research +

design +

policy +

portfolio [design] [process]

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research + [design] + policy

If radical creative thinking is necessary for a more sustainable, equitable and just tomorrow, architecture is an optimistic tool by which to design these futures.

This portfolio is a compliation of explorations that rethink and reimage what it means to craft a process at the intersection of research, design, and policy.

Many of design prompts proposed at GSAPP, discussed with peers and faculty, and explored through various forms representation are conceived as spatial problems. But more often than not, they also embody economic, environmental and socio-cultural dimensions. Rather than designing within the systems which cause these challenges in the first place, this series of studio explorations seek to design a process forward that is grounded in research methodologies and aim for policy interventions.

design **[process]**: the act of transforming a prompt into a means of response with observations, models, drawings, and research

process **[design]**: a non-linear, iterative process to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and explore, to empathize, define, ideate, and prototype

table of contents

GSAPP FALL 2020
CORE III STUDIO
'LIVING IN-BETWEEN'

CRITIC
ANNIE BARRETT

IN COLLABORATION
LUCIA SONG

BUELL CENTER PARIS PRIZE
FINALIST SELECTION

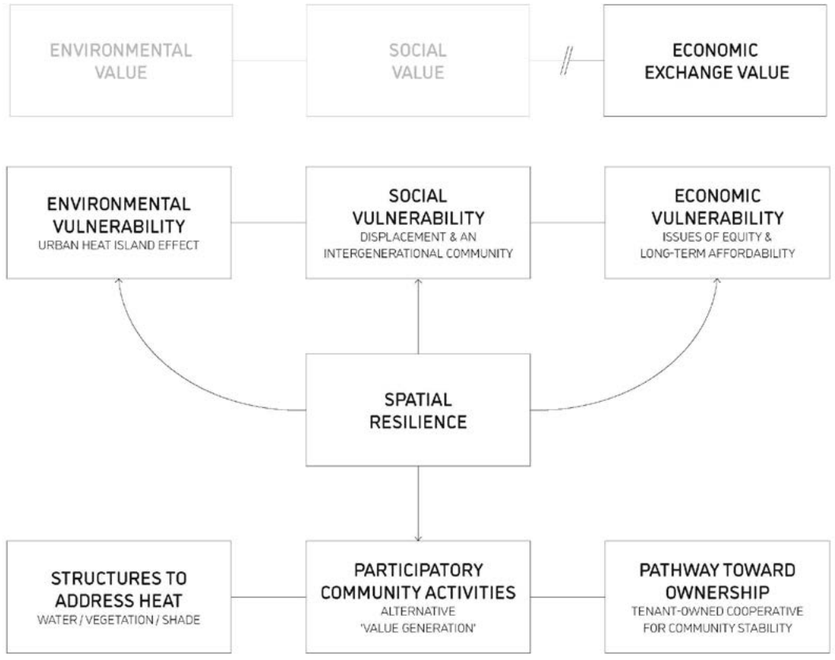
Housing Communities

micro-macro community model to challenge metrics of housing value

A Micro-Macro Community aims to cultivate a more equitable and environmentally resilient approach to housing communities. In order to align with and achieve the OneNYC Climate Change Policy, the project challenges existing metrics of housing value, ones that elevate a property's exchange value above its use value, to introduce a new holistic framework: one that encompasses environmental, social, and economic resilience. Because these three issues are heavily intertwined and interdependent, our proposal responds to climate, economic, and social vulnerabilities in the Melrose community of the South Bronx through a combined program, policy, and spatial approach.

This approach allows on-site participatory activities to generate social, environmental, and economic capital, all of which feed into community resilience. By generating this capital, the community can achieve a rent-to-own model by supporting low-income residents through an incremental process of ownership. Ownership allows residents to become more invested participants in environmental resilience-building community activities, such as gardening, rainwater collection, and shade-building, on site.

The project therefore rethinks economic frameworks for affordable housing in order to build community, creating a collective response to displacement and climate change.



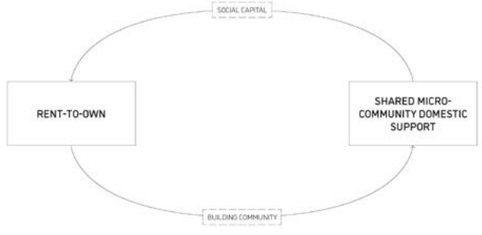
This proposal is a spatial response to conditions vulnerability that incorporates both programmatic and policy strategies to generate a new system of housing value. The project centers around cooling to alleviate environmental stresses, and houses programs imagined as participatory activities to generate social, environmental, and economic capital — all of which feed into community resilience. By generating this capital, the community can achieve a rent-to-own model by supporting low-income residents through an incremental process of buying into shares of units. **Architecture and policy work together to allow underserved groups to progressively achieve homeownership.**

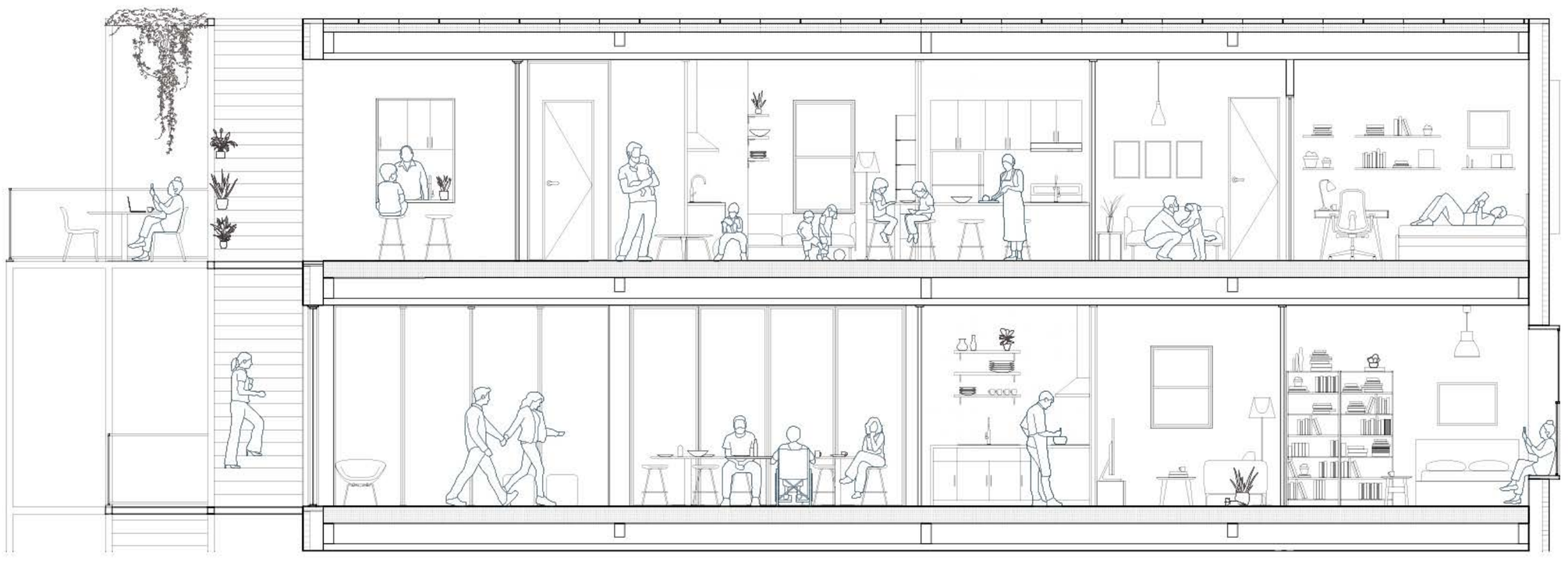
Street view from E 151st Street looking towards a shared courtyard by the Bronx Documentary Center and new residential building.

Micro-communities are conceived as **social collectives** which allow residents **to share domestic care responsibilities**. An aggregation of five or six residential units open up around a communal space.

Perspective view of a shared micro-community kitchen and community space.

The kitchen, at the heart of the home, is the connection between units and communal spaces: each kitchen opens up to foster shared responsibilities of domestic care—an economically undervalued, yet socially critical factor to the well-being of a household and community. The internal wall partitions between the different domestic programs allow for flexibility and openness, enabling residents to take ownership of their homes and transform them to best meet their needs.



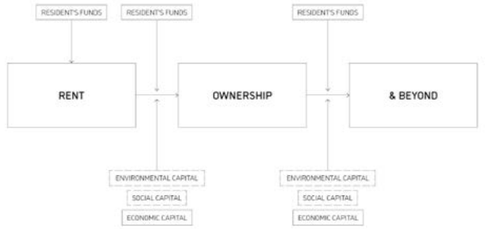


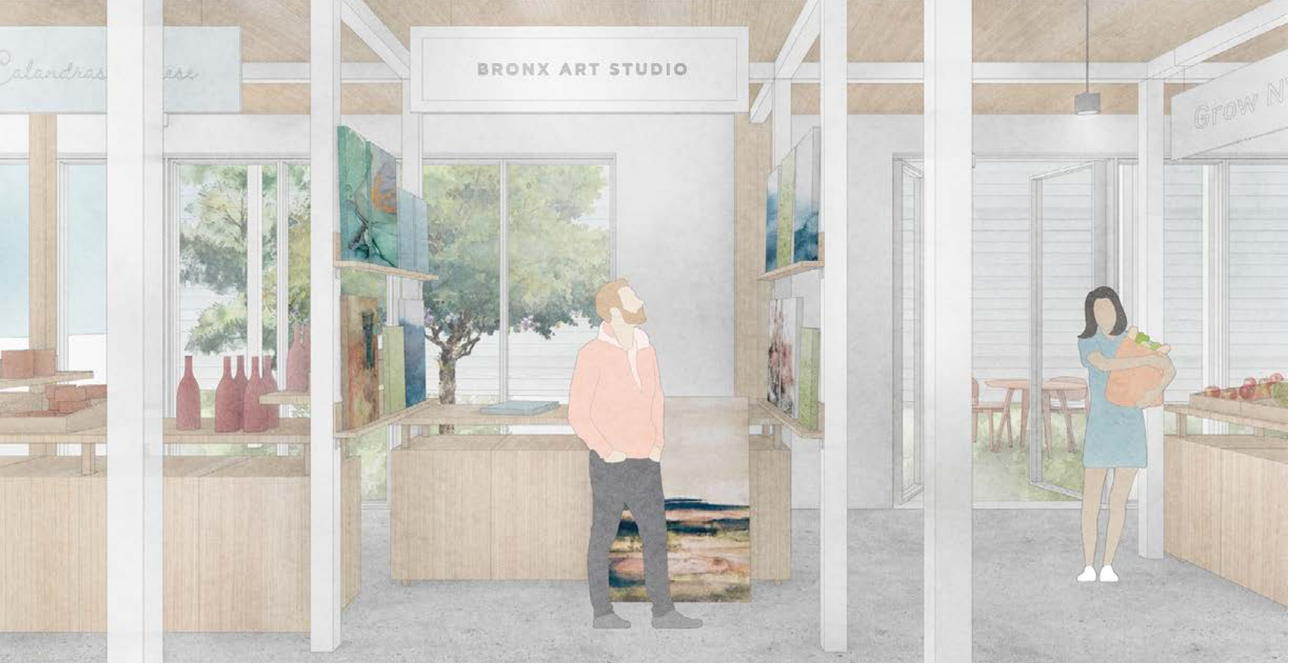
Micro-communities are connected to the macro-community via the scaffolding system, which is the project's social condenser that allows for resident design intervention. The scaffolding also supports adaptable shading, water transport, and additional vegetation.

Floor plan of all micro-communities connecting to the larger shared social spaces placed in site context.

Perspective view of the community garden and greenhouse located in the central courtyard.

The project's approach to social resilience uses these elements of water and vegetation to organize collective social programs that bring intergenerational residents together. For example, the garden is both an educational and recreational space that allows fresh produce to be shared with the community dining room for a locally-sourced meal.





Perspective interior view of community market and collective space.

The ground floor commercial areas of the buildings on Melrose Ave are used to generate revenue for the community cooperative. The ground floor of the building on Courtland Ave is used as a community market to increase entrepreneurial access and allow residents to play an active role in creating their local retail landscape.

Floor plan of all ground floor programs and extior communal activity zones - all which flow into the surrounding sidewalks and neighborhood programs.

GSAPP FALL 2020
ARCH TECH III + IV
'MATERIALS AND ASSEMBLIES'
'INTEGRATED DESIGN BUILDING SCALE'

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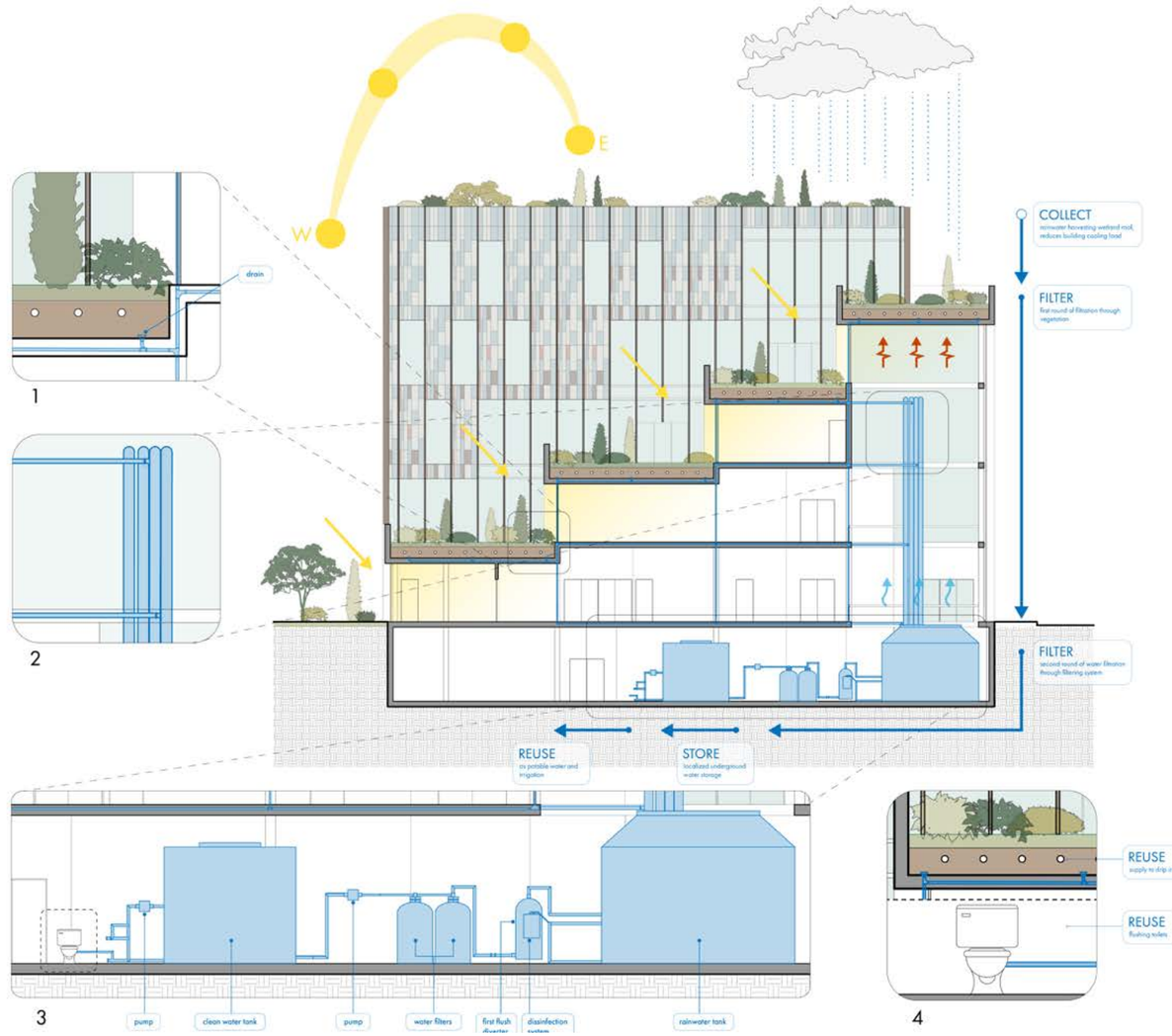
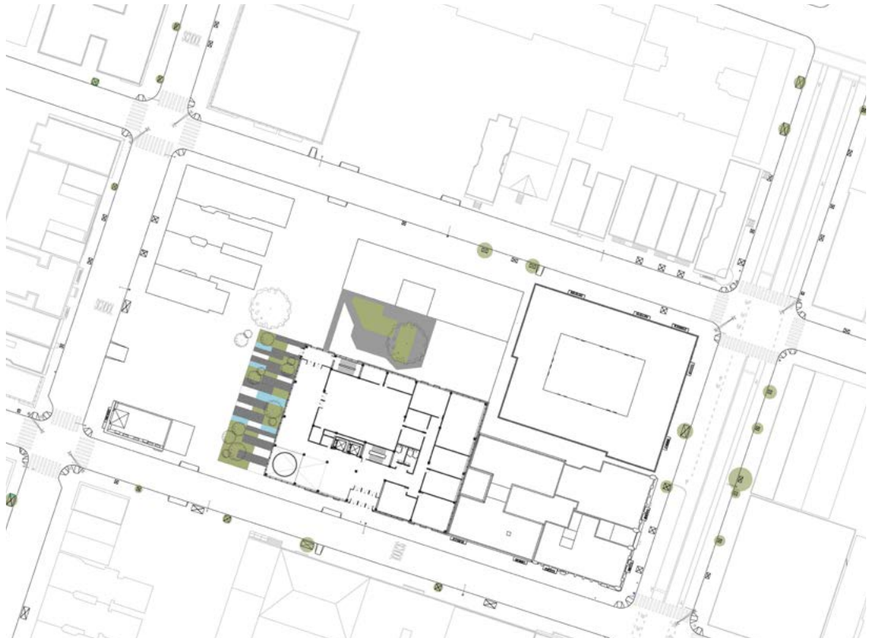
Waterworks Melrose Community Center

resource driven intergenerational neighborhood hub

The Waterworks Melrose Community Center aims to provide community programs for children and young adults, including health and nutrition, education, and the arts. The mission of the project is driven by a belief that the true potential of a building is connected to its multilateral use of resources. Therefore, water is the resource which shapes the formal design and operates as a social condenser to bring different generations of the community togeher. This organization concept integrates the physical and social component of the building through its structure, program and materiality.

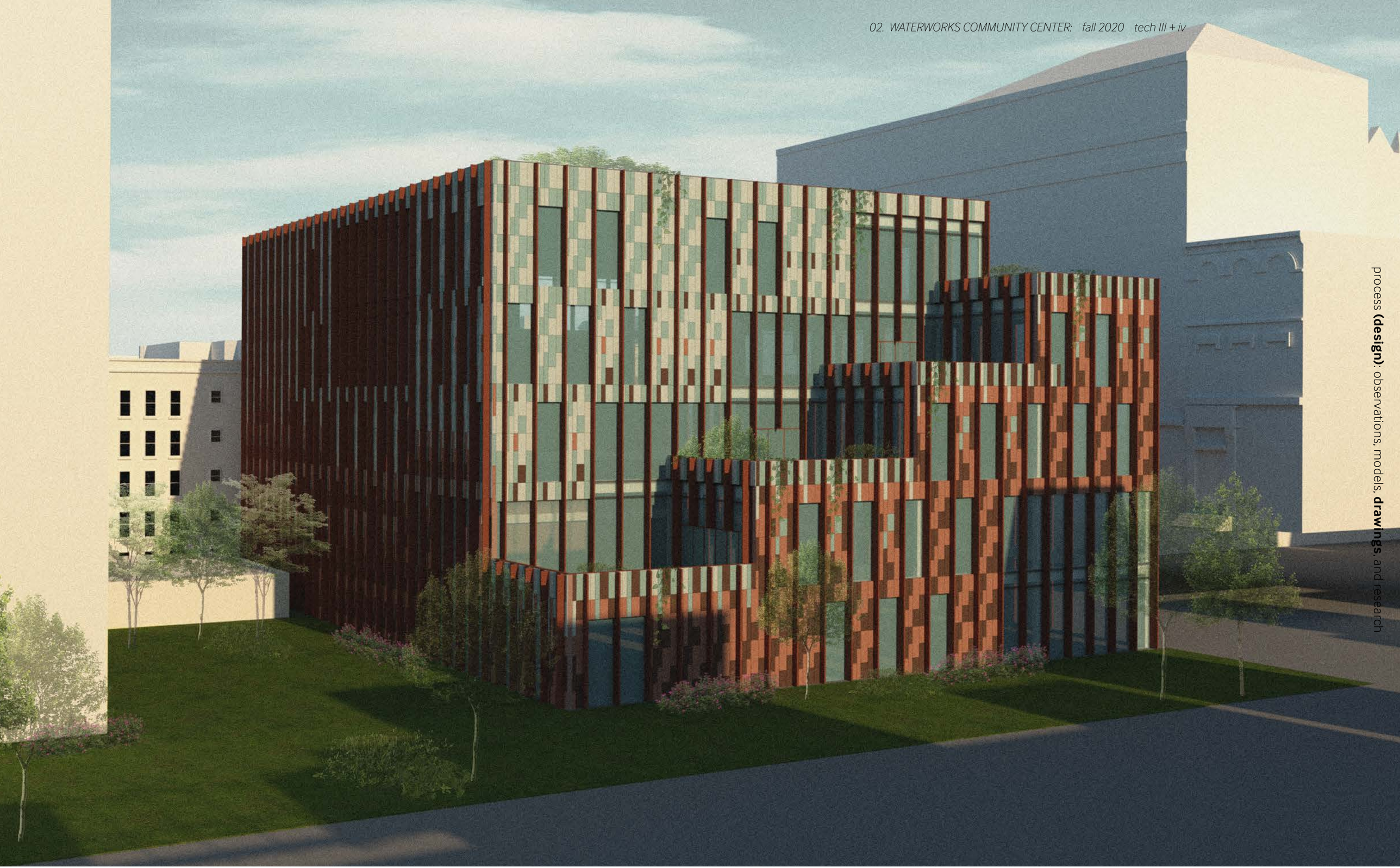
This project was designed with the belief that a community center is fundamentally different from a school, because it's a space where children continuously engage together and build social relationships. Within community centers, barriers are broken down. Children actively exchange attention, energyand openly start conversations. A successful building is one that supports and enhances this exchange by creating spatial opportunities for positive social interactions. Space and material layer the experience, creating dynamic spaces that connect people to each other and their environment.





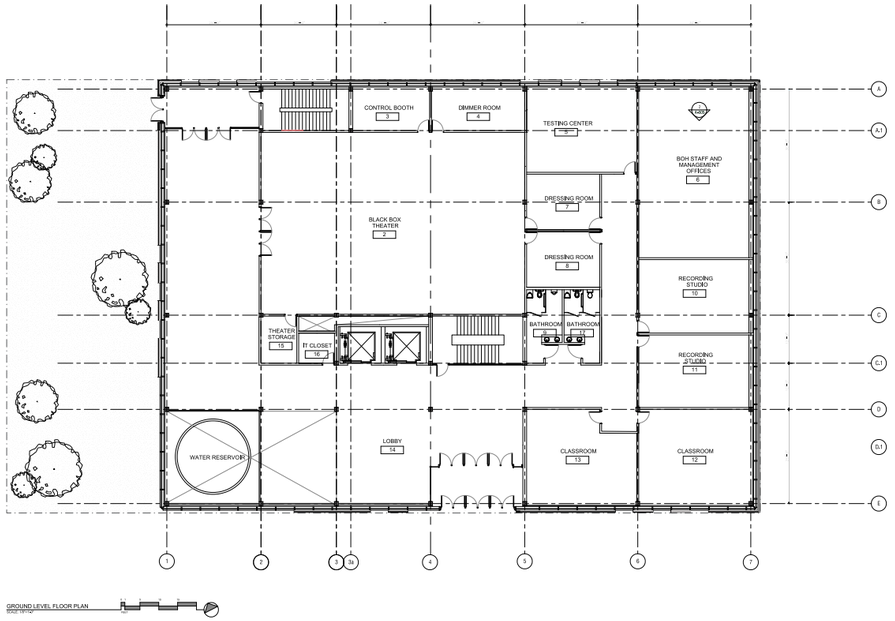
The site to be redeveloped is 363-381 East 151st Street, located in the Melrose section of the Bronx, **a neighborhood with one of the highest concentrations of public housing** in New York City. The northern side of the site is bounded by a Senior Community Center, small park, one of the few green spaces available to Melrose residents., and a large community garden to the south. The project responds to the neighborhood's vision to connect the two parks into a continuous greenway path within the building program. Its **multi-layer terraces revolved around the exterior envelope, allowing the building to physically and performatively operate with a campus-like flow to weave outdoor and indoor space.**

Axonometic view of building massing in context of adjacent buildings.

