Karan Matta
Portfolio

01

TREE HOUSING

Air Filtration Through Vegetation

Studio: Core III
Site: The Bronx, NY
Program: Housing
Instructor: Erica Goetz
Team: Yong Yeob Kim & Karan Matta

2021 Buell Paris Prize Runner Up

The project is tackling the issue of poor air quality through vegetation as a means of filtration. The massing follows a series of bars that stack from the street to the north-east corner of the site.

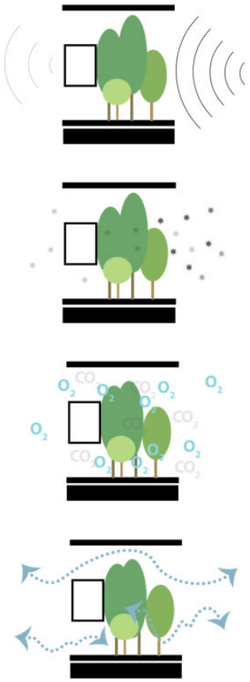
Each Bar consists of an aggregation of units and shared balcony spaces that operate as green/filtration pockets. They prevent air from stagnating around the building by creating a porous profile, aiding wind circulation. The vegetation in the pockets plays the role of a cleansing barrier and purifies the air before it reaches the building's inner parts.

When looking at the building in section, the bars ascend vertically and are suspended/cantilevered at moments. This creates a healthy amount of void spaces at the ground level allowing plenty of daylight into the lower levels while giving some units a feeling of levitation.

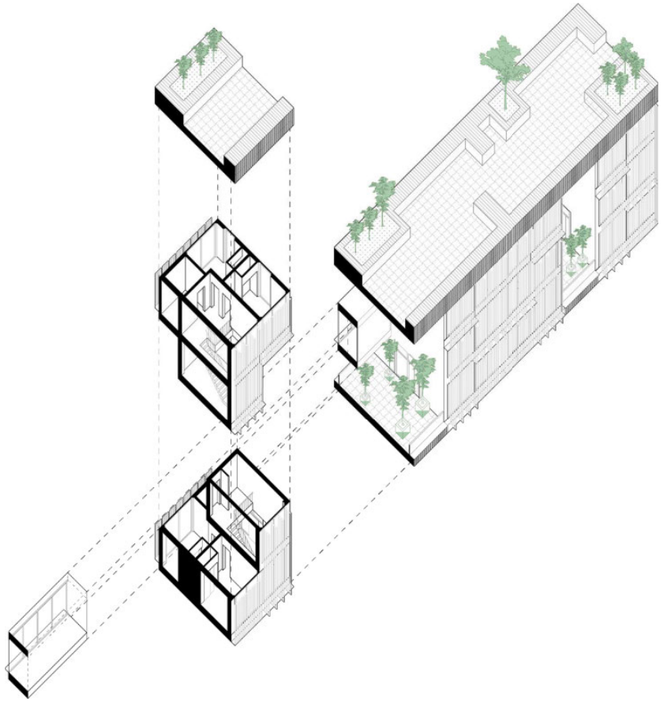
Ground Floor Exterior View

Skip - Stop Corridor (Summer)

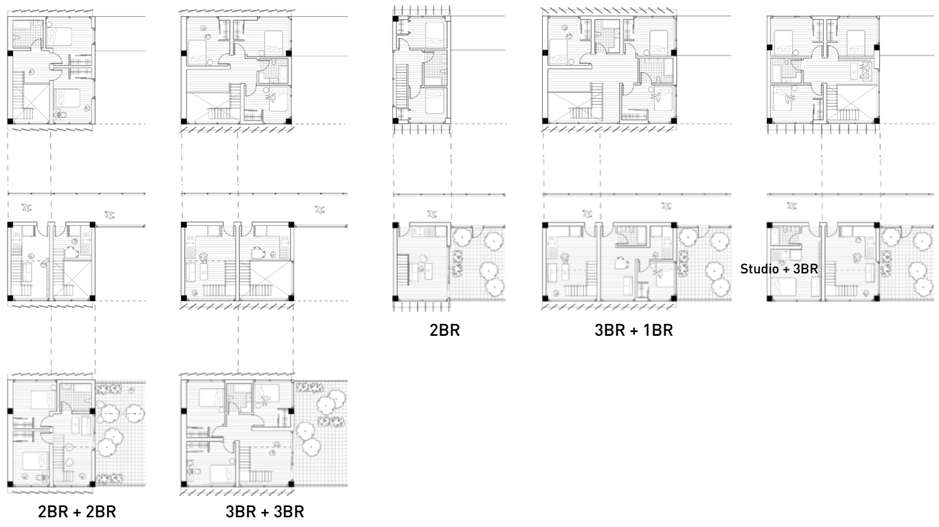
Skip - Stop Corridor (Winter)



