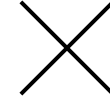Theater of the Multiple

Phoebe Hyunjung Lee
Columbia GSAPP 23-24

◑

When one person faces another, one mixes a little bit of a mask and a little bit of honesty. With sort of a façade, one desires to persuade another, and at the same time gets challenged to be persuaded. Their relation is affected from the phase defined by the spatial boundaries, thus to design the physical environment is also to design the theatricality of the spatial politics.

As space encloses multiple people, we as architects are bound to consider multiplicity. However, as architecture always bases on a site with its own history, it is almost impossible to design a innocent utopia for the multiple. Therefore, architecture for multiplicity can be unfolded by following methodology; to subvert the existing power relationship, to connect or juxtapose the heterogeneity, to intervene with existing dialectics, to dissolve the dichotomy, and so on.
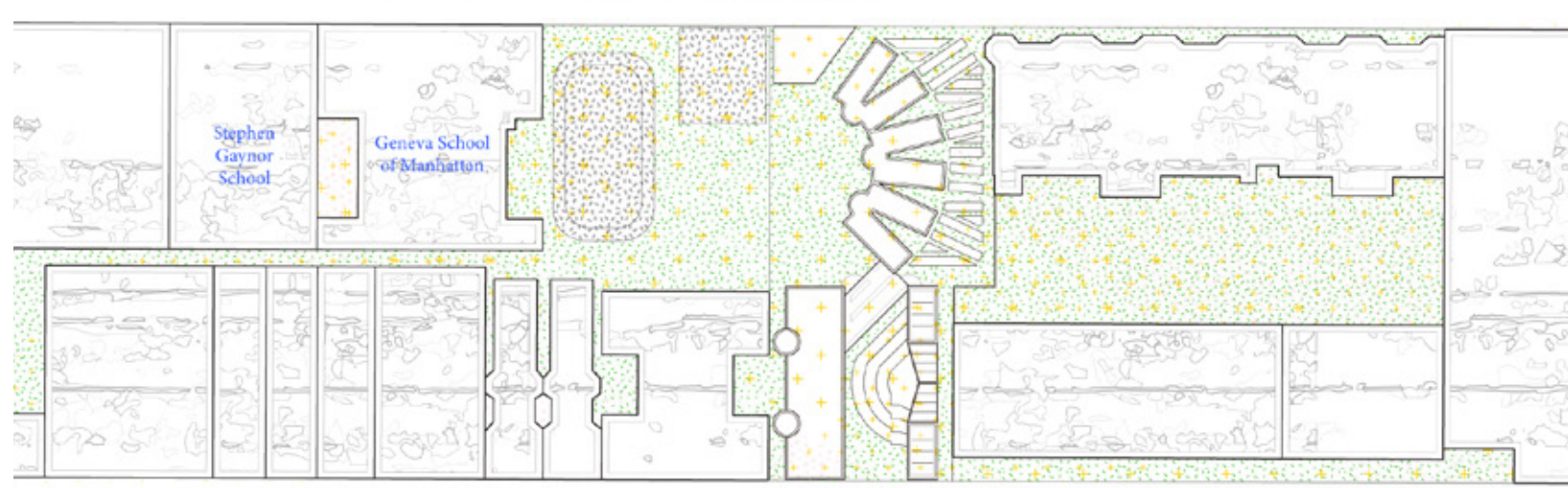
To Intervene the Dialectics
To Dissolve the Dichotomy

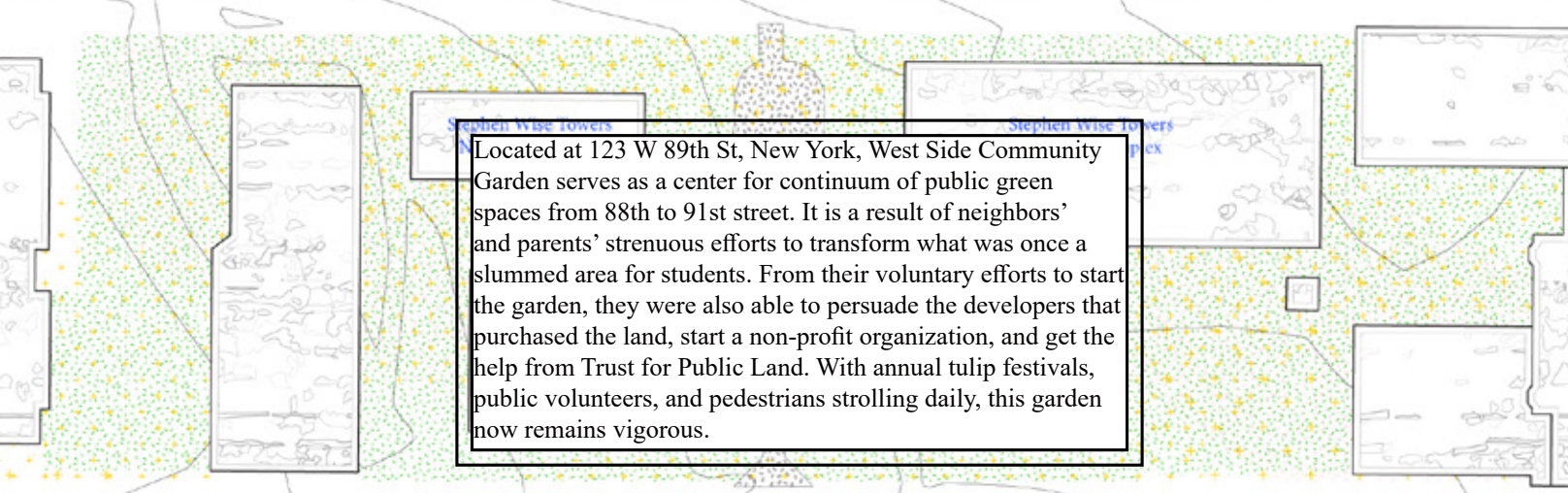# Westside Community Garden Housing

◑

The dichotomy of private and public and the dialectics between nature and artificial intensifies when the lot is introduced a new housing. While housing is always in shortage in NYC, how can a newly built residence communicate with the existing fabric of community? This project penetrates a new housing in the existing lot of Westside Community Garden, creating a new public pathway underneath, enhanced amphitheater and enclosed community spaces.

In case of dichotomy, the need of daylight and view of a residence conflicts with the need of privacy from the community garden. This project approaches this with buffers by balconies, arcades, and vine arches. While the housings are all uplifted from the ground, enclosed public spaces buffers from outside with arcades becomes a new public pathway. Then, the raised housings buffers from outside with green balconies. The private crop beds are also intersected with public crop beds, while the crop bed area is filtered from outside by vine arches.

In case of dialectics, the architecture once again introduces the artificial direction to control the nature. This project uses strong formatic languages of grid, axis, and vine and center that tries to shape the vacant lot of sprawling nature to a livable place. However, it also leaves room behind that nature can again sprawl upon - the green balconies and vine arches. After the building is erected and occupied by people, the act of gardening in these area will become the communication between the human and sprawling nature.

Located at 123 W 89th St, New York, West Side Community Garden serves as a center for continuum of public green spaces from 88th to 91st street. It is a result of neighbors' and parents' strenuous efforts to transform what was once a slummed area for students. From their voluntary efforts to start the garden, they were also able to persuade the developers that purchased the land, start a non-profit organization, and get the help from Trust for Public Land. With annual tulip festivals, public volunteers, and pedestrians strolling daily, this garden now remains vigorous.
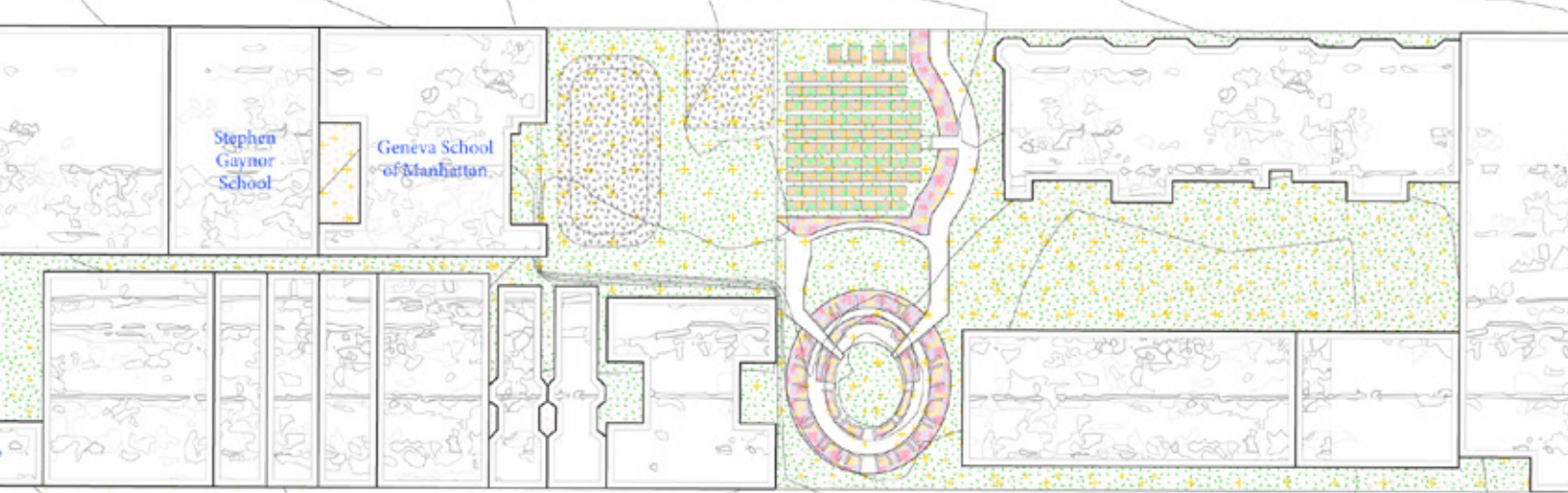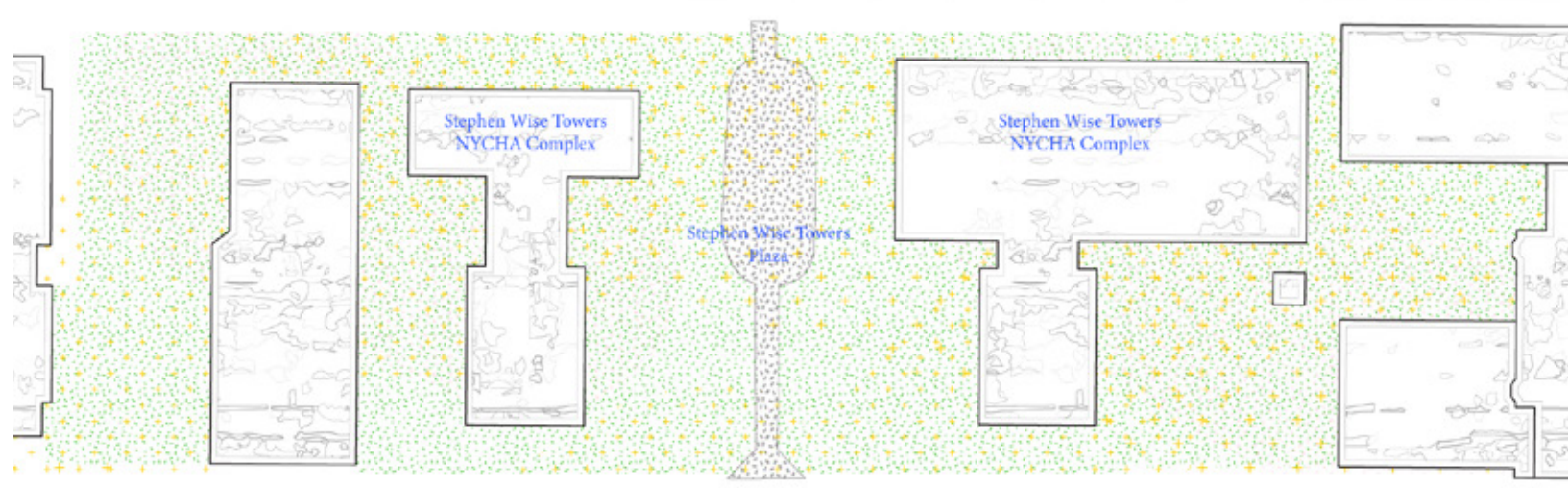
Site Plan | Before

Site Plan | After

To Intervene the Dialectics, To Dissolve the Dichotomy

W 90 St

Garden Plan Before Intervention

Spring 2024
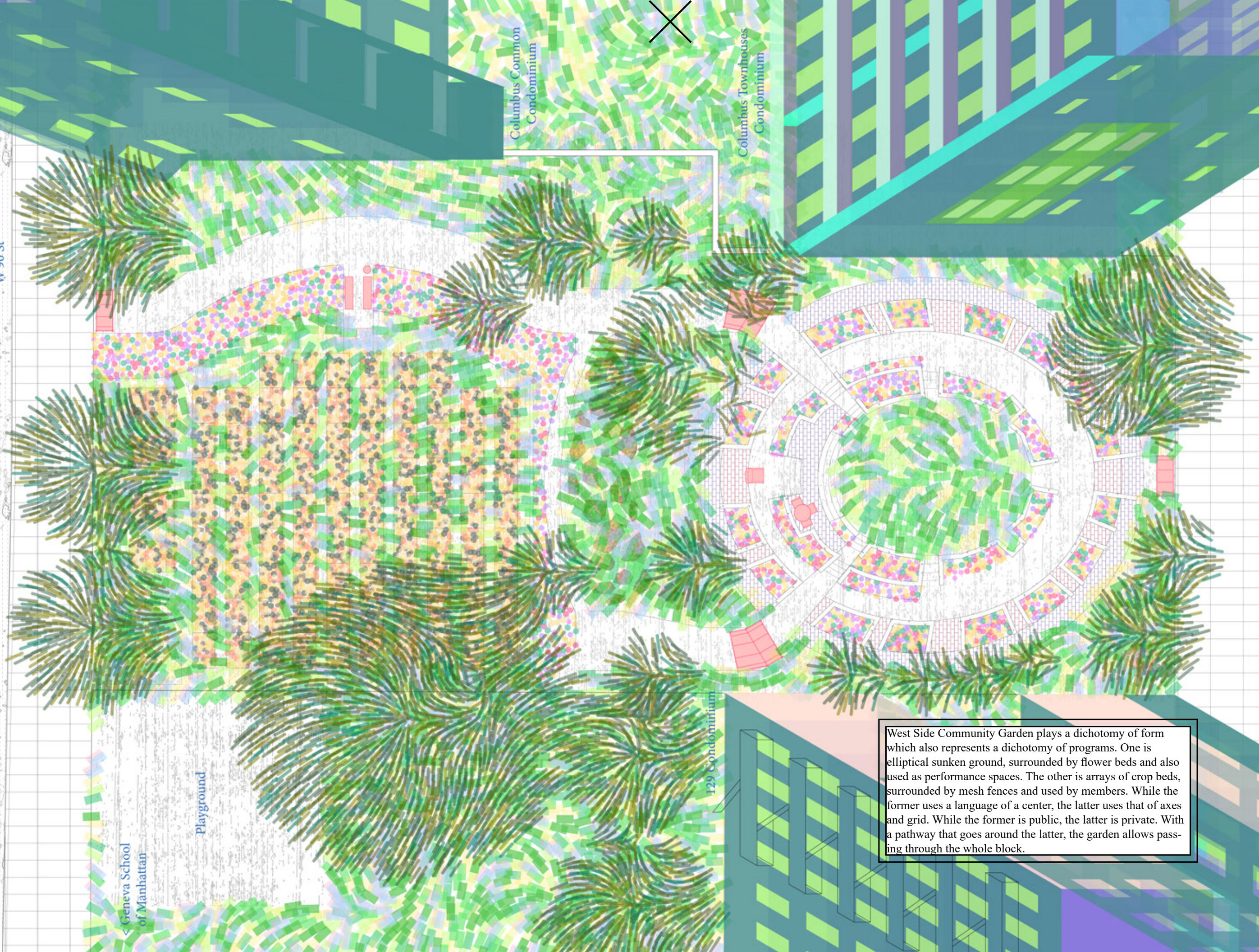
< Geneva School
of Manhattan

Playground

129 Condominium

Columbus Common
Condominium

Columbus Townhouses
Condominium

W 89 St

Individual

Westside Community Garden Housing

Hilary Sample

West Side Community Garden plays a dichotomy of form
which also represents a dichotomy of programs. One is
elliptical sunken ground, surrounded by flower beds and also
used as performance spaces. The other is arrays of crop beds,
surrounded by mesh fences and used by members. While the
former uses a language of a center, the latter uses that of axes
and grid. While the former is public, the latter is private. With
a pathway that goes around the latter, the garden allows pass-
ing through the whole block.

On top of this artificial dichotomy, nature sprawls on its own way, especially in winter, as the plants are less managed. The dialectic between artificial and nature that has been on forever, even in pre-colonial, can be also seen in the facades surrounding the garden and the unmanaged plants.
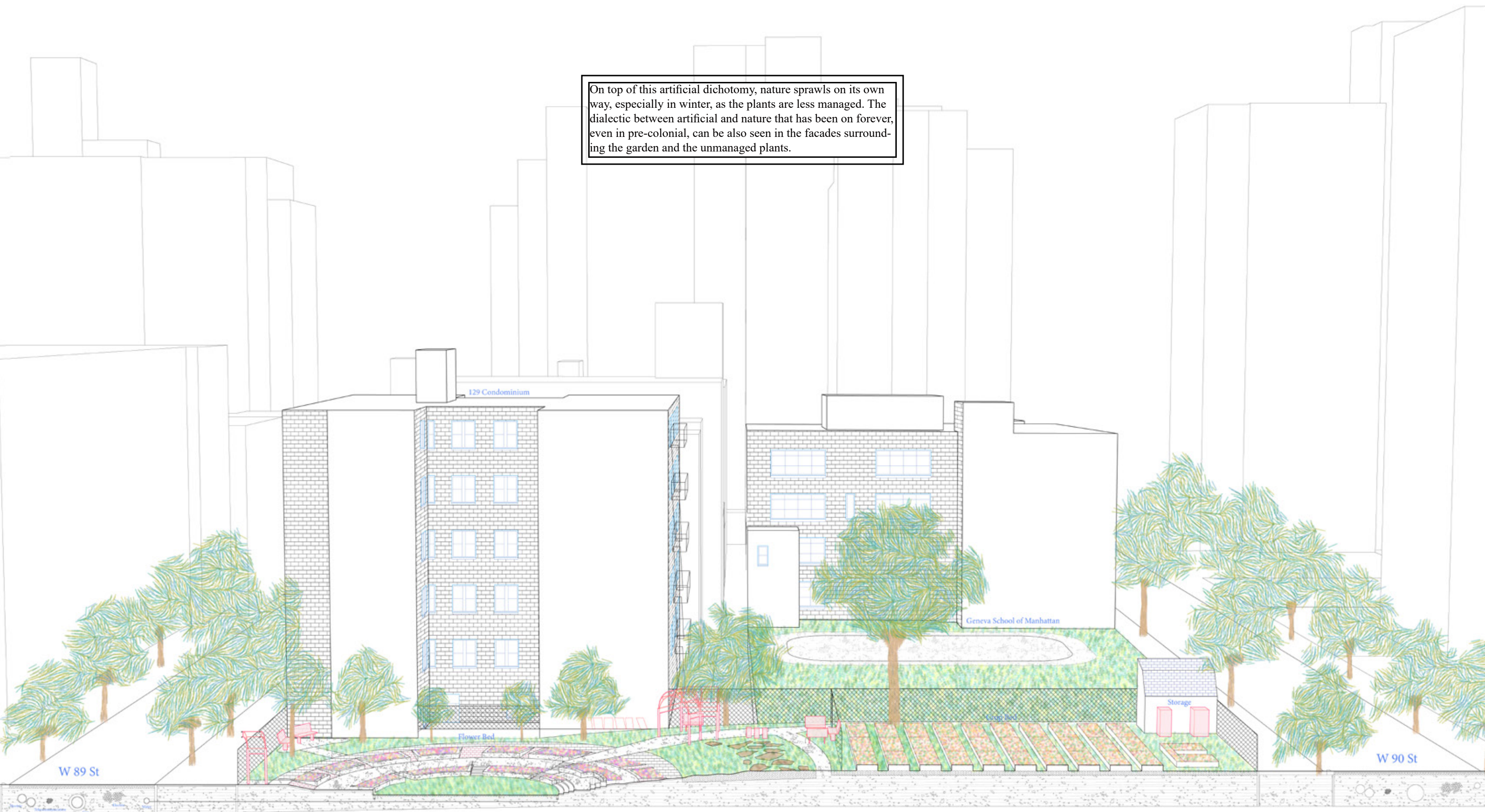
Garden Section Before Intervention
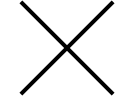
Problem   Outworn Amphitheater   Circular-shaped type without enough drainage
                                               Wet stains and corrosion along wooden steps
                                               Not enough seating spaces

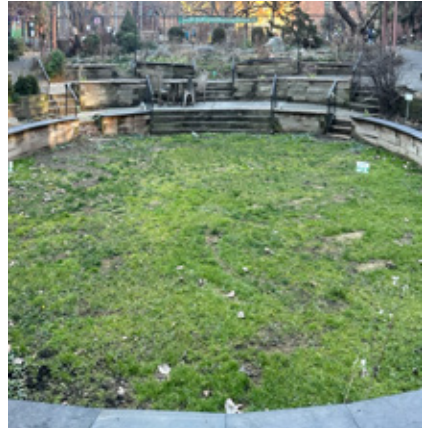Intervention   Amphitheater   Semi-circular type with water flow to one side
                 with Orangerie   Orangerie for storing plants during winter
                                               As stage background for amphitheater
                                               Flower beds and seatings provided

Amphitheater with Orangerie

Problem   Separation of   Private gardening area with fenced boundary
                 Public and Private   Lack of storage spaces causing mess inside fence
                                               Dichotomy with strict boundary without layers

Intervention   Buffered   Arcaded public pathway in the center of garden
                 Private Garden   Vine arches that filters people to private areas
                                               Public and private crop beds intersecting

Buffer by Arcade and Vine Arches

Problem   Lack of Enclosed   Not enough enclosed community, office,
                 Community Spaces   and storage spaces

Intervention   New Enclosed   Public kitchen and seating area for gathering
                                               Storage spaces at ground floor
                                               Office for management