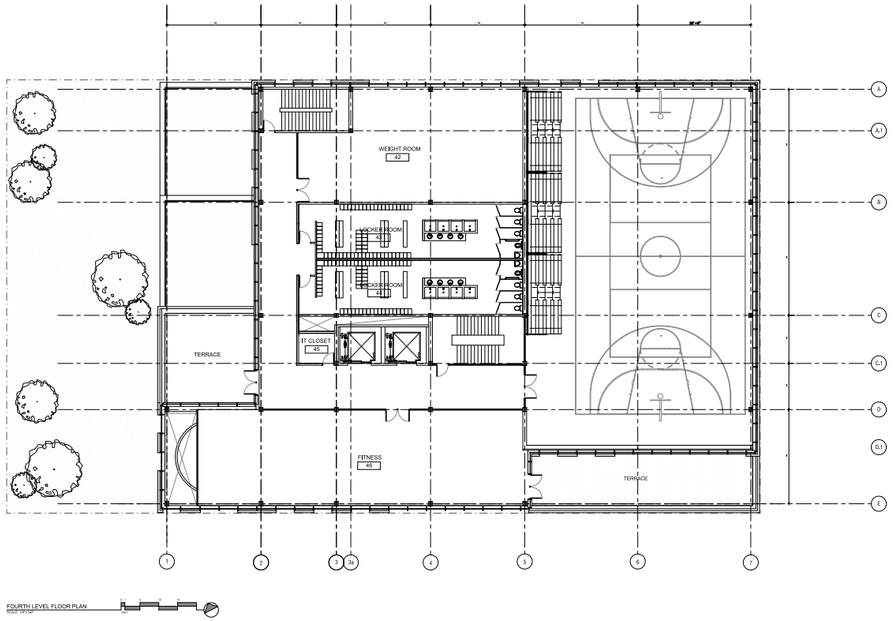


Water is the programmatic and formal organizing element of the building. Community members expierence the building's water performance through exposed pipes directing water captured through the exterior terraces to the central rentention tank. The interior programs are organized to spiral around these exterior terraces.

Interior view of water pipes on ground floor lobby and its surrounding gathering space for the community.



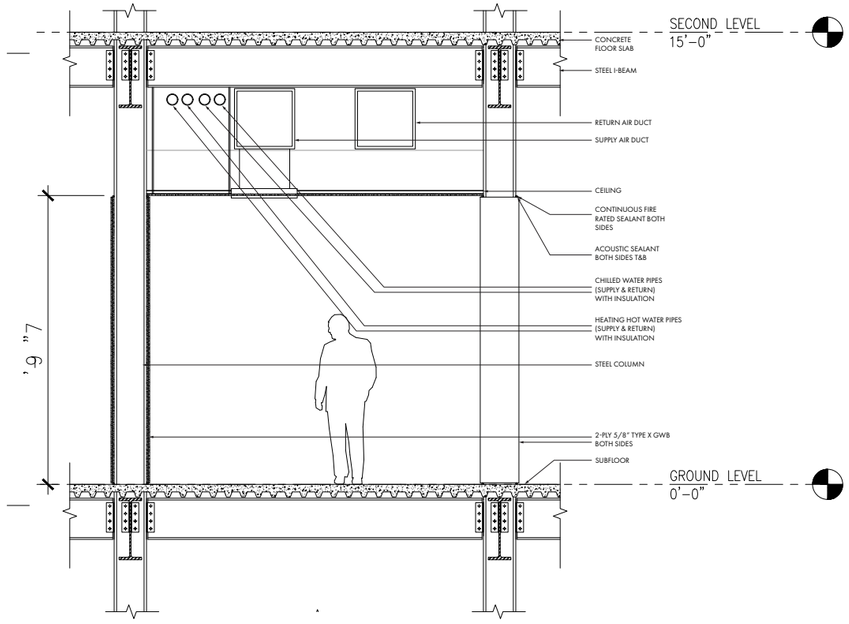
GROUND LEVEL FLOOR PLAN



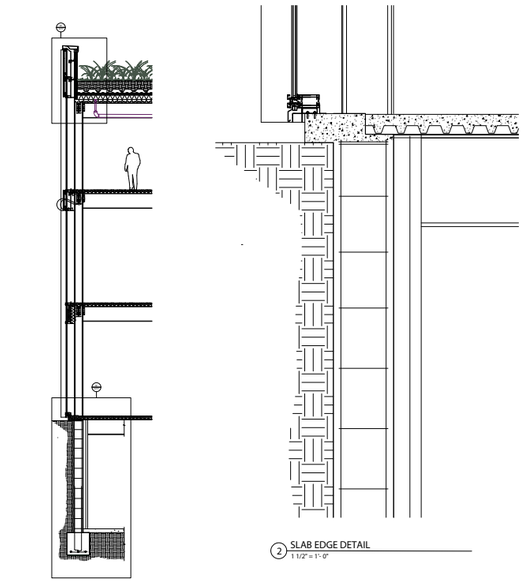
FOURTH LEVEL FLOOR PLAN

Green terraces along the eastern side of the building operate in part of the building's water capture and reuse system. Rain water is filtered through its pervious surfaces, and then cycled through the building to be used for potable water demand. Adjacent detail drawings show how **the technical system of water management shapes the social spaces.**

Exterior view of green terraces that are accessible by each level of the community center.

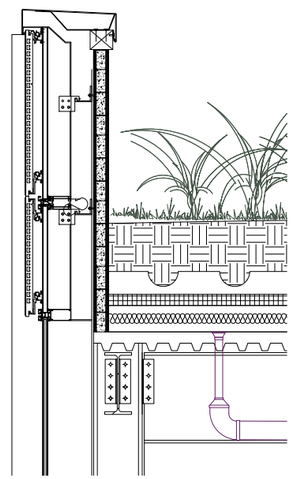


6 WALL SECTION AT CORRIDOR
1" = 1'-0"



1 WHOLE BUILDING SECTION
1/4" = 1'-0"

2 SLAB EDGE DETAIL
1 1/2" = 1'-0"



3 PARAPET DETAIL
1 1/2" = 1'-0"

GSAPP SPRING 2021
ADVANCED IV STUDIO
'DESIGNING FOR NORMAL'

CRITIC
PHU HOANG

IN COLLABORATION
KARAN MATTA

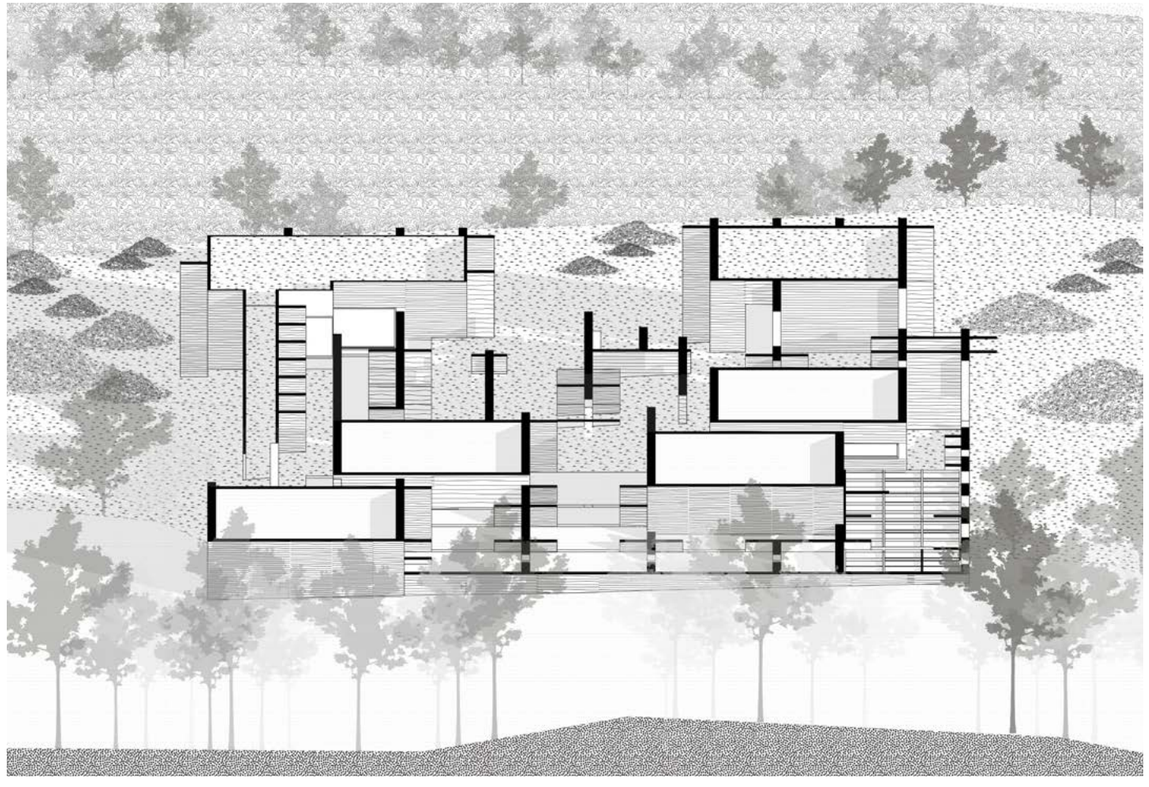
Thermal Walls

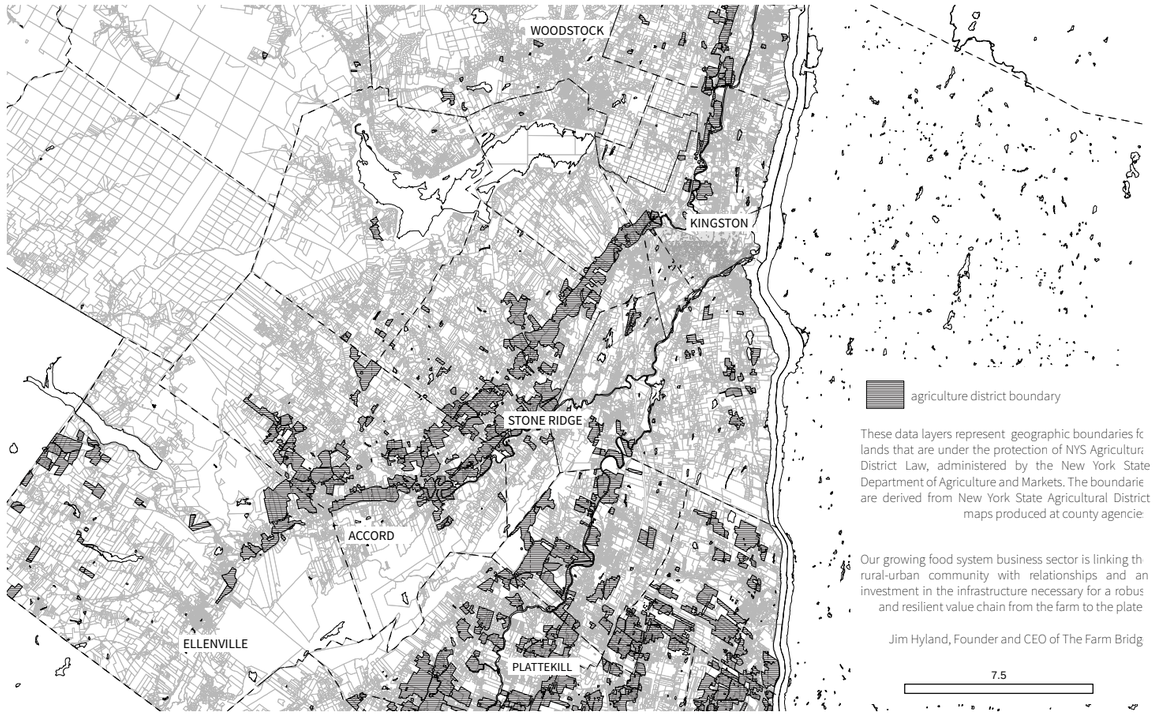
ulster county vaccine hub and its agricultural future

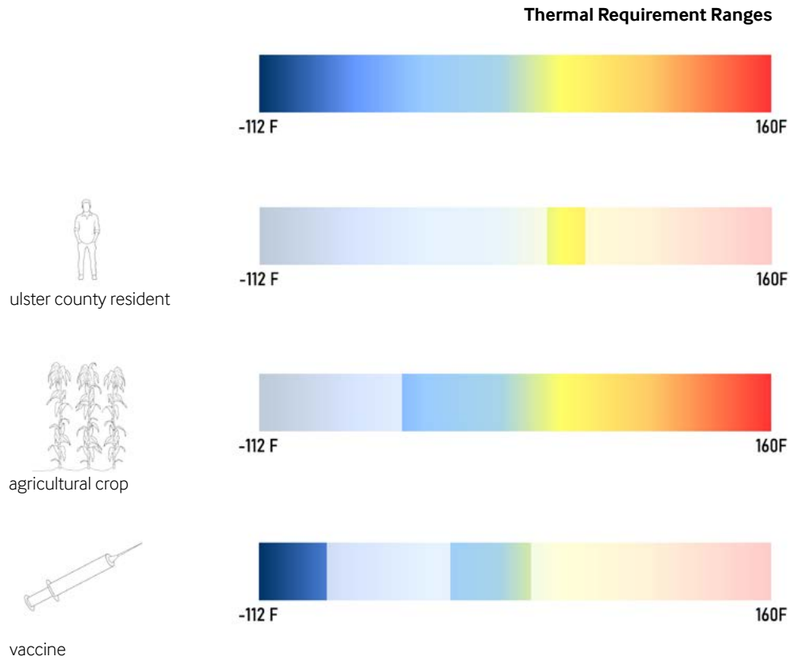
Ulster County is an agriculturally abundant region, yet it is also considered highly food-insecure. Crops grown in the Hudson Valley are collected and distributed from regional cold storage facilities, only to return to a grocery store a few miles from where they were produced. This mismatch between food production and food accessibility foreshadows challenges to the local distribution of Ulster County's highly centralized vaccination program.

Currently, the Ulster County Department of Health is operating two Points of Dispensing for the Covid-19 vaccine at Kingston High School and Ellenville High School. While the county's vaccine distribution plan emphasizes a strong focus on reaching underserved populations, the centralization of these sites does not ensure fair and equal access to the vaccine.

'Thermal Walls: A Living Library' is a proposal which sees the vaccine rollout as an opportunity to initiate a locally sustainable cold chain that will be used well beyond the current health crisis to connect communities with fresh produce. The project's mission is to connect by food, guide by landscape and root in agricultural practice.

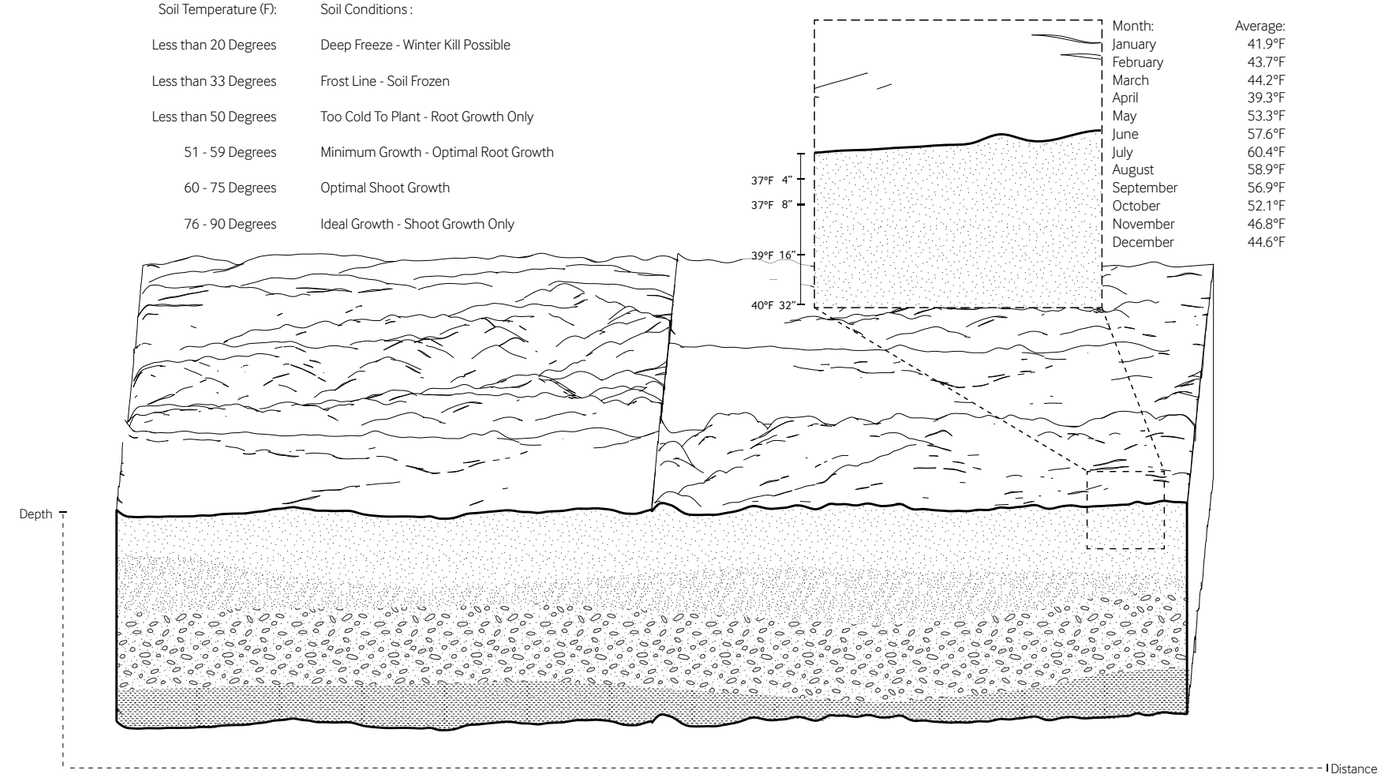






The design proposal is located on the site of Esopus Public Library, a site which has an existing community program, a terrain slope of 1/10' and an adjacent unbuilt area of soil that can be excavated. **Walls assembled at various ground depths combined with a roof system achieve a range of different thermal thresholds for different programs.** A range of extreme temperatures are needed to store crops (32 to 60F), grow crops in greenhouses (80 to 85F), and to compost food waste back into the earth (135 to 160F). Adjacent to these thermally specific agricultural programs, are series of community facing programs that need to exist within the band of thermal comfort and health.

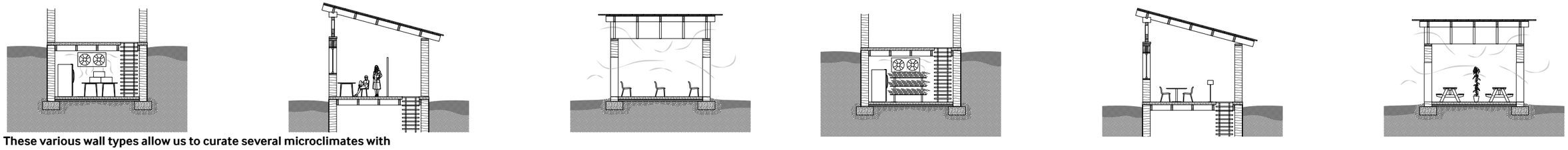
Soil Temperature (F):	Soil Conditions :
Less than 20 Degrees	Deep Freeze - Winter Kill Possible
Less than 33 Degrees	Frost Line - Soil Frozen
Less than 50 Degrees	Too Cold To Plant - Root Growth Only
51 - 59 Degrees	Minimum Growth - Optimal Root Growth
60 - 75 Degrees	Optimal Shoot Growth
76 - 90 Degrees	Ideal Growth - Shoot Growth Only



Month:	Average:
January	41.9°F
February	43.7°F
March	44.2°F
April	39.3°F
May	53.3°F
June	57.6°F
July	60.4°F
August	58.9°F
September	56.9°F
October	52.1°F
November	46.8°F
December	44.6°F

The average soil temperature in Ulster County is 48F, allowing the ground's thermal and moisture conditions to provide passive methods to store, grow and cultivate crops.

Section perspective across the site's cut and fill walls. The nothern spaces are subtracted from into the soil, southern walls are additative spaces on grade.

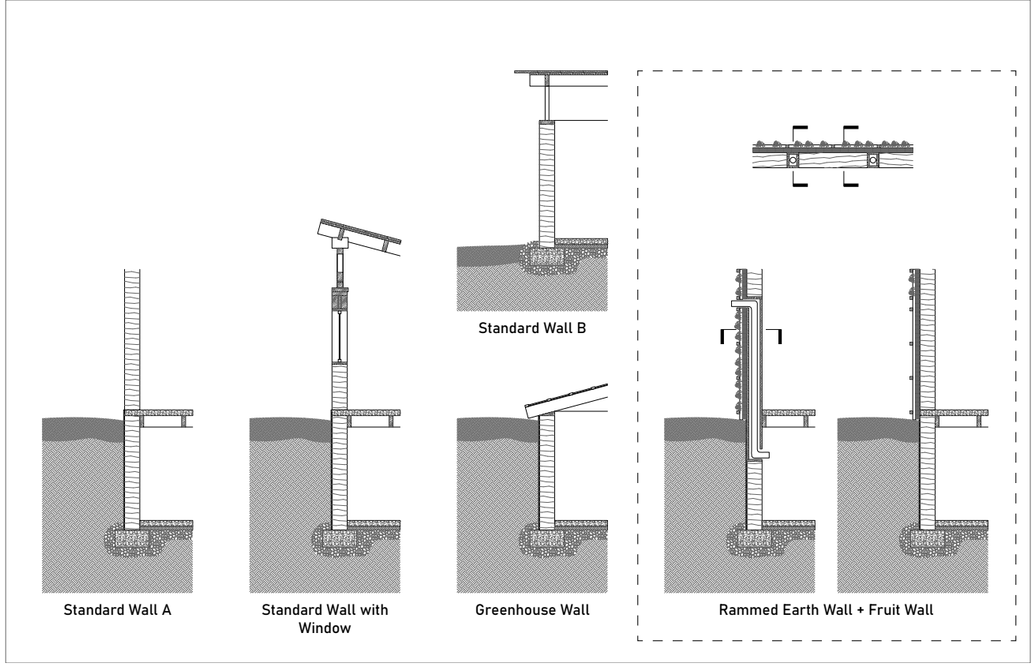


These various wall types allow us to curate several microclimates with passive methods of achieving their required thermal stabilities.

The site is treated as an archaeological site, where the process of excavation becomes the future act of building. The intersection of the existing topography and a phased excavation process creates a new architectural system of production.

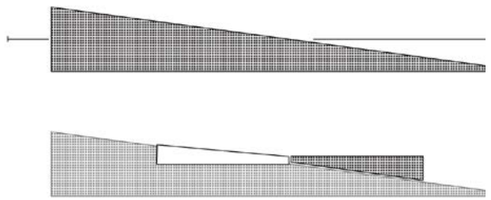
In Keller Easterling's essay 'Subtraction,' she writes that, "Like the cultivation of crops, subtraction may use both active forms and object forms to change not only the shape, but also the constitution or organization of space." The process of excavation provides us with active forms of excavated soil walls and object forms of additive earth walls, both carrying inherent thermal properties.

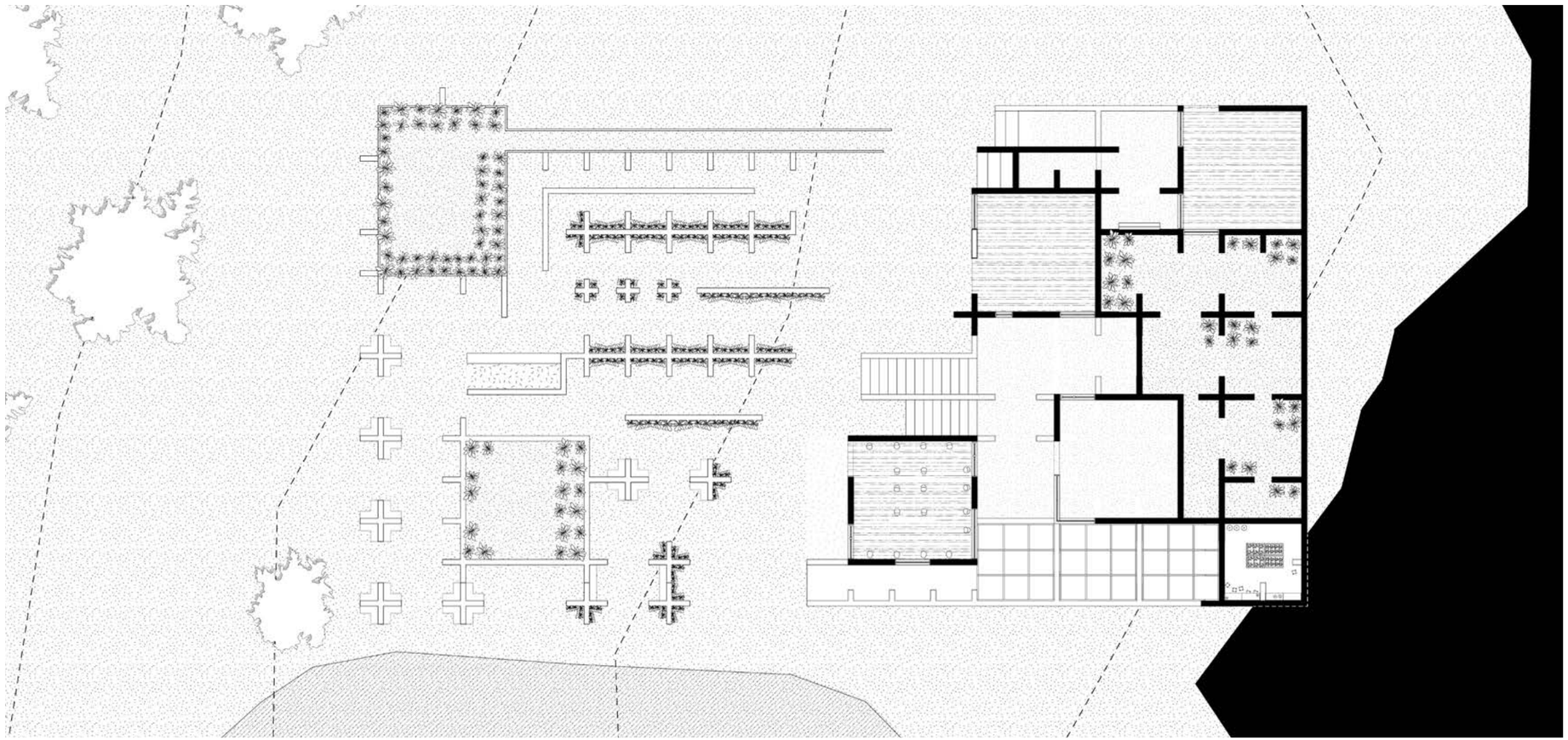
How, then, can these elements of architecture protect from or produce various micro-climatic environments?



