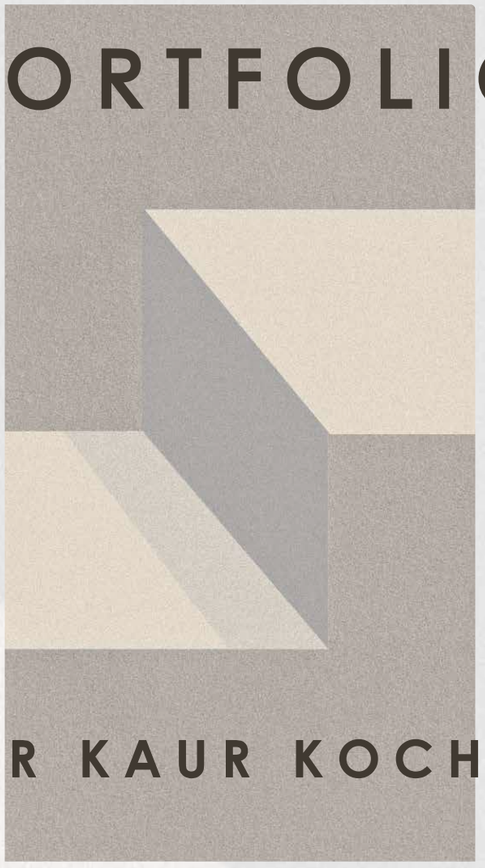
PORTFOLIO



SIMAR KAUR KOCHHAR

COLUMBIA GSAPP

MASTER OF SCIENCE IN ADVANCED ARCHITECTURAL DESIGN

2023- 2024

sk5285@columbia.edu

CONTENT

01

UNTETHERED

MICROCOSM

SUMMER 2023 I ADVANCED ARCH STUDIO I MICHEAL LOVERICH AND ANTONIO TORRES

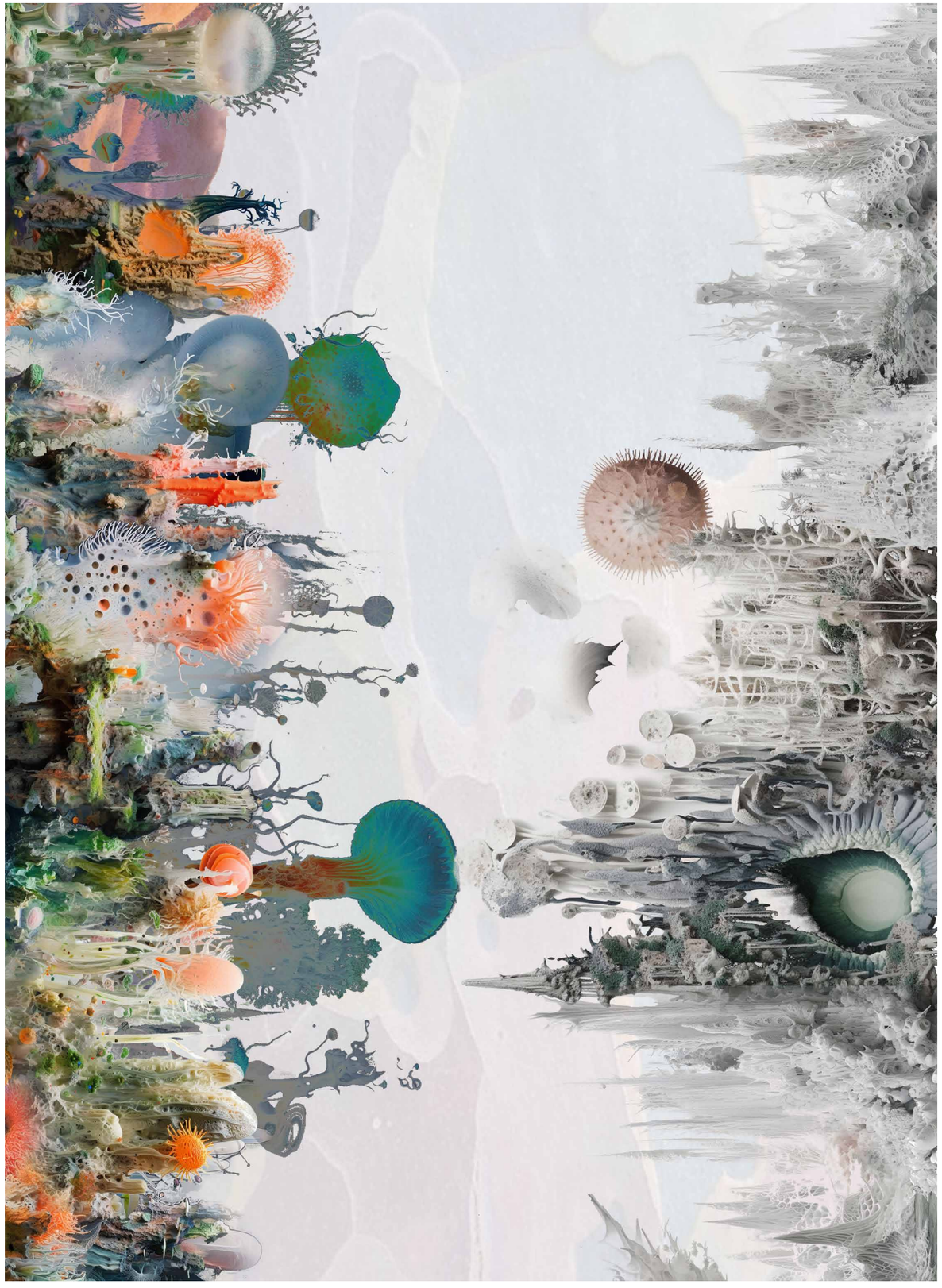
RHINO, GRASSHOPPER, PHOTOSHOP, ILLUSTRATOR, V-RAY, MIDJOURNEY

The studio examined the relationship between man and nature by building a microcosm, an island floating in the sea. As a fragile system in the middle of the ocean, the island is intricately intertwined with its watery surroundings, its physicality, the weather, and to us. While New York City has a notable history of island building and expansion, this studio sought an alternative trajectory in the way that islands were conceptualized, constructed, and used. And finally created islands that transcend these physical constraints, transforming them into richly layered composites of architectural spaces. The proposed islands varied, and each island hosted a different program, but collectively the islands created in the studio will form an urban ecology, a multi-dimensional floating village.

The design draws inspiration from a fusion of two distinct elements: Corals and Caves. Delving deeper into the shared characteristics of these materials, I investigated their significance both within and beyond water, exploring how they contribute to the creation of an ecosystem within the umbrella.

The form and structure of the design serve a dual purpose – acting as a tide break while also facilitating the passage of wind, effectively functioning as a pollinator. The island's life cycle is a continuous process of evolution, melting, and the formation of layers or floors to accommodate wildlife habitation.

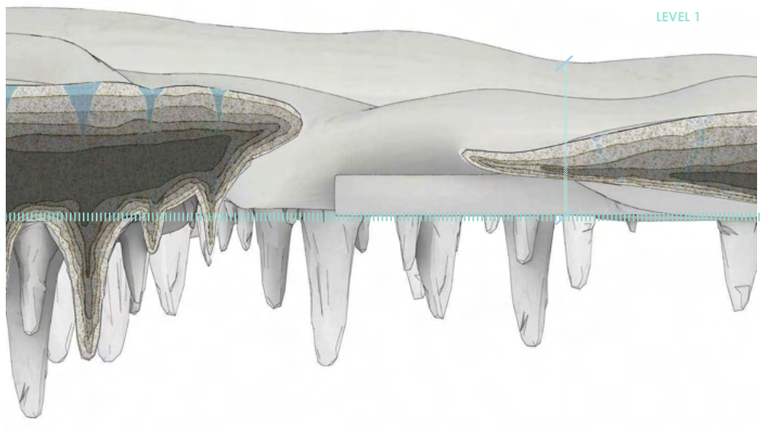
Coral Growth



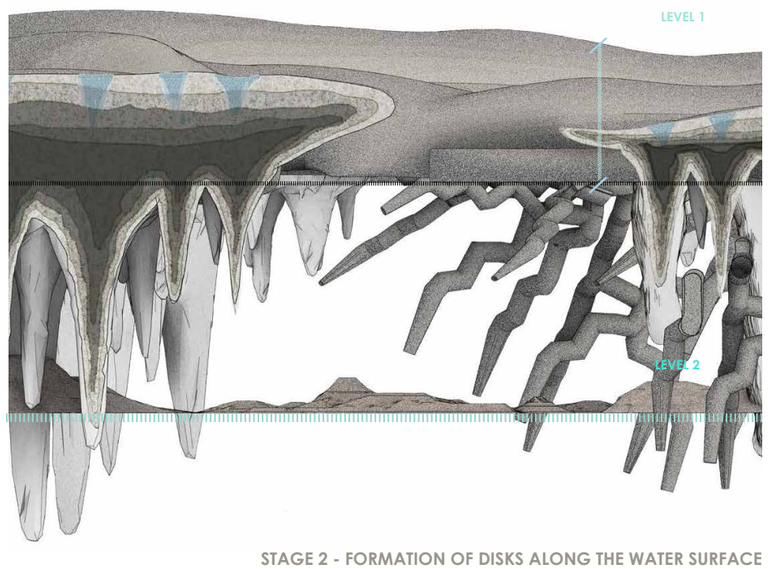
Collage on AI studies showing life and death of the island skeleton

ISLAND PLAN

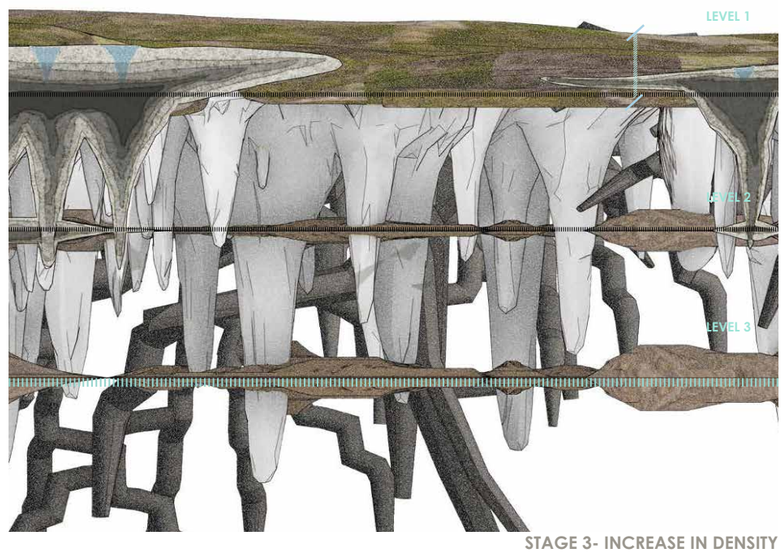
UNDERBELLY PLAN



STAGE 1- FORMATION OF STALACTITES

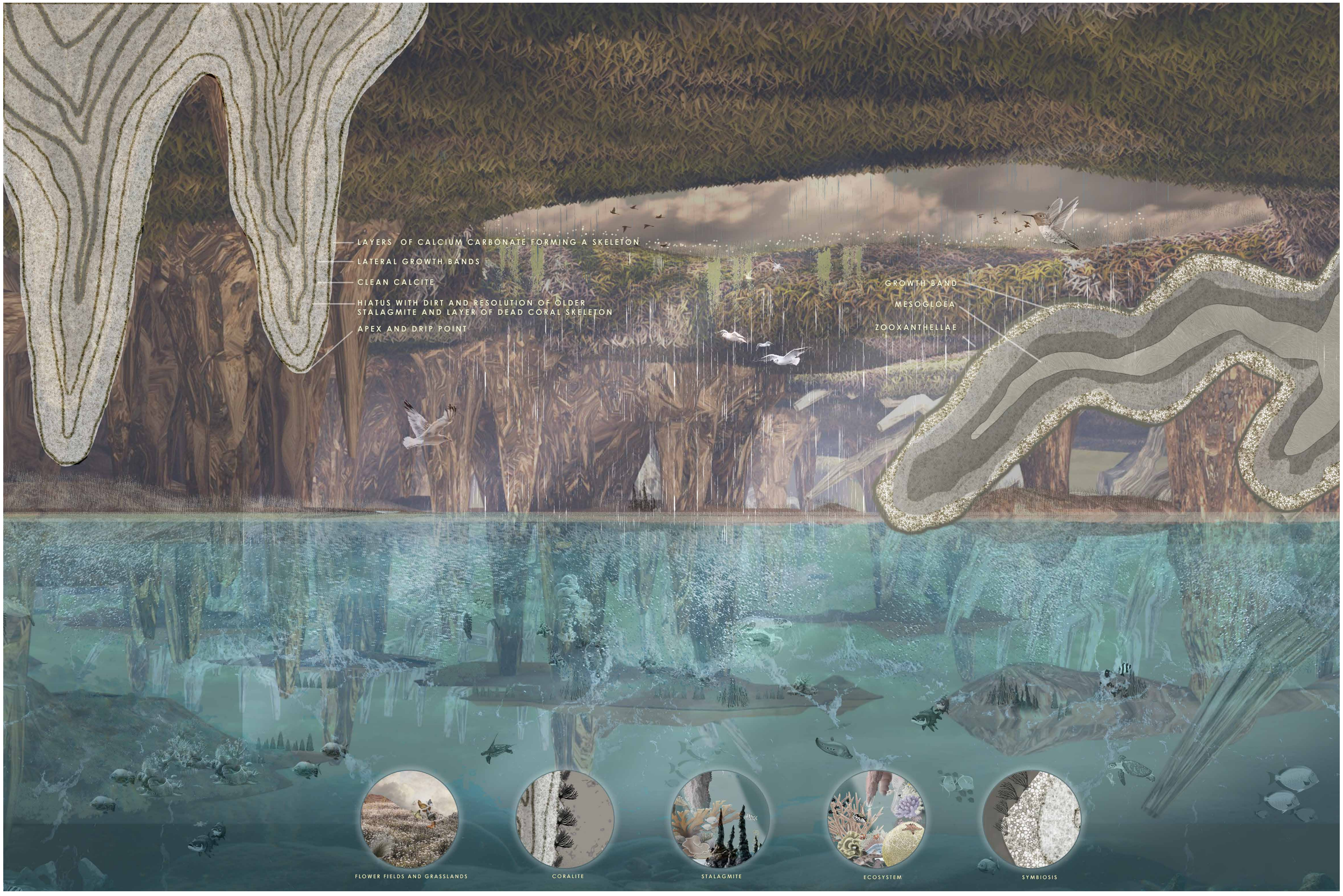


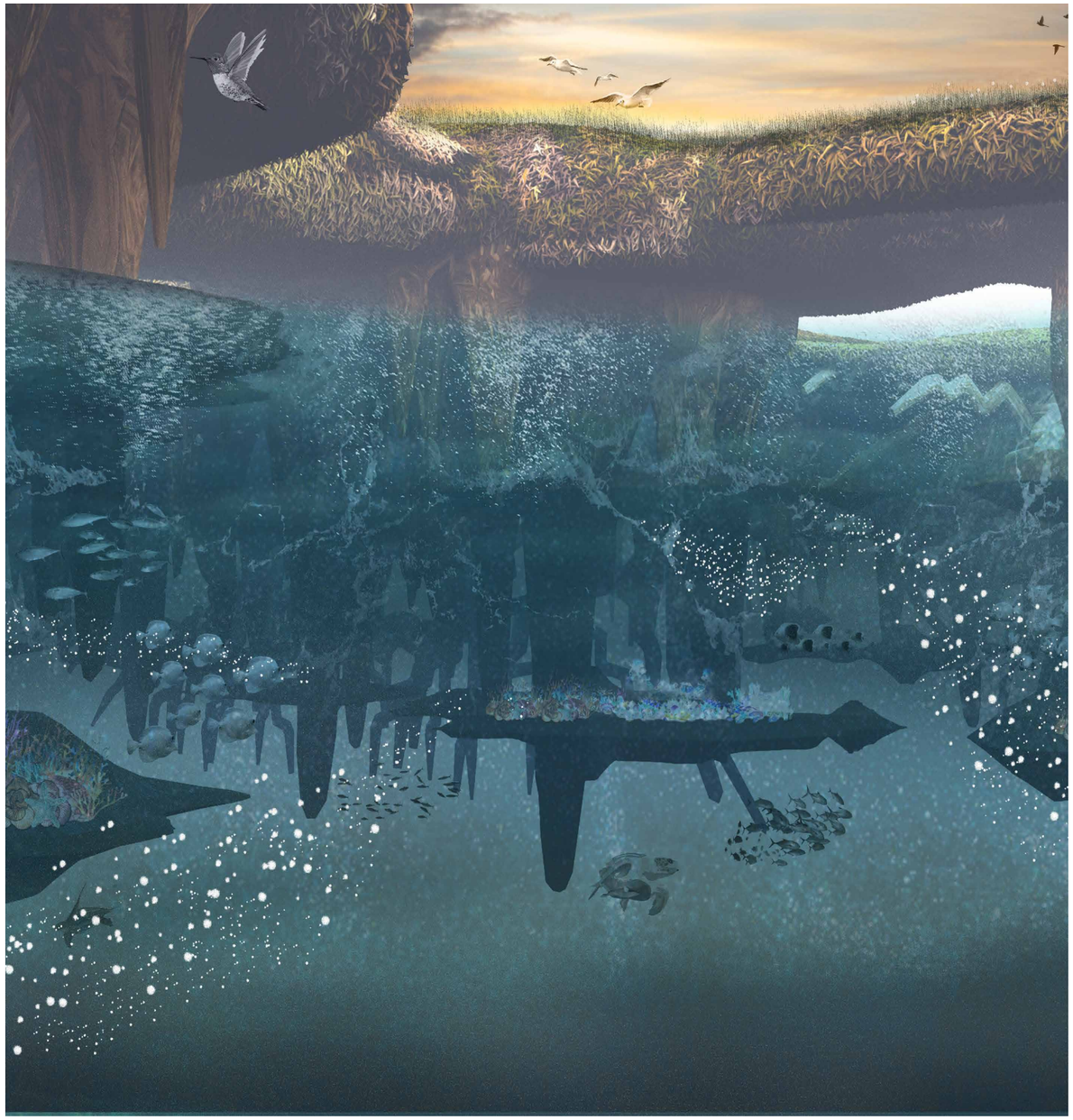
STAGE 2 - FORMATION OF DISKS ALONG THE WATER SURFACE



STAGE 3- INCREASE IN DENSITY

The developmental stages of the island design project offer insights into the envisioned life in a near-future scenario. Speculations revolve around changes in both the submerged and floating components of the island,the growth of biodiversity and to serve practical purposes such as tide-breaking, wind regulation, and the creation of multiple levels.
The application of these designs extends to real-world scenarios, with consideration for cities like New York. Envisioning the potential use of these designs involves anticipating their impact on the urban landscape and how they can contribute to addressing challenges related to tides and wind regulation.


LAYERS OF CALCIUM CARBONATE FORMING A SKELETON
LATERAL GROWTH BANDS
CLEAN CALCITE
HIATUS WITH DIRT AND RESOLUTION OF OLDER STALAGMITE AND LAYER OF DEAD CORAL SKELETON
APEX AND DRIP POINT
GROWTH BAND
MESOGLOEA
ZOOXANTHELLAE
FLOWER FIELDS AND GRASSLANDS
CORALITE
STALAGMITE
ECOSYSTEM
SYMBIOSIS



UNDERWATER VIEW

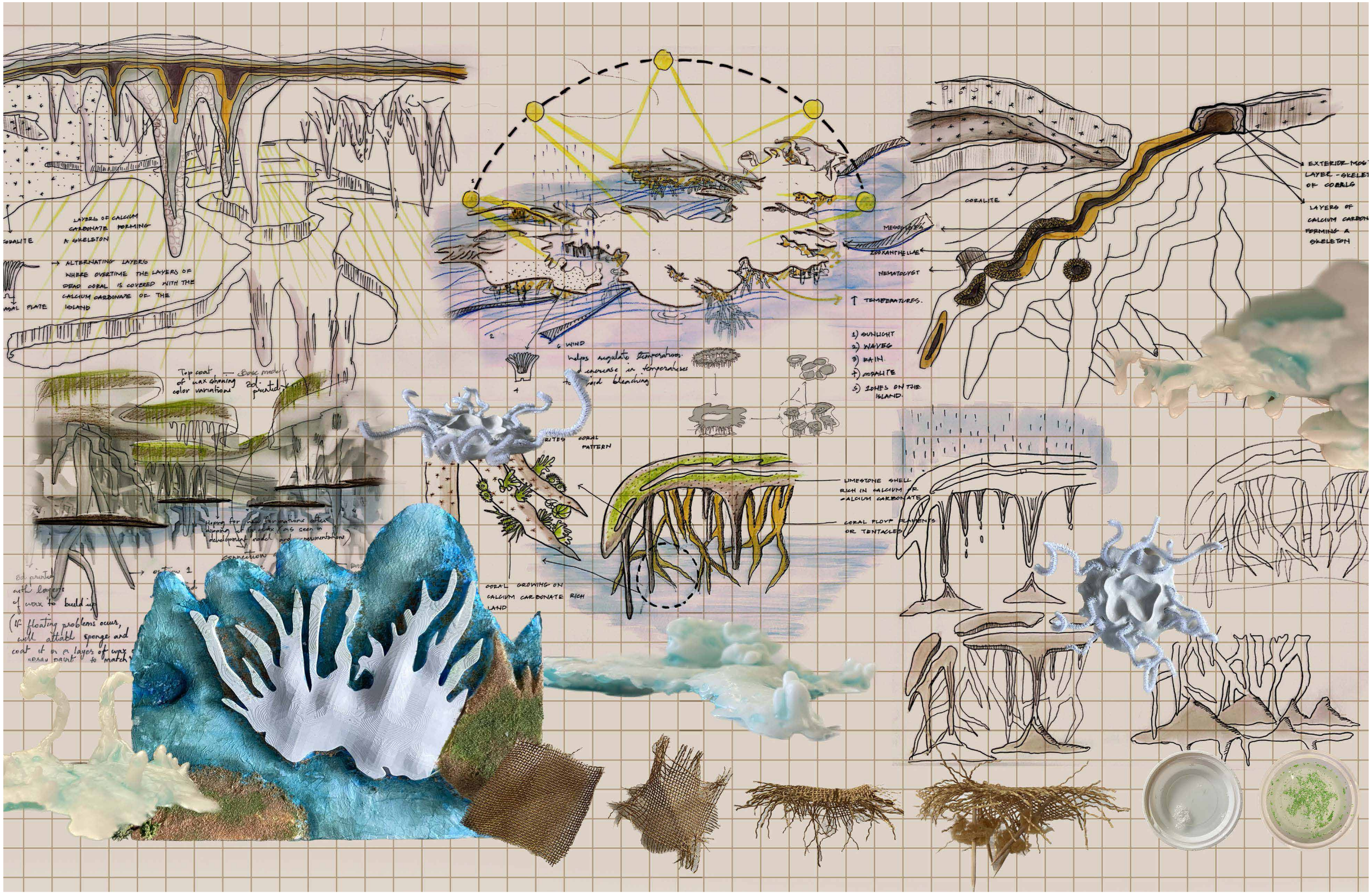
SECTION A-A'

ECOSYSTEM VIEW

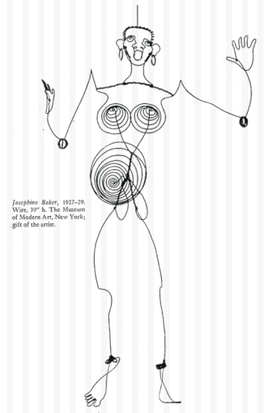
ECOSYSTEM VIEW

Underwater view
Section A-A'

Ecosystem View
Section B-B'


CORALITE
LAYERS OF CALCIUM CARBONATE FORMING A SKELETON
→ ALTERNATING LAYERS WHERE OVERTIME THE LAYERS OF DEAD CORAL IS COVERED WITH THE CALCIUM CARBONATE OF THE ISLAND
BASAL PLATE
Top coat of wax showing color variations
Some models printed
Hoping for new formations often skipping it (wax as seen in development model and experimentations)
Connection
Bed printed with layers of wax to build up
(If floating problems occur, will attach sponge and coat it in a layer of wax
to match
CORALITE
MESOGLOEA
ZOOXANTHELLAE
NEMATOCYST
↑ TEMPERATURES.
1) SUNLIGHT
2) WAVES
3) RAIN
4) CORALITE
5) ZONES ON THE ISLAND.
6 WIND
helps regulate temperatures.
increase in temperatures
to avoid bleaching
RITES
CORAL PATTERN
CORAL GROWING ON CALCIUM CARBONATE RICH LAND
LIMESTONE SHELL RICH IN CALCIUM OR CALCIUM CARBONATE
CORAL POLYP TENTACLES OR TENTACLES
EXTERIOR
LAYER - SKELE
OF CORALS
LAYERS OF CALCIUM CARBON
FORMING A SKELETON

02



Josephine Baker, 1927–29. Wire, 39½ h. The Museum of Modern Art, New York; gift of the artist.

