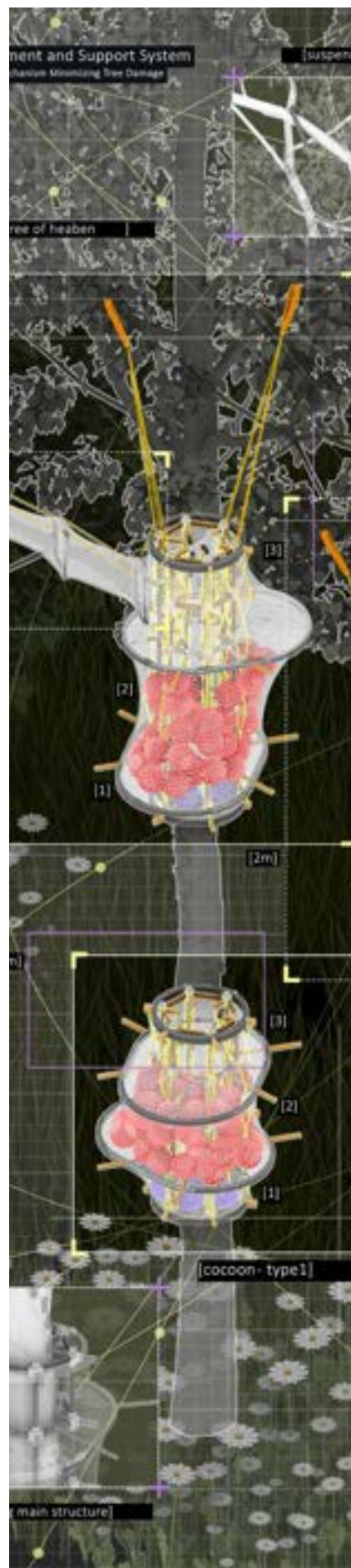




GRADUATION PORTFOLIO Representative Works from GSAPP

M.S. Advanced Architectural Design
Columbia University GSAPP

I Fu Chang
UNI : ic2698
Spring 2026



Living in Second Ground

I Fu Chang

Shawn Shao-Wei Wang

Panchenchen Feng

Spring 2026

Studio Critic : Fernanda Canales, Foteini Kallikouni

Project Description

The project focuses on Colonia Doctores in Mexico City, a neighborhood shaped by a vibrant and largely informal culture of automobile repair. Repair shops are not only economic units but also social anchors, where mechanical labor, daily exchange, and community life extend into the street, blurring the boundary between workshop, sidewalk, and public space.

Rather than transforming a single building, the proposal operates at the scale of the block, treating the neighborhood as a connected system of workshops, streets, and shared spaces. Through detailed mapping, a Morphological Catalog of repair shop typologies was developed to guide site-specific strategies. Hybrid interventions combine mechanical labor with flexible dwelling, forming a connected landscape where informal industry, housing, and collective life coexist productively over time.

Colonia Doctores

Colonia Doctores in Mexico City is shaped by a dense urban fabric and a vibrant culture of automobile repair workshops. Mechanical labor and social exchange often spill into the street, blurring the boundary between workshop and public space. The project maps this repair network and identifies sites where new structures can grow from the existing urban fabric

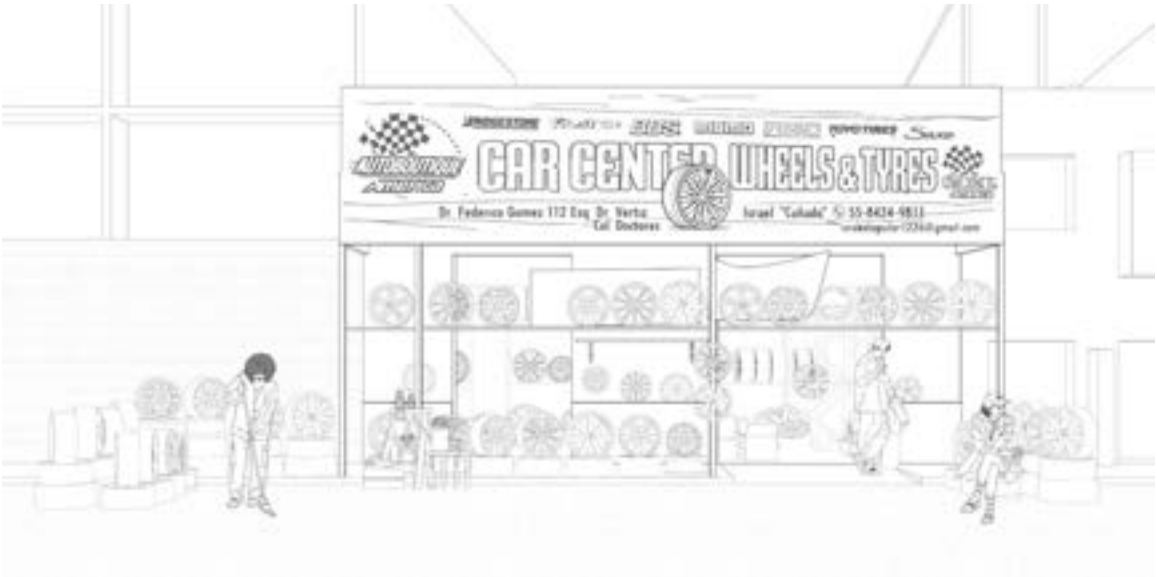


1

fig.1 Urban plan of Colonia Doctores

Precedent Studies

Colonia Doctores is composed of a diverse range of building and lot typologies shaped by incremental urban growth. Repair workshops occupy linear lots, corner conditions, courtyard blocks, and hybrid configurations, each producing different spatial relationships between workshop, street, and interior space. By mapping these existing typologies, the project develops adaptable architectural strategies that can respond to the specific geometry and constraints of each site.



1



2

fig.1 Elevation for the Tire Shop
fig.2 Elevation for the Bumper Shop

Thesis Drawing

Our proposal for Colonia Doctores establishes a collective framework that reconnects individual repair shops through adaptable scaffolding. The project imagines a hybrid environment where automobile repair remains active at ground level, while housing, courtyards, and community spaces grow above, transforming the workshop into a social anchor for automobile culture, art, and shared everyday life.



fig.1 Thesis collage showing the relationship between automobile work and collective living.

Ground & Second Floor Plan

The drawings show a building that opens directly to the sidewalk, creating a flexible ground floor for repair work, social exchange, and art display. Above, artists and mechanics live in mixed double-height units, with work below and housing above. Shared living rooms, studios, and in-between spaces blur public and private life across the community.



fig.1&2 Ground and second floor plan.

West - East Section

The west-to-east section shows how the existing building is preserved and extended through the new design. Most of the original structure and its sidewalk connection remain, while a scaffolding system creates an elevated layer of public movement. The section also shows artist units with studios below and living above, while shared atrium living rooms create collective gathering spaces for each floor.

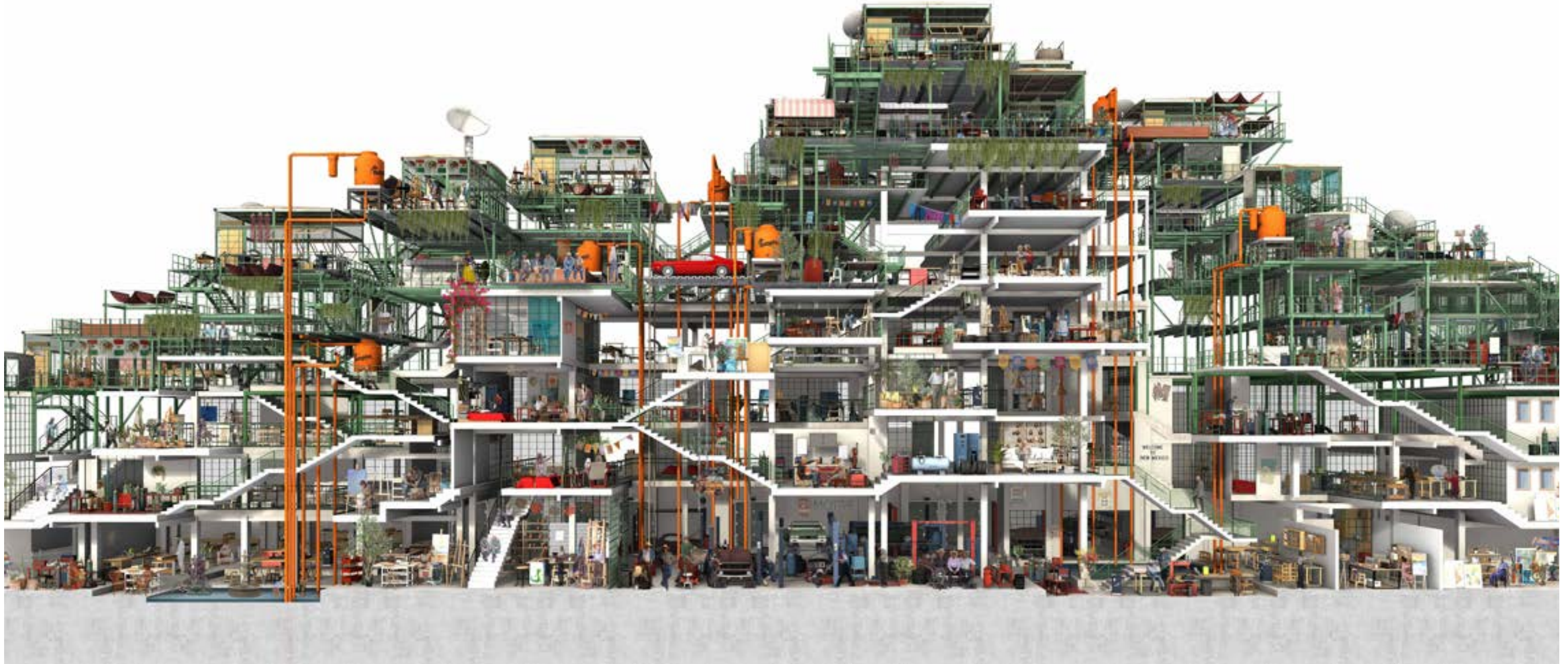


1

fig.1 Section perspective through existing buildings.

North-South Section

The north-south section shows how the project connects existing buildings into a collective living space where artists, mechanics, and seniors live together under one roof. Shared amenities allow the spaces to serve the whole community, creating more opportunities for social interaction and support. By linking these buildings, the project strengthens community life, while the roof becomes an extension of existing residents' homes and daily activities.



1

fig.1 Section perspective through existing buildings.

Collective Axonometric & Perspectives

The drawings show a building that opens directly to the sidewalk, creating a flexible ground floor for repair work, social exchange, and art display. Above, artists and mechanics live in mixed double-height units, with work below and housing above. Shared living rooms, studios, and in-between spaces blur public and private life across the community.



1



2



3

fig.1 Collective axonometric of our collective living.

fig.1 View from the self built area of the site.
fig.2 View from the social spaces.
fig.3 View showing how we incorporated the existing facade into our design.

