

**A GRASS ROOT INITIATIVE FOR WOMEN EMPOWERMENT:
A PROPOSAL FOR WEAVING CENTRE BY THE JAIN COMMUNITY
FOR WOMEN AT PINDRUKHI VILLAGE, M.P.**

A DESIGN THESIS

Submitted

*in partial fulfillment of the requirements for the
award of the degree of*

BACHELOR OF ARCHITECTURE

By

SWAPNIL JAIN

2015BARC029

Under the Guidance of

Prof. Sanjeev Singh



SCHOOL OF PLANNING AND ARCHITECTURE, BHOPAL

NEELBARD ROAD, BHOURI, BHOPAL (MP)-462030

JUNE 2020

DECLARATION

I Swapnil Jain hereby declare that the thesis work entitled **“A GRASS ROOT INITIATIVE FOR WOMEN EMPOWERMENT: A PROPOSAL FOR WEAVING CENTRE BY THE JAIN COMMUNITY FOR WOMEN AT PINDRUKHI VILLAGE, M.P.”** submitted to the Department of Architecture, School of Planning and Architecture, Bhopal, is a record of an original work done by me. The results presented in this report have not been submitted to any other University or Institute for the award of any degree or diploma.

A handwritten signature in black ink on a light gray rectangular background. The signature is cursive and appears to read 'Swapnil Jain'.

Swapnil Jain

2015BARC029

Date – June 18, 2020

Certificate

This is to certify that the student Ms/Mr Swapnil Jain No. 2015BARC029 has worked under my guidance in preparing this thesis **A GRASS ROOT INITIATIVE FOR WOMEN EMPOWERMENT:**

A PROPOSAL FOR WEAVING CENTRE BY THE JAIN COMMUNITY FOR WOMEN AT PINDRUKHI VILLAGE, M.P.

RECOMMENDED

_____ **Dr. Sanjeev Singh** _____

Guide Name

ACCEPTED

_____ Dr. Piyush Hajela _____

Name of HOD

Head, Department of Architecture

July, 2020, Bhopal

Acknowledgement

There are some any people to thank for their help and it is difficult to convey how many people's hands and minds touched this before completion. First of all I take the opportunity to express thanks with deep sense of gratitude to my Thesis guide Dr. Sanjeev Singh (Department of Architecture, SPA, Bhopal), his wide knowledge and his logical way of thinking have been of great value for me. I appreciate all his contributions of time, ideas, expert guidance, valuable inspiration, constant encouragement, attention, constructive criticism and suggestion to make my Thesis experience productive and stimulating. Thanks to Many professionals in a wide range of fields who offered me their time for interviews, theoretical discussions, and practical assistance. I cannot over look the support that my parents gave to help me complete this thesis safely and efficiently. Last but not the least, I express my thanks to the entire staff of Faculty of Architecture and to all my friends who extended their cooperation directly or indirectly in completing this thesis.

Swapnil Jain

Abstract

The major links between textile and architecture are when the textile is connected as a material and when the textile is used as an inspiration or metaphor for architectural design.

Textiles and architecture can be linked under three major categories. One being the textile treated as a structural component or space making component of architecture wherein how the use of woven fabric as an architectural material affects the qualities of space in terms of the physical environment, the psychological response, phenomenology in such spaces and the structural qualities which enhance the building envelope.

Second, is the relation between textile and the weavers who weaves. In this case, the tangible and intangible factors or quality of space affects the process of weaving, the anthropometry involved with the weavers in the workshops, the use of materials involved in weaving, the climate-responsive spaces, the ethnicity of such spaces linked with the vernacular architecture of the weaver's society and their memories of the tradition and history of their weaving art.

The third relation serves as a conceptual metaphorical relationship between the process of weaving and the architectural design process. It involves the idea of processes involved in weaving such as the collection of raw materials (cotton), preparation of threads, dyeing and drying of yarn, treating the threads, beaming them on the handloom machine and preparing it for weaving, following a set of design in repetition manner, certain tradition knowledge, inspired from the local context and history and finally portraying them on the product to be woven by a human user. All these layers of processes are similar to an effective architectural design process, where an architect design a spatial experience for a user through various woven not linear processes of site studies, conceptual frameworks, ideas from context and history, suturing space with the existing urban fabric, preparing pattern and design ideas, constructing a space that provides a sense of identity to the user group with the traditional aesthetics of their culture or vernacular.

The Integration of the two stated approaches one Women and second Weaving, best represents symbolically the first primary shape in architecture which is a CIRCLE.

Circle is a symbolized, introverted figure that is normally stable and self-centering in its environment. They are often used to symbolize Harmony and Unity. Circles are most frequently used to represent things of the same shape that we know and create a Sense of Completeness.

Therefore, Circle is taken as a predominant architectural component in my design.

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1. INTRODUCTION

1.1. Abstract

‘A comprehensive-employment generation program through architecture

to uplift the economic status of the rural people’.

With a long custom of excellence in its craftsmanship, India's handloom textile sector possesses a position of prominence in preserving its legacy and culture. The degree of creativity and design accomplished in the handloom textures is unparalleled and beyond the extent of modern machinery. It takes into account the requirements of a differing social ethos extending from the dazzling textures which take a very long time to weave to the prevalent things of large-scale manufacturing for everyday use. Hand-weaving is one of the most extravagant and the strongest media of ethnic articulation. The most recent 100 years have seen the development of mechanized material generation universally. Because of competition, handloom has lost a significant part of the market and is nearly non-existent in many nations.

The significance of the women in handlooms is to a great extent because of the lower types of technology which permit labour-intensive production processes. There is considerable observational proof that women work is reasonable and it attempts to the benefit of businesses and contractual workers to utilize them. Where creation gets to family work, women only from time to time get paid for their work. In India, several women who weave material by hand. They work from their houses, regularly in remote, rural areas. Their weaving machines are at home so that they can take care of their household duties and support their children's some time and simultaneously, earn an income for their families, but due to lack of proper facilities and space provided by the private or government organizations is unconditional. The scenario of Pindrukhi village is the same, the decrease in weaving has been due to unconditional spaces, lack of skills training, emerging into depleting socio-economic status of women weavers

Dindori, a district in Madhya Pradesh consists of 15 villages, as like the weaving tradition in Maheshwar and Chanderi, Dindori also resides weavers but the numbers and tradition are fading away. A need to revive the tradition of weaving to uplift the economy and development of the village. Women empowerment program leading to the generation of the knowledge to weave together to earn, gathering weavers targeted from 100 (currently working weavers in Dindori district) to 500 - 1000 women weavers through community participation programs, involving skills development training following the participatory tools to encourage the women weavers to work. Therefore, to acknowledge their skills into the product,

Self-sustainable entrepreneurship achieving through acknowledging, ‘women to weave to earn’ through ‘self-help design’. An idea to empower women through organising community participation program which will gather women weavers to adapt themselves in a sustainable environment to weave to earn.

The site is located in Pindrukhi village of Dindori district near Jabalpur. The site integrates the religious aspects of Jain religion, the project is governed by a Jain private organization which upholds a great significance of spiritual approach for a workspace like weaving. Weaving involves a state of meditation towards work. Integrating a spiritual feeling in terms of temples, meditational spaces merging with the workspace would bring out an un-stressful environment to acknowledge the work ethics.

The major links between textile and architecture are when the textile is connected as a material and when the textile is used as an inspiration or metaphor for architectural design.

Textiles and architecture can be linked under three major categories. One being the textile treated as a structural component or space making component of architecture wherein how the use of woven fabric as an architectural material affects the qualities of space in terms of the physical environment, the psychological response, phenomenology in such spaces and the structural qualities which enhance the building envelope.

Second, is the relation between textile and the weavers who weaves. In this case, the tangible and intangible factors or quality of space affects the process of weaving, the anthropometry involved with the weavers in the workshops, the use of materials involved in weaving, the climate-responsive spaces, the ethnicity of such spaces linked with the vernacular architecture of the weaver's society and their memories of the tradition and history of their weaving art.

The third relation serves as a conceptual metaphorical relationship between the process of weaving and the architectural design process. It involves the idea of processes involved in weaving such as the collection of raw materials (cotton), preparation of threads, dyeing and drying of yarn, treating the threads, beaming them on the handloom machine and preparing it for weaving, following a set of design in repetition manner, certain tradition knowledge, inspired from the local context and history and finally portraying them on the product to be woven by a human user. All these layers of processes are similar to an effective architectural design process, where an architect design a spatial experience for a user through various woven not linear processes of site studies, conceptual frameworks, ideas from context and history, suturing space with the existing urban fabric, preparing pattern and design ideas, constructing a space that provides a sense of identity to the user group with the traditional aesthetics of their culture or vernacular.

A weaver weaves the threads to produce a woven fabric for the user is an analogy for an architect when he or she designs a parcel of space woven together to produce an interwoven spatial experience to the user.

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Self-sustainable entrepreneurship achieving through acknowledging, **‘women to weave to earn’** through **‘self-help design’**. An idea to empower women through organising community participation program which will gather women weavers to adapt themselves in a sustainable environment to weave to earn.

1.2.PROJECT DESCRIPTION

The project falls under Pratiba Mandal trust, Jabalpur, a Jain community organisation. The project is situated in Pindrukhi Mal., Madhya Pradesh 481882 near Jabalpur, is a village under Dindori district. A design proposal for ‘a grass root initiative for women empowerment’ through weaving centre, with religious potential to acknowledge the religious integrity with a sustainable and spiritual environment for a workspace.

The project objectives are:

- To create a weaving centre for 500 - 1000 weavers, which includes spaces for Hatkargha machine, Ambar Charkha machine, Charkha machine, warping machine, Design studio and raw storage space.
- To create a Jain Temple linked with Sant Niwas.
- To generate tourism and skills training environment in the workspace with an endogenic approach to create a weaver live exhibition museum.

PROPOSING AUTHORITY

Private organization: Pratibha Mandal Trust, Jabalpur, Madhya Pradesh.

1.3.Aim

To propose architectural design strategies for Pindrukhi's handloom centre in relation to the shared concept of architecture and textile thereby designing a Weaving Centre for Women with a Jain Temple linked with Saint Niwas.

To design a self-sustainable working environment for women weavers incorporating the religious aspects through architecture that acknowledge their spiritual involvement with work comfort to sustain their livelihood that uplifts the economic status in the weaving industry through 'self-help design'.

1.4.Objective

- To understand the activity chain of weaving process from buying raw materials to finished products.
- To identify the relationship between architecture and woven textiles.
- To identify the space hierarchy and organization of spaces with respect to the process.
- To analyze the architectural, tangible and intangible context associated with the textile industry
- To propose design strategies from inferences associated with special requirements.

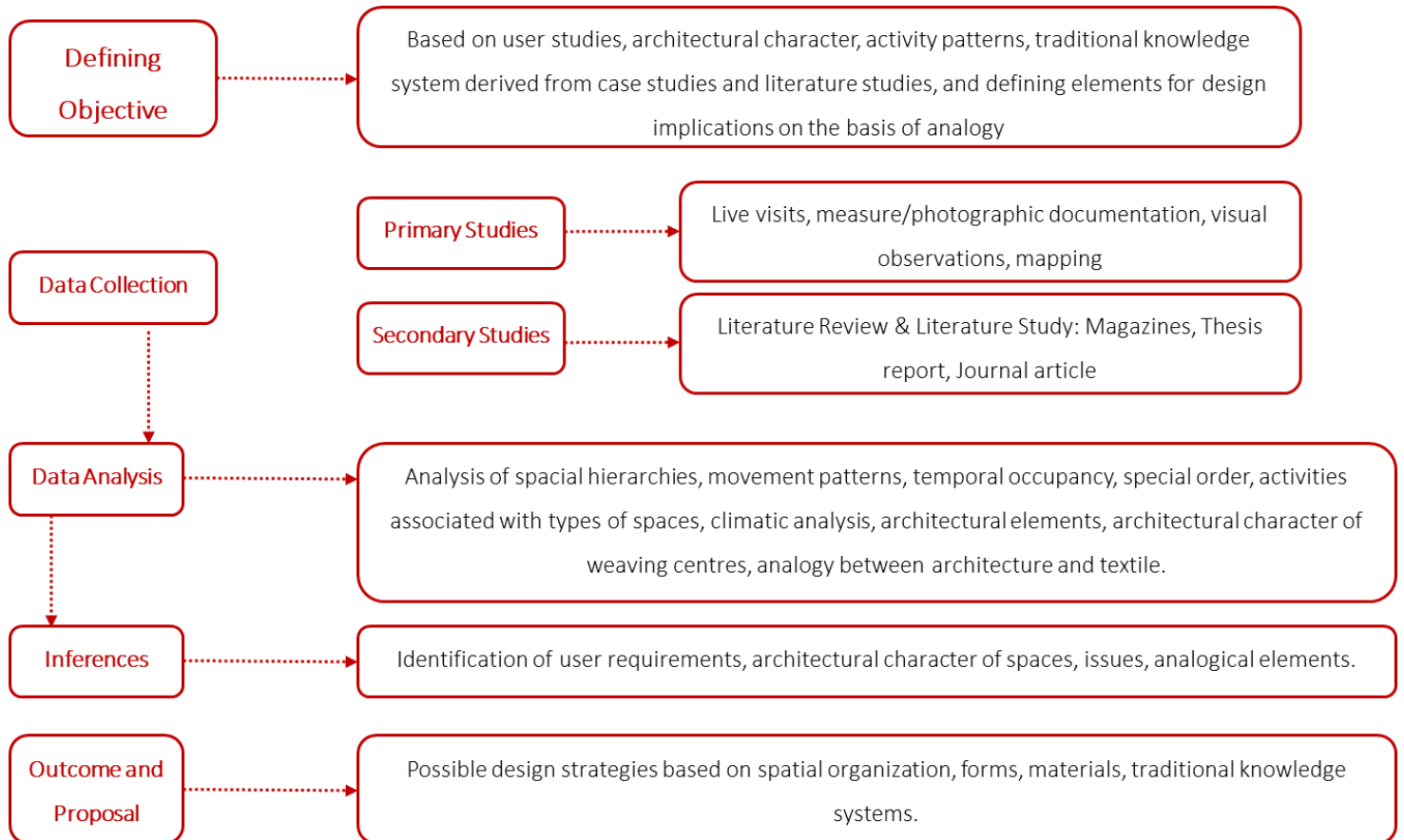
1.5.Scope and limitations

The scope of the research is proposing design strategies and theoretical framework to produce a design for the weavers of Pindrukhi village in Madhya Pradesh. The research finds the different elements or character of the weaving industry through architectural projects, case studies and journals and kinds of literature that define similar design thoughts for both textile and architecture.

1.6.Research Question

- What are the different processes involved in the handloom industry from cotton as a raw material?
- How are spaces related to the different process involved with the weaving culture?
- How individual spaces can be interlinked with each other?
- What is the interrelation between the architecture and textile industry?
- What are the possible design strategies, elements and principles that could play an important role in interweaving spaces and landscape?

1.7. Methodology



2. LITERATURE STUDY

2.1.UNDERSTANDING THE PROCESS INVOLVED IN HANDLOOM WEAVING

I would like to acquaint you through the different stages in the process, where each individual fibre of cotton weaved together to produce beautiful fabrics.

1. *Raw Material – Cotton*

Cotton was the main single biggest normal fiber utilized in creating garments. Today the cotton production of India has expanded to the second most productive in the world. Most of the cotton delivered in India is the short-staple assortment which is perfect for hand spinning. The cotton will be bought from the markets as well as will be produced in-house.



Figure 1: Cotton

2. *Making of yarns*

Yarn is a long continuous length of interlocked fibres. The staple length of cotton determines the thickness of yarn spun and this is referred to as 'yarn count'. Yarn is produced by spinning. For spinning machines like Charkha, Ambar charkha is used to convert cotton into yarns .



Figure 3: A Yarn made out of cotton

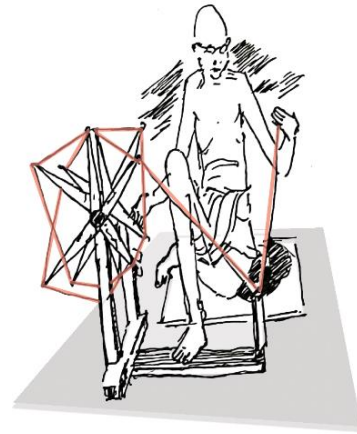


Figure 2: Charkha Machine

3. *Dyeing – colouring the yarns*

It is the process of giving different colours to the yarns to be used in the weaving process. The dyeing is performed with natural dye – colours or chemical colours. Dyeing can be processed before winding or after winding. After the yarn is dyed, it is hung for drying in an open space.

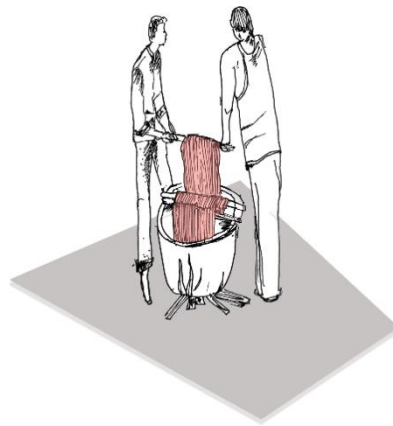


Figure 4: Image showing a dyeing step, dyeing yarn in a burning container

4. *Winding – converting yarns into bobbins or reels*

Winding is the process of converting yarns into bobbins, or reels. The yarn is wind into smaller bobbins for weft and for warping into larger bobbins. Smaller bobbins can be made from charkha machine and larger bobbins on a winding machine. Winding can be processed before or after dyeing yarn.

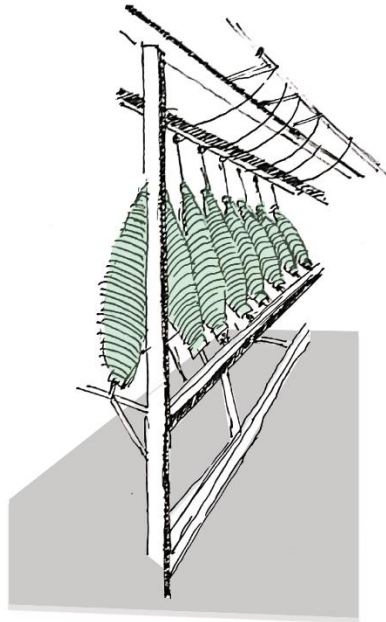


Figure 5: Winding larger bobbins

5. *Warping*

It is the process of making thread of required length by combining many threads together.

The final product is called warp which forms the vertical length of cloth. The process can be performed in many ways. Vertical sectional warping is used, which includes bobbins stand holds all the bobbins together. And then the warp is taken for the next process.

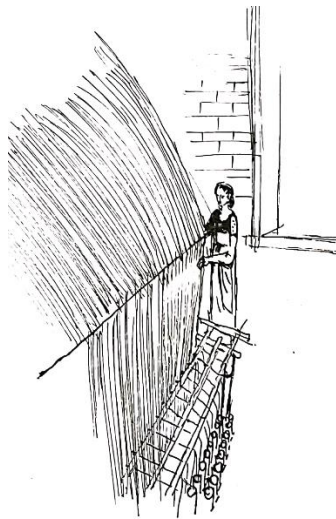


Figure 6: Warping

6. *Sizing*

It is the process of strengthening the warped threads so that it does not break at the time of weaving. The process is performed in an open space because the warped is stretched lengthwise which can be 40ft long.

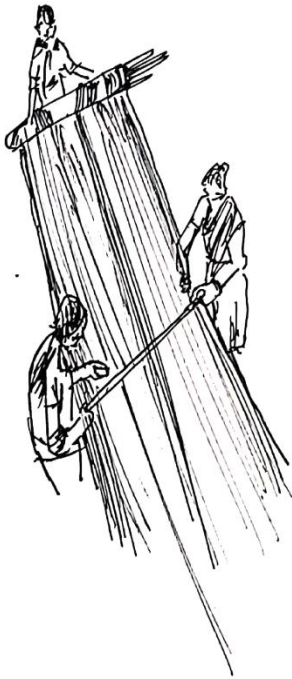


Figure 7: Sizing on an open area

7. *Beaming*

The warped sheet of threads is then transferred into the beam on the frame loom for the process of weaving. The process can be done in a closed or semi-open space.



Figure 8: Beaming of warp

8. *Drafting and Twisting*

The beam threads are then transferred into the loom passes through the heald of the loom as per the design of the product. This keeps the threads parallel to one another.

9. *Weaving*

The process of weaving is the interlacing of two sets of yarn – the warp and the weft. The equipment that facilitates this interlacement is the loom. A “handloom” is a loom that is used to weave fabrics without the use of electricity. The manipulation of the foot pedals to lift the warp has to be in sync with the throwing of the shuttle which carries the weft yarn. A perfect weave demands coordination between mind and body. The weaver achieves a harmony of motion and rhythm to create a unique product.

Depending on the complexity of the design, a weaver weaves between half a meter and five meters of fabric a day.

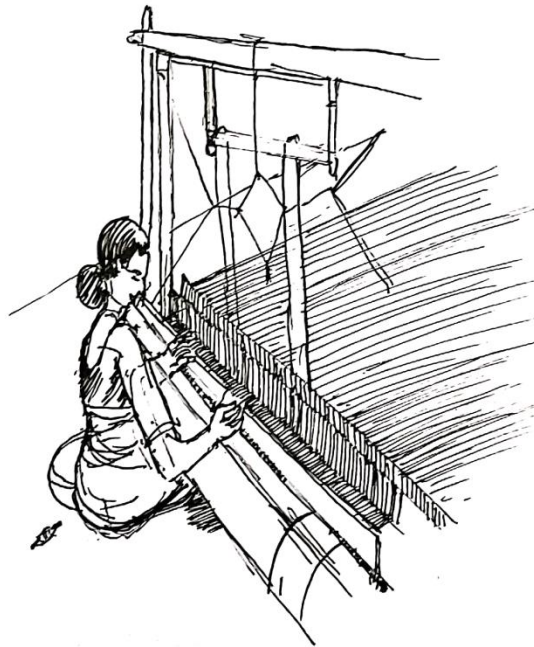


Figure 9: Final Stage – Weaving

2.2.TEXTILE IN ARCHITECTURE, THESIS REPORT

Heybroek, V. (n.d). TEXTILE IN ARCHITECTURE. Bouwkunde – TU Delft: Master Architecture – Graduation Explore Lab.

2.2.1. Summary

This exploration is part of the graduation project at Explore Lab for the Master Architecture at the Technical University in Delft. Explore Lab is a valediction studio for students with a unique fascination. There is a selection process to select students with thought-provoking fascinations that cannot be explored in any other thesis labs. Textile in Architecture was such a theme. The graduation project is an amalgamation of three subjects; Textile in Architecture, Fashion Industry and Sustainability. The investigation that lies before is about Textile in Architecture. This exploration comprises of 35 contextual analyses and two sorts of researches about those contextual investigations; the thought process in choosing material in the unmistakable activities and what sort of material is chosen. He closed the examination with a thought on the best way to structure with material in engineering, the manner in which he moved toward his plan for the building for the Dutch Fashion industry. He considers material to be a misplaced structure material and he needs to acknowledge what the possibilities are to improve the indoor atmosphere with the utilization of the material. In this exploration, he is scanning for conducts how material can be utilized in increasingly dynamic manners. The strain developments of material in design is a built up strategy and he thinks that its less animating to do broad examination on that point. That is the reason he needs to move toward his topic from the perspective of brilliant climatic frameworks on the grounds that there is a ton to progress at that conclusion.To connect this subject with a building program he involved anther fasciation of his to the venture, the Dutch fashion industry. The societal and environmental impact of the clothing industry increased in the last couple of years, And the sustainable matters are questioning for vicissitudes

2.2.2. Keywords

Textile in Architecture, Fashion Industry and Sustainability

2.2.3. Findings

Temporarily, Weight, Adaptability/ Movability, Translucency/ Lighting, Indoor Climate, Atmosphere, Acoustics

Textile as a mislaid building material and to realize what the potentials are to improve the indoor climate with the use of the textile.

2.3.SPATIAL TEXTILES AND THEIR INFLUENCE ON ARCHITECTURE, THESIS REPORT

Tani, N. (April 2015). ENHANCING THE SPATIAL EXPERIENCE Interweaving Textile, Human and Architecture. Otaniementie 14, 02150 Espoo, Finland: Department of Design Aalto University, School of Arts, Design and Architecture.

2.3.1. Summary

This thesis acknowledges the latent role of textiles in architectural space. By finding the relation between textile, human and architecture, this thesis aims to provide information and to propose new ideas for designing improved spaces. The movement comprises of examination through writing surveys and master meeting, investigations, and a few idea recommendations accordingly. The primary part presents the foundation and current relevance of the theory. The interests develop with an architectural approach towards textile design. Materials are not just enriching components; a few engineers, fashioners and specialists have practically combined textile with design. Although there are hopeful developments in the overlay between textile and architecture, no general expressions exist. In order to maximize the importance of textiles to further expand our living environment, a wide understanding of textile design in relation to its handlers and surroundings are essential.

The second and third chapter from the research segment of the thesis. First, historical associations between the three elements of textile, human and architecture are examined. In fact, textiles have existed in architecture since ancient times. For the fundamental need to survive, humans wrapped themselves and adjacent spaces with textiles. However, the relationship and different accents of the three elements change dramatically over time. At times, the textile design has been less associated with humans and architecture. By addressing the evolution of the relationship between their elements, the potential of spatial textiles is revived.

In the third chapter, the existing role of architectural space is discovered. Textiles have developed to meet several needs that are functional, aesthetic and atmospheric. The example in this chapter demonstrates the numerous effects only textile material can achieve.

Taking the above research into justification, the fourth chapter summarizes the evolution of textiles in architectural space. Furthermore, a future vision of spatial textiles is discussed in relation to the evolving needs of our complex society.

Finally, three textile concepts are projected in the fifth chapter. Each concept answers the urgent needs discussed in the fourth chapter by choosing and integrating the suitable functions. When textiles are designed in next of kin to the site and its users, the resulting spaces become more comfortable, efficient and revitalizing. As a result, textiles augment the spatial experience. In conclusion, the inclusive process and proposals are swotted in the sixth chapter.

2.3.2. Keywords

Textile, architecture, design, spatial design, interior design, curtain, weaving, history

2.3.3. Findings

- Historical associations between the three elements of textile, human, and architecture.
- The existing roles of textiles in architectural space
- The numerous effects only textile material can achieve
- A future vision of spatial textiles is discussed in relation to the evolving needs of our complex society.

Therefore, the paper concludes that textiles can create flexible spaces due to their pliability. Furthermore, the textures, scale and movement of textiles create a welcoming atmosphere, which adds to or restores the sense of a “place,” “habitat” or “home.” This balance of flexibility and humanity is essential in designing our future society. Thus, textiles will continue to be implemented further in architectural space.¹

¹ (Tani, 2015)

3. LITERATURE REVIEW

3.1.GENIUS LOCI OR SPIRIT OF A PLACE

“Sense of Place and genius loci can be defined as the collection of meanings, symbols beliefs, values, and feelings that individuals and groups associate with a particular locality” (Stewart, 1998,)

Genius loci is a roman concept meaning that every individual space has an overruling or protecting spirit that defines the character and identity of that space. Given below are the parameters for identifying the spirit of a particular place:

Energy fields, Authenticity, Local distinctiveness, Narrative with layers of history, Empowerment of ordinary people (In the followed thesis the idea is to Empower Women), Essence and Interiority, Character and Individuality, Pantheism, Panpsychism, Ecosystem

Various concepts from the study of a phenomenological approach are:

- Different actions demand different places with a different character.
- All places have character
- The character of a place is a function of time
- Enclosing properties of boundaries are defined by the openings
- Centralization, direction and rhythm are important properties of concrete space
- Settlement and landscape have a figure-ground relationship
- Character is how things are in the atmosphere
- The character of a place: the function of time, transposing character, material and formal constitution of a place
- Psychological functions for the understanding of a place: orientation and identification.