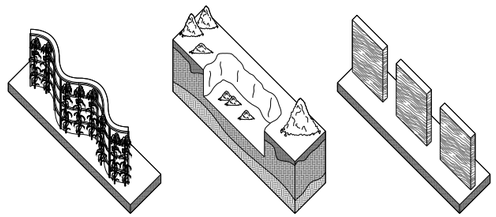
Different wall to roof assembly systems intersect with the ground at various sectional levels.

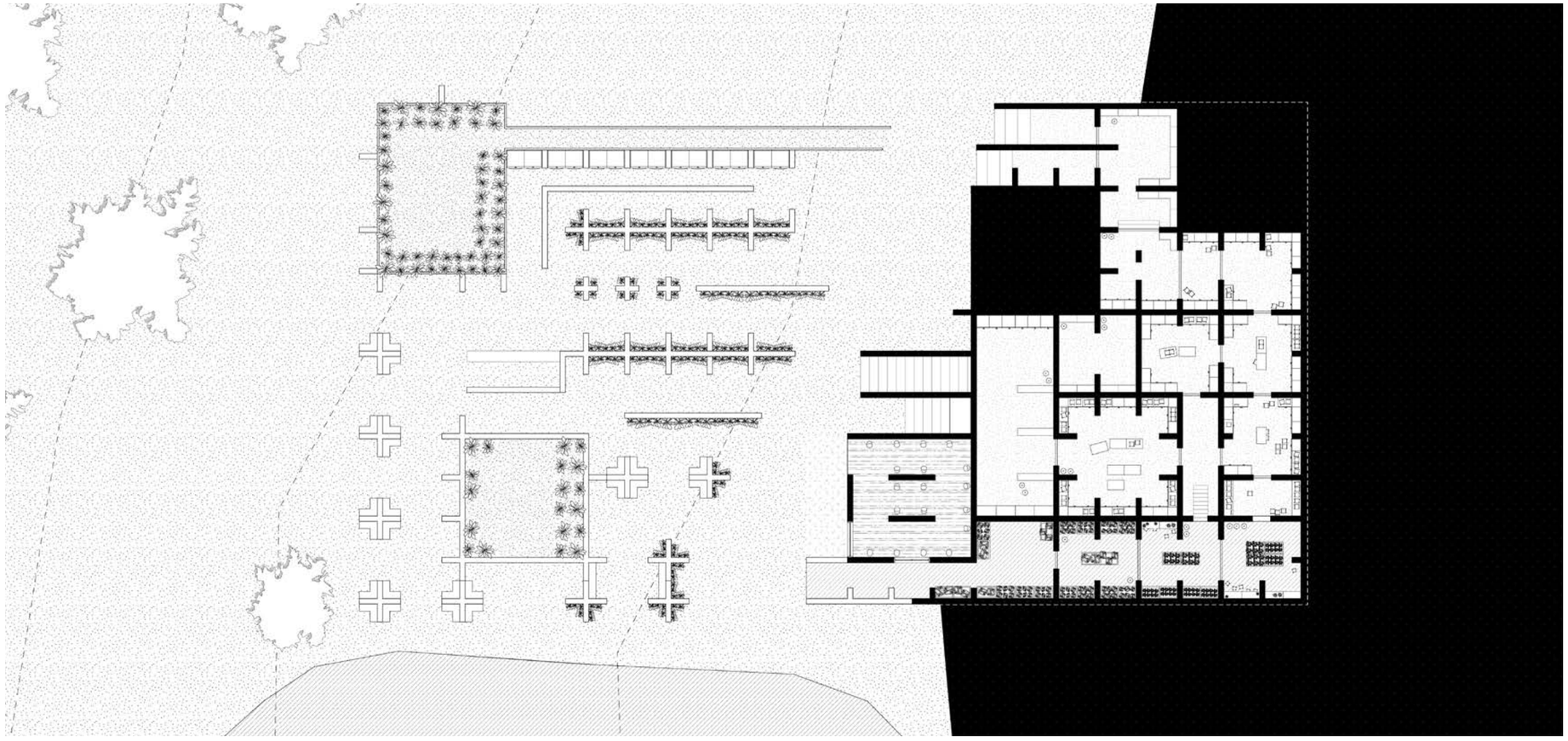
On the northern end of the site subtraction is the primary formal movement and the existing ground conditions define the interiors of storage spaces. On the southern end of the site addition is the primary foma movement.





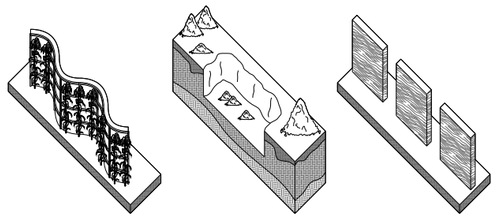
Below ground, excavated units house a series of root cellars, cold storage rooms and green houses. In contrast to building by subtraction, additive earth walls on the southern site accommodate fruit walls, a community kitchen, and collective educational spaces.



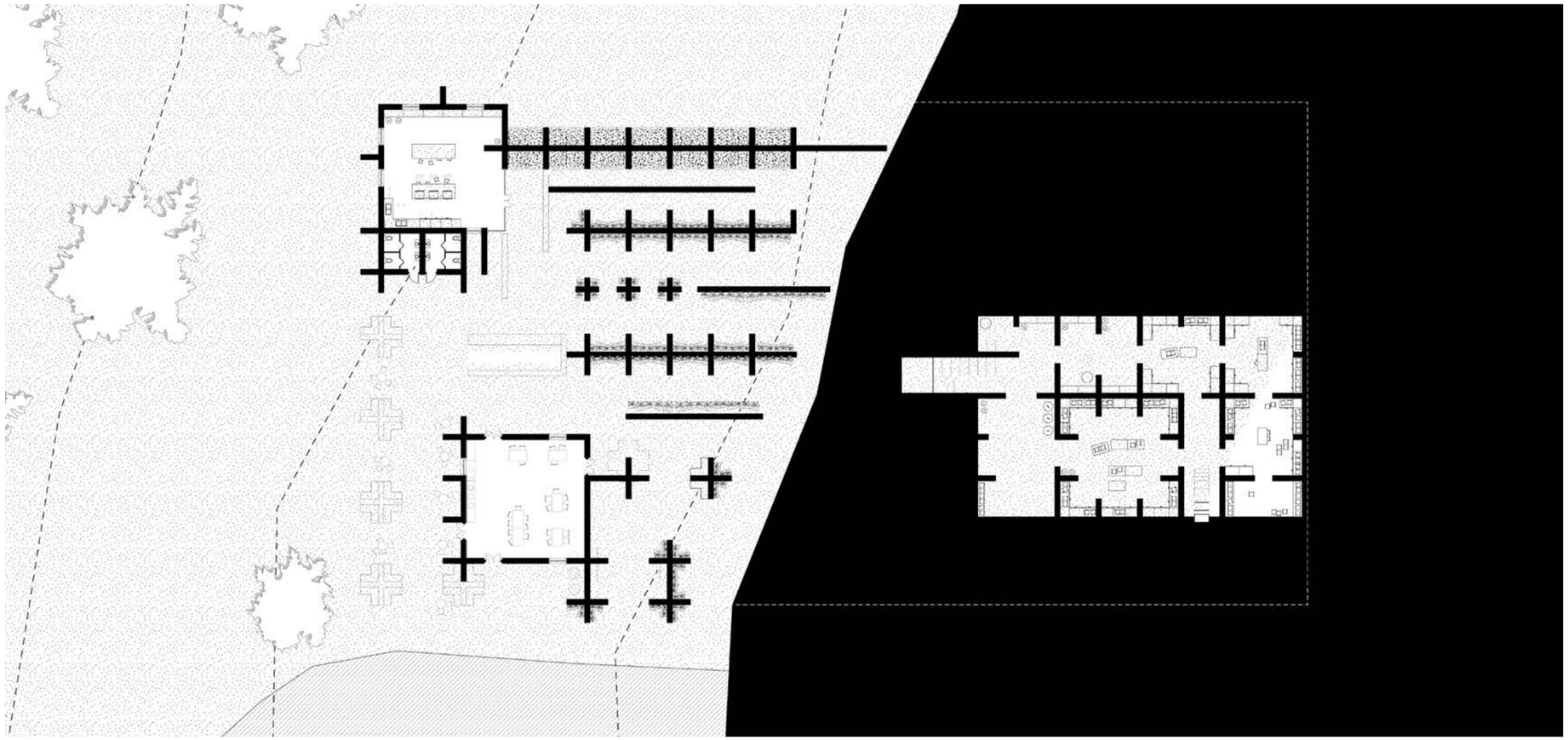


In the near term, one excavated root cellar for a vaccine cold storage and 4 rapidly deployable vaccine pavilions are constructed above ground. These pavilions house a sequence of waiting areas, screening clinics and vaccination pods.

In the distant future, the site expands below ground to utilize the earth's insulation properties to store agriculture. Using a mixture of passive and mechanical interventions, varying temperatures throughout the underground cellars create hot-dry to very cold-moist conditions depending on the crop.



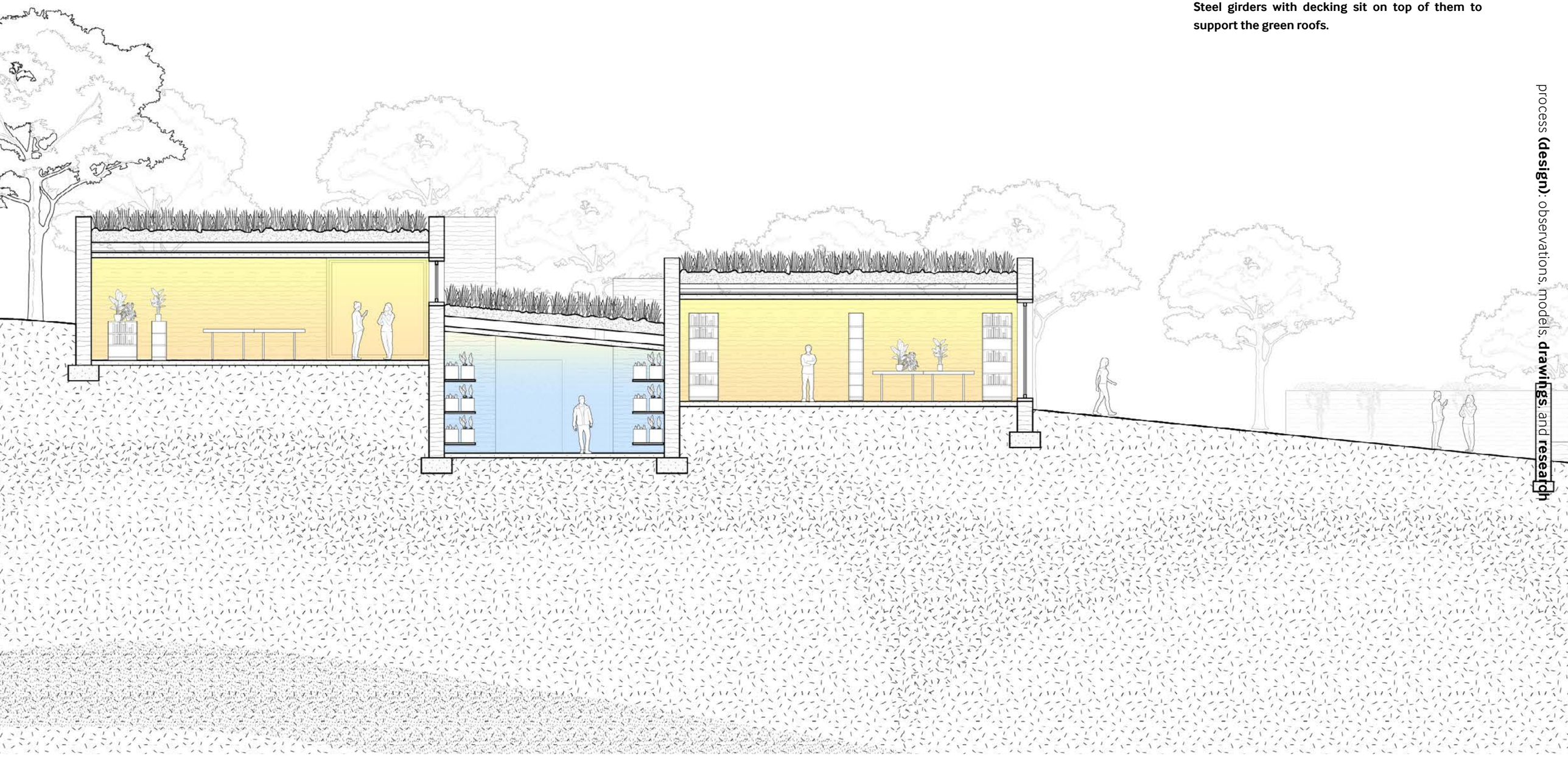
Addative: Fruit Walls | Subtractive: Excavation | Cut & Fill: Rammed Earth Walls



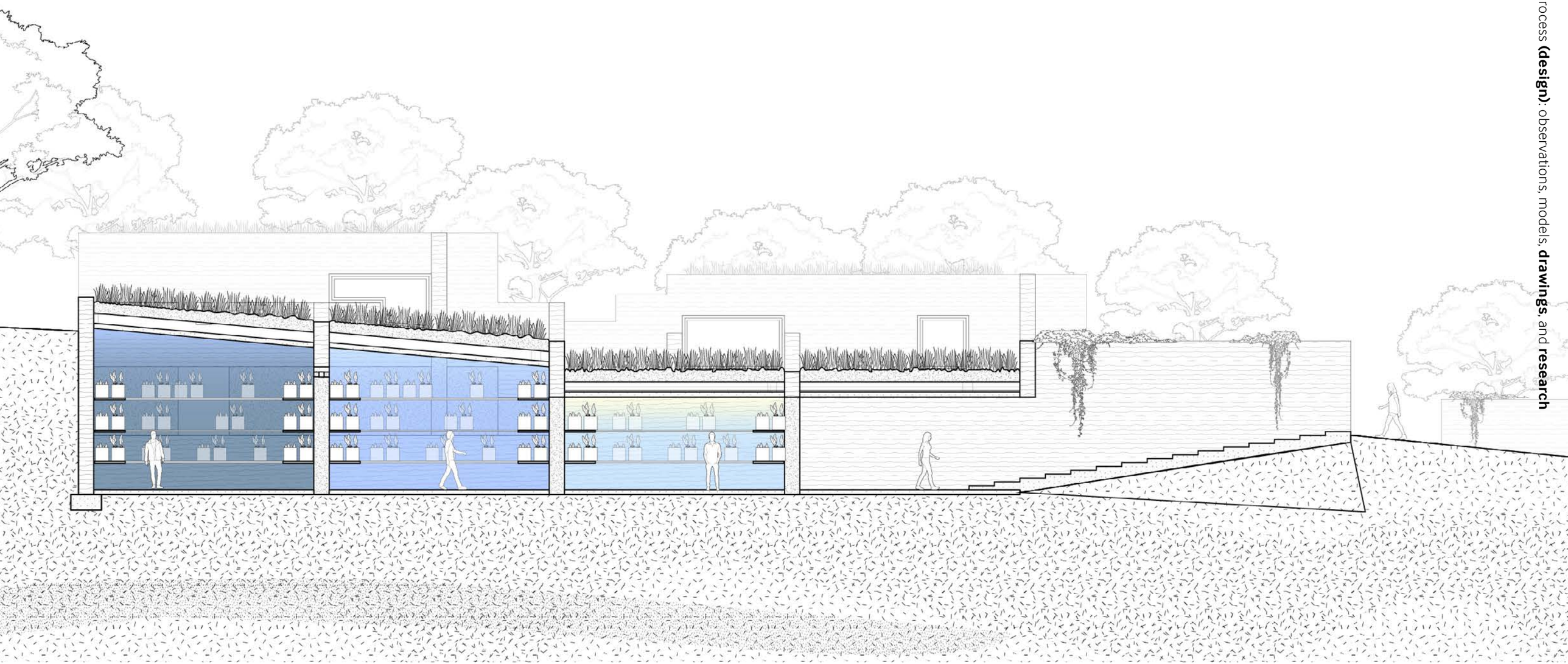
On the northern end of the site subtraction is the primary formal movement and the existing ground conditions define the interiors of storage spaces. On the southern end of the site addition is the primary foma movement.

The greenhouse spaces are located along the southern end of the site and have clear roofs that meet the slope of the ground to maximize their thermal gain from direct sun exposure. These spaces expand our agricultural program to support education events to keep the local community engaged long after the vaccine rollout ends.

The backmost cellar is 20ft deep and stays at the average year-round temperature of 50-60F. Soil walls are excavated and retained with a wire mesh system. They are capped with rammed earth walls. Steel girders with decking sit on top of them to support the green roofs.



The passive cooling capacity of root cellars as an opportunity to support vaccine storage in our near-future program and crop storage in the distant future. Placing vaccine refrigerators in steady passive environments can help reduce its energy demand, and support this shared infrastructure needs.



the Resilience of Local Food Systems in the Hudson Valley

spring 2021 conflict urbanism
in collaboration with c. maxwell, a. vosburgh, & h. black

In 1970, Henry Kissinger remarked that "[when you] control food, you control the people." While food can transcend cultural boundaries, it is also a site of conflict. Through the lens of infrastructure, our research focuses on how the Covid-19 pandemic has exacerbated food insecurity in the Hudson Valley, one of the most agriculturally rich regions of New York State. The Hudson Valley is home to 4969 farms, yet 1 in 10 people are food insecure (Feeding New York State). Why does a food desert exist in such an agriculturally wealthy region? What are methods for creating food sovereignty? How is food being utilized as a tool of soft power?

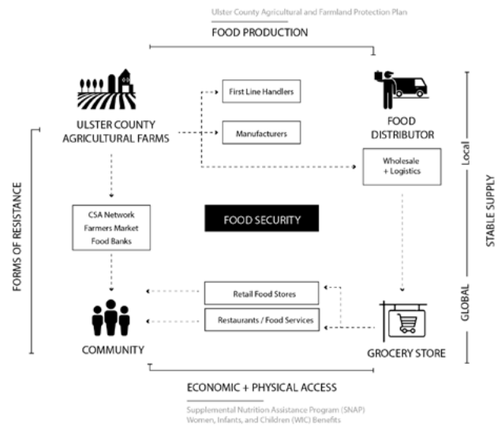
Food infrastructure is the foundation required for the production, processing, storage, distribution, retailing, consumption, and waste management of food within the local system. It exists as a tightly centralized network that expands into globalized distribution threads. While food infrastructures promise development and stability, their breakdowns reveal unsustainable notions of progress and economic growth. This tension, between promise and failure, makes infrastructure a productive locus for analysis. In investigating the Hudson Valley's local struggles, we hope to reveal broader systemic fractures within the US food system. Our government has prioritized capital over sustainability, and we are now seeing the repercussions of that prioritization in climate change, food insecurity, and environmental degradation. The COVID-19 pandemic has further illuminated how fragile we are as a species and provided a window to reflect and reorient our relationship with the world. What can food teach us about recovering from the pandemic and evolving as a species? In what ways does food infrastructure conceptually and physically perform in the staging of capitalist narratives?

Infrastructure networks facilitate the flow of goods and allow for their exchange over space. These systems simultaneously reveal forms of political rationality and give rise to an "apparatus of governmentality" that shape their terms of access. Through these modes of production, consumption and governance, the city, its residents and resources can be reimagined as new relational territories which reveal systems of inequity and inaccessibility. The theoretical framework of infra-politics is a helpful lens to guide our analysis of the food system, an infrastructure network, and food insecurity, a form of "apparatus of governmentality" with direct ties to systems of inequity. By definition, food security in a region depends on three factors. Does the region produce enough food for its people? Is the food supply stable? Do people have physical and economic access to food? In the U.S., where the food supply is abundant and stable, access to food is the primary concern. (New York City Council). Food access, or inaccessibility, is reinforced by a highly centralized industrial food system designed to produce large amounts of food quickly and inexpensively. However, the pandemic has revealed the vulnerabilities embedded within this process of essential workers who produce and package, to the communities who cannot access these products. In urban and rural communities throughout New York State, structural inequities have contributed to neighborhoods that are predominantly low-income communities of color having less access to healthy food and experiencing greater food insecurity and food-related illnesses. The policies and government programs which respond to food insecurity are designed to reduce the highest statistics of hunger, rather than addressing the systematic factors of inequity which produce them. As a result, the separation of hunger from its socioeconomic context has trivialized the relationship between "the restructuring of land, labor and industrial farming and its effects on access to healthful food. (Leblanc, NY Times)"

Covid-19 has added significant stresses to our already weak food infrastructure. By examining this infrastructure and the injustices within it, our work will begin to call out the systemic issues in the larger food system. The argument for a local, sustainable, and just food system will emerge through the analysis of inefficiencies and weaknesses in the existing food infrastructure. Studying past agricultural policy's effect on the farming landscape will show how policy change in favor of corporate farming has left our food system less prepared for natural disasters and climate change and a policy shift is needed. Studying the food infrastructure between Hudson Valley and New York City shows the connection between rural and urban and will begin to inform where these weak points exist on a larger scale. Drawing on the city's dependency on the Hudson Valley foodshed will promote a preservation of farmland and investment in a more robust infrastructure.

Infrastructure networks facilitate the flow of goods and allow for their exchange over space. These systems simultaneously reveal forms of political rationality that shape their terms of access. While food infrastructures promise development and stability, their breakdowns reveal unsustainable notions of progress and economic growth. The tension between promise and failure makes infrastructure a productive site for analysis. This diagram illustrates the increasing vulnerability of food the further it travels from its source and the apparatuses of infrastructural dependency embedded within food systems. A select few corporations have monopolized these networks, so when one fails, the ripple effects are felt throughout the country. This is the reason why most food has to travel at least 100 miles to be stocked right next to its source in Ulster County. In contrast, short food chains are being established, such as community supported agriculture, farmers markets, and food banks. This following research looks further into these grassroots organizing efforts and their fundamental role in the Hudson Valley's food supply chain.

Ulster County provides the framework for studying these issues surrounding food insecurity and infrastructure. Located 100 miles from New York City, Ulster is a center of food production, but has a higher than average food insecurity rate in the state. In Ulster County, food insecurity is compounded by barriers in relation to housing, employment, health, transportation, and legal status. In order to spatialize the demographic distribution of the county, the population per square mile census data were considered. The densest region of the county sits around Kingston, the county seat. To better understand the distribution of rural communities across the county, the metric of aggregation of households per census tract was determined. The demographic composition of the county is 78% White, 6% Black, and 11 % Hispanic.



The presence and distribution of these population densities overlap with the residential land use across the county which is distributed in its central and northern areas. A heavy presence of commercial use sits in the center of Ulster and is typically open to development. To preserve the county's agricultural identity, the New York State initiated a Certified Agricultural District Program to encourage the use of land farming. These agricultural districts overlap with residential and commercial land uses; however, inclusion into the agricultural district program allows for legal protections of agricultural activity. Food security in a region depends on three factors: the sufficiency of production for its people, stability of food supply, and people's access to food. Access to nutritious food is defined in two ways: physical and socio-economic access. Even though physical access is widespread in New York, food insecurity is still rampant across the state. Food access or inaccessibility is reinforced by a highly centralized industrial food system designed to produce large amounts of food quickly and inexpensively. In urban and rural communities throughout New York State, structural inequities have contributed to food insecurity, food-related illnesses, and difficulty in accessing healthy food of low-income communities of color. Shown here is farmland and areas lacking food access, which is defined as access to grocery stores within ten miles for rural areas and one mile for urban areas. Kingston is a generous area to study food insecurity and infrastructure in more detail with its abundance of local farms working with food pantries on one end of the spectrum and the large national chain grocery stores on the other.

Forms of resistance to corporate supply chains include grassroots organization, local food pantries, community fridges, farmers markets, and meal delivery services. When corporate supply chains such as Walmart collapsed during the Covid-19 pandemic, local systems were able to continue operating which created community resilience despite the circumstances. How does food infrastructure perform as a tool of soft power? Our research illuminates the increasing vulnerability of food the further it travels from its source and the apparatuses of infrastructural dependency embedded within the Hudson Valley food system. By examining infrastructure and the injustices within it, we hope to render visible the systemic issues present in our broader food systems. The Covid-19 pandemic has exacerbated the inefficiencies and weaknesses within corporate food infrastructure, so the argument for a local, sustainable, and just food system becomes critical for our shared future.

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"Growing Food Equity in New York City." Data Team, council.nyc.gov/data/food-equity/.
"Overview." USDA ERS - Food Security in the U.S., www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us.aspx.