Green Pockets



Bar Aggregation



Unit Aggregations

Section Perspective

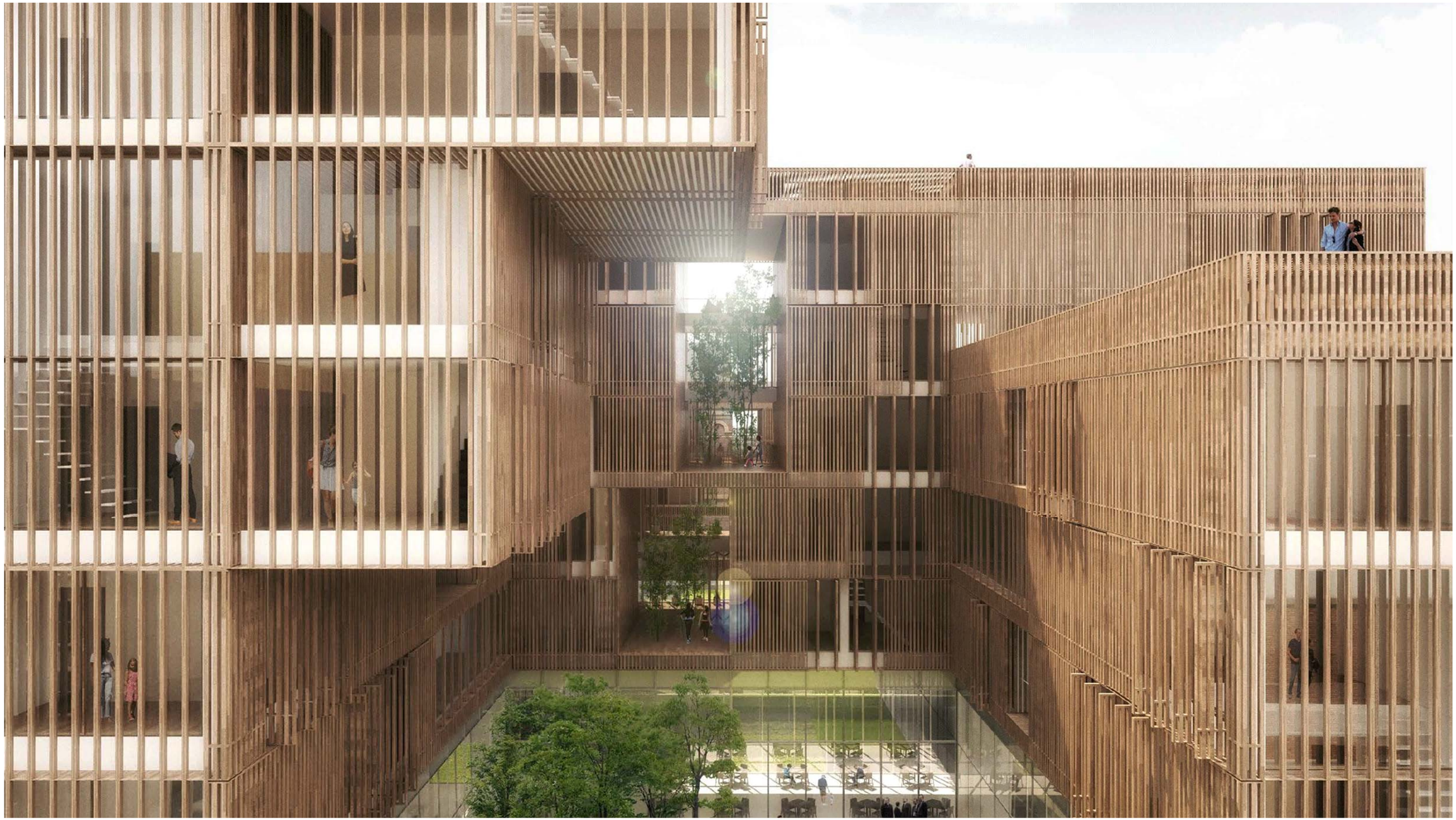
West Elevation

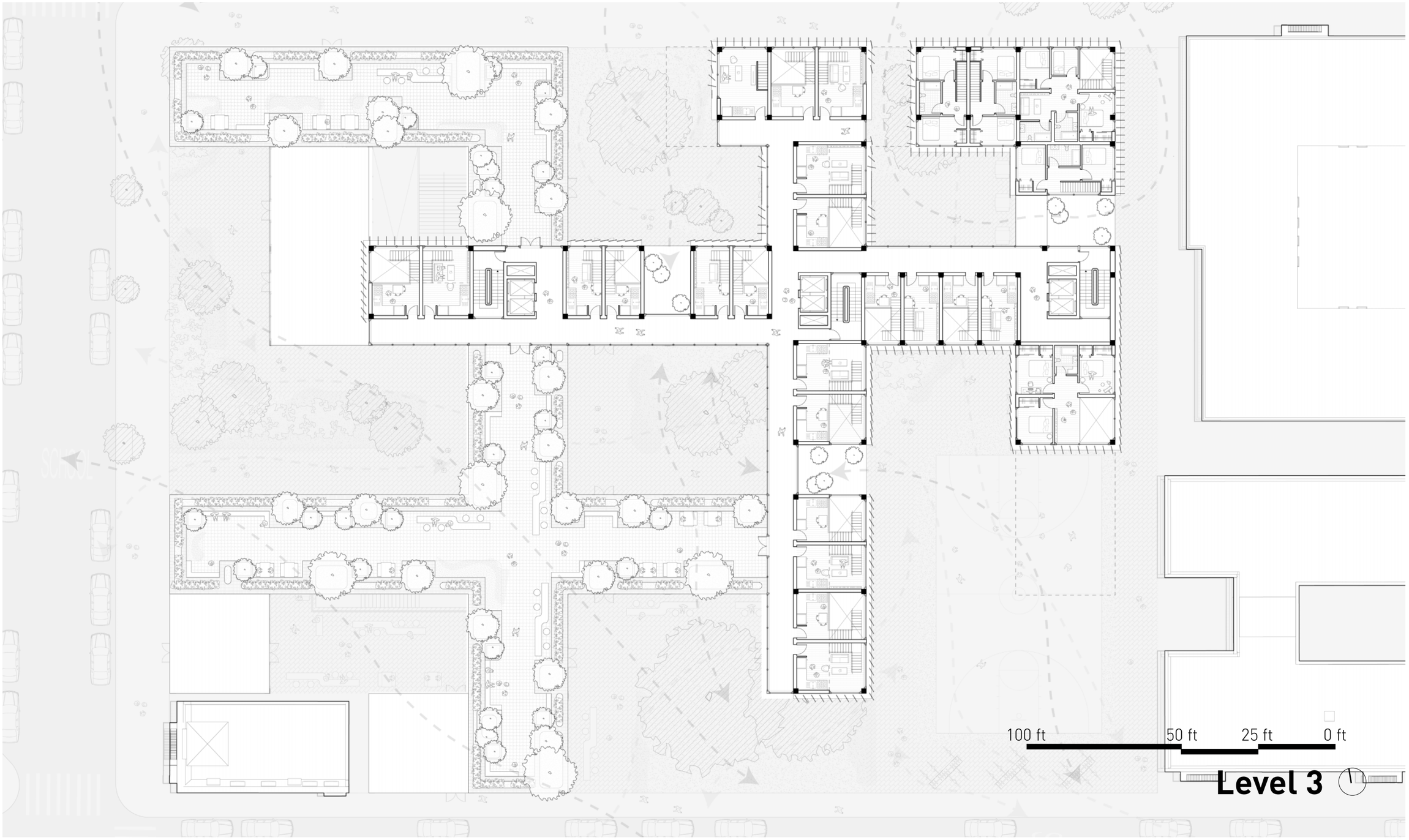
South Elevation

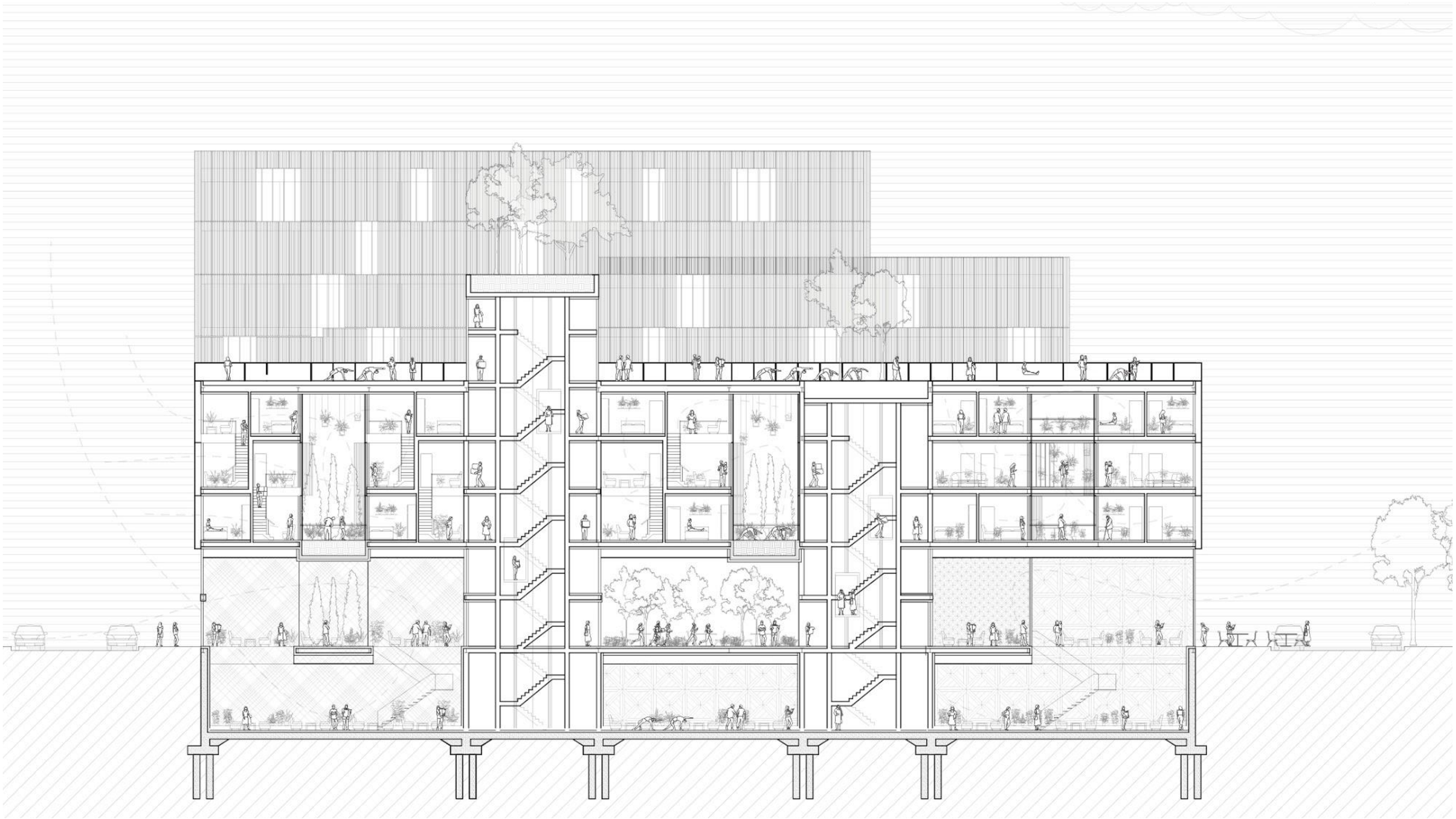
East Elevation

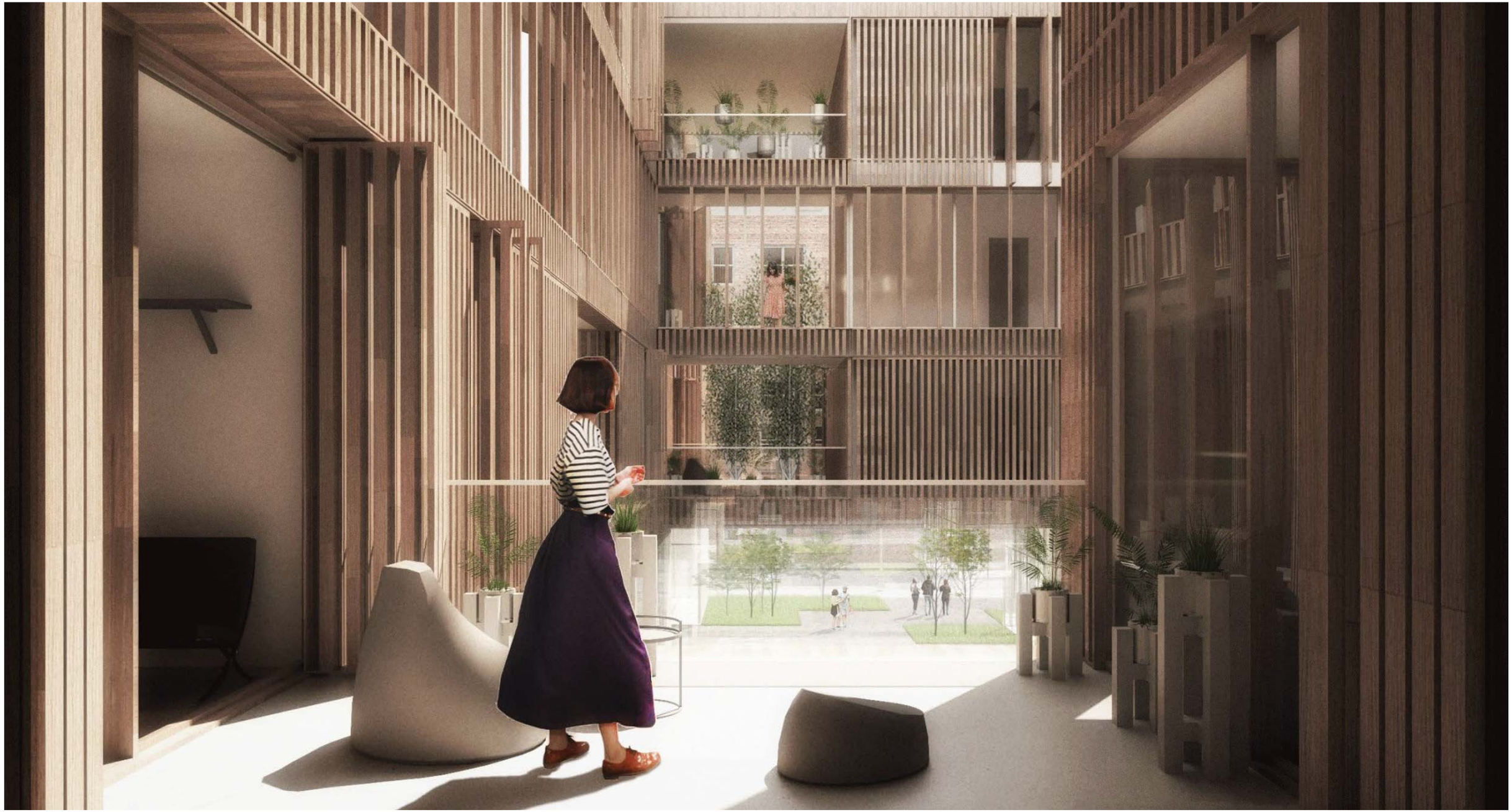
North Elevation

SCHOOL
SCHOOL
1 Circulation Core and Lobby
2 Restaurant
3 Restaurant Kitchen
4 Cafe
5 Bar
6 Takeout Restaurant
7 Laundromat Lobby (Underground)
8 Gym Lobby (Underground)
9 Outdoor Eating Area
10 Basketball Court
11 Entrance to Underground
12 Bicycle Stand
13 Bronx Documentary Center
100 ft
50 ft
25 ft
0 ft
Level 0




