuments in a sample period.
It is one of India's UNESCO World Heritage Cities, famous for its forts, palaces, and historic architecture.

KNHPI RESEARCH INSTITUTE:

Orientation course	15 Days
Specialized operators course	3 months
Training for practical consultants	1 month
Marketing & product development	15 days
Entrepreneurship development	1 week
Advanced course	1 year

UTILITIES:

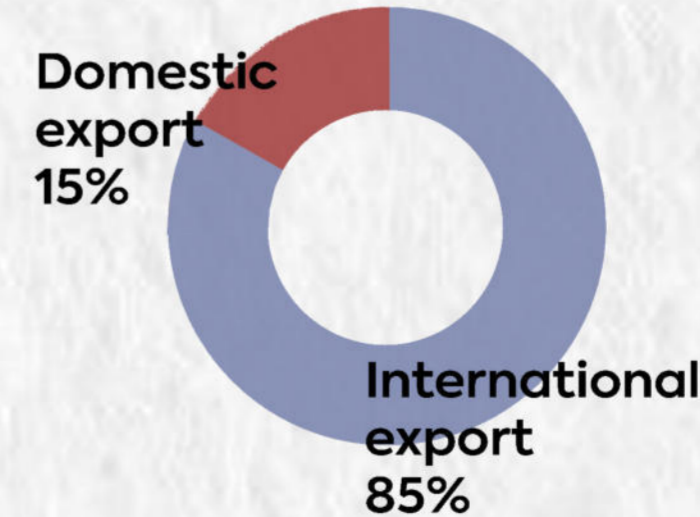
- The total requirement of power for the unit is **36 HP**
- The water requirement of the unit for the production of **80 Kgs/day i.e. 12000 liters.**

MARKET SUPPLY & DEMAND

Overall in India, there are around **3800 hand-made paper making units**, accounting for a production of **Rs. 128 crores and providing employment to 28,000 rural artisans in India.** In 2023, the value of exports was approximately **US \$4.93 million** with about **2.81 million kg shipped internationally** (HS Code 480210). The handmade paper industry in India is projected to reach **\$1.2 billion in 2025**, growing at a CAGR of 22% from 2023 to 2025.

Despite the continued focus on digitization, India's demand for paper is expected to **rise** primarily due to an increase in school-going children, Growing consumerism, modern retailing, rising literacy and increasing use of documentation will keep demand for paper buoyant.

International export- 85%
Domestic export- 15%



Highest sale- May - October
Domestic market- Metro cities of India including Mumbai, Delhi, Bengaluru, Chennai, Kolkata, Hyderabad, Pune

International market- US, UK, France, Canada, Nepal, Germany, Qatar, Spain, Denmark, Netherlands, Australia, Italy, UAE.



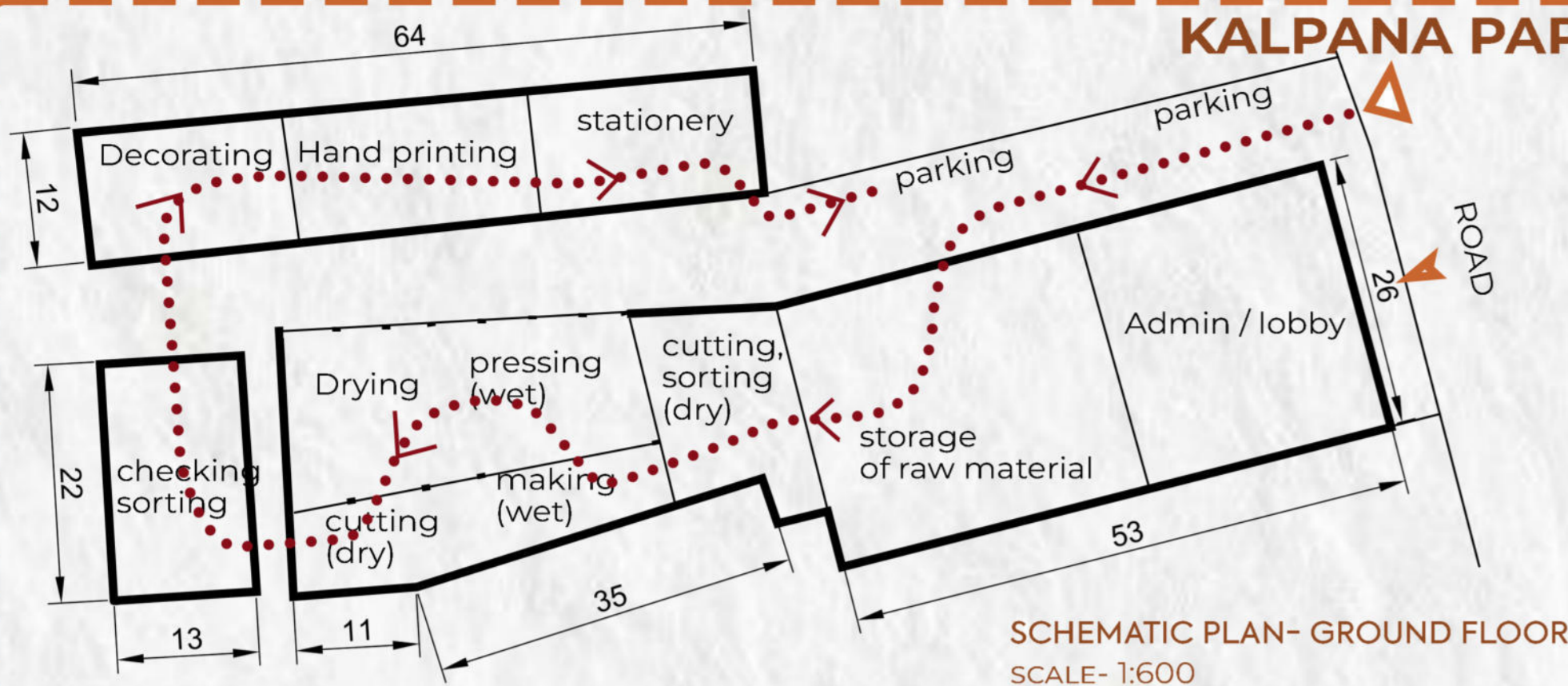
THE LIVING HANDMADE PAPER CENTRE, SANGANER
JAIPUR, RAJASTHAN

SCALE - 1:10,000
PROJECT FEASIBILITY

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PAPER INDUSTRIES OF SANGANER

KALPANA PAPER MANUFACTURERS



SCHEMATIC PLAN- GROUND FLOOR
SCALE- 1:600

- **Type of business** - manufacturing unit, export unit, distributor
- **Working**- mon- sat (10:00- 6:00)
- **No. of workers**- ~80 workers
- **No. of floors**- 2
- **per day manufacture**- 10,000 papers

The first storey of the building is used for paper pulping (wet activity), storage and drying.

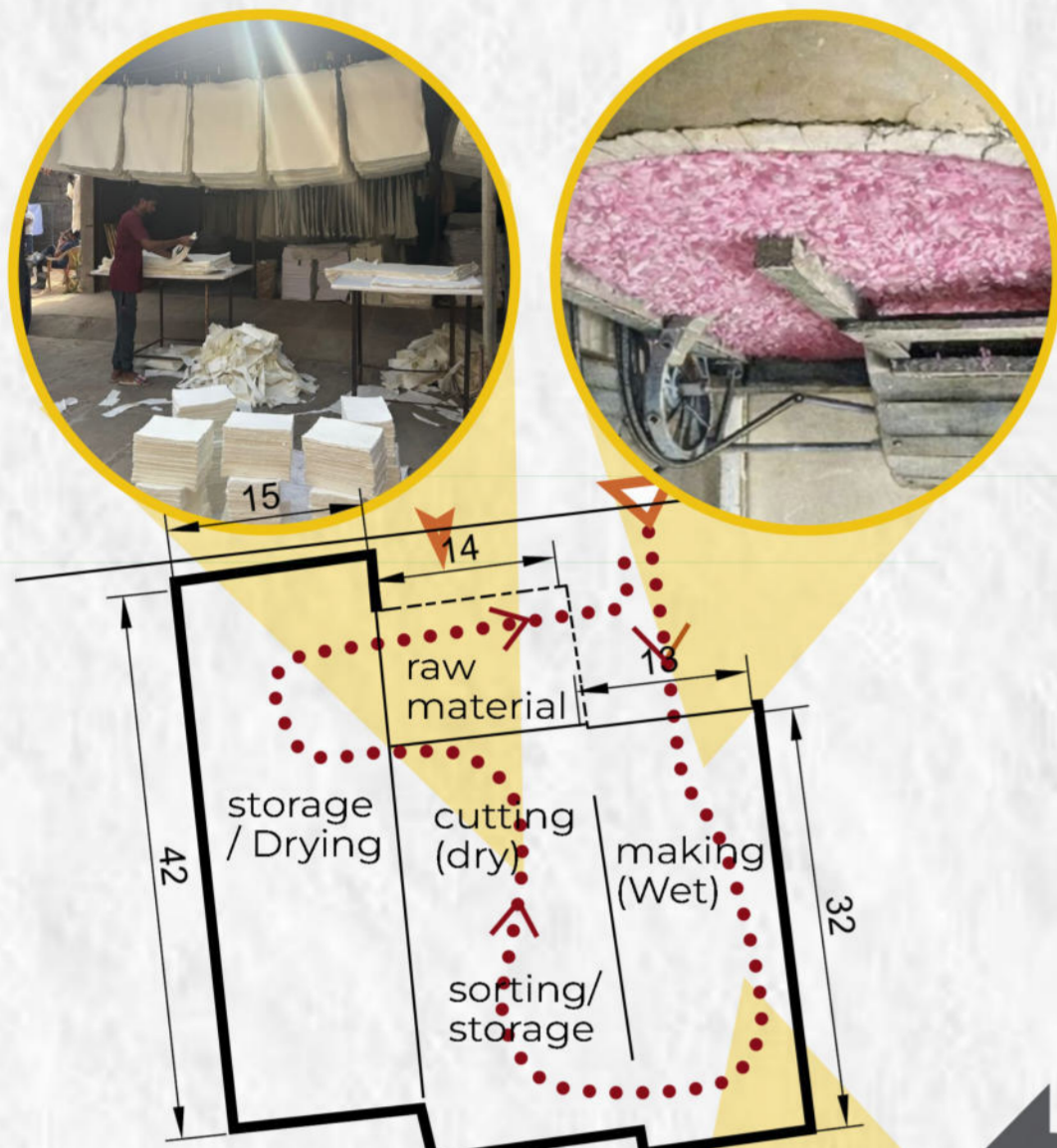
Paper sheets are hanged on ropes throughout the space by letting in neutral heat and wind.

Hardboards are dried on barren lands under the scorching sun for better drying as it is harder than paper.

PAPER PRODUCTS:



KRISHNA PAPERS

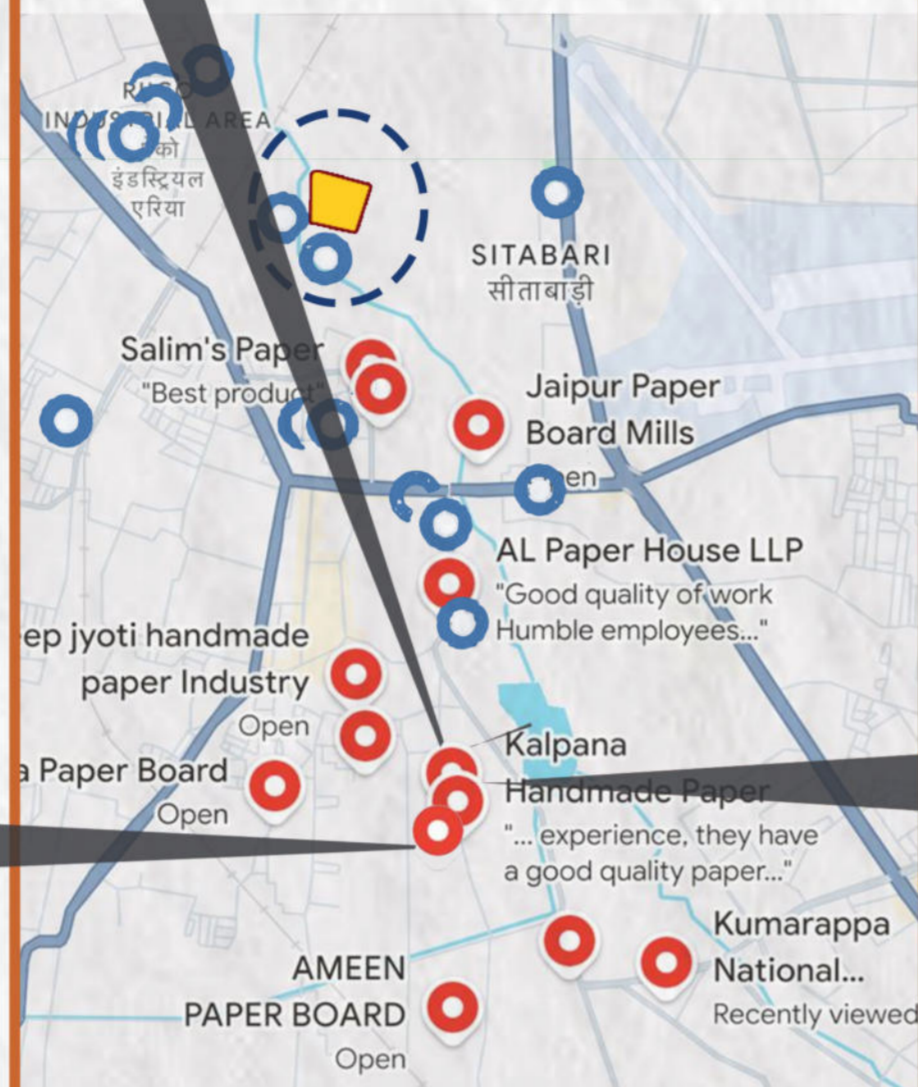


SCHEMATIC PLAN- GROUND FLOOR

SCALE- 1:600

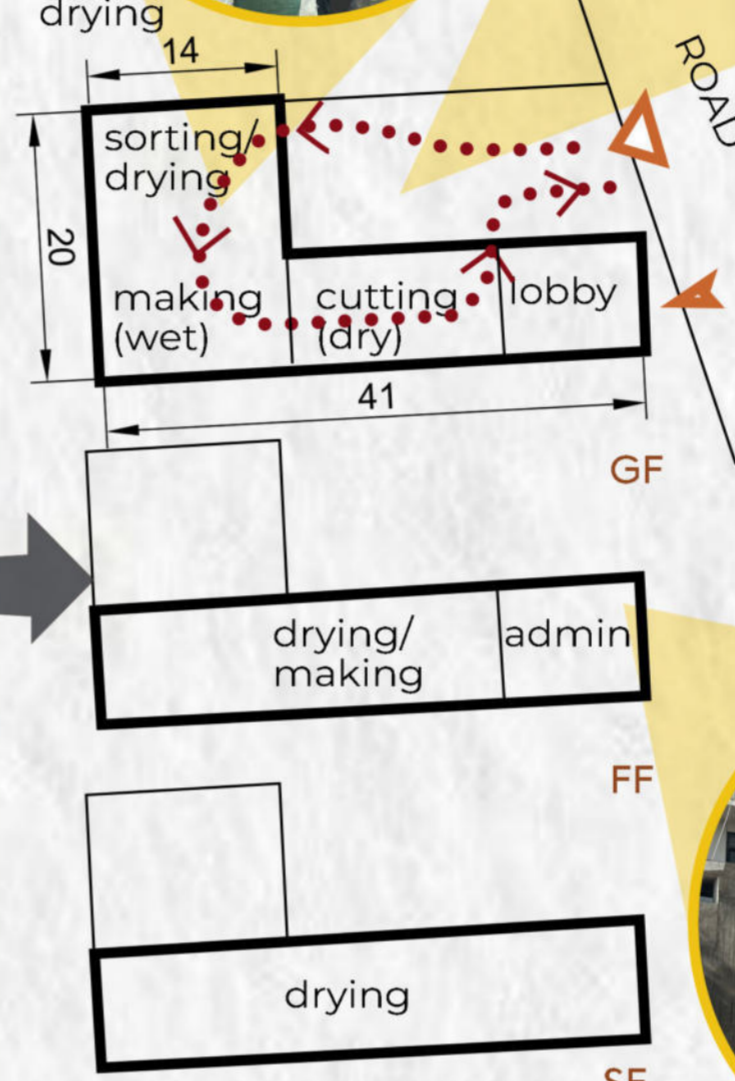
- **Type of business** - manufacturing
- **Working**- mon- sun (9:30-6:30)
- **No. of workers**- 25 workers
- **No. of floors**- 1
- **per day manufacture**- 8,000 papers

- **Type of business** - 1 manufacturing unit, 1 export unit, 1 stationery shop
- **Working**- mon- sun (9:30- 6:30)
- **No. of workers**- 45 workers (10 women)
- **No. of floors**- 3
- **per day manufacture**- 12,000 papers



- Paper industries
- Textile industries
- Proposed site

CENTURY PAPERS

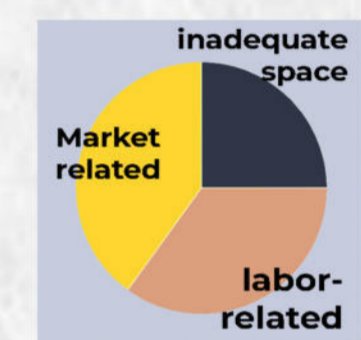


SCHEMATIC PLAN
SCALE- 1:600

CHALLENGES:

Out of 20 factories, **-25% - challenges related to inadequate space and infrastructure**, **-35% - labor-related issues**, **-40% - market-related obstacles**. primary concerns revolved around workforce management and space constraints.

- 30% - electricity supply issues
- 15% - lack of unity and cooperation within the industry.
- 75% - difficulties in maintaining the quality standards
- 50% - challenging to introduce new designs that met market demands.



THE PAPER MAKING PROCESS



The raw material for making paper is cotton waste. Cotton waste is first made into pulp. Different natural additives including flower petals are added to the pulp. After transferring this pulp to large tanks, fine meshes are used to fish out the pulp from the tanks' bottoms. The pulp is then covered with sheets of muslin which is then pressed to remove the water. The muslin is peeled off from the pulp and it is allowed to dry. The end product is handmade paper. This paper is then embellished with different accessories (optional) and made into the different forms as mentioned above.

