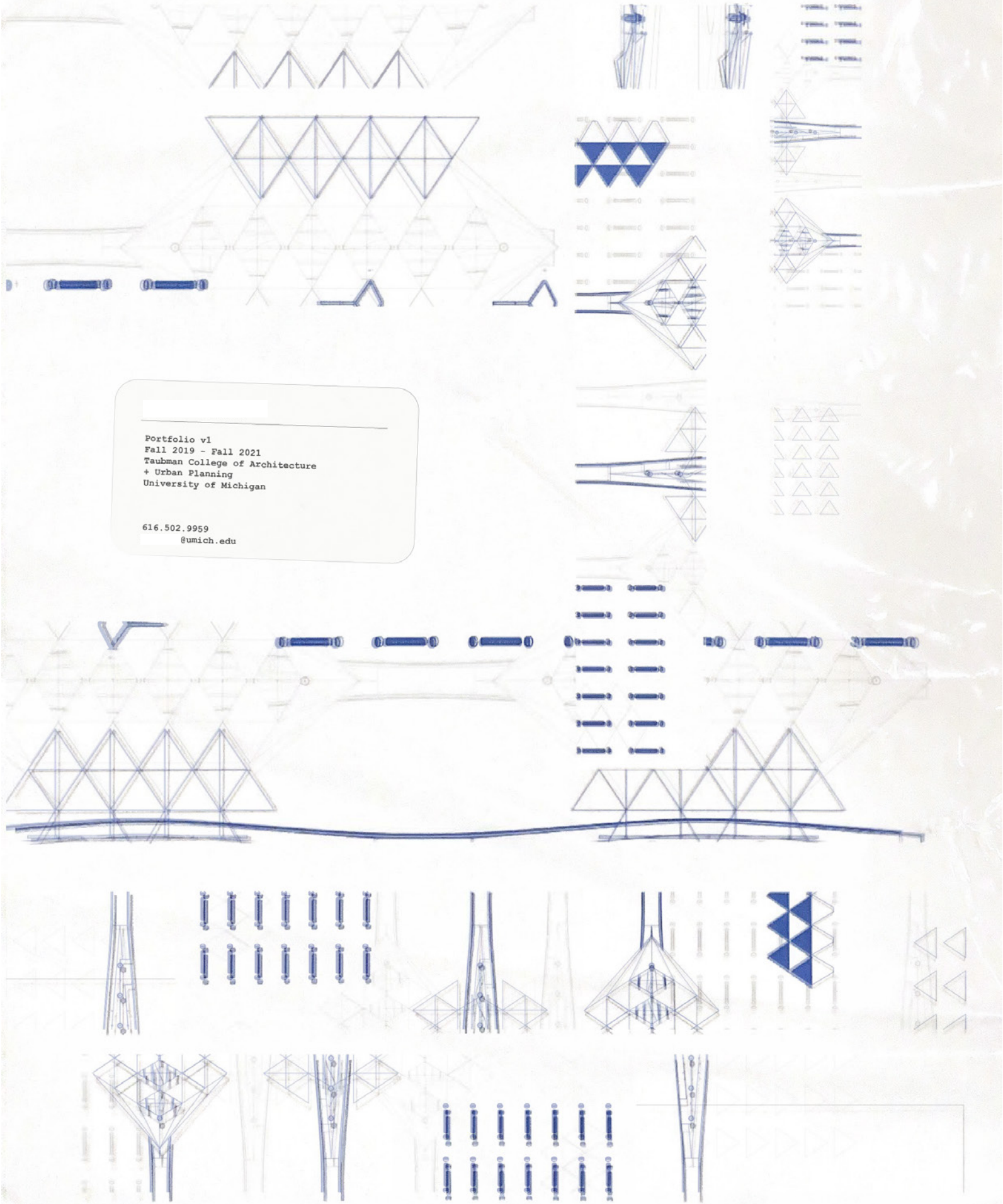

Portfolio v1
Fall 2019 - Fall 2021
Taubman College of Architecture
+ Urban Planning
University of Michigan

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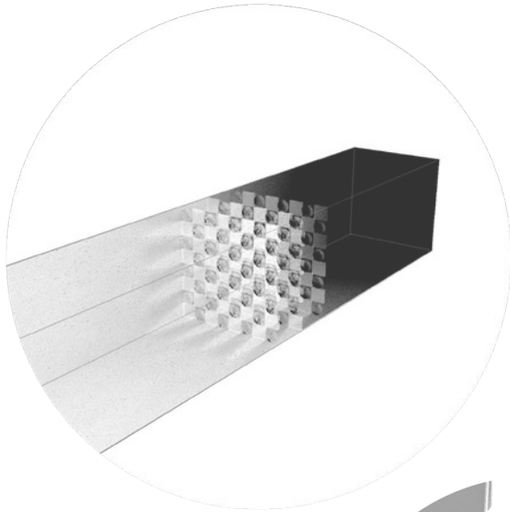
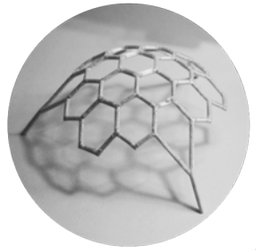
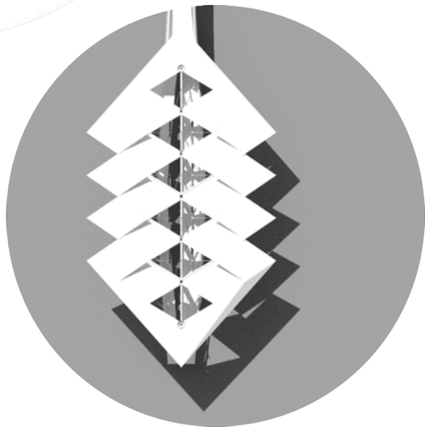



_01

Three Sisters Ranch

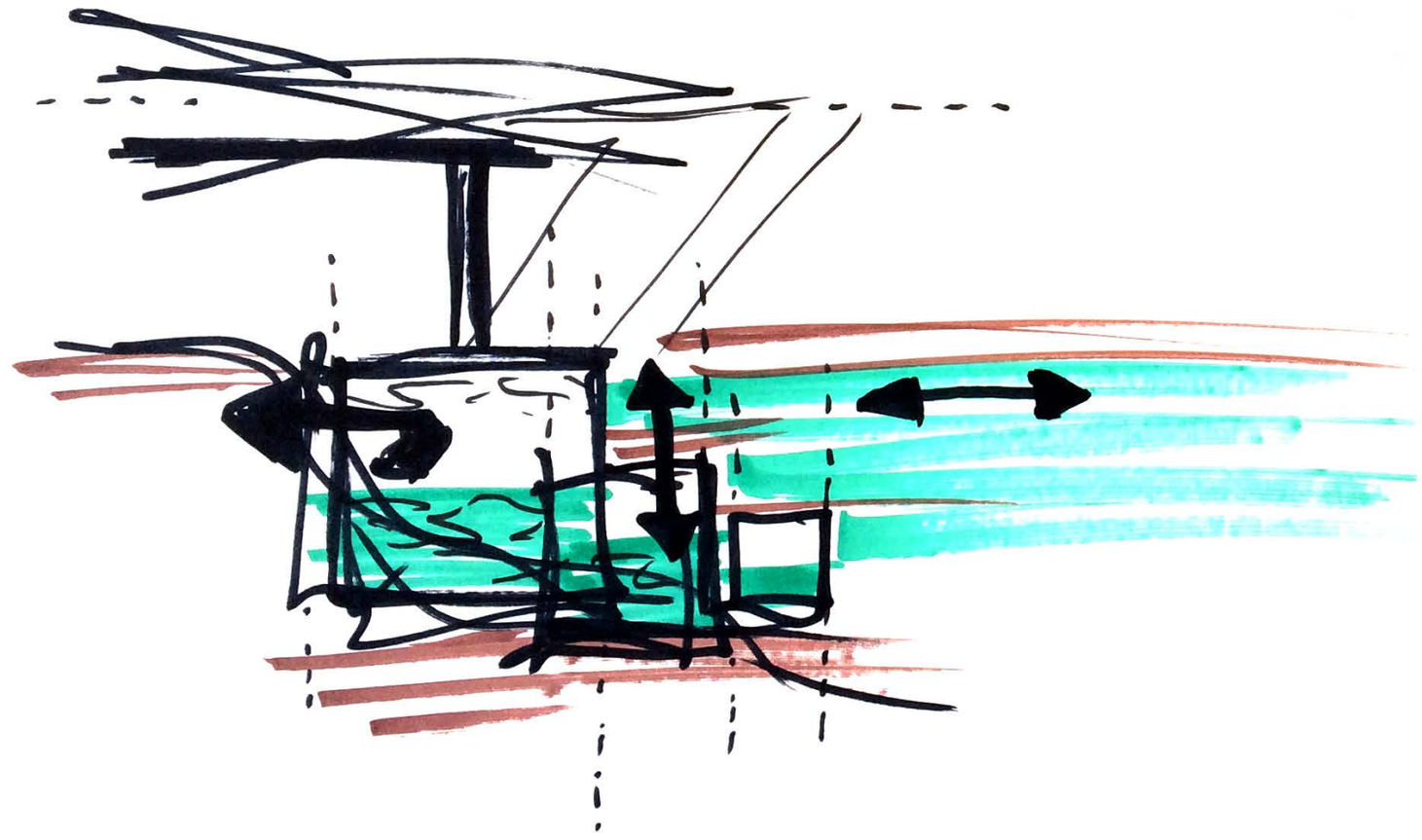
INSTRUCTOR:	**Christian Unverzagt**
COURSE:	**UG Studio 3 (UG3)**
TERM:	**Fall 2020**
STATUS:	**Concept**

