STUTI MURARKA

GSAPP PORTFOLIO

C O N T E N T S

S T U D I O   P R O J E C T S

E L E C T I V E S

THE THIRD SPACE

TRANSCENDING BOUNDARIES BETWEEN NEW YORK & MEXICO CITY THROUGH GROOMING SPACES

01

FALL 2023 ADVANCED V STUDIO
INDIVIDUAL PROJECT
MENTORS - THOMAS DE MONCHAUX AND
ROZANA MONTIEL

Brief : Analyze the urban landscape along 116th Street(New York), mapping movements from West to East and connecting them to a global perspective. Exploring breaking down borders by occupying deep thresholds and habitable boundaries, viewing storefronts as gateways between two cities(New York and Mexico City). Engaging with the local community in Little Mexico NY, design site-specific interventions amplifying voices and visions. Additionally, imagine "storeback/backstory" interventions projecting conceptual conditions into chosen sites in Mexico City. The goal is to craft architectural structures that narrate tales of migration, connection and belonging.

Project : Explores the idea of the city as a third space. Locating over 40 barbershops / salons across 116th Street NYC(seen in above diagram), identifies grooming as an indispensable part of the community. These grooming spaces provide an understanding of the interconnectivity between the hair, body and city. Ideas of the embodied experience vs the urban experience drive the design that tries to transcend the boundaries between NYC and CDMX. Multifaceted social interactions taking place in these spaces reveal themes of privacy in publicity as well as mutual care. These studies drive the real and surreal aspects that the design is composed of.

Psychogeographic mapping | Initial study
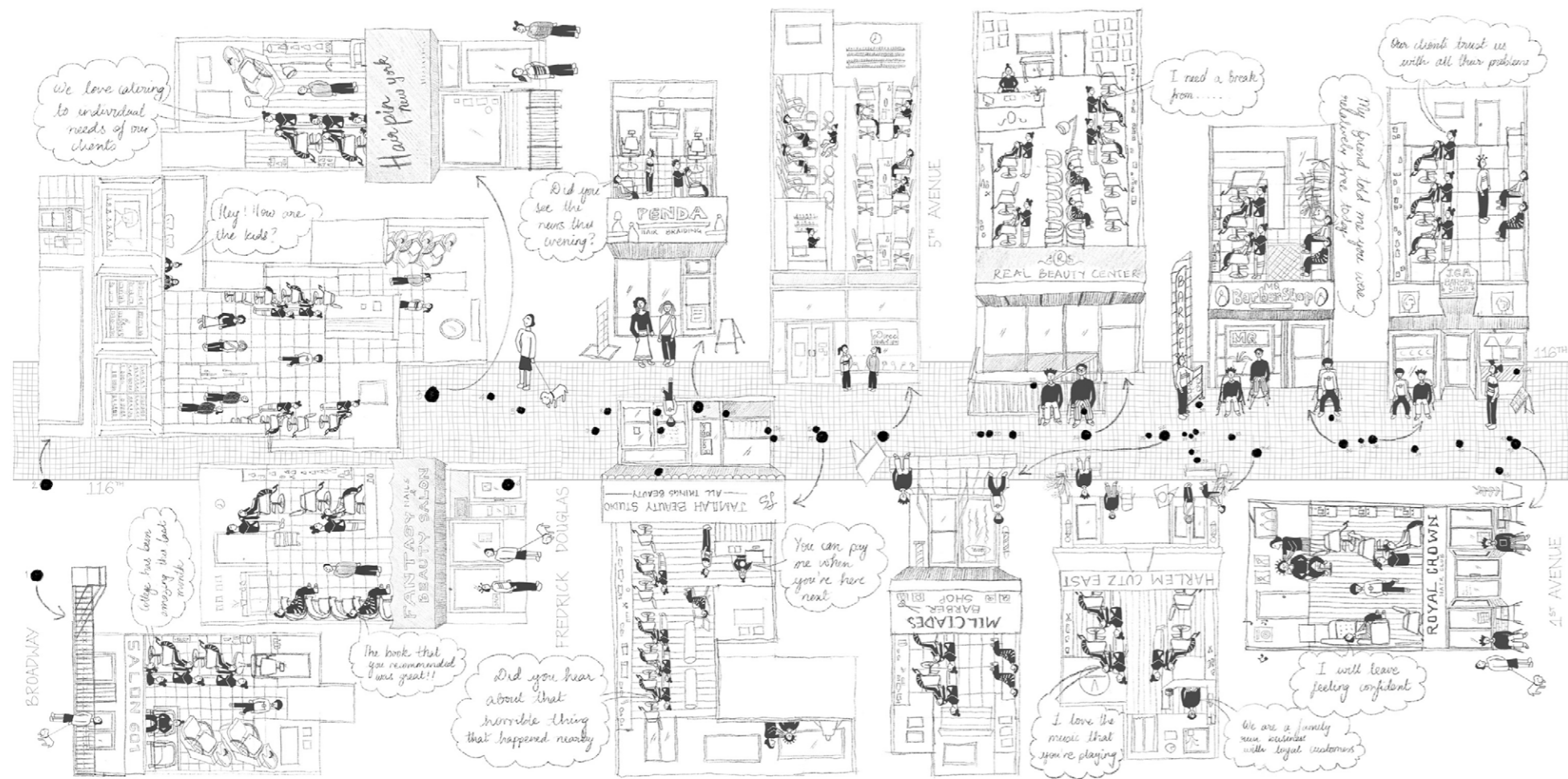
Psychogeographic mapping of the West-to-East translation from Columbia University to Little Mexico. Evaluating intersections between the North-to-South avenues and their role in connecting communities. Understanding the grooming spaces as in-between spaces, liminal "third spaces".

New York Map : Studying social interactions as well as change in character of grooming spaces from Columbia to Little Mexico along 116th. As we move towards the East, these spaces become more intimate and vibrant while reducing in scale.
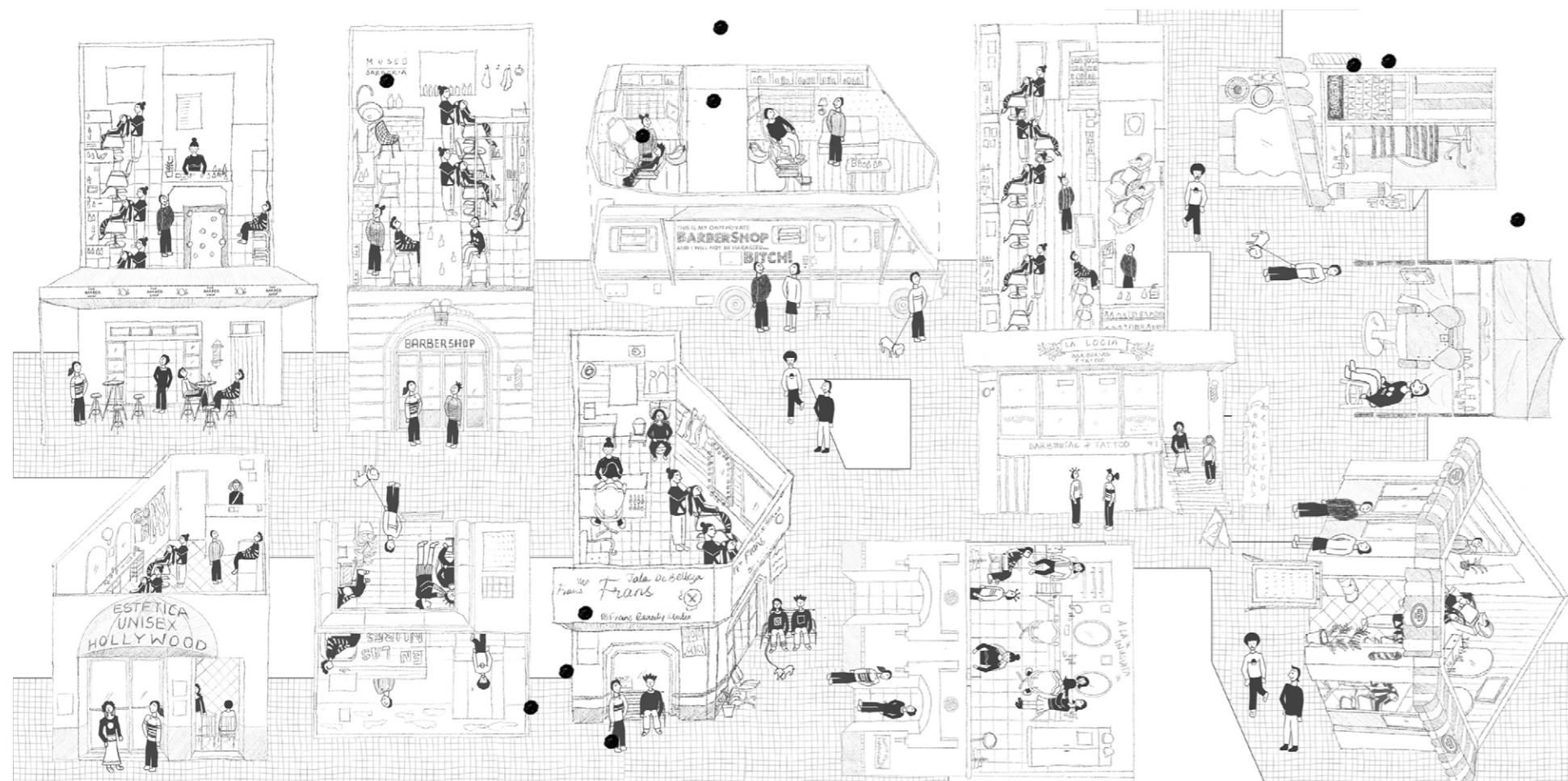
CDMX Map : Identifying Salons / Grooming spaces across Mexico city that simultaneously integrate within them other activities such as music, tattoing, bars, gaming parlours to name a few and have myriad spatial configurations.

Continued mapping | Initial study

Hailing from Mumbai, India, the study continued by representing and studying local salons there. These function as important 'third places' in the city where a multitude of activities take place while presenting interesting degrees of interaction between different stakeholders.
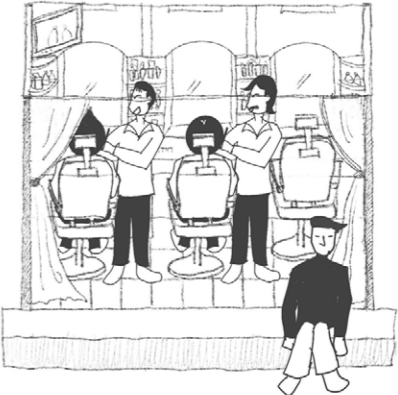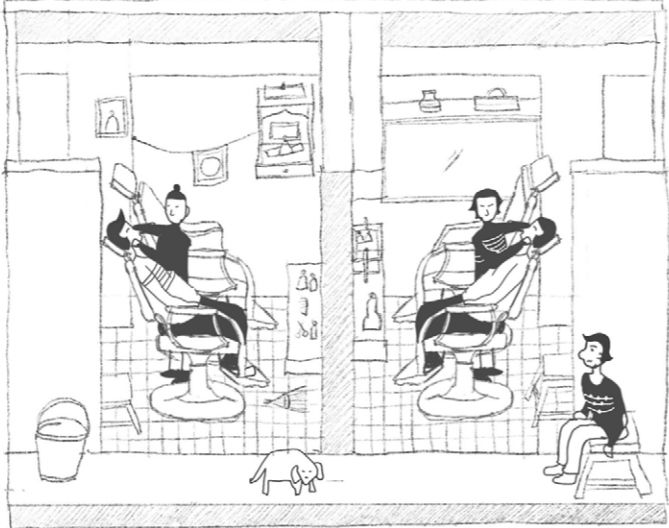
Activity Study

Montages with images from all 3 cities to understand myriad activities occuring in salons apart from hair related ones. To name a few : tattoo-ing, bar counter and table, gaming spaces, match-making, therapy sessions, music listening and performances.

Hair as Identity | Part 2 of Initial study

Salon walls are overwhelmingly filled with posters of celebrities and their unique hairstyles. People come in demanding those 'attractive' looks for themselves so that they can boost their confidence. They aspire to be the silhouettes they see and relate to that as feeling a sense of accomplishment.

Storeback | Portal between NYC & CDMX
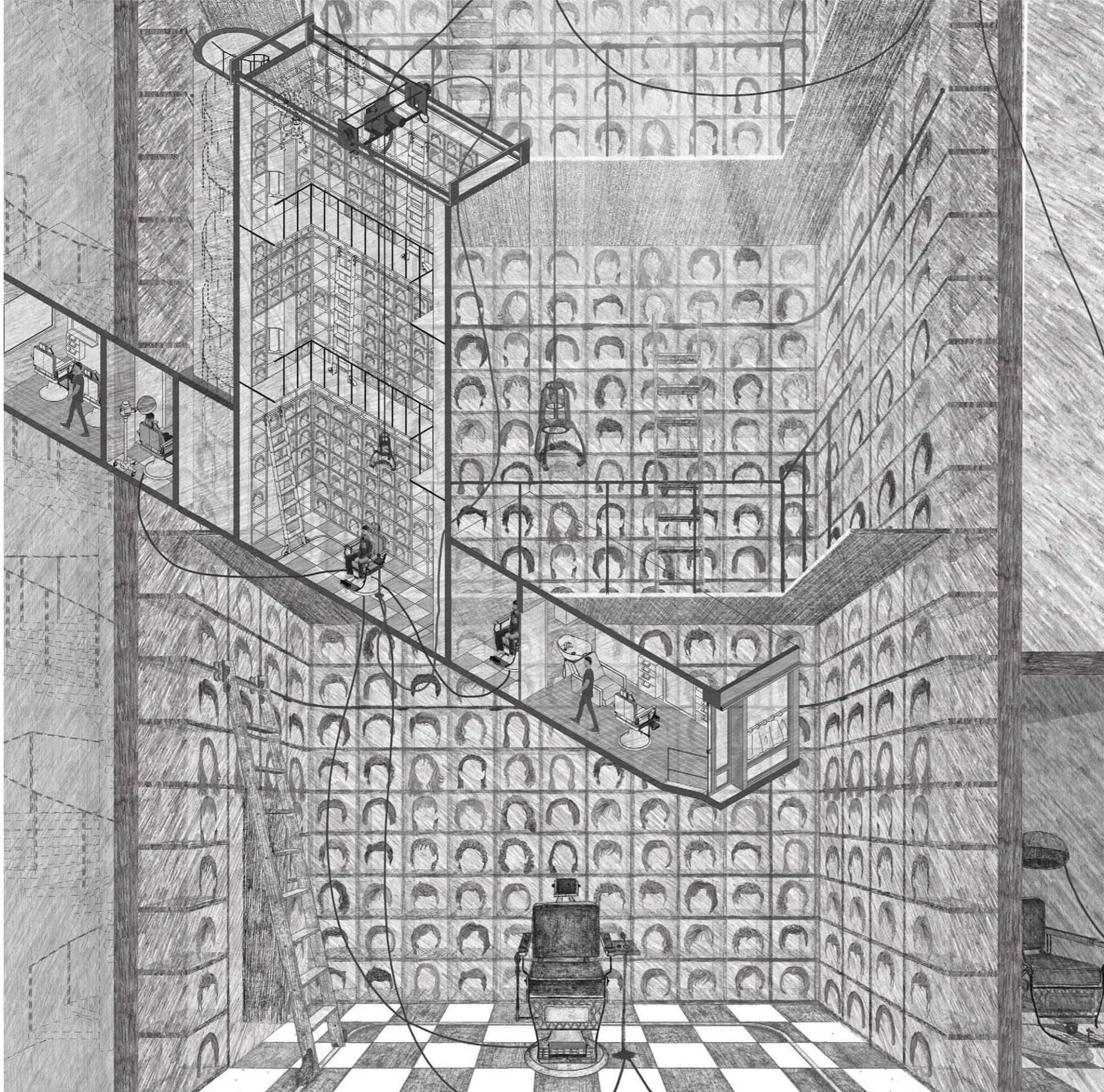

The storefront is the interface between street and store, and to complement it, the concept of "storeback" arises. This envisions the **rear wall** not as a surface but as a **portal to a specific site in CDMX**, informed by various ways of experiencing the city. A result of the initial study and close engament with the Little Mexico community, the site selection suggests a program connecting CDMX to NYC. This liminal space unfolds hometown stories and migration networks, bridging reality and fiction. The illustrations of the **project reflect magical realism, making the invisible visible.** The "storeback" idea explores portals as spatial expressions of global connectivity.