3.2. SHARED CONCEPTS AND ANALOGIES IN TEXTILE AND ARCHITECTURE

(Gupta, 2019)

3.2.1. Concept of Ornamentation

The historical evolution of attitudes towards ornamentation and its role in architecture is depicted by the various Art movements and styles that developed in Europe since the Gothic eras. From the Renaissance times, the in façade of a building in relation to ornamentation and the structure's exposure or coverage is visible till the modern and post-modern eras. The earlier practice of ornamentation has been changed drastically to a more functional definition of ornamentation rather than a mere addition or coverage of the structural members. This development in architectural history can be easily linked with the textile history following similar trends of ornamentation. Modern textiles are much more simple, sophisticated and emphasize the structural beauty of the material rather than highlighting it with organic and literal depictions.

In the Indian context, it is evident from the ornamentations of saris and depiction of culture as motifs or thread design which were traditionally derived from the local culture and ornamentation of forts or towns in which they were produced. Even the traditional wearing of Jain saints is a plain white cloth made of cotton, even the pooja time cloth is a boring addition with motifs printed on the bordered strips.

Both textile and architecture were initially functional in nature and have throughout history been ornamented in various ways according to cultural inclinations. Known as 'humanization' of environment, people all over the globe have been attracted to decorations after the basic requirements of shelter and security have been met. The motivations can be religious, cultural or spiritual behind the ornamentations of textile and architecture.

3.2.2. Concept of parts forming a whole

The notion of dressing or weaving a piece of fabric is similar to the skin of buildings conceptually and literally or physically. Textiles were used to provide shelter in the primitive architecture as discussed in the previous chapters got transformed into earthen materials thus forming the basic element of modern architecture, a 'wall'. *The wall as a single unit and its relationship between the structure underneath work as an integrated system similar to that in textile.* Semper insisted

in his works that earlier the wall was developed not only to provide a spatial experience but as a frame for the textile screen. (Semper, 1989) According to Semper, all the existing built forms, construction methods initially developed from textile production methods such as the *interweaving, the knots, layering, etc.* Semper was successful in tracing the origins of architectural practices, ornamentation and structural elements to the textile practices of specific cultural societies. (Semper, 1989)

From the works of Semper, Mies Van de rohe and Justin Ruskin, it is evident textile and architectural components are used in a similar manner forming parts to whole. From the development of a primitive wall of woven covering inside a frame to the role of textile becoming distant from structural members similar to the exterior building gradually departing away from the load-bearing structure. Through the architectural revolution by Le Corbusier and Mies van de rohe of the curtain wall system, this condition is best depicted.

Both architectural elements and textiles are produced by structural organizations and systems. If we remove the paint from a wall, the identity might change but the structural integrity won't, similarly, the organization of threads in textile have unique integrity which distinguishes from plastics. It is only through the structural Rationalist thought of the 19th century that architects around the world came to perceive buildings as composite systems of structures and several other components.

For example, the traditional warp and weft method of producing handlooms and the bamboo woven screens; the invention of modular building systems or jacquard looms depicts that both textile and architectural industries have evolved to complex structural systems.

3.2.3. Layered formations

Certain structural typologies of textile and architecture are based on the number of layers used to produce them. Both the fields can incorporate layers and even the functions of these layers can be integrated to enhance a spatial experience or body comfort. For example, maximum houses in the harsh climates of hot and cold incorporate multi-layered facades with insulations consisted of exterior claddings, insulation, primary structure and interior finishes or wallpapers for thermal comfort and acoustic treatment. Similarly, textiles are often woven in layers to enhance the body warmth or to increase the opaqueness. In textiles too, the functional properties of each layer of textile can be layered upon others to increase certain thermal resistances or other qualities associated with the human body.

3.2.4. Permeability and Flexibility

A building envelope is so designed as to allow the easy flow of wind and daylight thus enhancing the comfort for the users inside. Similarly, textiles are woven with pores and openings to allow the body to breathe and not to suffocate the user. The openings referred in architecture are similar to that in textiles with a difference in scale and proportions. As a cloth allows the body to breathe with its permeability similarly, the architecture does enhance the spatial experience.

3.2.5. Context response

Both textile and architecture are typically processed by the physical, social and cultural context in which they are developed. For example, the design of woolen cloths are specifically done with multi-layers, less permeable, darker in shades, thick membranes and low thermal conductance is contextually responsive to the climatic conditions, locally available local materials and the ornamentations are often restricted to culture. Similarly, the vernacular architecture of cold climates is formulated by fewer openings, use of stone and timber and mud walls with pitch roofs and less thermal conductivities is contextually responsive to the harsh cold winds, and heavy rainfall.

3.2.6. Tactile Memories (texture)

Materials used in both textile and architecture can be natural or synthetic based on the requirements of context and client. But some natural materials possess unique textures that have tactile memory (or feel) associated with them. The ageing characteristics that impart organic textures, colours, rootedness to the natural elements, transforming qualities under different climatic factors and the human scale of these natural materials are responsible for such memories to be naturally embedded in the human mind. Such tactile memories are common to both architecture and textiles. For example, the surface quality and the sense of linen fabric, woolen fabric, cotton fabrics, etc. and the textural qualities of stone, mud, bamboo, timber, slate etc. enhance the tactile memories of the user.

4. THEORETICAL FRAMEWORK

4.1. Genius Loci or Spirit of Place of Weaver's Workspace

- Energy fields, a characteristic point of intense energy that can be felt in a designed space in a form of tangible or intangible aspect. In the case of weaver's working space, it is the unique sound of continuous use of handlooms which signifies the place.
- Authenticity, or certain unique character which determines the tangible aspect or intangible culture of a certain place or the people. In this case, Pindrukhi, Dindori, M.P. is rich with Jain cultures and temples.
- No such unique architecture of the place but the governing people follows Jain cultures, and so Local distinctiveness refers to the ornamentation of Jain architecture, vernacular architecture, brick wall, stone architecture, thick walls, sloping roof, etc.
- A narrative with the layers of history, Story of the lost tradition of the place, and initiative for Women Empowerment.
- Empowering Women Weavers
- Essence and Interiority, interweaving working and spiritual environment, beliefs followed for working as well as meditative culture.
- Character and Individuality, cultural industrial environment with interdisciplinary linkages, a labyrinth of activities.
- Pantheism, believing that work is worship in a spiritual environment, Reality is identical to divinity.
- Panpsychism, awareness in the inanimate tools of handloom, raw material and the final textile product.
- An ecosystem of growth, inspirations, culture and tradition passed on to the younger and future generations.

4.2. Relation Between Handloom Weaving and Architecture

4.2.1. Historical Overview

Without much literature available in this respect, majorly the inferences are made from Indian traditional paintings and artworks that depicted the use of textiles to enhance or create architectural spaces. The historic buildings of India today stand as empty shells which leave us clueless as to how the monuments once served as livable spaces. The Indian textile element of '*Shamiyana*' or attachments of awnings to build spaces transformed the spaces not only

functional but also aesthetically or depicted in the various paintings of Red Fort, Delhi. These awnings served as physical barriers which were changed according to time and the types of activities it hosted. The presence of rings and hooks on the walls of traditional monuments infer that long stretched awnings were once used to enlighten the spaces now sitting in dead silence.

India's harsh climates and frequently changing climates demanded the use of such awnings as climate control devices and to serve for shade and comfort. Clothed screens served as moveable walls with extensive flexibility in providing private spaces. Purdah or Parda which initially meant the seclusion of a female person behind a screen of cloth slowly transformed into a team associated with the modern curtains.

In the 17th century Mughal and Rajput paintings, the use of floral depictions is clearly visible in both architectural ornamentations and patterns woven or printed on textiles.

Draperies, wall and ceiling hangings were also evident in traditional temple architecture of India. For example, the Himalayan monasteries in Tabo depict the use of textile patterns patented on fabric and attached to its ceilings. Narrative stories of Indian epics like Ramayana painted on textiles as hangings were also found in temples of India.

The canopy or '*chhatri*' was the Indian tent with the ancient concept of royal sun shading element. Also, temporary 'pandals' or enclosures for certain religious festivals has been an age-old practice of constructing temporary public gathering spaces from a framework of bamboo or wood scaffolding and then draping decorative fabric above it.

In India, historically the linkages between textile and architecture have often served a religious purpose, division of space based on the caste system and hierarchy of rule, festivals and as a symbol of royalty and worship.

4.2.2. Relationship of parts to the whole

- The process-oriented approach instead of product-oriented
- Interweaving and overlapping space, movements, activities, volumes, etc.
- Community involvement where designers, weavers and learners are interlinked
- Layered formations wherein countless layers of traditions, spaces and knowledge skills are piled up.

4.2.3. Tactility

- Tactile comfort is required for handloom activities as it is a long strenuous activity

- Tactile memories which involve them in a sense of belongings and responsibility to space
- Imparts an identity to the fabric as well as the architecture

4.2.4. Permeability

- Visual and perceptual permeability, community interaction, to expose the process of handloom
- Breathing quality, to inhale and exhale
- To expand and contract spaces

4.2.5. Continuity

- Spatial continuity
- Perceptual and visual continuity
- In response to context and evolving the process of the context

4.2.6. Organic character

- Temporal variations and multiple uses of the same spaces,
- Variety of interactive or gathering spaces, with varying internal or external courtyards.
- Labyrinth of pathways
- Breaking the solidity of mass or space, evolving it more into organic form into different patterns
- Variations in the built form with the hierarchy of spaces from open – semi-open – closed, and organization of spaces

4.2.7. Ornamentation Concept

The concept of ornamentation on the saris being inspired by the forts, temple architecture has been followed in weaver's society. Ornamentation is heavily inspired by their religion and community, for example, the saris of Varanasi host zari work from block cards and those of Maheshwari are simple and geometrical inspired from the Ahilya fort complex, also some motifs and ornamentation are inspired from temple architecture.

4.2.8. Parts to Whole Concept

The warp and weft techniques of handloom weaving produce a unique structure to the sari and the use of intricate zari work adds up to the structure. A sari is woven in many stages, part by part developing and weaved on the loom. The sheer amount of intricacies and parts associated

with a sari weaving is similar to the vernacular structural construction techniques followed by different communities. The vernacular architecture of mud, brick, stone, mud and clay tile is also a part by part weaving of single wall to a complete space.

4.2.9. Layered Formation

A sari is woven in multiple layers from raw material to initial stages through warp and weft which is similar to their architectural hierarchy of depicting use of space in layers of open space, semi-open spaces, covered spaces and their respective process associated with textile production. There are layers of culture, tradition and heritage imbued in an Indian traditional weaving much like their own vernacular architecture.

4.2.10. Permeability and Flexibility

Saris, and other wearables for saints are made from natural yarn mostly like cotton, which serves to impart excellent permeability and body comfort to the wearer. Similarly, vernacular architecture that is permeable to wind, water and adequate amount of required sunlight for the quality of their space used for threads and machines.

5. SITE STUDY

5.1. Location

The nearest city to the site is Jabalpur, 138 km from Dindori. The site is located in Pindrukhi Mal village. Pindrukhi Mal village is located in Dindori Tehsil of Dindori district in Madhya Pradesh, India. It is situated 25km away from Dindori.

The total geographical area of village is 678.94 hectares. Pindrukhi Mal has a total population of 1,104 peoples. There are about 269 houses in Pindrukhi Mal village.

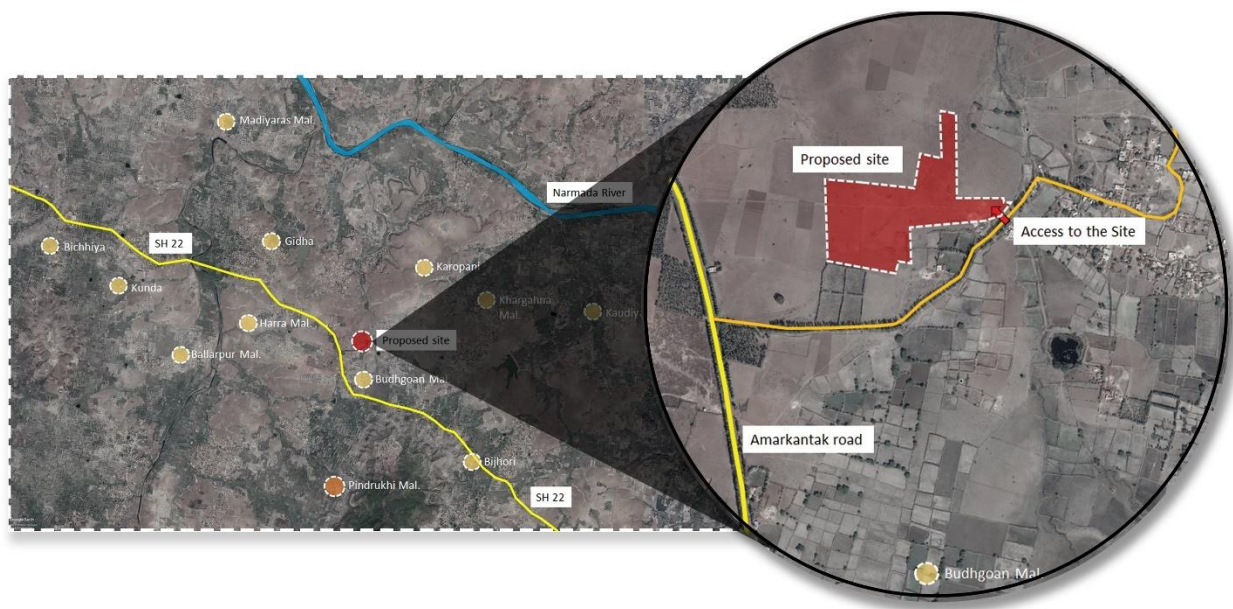


Figure 10: Proposed Site Location and Access

5.2. Site Surrounding

The site is surrounded by agricultural land, and no specific construction nearby site. A village is situated opposite of karopani road, opposite to the site.

5.3. Connectivity and Accessibility

The site connects the karopani road which connects to Amarkantak road. The site access is from east direction.

5.4.Context Study

5.4.1. Building Material

- Local vernacular materials will be used
- Rammed Earth Walls
- Deep rubble stone Masonary
- Terra cotta tiles for roofing

5.4.2. Bye – laws

Since the site is located on an agricultural land in a village, no specific bye-laws are applied or provided.

5.5.Site Character

5.5.1. Vegetation on Site

- No existing trees within the site
- Eucalyptus trees along the Karopani Road and some patches of trees can be seen outside the side.

5.5.2. Services on Site

No existing services of any kind, two electric lines run over the site from South to North and East to West direction with the transformer near the karopani road.

5.6.Climatic Anlysis

- The climate is considered to be Csa according to the **Köppen-Geiger climate classification.**
- Climate here is mild, and generally warm and temperate.
- Pindrukhi lies in the Zone III (Earthquake Zone)
- Average Rainfall : 1450mm
- Average Maximum Temperature: 43.6°C

- Average Minimum Temperature: 3.1°C

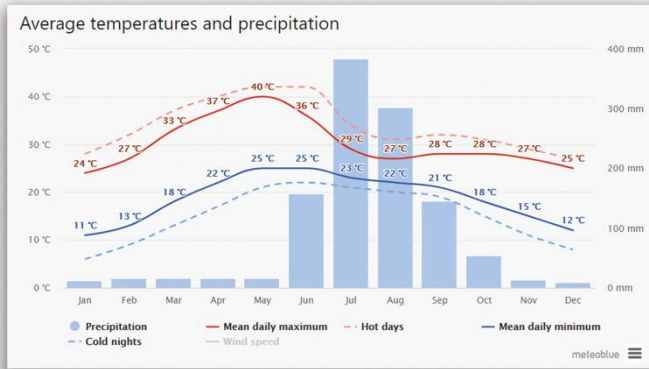


Figure 11: Average temperature and precipitation graph

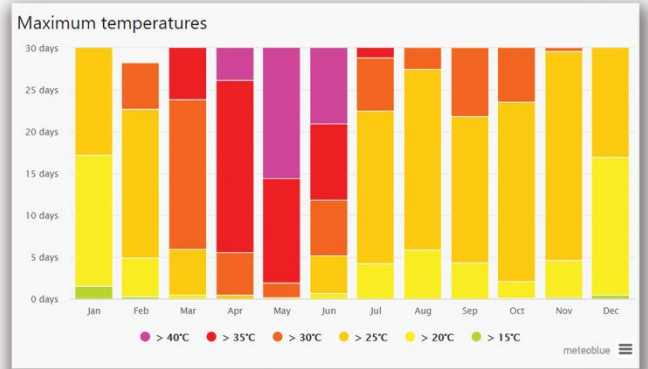


Figure 12: Maximum temperature graph

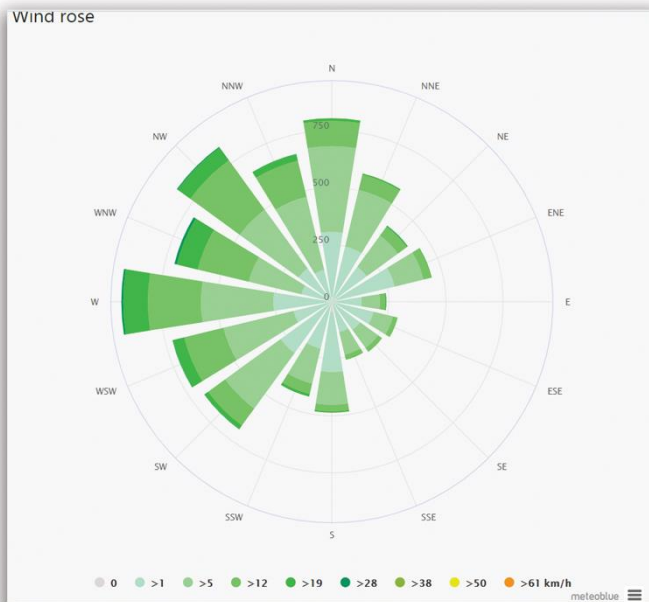


Figure 14: Wind Rose Diagram

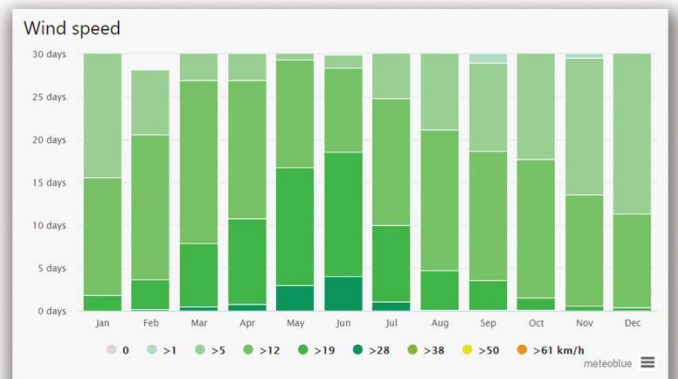


Figure 13: Wind Speed graph

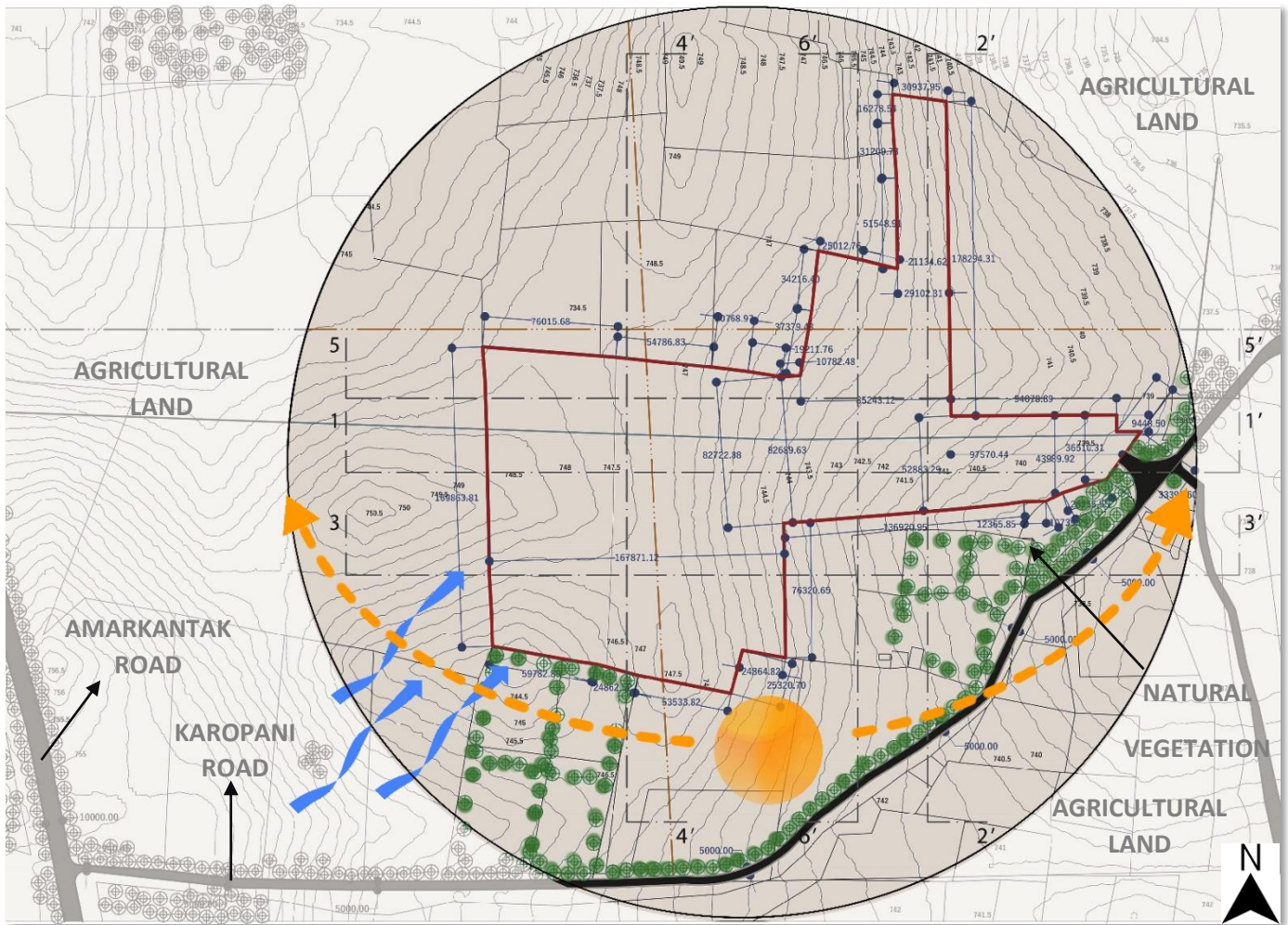


Figure 15: Existing Site Plan with Climate Analysis and Vegetation

5.7. Contour Analysis

- There is a gradual increase in slope from the east side of the site towards west for 11m of difference within a stretch of 350m.
- The lowest point on site is 739.5m and the highest point on site is 748.5m measuring from the sea level.
- The slope goes down in the S-W part of the site.
- The site connects to Karopani road from east of the site, the lowest contour of the site benefits for a slope up for drive-way.
- All the parcel land within the site is suitable for construction. The most probable parcel being the West parcel of site.

- Orientation of the building along parallel to the contour line in order to save excavation cost.
- Natural drainage on the site flow from west to east and to south sloping down the contour.

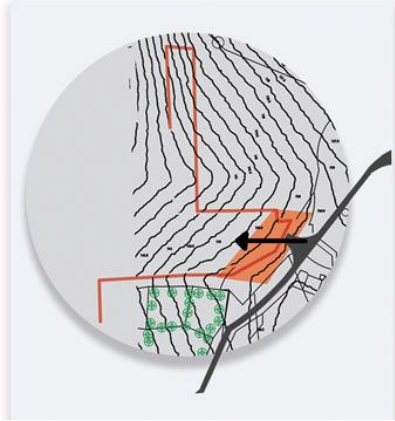


Figure 17: Showing the Entrance from East - accessed through Karopani road

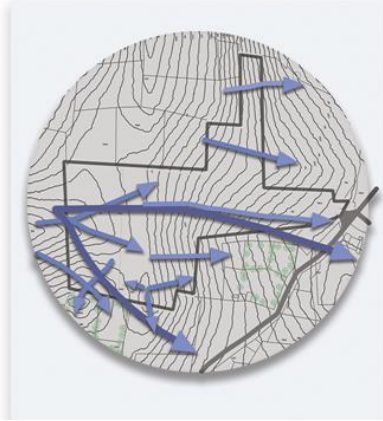


Figure 18: Showing Natural Drainage Flow

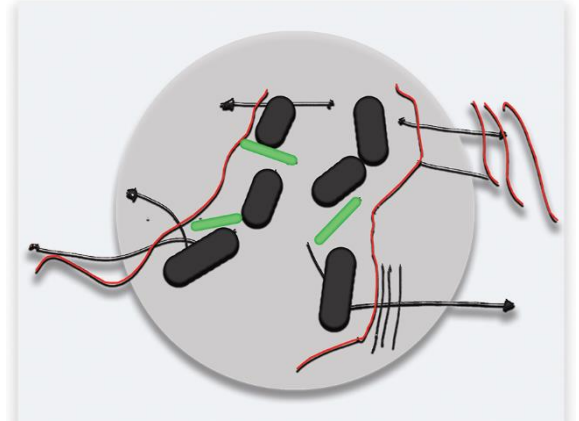


Figure 19: Orientation of Building with respect to Contour

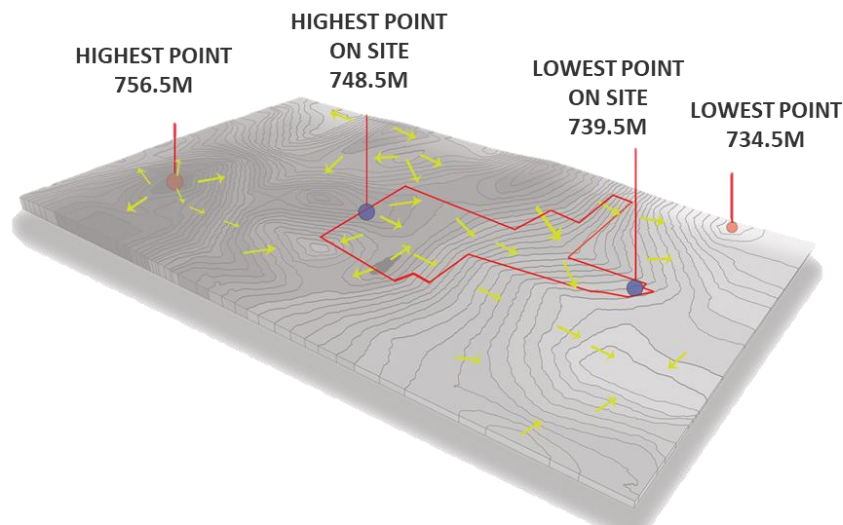


Figure 16: Contour 3D plan - showing highest and lowest point



Figure 20: Section through E-W

6. CASE STUDIES (Live and Literature)

6.1.Ganga Maki Textile Studio, Dehradun (Literature Case Study)

Location: Village Bhogpur 30kms from Dehradun, Uttarakhand

Site Area: 13000 sqm (3.3 ACRES)

Built-Up Area: 1077 sqm

Year of Commencement: 2012

Year of Completion: 2016

6.1.1. Concept:

To Embody and cultivate this cyclic relationship between work and life, the sun and the moon- bringing together the past, present and the future.