SCHOOL
100 ft
50 ft
25 ft
0 ft
Level 3

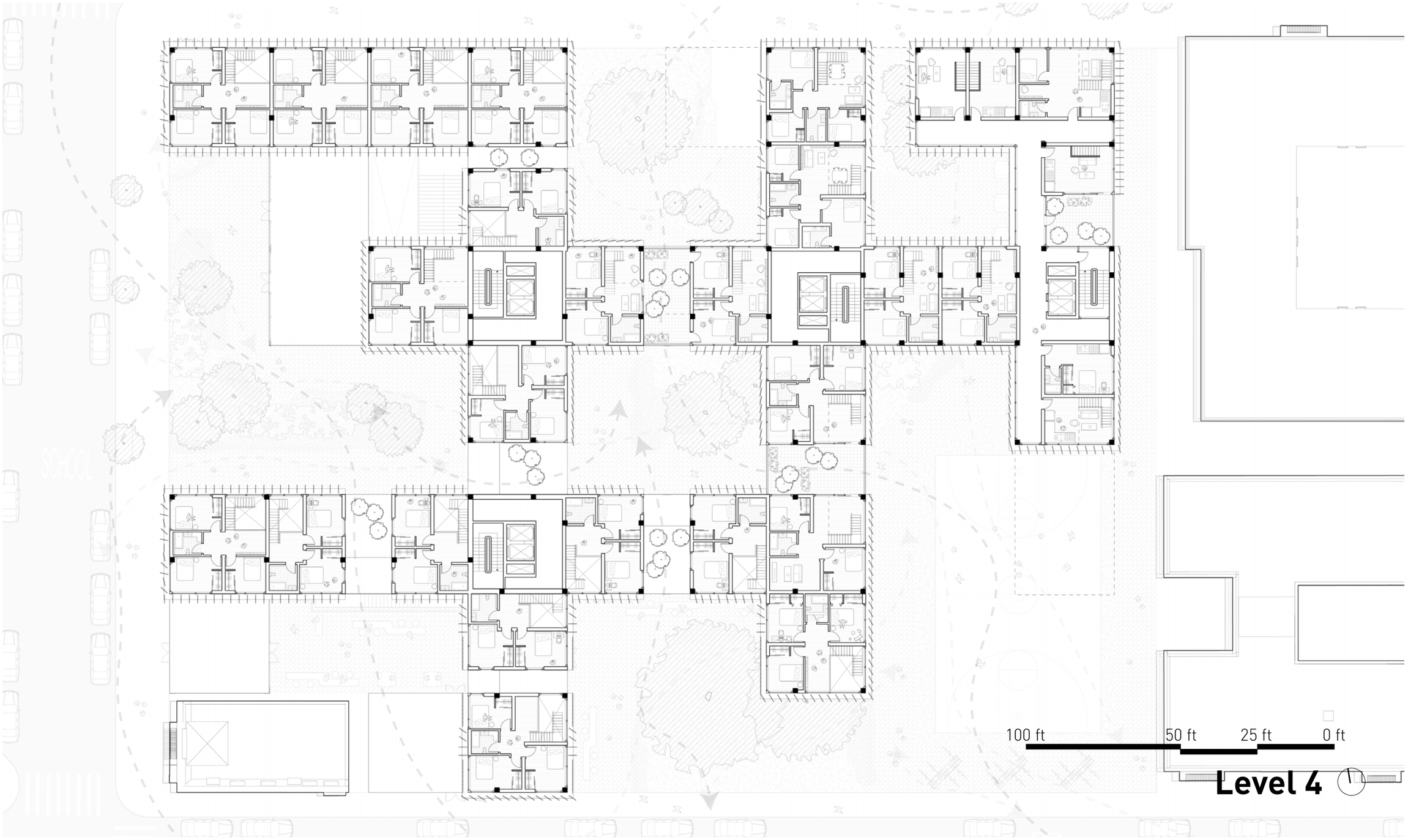




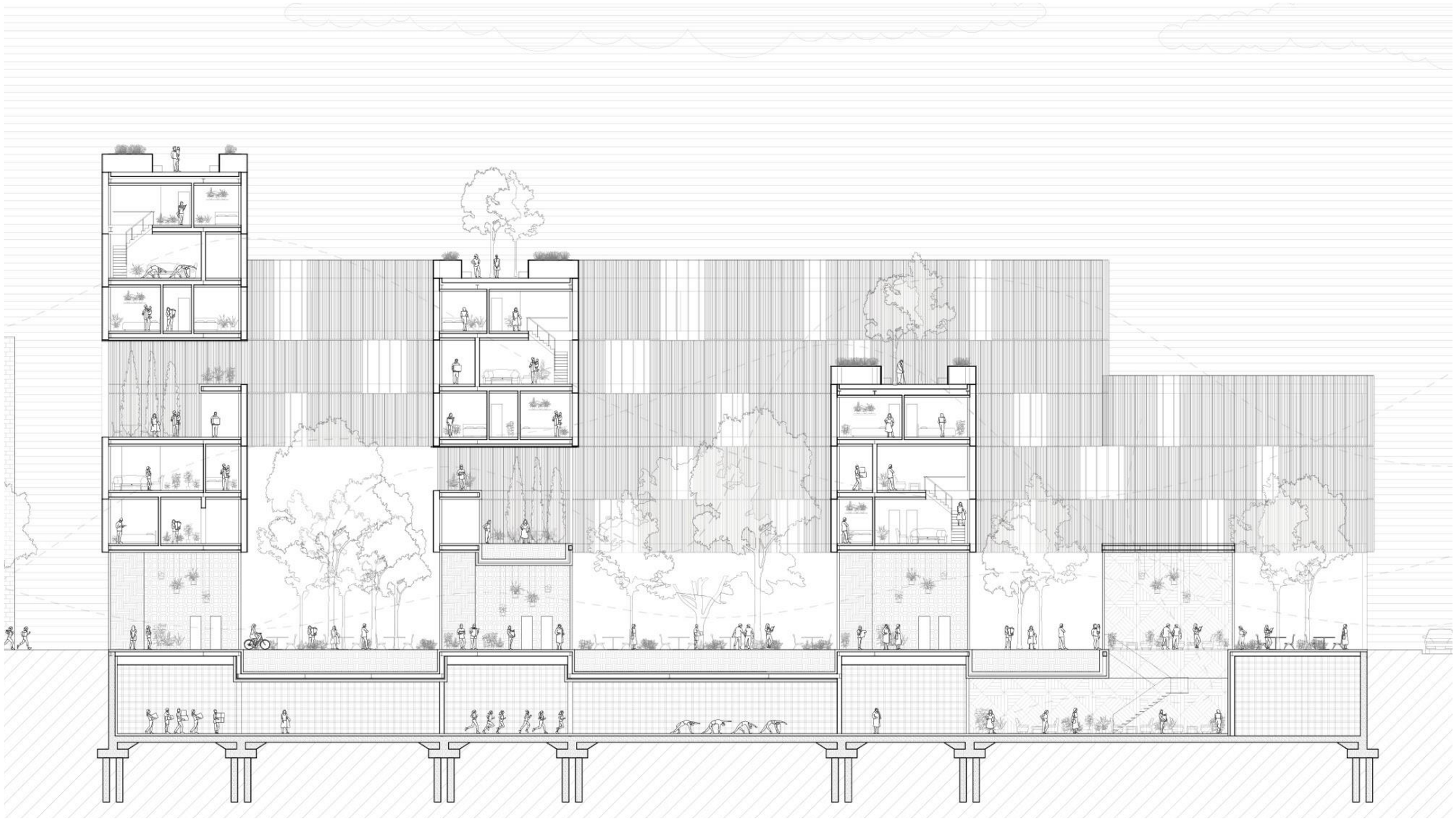
Green Pocket / Shared Balcony

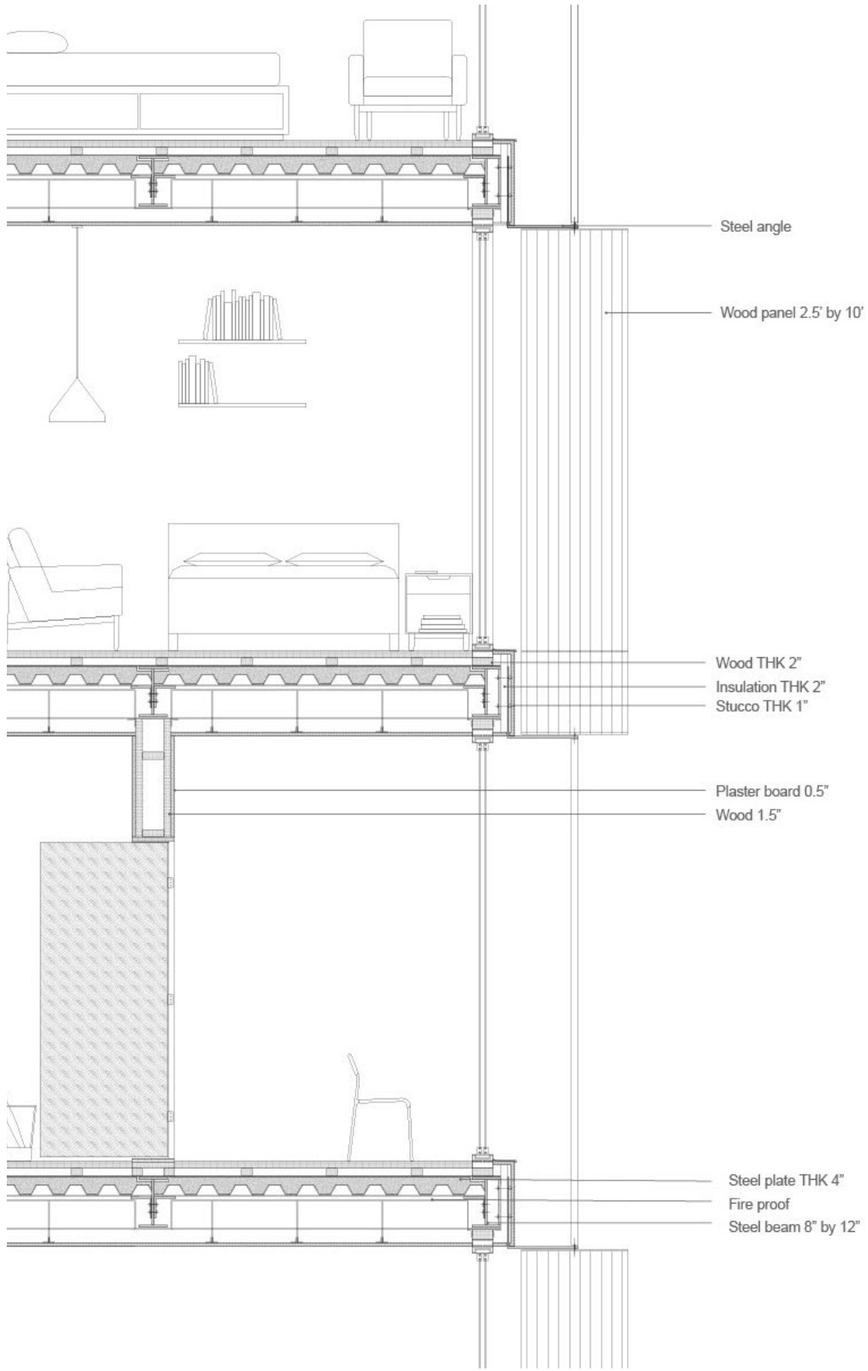
Interior Bedroom View

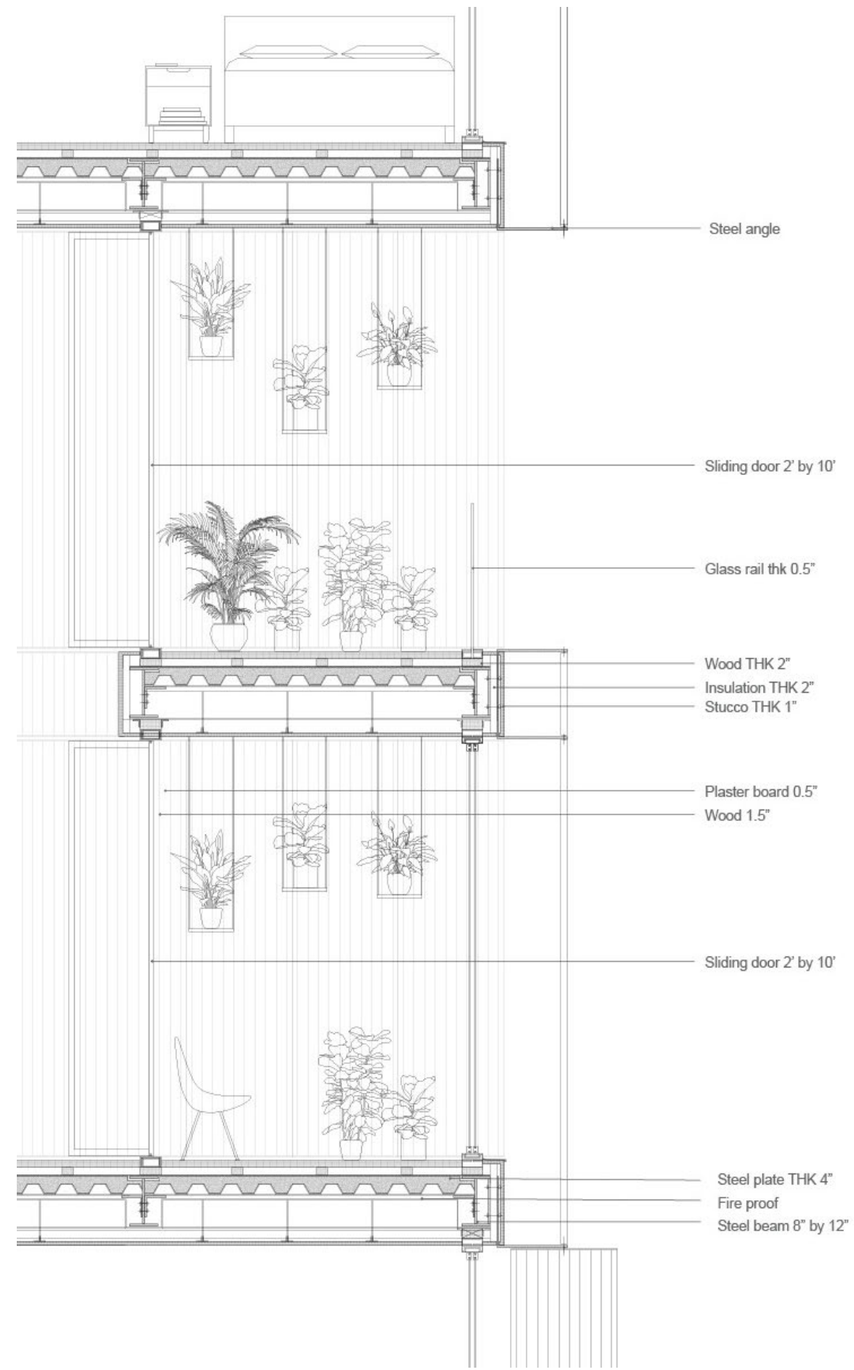
Courtyard and Commercial/Public Space



Level 4




Steel angle
Wood panel 2.5' by 10'
Wood THK 2"
Insulation THK 2"
Stucco THK 1"
Plaster board 0.5"
Wood 1.5"
Steel plate THK 4"
Fire proof
Steel beam 8" by 12"