Community Kitchen
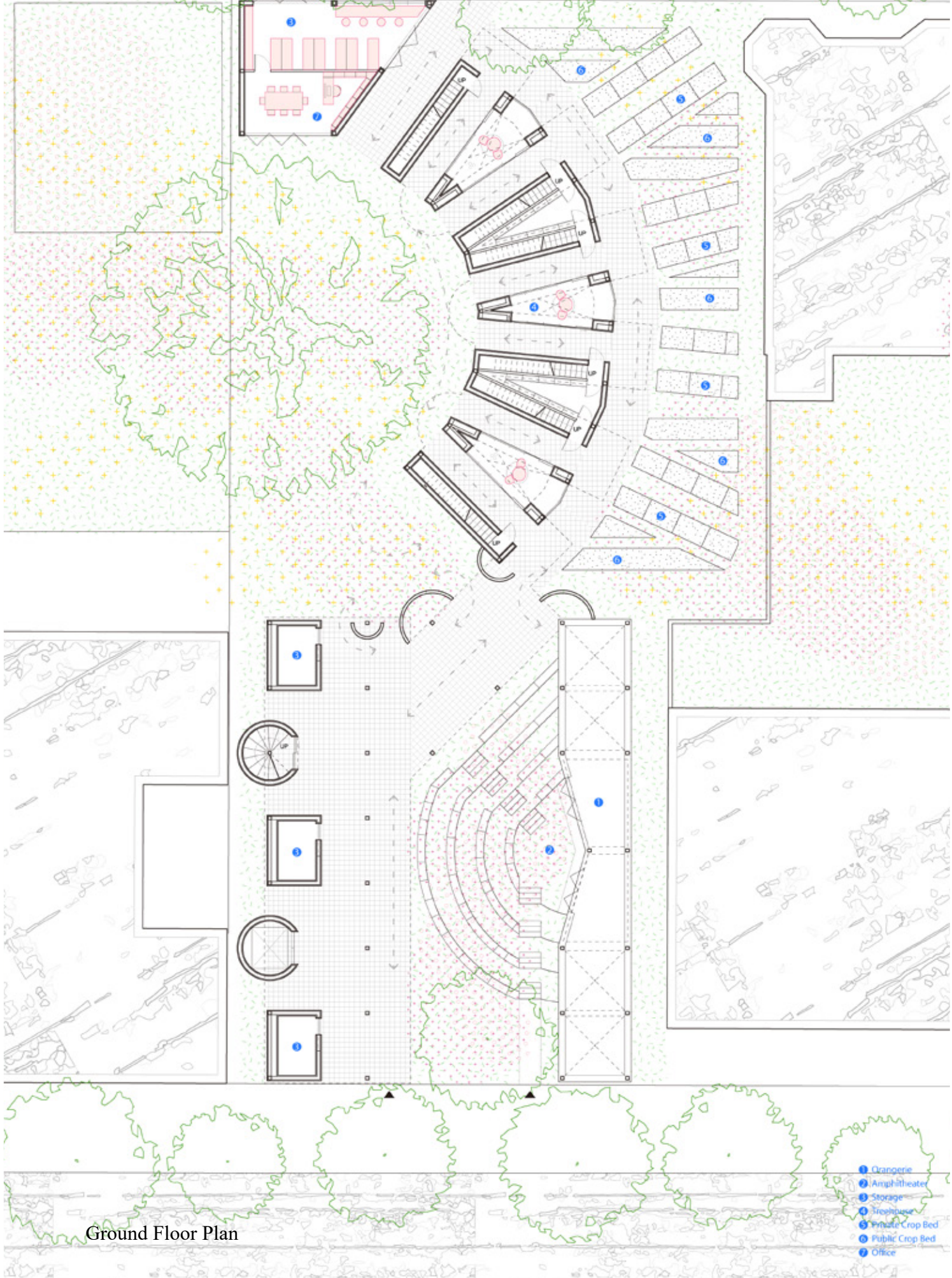
Ground Floor Plan

1 Orangerie
2 Amphitheater
3 Storage
4 Treehouse
5 Private Crop Bed
6 Public Crop Bed
7 Office
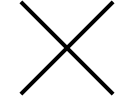
Treehouse Shared Sitting Area

Orangerie

Treehouse Arcade

Arcade

Second Floor Plan

Community Kitchen
Community Office
Community Terrace
Treehouse Duplex Unit Living Room
Treehouse Duplex Unit Shared Green Balcony
Treehouse Duplex Unit Shared Dining
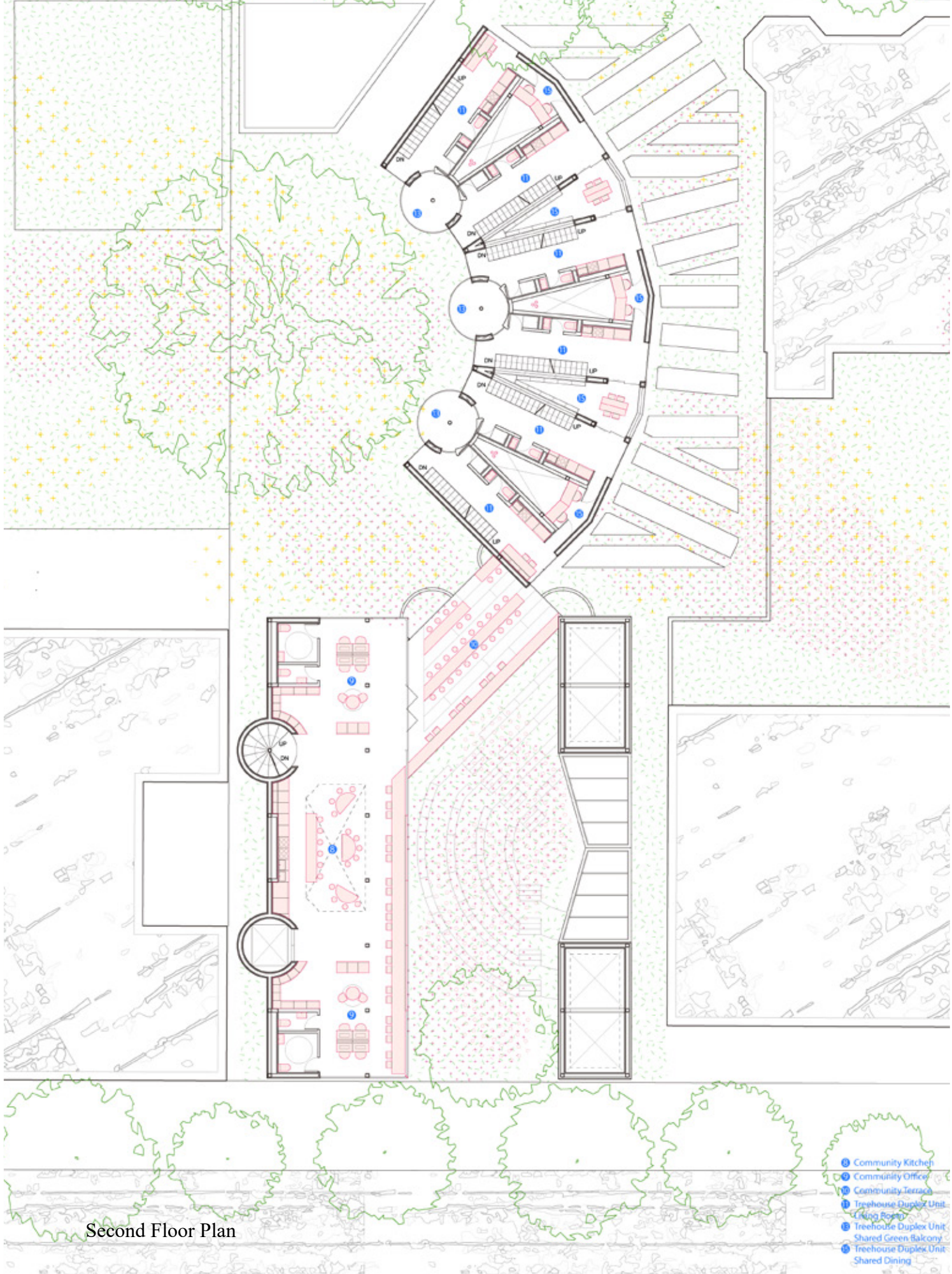
Treehouse Unit Living Room

Treehouse Shared Dining Area

Community Space

Community Terrace

Third Floor Plan

One Bedroom Unit Bedroom

One Bedroom Unit Living Room
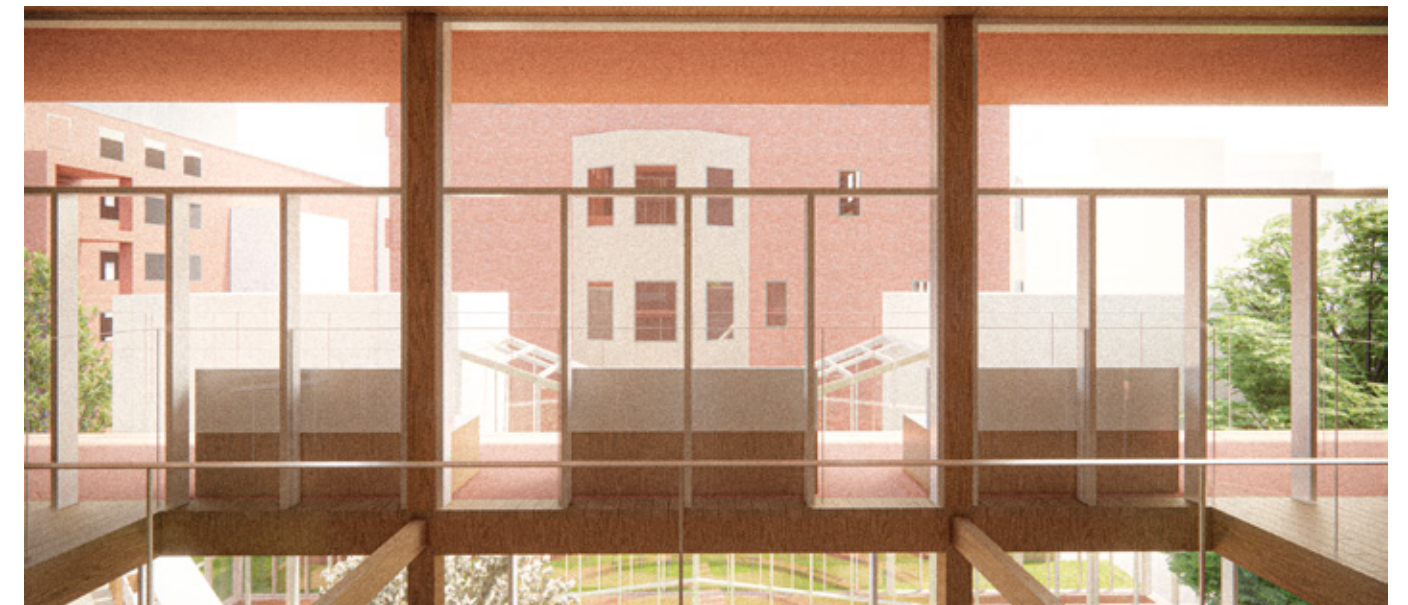
Community Space
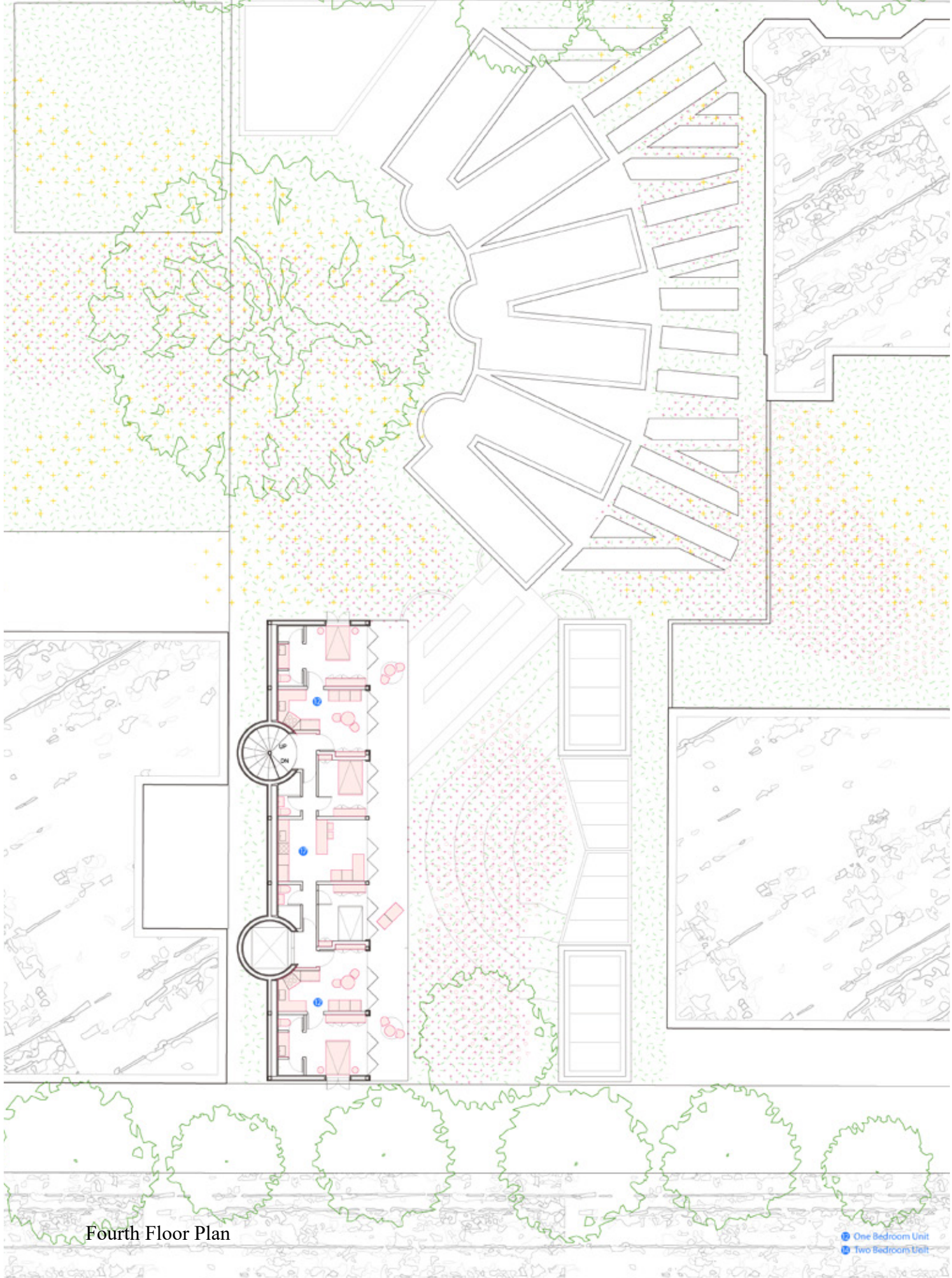
Fourth Floor Plan

One Bedroom Unit
Two Bedroom Unit

Treehouse Unit Bedroom

Two Bedroom Unit Living Room

Treehouse Balcony

Office

Section Perspective

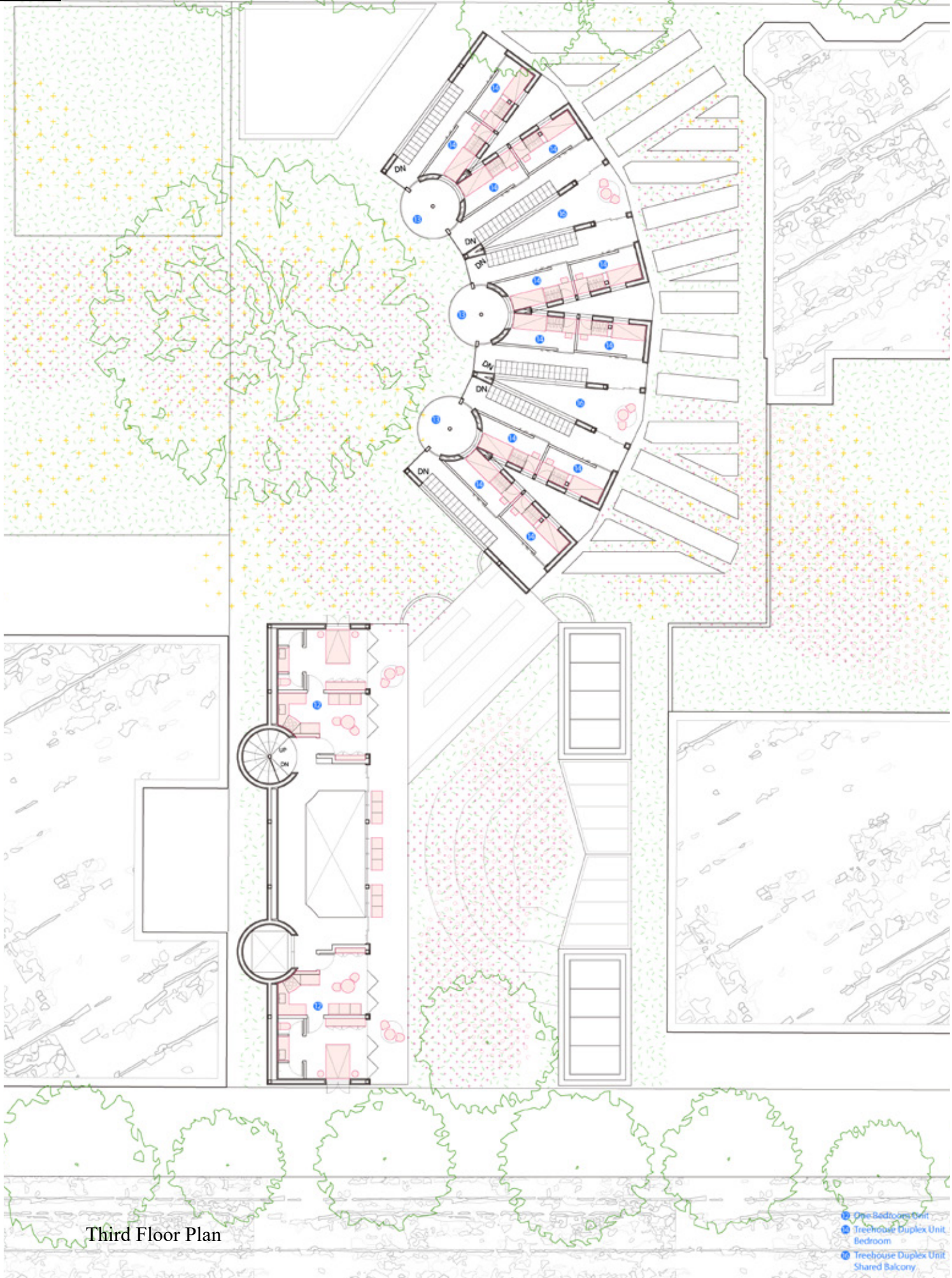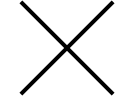Buffers of arcades, balconies and vine arches now provides a more re-centered linearity that mediates between public and prvate, and nature and artificial. Public now can cross the block without the feeling of entering a gated community since there are no fences, and also intervene with public crop beds that grows more variety of plants with a larger use of soil. Students in this area filled with schools, will now be provided a more safer pathway during the night. Residents can be provided buffered privacy through balconies that sets back the residential spaces from public eyesight, but also can have a moment of scene-balcony theater moment from the balconies. This setting therefore creates not only a literal amphitheater but also a theatrical relation between public and private.

View from 90th Street

Section Perspective

To Intervene the Dialectics, To Dissolve the Dichotomy

Planometric

Spring 2024

Westside Community Garden Housing
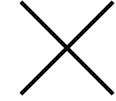
Hilary Sample

Postmodernist Concepts

◐

Session 3. Concepts in Autonomy vs. Signs

For Critique on Functionalism and Pursuit of Decoration

Our thesis is that most architects' buildings today are ducks: buildings where an expressive aim has distorted the whole beyond the limits of economy and convenience; and that this, although an unadmitted one, is a kind of decoration.(Venturi, Scottbrown, Ducks and Decoration, 448)

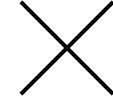I think that this expression is very valid on critiquing functionalism. We can also ask the question of functionalism, 'does it really need~?', to Villa Savoye, whether it really needs pilotis when it has enormous green space next to it. After all, five points reflected in the architecture are also just Le Corbusier's decoration of his words. As architecture happens from concept, it inherently relies on philosophy behind it, and the built form always can be seen as additive if other concepts or perspectives are given. As a result, it becomes decoration.

Against That Post-Functionalism, or formalism can be used to purse modern sensibility and move away from form/function dialectic.

But there is clearly a present need for a theoretical investigation of the basic implications of modernism in architecture. ... This new theoretical base changes the humanist balance of form/function to a dialectical relationship within the evolution of form itself. (Eisenman, Post-Functionalism, 3-4)

Formalism cannot avoid humanism inherent in architecture as the humanist pursuit and the modern sensibility are only different in the perspective of viewing society, where the former views as an individual perspective and the latter views as total perspective with views on singularity. Despite fragmentation, as architecture always occurs on specific sites and becomes engaged with people, it inherently becomes relative to sequence, programs and thus empiricism which places individual on center when consideration. As a result, the dialectic of form and function also becomes unavoidable.

Session 4. Phenomenological Affects

For: Critique against veneer populist architecture which economically facilitate marketing

Modern building is now so universally conditioned by optimized technology that the possibility of creating significant urban form has become extremely limited. ... any intervention tends to be reduced either to the manipulation ... or to a kind of superficial masking which modern development requires for the facilitation of marketing and the maintenance of social control. (Frampton, Towards a Critical Regionalism : Six Points for an Architecture of Resistance, 17)

This holds truer than ever under current situation where affects of architecture are only enabled through social media. People experience architecture through social media; they only try to visit spaces that have appeared on their social media feed, and try to take picture at the exact same spot and perspective to the picture they have seen. Modern spaces, as a result, goes even further than veneer materiality, and only decorate one scene that can be considered as 'instagrammable.' This reduces the character of space to taxidermied two-dimensional experience, becoming completely out of context of given region or site and losing totality of phenomena with no consideration of the tactile.
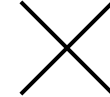
Against: The panic against populism

But it is necessary, ... to distinguish between Critical Regionalism and simple-minded attempts to revive the hypothetical forms of a lost vernacular. In contradistinction to Critical Regionalism, the primary vehicle of Populism is the communicative or instrumental sign. Such a sign seeks to evoke ... the sublimation of a desire for direct experience through the provision of information. (Frampton, Towards a Critical Regionalism : Six Points for an Architecture of Resistance, 21)

Ironical to the point just made before, I think that phenomenological architecture sometimes gets too far from the basic need to communicate to people with visuals, leaving the phenomenological experience only to architects. I personally experienced these questions one time I visited a gallery by Tadao Ando named Genius Loci in South Korea. Despite the literally phenomenal architecture with focus on the tactile and total experience, when I read the visitors' notes at the end of the gallery, it was only full of architects and architectural students. When there are no people other than architects left to experience the total phenomena, are the affects of architecture truly reinforced?