Rapidly Electrify + Decarbonize Everything

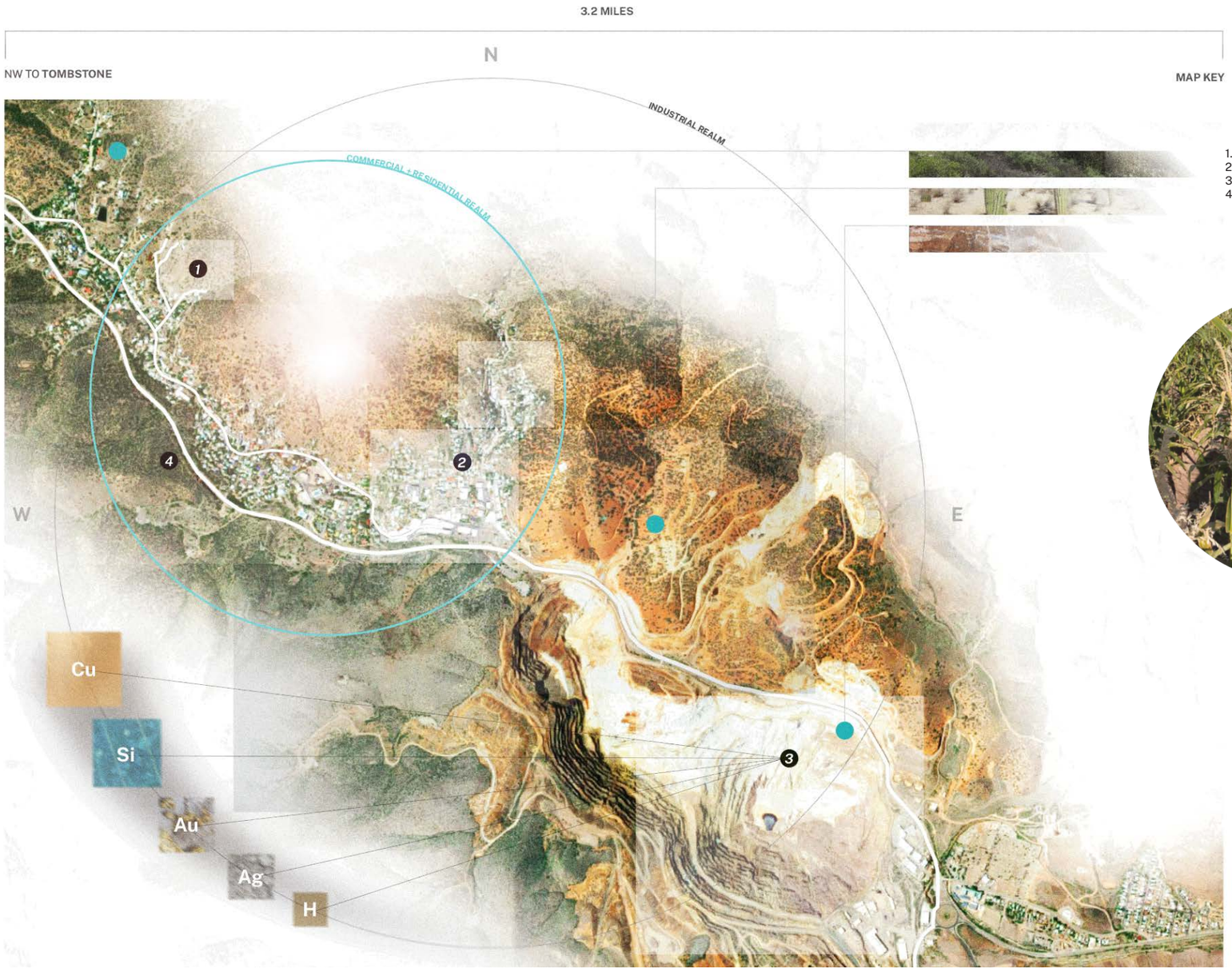
In order to counteract the monolithic impact of self-induced climate crisis, we must make the transition to 100% clean energy production. In 2020, the cheapest source of energy is solar, yet it only represents 11% of the USA's energy market. In short, this project aims to provide a grassroots model for eco-conscious living, utilizing novel energy production methods, new models for living, all whilst providing net negative environmental outputs.

In the third undergraduate studio course, students must produce a "basecamp" dedicated to the pursuit of a more environmentally sustainable future.

Base Parameters	
Buildable Area:	Not Defined
Location:	Bisbee, Arizona
Program:	Experimental Living
Living Capacity:	42 Persons



A preliminary sketch explores the concept of inter-related space, water / land, and overlapping platforms in an arid landscape.



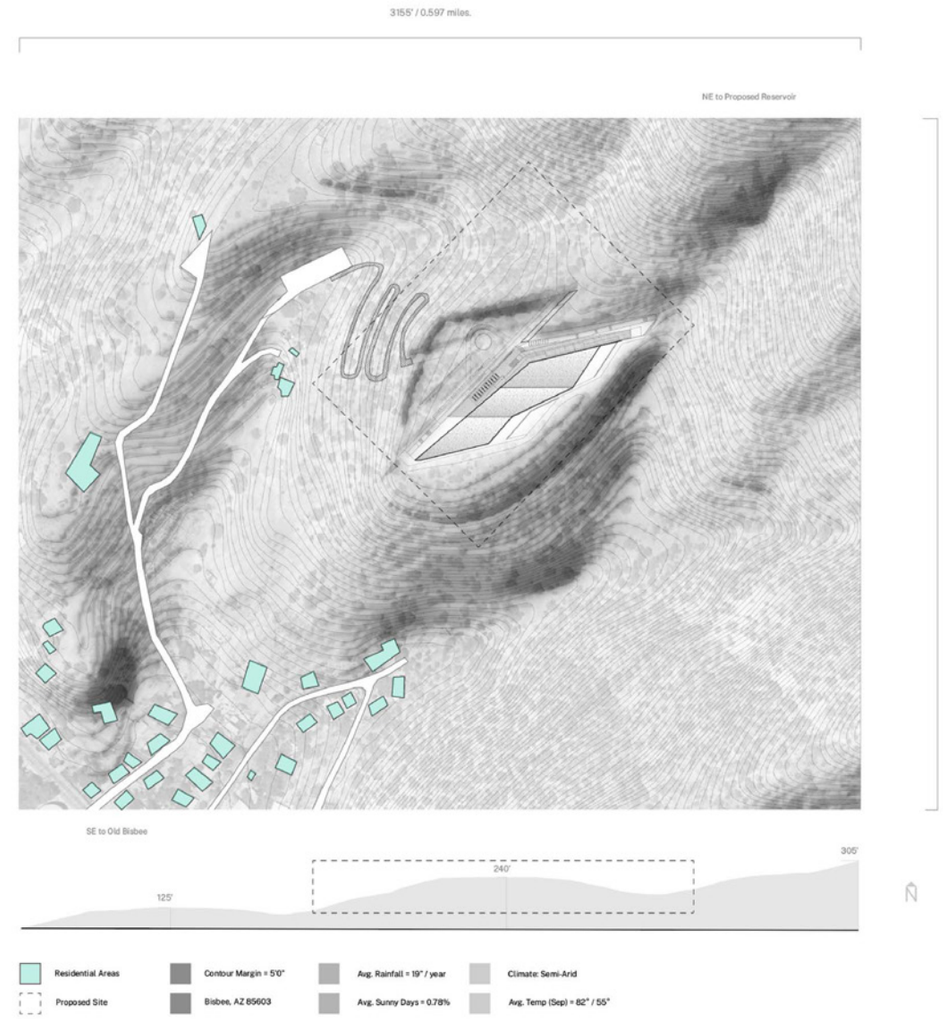
MAP KEY

1. Site — Location of roughly 0.5 square foot site.
2. Downtown — Downtown Bisbee and surrounding residential areas.
3. Lavender Pit — Historic mining location, now offering views and attractions.
4. Highway AZ-80 — Primary highway running East / West.

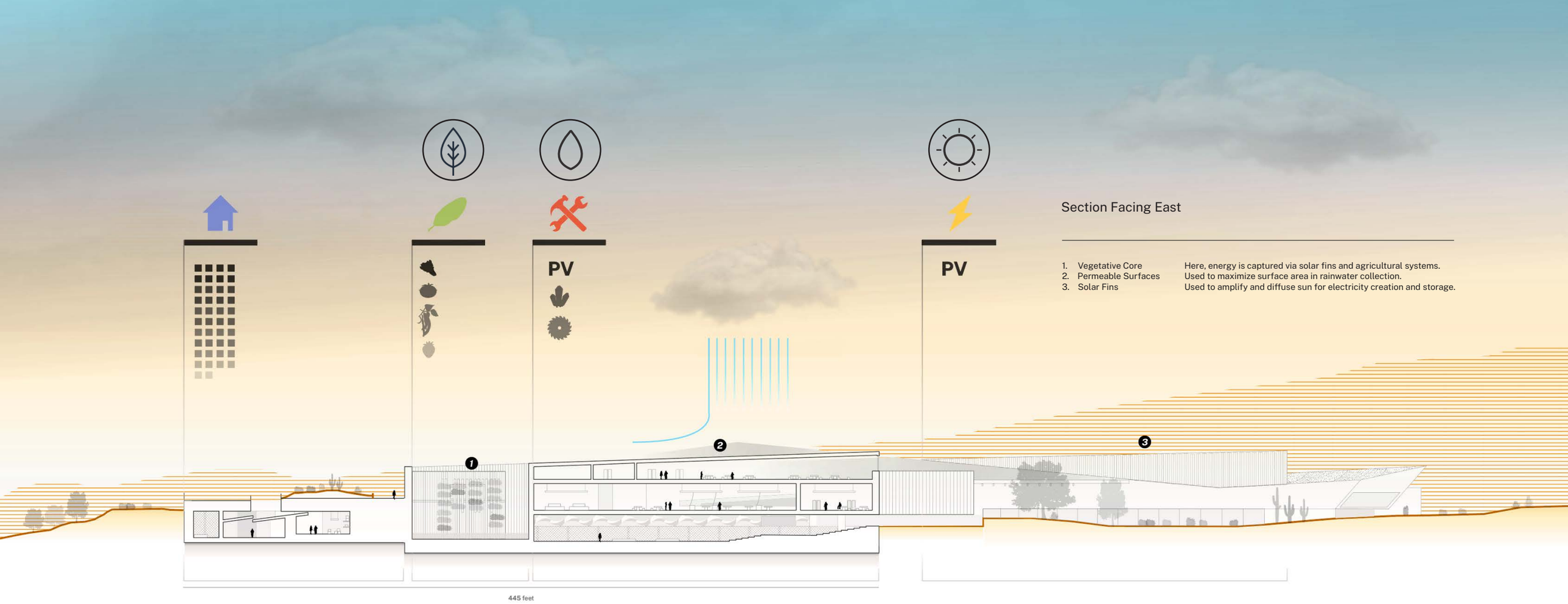
Located in southern Arizona, Bisbee was a historic mining town known for its abundance of precious metals and industry. After a resource depletion in the early 70s, the housing market crashed, bringing Bisbee into a place of disrepair. The decrease in housing costs attracted eccentric personalities from across the country, creating a town now known for boutique clothing stores, restaurants, and eclectic art galleries.

Above, three components of the Bisbee vernacular can be seen: colored, graphic walls, ad-hoc construction methods, mining, and arid agriculture. While Bisbee's mining glory has certainly passed, remnants make up a large component of the Bisbee experience.

Located in Bisbee, Arizona, the proposed site has been highlighted. Much of the site remains barren, with desert scrub growing in most of the area. Located just north of downtown, the area between Moon Canyon and Star Avenue was once the site of a large wildfire. Similarly, the site offers great solar exposure and arid conditions.



Above, a diagrammatic view of the site can be seen. To the south, residential buildings scatter the arid hillside. In the center of the site is the proposed Three Sister's Ranch, an experimental living community centered around sustainable energy research.



Section Facing East

1. Vegetative Core — Here, energy is captured via solar fins and agricultural systems.
2. Permeable Surfaces — Used to maximize surface area in rainwater collection.
3. Solar Fins — Used to amplify and diffuse sun for electricity creation and storage.

Three Sisters Ranch is an ideological base camp. This experimental community revolves around rapid decarbonization, low cost cooperative living, all while utilizing low tech solutions for high tech problems. Just as the three sisters planting method combines crops to survive where they couldn't on their own, the basecamp utilizes sunlight, water, and vegetation to create a symbiotic oasis. The project brief has been broken into two categories: functional and social objectives.