- 1. Sorting and cleaning of raw materials:** Raw materials such as cotton rags, waste paper, jute, etc are sorted to remove unwanted materials.
- 2. Chopping of raw materials:** The cleaned raw materials are then chopped into small pieces. This increases the surface area of the fibers.
- 3. Beating process:** The fibers are beaten using traditional beaters or mechanical devices. Beating separates the fibers, turning them into pulp.
- 4. Paper making process:** The pulp is mixed with water in large vats. A mould and deckle are dipped into the vat and lifted carefully, allowing a thin layer of fibers to spread evenly over the screen. This forms the basic sheet.
- 5. Squeezing and separating process:** The wet sheets are stacked between cloths and pressed to remove excess water.
- 6. Hanged drying process:** After pressing, the sheets are separated from the cloth and are hung on drying racks in well-ventilated spaces.
- 7. Calendering process:** Once dried, the paper sheets are passed through rollers or pressed manually to smoothen the surface.
- 8. Sorting process:** The finished sheets are sorted based on size, thickness, color, and surface quality. Defective sheets are recycled.
- 9. Decorating process:** Decorative elements such as flowers, threads, leaves, or pigments are added to selected sheets.
- 10. Packaging:** Finally, the sorted and decorated paper sheets are bundled, wrapped, and packed for storage or transportation.

WASTE MANAGEMENT

Handmade papers are completely recycle-able material as it is made of waste cotton pieces and other natural materials. Hence, this industry supports in utilising the **8.5% (7793 ktons) share of global textile waste produced in India. 17% of these waste ends up in landfill.**

Waste water drained during the process is channelled out into the drainage from the interiors

RAW MATERIALS:



- **Cotton hosiery waste**
- **Cotton rags**
- Shredded currency
- Cow dung
- Wheat straw
- Rice straw
- Mulberry (Shahtut)
- Jute
- Pineapple leaf fibre
- Banana fibre
- Sunn hemp
- Bhimal (Grewia)
- Ankara (Calotropis)
- Bamboo fibre
- Palm leaf fibre
- Silk cocoon waste (endo-cocoon pulp)
- non-wood plant fibres
- Agro-residue fibres
- Grasses and weeds

raw materials as documented and researched by Kumarappa National Handmade Paper Institute (KNHPI):

Drying of paper boards are well executed in open lands. Majority of land parcels of Sanganer takes up space for drying areas.



THE LIVING HANDMADE
PAPER CENTRE, SANGANER
JAIPUR, RAJASTHAN

SCALE - 1:600
BACKGROUND STUDY
ALL DIMENSIONS ARE IN M

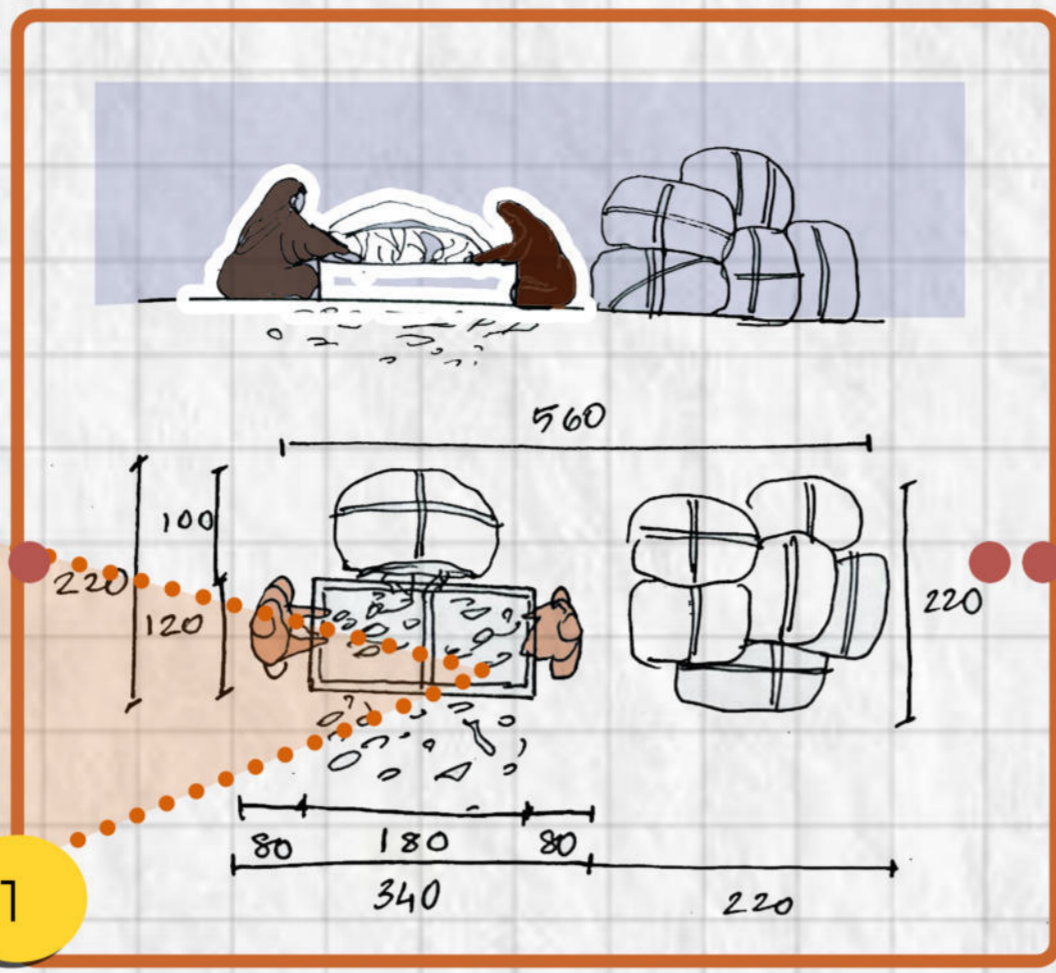
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HANDMADE PAPER MAKING SPACES

CLEANING AND SORTING PROCESS

Area required- **12.3 sqm**
 Machine name - **Sieve**
 No. of workers required - **2**
 No. of equipment - **1**
 Production/ day - **10,000 paper**
 Present working condition- **No specific spacial arrangement for cleaned rags and stored rags**

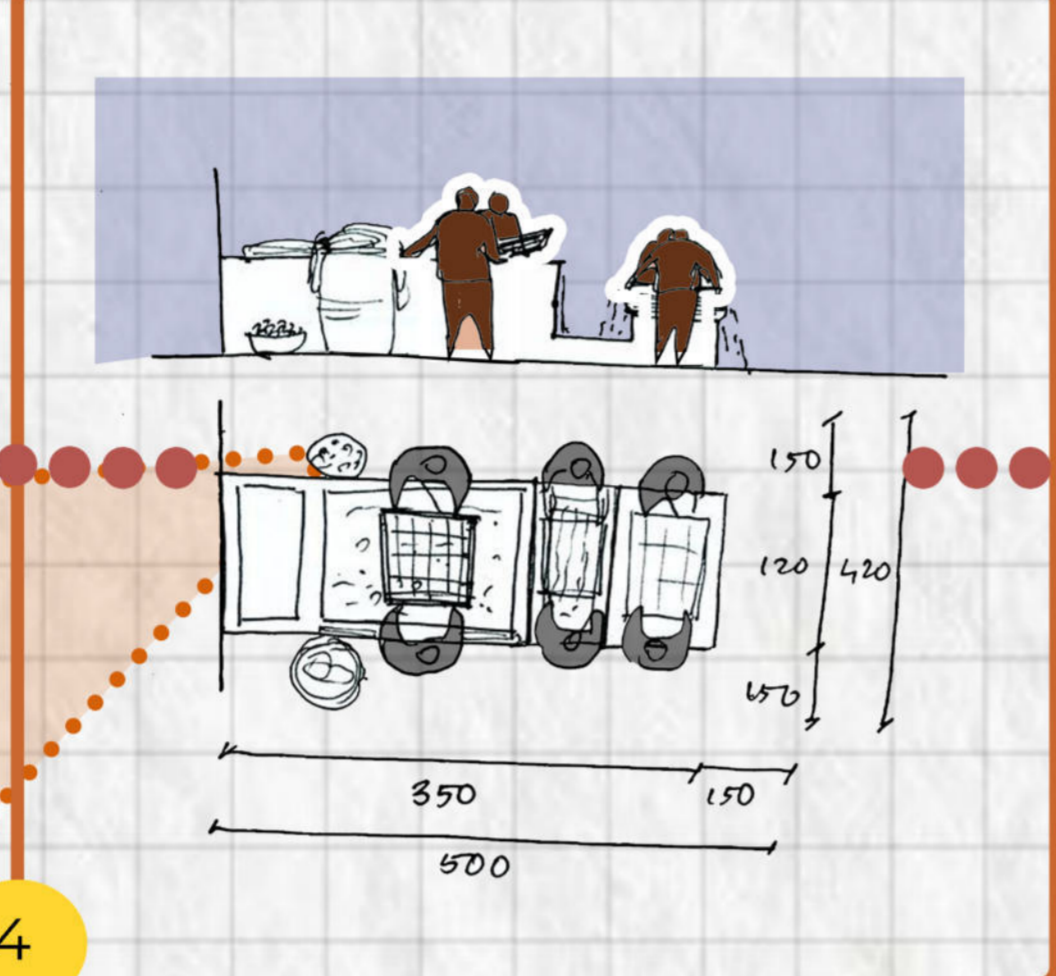
Unwanted dirt is sieved and thrown away from the rags



PAPER MAKING PROCESS

Area required- **21 sqm**
 Machine name - **Mould and deckle tank**
 No. of workers required - **2**
 No. of equipment - **2**
 Production/ day - **10,000 paper**
 Present working condition- **Water is spiller out to the surrounding and are carried through indoor channels. No specific place for stacking cotton cloth and decorative elements**

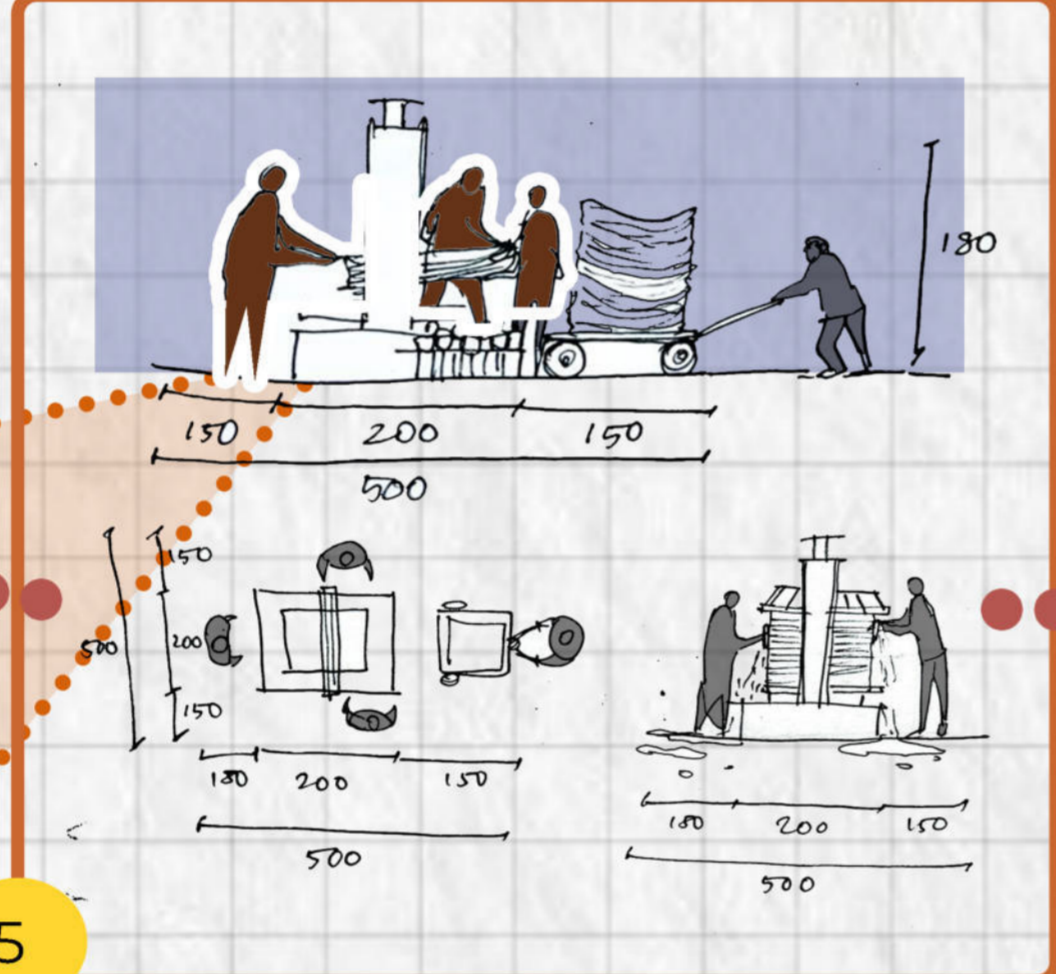
GSM variation from **60-400** is made possible in this process according to the batch



WATER ELIMINATION PROCESS

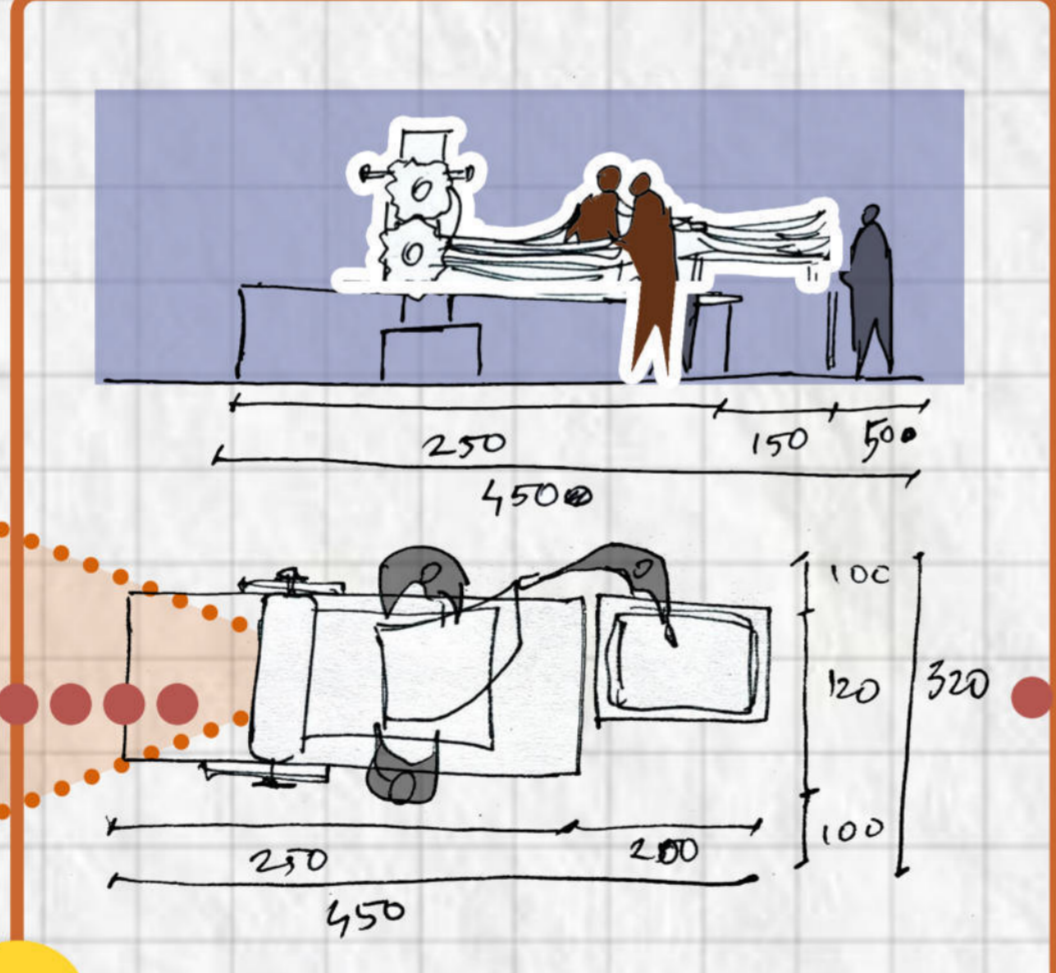
Area required- **25 sqm**
 Machine name - **Hydraulic press**
 No. of workers required - **3**
 No. of equipment - **1**
 Production/ day - **10,000 paper**
 Present working condition- **requires elimination using hand along the paper edges even after machine pressing. Water is eliminated to the floor making the area slippery.**

Machine is kept outdoor to let the excess water outside the building



WRINKLE ELIMINATION PROCESS

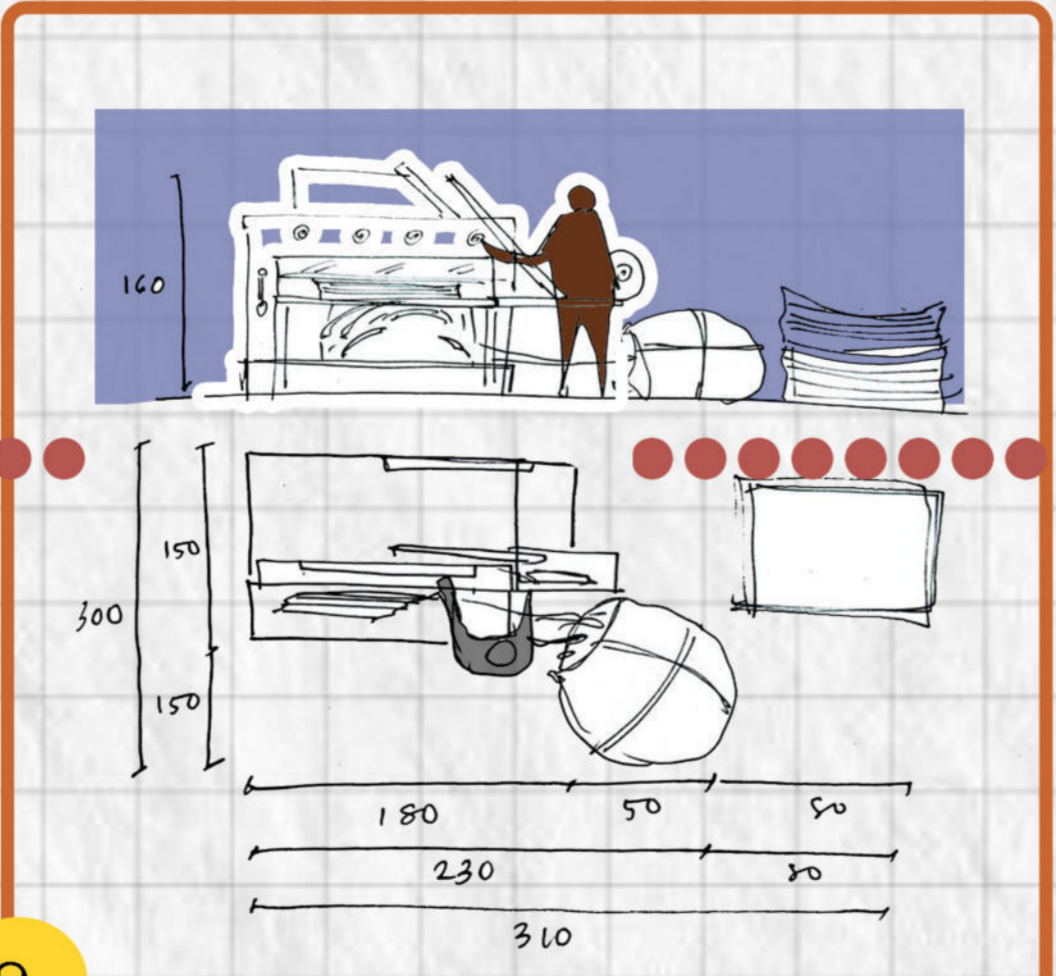
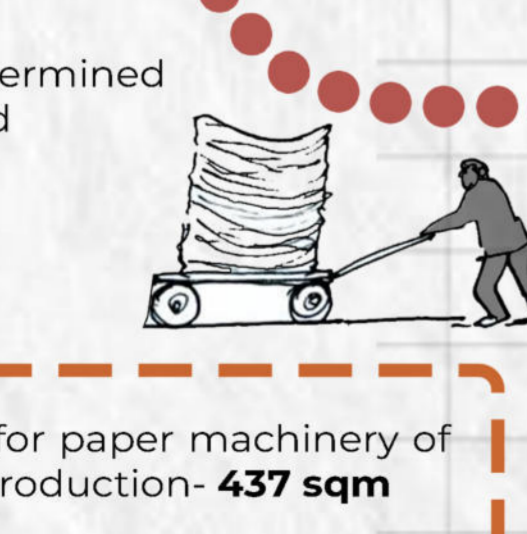
Area required- **14.4 sqm**
 Machine name - **calendering maching**
 No. of workers required - **3**
 No. of equipment - **1**
 Production/ day - **10,000 paper**
 Present working condition- **Paper is placed in between iron sheets for straightening it without wrinkles.**