Villa Savoye, Le Corbusier

Wexner Center, Peter Eisenman

Copied Experience of Instagram Spaces,
from student research by Jin Jangyu and Jisoo Lee(SNU)


Genius Loci by Tadao Ando

Session 5. Heterogeneity, Disjunctions, Fragmentation

For: Revealing the Inherent Flaws

On the contrary, deconstruction gains all its force by challenging the very values of harmony, unity, and stability, and proposing instead a different view of structure: the view that the flaws are intrinsic to the structure. ... A deconstructive architect is therefore not one who dismantles buildings, but one who locates the inherent dilemmas within buildings. (Wigley, Deconstructivist Architecture, 11)

Revealing the inherent fallacies of pretentiously harmonized network is needed more than ever. Seemingly harmonious social media with its effects of globalization and representation of singularities becomes stronger as a media than architecture, with people sensing, experiencing, forming relations, and eventually dwelling inside cyber junkspaces (referring to the concept of Rem Koolhaas) with facade of a 2D screen. However, as recommendation algorithm of social media lets people see only what they want to see, individuals tend to fall into fragmented and polarized ideological rabbit holes. As revealing of these inherent fallacies is almost impossible due to its multi-dimensionality that people cannot process, only architecture can reveal it – it has to become a stronger media and reveal the flaws, just like Eisenmann's essay, <The Affects of Singularity>.
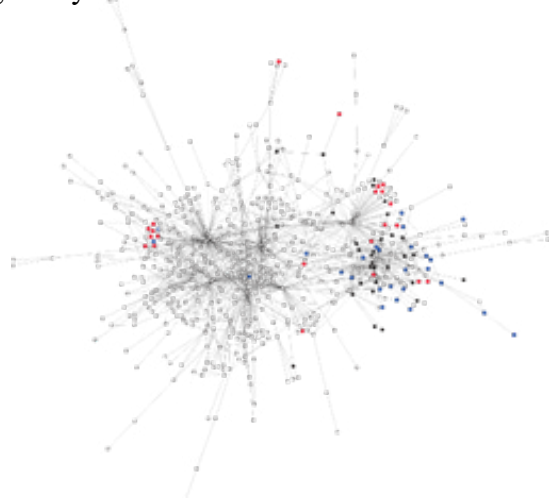

Youtube network graph, from my undergraduate thesis which researched the network of Youtube political videos, and red and blue dots are each conservative or liberal rabbit holes, where user can easily fall into

Against:

Similarly, Tschumi states that "La Villette ... aims at an architecture that means nothing, an architecture of the signifier rather than the signified one that is pure trace or play of language." In its continual deferral of meaning, in its celebration of the endless signifier, poststructuralist theory appears to have produced another kind of aestheticization, which privileges form(language) and "textuality" and which refuses any reality outside the object(text). (McLeod, Architecture and Politics in the Reagan Era : From Postmodernism to Deconstructivism" Assemblage 8, 692)

I disagree with this statement. Especially in La Villette, follies signify multiplicity, like Derrida has stated, answering to a program of transfers, transformations or permutations over which these external norms no longer hold the final word. (Derrida, 573) Play of forms in architecture never can be marginalized as aestheticization, as forms bound spaces and thus relations. In configurations of these relations, architecture not prioritizing single ideology but signifying multiplicity does not refuse outside reality but rather reacts to its complexity.
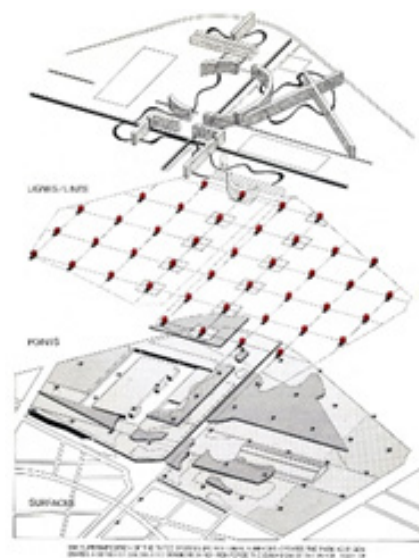
La Villete, by Bernard Tschumi
Revealing the multiplicity of follies

Session 6. Programmatic Concepts and Diagrams: A Search for Abstraction

For:

In Bigness, the distance between core and envelope increases to the point where the facade can no longer reveal what happens inside. The humanist expectation of "honesty" is doomed: interior and exterior architectures become separate projects, one dealing with the instability of programmatic and iconographic needs, the other – agent of disinformation – offering the city the apparent stability of an object (Koolhaas, Bigness, 501)

Truly, cities of today are far from honesty. One cannot distinguish in New York City whether a building is residential, office or commercial by its facade. One does not even desire to. The city that a person faces outside the interior places they dwell daily is too big of a place to an extent that is incomprehensible. Visiting somewhere new in the city out of instant needs depends on virtual information out of Google Maps or social media. As the city becomes incomprehensible, it excludes human, making it impossible for dwelling or building memories. As a result, I think that this extends to another concept of Koolhaas, Junkspace, spaces that cannot become places.

Animation background from Flagrant Delit
by Madelon Vriesendorp

Against:

Architecture can be a tool for communication. ... Today, architecture is moving toward the development of "devices" that can combine large-scale issues with individualized input, and analysis with proposals. Architecture in the future will be consumer oriented, connecting bottom-up with top-down. (Winy Maas, 15)

Consumer oriented architecture of today is far from bottom-up process, as those consumers(clients) of consumerist firms are only becoming much richer. As polarization of wealth is worsened, as more spaces of the city is privatized, and as the only affordable architecture of the majority is IKEA furniture, the consumers that can indulge in the architectural communication processes are only big developer firms. Only few architects are left to participate in the bottom-up process for public architecture.

Radio Tower & Hotel by MVRDV
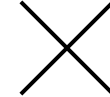
Session 9. The Post-Critical and the Iconic

For:

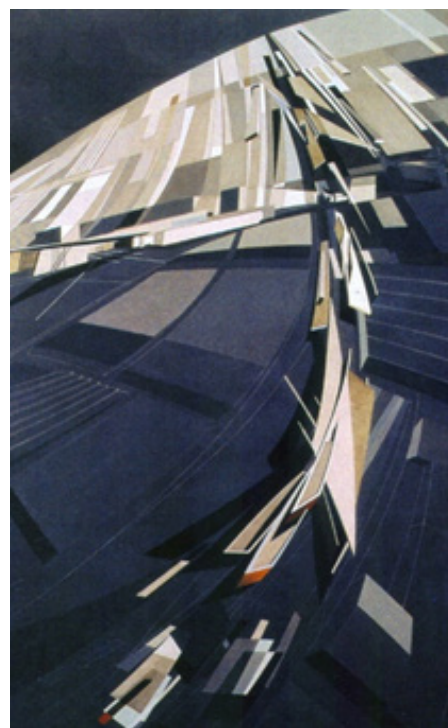*If critical dialectics established architecture's autonomy as a means of defining architecture's field or discipline, a Doppler architecture acknowledges the adaptive synthesis of architecture's many contingencies. ... It is important to underscore that this multiplying of contingencies differs greatly from the more dilute notion of interdisciplinarity, which seeks to legitimize architecture through an external measuring stick, ... (Somol, 75)*

I think using Doppler effect to describe the disciplinarity of architecture is valid, as architecture is about designing places – spaces that formed meanings with people -, and these meanings do not exist when to describe architecture on its own. Barcelona pavilion and Dom-ino might be self-referential examples, but as they become examples and systems to be referenced and replicated afterwards, they are bound to be changed by effects from outside architecture, and the whole process of changes itself would be part of architecture.

Against:

There are three fundamental properties of organization in a computer that are very different from the characteristics of inert mediums such as paper and pencil: topology, time, and parameters. (Lynn, Animate Form, 20)

I disagree that topology, time, and parameters are irrelevant in design mediums of paper and pencil. When parametric design uses geometries as parameters and search its multiple topology through scripting, another architect can do the same with paper and pencil – they would explore, modify and explore the multiplicity of dots, lines, and planes. It might be easier to do those in computers, but I also think that sometimes the medium - scripting language and the base modeling program (for example, Grasshopper and Rhino3D accordingly) – limits the exploration in certain ways that creates rather numerous similar looking designs.

Zaha Hadid, Vitra Firestation design study, 1990

MAD Architects, Cloudscape Library

Session 10. 'Form Follows Climate' and Green New Deal or "Else"

For:

Ecological design can no longer be conceptualized exclusively as a combative tool against aggravating climate conditions. Technology, as weaponry and as defense, is not the sole option; either is an exclusive engagement with teleology. (Kallipoliti, History of Ecological Design, 31)

I agree with this, as ecological design of today has gone much more diverse than from its original purpose to combat with climate change. Its political stance aligned with the Leftist's desire to shed light on the othered has influenced the mentioned artists in the article, who focus on subnature and nonhumans. However, they do not necessarily directly engage with the purpose – for example, the cricket shelter cannot solely be explained by the purpose of combat with climate change.
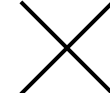
Against:

The buildings here are not for humans but for things and machines. Thousands of years of architectural and cultural history are ditched. Debates, predictions, ideologies ignored, literally. It is post-human. (Koolhaas, TRIC : Post-human Architecture)

I have a different view on industrial centers or data centers. Since there are almost no physical presence of humans in these centers, it does become quite irrelevant of the polemics in the discipline of architecture. However, that the data that these data centers store could be someone's memory – photos, records - makes these buildings far from post-human. Demolition of one of these buildings might have greater impact on humans than another demolition of another building that has been used by humans. But still, it is hard to describe them as places when humans do not directly form meanings with these spaces (but rather, their meanings and memories with others are stored here.) Then, it might be fair to describe these buildings non-architecture but not post-human.

Cricket Shelter: Modular Edible Insect Farm
by Terreform One, from abovementioned article, 38

Microsoft data center interior

Superimposing Sequences
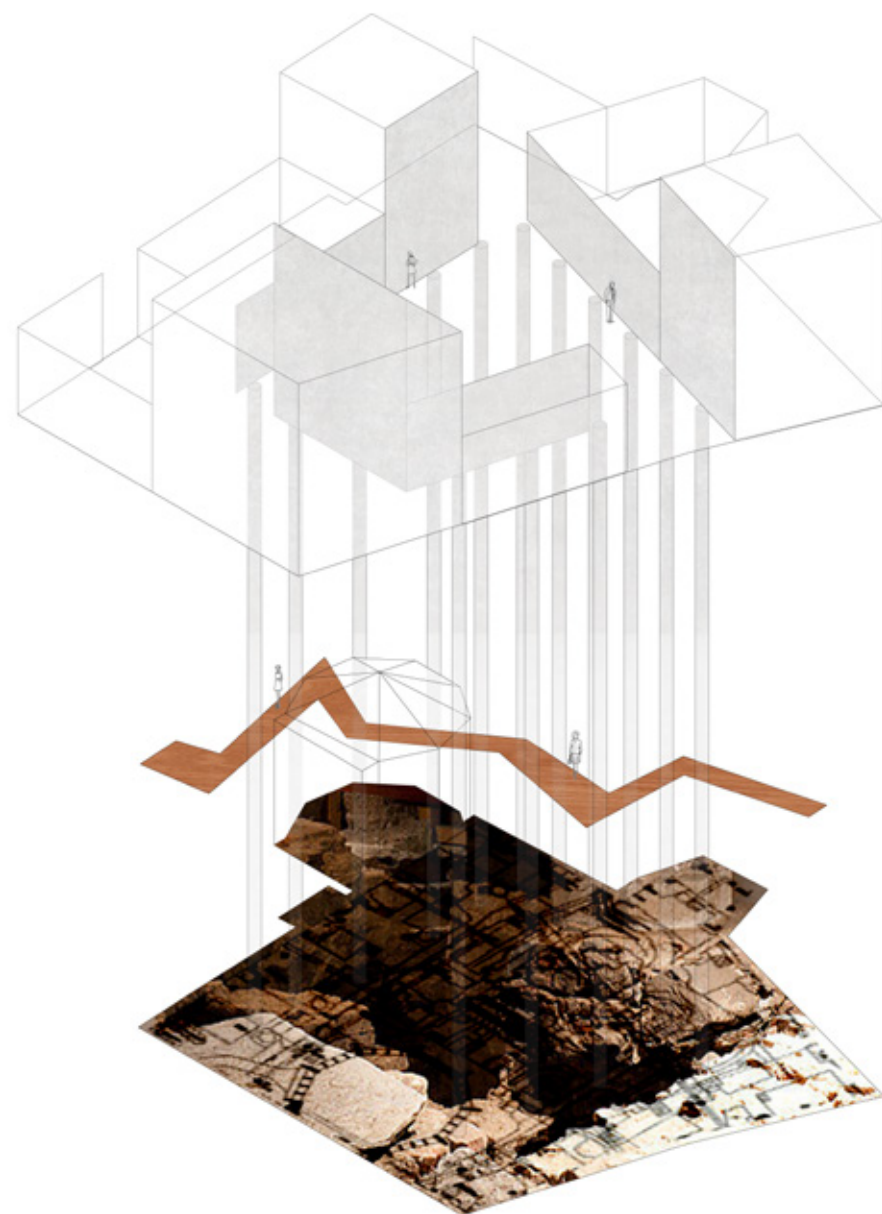
Hypothesis: The Kolumba Museum sequences layers of superimposed archaeological remnants. In doing so, it becomes their background, choreographing contemplation without getting in the way.

Synthesis: By synthesizing spatial, historical, and cultural context into a distinct affective content using Norberg-Schulz-prescribed phenomenologies of boundary, discontinuity, texture, and opening, Zumthor has constructed what Kenneth Frampton descriptively calls a "place conscious poetic" (Critical Regionalism, 27) – in which the building's effect and affect come from its relationship with the existing ruin, amplifying and mediating it, teasing from it emotional movement, designing a careful solemnity, all while minimizing its own existence.

Most importantly Zumthor relies on direct experience rather than allusive metaphor for the building's meaning. The integration of old into new – not performed at the level of conceptual abstraction – is conducted in literal tapestry, where remains of prior structures are interposed within the bare, planar walls. On the outside, as one approaches and then enters the building, an austere wall of light gray bricks connects frayed remnants of an 11th century romanesque cathedral, expanded in the Gothic style a century later. The remains are presented as the figure to the connective ground, like art hung from a bare wall, or a performance on a stage set.

The effect is best defined phenomenologically rather than spatially – as Norberg-Schulz says, not "what" things are, but "how." While the singularity of these integrated surfaces might recall continuity, their unevenness and bare expression of decay and destruction more pointedly emphasize the site's discontinuity. The tapestry is ragged, not smooth. A zagging catwalk through the ruins is lit from above by generous brick openwork and hanging pendant downlights, putting the modest wreckage into stark chiaroscuro, but more importantly presenting it as a monument. A strictly delimited edge between public catwalk and the cratered surface below makes the relic unavoidable and surrounding, but also fixed in time, conjuring solemnity and encouraging contemplation. Zumthor has thus framed the place-conscious poetic by heightening *"an interaction between culture and nature, between art and light" (Frampton, 27)*.

The contextual synthesis is also reinforced by the language of superposition. The plans and sections of Kolumba museum reveal the overlap of different time periods - ruins of the past, and the bridge and galleries of the present - on top of each other. These different historical layers affect each other on different levels of movement and sight. On top of the historical bombed ruins of the ground floor, the wooden bridge introduces movement of visitors of the present in a zigzag motion which is independent from the order of concrete columns. These columns do not exist in a grid logic but follow the site boundary, which is of a language not to rule the context but to follow it. As a result, these columns introduce a sense of logic and order into the unruly space of ruins and zigzag bridge, but do not visually outrule the space. This is further due to their thin proportion, the downlights emphasizing the ruins, the polite materiality of the concrete behind the strikingly contrasting materialities of wood, brick, and earthy ruins, and most importantly the inconsistency of the movement of the visitor from the logic of the columns.

In contrast, the configuration of the columns becomes the movement logic of the upper floor of the galleries. As a structure, the logic of the columns continues in the second floor in the form of walls, further elongating and strengthening the spatial logic. This creates a central gallery space and subdivides the perimeter as three different rooms. As these are gallery spaces, both the movement and the sight mostly follow the walls. While the second floor is empirically distinctive from the lower floors in terms of materiality, lighting, and environment in order to create more of a controlled space for different exhibition content, the continuity from the lower floors exist in more of an unconscious level. What only existed as a visual background becomes a spatial configurator. It touches on the unconsciousness of the phenomenological affects of the overlapped history.

Thus the Kolumba's concept depends on its use of context to communicate affect. Zumthor has not created that affect – the solemnity of a bombed ruin harbors an affective content that is indisputable and all its own. Rather, Zumthor has used this delicate palette of material and lighting choices to curate it. It is a choreographed encounter with history's spatial aftereffects. This interplay of the physical (material and lighting) with the affective, or metaphysical (contemplation and solemnity) results in the building's poetics. The remnants are not disturbed, only encountered; the character of the encounter is what is manipulated.

Crucially, while Zumthor's intervention is in reality highly choreographed, its success depends on its own modesty. The flatness of the surfaces and the absence of complex detail intends to be unobtrusive, directing attention towards the monument rather than itself. The intervention's functional parameters all orbit the monument (the ruins, as well as the art hanging in the spaces above it) – its apertures creating light, its connections interweaving layers of disordered historical aftermath. Its primary materiality thus strives for immateriality.

Therefore the role of the architect at Kolumba is: if Zumthor has done his job properly, the visitor won't know he's there. More than any composition of material choices or any historical or archaeological narrative, building's poetics comes from its carefully-executed modesty. The museum presents with deceptively little fanfare a highly nuanced and visually striking historical artifact, without presenting itself, though of course "itself" is actually all around. It interacts with the viewer by framing the mood of the encounter in terms of height, light, and direction; these are not literal communications, but phenomenological ones.

Where much of architecture conveys semiotic meaning, Zumthor's intervention punctuates a sentence already written. It imparts an atmosphere – a state of mind in which to experience something else – and it does this by getting out of the way.
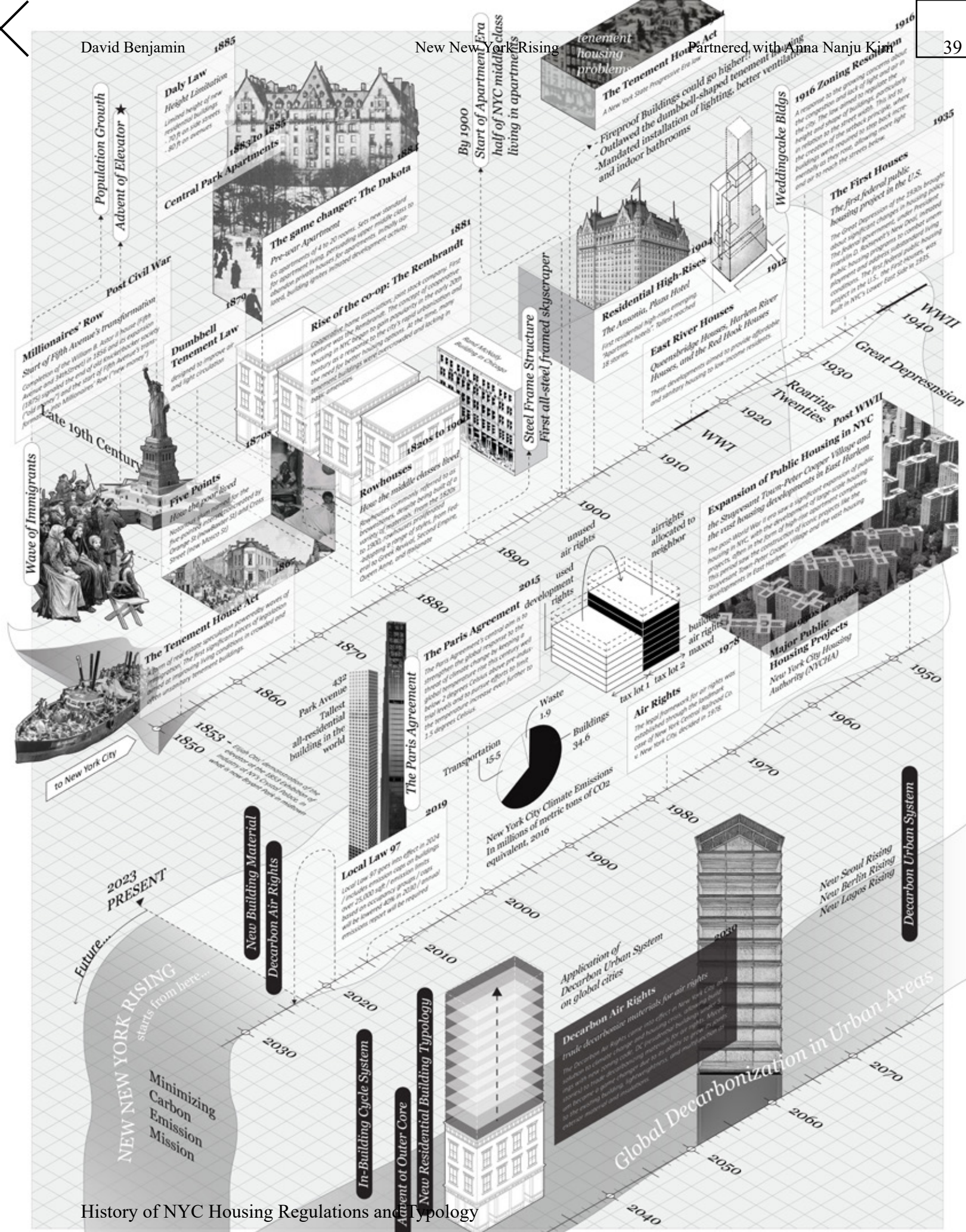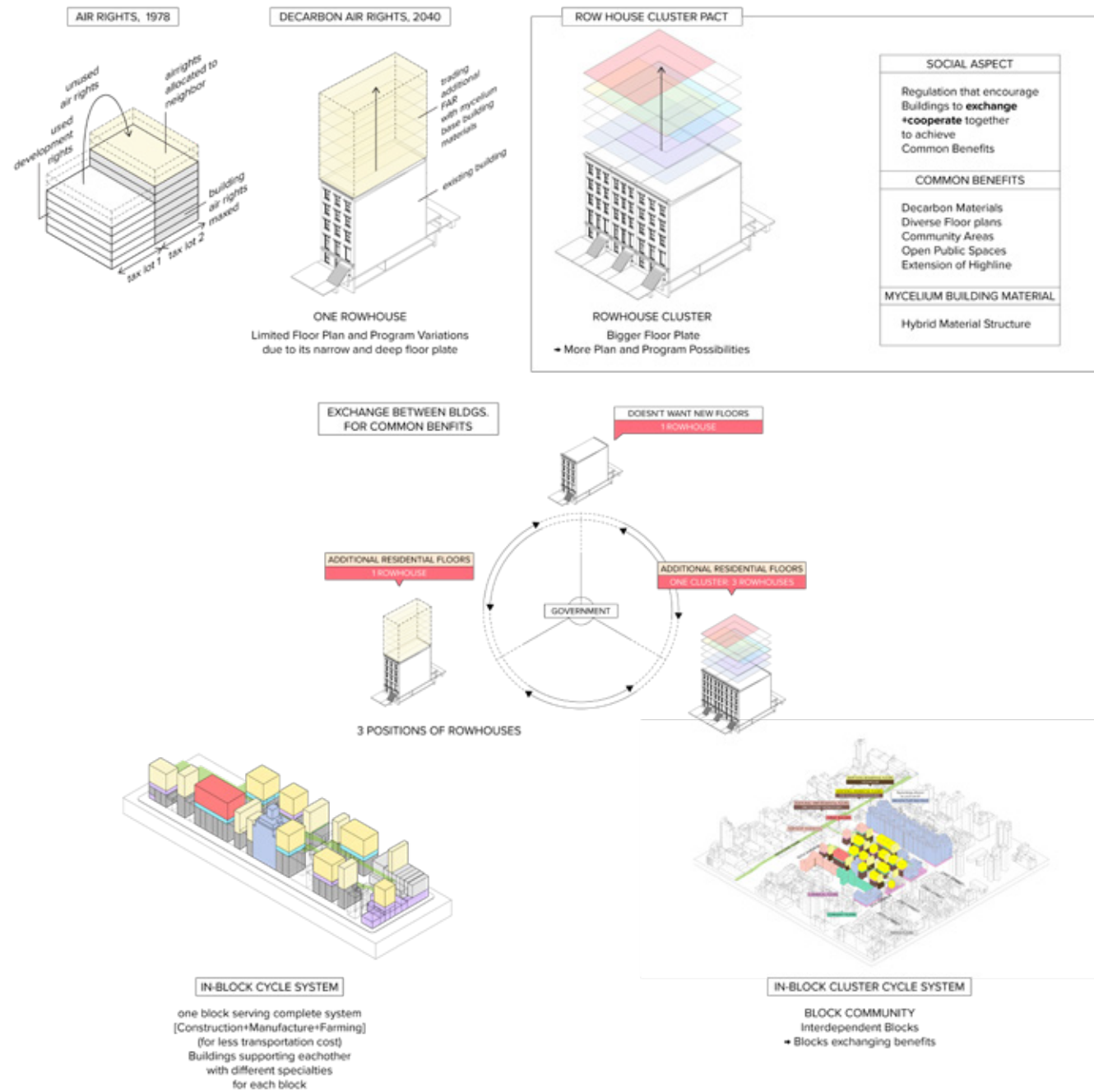
To Connect and Juxtapose the Heterogeneity

New New York Rising

The Decarbon Air Rights came in to effect in New York City, as a solution to climate and housing crisis, allowing buildings with new zoning code, DC (residential buildings under 5 stories) to trade decarbonizing materials for air rights. Mycelium became a game changer due to its ability to grow its joints to the existing building, lightweightness, and multifunction as exterior material and insulations.