Sweet Negotiations

I Fu Chang

Minjae Kim

Fall 2025

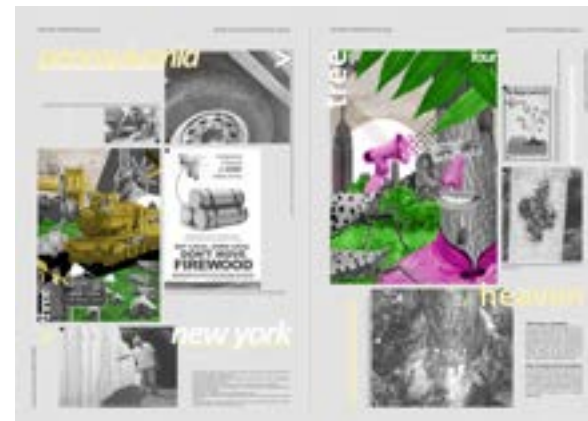
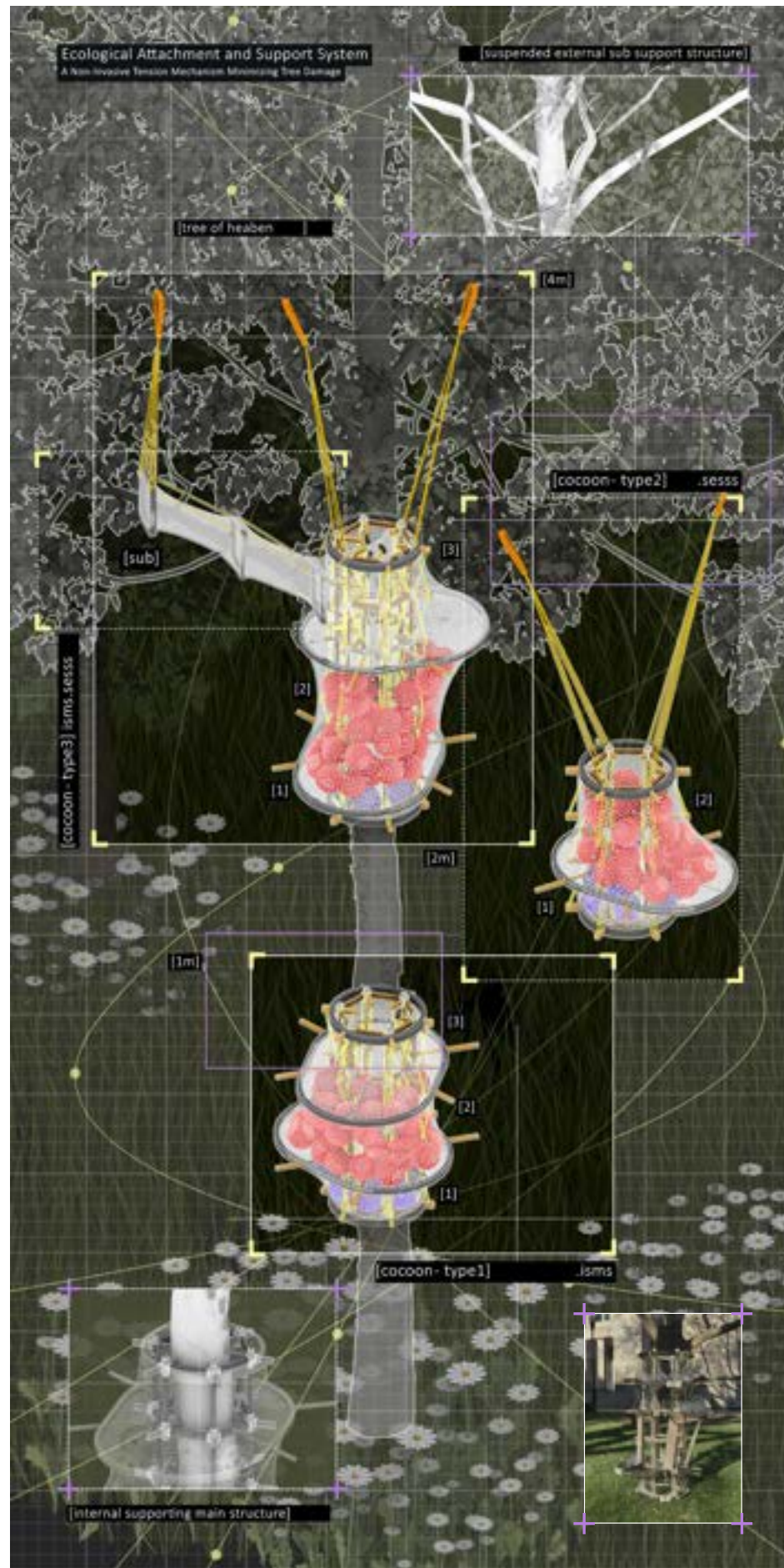
Studio Critic : Michael Wang

Project Description

Our project begins with an examination of an invasive species increasingly visible across New York: the Spotted Lanternfly. By studying how the SLF arrived in the city, we learned that its presence is not the result of an active invasion but of unintentional transport. This shift in perspective led us to question the dominant eradication narrative and to explore how we might instead advocate for the SLF as a displaced species.

Early in the design process, we considered a centralized management strategy to control SLF habitats. However, we realized such an approach could destabilize population dynamics rather than regulate them. We instead sought another species capable of mediating the relationship between humans and the SLF, setting the foundation for a recalibrated ecological balance.

Focusing on the SLF's honeydew production, we identified bees—highly social insects attracted to sugar—as potential ecological connectors. By redirecting bees toward consuming SLF honeydew, we imagined a new form of multispecies interaction that could even generate a secondary product: honeydew honey, reintroduced as a resource beneficial to humans.





Rotation Angle : 0° 30° 90° 150° 210° 270°
Layer : 1,2,1,2,1,2,1,2

20

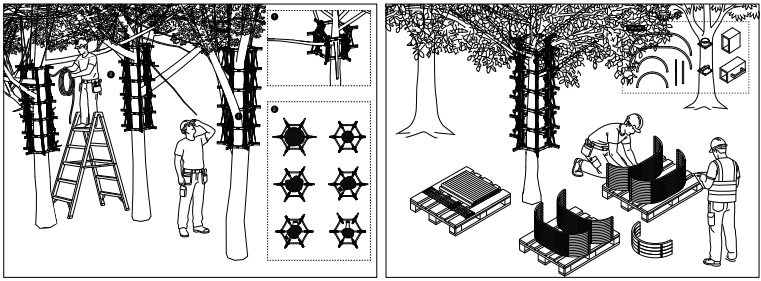
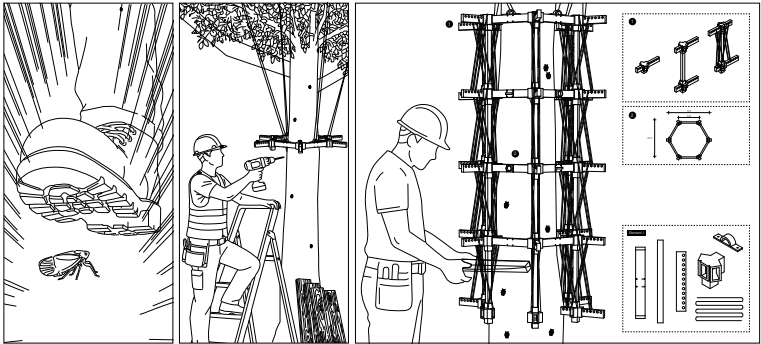
40

60

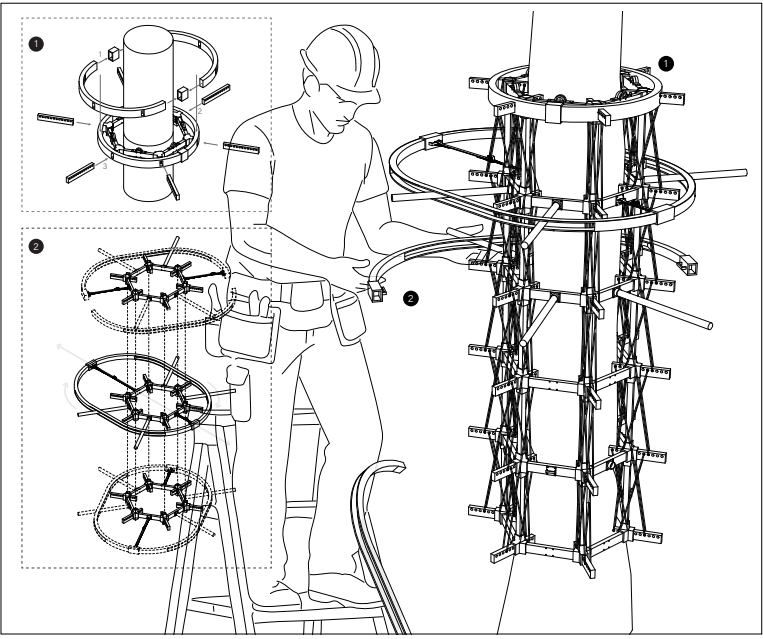
80

Individual Assembly Steps

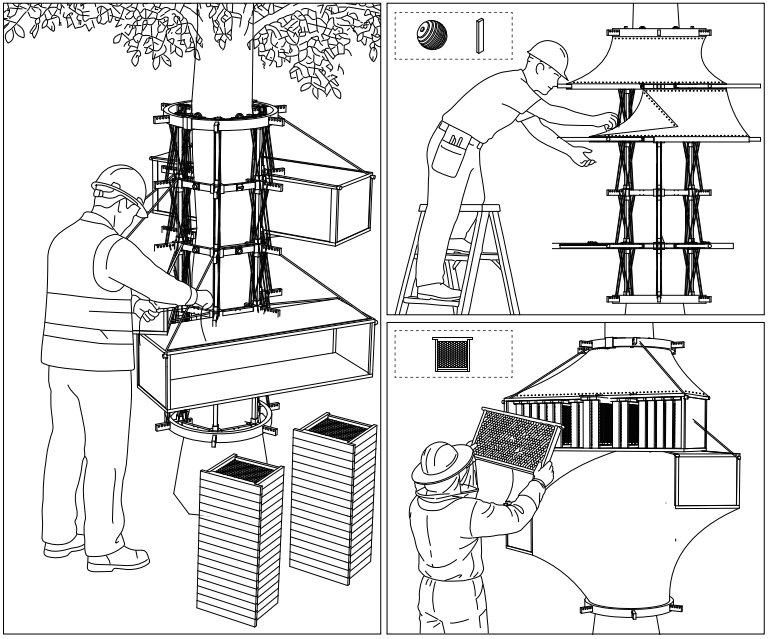
Our designs are intentionally low-tech so everyone can assemble and deploy them. First, attach the top structure to the tree then assemble the middle structure. Adjust the system and prepare the mesh structure. The outer structure adapts to each tree. Some parts connect to the beehive system, while others attach to our modules. We believe these self-expanding systems offer the most effective way to connect urban species.