PAPER EDGE CUTTING PROCESS

Area required- **9.3 sqm**
 Machine name - **Paper shredding maching**
 No. of workers required - **1**
 No. of equipment - **1**
 Production/ day - **10,000 paper**
 Present working condition- **A deck of paper is cut along the edges to give a clean finish. The waste paper is again turned into paper trough rag chopping machine**

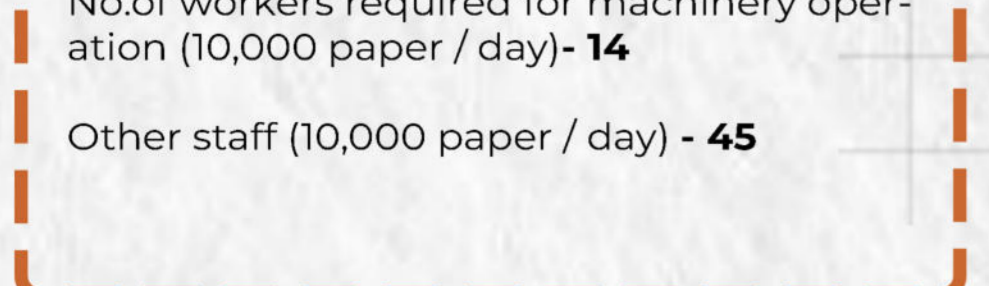
Size of the paper is determined in this stage and stored accordingly.



Total area required for paper machinery of 10,000 paper / day production- **437 sqm**

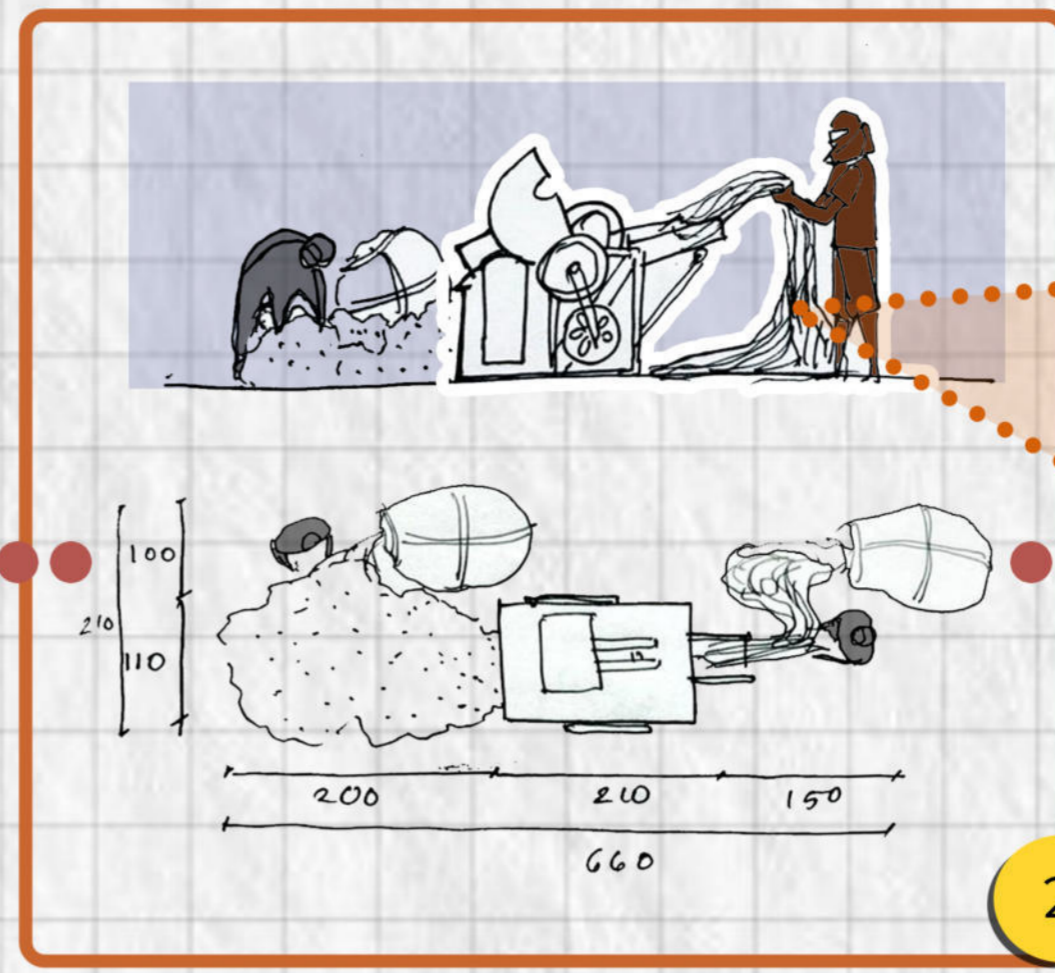
No. of workers required for machinery operation (10,000 paper / day)- **14**

Other staff (10,000 paper / day) - **45**



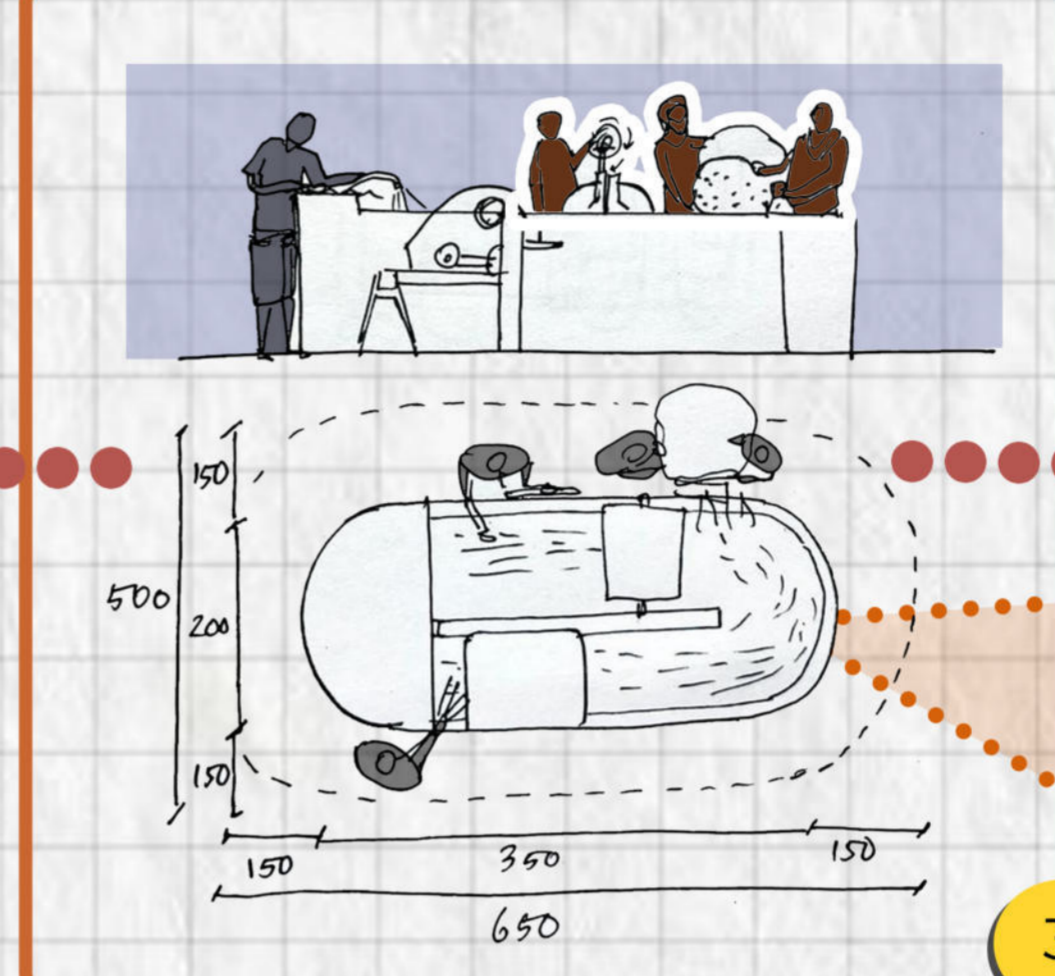
CUTTING PROCESS

Area required- **13.8 sqm**
 Machine name - **Rag chopper**
 No. of workers required - **2**
 No. of equipment - **1**
 Production/ day - **10,000 paper**
 Present working condition- **No specific spacial arrangement**



PULP MAKING PROCESS

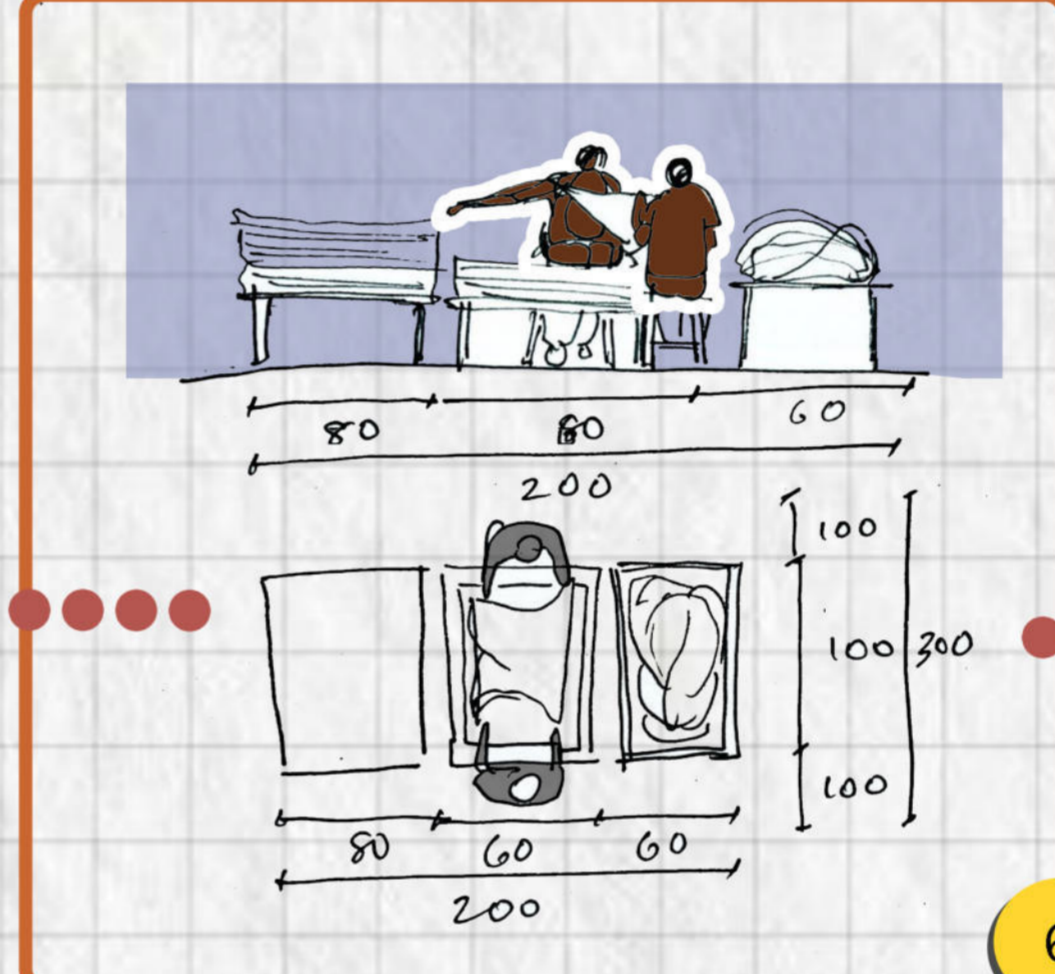
Area required- **32.5 sqm**
 Machine name - **Hollander beater**
 No. of workers required - **3**
 No. of equipment - **1**
 Production/ day - **10,000 paper**
 Capacity of rags - **200 pounds**
 Time for 21 batch - **2 hours**
 Water required - **1500 L**
 Present working condition- **requires circulation surrounding the beater for mixing, water pumping and beating**



Natural dyes are added to paper during this stage for coloured sheets

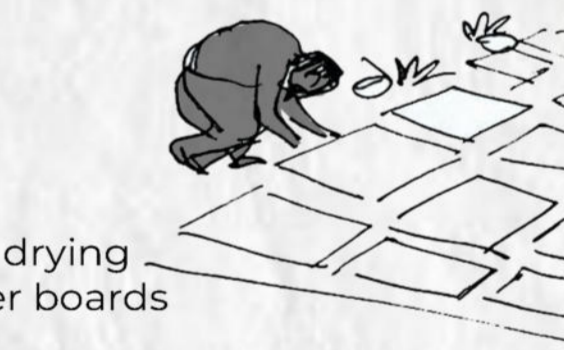
SEPARATING PROCESS

Area required- **6 sqm**
 Machine name - **Tables**
 No. of workers required - **2**
 No. of equipment - **1**
 Production/ day - **10,000 paper**
 Present working condition- **requires 2 people to separate each sheet hand by hand, and separating the cotton cloth for the next batch.**



PAPER DRYING PROCESS

Area required- **300 sqm**
 Machine name - **Hanged drying on cables/ pasted drying on walls**
 Drying time - **2 days**
 No. of workers required - **min 5**
 Production/ day - **10,000 paper**
 Present working condition- **Each paper is hanged without touching each other, using clips.**

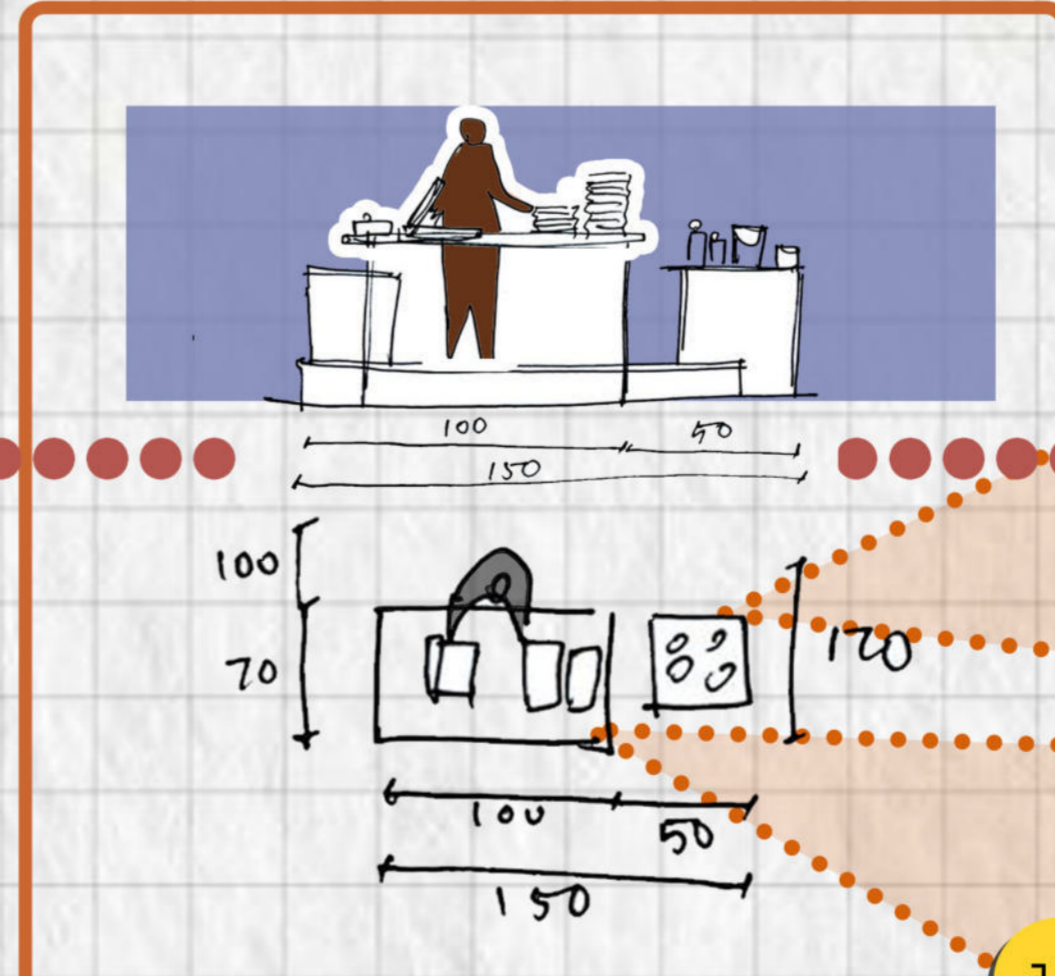


Ground drying for paper boards



PAPER PRINTING PROCESS

Area required- **2.55 sqm**
 Machine name - **Table and print board**
 No. of workers required - **min 7**
 Production/ day - **10,000 paper**
 Present working condition- **Each paper is printed according to client requirement using paints and hand printers.**

