

PORTFOLIO

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C O N T
E N T S

01	BEYOND MUSEUMS: DE-MONUMENTALIZING MODERNIST BIG CONTAINERS	4
	<i>Pabellón De Cristal - The Experimental Agricultural Research Center in Madrid Spring 2024 / In Collaboration with Shunshan Chen and Ziyi Zhu</i>	
02	ADAPTIVE CAPACITY	20
	<i>Modular Convertible Drawer in New York Fall 2023 / In Collaboration with Shunshan Chen</i>	
03	A NEW ARCHITECTURE OF INVISIBILITY	30
	<i>Power Station in New York Summer 2022 / Individual Work</i>	

01

BEYOND MUSEUMS: DE-MONUMENTALIZING MODERNIST BIG CONTAINERS

The Experimental Agricultural Research Center

Spring 2024

ARCH4006A & ARCH4106A

Collaboration Work / Academic Work

Collaborator: Shunshan Chen, Ziyi Zhu

Site: Pabellón De Cristal in Casa de Campo, Madrid, Spain

Instructor: Juan Herreros & Oscar M Caballero

The prompt of this project was to refurbish the existing structure and address the question of how architecture can translate the theoretical discourse that institutions have embraced when they declare themselves to be transparent, inclusive, anti-machist, and eco-friendly into a physical reality. By challenging architectural norms and prioritizing the common user over elitist audiences, it addresses climate change head-on while pioneering innovative solutions for future agriculture. Through its blend of fantasy and pragmatism, the project stands as a symbol of possibility, showcasing the transformative power of architecture in shaping a more sustainable and equitable world.



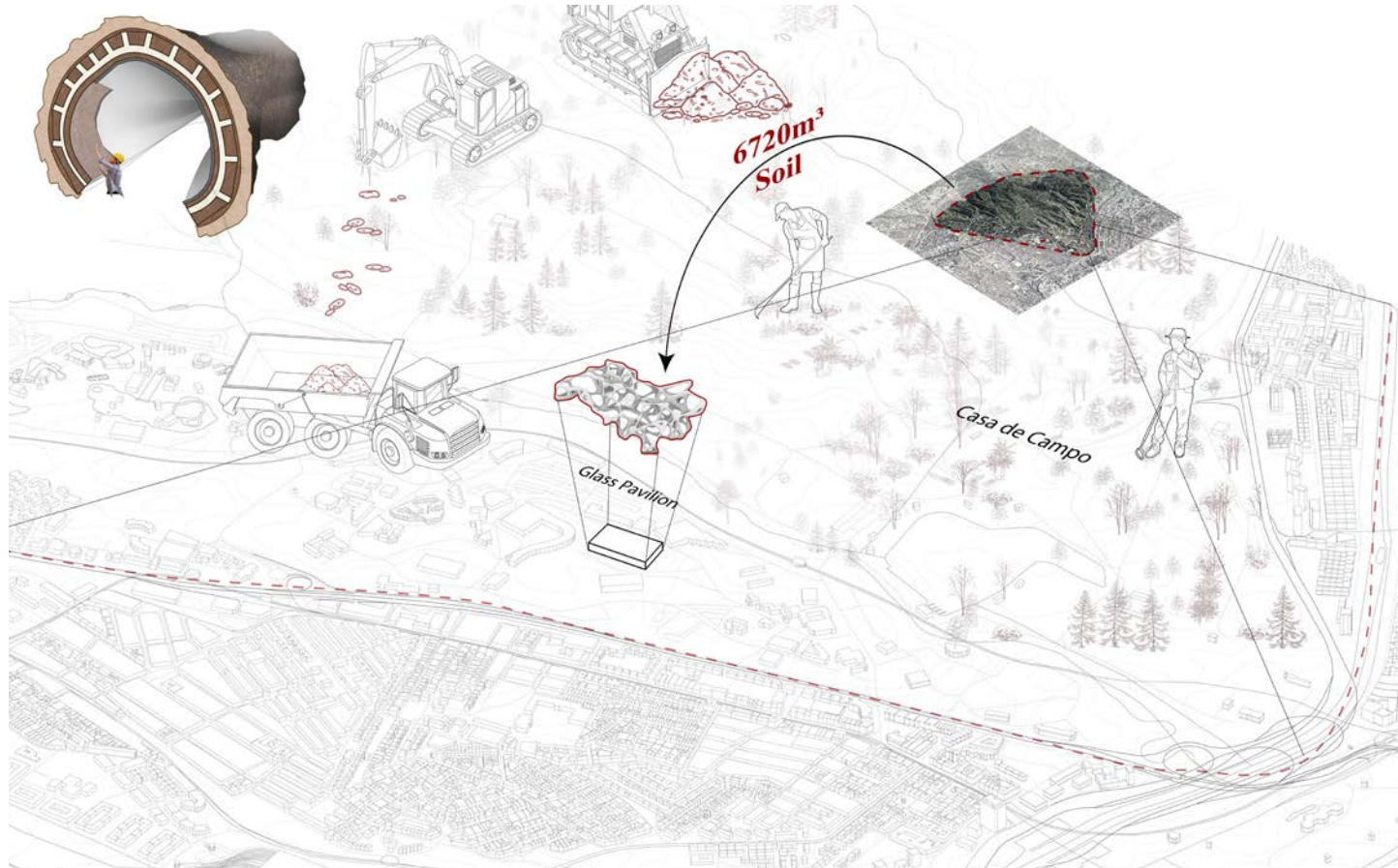


History of Casa de Campo & Crystal Pavilion

Casa de Campo and the Crystal Pavilion in Madrid, previously symbols of royal luxury and political importance, have transformed with time, adapting to the changing course of history. Originally symbolizing the authority and status of the Spanish monarchy, the estate underwent a significant change in 1950 when government control replaced ownership by the royal family. The first National Country Fair was an important affair that turned the grounds into a vibrant center for showcasing provincial representation and agriculture. Amidst the several pavilions, there was the Crystal Pavilion, which served as a symbol of Spain's agricultural expertise and strategic communication. However, after Franco's death in 1975, the fair's vibrant legacy waned, resulting in the Crystal Pavilion being used only sometimes for specific purposes, such as hosting Madrid's contemporary art exhibition and the yearly Communist Party celebration. After 2007, neglect began to affect this historically significant structure, diminishing its former vibrancy as a symbol of national pride and political intrigue.

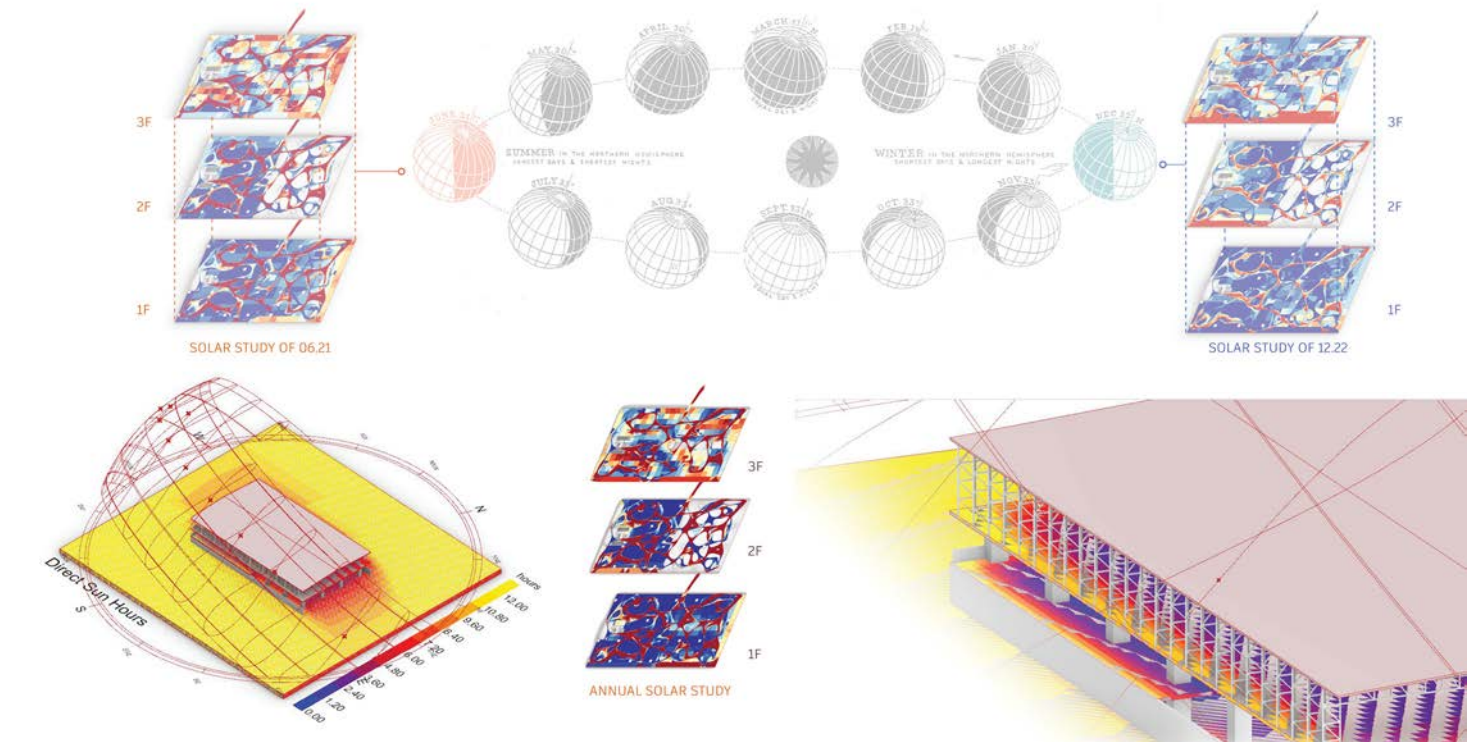
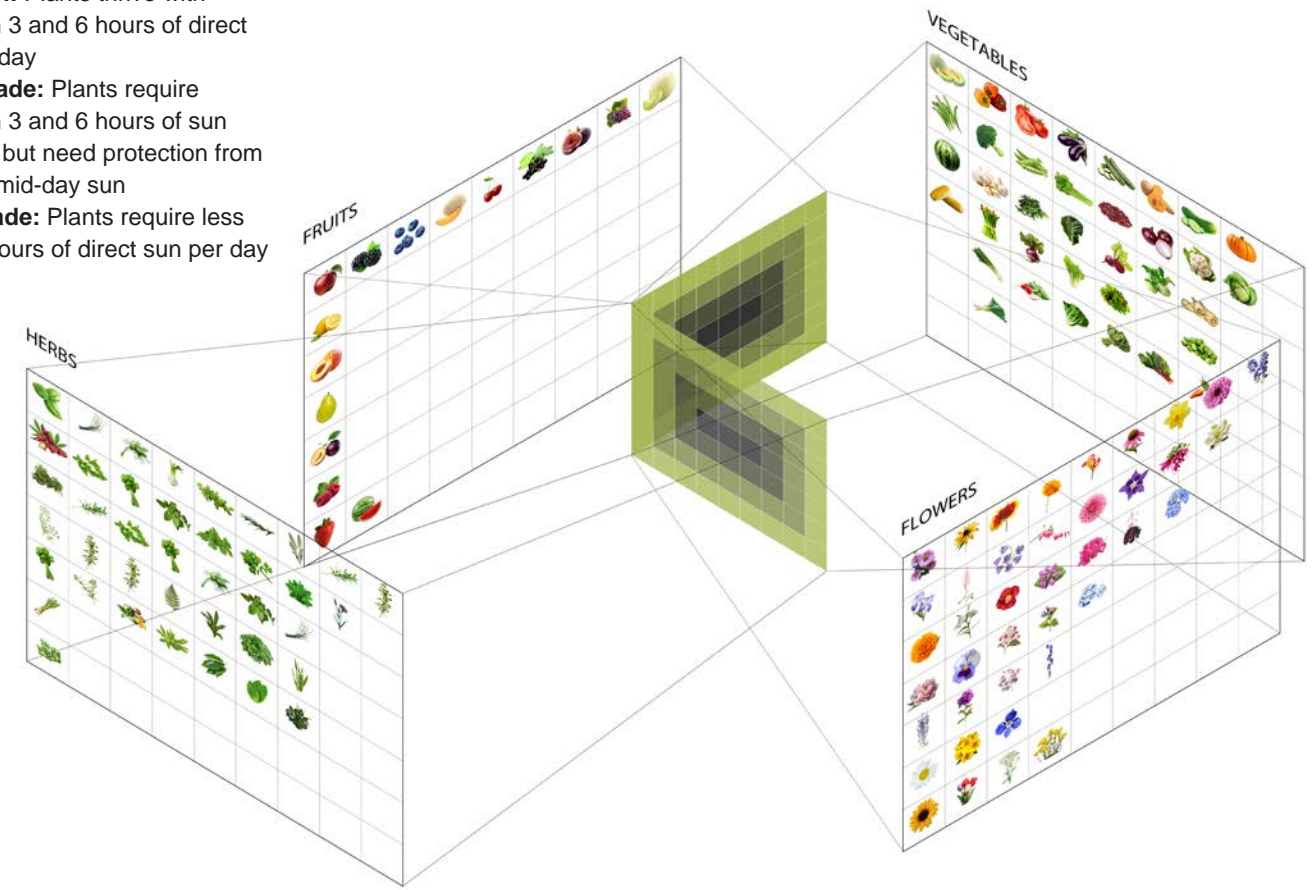