6.1.2.Development of Plan

Introvert planning with sequential opening up of spaces.

Enclosures created by the landscape.

Situated in a grove of Mango trees.

The design follows the natural terrain

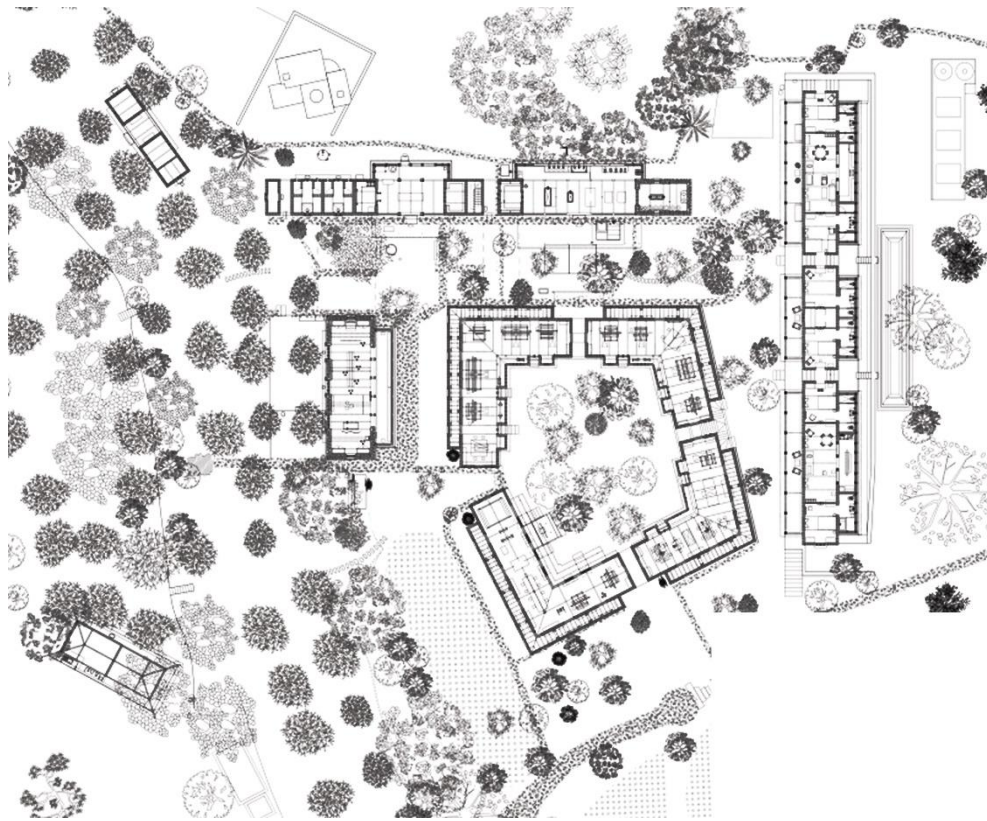


Figure 21: Site Plan – Ganga Maki Studio

6.1.3. Design Observation

At its heart are four L-formed studios where weavers and craftspeople make handwoven textures and pieces of clothing. Arranged around a courtyard, the basic rectangular boxes are buttressed on one side by a tight stockpiling and administration space, and on the other by a marginally raised workshop. Richly lit, natural and agreeable, the studios suit weavers - for the most part men - who

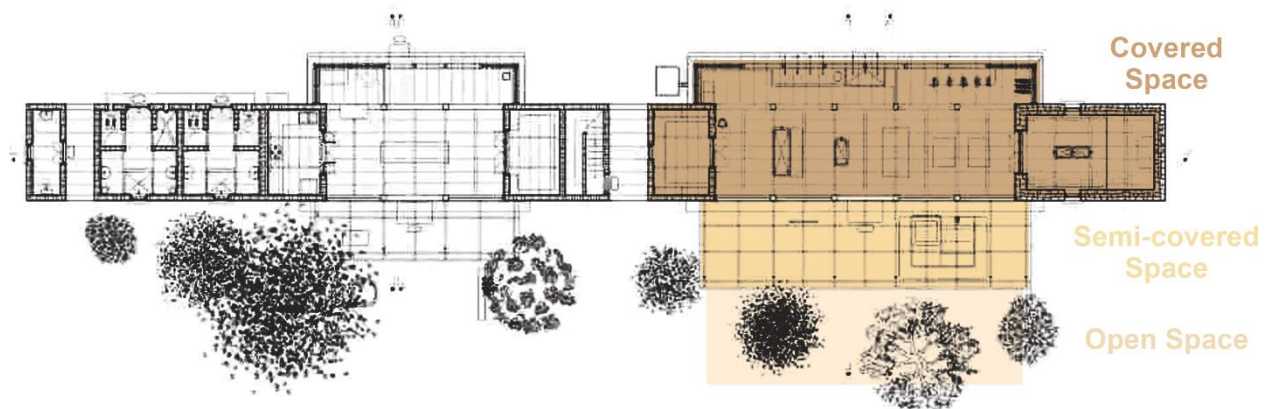


Figure 22: Hierarchy order of Weaving Studio and Dining Space

sit at their weavers the focal, sky-lit zone. Ladies who weave, fasten and turn the yarns comfortably utilize the raised workspace. Of the four studios, the one made for Maki is particular, not connected to the others, the structure is made with bamboo outlines, put with mud blended in with waste and secured by a straightforward rooftop with a bamboo trellis underneath, looking like a persuasive earthen house. It is structured explicitly for her utilization while the others are increasingly aggregate.

North of the central courtyard run the blocks housing the dyeing workshop, guest dining and other amenities. Right at the top of the campus sit the owner and guest residences.

At the entrance, a gallery invites visitors.

The facility is a space that looks internally into a sort of courtyard. It serves as a workshop as well as a kind of container within which there is an open void space in the middle - where a lot of the weaving and other activities can take place outside in good weather. during the monsoons, the weavers can stay in. But the idea is that this facility has the ability to contract and expand depending on seasonal weather changes.

6.1.4. Climate Illustration

- The facility is closer to Rishikesh than Dehradun, which means we are negotiating extreme climatic conditions - very cold winters, extremely hot summers, and anything that comes in between.

The monsoons, for example, are very small but they bring very strong rain and hail.

The challenge has been to understand the programmed and build a place that could sustain the weavers.

- The spaces are oriented and arranged in order to protect the internal courtyard from cold northeast winds and to cross ventilate the spaces via south-west winds.
- The external opening sizes are small to minimize direct sunlight and to allow for maximum diffused lighting from the internal courtyard.
- Introvert planning with orientation in response to the user activities and spacial order and occupancy times.
- Low occupancy buffer zones of storage of reels and raised working spaces in the internal courtyard acts as an insulation layer to the direct heat gain.

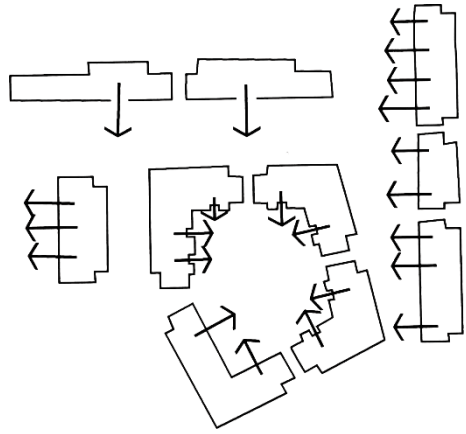


Figure 26: Showing introvert planning

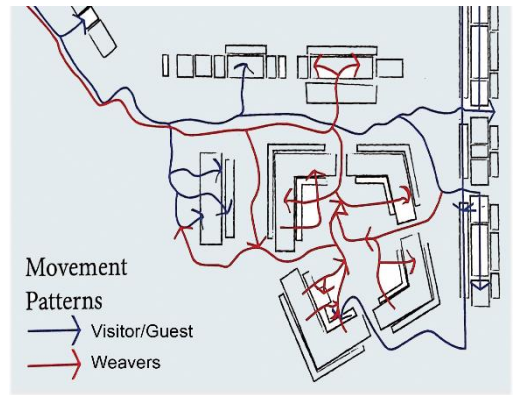


Figure 25: Movement Pattern

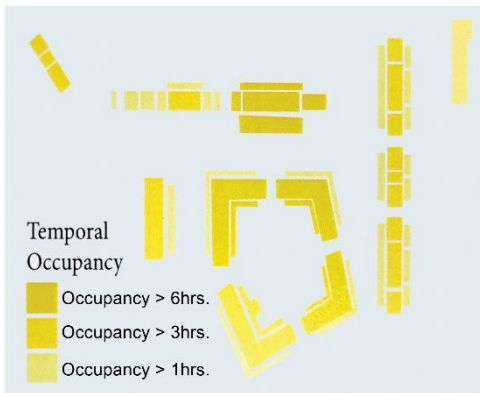


Figure 24: Showing Temporal Occupancy



Figure 23: Showing Spatial Order

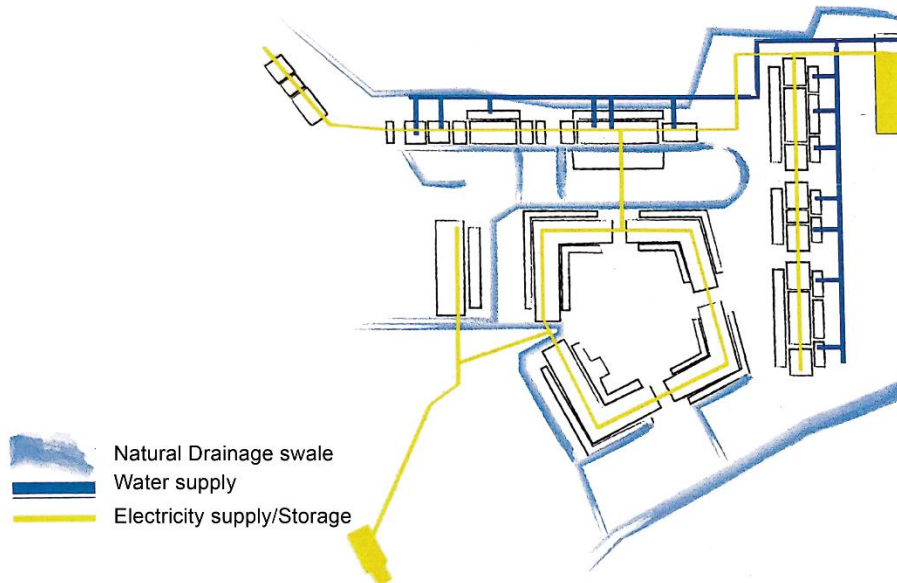


Figure 27: Electricity/ Drainage/ Water Supply Diagram

6.1.5. Inferences

- Climate response via materials, planning and layout.
- Provision of low occupancy buffer zones to minimize direct heat gain.
- Topography response by channeling natural drainage.
- Minimal cut and fill
- Enhancing visual and thermal comfort by the natural landscape.
- Integrating workshop design within the architectural form.
- Tactile comfort while working for long hours.
- Introvert planning of working spaces.
- Sufficient diffused lighting as direct sunlight destroys natural fabric.
- A semi-private project with lack of efficient connectivity and lack of weaver settlements.
- less number of commercial spaces for management of raw materials, lack of store manager spaces.

6.1.6. Spatial organization

- Open space like courtyard being used for weaving related activities like reeling and preparing reel for weft, and for gathering or relaxing.
- Semi-open spaces in the courtyard used for handloom weaving. Mud flooring, pit loom specifically used by the owner.
- Semi-open spaces in front of dyeing block used for drying out dyed yarns.
Covered with bamboo trellis.
- The raised workshop incorporated within the internal courtyard. Diffused lighting.
Semi-open space.
Post loom activities.
- Internally placed handlooms with a small opening and sufficient diffused light from courtyard and buffer zones.

6.2.Khamir Crafts Resource Centre, Bhuj (Live Case Study)

Location: Khamir craft centre is located Behind BMCB society at Lakhond crossroad-Kukma Road, Bhuj

Context: The immediate context is the open lands (Private property).

Topography: Gentle contours

Climate: The average temperature during the summer months can rise up to 31° C. In winter the temperature drops and average temperature in the months of winter is about 12° C.

Site area: 8093.7 sq.m.

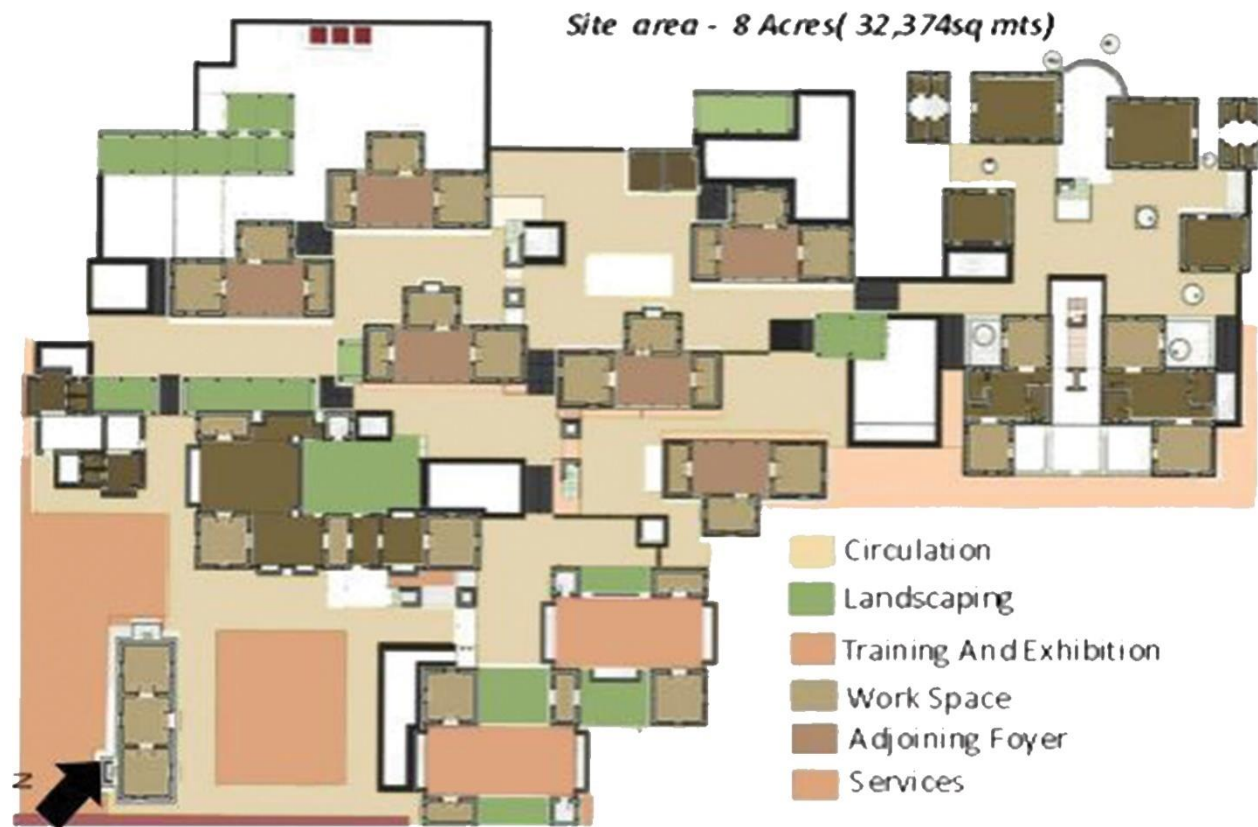


Figure 28: Site Plan – Khamir

6.2.1. Design Concept

Khamir was designed to create 2500 sq.m. Facility for the promotion of craft in Kutch. Concept of planning this centre is derived from the local streetscape and village pattern noted before the earthquake. Some of the typical layouts of the streets are:

- Y shaped branching of streets forming interconnections (squares chowks) at regular intervals
- The staggered arrangement of built form can be seen in plan.
- As shown in plan the same modules repeat to form clusters which represent Kutch village.
- Built-up area is about 2200 sq. m.
- The orientation of built form (workshops and administrative block) results in proper breeze flow, reduction of thermal radiation exposure and create effective daylight conditions.
- The interrelation between closed, semi-open and open spaces to create a natural and fresh environment for people working there.
- Building module is placed in such a way to form narrow pathways and shaded spaces.
- Courtyards are connected by shaded pathways.
- Katta's (outdoor seating is provided in the courtyard).

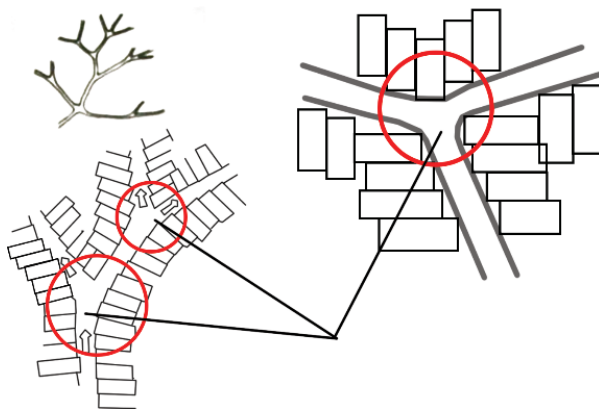


Figure 30: Typical Street Layout - Bhuj

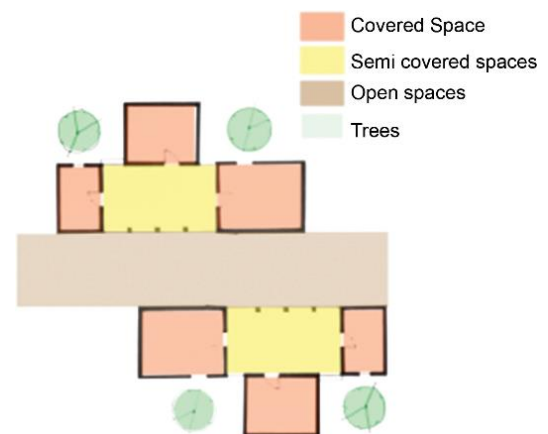


Figure 29: Hierarchy of Spaces

6.2.2. Design onsideration

- Khamir crafts centre is located in the area which falls in type V seismic zone, and the climate of the region is Hot and Arid.

Main Design considerations-

- Making the space user friendly and suitable for artists.
- The structure should be climate responsive.
- The structure should be earthquake resistant.
- The construction was carried out by Hunnarshala Foundation taking inferences from the vernacular Architecture of Kutch.

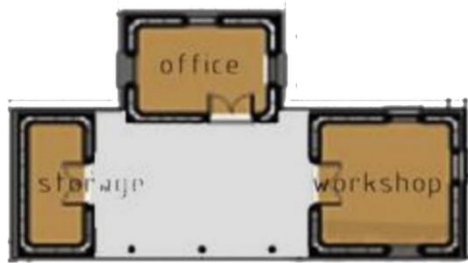
6.2.3. Climate Consideration

- Hot and Dry Climate
- Building must remain cool in the extremely hot summers and warm in the cold winters.
- Shade and insulate the house against the heat of the day and flush out any stored heat during the cooler nights.
- Capture and store solar energy in solid material such as a concrete floor or brick walls (thermal mass).
- Windows are placed to take advantage of cooling breezes in summer.
- Use light colours for external and internal wall surfaces.
- Different techniques of mud structure such as Puddled, Wattle and Daub, Rammed Earth are used.
- Outlets at higher levels serve to vent out hot air.

6.2.4. Module Design Approach

The workshop area is made by creating a module and repeating it six times creating lanes and chowks in between them.

Module Level - The module is created with covered interior spaces around a semi-open space at the centre which acts as an informal active verandah.



THE MODULE FOR WORKSHOPS

Figure 31: A Module for Workshop

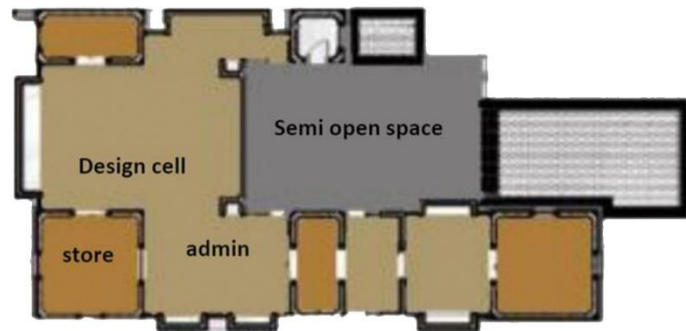


Figure 32: Admin Block

6.2.5. Structure System

Khamirs structural system involves three main elements:

Foundation:

- Deep rubble stone foundations hold up the ground floors till the plinth level, with local stones available.
- 2-meter-deep Strip Foundations are made with CC base.

Walls: Walls at Khamir are the combination of three types.

- Rammed Earth Walls
- Stabilized Concrete Blocks
- Wattle and Daub

RAMMED EARTH

- The ground floor of this Craft Facility is constructed in rammed earth.
- Rammed earth is simple to construct, on –combustible, thermally massive, strong and durable.
- Natural raw materials such as earth, chalk, lime and gravel are used.
- One of the significant benefits of rammed earth is its high thermal mass, it can absorb heat during the day and release it at night.
- This moderate daily temperature variations and reduces the need for air conditioning and heating

Earth: Rammed Earth, CSEB (Compressed Stabilized Earth Block)

- Locally available and produced.
- Traditional influence

- Aesthetics involved
- Climatic factors: low rainfall- easy to construct earth walls, heat insulation
- Financial – cost-effective.

Burnt clay bricks:

- Low compressive strength- 25-40 kg/cm²
- Burnt clay bricks – 1:6 used in masonry construction.
- Stone: Due to low compressive strength of bricks, stones are used in masonry till plinth.

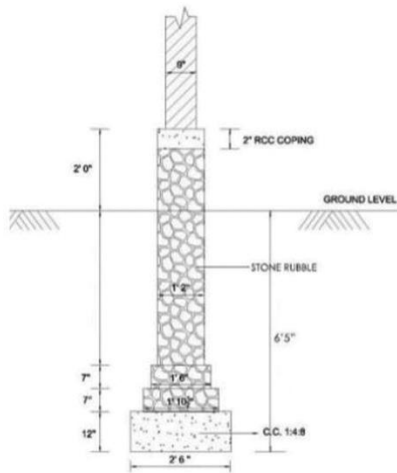


Figure 34: Section Showing Foundation and Plinth Pad Details

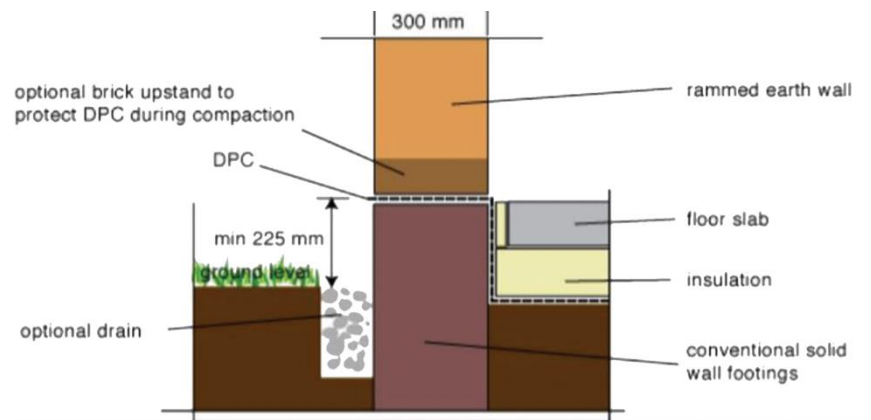


Figure 33: Typical Detail of Rammed Wall at Plinth level

WATTLE AND DAUB PANELS

- The walls of the first floor of this Craft Facility were made with Wattle and Daub Panels.
- In this method of construction, the vertical wooden stakes or wattles are woven with horizontal twigs and branches.
- ‘Daub’ is a combination of materials such as wet soil, clay, sand, lime, animal dung and dried grass.
- Substances such as clay is a binder to hold the daub together and the addition of materials such as dried grass help to hold the daub mixture together and provides flexibility.

Roofing:

- Two types of roof can be seen – Lean-to and Couple Roof.
- Height Variations to provide shade and shadows.
- Small openings to avoid harsh sunlight.
- Due to low rainfall, plinth height is low.

- Admin Block on the south side is two-storied and blocks harsh sunlight and provides shade and shadow to pathways and courtyards around it.
- Wide overhangs to protect rammed earth wall from rainfall and to avoid direct sunlight

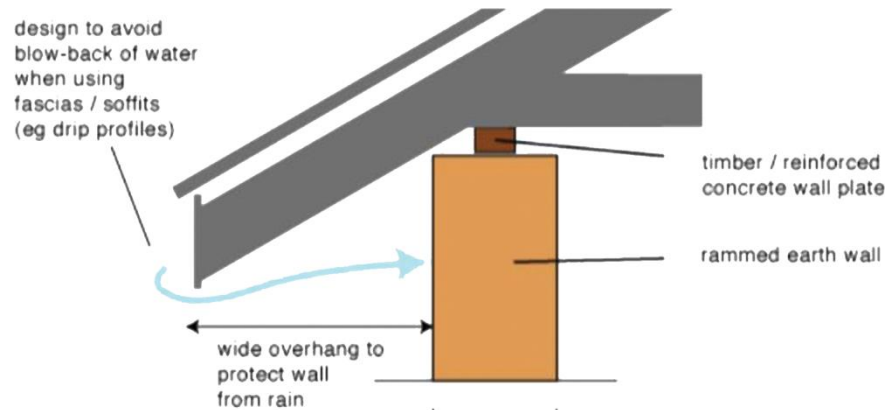


Figure 35: Detail of Roofing with Steel Rafters

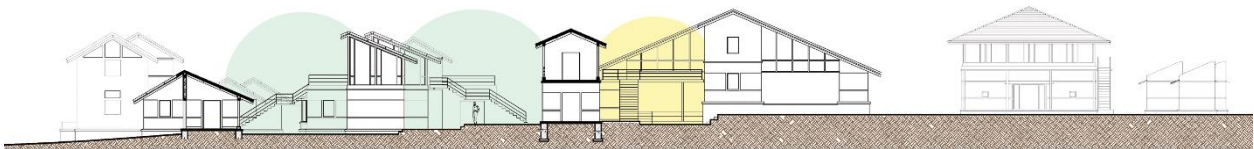


Figure 36: Section Showing types of Roof and Streets & Courtyards

6.2.6. Inferences

- Strength
 - Has the ability to inform the context.
 - It is a sustainable structure.
 - Earthquake resistant.
 - It's a resource centre.
 - It goes from open - semi-open and then closed space.
 - Includes services like training, accommodation.
 - Use of locally available material, vernacular architecture.
- Weakness
 - The foyer space that is the interactive space can be increased.
 - Due to modular design, spaces are not designed as per artisans' requirements but they need to

adjust accordingly.

- Lack of sense of direction.

- Opportunities

-More arts can be introduced.

- A huge common interactive space, where all the arts meet.

- To provide with the sense of direction.

- Threats

- Future earthquakes.

- security.

- Pause points in-between clusters.

- The internal spaces are simply designed, resonating a sense of openness.

- A composition of familiar space elements, the design is structured together in a manner to form shaded courts and thresholds.

- The manifestation of the idea of local availability and sustainability.

- Use of vernacular architecture in a modern way.

- Earthquake resistant techniques.

- The complex circulation - moves through a service of progressions and pauses.

- Clubbing of two areas - courtyard - arts

- foyer space - activities.

.

6.3.THE KAYA KALP Handloom School, Women Weave, Maheshwar

(Literature Case Study)

Site area: 700 sq.m.