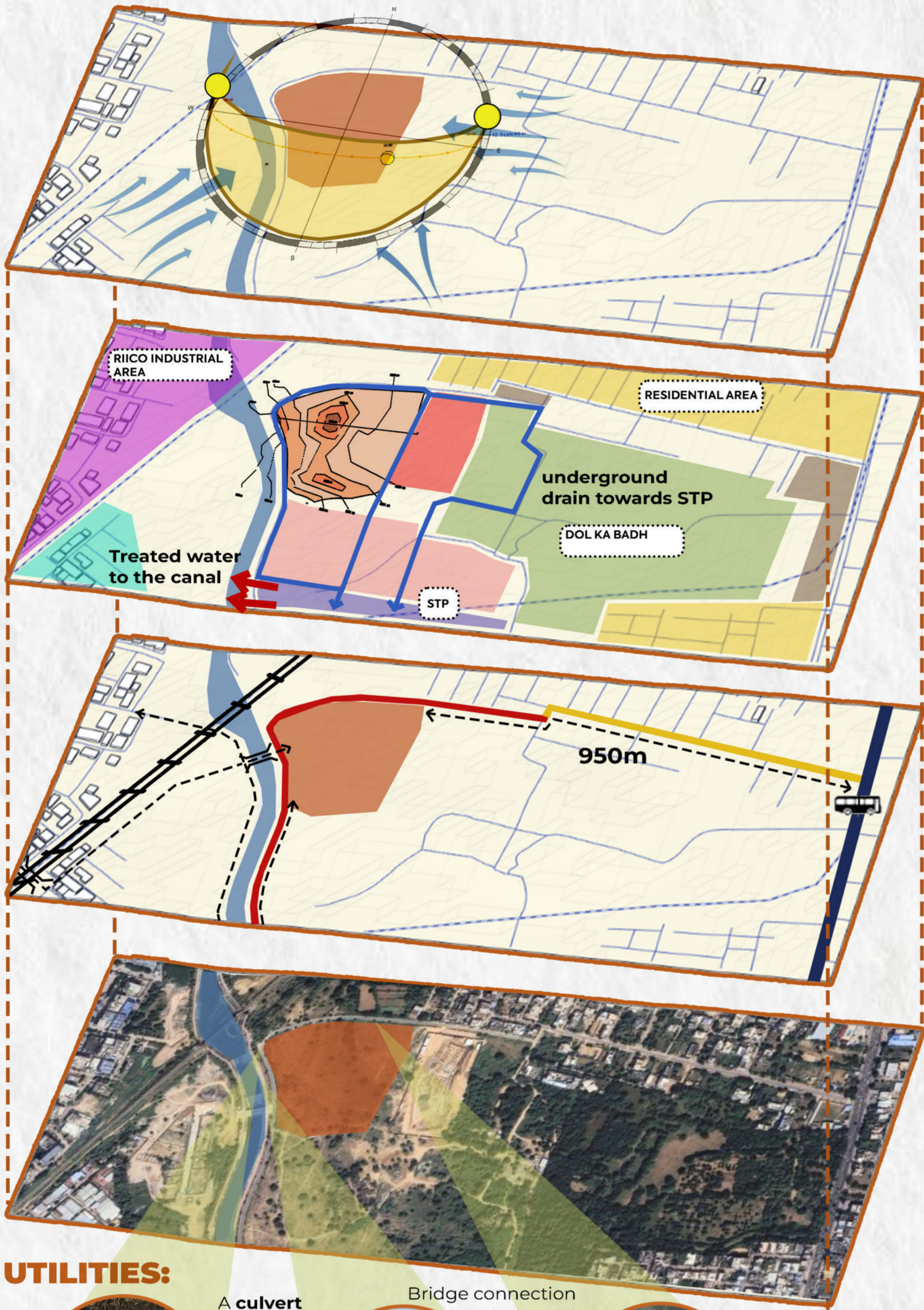


THE LIVING HANDMADE
 PAPER CENTRE, SANGANER
 JAIPUR, RAJASTHAN

SCALE - NTS
DESIGN FORMULATION
 ALL DIMENSIONS ARE IN CM

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ECOLOGICAL FEATURES-



UTILITIES:



A culvert is present to let storm-water drain towards the abutting river



Bridge connection to RIICO industrial Area



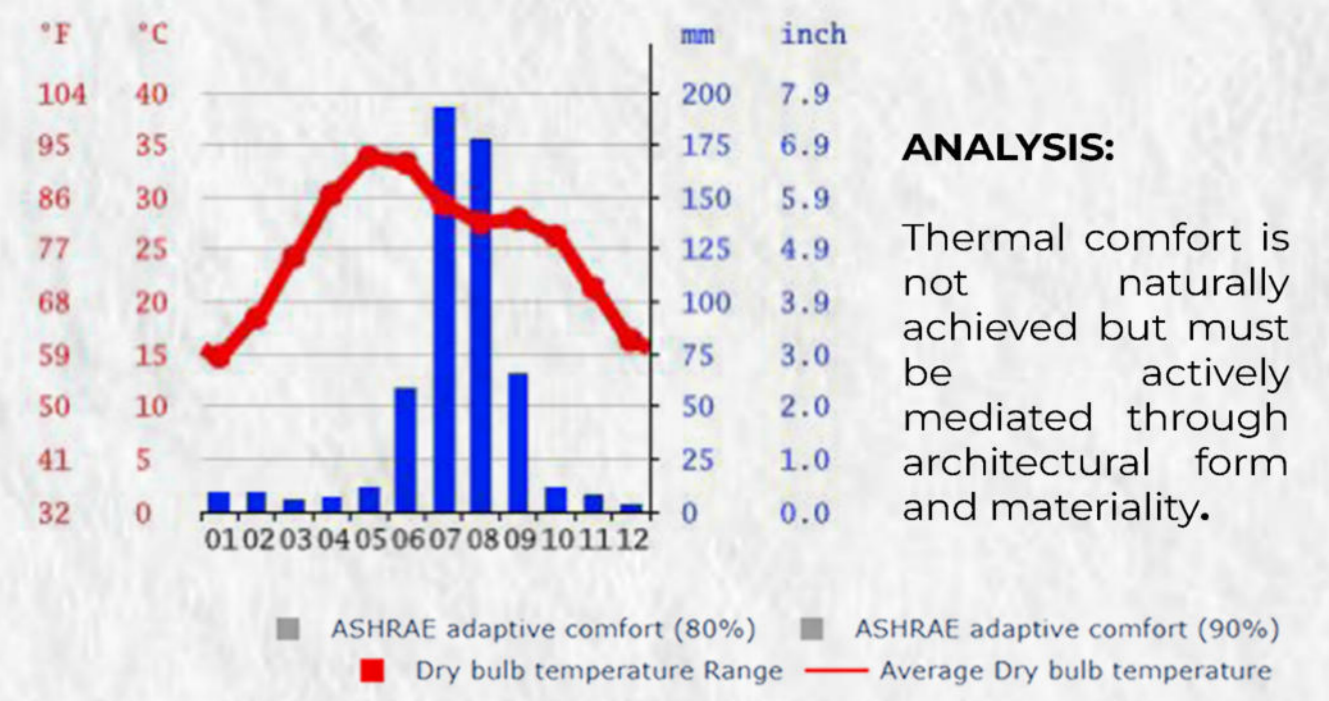
Pedestrian path along the road of 1.5m width

CLIMATE:

DRY BULB TEMPERATURE

TEMPERATURE & PRECIPITATION

Latitude- **26.82**
 Longitude- **75.8**
 Elevation- **390**
 Köppen-Geiger climate zone: **BSh. Subtropical steppe.**
 Average yearly temperature: **25.6 °C**
 Hottest yearly temperature (99%): **40.3 °C**
 Coldest yearly temperature (1%): **8.3 °C**
 Annual cumulative horizontal solar radiation: **1991.41 kWh/m²**
 Percentage of diffuse horizontal solar radiation: **33.6 %**



ANALYSIS:
 Thermal comfort is not naturally achieved but must be actively mediated through architectural form and materiality.

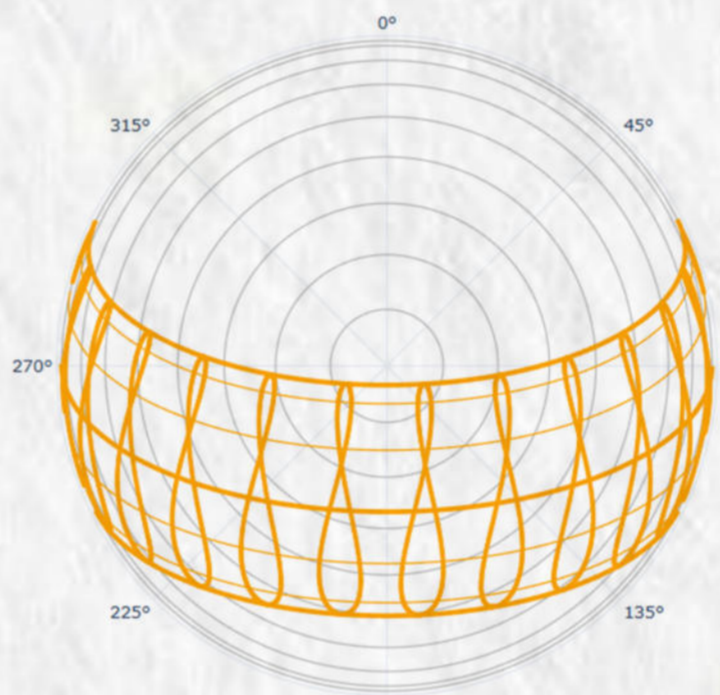
ZONING

- Upcoming unity mall (commercial)
- Dol Ka Badh natural preserve
- Upcoming techpark
- RIICO Industrial area
- Other industrial area
- Residential area
- Commercial area
- TATA sewage treatment plant
- Underground sewage
- Treated water

CONNECTIVITY

- State highway-tonk road
- Arterial road
- Tata STP road (RIICO)
- Bus stop
- Pedestrian access
- Bridge
- Railway track

SUN PATH DIAGRAM

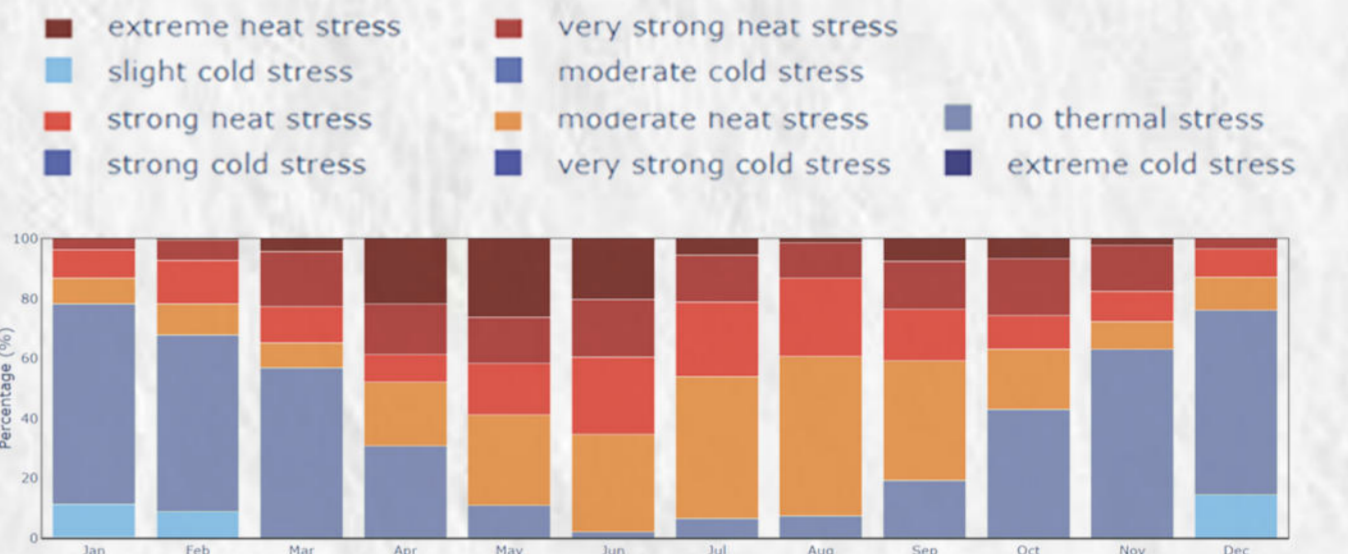


Openings:

- small, **deep-set windows** with shading elements like **chhajja** prevent direct solar gain.
- **Terracotta jaali screens** for filtered light and airflow ensuring privacy, diffused light, and ventilation.

UTCI THERMAL STRESS DISTRIBUTION:

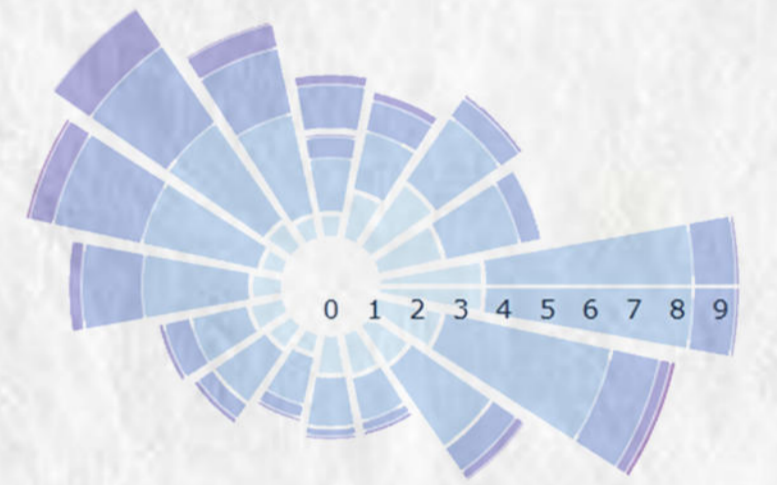
Effective climatic response depends on orientation control, deep horizontal shading, protection of east and west facades and courtyard-based planning, reinforcing the logic of traditional Rajasthani architecture.



ANNUAL WINDROSE DIAGRAM

Wind Speed (m/s)

- calm
- 0.5 - 1.5 m/s
- 1.5 - 3.3 m/s
- 3.3 - 5.5 m/s
- 5.5 - 7.9 m/s
- 7.9 - 10.7 m/s
- 10.7 - 13.8 m/s



Sanganer's climate is dominated by prolonged heat stress driven by intense solar radiation, extended daytime exposure, and high ambient temperatures, with only brief seasonal and hourly comfort windows. Air movement alone is insufficient to offset thermal stress during most of the year.

ANALYSIS:

Effective climatic response therefore depends on controlling solar gain, storing and releasing heat through thermal mass, enabling night-time cooling, and structuring buildings as inward-oriented, shaded, and temporally adaptive environments.

SITE FEATURES:

DRAVYAVATI RIVER REJUVENATION PROJECT
 (stormwater + treated sewage + groundwater recharge).



Jaipur Development Authority has taken up the ambitious project of Rejuvenation of Historical Dravyavati River in Jaipur. The river had gradually converted into a waste water nallah passing through the city of Jaipur. It has been restored to its pristine glory under the project. The river in a length of 47.5 Km starting from Nahargarh Hill. Construction of **84 Check Dams, Walking and Cycle track, green spaces in the embankment, 5 Sewerage Treatment Plants of total 170 MLD capacity, 3 Gardens** along the river.

SITE OWNERSHIP:

- **Site Ownership:** RIICO (Rajasthan State Industrial Development & Investment Corporation)
- **Land Use:** Industrial land within RIICO Industrial Area, Sanganer

The site's proximity to the RIICO industrial area ensures logistical viability, while the nearby STP and Dravyavati river corridor enable environmentally responsible water use and discharge. The absence of open drains and presence of underground drainage reflect planned infrastructure, allowing the project to function as a model craft-production ecosystem.

STREET CONTEXT:



EXISTING VEGETATION:

The site is home to valuable flowering trees as it is along a natural preserve area and is to be protected from cutting.

Shrubs- thorny desert shrubs



INFERENCES:

Providing two separate entrance from RIICO area and the North-east area would be apt for easier accessibility of workers and visitor's. The building facaded could be offsetted approximately 90m from the entrance for an appealing view. The parking areas could be zoned towards the south as it buffers the direct facing sunlight. Production and visitor's block zoning towards the west as it offers more views and easier access, meanwhile training and guest house could be zoned in the East for more privacy and calmness.



THE LIVING HANDMADE PAPER CENTRE, SANGANER
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SCALE - 1:800

SITE ANALYSIS
 ALL DIMENSIONS ARE IN M

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CONCEPT DEVELOPMENT

UNFOLDING SPACES

The architecture does not imitate paper superficially, but **interprets its behaviour such as folding, layering, wrapping, and revealing as spatial and structural principles.** This gradual revelation transforms circulation into a learning journey.

Folded plate systems and origami-inspired pavilions derive their geometry from the inherent properties of paper by **translating material logic into built form.**

BUILDING MATERIALS



Brick walls Lime plaster Terracotta jaali Pink sandstone

The sharp-edged and angular geometry emerges from the **intrinsic material logic of paper, which derives its strength and form through folding** rather than curvature.

Architectural implication:

- **Angled walls and roofs**
- Act as **folded-plates**
- **precise solar orientation**
- **self-shading surfaces**



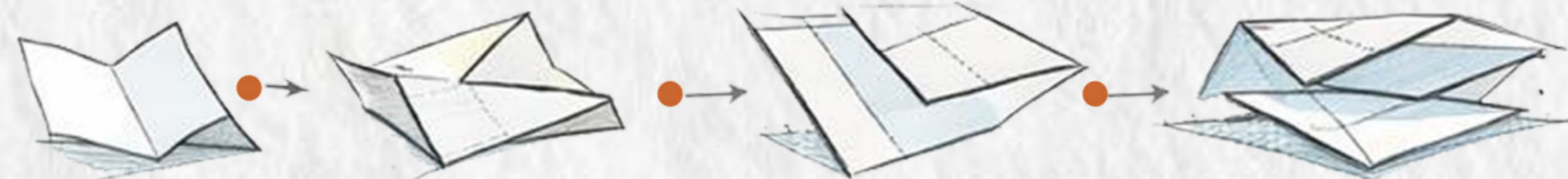
Paper drying could be provided as an eye-catching element in public areas, thereby providing shade.

MACRO FOLDS & LAYERED FACADE

macro-scale folds fragments direct sunlight into softer, diffused illumination.

Primary folded plates provide structure and shading, while secondary perforated or folded screens act as light filters.

This layering allows varying degrees of transparency & more openness in public and interaction spaces.



FORM - FUNCTION INTEGRATION

The unfolded and folded planes are **strategically oriented in response to sun paths and prevailing wind directions**, allowing the building form itself to act as a climatic moderator. The **layered spaces create shaded transitions between indoor and outdoor areas**, allowing diffused daylight while limiting heat ingress.



Variations in height and slanted planes facilitate the upward movement of warm air, drawing cooler air through lower openings and enhancing cross-ventilation. This **controlled air movement is channelled towards drying zones and interaction areas**, where continuous airflow is essential for both production efficiency and user comfort.