Site Plan



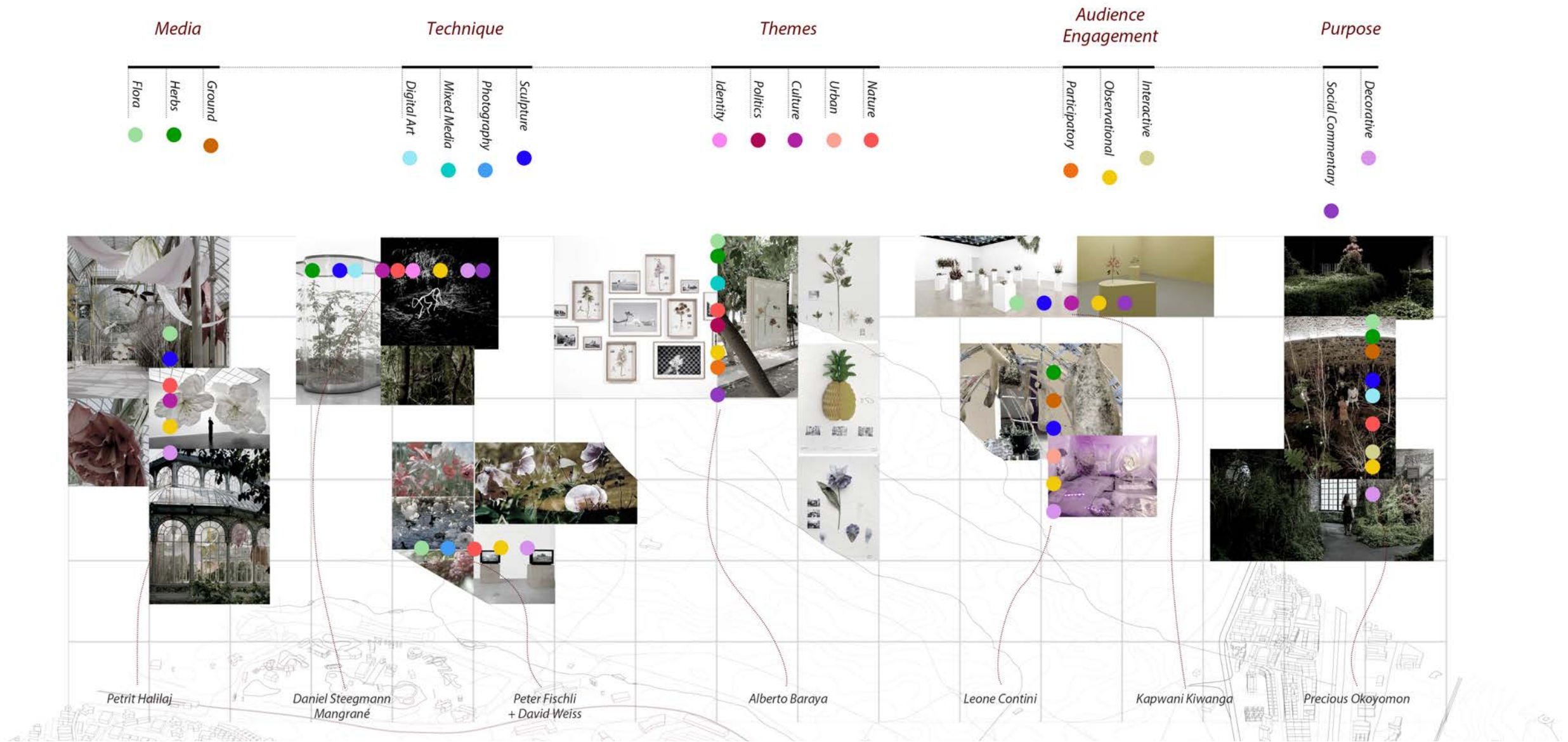
Construction Diagram

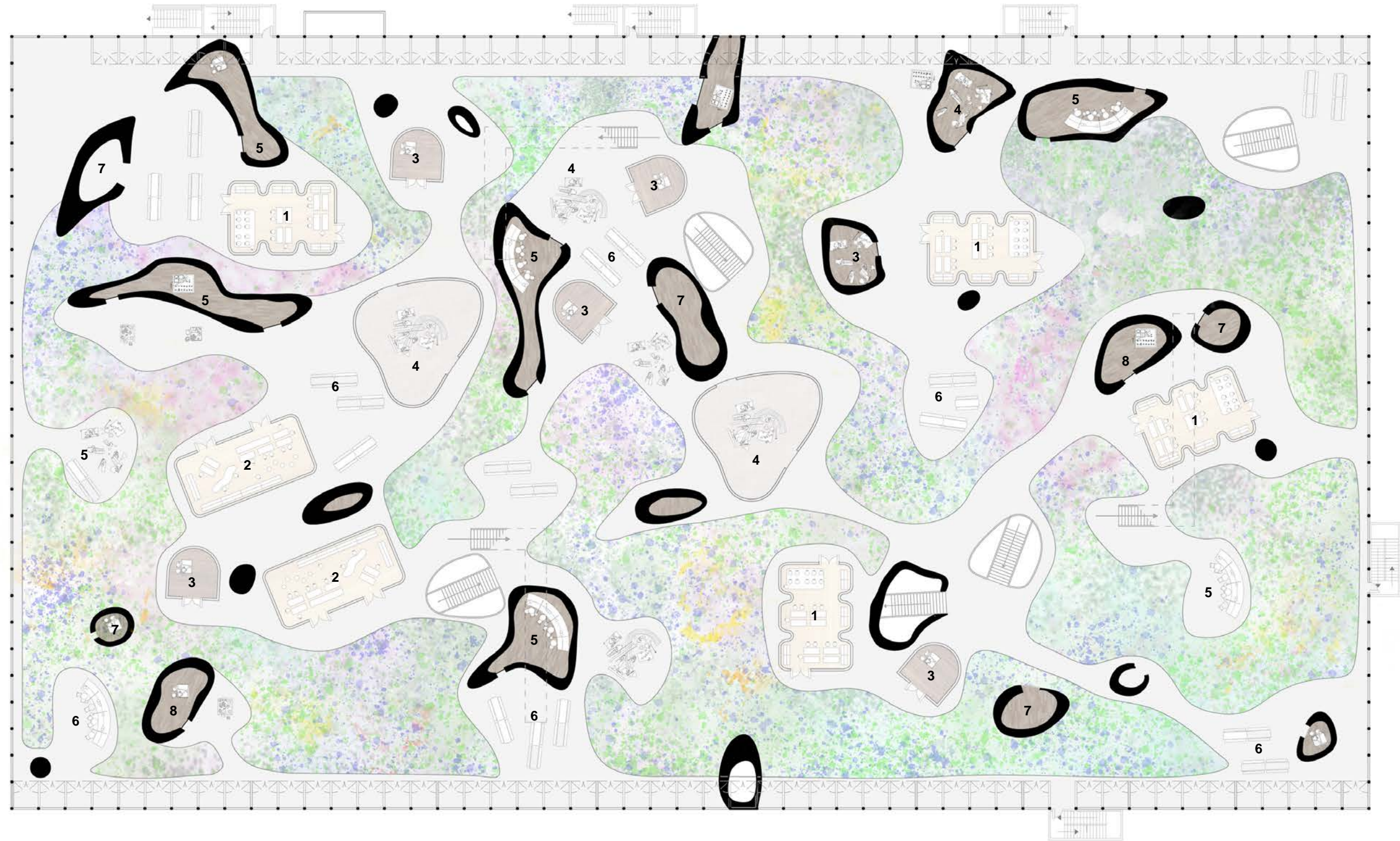
- Full Sun:** Plants need at least 6 hours of direct sun daily
- Part Sun:** Plants thrive with between 3 and 6 hours of direct sun per day
- Part Shade:** Plants require between 3 and 6 hours of sun per day, but need protection from intense mid-day sun
- Full Shade:** Plants require less than 3 hours of direct sun per day