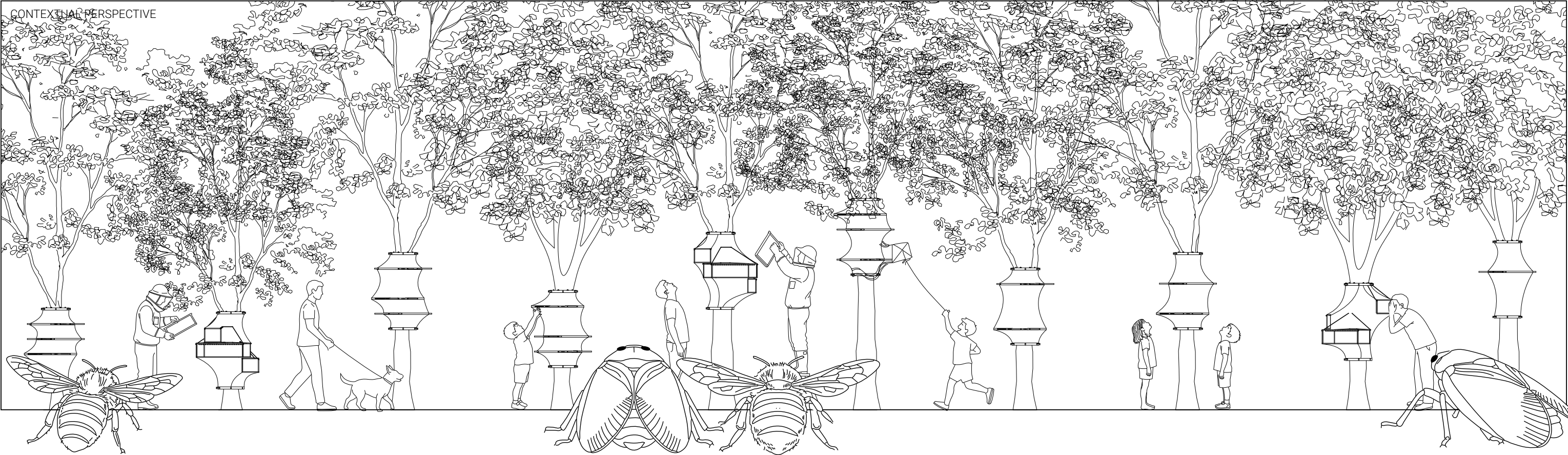
01. Base Installation



02. Structural Assembly



03. Envelope & Finishing



Section

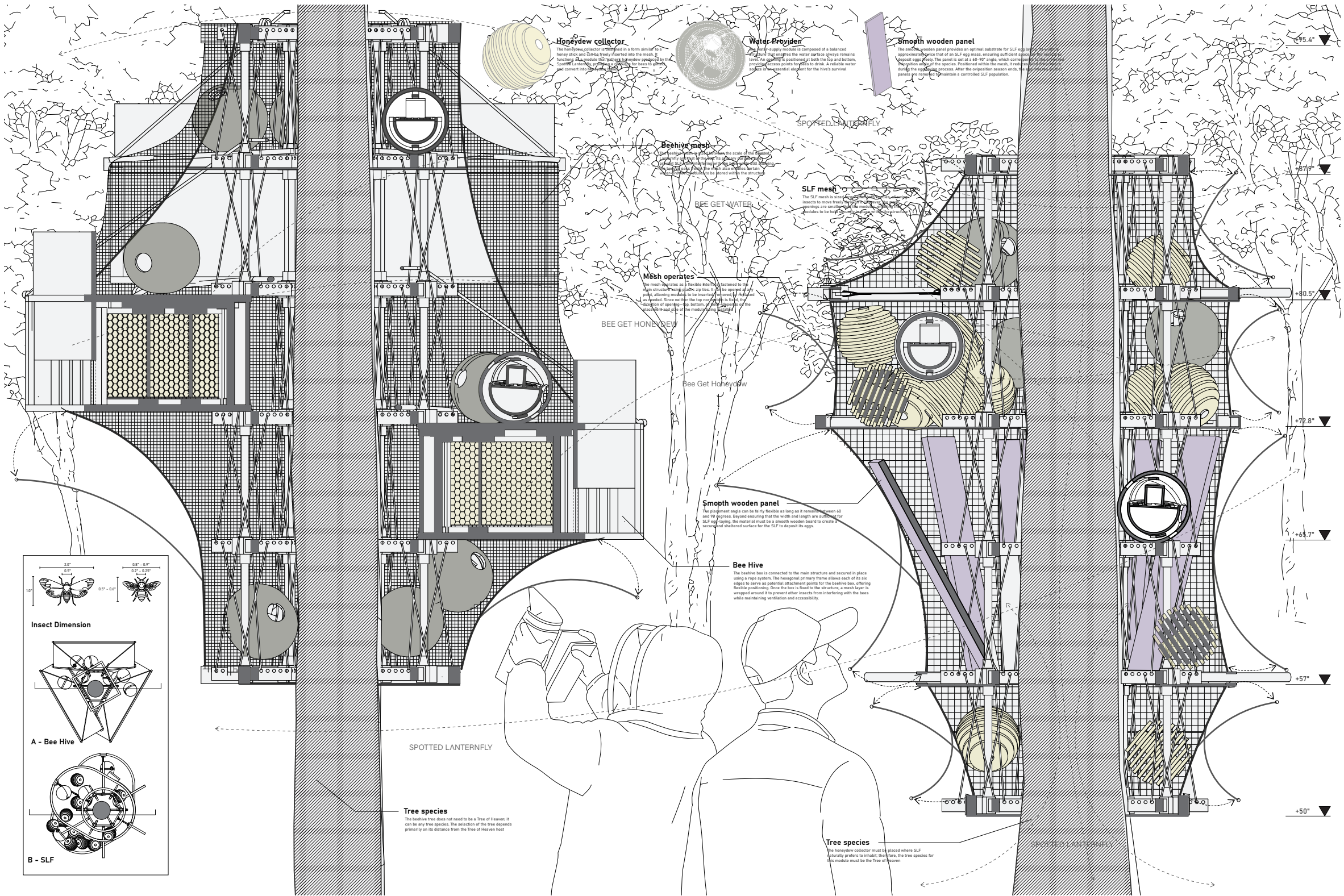
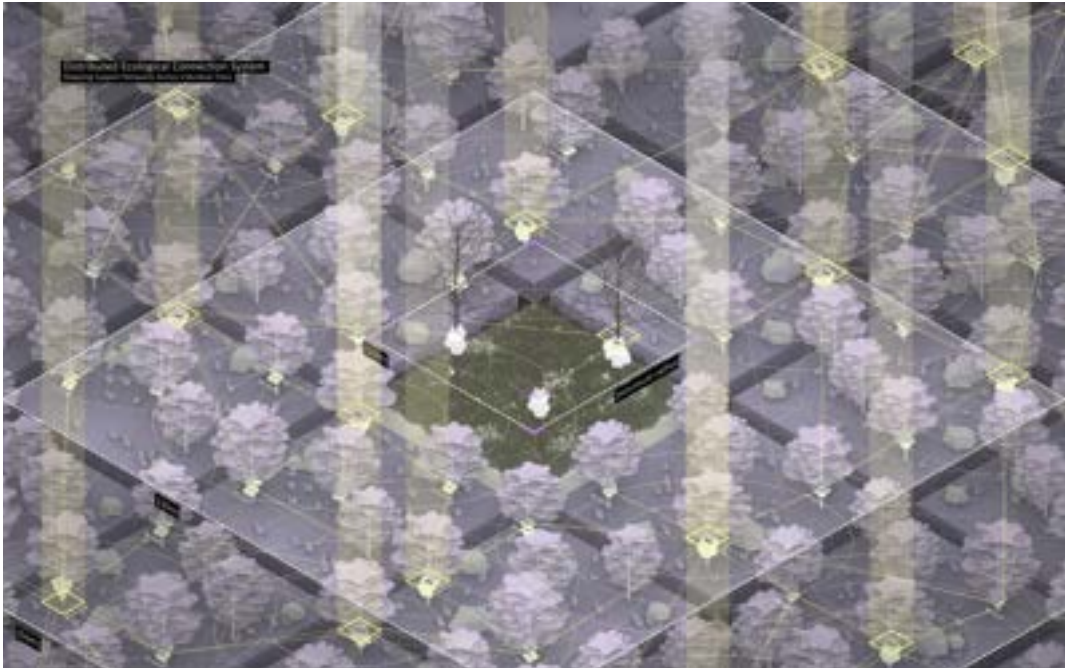
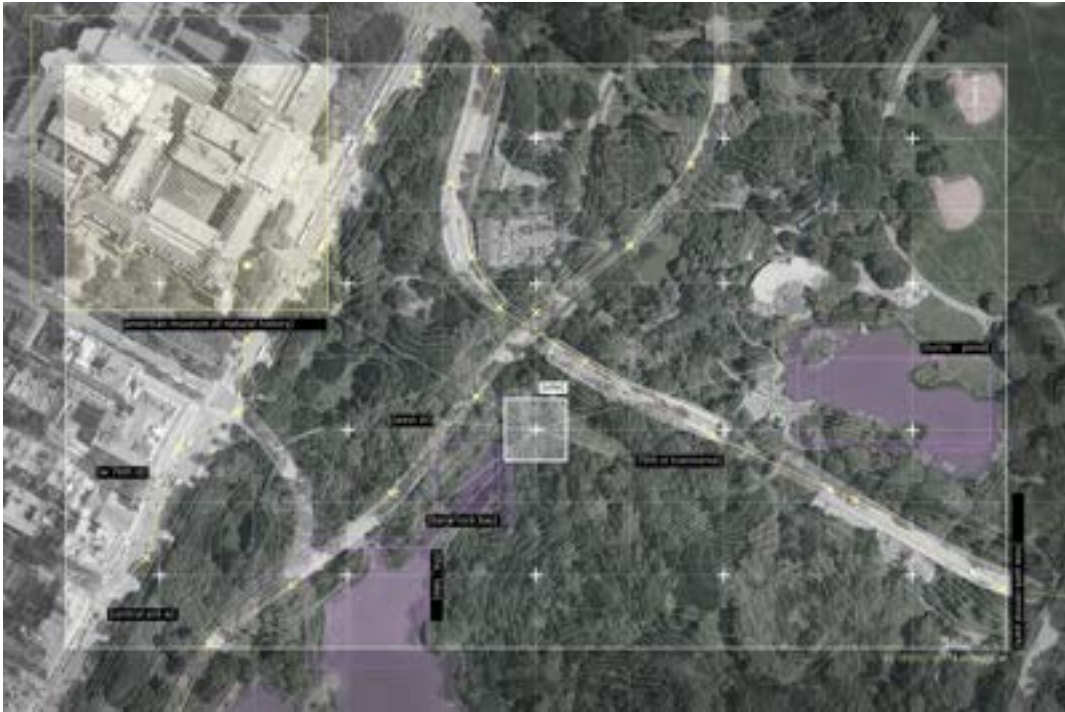


fig.1 Interactions among Three Species

New Biological Relationships



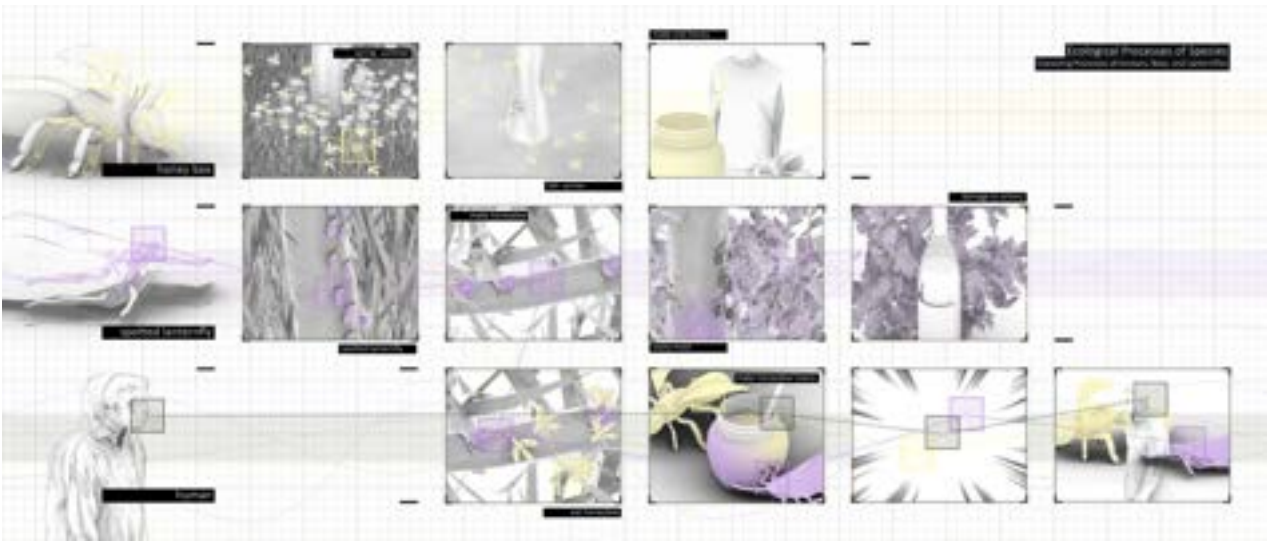
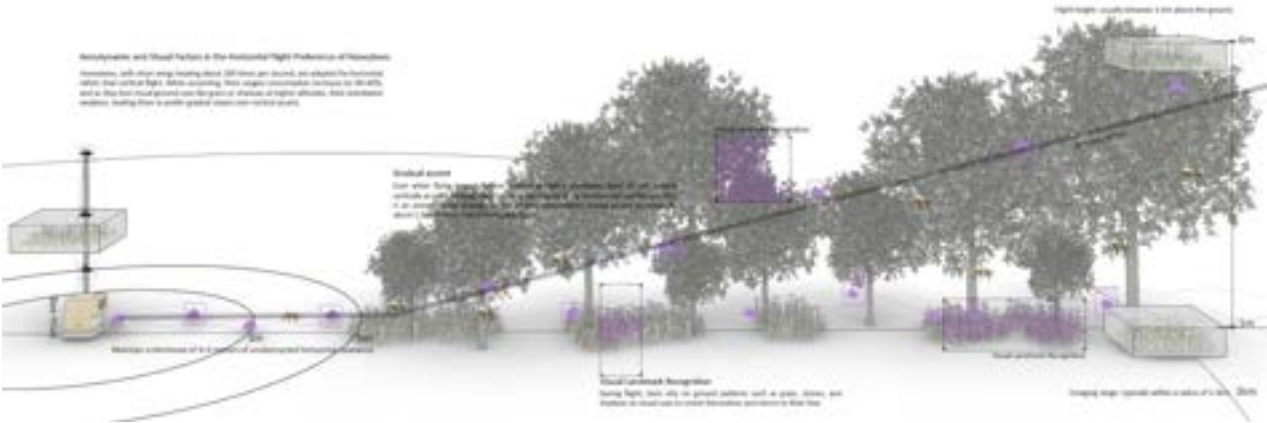
1