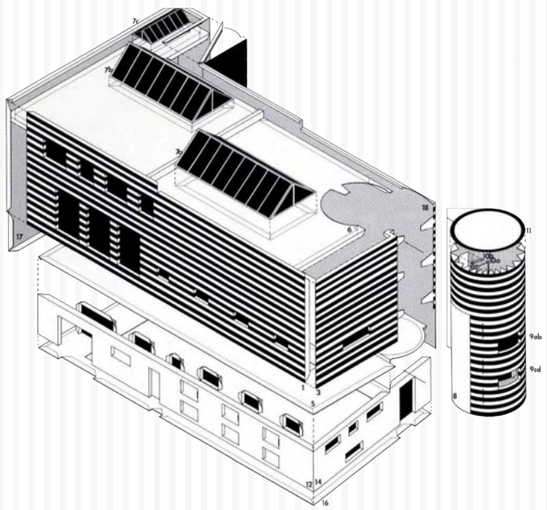
A MATERIALITY OF CARCERAL ARCHITECTURE

ESSAY

SUMMER 2023 I TRANSCALARITIES I Iván-Nicholas Cisneros-Rangel

This course queries the ways in which architectural devices of reference, which have shaped the discourse of the field over the last few decades, are characterized by their transitioning through spatial, material, and temporal scales. The course explores the agencies architectural devices unfold through transscalar conditions—that is to say, the specific forms of politics that architectural devices perform by participating in diverse dimensional and physical settings; and the way they multiply their reach, influence, and sensitivity by entangling, for instance, the microbiological to the mineral, the atmospherical, the ecosystemic, the genetic, and the planetary.

When in 1928 the variety artiste Josephine Baker allegedly asked Adolf Loos to design her residence, she was in the zenith of her glory. Her appearance in the Revue Nègre was the talk of the town.
Loos' design for a house for Josephine Baker has never been realized. Only a maquette (the exterior) and a number of drawings of ground plans and sections have remained. The different ground plans show small mutual + differences, while the comparison of the model with sections and façades is not quite consistent either. Apart from the plans and the model, the museum Albertina in Vienna provides a little more insight into the subject with a letter from Loos' assistant Kurt Unger from 1935.



Model/ Maquette of the house of Josephine Baker

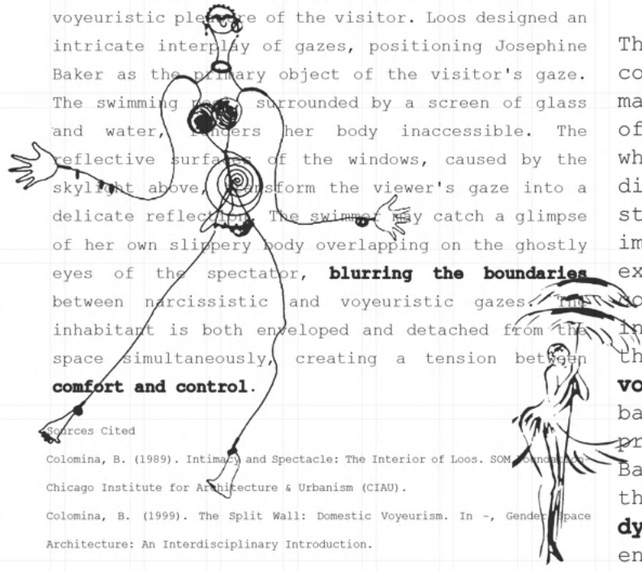
At a costumed soirée, Le Corbusier cross-dressed as Baker, his skin blackened and his hips embellished with a waistband of feathers. Their encounter seems to represent the assembly of **two opposing ways** of understanding the **body in modernity**. Le Corbusier is synonymous with the grand paradigm of modern architecture, where the behavior of the body is disciplined in relation to the purpose of design and urbanism. For her part, as the world's first black star, Josephine Baker extinguished the dance canon of her time with a nude body and through a choreography of savage movements that claimed **subjective liberation**.

After this interaction, Josephine came into contact with Loos and taught him the **Charleston**, leading Loos to design a house for Josephine Baker. While Baker thrived and gained fame and fortune, Loos faced physical and **professional decline**. Overwhelmed by the challenges of not knowing French, Loos decided on designing the Baker House as a theoretical exercise and a strategic marketing tool, aiming to showcase his architectural expertise in a city that proved difficult to penetrate.

The alternating black and white ornamental marble stripes on the upper portion of the façade are evidence of **gender** and **racial discrimination** by Loos. The façade does not only violate Loos' cultural-aesthetic standards for modernity but also implies that the owner of the home is **condemned** by the design to share the same ornamental cravings as primitive people and criminals who have tattoos on their bodies.

These contrasting colors draw the eye, wrapping around the building and creating a continuous surface. They resembled prison uniforms, bringing up theassociation of the house as a prison cell that would bind Josephine. Through this graphic effect, the Baker House sets itself apart from its surroundings, establishing a metaphorical connection between the structure and the confinement of Josephine Baker under the **white male gaze.**

At the heart of the Baker House lies the swimming pool, the focal point, configuration, and compositional pivot of the entire structure. Flooded with light, the pool offers an enjoyable retreat and sensual space for its inhabitants. However, this pleasure is essentially intertwined with the voyeuristic pleasure of the visitor. Loos designed an intricate interplay of gazes, positioning Josephine Baker as the primary object of the visitor's gaze. The swimming pool, surrounded by a screen of glass and water, renders her body inaccessible. The reflective surfaces of the windows, caused by the skylight above, transform the viewer's gaze into a delicate reflection. The swimmer may catch a glimpse of her own slippery body overlapping on the ghostly eyes of the spectator, **blurring the boundaries** between narcissistic and voyeuristic gazes. The inhabitant is both enveloped and detached from the space simultaneously, creating a tension between **comfort and control**.



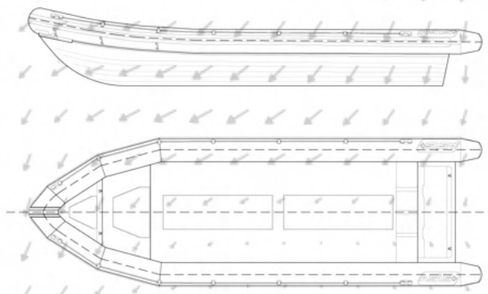
Sources Cited

Colomina, B. (1989). Intimacy and Spectacle: The Interior of Loos. SOM, Architecture, Chicago Institute for Architecture & Urbanism (CIAU).

Colomina, B. (1999). The Split Wall: Domestic Voyeurism. In -, Gender Space Architecture: An Interdisciplinary Introduction.

The Baker House encapsulates the complex interplay between racism, materiality, and the incarceration of the black female body by the white male gaze. Through its distinctive materiality, the structure visually indicates the imprisonment and confinement experienced by Baker within the confines of societal norms. The interior arrangement, particularly the swimming pool as a locus of **voyeuristic** pleasure, showcases the balance between the inhabitant's privacy and the visitor's gaze. The Baker House stands reflection on the impact of **race and gender dynamics** within our built environments.

03



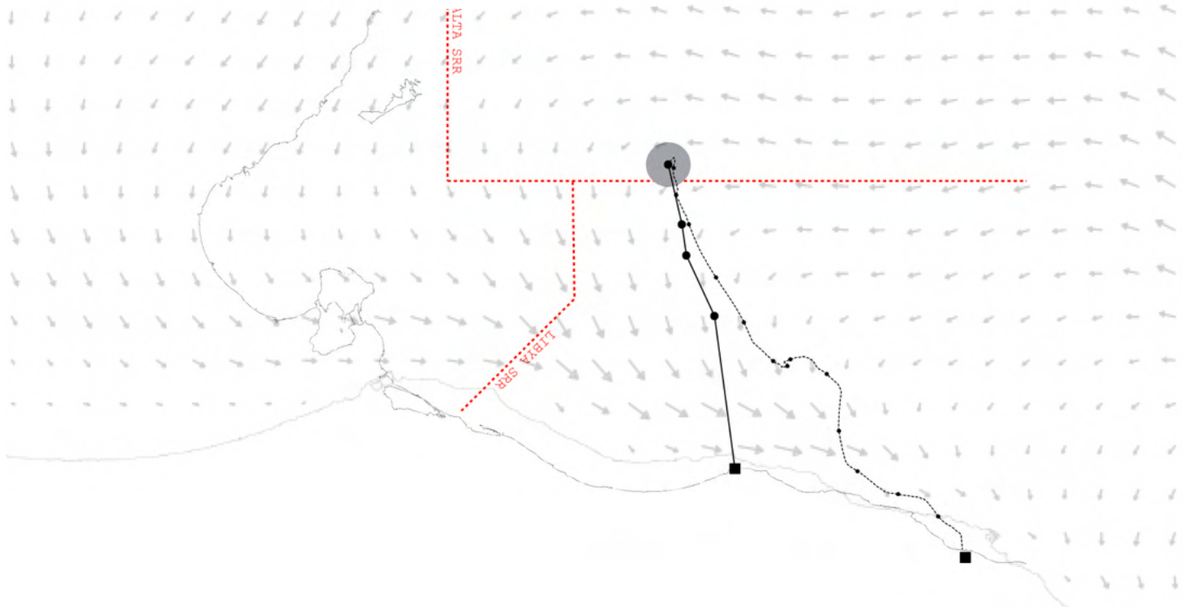
THE SEA OF SUFFERING

REPORT - THE LEFT TO DIE BOAT

SUMMER 2023 I TRANSCALARITIES I Iván-Nicholas Cisneros-Rangel

This course queries the ways in which architectural devices of reference, which have shaped the discourse of the field over the last few decades, are characterized by their transitioning through spatial, material, and temporal scales. The course explores the agencies architectural devices unfold through transscalar conditions—that is to say, the specific forms of politics that architectural devices perform by participating in diverse dimensional and physical settings; and the way they multiply their reach, influence, and sensitivity by entangling, for instance, the microbiological to the mineral, the atmospherical, the ecosystemic, the genetic, and the planetary.

In collecting and analyzing data, reports, and human testimonies related to the 'Left-to-Die' boat, Forensic Oceanography reconstructs and reveals a complex web of overlapping jurisdictions and the militarized border regime affecting migration in the Mediterranean Sea.



Scale Diagram of the boat that transported the Migrants
Points on the map show the events described in the report

Borders are physical and imaginary, embedded in the ground and permeating the sea.

In collecting and analyzing data, reports, and human testimonies related to the **'Left-to-Die'** boat, Forensic Oceanography reconstructs and reveals a complex web of overlapping jurisdictions and the **militarized border regime** affecting migration in the Mediterranean Sea.

The visualization of borders in the Mediterranean Sea reveals a landscape far from homogeneous and lawless. The **delimitation** of Search and Rescue (S&R) zones, the undefined zones of Tunisia and Libya, and the overlapping S&R borders of Italy and Malta depict a complex interplay of visible and invisible regions where the movement of migrants becomes intricately entangled with the politics of **illegalization** and the **surveillance, search, and rescue** laws.[3]

This transcalar space witnesses the convergence of national and transnational alliances and the **blurring of territorial lines**. Rather than a simple line dividing states, the border here becomes an expansive and ambiguous zone marked by contested gaps between legal jurisdictions.

At sea, border crossing evolves into a prolonged, dangerous process across an uneven and heterogeneous territory beyond any single authority's reach, where jurisdictional boundaries in the Mediterranean turn its waters into a lethal entity, endangering migrants' lives and disregarding their safety.
The SAR satellite imagery regularly collected and confirmed the presence of a significant number of ships near the drifting vessel in the Mediterranean Sea.

In the case of the 'Left-to-die boat', the remote sensing technologies usually used for surveillance are **repurposed as evidence** of **guilt**. Using these media to document the crime of non-assistance of
people in distress at sea thus involved a strategic repurposing of images and the use of surveillance technologies 'against the grain'.[3]

Forensic Oceanography exercises a **disobedient gaze**, one that refuses to disclose the clandestine migration but seeks to expose the violence of Europe's border regime instead.

Despite the abundance of data and tracking methods, the political bodies failed to change the migrants' outcome. Instead, these tools have become **accomplices** to countless crimes committed by the search and surveillance coastguards and facilitated by invisible geopolitical boundaries.
By combining their testimonies with wind and sea-current data as well as satellite imagery, Forensic Oceanography reconstructed the liquid traces of this event.[3]
The poignant progression of the journey of the migrants from prison to the expansive and isolating oceans' vastness and back to the similar confines of the prison highlights the ironic symmetry of their experiences, encapsulating themes of confinement, liberation, and the **inescapable nature** of their circumstances.[4]
As most of the journey was through the NATO maritime surveillance area, it demonstrates a concerning lack of regard for the lives of migrants, reminiscent of past practices. NATO's primary focus on **"security and defense"** in maritime surveillance exposes how the laws in place create an imaginary border, differentiating between protecting what belongs to them and what does not. Consequently, this figurative wall becomes even more formidable when unethical laws are established, allowing political entities to **evade accountability** for their actions. Additionally, this situation brings attention to the media's influence and the prevalence of articles discussing Europe's perceived disregard for migrants.
The Left-To-Die boat signals how the policing of illegalized migration creates conditions of both **(in)visibility and (in)audibility**, but these conditions are notstatic; they are influenced and contested by various actors.
It emphasizes that challenging the violenceof borders requires challenging not only physical boundaries but also the limitations of perception.
To effectively examine these borders, one must expand what can be seen and heard, embracing a broader perspective that includes the **v**of those affected by migration policies.

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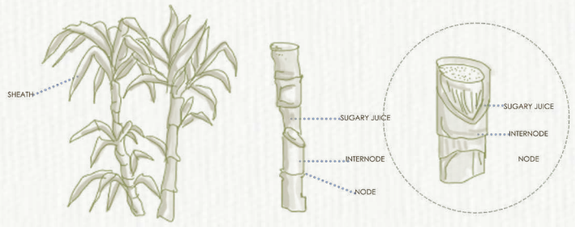
[1] Balibar, Etienne. 1990. The Nation Form: History and Ideology . Research Foundation of State University of New York for and on behalf of the Fernand Braudel Center.
[2] Frant, Ancuța-Elena. 2022. Forensic architecture: A new dimension in Forensics. Romania: Editura Universității „Alexandru Ioan Cuza" din Iași.
[3] Heller, Charles, Lorenzo Pezzani, and Situ Studio. 2012. Forensic Oceanography Report on the "Left-To-Die Boat". Centre for Research Architecture, Goldsmiths, University of London.
[4] Nations, United. 2021. "A call to safeguard migrants in central Mediterranean Sea."
[5] Nations, United. 2020. "Mediterranean Sea: 'Cycle of violence' for fleeing migrants must be addressed."

04



MAISON STUDIO

MODULE AND MATERIAL

FALL 2023 I ADVANCED STUDIO V I GORDAN KIPPING

RHINO, GRASSHOPPER, REVIT, PHOTOSHOP, ILLUSTRATOR, V-RAY.

DESIGN TEAM- SIMAR KAUR KOCHHAR, SHIVANI GOLATKAR

DRAWINGS AND MODELLING DEPICTED- SIMAR KAUR KOCHHAR

The Maison Studio actively addresses the pressing issue of the climate crisis by leveraging emerging building technologies to offer sustainable solutions. The imperative to combat the climate disaster has prompted a fundamental shift in our approach to construction, influencing both the methods and materials we employ.

In our design proposal, we explore the innovative use of a material known as Sugarcrete, derived from sugarcane waste—specifically Bagasse and Lime. Sugarcane waste, abundantly available with approximately 600 million tons produced globally, serves as a sustainable base for this material.

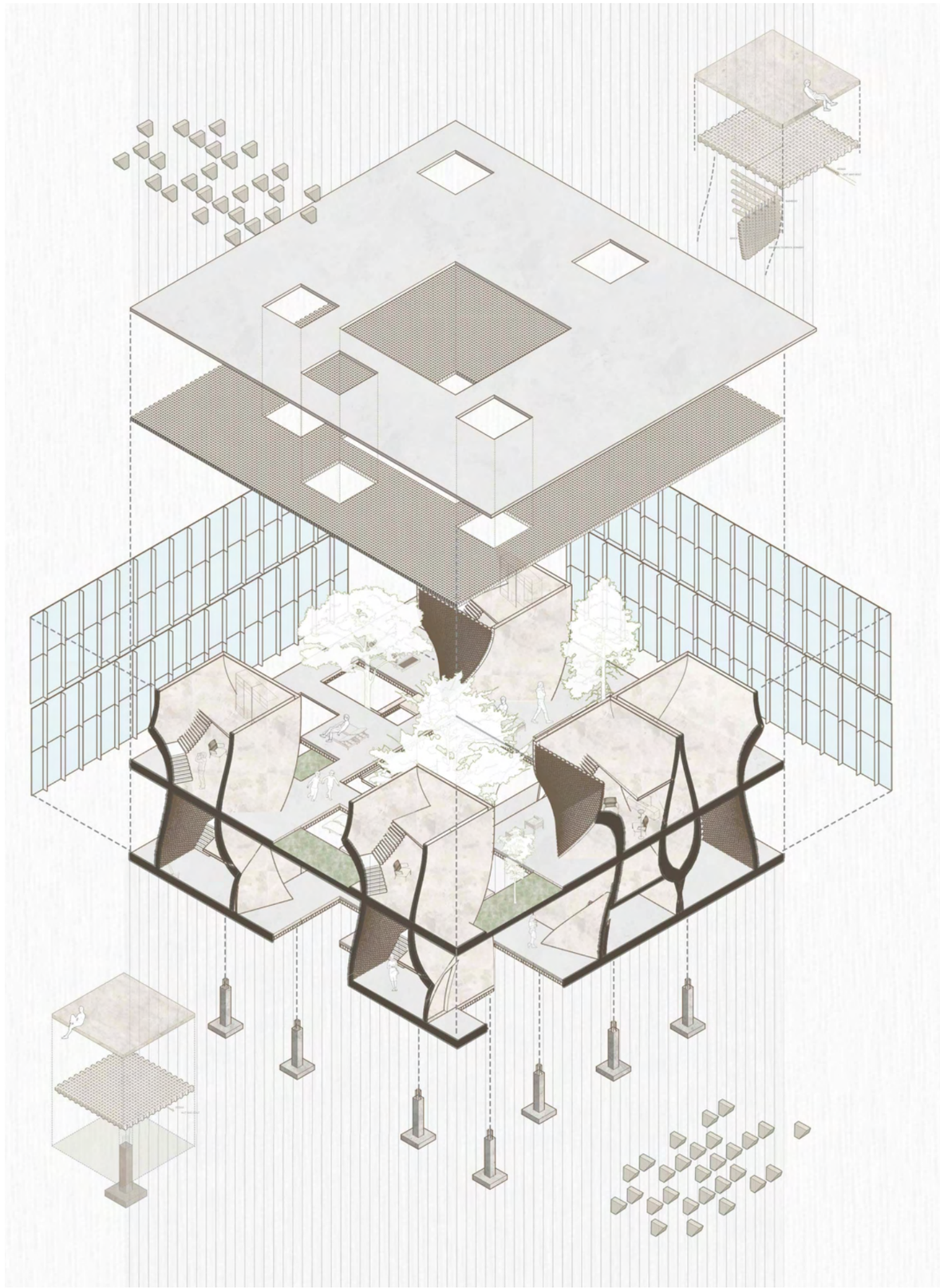
Our extensive research focused on enhancing the material's strength in both compression and tension, making it suitable for use as a structural element in low-rise construction. Drawing inspiration from the Maison Domino design concept, we adopted grid formations, infusing creativity by introducing a unique twist to the conventional grid while adhering to its underlying principles.