Sun Analysis Study

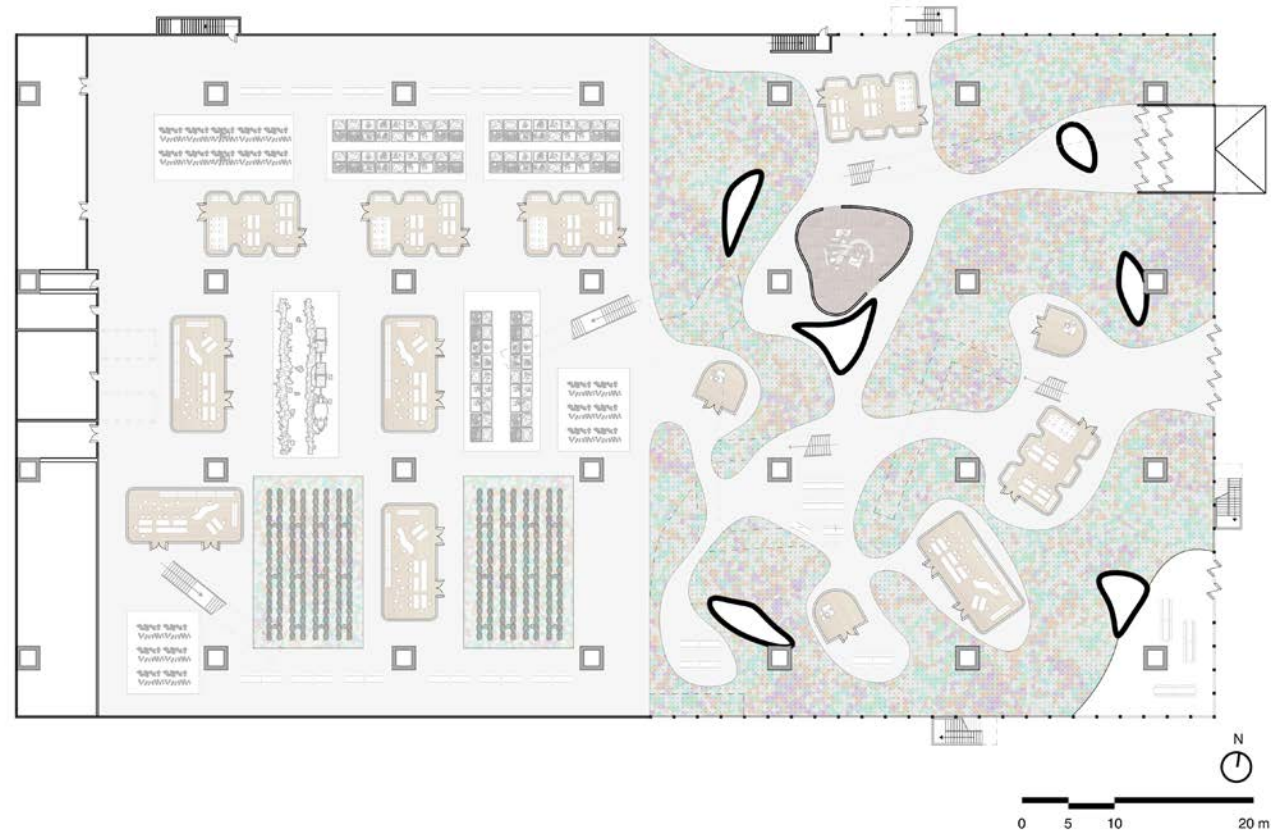
Analyzing the longest, shortest, and average daylight hours during the year provides valuable insights for determining ideal environment for cultivating plants, hence informing selections on suitable crops and growth conditions for various places. By utilizing this information to customize agricultural methods, harvests and growth are optimized in accordance with regional sunlight patterns.



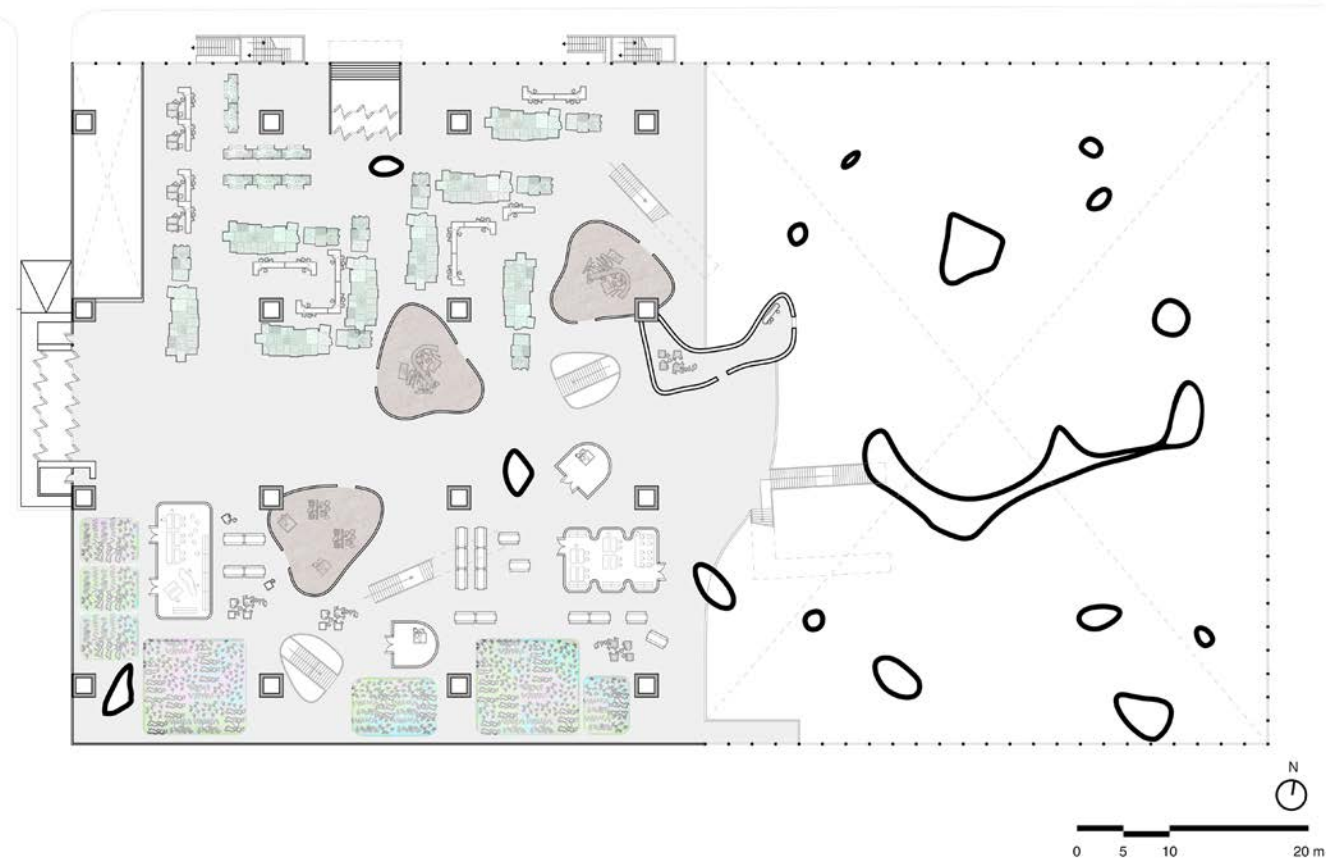


- 1. Research Lab
- 2. Research Office
- 3. Artist Studio
- 4. Artist Workshop
- 5. Lounge
- 6. Seating Area
- 7. Meditation Room
- 8. Auditorium Room

Top Floor Plan



Ground Floor Plan



Mezzanine Floor Plan









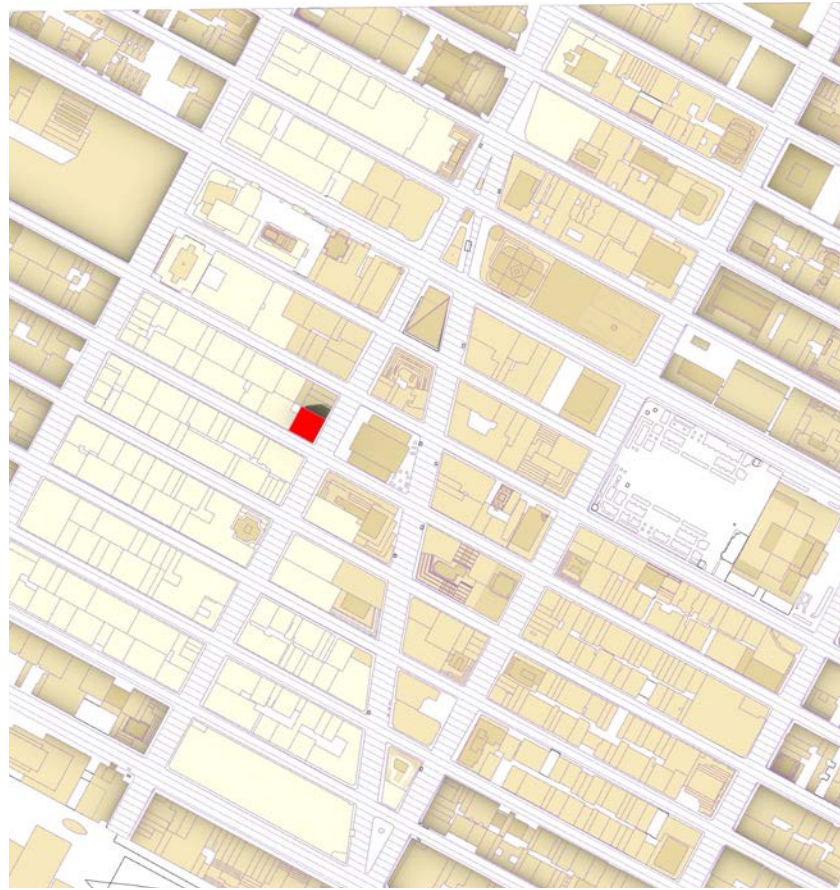
02

ADAPTIVE CAPACITY

Modular Convertible Drawer

Fall 2023
ARCH4005A & ARCH4105A
Collaboration Work / Academic Work
Collaborator: Shunshan Chen
Site: 550 7th Ave, New York, NY 10018
Instructor: Katharine Shima

The prompt of this project was to examine a focused set of innovative yet practical approaches to tackle embodied carbon, with a specific focus on enhancing the adaptive capacity of the built environment. Embracing uncertainty, the project envisions a forward-looking retrofit for housing in garment district and explores potential future programs. As part of the exploration, the project challenges traditional notions of permanence and monumentality in architecture. The proposed ideas will be tested through full-scale prototypes, emphasizing unique assemblies and utilizing readily available materials.