The gently slanted unfolded surfaces enable efficient rainwater movement, preventing water stagnation on flat roofs.

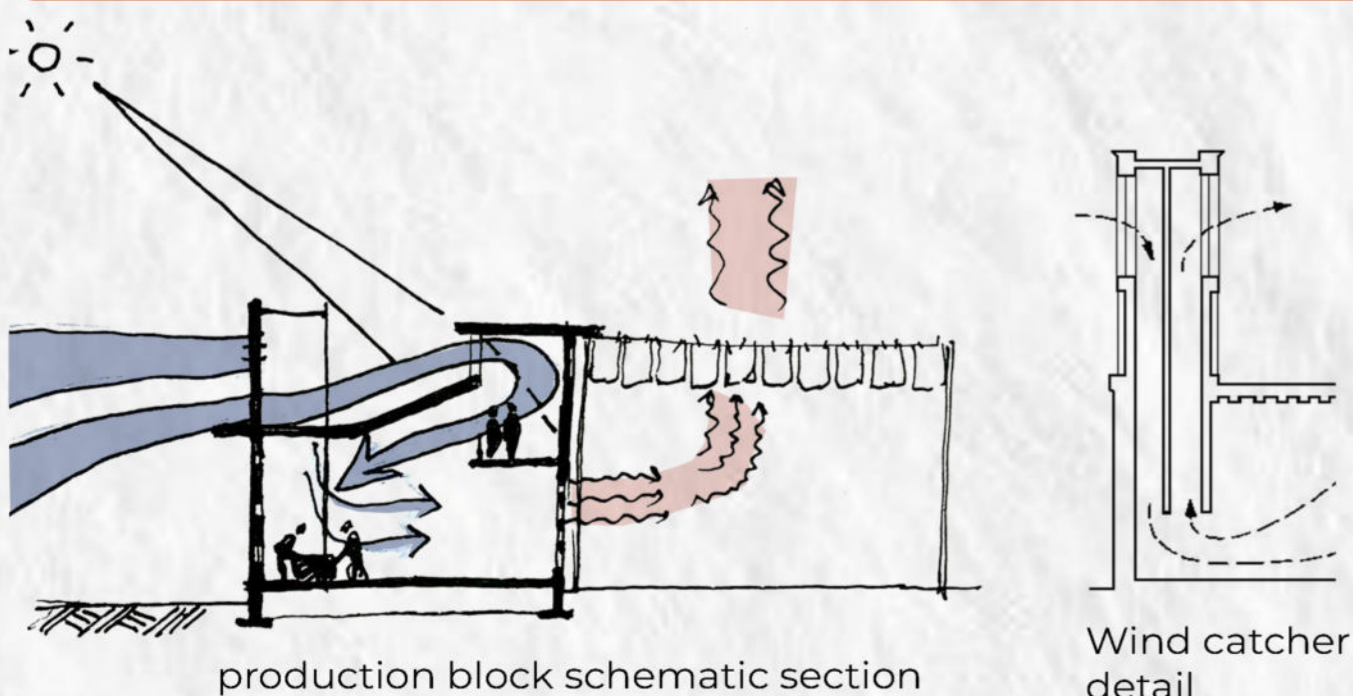
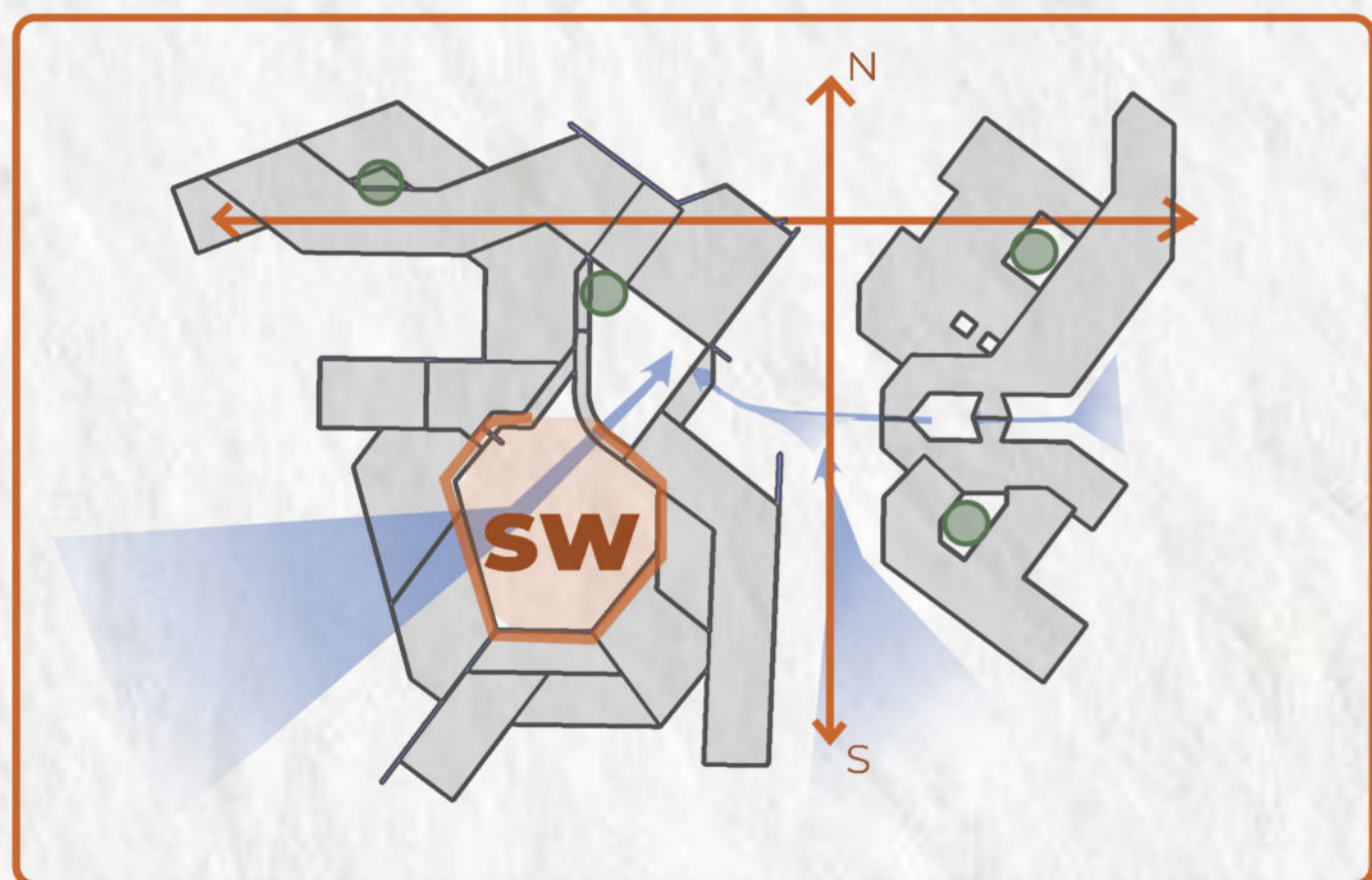
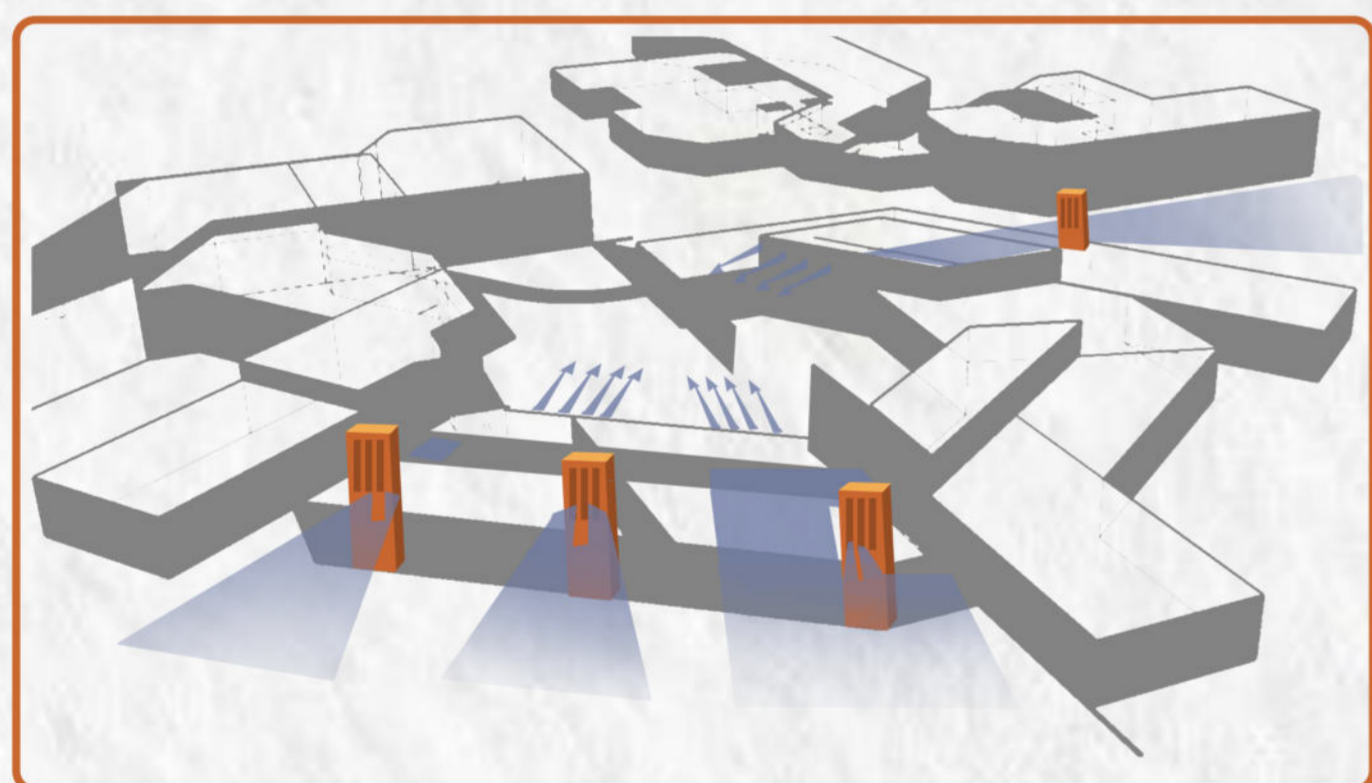
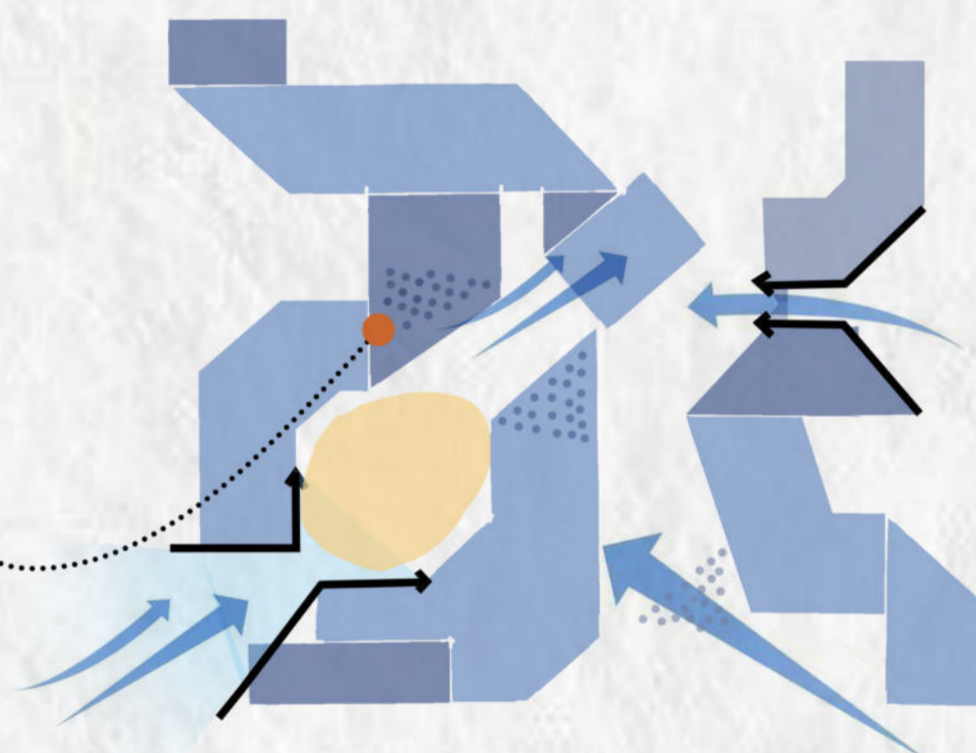
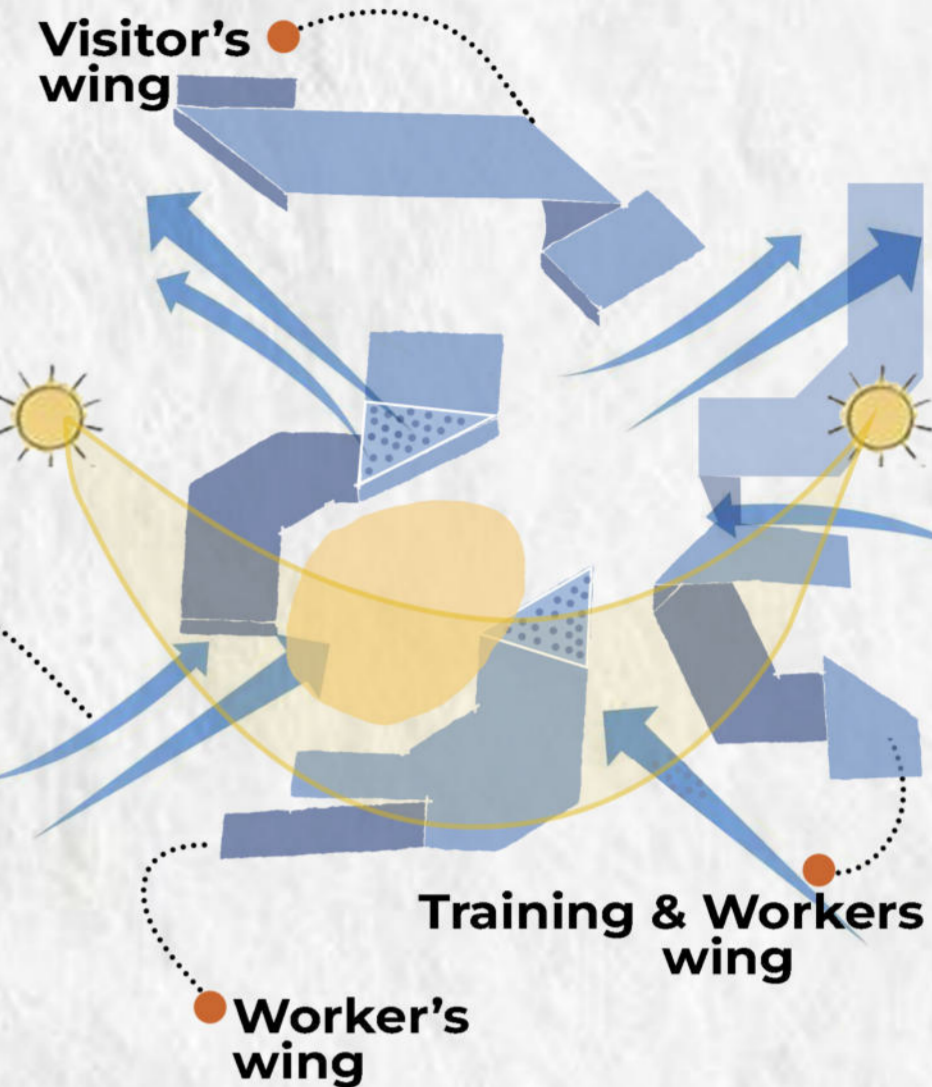
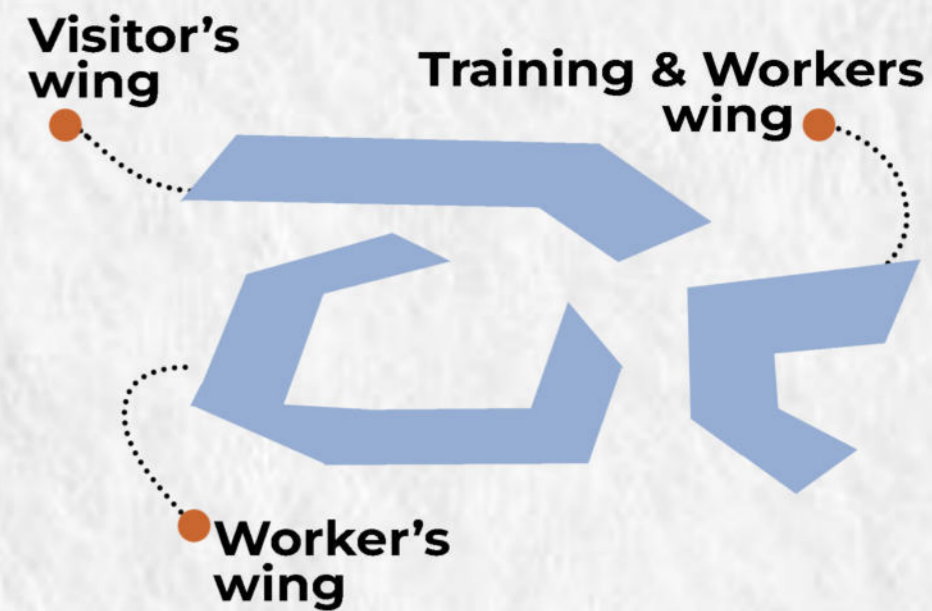


Folded planes could be transformed into **ramp-like pathways**. These gradual inclines allow seamless movement, **blurring the distinction between walls, roofs, and walkways.**