The chosen store is the last owned one by Little Mexico's oldest barber, Oscar. The design creates an in-between space inspired by barbering's non-discriminatory nature. Oscar served clients from various backgrounds including criminals, maintaining their secrets. The space aims to be a **'safe space' for those seeking transformation from a criminal life, using barbering as an alternative choice.** The portal opens strategically in a crime-ridden area in CDMX, Iztapalapa. The design features a **collumbarium of wigs**, symbolizing identity and transformation. Wearing the wigs acts as a portal into the individual barber-worlds of those who have successfully transformed. The space lacks a roof, symbolizing **constant growth** as more people embark on their journey of change, **exploring the boundaries between the informal economy(barbering) and criminal economy.**

Plan & collage | Storeback
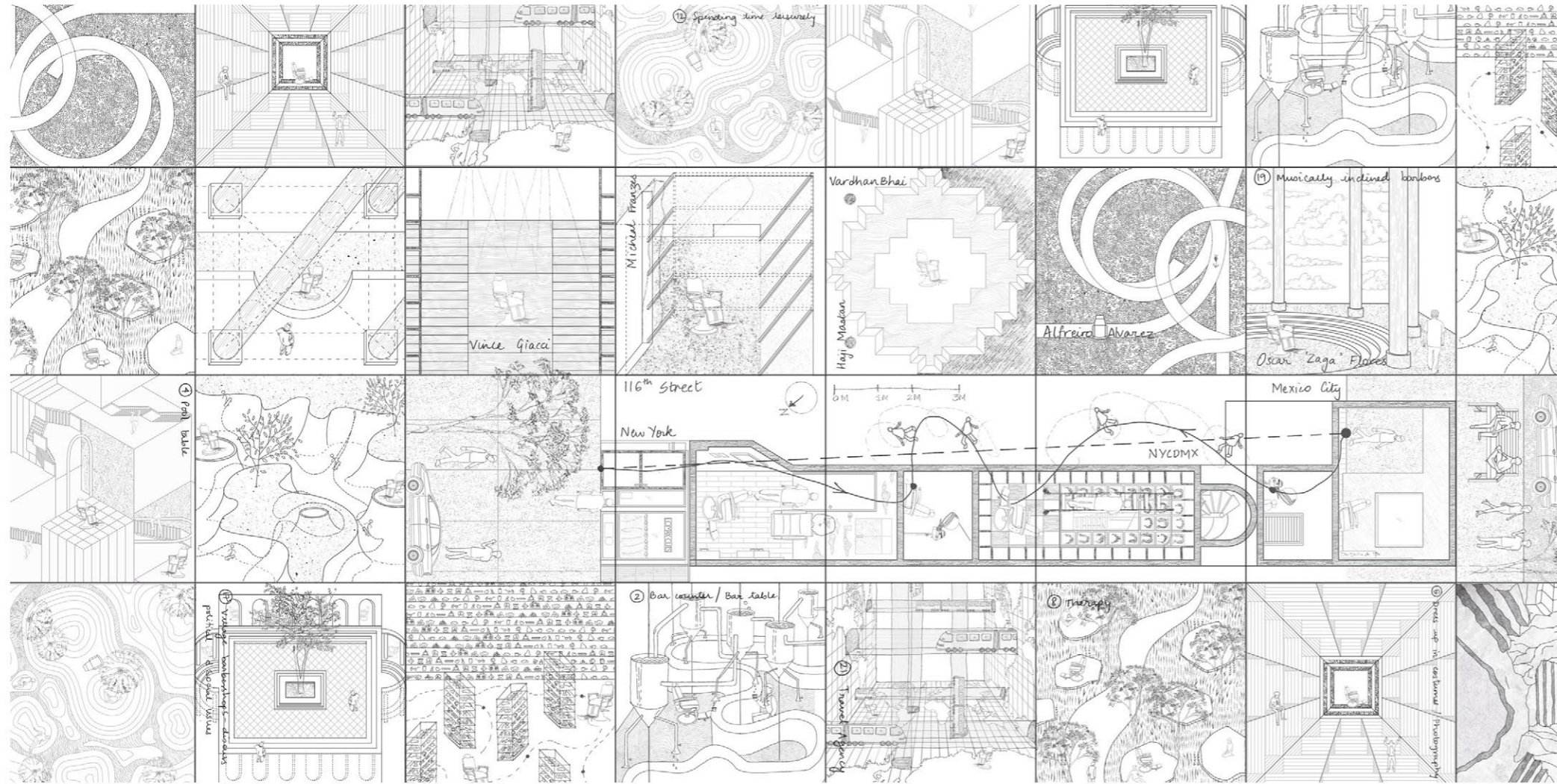
The **conceptual plan** is inspired by the checkered tiled flooring of barbershops/salons, with **incomplete edges symbolizing infinite transformation stories**. Each tile represents a real or imagined story of transformation from a criminal life, combining names of real criminals with activities that can be combined with that of grooming. The **tiles showcase individual worlds of successfully transformed individuals**, accessible by wearing the wigs. The plan isometric of the storeback design is subtly collaged into the illustration.

The **collage zooms in on the tiles**, extending the concept of infinity through cut-off edges. In 3D, it visually represents real transformation stories explored in the plan. One example is Alfreiro Alvarez's story from Iztapalapa(bottom left tile), a former criminal. Inspired by witnessing the burning of Judas, he felt the urge to rise from the ashes of his criminal life, finding solace in cycling. The illustration portrays a cycling ramp rising from ashes, symbolizing Alfreiro's created grooming world—a safe space for people to discuss their transformative journeys.
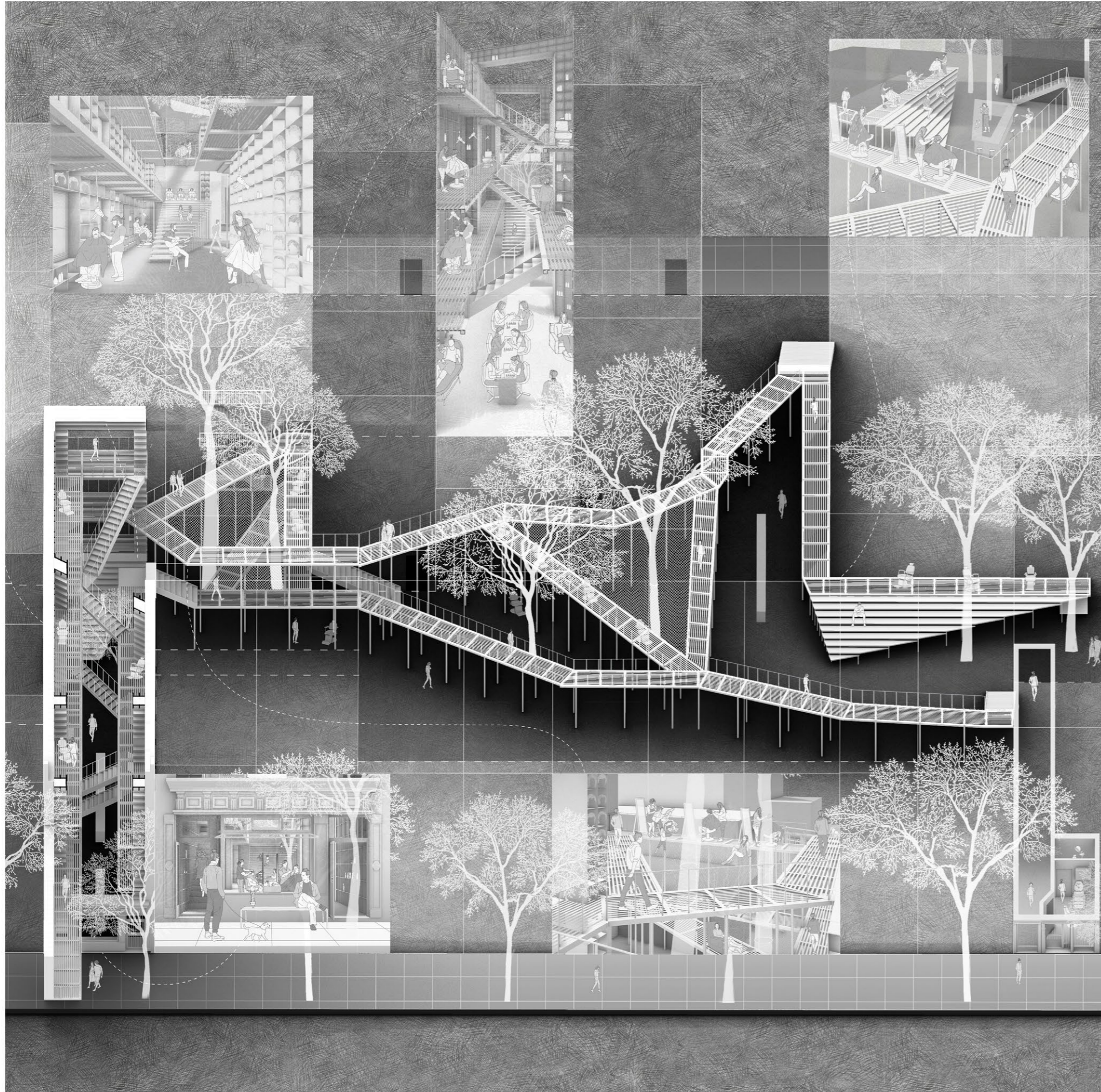
The design originates within a selected store, conceptually translating the surface of its storefront into a spatial and material volume that occupies space behind it. The program of this structure is determined by the fictions and fantasies studied so far. The unconscious and memory of the storeback/backstory is now projected into the consciousness and spaciousness of the city. The mission of this proposal is to construct spaces of reciprocity, mutual care, communication and participation.

The envisioned structure is a grooming mall, a convergence of various activities where people come to see and be seen. Staggered ramps and balconies ensure visibility throughout the space. Connecting Oscar's two stores, the right one leads to the portal, while the left is the main access to the new store design. The design pays homage to Oscar, incorporating his principles. The ramps not only link the two stores but also connect other grooming spaces on the block. The store explores the concept of privacy in publicity. Elements of the storeback portal, like display grid shelves and balconies, are retained.
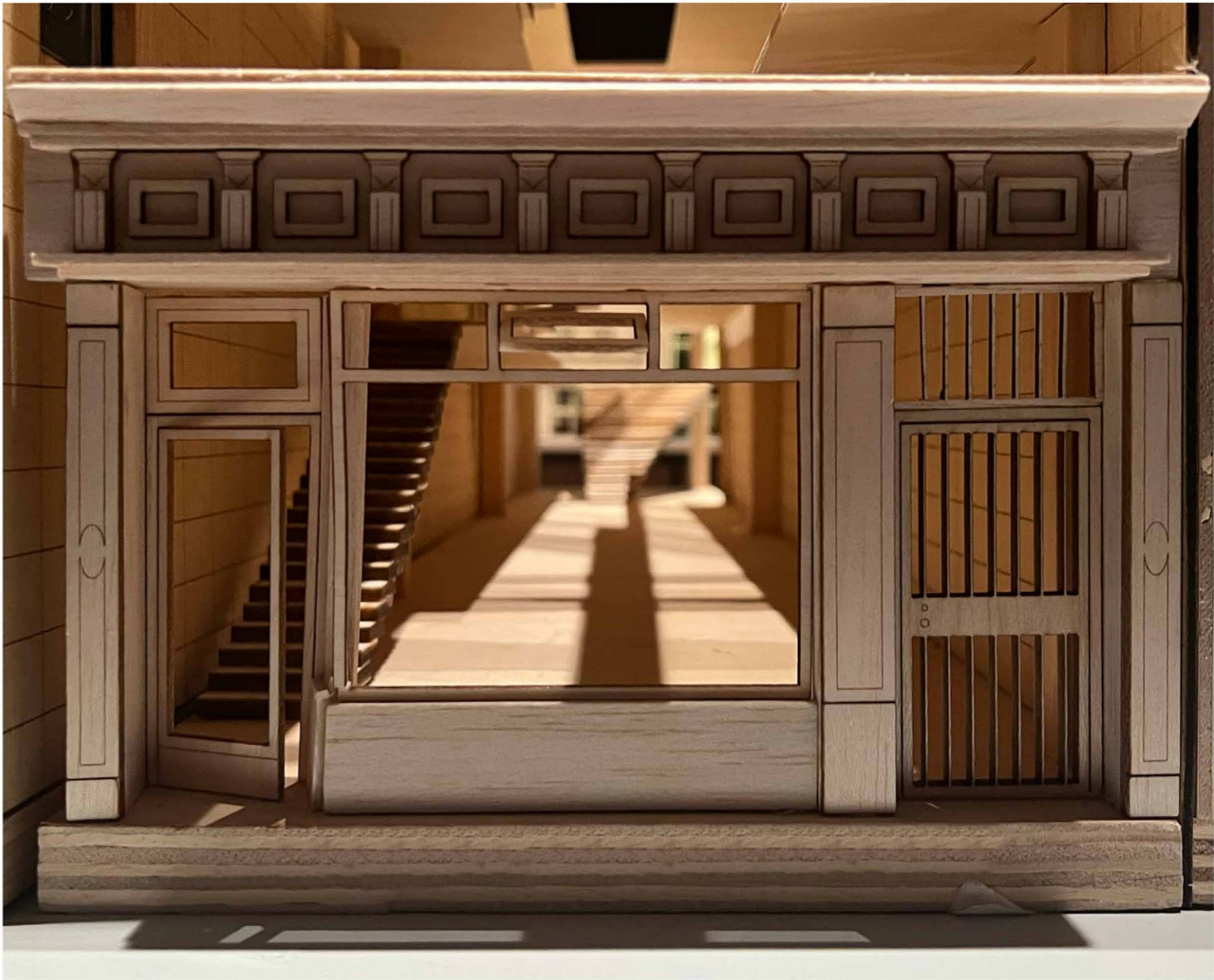
FOOD FOR THOUGHT!
EMPOWERING RIO'S PLATE AND PEOPLE