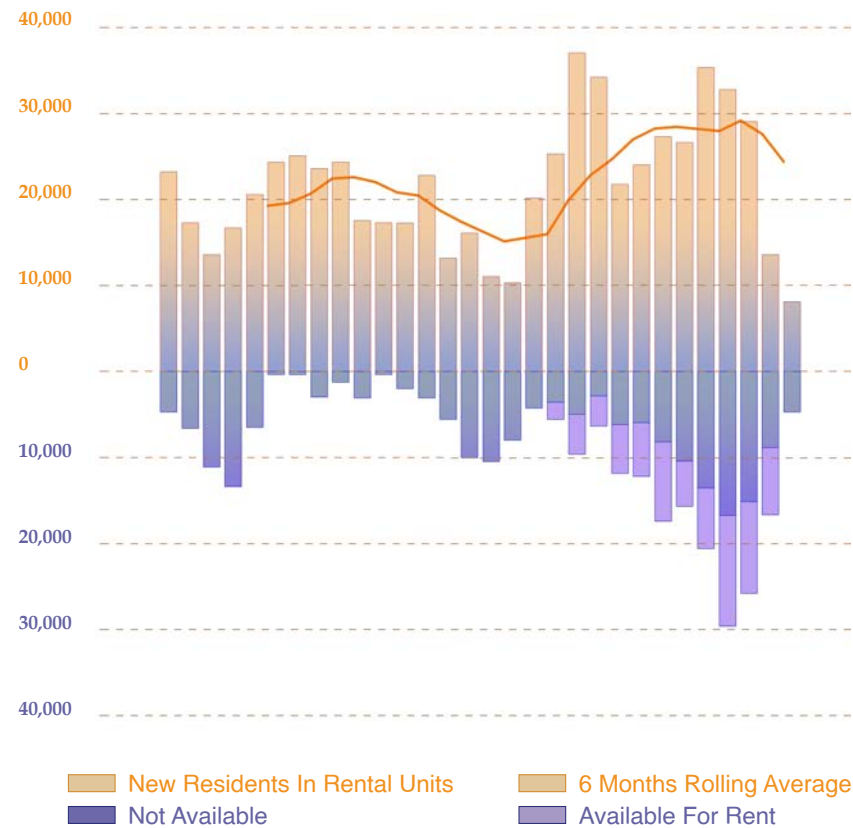


Site Plan



Facade

Examining the New York City rental market revealed notable fluctuations in both the number of occupants and demand for rental housing. These variations are influenced by economic conditions, seasonal changes, policy shifts, and other factors, leading to unpredictable vacancy patterns that pose a challenge for developers. To address this issue, we envisioned a flexible approach where the number of building units could be adjusted like a drawer in response to vacancy rate fluctuations. This adaptive strategy would allow vacant units to be transformed into public spaces during low-rental periods, minimizing space wastage, or converted into additional rental units during high-demand periods.



Rental Turnover & Timing of Vacancy by Availability

* Source: New York City Housing and Vacancy Survey (NYCHVS), 2021. US Census Bureau / NYC Dept of Housing Preservation and Development.



NAME: CLARA
GENDER: FEMALE
AGE: 24
OCCUPATION: STUDENT
PERSONALITY: IMAGINATIVE, FLEXIBLE
LEASE TERM: 2 YEARS



NAME: ALICE
GENDER: FEMALE
AGE: 32
OCCUPATION: FASHION DESIGNER
PERSONALITY: ENTHUSIASTIC, OPEN-MINDED
LEASE TERM: 6 MONTHS



NAME: JOE
GENDER: MALE
AGE: 20
OCCUPATION: STUDENT
PERSONALITY: ADAPTABLE, SELF-DISCIPLINED
LEASE TERM: 4 YEARS



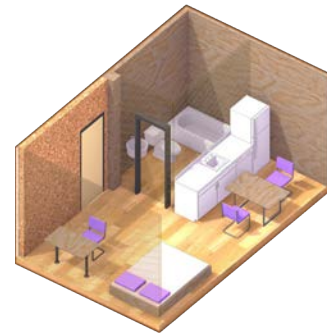
NAME: DIANA
GENDER: FEMALE
AGE: 27
OCCUPATION: WRITER
PERSONALITY: CURIOUS, INDEPENDENT
LEASE TERM: 6 MONTHS



NAME: JUSTIN
GENDER: MALE
AGE: 35
OCCUPATION: ARCHITECT
PERSONALITY: INNOVATIVE, PRACTICAL
LEASE TERM: 1 YEAR



Concept Diagram



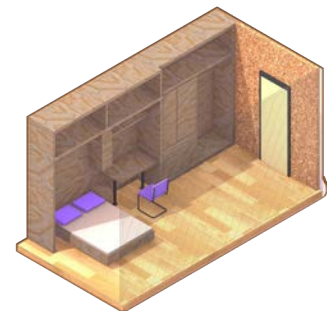
STUDIO - TYPE I



STUDIO - TYPE II



DORM ROOM- TYPE I



DORM ROOM- TYPE II

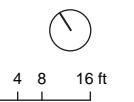


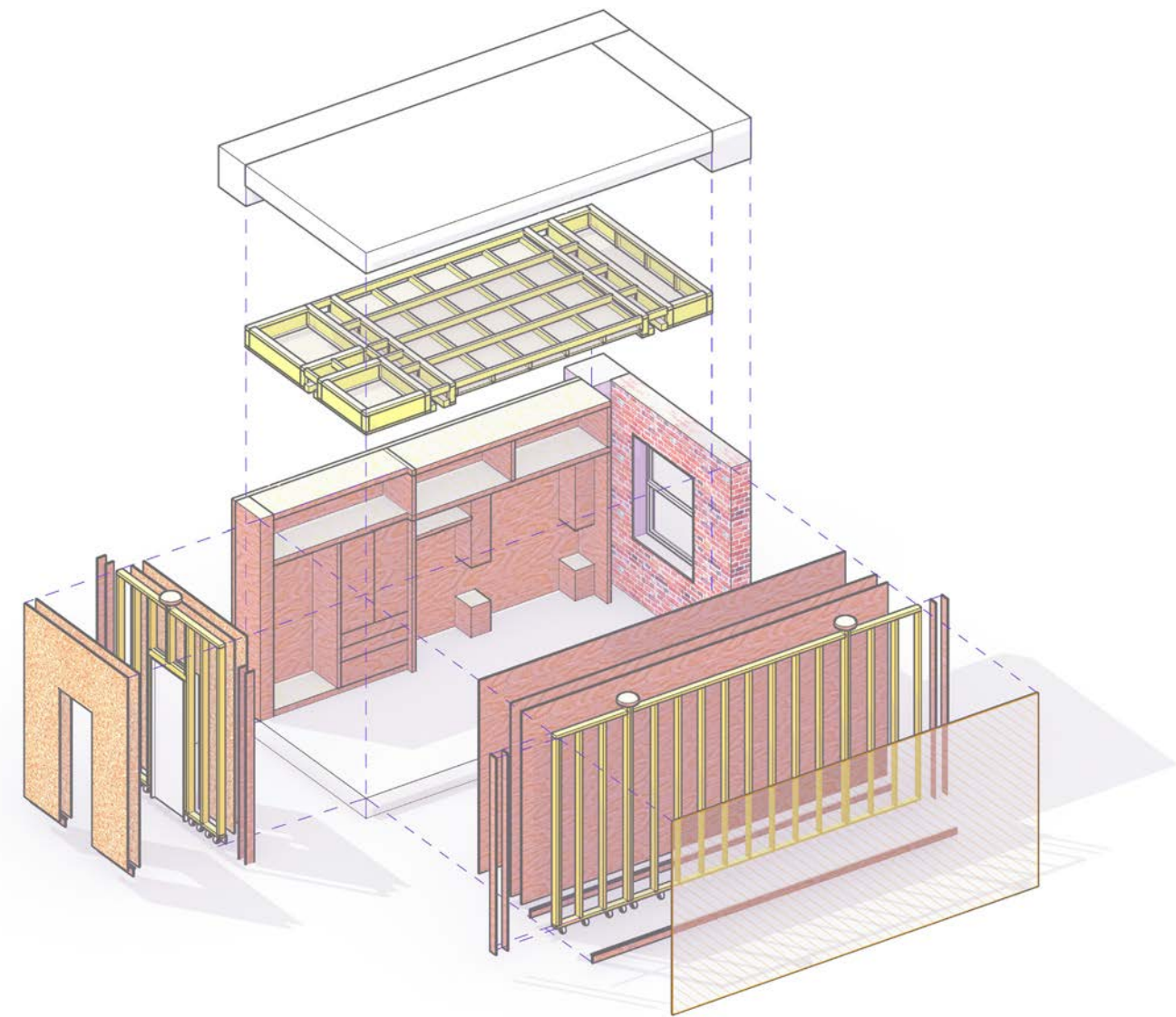
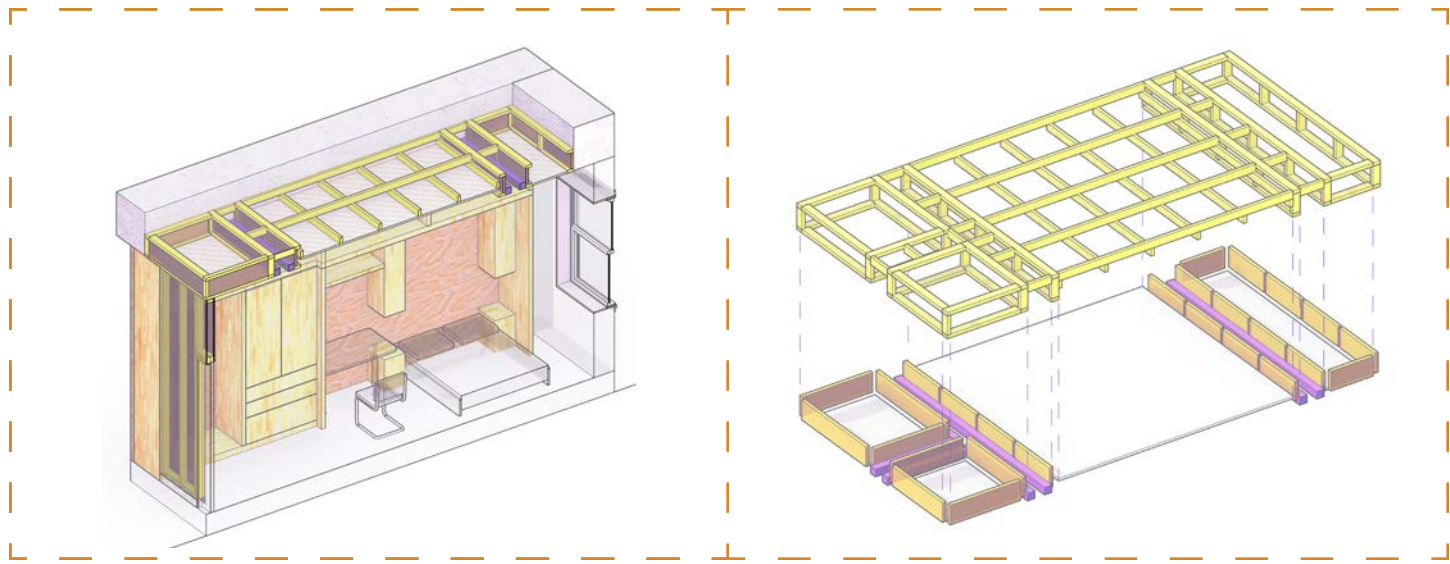
Dorm Room Transformation