5.3.1. Introduction

The kaya Kalp project was commissioned by Rehwa Society, a profoundly fruitful co-employable that business sectors neighborhood items at shows all through the nation. Kaya Kalp covers a total area of 7500 square feet (700 square meters) and has been worked (in the mid-1990s) at an expense of just Rs. 105 for each square foot.

These figures shocked everybody in light of the fact that no below average materials or methodology were used. It must be referenced in any case, neighborhood work is exceptionally modest and contributed significantly to the bringing down the general expense. On the other hand, other relative errands in Maheshwar at the time had cost up to three-overlap the sum.

The rooftop system has steel supports secured by corrugated galvanized iron sheets which are, thusly, clad with interlocking half-round terracotta country tiles. Together they make a protecting air-hole that keeps the room cool, even in the 46°C summers. The mix in like manner thwarts even the littlest spillage, which could without a very remarkable stretch ruin various extensive stretches of work as it lies relaxed up on a loom.

Landscape

Khair tree (outside), Guava, Berr, Almond, Jamun, Lemon, Jackfruit, Mango, fruiting trees all inside creating a pleasant microclimate for long hours of working and gathering spaces.

Materials:

Mud flooring, terracotta tiles for roofing, GI sheets for roofing, Mild steel trusses in weaving studios and classrooms, Brick walls, Stone lintels, Brick pathways, Mud and lime plaster.

Double height spaces with pitch roof and a small opening at the top provides cross ventilation and increase the time for direct sunlight to reach the ground. Also, mud flooring enhances the thermal and tactile comfort in the weaving studios where weavers spend 8 hours per day.

5.3.2. Design strategies explained through graphical maps

- Plan layout with brick corbelling
- The movement pattern of various users
- Natural drainage flow-through internal courtyard runoff from the roof
- Introvert planning with an internal courtyard and surrounded by tree cover to enhance comfort levels in the surrounding and inside the place
- Number of hours spent in each space by a maximum number of users depict the design significance and consideration to the spaces associated with weaving on the loom
- Spaces related to weaving such as warping, loom weaving, dyeing are carried out in all open, closed and semi-open spaces and thus require careful attention while design
- The hardscape and softscape are so woven together with brick pathways manifesting the user movements in the area and enhancing the overall spatial experience.
- Relationship with the surrounding landscape and compact forms and compact arrangement to minimize heat gain.



Figure 37: A) Plan showing introvert behaviour/ B) Movement Pattern

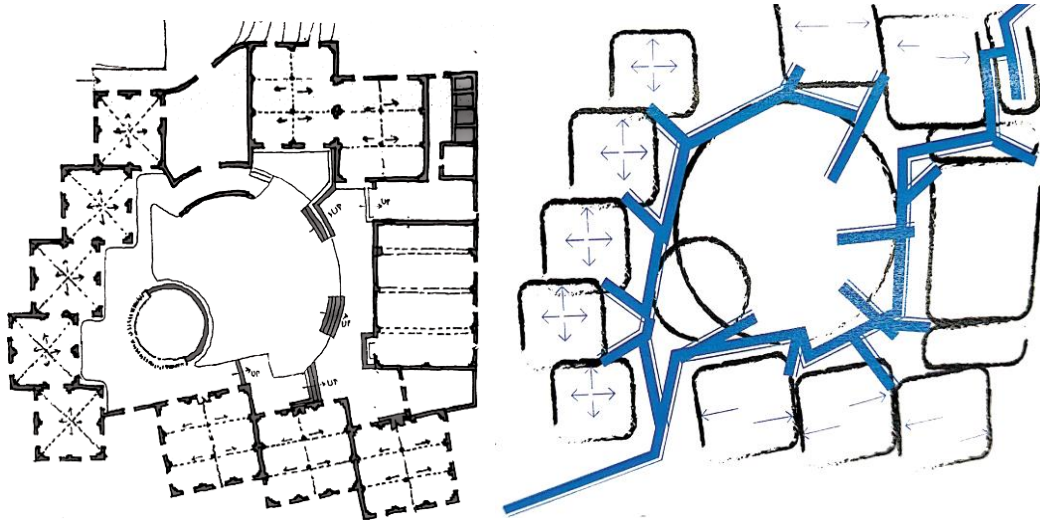


Figure 38: A) Plan layout with Brick Corbelling/ B) Natural Drainage Flow-Through Internal Courtyard

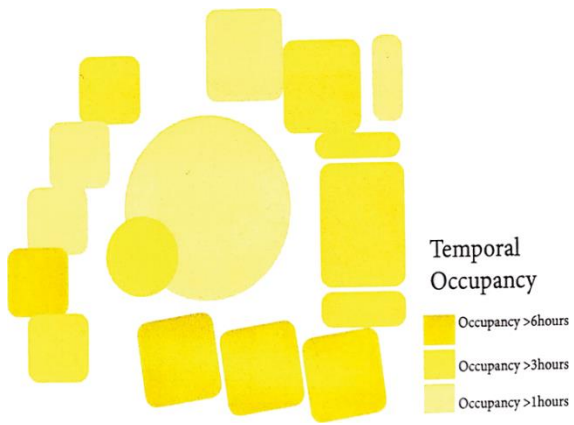


Figure 39: Temporal Occupancy

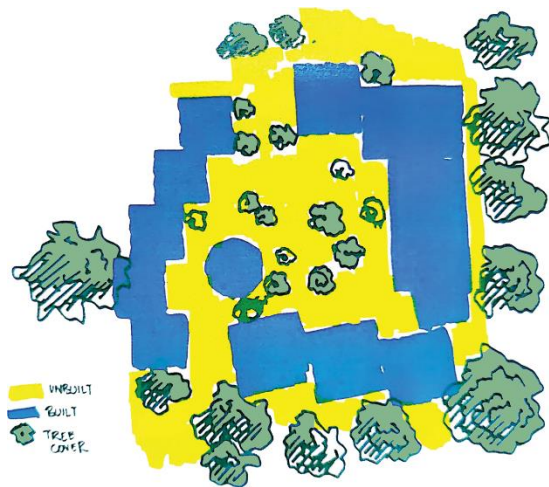


Figure 40: Built-unbuilt with introvert planning

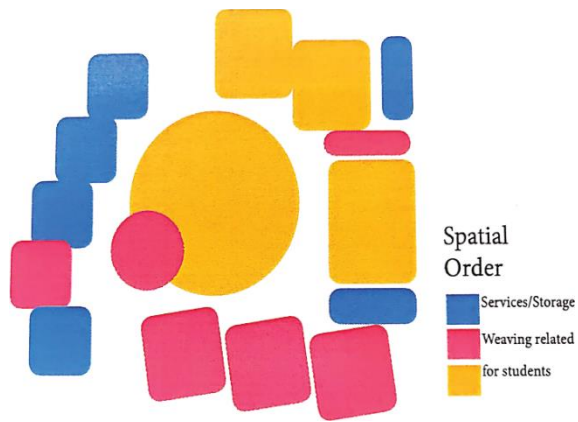


Figure 41: Spatial Order

5.3.3. Inferences

- Introvert planning with the sequential revealing of spaces.
- Climate response via layout, materiality, double-height forms, brick jalis, mud flooring and clay tiles.
- Internal and external environments and enhanced by the use of delicious landscape trees.
- Response to topography by channelling natural drainage through the building.
- North-south oriented spaces by blocking west winds and channelling them through the built form thus cooling them.
- Hierarchy of open, semi-open and closed spaces in response to the user requirements and activity patterns of the weavers and their associated trainers, officials and stores manager.
- The loadbearing structure is built from locally made burnt brick, set in a mixed lime/cement mortar.
- There was minimal plastering on the external walls and certainly none on the internal walls.
- Double heightened pitch roof form to delay heat gain in the interiors.

6.4. Government Training Centre and Dye House, Maheshwar (Live Case Study)

Location: Khargone (West Nimar), SH-1, Mandleshwar Road, Khargone, Khargone, Madhya Pradesh 451224

The Government training centre, Maheshwar trains young weavers from around the town for a 3-month course. The training centre occupies 35 trainees at a time with frame handloom machines, pit looms, warping and winding machine and charkha for the preparation of bobbin. The study describes the various processes and the use of different machines for different purpose of the process.

The study describes two different spaces:

1. The training centre
2. The dye-house

5.4.1. The Training Centre

Development of Plan

Linear planning with a single shed structure.

Entrance lobby connecting a large span space for weaving activities.

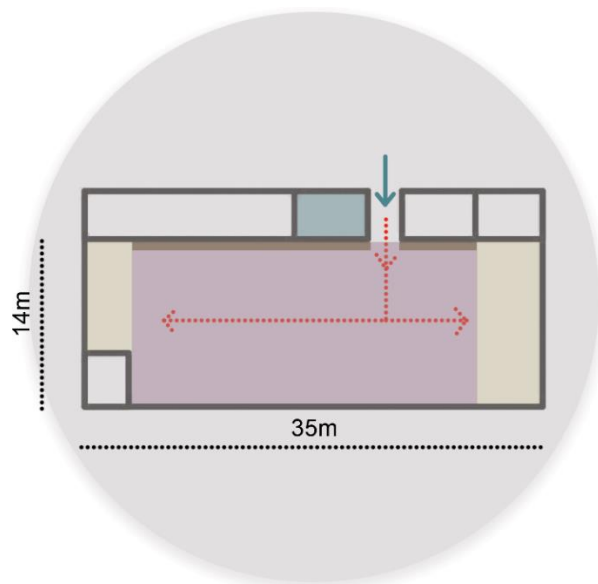


Figure 42: Plan – The Training Centre

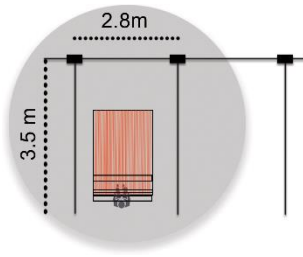


Figure 43: Figure shows a single handloom machine space

Functional Aspects:

Training centre space includes frame handloom machines - 13 looms.

1 Warping Machine

1 Winding machine

2 Charkha machines

All working in a single large span area: 490 sq.m.

No of Trainees: 35

Office/Souvenir shop: 21 sq.m.

Space analysis

Single frame handloom space analysis, it covers the area of 9.8 sq.m. including circulation space.

Loom size varies according to product type.

Materiality of Space

This training centre is along with span structure with Howe timber truss system supported by timber pillars. Steel sheeting on the roof.

Different types of machines:

Handloom Machine: This is a wooden frame loom of size 90" x 62". The weft is proceeding through the shuttle thread method.

Winding Machine: This machine is used to convert a small package of yarn(bobbins) into a bigger package of yarns(cones). To prepare warp.

Size: 78" x 31"

Spinning Machine: Raw materials and tools required -

- Bobbins made of wood, yarns for warp and weft.
- Cycle - wheel to function the charkha.
- Wooden frame to wing the hanks on.

Warping Machine: This is a wooden frame Warping machine includes -

Warping Wheel: 87" x 70"

Loom Rod: 88" x 60"

Bobbin Stand: 120" x 87"

Raw materials and tools required -

- Bobbins of the cotton yard, 20s count
- Bobbin stand
- Wooden frame
- Reed
- Warping wheel
- Lease sticks
- Loom rod

5.4.2. The Dye-House

Dyeing is the process of adding colour to textile products like fibres, yarns, and fabrics. Dyeing is normally done in a special solution containing dyes and particular chemical material.

Raw Materials & Tools for Dyeing

1. Yarns (usually 20s count cotton for warp & 60s count wool for weft.)
2. Dyes (natural or chemical, as per the order)
3. Dyeing vessels

4. Water
5. Gas stove

The process

1. The hanks are dipped into the desired colours and dyed at a specified temperature.
2. Dyeing is followed by drying of yarns.

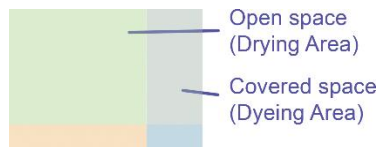


Figure 44: Hierarchy of Space

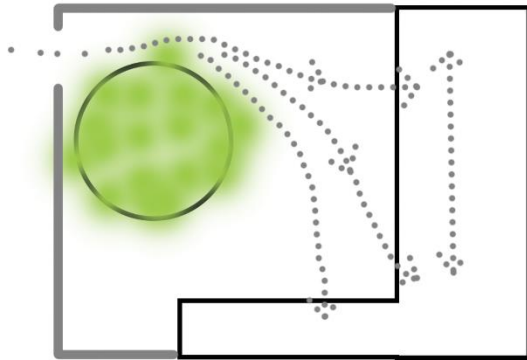


Figure 45: Site Plan – Dye-House

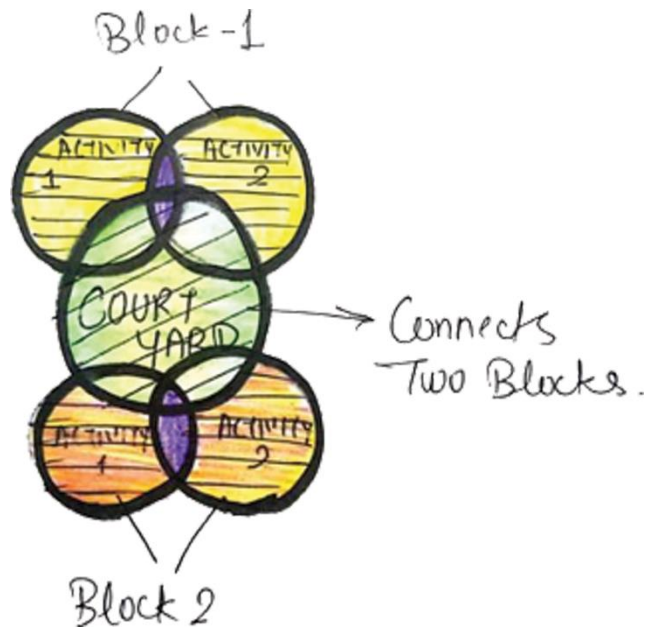
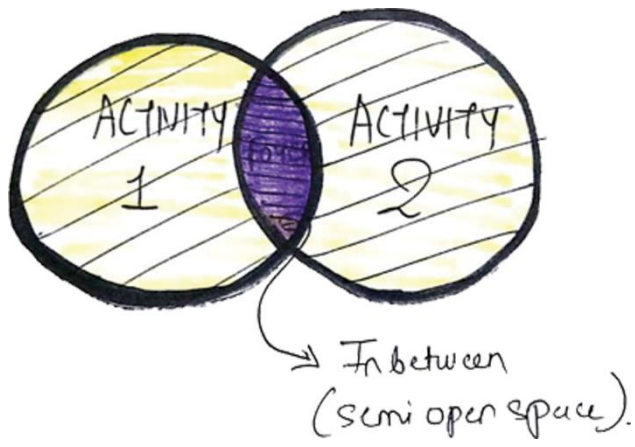
6.5. Case study Inferences – Strategies for Design Proposal

Spatial organization

- Open space like courtyard being used for weaving related activities like reeling and preparing reel for weft, and for gathering or relaxing.
- Semi-open spaces in the courtyard used for handloom weaving. Mud flooring, pit loom specifically used by the owner.
- Semi-open spaces in front of dyeing block used for drying out dyed yarns.
Covered with bamboo trellis.
- The raised workshop incorporated within the internal courtyard. Diffused lighting.
Semi-open space.
Post loom activities.
- Internally placed handlooms with a small opening and sufficient diffused light from courtyard and buffer zones.

Design Strategies

- Introvert planning of working spaces.
- Maintaining the hierarchy of space.
- Climate response via materials, planning and layout.
- Provision of low occupancy buffer zones to minimise direct heat gain.
- Enhancing visual and thermal comfort by a natural landscape.
- Integrating workshop design within the architectural form.
- Tactile comfort while working for long hours.
- The process-oriented approach instead of product-oriented
- Incremental and need-based, irregularities and variations in built form and spacial order.
- Temporal variations and multiple uses of the same space.
- Breathing quality, to inhale and exhale, to expand and contract spaces.
- Visual and perceptual permeability, community interaction, to expose the process of handloom.
- Interweaving and overlapping spaces, movements, activities, volumes, etc.
- Perceptual and visual continuity.
- Spacial continuity
- Organic behaviour of the form of the building.



• **Traditional knowledge system and Characteristics of Weavers workspace**



Regular Air Flow

To prevent bugs and pests from destroying yarn. To provide a comfortable zone to work almost eight hours a day.



Spill - Over Spaces

Streets and courtyards for pre-loom and post loom activities, open and semi open spaces.



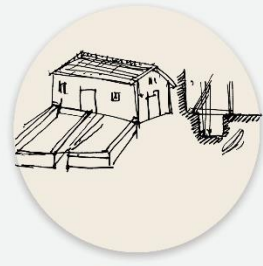
Adequate Light

Direct sunlight can harm the handloom Fabric. To avoid dampness in yarn required for long hours of work.



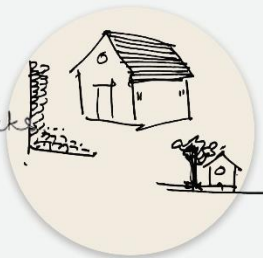
Balanced Humidity

50-70% humidity required for yarn. Require for twisted yarn of warp and weft to prevent breaking landscape, water body, mud as building material.



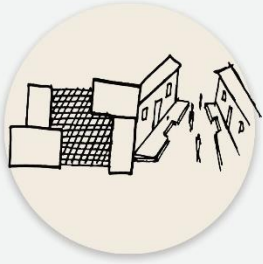
Soft Flooring

For digging of pits, even for frame loom, tactile comfort, temperature control, special care for loom accessories protection against bugs and termites.



Maintenance of Temperature Control

In hot and dry, breaking of thread in cold and humid, damp, sagging of thread. Required for long hours of intense work



Empowerment

Of ordinary people, handloom weaver and their families.



Authenticity

Of certain unique character or intangible cultural value or tangible element associated authentic to a certain place. Interweaving the workspace with spiritual essence and architecture.



Character and Individuality

Cultural industrial environment with interdisciplinary linkages, labyrinth of activities.



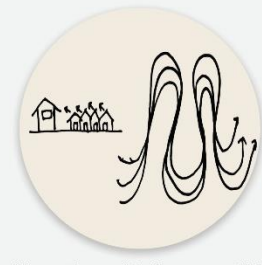
Energy Fields

A characteristic point of intense energy tangible or intangible that can be felt in a designed space. In the case of weavers village, it is the unique sound of constant use of handlooms which identifies the space.



Character and Individuality

Cultural industrial environment with interdisciplinary linkages, labyrinth of activities.



Narrative with Layers of History

Story of weaving and its essence, handloom, emotion of respect, care, trust, guardianship, empathy.



Ecosystem

Of growth, inspirations, eco-friendly, intangible cultural heritage passed on to future generations.



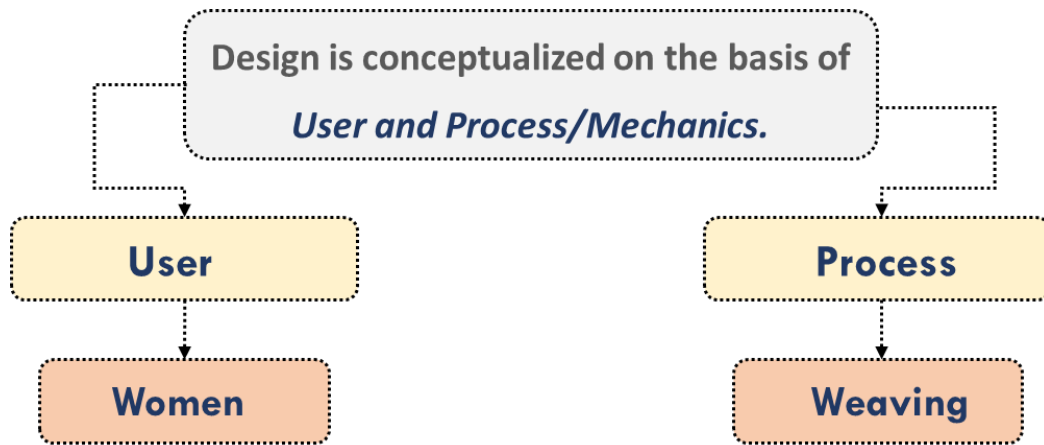
Subjectivism

Consciousness in the inanimate tools of handloom, raw material and the final textile product.

7. Area Programming

Weaving Centre for 1500 women Weavers at Pindrukhi, M.P.						
No.	Spaces	Occupancy	Area in sq.m.	Occupancy (for 1500 Women Weavers)	Area in sq.m. (Proposing)	Description
1 Administration						
1.1	Entrance	50	160	10	32	Main entry of the building
1.2	Reception	4	40			
1.3	Director's cabin with attached toilet	6	100	6	100	Head of the institute who handles the weaving centre
1.4	Staff area	12 staff + 8 faculty	100	4	20	Persons who manages the weaving centre (Jain community)
1.5	Pantry	-	20		20	
1.6	Collabrative wing		200		100	Brands, Designers and international compny's offices
1.7	Toilets	male: 2 female: 4	70		70	
	Total		680		342	
2 Weaving						
2.1	Dyeing area	5	40	35	280	Cotton purchased from market and dyes in desired colour
2.2	Warping area	8	25	480	1704	Cotton loaded on spinning wheel, transfers into spindles and warpping process [consists warpping and winding machines]
2.3	Design lab	2	20	85	850	To explore new designs using computer
2.4	Handloom sheds / Workshop area	20	175	855	7481.25	Work area for all the machines included
2.5	Storage space	-	100			Yarn depot, to store raw material and machinery
2.6	Toilets	female: 6	70	female: 100	1200	
	Total		430		12735.25	
3 Design and Training						
3.1	Information centre	10	50	10	50	Collective to understand rights and different scheams
3.2	Handloom sheds / Workshop area / Classroom	44 students+ weavers	450			Learning area for weaving with Frame and Pit looms Training production, marketing and distribution with computers
3.3	Design lab	10	100			To design different patterns on computer
3.6	Multipurpose hall	80	100			For seminars, discussions, new technology introduction, etc.
3.7	Toilets	male: 3 female: 3	70	male: 3 female: 3	70	
	Total		1070		1070	
4 Public spaces						
4.1	Exhibition space	130	130			Exhibit their different designs and works with different display areas
4.2	Souvenir shops	130	100			0.55 for one person standing excluding circulation spaces and products display space
4.3	Cotton products shops	-	300			
4.4	Toilets	male: 2 female: 2	50			
4.5	Food court + Kitchen	-	200			
	Total		780		780	
5 Open spaces						
5.1	Organic Farming		4000			open farm for growing cotton and other medicianl plants and plants for natural dyeing process
5.2	Child Care center	55 child	253	200	920	4.6 sq.m per child
5.3	OAT	1600	960			.60 sq.m per person including cicalution
	Total		268		1012.9	excluding 5.1 and 5.3
	Total		5895			
6 Residences						
6.1	Guest House	20	156			Accomodation facility for guests
6.2	Sant Niwas	36	900			Accomodation facility for Jain Sants including with meditation space and sant classroom
6.3	Service Spaces		44			
	Total		1100		1100	
7 Temple spaces						
7.1	Temple		3720		1860	Reference: The Adinath Temple, Ranakpur, Rajasthan
8 Parking Area						
8.1	Cycle parking	10	12			1.2 sq.m per cycle(assuming the women weavers of Pindrukhi village will use cycle as a transportation means)
8.2	Guest vehicular parking	four wheeler: 150 two wheeler: 200	2160			12 sq.m for 1 car parking / 1.8 sq.m for 1 two-wheeler parking
8.3	Bus parking	2	96			48 sq.m for 1 bus parking
	Total		2268		2268	
	Total				18038.15	excluding parking area (Open parking)
9 Services						
9.1	Water Requirement					
9.1.1	For Dyeing Purpose					110 liters of water is needed to dye 1 kg cotton fabric and thus the water consumption of an average sized textile mill having capacity only 8tons/day is about 880000 liters per day
9.1.2	For Flushing use	1500-1600	72000 Ltr/day - 72 cu.m			45 Ltr per day for Production centre cum institutional building
9.1.3	For Drinking use	1500-1600	144000 Ltr/day - 144 cu.m			90 Ltr per day

8. Concept Development



Design is conceptualized on the basis of *User and Process/Mechanics*.

1. The user being the *Women*, an initiative for empowering women. To replicate the user approach, design should include elements which is women specific. Therefore, strikes with the idea of *Femininity In a Space*, normally femininity is defined as:

Femininity

/ˌfɛmɪˈnɪnɪti/

noun: **femininity**; plural noun: **femininities**

- qualities or attributes regarded as characteristic of women.

And applying femininity in a space in architecture, some of the elements/approach were derived, they are as follows;

- SELF – REFLECTIVE
- COMPLETENESS
- HARMONY
- BALANCE

- PROCESS -ORIENTED
- FUNCTIONAL
- FLEXIBLE
- HARMONIOUS FLOW
- RECEPTIVE
- ORGANIC
- POETIC
- RESPONSIVE

2. The second being **Process and Mechanics/Mechanism**, the *process-* oriented was derived from the process of weaving, as weaving industry follows a process of producing final products starting from making yarns from raw material (cotton) to final weaving. It follows a series of processes which are important respectively and therefore space should be symbolize in a way which simplifies the user movement and working. The *Mechanism* derived from the process of warp and weft, in the way they are interweaves or overlapped. The mechanism of machines works in a cyclic manner or flow, whether it is a Charkha or the Hathkargha machine or any other machine used in the process.

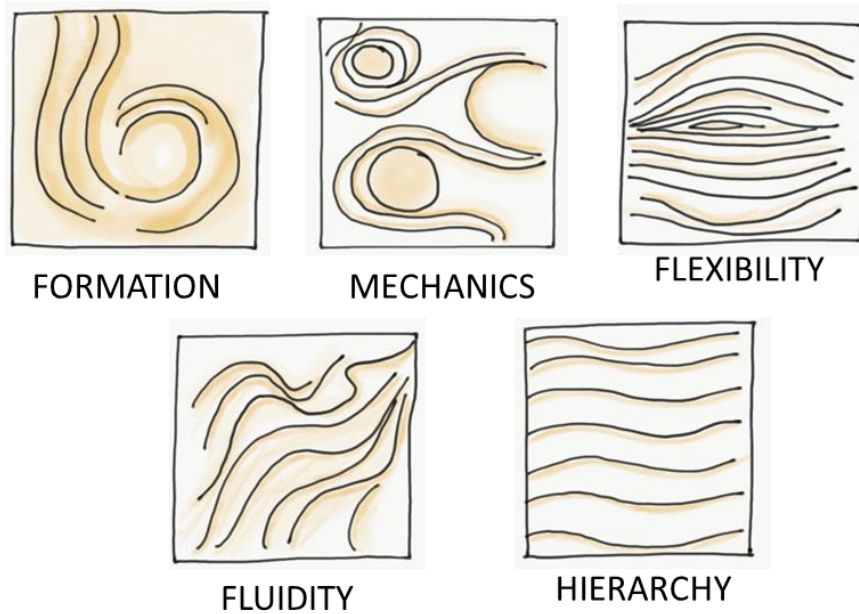


Figure 46: The above figure represents the mechanics of the weaving.

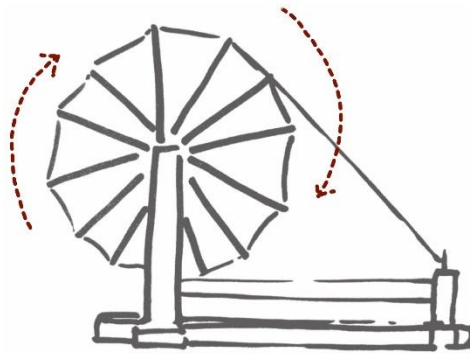


Figure 47: Charkha Machine Showing Mechanism of Machine

The **Integration** of the above two stated approaches best represents symbolically the first primary shape in architecture which is a **CIRCLE**.