The functional objectives include:

Rapidly Electrify and Decarbonize Everything
In order to counteract the monolithic impact of self-induced climate crisis, we must make the transition to 100% clean energy production. In 2020, the cheapest source of energy is solar, yet it only represents 11% of the USA's energy market. In short, this project aims to provide a grassroots model for eco-conscious living, utilizing novel energy production methods, new models for living, all while providing net negative environmental outputs.

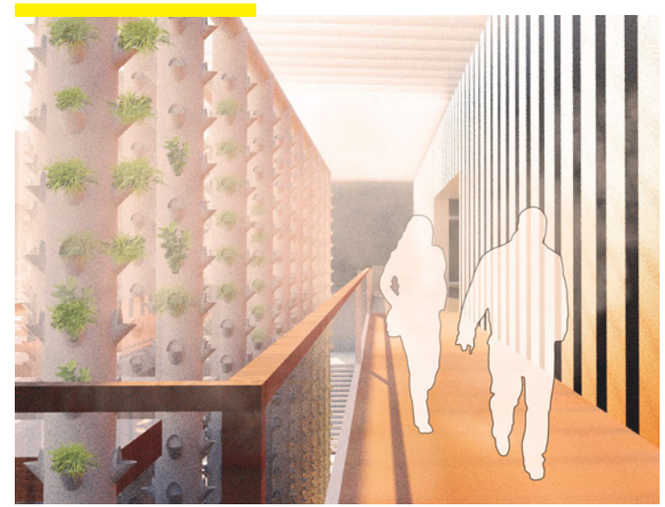
Incorporate "low tech" Sustainable Solutions
Rather than using inaccessible, externally-based high technologies for operation, this architecture will rely on passive, "low tech" systems to provide alternatives to traditional HVAC, laundry, and kitchen utilities.

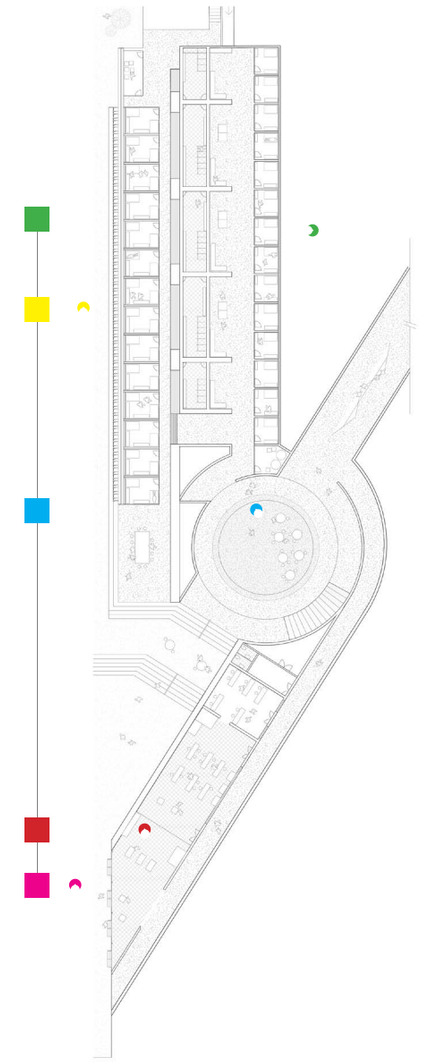
The social objectives include:

Create Co-operative, Purpose Driven Lifestyles
While this architecture serves as a functional model for "decarbonized living," the structure will also empower cooperative, purpose driven lifestyles. In short, this project aims to foster a new model for living, one where the act of consuming is an analyzed, thought-out process. Here, each individual is one unique part in a whole, contributing individual skills and ambitions to one communal organism.

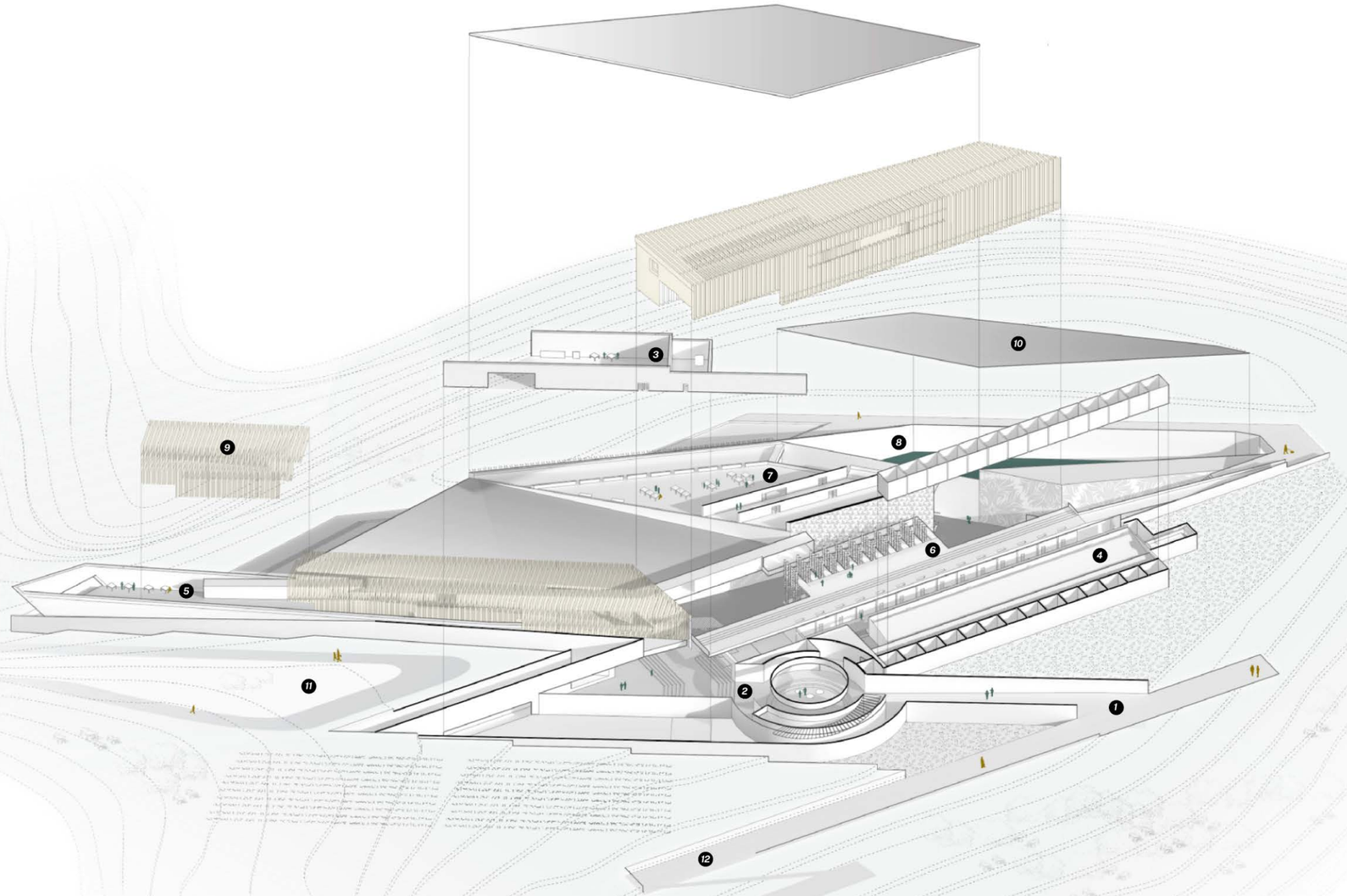
Adopt a "Learn by Doing" Educational Philosophy
In order to rapidly expand the cooperative, decarbonized lifestyle this architecture provides, an equal, accessible educational opportunity must be provided. This can be achieved through a "learn by doing" method. Real skills can be attained, highlighting the doing rather than the knowing of the thing; in this case a model for decarbonized, empathic living.

In short, these "goals" serve as talking points surrounding co-operative living, sustainable living practices, and alternative forms of energy collection in a conceptual sense.





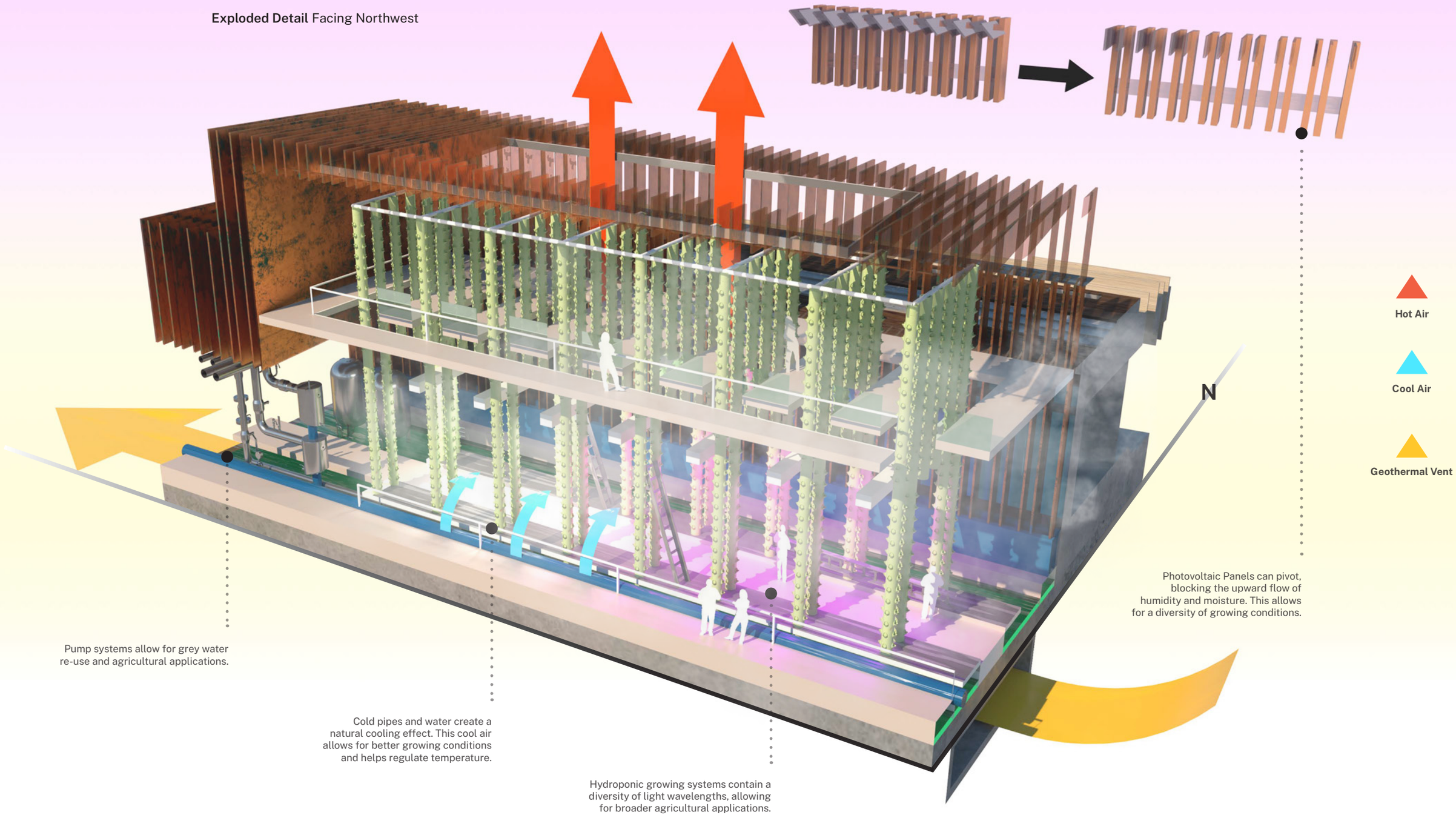
Perspectival Views include gathering rotundas, fabrication areas and an agricultural core capable of producing its own food. On the right, a plan view exhibits the “residential” half of Three Sisters Ranch.