This thoughtful integration of the Maison Domino's grid aesthetics informed the final structure—a remarkable fusion of crop waste utilization and mathematical structural design.

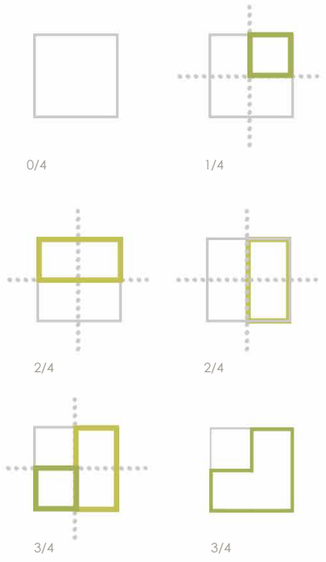
DRY MIXING AND WET MIXING

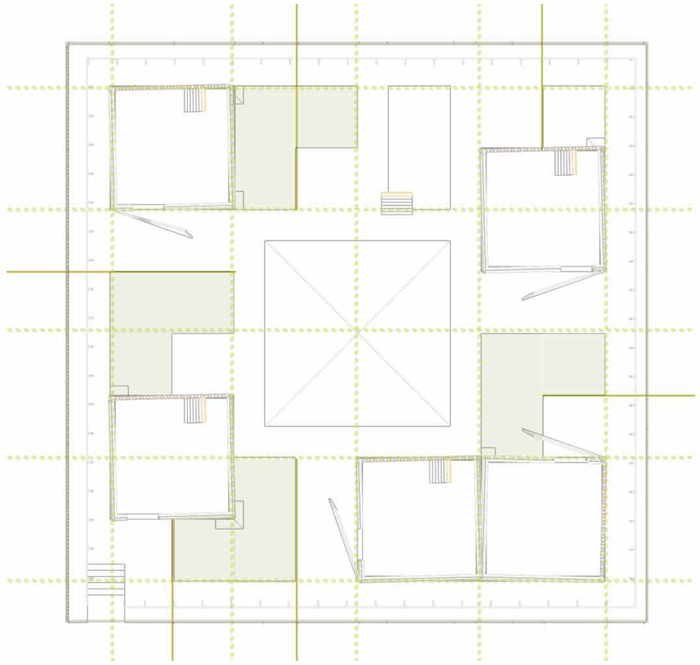
BRICK MOULD

Sugarcrete Block production

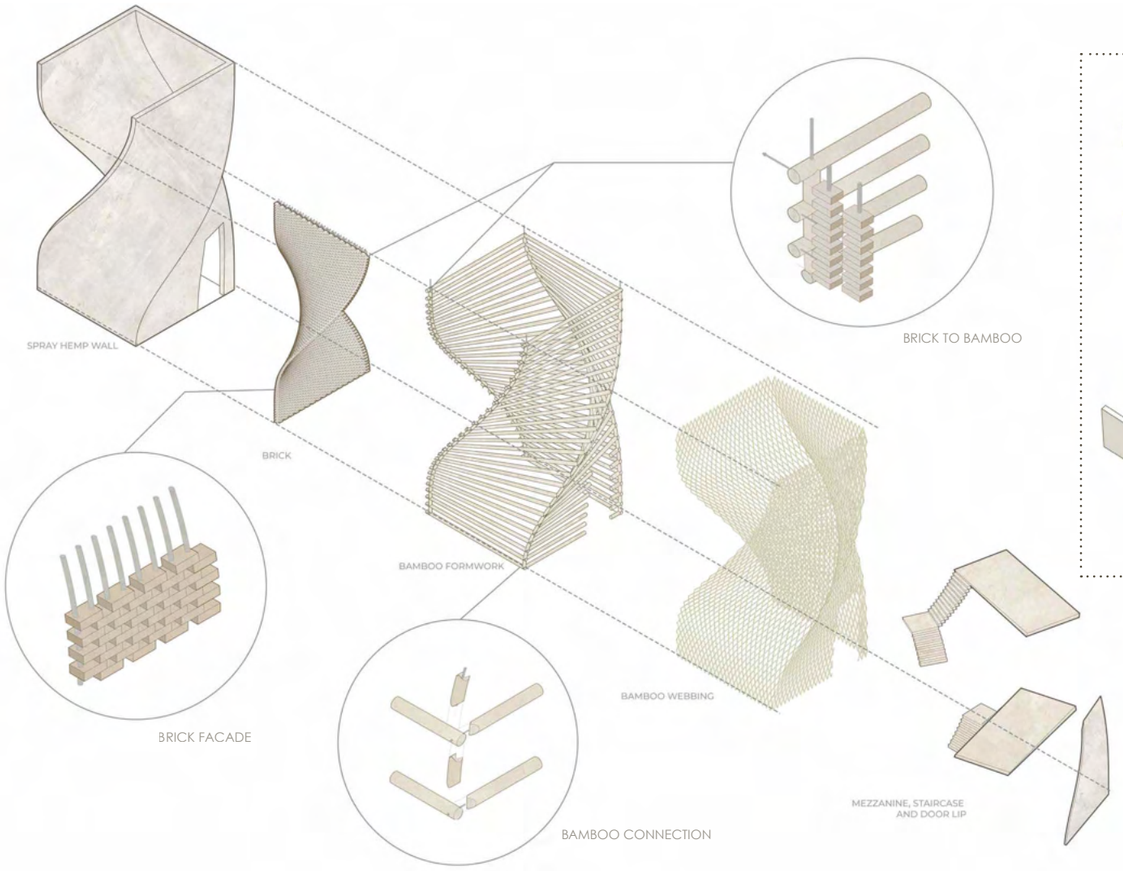


Exploded Axonometric of Module

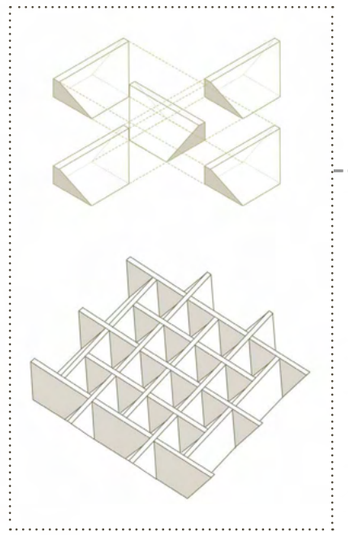




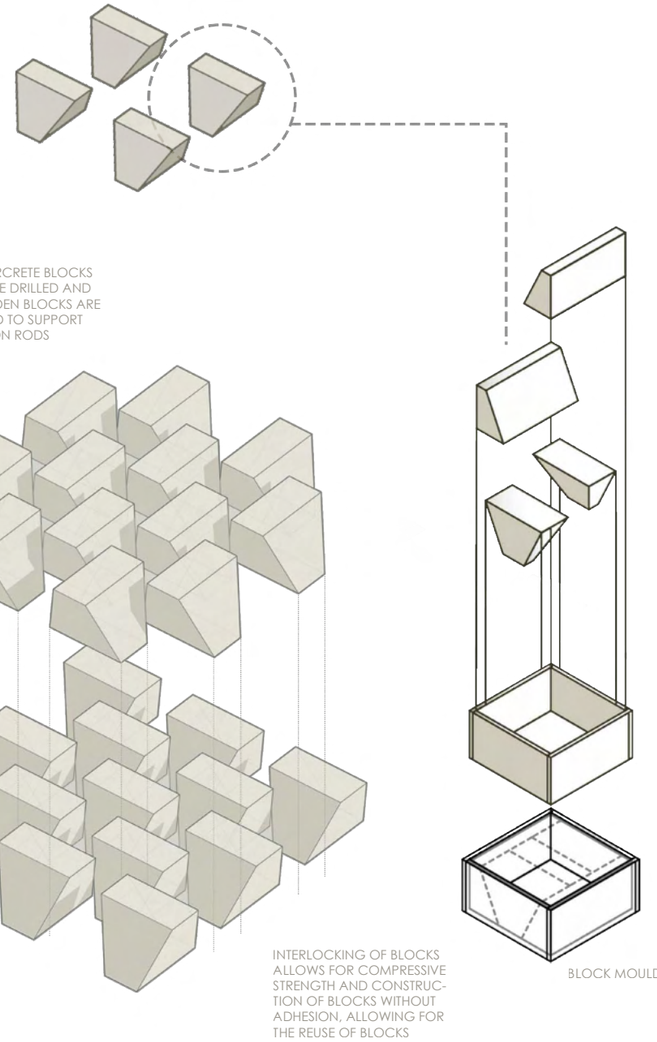
PLANNING AND DIVISIONS

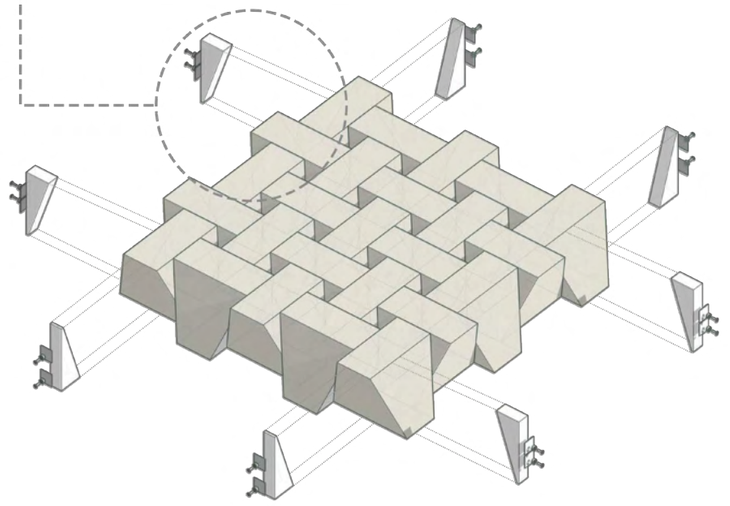


TWIST EXPLODED AXONOMETRIC



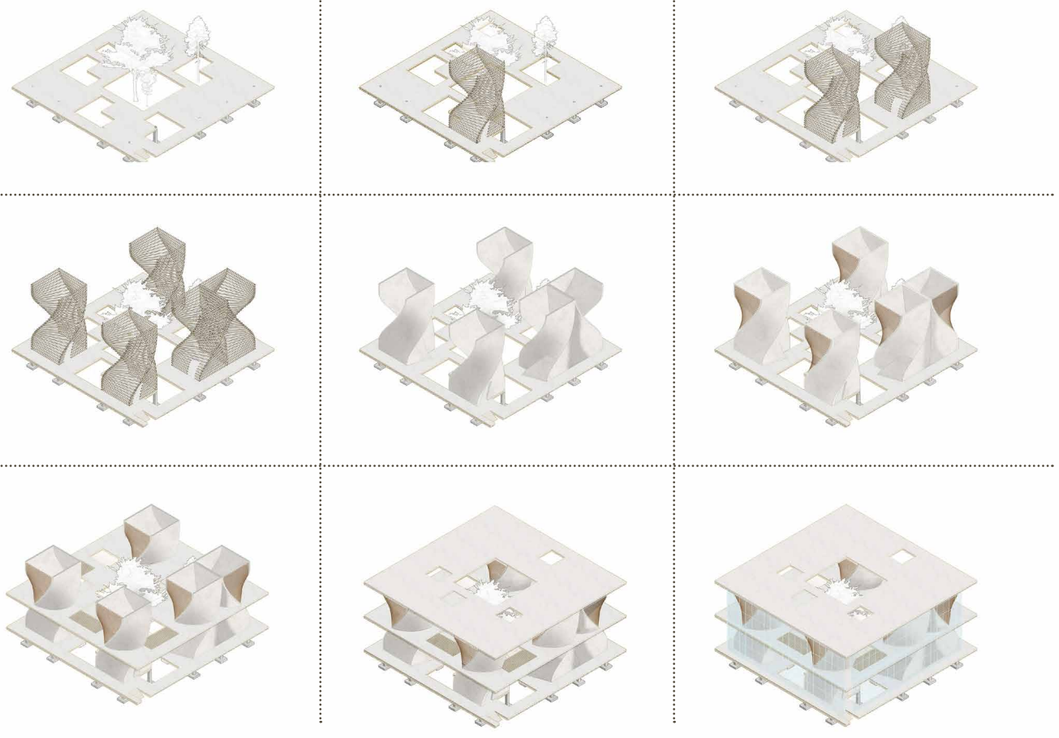
CASE STUDY



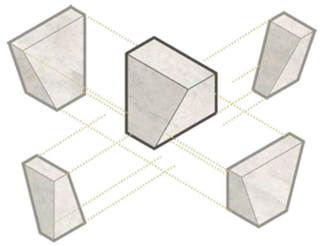


SUGARCRETE SLAB

1:100- MODEL



COURTYARD VIEW



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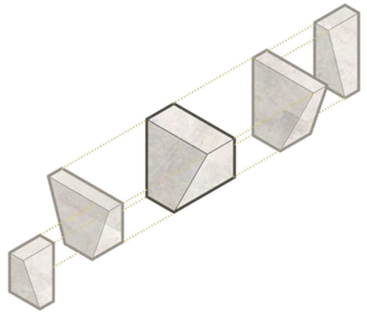
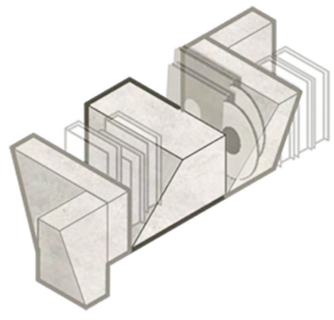
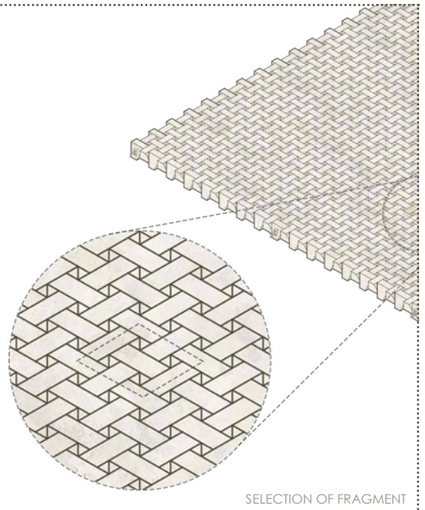
MODULAR OPTION 1- SIDE TABLE



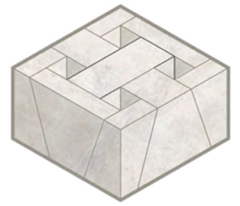


MODULAR OPTION 2- SHELF AND VINYL STORAGE

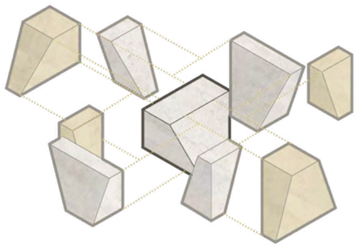
FRAGMENT OPTIONS



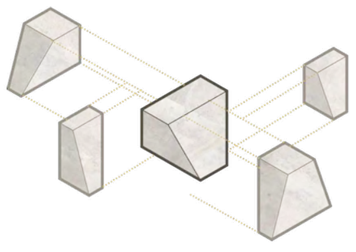
SELECTION OF FRAGMENT



FRAGMENT SELECTED



ELIMINATION



FINAL SET

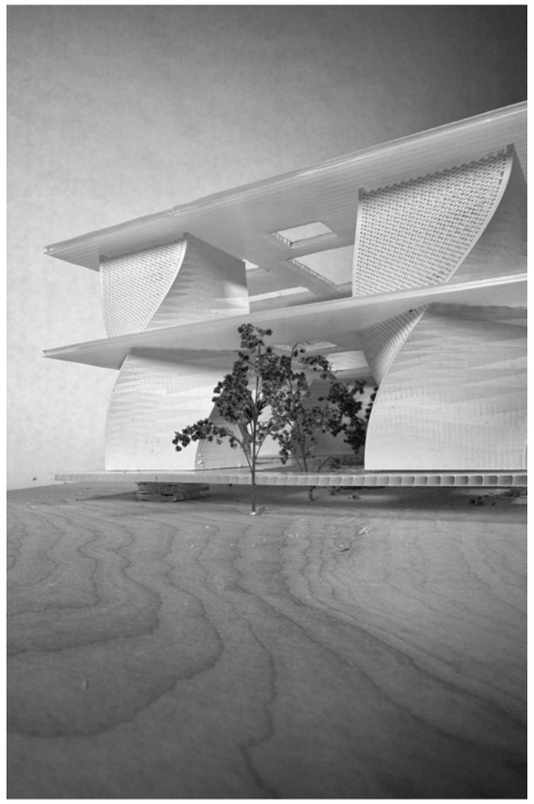
FRAGMENT DEVELOPMENT

Our second design intervention involved integrating our modular design into an ongoing Mass Timber Project in Australia. In this intervention, we retained the existing structural components of the project while introducing sugarcrete slabs to replace the traditional ones. Rather than incorporating a full twist, we opted for a unique approach by introducing a half-twist balcony and green space.

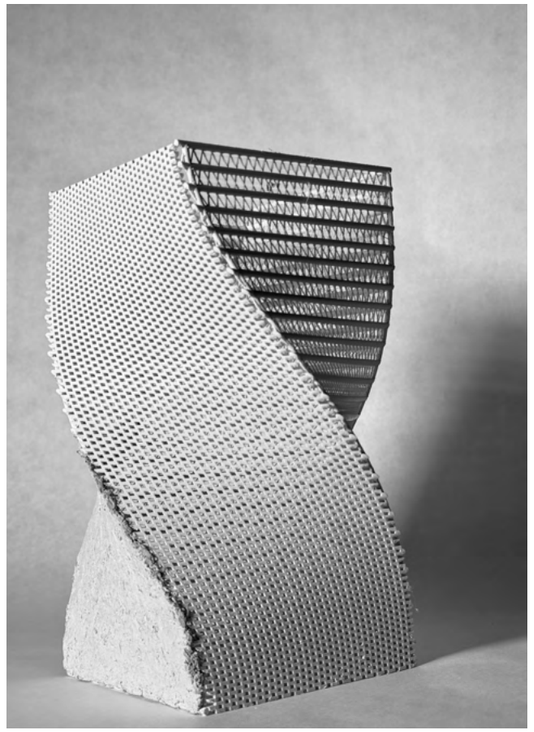
This innovative design not only serves as a facade element but also provides a breathing space for the mixed-use High-Rise structure. By replacing the slab with sugarcrete and incorporating a partial twist, we seamlessly blend sustainability with aesthetics, contributing to the overall appeal and functionality of the project.

PERSPECTIVE SECTION OF TOWER

TOWER VIEW



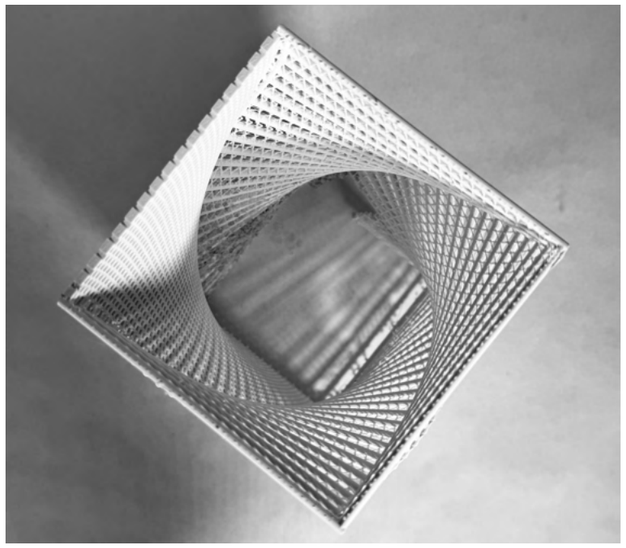
1:100 MODEL



1:50 MODEL OF TWIST

TOWER WITH HALF TWIST

1:1 SUGARCRETE INTERLOCKING BLOCKS



BIRDS EYE VIEW- 1:50 MODEL

Perspective Section
Tower View

Physical Model Images- 3D printed PLA,
1:1 Sugarcrete block (bagasse +Lime)

1:1 Sugarcrete blocks (bagasse +Lime)