Circle is a symbolized, introverted figure that is normally stable and self-centering in its environment. They are often used to ymbolize Harmony and Unity. Circles are most frequently used to represent things of the same shape that we know and create a Sense of Completeness.

Therefore, **Circle** is taken as a **predominant architectural component** in my design.



WHY CIRCULAR OVER LINEAR SPACE?

1. Creative and Interactive Working Environment – the interaction of weavers communicating increases radially to 360deg, as compared to a linear space, therefore increases cone of vision for weaves.
2. Movement of the Eye in terms of viewer – because of no edges or dead end as in a linear space, the circular space/walls automatically direct to another space or the spaces becomes naturally appealing.

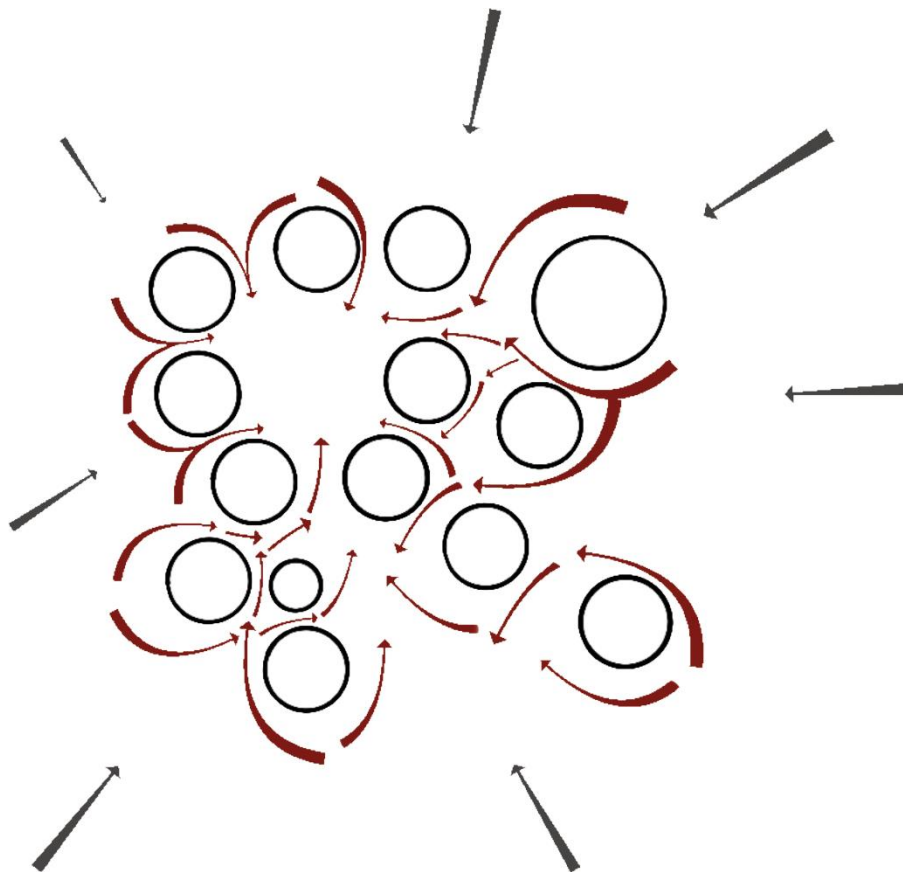


Figure 48: Showing the movement of eye/vision with respect to curved walls and spaces

9. Design Proposal

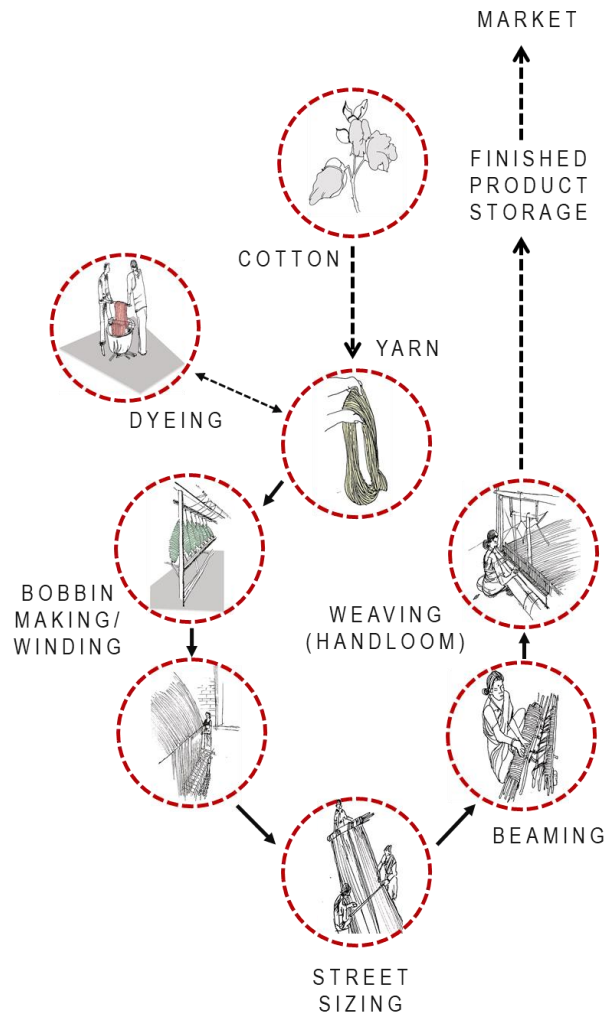


Figure 49: Showing the flow of process in weaving

9.1. Site Development

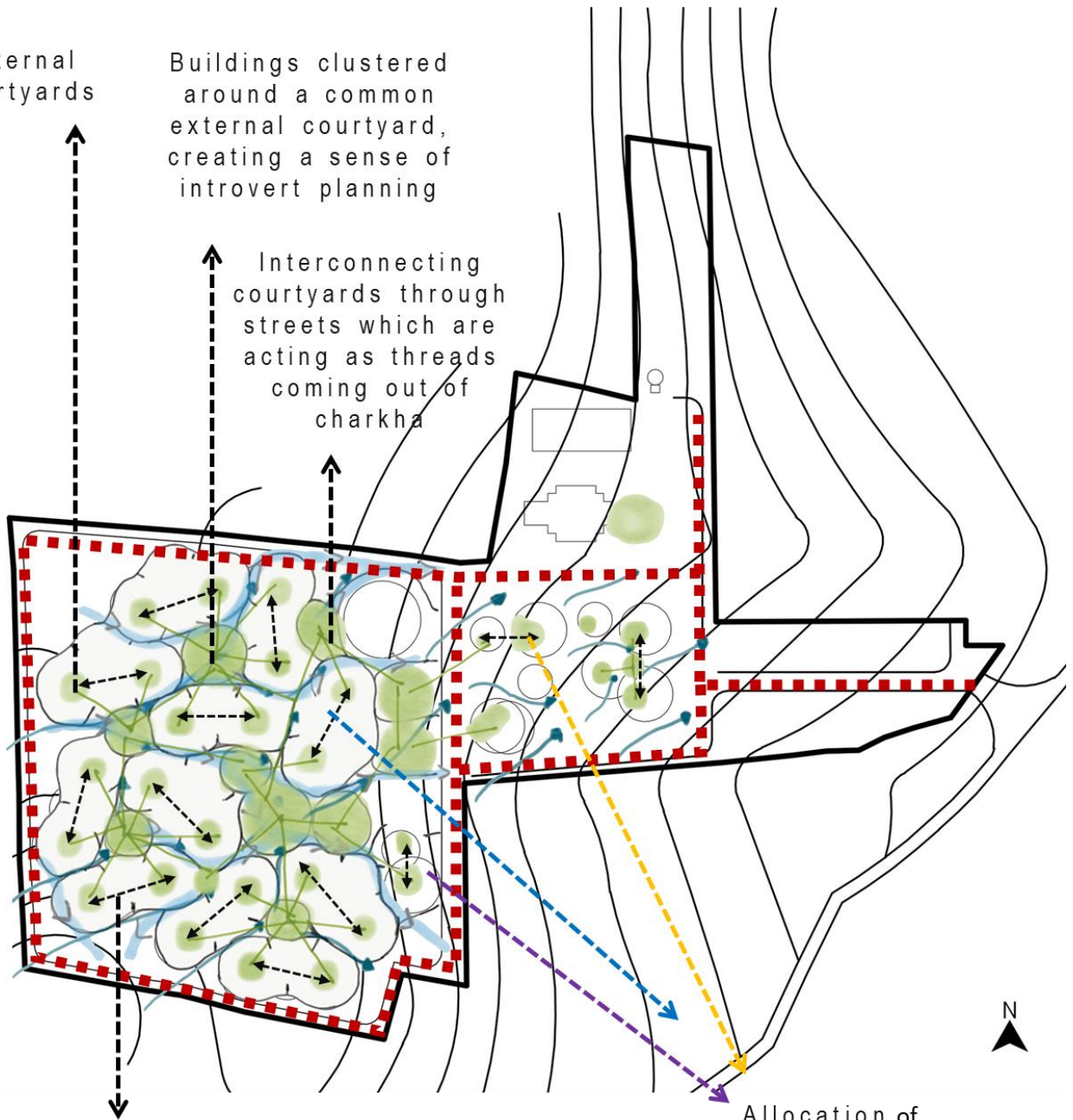
- The above chart shows the process followed in weaving industry.
- The zoning of spaces has been done on the basis of process-oriented approach.
- The site plan thus evolved as a result of movement of the yarn from Charkha Space to different spaces for further processes.
- As a result, the movement flow became an important factor in organizing spaces,
- The Raw and finished product Storage placed in the centre of the site accessible by vehicular and pedestrian movement for the proper governing of processes.

- The Dye-House has been placed on the S-E part of the West parcel of Site accessible to both vehicular and pedestrian movement.
- The Weaving Studios – which includes spaces such as; Charkha Machine Space (for making of yarn and bobbins from yarns), Winding Machine Space (for making yarns and bobbins from yarns), Warping Machine Space (for making Warp roll of threads – usually called Beam out of small bobbins) and Hathkargha or Handloom Machine Space for final weaving using warp and weft threads.
- Then the final weaved product is carried back to the storage unit, thus completing a cycle of process
- The Design Studio and the Admin unit is the first cluster on the east side of the site placed centre to the site along with the Souvenir Shop.
- The Jain temple Linked with Saint Residence is placed on the North Side of the Site facing East direction, the temple cluster placed away from the studios so as to maintain a sense of meditation and keep away from the energy fields (sounds of the machines) to maintain silence and meditative environment.
- The Guest Room Cluster kept with the residence portion on the North part of the site.

Internal courtyards

Buildings clustered around a common external courtyard, creating a sense of introvert planning

Interconnecting courtyards through streets which are acting as threads coming out of charkha

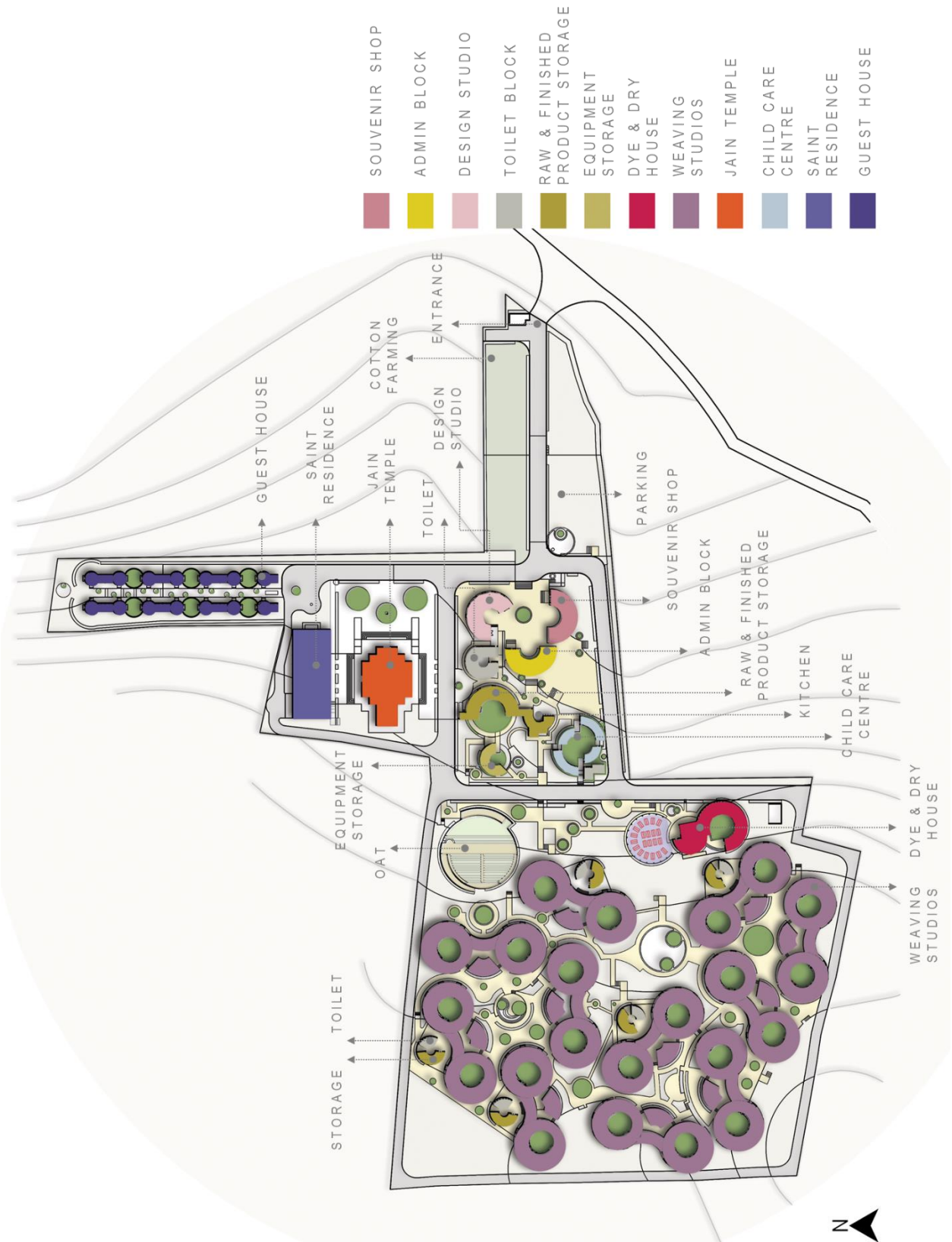


Maximum use of contour parcel to place building, along the contour or perpendicular.

Allocation of spaces on the basis of process

Figure 50: Showing the development of Site Plan

9.2. Site Plan



- Other Details Attached As Presentation presented at the time of the Final Jury Viva held on 10th of JULY, 2020.

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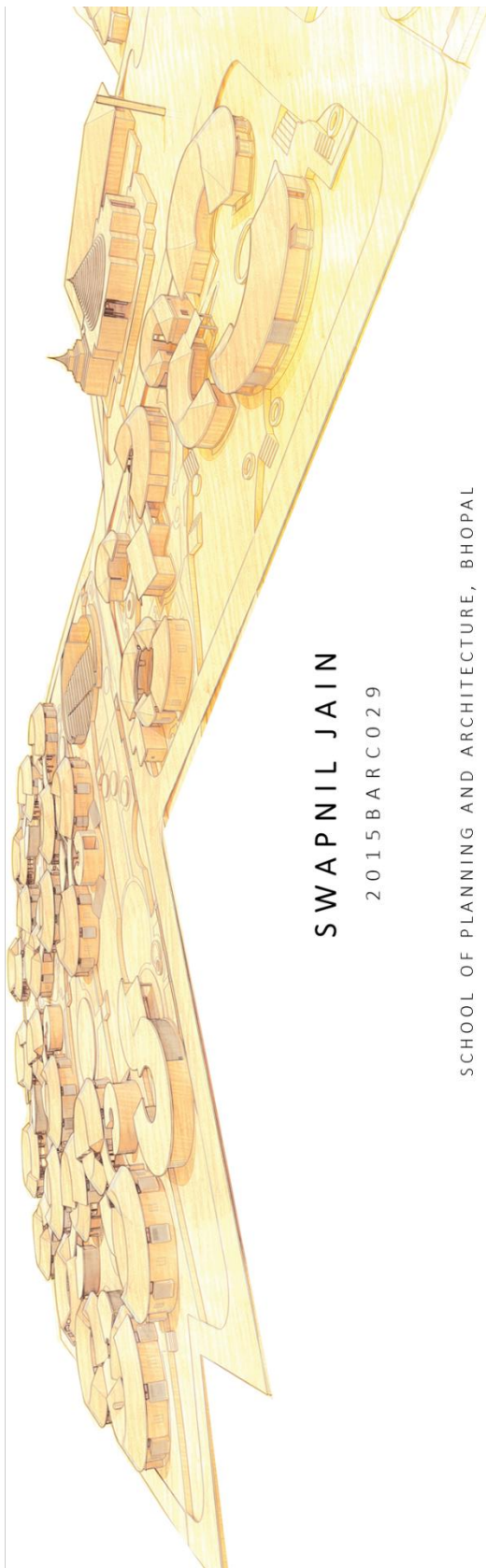
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A Grass Root Initiative for Women Employment:

‘A Proposal for a Weaving Centre by the Jain Community for Women at
Pindrukhi Village, Madhya Pradesh

ARCHITECTURE THESIS

2020



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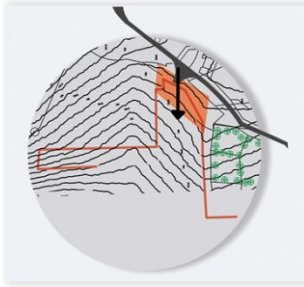
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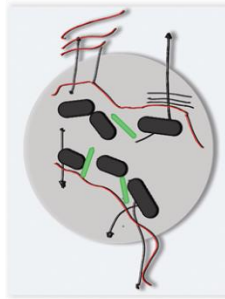
CONTOUR AND CLIMATE ANALYSIS



Entrance to the site is from E4 Direction, slope increases upwards.

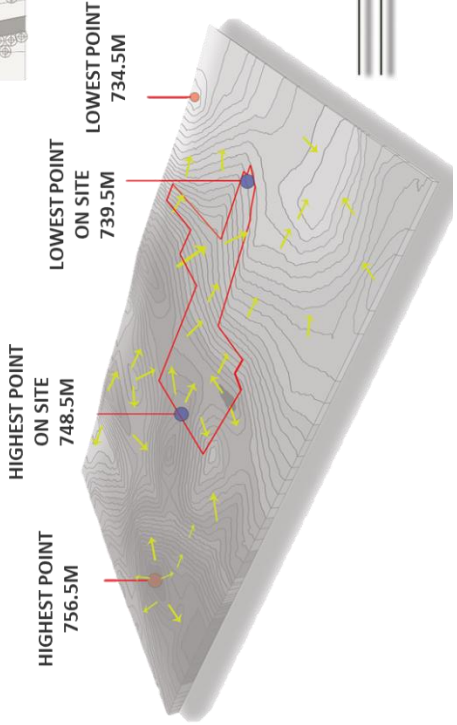
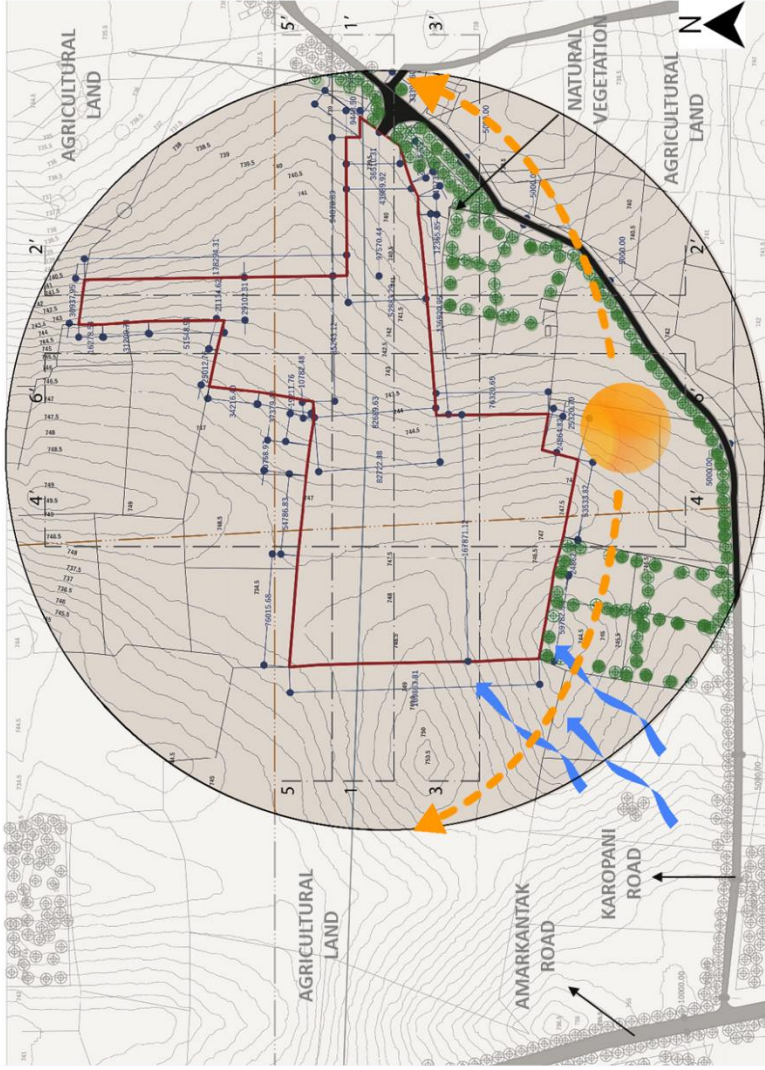


Natural drainage flow within the site.

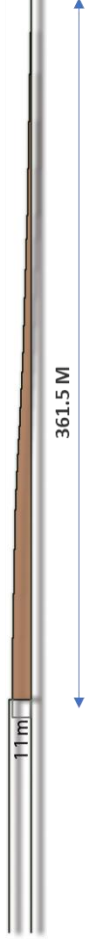


Orientation of the building along to the contour line in order to save excavation cost.

SITE ANALYSIS



- The climate is considered to be Csa according to the Köppen-Geiger climate classification.
- Climate here is mild, and generally warm and temperate
- Pindrukhi lies in the Zone III (Earthquake Zone)
- Average Rainfall : 1450mm
- Average Maximum Temperature: 43.6°C
- Average Minimum Temperature: 3.1°C
- No existing trees within the site
- Ashoka trees along the Karopani Road and some patches of trees can be seen outside the side.

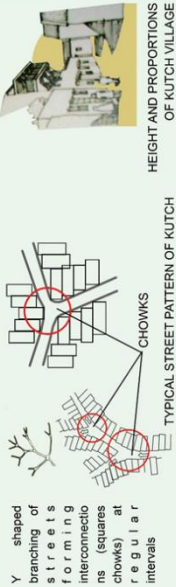


03 DESIGN CONCEPT

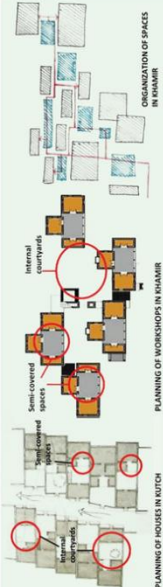
KHAMIR, BHUJ CASE STUDIES | THESIS 2020 BACHELORS OF ARCHITECTURE

DESIGN CONCEPT

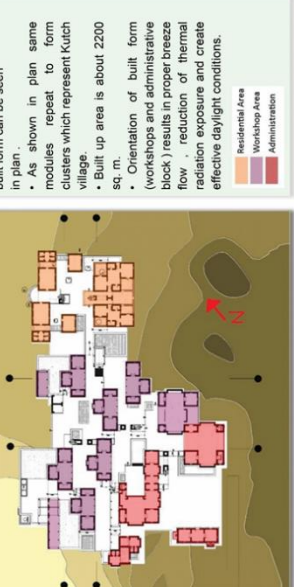
Khamir was designed to create 2500 sq.m. Facility for the promotion of craft in Kutch. Concept of planning this centre is derived from the local street scape and village pattern noted before earthquake. Some of the typical layouts of the streets are:



HEIGHT AND PROPORTIONS OF KUTCH VILLAGE

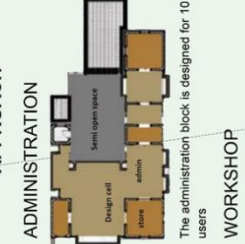


ORGANIZATION OF SPACES IN KHAMIR

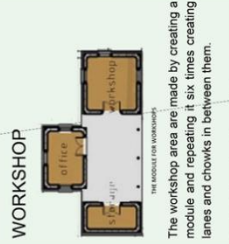


- Interrelation between closed, semi open and open spaces to create natural and fresh environment for people working there.
- Building module are placed in such a way to form narrow pathways and shaded spaces
- Courtyards are connected by shaded pathways.
- Kaitas (outdoor seating are provide in courtyard)

MODULE DESIGN APPROACH



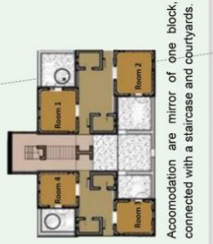
The administration block is designed for 10 users



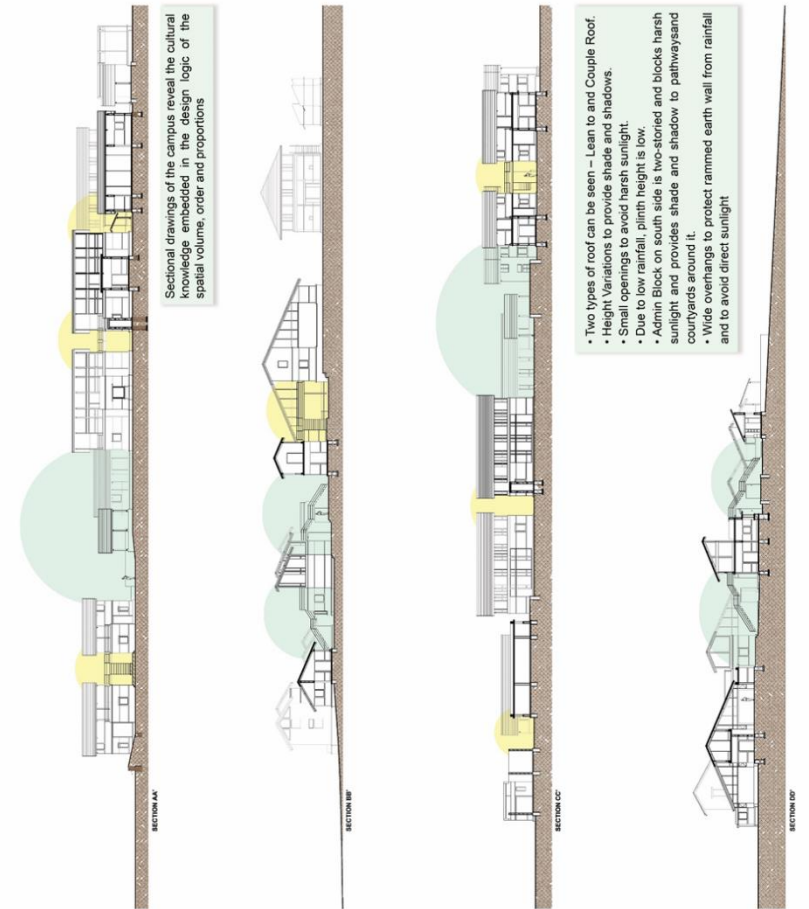
The workshop area are made by creating a module and repeating it six times creating lanes and chowks in between them.