2

fig.2 Site Plan of the Design
fig.1 Urban Connectivity

Behavioral patterns of honeybees in managed colonies



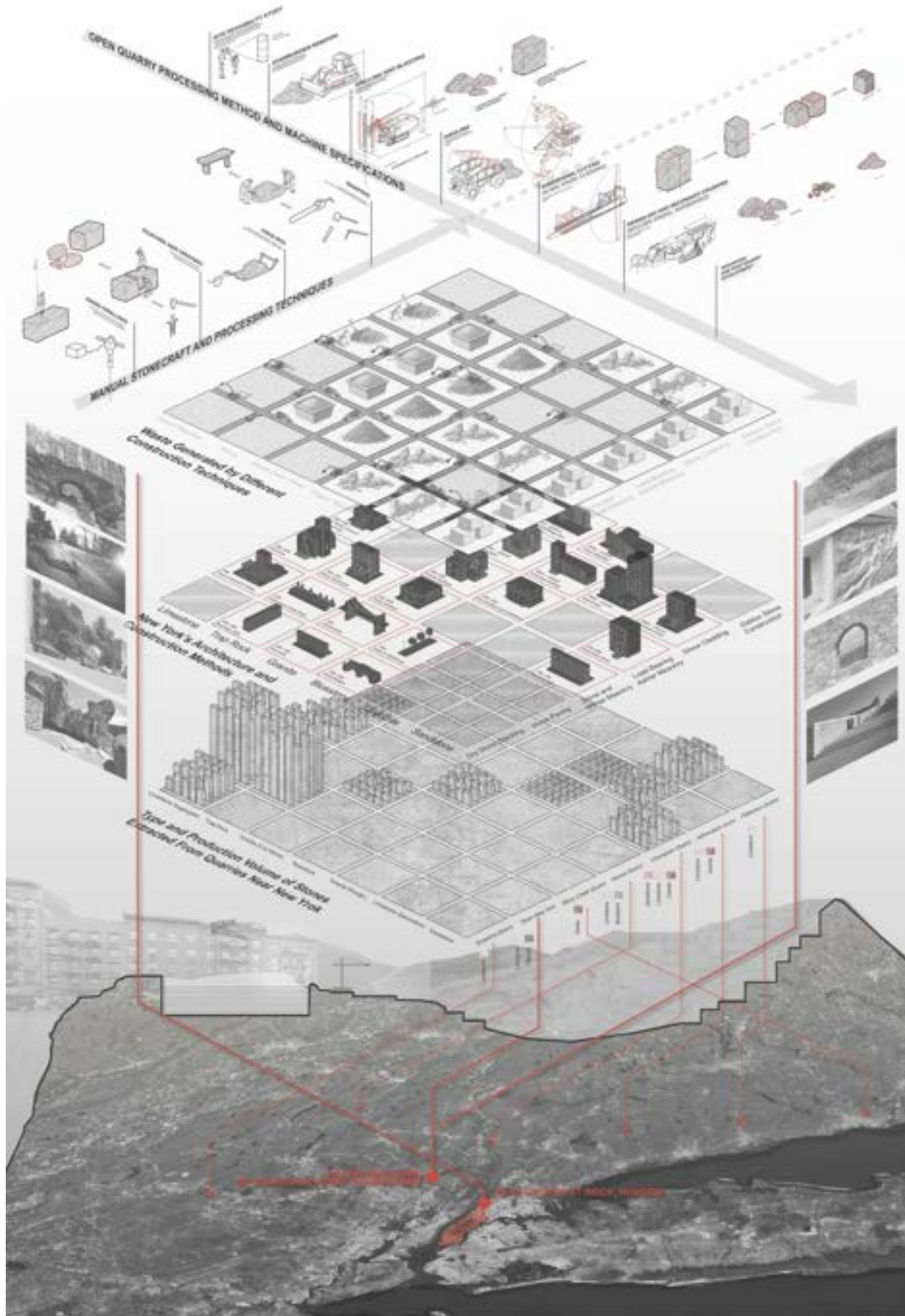
1



2

fig.1 System Interaction
fig.2 From Eradication to ecological Coordination

UNDERSTANDING IMPACTS OF STONE PROCESSING METHODS



From Quarry to Structure

I Fu Chang

Summer 2025

Studio Critic : Nzinga Mboup, Nicolas Rondet

Project Description

This project rethinks quarry waste as a primary architectural resource rather than a by-product of extraction. By analyzing each stage of limestone quarrying, the design identifies reusable waste streams—ranging from large broken blocks to fine stone fragments—and reorganizes them into a comprehensive construction system.

At the core of the proposal is a structural wall system entirely built from quarry waste. A timber framework acts as a flexible holding mechanism, allowing stones of varying sizes to be clamped, stacked, and infilled according to their physical properties. Larger blocks form the base and structural edges, while smaller fragments are stabilized with mortar at upper levels. Behind the stone layer, a rammed earth wall mixed with stone slurry provides thermal mass and moisture regulation, particularly suited to CFA climates.

The project also adopts a time-based site strategy. Initially functioning as a remediation facility during the quarry's final operational phase, the building later transforms into a visitor center. Through this material and programmatic continuity, the project demonstrates how architecture can extend the life of a quarry—from extraction to remediation and public engagement—by treating waste as structure and construction as a temporal process.

Detail Drawing

This detail drawing shows how quarry waste is reorganized into a buildable wall system. Large stone fragments provide structural mass, while smaller pieces are infilled within a timber framework and stabilized with mortar. Behind the stone layer, rammed earth mixed with stone slurry adds thermal mass and moisture regulation. Rather than hiding irregular waste, the assembly makes the material process visible, transforming quarry residue into structure, enclosure, and environmental performance.

Wall Assemblies and Material Variations

This page studies how quarry waste can form different wall assemblies through changes in stone size, timber structure, opening rhythm, and infill logic. Each variation tests a different relationship between structure, enclosure, and environmental performance. Rather than producing a single fixed wall type, the project develops a flexible construction system that can adapt to different programs, spatial needs, and stages of quarry reuse.

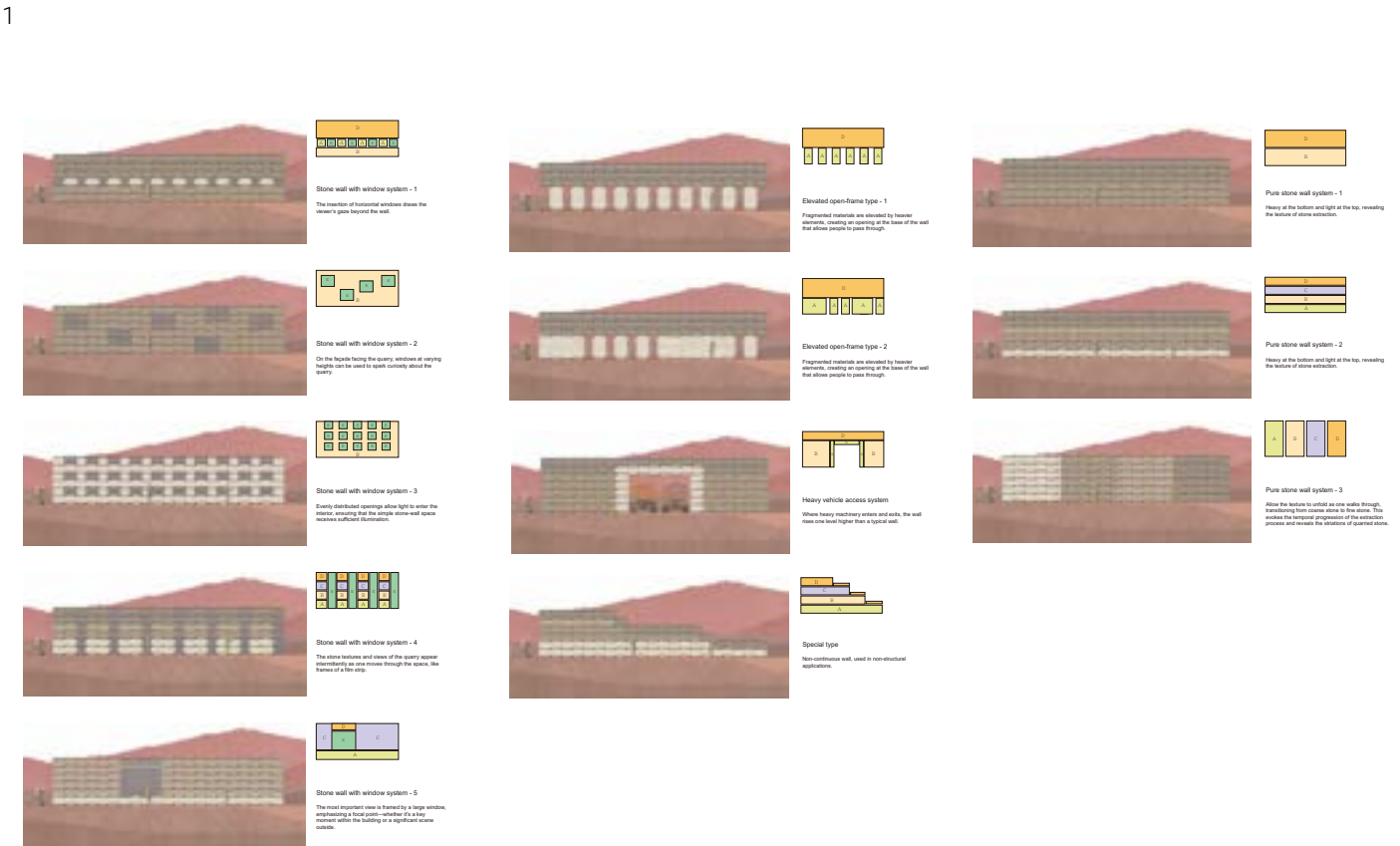
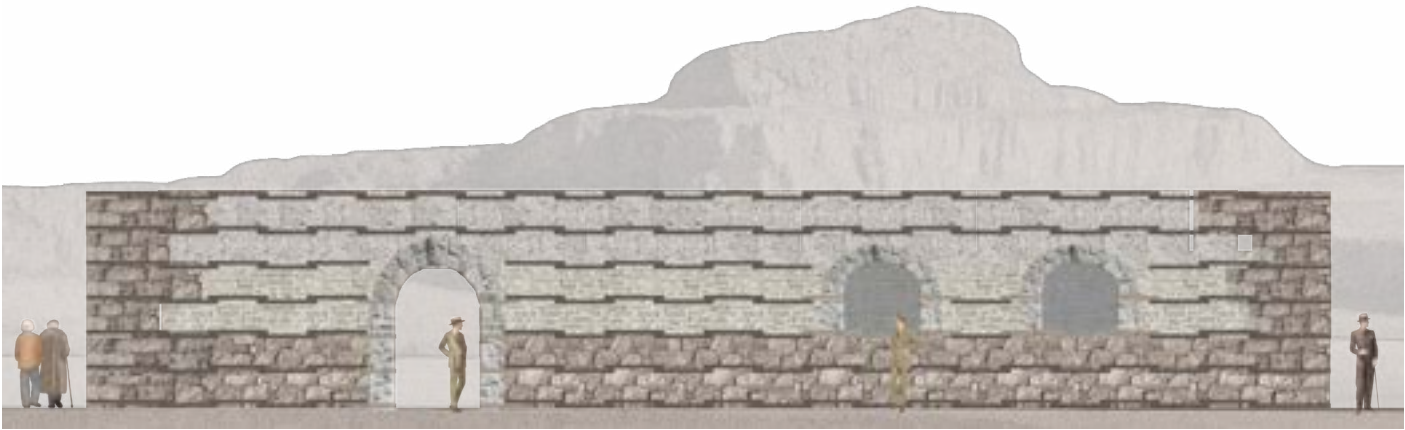
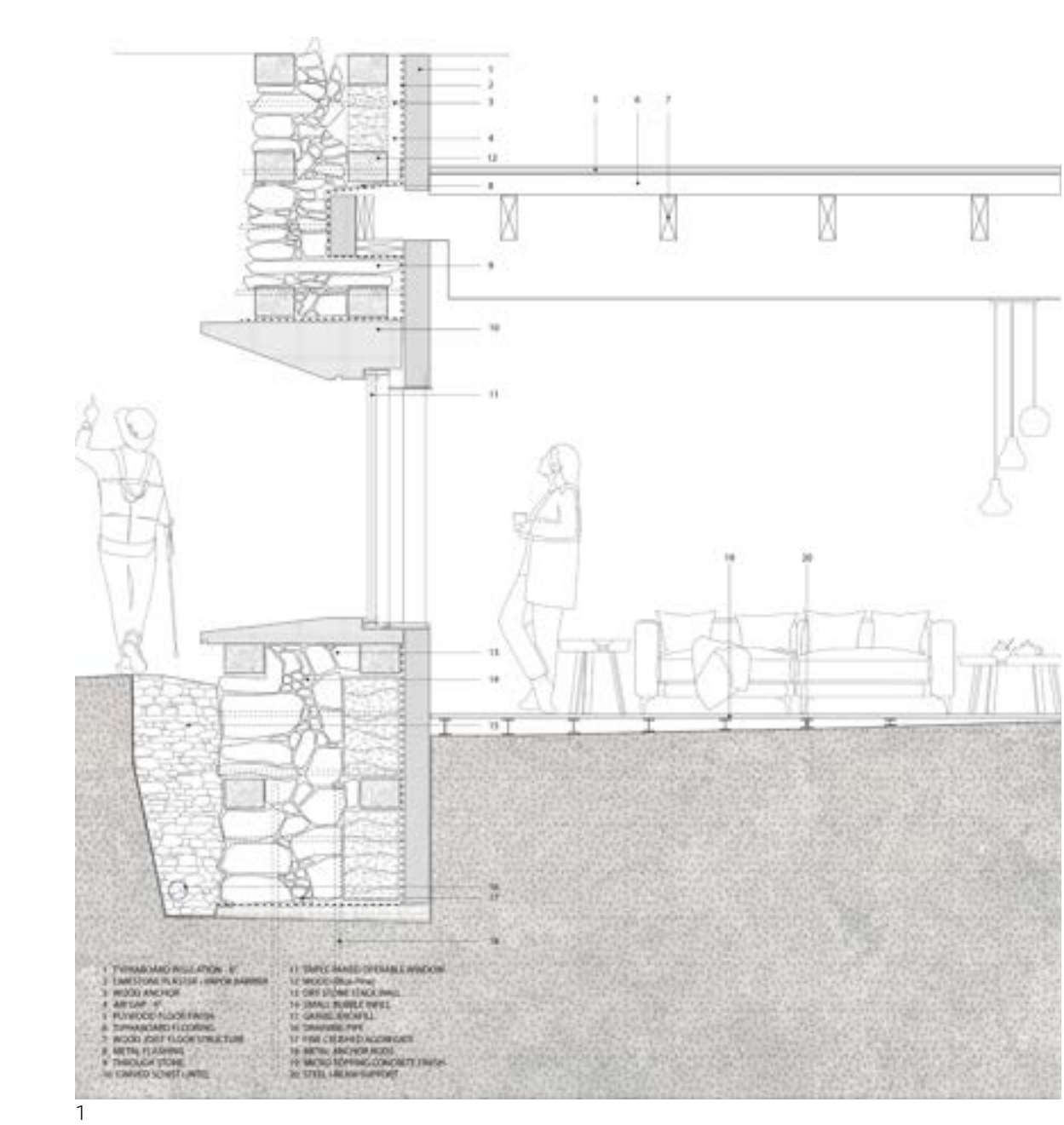