02

SPRING 2024 ADVANCED VI STUDIO
GROUP - HARSHINI ASHOK, MARYAM HANIF & SELF
MENTOR - GALIA SOLOMONOFF

This adaptive re-use design proposal addresses the critical issue of food insecurity in Rio de Janeiro. By integrating a food bank with urban agriculture, the provided A Noite building's new proposal fosters self-reliance within the community. Recognizing the limitations of government policies and import reliance, food banks within urban agriculture foster a self-sufficient community. The concept draws inspiration from the local diet and utilizes circular water management systems, potentially incorporating seawater desalination. Educational programs within the building focus on vertical and peri-urban farming techniques, empowering residents to grow their own food. The design acts as a bridge, connecting the Morro with the waterfront and plaza. The cylindrical form maximizes farmable surface area, resembling grain silos, while public walkways weave through planted zones. This open welcoming structure offers subsidized food and food bank services, transforming the space into a learning environment for residents to experiment with new crops, share knowledge, and access subsidized food markets. By educating users on urban farming techniques and fostering collaboration, this design proposal aims to cultivate a more resilient and food-secure future not just for residents but for the entire community.

Problems

Brazil stands as the 4th largest food producer in the world but still suffers from **food insecurity**. This problem grew in Rio after covid struck due to insufficient government policies / aid accompanied by unforseen circumstances and poor water management especially in the lower income areas like the favelas.

Rio.

4.2 % More in women than men

9.6 %

Unemployment rate

Households with Power Outage more than 24 hrs in a month

43 units increase

Food prices 2018-2022

Hunger

34 %

15 % rise since COVID

Food insecurity

23 % Total rise from 2018-2022

Government Aid

1.9 meals per day average per person affordability

Total % of people making budget cuts

% of budget cuts made by housholds (more processed foods consumed)

11.1 %

Rapidly increasing

Unemployment rate

% increase in price from 2021 to 2022

Made with Unopp Charts

Food prices

High nutritional vulnerability

Favelas. 16 million people

No Health Insurance

Hunger

68 % homes get inadeguate supply in the bottom 10 favelas

Water Scarcity %

Severe food insecurity %
undefined

Food insecurity

Deaths by Starvation

Diet worse 2021 from 2020 %
undefined
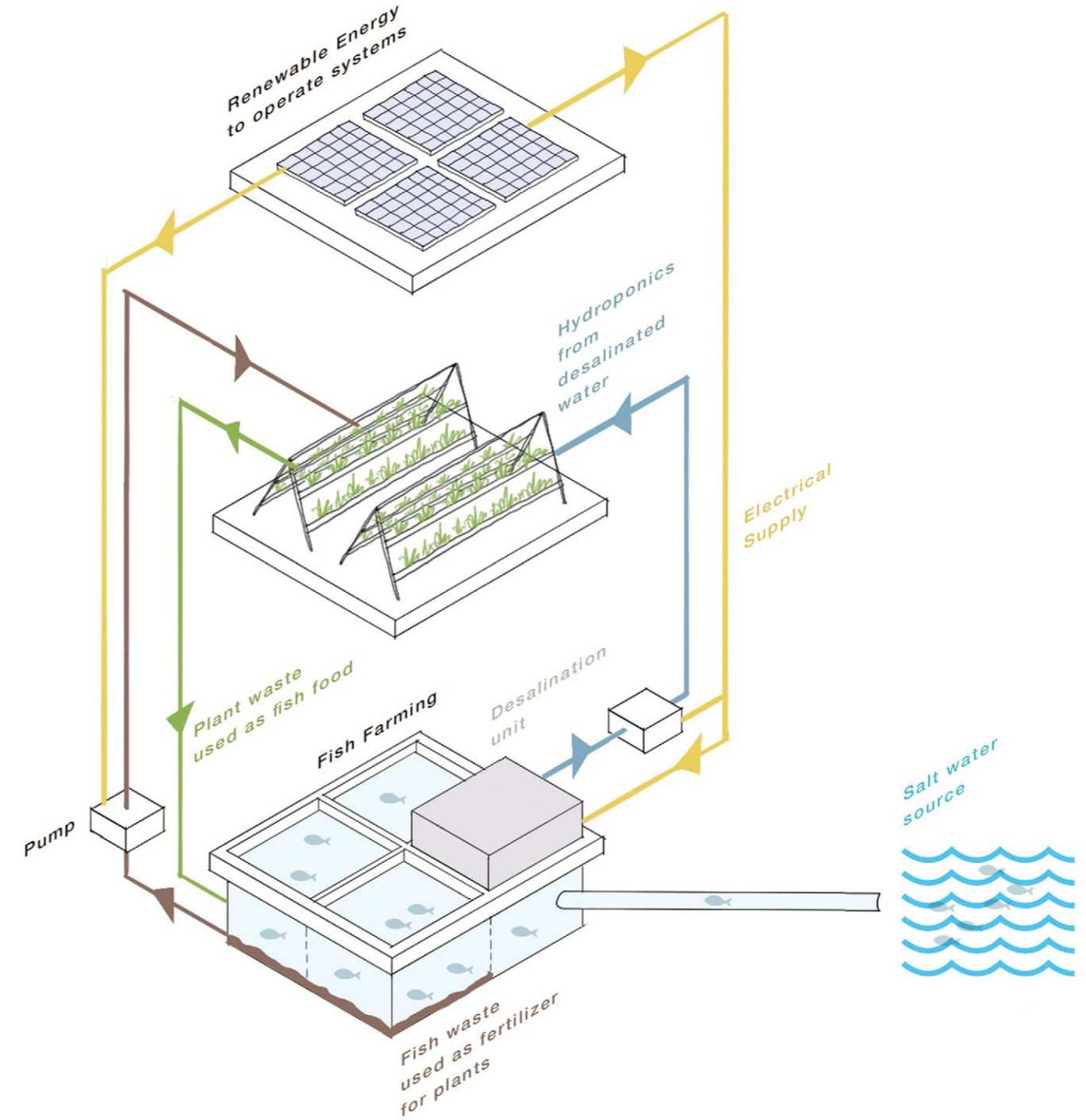
9 % of people experience Severe food insecurity

Solutions

Some possible proposed solutions to the issues discussed could be using the given **abandoned building** and many others in Rio to act as models of change. Through research and education, these spaces can be used to inhabit **circular systems** that use abundant sea water and grow food to **engage communities** in the agriculture process. This would also aid in **self-sufficiency**.
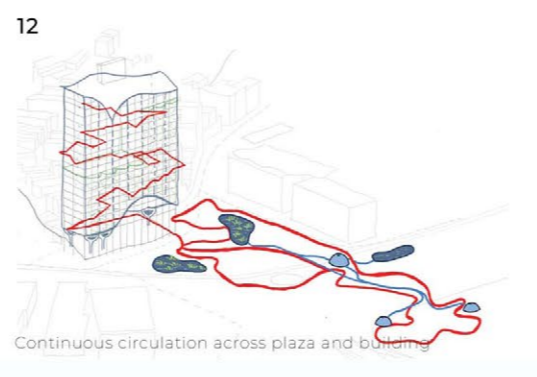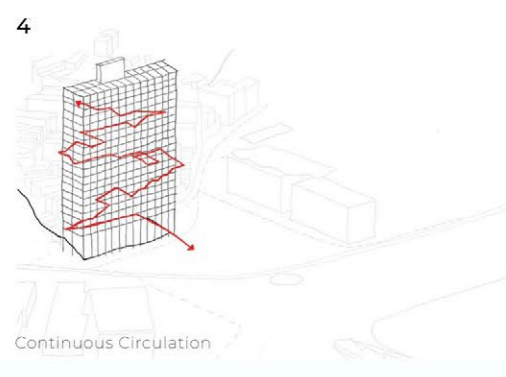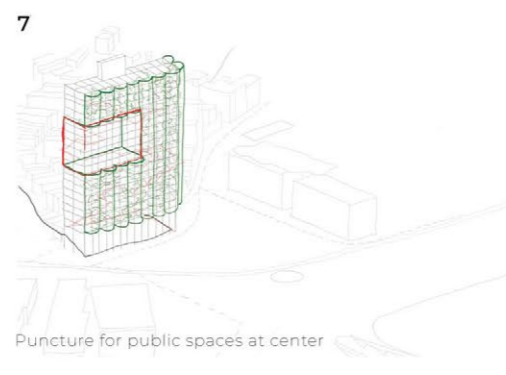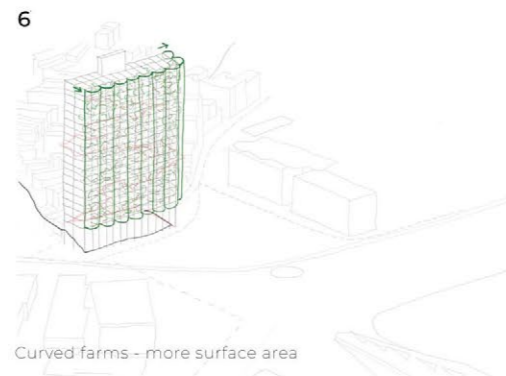
Circular System.
desalination + fish farming + hydropinics.

Renewable Energy to operate systems

Hydroponics from desalinated water

Electrical Supply

Plant waste used as fish food

Fish Farming

Desalination unit

Salt water source

Pump

Fish waste used as fertilizer for plants
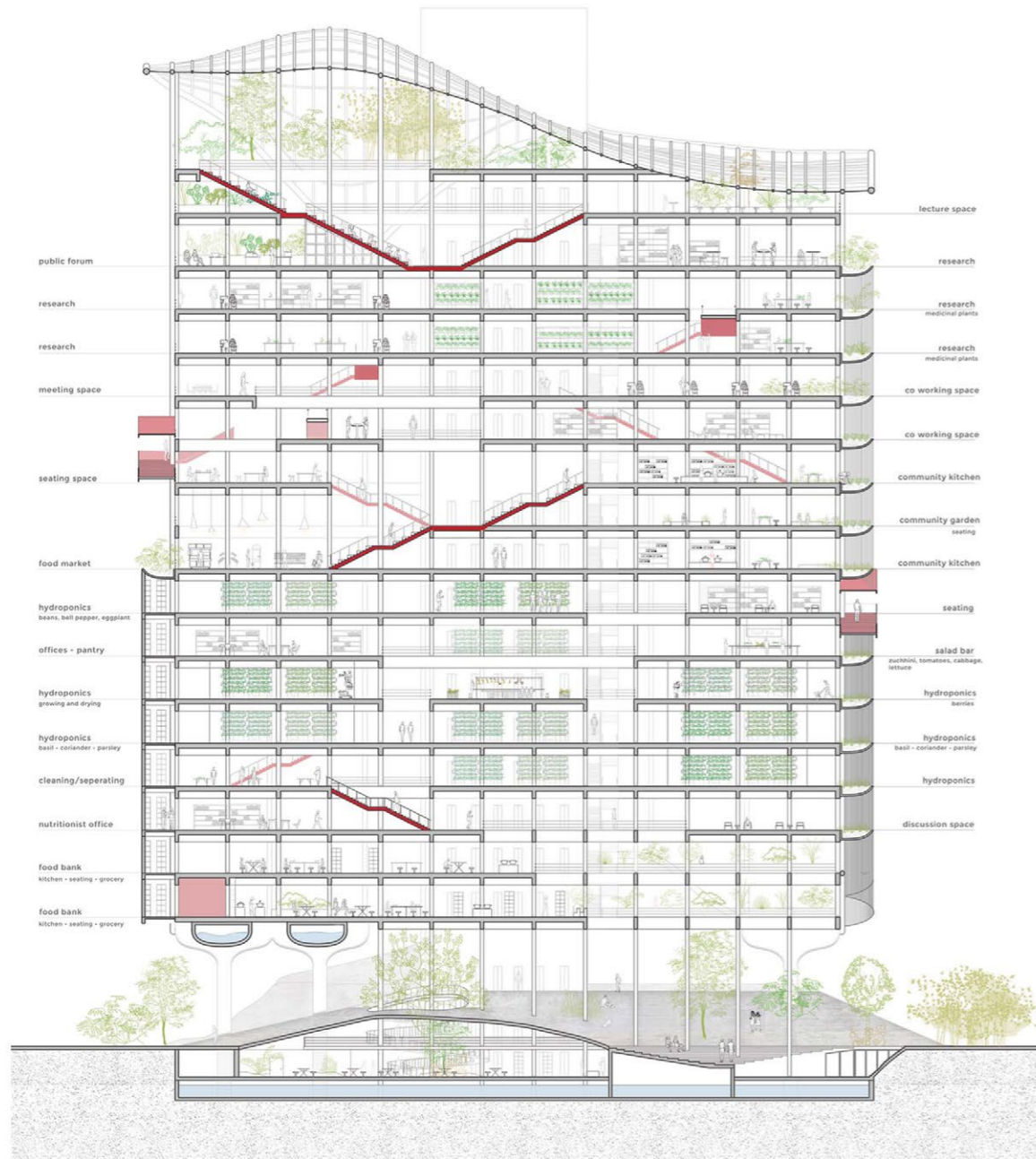
Design Development

A **Noite building** placed at the Praca Maua location in the center of Rio, provided great opportunity to apply our ideas on an **adaptive re-use** project. It's location close to the sea, in addition to an adjacent plaza that was largely empty and a cut morro at the back allowed us to view the **building as** a point of **interconnection**. Currently apprearing as a wall on site, A Noite was opened up to extend the public spaces inside and make the proposal **inviting**. The idea of housing a **food bank** within the structure made it essential to create a warm space that people did not hesitate to enter. The plaza design respects existing site markers like trees, monuments and tram lines. It integrates it within the design.