Exploded Isometric View Facing South

1. Entryway — Entrance to basecamp is underground. Passage serves as an integral component of air flow.
2. Vestibule — Serves as a gathering place for residential and public inhabitants. This space also regulates temperature via air vents and proximity to thermal massing.
3. Fabrication — Multi-purpose fabrication areas provide opportunities for inhabitants to fix, repair, and produce their own solutions to basecamp upkeep.
4. Residential — The residential block provides housing for 42 inhabitants. Modular rooms provide their own solar energy and cooling effect due to in-ground construction.
5. Library — The interdisciplinary library is a resource for both public and internal members of Three Sisters Ranch. Inhabitants are encouraged to conduct their own research using the library.
6. Core — In the Vegetal Core, energy is captured via solar fins and hydroponic agricultural systems.
7. Studios — Upper Floor Studios are intended for “dry-lab” work. Similar to an architecture studio, this space is intended for both individual and collective work efforts.
8. Water — Here, the basecamp’s water is stored via a large subterranean pool. A gravity pump system is used to pump this water between the camp and a reservoir located on higher ground. This system is used to capture kinetic energy as water flows down from a higher point.
9. Solar Fins — Solar “fins” contain light amplifying fresnel lenses, mirrored surfaces, and translucent PV panels to effectively capture solar energy while alowing light to pass to the vegetal core inside.
10. Surfaces — Slanted roof surfaces contain vegetative components and impermeable surfaces to collect water.
11. Trails — A series of trails / running track provide inhabitants with a furthered connection to the outside.
12. Walkway — Here, inhabitants can travel back and forth from the parking area.

Exploded Detail Facing Northwest



Above, students in UG2 use scale boat measurements to inform design thinking.

_02

ALLUVIUM

INSTRUCTOR: Neal Robinson
COURSE: UG Studio 2 (UG2)
TERM: Spring 2020
STATUS: Concept

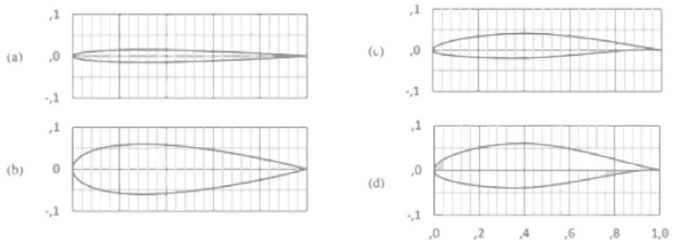
Objectives:

Create a boathouse on the Huron River intended for public and competitive access.

Using sand “alluvia” as inspiration, create a structure that allows for easy access to river via long “racing shells” used in competitive rowing.

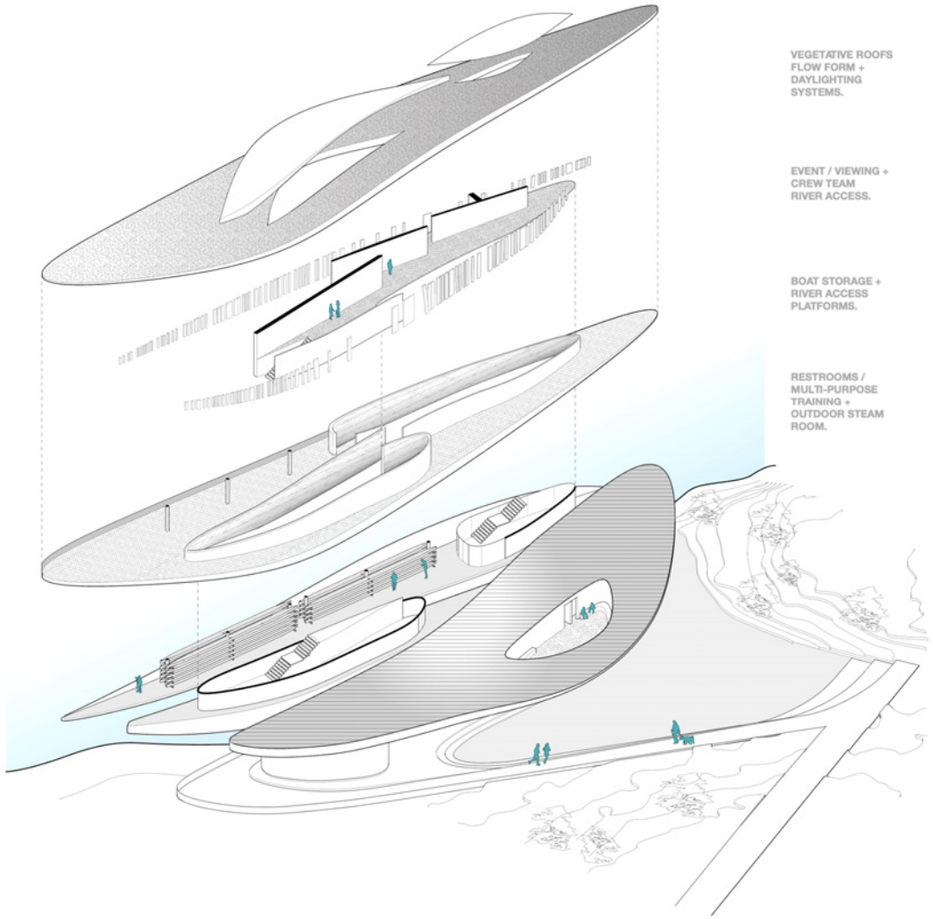
Design a minimally invasive structure, honoring existing marsh conditions, and celebrating the gradient that occurs between dry land, and open water.

Base Parameters	
Buildable Area:	Not Defined
Location:	Ann Arbor, Michigan
Program:	Public Boathouse
Biome:	Temperate Moist Forest



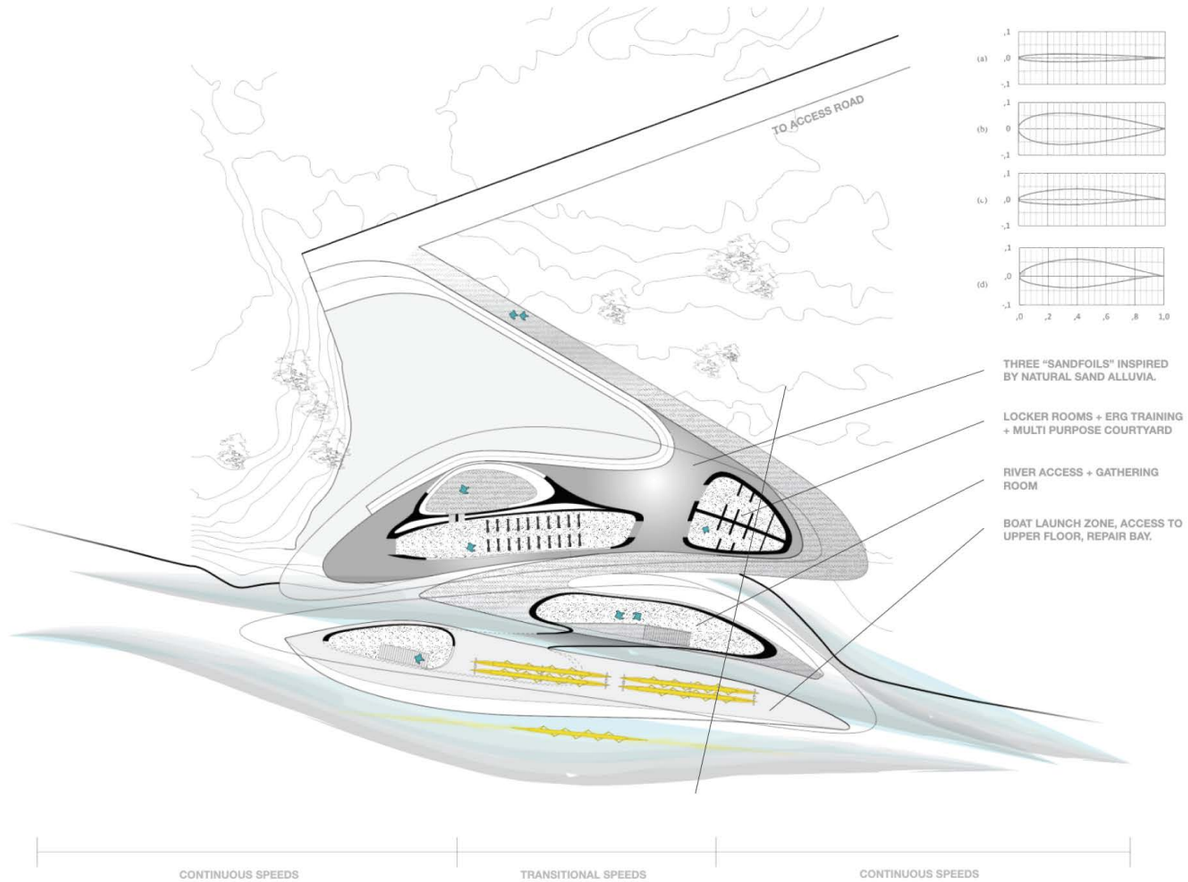
The Huron River Watershed gives life to an abundance of macro and micro organisms, each contributing vital components to the ecosystem that includes municipalities around south-east Michigan. Much of this life relies on the kinematics of water, allowing for specific sediment and chemical compositions to persist. Taking this effect into consideration, the boathouse is designed to complement and accentuate the natural flow of water in an ecologically conscious way. Above, are alluvium, natural sediment formations found near waterways and deltas. These formations allow for a variety of water conditions to exist, furthering the diversity of ecosystems available in a given area.

By creating a boathouse that complements these natural forms, the natural gradient from land to open water remains intact. To the left, this land-water transition is shown. Located at Bandemer Park in Ann Arbor, Michigan, the boathouse is located within the highlighted section, an area of considerable organismal diversity.



Exploded Isometric View Facing Southeast

On upper level: vegetative, alluvium inspired forms can be seen. Covered daylighting systems incorporate natural visibility below. Below the roof is gallery and river viewing zones. Two staircases allow for occupants to pass above the flowing river. Finally, two “islands” hold boats and provide easy access to the river in a way that does not halt natural flow.