fig.1 Thesis collage showing the relationship between automobile work and collective living.

fig.1 Quarry-waste wall elevation and landscape context.
fig.2 Wall assembly variations and material logic.

Detail Drawing

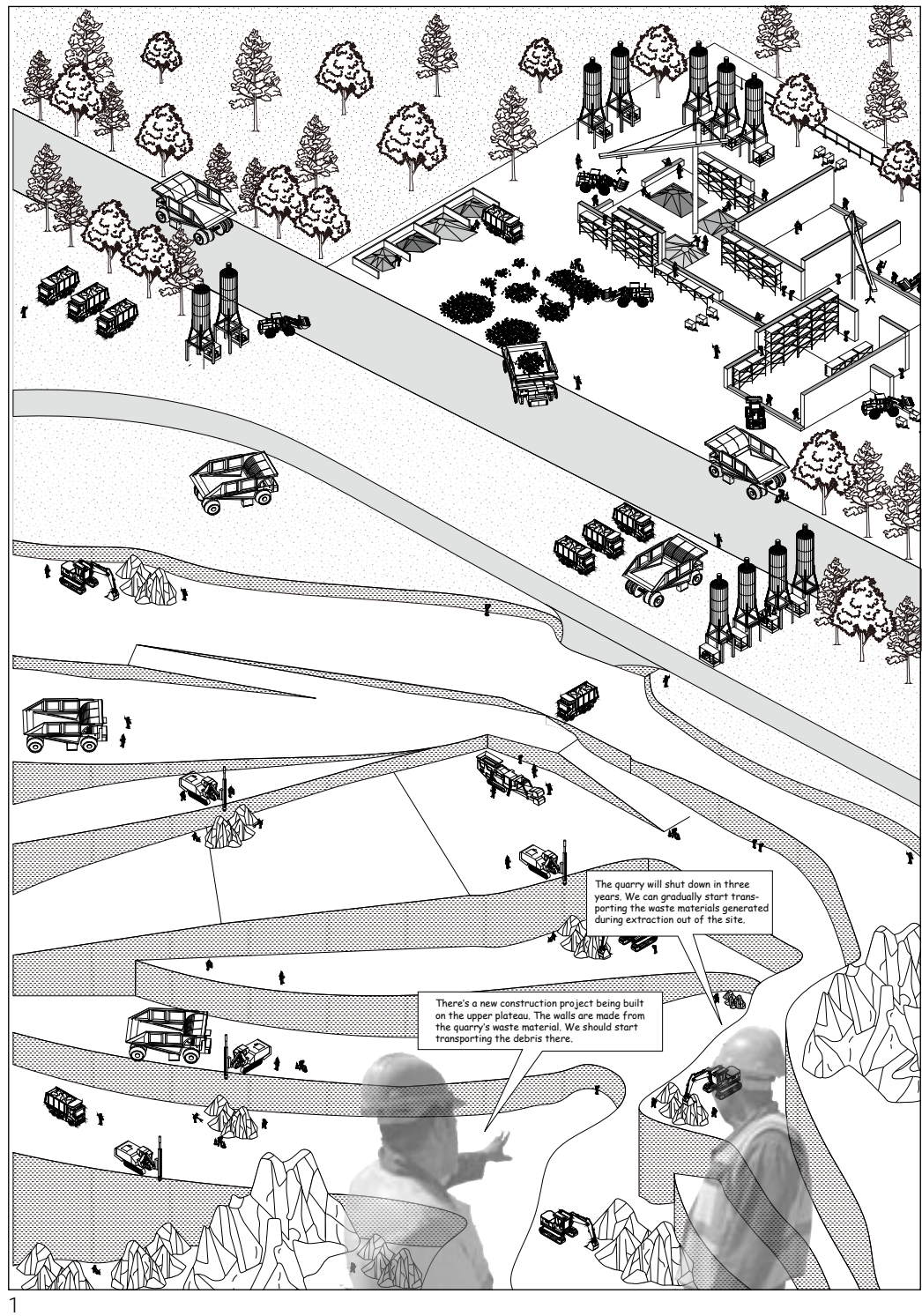
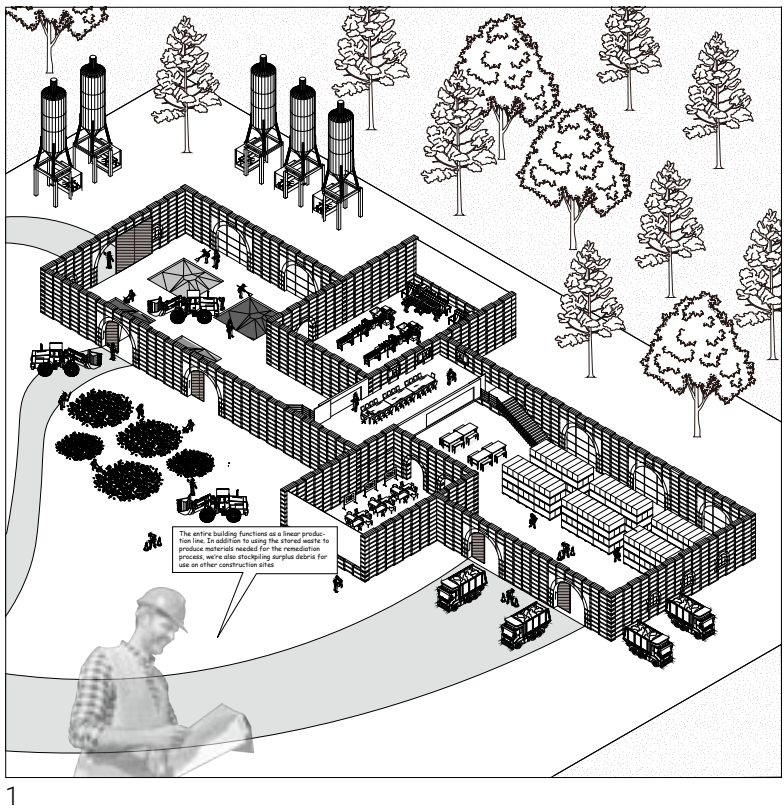


fig.1 Extract and Construct Stage



As extraction ceases, the building shifts into a remediation phase. The structure operates as a linear processing system—organizing waste, refining stone blocks, and supplying materials for landscape repair and quarry restoration.

After remediation is complete, the building transforms into a visitor and cultural center. Former industrial spaces become exhibition halls and public programs, allowing visitors to engage with the quarry's material history and the architectural system built from its waste.