Studio Transformation

Transformation

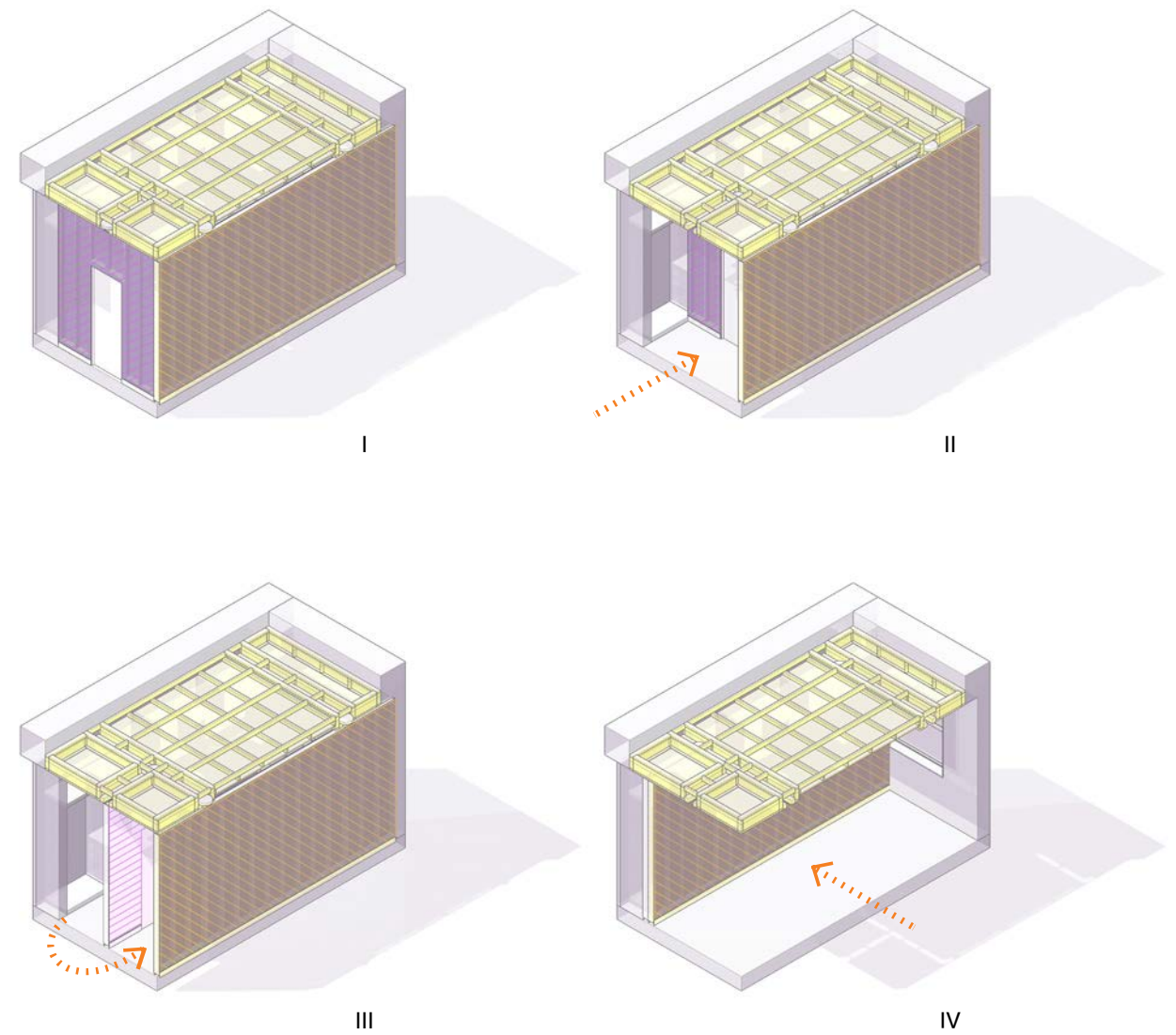
The transformation revolves around the configurations of two types of units, focusing on determining elements that can be condensed and those that require permanence. According to Louis Khan, the permanent components are designated as “service” spaces, serving functional purpose. Conversely, spaces adaptable for human use are termed “served” spaces. In this case, the studio, kitchen, and bathroom are the fixed elements, while collapsible units create versatile spaces for furniture storage when not in use. This approach extends to dorm rooms, where communal facilities allow complete unit collapse. Looking ahead, the potential exists to convert entire floors into office space.



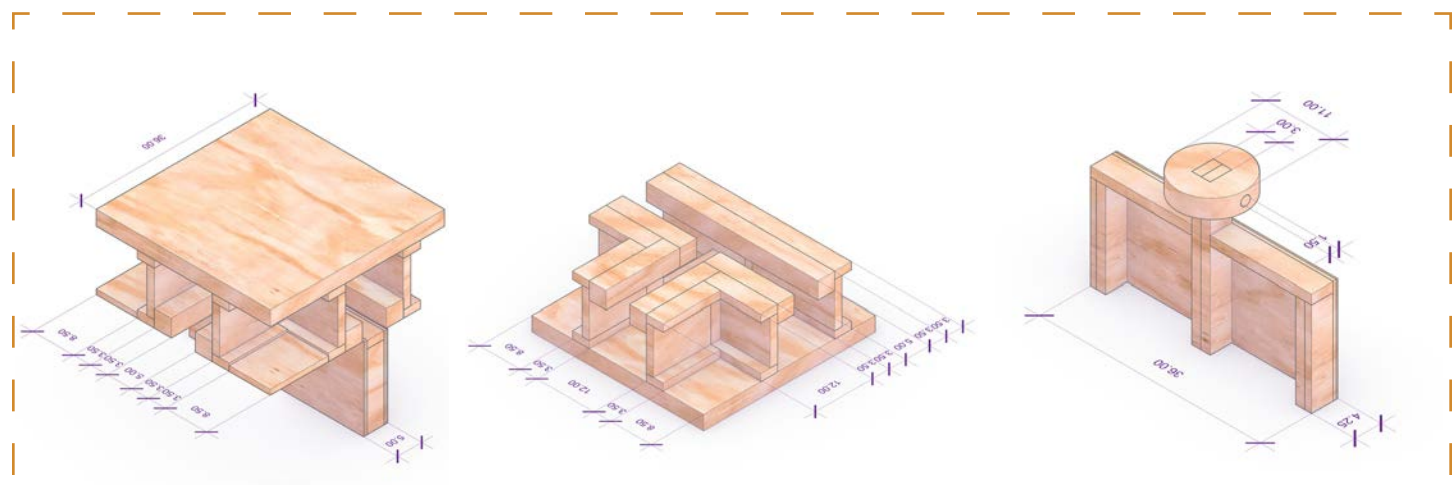


Prototype

The prototype comprises two movable partitions and a ceiling system featuring tracks. These movable partition walls are designed with a top plate that seamlessly fits into the overhead track, facilitating smooth movement. The base of the wall is equipped with wheels for easy mobility and partial weighing. As for materials, plywood and cork serve as the wall finish, contributing to the overall construction of the prototype.



Transformation Process



Prototype Detail Model



Perspective Section Rendering

It represents the corridor view towards the communal area, formed by the collapse of two units on both sides.