Lower Level Plan

In plan view, alluvium inspired forms can be seen. Inside the boathouse, locker rooms and training rooms provide space for small teams and public access. Similarly, a sauna/courtyard allows for cold rowers to warm up after a long day of practice or dip in the river.

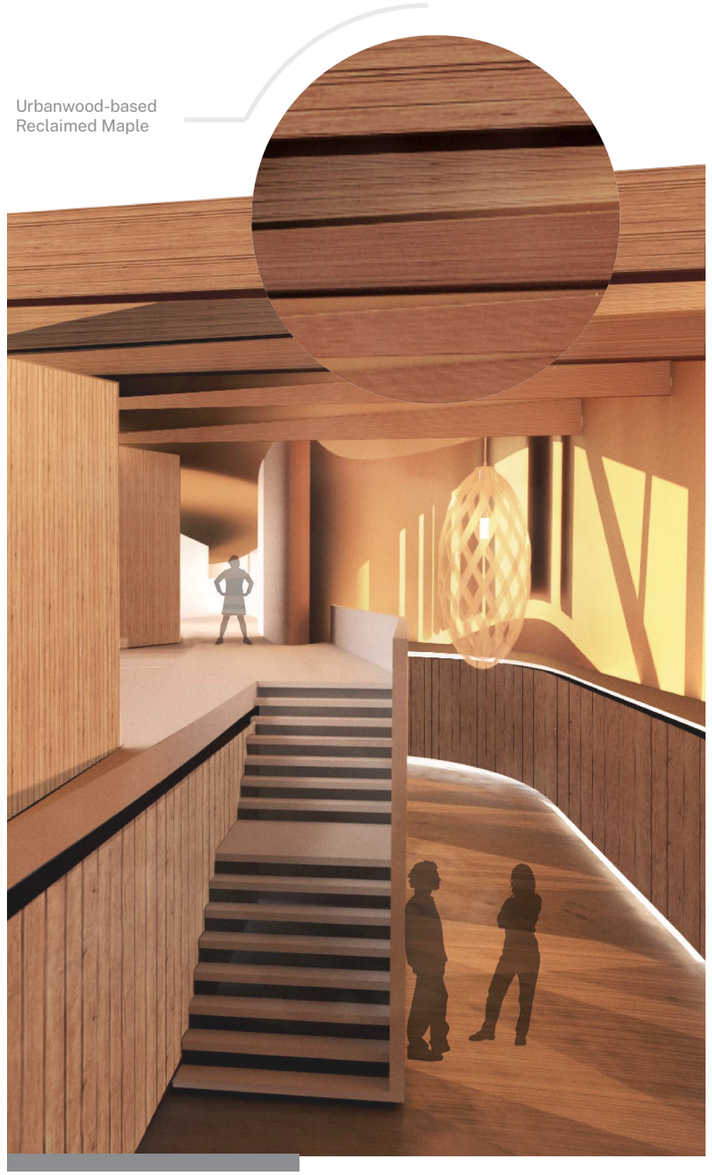
SECTION facing North

1. Vegetative Roof — Here, semi-permeable surfaces capture rainwater and redirect it to the marsh below.
2. Courtyard — In the courtyard, occupants can warm up after a cold day of training via hot steam.
3. Training Room — The training room provides a number of athletic resources such as erg machines.
4. Sun Room — In this "semi-exterior" space, occupants can bask in the setting sun.
5. Gallery Space — The gallery space is intended for multi-purpose events, team meetings, and leisure.

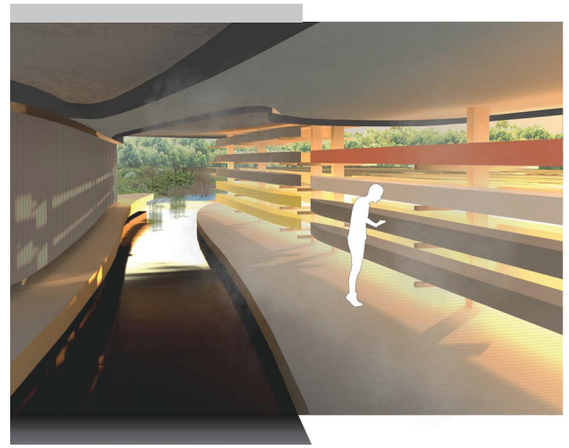
SECTION facing South

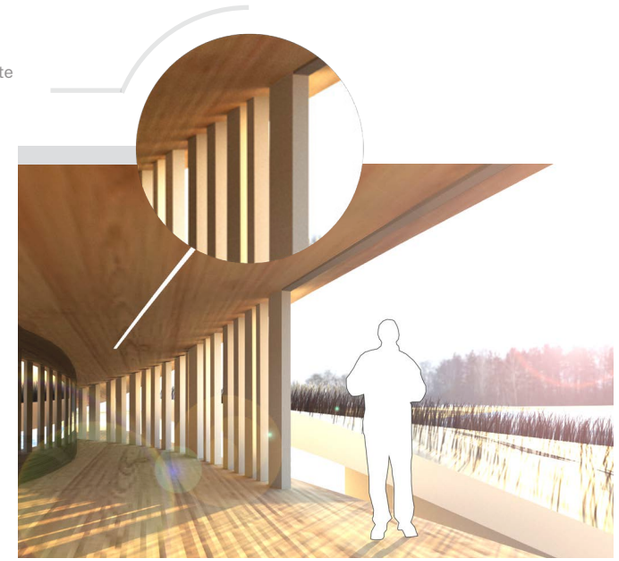
6. Water Access — Here, occupants can easily access the Huron riverscape. Boats can be stored and rigged on the land form adjacent.
7. Gallery Space — The gallery space is intended for multi-purpose events, team meetings, and leisure.
8. Boardwalks — The boardwalks surrounding the boathouse provide access across "alluvia." This gives occupants a chance to observe the watershed.
9. Locker Rooms — The locker rooms serve both competetive teams and the public. Restrooms, showers, and personal storage space are included.
10. Exit/Walkway — This path provides access to and from the parking area located to the west near Bandemer Park.

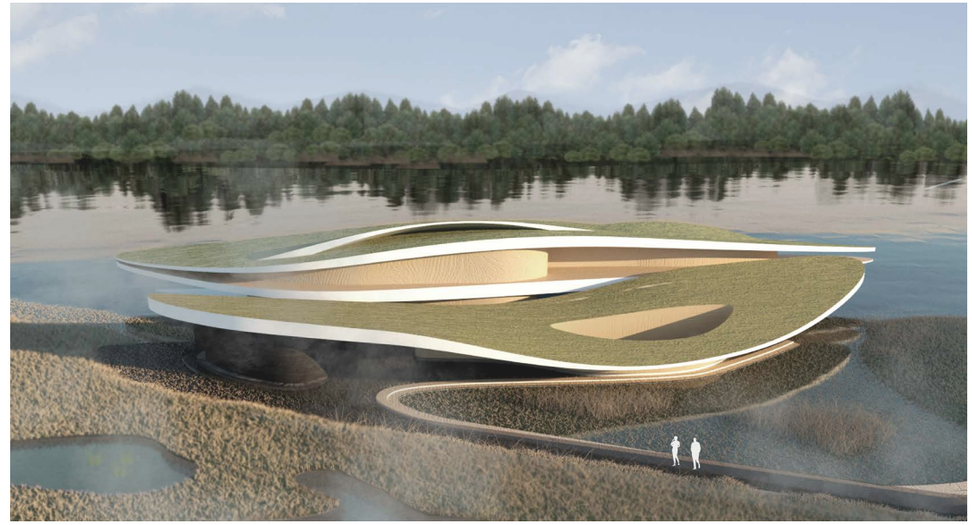
Urbanwood-based
Reclaimed Maple



Fallen Timbers found at site
(non-structural)





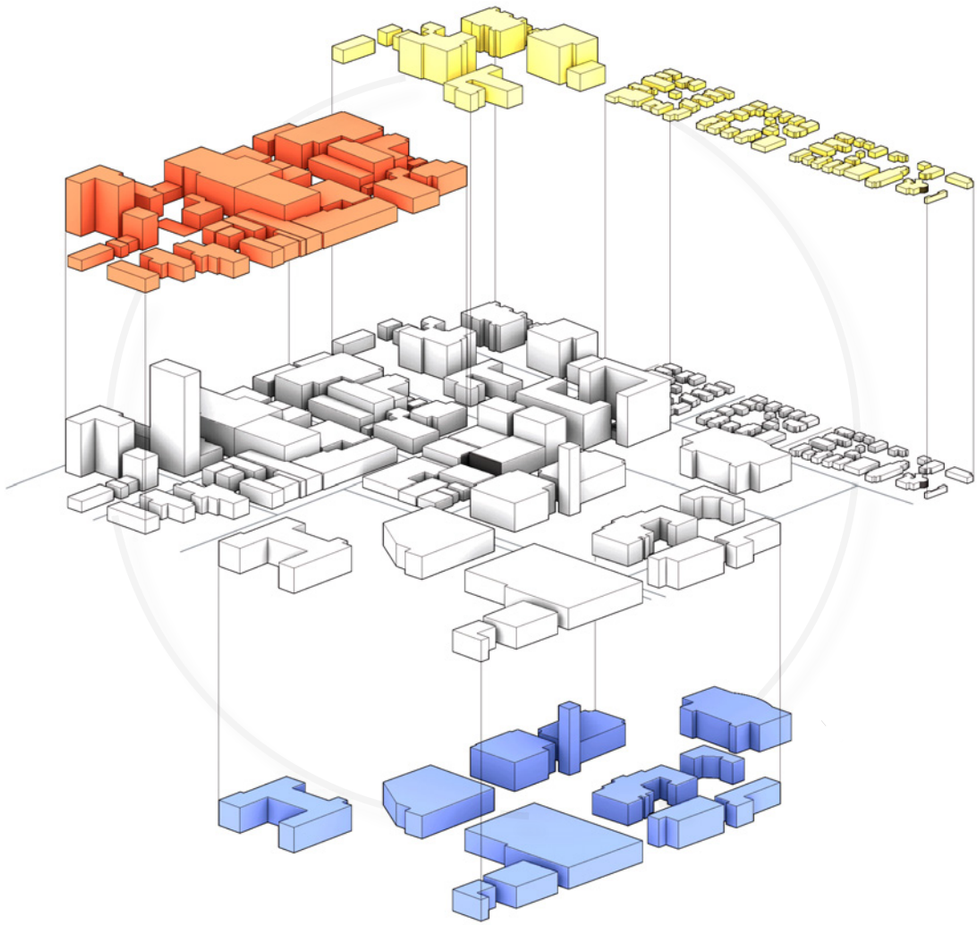


Central Staircase + Gallery

Boat Storage + River Access

Upper Deck

Perspectival renders showcase key areas around the boathouse. Native woods are used to construct the interior panelling and structural timbers. By doing this, the design is able to capture the essence of the existing material landscape.