GSAPP FALL 2021
ADV V STUDIO
'RESET'

PROFESSOR
DAVID BENJAMIN

FARM TO ADU

regionalizing a rice straw supply chain for affordable housing

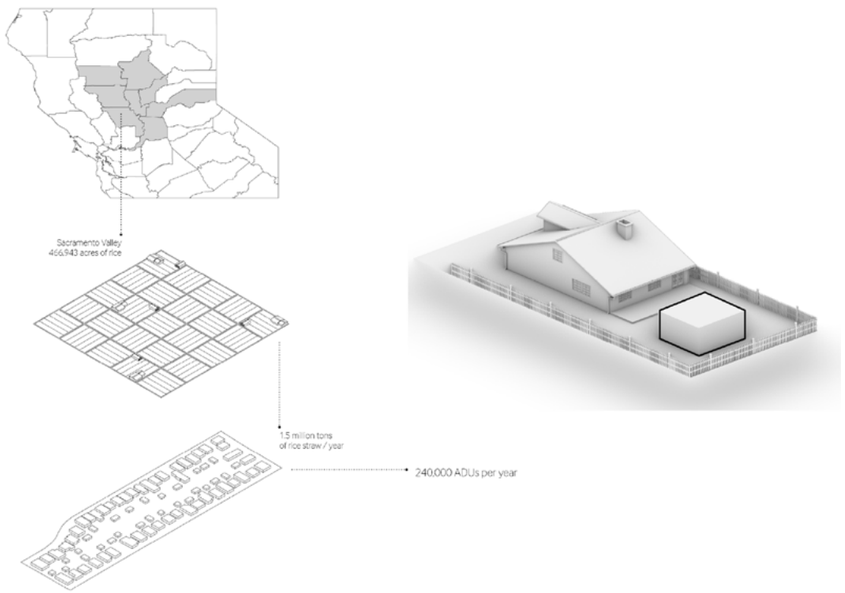
The Sacramento Valley, an agriculturally abundant region, sits adjacent to an urban core in critical need of affordable housing. 'Regenerative Regionality' reimagines this spatial proximity between resource abundance and housing deficiency.

500,000 acres of planted rice cultivate the highest yield in the world, and also produce a waste stream of 1.5 million tons of rice straw each year.

In the same region, low density zoning covers 70% of Sacramento's urban land use, a critical factor of the statewide housing crisis. The governor's office estimates 3.5 million more homes need to be constructed by 2035. In order to combat this issue, the state enacted a policy to legalize accessory dwelling units – small standalone residences that are built on properties zoned for single family homes.

This regional initiative was catalyzed by a municipal Farm to ADU community development program. The strategic plan lays the groundwork for connecting stakeholders, giving farmers and communities' access to sources of funding and legal counsel, but also opportunities to engage architects and other building experts. The policy promotes the architect's changing role, in designing the flows of capital, energy, and material production, necessary to achieve climate targets.

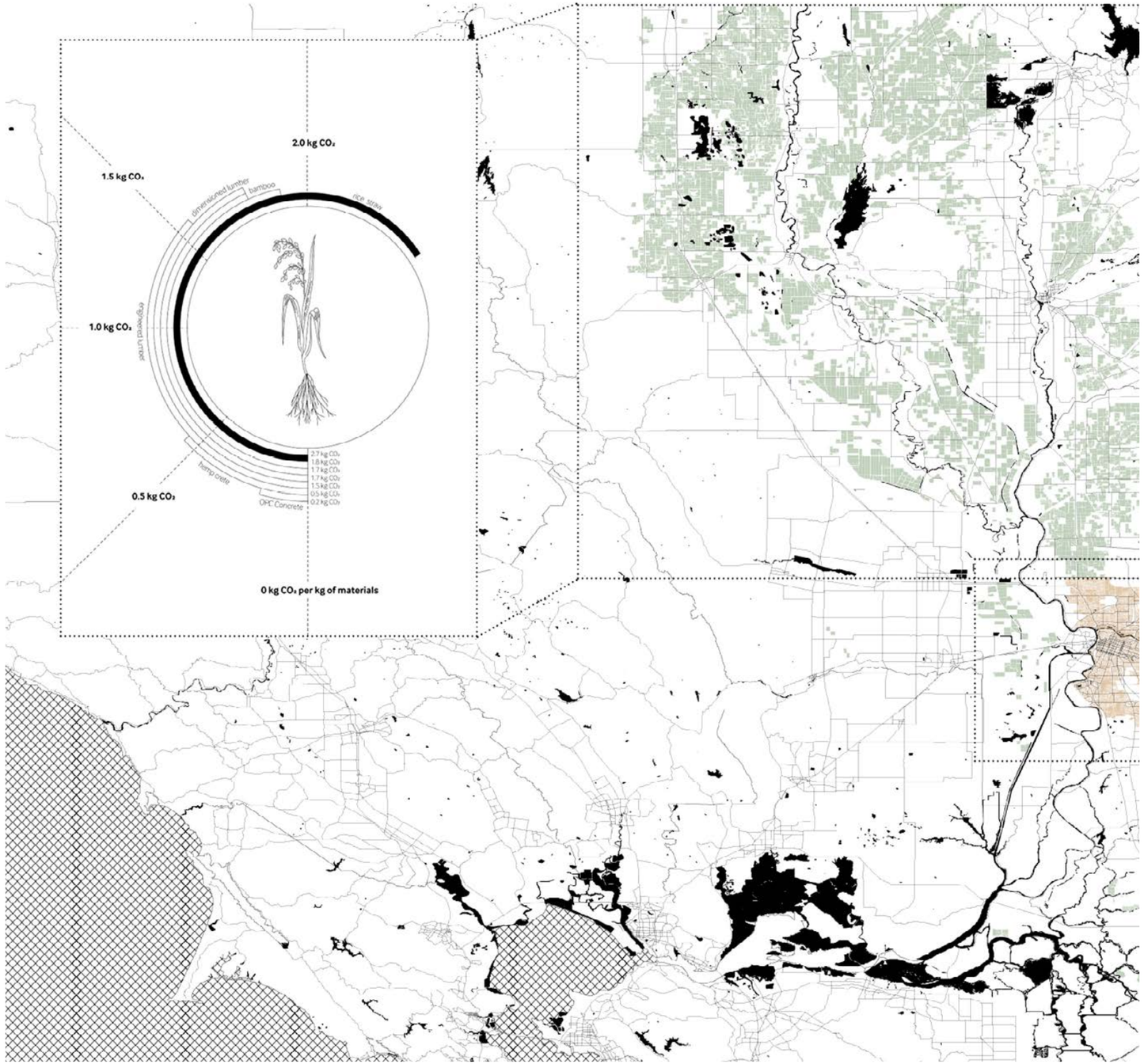
View of rice crops in



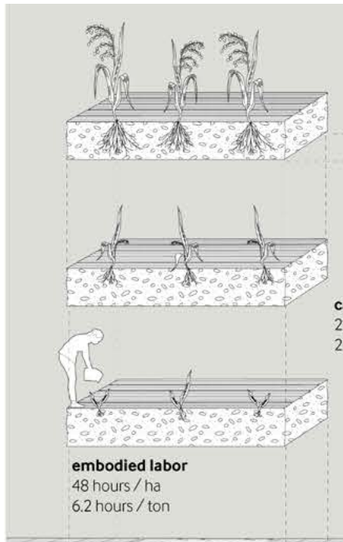
This project traces the infrastructural and land-use impacts of transferring rice straw to the urban environment. How many ADUs can we build with 1.5 million tons of rice straw per year?

The material flow spans state, regional and neighborhood levels, and builds on California's growing efforts to embrace sustainable waste streams by reimagining a regional supply chain.

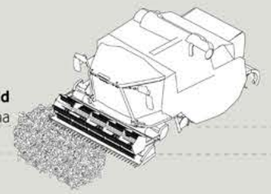
Overall, **the short life cycle and high carbon sequestering potential of rice plants provide an efficient way to draw down carbon and store it indefinitely within the walls of homes**. On average, 9306 kg CO2 per hectare will be captured as stored carbon. Simultaneously, 240,000 units of ADUs can be created per year from the existing waste volume. This allows the state to lay the foundation to develop 2.4 million ADUs by 2030, while achieving multiple social, economic and environmental bottom lines. But this is only possible if architects, farmers, policy makers, and community members contribute interdisciplinary cooperation to develop material, labor and building systems.



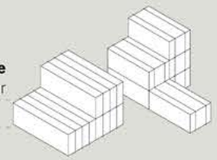
Mapping agricultural land use with rice crops in the Sacramento Valley, which sits just north of the city's single family, low density land use zones.



annual yield
9.5 yield ton / ha



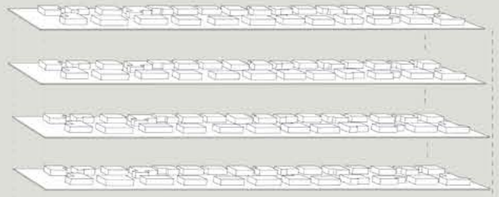
agrowaste
1.5 million tons per year



carbon sequestration
2.7 kg CO_2 per kg of yield
2449 kg CO_2 per ton of yield

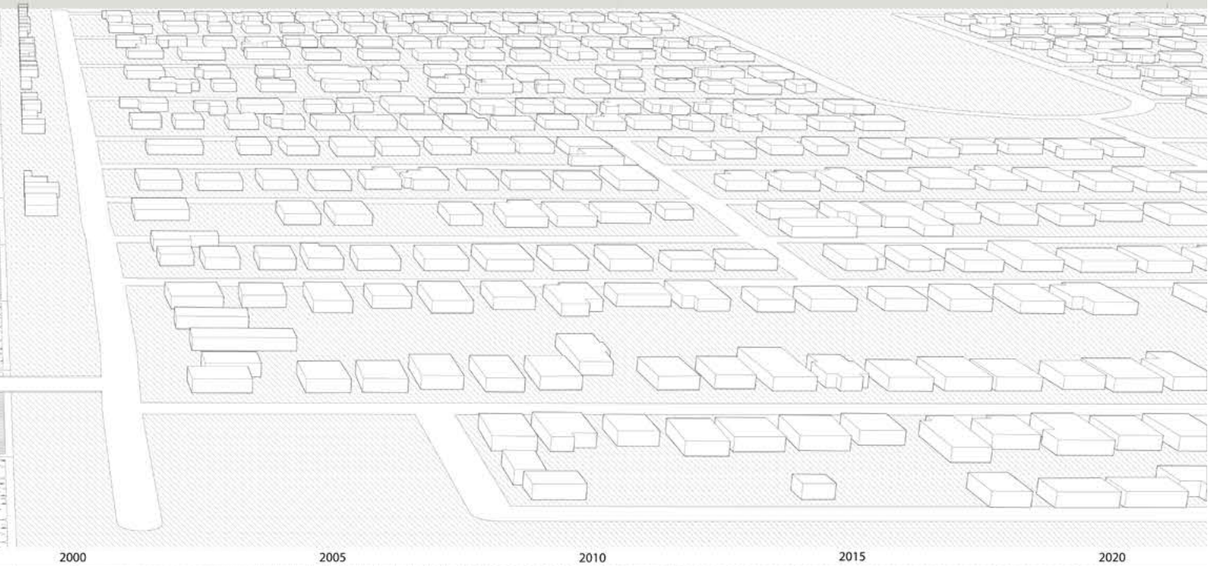
embodied labor
48 hours / ha
6.2 hours / ton

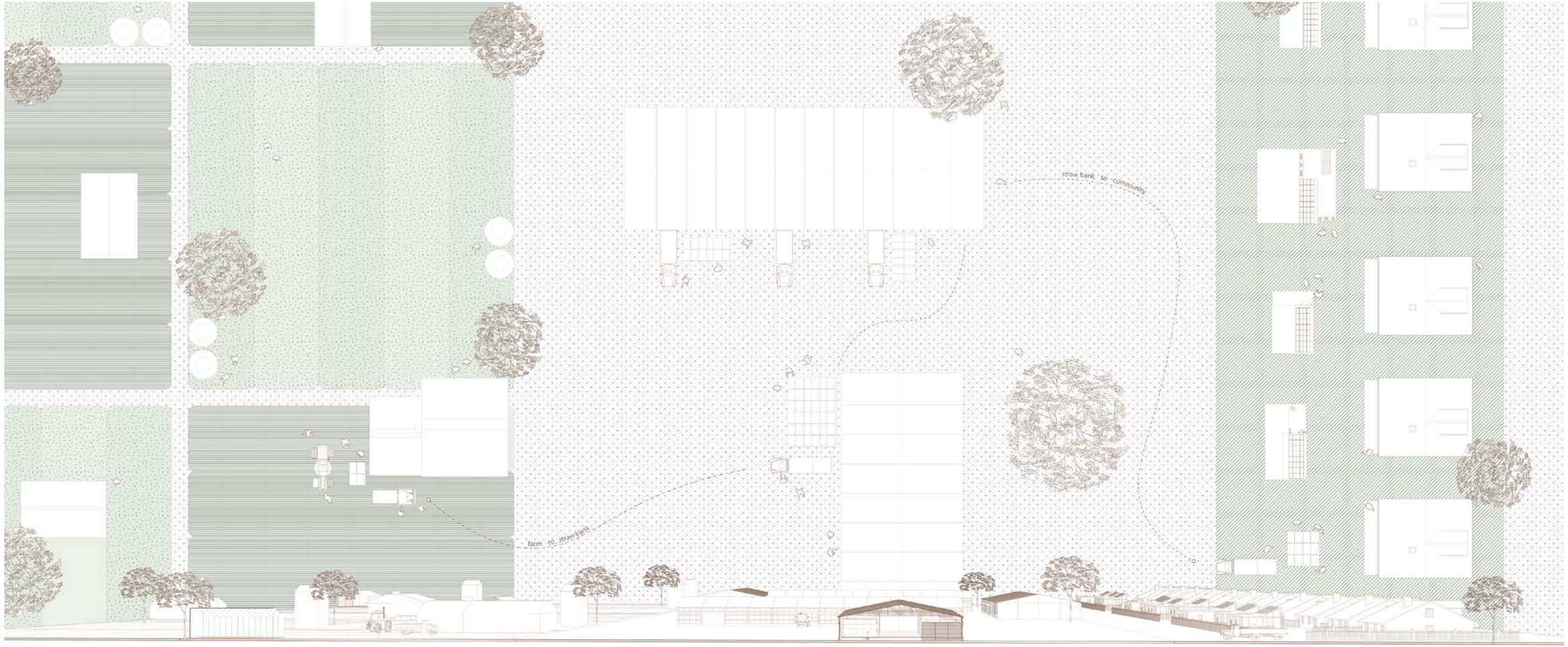
ADU legislation 2017
2.5 million new units are possible
to build in terms of permitted space

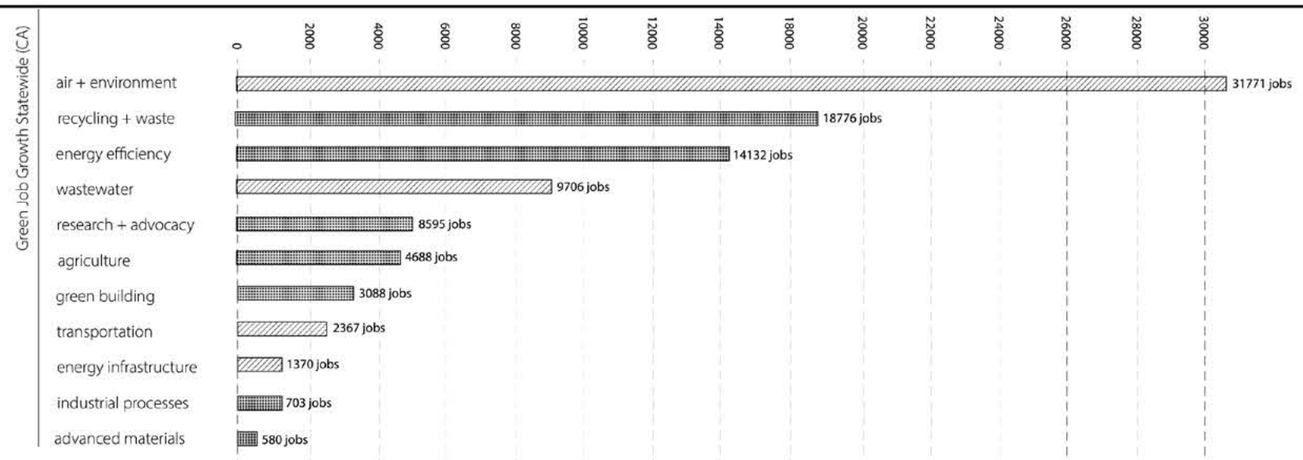


housing demand
3.5 million by 2035
85,000 units per year

land use
70% low density
single family residential

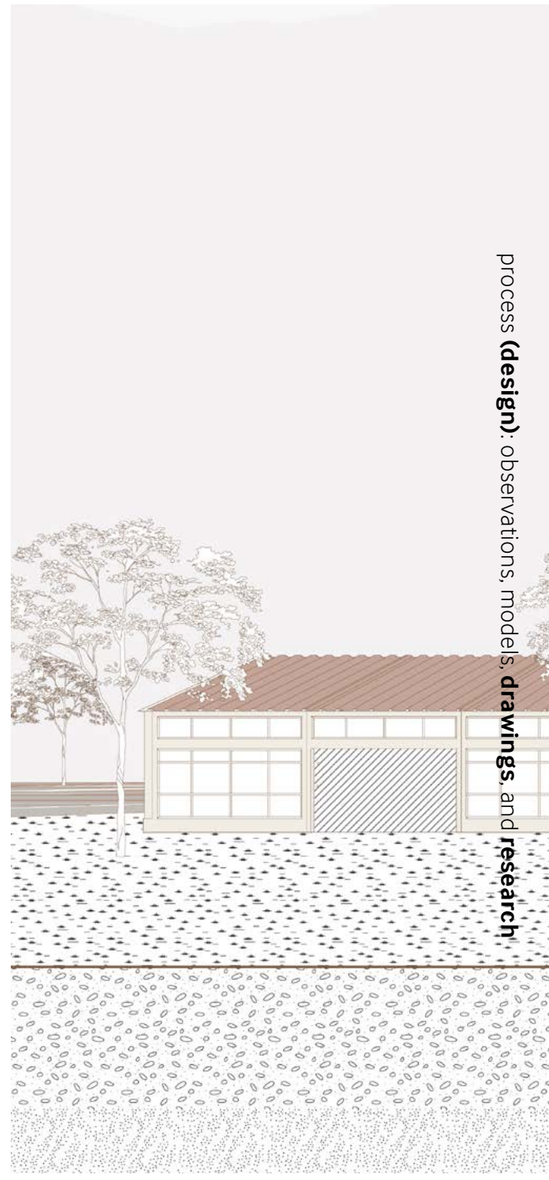



straw bank to community
farm to straw bank
state
regional
neighborhood


Green Job Growth Statewide (CA)
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
22000
24000
26000
28000
30000
air + environment
31771 jobs
recycling + waste
18776 jobs
energy efficiency
14132 jobs
wastewater
9706 jobs
research + advocacy
8595 jobs
agriculture
4688 jobs
green building
3088 jobs
transportation
2367 jobs
energy infrastructure
1370 jobs
industrial processes
703 jobs
advanced materials
580 jobs


California Farm Bureau
2500 rice growers statewide
25000 agriculture jobs created annually
CALIFORNIA CLIMATE ACTION CORPS
300 fellows selected annually

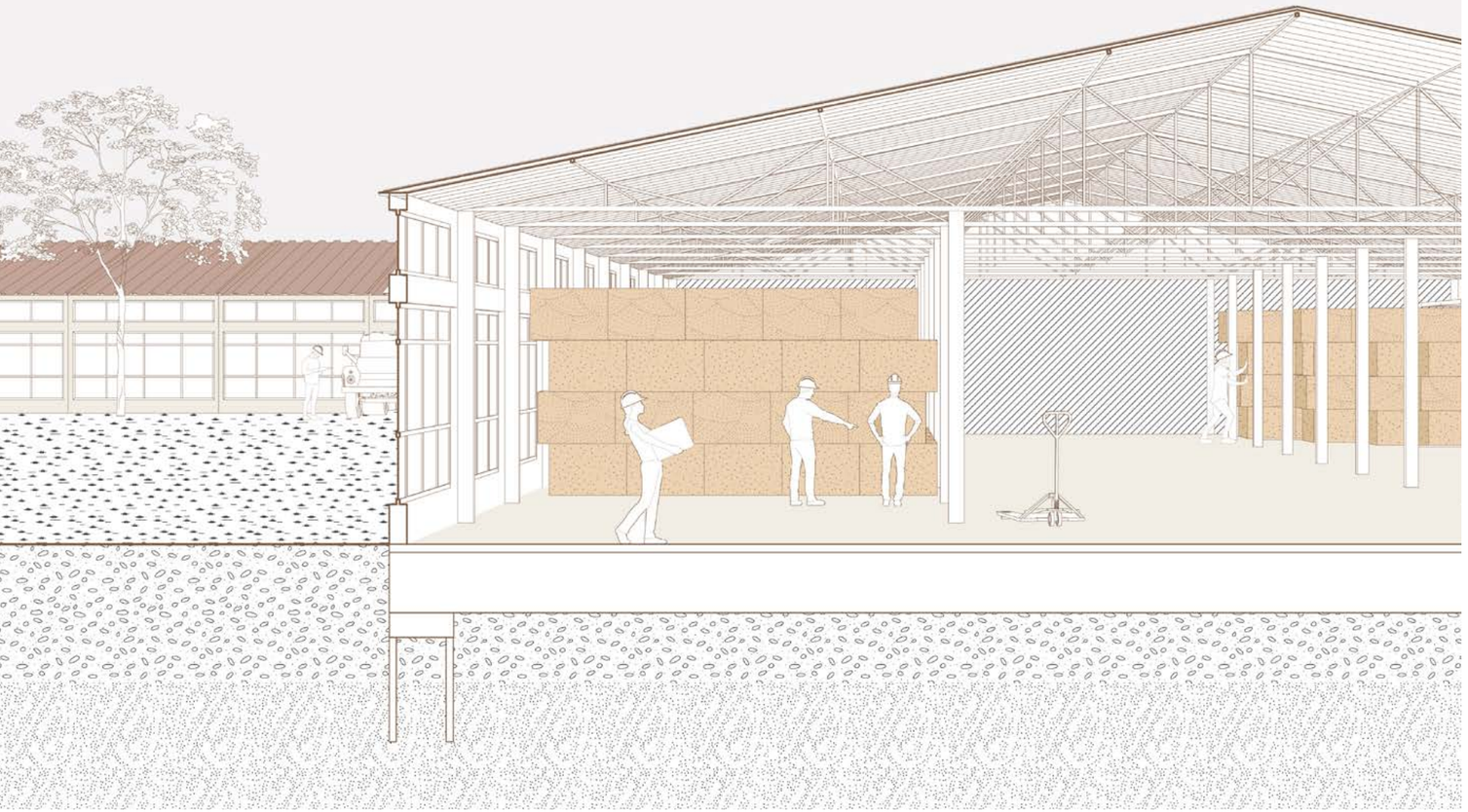
The process begins in the northern Sacramento Valley where rice is harvested, collected and densified into bales for easy transport by local farmers.



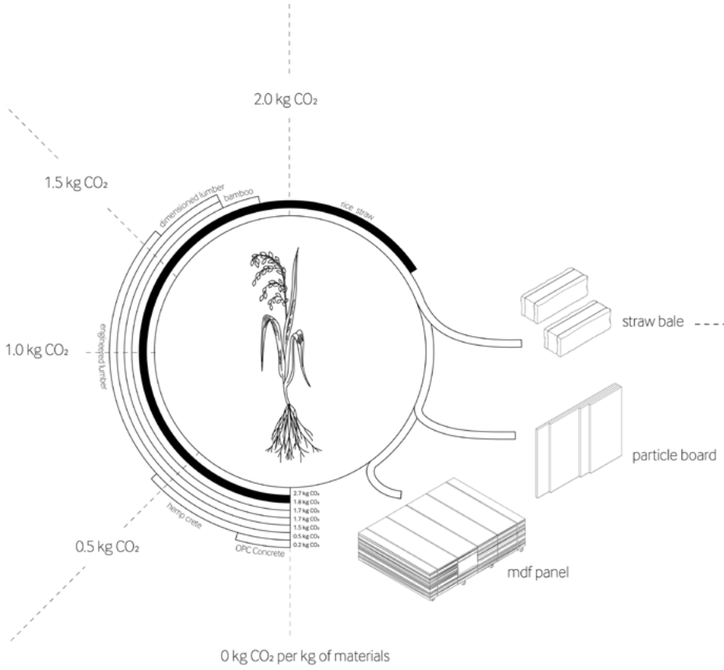
process **(design)**: observations, models, **drawings**, and **research**

Regional straw banks store the bales until they are needed for construction by workers of the California Civilian Climate Corps.