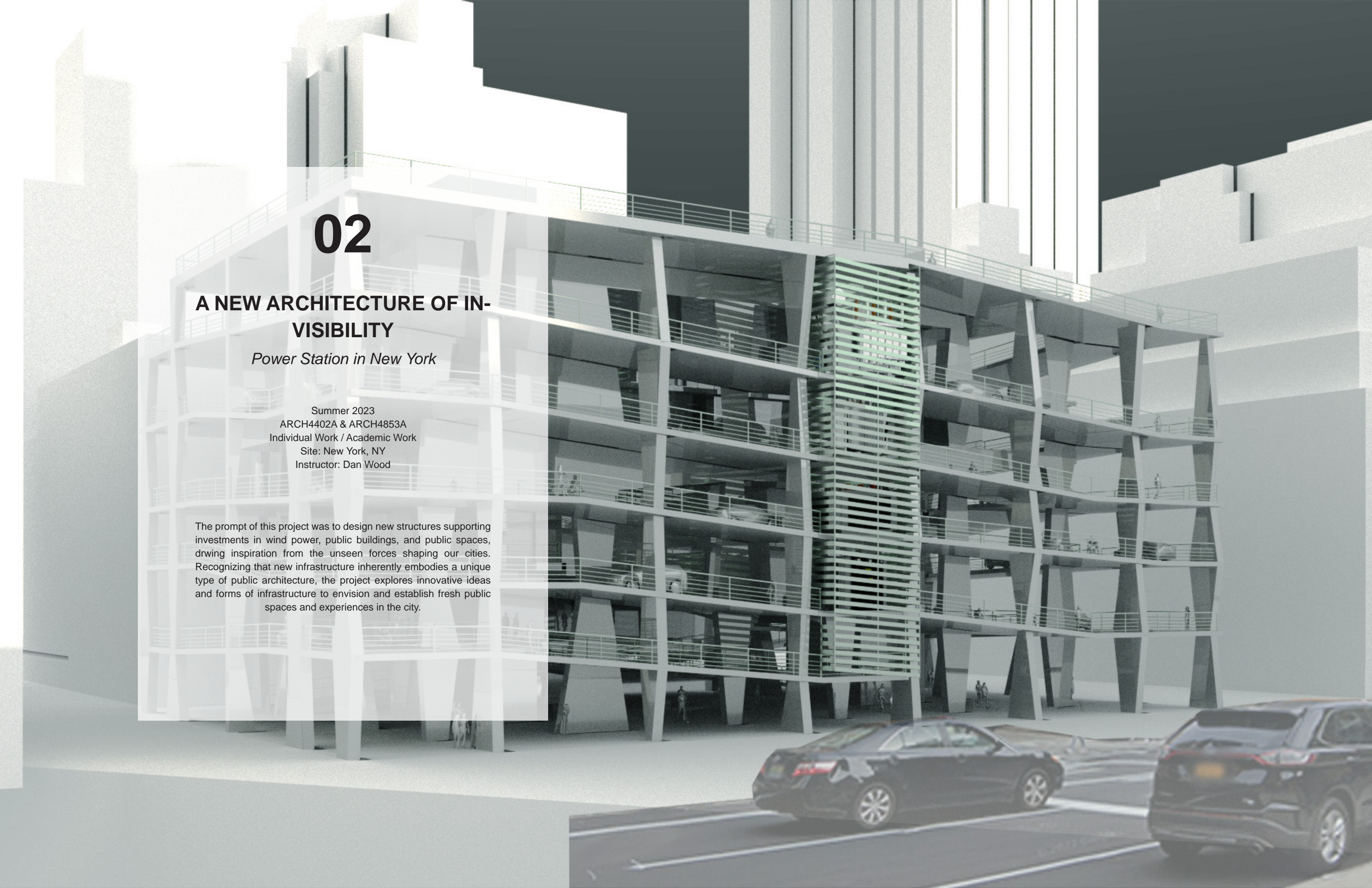
02

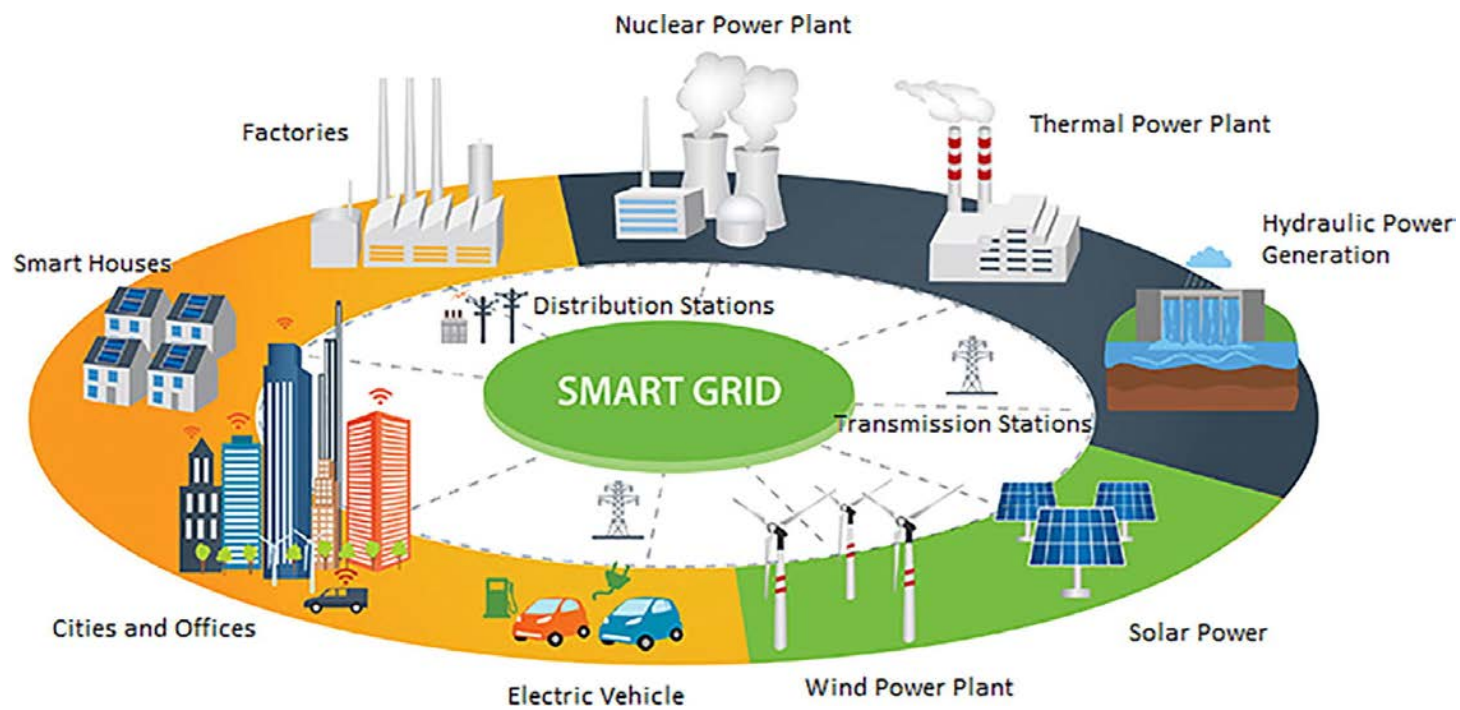
A NEW ARCHITECTURE OF IN-VISIBILITY

Power Station in New York

Summer 2023
ARCH4402A & ARCH4853A
Individual Work / Academic Work
Site: New York, NY
Instructor: Dan Wood

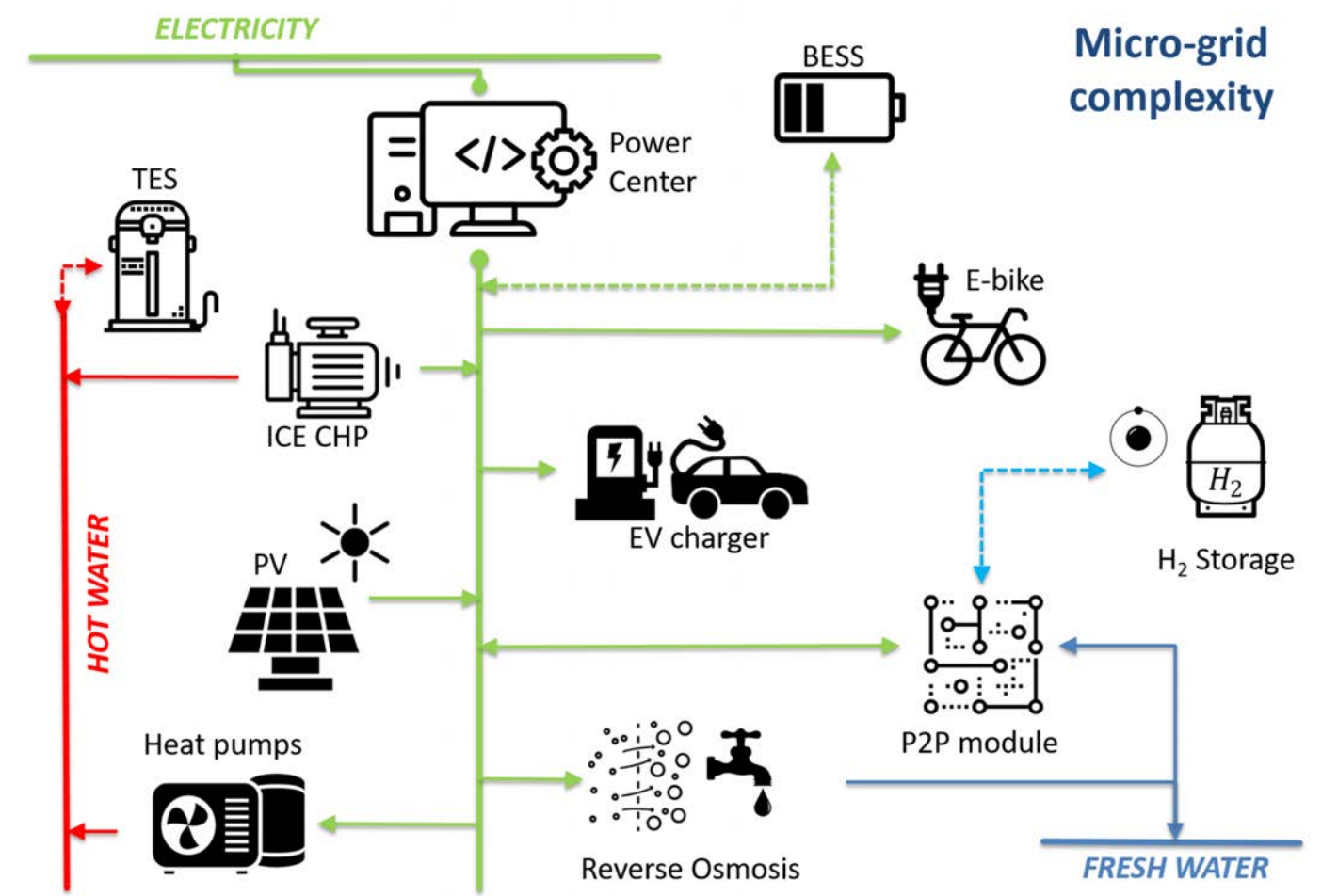
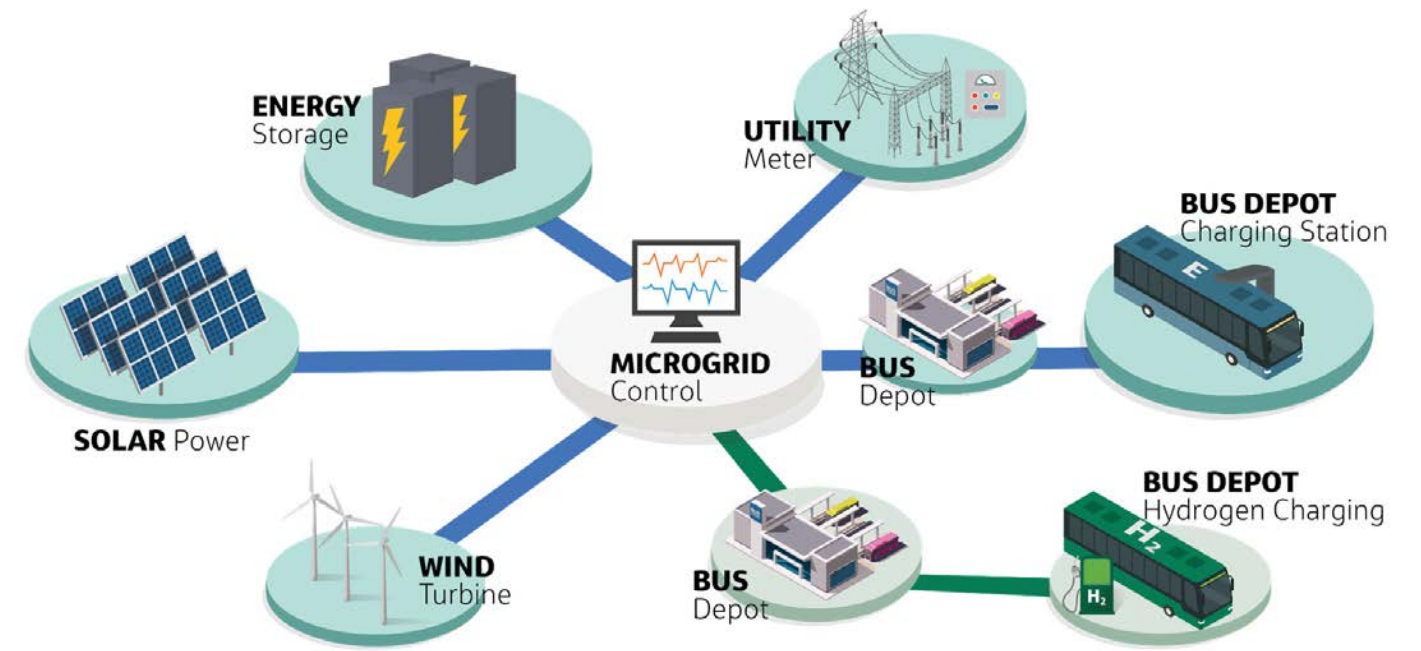
The prompt of this project was to design new structures supporting investments in wind power, public buildings, and public spaces, drawing inspiration from the unseen forces shaping our cities. Recognizing that new infrastructure inherently embodies a unique type of public architecture, the project explores innovative ideas and forms of infrastructure to envision and establish fresh public spaces and experiences in the city.





Research - Smart Grid

The **Smart Grid** is a real-time, dynamic network of electrical demand, supply, and control. It is an advanced and interconnected electricity distribution system that leverages digital technology and real-time communication to enhance the efficiency, reliability, and sustainability of power delivery. It encompasses various components, such as smart meters, sensors, automation systems, and advanced analytics, to enable seamless two-way communication between consumers, utilities, and power generators. There are some elements that are no longer one-directional: an electric vehicle (EV) can be taking energy from the grid –charge process- or releasing energy –car parked, plugged in and charged. Power can be generated in a distribution branch and transmitted to zones with demand at the same instant.