Steel angle
Sliding door 2' by 10'
Glass rail thk 0.5"
Wood THK 2"
Insulation THK 2"
Stucco THK 1"
Plaster board 0.5"
Wood 1.5"
Sliding door 2' by 10'
Steel plate THK 4"
Fire proof
Steel beam 8" by 12"

02

FARMACY

A Living Library

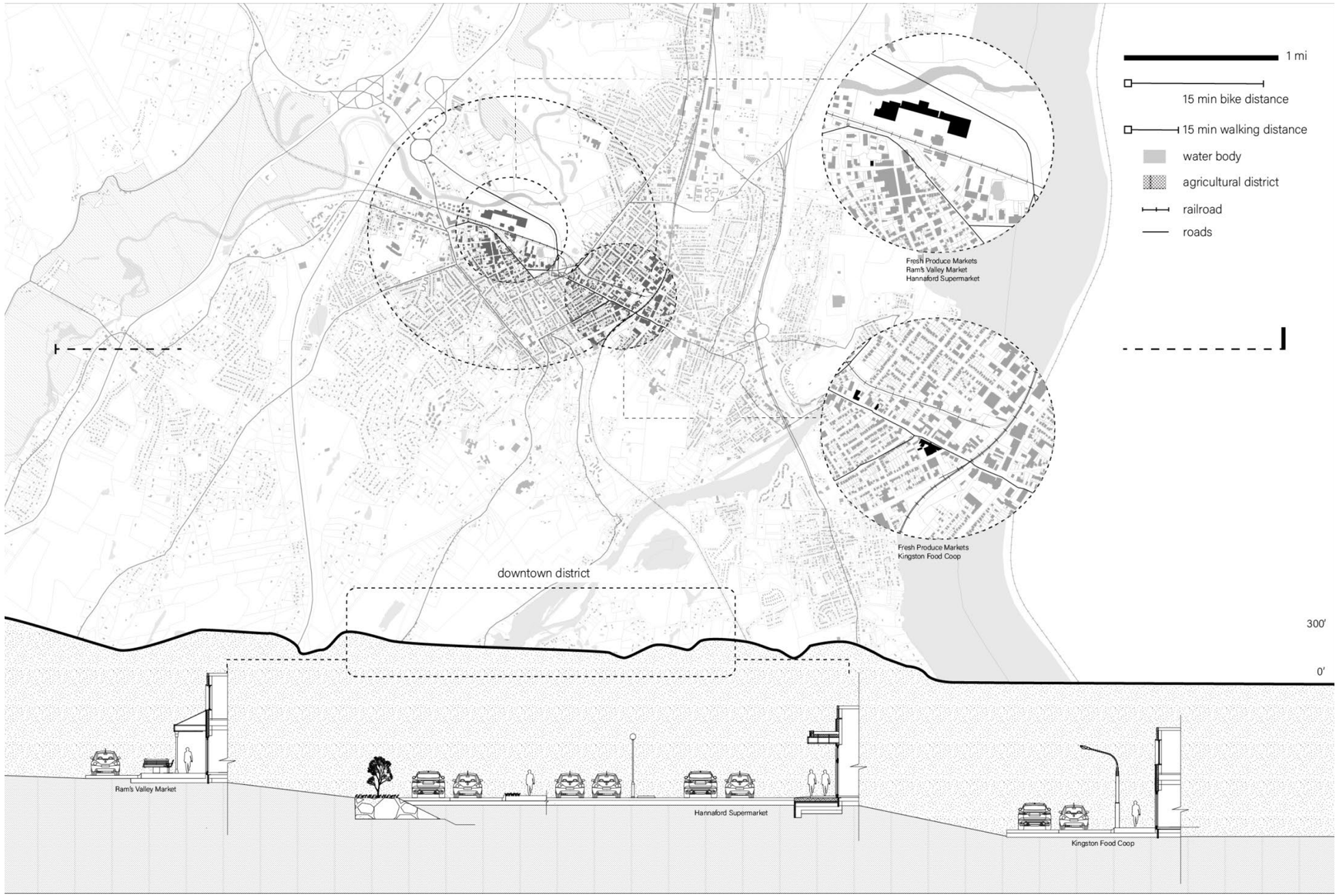
Studio: Advance IV
Site: Mid-Hudson Valley, NY
Program: Vaccination Center/Food Library
Instructor: Phu Hoang
Team: Gizem Karagoz & Karan Matta

'Between 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.

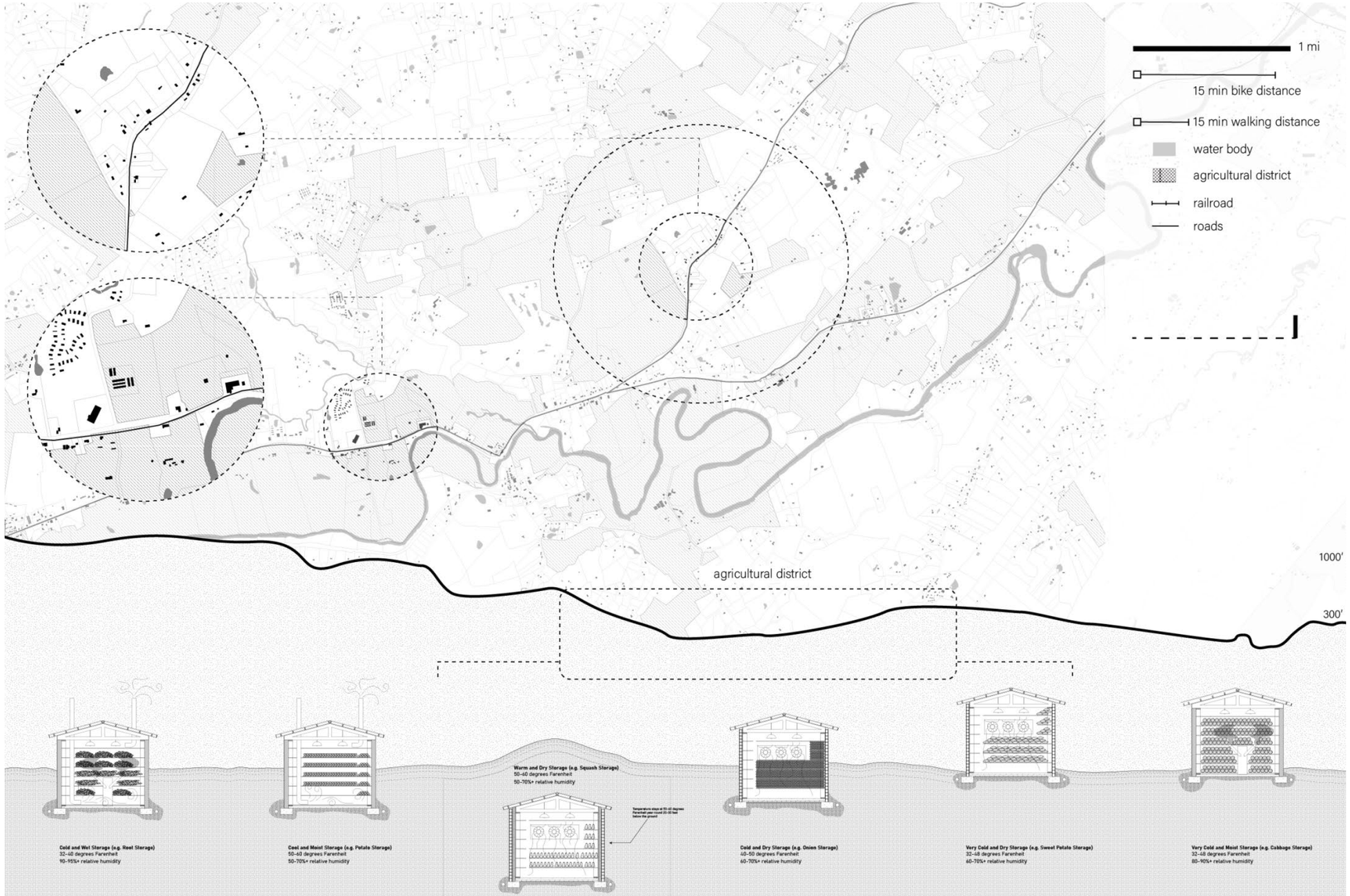
In the near future, one cold storage room sits below four rammed earth wall pavilions, which are constructed as open air spaces to accommodate the vaccination process. The open air structure of the pavilions allow for natural ventilation through the space, while allowing daylight to enter to keep the spaces thermally comfortable.

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. The back most cellar is 20ft deep and stays at the average year-round temperature of 50-60F.

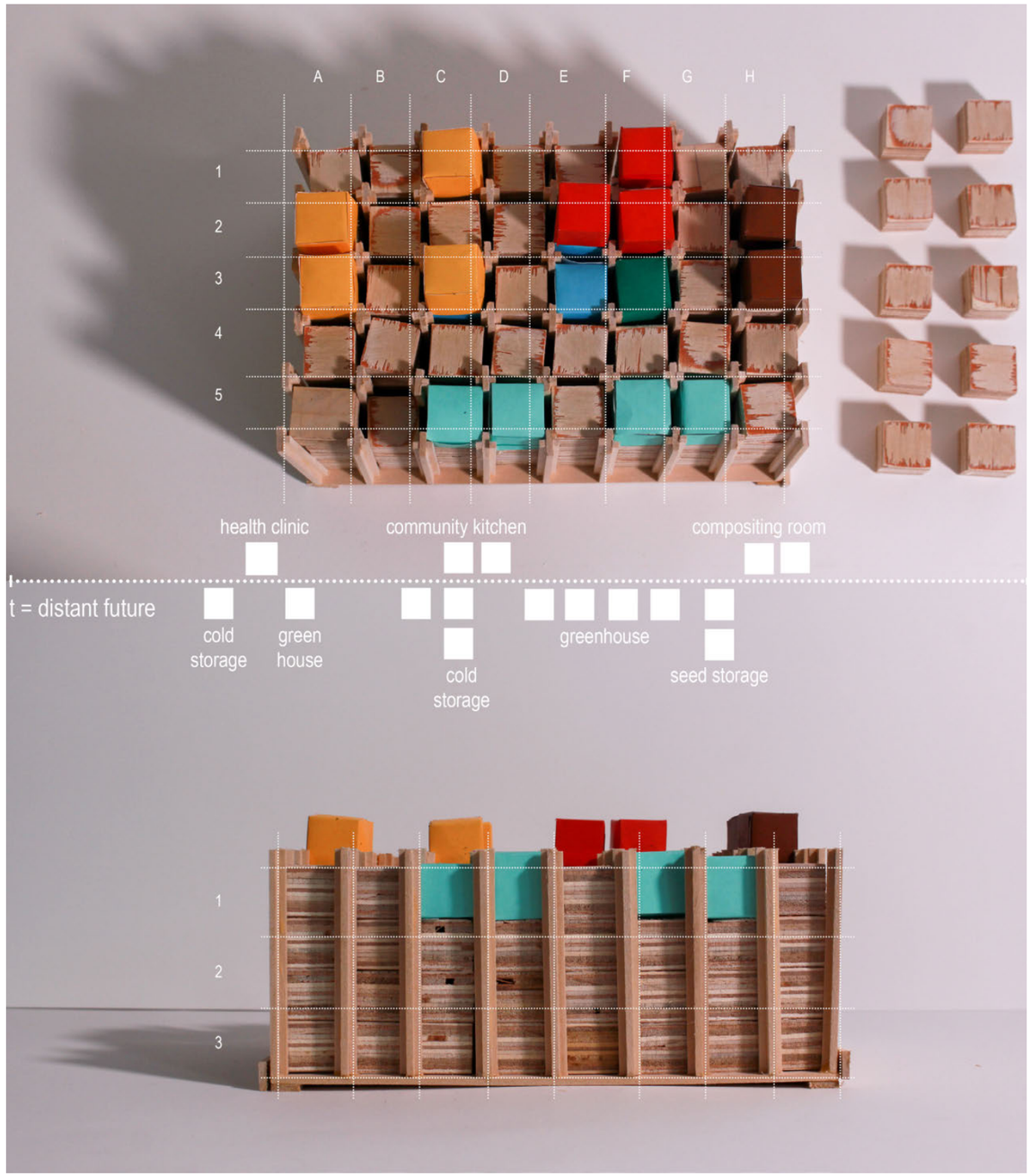
We found the passive cooling capacity of root cellars as an opportunity to support vaccine storage in our near-future program and crop storage in the distant future. Placing vaccine refrigerators in steady passive environments can help reduce its energy demand, and support this shared infrastructure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