Commercial Residential University

_03

Thayer Street Archive

INSTRUCTOR: Melissa Harris
COURSE: UG Studio 1 (UG1)
TERM: Fall 2019
STATUS: Concept

Objectives:

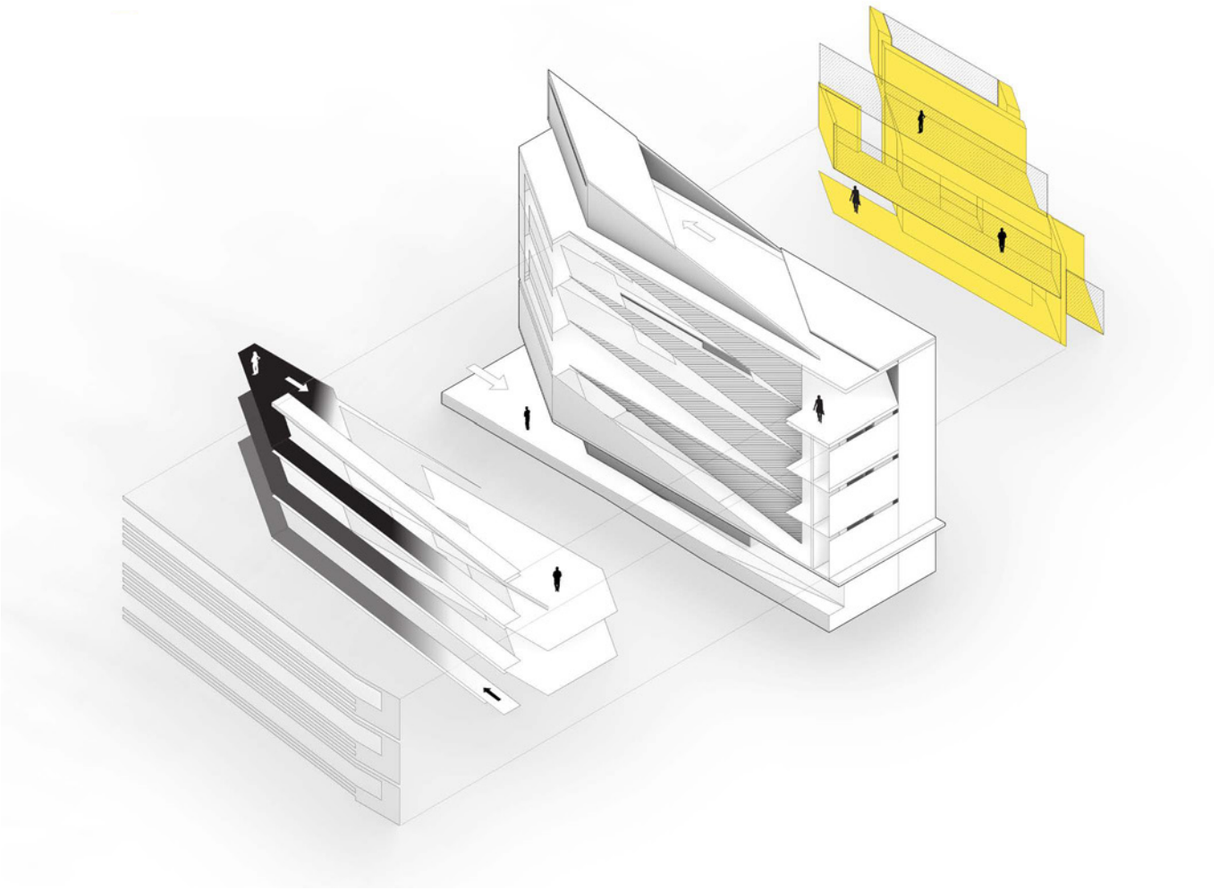
Become a viewpoint between two iconic institutions: the city of Ann Arbor and the University of Michigan.

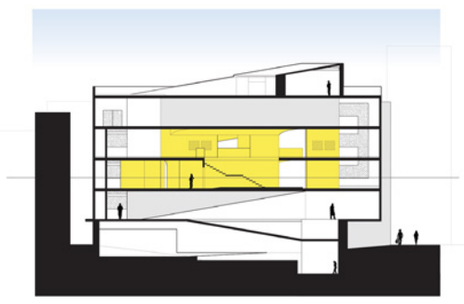
Explore formal qualities of space through degrees of enclosure, light, solid and void.

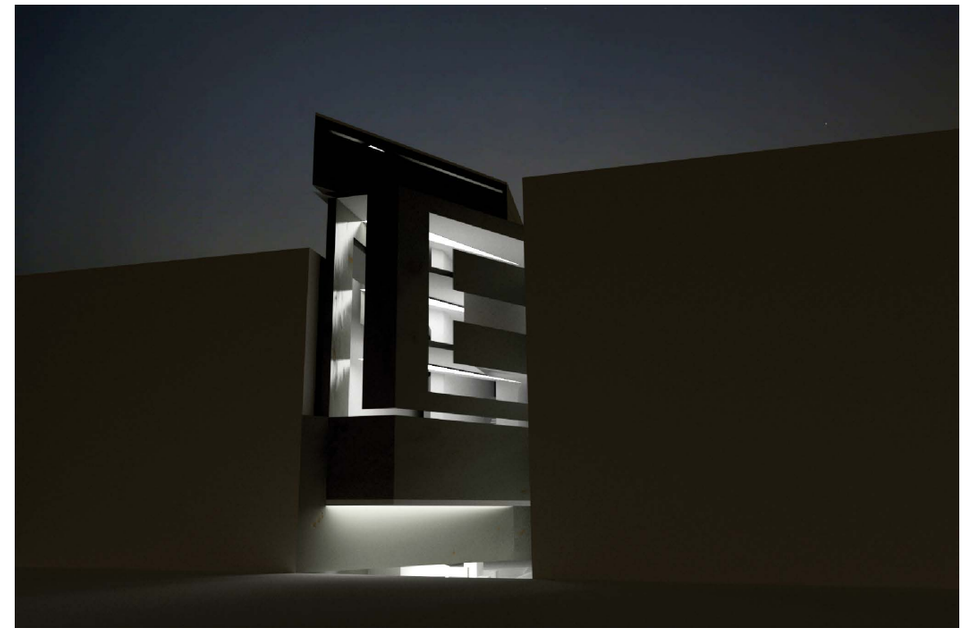
Propose an archive of architectural plans, a central architectural record of all built things in the city of Ann Arbor. Located at a unique corner between commercial, residential, and academic institutions, the archive must acknowledge this condition in hopes of bridging the gaps between members of these separate institutions.

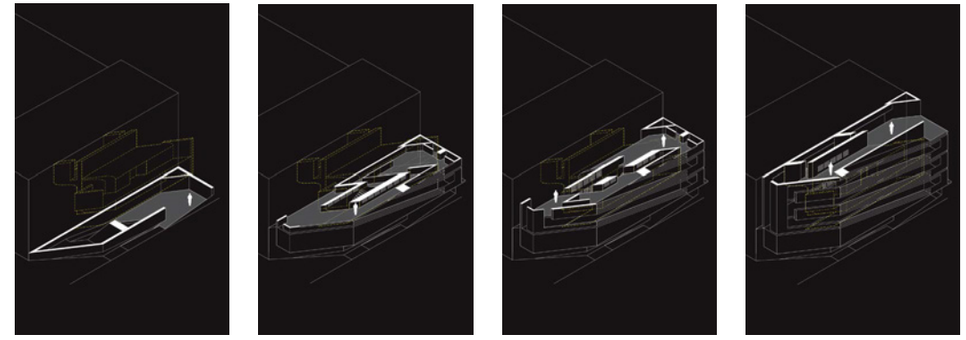
Acknowledge pre-existing social conditions in an attempt to re-create spaces for the collaboration among several disciplines.

Base Parameters	
Buildable Area:	33’ x 120’
Location:	Ann Arbor, Michigan
Program:	Public Archive
Context:	Urban



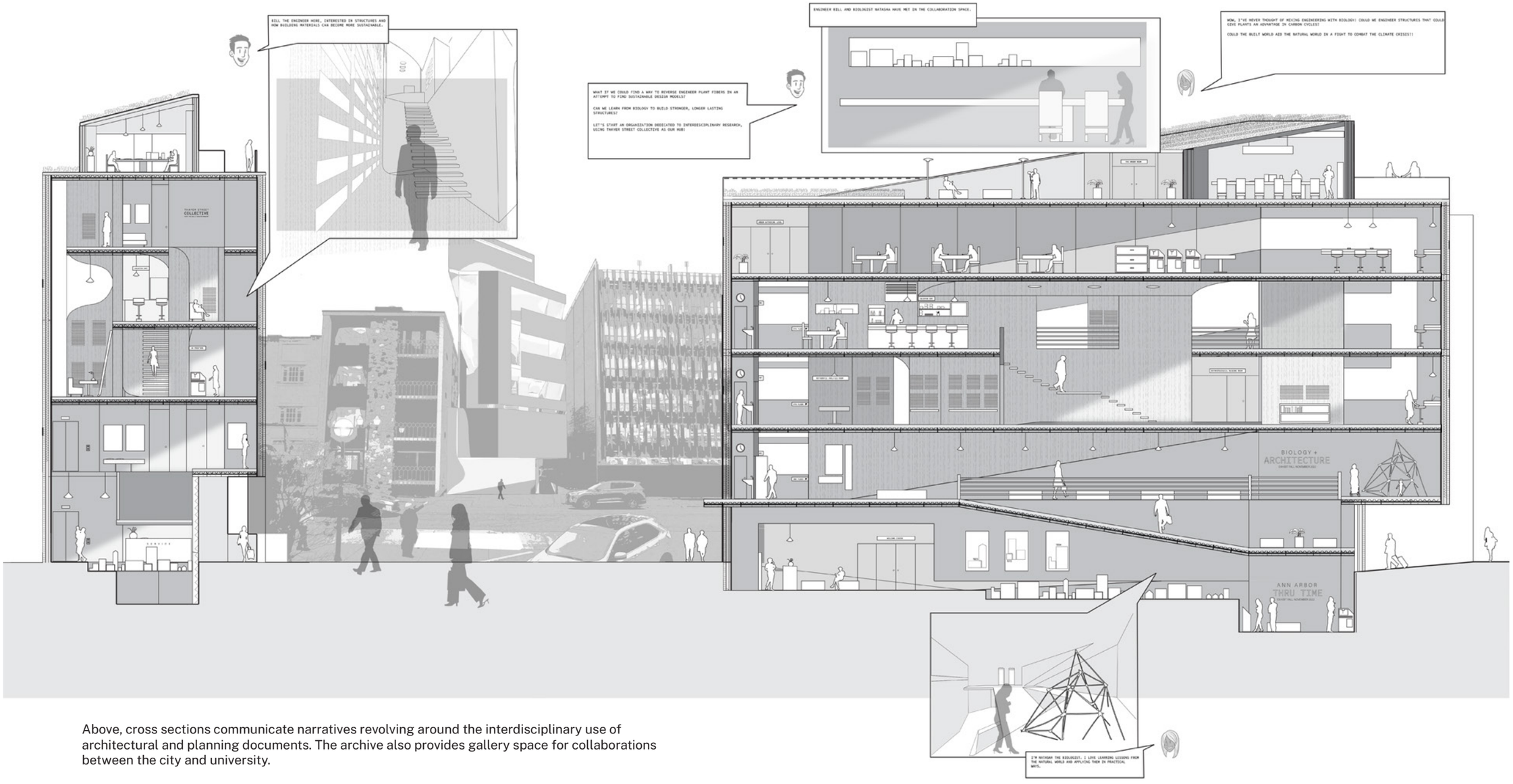






Archive Area

An Archive dedicated to the interdisciplinary use of architectural plans. As citizens of Ann Arbor, everyone is involved in shaping the world around them. In that sense, the archive invites members of various disciplines and communities to discuss their environment, providing input in ways inaccessible to architects alone. In the center (yellow), the physical archive of plans exists, surrounded by research rooms dedicated to various disciplines.