By creating a new policy and investigating the building, carbon, material cycle and related decision-makers, we are looking for a possibility to minimize the carbon emissions by locating the entire material cycle at the city. This material cycle exists within the scale of a building, a block, several blocks, and a city, but does not exist as a enclosed one so that buildings or blocks need to cooperate and exchange with each other, forming interconnected network.

Since mycelium is stronger in compression and weaker in tension, we used compression only structures with pre-tension form finding methods, and interpreted it in monolith vault, arch and truss systems. The stereotomic and the tectonic structures are juxtaposed and support different functions; the former compose residential units and the latter compose bridges and community spaces, emphasizing interdependence and interconnectivity.
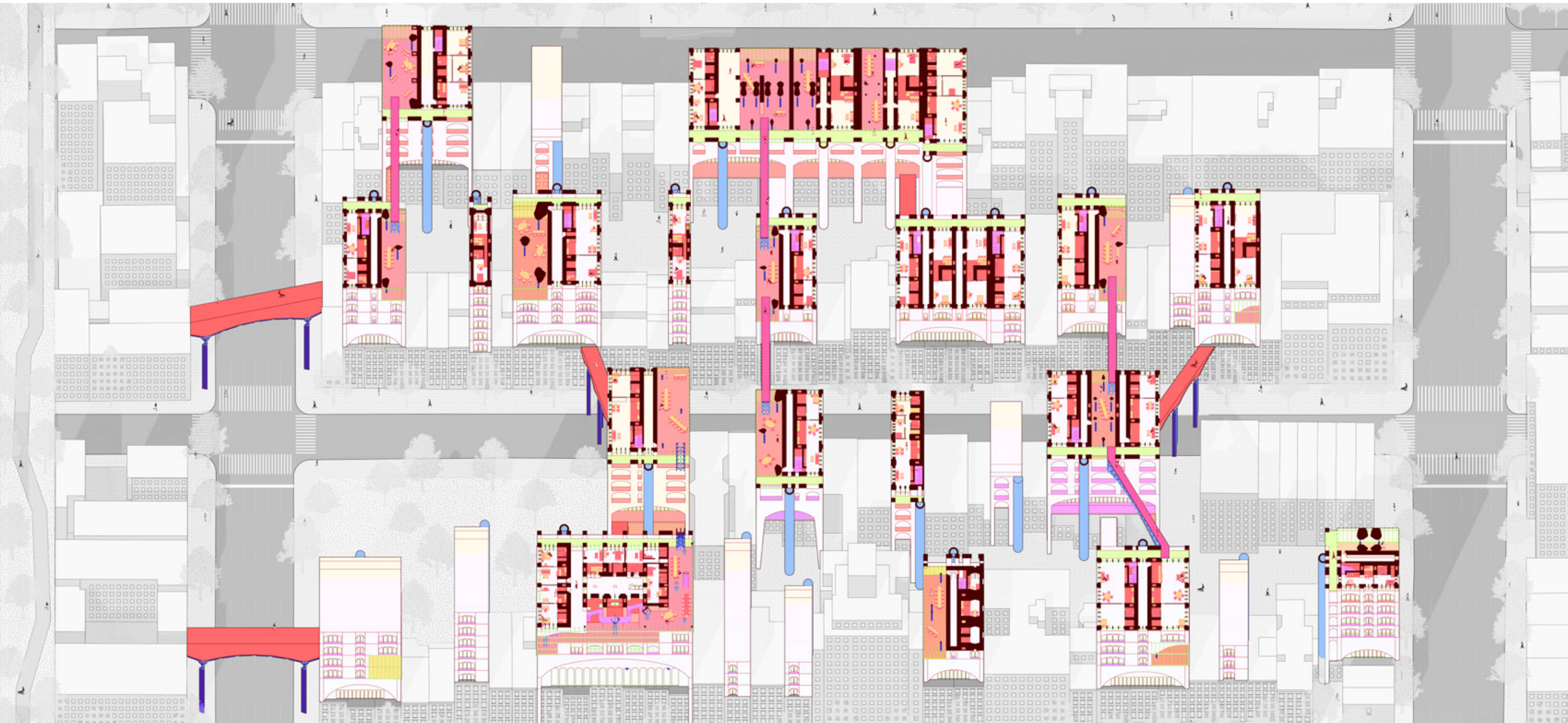
Starting from the regulation that trades the promise to build additional residential floors with decarbon materials with air rights, we also proposed a decarbon row house regulation and cluster, which can provide expanded possibilities of floor plans, diverse tenants, more public spaces.
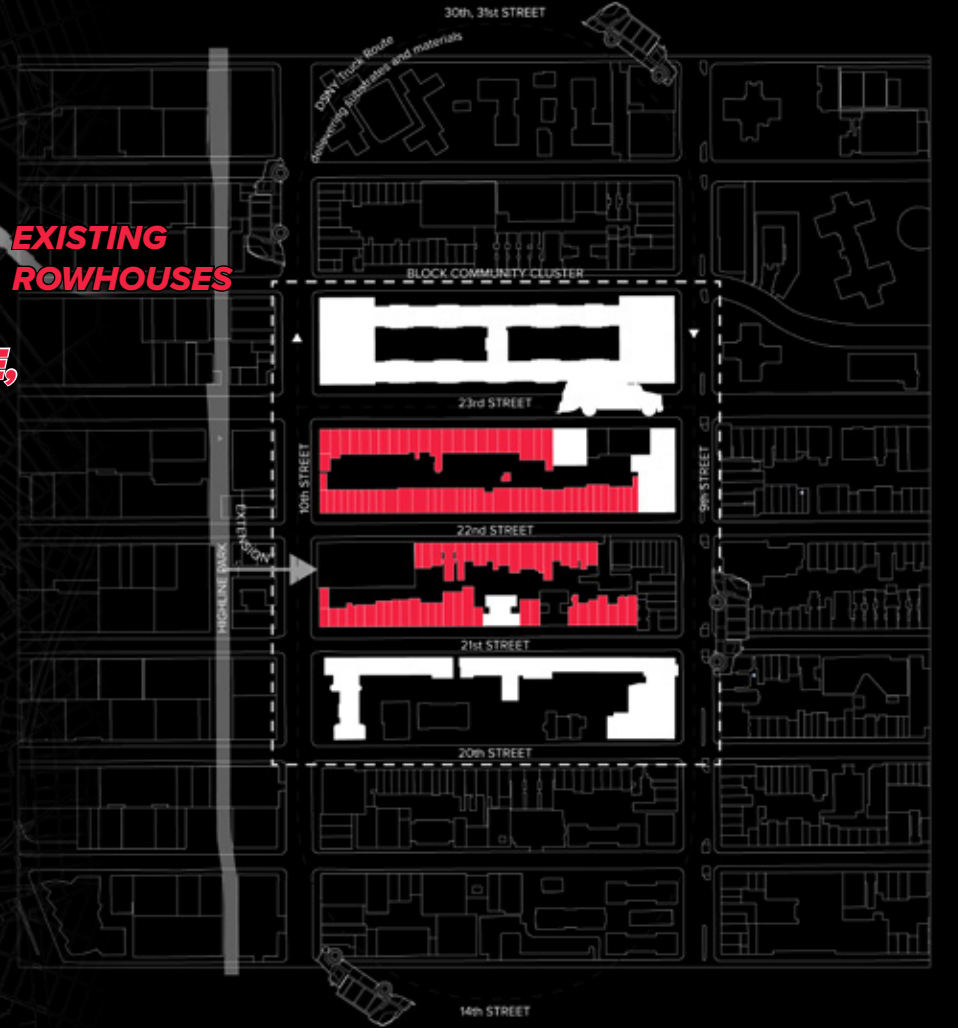

AIR RIGHTS, 1978

DECARBON AIR RIGHTS, 2040

ROW HOUSE CLUSTER PACT

SOCIAL ASPECT

Regulation that encourage Buildings to **exchange** **+cooperate** together to achieve Common Benefits

COMMON BENEFITS

Decarbon Materials
Diverse Floor plans
Community Areas
Open Public Spaces
Extension of Highline

MYCELIUM BUILDING MATERIAL

Hybrid Material Structure

ONE ROWHOUSE
Limited Floor Plan and Program Variations due to its narrow and deep floor plate

ROWHOUSE CLUSTER
Bigger Floor Plate
→ More Plan and Program Possibilities

EXCHANGE BETWEEN BLDGS. FOR COMMON BENFITS

DOESN'T WANT NEW FLOORS
1 ROWHOUSE

ADDITIONAL RESIDENTIAL FLOORS
1 ROWHOUSE

GOVERNMENT

ADDITIONAL RESIDENTIAL FLOORS
ONE CLUSTER, 3 ROWHOUSES

3 POSITIONS OF ROWHOUSES

IN-BLOCK CYCLE SYSTEM
one block serving complete system
[Construction+Manufacture+Farming]
(for less transportation cost)
Buildings supporting eachother
with different specialties
for each block

IN-BLOCK CLUSTER CYCLE SYSTEM
BLOCK COMMUNITY
Interdependent Blocks
→ Blocks exchanging benefits
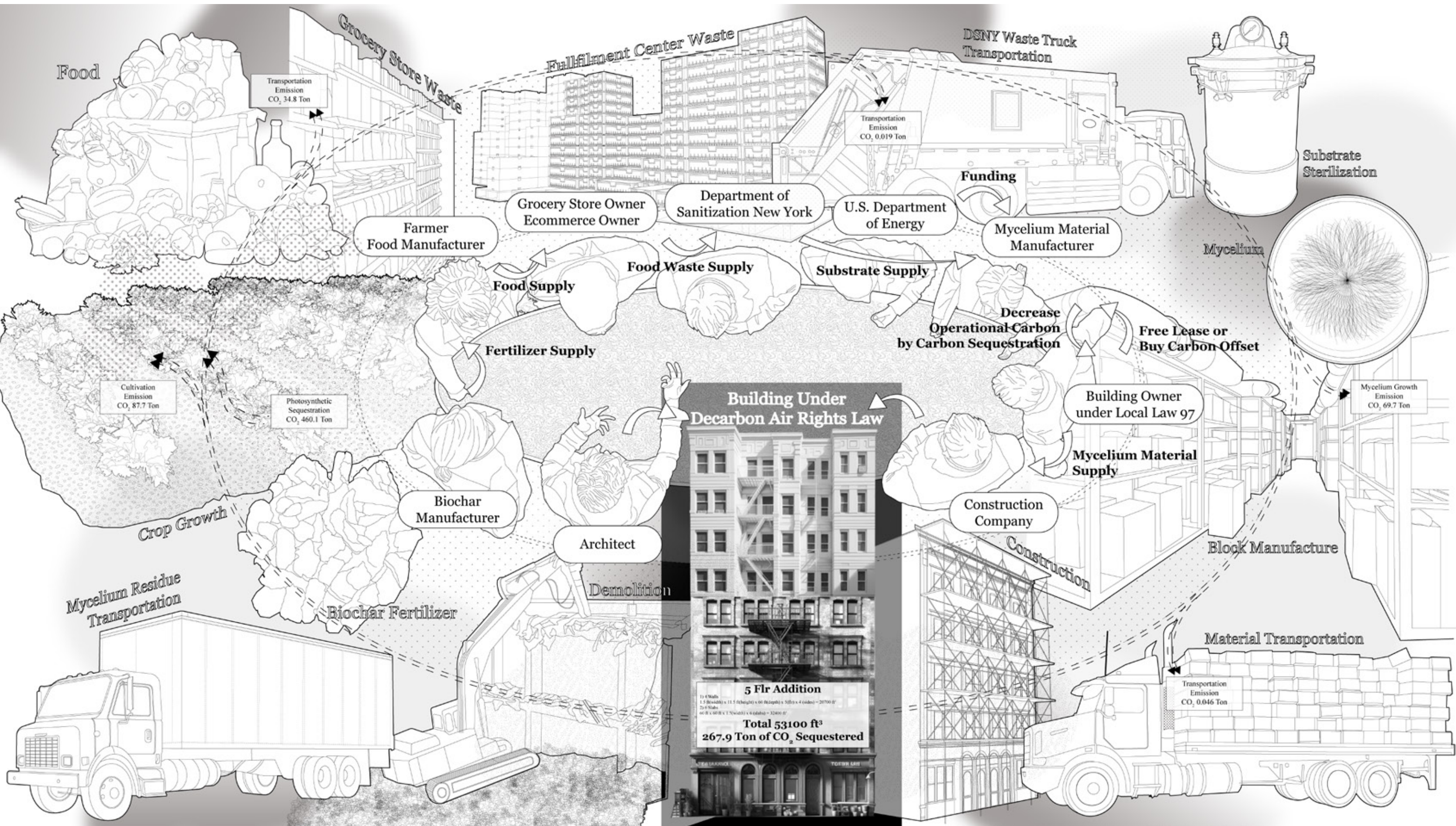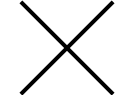
Regulation Proposal

History of NYC Housing Regulations and Typology

Manufacture Site | by Local Law 97
Construction Site | by DC Zoning Codes
DSNY Truck Garage
DSNY Food Scrap Collect
Grocery Store
Residential Zone

SITE SELECTION : CHELSEA

RESIDENTIAL BLDGS
UNDER 5 STORIES
AFFECTED BY
DECARBON ZONING CODE,
eligible to acquire
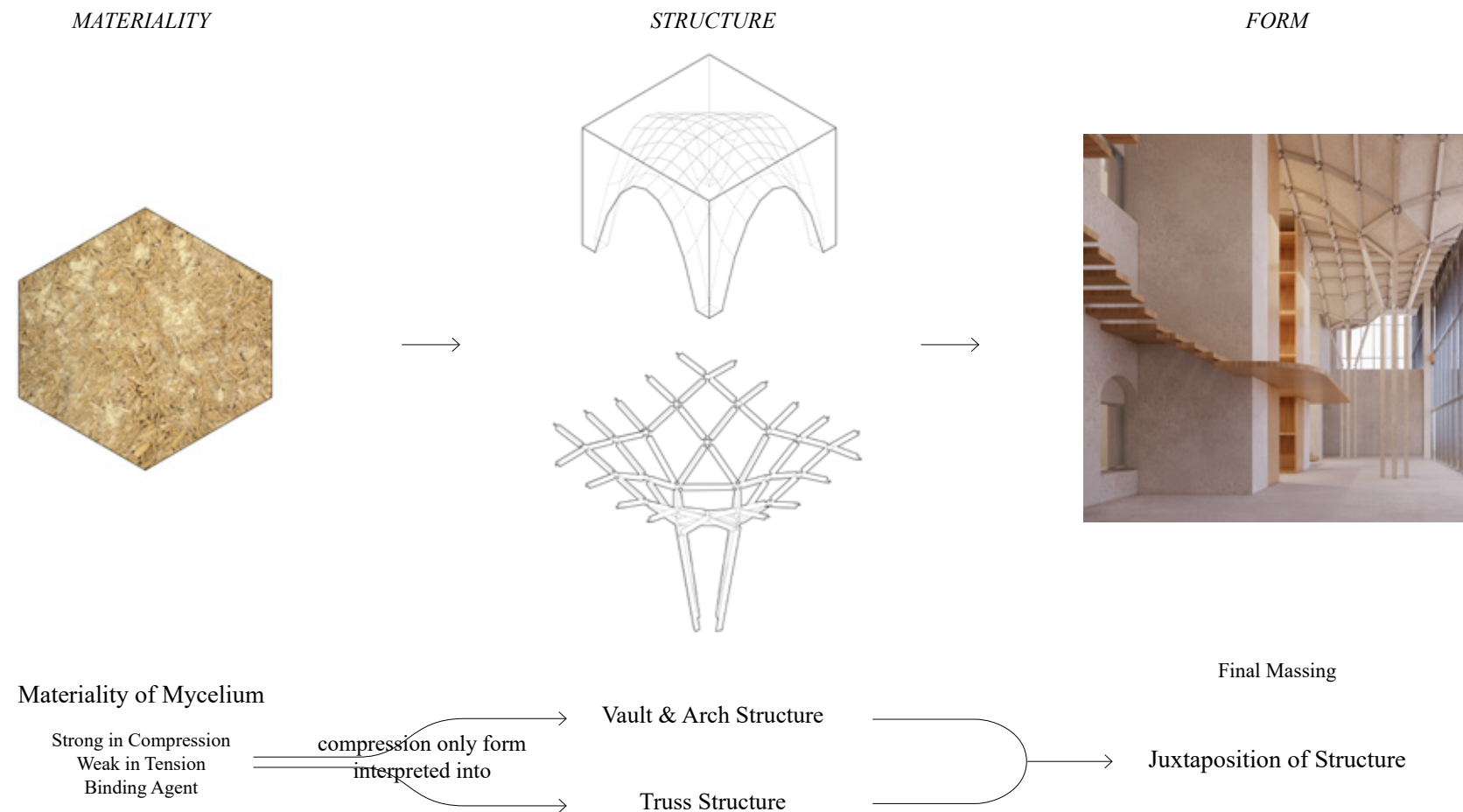additinoal air rights

EXISTING
ROWHOUSES

BIG BUILDINGS
AFFECTED BY
LOCAL LAW 97,
buying carbon offset or
free leasing boiler room
to Mycelium Manufactuers

Food

Grocery Store Waste

Fullfilment Center Waste

DSNY Waste Truck Transportation

Transportation Emission CO_2 34.8 Ton

Transportation Emission CO_2 0.019 Ton

Substrate Sterilization

Farmer Food Manufacturer

Grocery Store Owner Ecommerce Owner

Department of Sanitization New York

U.S. Department of Energy

Funding

Mycelium Material Manufacturer

Mycelium

Food Supply

Food Waste Supply

Substrate Supply

Fertilizer Supply

Decrease Operational Carbon by Carbon Sequestration

Free Lease or Buy Carbon Offset

Cultivation Emission CO_2 87.7 Ton

Photosynthetic Sequestration CO_2 460.1 Ton

Mycelium Growth Emission CO_2 69.7 Ton

Building Under Decarbon Air Rights Law

Building Owner under Local Law 97

Mycelium Material Supply

Crop Growth

Biochar Manufacturer

Architect

Demolition

Construction Company

Construction

Block Manufacture

5 Flr Addition
Total 53100 ft³
267.9 Ton of CO_2 Sequestered

Mycelium Residue Transportation

Biochar Fertilizer

Material Transportation

Transportation Emission CO_2 0.046 Ton

Mycelium Material Cycle with New Regulation

Mycelium Block Neighborhood Axonometric

Juxtaposition of Different Structural Systems of Mycelium

MATERIALITY   *STRUCTURE*   *FORM*

Final Massing

Materiality of Mycelium

Strong in Compression
Weak in Tension   compression only form
Binding Agent   interpreted into

Vault & Arch Structure

Truss Structure

Juxtaposition of Structure

Material Experiment of Different Structural System

STEREOTOMIC STRUCTURE

Casting   Reinforced   With Void

TECTONIC STRUCTURE

Truss   Waffle   Bracing
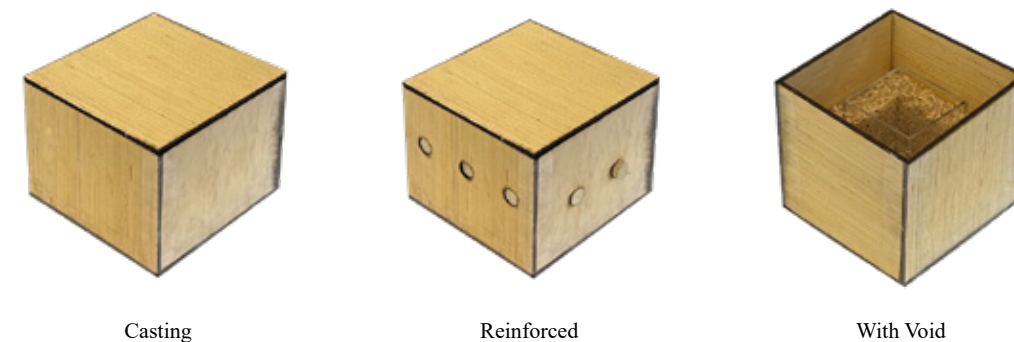
Stereotomic Vault Karamba3D Optimization

SINGLE FLOOR

Slab Width 1000mm
Displacement
0.014323cm

Slab Width 800mm
Displacement
0.014314cm

Slab Width 500mm
Displacement
0.014527cm

Slab Width 650mm
Displacement
0.014365cm

Slab Width 900mm
Displacement
0.014307cm

Span 5.6m
Displacement
0.011936cm

Span 8m
Displacement
0.0642003cm

Span 15m
Displacement
1.441533cm

Span 12m
Displacement
1.033212cm

Span 11m
Displacement
0.919508cm

Span 10m
Displacement
0.822651cm

Selection Criteria: NYC Zoning Code Displacement Limit = Storey Height x 0.004
           >since we only measure live & dead load, we halved the limit(Storey Height x 0.002)