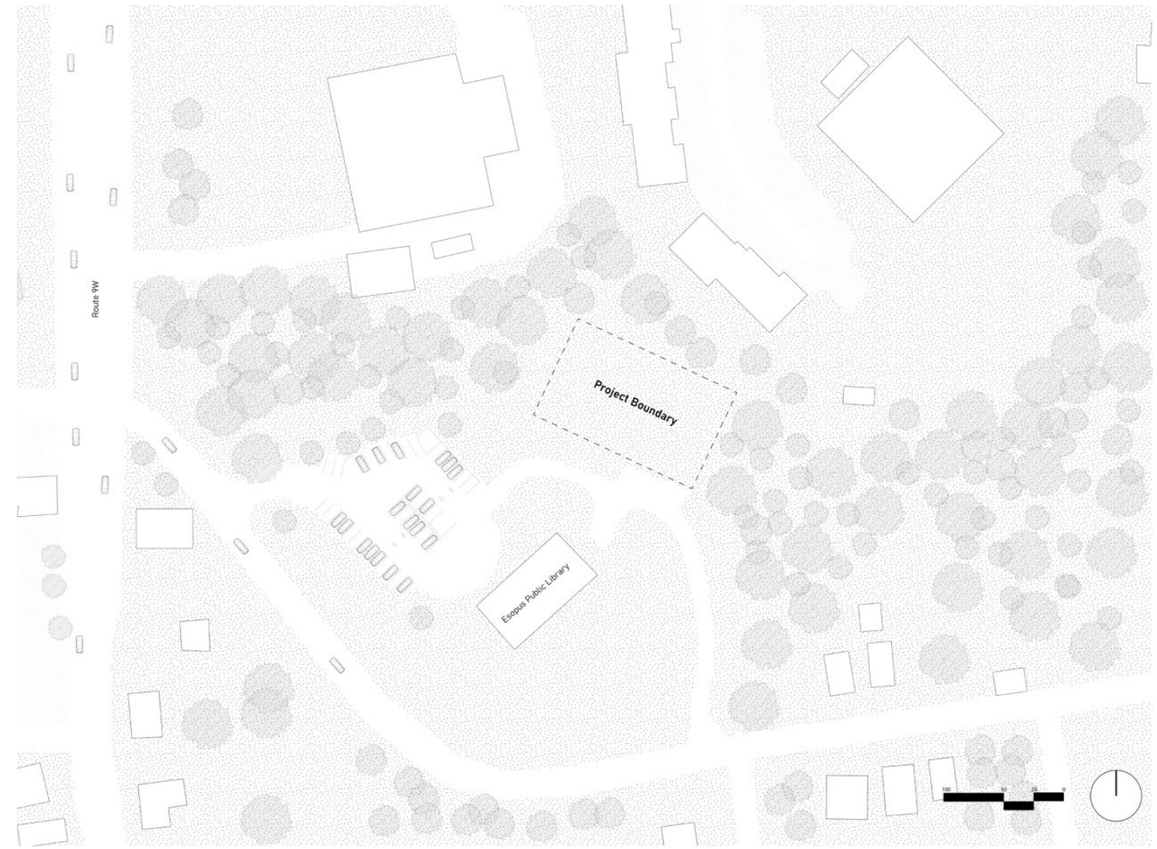
Food Desert Diagram

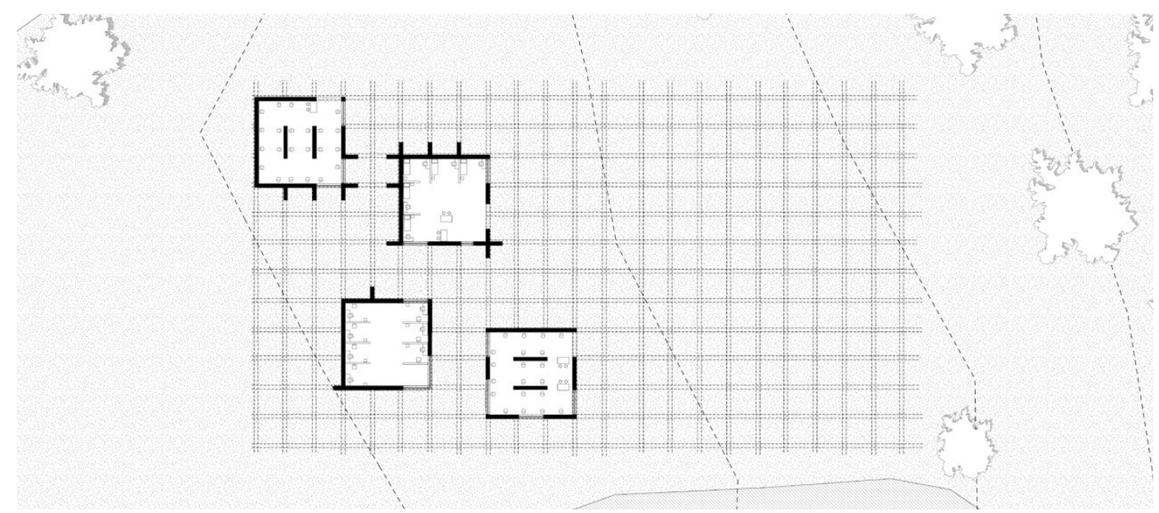


Root Cellar and Thermal Capacity Diagram



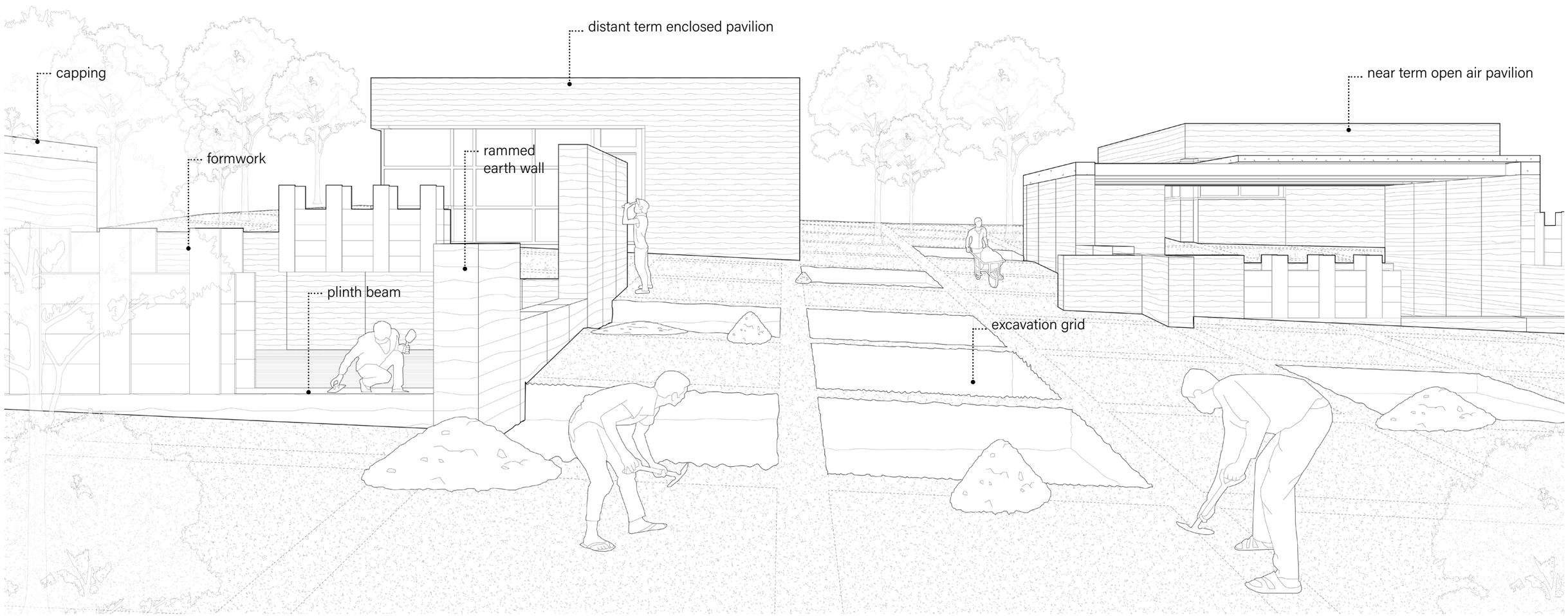
Excavation and Program Correlation Time Diagram