05

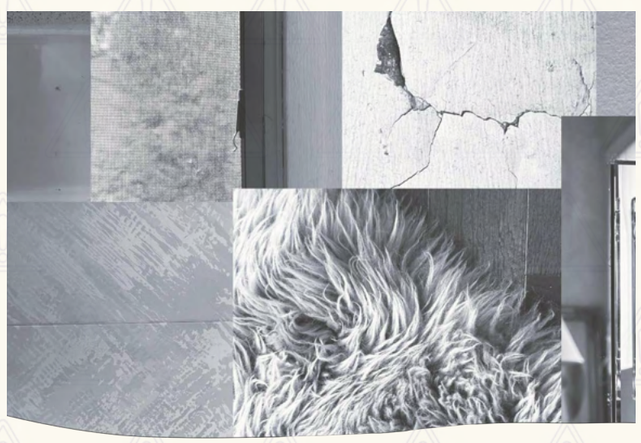
HOME IS WHERE THE TOXICS ARE

INTERIOR STUDY

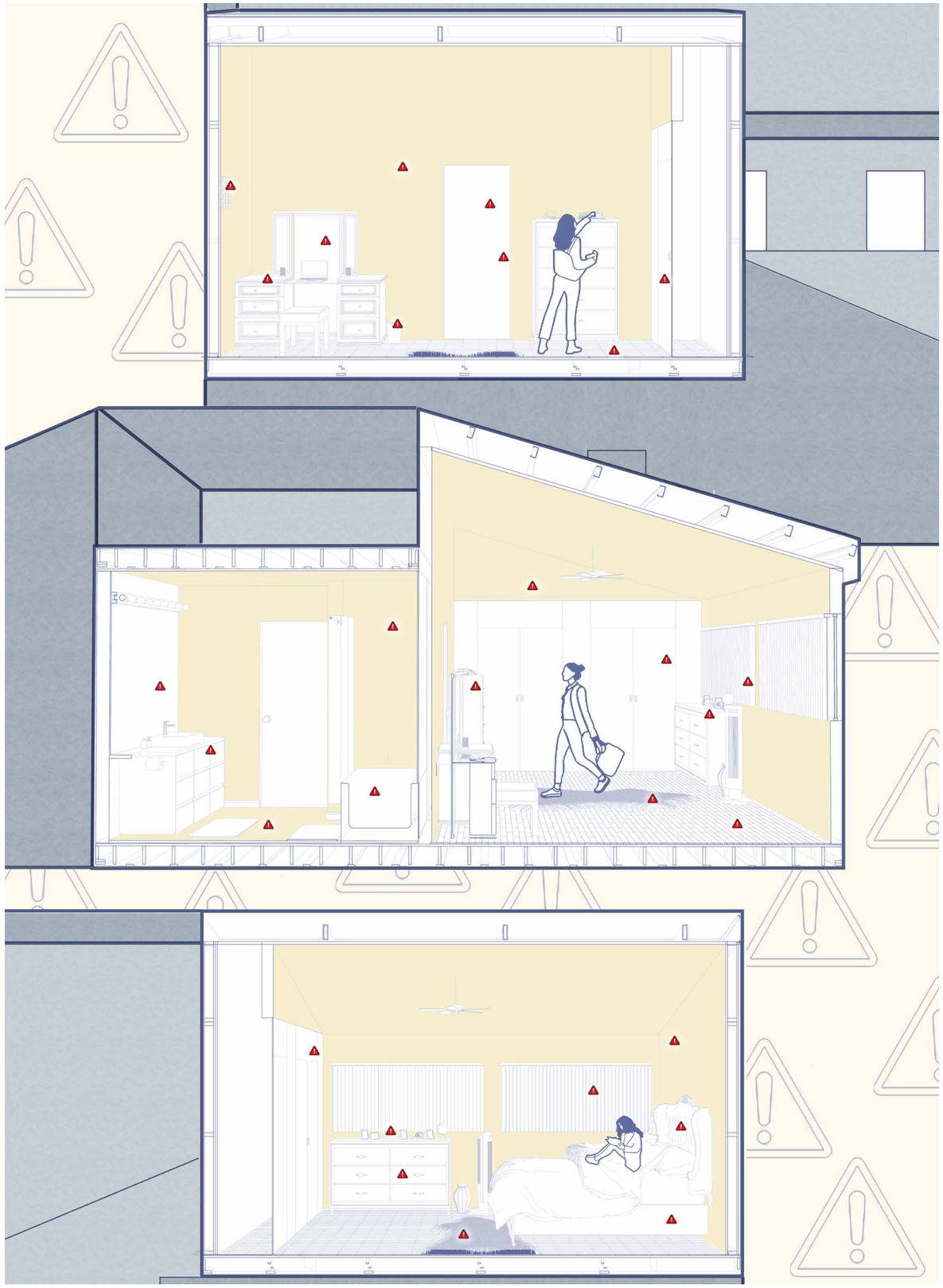
FALL 2023 I BUILDING TECHNOLOGY I MARTA HEISEL-WISNIEWSKA

RHINO, SKETCHUP, PHOTOSHOP, ILLUSTRATOR, V-RAY.V

Looking at what surrounds us—"peel away" the material layers of domestic buildings —to locate the hazards hidden within.
The expected outcome is a single "artwork" piece- here understood as a hybrid between a scientific analysis represented originally and appealingly.
Upon selecting the material, the piece should contain 20 moments of materials or surfaces, which were analyzed through the lens of safety, ingredients (chemicals), and possible impacts on the occupant's and planet's health.



Material textures



Interior View highlighting toxins

FURNITURE

PLYWOOD, COMPOSITE WOOD
- Silica
- Fungicides
- Silicon adhesives
- Formaldehyde

UPHOLSTERY, MATTRESS
- Phthalates
- Bisphenol A (BPA)
- Halogenated and Brominated
- Flame retardants (HFRs + BFRs)

VARNISH
- Formaldehyde
- Ethyl Acetate and Acetone
- Polyurethane

MIRROR
- Silica
- Isocyanates
- Volatile organic compounds
- Formaldehyde
- Solvents

FLOORING

HARD WOOD FLOORING
- Silica
- Fungicides
- Silicon adhesives
- Formaldehyde

RUG
- Benzene
- Orthophthalate plasticizers
- Polyurethane

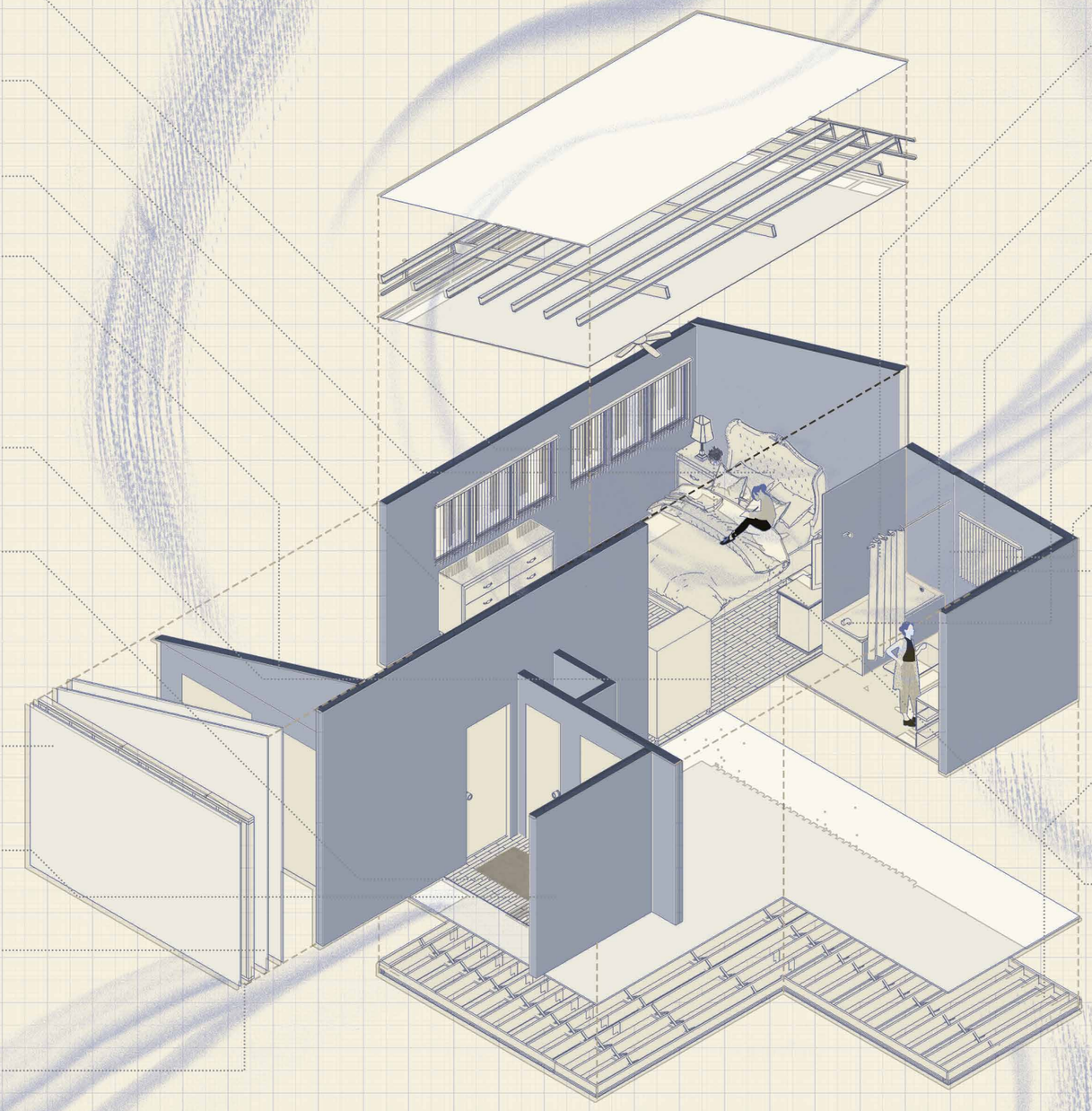
WALL

PAINT
- Rubber based adheive
- Lead
- Volatile Organic compounds

WALLPAPER
- Rubber based adheive
- Lead
- Volatile Organic compounds

PLASTER
- Asbestos
- Calcium Sulphate
- Gypsum
- Non combustible solid

INSULATION
- Flame retardants
- Isocynates
- Formaldehyde



BATHROOM

SHOWER CURTAIN
- Phthalates
- Bisphenol A (BPA)
- Halogenated and Brominated
- Flame retardants (HFRs + BFRs)

SILICONE
- Orthophthalate plasticizers
- Polyurethane
- Benzene

TILING, MORTAR
- Vinyl
- Asbestos
- Silicon Adhesive
- Phtalates
- Volatile Organic compounds

STAINLESS STEEL FITTIGS
- Dioxin and vinyl chloride
- Lead

WINDOW

GLAZING
- Silica
- Isocynates
- Volatile Organic compounds
- Formaldehyde
- Solvents

BLINDS
- Phthalates
- Bisphenol A (BPA)
- Halogenated and Brominated
- Flame retardants (HFRs + BFRs)

STRUCTURAL

STEEL JOISTS + FRAME
- Formaldehydes
- Polycyclic hydrocarbons
- Chromium
- Nickel
- Isocynates

DECOR

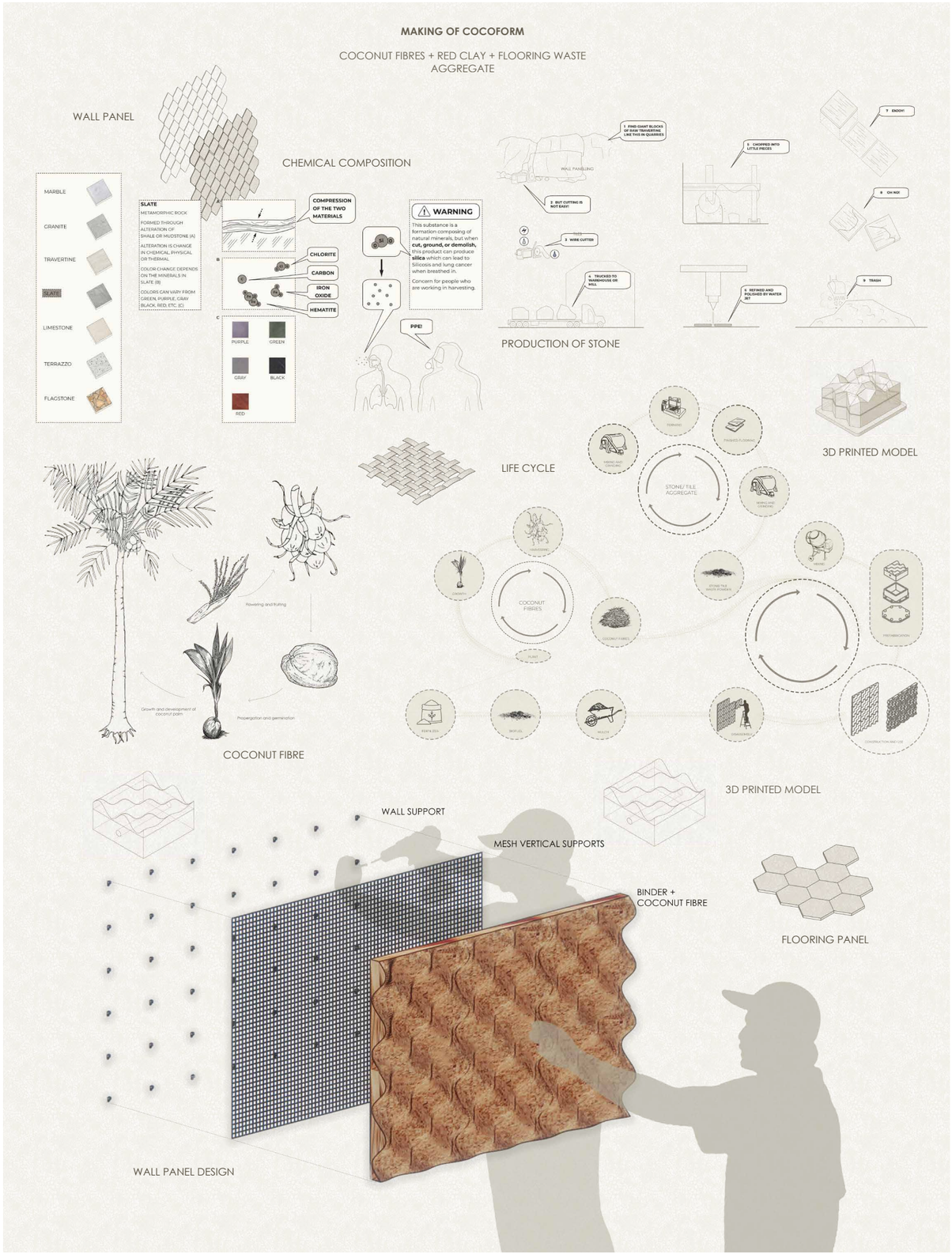
SCENTED CANDLE
- Benzene
- Formaldehydes
- Toulene

BRASS KNOB
- Hydrocarbons
- Ammonia

NAIL POLISH
- Dibutyl phthalate
- Toulene
- Formaldehydes

Asthamagens · Carcinagen · Neurotoxicant · Endocrine disruptor · Reproductive + developmental toxicant

Detail Diagram showing toxins in the bedroom



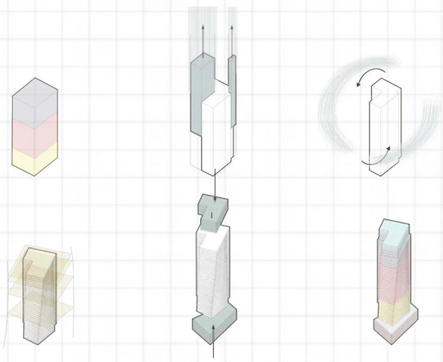
CONTEXT ANALYSIS

MATERIAL SAMPLES

Collage- Research Process and Final product

Material Experimentation and Product images
Use of Panel

06



RETHINKING THE BIM

NEW YORK CITY HIGH-RISE

FALL 2023 I VISUAL STUDIES COMPUTATION + BUILDING TECHNOLOGY I JOSEPH BRENNAN

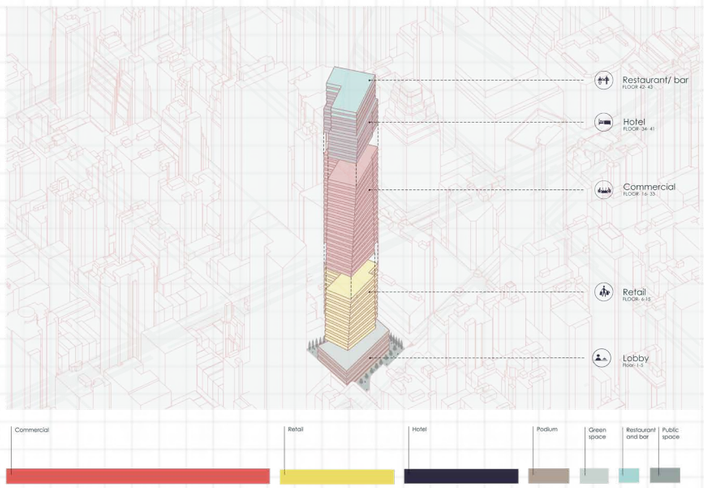
REVIT, RHINO, RHINO INSIDE, GRASSHOPPER, PHOTOSHOP, ILLUSTRATOR, V-RAY, CLIMATE STUDIO.

DESIGN TEAM- SIMAR KAUR KOCHHAR, SUDHANSHU SINGH, SHIVANI GOLATKAR

RHINO MODELLING- SIMAR KAUR KOCHHAR, SUDHANSHU SINGH
REVIT- SIMAR KAUR KOCHHAR
PHOTOSHOP POST PRODUCTION, CLIMATE STUDIO- SHIVANI GOLATKAR

Rethinking BIM challenged me to explore different methods of leveraging BIM to enhance all processes within our industry.
One of the critical drivers of success is our ability to collaborate with other members of the development, architecture, engineering, and construction (DAEC) industry. Therefore, we examined how these related disciplines function. Concurrently, we developed processes to understand different priorities better and exchanged information more seamlessly. Additionally, we leveraged drawing and diagramming to visualize and explain these collaborative processes.

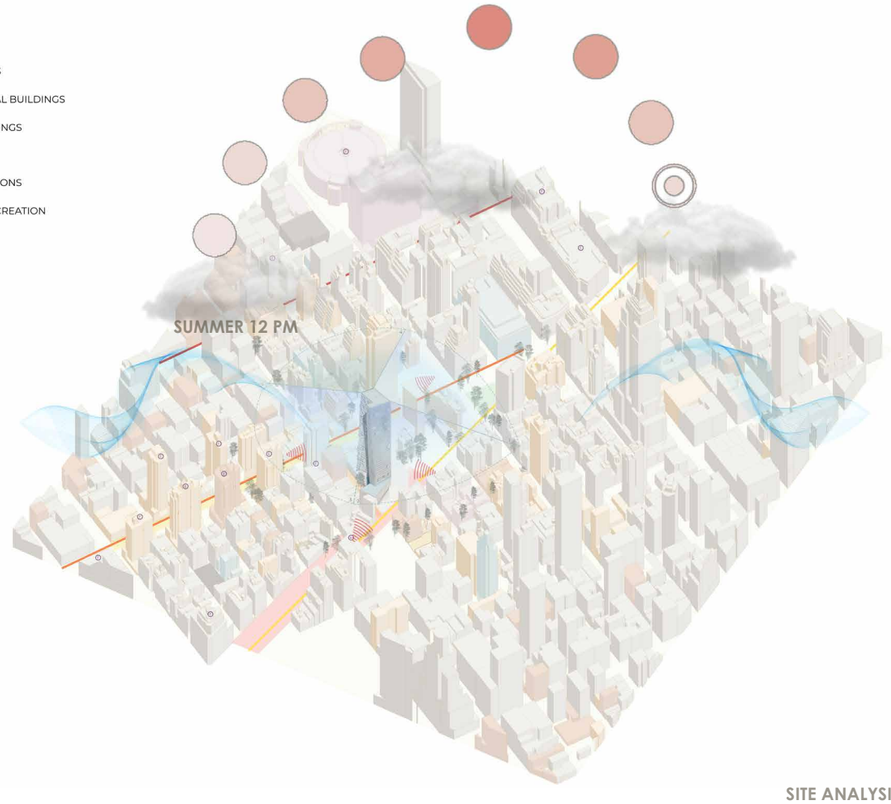
Throughout the semester, our projects and thinking functioned at both urban and building scales. The goal of the class was to leverage new BIM processes to drive better-informed design.



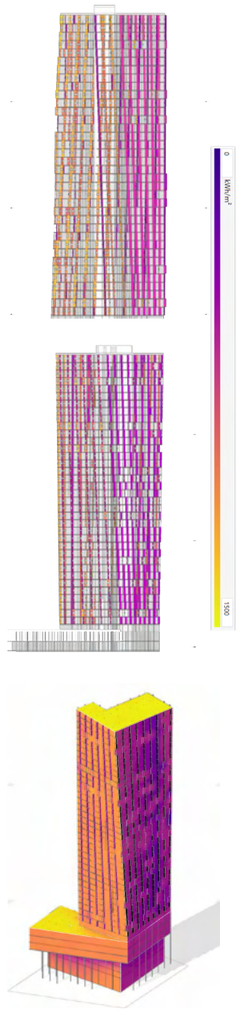
Form Massing
Exploded Axonometric of building user group

Worms Eye View

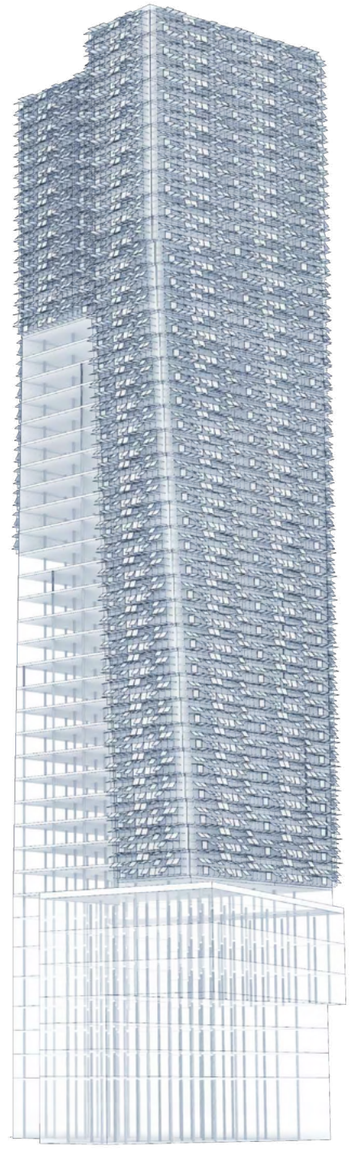
SITE
OFFICE COMMERCIAL BUILDINGS
MIXED RESIDENTIAL COMMERCIAL BUILDINGS
MULTI - FAMILY ELEVATOR BUILDINGS
FAMILY WALKUP BUILDINGS
PUBLIC FACILITIES AND INSTITUTIONS
OPEN SPACE AND OUTDOOR RECREATION
PARKING FACILITIES
VACANT LANDS
TRANSPORT AND UTILITY
PROPERTY WITH E-DESIGNATION
NOISE
1 2 3
B D F M
N Q R
VIEWS
PRIMARY ACCESS
SECONDARY ACCESS
TERTIARY ACCESS