Module Level - The module are created with covered interior spaces around a semi-open space at the centre which acts as an informal active verandah.

ACCOMMODATION



Accommodation are mirror of one block, connected with a staircase and courtyards.



Sectional drawings of the campus reveal the cultural knowledge embedded in the design logic of the spatial volume, order and proportions

- Two types of roof can be seen - Lean to and Couple Roof.
- Height Variations to provide shade and shadows.
- Small openings to avoid harsh sunlight.
- Due to low rainfall, plinth height is low.
- Admin Block on south side is two-storied and blocks harsh sunlight and provides shade and shadow to pathways and courtyards around it.
- Wide overhangs to protect rammed earth wall from rainfall and to avoid direct sunlight



Overhead walkways connect the upper floors, dramatising the walk through the 'village' with visual connectivity across levels

The materiality and the spatial construct lap into the creative possibilities inherent in the traditions of

Familiar shadows slant across the courtyard and chowks.

Structured together, the workshops, streets and shaded places from courtyard and chowks.

STRUCTURE SYSTEM

Khamir's structural system involves three main elements:

1. Foundation
2. Walls
3. Roofing

Foundation

Deep rubble stone foundations hold up the ground floors up till the plinth level, with local stones available.

2 meter deep Strip Foundations are made with CC base.

Walls

Walls at Khamir are combination of the following types:

- Rammed Earth Walls
- Stabilized Concrete Blocks
- Wattle and Daub

1. RAMMED EARTH

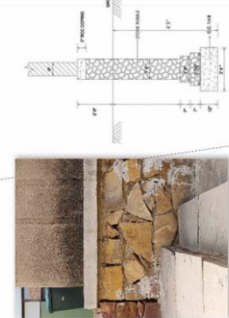
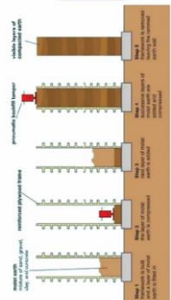
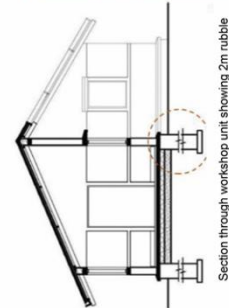
The ground floor of this Craft Facility is constructed in rammed earth. It is simple to construct, on combustible, thermally massive, strong and durable. Natural raw materials such as earth, chalk, lime and gravel are used. One of the significant benefits of rammed earth is its high thermal mass; it can absorb heat during the day and release it at night. This moderate daily temperature variations and reduces the need for air conditioning and heating.

2. Earth - Rammed Earth (CSEB) (Compressed Stabilized Earth Block)

- Locally available and produced.
- Traditional influence
- Aesthetics involved
- Climatic factors: low rainfall - easy to construct earth walls, heat insulation
- Financial - cost effective.
- Burnt clay bricks: compressive strength - 25-40 kg/cm²
- Stone: Due to low compressive strength of bricks, stones are used in masonry till plinth.

3. WATTLE AND DAUB PANELS

The walls of the first floor of this Craft Facility were made with Wattle and Daub Panels. In this method of construction, the vertical wooden stakes or wattles are woven with horizontal twigs and branches. 'Daub' is a combination of materials such as wet soil, clay, sand, lime, animal dung and dried grass. Substances such as clay is a binder to hold the daub together and the addition of materials such as dried twigs and branches at the daub mixture together and provides flexibility.



ROOFING

Above the ground floor steel frames take over and support the roof. The roof are made of corrugated sheeting covered with country tiling, using a naturally available compound, acting as an insulating and binding agent.



LANDSCAPE FEATURES

- There are number of courtyards connected by the paths.
- Pathways are made up of sandstones.
- Trees are planted along courtyards to provide shade.
- Trees are planted in front of windows to create proper screening.
- Many levels are created for people to have interesting pathways.
- A low wall in front of the masonry wall of admin block to create buffer zone.

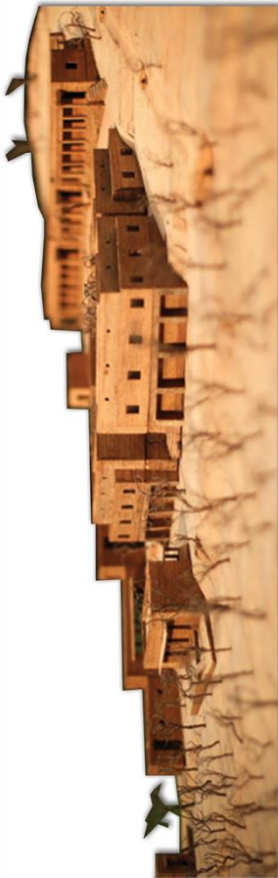


INFERENCES

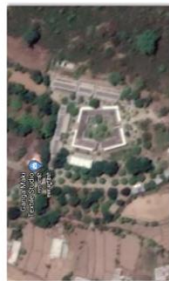
- Strength**
- Has the ability to inform the context.
 - It is a sustainable structure.
 - It's a resource center.
 - It goes from open - semi open and then closed space.
 - Includes services like training, accommodation.
 - Use of local available material, vernacular architecture.
- Weakness**
- The foyer space that is the interactive space can be increased.

- Pause points in-between clusters.**
- The internal spaces are simply designed, resonating a sense of openness. A composition of familiar space elements, the design is structured together in a manner to form shaded courts and thresholds.
- Opportunities**
- More arts can be introduced and meet with the sense of direction.
 - A huge common interactive space, where all the way.
 - To provide with the sense of direction.
- Threats**
- Future earthquakes.
 - security.

- Threats**
- Future earthquakes.
 - security.



Location: Village Bhogpur 30kms from Dehradun, Uttarakhand
 Site Area: 13000 sqm (3.3 ACRES)
 Built-Up Area: 1077 sqm
 Year of Commencement: 2012
 Year of Completion: 2016
 Concept: To Embody and cultivate this cyclic relationship between work and life, the sun and the moon- bringing together the past, present and the future.



Development of Plan
 Introvert planning with sequential opening up of spaces.
 Enclosures created by landscape.
 Situated in grove of Mango
 Design follows the natural terrain

Functional Aspects:
 Dyeing Workshop - 82 sq.m
 Weaving Studio - 450 sq.m
 Gallery - 78 sq.m
 Guest/Owner Residence - 250 sq.m

Materiality of Space
 This weaving facility is, perhaps, the most intimate here- handmade, intimate and sensitive.
 The scheme sensitively fuses locally harvested bricks and lime, stone and marble from Rajasthan, and Bengali bamboo and cane in the craftsperson's hall from different places.
 Brick masons are local, lime and bamboo workers from Bengal, stone masons and carpenters from Uttar Pradesh.



Marble Sheet Roof, Rajasthan



Cement Sheet Roofs



Stone for Retention



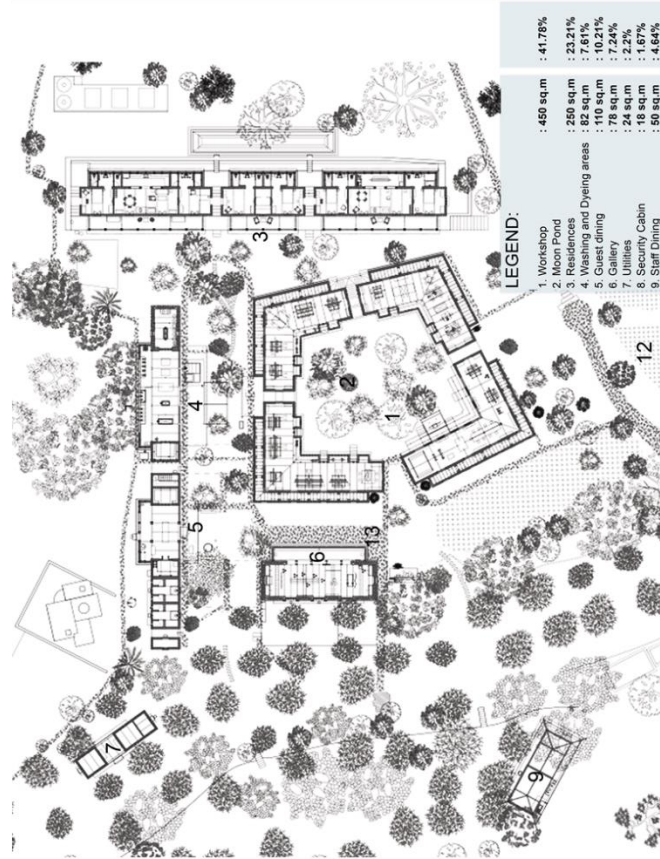
Locally Harvested Lime



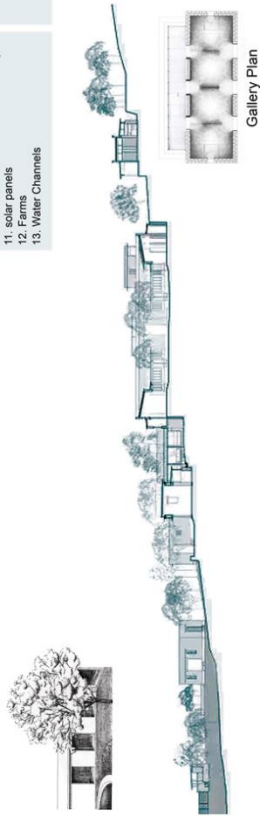
Locally Harvested Brick



Bamboo from Bengal



LEGEND:
 1. Workshop : 41.78%
 2. Moon Pond : 250 sq.m
 3. Guest/Owner Residence : 25.21%
 4. Weaving Dyeing area : 82 sq.m
 5. Guest dining : 10.21%
 6. Gallery : 7.24%
 7. Utilities : 2.2%
 8. Security Cabin : 18 sq.m
 9. Staff Dining : 50 sq.m
 10. Cow shelter : 4.64%
 11. Four panels : 15 sq.m
 12. Water Channels : 1.38%



Gallery Plan

Owners/guest residences & dyeing workshop sections

Gallery, canteen & workshop/studio sections

Gallery, canteen & workshop/studio sections

Wattle and daub
Construction with mud and split bamboo

Rammed earth with stone and lime flooring

Bamboo frame work for sawtooth roof of gallery

Stone plinth with brick construction following the sloping terrain

Movement Patterns

Visitor/Guest

Weavers

Temporal Occupancy

Occupancy > 5hrs.

Occupancy > 3hrs.

Occupancy > 1hrs.

Spatial Order

Residences

Commercial activities

Weaving/Dyeing activities

Services/Utilities

Guest Dining and Washing Space linear plan

Covered Space

Semi-covered Space

Open Space

Kitchen and Canteen

Washing Area

Guest Dining and Washing Space

Weaving studio with looms

Weaving studio with looms

Dyeing and washing space

Storage act as thermal buffer

Raised workshop

Construction Process

Wattle and daub
Construction with mud and split bamboo

Rammed earth with stone and lime flooring

Bamboo frame work for sawtooth roof of gallery

Stone plinth with brick construction following the sloping terrain

Inferences

- Climate response via materials, planning and layout.
- Provision of low occupancy buffer zones to minimise direct heat gain.
- Topography response by channeling natural drainage.
- Minimal cut and fill
- Enhancing visual and thermal comfort by natural landscaping.
- Integrating workshop design within architectural form.
- Tactile comfort while working for long hours.
- Sufficient planning of working spaces.
- Insufficient diffused lighting as direct sunlight destroys natural fabric.
- Lack of efficient connectivity and lack of weaver settlements.
- less number of commercial spaces for management of raw materials, lack of store manager spaces.

Semi-open spaces for drying out dyed yarns. Covered with bamboo trellis.

Semi-open spaces in courtyard for handloom weaving. Mud flooring, pit loom specifically used by owner.

Raised workshop incorporated within the internal courtyard. Diffused lighting. Small handlooms. Post loom activities.

Internally placed handlooms with small opening and sufficient diffused light from courtyard and buffer zones.

Location: Khargone (West Nimar), SH-1, Mandeswar Road, Khargone, Madhya Pradesh 491224

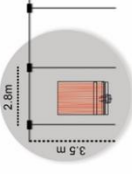
The Government training centre, Maheswar trains young weavers from around the town for a 3 month course. The training centre occupies 35 trainees at a time with frame handloom machines, pit looms, warping and winding machines and Charkha for the preparation of bobbin.

Development of Plan

Linear planning with a single shed structure. Entrance lobby connecting a large span space for weaving activities.

Functional Aspects:

- Training centre space includes frame handloom machines - 13 looms.
 - 1 Winding Machine
 - 2 Charkha machine
- All working in a single large span area. 490 sq.m.
- No of Trainees: 35
- Office/Souvenir shop: 21 sq.m.

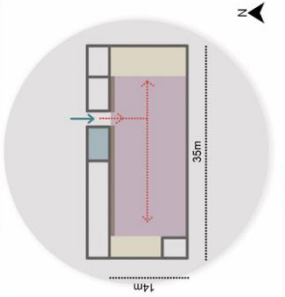


Materiality of Space

This training centre is along span structure with Howe timber truss system supported by timber pillars. Steel sheeting on the roof.

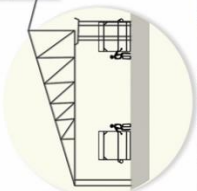
Handloom Machine

This is a wooden frame loom of size 50" x 62". The weft is processed in shuttle thread method.



Space analysis

Single frame handloom space analysis shows the area of 9.8 sq.m including circulation space. Loom size varies according to product type.



Winding Machine

This machine is used to convert small package of yarn (bobbins) into bigger package of yarns (cones). To prepare warp.

Size: 78" x 31"

Spinning Machine

Raw materials and tools required -

- Bobbins made of wood, yarns for warp and weft.
- Cycle - wheel to spin the yarn.
- Wooden frame to wing the hanks on.

Long Span Truss

Howe timber truss is used with timber supports roof with skylight punctures

Warping Machine

Raw materials and tools required -

- Bobbins of cotton yard, 20s count
- Bobbin stand
- Wooden frame
- Leasing wheel
- Warp sticks
- Loom rod

This is a wooden frame warping machine including

- Warping Wheel: 87" x 70"
- Loom Rod: 88" x 60"
- Bobbin Stand: 120" x 87"

DYEING

Dyeing is the process of adding color to textile products like fibers, yarns, and fabrics. Dyeing is normally done in a special solution containing dyes and particular chemical material.

Raw Materials & Tools for Dyeing

1. Yarns (usually 20s count cotton for warp & 60s count wool)
2. Dyes (Natural or Chemical, as per the order)
3. Dyeing vessels
4. Gas Stove

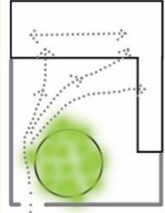
The Process

1. The hanks are dipped into dye solution and dyed at a specified temperature.
2. Dyeing takes place at a common dyeing unit, located on the premises. The weavers take about one month before the weavers can start spinning their yarns again.
3. The dyed yarns are stored in the godown from where every weaver collects them according to the amounts to be woven.

Water Management

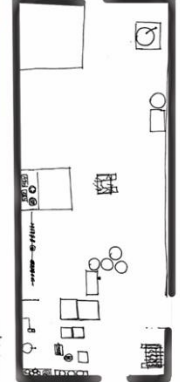
Water scarcity is a common problem across Rajasthan. Therefore, for purposes such as dyeing, water is ordered into the village with the help of tankers.

After dyeing, the water is disposed off onto a barren land. These completely absorb the water. Groundwater quality, this is the most economic and the most efficient way to let the water get filtered naturally. The water that is filtered is then introduced when the land advances economically.



Area Statement:

- Dyeing area: 157.25 sq.m
- Storage area: 60 sq.m
- Drying area: Open Space
- Services (Water treatment Plant): 42.5 sq.m



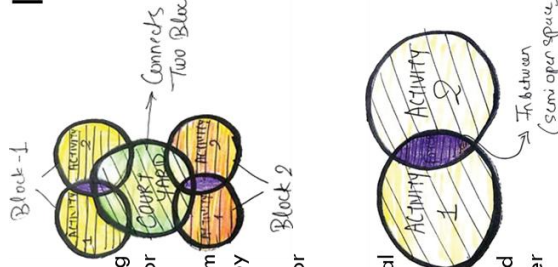
Spatial organization

- Open space like courtyard being used for weaving related activities like reeling and preparing reel for weft, and for gathering or relaxing.
- Semi-open spaces in the courtyard used for handloom weaving. Mud flooring, pit loom specifically used by the owner.
- Semi-open spaces in front of dyeing block used for drying out dyed yarns.
- Covered with bamboo trellis.
- The raised workshop incorporated within the internal courtyard. Diffused lighting.
- Semi-open space.
- Post loom activities.
- Internally placed handlooms with a small opening and sufficient diffused light from courtyard and buffer zones.

INFERENCES CASE STUDIES |

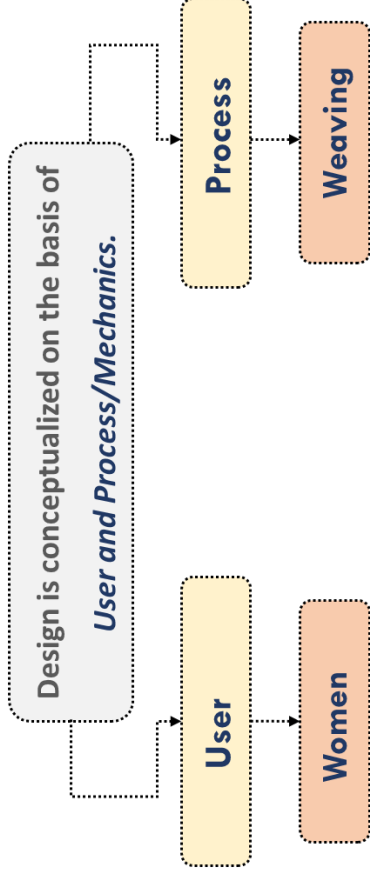
Design Strategies

- Introvert planning of working spaces.
- Maintaining the hierarchy of space.
- Climate response via materials, planning and layout.
- Provision of low occupancy buffer zones to minimise direct heat gain.
- Enhancing visual and thermal comfort by a natural landscape.
- Integrating workshop design within the architectural form.
- Tactile comfort while working for long hours.
- The process-oriented approach instead of product-oriented
- Incremental and need-based, irregularities and variations in built form and spacial order.
- Temporal variations and multiple uses of the same space.
- Breathing quality, to inhale and exhale, to expand and contract spaces.
- Visual and perceptual permeability, community interaction, to expose the process of handloom.
- Interweaving and overlapping spaces, movements, activities, volumes, etc.
- Perceptual and visual continuity.
- Spatial continuity
- Organic behaviour of the form of the building.



Traditional knowledge system and Characteristics of Weavers Workspace

<p>Regular Air Flow To prevent bugs and pests from destroying yarn. To provide a comfortable zone to work almost eight hours a day.</p>	<p>Balanced Humidity 50-70% humidity required for yarn. Require for twisted yarn of warp and weft to prevent breaking landscape, water body, mud as building material.</p>	<p>Empowerment Of ordinary people, handloom weaver and their families.</p>	<p>Authenticity Of certain unique character or intangible cultural value or tangible element associated authentic to ascertain place. Interweaving the workspace with spiritual essence and architecture.</p>	<p>Narrative with Layers of History Story of weaving and its essence, handloom, emotion of respect, care, trust, guardianship, empathy.</p>
<p>Spill - Over Spaces Streets and courtyards for pre-loom and post loom activities, open and semi open spaces.</p>	<p>Maintenance of Temperature Control In hot and dry, breaking of thread in cold and humid, damp, sagging of thread. Required for long hours of intense work</p>	<p>Character and Individuality Cultural environment with interdisciplinary linkages, labyrinth of activities.</p>	<p>Energy Fields A characteristic point of intense energy tangible or intangible that can be felt in a designed space. In the case of weavers village, it is the unique sound of constant use of handlooms which identifies the space.</p>	<p>Subjectivism Consciousness in the handmade tools of handloom, raw material and the final textile product.</p>
<p>Adequate Light Direct sunlight can harm the handlooms. Fabric to absorb sunlight in year required for long hours of work.</p>	<p>Soft Flooring For digging of pits, even for frame loom, tactile temperature control, special care for loom accessories protection against bugs and termites.</p>	<p>Empowerment Of ordinary people, handloom weaver and their families.</p>	<p>Authenticity Of certain unique character or intangible cultural value or tangible element associated authentic to ascertain place. Interweaving the workspace with spiritual essence and architecture.</p>	<p>Narrative with Layers of History Story of weaving and its essence, handloom, emotion of respect, care, trust, guardianship, empathy.</p>



1. The **User** being the **Women**, an initiative for **empowering women**. To replicate the user approach, design should include elements which is **women specific**. Therefore, strikes with the idea of **Femininity In a Space**, normally **Femininity** is defined as:

Femininity

/,femɪˈnɪnɪti/

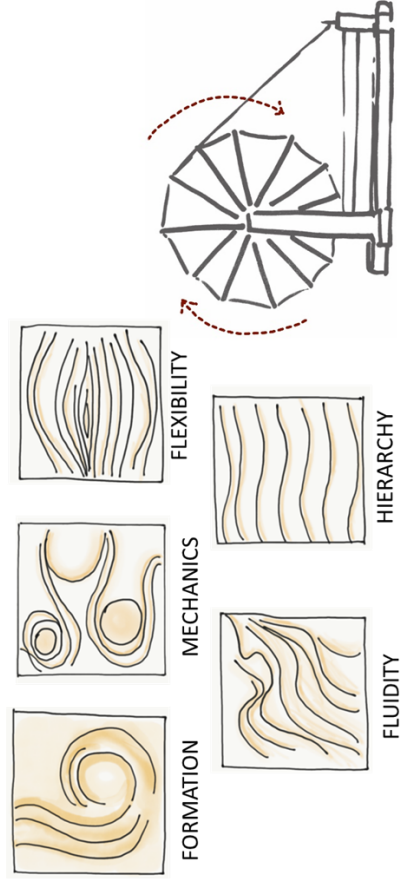
noun: **femininity**; plural noun: **femininities**

- qualities or attributes regarded as characteristic of women.

And after studying **Femininity in a Space in Architecture**, some of the elements/approach were derived, they are as follows;



2. The second being **Process and Mechanics/Mechanism**, the **process-oriented** was derived from the **process of weaving**, as weaving industry follows a process of producing final products starting from making yarns from raw material (cotton) to final weaving. It follows a series of processes which are important respectively and therefore **space should be organised in a way which simplifies the user movement and working**. The **Mechanism** derived from the **process of warp and weft**, in the way they are interweaved or overlapped. The **mechanism of machines** works in a **cyclic manner or flow**, whether it is a Charkha or the Hathkargha machine or any other machine used in the process.



The **Integration** of the above two stated approaches best represents symbolically the first primary shape in architecture which is a **CIRCLE**.

Circle is a centralised, introverted figure that is normally stable and self-centering in its environment. They are often used to symbolise Harmony and Unity. Circles are most frequently used to represent things of the same shape that we know and create a Sense of Completeness.

Therefore, **Circle is taken as a predominant architectural component in my design.**

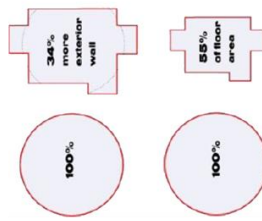


WHY CIRCULAR OVER LINEAR SPACE?

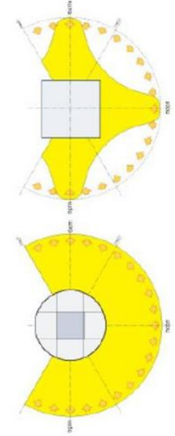
- **Creative and Interactive Working Environment** - the interaction of weavers communicating increases radially to 360deg, as compared to a linear space, therefore increases cone of vision for weavers.
- **Movement of the Eye in terms of viewer** - because of no edges or dead end as in a linear space, the circular space/walls automatically direct to another space or the spaces becomes naturally appealing.