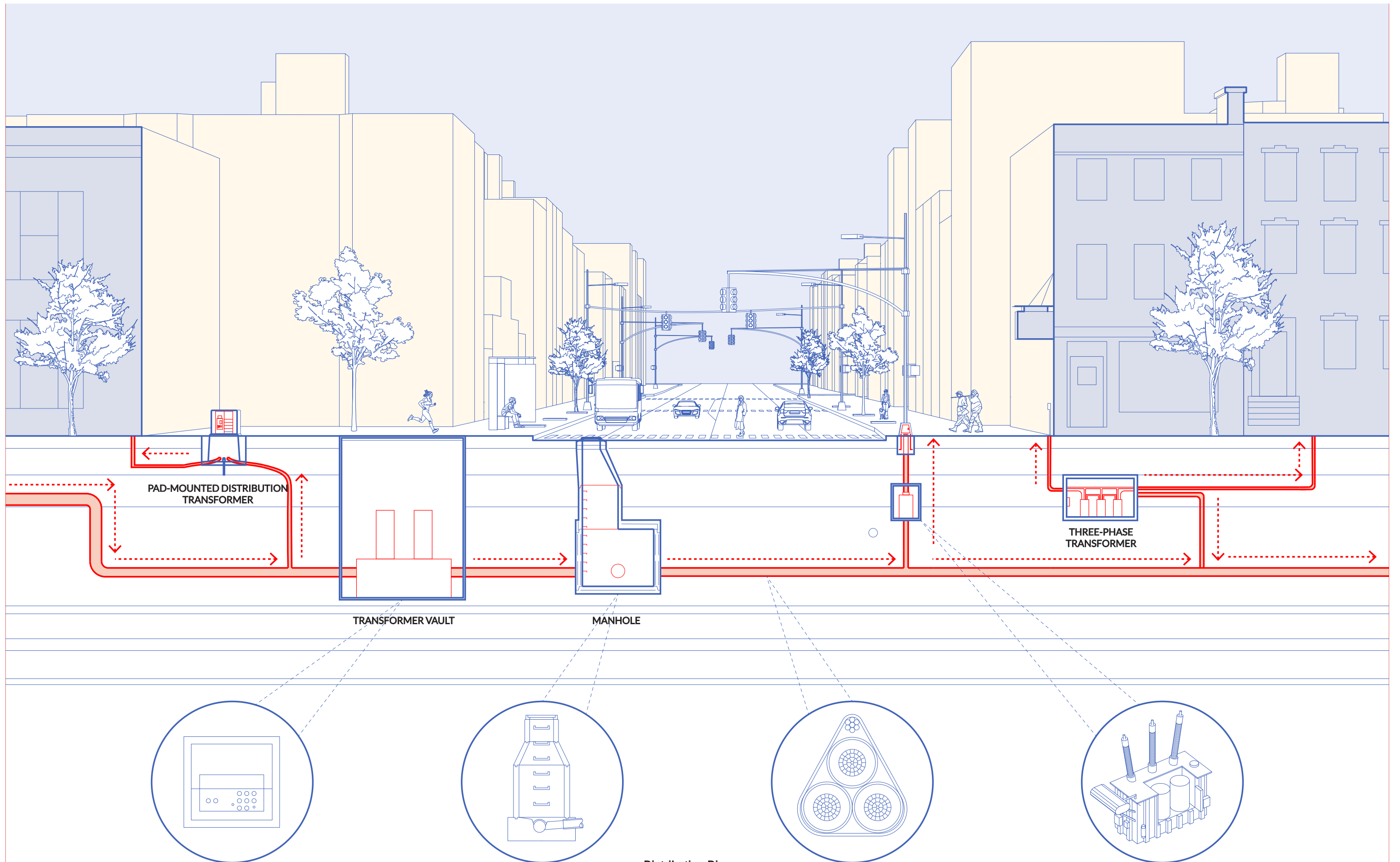


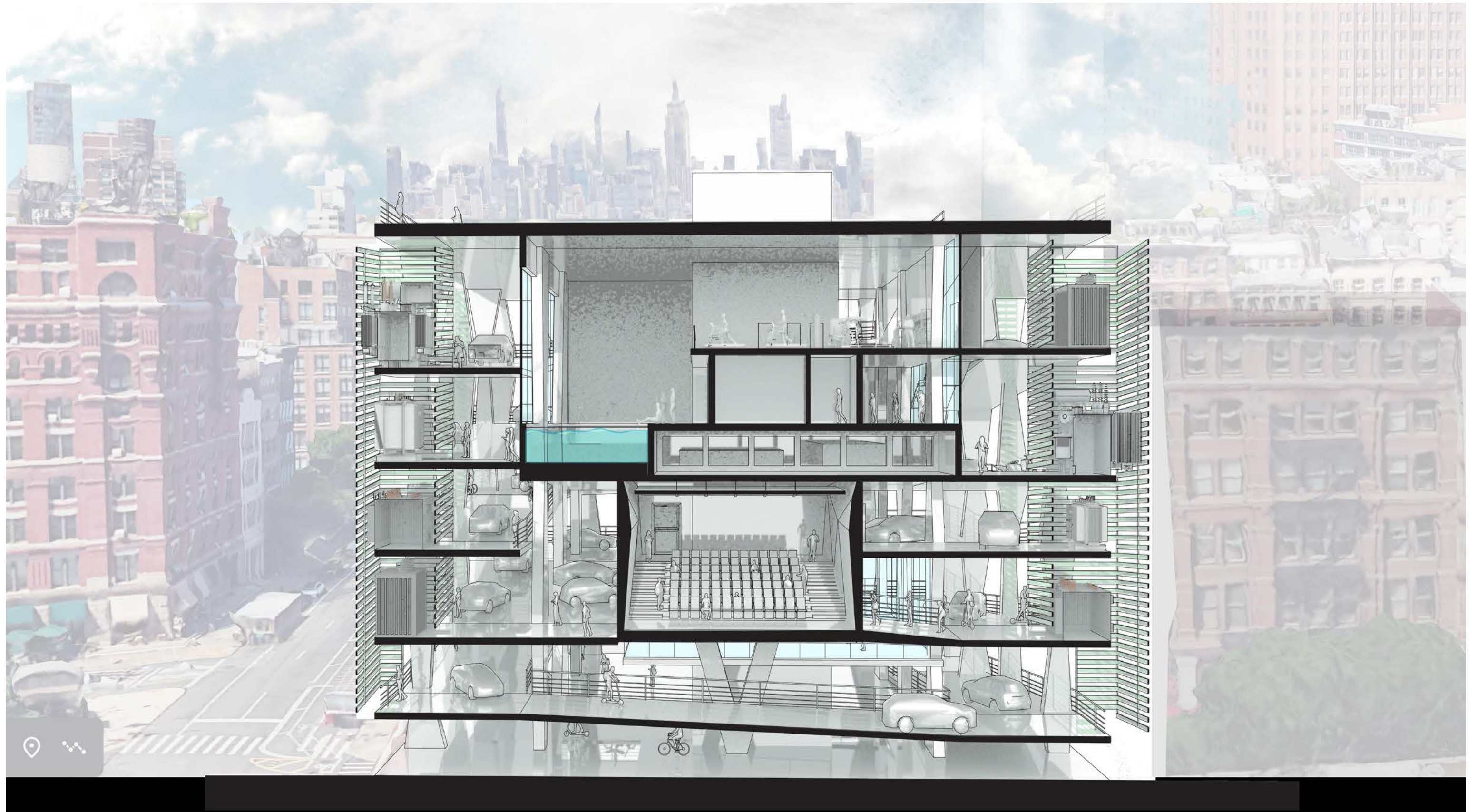
Research - Microgrids

Microgrids can draw power from a variety of sources, and dispense back-up power to a host of buildings. As weather conditions get worse, developers and municipalities are turning to microgrids as supplemental energy controls.

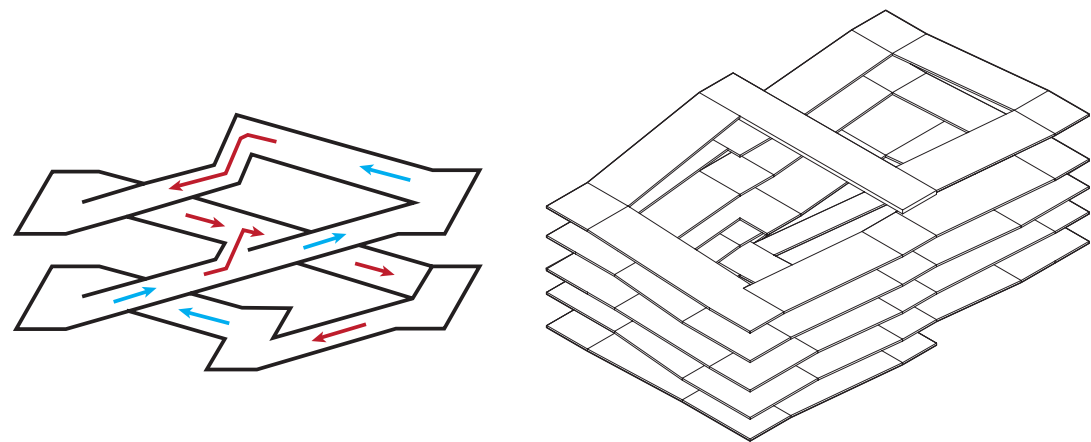
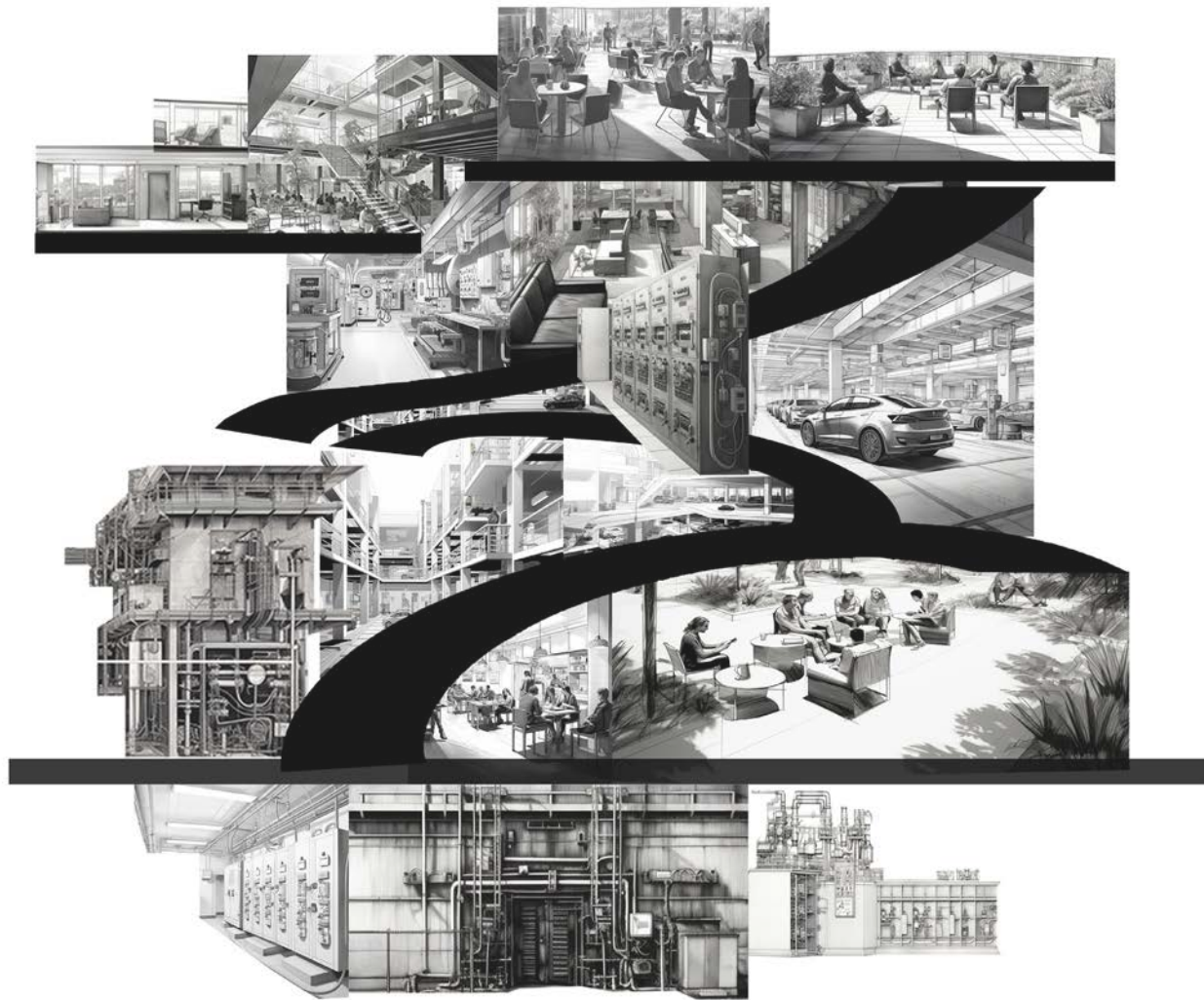
Resilience is what makes microgrids attractive as back-up energy controls.