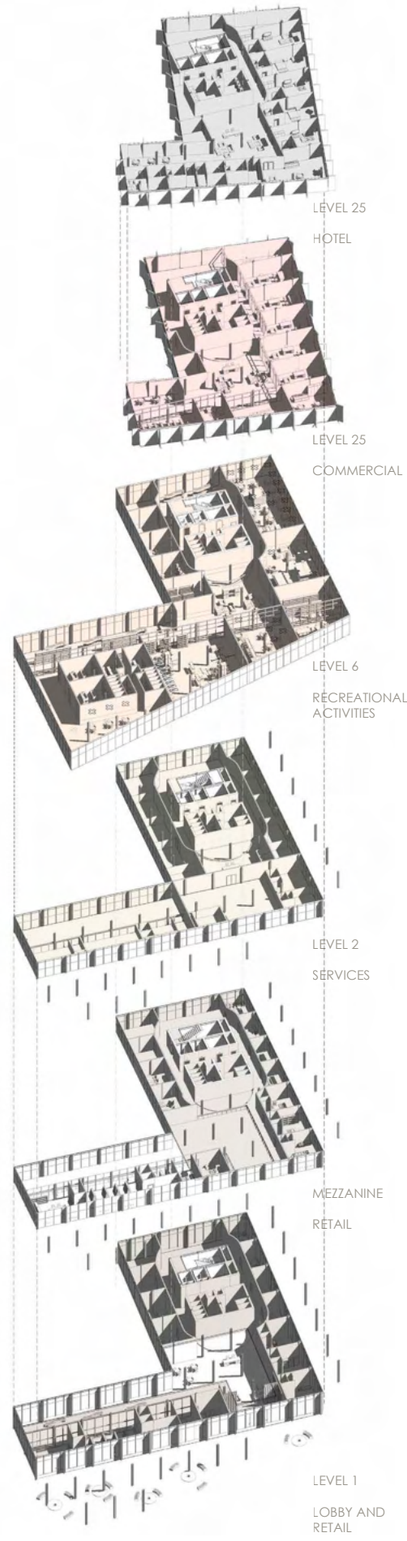
SITE ANALYSIS



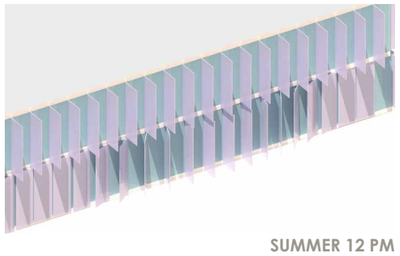
DAYLIGHT ANALYSIS OF FACADE



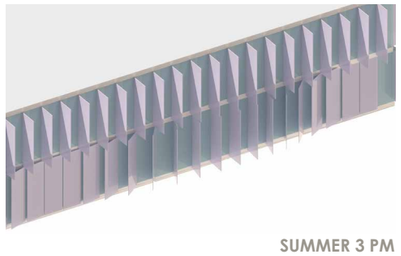
DYNAMIC FACADE ON TWISTED BUILDING STRUCTURE



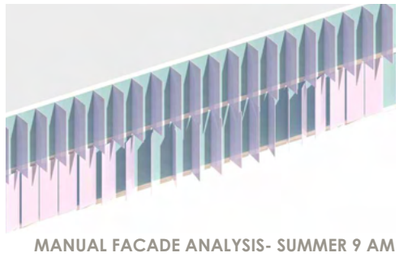
REVIT GENERATED- AXONOMETRIC



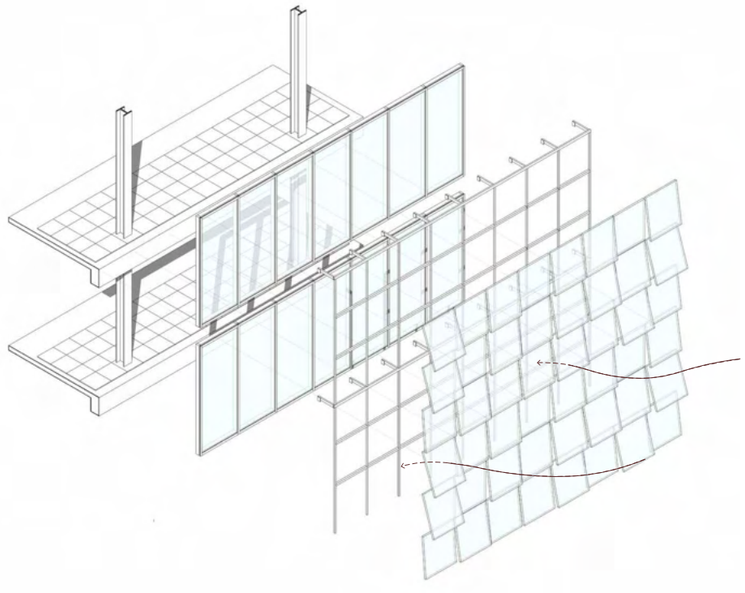
SUMMER 12 PM



SUMMER 3 PM

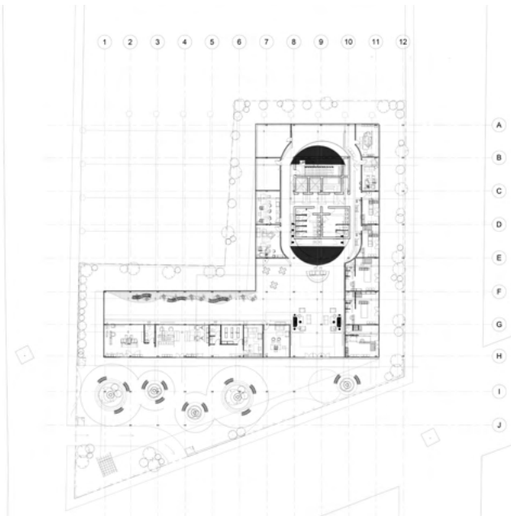


MANUAL FACADE ANALYSIS- SUMMER 9 AM



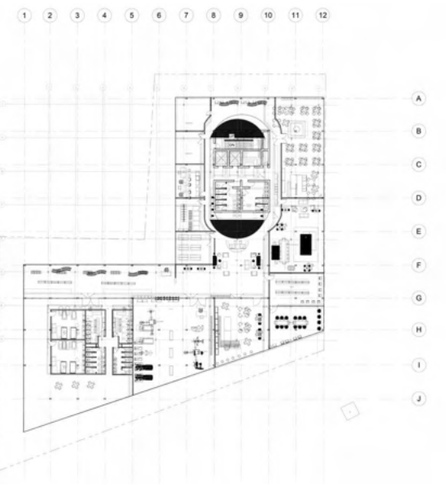
DYNAMIC FACADE DEVELOPMENT

BUILDING VIEW

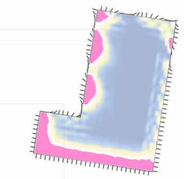


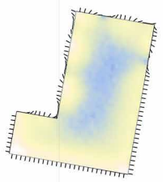
LOBBY PLAN

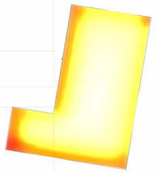
TYPICAL COMMERCIAL PLAN

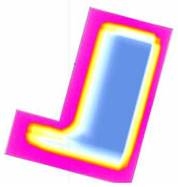


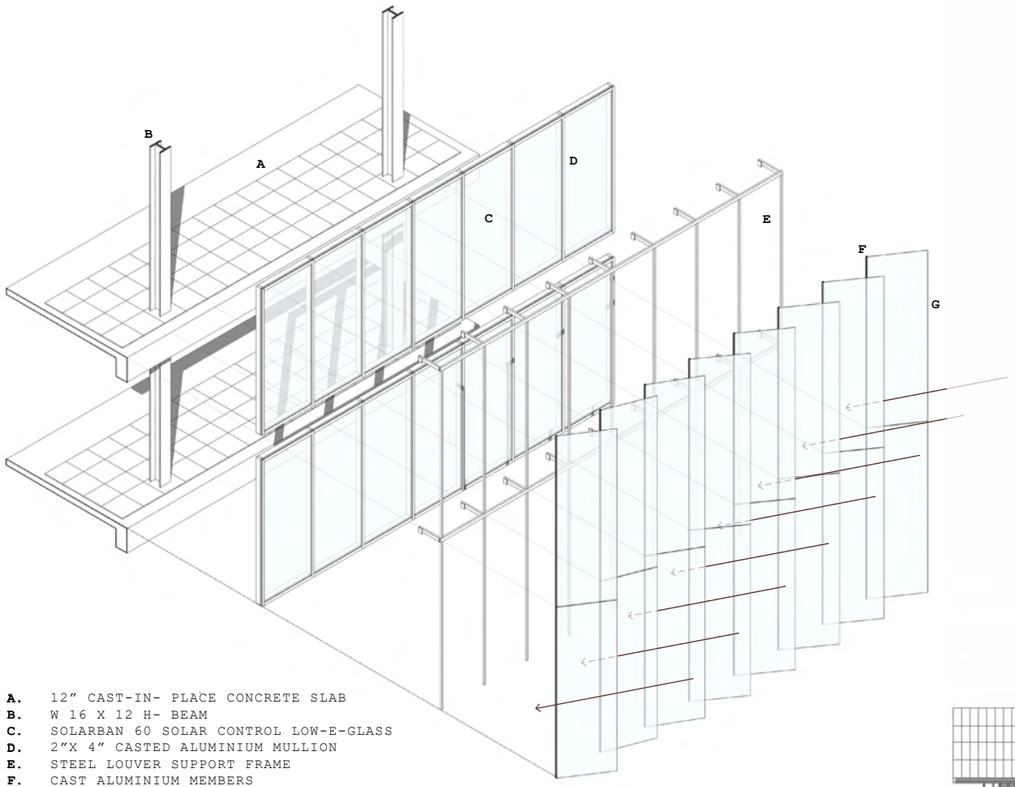
TYPICAL PODIUM PLAN





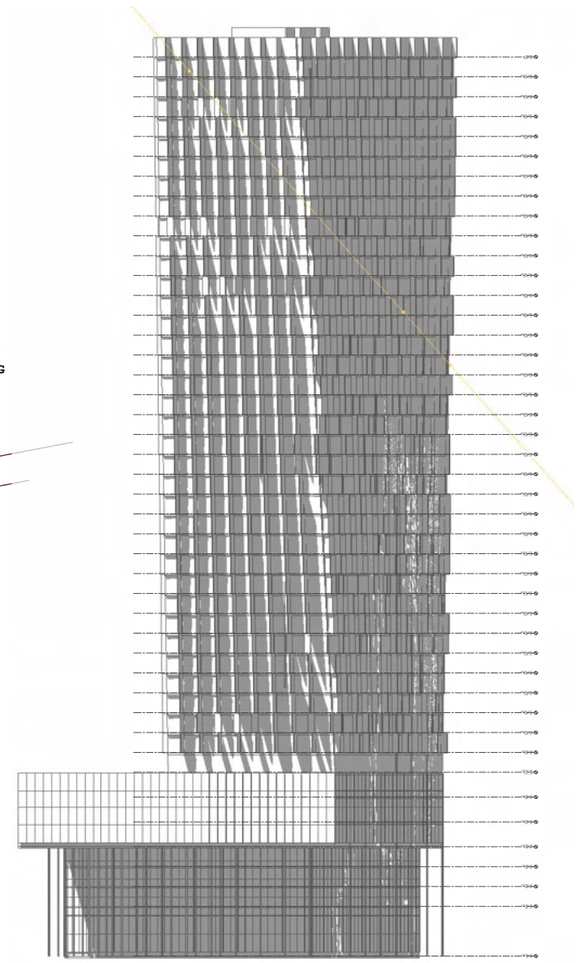




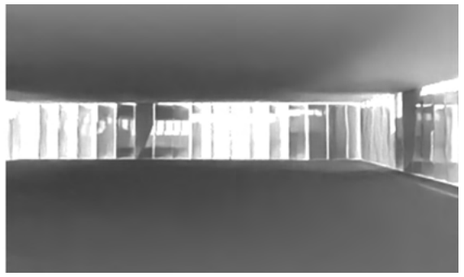


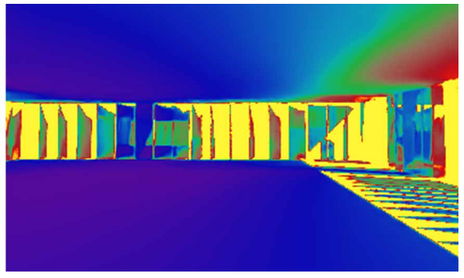
A. 12" CAST-IN- PLACE CONCRETE SLAB
B. W 16 X 12 H- BEAM
C. SOLARBAN 60 SOLAR CONTROL LOW-E-GLASS
D. 2"X 4" CASTED ALUMINIUM MULLION
E. STEEL LOUVER SUPPORT FRAME
F. CAST ALUMINIUM MEMBERS
G. 2" AF LOUVER PANELS

FACADE DETAILS

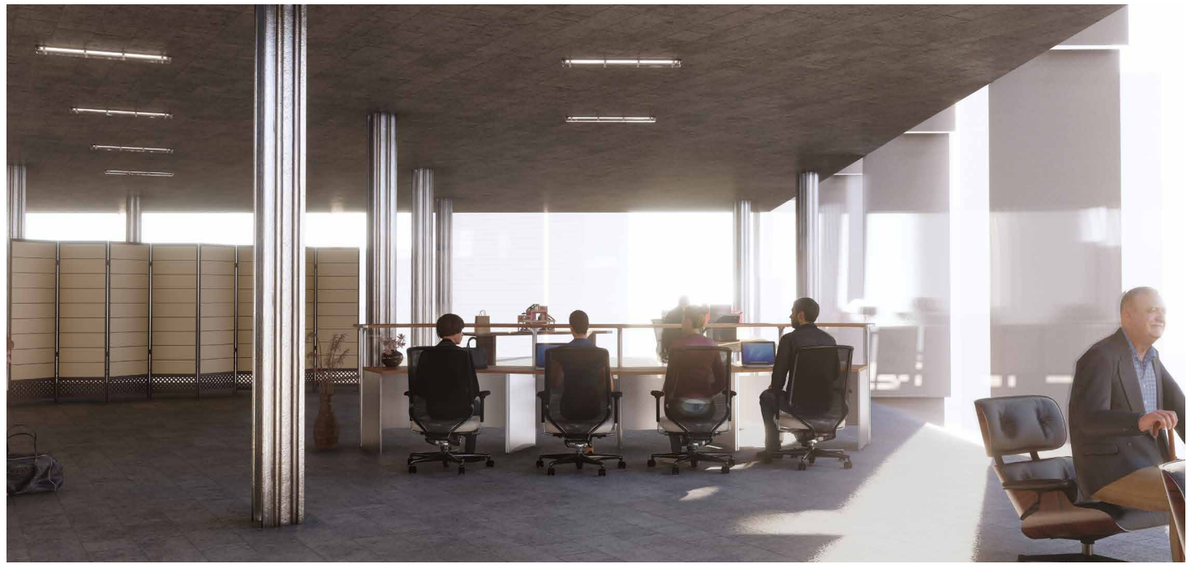


WEST ELEVATION





HEAT GAIN ANALYSIS FOR INTERIOR



INTERIOR VIEW- COMMERCIAL

07

3D PRINTED EARTH

COLUMN

WORKSHOP 2024 I NATURAL MATERIALS LAB I PROFESSOR LOLA BEN-ALON

RHINO, GRASSHOPPER, PHOTOSHOP, ILLUSTRATOR, G-CODE.

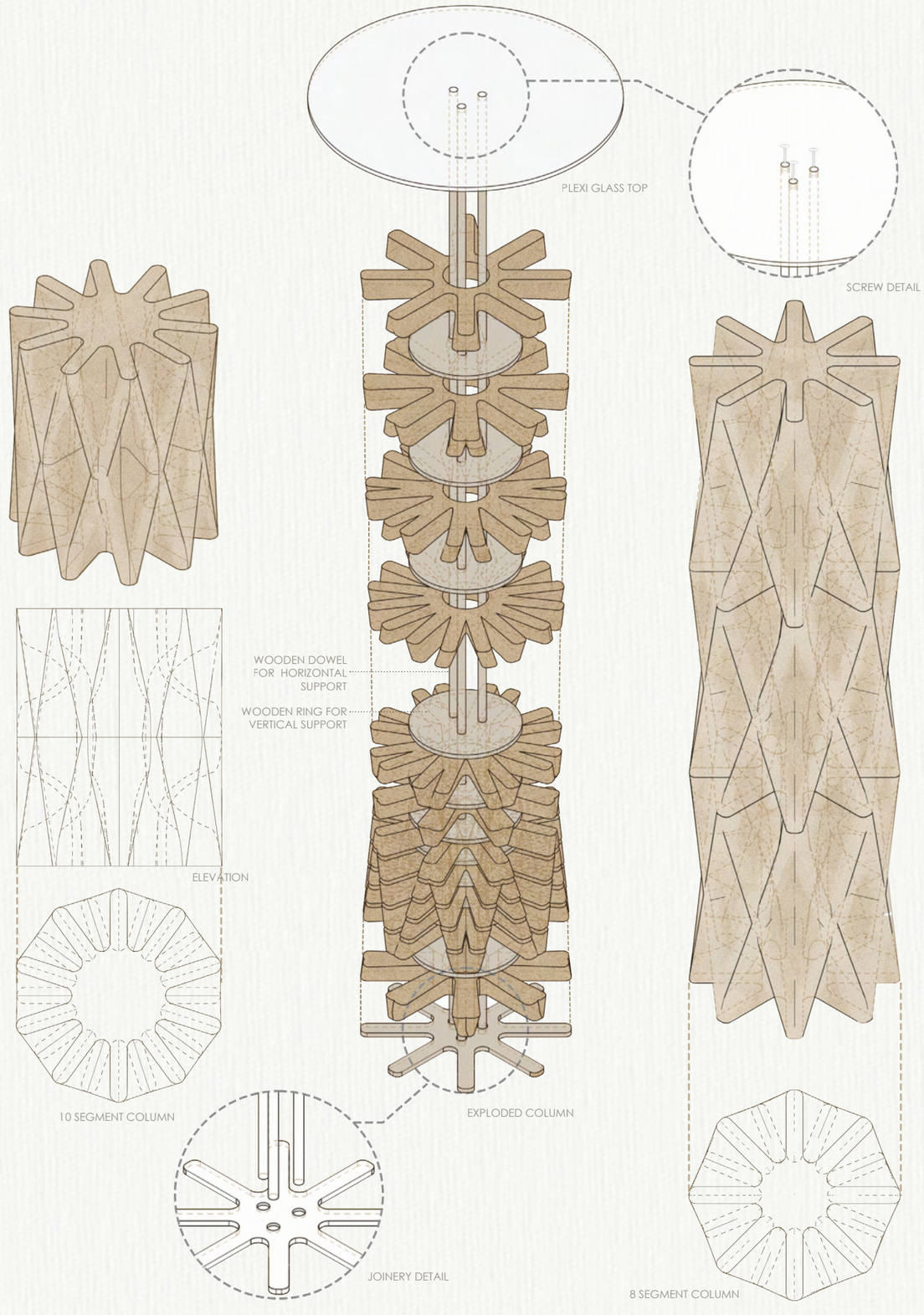
DESIGN TEAM- SIMAR KAUR KOCHHAR, SHIVANI GOLATKAR

The 3D Printed Earth Hackathon, led by the Natural Materials Lab at Columbia GSAPP and Carleton Lab at Columbia Engineering, was a collaborative workshop with Green SAPP, a student organization focused on climate and sustainability initiatives.

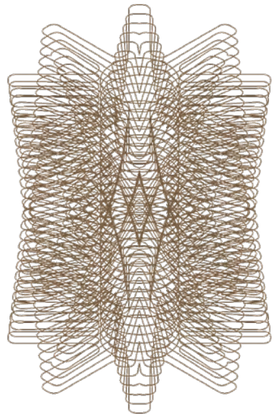
As the Co-chair of Green SAPP, I spearheaded the organization of this workshop and had the privilege of actively participating in it. Throughout the hackathon, our team delved into research to create a new mixture of earth-based clay. Subsequently, we designed a parametric column intended for large-scale 3D printing at the Carleton Lab.