1
Stripping the facade

5
Sunlit facades will have farms

9
Low lying areas - constructed wetlands to collect desalinated water + clean rain water before storing in building for use

2
Identifying cut hill (Morro) behind

6
Curved farms - more surface area

10
Storing water below basement level before supply

3
Extending Morro into plaza

7
Puncture for public spaces at center

11
New exoskeleton structure to take new load of farms and integrating with water supply movement

4
Continuous Circulation

8
Rain collection + movement

12
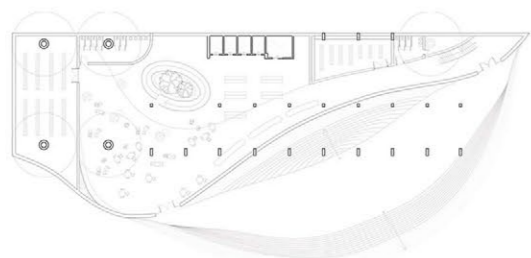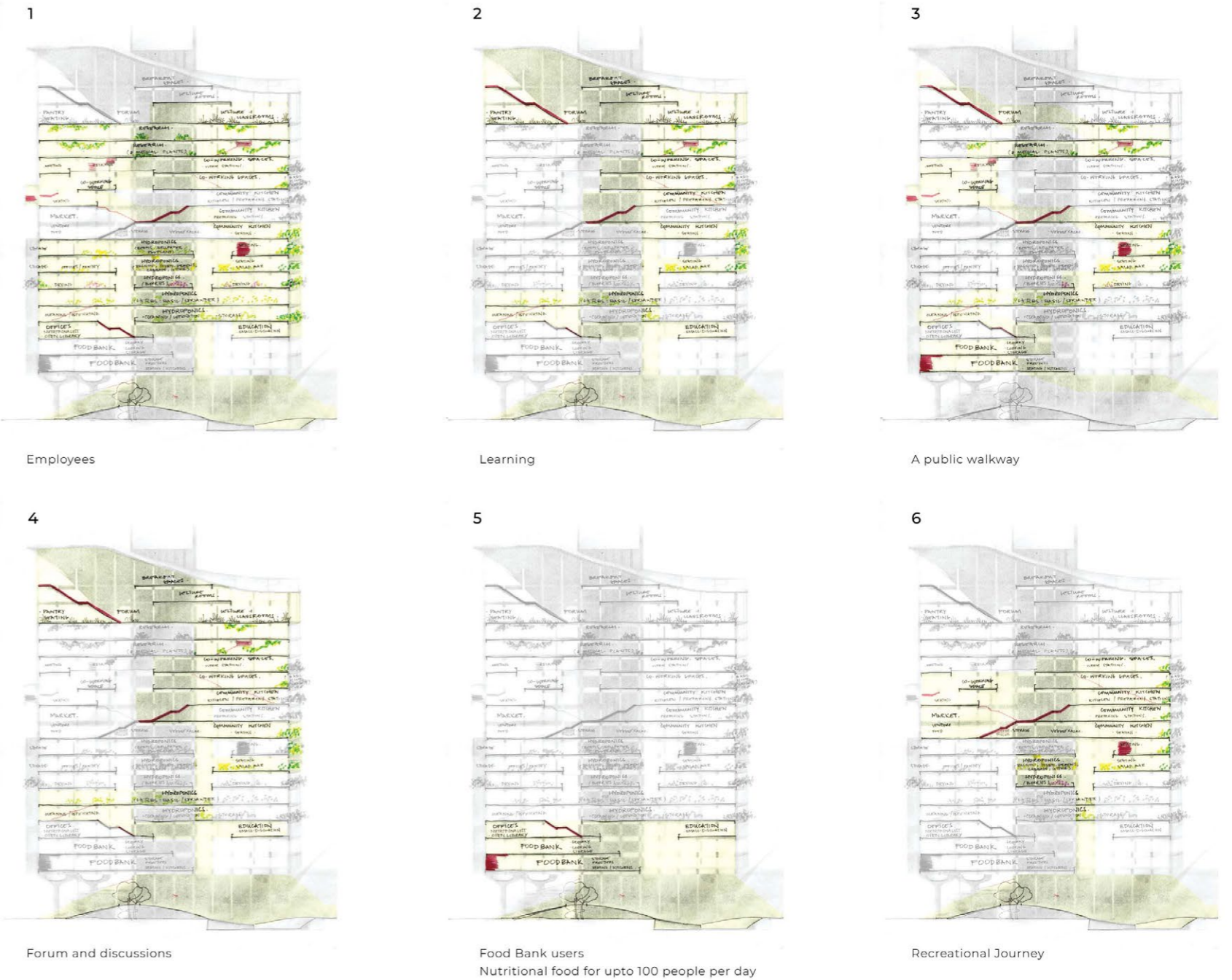Continuous circulation across plaza and building

Final design

The public forum extends into the programs, housing a community kitchen, research labs, co-working spaces, and a marketplace. By educating users on urban farming techniques and fostering collaboration, this proposal cultivates a more resilient and food-secure future for residents and the entire community.
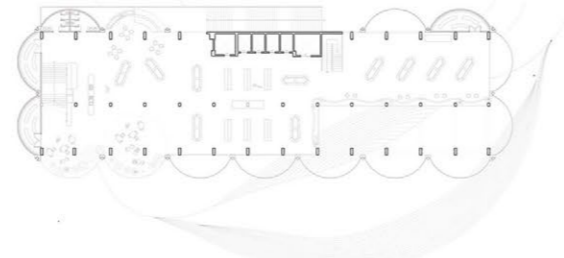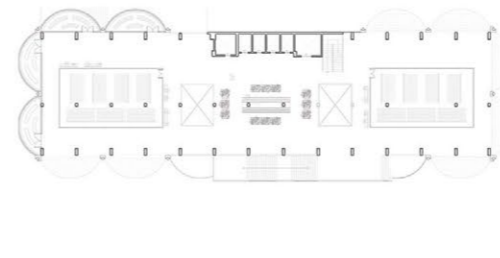

lecture space

research

research
medicinal plants

research
medicinal plants

co working space

co working space

community kitchen

community garden
seating

community kitchen

seating

salad bar
zucchini, tomatoes, cabbage, lettuce

hydroponics
berries

hydroponics
basil - coriander - parsley

hydroponics

discussion space

public forum

research

research

meeting space

seating space

food market

hydroponics
beans, bell pepper, eggplant

offices - pantry

hydroponics
growing and drying

hydroponics
basil - coriander - parsley

cleaning/seperating

nutritionist office

food bank
kitchen - seating - grocery

food bank
kitchen - seating - grocery

Journey diagrams

The building is a place to nourish, learn and collaborate. The circulation and programs across the section were studied strategically as **journeys** that **different users would take** through the structure. The movement of each user was curated to develop unique experiences.

1

Employees

2

Learning

3

A public walkway

4

Forum and discussions

5

Food Bank users
Nutritional food for upto 100 people per day

6

Recreational Journey

Basement plan - food bank and plaza

First level plan - food bank

Sixth level Plan - hydroponics and drying berries
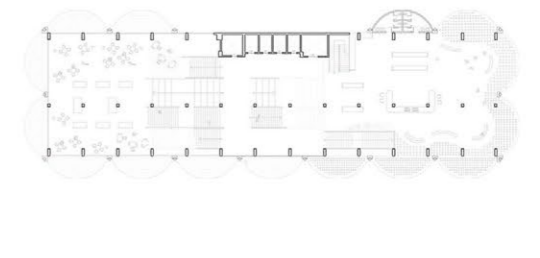
Tenth level Plan - Community kitchen
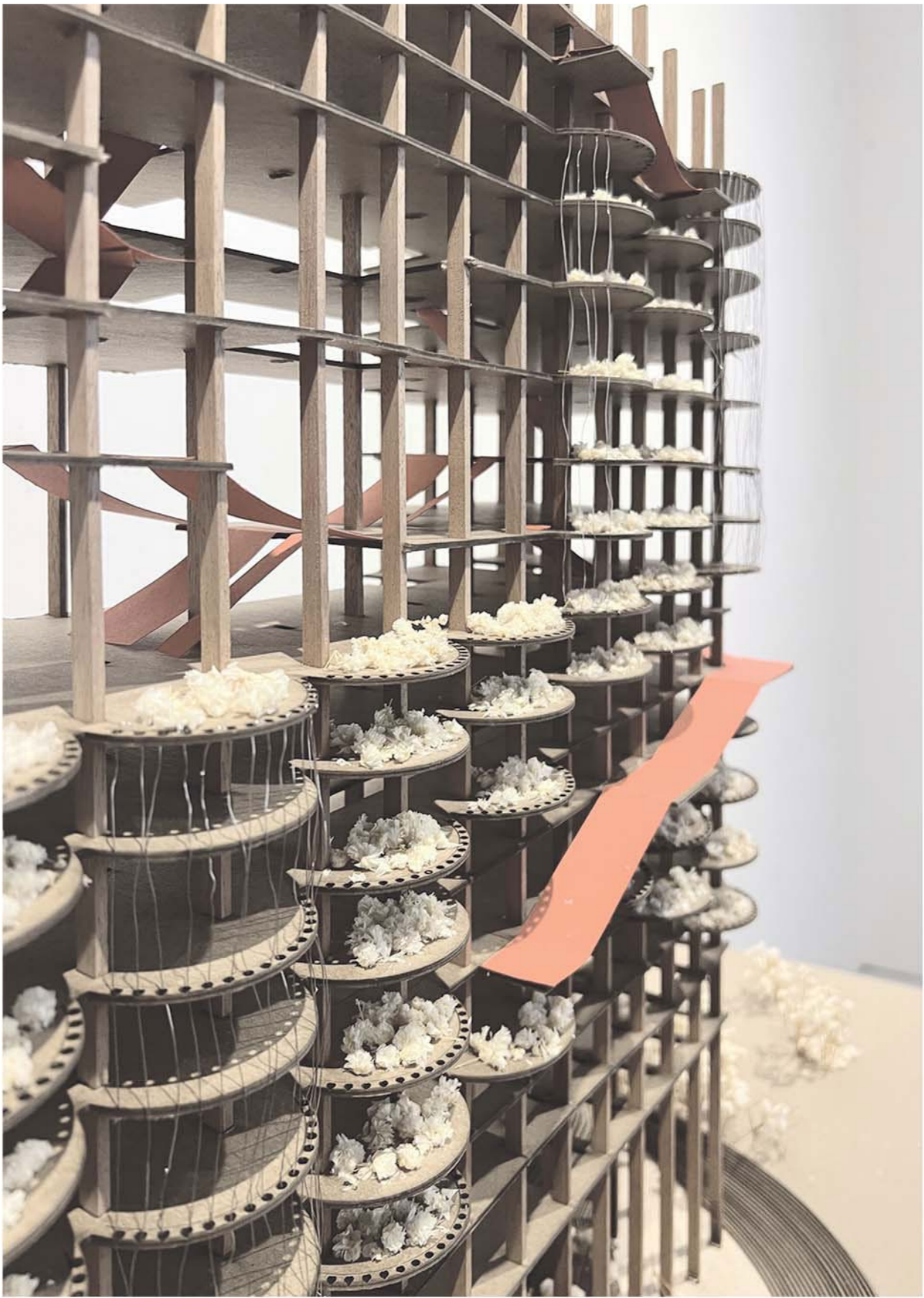
TROPICAL CO-HOUSING
A GRADIENT OF SHARED SPACES