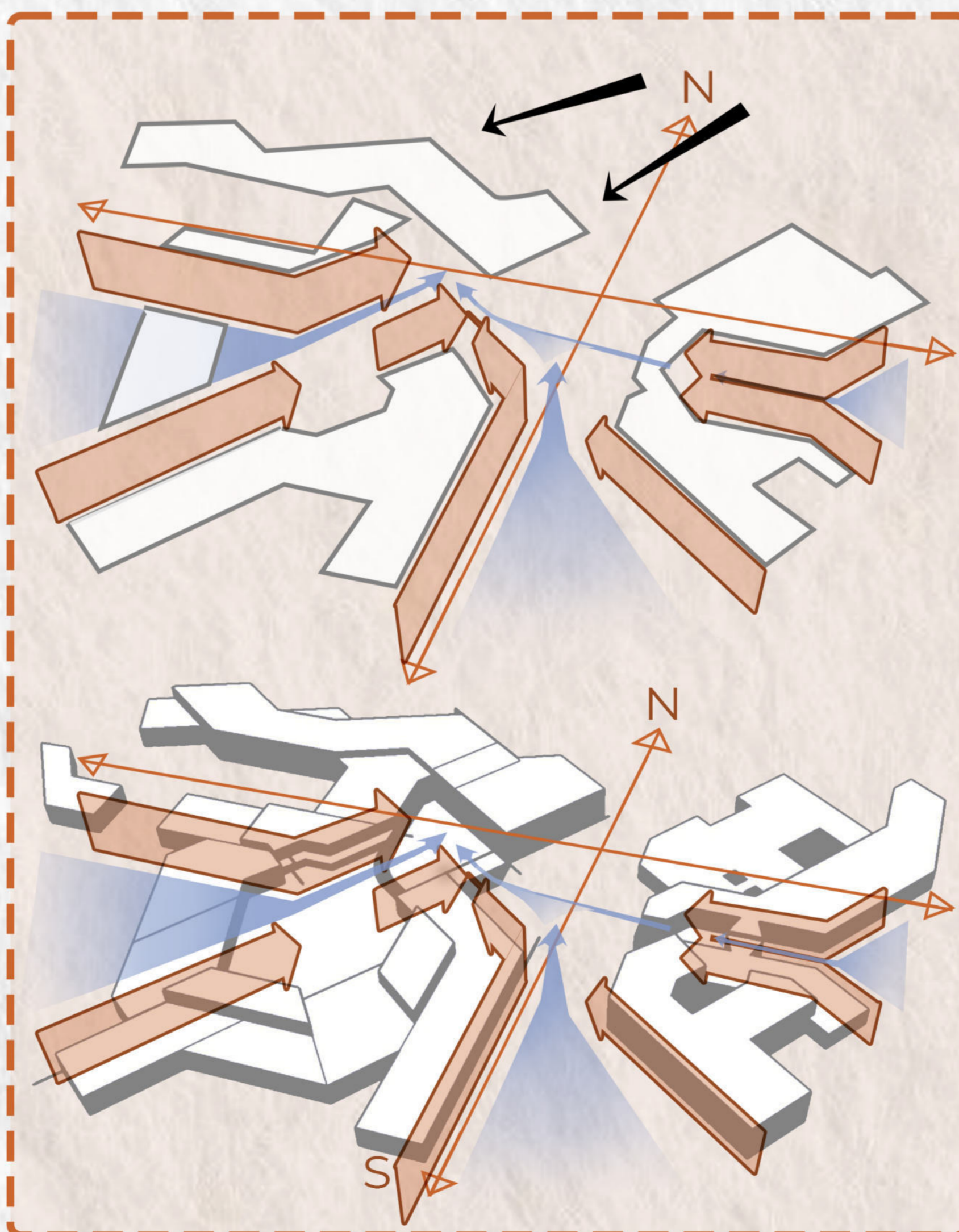
The accessible **rooftops created are utilised as functional drying surfaces for handmade paper board sheets.** By transforming roofs into active workspaces, the building maximises usable area without depending on open grounds for drying.

Wind catchers positioned on the windward side collect cool air and let out the heated air.

SPATIAL INTEGRATION



funnel shapes of the building along the windward sides are strategically provided to increase wind speed towards gathering areas and paper drying areas. This form along with the venturi affect caused by jaali screens creates a thermally comfortable environment.



COOLING TOWERS

The complex as a single segment is oriented towards **East-west direction**.

South west side having more intense heat is utilized for the production and drying yard. Heat towards the indoors are reduced using **provision of cooling towers on the windward side with minimal openings.** The towers let in cool air above the ground level and let out to the drying yard through jaali outlets.

SHADING DEVICES

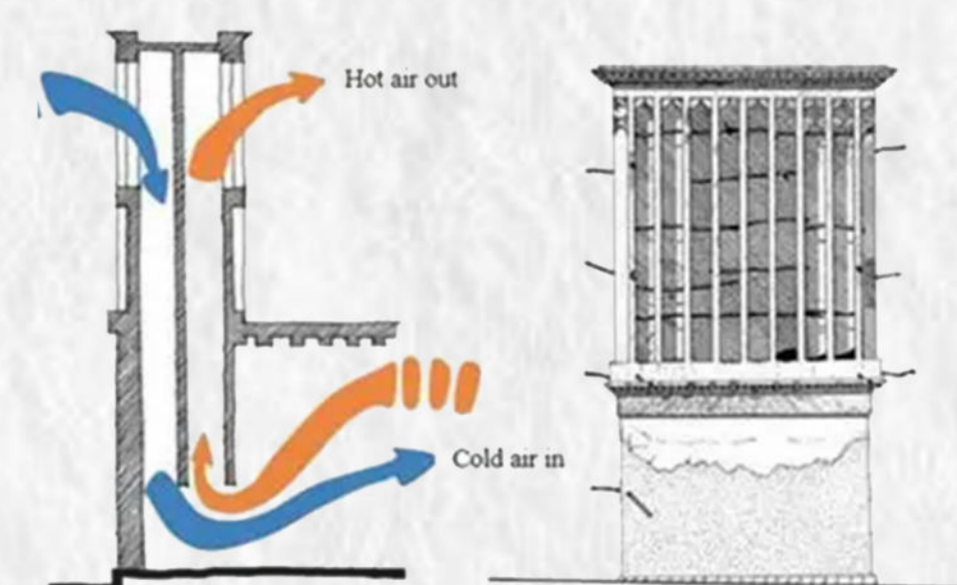
Windward side having high pressure are provided large openings and **jaali screens** are provided towards the leeward side to **increase wind speed** towards drying yard.

Southern side facing walls are provided with **vertical shading devices angled at 45 degree** to reduce direct glare within the building.

Drying yard acts as a hot core with **ramps and semi open corridors acting as a buffer ring** between the indoor spaces.

COURTYARD EFFECT

stagnant air in the drying yard heats up and is let out through the clerestory openings above ramps. This way the heat does not slip into the indoor areas.



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SCALE - NTS

CONCEPT DEVELOPMENT

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LEGENDS

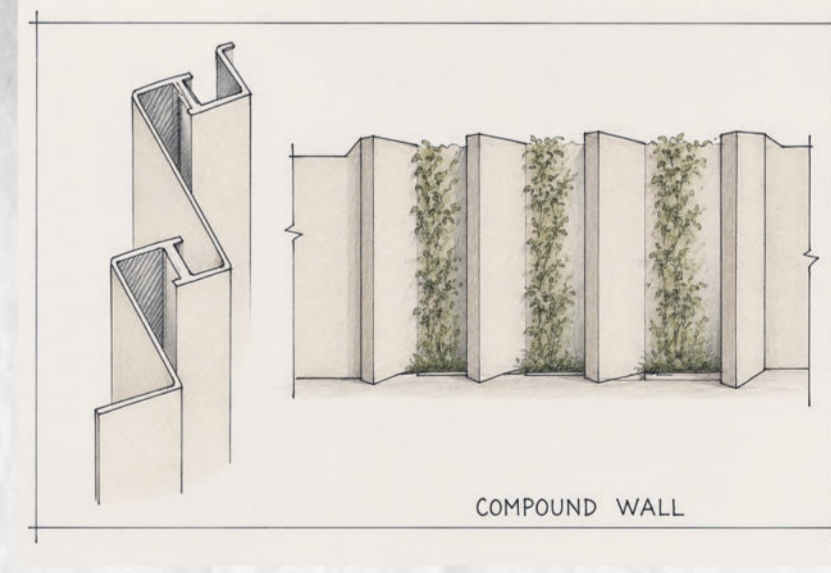
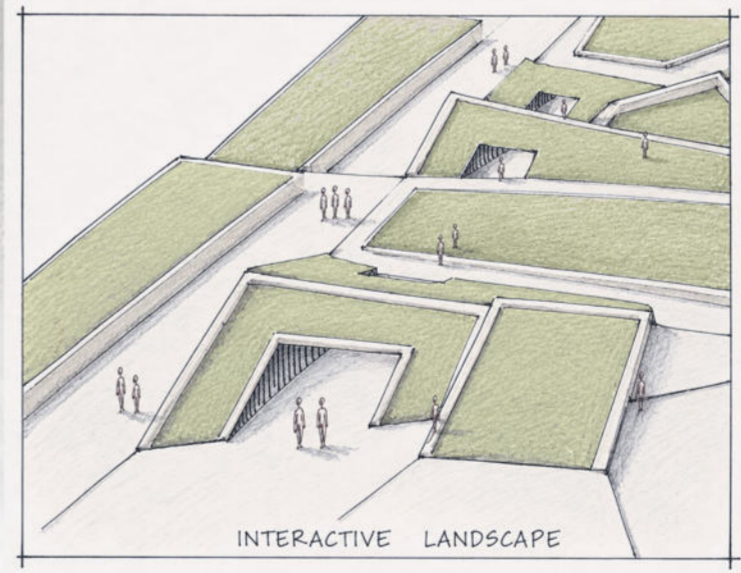
- SITE ENTRY AND EXIT
- BUILDING ENTRY & EXIT
- PEDESTRIAN PATH
- SERVICE ROAD

LANDSCAPE DETAILS

SYMBOL	NAME	IMAGE	NO.S	SYMBOL	NAME	IMAGE	NO.S	SYMBOL	NAME
	DALBERGIA SISSOO TREE		4		SWEET THORN TREE		4		GRASS
	WHITE ASOKA TREE		10		MESQUITE TREE		9		FOOTPATH
	BABUL TREE		29		WEDELIA TRILOBATA		24		SHAHABAD STONE
	CASCABELA THEVATIA		57		AGAVE AMERICANA		150		GRASSCRETE
	FRANGIPANI		33		RED CORDYLINE		21		WATER
	YUCCA ELEPHANTIPES		211		MANGIFERA INDICA		9		
	SANTAVIERA TRIFASCIATA		35		KOTA STONE				

LAND PARCELING	
Site area	58,216 SQM
Built area	18,850 SQM
Parking area	4342 SQM
Expansion area	4750 SQM

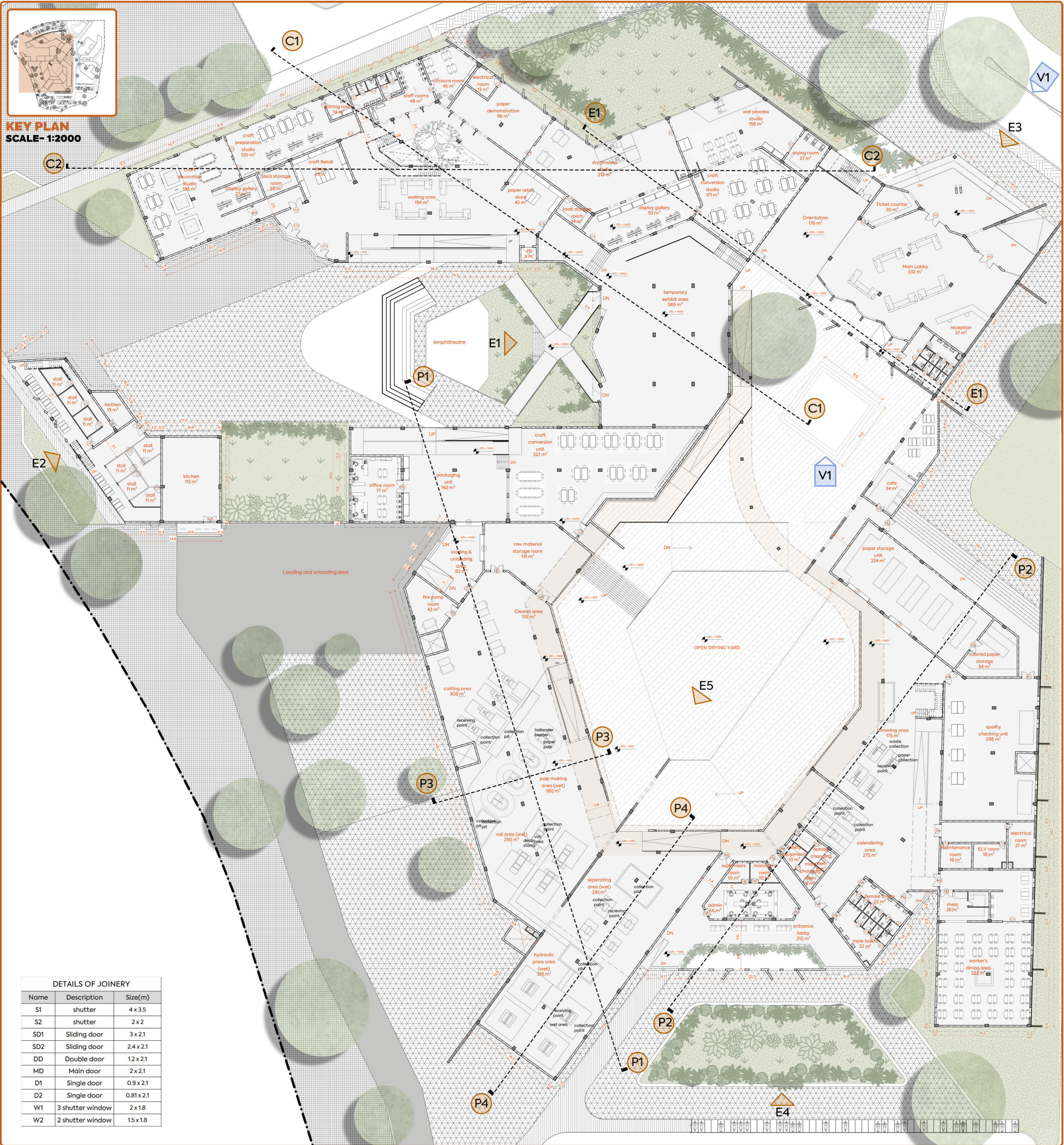
PROJECT DETAILS		
	permissible	Provided
Coverage	40%	25%
FAR	1.5	0.3
Front setback	9	9
Rear setback	9	9
Sides setback	9	9



THE LIVING HANDMADE PAPER CENTRE, SANGANER
JAIPUR, RAJASTHAN

SCALE - 1:500
SIT PLAN
ALL DIMENSIONS ARE IN M

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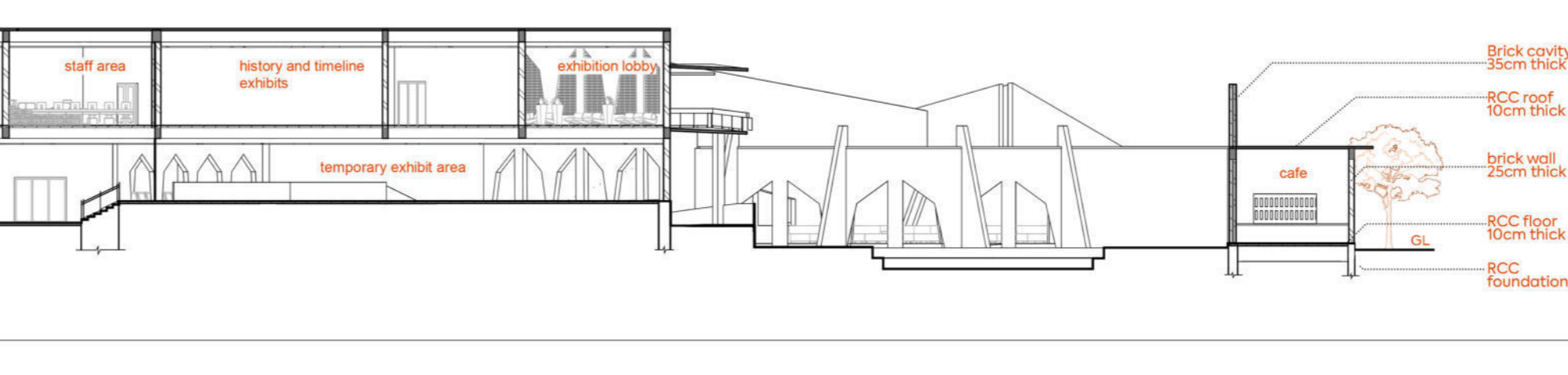
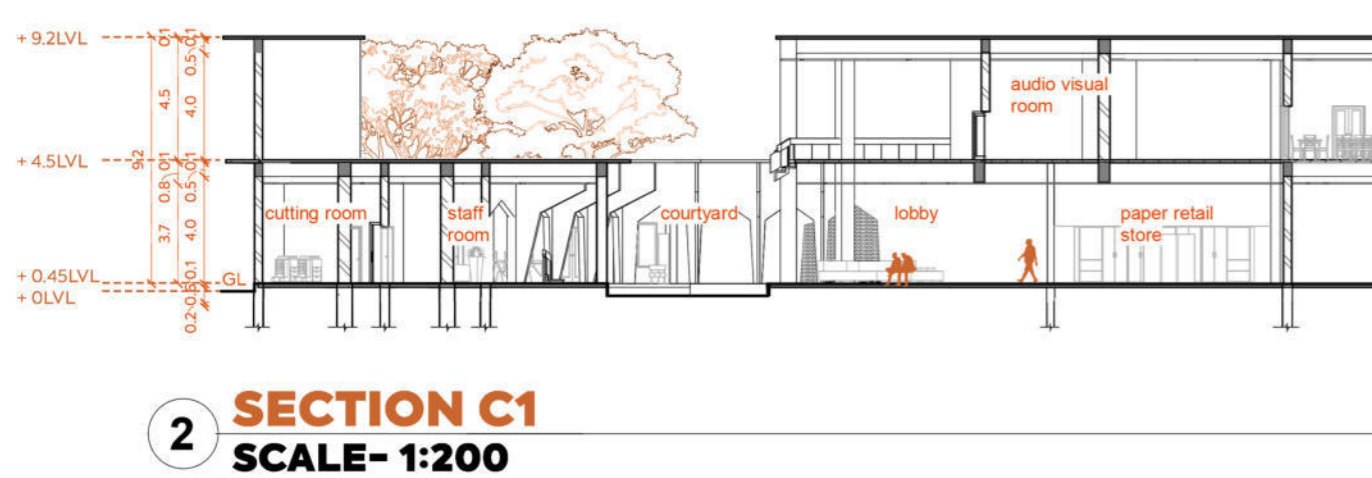
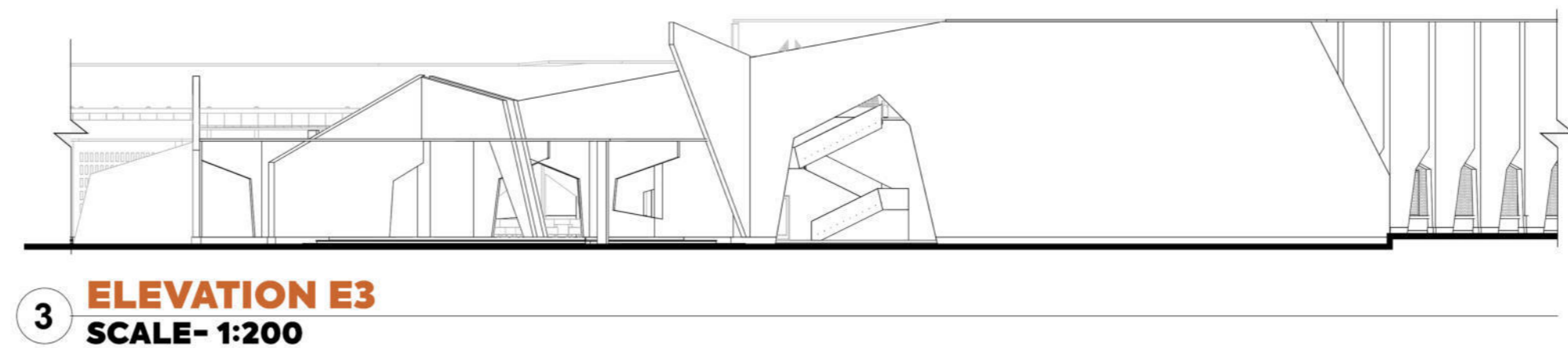