Above, cross sections communicate narratives revolving around the interdisciplinary use of architectural and planning documents. The archive also provides gallery space for collaborations between the city and university.

_04

Translations

INSTRUCTOR: Melissa Harris + Yojairo Lomeli
COURSE: Transfer Studio (UG0) + UG1
TERM: Fall 2019
STATUS: Design Exercise

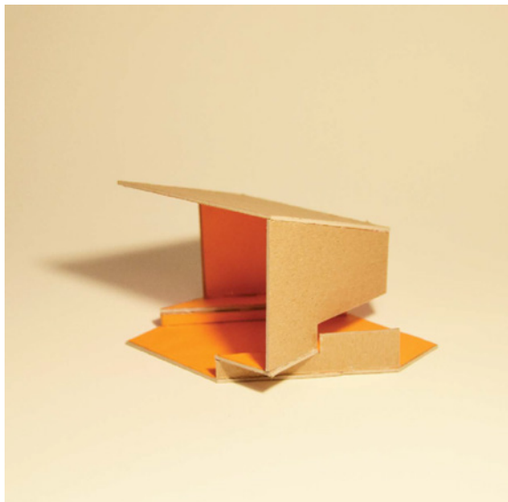
Objectives:

Explore formal qualities of space through degrees of enclosure, light, solid and void.

Produce a small enclosure that utilizes two pathways: one to a view of the exterior, the other, to a painting.

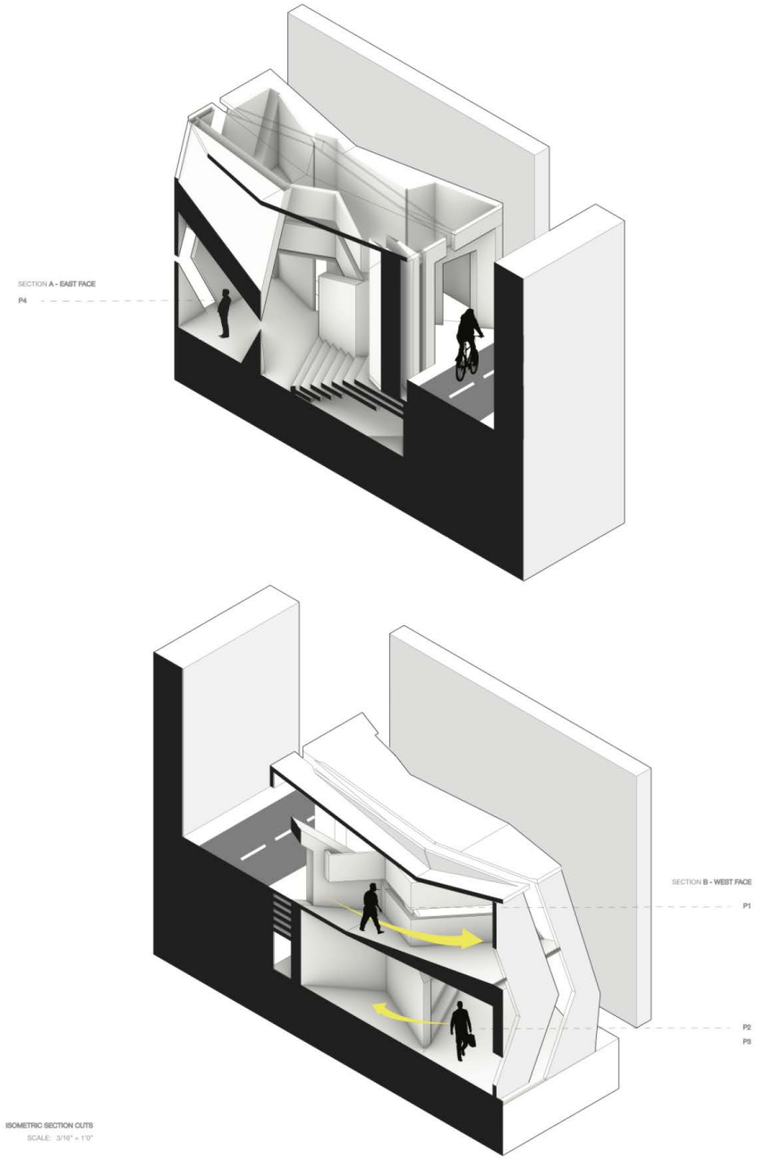
Acknowledge site parameters to influence and dictate design. Experiment with solid-void relationships and their influence on light, etc.

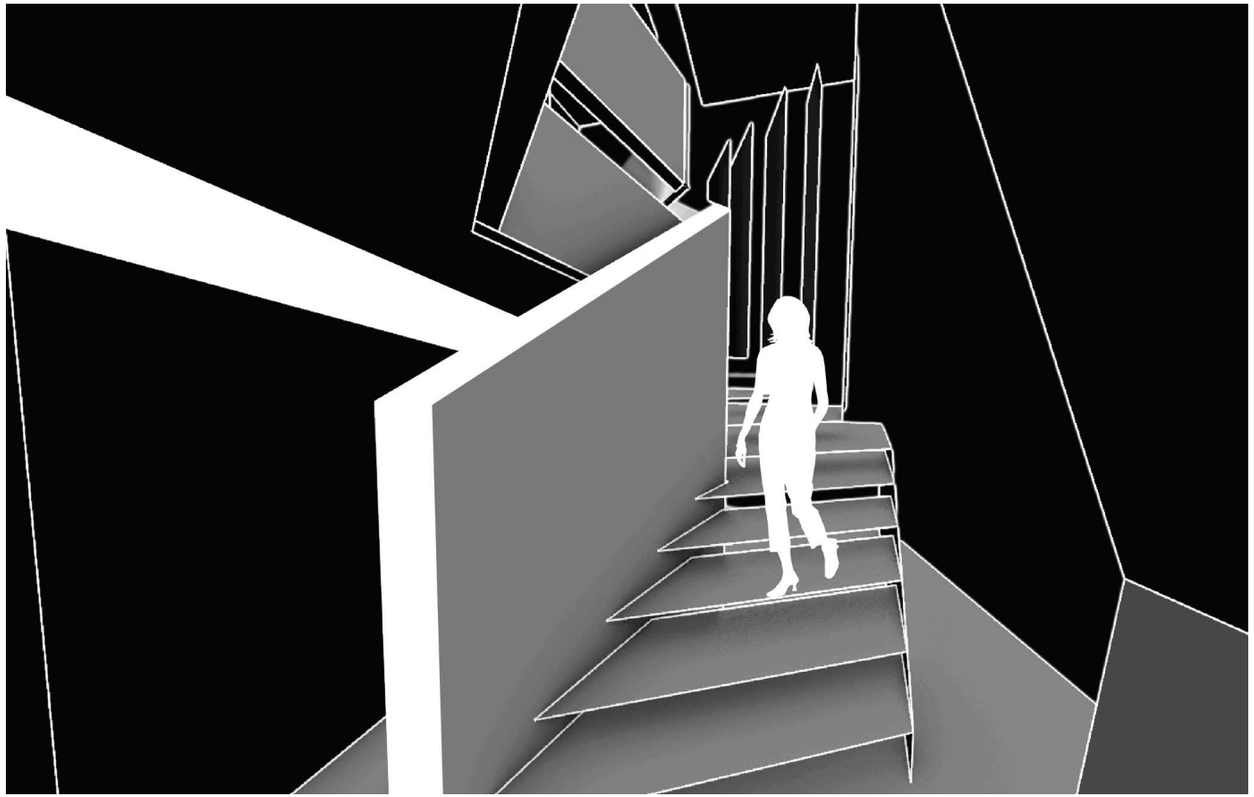
Base Parameters	
Buildable Area:	Not Applicable
Location:	Ann Arbor, Michigan
Program:	Design Process
Context:	Studio Practice

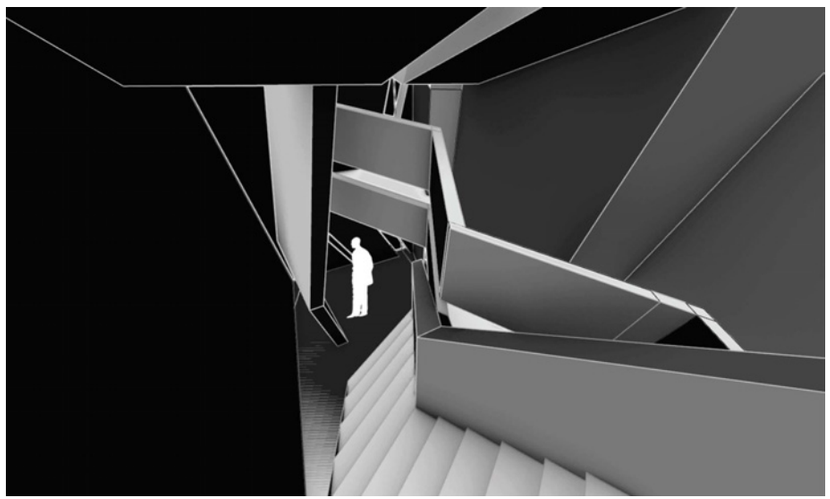


Spatial Fragments, an iterative attempt at finding qualities suitable for archive design. Studies of light and form, blurring what it means to be “inside” and “outside” of the particular form. Models created with chipboard and origami paper.

In the design, site location created constraints in vertical, north, east and west faces. Buildable area was limited to 32 x 16 x 24'. As a result, the structure could only provide one or two pathways without becoming uninhabitable. This schematic features two primary pathways, one descending to the lower level allowing exposure to a painting. The higher path ascends and transports the occupant to a view of the horizon. In the design, both higher and lower paths produce different horizontal results. For instance, the lower view only exhibits sky while the higher exhibits only wa-ter. By doing this, the inhabitants' perception of horizon is abstracted, resulting in purely textural "images."