ADVANTAGES OF CIRCULAR SPACE/BUIDING

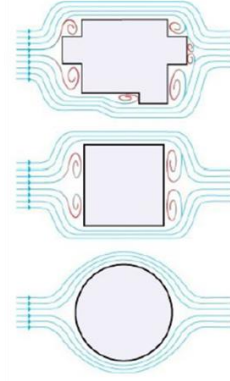
Less embodied energy



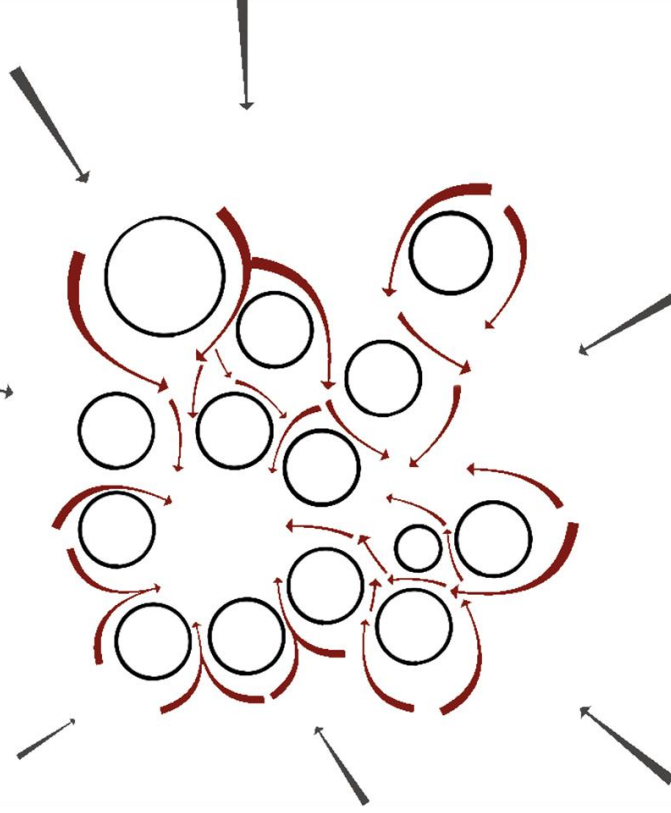
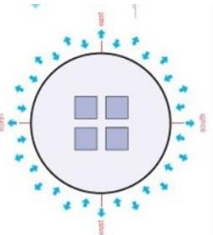
Reduces heat gain



Earthquake and Wind Resistant

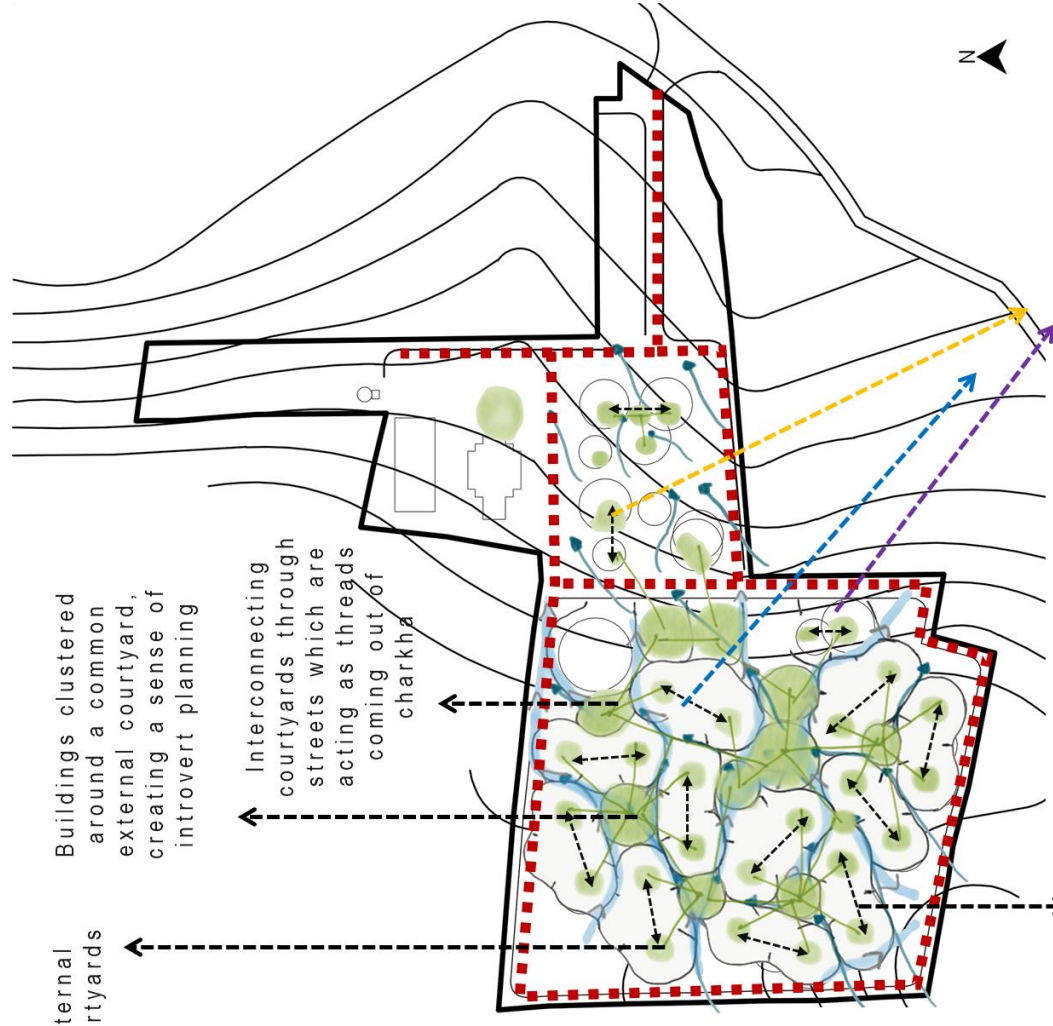
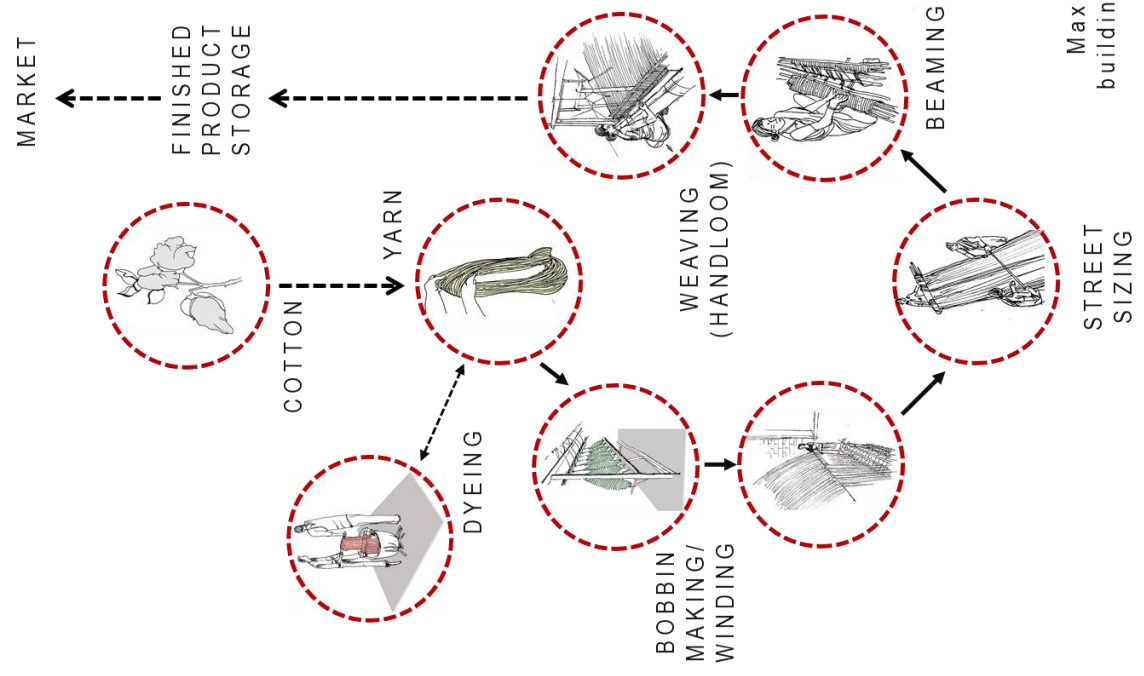


Natural Climate Control



- NATURALLY APPEALING SPACES
- HARMONIUS FLOW
- NO DEAD ENDS
- INTERLINKED SPACES
- INTROVERT CLUSTER
- REDUCING HEAT GAIN DUE TO CURVED SURFACE

Round Buildings are incredibly flexible
More Energy Efficient
Cheaper to Build



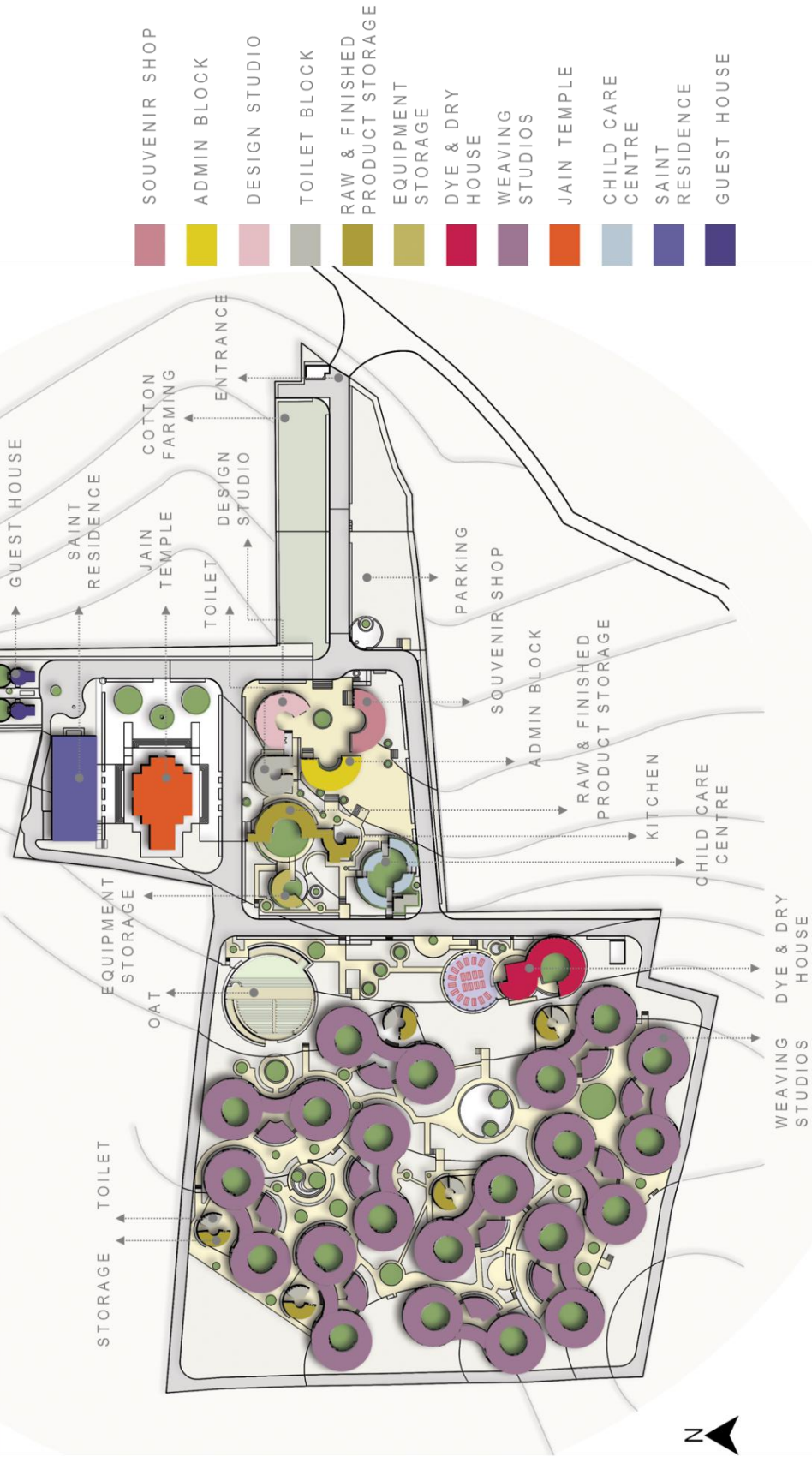
Internal courtyards

Buildings clustered around a common external courtyard, creating a sense of introvert planning

Interconnecting courtyards through streets which are acting as threads coming out of charkha

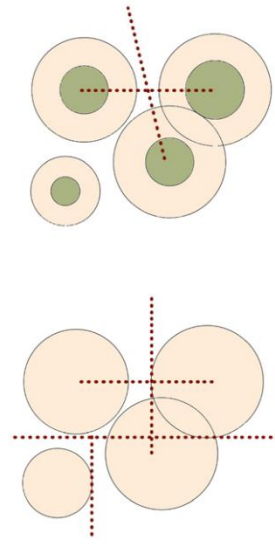
Allocation of spaces on the basis of process

Maximum use of contour parcel to place building, along the contour or perpendicular.

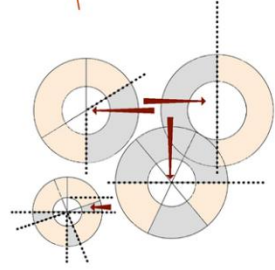




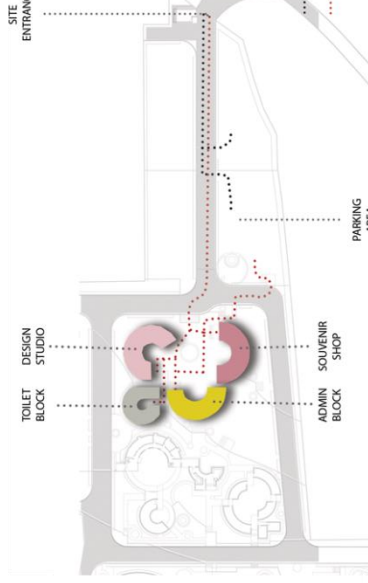
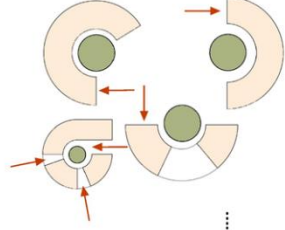
DEVELOPMENT OF PLAN

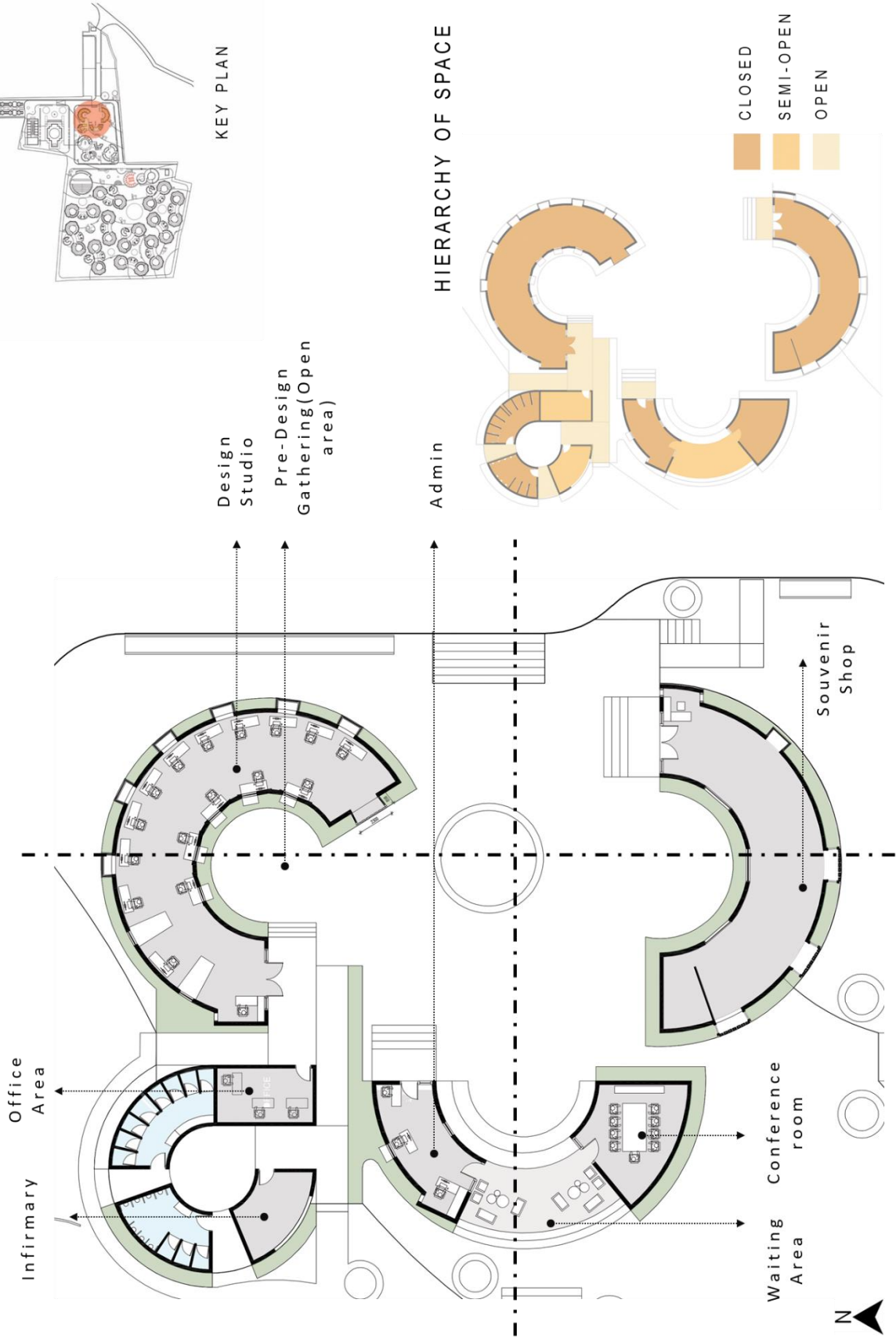


PLACING CIRCLES
ALONG TANGENTS AND
CENTRAL AXIS
INTERLINKING THEM



OPENING UP OF THE
SPACE ALONG THE
ENTRANCE TO THE
INTERLINKAGE
SPACE

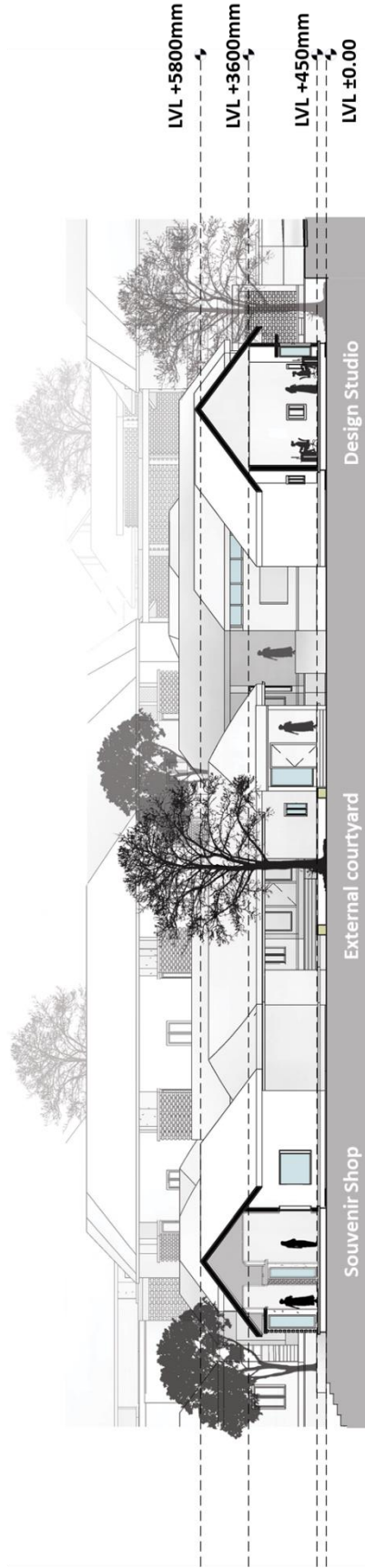




16 SECTIONS

THE DESIGN STUDIO |

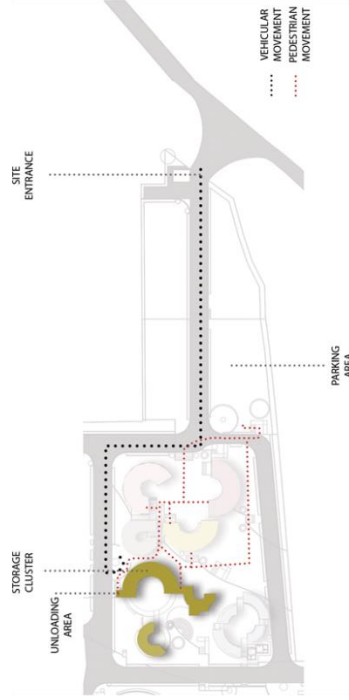
THESIS 2020
BACHELORS OF ARCHITECTURE



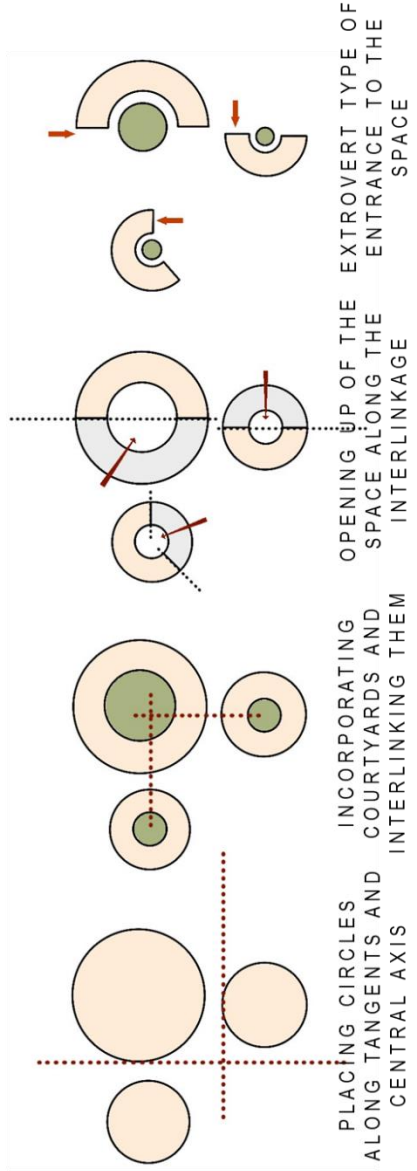
SECTION : THROUGH SOUVENIR SHOP, COURTYARD AND DESIGN STUDIO

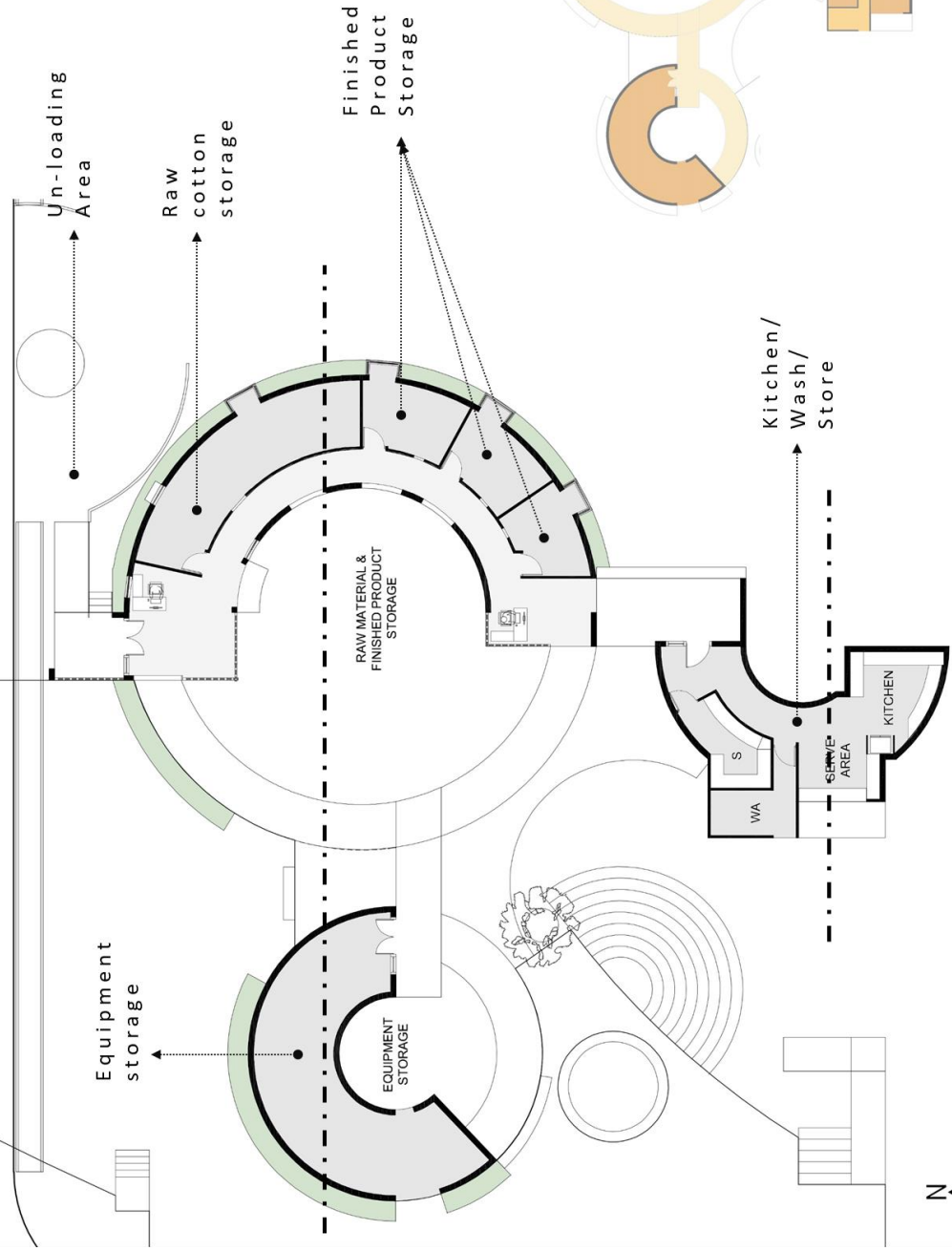
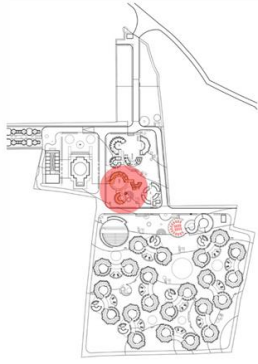


SECTION : THROUGH WAITING AREA CONNECTING KITCHEN

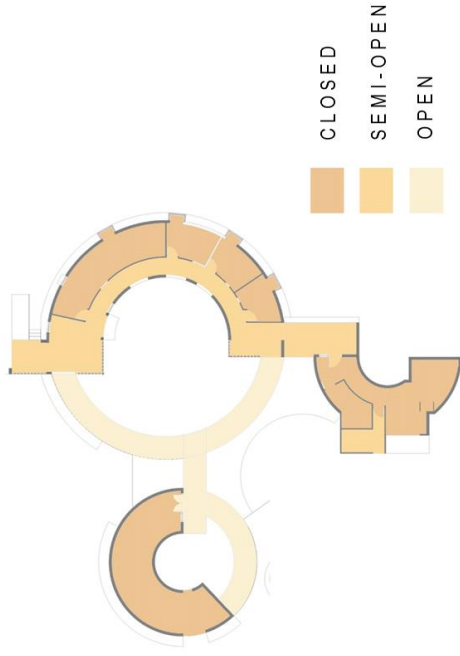


DEVELOPMENT OF PLAN



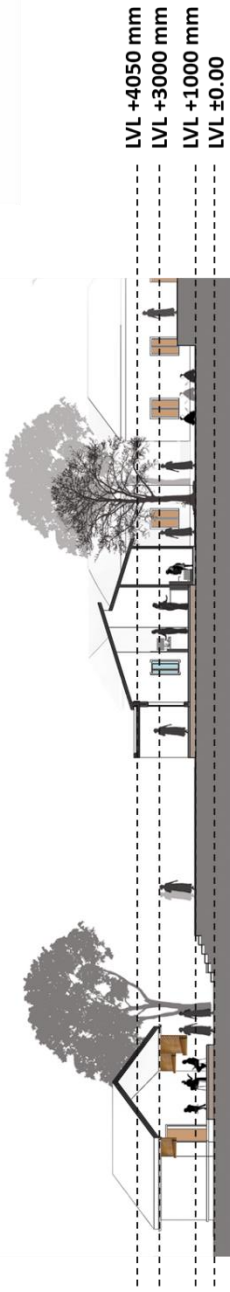


HIERARCHY OF SPACE

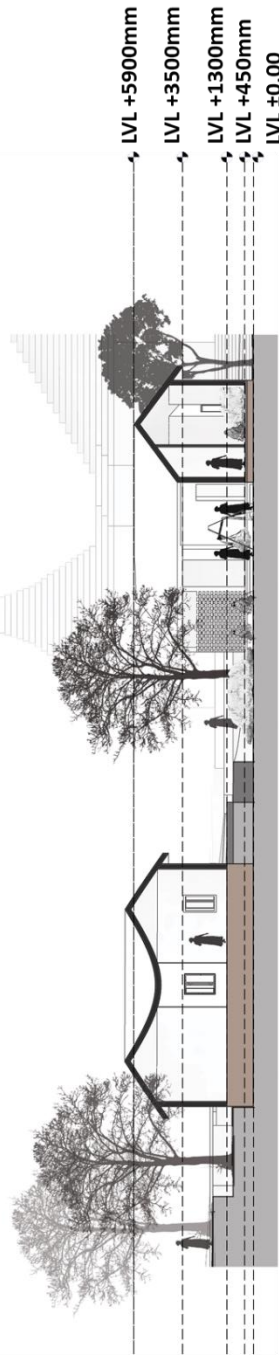


THE STORAGE CLUSTER |

THESIS 2020
BACHELORS OF ARCHITECTURE



SECTION : THROUGH RAW MATERIAL STORAGE AND EQUIPMENT STORAGE

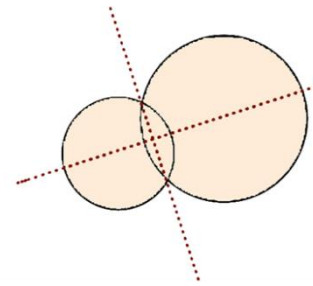


SECTION : THROUGH RAW MATERIAL STORAGE AND EQUIPMENT STORAGE

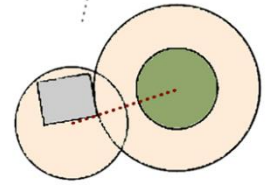




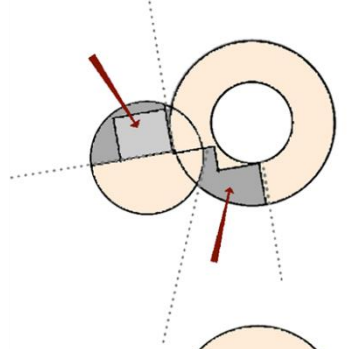
DEVELOPMENT OF PLAN



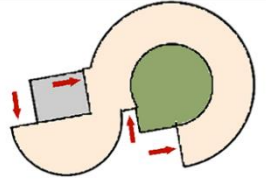
PLACING CIRCLES
ALONG TANGENTS AND
CENTRAL AXIS