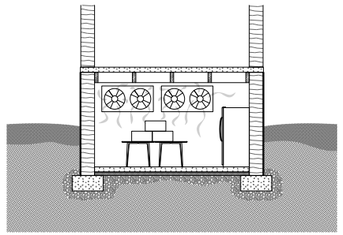
Stage 1: Vaccine Center

Stage 1: Vaccine Center

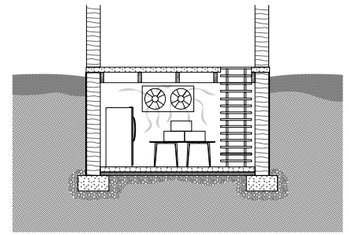


Excavation Phase 2: Transition Between Vaccine Center and Food Library

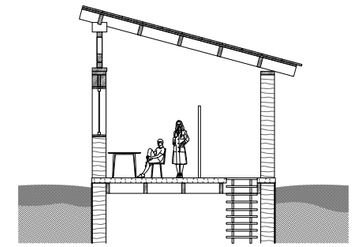
N/A



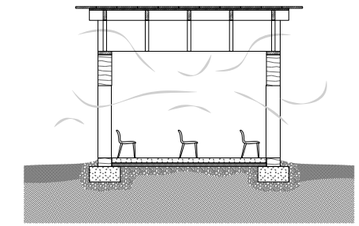
Vaccine Cold Storage



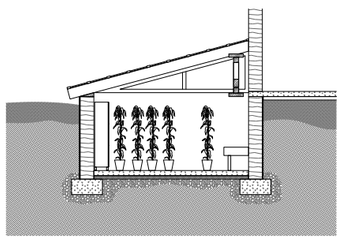
Vaccine Cold Storage



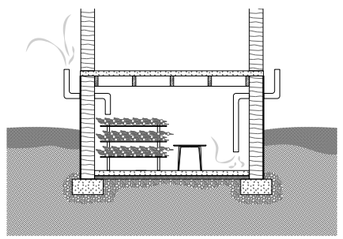
Vaccination Booths



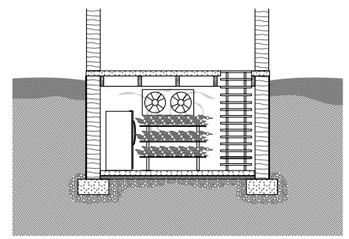
Screening/Waiting Space



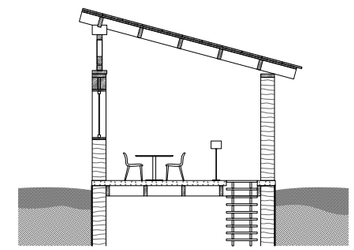
Underground Greenhouse



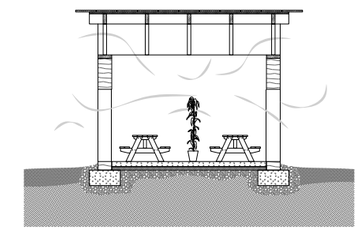
Semi-Underground Root Cellar



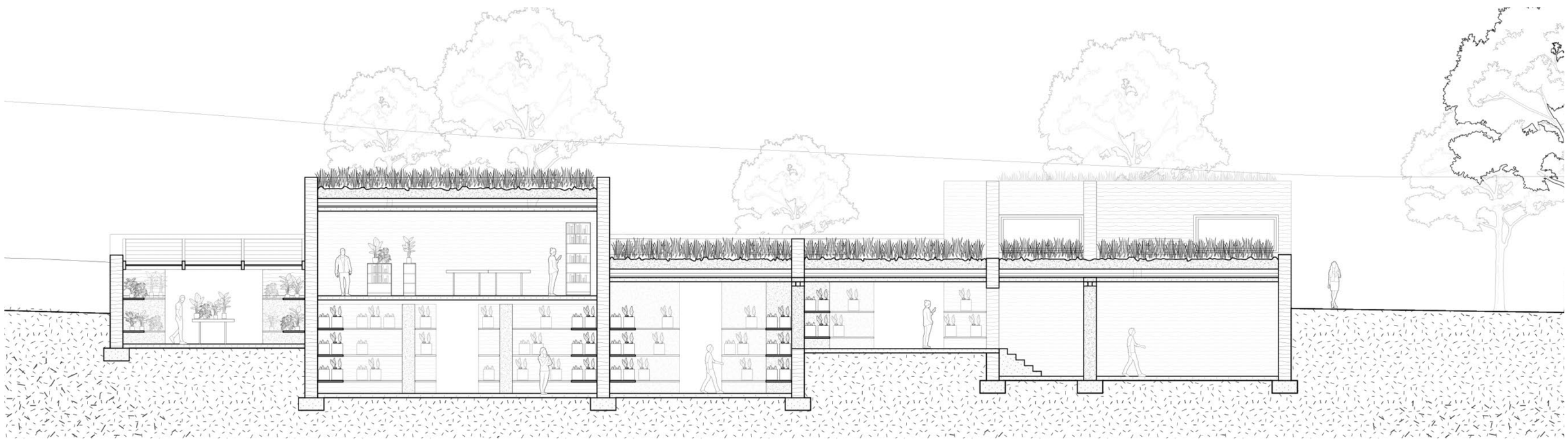
Underground Root Cellar

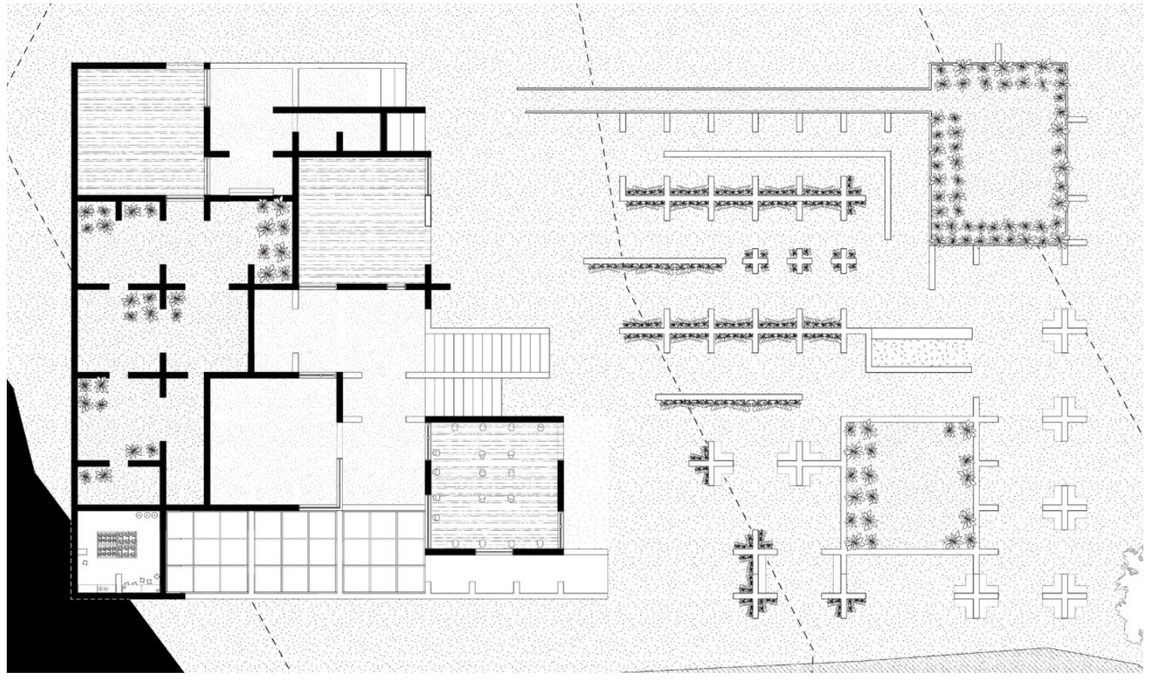


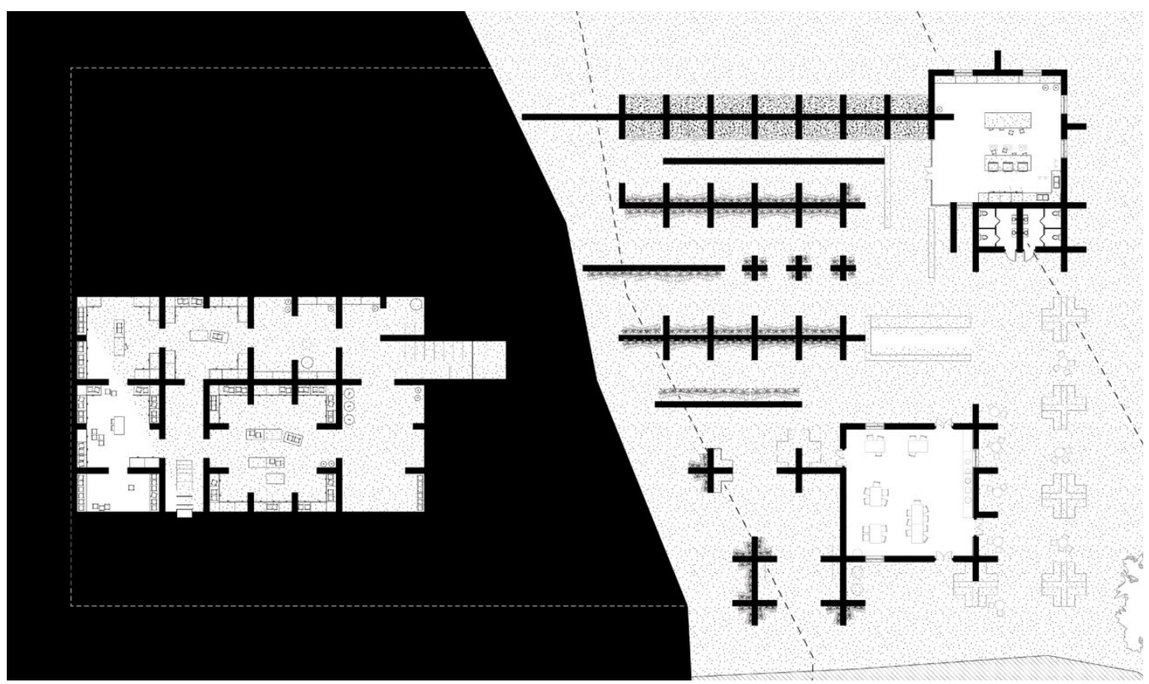
Community Library Space

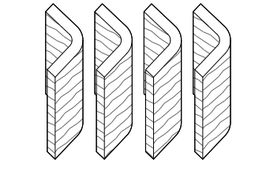


Community Social Space

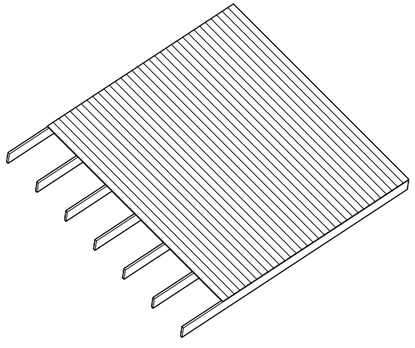




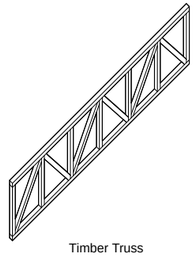




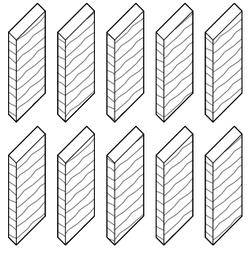
Pre-Fabcricated Curved Rammed Earth Walls