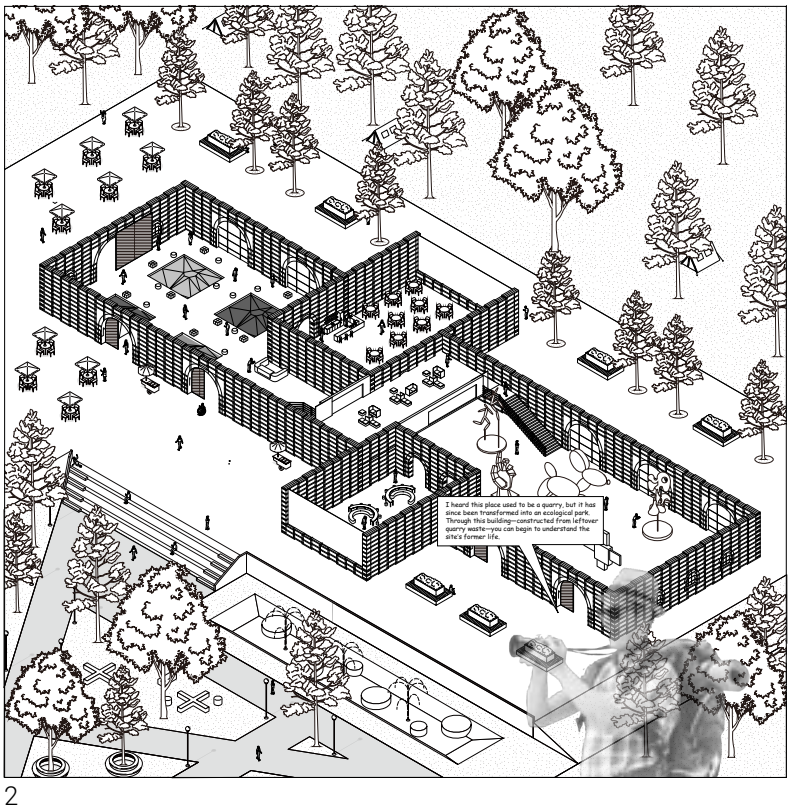


fig.1&2 Material Storage and Visitors' Center Stage



Vertical Urban System

I Fu Chang

Chaotang Lin

Kenny Shao

Spring Re-Thinking BIM
Studio Critic : Joseph A. Brennan

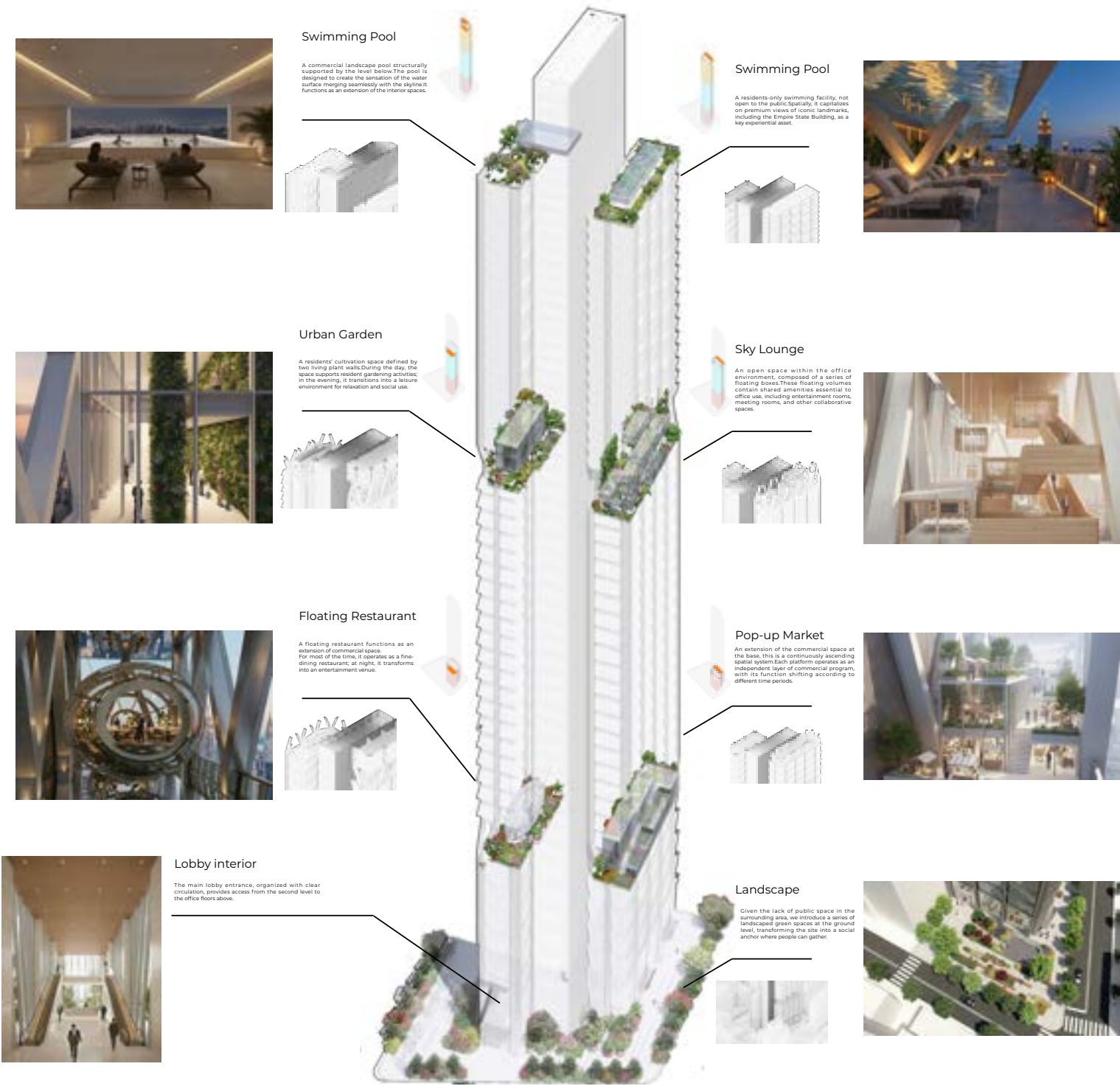
Project Description

This project proposes a mixed-use high-rise that rethinks vertical living by integrating program, structure, public space, and computation. Instead of treating the tower as a static object, the design extends street life upward into a continuous vertical urban condition.

Using Grasshopper and BIM-driven workflows, the project maximizes FAR while separating the service core to create flexible, column-free floor plates. Retail, office, and residential volumes shift parametrically, generating double-height voids for social programs such as markets, sky lounges, restaurants, pools, and shared amenities.

The facade system follows a repetitive grid with localized variations based on program and environmental needs. Retail facades open to the street, office facades tilt outward for shading, and residential facades angle inward to create balconies. Together, the massing, structure, circulation, and facade form an integrated vertical ecosystem rather than a simple stack of functions.

Programmatic Tower Diagram



1

fig.1 Vertical program diagram showing shared amenities within the tower.

Revit Drawing

This page shows how the tower is developed through massing, program, and facade logic. Retail, office, and residential volumes are stacked and shifted to create flexible floor plates, transfer zones, and double-height public spaces. The facade uses a repeated grid with small variations based on program and environmental needs, turning the tower into an integrated vertical system.

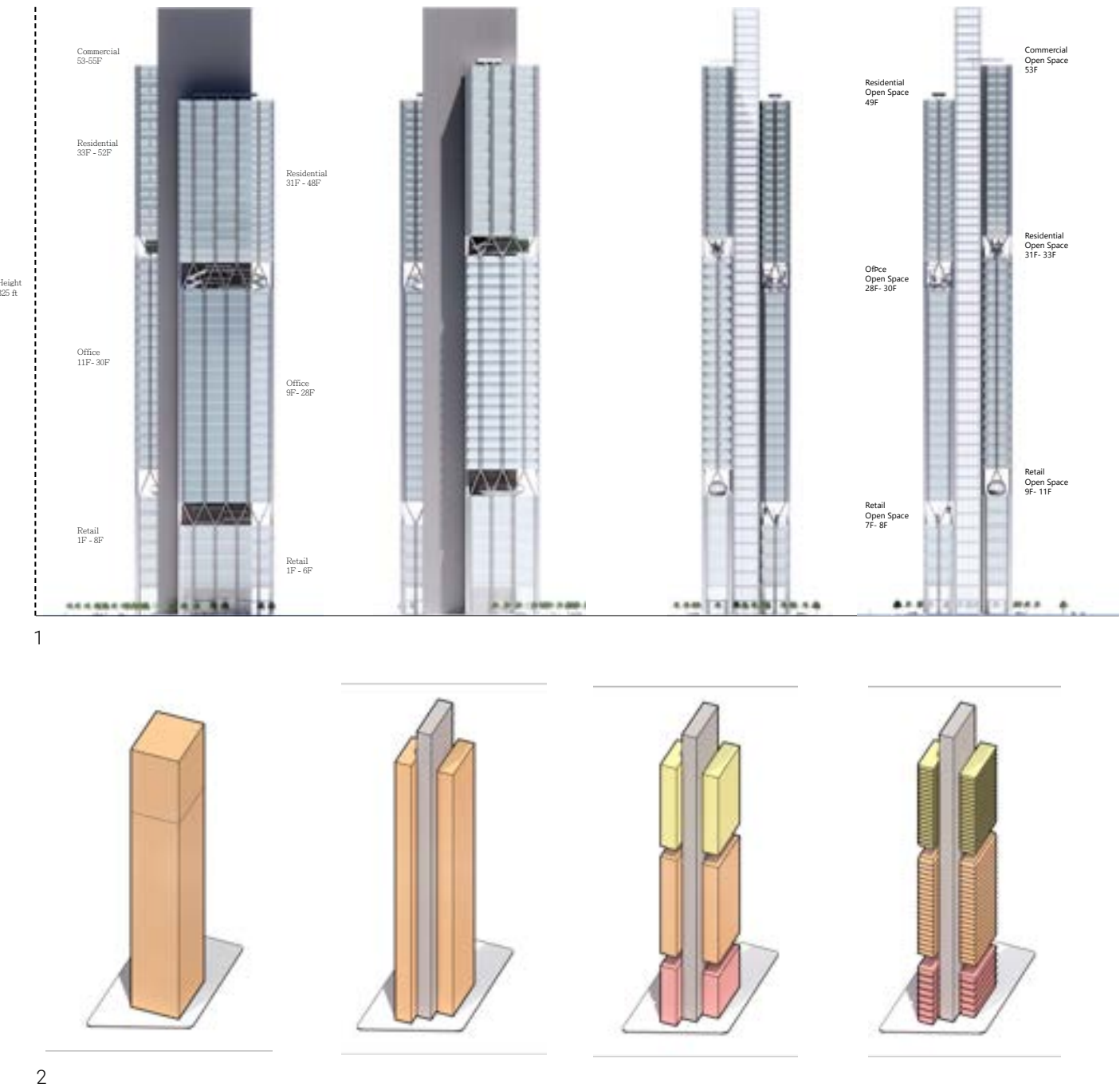
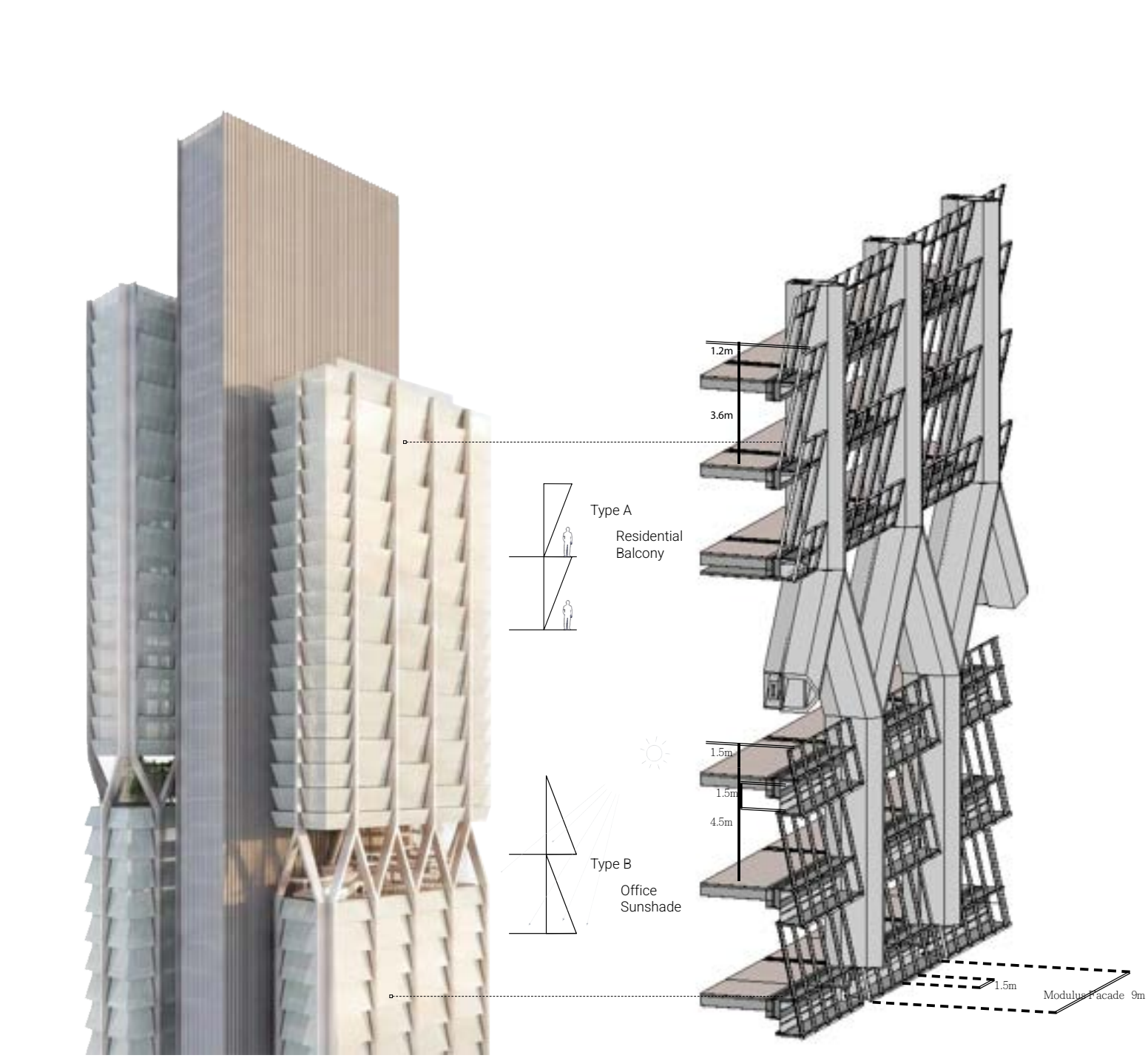


fig.1 Elevation studies showing facade variations and program organization.
fig.2 Massing sequence showing the tower's program and volume development.