INCORPORATING
COURTYARDS AND
INTERLINKING THEM

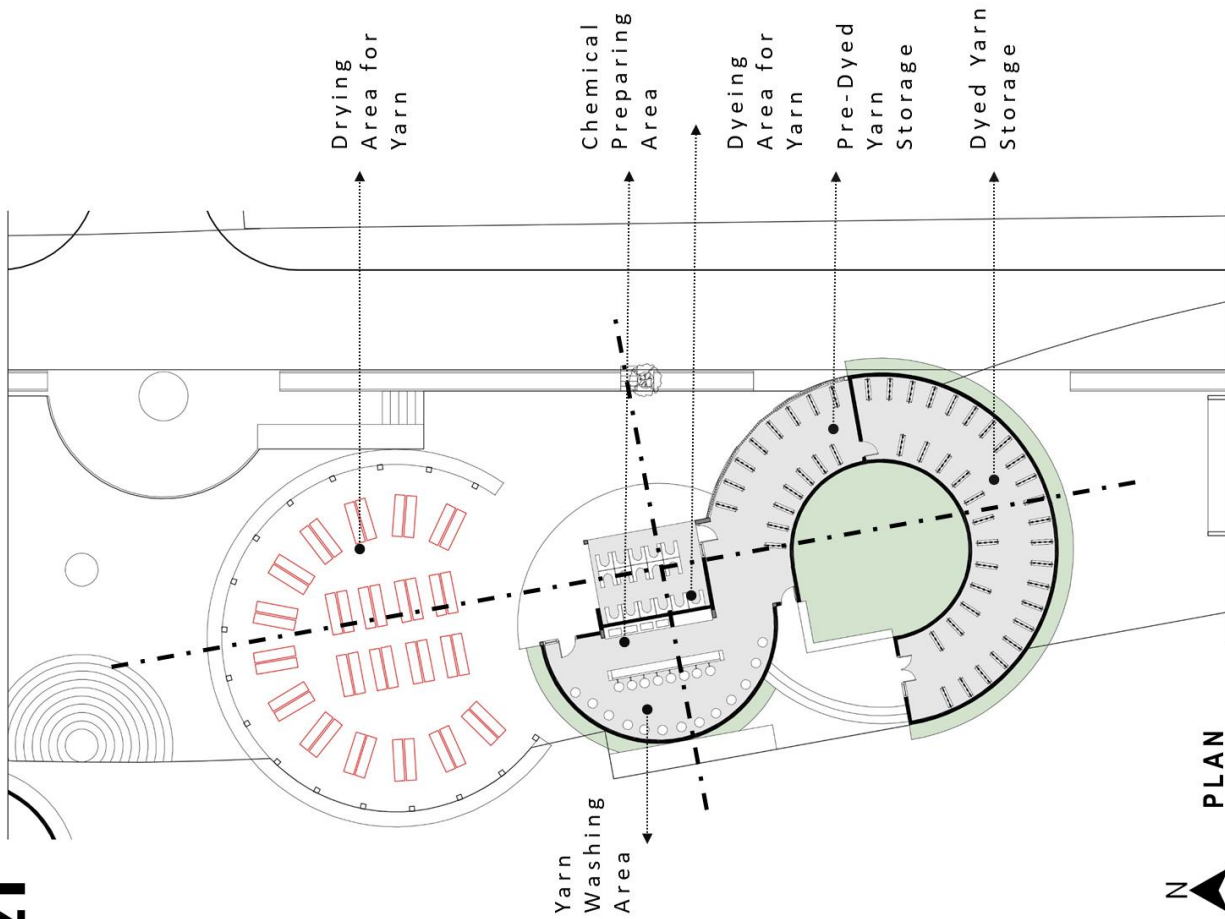


OPENING UP OF THE
SPACE ALONG THE
INTERLINKAGE

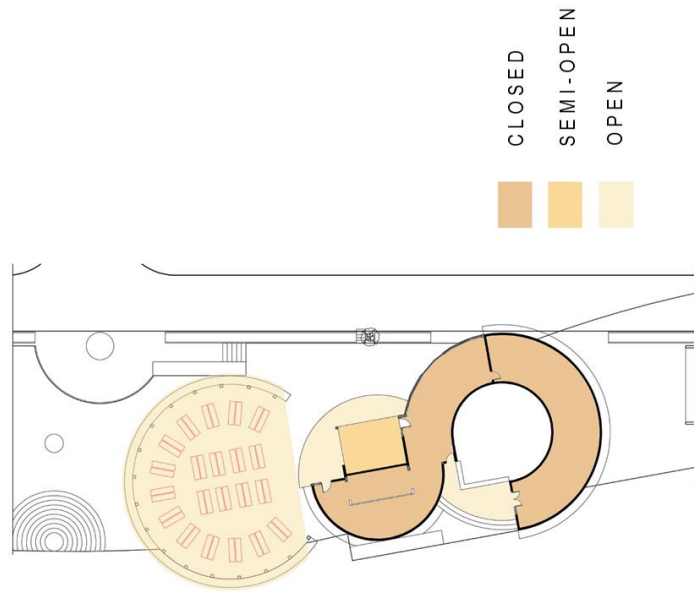


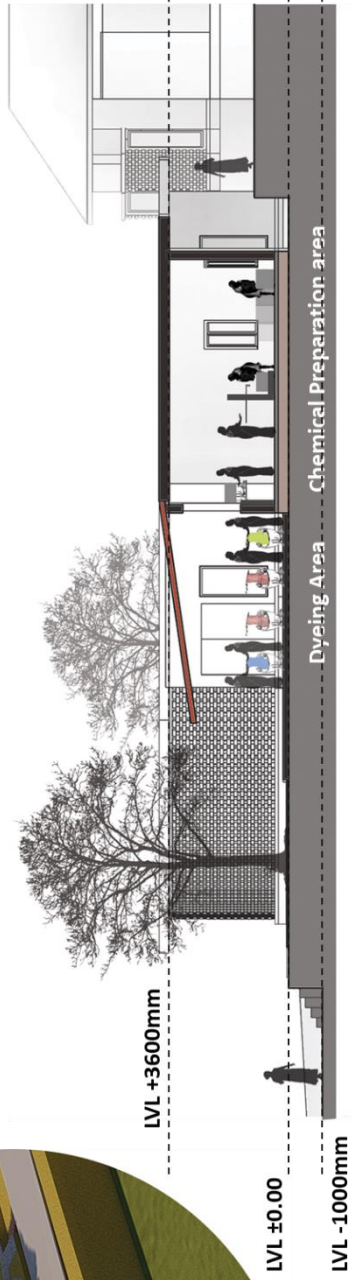
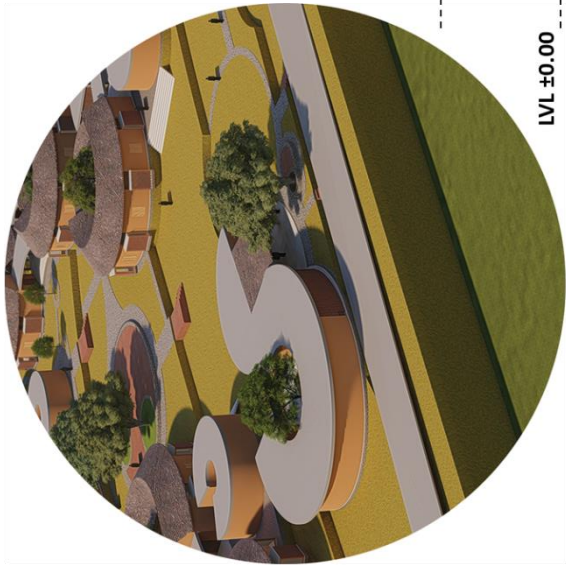
EXTROVERT TYPE OF
ENTRANCE TO THE
SPACE





HIERARCHY OF SPACE





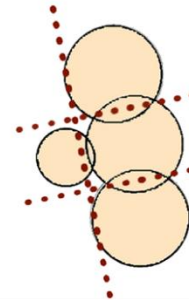
SECTION : THROUGH DYEING SPACE AND CHEMICAL PREPARATION SPACE



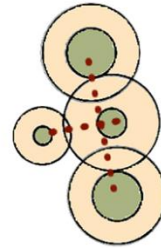
SECTION : THROUGH STORAGE, DYEING AND DRYING SPACE



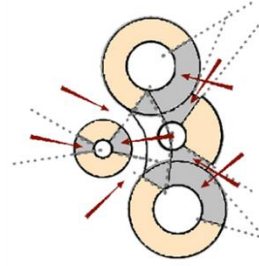
DEVELOPMENT OF PLAN



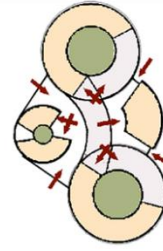
PLACING CIRCLES
ALONG TANGENTS AND
CENTRAL AXIS



INCORPORATING
COURTYARDS AND
INTERLINKING THEM



OPENING UP OF THE
SPACE ALONG THE
INTERLINKAGE



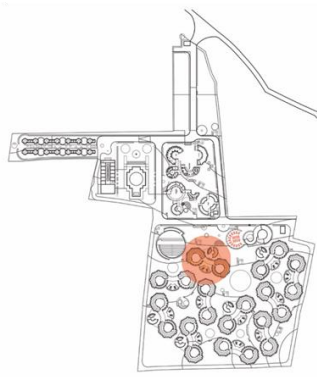
EXTROVERT TYPE OF
ENTRANCE TO THE
SPACE



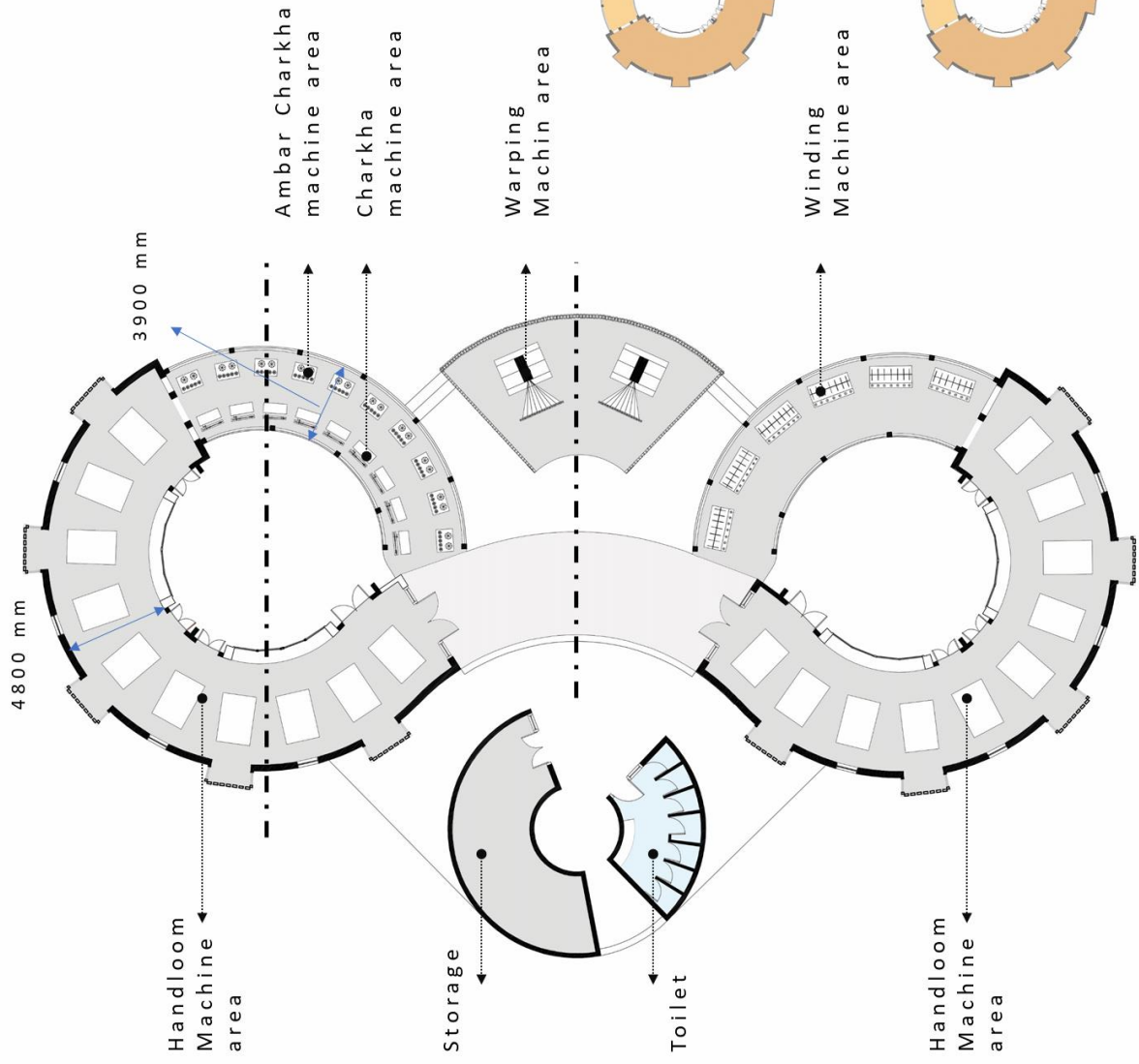
24 PLAN

THE WEAVING STUDIOS |

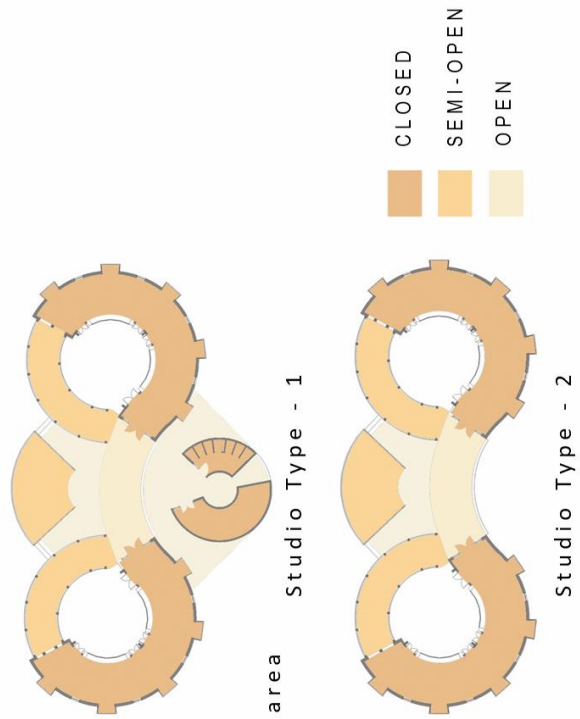
THESIS 2020
BACHELORS OF ARCHITECTURE

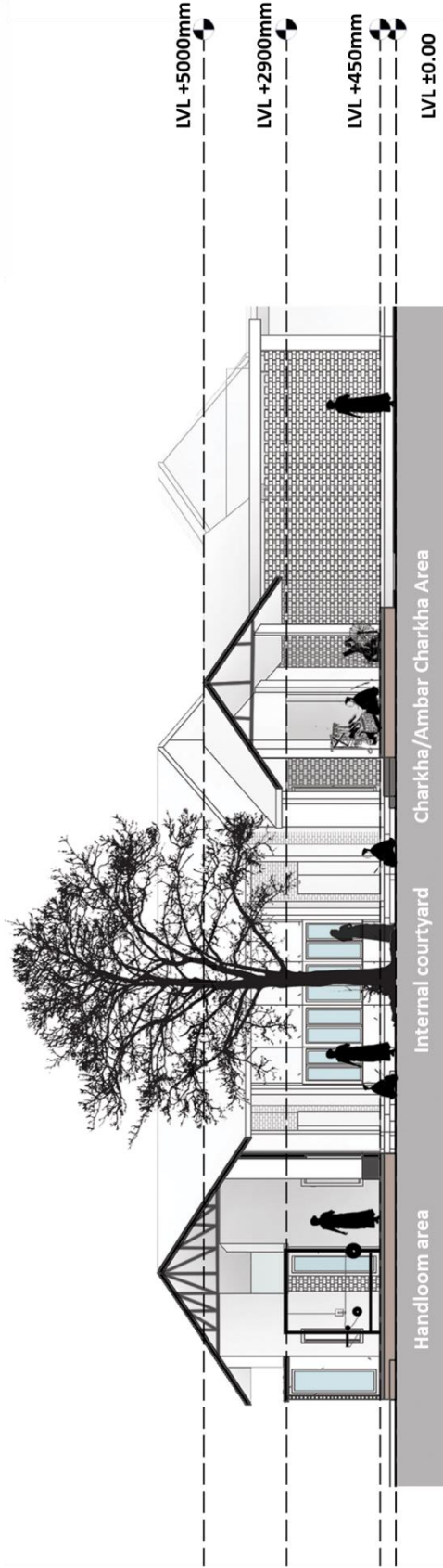


KEY PLAN

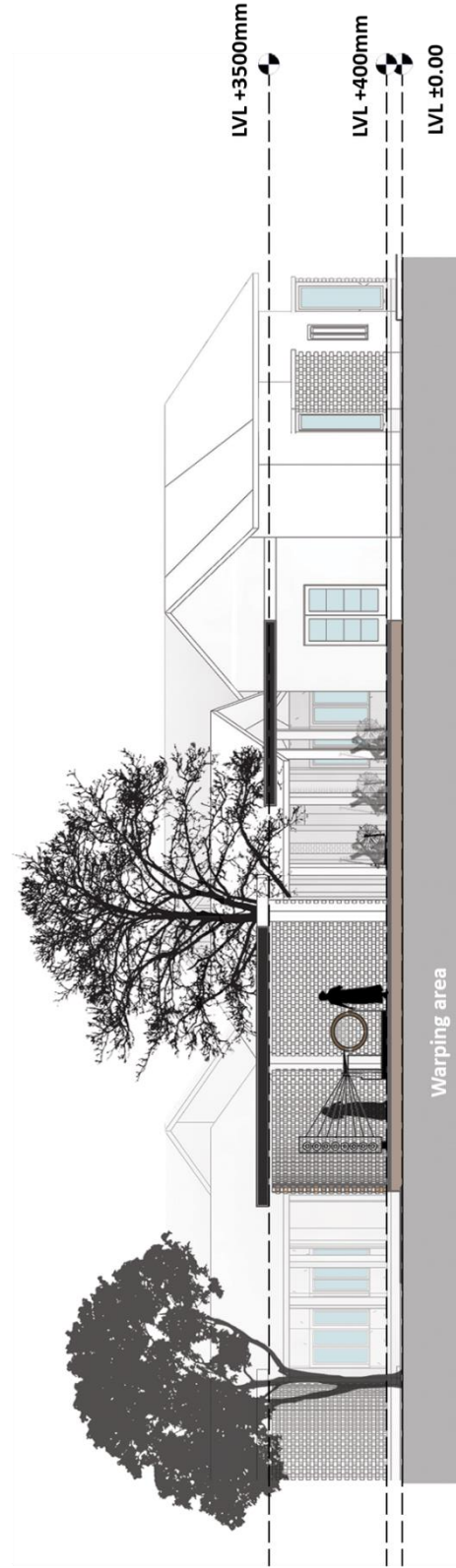


HIERARCHY OF SPACE

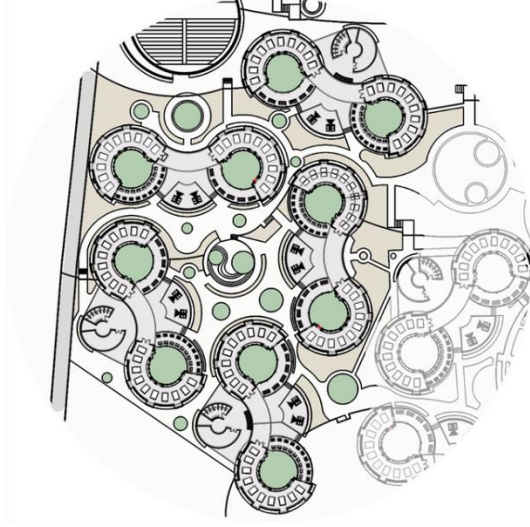




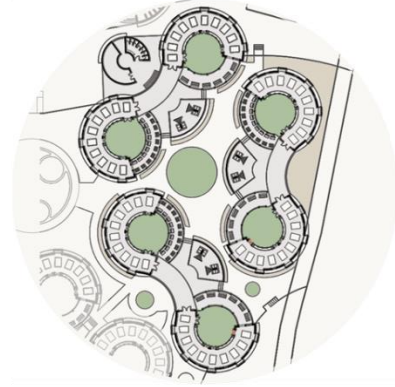
SECTION : THROUGH WEAVING UNIT CLUSTER – SHOWING HATKARGHA SPACE AND CHARKHA & AMBAR CHARKHA SPACE



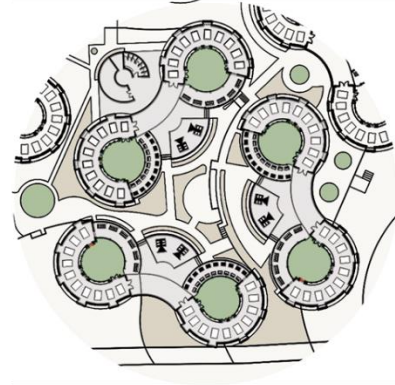
SECTION : THROUGH WEAVING UNIT CLUSTER – SHOWING WARPING SPACE



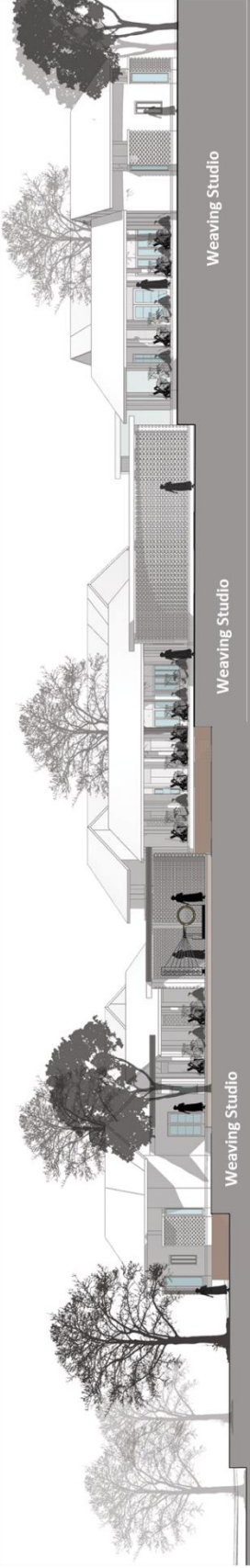
N-W CLUSTER



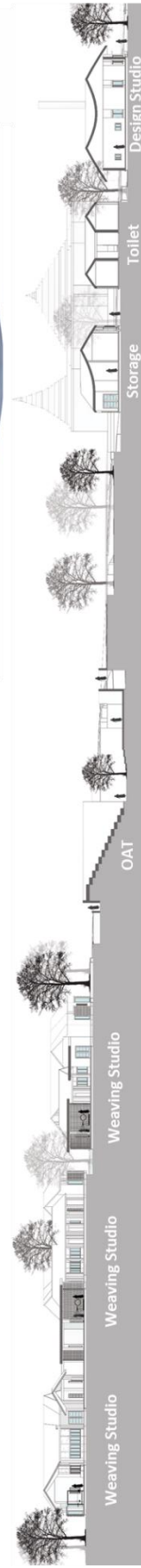
S-E CLUSTER



S-W CLUSTER



SECTION : THROUGH SOUTH – WEST CLUSTER

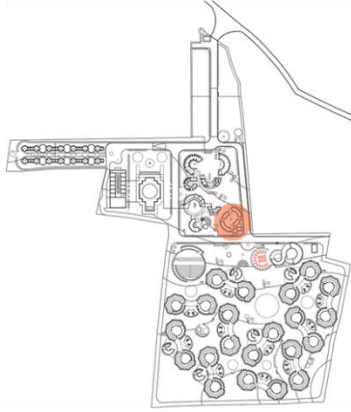
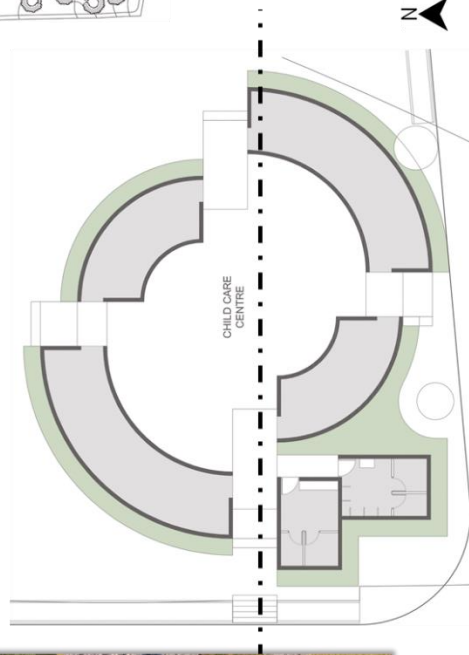


SECTION : THROUGH EAST – WEST, THROUGH OAT AND WEAVING STUDIOS

DYE - HOUSE

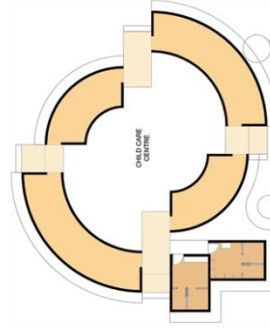


OAT

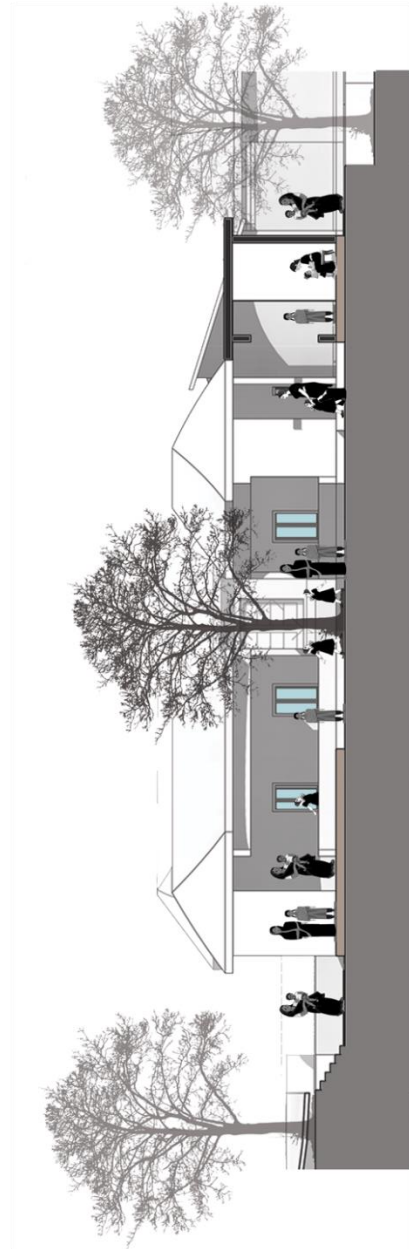


KEY PLAN

HIERARCHY OF SPACE



- CLOSED
- SEMI-OPEN
- OPEN



SECTION : THROUGH CHILD CARE CENTRE



THANK YOU