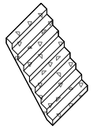
Roof System



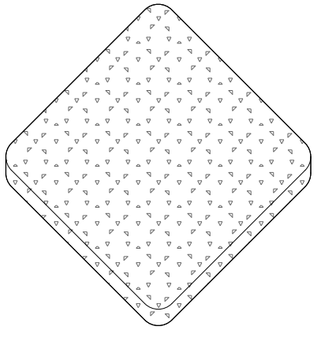
Timber Truss



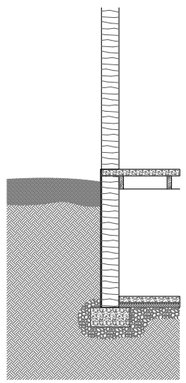
Pre-Fabcricated Rammed Earth Walls



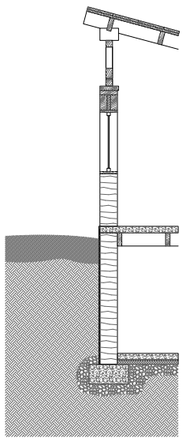
Pre-Fabcricated Stairs



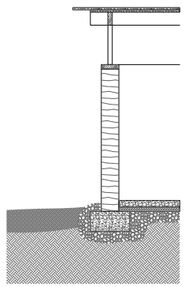
Concrete Platform



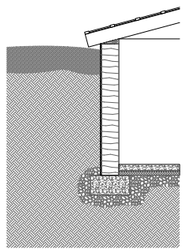
Standard Wall A



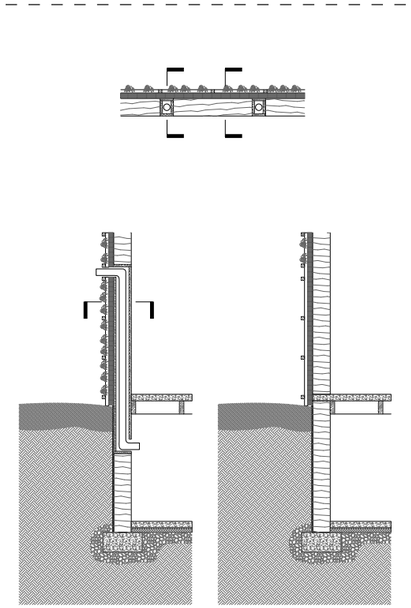
Standard Wall with Window



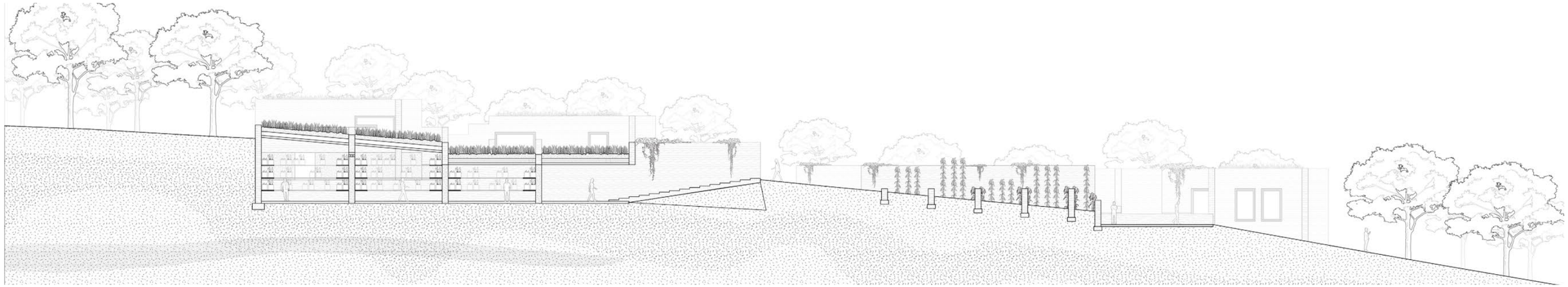
Standard Wall B

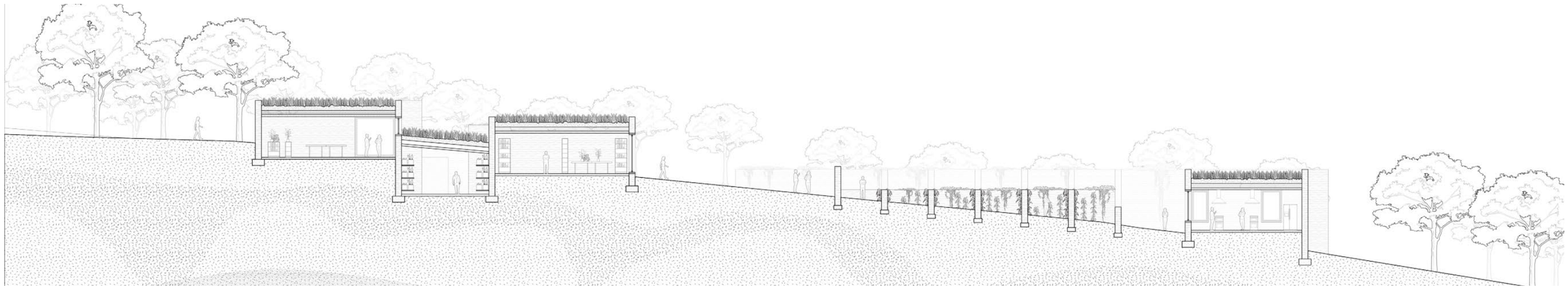


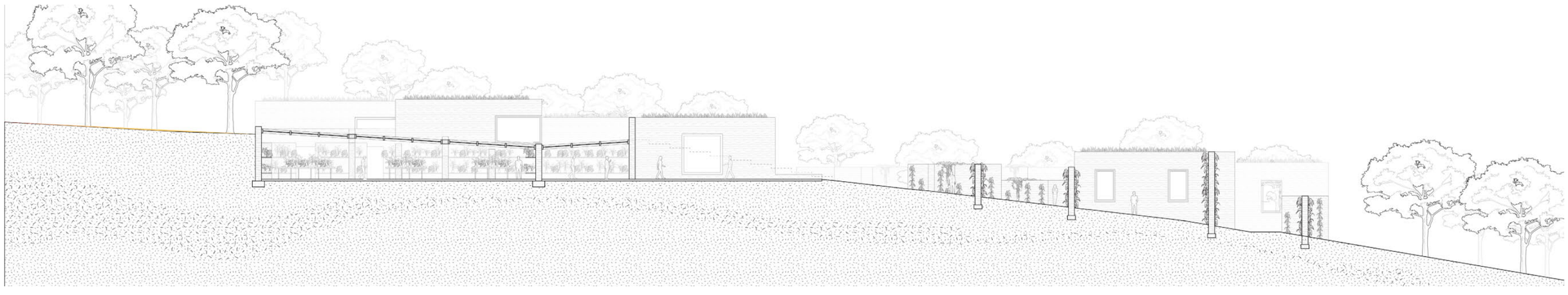
Greenhouse Wall



Rammed Earth Wall + Fruit Wall



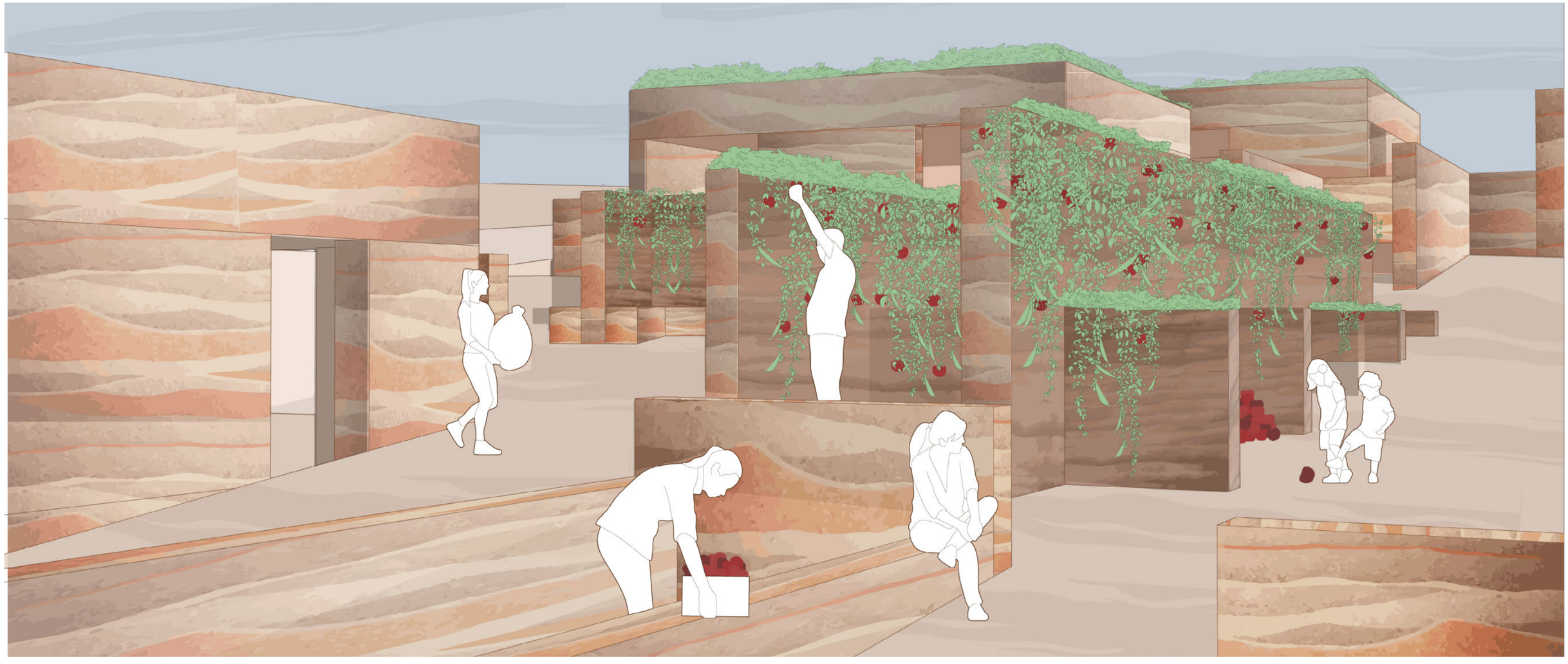




Stage 2: Food Library and Community Center

Stage 2: Food Library and Community Center

Stage 2: Food Library and Community Center



Stage 2: Food Library and Community Center

cold storage
near term vaccine pavillions
composting area
fruitwall garden
community kitchen
food hall
-20 ft. Temp = 55F year round

cold storage
near term vaccine pavillions
composting area
fruitwall garden
community kitchen
food hall
-20 ft. Temp = 55F year round

03

Columbia LDEO

Net Zero Design

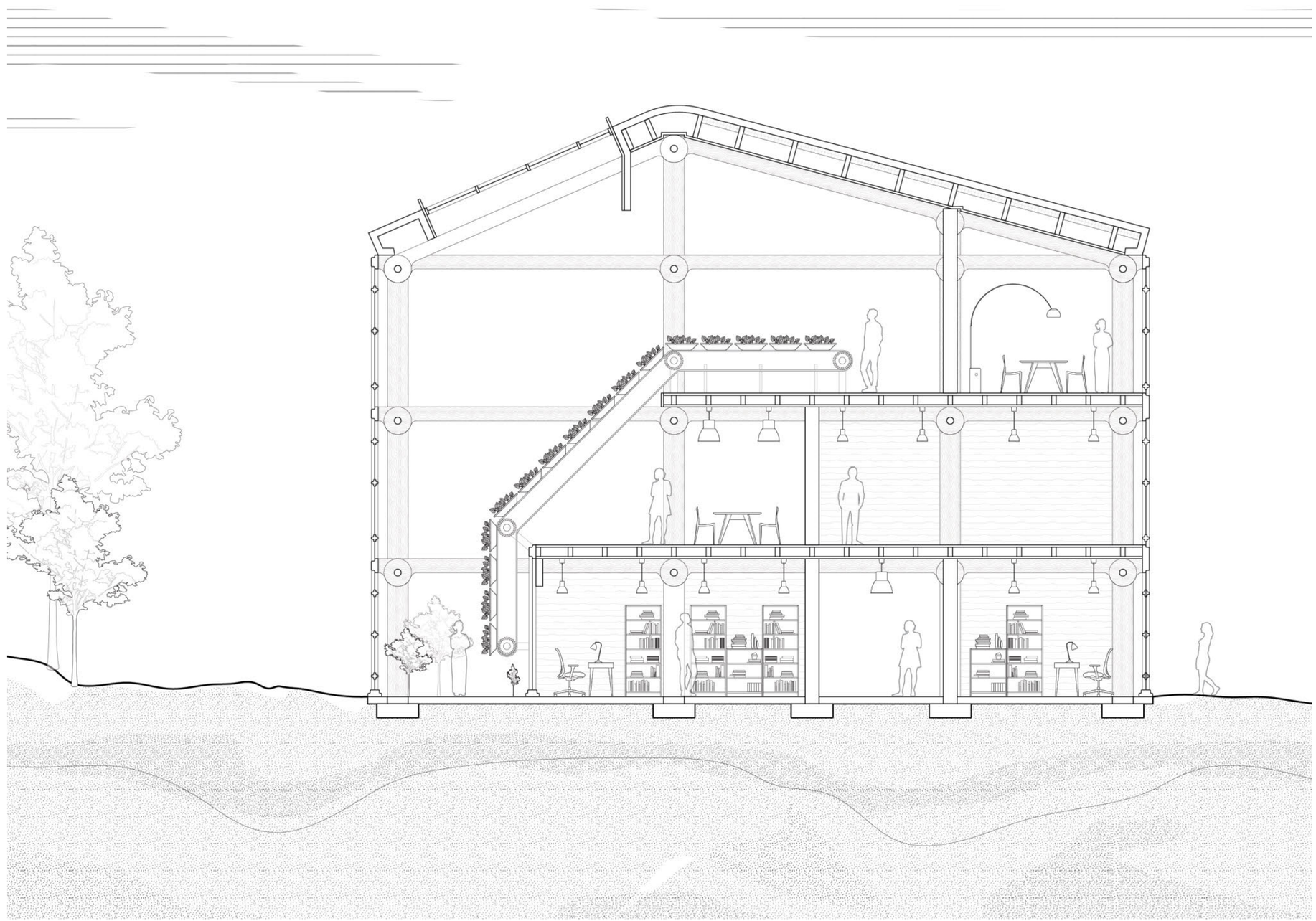
Studio: Advance V
Site: Palisades, NY
Program: Education, Research & Exhibition
Instructors: Mark Rakatansky & Jorge Otero-Palios

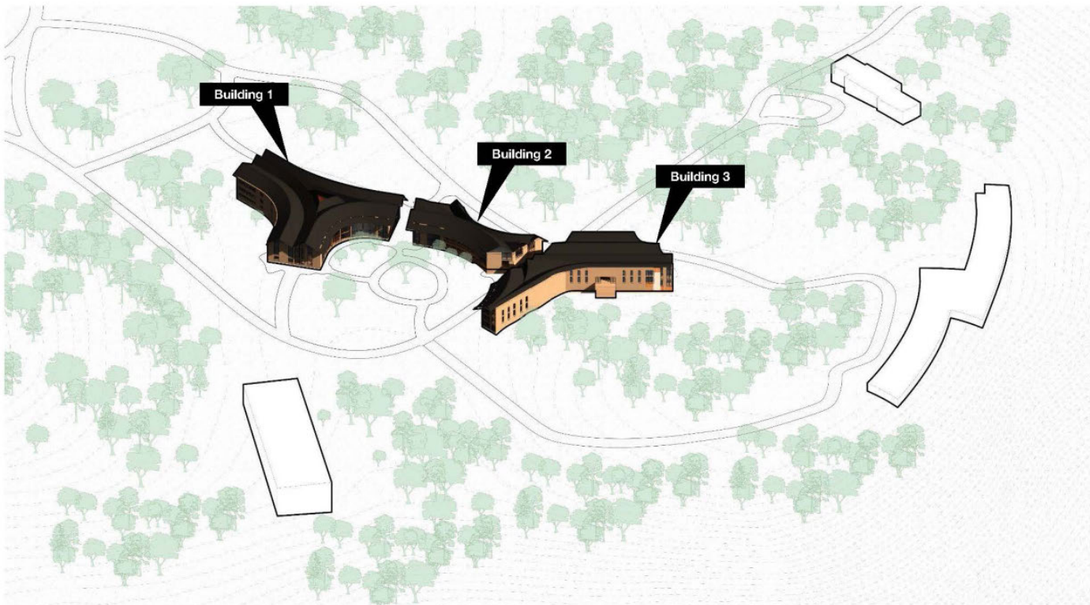
Dual Historic Preservation and Architecture Studio