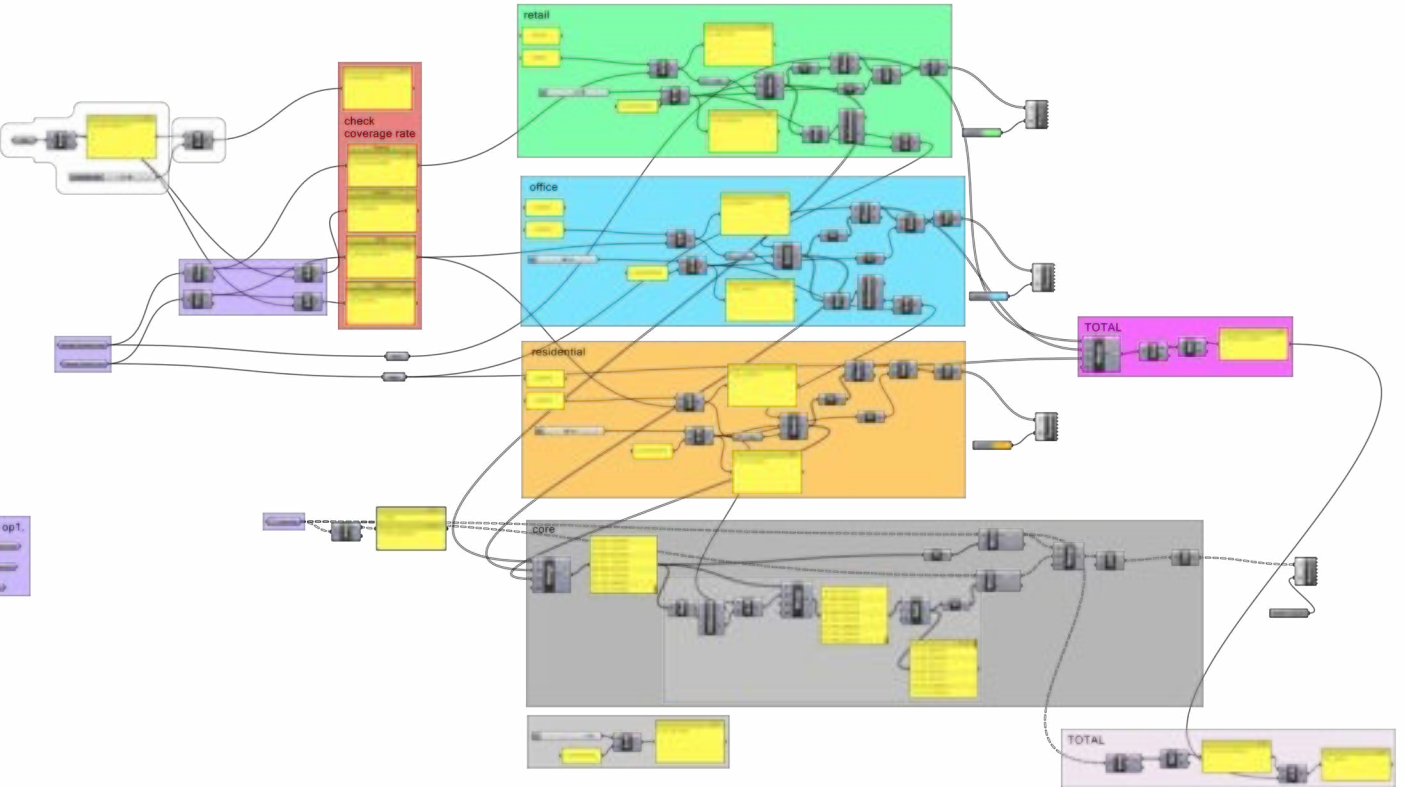
Facade System and Revit Modeling



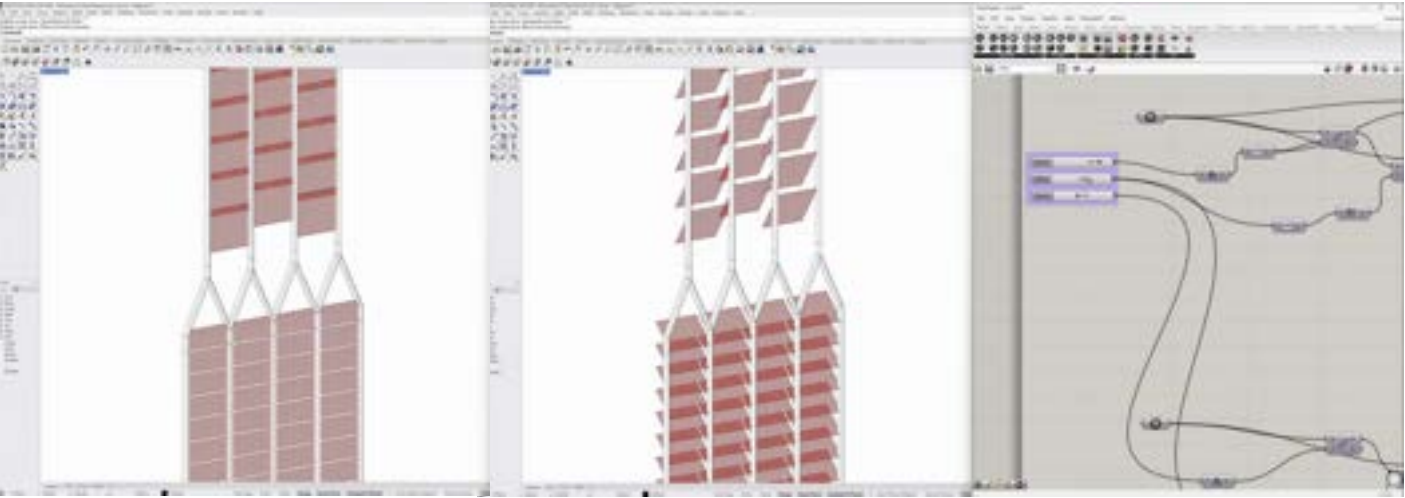
1

fig.1 Revit facade study showing balcony and sunshade module variations.

Grasshopper and BIM Workflow



1



2

fig.1 Grasshopper definition showing FAR calculation, program distribution, and massing logic.
fig.2 Parametric facade studies showing program-based variations and geometric control.

Argument Booklet

I Fu Chang

Studio Critic : Jia Weng

Project Description

Matter Against Silence examines how building materials carry histories of extraction, labor, violence, displacement, and ecological transformation. Instead of treating materials as neutral construction elements, the project argues that architecture must read materials as witnesses—objects that remember where they came from, how they moved, and what systems they helped produce.

Through case studies including Kath-Kuni, Beinecke Library, Ganga Maki Textile Studio, Design Earth, Tracing Sand, and refugee-camp material practices, the work compares visible and invisible material narratives. It asks how architecture can move beyond formal silence and take responsibility for the origins, circulation, and afterlife of matter.

The project proposes material knowledge as an ethical design responsibility: to design is not only to assemble form, but to acknowledge the political, environmental, and human consequences embedded within every material choice.

Material Origins as Narratives	The Language of Materials vs. The Silence of Architecture	Material Knowledge as Design Responsibility	The Afterlife of Matter
Question What stories do building materials carry before they become architecture?	Question Why has architecture remained silent while materials continue to speak?	Question Once we know where a material came from—what must change in design?	Question What if the afterlife of matter is embedded in architecture?
			
Material Origins <i>quarrying, vernacular, visibility of process</i> Materials do not begin their lives in walls, roofs, or columns. Before arriving on site, they are quarried, harvested, mixed, cut, and moved—each stage shaped by human labor, environmental conditions, and socio-political systems. The walls of Kath-Kuni homes, for example, retain the rhythm of seasonal construction and the collective knowledge of local builders. In contrast, the Beinecke Library’s polished Danby marble may appear silent, but it too is the result of quarry logistics, precise engineering, and curatorial decisions about light and perception. This page compares these two cases not to oppose vernacular and modernist architecture, but to emphasize that all architecture begins with a material story—some visible, some suppressed.	Formal Silence <i>abstraction, silencing, resistance of materials</i> Modern architecture has long favored abstraction—flat façades, polished finishes, and formal purity. But in doing so, it often silences the very materials it relies upon. Meanwhile, those same materials bear scars of extraction, traces of labor, and evidence of violence. This tension between the language of materials and the silence of architectural form poses a challenge: can architecture shift from representation to narration? As we face planetary crises and calls for decolonization, treating materials as inert resources is no longer tenable. Materials resist. They archive. They demand a response. This booklet invites us to listen.	Design Ethics <i>accountability, systems of labor, ethics of choice</i> When we trace a material’s origin—its site of extraction, the hands that shaped it, the systems that transported it—design is no longer a neutral act. It becomes entangled with responsibility. Knowing forces us to confront choices: Should this material be used? Can its labor be acknowledged? Will its afterlife be regenerative or toxic? Architects cannot design solely with form—we must design with consequences. This doesn’t mean every wall must tell a didactic story, but that the ethical, political, and environmental dimensions of material selection must be considered at every stage. To know is to be accountable.	Waste Presence <i>waste, invisibility, afterlife</i> Material afterlife is not just a matter of time. It is the moment matter cracks; brick walls decay; steel structures rust. This physical decay is not just a failure of material, but a failure of invisibility—in architecture, “Waste” is not just a byproduct, but a haunting coexistence. This page visualizes this tension, showing how the material’s afterlife extends far beyond the initial design. “What is left behind” is not just a question of waste, but of what remains beneath the surface of the built environment.
 Kath KuniBeinecke Library	 Louis Kahn-Brick	 Gilles Perraudin-Espace d'accueil de la carrière de Fontvieille	

The Systemic Afterlife of Materials

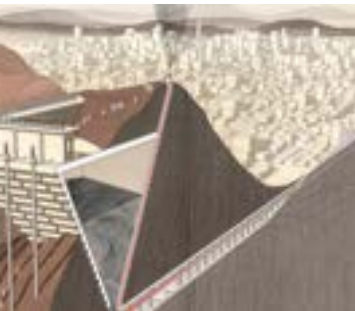
The afterlife of materials is already architecture?

04



...nce
...bility, planetary hauntology

Life is not just about demolition or reuse—it begins when material enters architecture. Concrete will one day weather; even glass degrades. But beyond the afterlife of material includes its displacement in landfills, toxic runoff, displaced communities. Its absence—it is migration. It is infrastructure. It haunts cities and deserts. Design Earth’s speculative work is haunting, reminding us that architecture’s footprint extends beyond the site. This page shifts the question from “What’s behind?” to “What systems are already at work on the surface?”



Design Earth

M.S.AAD Arguments

"Design must move beyond the pursuit of form and begin to narrate the afterlife of material—revealing how waste, debris, and residue embody the history of extraction, labor, and anthropogenic violence"

I Fu Chang (Ethan)

George Maki Textile Studio reveals how materials can speak through labor, climate, and craft. Rather than obscuring origins, it embeds them—making architecture a carrier of material memory and responsibility.

Polle complicates the material afterlife by reweaving it in energy systems and climate logistics, extending my argument beyond memory to political and infrastructural agency.

Trading Sand shows how waste and residue—here, sand—become mobile witnesses to colonization and labor, expanding my argument from memory to planetary environment and occupation.

Siddiqi's rehousing of refugee camp materials reveals that debris and residue clearly archive displacement, labor, and violence, aligning directly with my call to recognize the narrative potential of material objects.