MULTI FLOOR

16ft span
Column Width 2.3ft

30ft span
Slab width 1.6ft
Column Width 2.6ft

Possibilities of Long Span Ground Floor
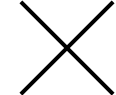
Mycelium Substrate Experiment

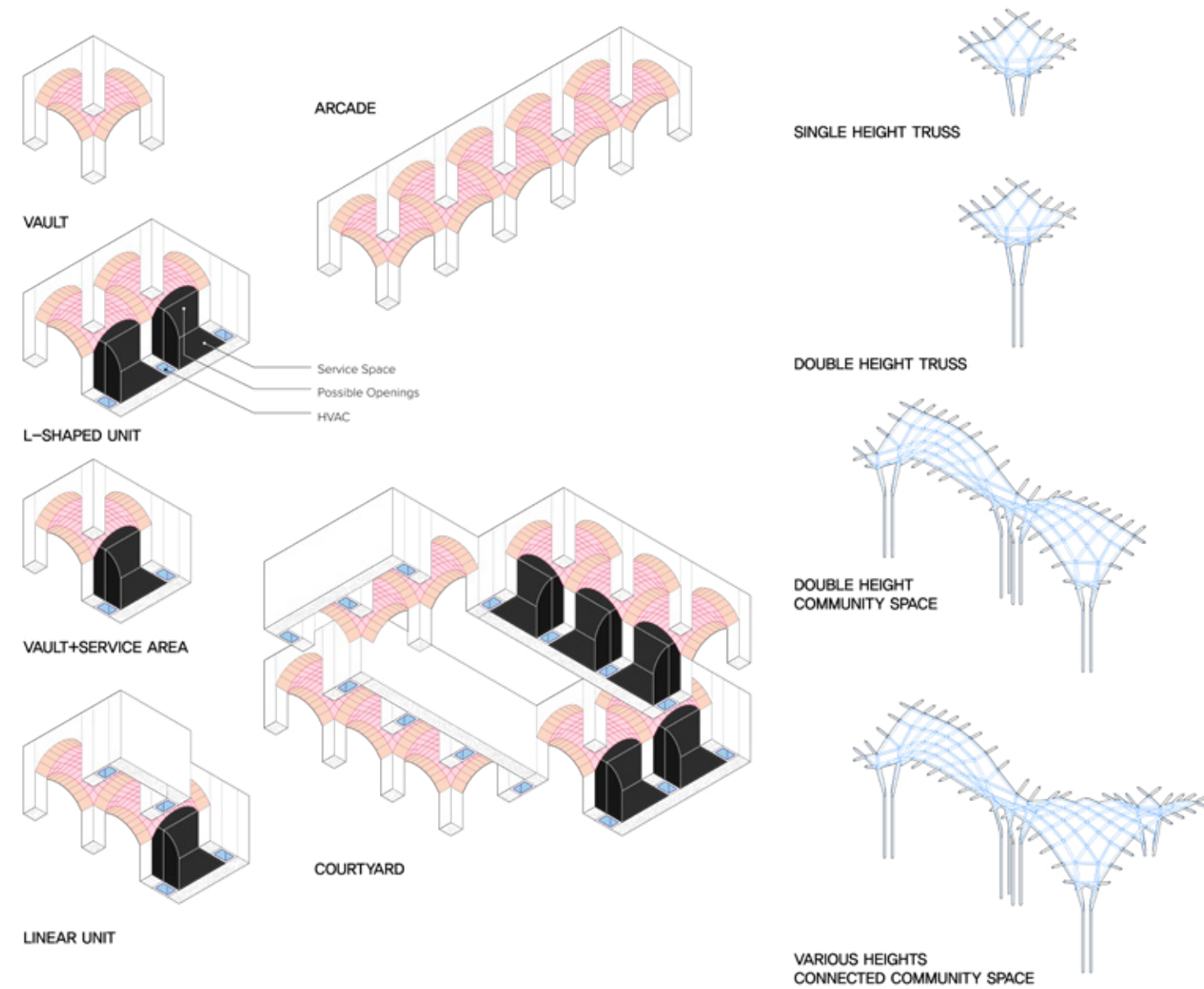## Mycelium Vault Fabrication Process
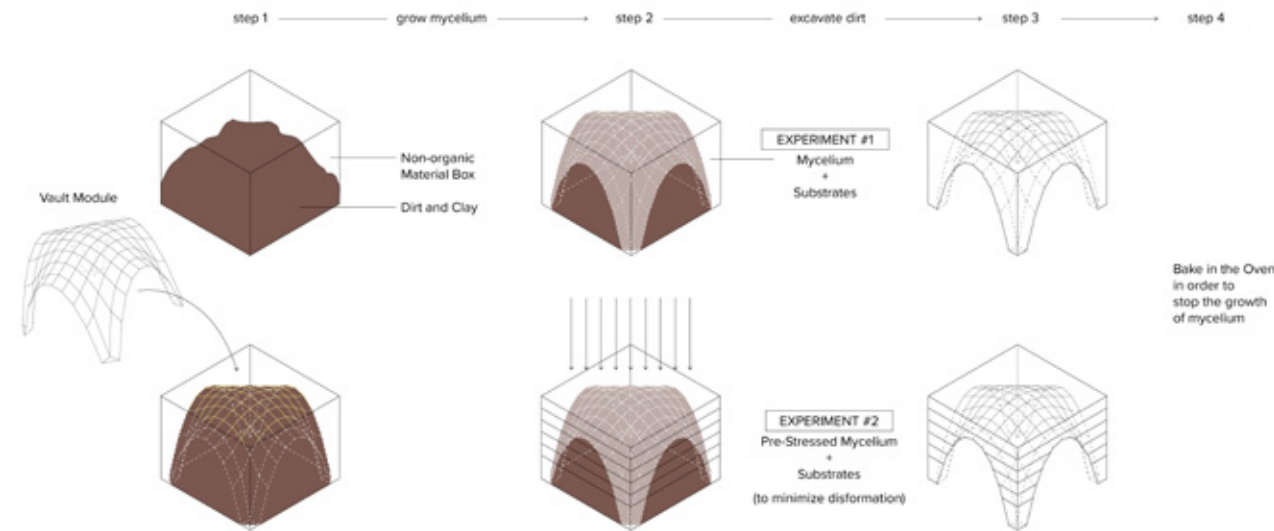
Mycelium Vault Fabrication Experiment

Stereotomic and Tectonic Structural System to Unit Configuration

Vaults are supported by supporting arches,
where wet walls and HVAC spaces are placed.
These vaults connect and create l-shaped linear units, arcades and courtyards.
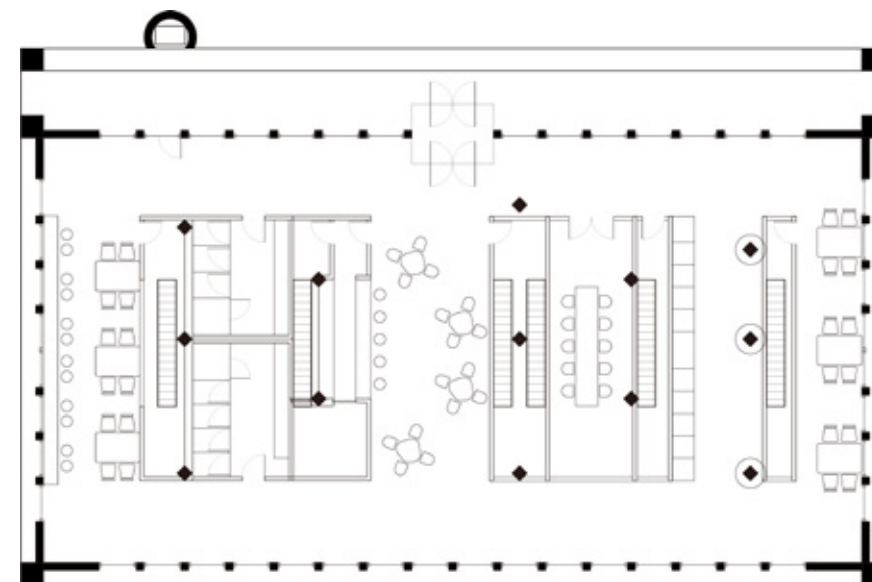
ARCADE

VAULT

Service Space
Possible Openings
HVAC

L—SHAPED UNIT

SINGLE HEIGHT TRUSS

DOUBLE HEIGHT TRUSS

VAULT+SERVICE AREA

DOUBLE HEIGHT
COMMUNITY SPACE

LINEAR UNIT

COURTYARD

VARIOUS HEIGHTS
CONNECTED COMMUNITY SPACE
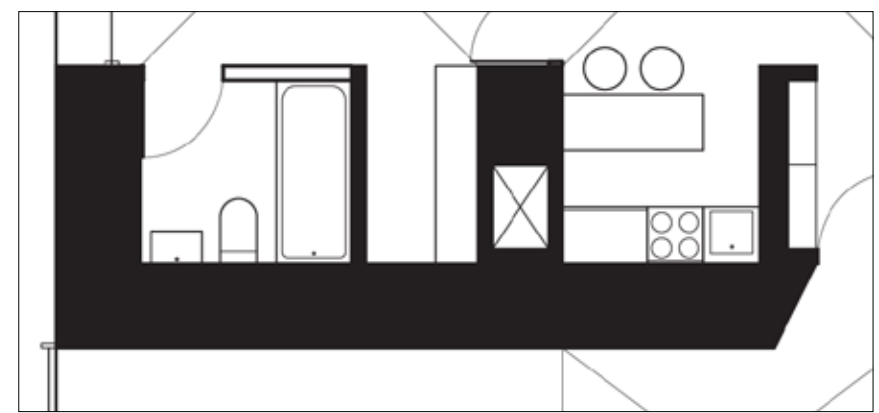
PLAN STRATEGY: *Carve into the walls*

Place Service Area into the Negative Space
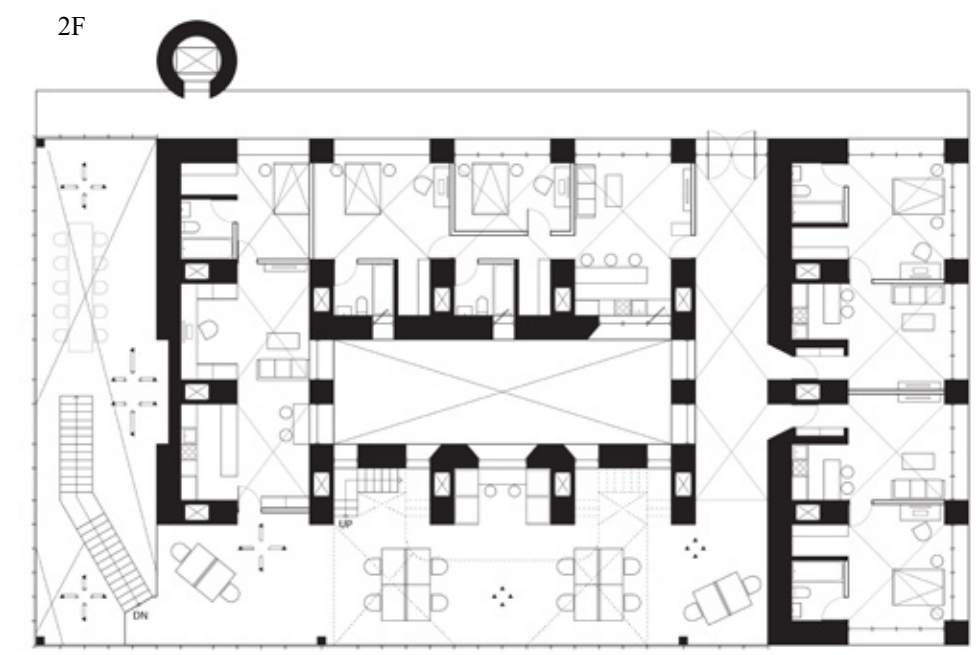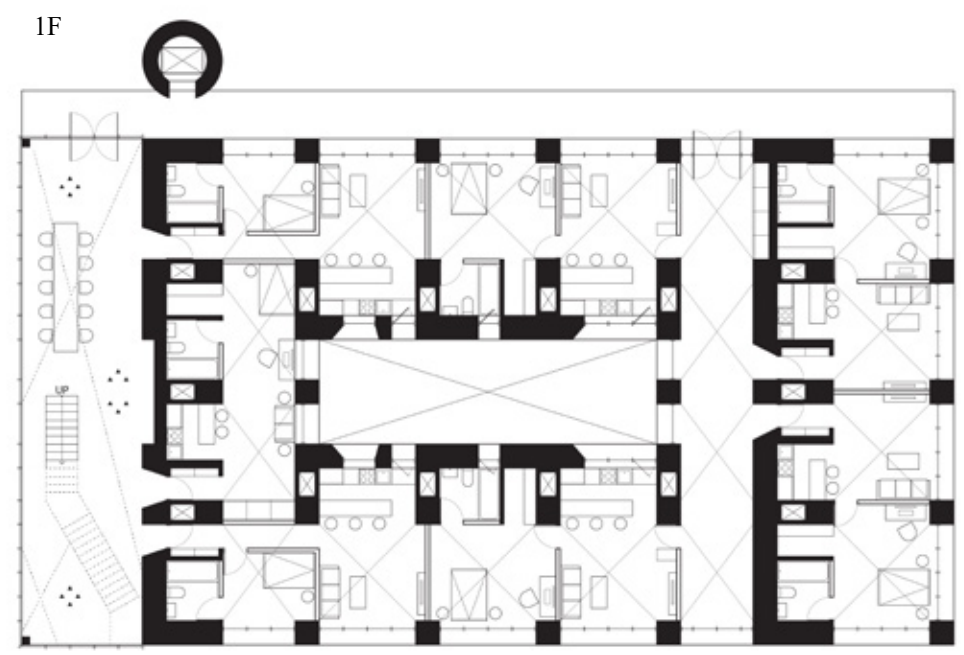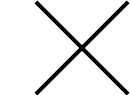
Mycelium Vault Model

Target Building Transitional Public Floor Plan

Target Building Transitional Public Floor Perspective

Target Building Arcade

Target Building Facade View From Another Building Arcade

1F

2F

3F

4F

5F

6F

Target Building Addition Residential Floor Plan
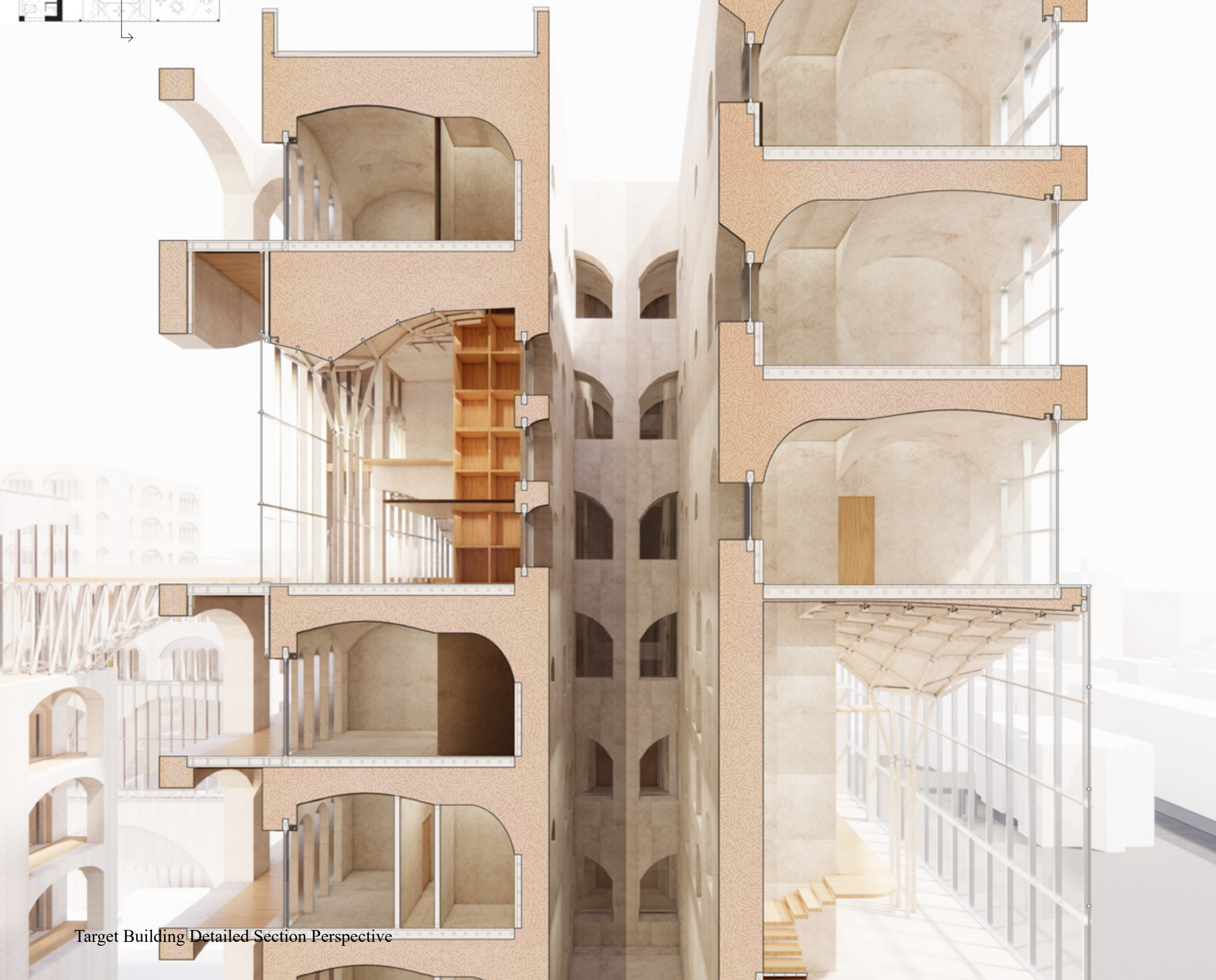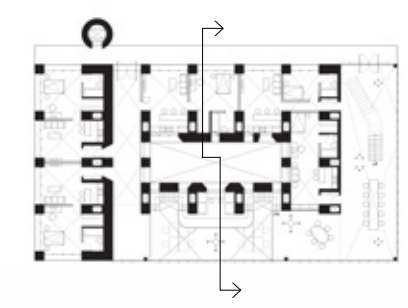
1 Community Space
2 Community Space
3 Vertical Farm
4 Library
5 Common Dining Space
6 Outer Core
7 Balcony
8 Bridge
9 One Bedroom
10 Studio

To Connect and Juxtapose the Heterogeneity

Target Building Axonometric

Fall 2023

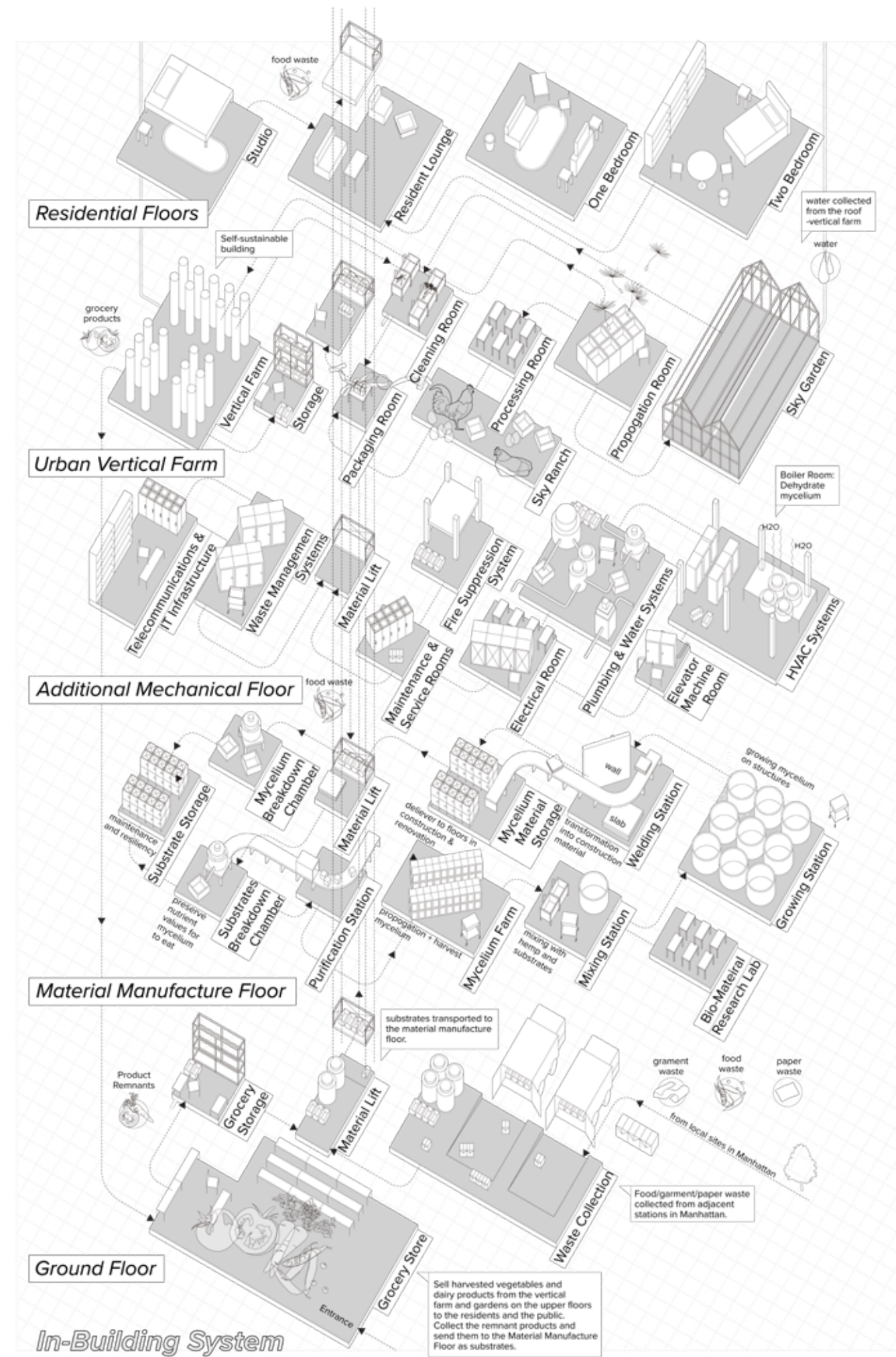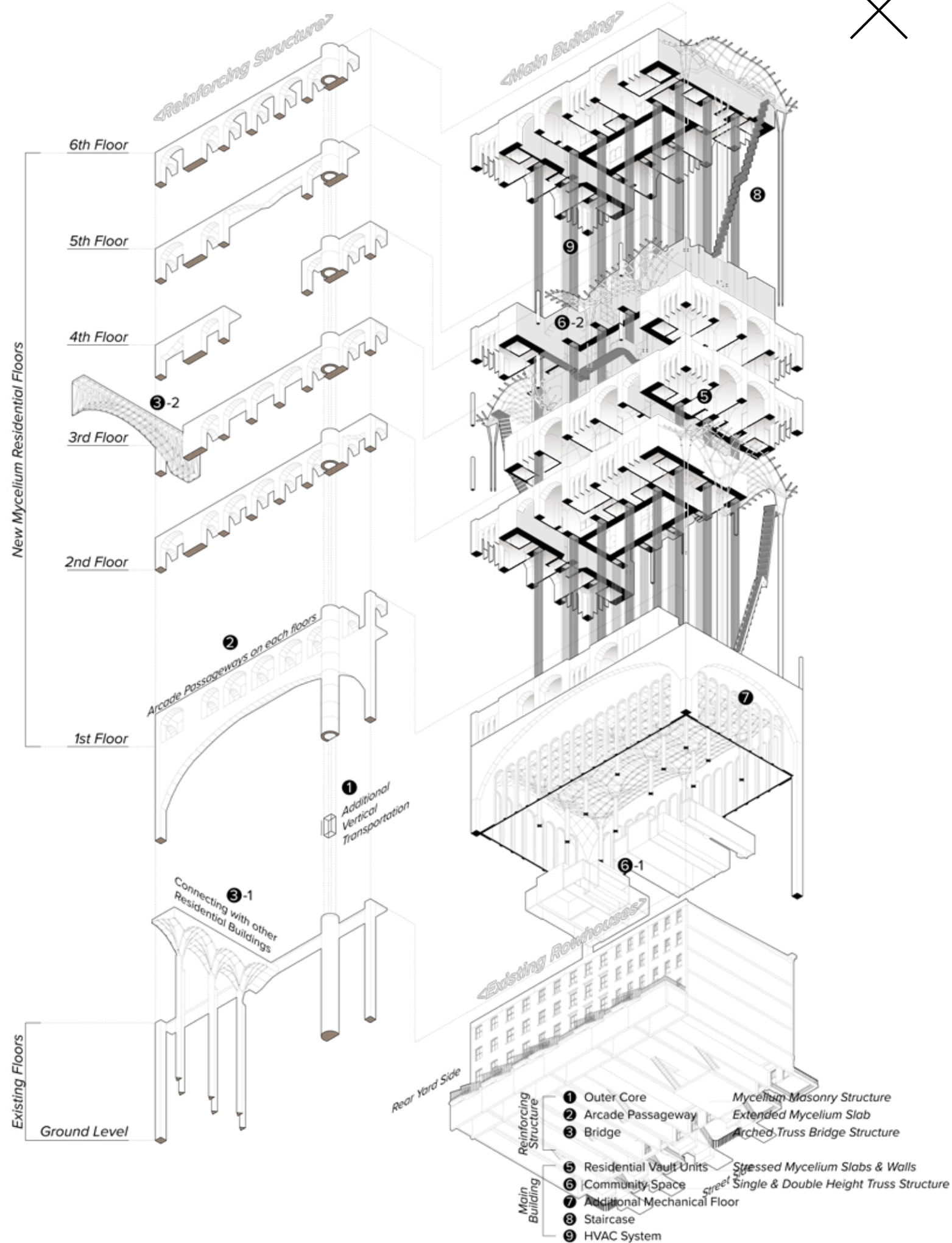Partnered with Anna Nanju Kim