03

SUMMER 2023 ADVANCED IV STUDIO
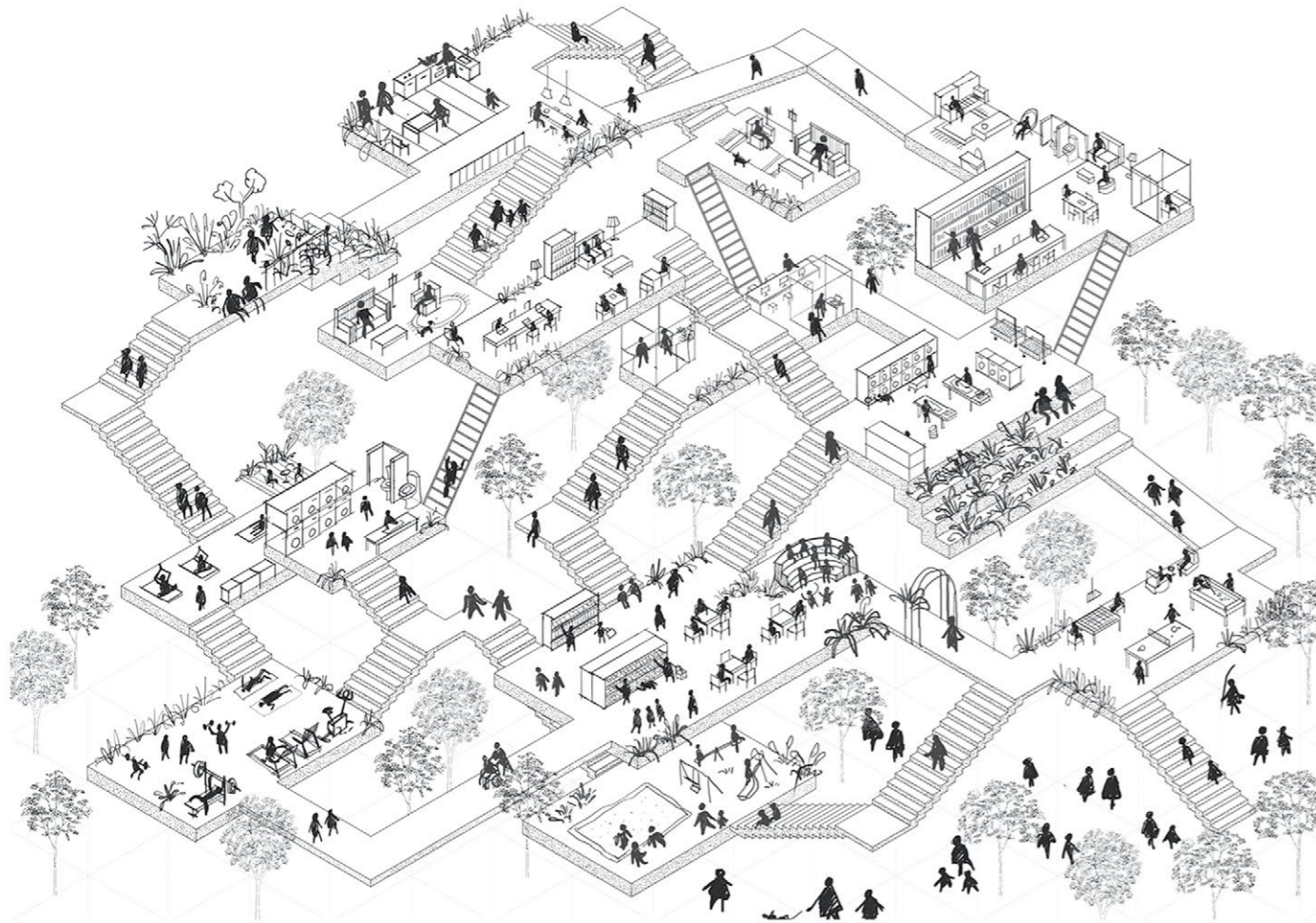INDIVIDUAL PROJECT
MENTOR - ANUPAMA KUNDOO

Brief : Experiment with conventional co-living strategies that exist today using Auroville,India as a model city. It iss currently being designed and gradually built. We had to pick one of the 11 proposed residential buildings and use it's massing as constraints for our design.
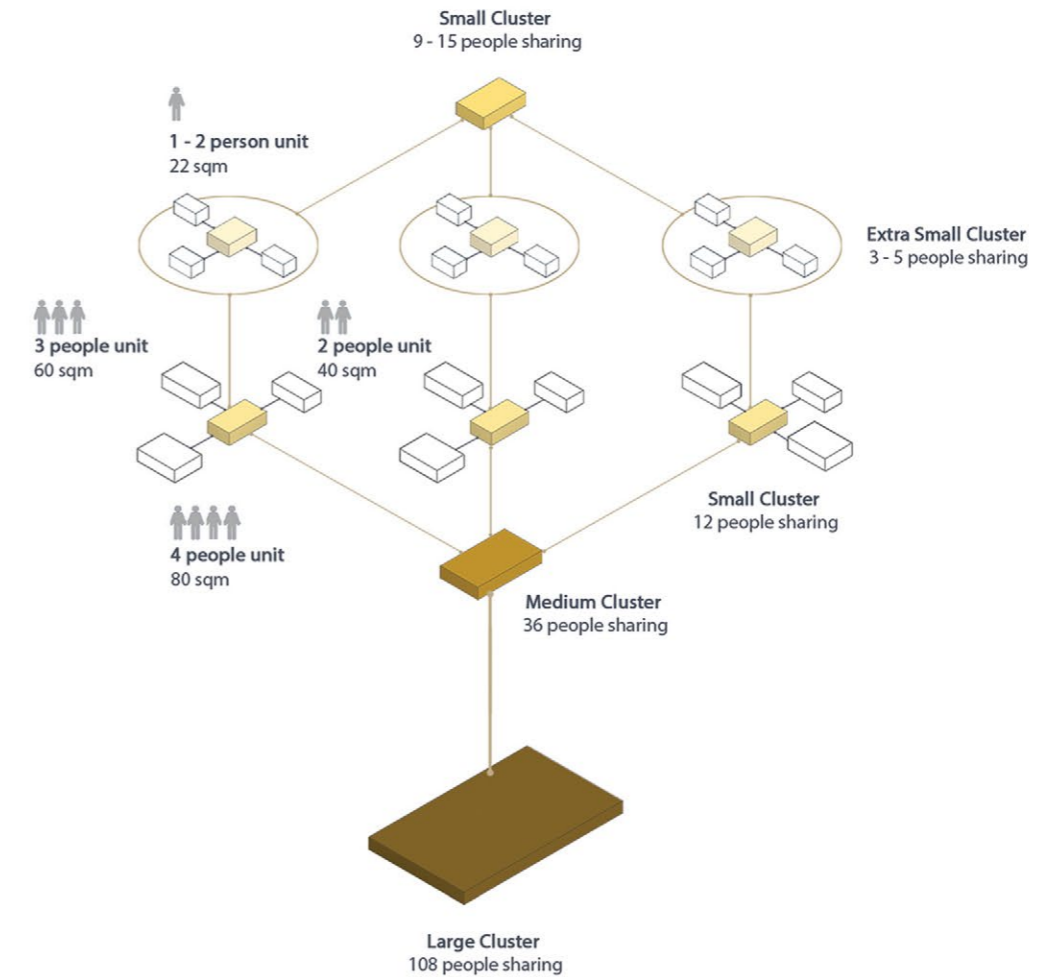
This proposal leverages Auroville's lab that dispenses privatization of land and car culture. Hence, the conventional podium-sharing co-living model can be re-invented to create an integrated sharing system. To humanize the scale of construction for a large massing and make it more relatable, the design started by deciding a hierarchy of shared spaces, assigning them areas and dispersing them in a generated order along a seamless 'urban ramp.' A ten-meter width for the massing provided direct light to all volumes on one side or more. All individual spaces were positioned for light to enter and allowing free movement across the form. Overlapping the shared spaces and internal, external staircases that are free from the core leads to seamless physical experiences while enhancing the spatial and social quality. Apart from gluing spaces physically, the design brings people together metaphorically generating instances for people to interact with that of other clusters regularly.

Concept | Gradient of shared spaces

Above : Idea to experiment with the gradient of shared spaces to create an integrated cluster which enhances the quality and quantity of social interaction and collaboration.

Below : Moving away from the conventional sharing model- podium type(left below) to introduce a more integrated one(right below).


Cluster diagram & Site selection

Small Cluster
9 - 15 people sharing

1 - 2 person unit
22 sqm

Extra Small Cluster
3 - 5 people sharing

3 people unit
60 sqm

2 people unit
40 sqm

Small Cluster
12 people sharing

4 people unit
80 sqm

Medium Cluster
36 people sharing

Large Cluster
108 people sharing
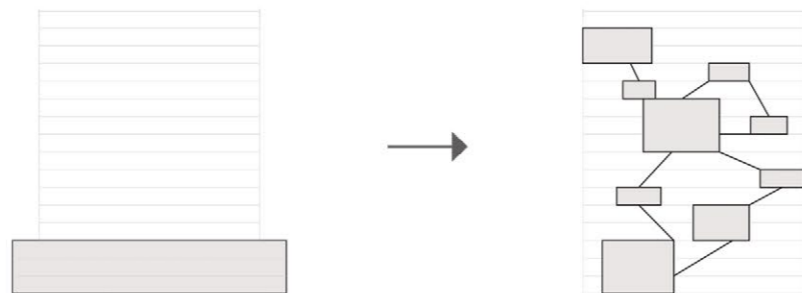
Above : Enhancing the 'quantity' of shared spaces by increasing chance encounters via an interconnected hierarchy. Specific sizes strategically allotted for varying number of people inhabiting different unit types to make sharing comfortable at all scales.

Below : 9 storey structure close to the main road(crown) was chosen
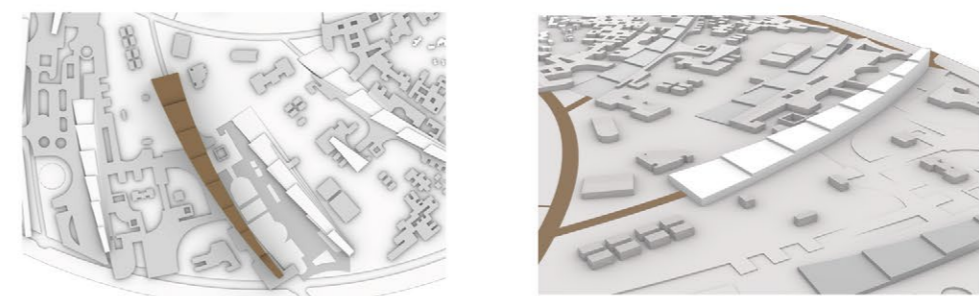
Design development | Defining and growing the cluster
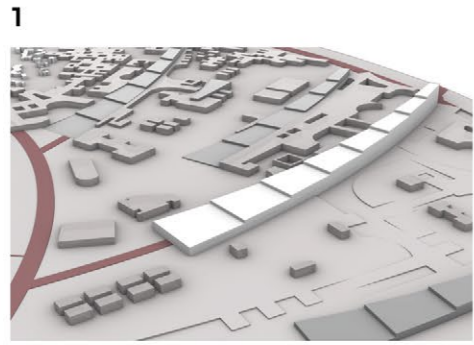
1

Existing building massing that cannot be altered as per studio brief
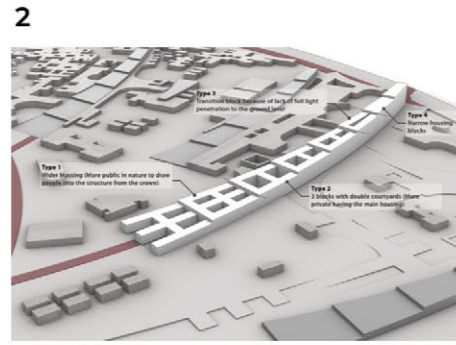
2

Puncturing a gradient of courtyards in plan for light and ventilation
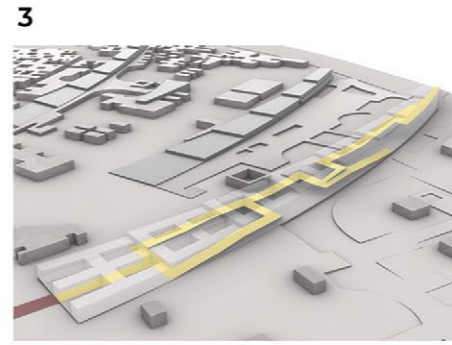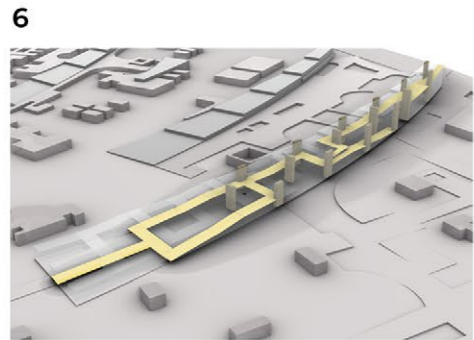
3

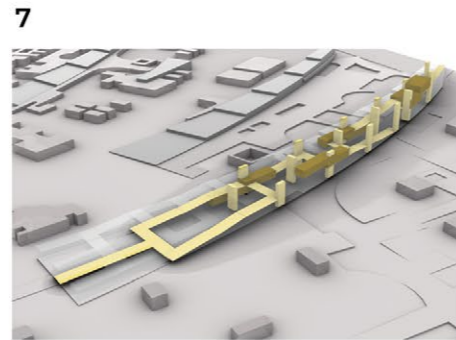A public ramp - social connector linking the design seamlessly within and to the context
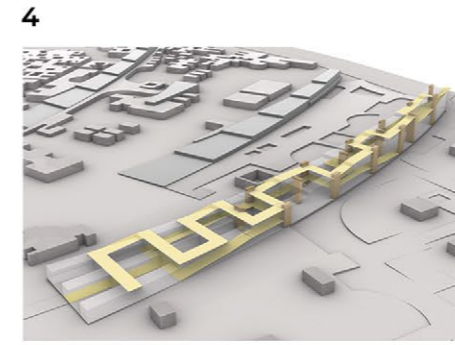
4

Continuing ramp on roof and introducing circulation cores at regular intervals for better access
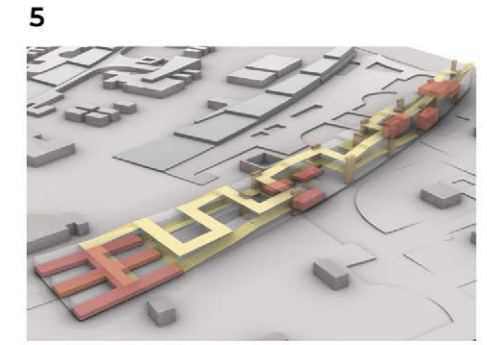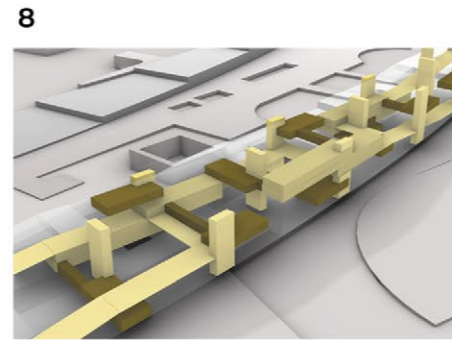
5

Creating voids in elevation for free movement, public gatherings and light

6

Removing the roof ramp layer from diagram to better understand cluster growth within

7

Large shared spaces added along ramp and circulation cores
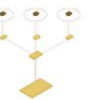
8

Zooming into 6 storey part of structure: Two Medium shared spaces connected to the large via passages and one via a core
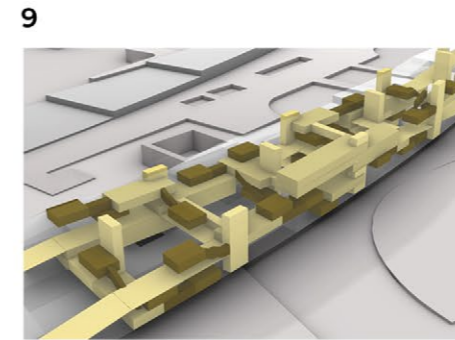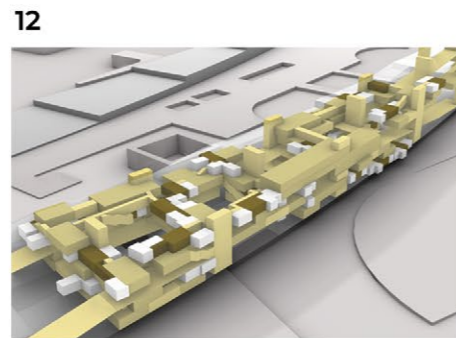
9