KEY PLAN
SCALE- 1:2000

DETAILS OF JOINERY

Name	Description	Size(m)
S1	shutter	4 x 3.5
S2	shutter	2 x 2
SD1	Sliding door	3 x 2.1
SD2	Sliding door	2.4 x 2.1
DD	Double door	1.2 x 2.1
MD	Main door	2 x 2.1
D1	Single door	0.9 x 2.1
D2	Single door	0.81 x 2.1
W1	3 shutter window	2 x 1.8
W2	2 shutter window	1.5 x 1.8

GROUND FLOOR PLAN
SCALE- 1:200
PLAN AT LVL + 350 CM



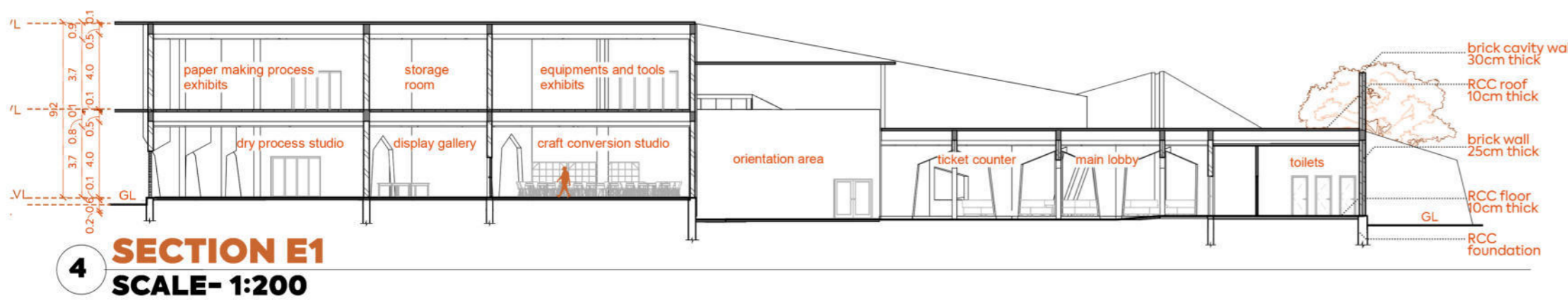


KEY PLAN
SCALE- 1:2000

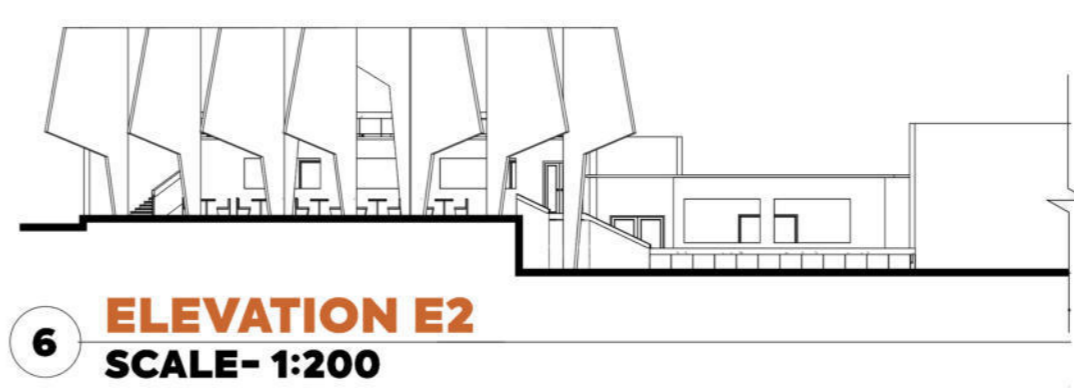


DETAILS OF JOINERY		
Name	Description	Size(m)
S1	shutter	4 x 3.5
S2	shutter	2 x 2
SD1	Sliding door	3 x 2.1
SD2	Sliding door	2.4 x 2.1
DD	Double door	1.2 x 2.1
MD	Main door	2 x 2.1
D1	Single door	0.9 x 2.1
D2	Single door	0.81 x 2.1
W1	3 shutter window	2 x 1.8
W2	2 shutter window	1.5 x 1.8

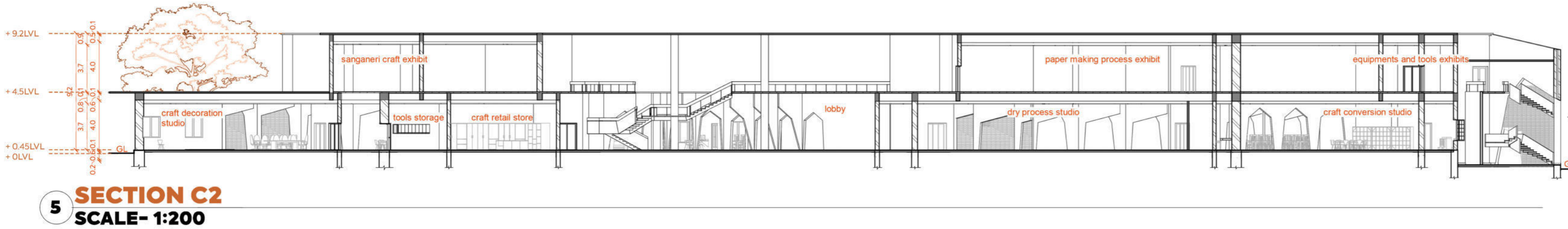
FIRST FLOOR PLAN
SCALE- 1:200
PLAN AT LVL + 750 CM



SECTION E1
SCALE- 1:200



ELEVATION E2
SCALE- 1:200



SECTION C2
SCALE- 1:200



V1



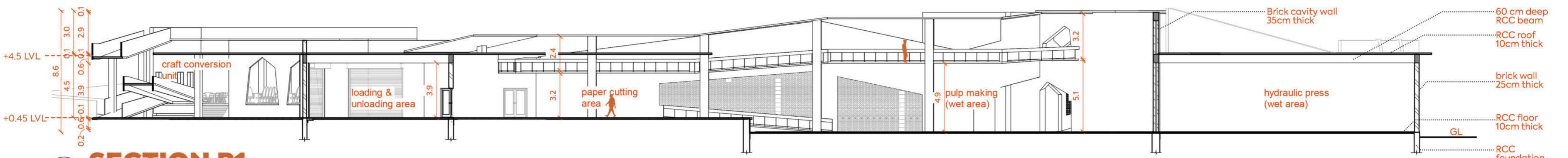
V2



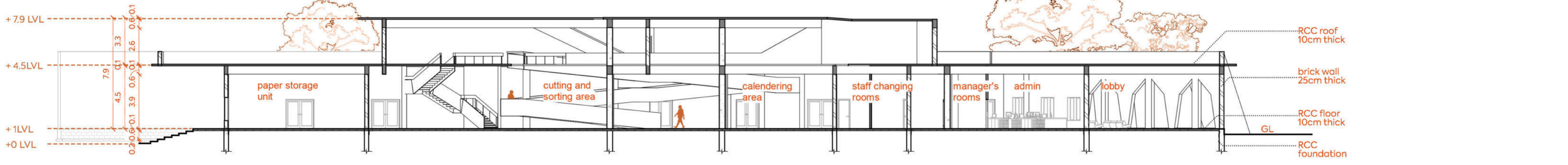
**THE LIVING HANDMADE
PAPER CENTRE, SANGNER**
JAIPUR, RAJASTHAN

SCALE - 1:200
20
PRODUCTION AND VISITORS CENTRE
ALL DIMENSIONS ARE IN M

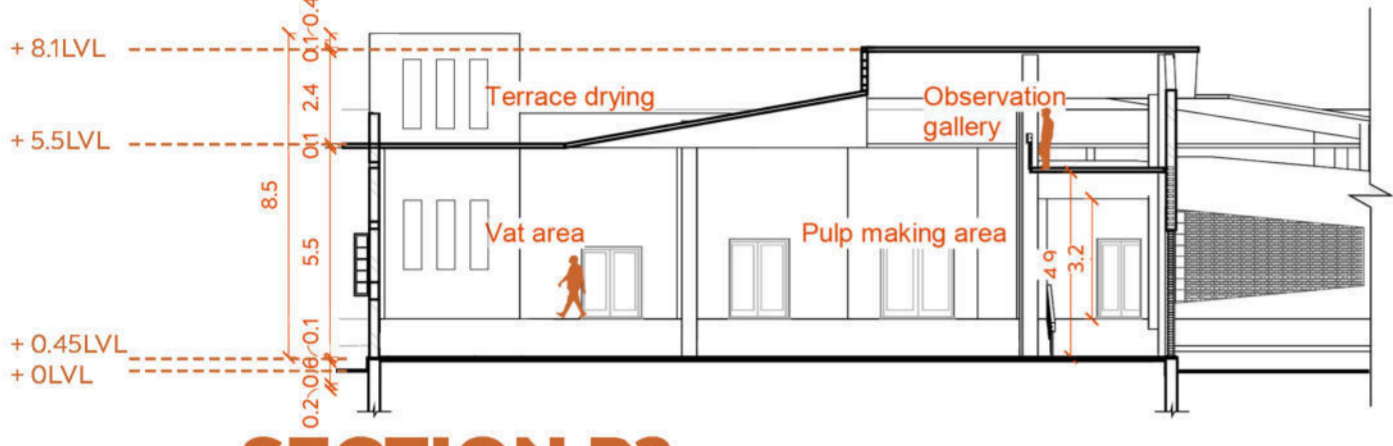
NASRIN RIYAZ A
TCR21AR031 / THESIS BATCH 2021-2026 / SCHOOL OF ARCHITECTURE AND PLANNING /
GOVERNMENT ENGINEERING COLLEGE THRISSUR
THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
DEGREE IN BACHELOR OF ARCHITECTURE- APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY



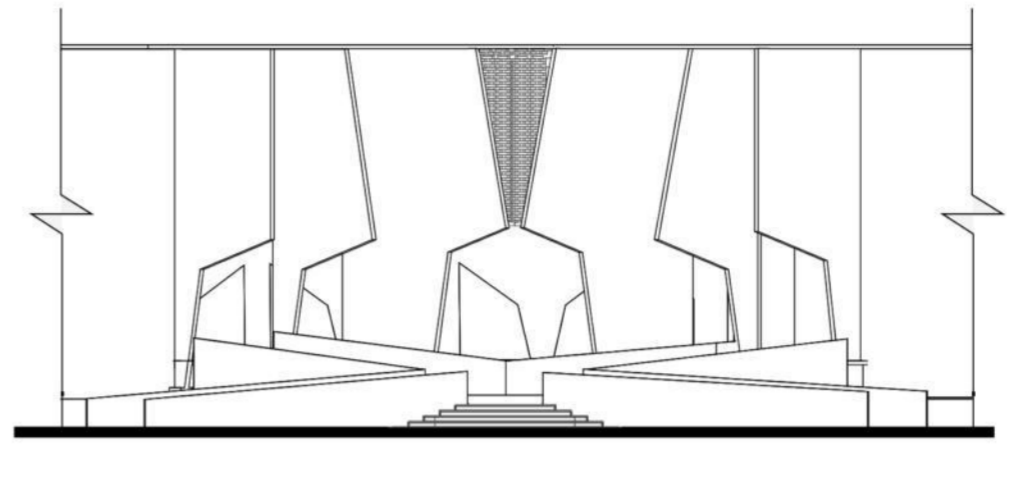
7 SECTION P1
SCALE- 1:200



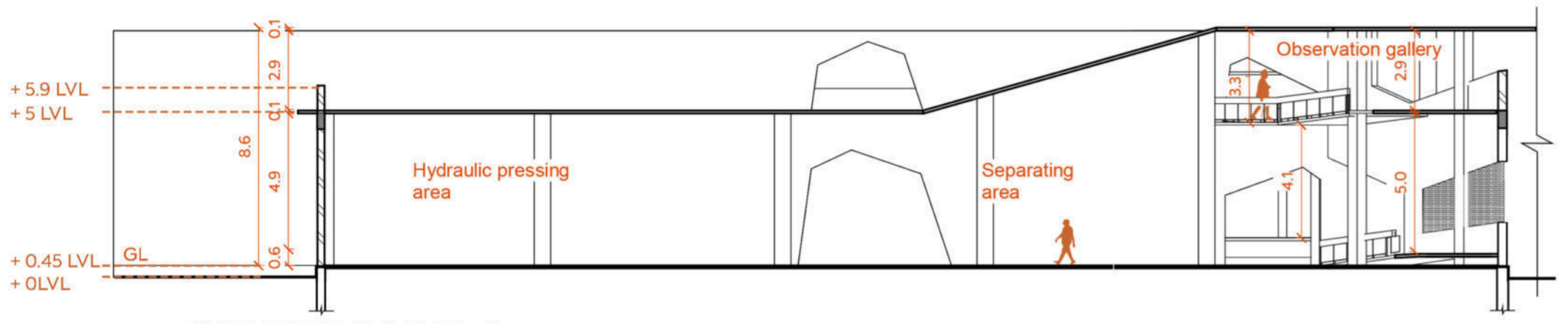
8 SECTION P2
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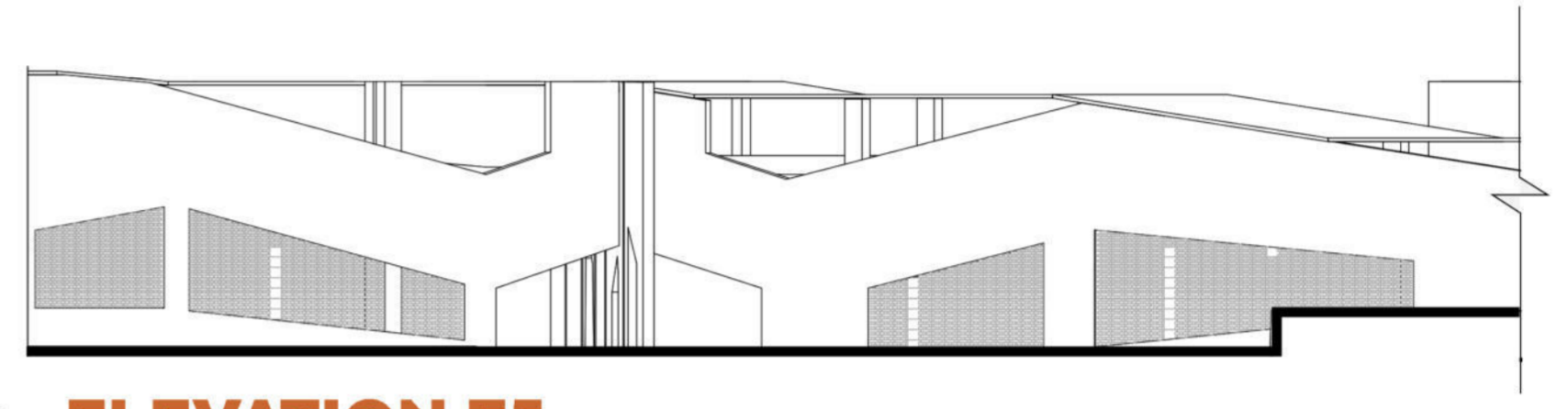
9 SECTION P3
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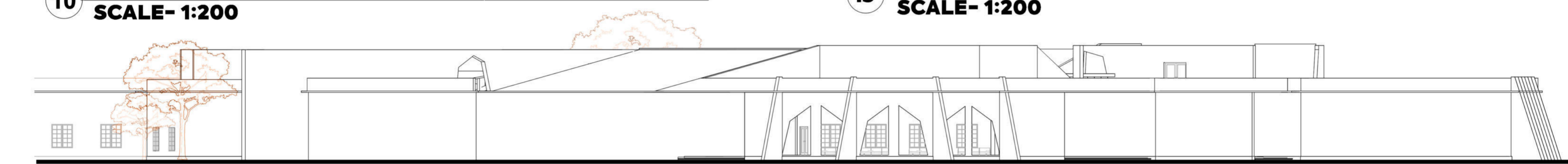
12 ELEVATION E1
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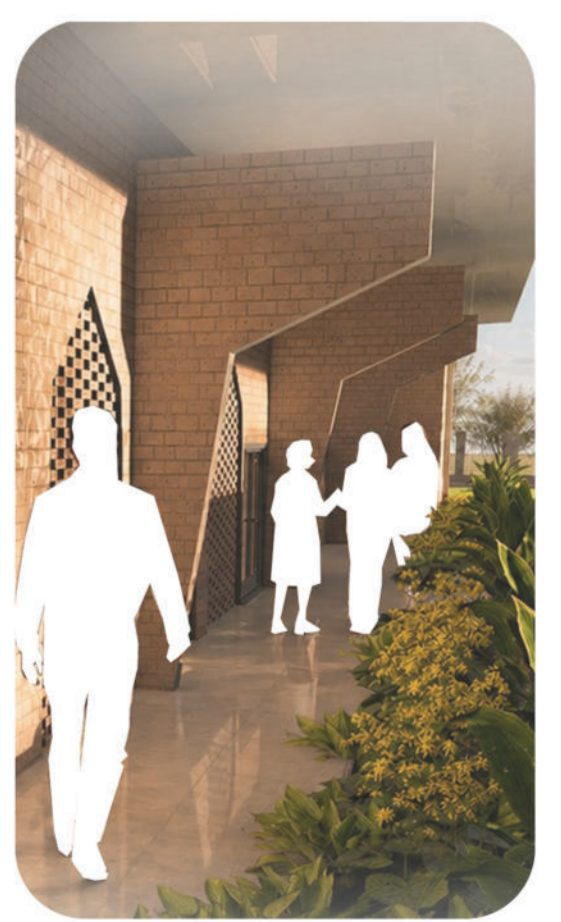
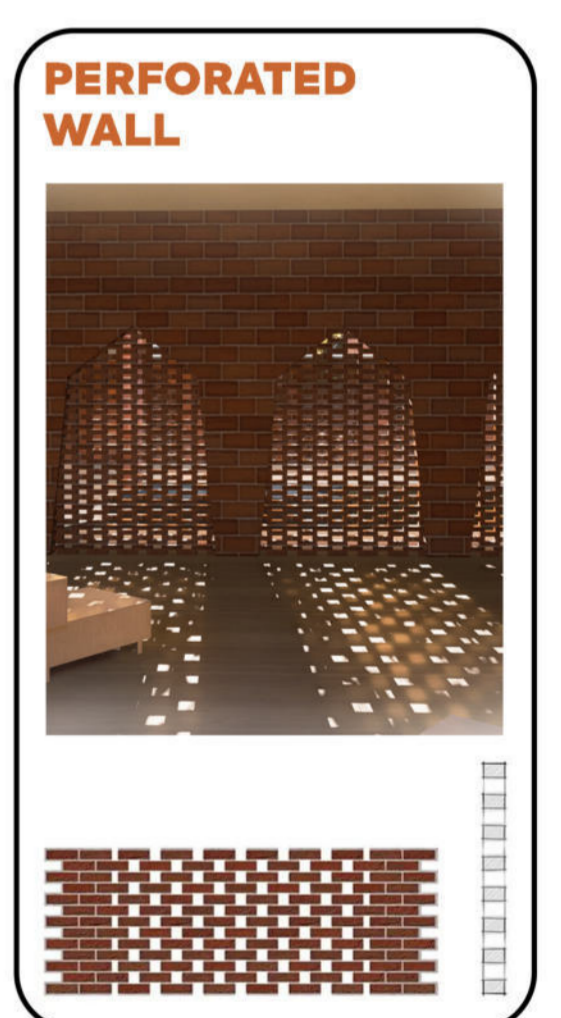
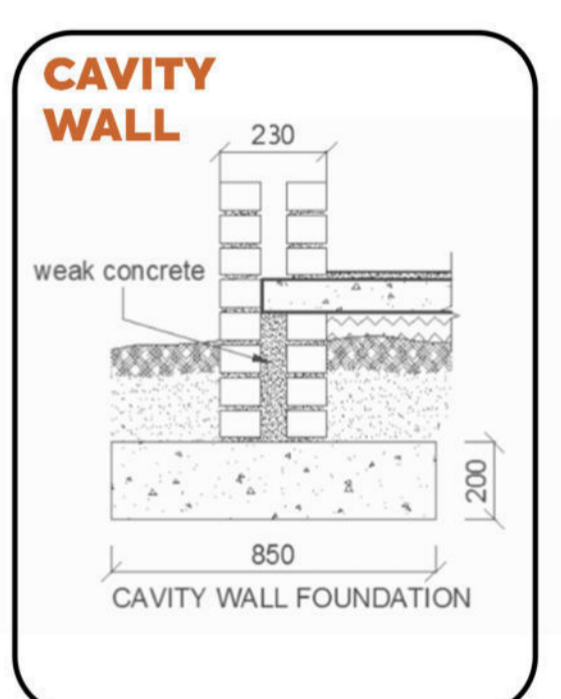
10 SECTION P4
SCALE- 1:200