New New York Rising

David Benjamin

Target Building Residential Unit Perspective

Target Building Upper Public Space

Target Building Upper Public Space
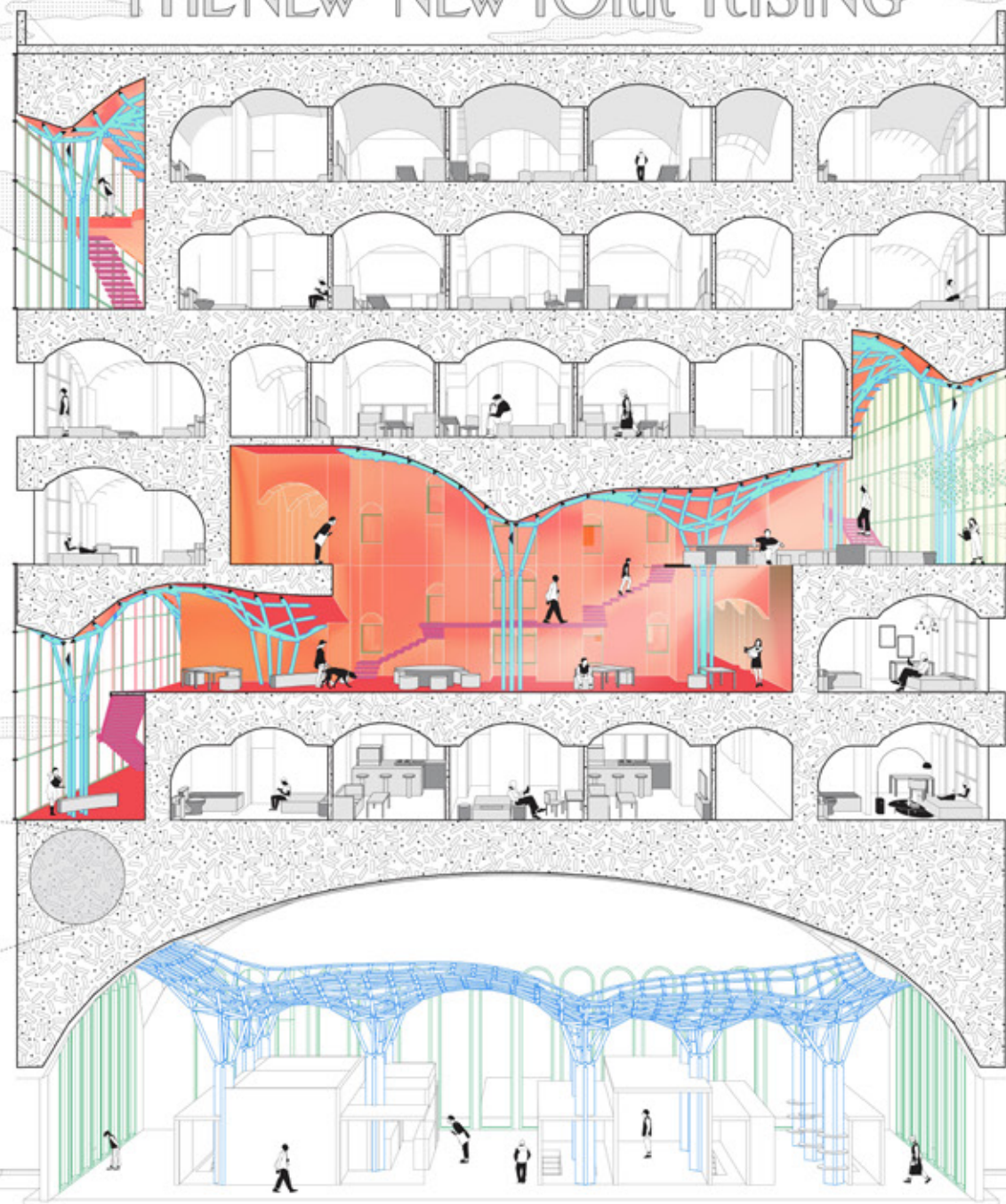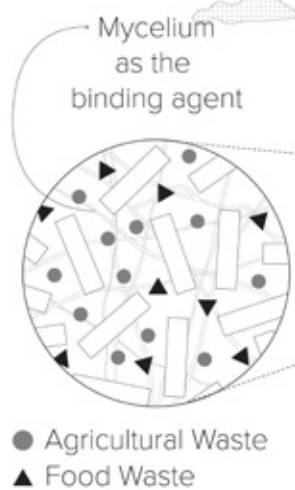

Target Building Detailed Section Perspective

To Connect and Juxtapose the Heterogeneity

Worm-eye Axonometric

Fall 2023

Reinforcing Structure

Main Building

6th Floor

5th Floor

4th Floor

3rd Floor

2nd Floor

1st Floor

Ground Level

New Mycelium Residential Floors

Existing Floors

Arcade Passageways on each floors

Additional Vertical Transportation

Connecting with other Residential Buildings

Rear Yard Side

Existing Rowhouses

Reinforcing Structure

Main Building

Street

❶ Outer Core   Mycelium Masonry Structure
❷ Arcade Passageway   Extended Mycelium Slab
❸ Bridge   Arched Truss Bridge Structure
❺ Residential Vault Units   Stressed Mycelium Slabs & Walls
❻ Community Space   Single & Double Height Truss Structure
❼ Additional Mechanical Floor
❽ Staircase
❾ HVAC System

Partnered with Anna Nanju Kim

Building Material Cycle

David Benjamin

Residential Floors

food waste

Studio

Self-sustainable building

Resident Lounge

One Bedroom

Two Bedroom

water collected from the roof -vertical farm

water

grocery products

Vertical Farm

Storage

Packaging Room

Cleaning Room

Processing Room

Propagation Room

Sky Garden

Urban Vertical Farm

Sky Ranch

Boiler Room: Dehydrate mycelium

Telecommunications & IT Infrastructure

Waste Management Systems

Material Lift

Fire Suppression System

Electrical Room

Plumbing & Water Systems

Elevator Machine Room

HVAC Systems

H2O

H2O

Additional Mechanical Floor

food waste

Maintenance & Service Rooms

Substrate Storage

Mycelium Breakdown Chamber

Substrates Breakdown Chamber

Material Lift

deliver to floors in construction & renovation

Mycelium Material Storage

wall

slab

transformation into construction material

Welding Station

growing mycelium on structures

Growing Station

maintenance and resiliency

preserve nutrient values for mycelium to eat

Purification Station

propagation + harvest mycelium

Mycelium Farm

mixing with hemp and substrates

Mixing Station

Bio-Material Research Lab

Material Manufacture Floor

substrates transported to the material manufacture floor.

Product Remnants

Grocery Storage

Material Lift

Waste Collection

grament waste

food waste

paper waste

from local sites in Manhattan

Ground Floor

Food/garment/paper waste collected from adjacent stations in Manhattan.

Grocery Store

Entrance

Sell harvested vegetables and dairy products from the vertical farm and gardens on the upper floors to the residents and the public. Collect the remnant products and send them to the Material Manufacture Floor as substrates.

In-Building System

THE NEW NEW YORK RISING

Partnered with Anna Nanju Kim

Section Perspective

BUILDING
MATERIALS
AS THE
STORAGE
FOR
LOCKED
CARBON

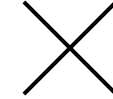Mycelium
as the
binding agent

● Agricultural Waste
▲ Food Waste

Why THICK
Mycelium Walls?

LOCKED
CARBON
that does not
biodegrade

Demolish 8 floors : 500ton
-> 530Million ton (Entire NYC)
3 floors addition: 180 ton
-> 190 million ton (entire NYC)
1,055,514 Buildings

Mycelium 3 floors addition 35ton
sequester
-> 37 million ton (entire NYC)

Fall 2023

David Benjamin

To Subvert the Existing Power Dynamics
Invading the Invasive

◑

 Throughout history, water has not only been the subject of being othered, but also used as tools to other the undesirable. From discrimination of Lenape, Robert Mose's proposal to ship waste to 50 years of world's largest landfill - Freshkills.

Staten Island is still experiencing displacements by water. Unlike the Staten island mall, the Northern edge of Staten Island, a densely populated and old residential area, is prone to flooding.

 Here, we are subverting the existing situations of undrowning. We plan to turn the surfaces of the mall and golf courses to spongey wetlands to alleviate the flooding of the northern area. This is our answer to what is truly invasive, as their surfaces are both non-native and causing ecological harm. Invasion of these invasives will start with small holes, aided by Phragmites Australis, so-called invasive species, with periodical floodings.

 The perforation process starts on Latourette Golf Course along with the first set of fabric barriers to control the seed spreading. The increasing storms in hurricane season will help the phragmites spread across the commercial blocks within the next 10 years. In the future, when Fresh Kills is submerged, the fabric barriers will prevent phragmites from taking over the new water edges. By allowing the soil to breathe through phragmites as an invasive breathing machine, we undrown the flood-prone neighborhoods of Staten Island by drowning the invasive landscape.

Collage of the Othered History of Water in Freshkills

What do we remember and what do we forget?

Throughout history, we remember that waterways were one of the initial ways to commute from one place to another. But what we forget is, they have been used as a medium for a larger 'segregation' and 'oppression' across the world.

As we look through the history of the Staten Island:
Lenape Native Americans were one of the island's first inhabitants, who visited Fresh Kills in summer to harvest oysters.

The Lenape were massacred and chased out of Staten Island, where the Dutch subsequently established their fur trade.

In the late 17th century, refugees and ships carried the yellow fever virus to the port cities of the USA.

There was a spread of yellow fever caused due to which patients were shipped off to Staten Island's Quarantine hospital.

Robert Moses proposed to 'ship' the waste from all boroughs of New York and dumped it at the 'othered' Staten Island to eventually form the world's largest landfill

Which caused the solidification of marshes with the city's waste. Clogging the existing ecology of productive wetlands present there.

After the landfill's closure, efforts were made to restore the destroyed marshlands into New York City's new public park.

To Subvert the Existing Power Dynamics

Subversion in Geography of Flooding

Summer 2023

Invading the Invasive

Nerea Calvillo
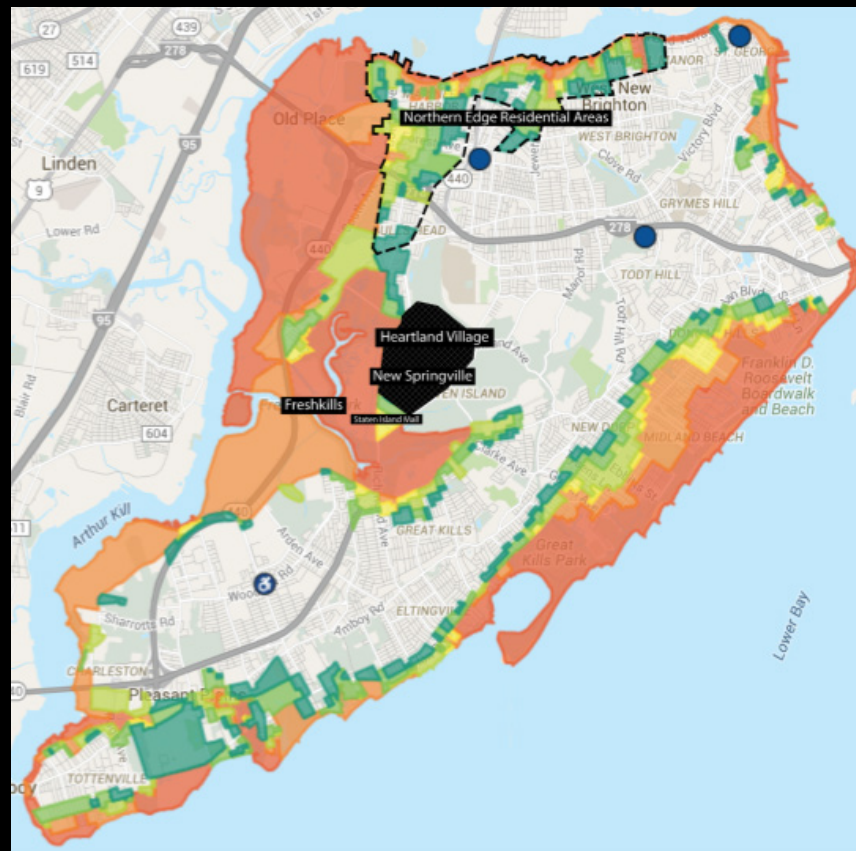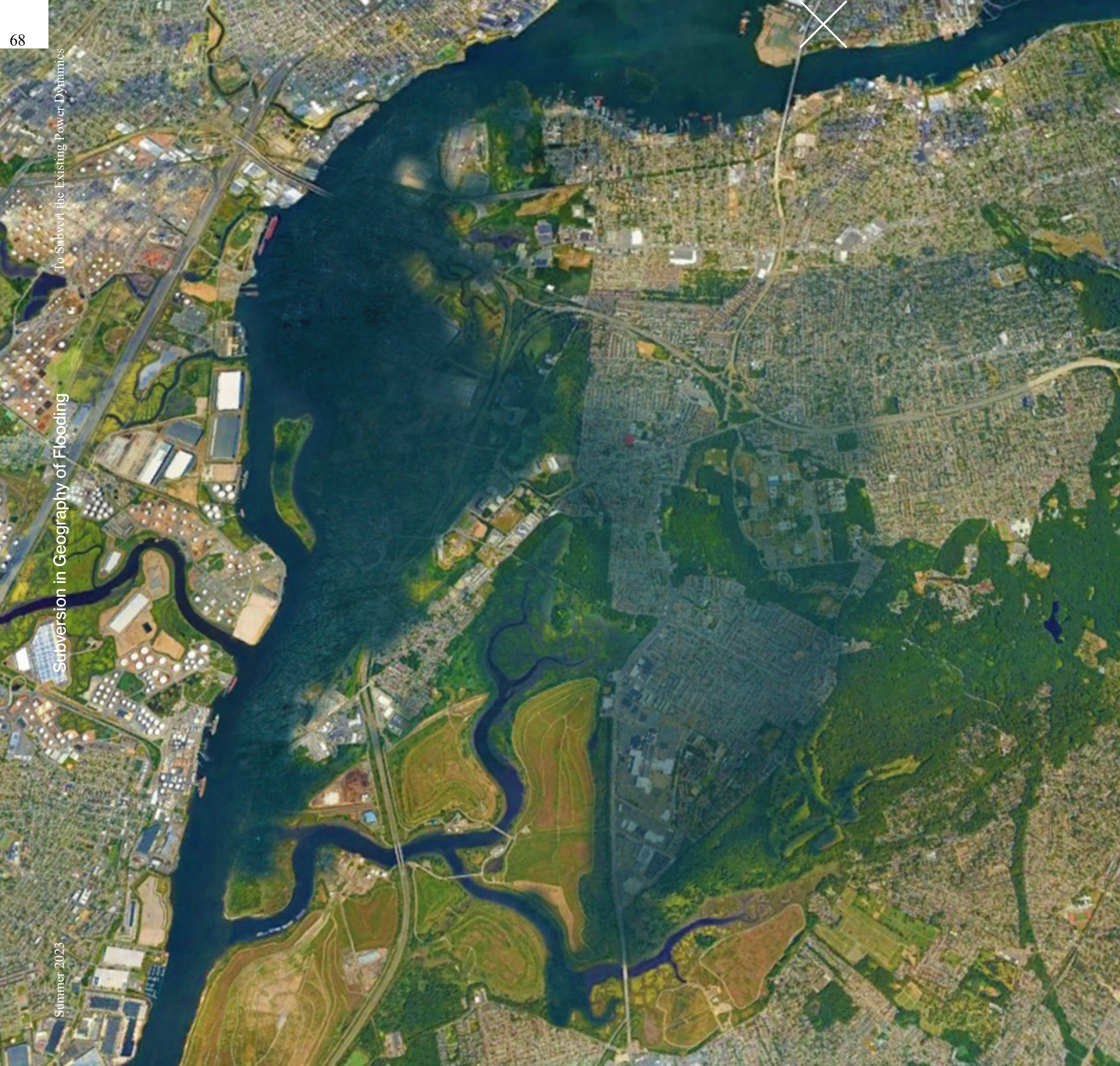
Current Floodmap

What about the Displacements by Water?

Heartland Village and New Springville, neighborhoods were built in the 1980s around Staten Island Mall, to the east side of Fresh Kills. These neighborhoods sit on a hill and outside of FEMA's flood zone.

Instead, the older neighborhoods along the water on the North Shore are one of the most densely populated and diverse areas where population is 60% minority and approximately 20% of residents below the Federal Poverty Line.

Northern edges of Staten Island are within FEMA's tidal flooding zone; old houses cost them more insurance fees according to FEMA's new risk rating model. These older neighborhoods will likely be driven out in the near future either from the increasing insurance rate or constant flooding, as a result of downhill rainwater from higher neighborhoods like New Springville.

On steep slopes and mostly hard surfaces whose location redirects street flooding to lower areas. These older communities are physically and economically drowning: unable to get out of the vicious cycle of flood destroying their houses and health.

Heartland Village

New Springville

Staten Island Greenbelt

Staten Island Mall

North Mound

East Mound

Freshkills

La Tourette Golf Course

Target

Costco

South Mound

West Mound

Here, we are subverting the existing situations of drowning.

We will flood and break the surfaces of New Springville and Heartland village, making them into spongy surfaces that will absorb the floods before reaching the northern edge.

Different types of water flow will aid the flooding, in nearby Freshkills, tides and sea level rise would be the main factor, and for water to flow down the hill and accelerate, rainwater will also play a key role.

This subversion of undrowning is also the subversion of the invasion.

1000ft
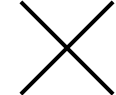
Parking Lot Asphalt Surface

Golf Course Green Turf

Freshkills

Rethinking the 'Invasive' of Landscape in Section
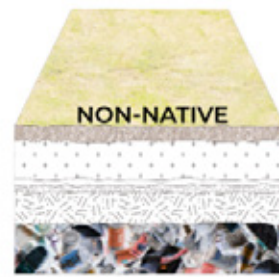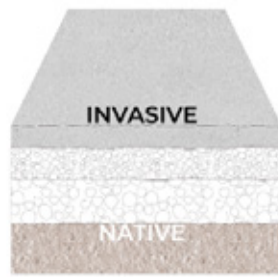
Invasion starting with small holes
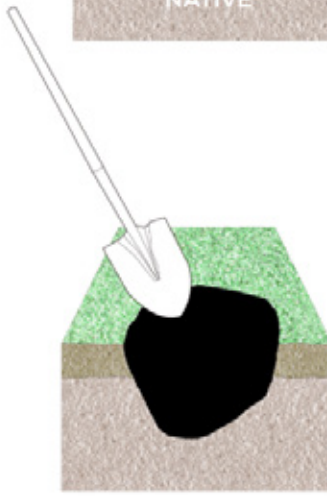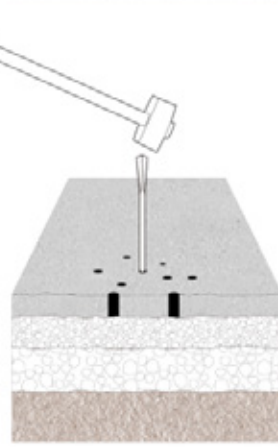
Invaded by Phragmites Australis, so-called invasive species
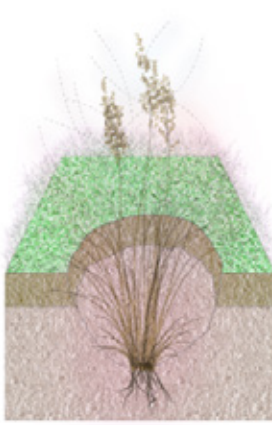
Periodical floodings enlarging holes
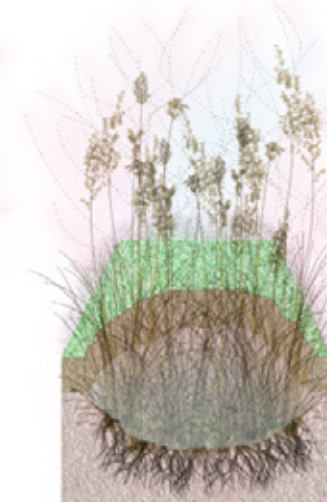
Executive Order 13112
(signed by President Clinton establishing
the National Invasive Species Council on Feb 3, 1999)

INVASIVE SPECIES

Narrow Definition
1) **non-native** (or alien) to the ecosystem
2) whose introduction causes or is likely to cause economic or **environmental harm** or **harm to human health**.