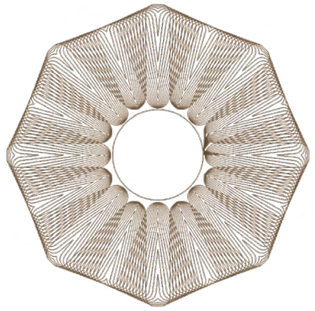
This experience provided us with valuable insights into the operation of industrial machinery and taught us the meticulous preparation of materials and code necessary for the machinery's proper functioning.vv

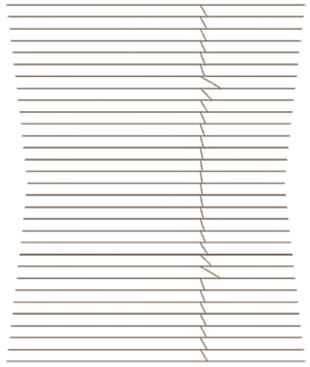
Conceptual Sketches



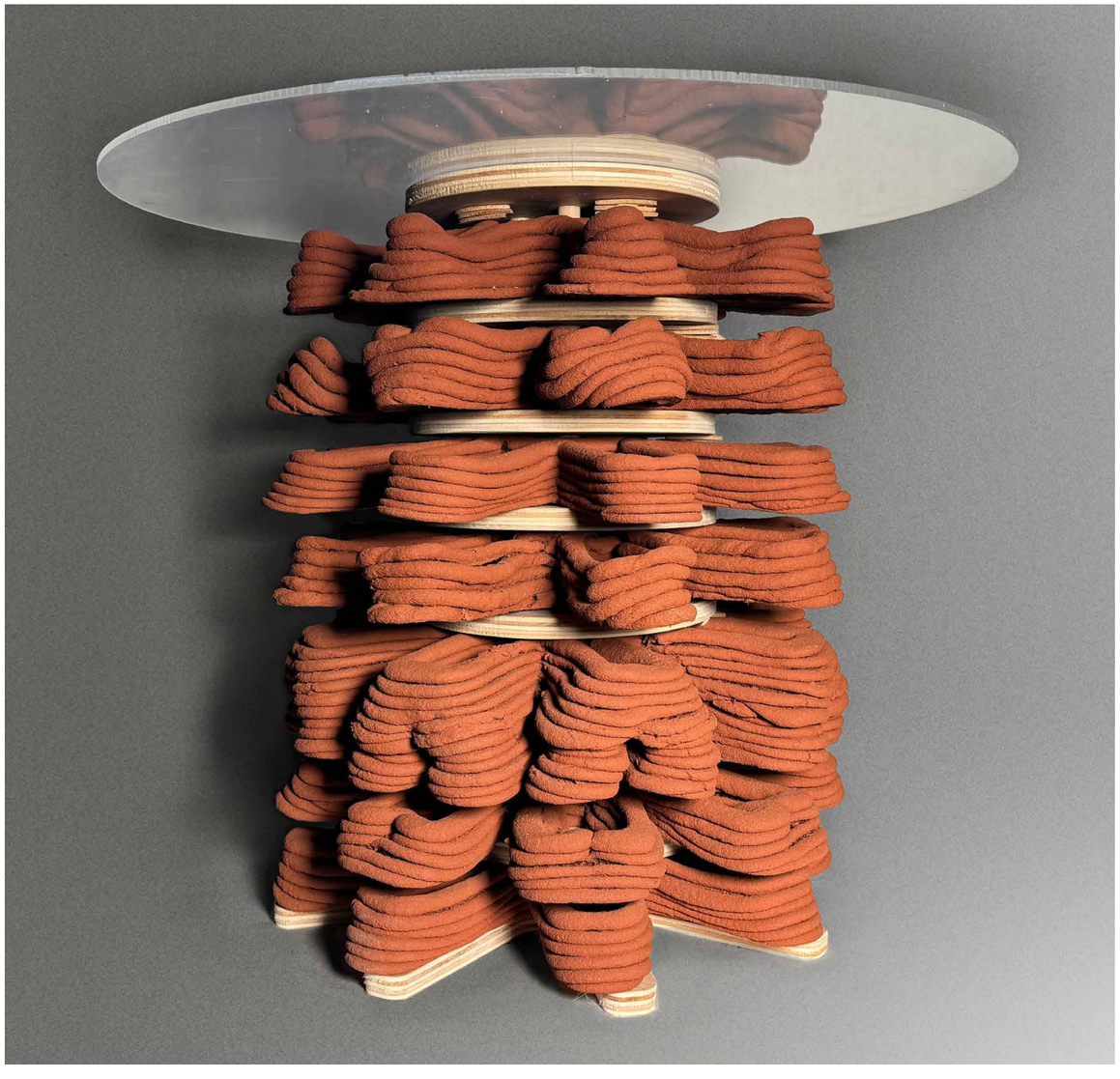
Exploded Diagram of Column Design







GRASSHOPPER GENERATED CURVES FOR G-CODE



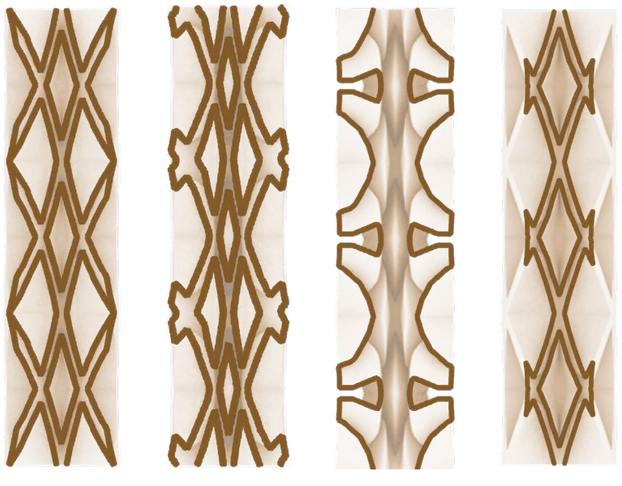
3D Printed Column
Grasshopper generated curves for Gcode

3D PRINTING USING SCARA

1 SEGMENT OF COLUMN

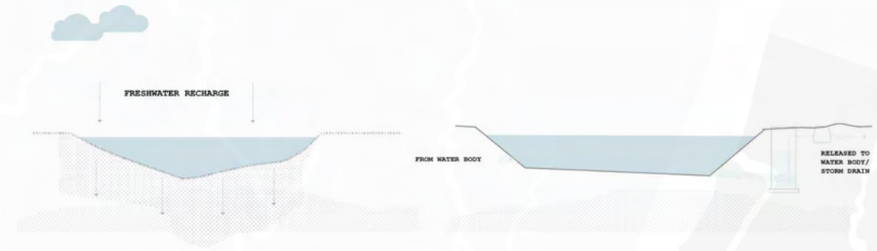
RED CLAY + HEMP FIBRES+ ALGENATE+ CELLULOSE

LAYERS



FINAL COLUMN / TABLE

08



FLOATING NEW YORK

MARITIME DEPOT AND FERRY TERMINAL

SPRING 2024 I ADVANCED STUDIO VI I LAURIE HAWKINSON

RHINO, REVIT, PHOTOSHOP, ILLUSTRATOR, V-RAY, AUTOCAD.

DESIGN TEAM- SIMAR KAUR KOCHHAR, ZHUORUI LI

Higher Sea levels and increasing coastal flood exposure pose growing challenges for the large population and major economic assets along New York City's shoreline. Historically, severe coastal floods (both hurricanes and nor'easters) have struck the City, causing great harm.

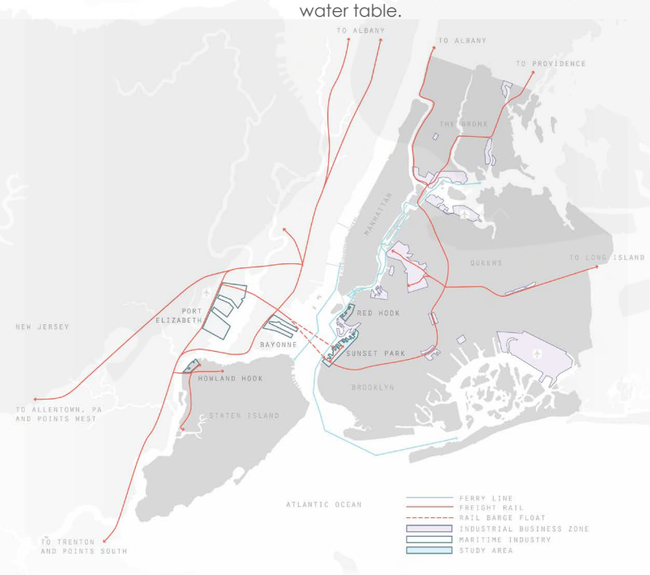
Could issues of energy, ecology, together with cultural production be our framework for thinking about Architecture and Infrastructure?

The South Brooklyn Marine Terminal (SBMT), located in Sunset Park, adjacent to Industry City and Bush Terminals serves as the urban site. The designated New York Harbor areas for Empire Wind 1 & 2 (approximately 15-30 miles offshore) serve as the greater site field. The site history as an intermodal shipping, warehouse and manufacturing hub; encompasses 73 acres leased from NYC for a new station port assembly of wind turbine components.

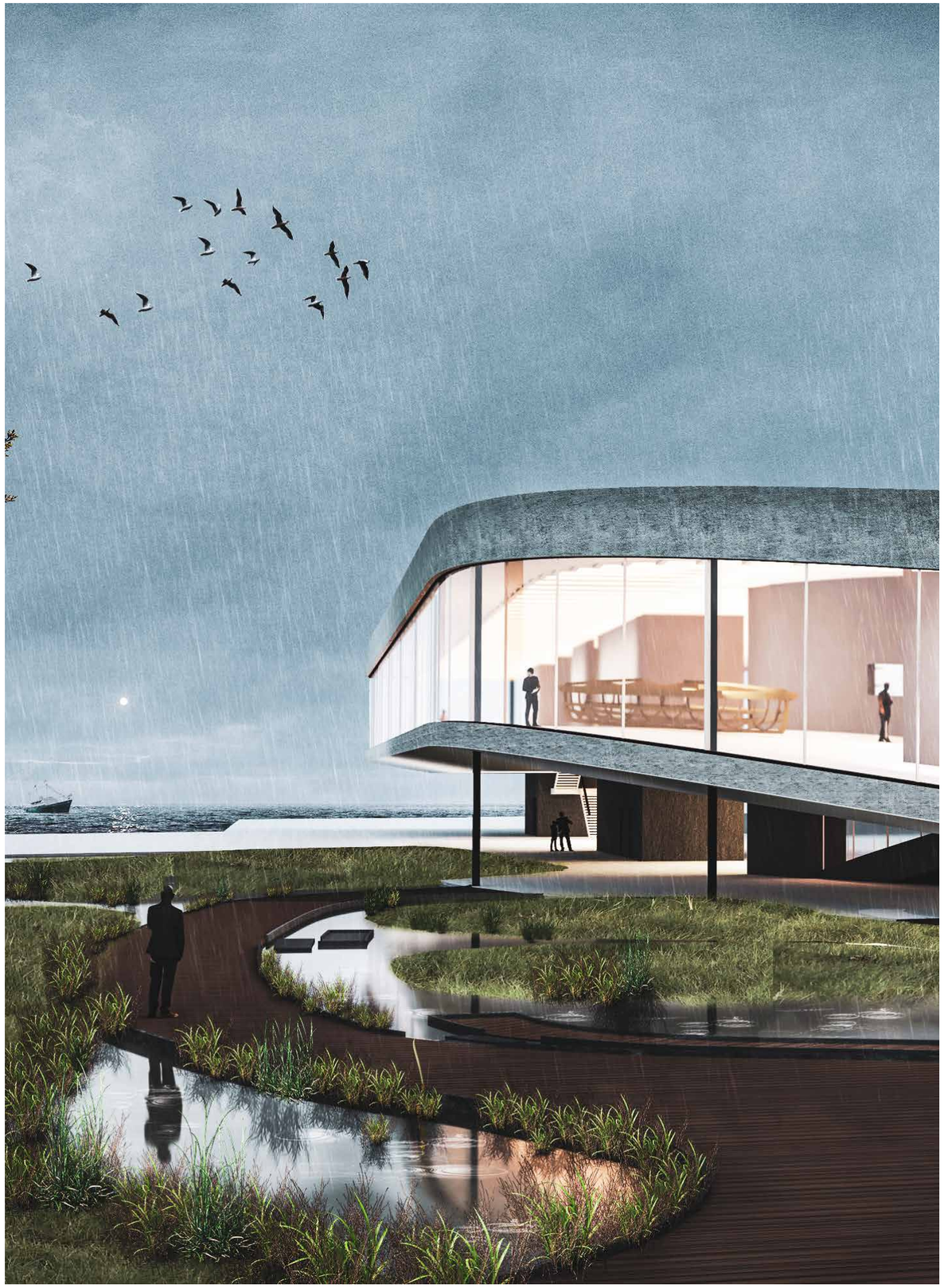
With a rich maritime and industrial history, the site acts a base to reflecting on the past and looking into the future. The design and program allows us to enhance on that history while keeping the site as a backdrop but important layer.

The design focuses on some real conditions on site to create ecological solutions to rising flood and storm water conditions on site.

The concept follows the methods of retention and detention for the collection of saline and fresh water without mixing the two and allowing the replenishing on the ground water table.

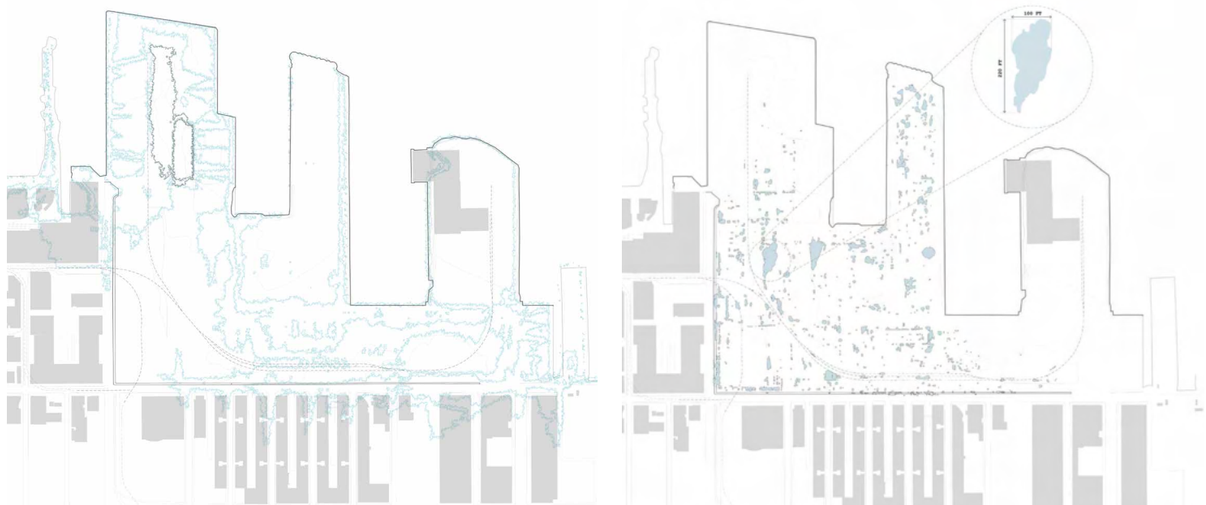


Retention and Detention



View from pedestrian pathway

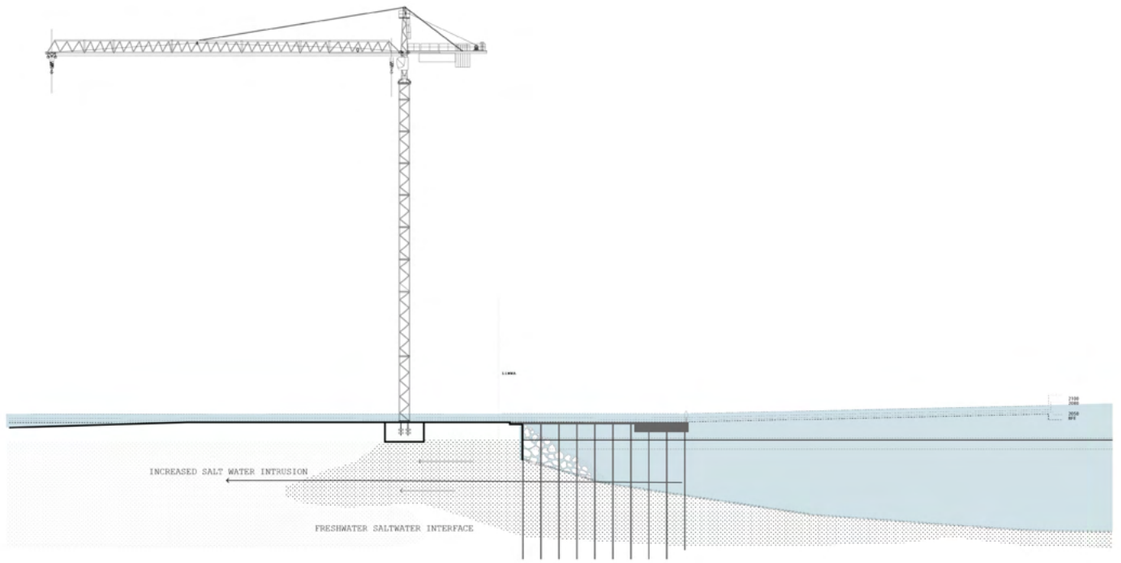
SITE CONDITIONS



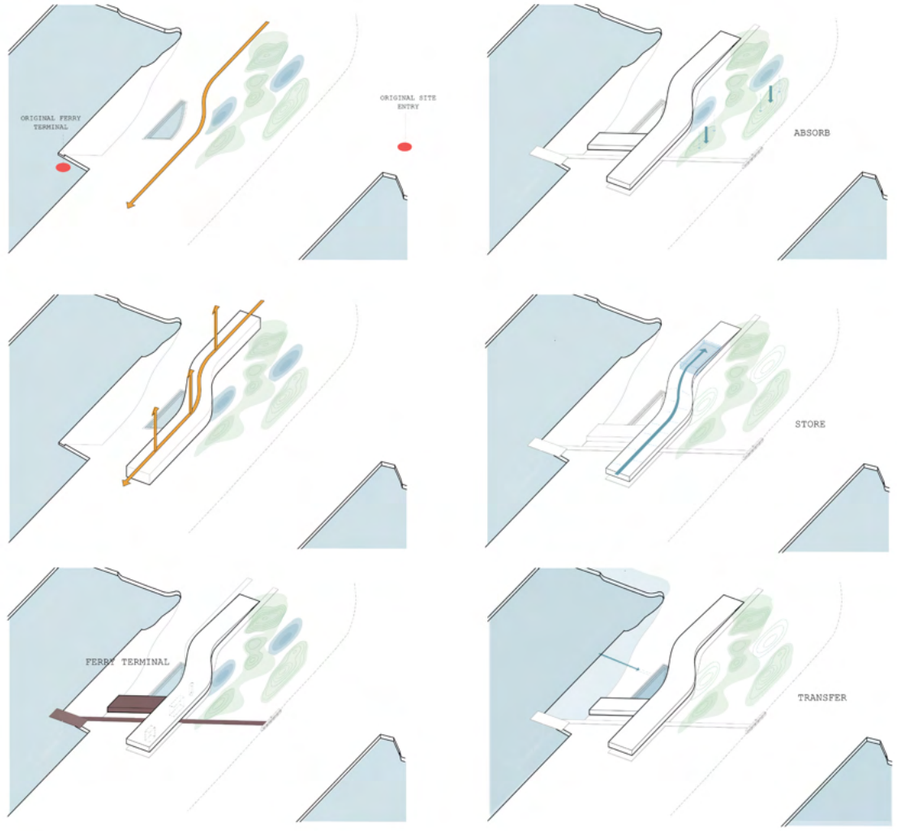
FLOOD CONDITIONS ON SITE- NYC FLOOD MAPPER 2020- 2100

RAIN CONDITIONS ON SITE-GOOGLE EARTH

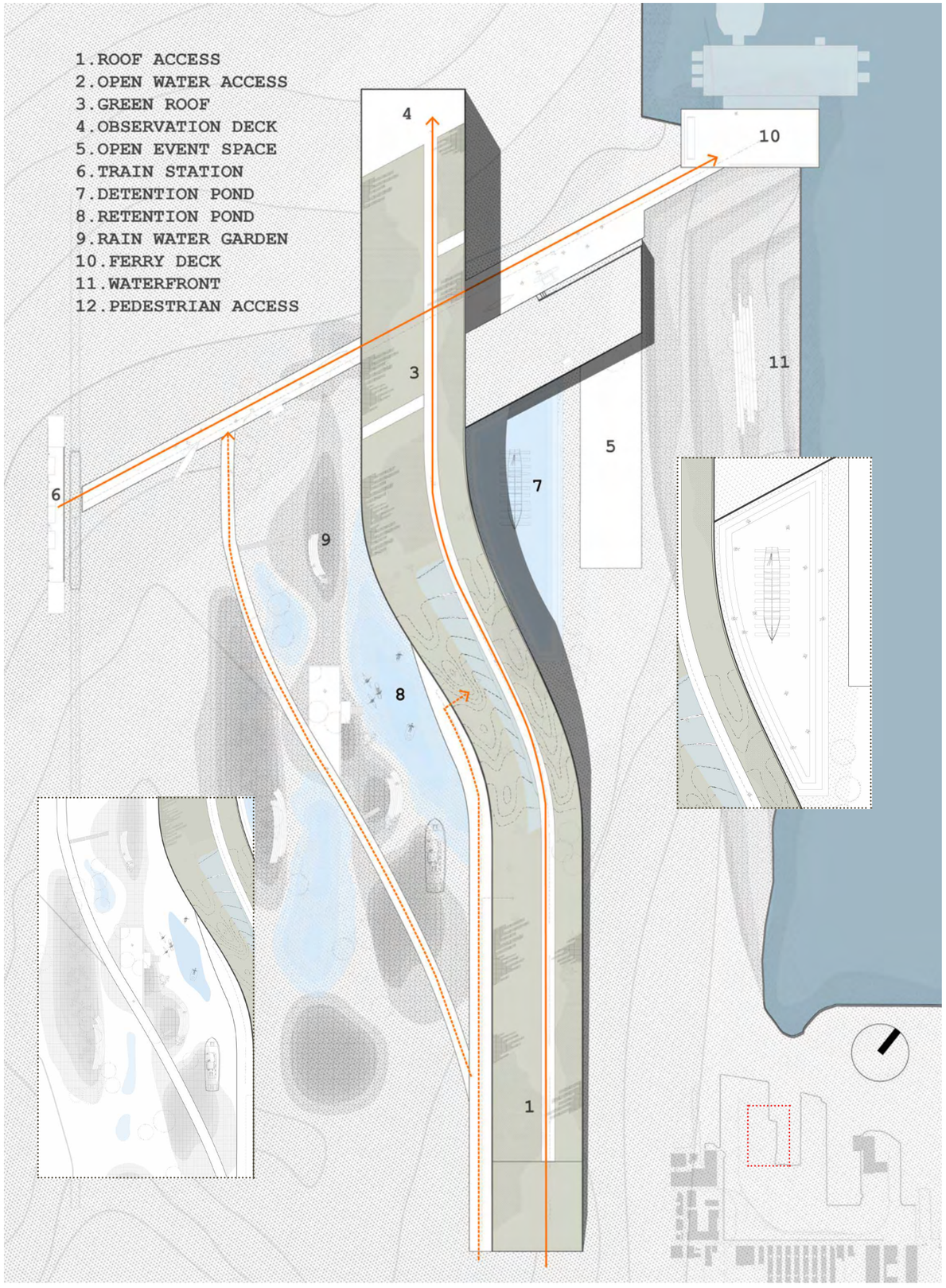
Rain Conditions on Site Mapped from Google Earth
Maximum High Tide for the years 2020- 2100