These straw bales are then transported to local neighborhoods for onsite ADU construction by community organizers and residents, initiating a process of community engagement and participatory action.



process **(design)**: observations, models, **drawings**, and **research**



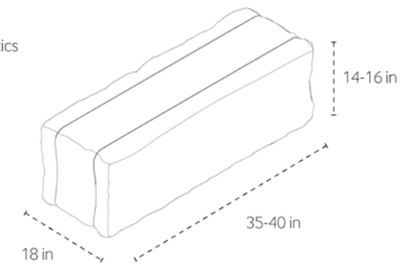
Green Building Material Research
rice straw

1 ton straw = 112,500 BTU energy required for production
1 ton concrete = 5,800,000 BTU energy required for production

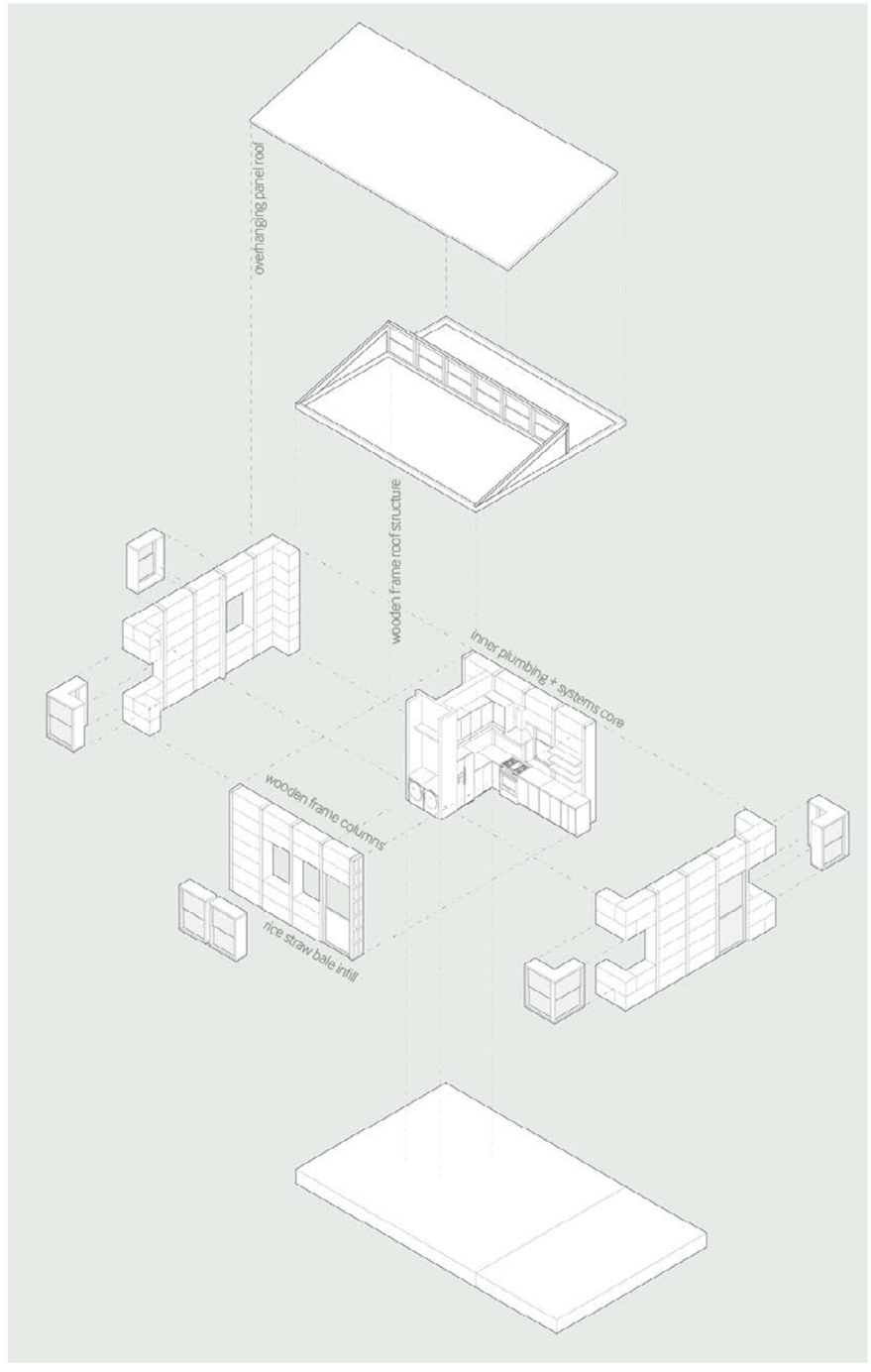
98% energy reduction during material production process

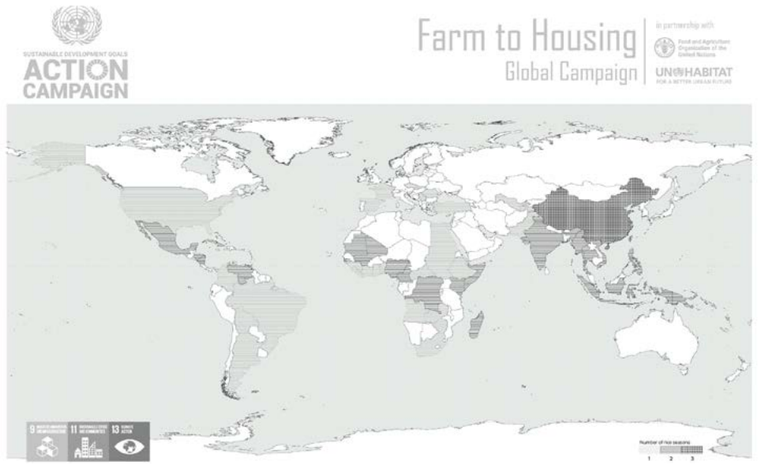
2 string straw bale material characteristics

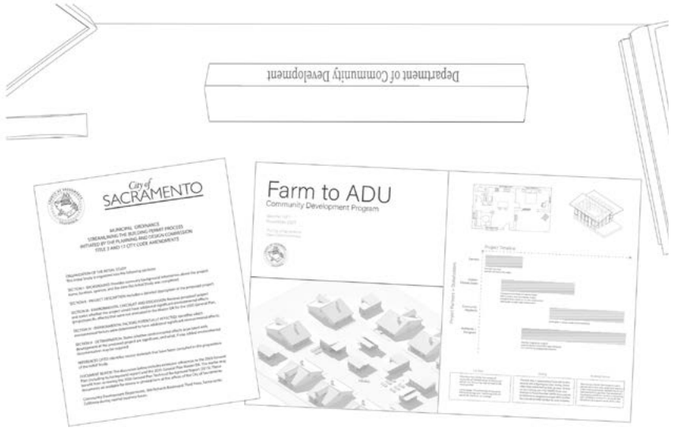
35 - 65 lbs
14% moisture limit



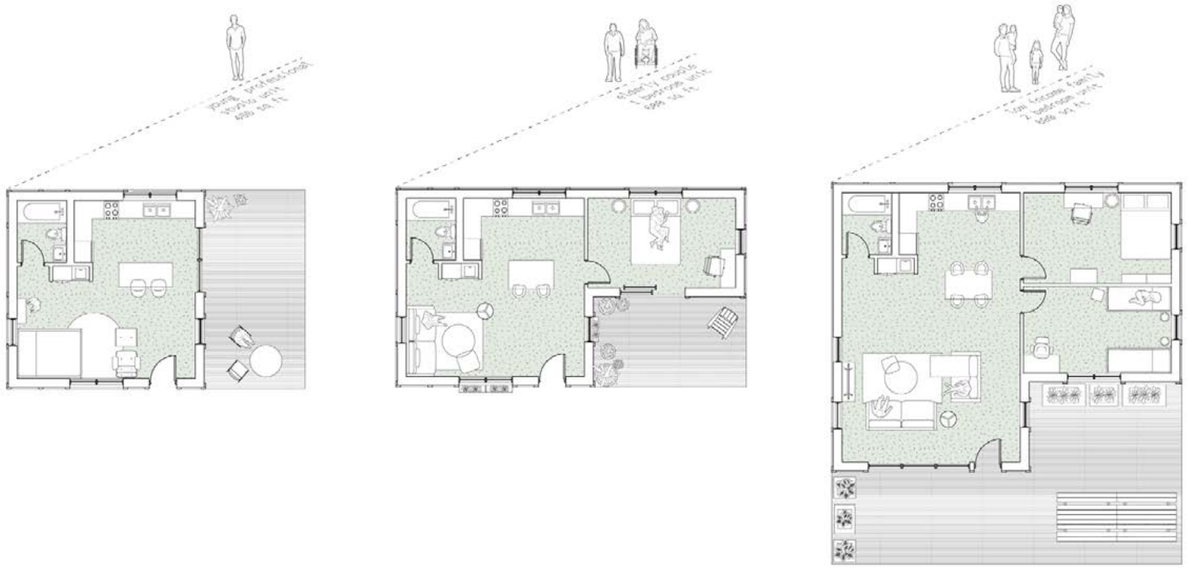
Straw bale configuration	Thickness (in)	Density (lb/ft3)	R value (R/in)
Flat (heat flow with grain)	23 in	8.3 lb/ft3	2.38
Edge - heat flot across grain	16.3 in	8.3 lb/ft3	2.96
Flat - heat flow with grain	18 in	5.2 lb/ft3	2.67







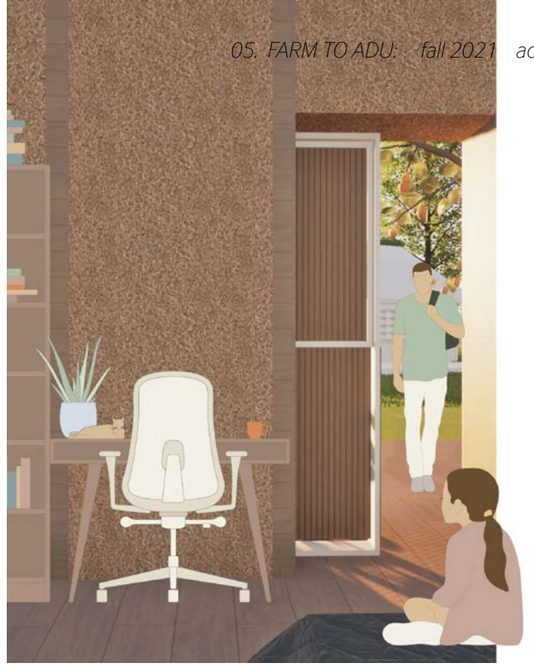
process **(design)**: observations, models, **drawings**, and **research**



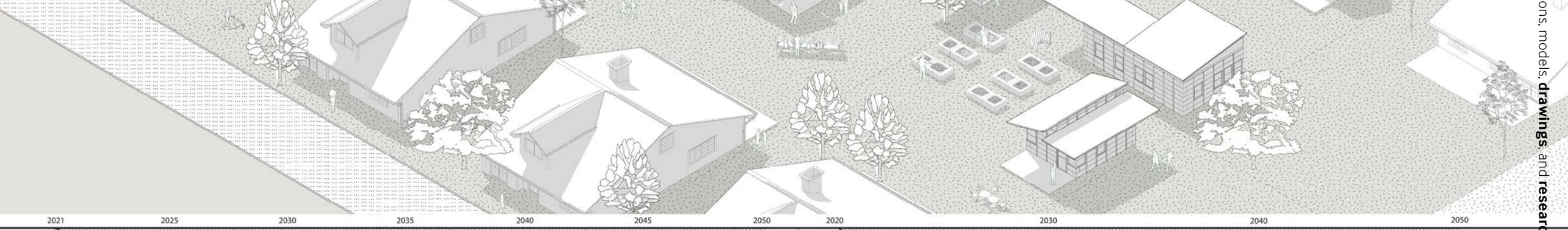
Floor plan typologies for different users.
Prototypical unit sizes of studio, 1 bedroom or two bedroom units are imagined for various types of users, such as a recent college graduate, an elderly couple or a low income family.

Yes-in-my-backyard scheme redesigns the typical single family neighborhood block
ADU development covers a need in the housing market for smaller, affordable, yet safe and healthy living spaces. Claiming the single family backyard not only increases homeowner equity, it also reimagines a future with increased density on a residential block.

The density of the straw walls provide thermal efficiency to create comfortable domestic spaces, and utilize passive design standards to reduce energy demand.



New opportunities for co-living and co-housing turn Not-in-my-backyard sentiments into positive neighborly interactions.


2021
2025
2030
2035
2040
2045
2050
7.03 million metric tons of CO_2
15.83 million metric tons of CO_2
24.62 million metric tons of CO_2
33.41 million metric tons of CO_2
42.20 million metric tons of CO_2
50.99 million metric tons of CO_2
9306 kg CO_2 sequested / ha
1.78 million metric tons CO_2 sequested / yr
Maximum Potential CO_2 Sequestered in Constructed ADUs per Year
10
20
30
40
50

2020
2030
2040
2050
2,160,000 units
4,560,000 units
1.5 million tons of rice straw / year
240,000 ADUs constructed / year
Maximum Construction ADUs per Year
1,000,000
2,000,000
3,000,000
4,000,000
5,000,000

GSAPP SPRING 2022
CORE III STUDIO
'LA WATER'

PROFESSOR
LAURIE HAWKINSON

Sepulveda Waterbasin

a climate park mediating between environmental + cultural extremes

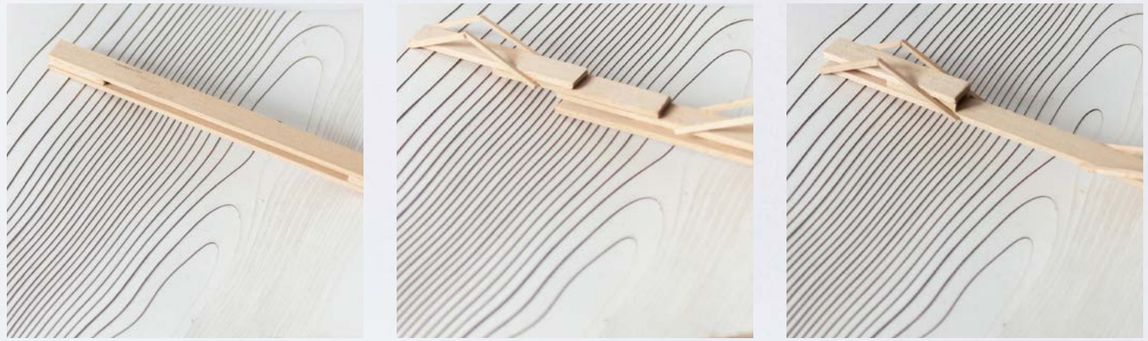
The Sepulveda Basin is a 2,000 acre federally-owned facility designed for flood management with 8 miles of the LA River running through its center. Sepulveda Dam, at the southern end of the site, was constructed in response to the historic 1938 floods which killed 144 people. One legacy of Sepulveda Dam is its large and undeveloped area in the center of the Valley, used mostly for wildlife refuge and recreation. But another legacy of the 1938 Los Angeles River flood was the channelization of all the Valley's dry washes, which along with the post-World War II rapid suburbanization left the Valley with hot, dry, concrete-lined river bottoms instead of greenbelts. The Basin is kept free of urban over-building so that water can build up there during a prospective hundred-year flood. As you can see dotted here, my site at the central south zone encompasses all of the 5-, 10-, and 100-year flood plains.

The parks within the basin serve a large population of both local and regional users – including underserved communities – with a multitude of active and passive recreational activities. The larger San Fernando Valley which is home to our site, is at risk of extreme heat, and has high proportions of limited-English speaking households and people with preexisting health conditions. These low-income communities of color are often more exposed to climate hazards such as higher temperatures and worse air quality, and have fewer resources to weather these conditions.

View of the LA River Bridge Museum from the southern banks of the LA River.

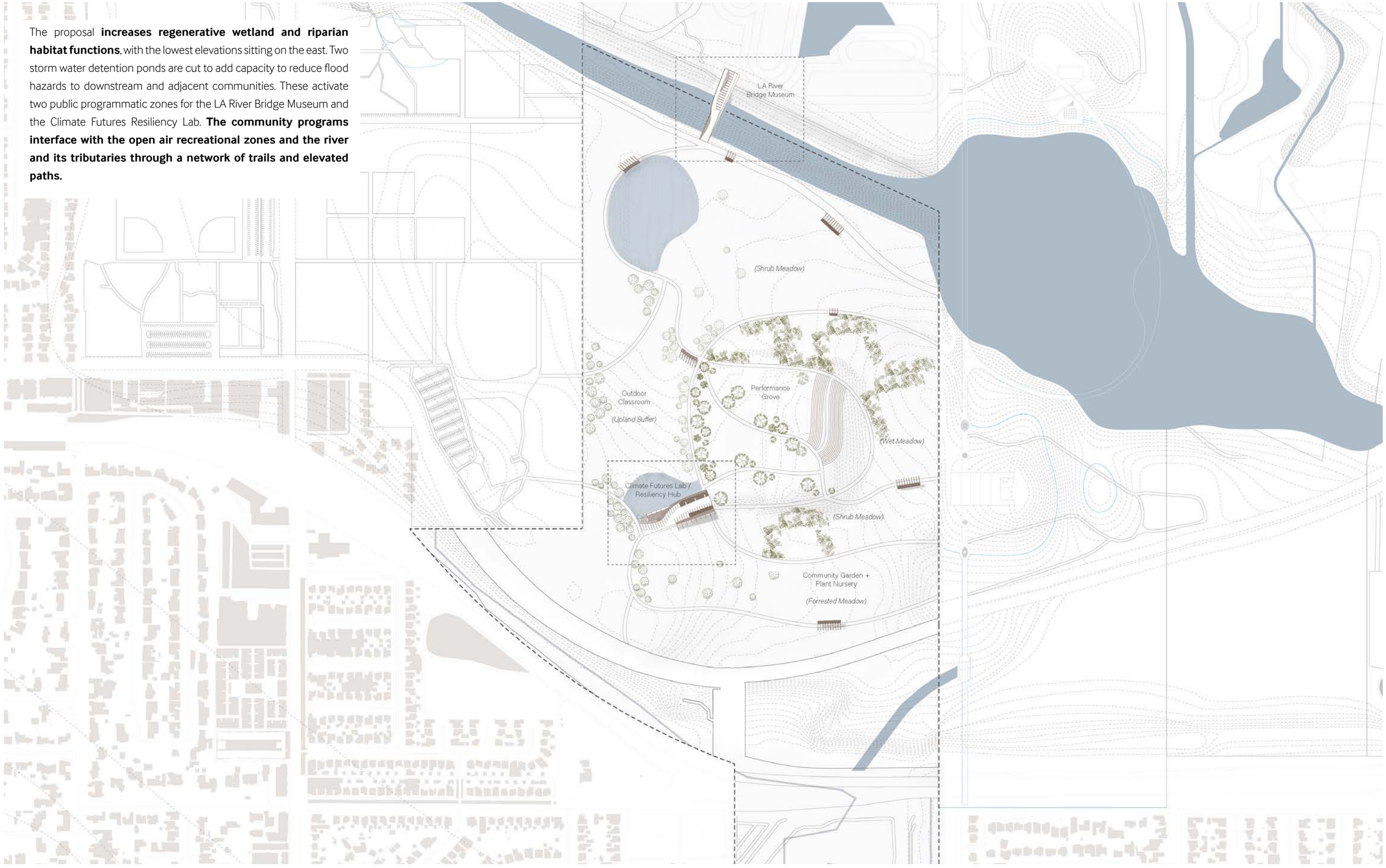
Mapping analysis of the LA River and its flood zones.

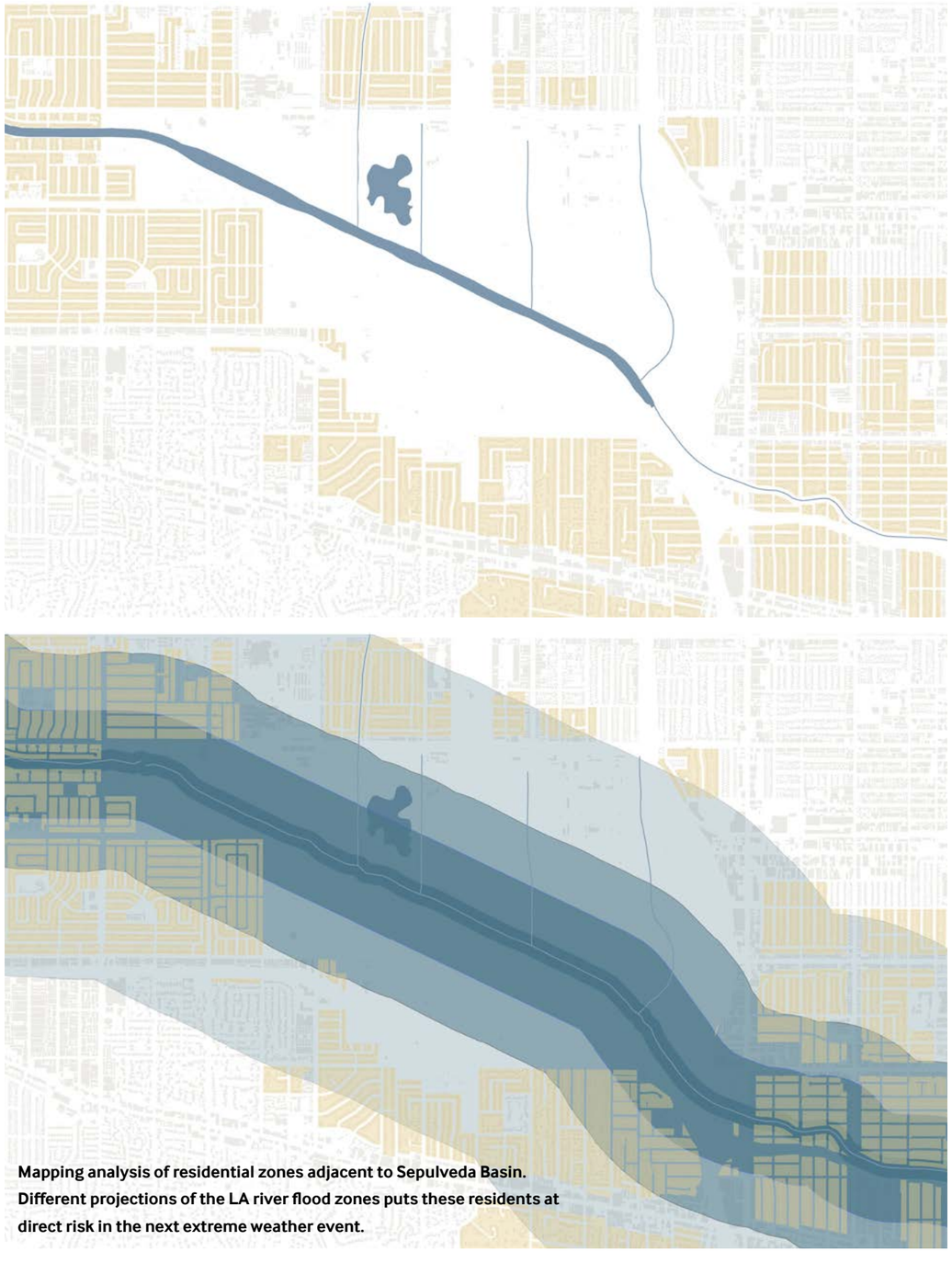
This study centers the river in its design process and aims to initiate **a spatial framework to respond to these various climate challenges**. The site is addressed through the cyclical timeline of daily recreation, extreme weather events, and recovery and resiliency, to maximize its potential to serve as a community resource. The existing landscape at Sepulveda Basin creates an opportunity to demonstrate a socio-ecological approach, one that leverages natural river processes to create self-sustaining habitat; that provides respite, relaxation, and recreation; enhances ground water recharge, and provides greater flood relief to the region.



Study models of LA River Bridge Museum over its topographic context.