Widely known invasive species, Phragmites Australis are common reed grasses found in wetlands, also in Freshkills. Despite their ecological benefits, they have been considered as invasive, and therefore unwanted.

On the other hand, shopping centers and golf courses to the east of Freshkills, can be considered invasive landscapes, as they are both non native and cause ecological harm.

So, with hammers, star drills, and shovels, we will perforate these invasive layers and finally let the existing soil previous to the invasives reveal, and reconnect with the air again.

Unlike the invasive layers that would not absorb water, the soil underneath would absorb them, later alleviating the floods of the northern edge.

Floating seeds of phragmites will also arrive, take and grow. They, along with periodical floodings, will accelerate the corrosion of the invasive layers.

Also by periodical harvesting, their tough roots are pulled out from the ground, these invasive layers will crumble even more.



Parking Lot Perforation

Harvesting of Phragmites
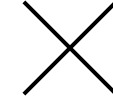
In six months to a year, the holes will be created mainly in La Tourette Golf Courses and on nearby hills, creating waterways down the hills that will be directed towards the parking lot. The holes in the freshkills will be made, flooding the highway.

The first set of fabric barriers will be set up following the paths created by these holes. This can be arranged as community activities conducted by DIY workshops all across Staten Island, such as the Hammer & Stain workshop in Great Kills, another area which suffered from a landfill project by Robert Moses. Similar perforation and barrier installation will be done along the small channel of water between Fresh Kills and New Springville. With repeated growth and harvest of phragmites, this small channel will gradually widen it into a creek.

Water Invasion | 6 Months - 10 Years
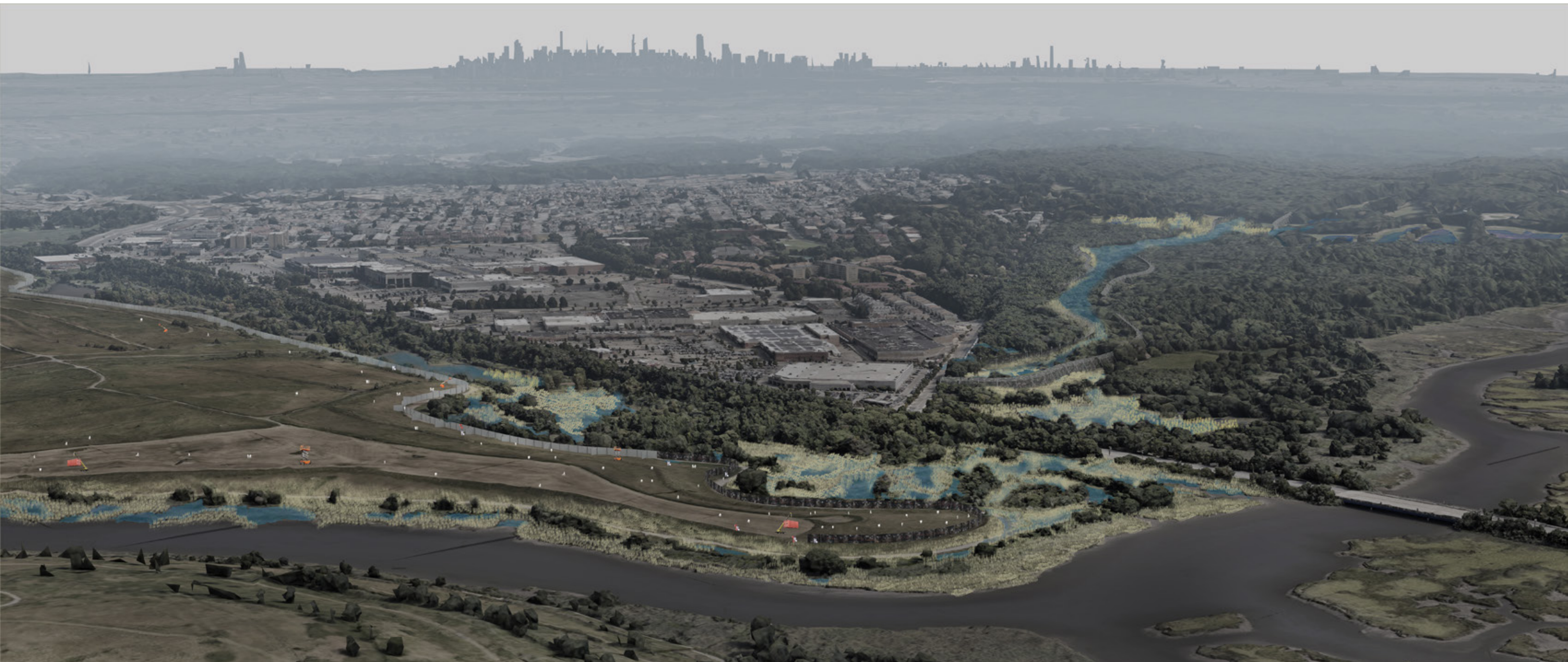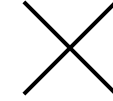
In 10 years, the holes will be created in shopping mall parking lots, flooding the mall. In 80 years, the holes will be created in residential areas, New Springville, and Heartland Village.

The increasing storms in hurricane season, which coincides with the phragmites' seed dispersal period, will intensify the spread of phragmites and allow it to overtake the commercial blocks within the next 10 years. During this period, a collaborative effort between local thrift stores and fishing communities will be the one setting up new fabric barriers.

Meanwhile, the perforation of the parking lots will be done by the labor unions who stand in opposition against the shopping mall's exploitation of manufacturing workers.

Water Invasion | 10 Years - 80 Years
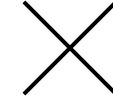
In the year 2100, parts of Fresh Kills will already be submerged by the rising sea level, but the fabric barriers we set up years prior will prevent phragmites from taking over the new water edges. On the full moon night of September, when the water reaches its highest level through an overlap of moon and season cycle, a harvest festival will be held at Fresh Kills. During this event, phragmites will be harvested before they can wither and clog up waterways. With the phragmites harvested, the fabric barriers will be let loose for the night among the festivities.

The fabric barriers will expand past New Springville and Heartland Village, toward the north. The transformed landscape's water retention quality will mitigate street flooding in communities on the northern edge of Staten Island and reduce their reliance on frequent flood insurance.

By allowing the soil to **breathe** through phragmites as an **invasive** breathing machine, we **undrown** the flood-prone neighborhoods of Staten Island by **drowning** the invasive landscape.

Water Invasion | 2100

To Rethink the Typical Assemblies
Wood but Masonry

By its nature, wood is strong in tension and weak in compression. It is easy to process, and these traits make it almost perfect for wood to use as tectonic structure. However, attempts to use them as stereotomy also have existed in the history of architecture, especially in ancient history or polar areas. Thus, using wood as masonry could be read as an underdeveloped method of using wood, with a lack of understanding of its properties. However, it also suggests that it is a construction method that requires low technology, makes use of local materials, and even recycles leftover logs, which all also indicate that this is eco-friendly. Using a material in an opposite way from its typical use strongly captured our group's interest and provided a starting point for translating them in parametric ways.

However, what does it mean to conduct parametric fabrication of a low-tech assembly method? When parametric fabrication is the state-of-the-art construction method that aims for the most precise construction with as minimal tolerance as possible, wood masonry aims for the opposite; it is to build a wall as most effortless as possible, with the design fully taken in the hands of the construction workers and their intuition. Then, parametrically translating and recreating a wood masonry wall almost seems like taking the most complicated way possible to do the simplest task. It can only be justified when the parametrization can enable breakthroughs in the wood masonry assembly method.

Similar to those histories of other assembly methods, breakthroughs occur when designers try to set up a goal that was not feasible in older methods. For us, we aimed to increase porosity until the point that it is structurally stable. Unlike CMU block masonry, which we joined with in the late semester, logs are not uniform in shape and do not have edged boundaries. Thus, they are highly dependent on mortars and boundaries for structure, making the wall extremely solid and making it hard to create punctures. Therefore, computational design was needed to create less mortar-dependent openings - to use adhesives at only necessary points - and not use other materials for opening boundaries - unlike our case study, Arcus Center by Studio Gang. I created a Jenga algorithm, which made a loop of pulling out the log with the least lateral displacement. We were able to decide the best logs to pull out with structural analysis and figure out the necessary points to use adhesives. At the same time, intuition and manual adjustments came in from time to time, such as manually adjusting the boundary logs or intuitively presuming the ones to remove.

As Michael Meredith pointed out in <From Control to Design>, parametrics is about relations. Our project also took another step by creating a relation to another assembly method, CMU block masonry. By weaving boundaries between logs and CMU blocks, these two assembly methods enabled what they couldn't do independently. We could create overhangs of CMU blocks and increase the possible porosity of logs as the surface area of the boundary was increased, where logs could structurally be supported. By parametric, the relations between different properties, the size of logs, the length of CMU overhangs, the composition of the boundary, the joinery points, and so on, were clarified and logically aggregated.
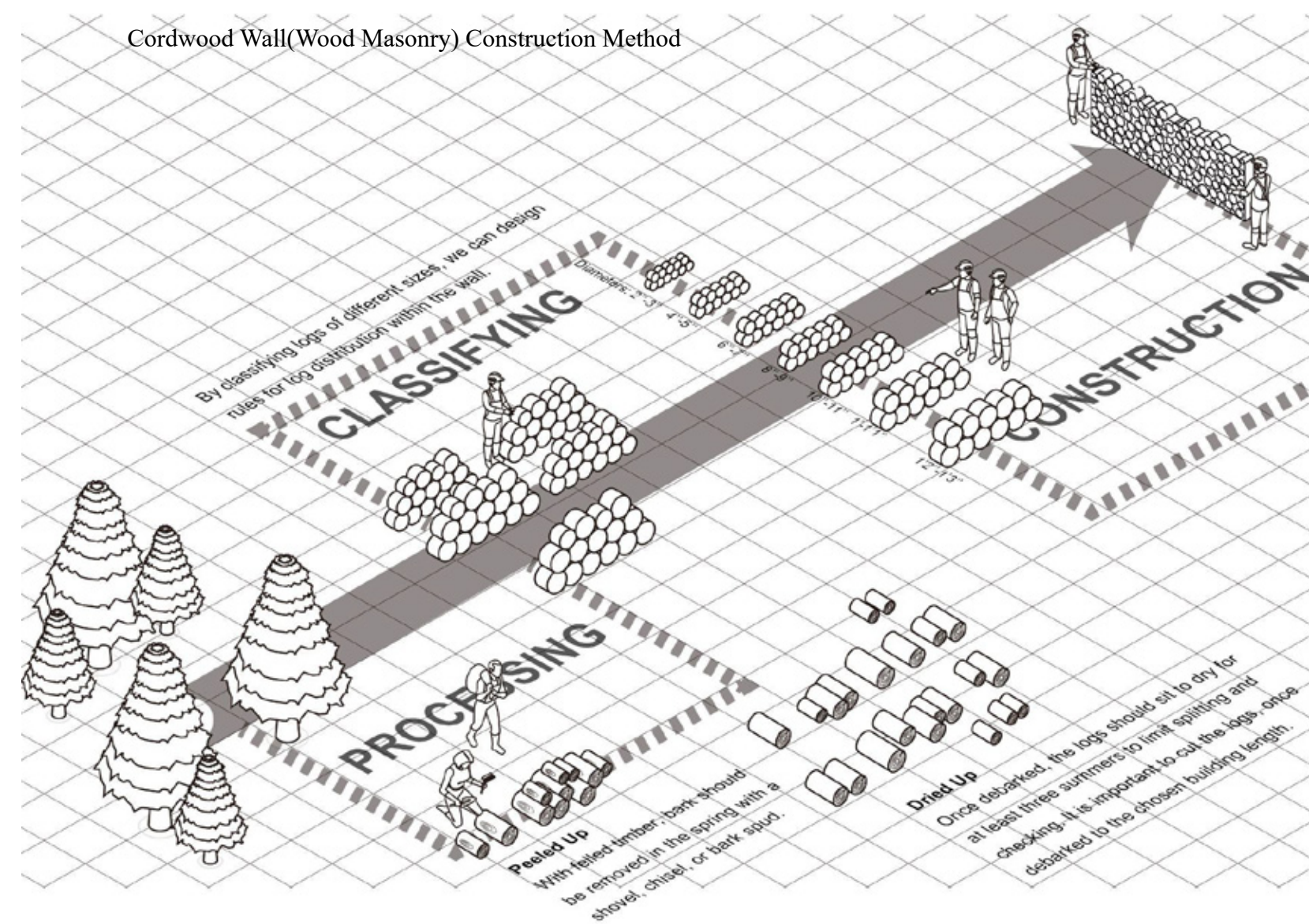
Fabrication Experiment
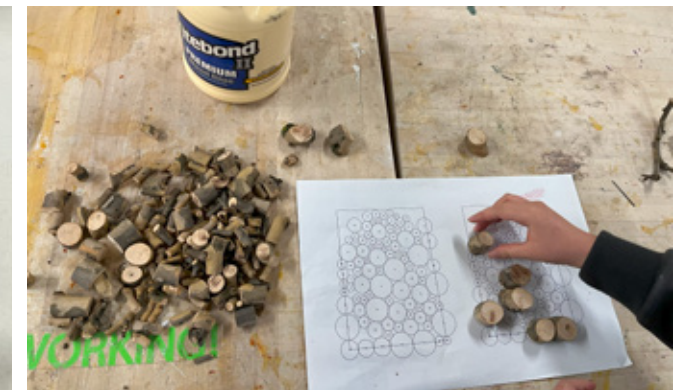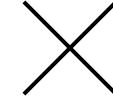

Kangaroo Circle Packing

1. Define boundary of the wall
2. Make Total log radius list and Log Center List
By sorting, placing large logs from the bottom with Jitter component

3. Kangaroo Physics Component

OnMesh: keep them inside boundary
Collider: make logs collide
Load: gravity
Floor: keep them above ground
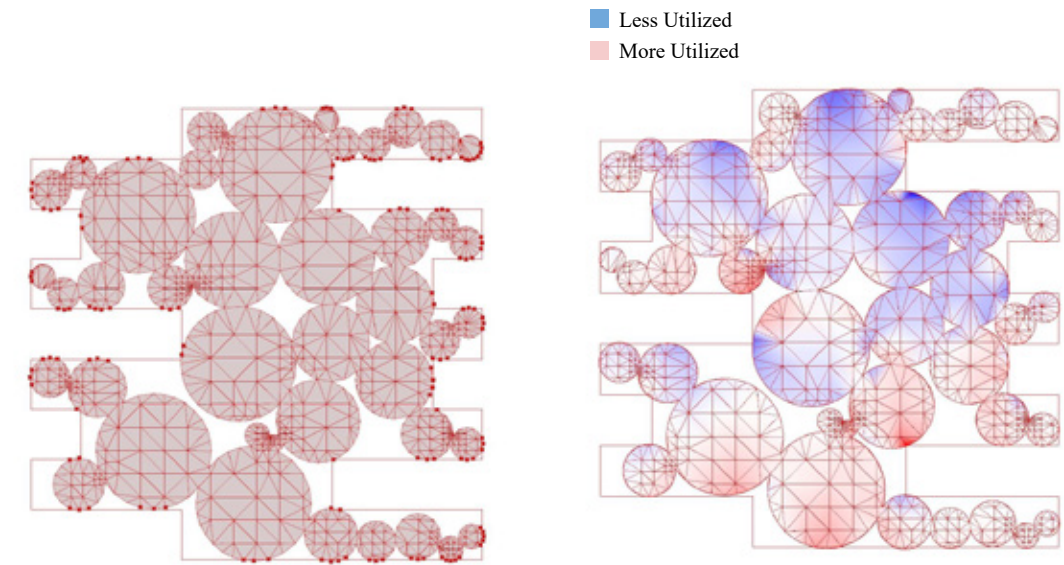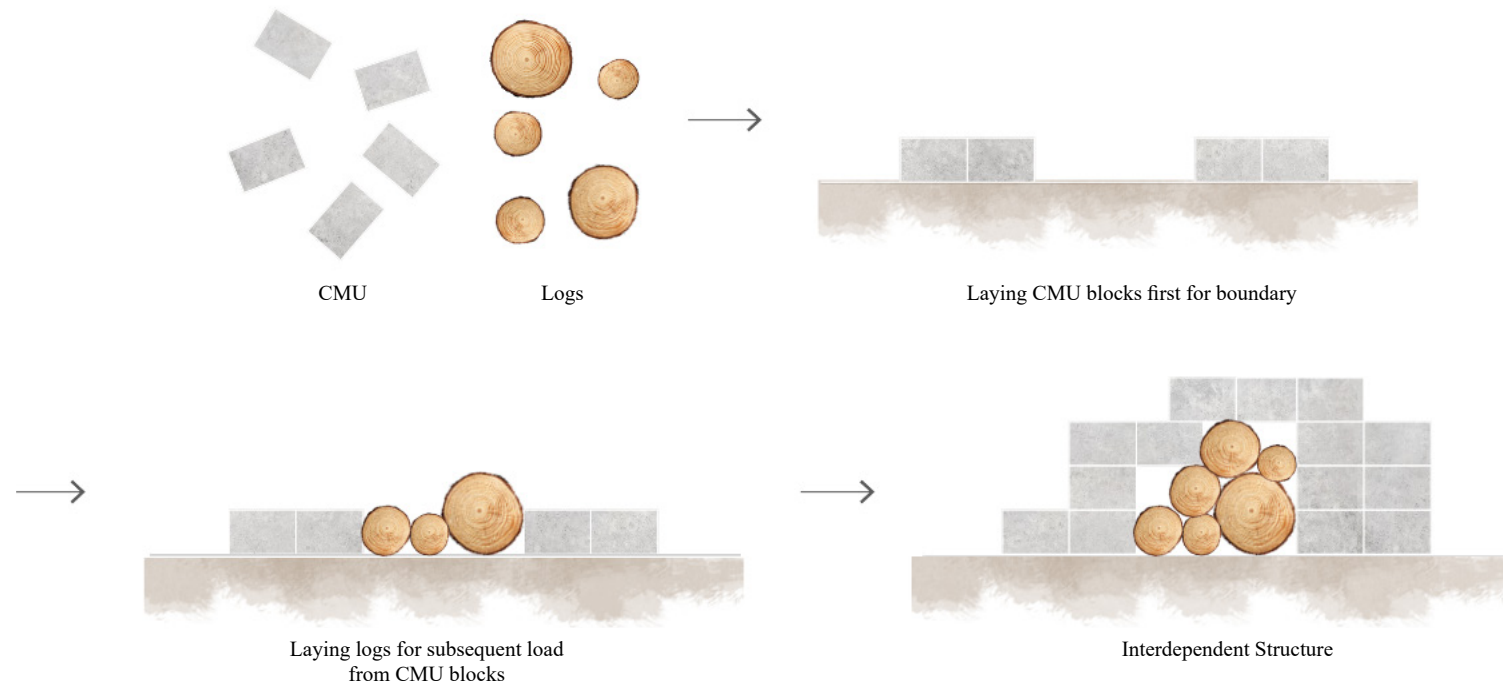
Cordwood Wall(Wood Masonry) Construction Method
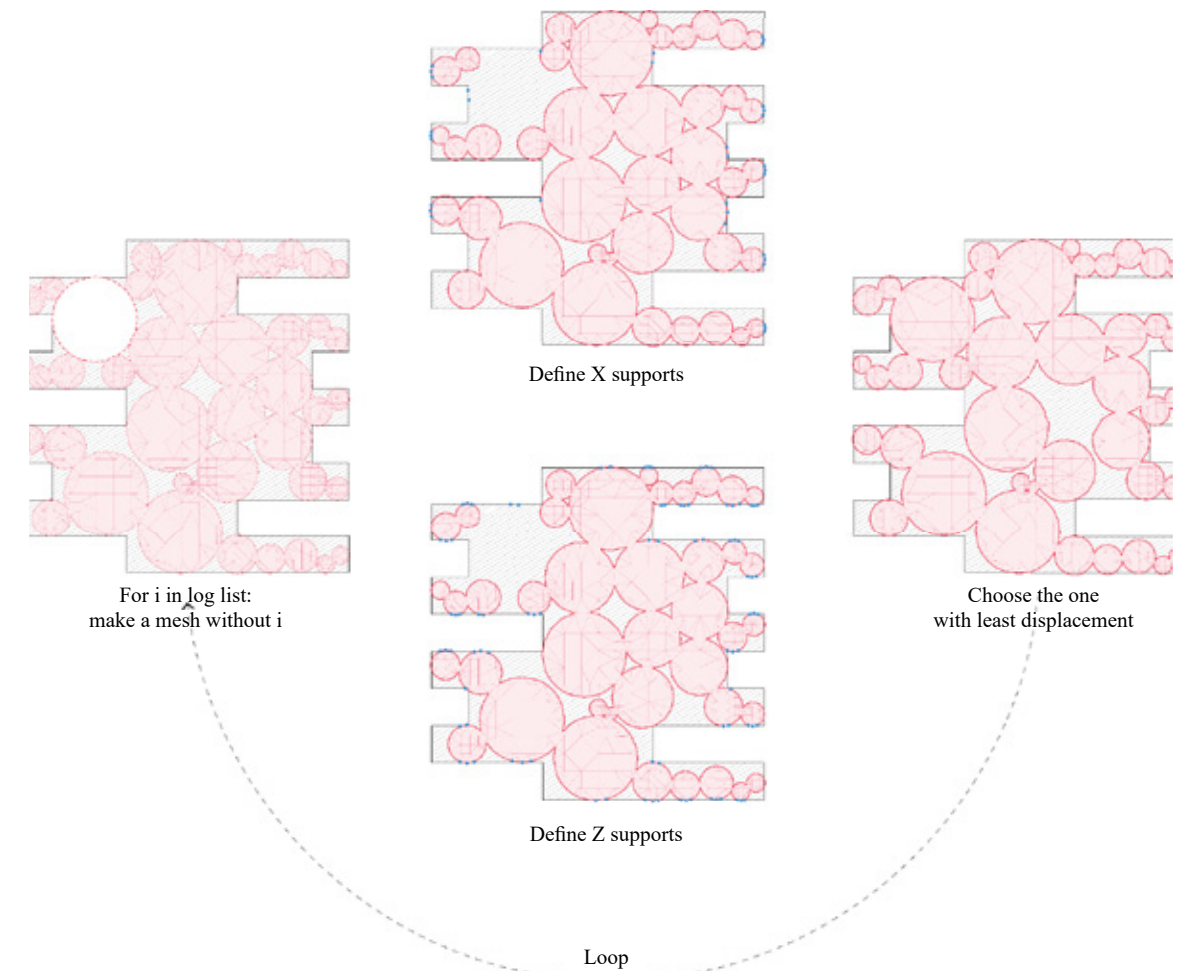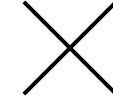
Wood and CMU Masonry

CMU   Logs

Laying CMU blocks first for boundary

Laying logs for subsequent load
from CMU blocks

Interdependent Structure

Jenga Algorithm

Increasing Porosity from Existing Structure

■ Less Utilized
■ More Utilized

Structural Analysis Loop to Choose What to Plug Out

For i in log list:
make a mesh without i

Define X supports

Define Z supports

Choose the one
with least displacement

Loop

To Analyze the Network of Sight

Rotating Shelves as Spatial Boundaries

Spatial boundaries form the network of different perspectives inside. These boundaries are not always fixed, since there are also movable furnitures such as small shelves, carts or chairs. This project starts from my small room with a small shelf that I like to move and rotate around. When this shelf moves, the physical and visual center of the room changes. It can divide or integrate the living and sleeping area by its angle.