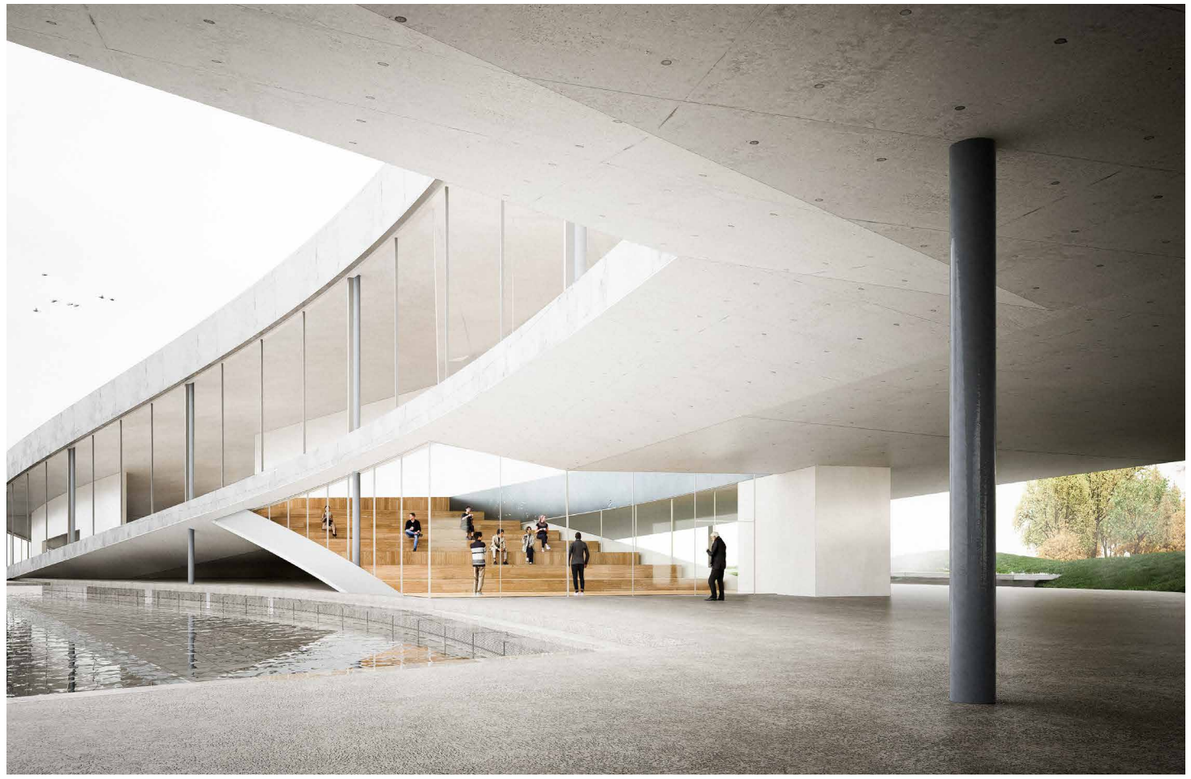
FLOOD CONDITIONS ON SITE- NYC FLOOD MAPPER 2020- 2100



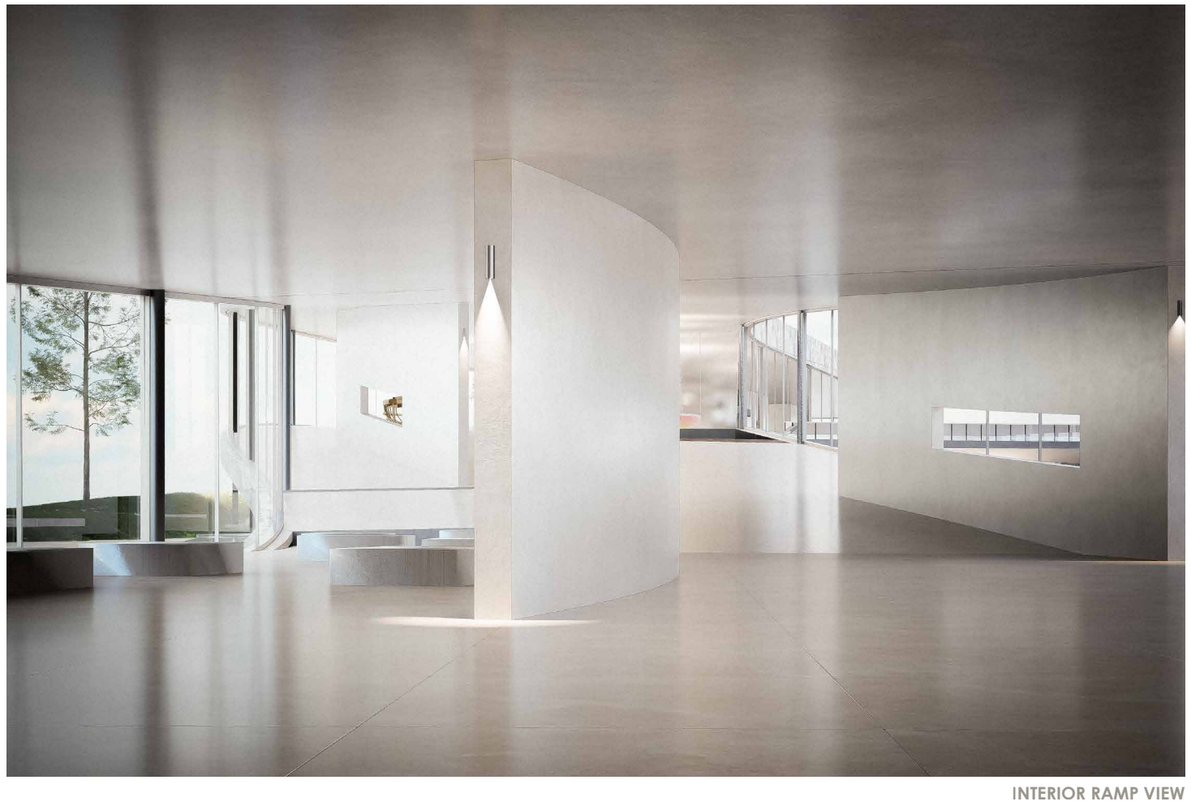
Rain Conditions on Site Mapped from Google Earth
Zoning Diagrams



Site plan

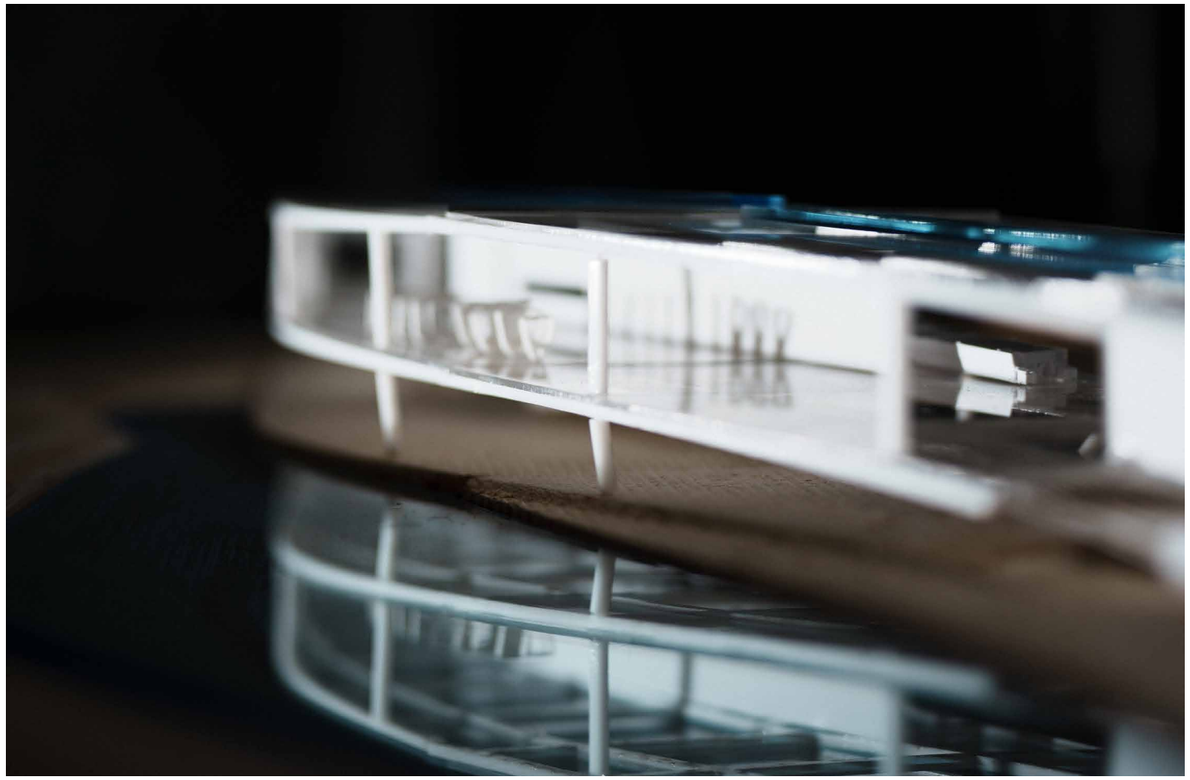


VIEW FROM FERRY TERMINAL

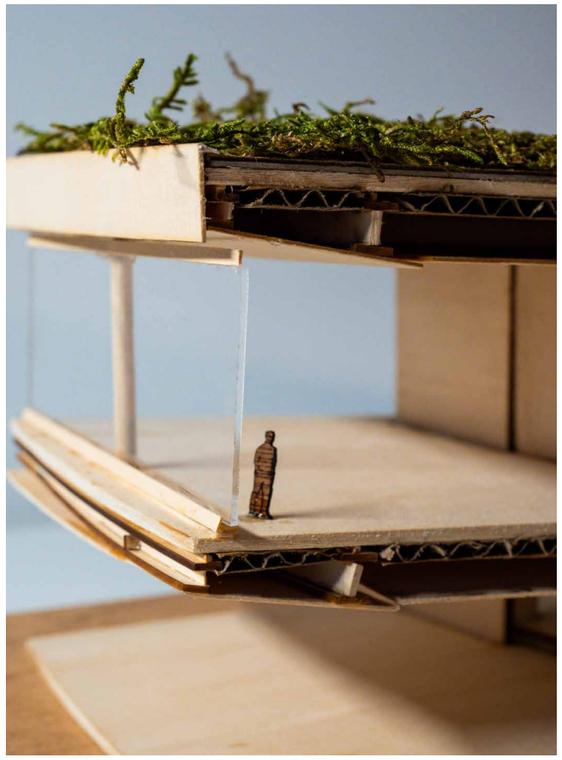


INTERIOR RAMP VIEW

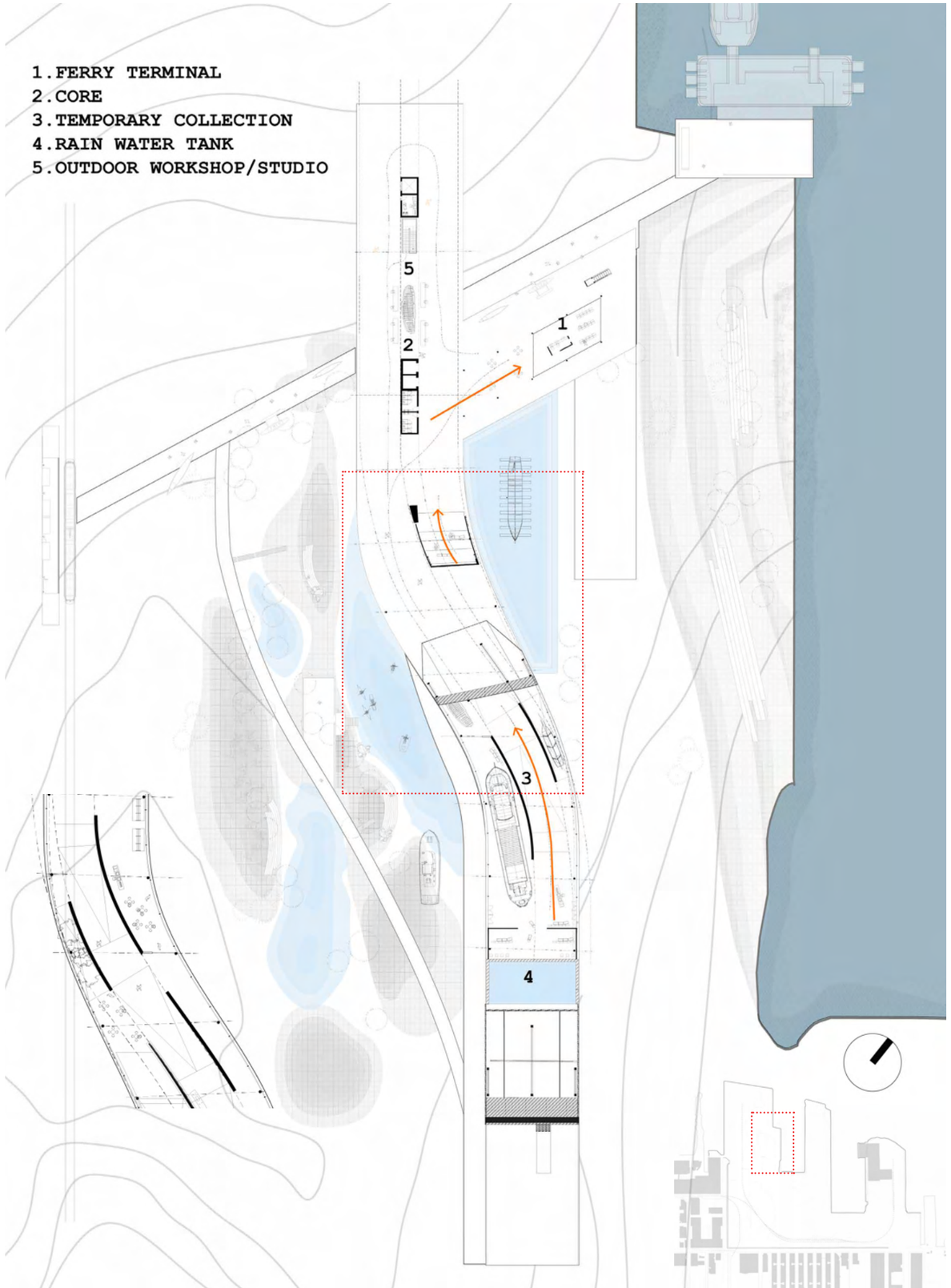
View from Ferry Terminal
Interior Ramp view



SITE MODEL- 1:200

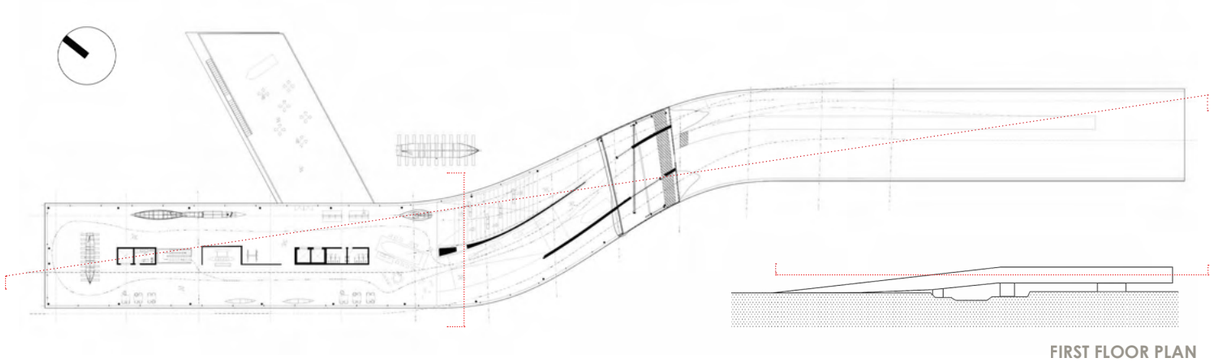


CHUNK MODEL 1:100



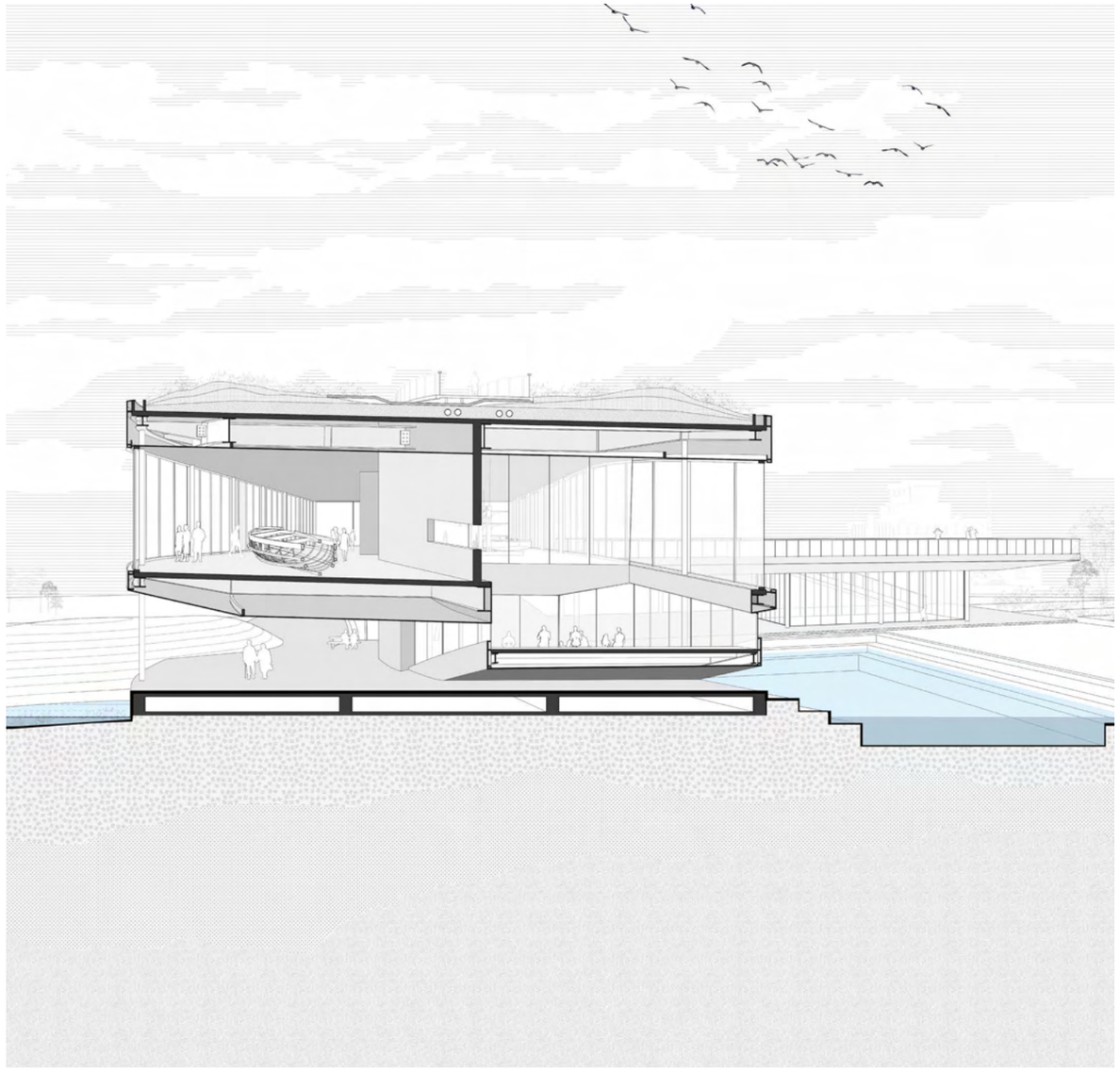
Site Model- 1:200 - CNC Plywood and Acrylic
Chunk Model -1:50 - Bass wood and Chipboard