Three small shared spaces connected via a staicase, overlaps and a passage each to a medium shared space
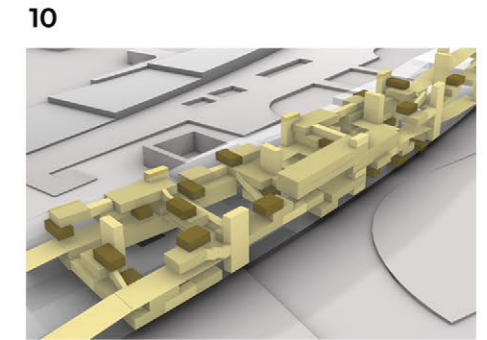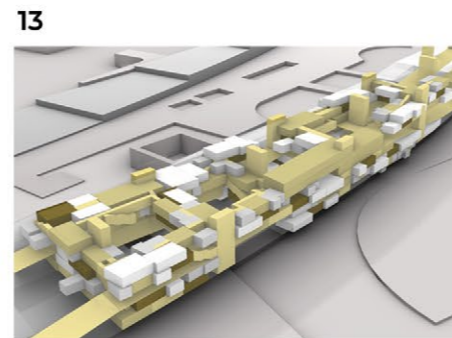
10

Extra Small shared space placed adjacent to or overlapped with the small shared space
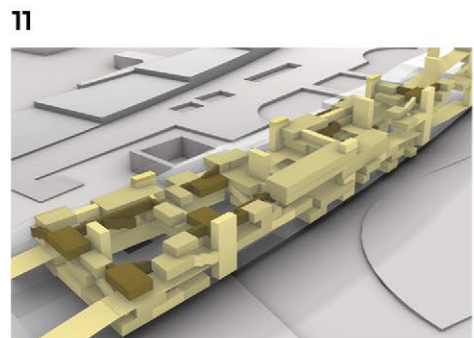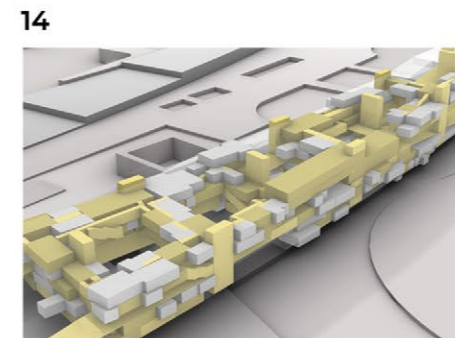
11

Extra small shared spaces connecting to the another small shared space via different means
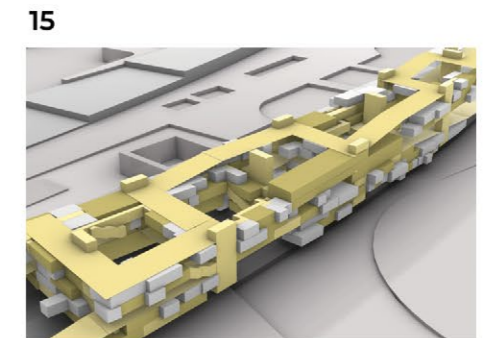
12

3 living units of 1-2 people connected to the extra small shared spaces

13

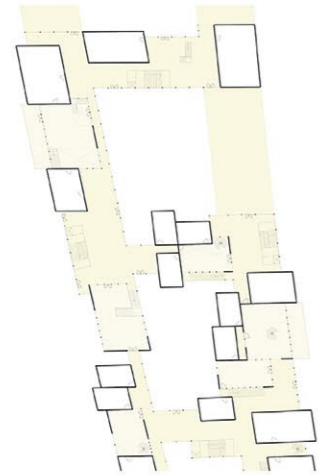One 2, 3 and 4 people living units connected to each small shared space

14

All living units and shared spaces

15

Re-introding the roof ramp to the massing
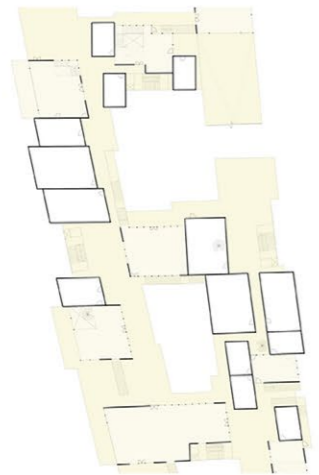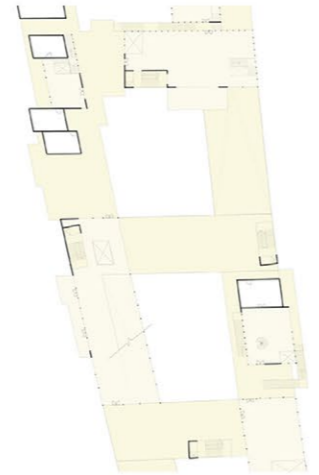
Massing plan | Movement in 6 storey block

Ground level

First level

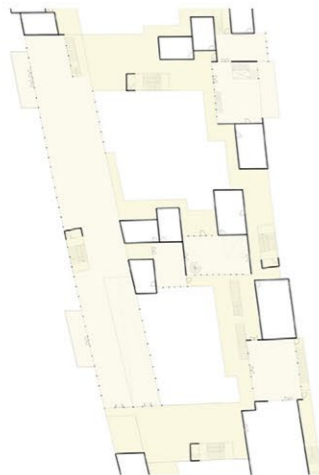Second level

Third level

Fourth level

Fifth level

Level plans | Part of 1 cluster
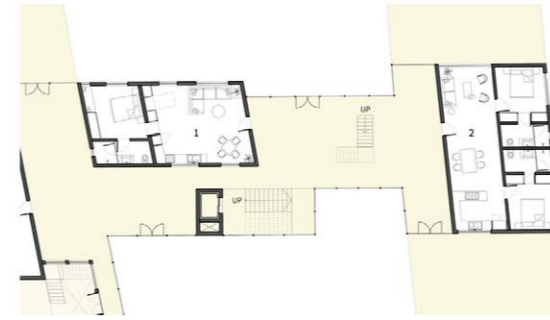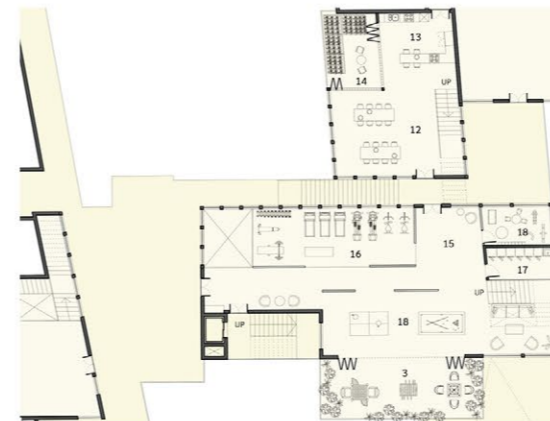

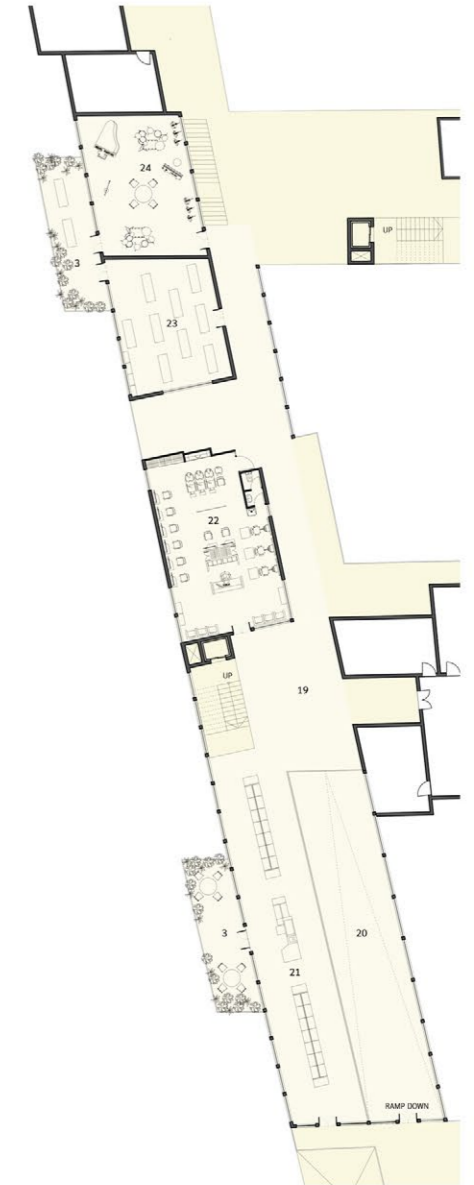Ground level : 3 and 4 people living units

First level : Small Shared Space with 2 people unit

Second level : Extra Small Shared Space with 1-2 people unit

Third level : Medium and Small Shared Space

Fourth level : Large Shared Space

Legend :

1. 3 people unit
2. 4 people unit
3. Balcony/Terrace
4. 2 people unit
5. Cell (1-2 people unit)
6. Small Shared space (12 people)
7. Co-work space
8. Library
9. Extra small Shared Space (3-5 people)
10. Living room
11. Shared Toilet
12. Small shared Space (12-15 people)
13. Community kitchen
14. Kitchen garden terrace
15. Medium Shared Space (36 people)
16. Gym
17. Laundry
18. Play/ Gaming Areas
19. Large Shared Space (108 people)
20. Ramp
21. Grocery Store
22. Parlour
23. Yoga/ dance Studio
24. Class for children activities

AQUA GENESIS

04

SPRING 2024
BUILDING TECH ELECTIVE
EMERGING OPTIMISM
INDIVIDUAL PROJECT
MENTOR - SEAN GALLAGHER

Brief : The course is structured as a think-tank. Choose an industrial activity + site and its associated social, economical, and environmental consequences, and see how you might re-calibrate these processes. Review your research and analysis work to identify moments of tension, under-utilization, and/or waste currently in the system or inevitably in its future. Speculate on public or infrastructural programs that might tolerate or benefit from these conditions and act as a catalyst to ensure continued or improved productivity within its given context. Concentrate on the creation of a conceptual narrative. Refine your proposal in terms of proposing not only a site specific response but a model for future interventions and synchronicities in the industrial landscape. Create a pamphlet for it.

Project : The project studies floating farms as a potential emerging industry to revolutionize farming. The proposal initially looked into the tomato farms of Almeria which are one of the largest greenhouses in the world along the Southern coast of Spain. The water crisis across Spain provided opportunities to propose these farms on the sea to use desalinated water instead of freshwater use. Additionally, a cultural experience of the spanish wineries is infused.

Open Pamphlet

Embracing the culture of Spain

A cultural experience

A floating winery in addition to the farms just a 30 minutes boat ride

Barcelona

Valencia

Alicante

Cartagena

Almeria

Bringing ⌄ Farms Closer to Cities

high water pressure regions

Floating Farms

7mn kgs
Food produced per 490k sqm in a year

100% more
Yield per sqm than Almeria Greenhouses

350% more
Yield per sqm than the average farm produce

Barcelona
Population : 5,711,917
Floating Farm Area : 10,075,822 sqm

Valencia
Population : 840,000
Floating Farm Area : 1,481,760 sqm

These farms can undertake production of the 3 highest consumed vegetables in Spain for the chosen cities:

Tomato
13 kgs per capita per year

Onion
7 kgs per capita per year

Pepper
3 kgs per capita per year

Alicante
Population : 1,838,819
Floating Farm Area : 3,243,677 sqm

Cartagena
Population : 409,585
Floating Farm Area : 722,310 sqm

Almeria
Population : 200,665
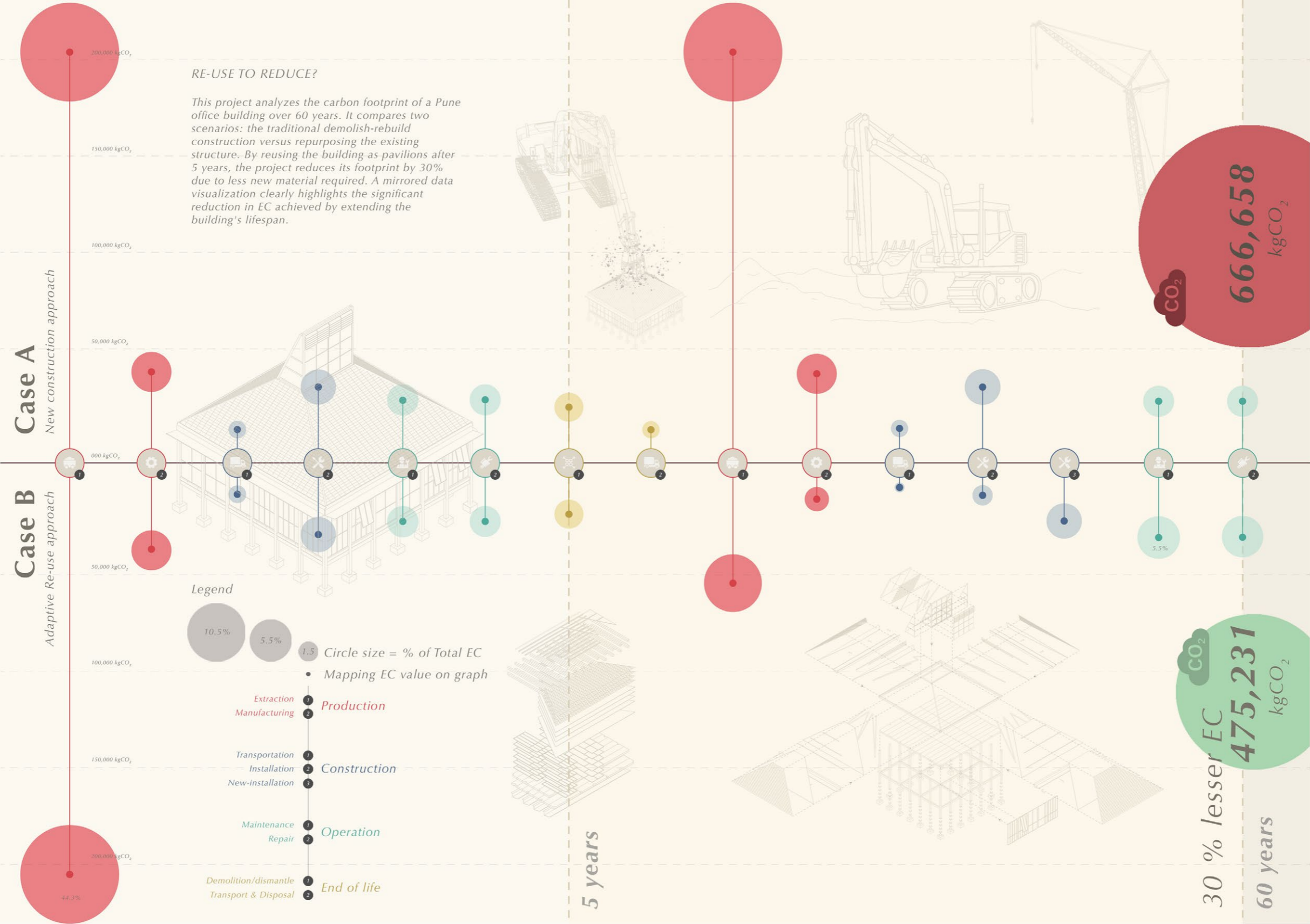Floating Farm Area : 353,973 sqm

Back of open pamphlet

THEN?