Starting from analysis, I followed space syntax analysis methodologies. The analysis were done in different conditions; whether it is physical or visual, and whether the person is standing or sitting. Since a person cannot physically pass the shelf, it becomes a physical boundary. However, it does not count as a boundary when the person is standing; since it is below the eye level.

The project then moves on to an imaginary condition where there is an infinite grid of rotating shelves. Using genetic algorithm, I tried to optimize the different angles of different shelves to center certain locations. I used Isovist methods, and also tested with both physical and visual conditions. While architects use typology to enable certain social network under chosen physical boundaries, this can be a hint to find the physical boundaries under certain social network.
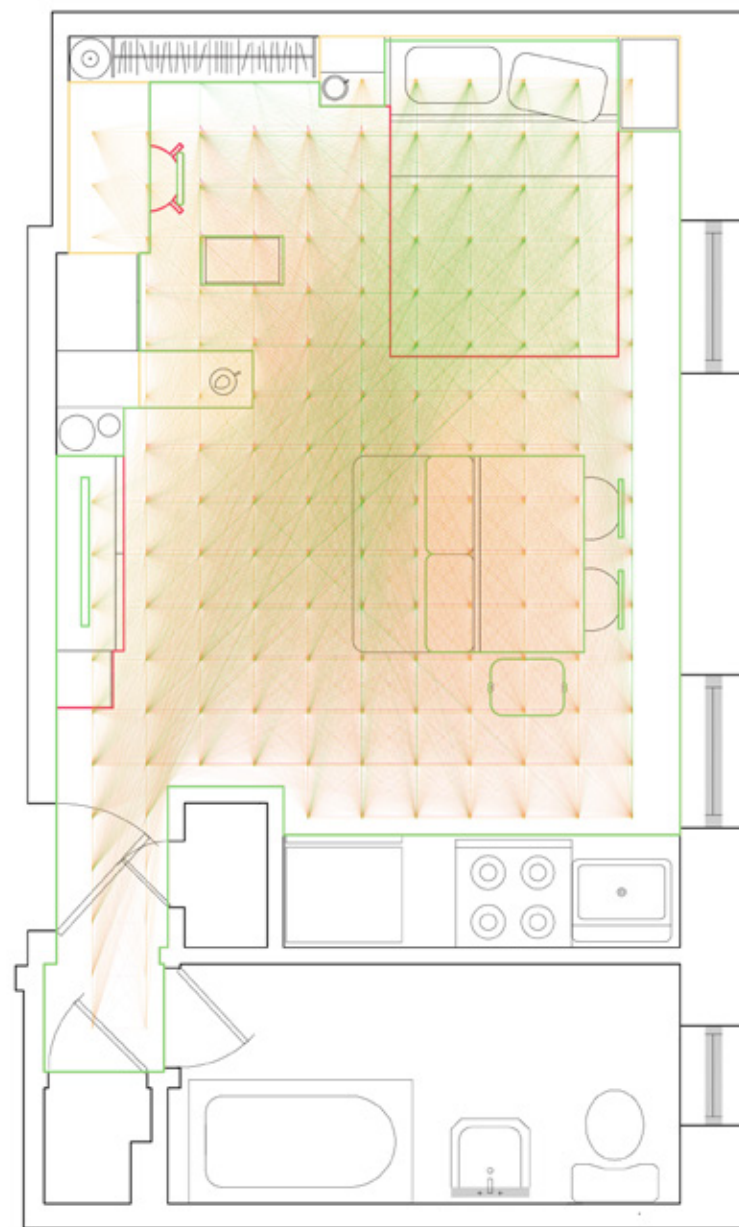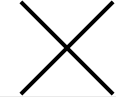
Physical and Visual Network within Fixed Boundaries while Standing
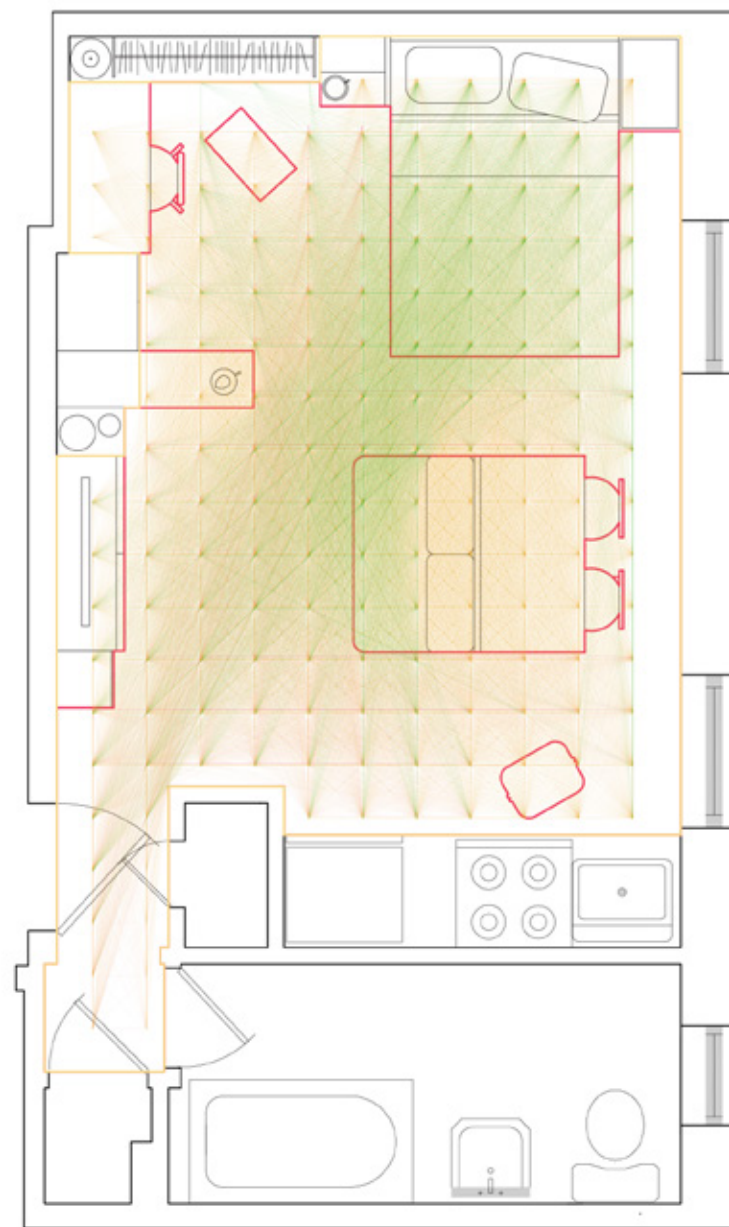
Physical and Visual Network within Fixed Boundaries while Sitting

Physical and Visual Network within Moved Boundaries while Sitting
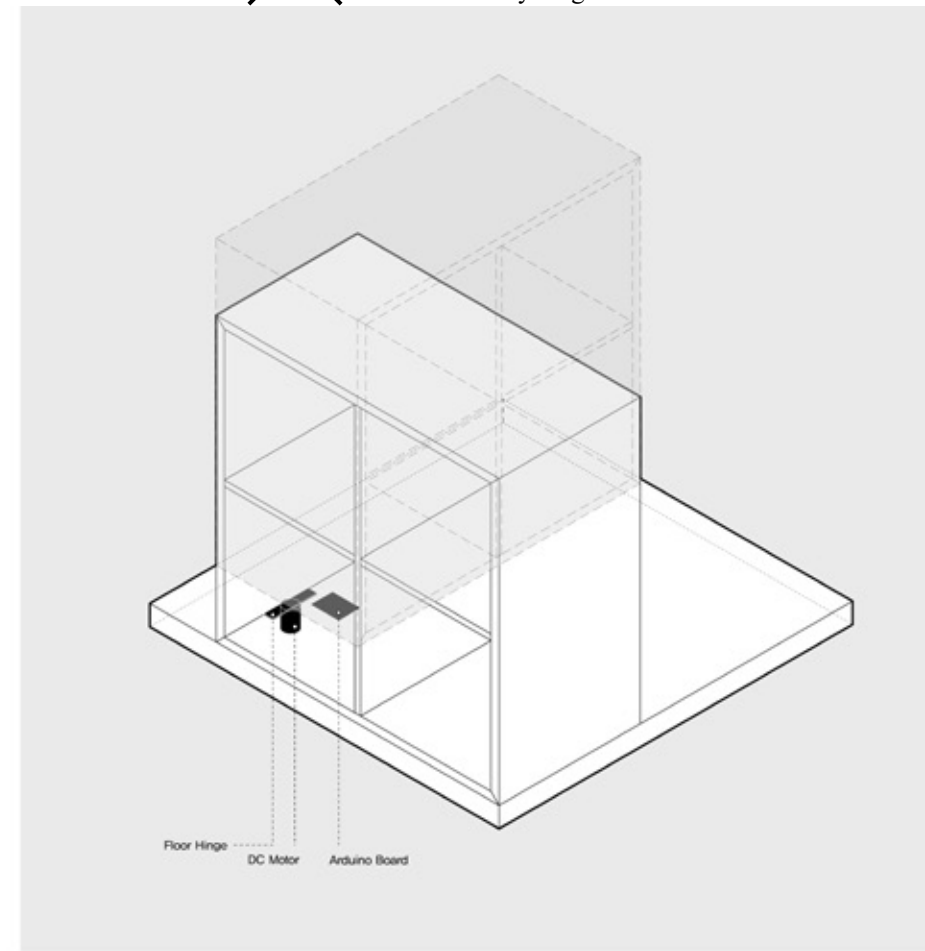
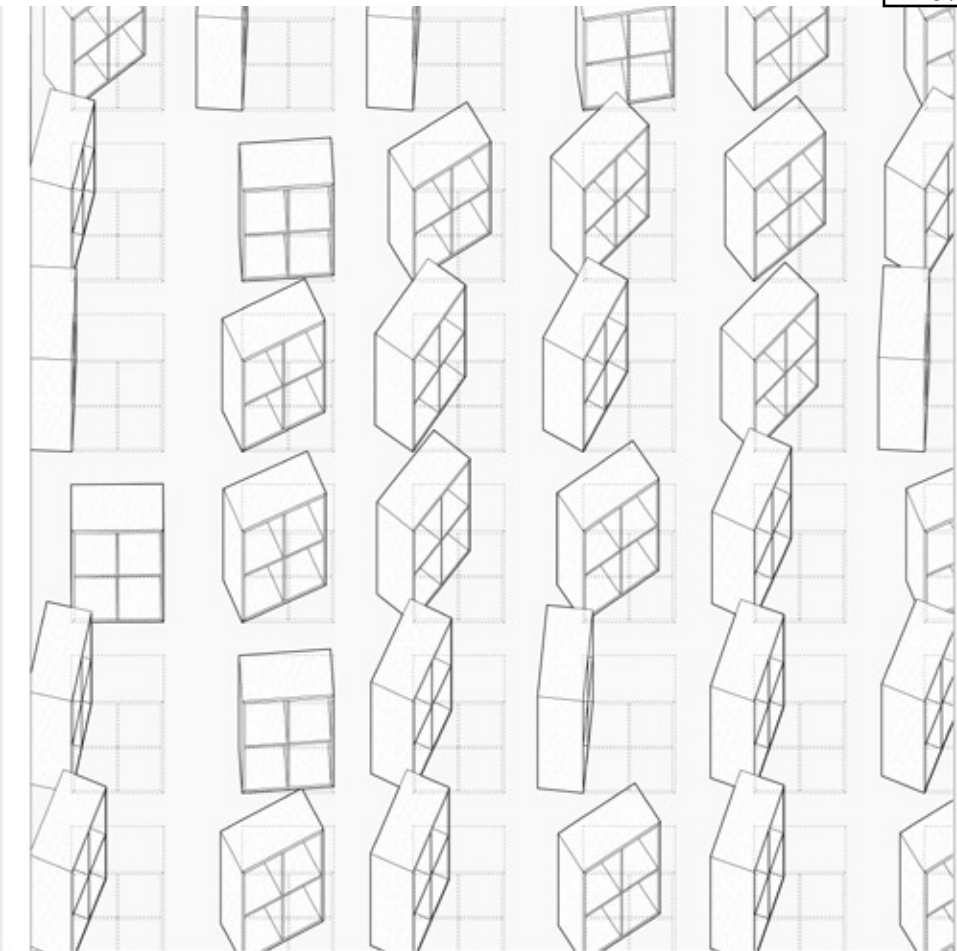Visual Network while Standing with Fixed Boundaries

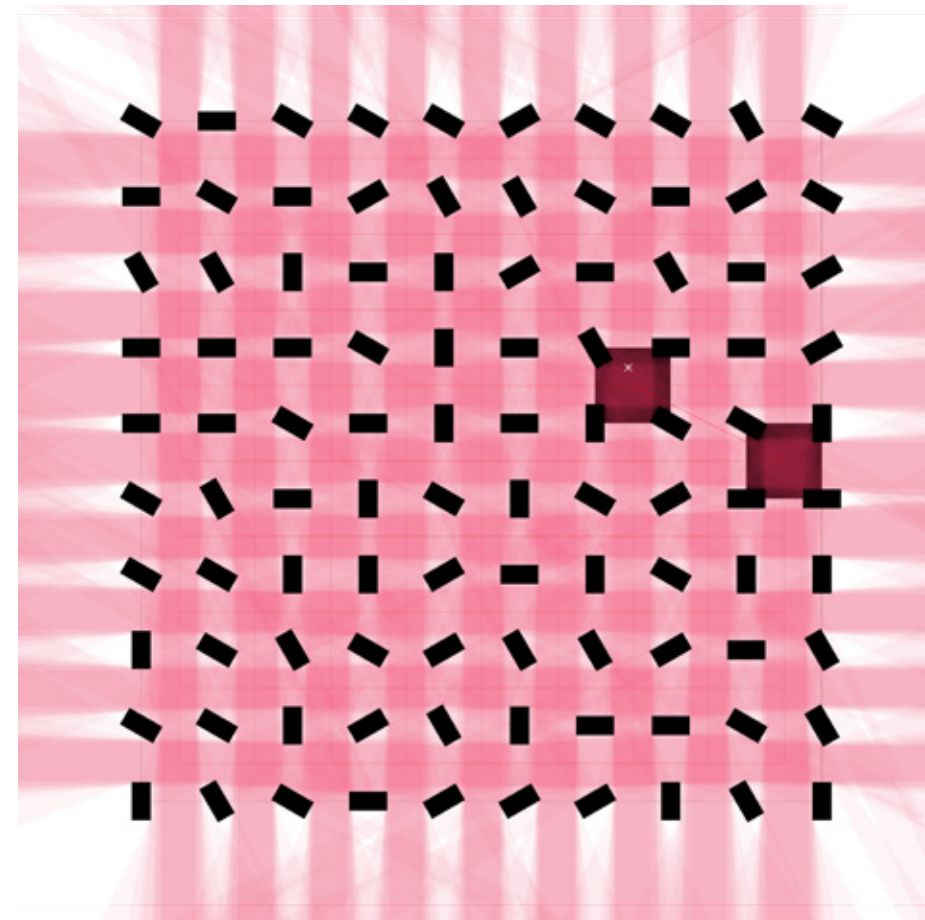Physical Network while Standing with Moved Boundaries

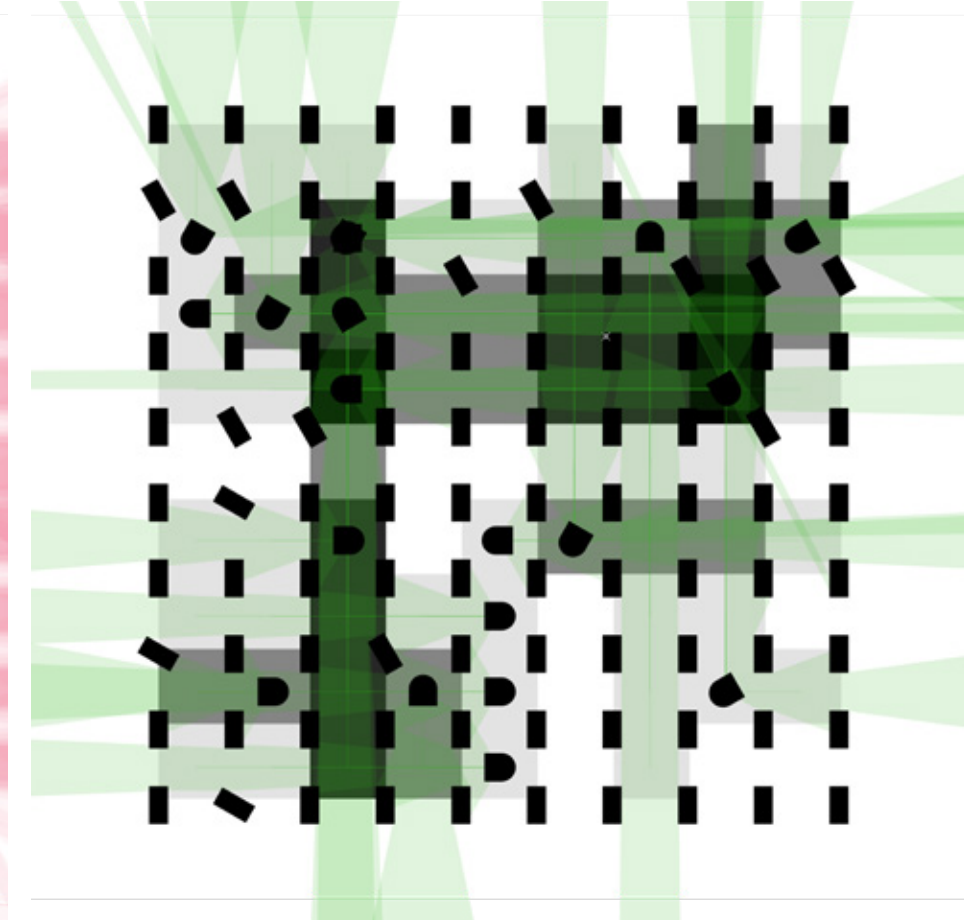Visual Network while Sitting with Moved Boundaries
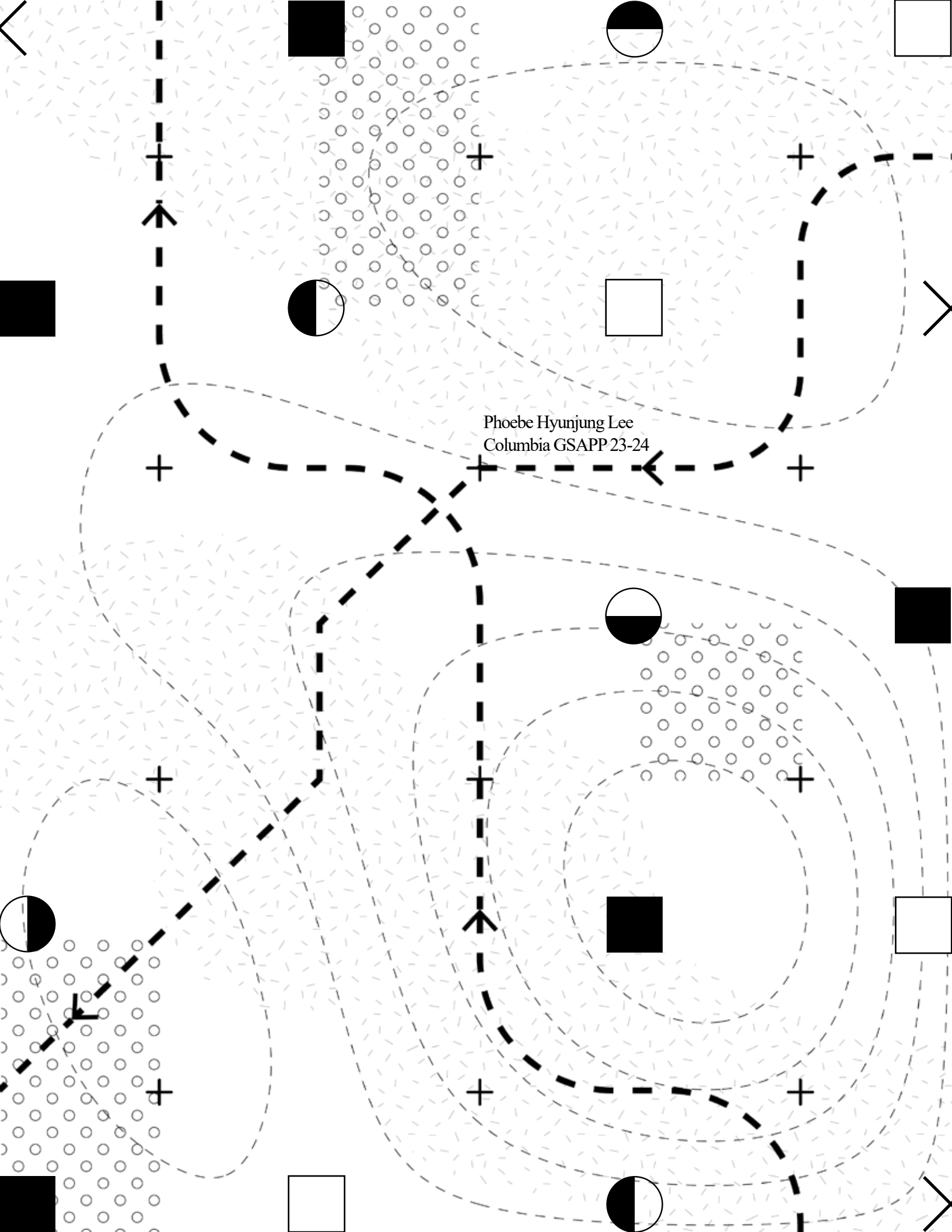

Rotational Shelf

Grid of Rotating Shelves

Optimization of Shelves' Angles
to Centralize Physical Connectivity of Certain Location

Optimization of Shelves' Angles
to Centralize Visual Connectivity of Certain Location

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Columbia GSAPP 23-24