Materials Remember — Matter as Witnesses

Siddiqi rehouses materials as archival witnesses. In refugee camps, even the most mundane materials—sags, benches, plywood—accumulate meaning over time. Torn fabric, patched walls, and weathered seatpads become silent records of displacement, violence, and adaptation. These materials are not intentionally designed to narrate, yet they do—they resist erasure.

Arcovalda Iyer Siddiqi

Conceptual Turn:
→ Materials are not just passive building blocks; they remember.
→ Architecture is not only the result of fabrication—but also of residue.

Materials Migrate — Matter as Evidence

Building on Siddiqi, Cheng and Zhan move across borders, trading sand as a global material—extracted, transported, reused, and reconstructed. Sand is not just granular matter; it's geological evidence. Their project Trading Sand reveals how granular debris speaks of colonial extraction, transnational labor, and ecological dispossession.

Jingyu (Cyan) Cheng & Chen Zhan

Conceptual Expansion:
→ If materials can remember, they can also migrate and accuse.
→ Sand becomes a planetary witness, crossing borders, implicating economies.

From Substance to System: The Infrastructural Afterlife of Materials

Dennis Polle shows that architecture is inseparable from energy and infrastructure. Buildings aren't isolated objects—they operate within systems of climate control, logistics, and power. In this view, materials don't end when the building is done. They continue to work: insulating, regulating heat, supporting networks of circulation and control. Materials' afterlife is not passive—it shapes behavior, enforces standards, and participates in planetary logistics. It becomes infrastructure.

To design with this awareness means seeing materials not just as expensive materials, but as active agents in systems of governance.

Dennis Polle

Conceptual Integration:
→ Materials don't just archive the past—they govern the present.
→ The afterlife of materials isn't symbolic—it is infrastructural, behavioral, and political.
→ Architecture becomes a medium of control through the latent operations of its matter.

Contemporary Cases Materials That Speak

The Getty Photo Studio reveals how materials can speak through labor, climate, and craft. Rather than obscuring origins, it embeds them—making architecture a carrier of material memory and responsibility.

Polle complicates the material afterlife by reweaving it in energy systems and climate logistics, extending my argument beyond memory to political and infrastructural agency.

Trading Sand shows how waste and residue—here, sand—become mobile witnesses to colonization and labor, expanding my argument from memory to planetary environment and occupation.

Siddiqi's rehousing of refugee camp materials reveals that debris and residue clearly archive displacement, labor, and violence, aligning directly with my call to recognize the narrative potential of material objects.

MATTER

AGAINST

SILENCE

EMERGING OPTIMISM RESOURCES + THE FOURTH INDUSTRIAL REVOLUTION

I Fu Chang

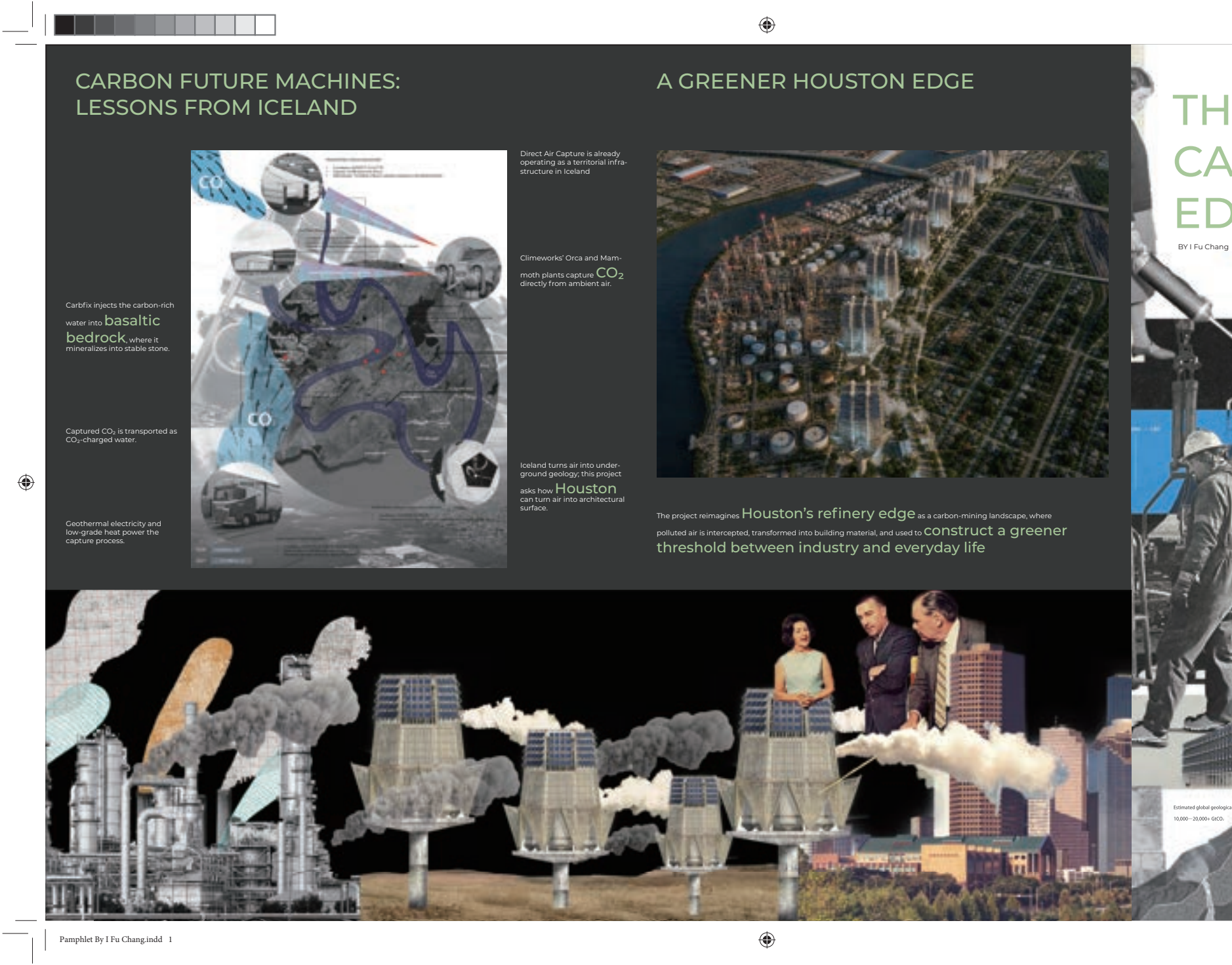
Studio Critic : Sean A. Gallagher

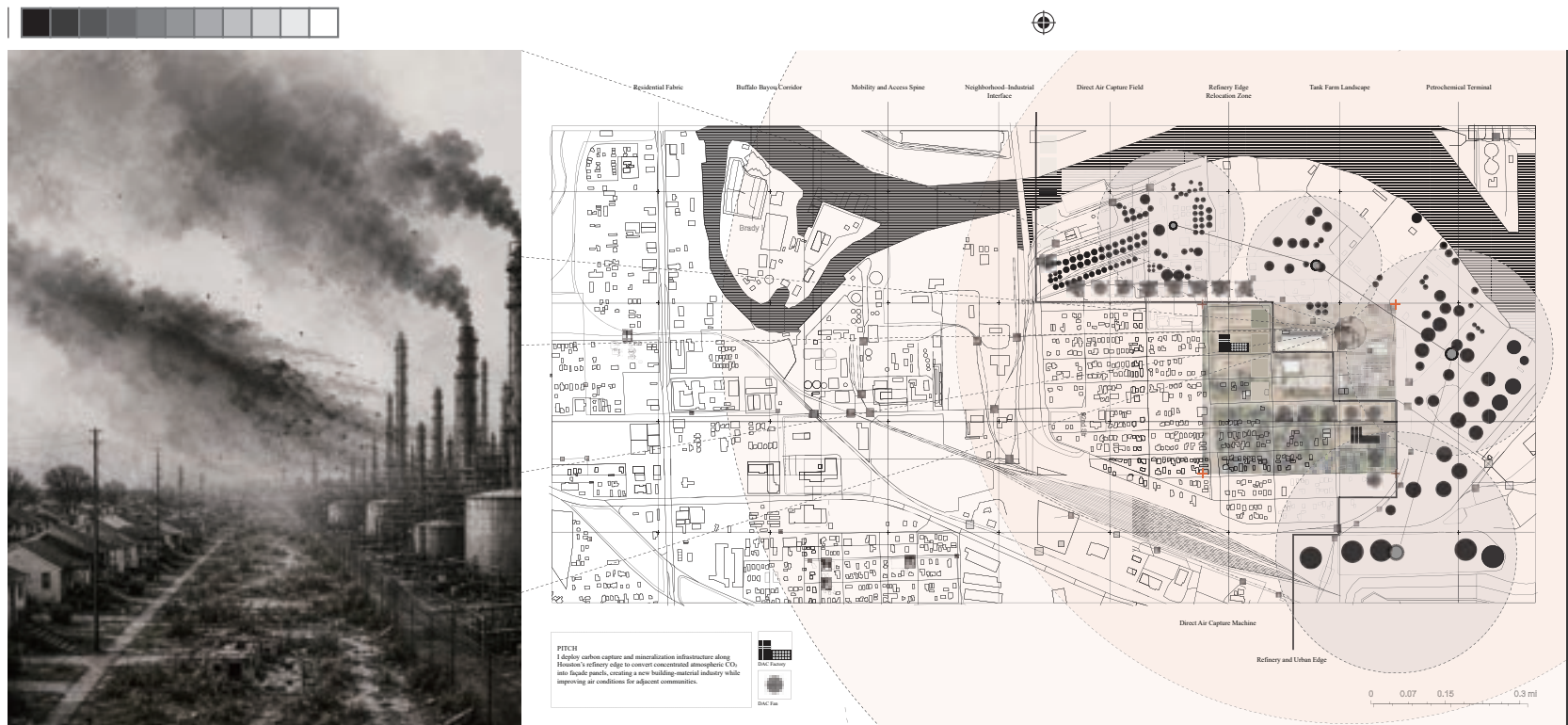
Project Description

The Carbon Edge reimagines Houston’s refinery boundary as a carbon-mining landscape. Instead of allowing polluted air to move directly from industrial infrastructure into residential neighborhoods, the project proposes a field of Direct Air Capture machines that intercept refinery emissions before they reach the community.

Learning from Iceland’s carbon mineralization infrastructure, the project transforms captured CO₂ into mineral-based building material. At the scale of one cubic inch, carbon becomes a measurable unit that can be translated into panels, blocks, and architectural surfaces. Through this process, polluted air is not only removed, but reorganized into a material resource.

The project operates between environmental remediation and architectural production. It proposes a greener threshold where air, industry, infrastructure, and everyday life are actively recomposed, turning Houston’s refinery edge into a future landscape of carbon capture, material transformation, and public repair.

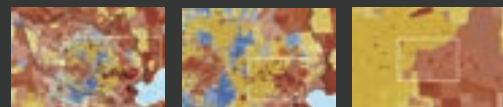




THE PROBLEM

REFINERY AIR IS KILLING THE NEIGHBORHOOD

Houston's refinery edge produces a toxic threshold between industrial infrastructure and residential life. Houses sit beside fractionating towers, storage drums, and abandoned land, where polluted air moves directly toward the neighborhood.



THE FUTURE / WHAT IF

MINING THE AIR BEFORE IT REACHES THE NEIGHBORHOOD

Instead of allowing polluted air to pass directly into the neighborhood, this project proposes to capture and mineralize carbon at the industrial edge. A series of DAC towers intercepts refinery air before it reaches residential blocks, transforming pollution into a material resource. The refinery boundary is no longer treated as a line of separation, but as a productive green threshold where air, infrastructure, and building material are actively recomposed.

THIS IS HOW

FROM AIR TO CARBON MINERAL

At the scale of one cubic inch, carbon mineralization converts atmospheric CO2 into a measurable building unit. This project uses the unit as a bridge between air, material, and architectural production. Captured carbon is transformed into mineral blocks, panels, or aggregates that can be assembled into new landscape and building elements. In this process, the polluted air of the refinery edge becomes the raw material for constructing a greener Houston threshold.