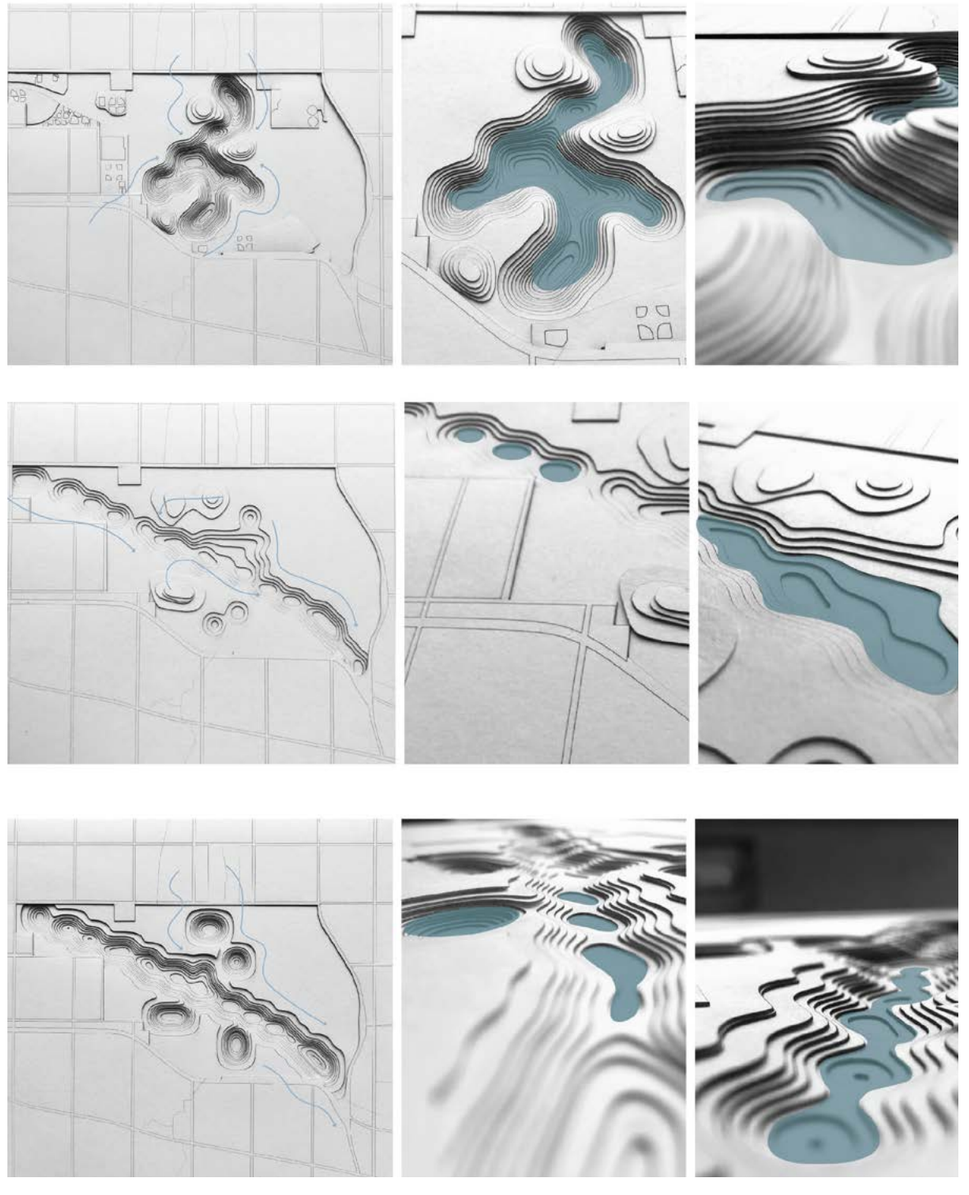
The proposal **increases regenerative wetland and riparian habitat functions**, with the lowest elevations sitting on the east. Two storm water detention ponds are cut to add capacity to reduce flood hazards to downstream and adjacent communities. These activate two public programmatic zones for the LA River Bridge Museum and the Climate Futures Resiliency Lab. **The community programs interface with the open air recreational zones and the river and its tributaries through a network of trails and elevated paths.**



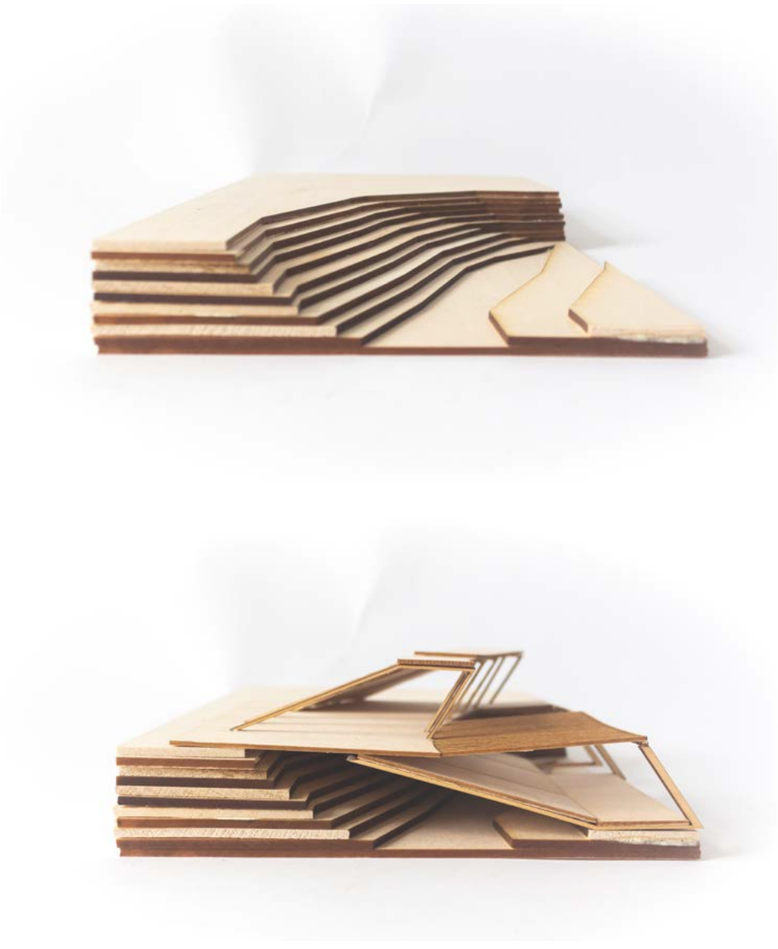


Mapping analysis of residential zones adjacent to Sepulveda Basin. Different projections of the LA river flood zones puts these residents at direct risk in the next extreme weather event.

Water, sediment and vegetation work together to shape and maintain healthy stream corridors through two primary processes: erosion of existing landforms and deposition of new materials to create new landforms. These corridors, from stream to floodplain extent, accommodate the extremes of floods and droughts, expanding and contracting accordingly.

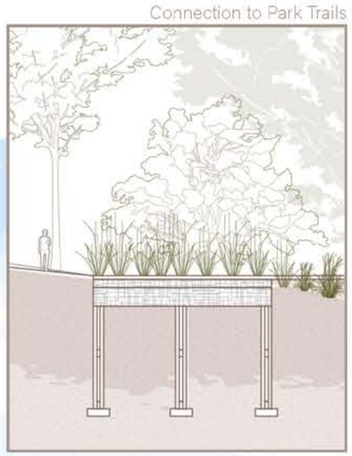


Study models of topographic cut and fill design schemes to retain water on site.



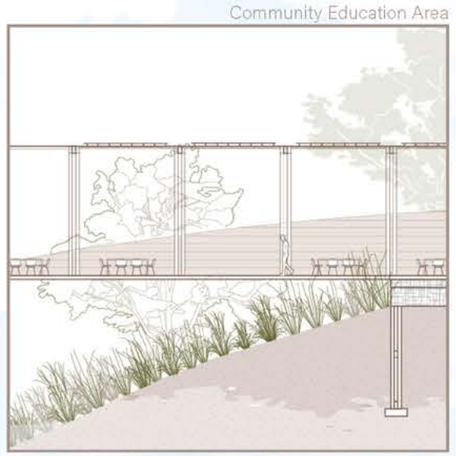
The Climate Futures Lab and Resiliency Hub mediates the ground section between the cut retention pond and existing slope condition. The sectional levels are submerged in water at various levels during flood events, and house educational public programs on climate risk and ecology.

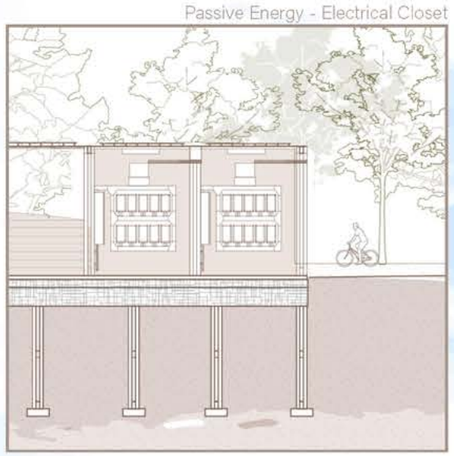
The Bridge Museum Acts as a programmatic and infrastructural connector for pedestrians and cyclists who want to cross to the northern side of Sepulveda Basin. The truss system allows for both the structural support to elevate the bridge, as well as the formal design of its museum program.


Connection to Park Trails


Overpass / River Outlook


Bridge Museum Exhibition Area


Community Education Area


Passive Energy - Electrical Closet

The LA Bridge Museum during a low tide event.
Visitors can experience a closer view of the river from the lowered outlook area.

The LA Bridge Museum during a high flood extreme rain event.

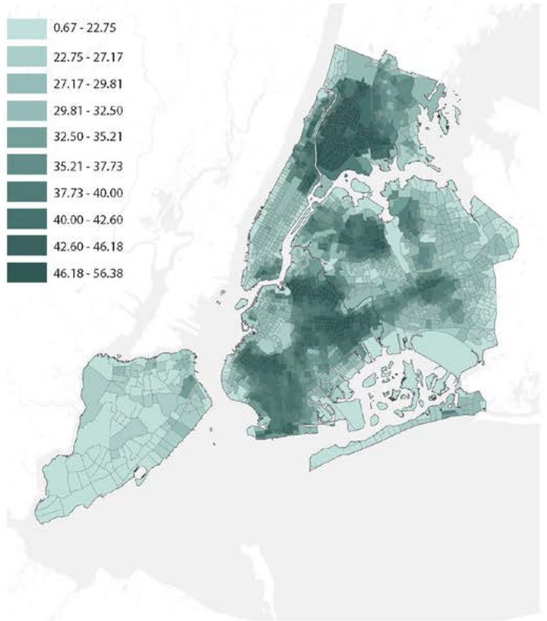
MAPPING CLIMATE CHANGE VULNERABILITY

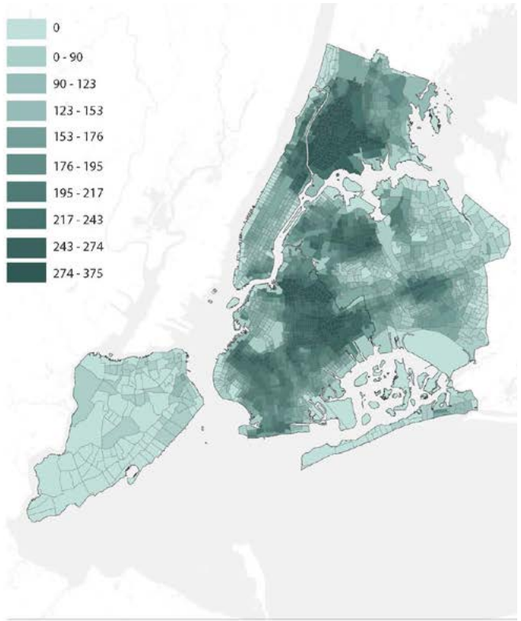
fall 2018 geographic information systems
in collaboration with c. ghosal & j. watkins

1.5C Climate Action Plan, enacted by executive action in 2017, aligns New York City with the goals of the Paris Climate Agreement. This climate change policy outlines strategies to mitigate greenhouse gas emissions and build resiliency against the projected impacts of climate change. Regionally, New York City will face increased sea levels, flooding, and stronger weather events. Recent storms such as Hurricane Sandy are indicators of the frequency and extent of this potential risk. The impacts of climate risk disproportionately affect various neighborhoods across New York City. This risk is based on each community's adaptive capacity: the socio-economic characteristics which enable the community to cope with the impacts of climate change. Therefore, in order to efficiently and effectively respond to climate risk, neighborhoods that have the highest vulnerability levels must be identified. For the scope of this GIS analysis, climate change vulnerability is operationalized as the compounded impact of environmental hazards, socio-economic factors and access to resources. This study will identify vulnerable neighborhoods and compare them with those highlighted in the Resilient Neighborhoods initiative by the NYC Department of City Planning in 2013 (updated in 2017). The Resilient Neighborhoods initiative is based solely on flood plains, which represents a single aspect of our analysis. The aim of this GIS process is to advocate for a comprehensive analysis of climate change vulnerability by utilizing several spatial analyses methods and a holistic set of criteria.1.5C Climate Action Plan, enacted by executive action in 2017, aligns New York City with the goals of the Paris Climate Agreement. This climate change policy outlines strategies to mitigate greenhouse gas emissions and build resiliency against the projected impacts of climate change. Regionally, New York City will face increased sea levels, flooding, and stronger weather events. Recent storms such as Hurricane Sandy are indicators of the frequency and extent of this potential risk. The impacts of climate risk disproportionately affect various neighborhoods across New York City. This risk is based on each community's adaptive capacity: the socio-economic characteristics which enable the community to cope with the impacts of climate change. Therefore, in order to efficiently and effectively respond to climate risk, neighborhoods that have the highest vulnerability levels must be identified. For the scope of this GIS analysis, climate change vulnerability is operationalized as the compounded impact of environmental hazards, socio-economic factors and access to resources. This study will identify vulnerable neighborhoods and compare them with those highlighted in the Resilient Neighborhoods initiative by the NYC Department of City Planning in 2013 (updated in 2017). The Resilient Neighborhoods initiative is based solely on flood plains, which represents a single aspect of our analysis. The aim of this GIS process is to advocate for a comprehensive analysis of climate change vulnerability by utilizing several spatial analyses methods and a holistic set of criteria.

The scope of this project focuses analyses on climate change vulnerability for New York City's five boroughs based on multiple factors that contribute to climate change vulnerability. These factors are identified from previous research, as either additive or subtractive factors for climate change vulnerability. The most recent data for three different data categories are used to determine the most vulnerable census tracts: environmental data, sociodemographic data, and "resources" data. Within the environmental data category, three individual data sets are included to represent climate change vulnerability: potential flooding, urban heat index, and air pollution. All three data sets are provided by New York City departments. From the United States Census Bureau, the American Community Survey, 2012-2016 five year range, serves as the data source for sociodemographic data. The five year range is used in this analysis as it is more accurate than a single year dataset and not intended to focus on a specific year. Within sociodemographic data, the specific fields used are: age under 18 and above 75 years old, language English ability as "less than very well," and median income. All of the sociodemographic data was initially joined and mapped to New York City's 2010 census tracts. Further analysis for other climate change vulnerability layers also was performed and compared at the census tract level. "Resources" data sets for New York City spatially represent varying levels of "access" to support against climate change vulnerability.These data sets are continuously updated by the NYC Open Data site and the most current versions will be used. The three data sets used are bus stops, subway stations, and a selection from the New York City Department of City Planning's Facilities Database. The facilities selected include public facilities as well as specific facilities identified as resources to mitigate the effects of climate change.

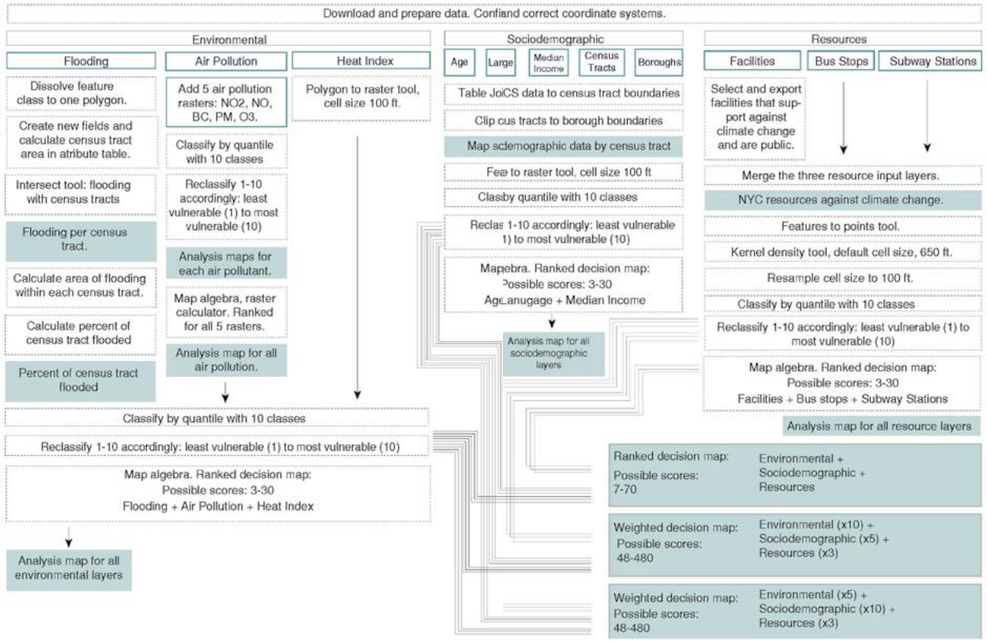
The overall analysis to climate change vulnerability produced a set of three decision maps. The first was a ranked decision map in which each of the seven criteria were considered equal. The second decision map was a weighted decision map in which vulnerability to the environmental factors of climate change was given greater preference by more heavily weighting flood risk, air pollution, and heat vulnerability. Sociodemographic factors were given less preference for this map, and therefore, less weight. The purpose of this was to identify any areas that presented a somewhat greater risk to climate change vulnerability when environmental factors were given greater preference within the overall aggregated map. The third decision map was another weighted decision map in which sociodemographic vulnerability was given greater preference by more heavily weighted median income, age, and language. Environmental factors were given less preference for this map, and therefore less weight. The purpose of this map was to pose an opposite comparison to the first weighted map in which environmental vulnerability was given greater weight. These three decision maps present how even with the same data, vulnerability can be visualized differently based on the weights and thereby, preference given to each analysis layer. Interestingly, much of the most vulnerable areas across New York City are consistently displayed in all three decision maps. Notice in each of the decision maps, the Bronx, south Brooklyn, northeast Brooklyn, and various other areas represent the most vulnerable areas to climate change based on this analysis. Individual differences would be representative of their specific vulnerability within each of the analysis layers and weights given.





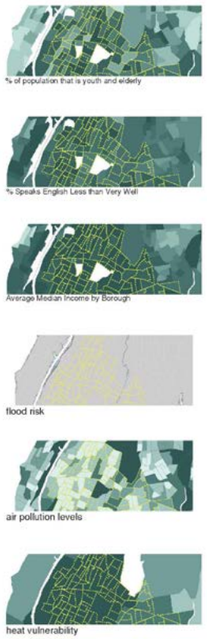
Layer	Number of Classes	Rank
Flood risk	1 - 10	1
Air pollution level	1 - 10	1
Heat vulnerability	1 - 10	1
Median Income	1 - 10	1
Age	1 - 10	1
Lanugage	1 - 10	1
Resources	1 - 10	1
Max score:	70	

Layer	Number of Classes	Weight
Flood risk	1 - 10	10
Air pollution level	1 - 10	10
Heat vulnerability	1 - 10	10
Median Income	1 - 10	5
Age	1 - 10	5
Lanugage	1 - 10	5
Resources	1 - 10	3
Max score:	480	



Comparison with Resilient Neighborhoods

non-corresponding areas

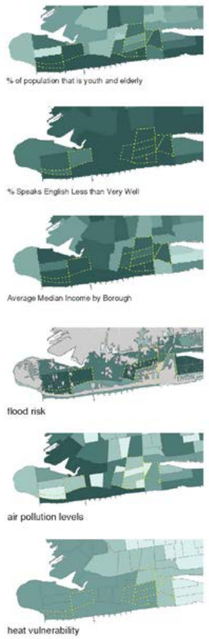


Average Demographics of Most Vulnerable Census Tracts

total population	4736 people
% youth and elderly population	32%
% limited English proficiency	32%
median household income	$16,464
% census tract flooded	7.2%
air pollution level	6.4
heat vulnerability score	4.5

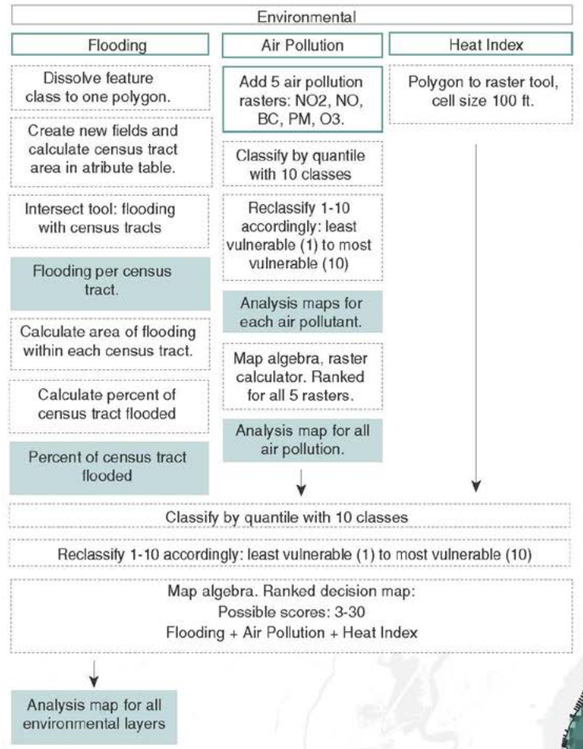
Comparison with Resilient Neighborhoods

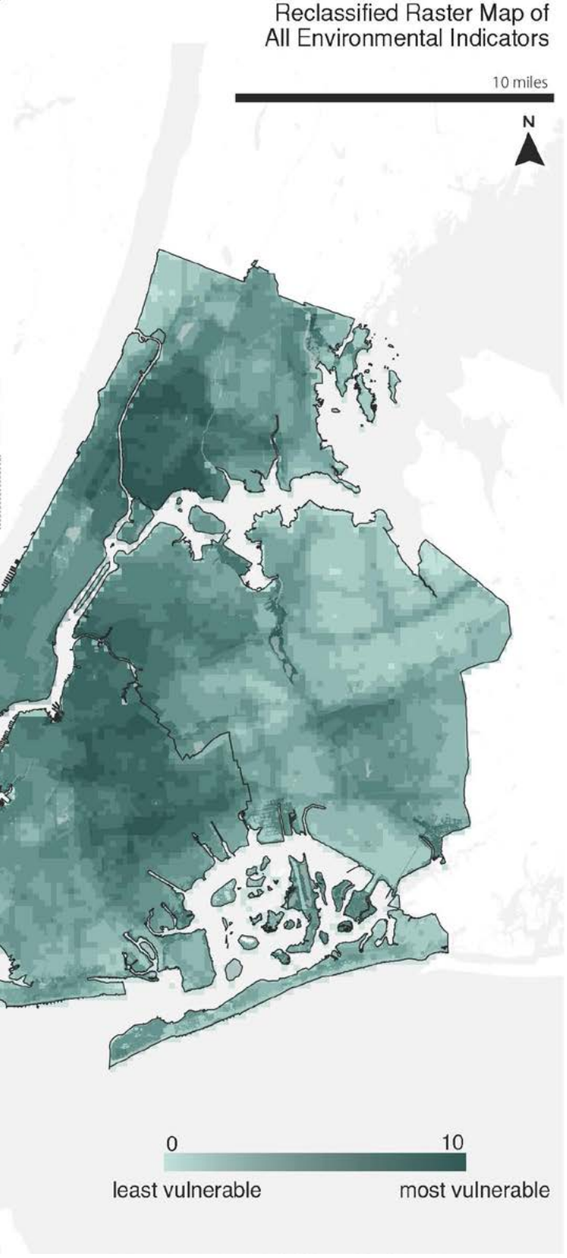
corresponding areas



Average Demographics of Most Vulnerable Census Tracts

total population	3999 people
% youth and elderly population	34%
% limited English proficiency	52%
median household income	$16,861
% census tract flooded	62.9%
air pollution level	6.6
heat vulnerability score	2.7





GSAPP SPRING 2020
CORE II STUDIO
"EVERYTHING SCHOOL"

CRITIC
BENJAMIN CADENA

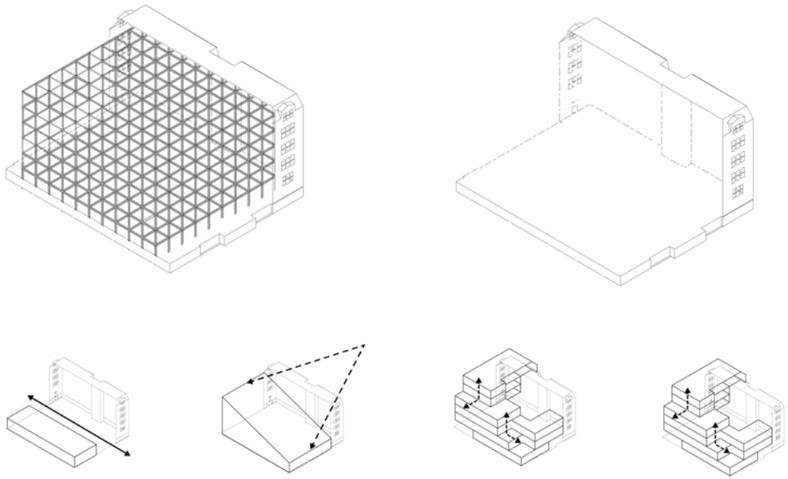
Collective Learning

the extended life of a new york city public school

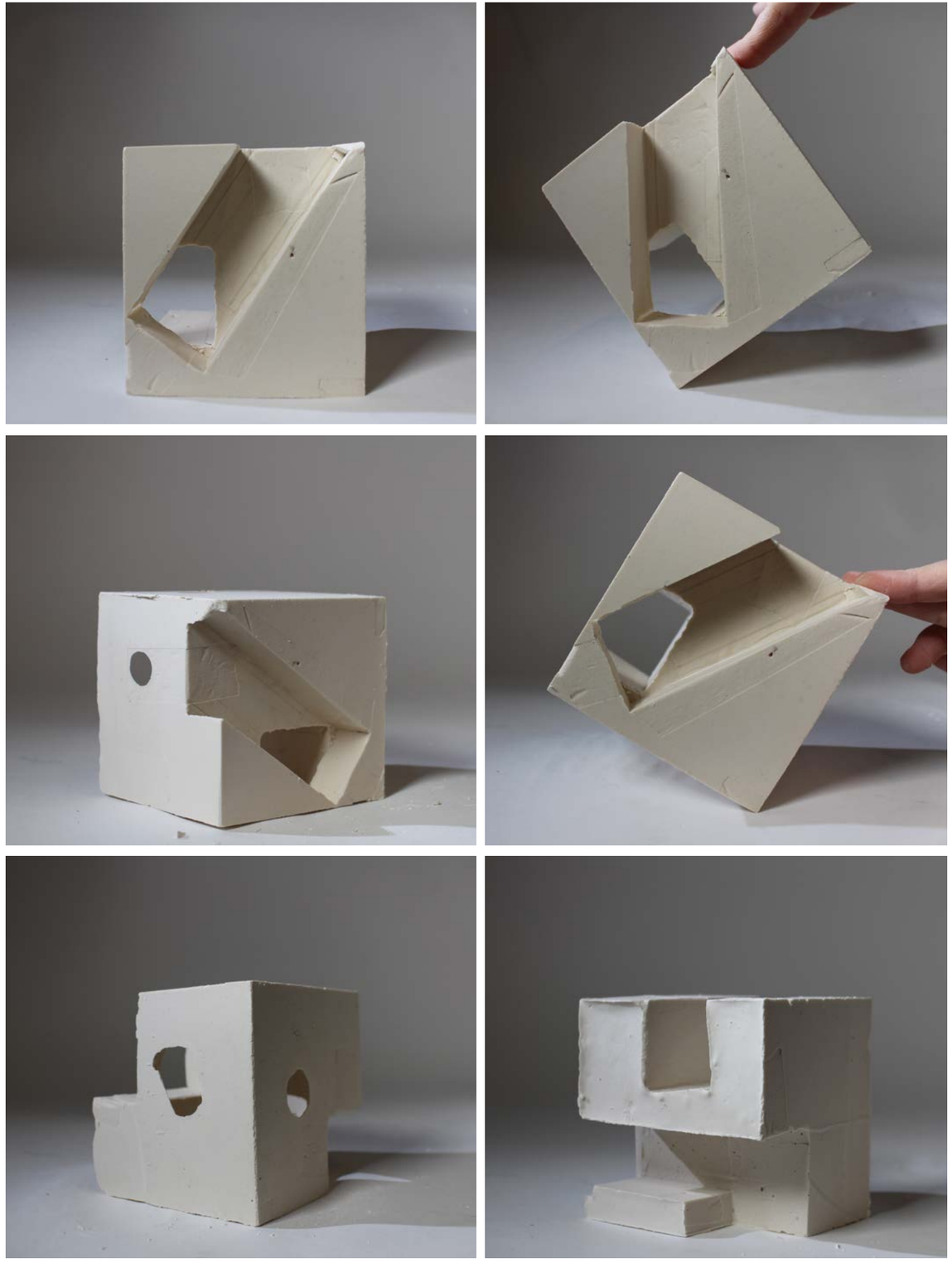
The new proposal for P.S. 64 operates on the premise of "it takes a village to raise a child." The organizational framework creates a network of spaces and people, building an interior urban environment where community members can participate in the education of the students. The central common areas are surrounded and shaped by a perophery of more enclosed units. This sequence of inside and outside contingent units interlock, creating scalar relationships between the city and the building, and the building and its interior furniture. Social spaces are emphasized through an open and clearly organized system where all the attributes of learning and thinking are readily accessible.