13 ELEVATION E5
SCALE- 1:200



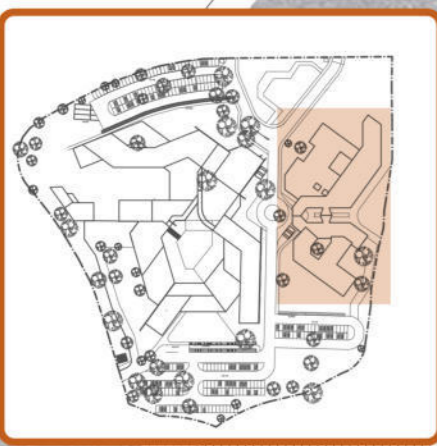
11 ELEVATION E4
SCALE- 1:200



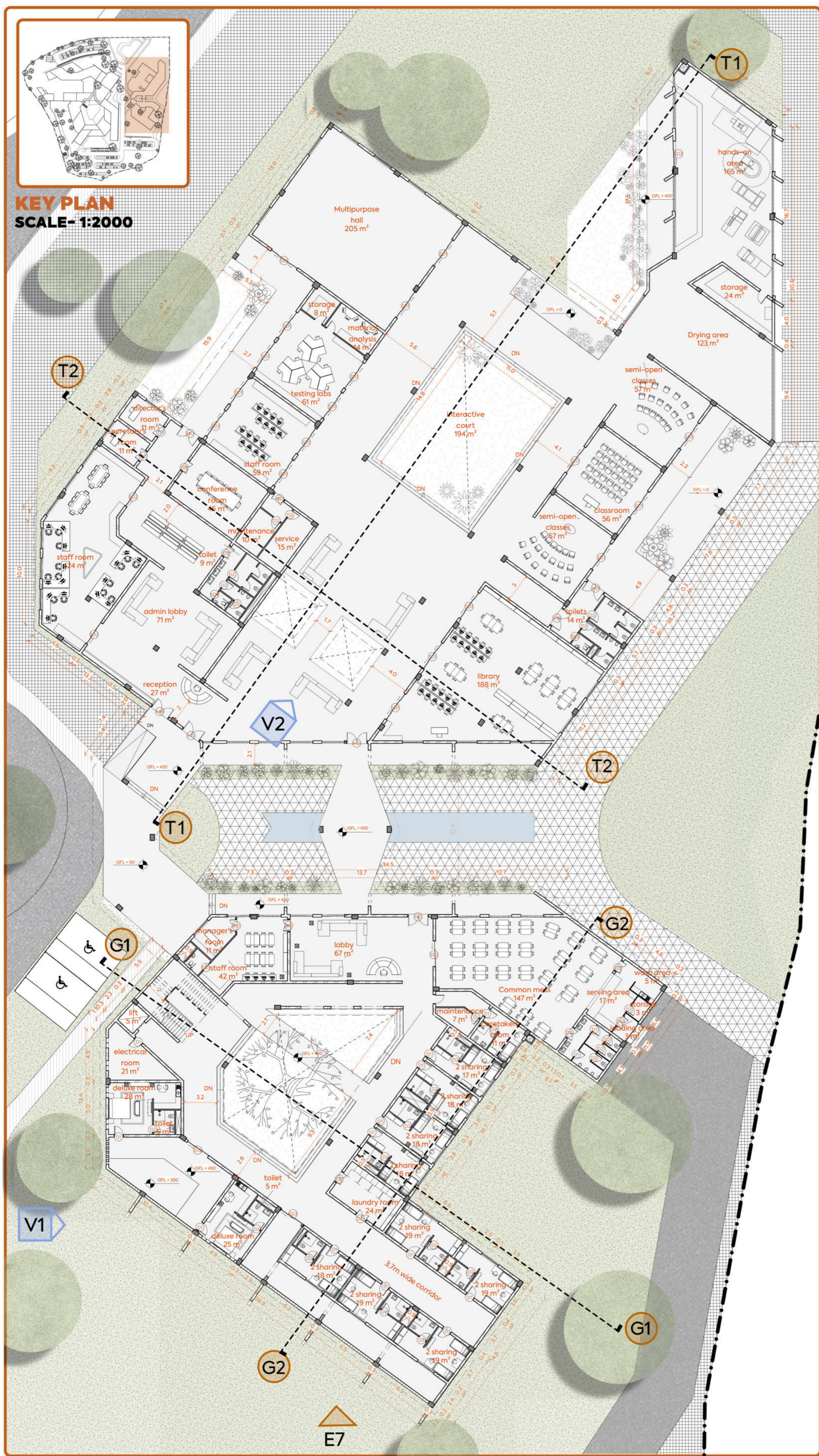
THE LIVING HANDMADE
PAPER CENTRE, SANGANER
JAIPUR, RAJASTHAN

SCALE - 1:200
SECTIONS & ELEVATIONS
ALL DIMENSIONS ARE IN M

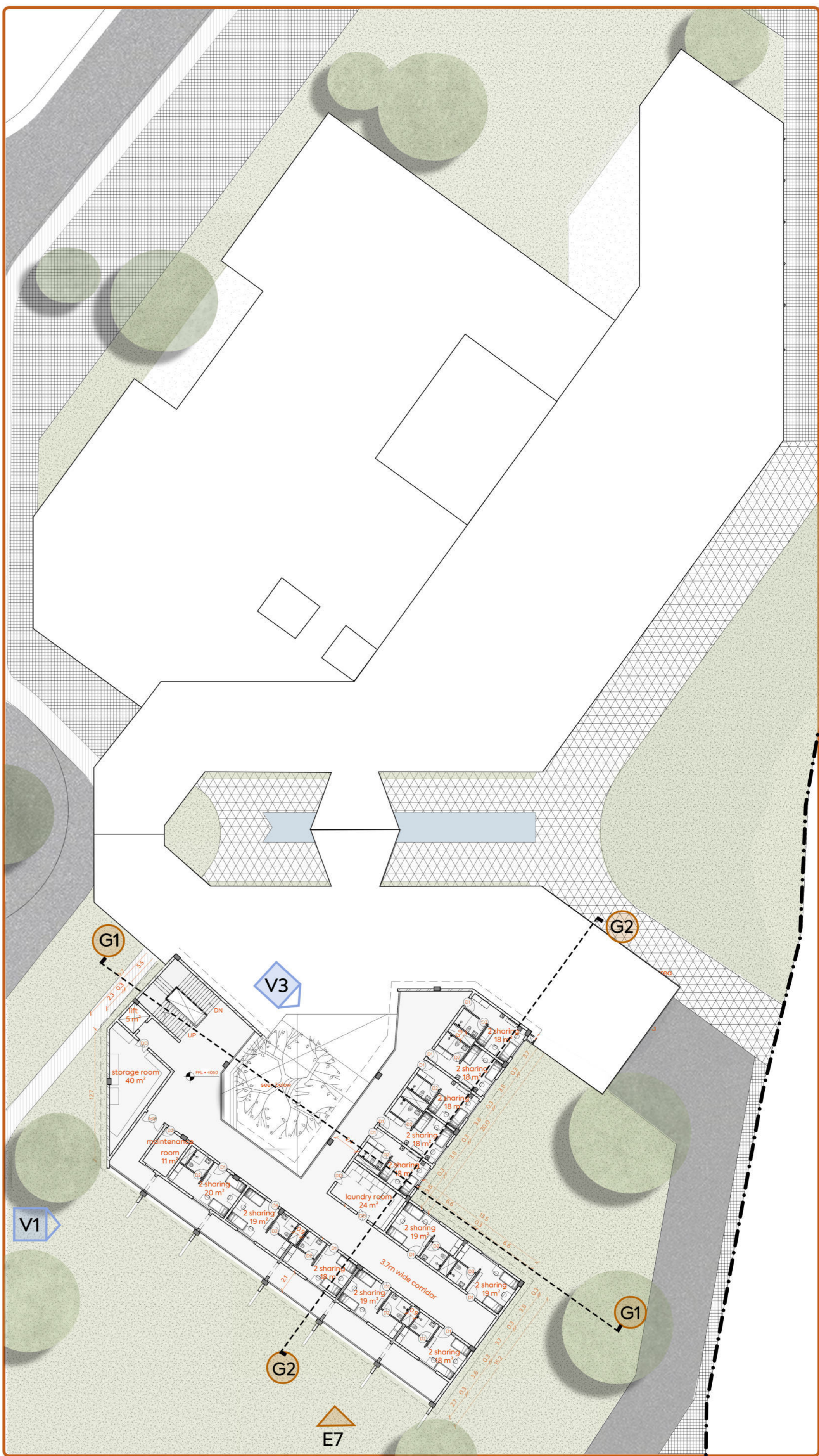
NASRIN RIYAZ A
TCR21AR031 / THESIS BATCH 2021-2026 / SCHOOL OF ARCHITECTURE AND PLANNING
/ GOVERNMENT ENGINEERING COLLEGE THRISSUR
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IN BACHELOR OF ARCHITECTURE - APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY



KEY PLAN
SCALE- 1:2000



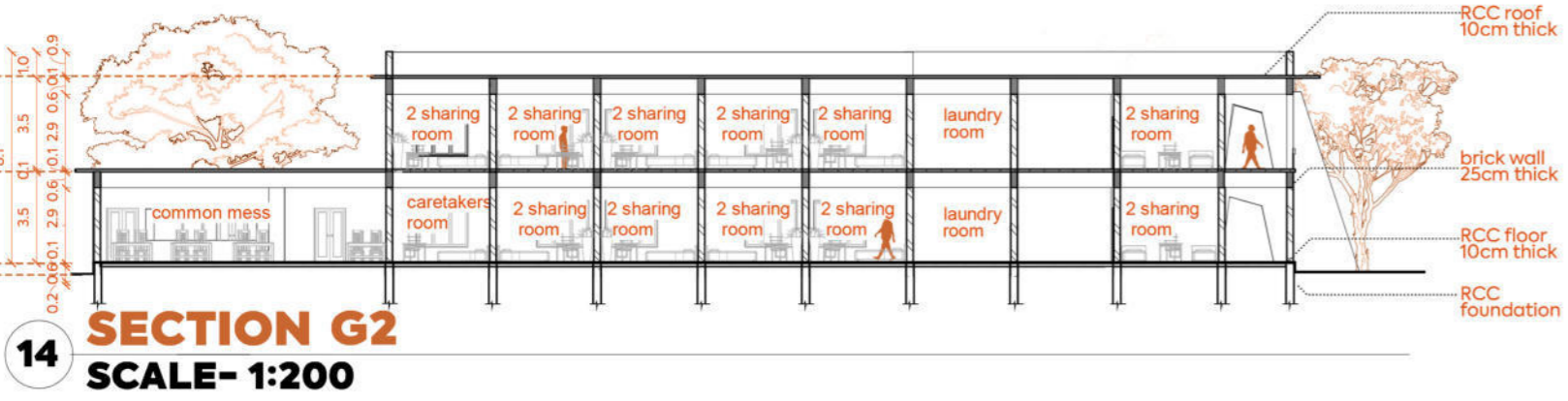
GROUND FLOOR PLAN
SCALE- 1:200
PLAN AT LVL +150 CM



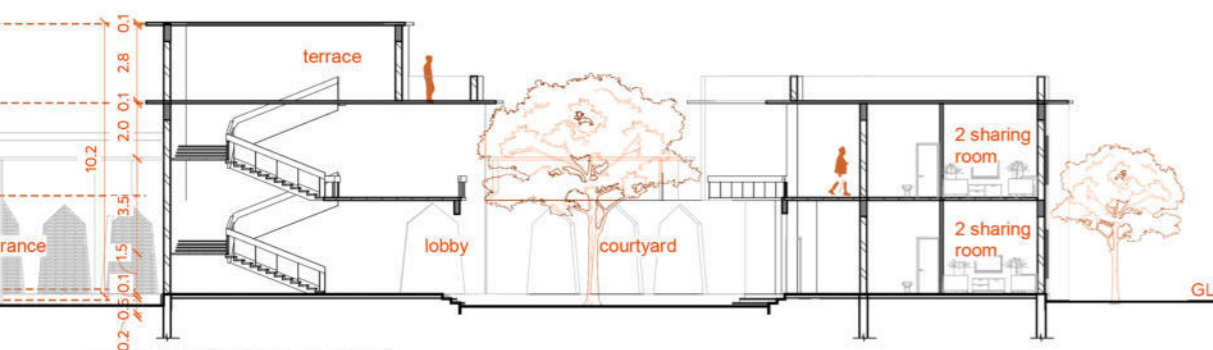
FIRST FLOOR PLAN
SCALE- 1:200
PLAN AT LVL + 3150 CM

DETAILS OF JOINERY

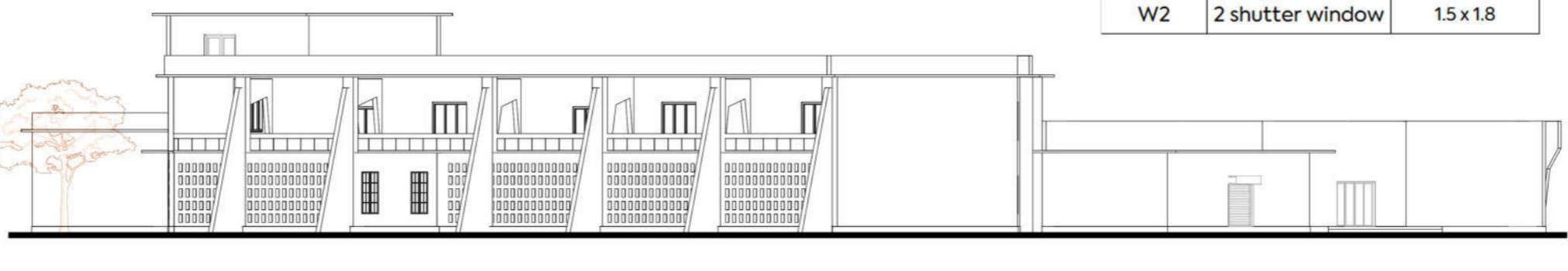
Name	Description	Size(m)
S1	shutter	4 x 3.5
S2	shutter	2 x 2
SD1	Sliding door	3 x 2.1
SD2	Sliding door	2.4 x 2.1
DD	Double door	1.2 x 2.1
MD	Main door	2 x 2.1
D1	Single door	0.9 x 2.1
D2	Single door	0.81 x 2.1
W1	3 shutter window	2 x 1.8
W2	2 shutter window	1.5 x 1.8



14 SECTION G2
SCALE- 1:200



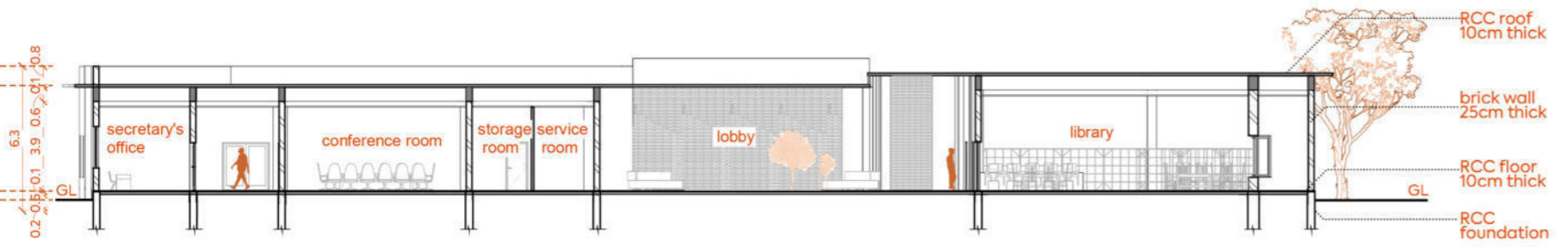
15 SECTION G1
SCALE- 1:200



18 ELEVATION E7
SCALE- 1:200



16 SECTION T1
SCALE- 1:200



17 SECTION T2
SCALE- 1:200