Ground Floor Plan

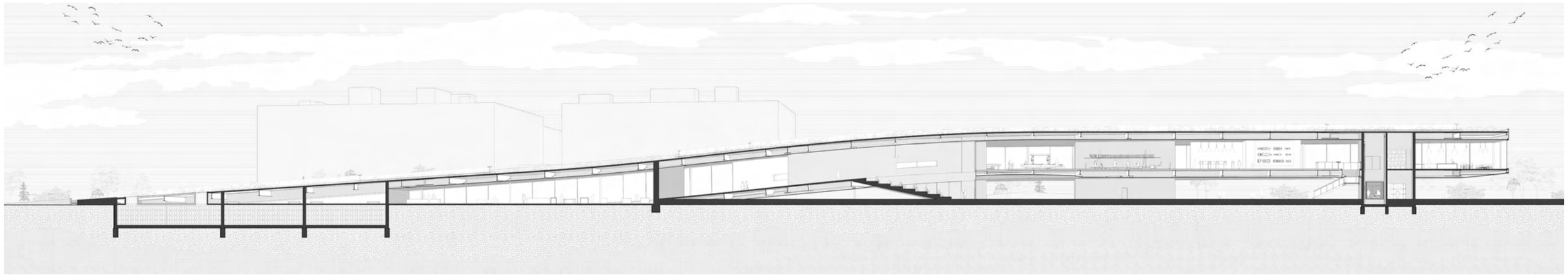


FIRST FLOOR PLAN

SOUTH FACING VIEW

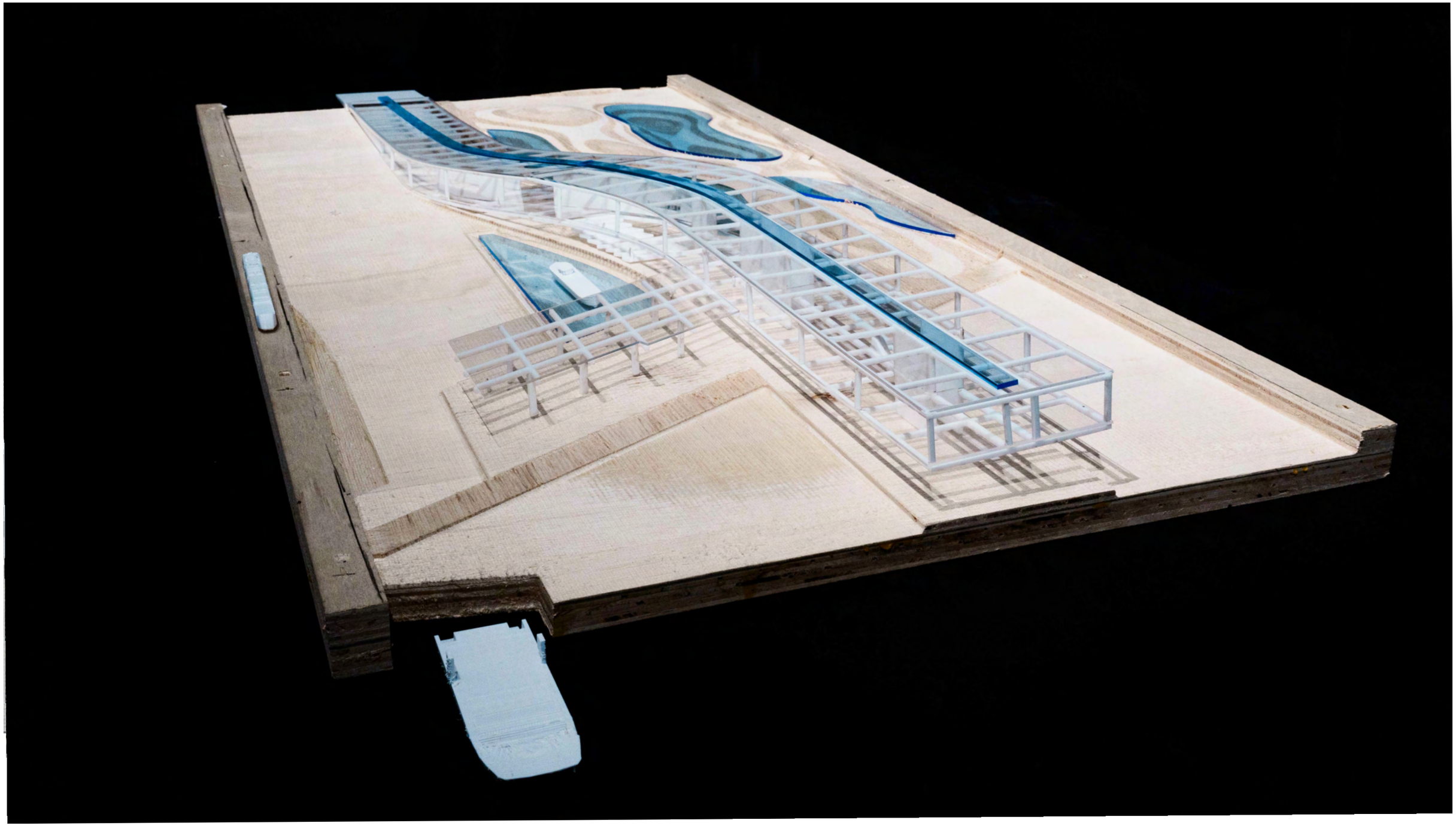


SHORT SECTION

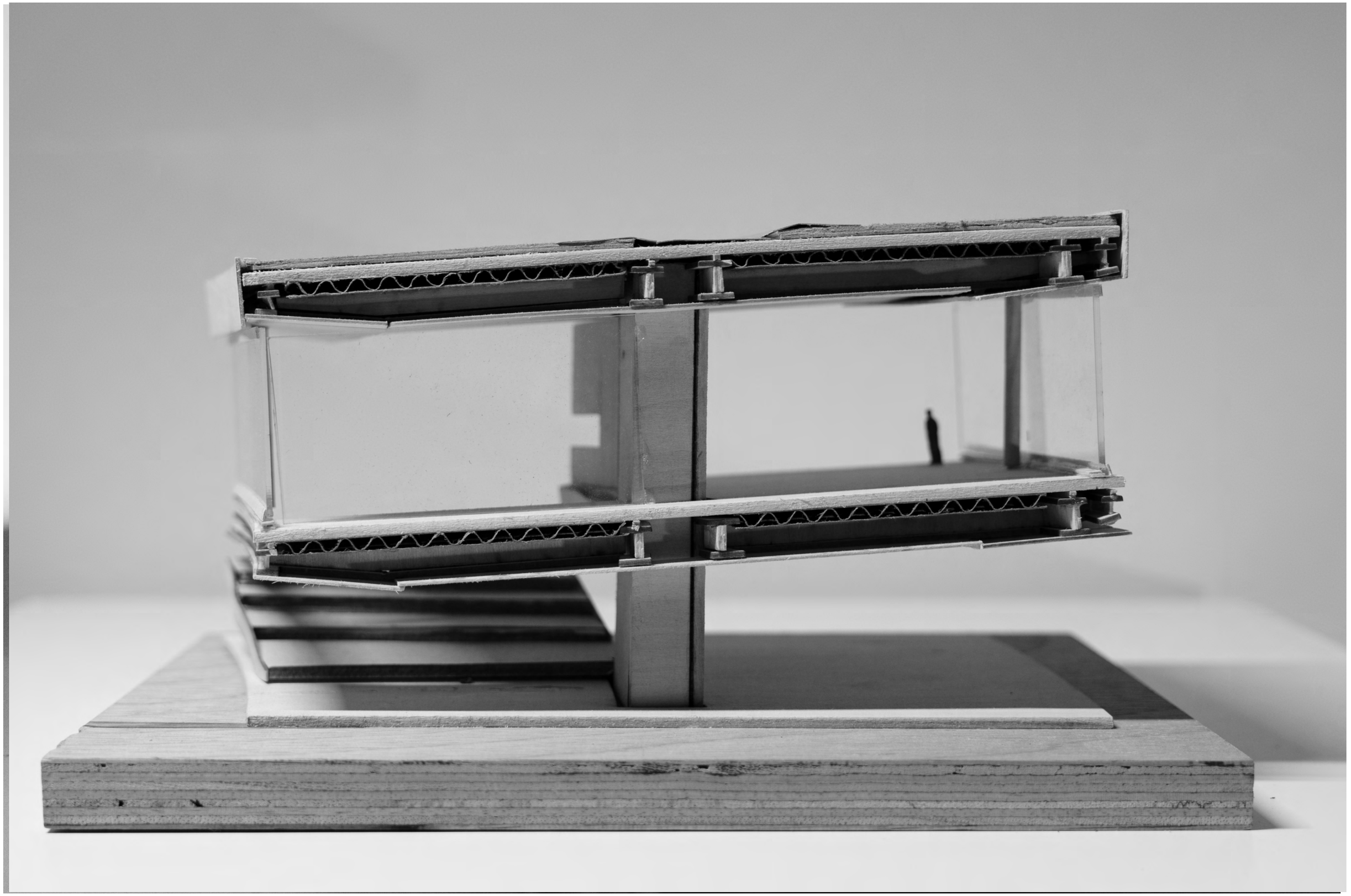


First Floor Plan
South facing view from Pier 35

Short Section across water bodies
Long section vertically scross the structure

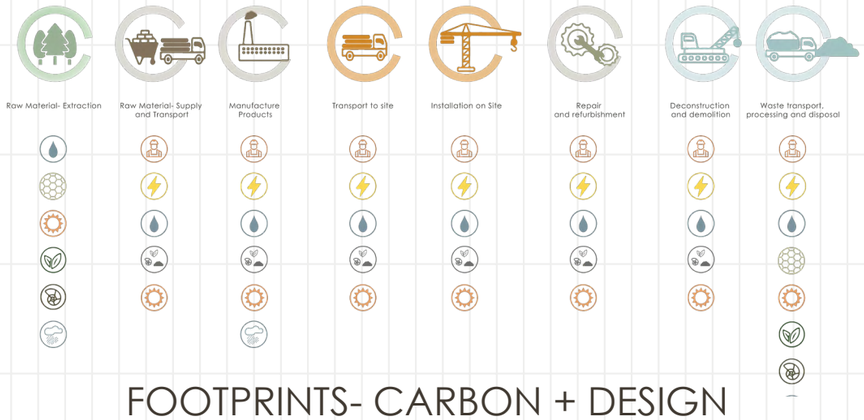


Site Model- 1:200 - CNC Plywood and Acrylic



Handmade Chunk Model -1:50 - Bass wood and Chipboard

09



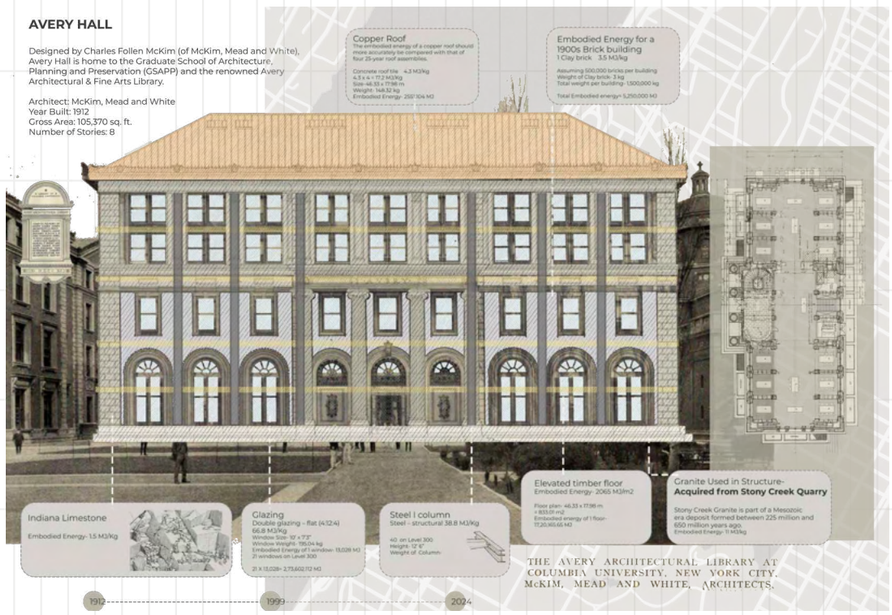
FOOTPRINTS- CARBON + DESIGN

EMBODIED CARBON + OPERATIONAL CARBON

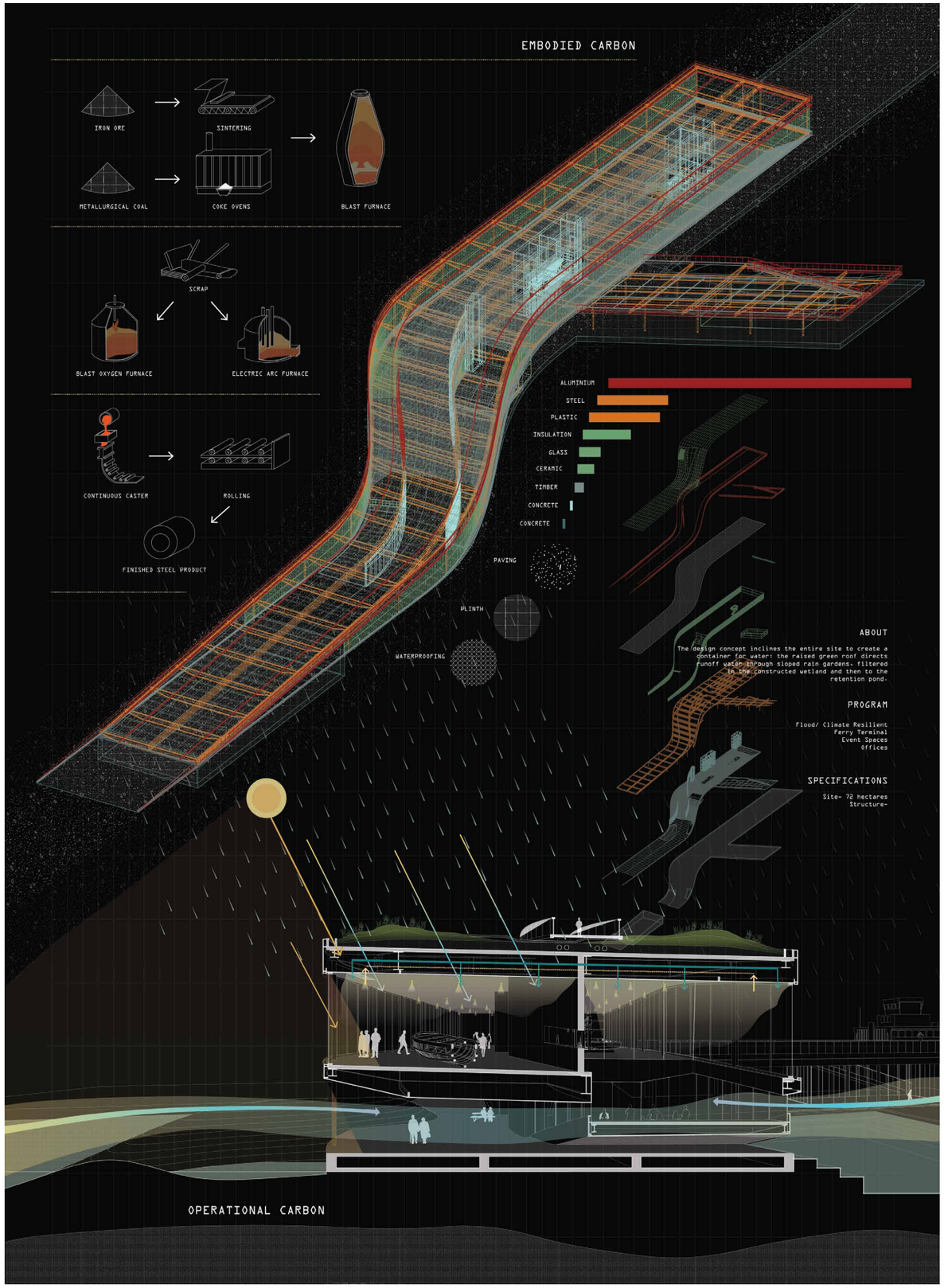
SPRING 2024 I BUILDING SCIENCE AND TECHNOLOGY I DAVID BENJAMIN

In the context of the climate crisis, there has never been a more important moment to think clearly and critically about the footprint of architecture. Carbon footprint is the most famous—and most urgent—impact of buildings, but it is interconnected with other footprints such as energy, water, labor, fairness, and biodiversity. Each fooprint links individual design decisions to global consequences. This seminar and workshop conducted research into carbon accounting, examining the history and relationships between various systems of environmental measurement, inventing new forms of visualizing the footprint of architecture, and developing strategies for designing low-carbon buildings and cities.

Low-carbon strategies that were investigated included material selection, lifecycle analysis, building codes and government regulation, alternative business models, re ovation and adaptive reuse, and design for disassembly.



Legend of icons for Embodied Carbon
Embodied Carbon Caculation for Avery Hall



Embodied and Operational Carbon for Studio Project

POWER TOOLS

MODEL AND DIAGRAM- ESCR PROJECT

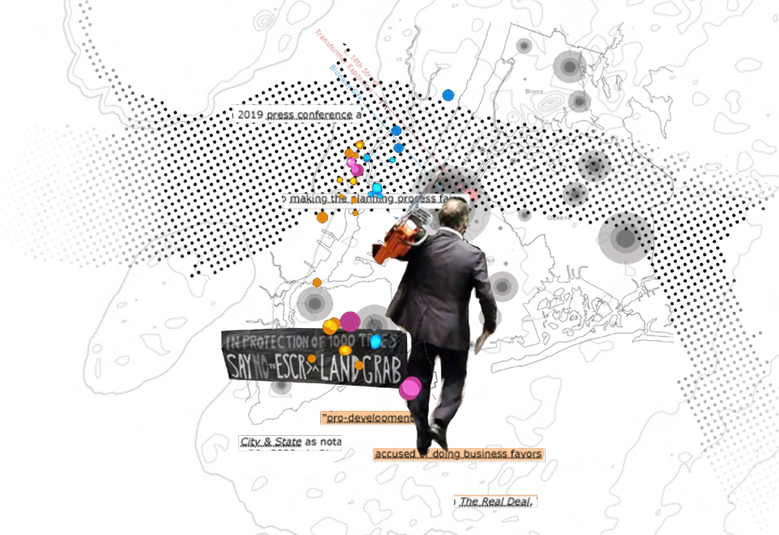
SPRING 2024 I VISUAL STUDIES REPRESENTATION I JELISA BLUMBERG

The purpose of the course was to identify a thematic thread from New York's history of social/ cultural evolution that touches both on resistance to oppression and on visual aesthetic productions in the built realm. This included themes related to race, gender, sexuality, class along with creative practices that could be made legible through a spatialized study.

The East Side Coastal Resiliency Project, signed off by de Blasio, was not the first, nor the only, plan for flood mitigation in East River Park.Research and planning for The East River Blueway Plan began in 2011, right before Hurricane Sandy. The next flood mitigation plan came from a US Department of Housing and Urban Development (HUD) competition called Rebuild by Design, launched in June 2013. But in 2018, without much explanation beyond a described "design update," the BIG U plan was modified into what is now the ESCR project—revising 70 percent of the project and erasing years of community planning.

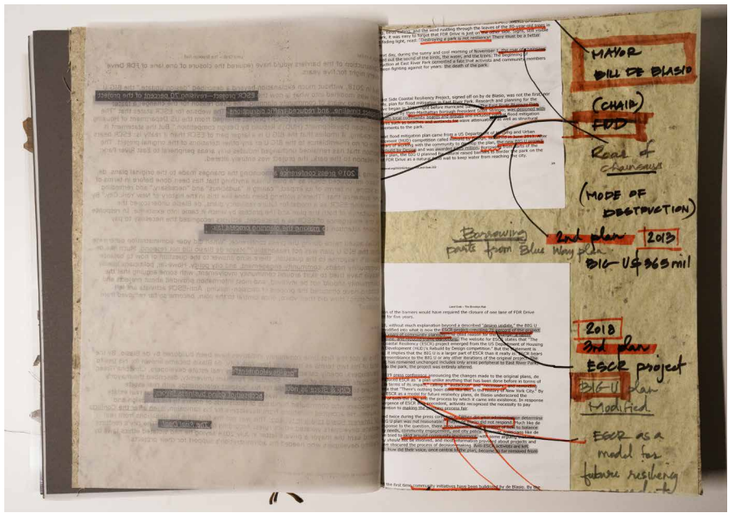
This collage highlights the key events and the controller of these events and also some speculation on the future play of events.

As the city is planning to bury East River Park much of the biodiversity in the park is endangered. This includes trees, native plants and habitat for birds, butterflies, native bees, insects and animals. It can take years for certain species to return after their habitat is destroyed. Protecting wildlife habitats and our biodiversity is crucial in keeping our world healthy.



Analogue and digital Annotation
Digital Collage highlighting the gentrification and series of events

Power Diagram- Depicting People and Organizations in power on the map of New York



Pages of the Analogue Zine

Handmade Realistic Maquette- Foam and Clay model

Maquette/ Collage of Habitat of a bird at East River Park

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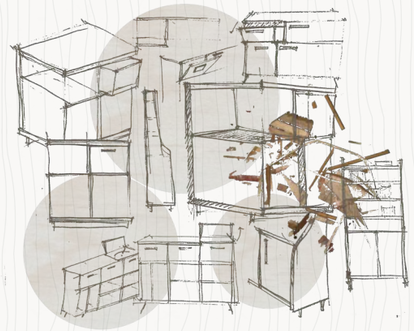


METABOLIC MATERIALITIES

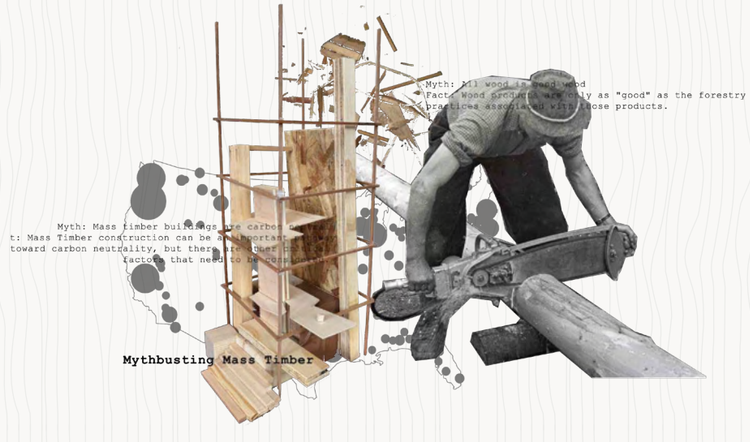
MATERIAL STUDY AND ART WORK

SPRING 2024 I BUILDING SCIENCE AND TECHNOLOGY I MICHAEL WANG

A distinction between animate and inanimate matter pervades so-called Western thought since at least Aristostle's De Anima. In this course, we questioned this persistent dividing line and uncover new linkages between the quick and the dead, using metabolic processes as both metaphor and mechanism for the transformation of matter. Our methods borrowed from and work through scientific discourses, industry-specific expertise, animal studies, indigenous knowledges, queer theory and critical race thory. Having a history of working with organic materials I decided to explore a more industrialized and large scale material. Due to its increase in popularity, it has caused mass timber to become synonymous with carbon neutrality, due to the stored carbon offsetting the emissions expended by them.While this is at an industrial scale, I started looking at my personal connections to mass timber and the waste produced by me as an architect.

I keep a scrap box filled with a variety of wood pieces, ranging from large to small and odd-shaped. These are leftovers that might otherwise be discarded. This setup enables me to consistently utilize these materials instead of purchasing new wood sheets for smaller projects.

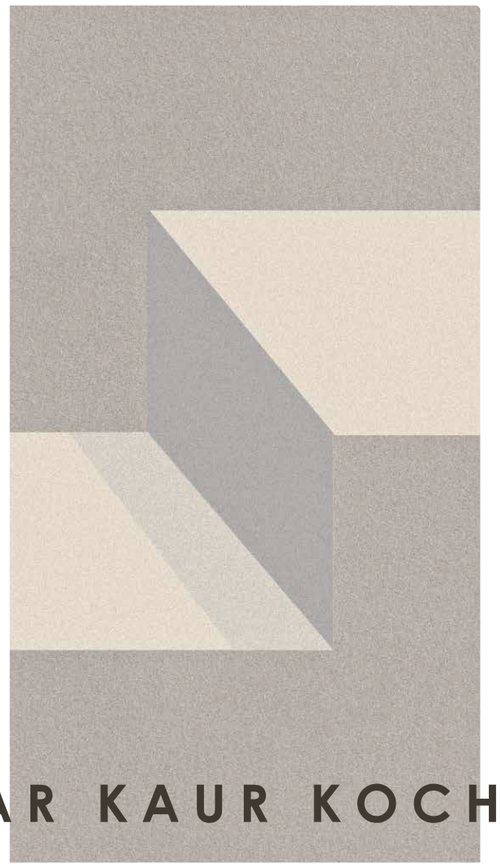
This concept of a Scrap Box allowed me to look at different scales of scrap, coparing my box to the making shops scraps and then to the scraps left behind after cutting the smaller scraps.



Sketches of final work
Collage of the production of Mass Timber

Mood Board of Wood Scraps

Series of Maquettes- Scrap box of smaller unusable Wood scraps



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