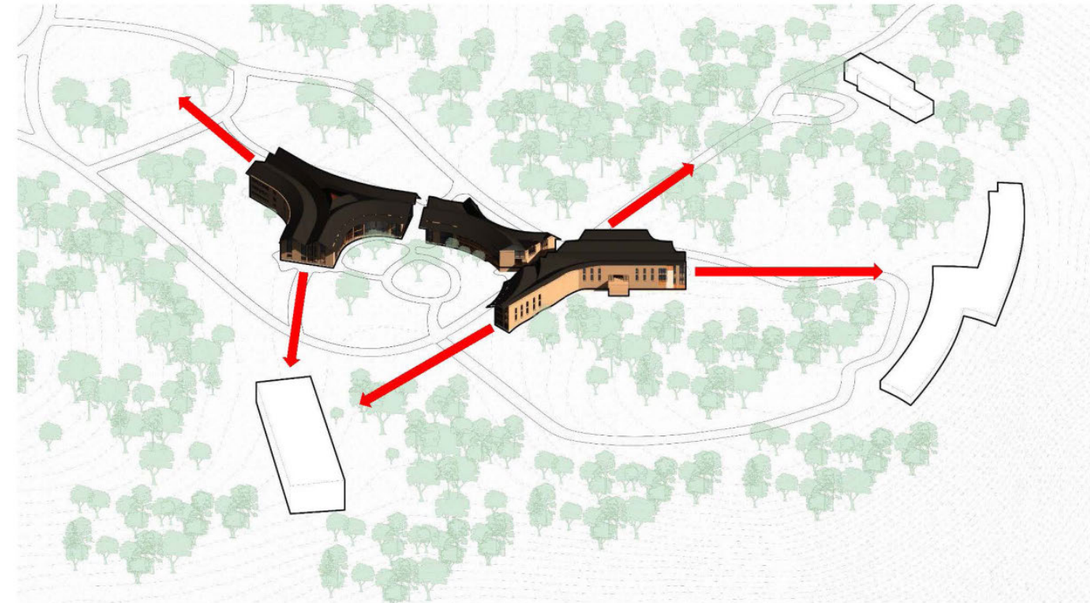
The proposal consists of 3 buildings that are designed with similar language meant to guide residents and visitors through the landscape. Its form emphasized by the language of its roof highlights the continuity that exists among the three structures and the negotiation with the contours and slopes of the hilly site. The form of the building results in the creation of a center and an outdoor commons for the lamont doherty community. In order for the project to relate the context, material identity was a big factor. The structure is primarily a laminated timber frame achieving spans supported by shear walls of rammed earth or wood masonry in certain cases.

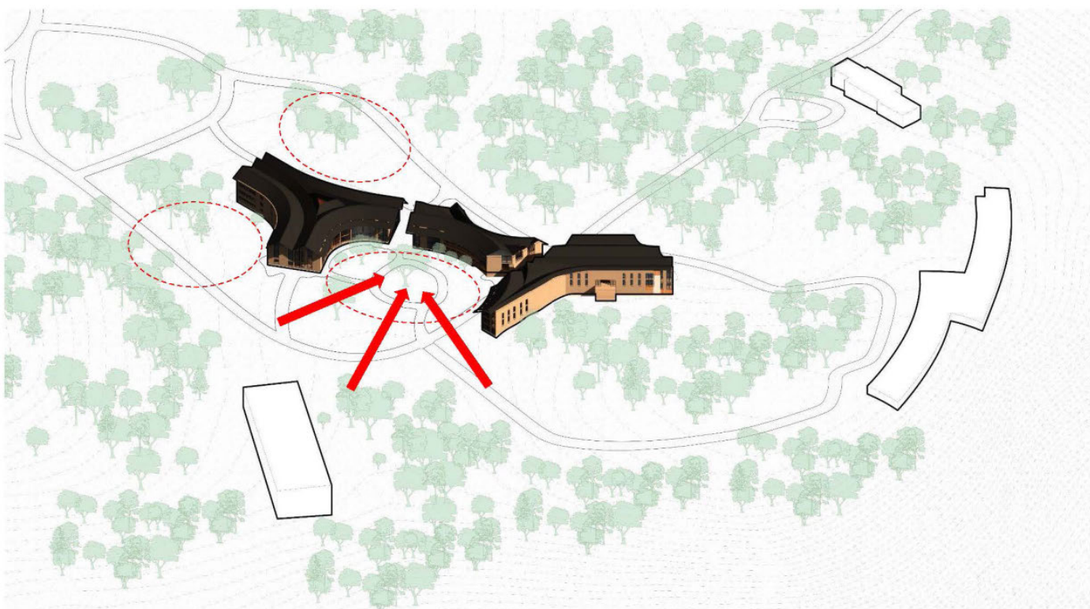
In the site plan we get a better understanding of how the buildings relate to each other in terms of their internal mechanisms and systems such as program, circulation and structure. With the unique topography the buildings that adjusts via ramps and stairs a common circulation spine connects these three buildings.

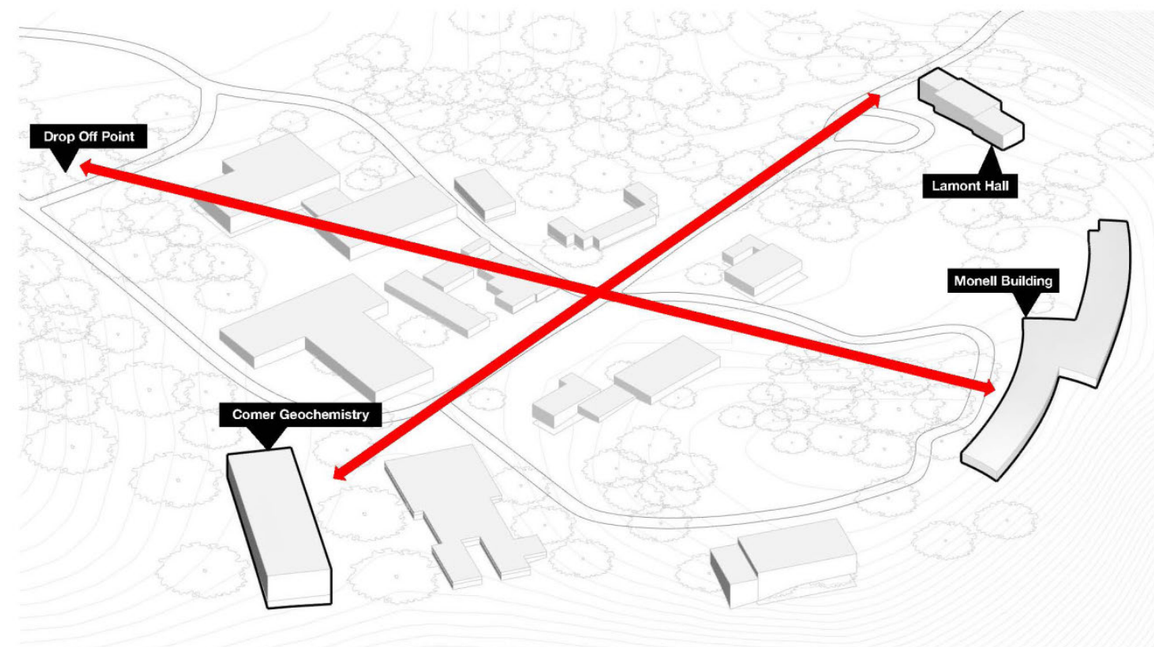
Biophilic design was a key driver in the conception of this proposal. Taking advantage of the existing environmental conditions it was important that the interior spaces was always in touch with the exterior environment in order to foster healthy spaces for learning and growing.

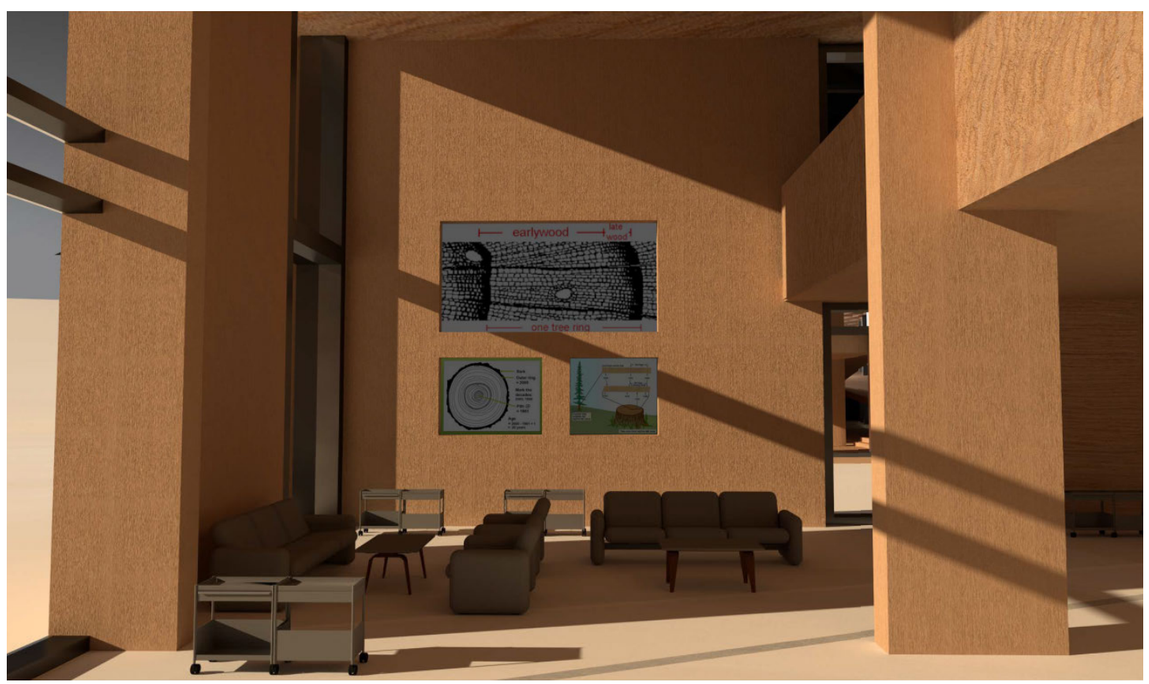


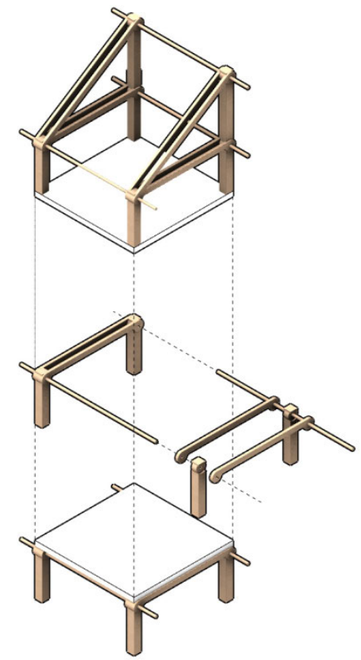

Building 1
Building 2
Building 3






Drop Off Point
Lamont Hall
Monell Building
Comer Geochemistry





Energy Reduction Engineered Timber Structure