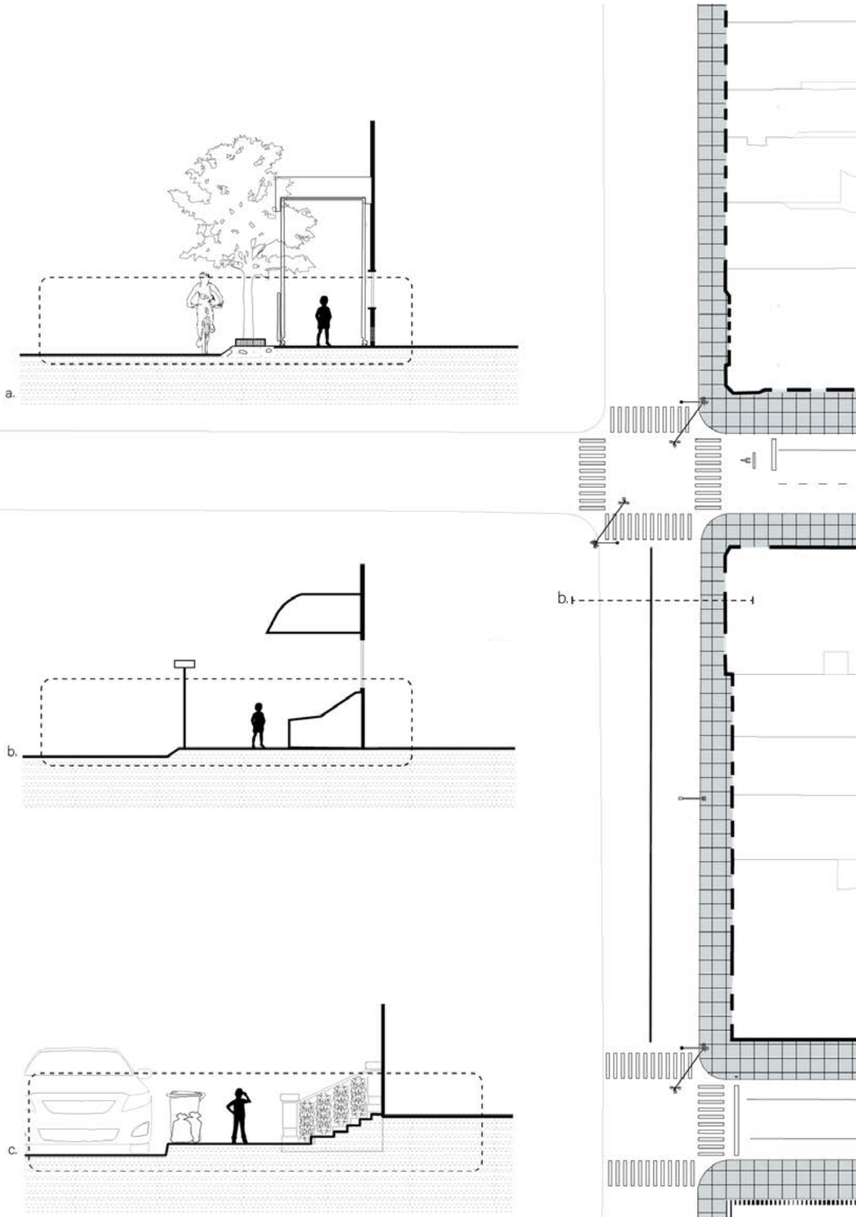
This proposal applies Herman Hertzberger's thesis that the traditional autonomy and dominance of the classroom keeps diminishing, and instead advocates for a physical environment that encourages children's everyday freedoms to be active, play, socialize and connect both to their environments and communities.

Diorama model of interior reading room rendered with daylight streaming in from its facade envelope.



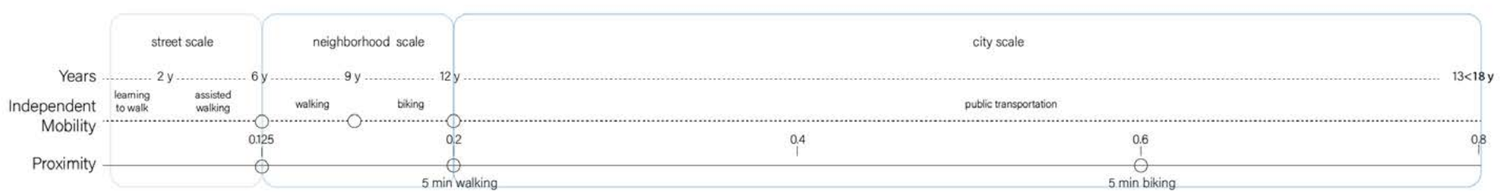
A sequence of inside and outside contingent units interlock, creating scalar relationships between the city and the building, and the building and its interior organization. This formal approach began with a modular exploration of casting plaster to create a series of nested volumes and voids. These units allowed me to imagine a system of parts to a whole, which created different spatial propositions for collective spaces. And when placed in the context of an educational program, they began to inform the types of social interactions a school could encourage, ranging from the scale from the individual to a community. Externally these parts to a whole react to specific site and environmental conditions such as creating a public right of way through the building lot, staggering the SW façade to maximize access to daylight and offsetting volumes to create adjacent open-air platforms.

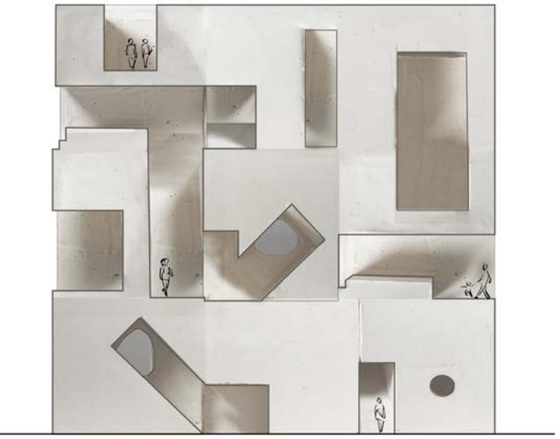


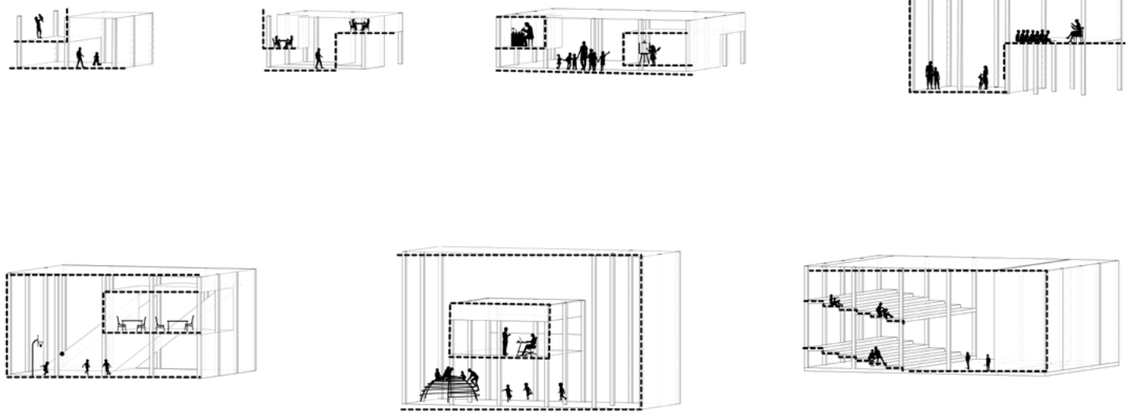


These massing decisions were informed by a site analysis which investigated the perspective of urban childhood. Taking into consideration how a child experiences the city, its traffic, and infrastructure from the street level, as well as, which resources are available within safe walking routes and child friendly distances.

In response, the school becomes a neighborhood social unit in the city which networks people and spaces on site. .



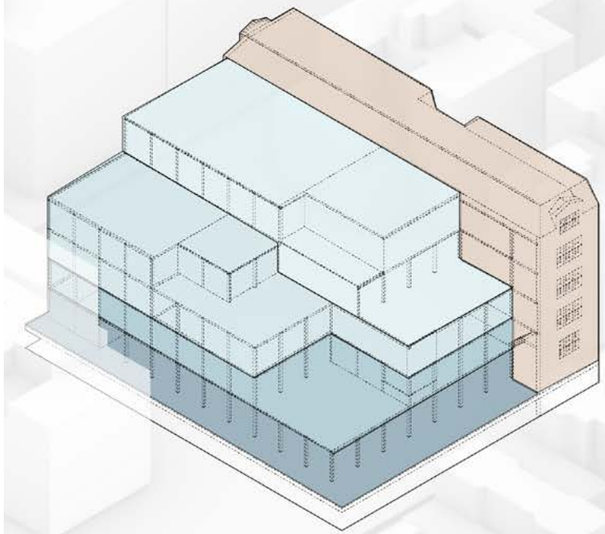


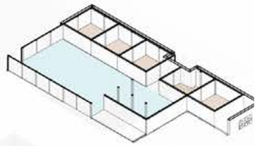


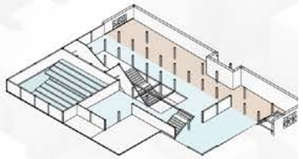
Floor plan typologies for different users.
Prototypical unit sizes of studio, 1 bedroom or two bedroom units are imagined for various types of users, such as a recent college graduate, an elderly couple or a low income family.

Axonometric view of building massing in context of its neighborhood.

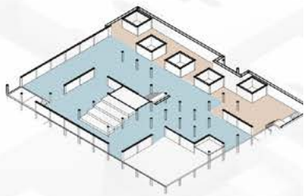
The typical floor plan reveals the zoning of the internal nested spaces with different sizes and goals for the learning environment creates different modes of learning + working.

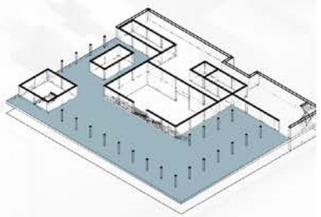


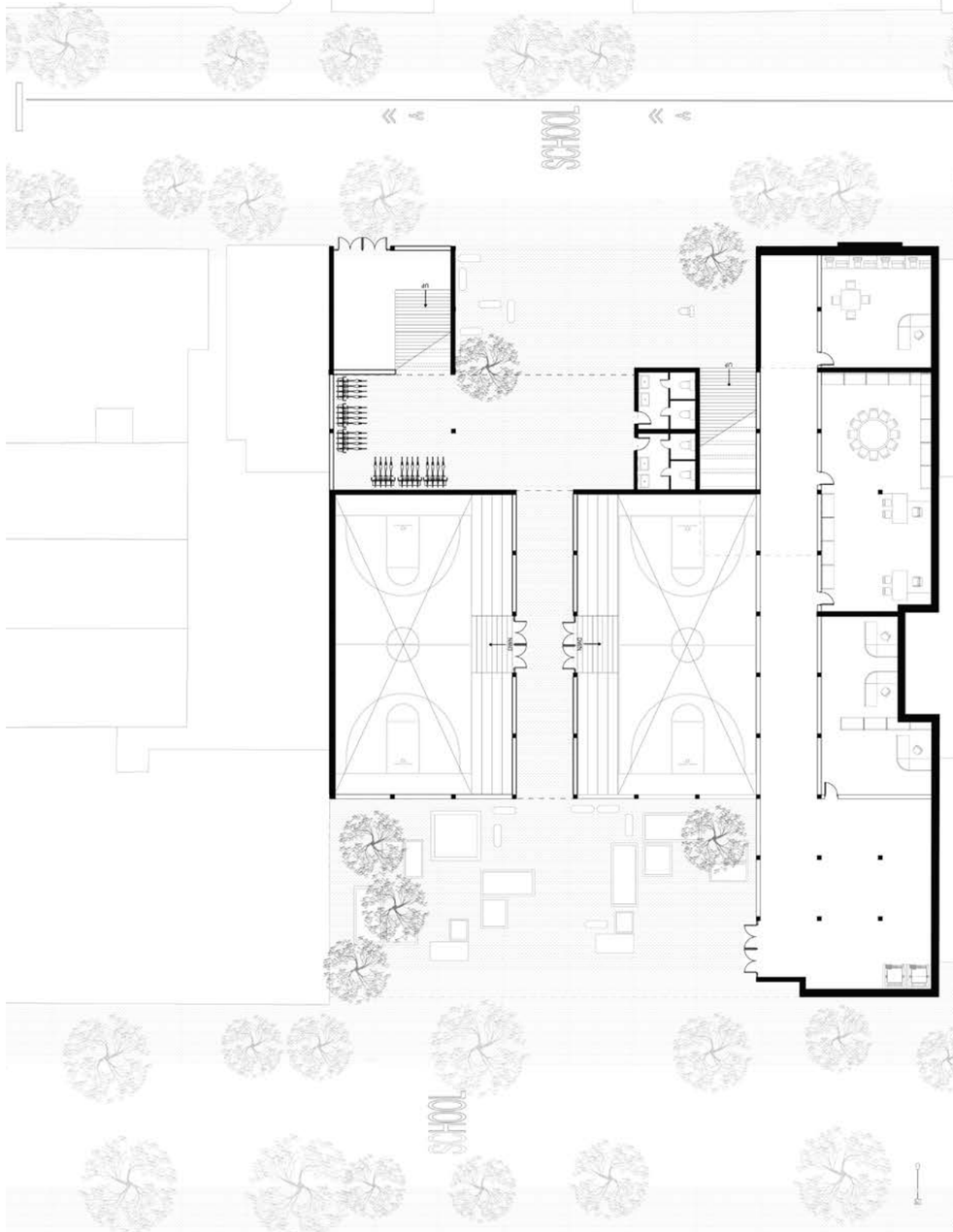

Library


Library
Science Labs


Auditorium
Music + Art Studios

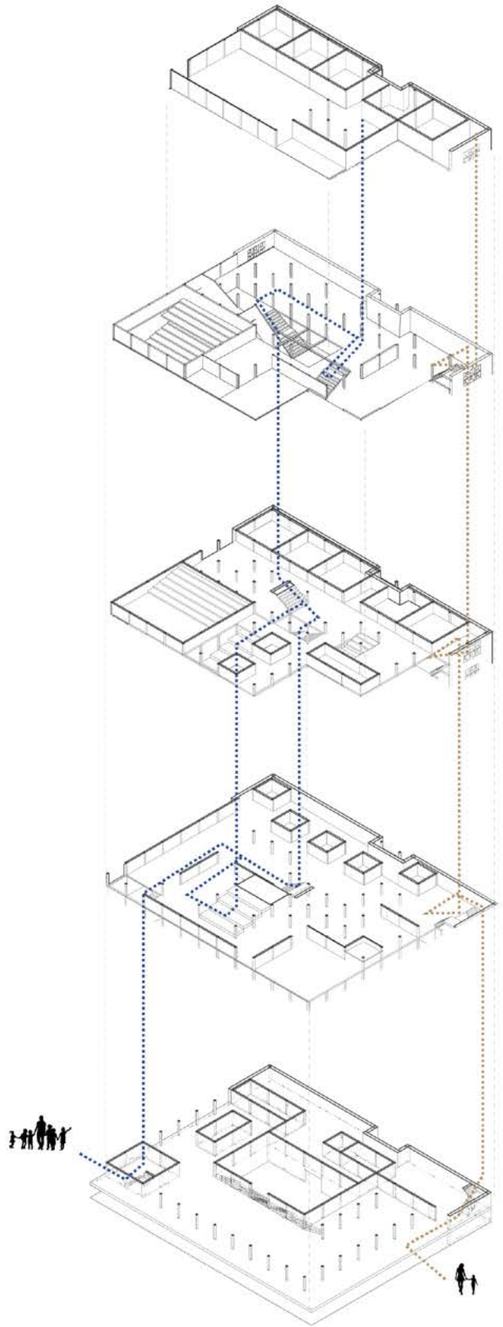

Roof Garden
Kitchen
Cafeteria

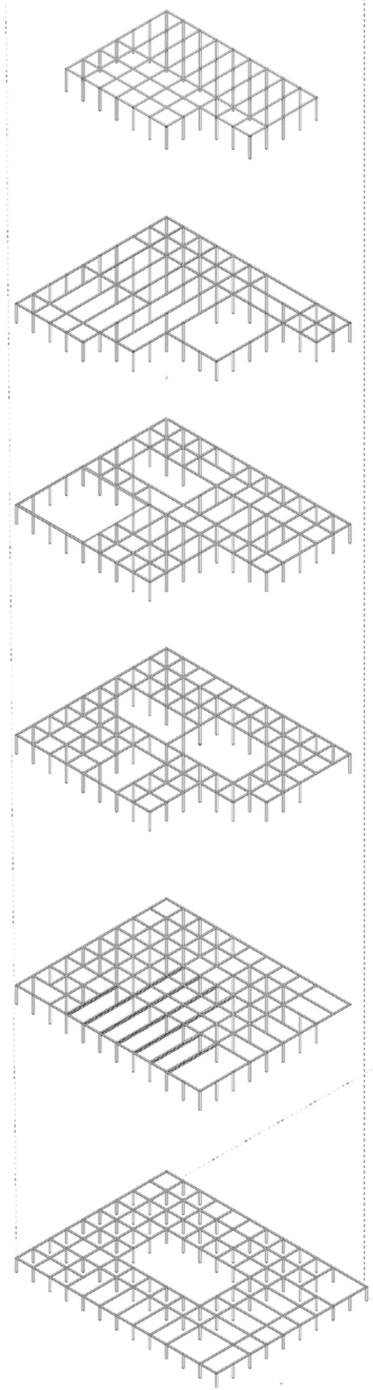

Urban School Yard
Administration

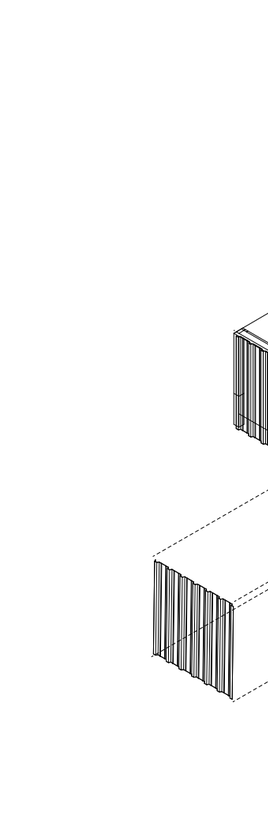


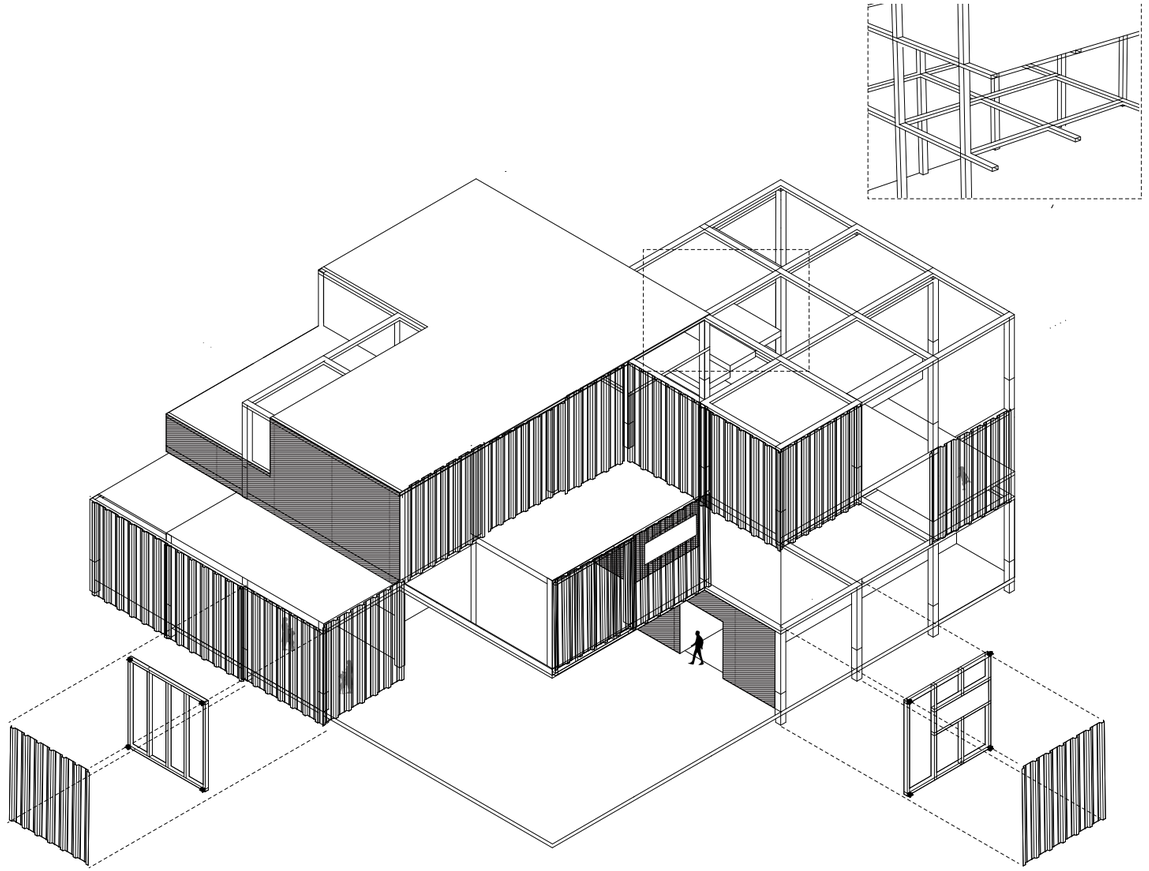
process **(design)**: **observations**, **models**, drawings, and research

So beginning with the ground floor where the building connects with the city, both public and private entrances allow access to the site. The ground floor becomes an open school yard for the students and local community with athletic facilities and playscapes that provides children with the space to be adventurous in the dense urban neighborhood.