Aqua
Genesis.

Farms to 'float' into a
sustainable future

NOW

Almeria
Greenhouses

25 % of Spain's tomato
production

Rapid ground water depletion :
25 years left

Can we use less land and
water and create an
experience out of it too?

RE-USE TO REDUCE?

This project analyzes the carbon footprint of a Pune office building over 60 years. It compares two scenarios: the traditional demolish-rebuild construction versus repurposing the existing structure. By reusing the building as pavilions after 5 years, the project reduces its footprint by 30% due to less new material required. A mirrored data visualization clearly highlights the significant reduction in EC achieved by extending the building's lifespan.

Case A — New construction approach

Case B — Adaptive Re-use approach

666,658 $kgCO_2$ CO_2

30 % lesser EC 475,231 $kgCO_2$ CO_2

5 years

60 years

200,000 $kgCO_2$
150,000 $kgCO_2$
100,000 $kgCO_2$
50,000 $kgCO_2$
000 $kgCO_2$
50,000 $kgCO_2$
100,000 $kgCO_2$
150,000 $kgCO_2$
200,000 $kgCO_2$

44.3%

Legend

10.5% 5.5% 1.5   Circle size = % of Total EC

• Mapping EC value on graph

Extraction (1) / Manufacturing (2) — *Production*

Transportation (1) / Installation (2) / New-installation (3) — *Construction*

Maintenance (1) / Repair (2) — *Operation*

Demolition/dismantle (1) / Transport & Disposal (2) — *End of life*

5.5%

REDUCE TO RE-USE?

05

SPRING 2024
BUILDING TECH ELECTIVE
CARBON FOOTPRINT
INDIVIDUAL PROJECT
MENTOR - DAVID BENJAMIN

Brief : The assignment should involve a project that you are designing or a project that you have designed. The project can be a building, a piece of infrastructure, or an urban plan. The idea is to study the footprint of the project, visualize the footprint in a clear and creative way, and offer insights about using this analysis as part of the design process. Keep in mind that metrics are not neutral and objective; they are designed, and they may include assumptions and bias, which your project should address. The final drawings should convey data clearly and at the same time they should be inventive. How do you draw the invisible—yet essential—footprint of your project? Explore atmosphere as well as metrics.

Project : The ptoject analysed in this assignment was the experience center and show flat for a large Township in Pune,India. Usually such structures are destroyed in a short period of time after all the apartments in the complex are sold, but an idea to repurpose the structure provided an interesting opportunity to analyse its Carbon Footprint to create a comparative report.
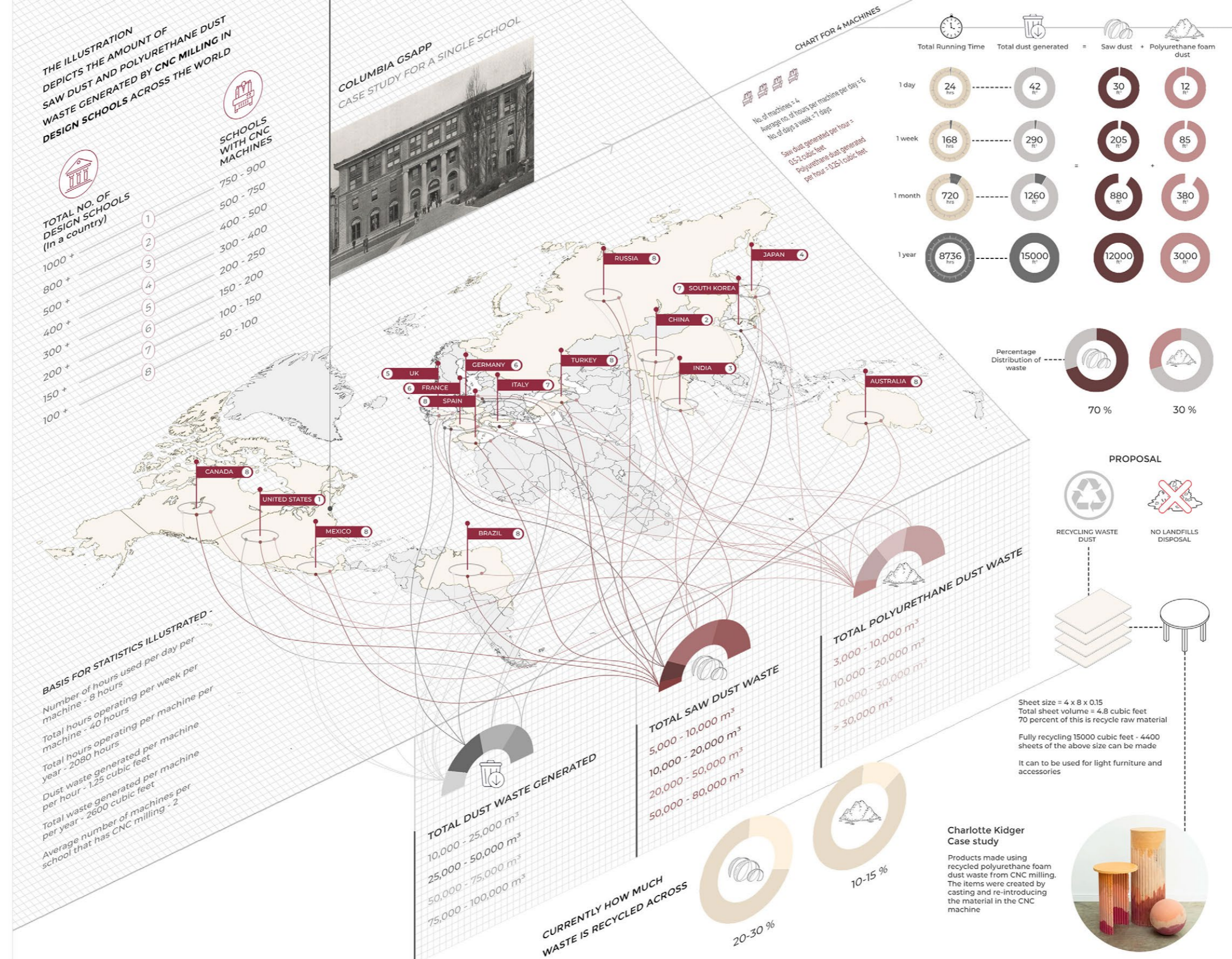
Toxics in my home !?

Kitchen Stove
- Lead mercury , arsenic
- Carcinogen, developmental toxicant

Wall boards - Recycled gypsum
- Lead mercury , arsenic
- Carcinogen, developmental toxicant

Fibreglass Wall insulation
- Isocyanates, Styrene
- Asthamagen, Possible Carcinogen

Interior wall finish - paint
- Formaldyhyde (VOCs)
- Carcinogen and asthamagen

Engineered Wooden flooring
- Formaldyhyde (VOCs)
- Carcinogen and asthamagen

Bathroom Plywood storage
- Formaldyhyde (VOCs)
- Carcinogen and asthamagen

Epoxy flooring tile grout
- VOCs
- Asthamagen, respiratory isuues

Vinyl shower curtain
- Polyvinyl Chloride
- Phthalates
- Endocrine disruptors

Synthetic Rubber mat
- 3-Butadine
- Carcinogen

Floor mat
- Benzene based adhesive, styrene
- Carcinogen, neurotoxicants, respiratory isuues

Wooden flooring adhesive, turpentine and sealant
- Formaldehyde (VOCs)
- Carcinogen, Asthamagen, respiratory isuues

Coffee machine plastic components
- Bisphenol A(BPA)
- Endocrine disruptor

Skirting
- Adhesive, Sealant
- Possible Carcinogen, Developmental toxicant

Sofa upholstery material
- Perfluorinated Compounds (PFC's)
- Possible Carcinogen, Developmental toxicant

Sofa foam cushions
- Halogenated flame retardants (HFR)
- Developmental toxicant

Vinyl Window Frame
- Polyvinyl Chloride(PVC)
- Ortho-pthalates
- Endocrine disruptors

Polyurethene wood varnish
- Toluene
- Developmental toxicant

Wooden study table adhesive and sealant
- Benzene, Formaldehyde
- Developmental toxicant, neurotoxicant, carcinogen, asthamagen

Comfortor
- Formaldyhyde (VOCs)
- Carcinogen and asthamagen

Polyurethene Foam mattress
- Formaldyhyde (VOCs)
- Carcinogen and asthamagen

Flooring insulation Polyurethane / Polyisocyanurate Foams
- Isocyanates
- Asthamagen

ANALYSIS OF THE DOMESTIC ENVIRONMENT

06

FALL 2023
BUILDING TECH ELECTIVE
HOME IS WHERE THE TOXICS ARE ASSIGNMENT 1
INDIVIDUAL PROJECT
MENTOR - MARTA HEISEL-WISNIEWSKA

Brief :
- Look around and document your surrounding Minimum one room, might be with a kitchen, bathroom, living room.
- Look through the lens of potential exposures to toxicants (long and short term). Minimum 20 "moments" of investigation (for example: vinyl floor, paint, carpet etc.)
- Specify What? (for example: shower curtain), Questionable ingredients (VOCs, phthalates, metals), Mark if those components belong to asthmagens, carcinogens etc.

- Not only visible surfaces- assume the invisible layers of walls and ceilings (insulation, layers of paint or varnish, structural elements etc.)
- The analysis might be more abstract, does not need to have the right proportions, might be photoshopped (delete items you do not want to show, make the invisible layers visible, bigger, more outstanding etc)
- Use medium of your choice : Photo Collage , Sketches, Paintings, Images +AI, Model, Visualisations.

I chose to represent and analyze my apartment for the assignment.

THE ILLUSTRATION DEPICTS THE AMOUNT OF SAW DUST AND POLYURETHANE DUST WASTE GENERATED BY CNC MILLING IN DESIGN SCHOOLS ACROSS THE WORLD

COLUMBIA GSAPP
CASE STUDY FOR A SINGLE SCHOOL

TOTAL NO. OF DESIGN SCHOOLS
(In a country)

	SCHOOLS WITH CNC MACHINES
1000 + ①	750 - 900
800 + ②	500 - 750
500 + ③	400 - 500
400 + ④	300 - 400
300 + ⑤	200 - 250
200 + ⑥	150 - 200
150 + ⑦	100 - 150
100 + ⑧	50 - 100

BASIS FOR STATISTICS ILLUSTRATED -

Number of hours used per day per machine - 8 hours

Total hours operating per week per machine - 40 hours

Total hours operating per machine per year - 2080 hours

Dust waste generated per machine per hour - 1.25 cubic feet

Total waste generated per machine per year - 2600 cubic feet

Average number of machines per school that has CNC milling - 2

CHART FOR 4 MACHINES

No. of machines = 4
Average no. of hours per machine per day ≤ 6
No. of days a week = 7 days

Saw dust generated per hour = 0.52 cubic feet.
Polyurethane dust generated per hour = 1.25 cubic feet

	Total Running Time	Total dust generated	=	Saw dust	+	Polyurethane foam dust
1 day	24 hrs	42 ft³		30 ft³		12 ft³
1 week	168 hrs	290 ft³		205 ft³		85 ft³
1 month	720 hrs	1260 ft³		880 ft³		380 ft³
1 year	8736 hrs	15000 ft³		12000 ft³		3000 ft³

Percentage Distribution of waste
70 %   30 %

Map locations:
RUSSIA ⑧ — JAPAN ④ — SOUTH KOREA ⑦ — CHINA ② — INDIA ③ — TURKEY ⑧ — GERMANY ⑤ — ITALY ⑦ — UK ⑤ — FRANCE ⑥ — SPAIN ⑧ — AUSTRALIA ⑧ — CANADA ⑧ — UNITED STATES ① — MEXICO ⑧ — BRAZIL ⑧

PROPOSAL

RECYCLING WASTE DUST   NO LANDFILLS DISPOSAL

TOTAL POLYURETHANE DUST WASTE

3,000 - 10,000 m³
10,000 - 20,000 m³
20,000 - 30,000 m³
> 30,000 m³

Sheet size = 4 x 8 x 0.15
Total sheet volume = 4.8 cubic feet
70 percent of this is recycle raw material

Fully recycling 15000 cubic feet - 4400 sheets of the above size can be made

It can to be used for light furniture and accessories

TOTAL SAW DUST WASTE

5,000 - 10,000 m³
10,000 - 20,000 m³
20,000 - 50,000 m³
50,000 - 80,000 m³

TOTAL DUST WASTE GENERATED

10,000 - 25,000 m³
25,000 - 50,000 m³
50,000 - 75,000 m³
75,000 - 100,000 m³

CURRENTLY HOW MUCH WASTE IS RECYCLED ACROSS

20-30 %   10-15 %

Charlotte Kidger Case study

Products made using recycled polyurethane foam dust waste from CNC milling. The items were created by casting and re-introducing the material in the CNC machine

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07

INNOVATIVE MATERIAL PRODUCTION

FALL 2023
BUILDING TECH ELECTIVE
HOME IS WHERE THE TOXICS ARE FINAL PROJECT
GROUP - MAURO RODRIGUEZ & SELF
MENTOR - MARTA HEISEL-WISNIEWSKA

Brief : In groups of 2 the students were expected to experiment with a new material production using sustainable methods. The process included :
1. Creating Material samples
2. Charting - Ingredients/raw material samples; tools, formworks etc.
3. Photo and Video Documentation.
4. Life Cycle Diagram (updated or brand new diagram)
5. Diagram of "How to"= Production Manual
6. Imagined Application: 1 perspective, 1 axonometric detail

Project : Design and Architecture schools have labs that extensively use CNC machines and constantly produce a whole lot of waste such as saw dust and polyurethane foam dust that ultimately end up in landfills or the incinerator.
The idea is to break this pattern to reduce waste by creating a new material that utilizes natural resins and pigments to create aesthetic and eco-friendly composites. Several different iterations were tried to assess different characteristics of the new material especially it's strength and sturdiness.