<https://www.bdcnetwork.com/resilience-what-makes-microgrids-attractive-back-energy-controls>





Perspective Section



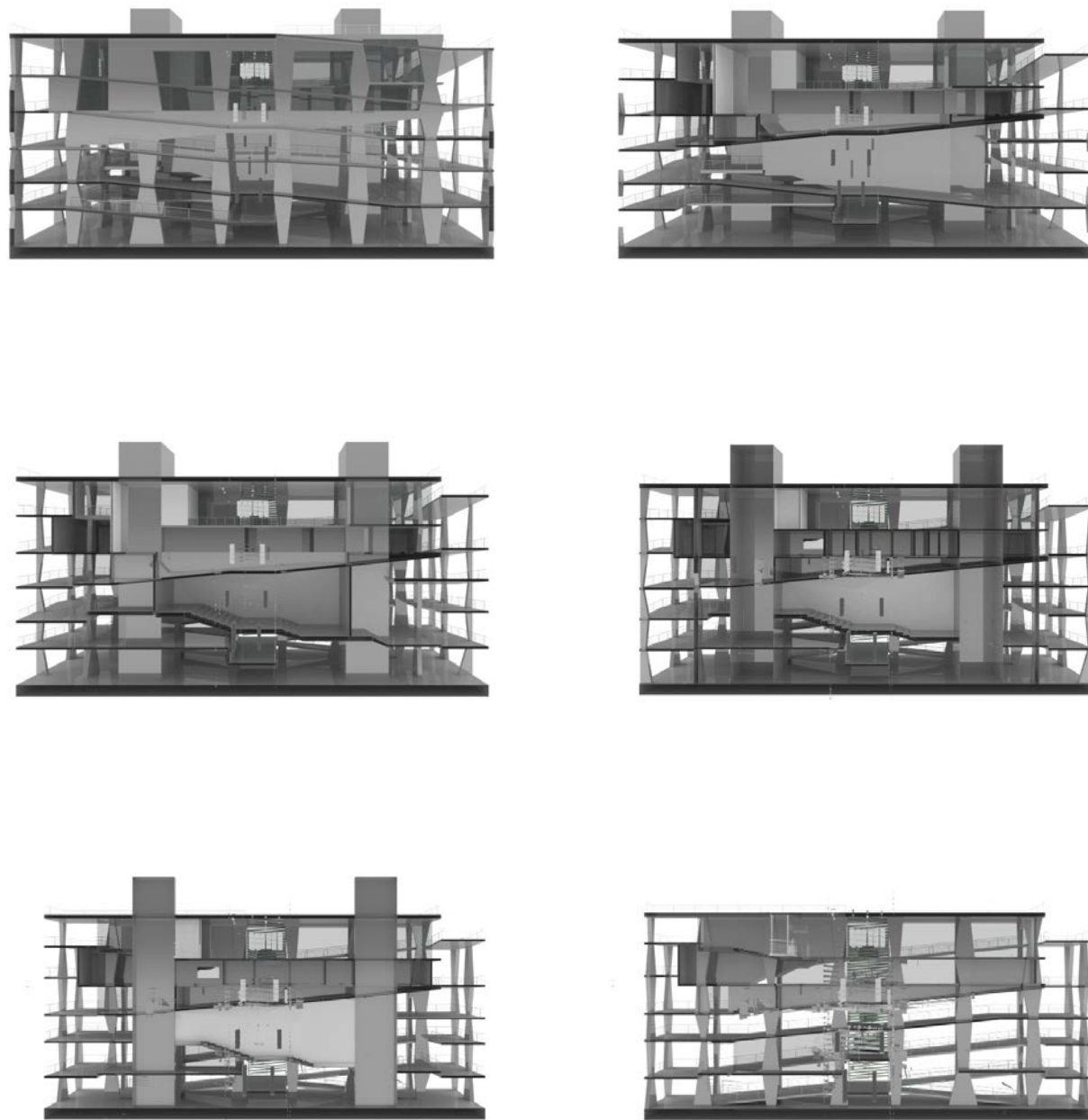
Concept Diagram



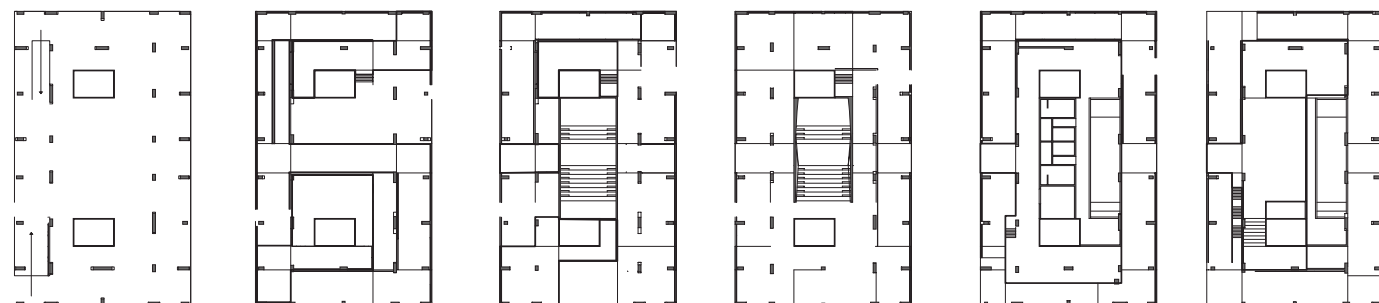
Rendering of South Facade



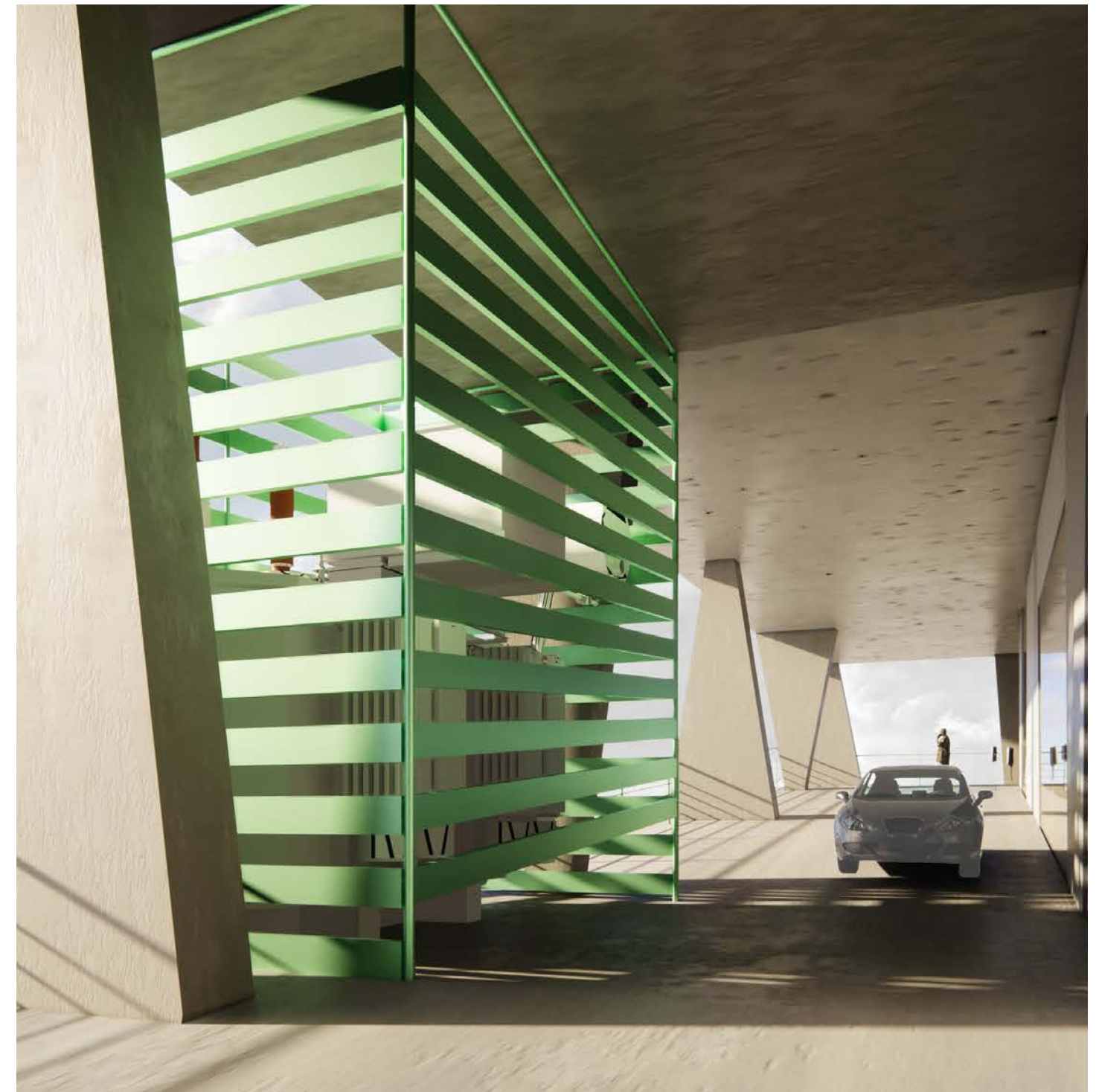
Rendering of North Facade



Section Series



Floor Plans



Visible & Invisible

The architectural design ingeniously integrates functionality with aesthetics, seamlessly blending practicality with modern allure. It provides not only a place to park vehicles, but also a peaceful environment for both cars and their owners. It offers tranquil spaces for relaxing and unwinding, even in the midst of the busy activity of charging electric vehicles. Transformers, which were previously hidden in the cityscape, now play a prominent role as they are incorporated into the building's exterior. This integration of infrastructure and artistic design brings them to the forefront. This intentional transparency not only removes the mystery surrounding the complexities of electricity infrastructure but also enhances the efficiency of supplying power to charging stations at each level, promoting a mutually beneficial connection between design and functionality, innovation and ease of use.