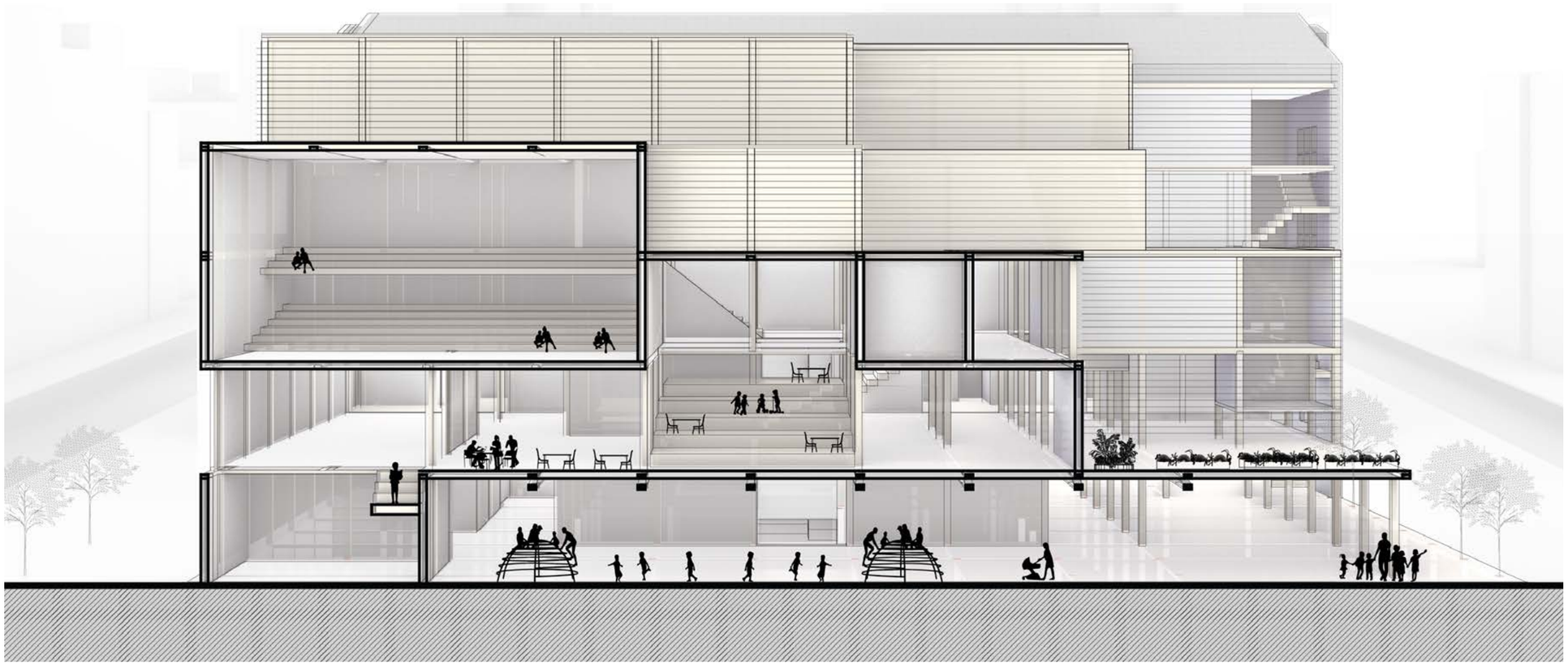
process **(design)**: **observations**, **models**, drawings, and research

The scale and connection of these focal spaces sectionally is created using a mass timber structure of 12” columns and 6” beams. This structural frame is organized on a 15’ x 15’ grid where internal breaks allow for larger spaces with inner nested units. In section this allows for the flow from external to internal spaces with perforation to open elevational treatment. The frames are clad with translucent polycarbonate panels that bring in different degrees of daylight. Outwardly, it also allows for different levels of the activity to be revealed to the city. This allows for the school to be thought of a space that can exist beyond regular hours and academic year maximizing its role as a community hub.

View of an interstitial learning space:
corridor between classrooms as a playscape opportunity.

The ground floor gym has views into and from the neighborhood sidewalk.

Learning activities are based on scales of gathering, encouraging the school community to gather around focal activities: library, auditorium, urban garden, kitchen, and gym. Overall, this is a sectional proposition where each slice of the building reveals different meeting moments and opportunities for interaction.



Overall, this is a sectional proposition where each slice of the building reveals different meeting moments and opportunities for interaction. While also looking at how the different internal conditions meet the exterior

The future PS 64 turns the lot into a microcosm of the city, that a small child can play and wander around without being aware of the whole. It advocates for a physical environment that encourages children to be active, play, socialize, belong, and connect to both their built environment and communities

GSAPP FALL 2019
CORE I STUDIO
'BROADWAY STORIES'

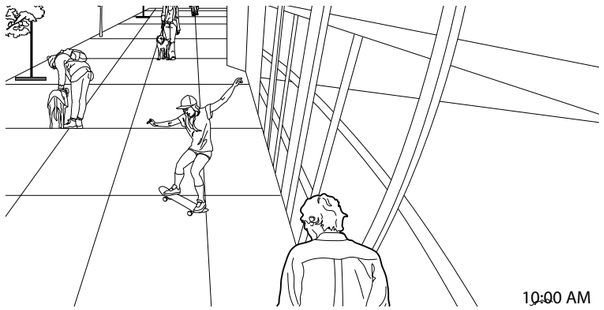
CRITIC
ANNA PUIGJANER

Citizen Library

reading as an act of protest in (POPs) privately owned public spaces

Privately owned public spaces (POPs) offer zoning concessions to commercial and residential developers in exchange for access and use by the public. As developer priorities are often profit driven, the maintenance of these spaces severely limit political, social and democractic functions of public space and produce a constrained definition of 'public.' Timed constraints, heightened surveillance, and commercial programs are set as "reasonable" rules to enforce public activity, but the definition of "reasonable," though regulated, has never been defined.

Occupy POPs aims to test the spectrum of public activity that can take place in these ambiguous public spaces based on the premise that New Yorkers need well conceived "public commons" outside of their private homes to gather and pursue non-commercial
activities together. Building upon a series of initial observations and drawings of exisiting POP typologies and spatial conditions, the proposal imagines a moment of oddness where a set of bodies aligned in a certain space can claim political action and define the space with a particular meaning. Specifically, the collective act of reading in public is explored as a form of architectural construction



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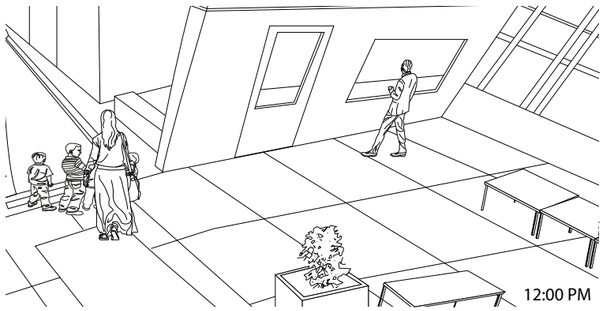

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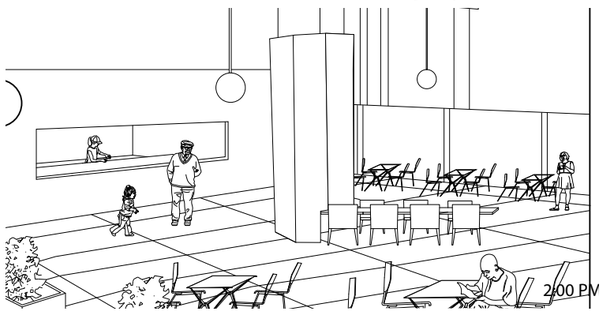

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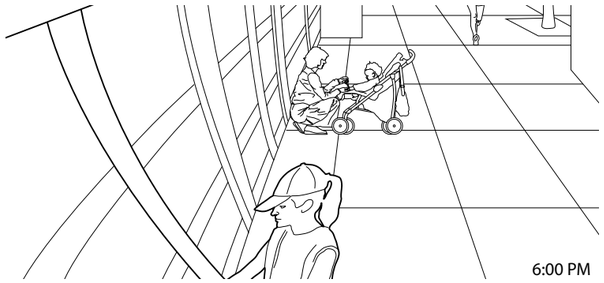

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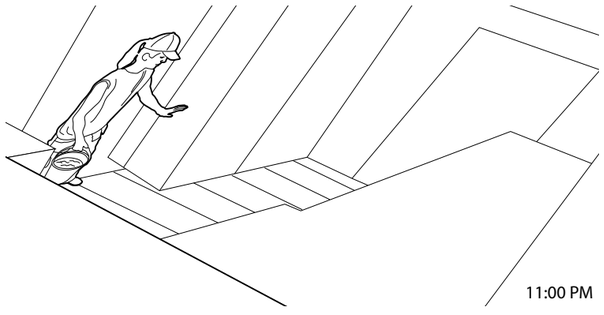

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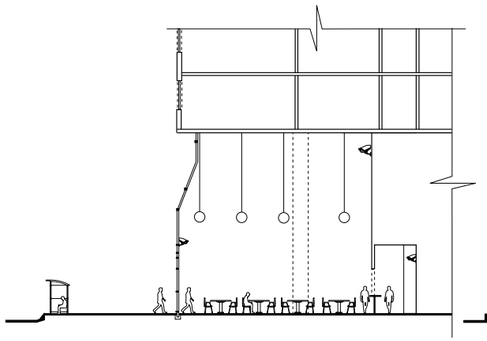

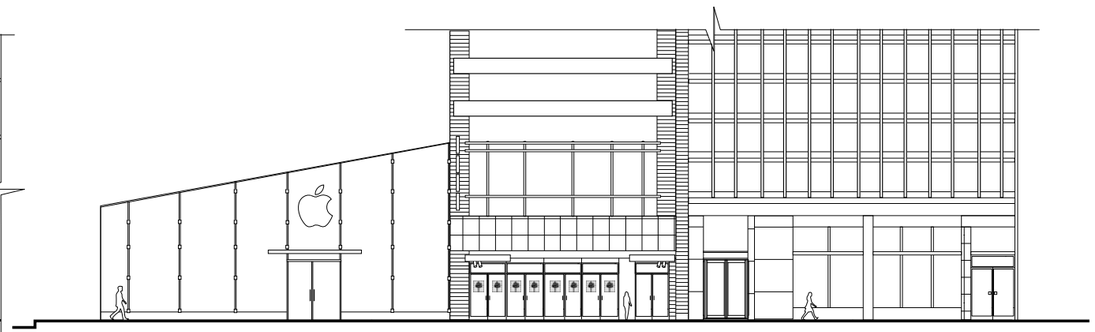

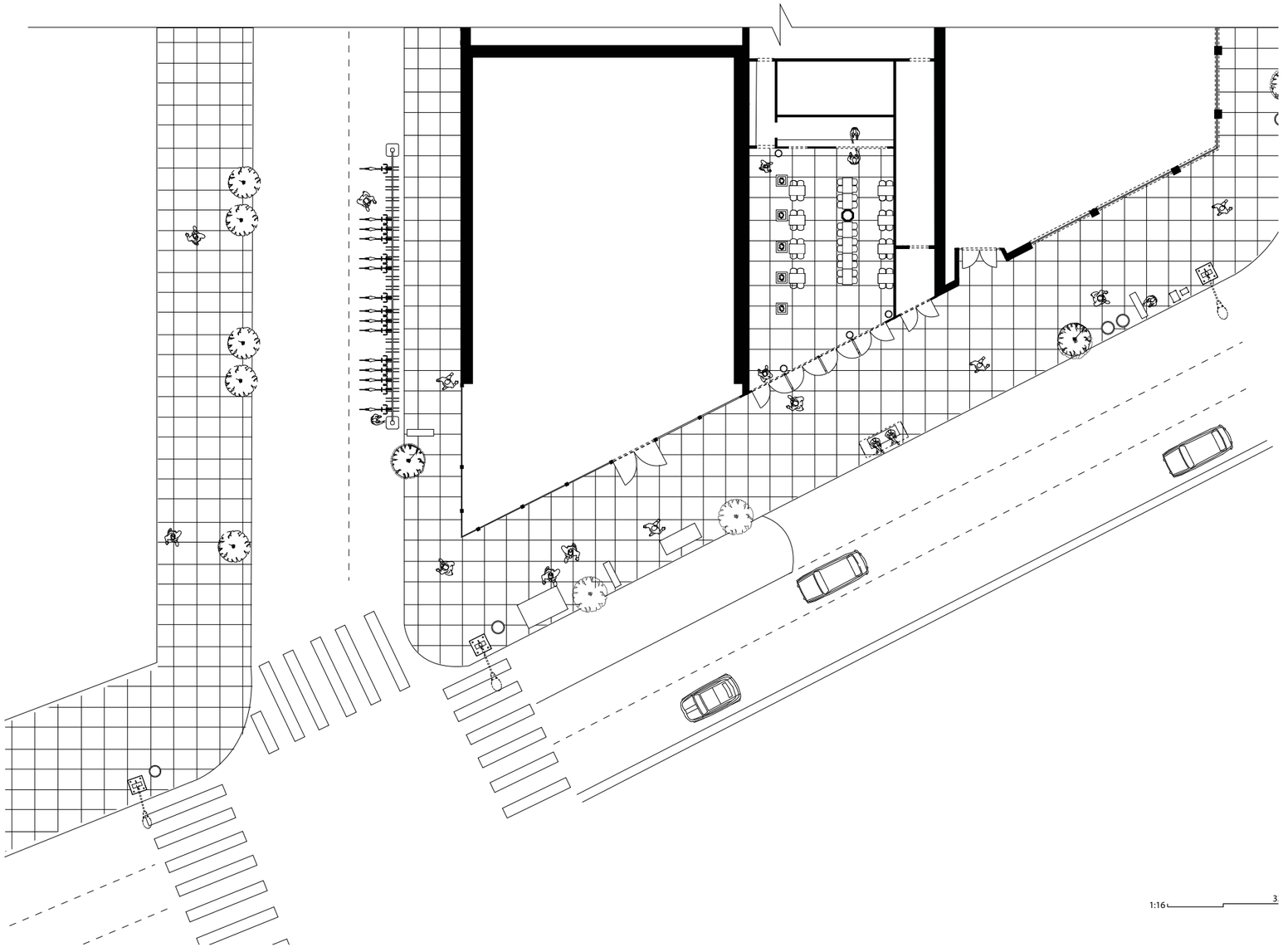

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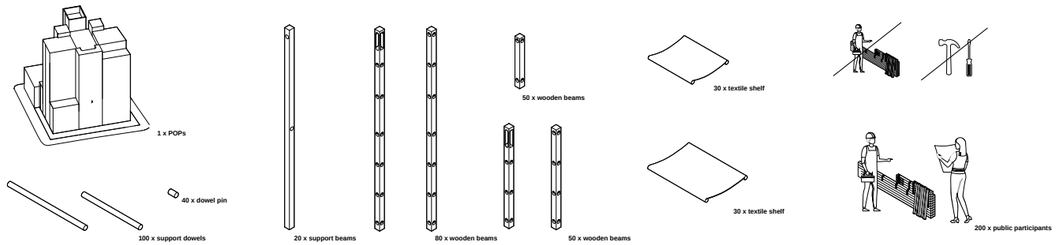
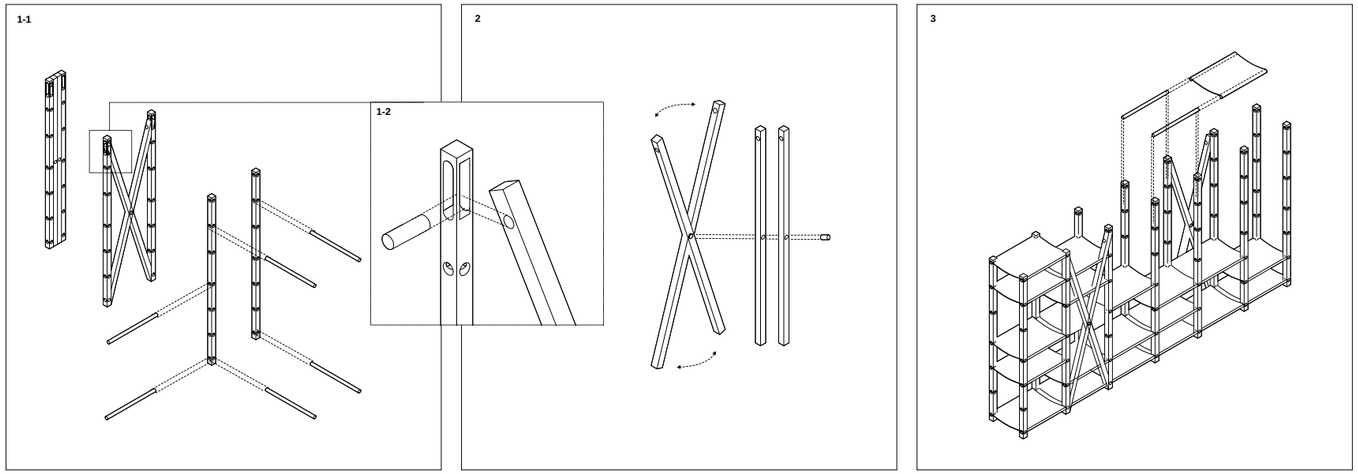
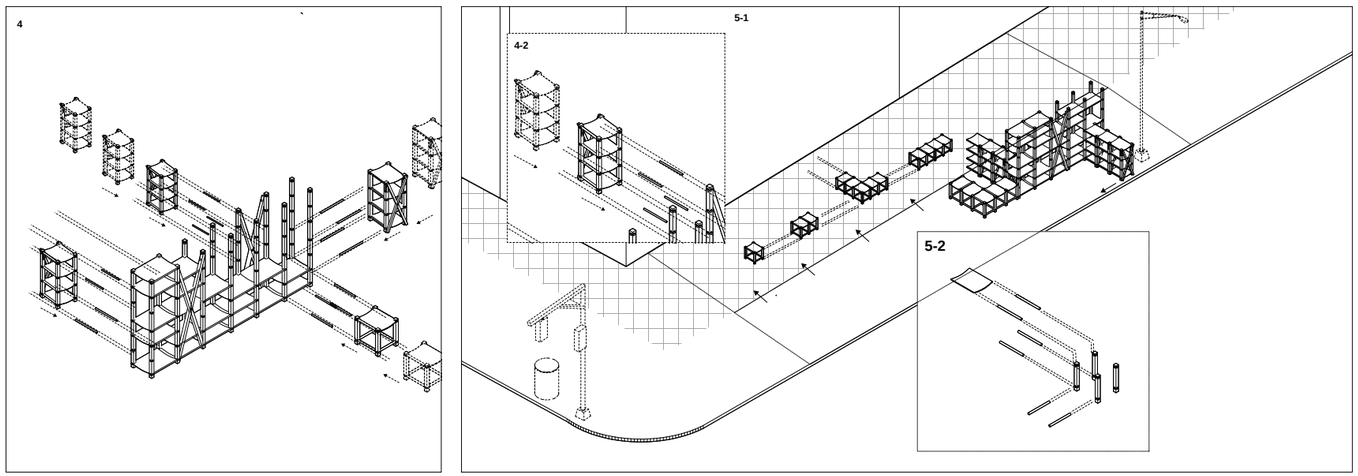
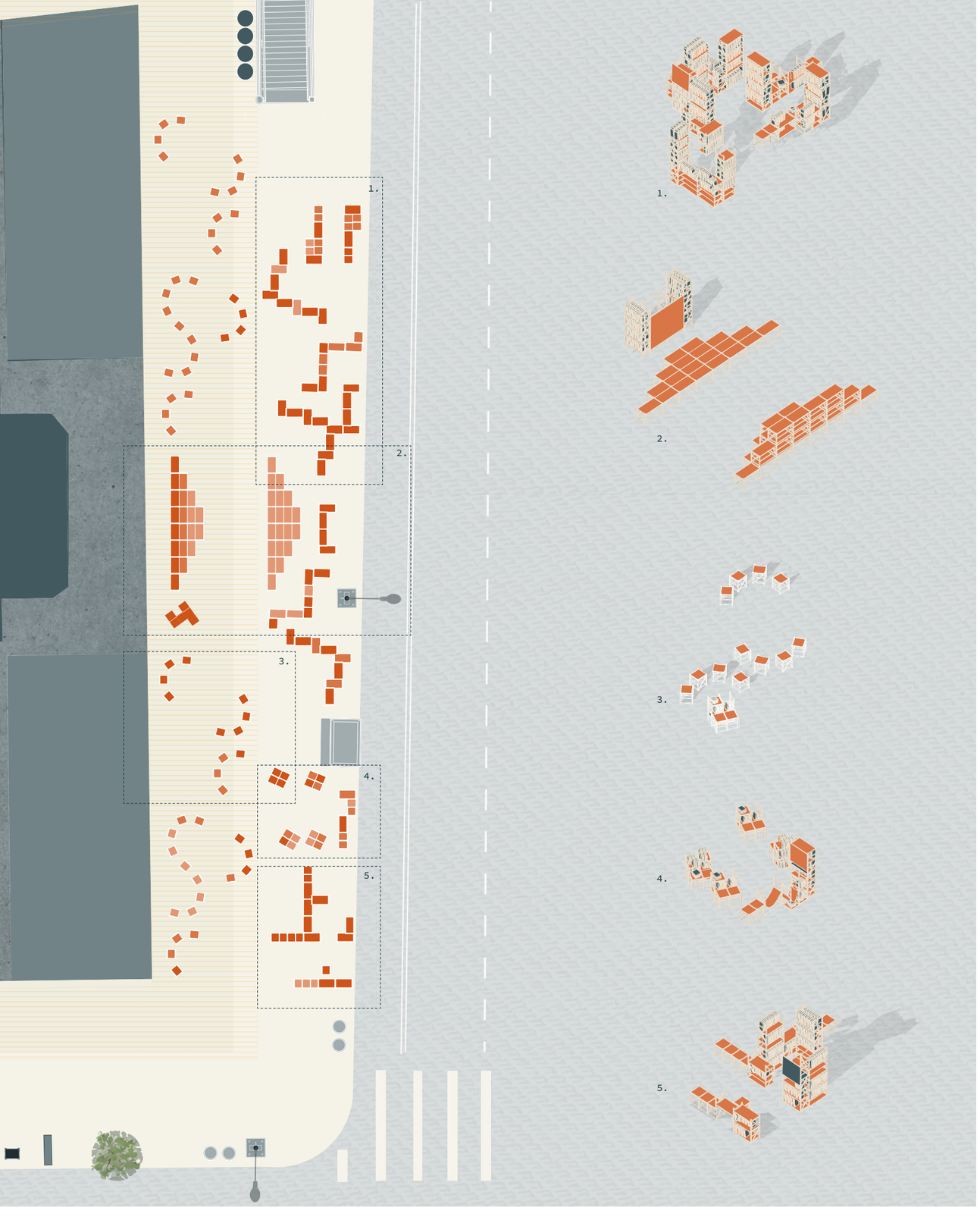






process **(design)**: **observations, models**, drawings, and research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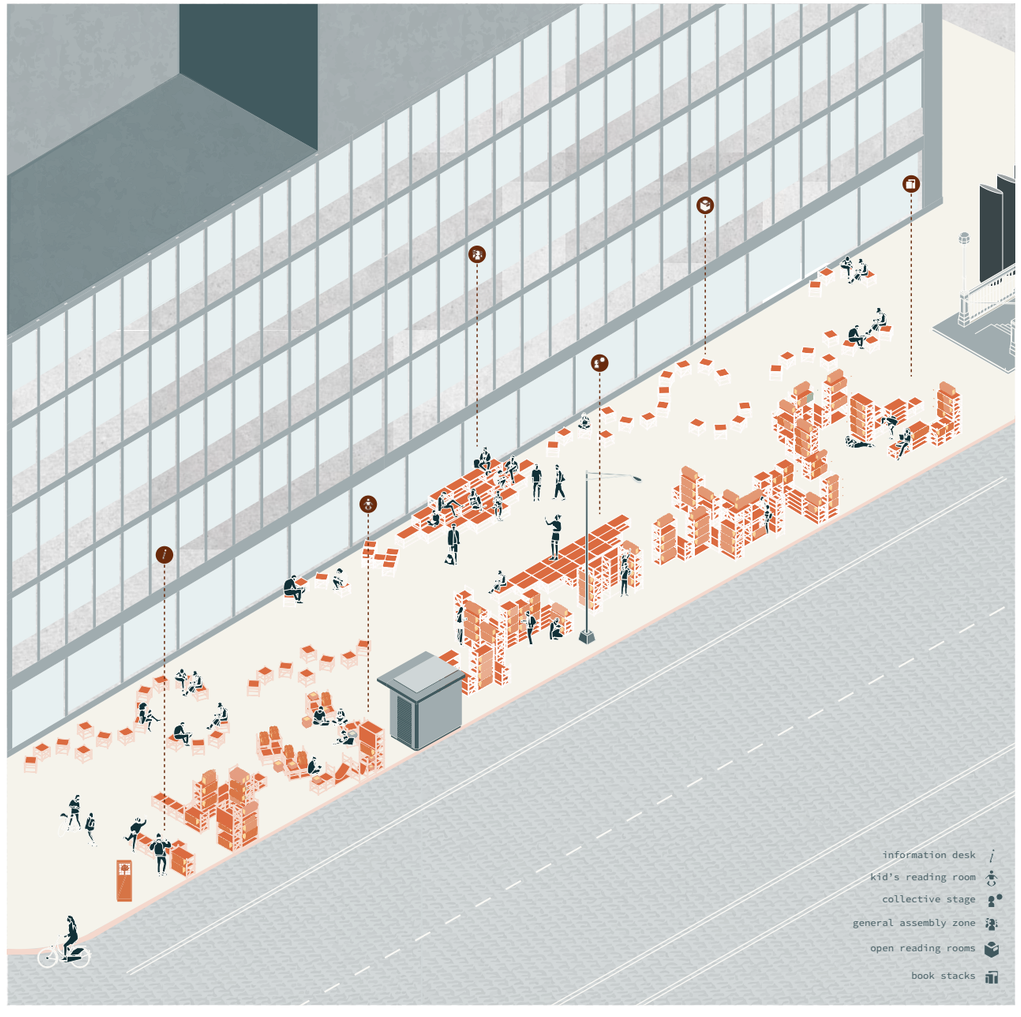
information desk
kid's reading room
collective stage
general assembly zone
open reading rooms
book stacks


1.
2.
3.
1.
2.
3.


information desk
workshop stations
open reading rooms
book stacks
OPEN TO PUBLIC
OPEN TO PUBLIC

research + [design] + policy

This portfolio is grounded in the belief that architects are pragmatic optimists, trained with the ability to imagine sustainable and equitable futures, and with the technical skills to carry out these visions into the built environment. In order to place architecture's role as an active participant in the sustainable development process, these projects aim to discuss its opportunities for impact through two parallels, pragmatism - technical design, and optimism - inclusive and interdisciplinary design processes.

portfolio [design] [process]

gizem karagoz

m. architecture + ms. urban planning candidate 2022

columbia university, graduate school of architecture, planning & preservation