Life cycle | Samples | Imagined Application

CNC MATERIAL WASTE

PREVIOUS METHOD

WOOD
FOAM

DISCARDED
TO LANDFILL

1 FILTER MATERIALS

SAW DUST
FOAM DUST

CORNSTARCH
WATER
GLYCERIN

NATURAL RESIN

VINEGAR
MIX
HEAT

2 ADD NATURAL RESIN

FROZEN BERRIES
HEAT
SIMMER 10 MIN

NATURAL PIGMENT

3 ADD NATURAL PIGMENT

FINAL LIQUID
POUR INTO STRAINER
SMASH

4 SHAPE & APPLY PRESSURE

5 HEAT
6 NEW MATERIAL
7 NEW FORMS

10 ADD TO SOIL TO PROVIDE NUTRIENTS
9 COMPOST
8 GRIND

Catalog of Recipes for samples

CATEGORY 1

Sample 1

Composition :
Raw material - Polurethane dust
Resin - Cornstarch base
Raw Material : resin - 2 : 1

Resin Recipe :
1 cup cornstarch
5/8th cup water
2 teaspoon vinegar
2 tablespoon glycerin

Method of Combining
Resin prepared and then mixed with raw material

CATEGORY 1

Sample 2

Composition :
Raw material - Saw dust
Resin - Cornstarch base
Raw Material : resin - 2 : 1

Resin Recipe :
1 cup cornstarch
5/8th cup water
2 teaspoon vinegar
2 tablespoon glycerin

Method of Combining
Resin prepared and then mixed with raw material

CATEGORY 1

Sample 3

Composition :
Raw material - Saw dust & polyurethane dust
Resin - Cornstarch base
Raw Material : resin - 2 : 1

Resin Recipe :
1 cup cornstarch
5/8th cup water
2 teaspoon vinegar
2 tablespoon glycerin

Method of Combining
Resin prepared and then mixed with raw material

CATEGORY 2

Sample 1

Composition :
Raw material - Polurethane dust
Resin - Cornstarch base
Raw Material : resin - 1 : 1

Resin Recipe :
1 cup cornstarch
1/3rd cup water*
2 teaspoon vinegar
1 tablespoon glycerin*

Method of Combining
Resin prepared and then mixed with raw material

CATEGORY 2

Sample 2

Composition :
Raw material - Saw dust
Resin - Cornstarch base
Raw Material : resin - 1 : 1

Resin Recipe :
1 cup cornstarch
1/3rd cup water
2 teaspoon vinegar
1 tablespoon glycerin

Method of Combining
Resin prepared and then mixed with raw material

CATEGORY 2

Sample 2

Composition :
Raw material - Saw dust & polyurethane dust
Resin - Cornstarch base
Raw Material : resin - 1 : 1

Resin Recipe :
1 cup cornstarch
1/3rd cup water
2 teaspoon vinegar
1 tablespoon glycerin

Method of Combining
Resin prepared and then mixed with raw material

CATEGORY 3

Sample 1

Composition :
Raw material - Saw dust
Resin - Cornstarch base
Raw Material : resin - 1 : 1 *

Resin Recipe :
1 cup cornstarch
1/2 cup water
2 teaspoon vinegar
1 tablespoon glycerin

Method of Combining
Put raw material in resin when on stove and then pressed in mould for 5 days

CATEGORY 4

Sample 1

Composition :
Raw material - Polyurethane dust
Resin - Tapioca starch base
Raw Material : resin - 1 : 1

Resin Recipe :
1/4th cup Tapioca starch
1 cup water
1 teaspoon vinegar
1 teaspoon glycerin

Method of Combining
Put raw material in resin when on stove and then pressed in mould for 5 days

CATEGORY 4

Sample 2

Composition :
Raw material - Polyurethane dust
Resin - Tapioca starch base
Raw Material : resin - 1 : 1

Resin Recipe :
1/4th cup Tapioca starch
1 cup water
1 teaspoon vinegar
1 teaspoon glycerin

Method of Combining
Put raw material in resin and poured into mould for air drying

CATEGORY 5

Sample 2

Composition :
Raw material - Polyurethane dust
Resin - Tapioca starch base
Raw Material : resin - 1 : 1

Resin Recipe :
1/2 cup Tapioca starch
1/4th cup water
1 teaspoon vinegar
1 tablespoon glycerin

Method of Combining
Dust added to starch in first step for a homogenous mixture
Heating Method
Air dried in mould

CATEGORY 5

Sample 1

Composition :
Raw material - Saw dust
Resin - Cornstarch base
Raw Material : resin - 1 : 1

Resin Recipe :
1/2 cup cornstarch *
1/4th cup water *
1 teaspoon vinegar
1 tablespoon glycerin
Crushed rose petals
mustard seeds

Method of Combining
Dust added to starch in first step for a homogenous mixture
Heating
Baked in oven at 200 degrees Fahrenheit for 12 minutes and then dried overnight in oven

CATEGORY 6

Sample 1

Composition :
Raw material - Saw dust
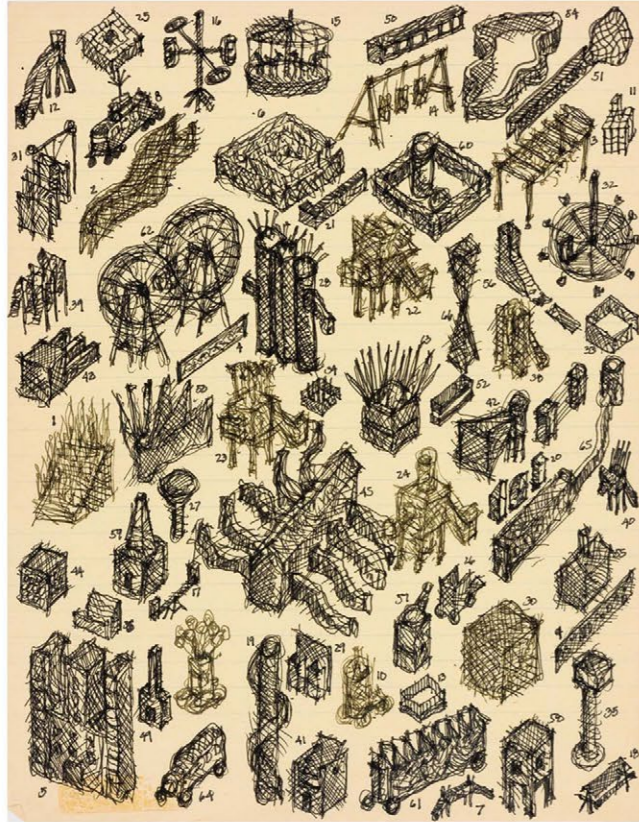Resin - Wooden glue
Raw Material : resin - 2 : 1

Method of Combining
Resin and material mixed in a container and poured into the mould for air drying

Exhibition Panel & display

Victims Project | John Hejduk

John Hejduk's revolutionary Masque series adopts a psychological perspective to develop fictional 'characters' to communicate untold stories in myriad social settings. In 1984, he concluded this series with the 'Victims' project which was a memorial design proposal in Central Berlin. Its 60-year-long construction was meant to mature alongside the lives of the people in the city, while seamlessly unifying the historical, social and architectural. A double hedge lining surrounds a set of 67 eccentric structures loosely composed in a literal and metaphoric ocean of torture and oppression. A two-fold 'social contract' governs the design.

The first is where the architect is socially indebted to the context to honour all aspects of its legacy. Eerie-looking sketches of the anthropomorphic structures drew their spirit from the site's history as a Gestapo chamber for political prisoners flanked by the Berlin Wall in the south. This territorial rootedness becomes apparent through the project's incremental growth signifying a continuous presence of the 'victims', commemorating them long after their lives have ended. Catering to a strong collective memory while being abandoned, the characters form connections with the contemporary citizens and project the site toward its future. Unger's plan for reviving West Berlin post World War II is believed to be a precursor to the project. He believed the city would rebuild itself from strategically located pockets of urban fabric retained amid a densely forested expanse. Hejduk's aim of rebuilding the narrative of this site using individual structures within a green grid echoes this belief.

As one overlays and tries to surgically dissect the proposed grid over that of the original plan of the chambers, we find how Hejduk carefully positions and orients his structures to connect with the ghosts of the past. Each 'victim' purposefully connects, overlaps or buffers itself from the original massing. The politics of Nazi Germany and it's affiliation with the rest of the world invokes the historical evolution of the site from a torture chamber to barren land and finally followed by Hejduk's design. The scars of the past are not erased. They are honored through the creation of a powerful and timeless proposal.

The second social contract is between the architect and the people whose stories he intentionally and unintentionally conveys. The symbolism and power of this design to enact change is witnessed beyond its physical constraints in Berlin. Even though the Victims project was never realized, people across the world resonated with various 'characters' and built them to demonstrate specific collective emotions. For instance, the character 'Security' was constructed outside the Nazi headquarters in Oslo, Norway. The structure built within the city center by the students and teachers of the Architecture University, re-told the stories of Hejduk's character while channeling their inner losses. These structures surpass the program of merely being spaces for physical habitation, and address 'spatial literacy' by articulating designs that bind together humanity.

"How does one author silence?" Hejduk's buildings speak to us and make us realize that architecture is an empathetic discipline. The 'victims' eulogize the fallen history by translating the past horrors into life-giving characters. The 'social contract' establishes space as something not distinct from us but rather an extension. By grafting the new into the old he delivers a profound conglomeration altering the way people experience design. Architecture plays the role of an actor and mediator in the broader socio-political aspects of the world.
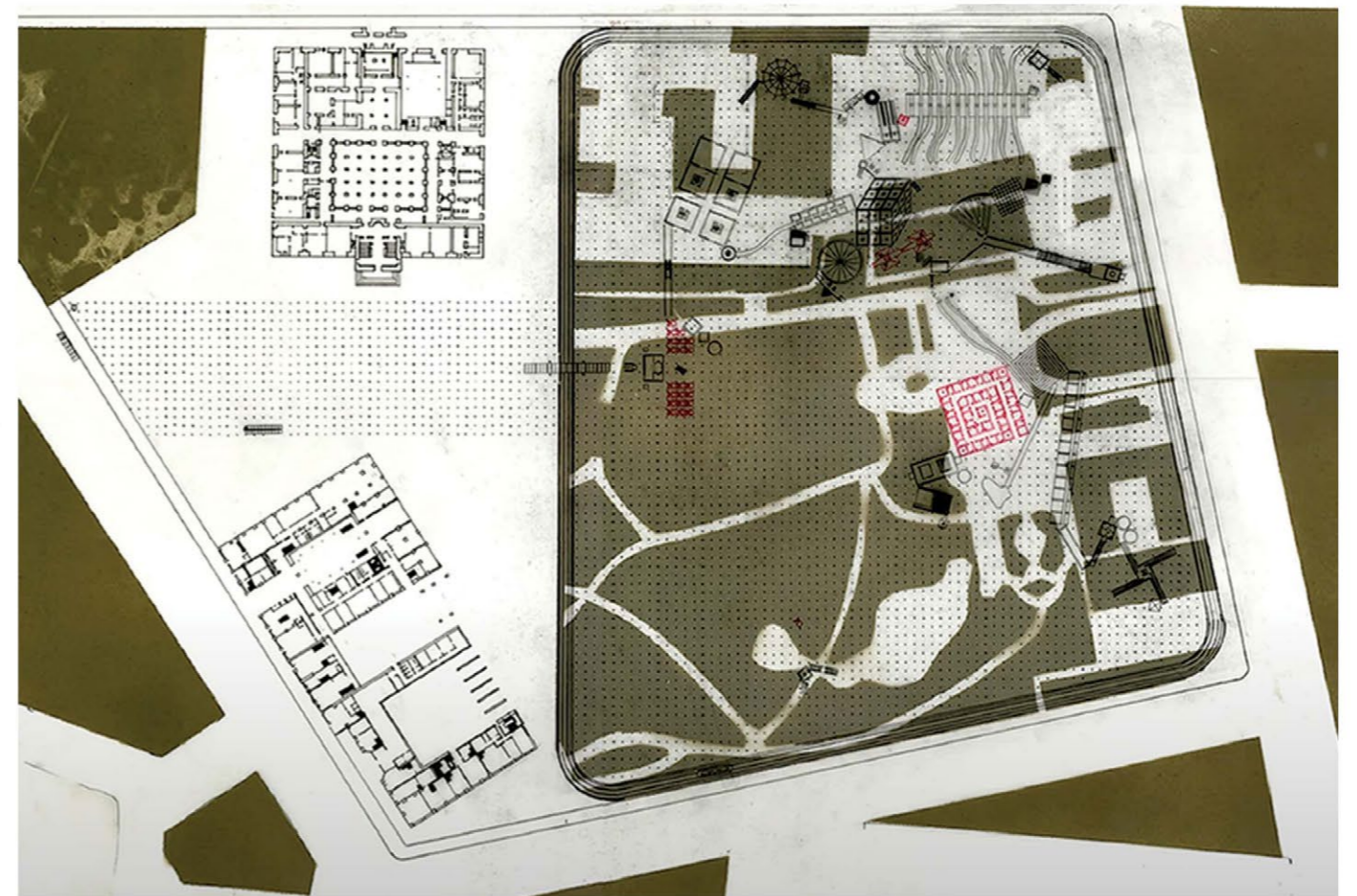
08

ARCHITECTURE: THE ACTOR AND MEDIATOR

Brief : Each student will present a documental research essay on their Case Studies 01. They will address 3 out of the 6 following questions:

1. How does your Case Study 01 relate to/operate/affect/is affected by "the territorial scale" or "territorial"?
2. How does your Case Study 01 relate to/operate/affect/is affected by "the microscopical or bodily scale" or "microscopical" or "bodily"?
3. How are the construction details of your Case Study 01 affected by or affecting contexts / ecosystems / environments beyond the Case Study 01 confinement?

4. What are the political conflicts / controversies / alliances / activisms / dissidences / alignments / confrontations / disputes / solidarities your Case Study 01 participates in/as?
5. What are the main actors in those politics and their temporary evolutions?
6. How are the specificities in the design of Case Study 01 entangled with historical political processes or evolutions?

The case study provided to me was the 'Victims' project by John Hejduk.