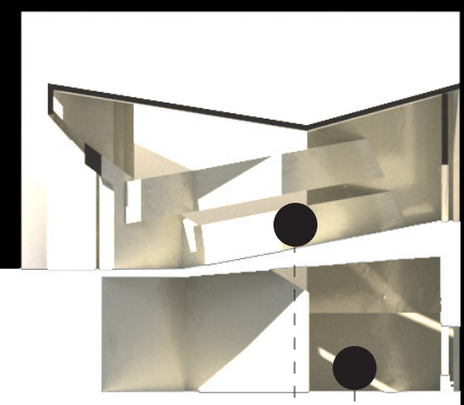


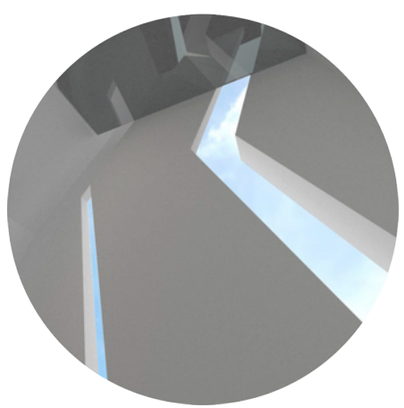


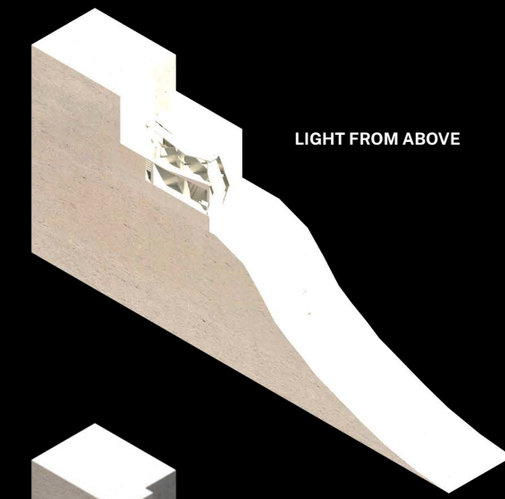


On the left, two opposing section cuts exhibit primary walkways within structure. The lower section contains painter Georgio Morandi work, while the higher continues to exhibit horizon view. Along the cliffslide, the “Morandi Pavillion” attracts bicyclists and pedestrians stemming from nearby bikepath. Above, perspective view portrays a scale figure moving throughout the structure.

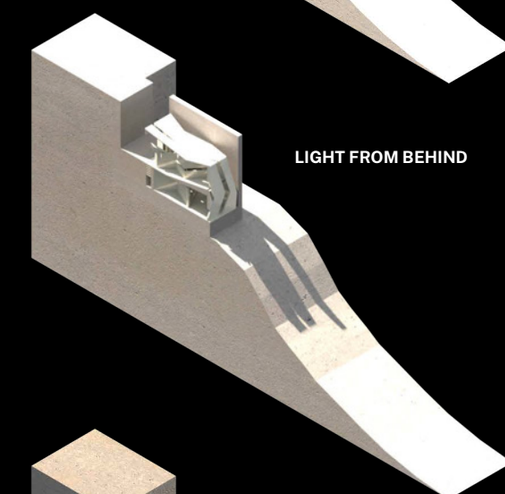
Shown below, are two corresponding views of the sky, and the staircase leading up to the walkway. On the right, three isometric views show lighting effects at different angles/times of day.



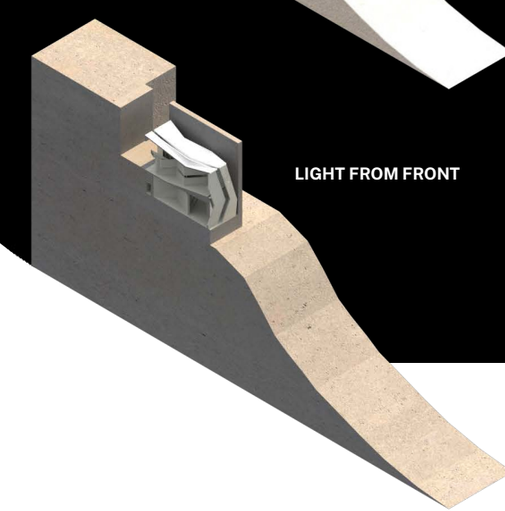




LIGHT FROM ABOVE

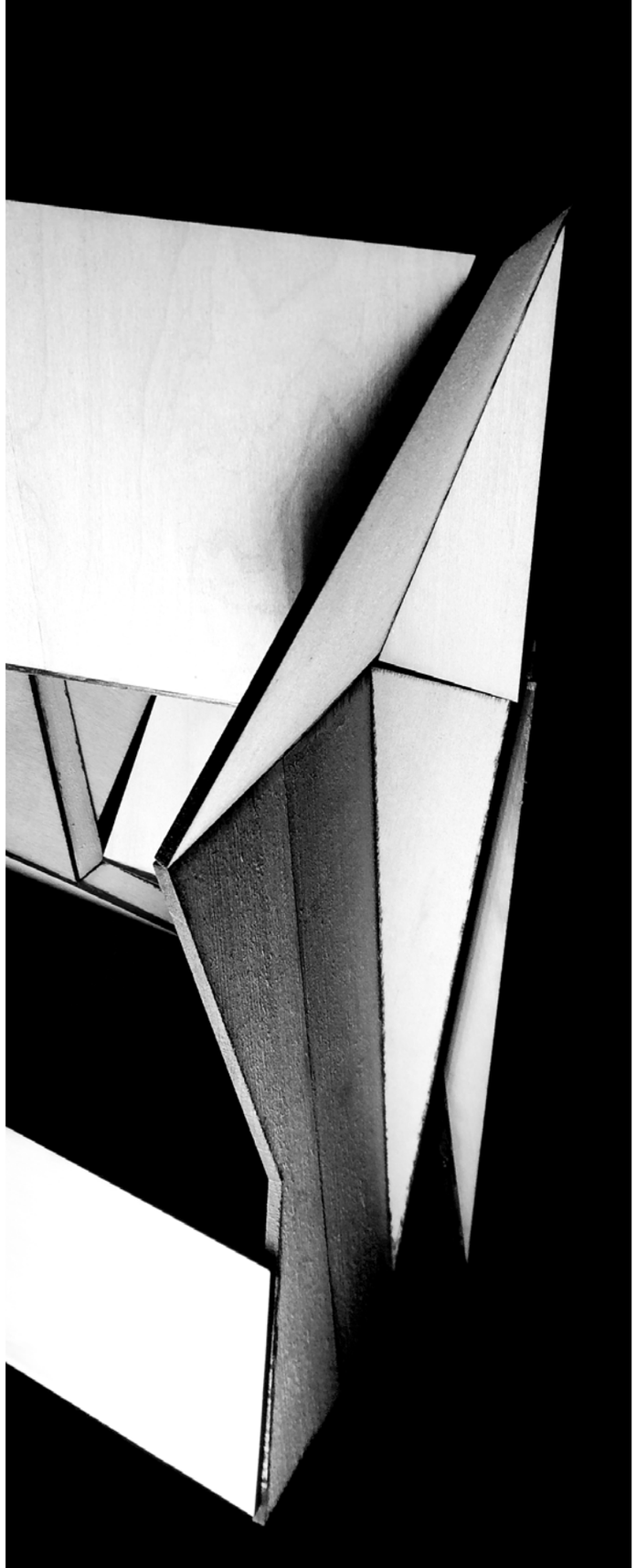


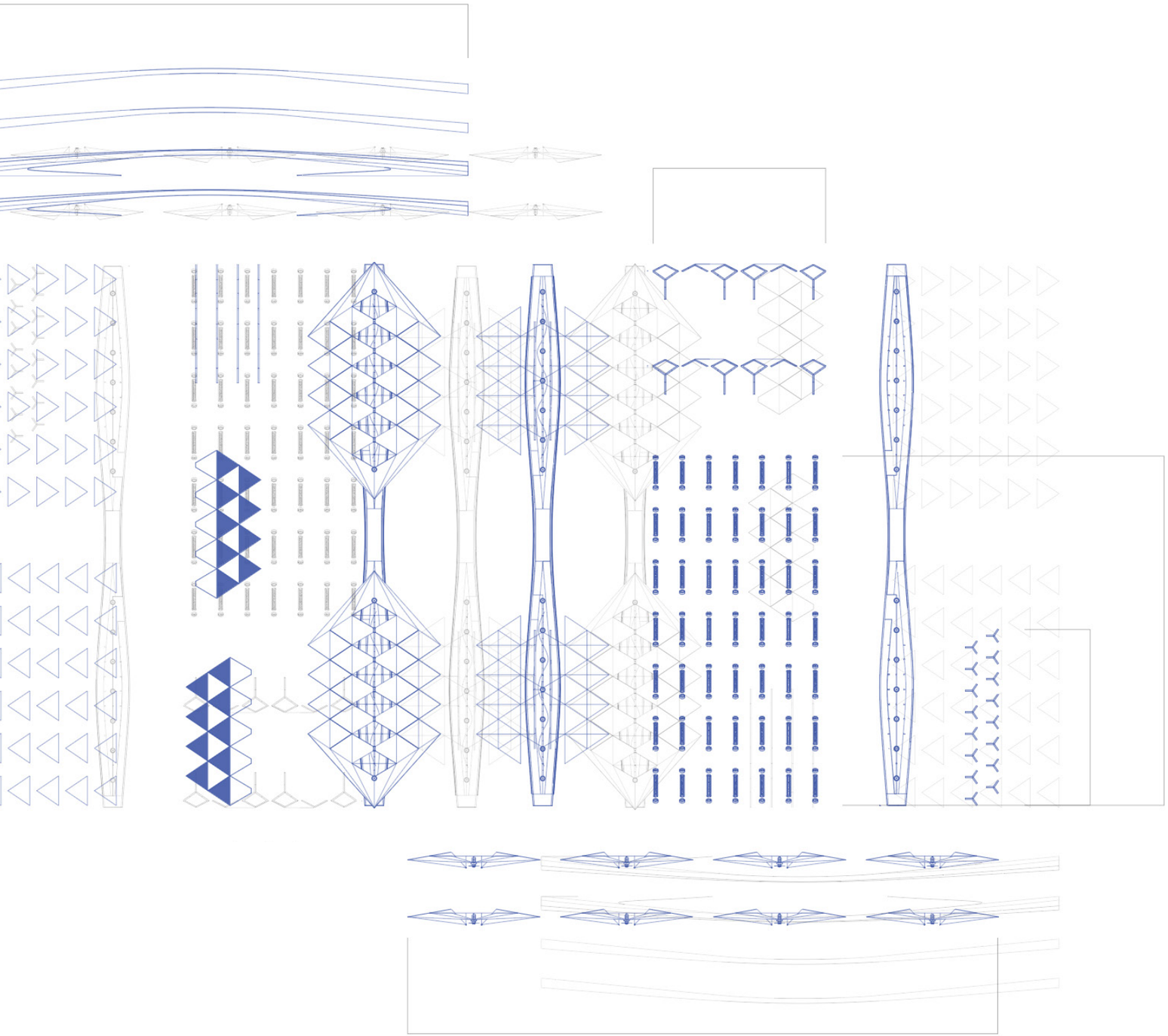
LIGHT FROM BEHIND



LIGHT FROM FRONT

Above, a perspectival view of the interior staircase. To the right, images of the physical model, highlighting lighting and wood materiality. Model constructed with 1/8” thick bass wood.





_05

Harlem Hydroponic

INSTRUCTOR: NA
COURSE: Self Initiated
TERM: Summer 2020
STATUS: In Progress

Objectives:

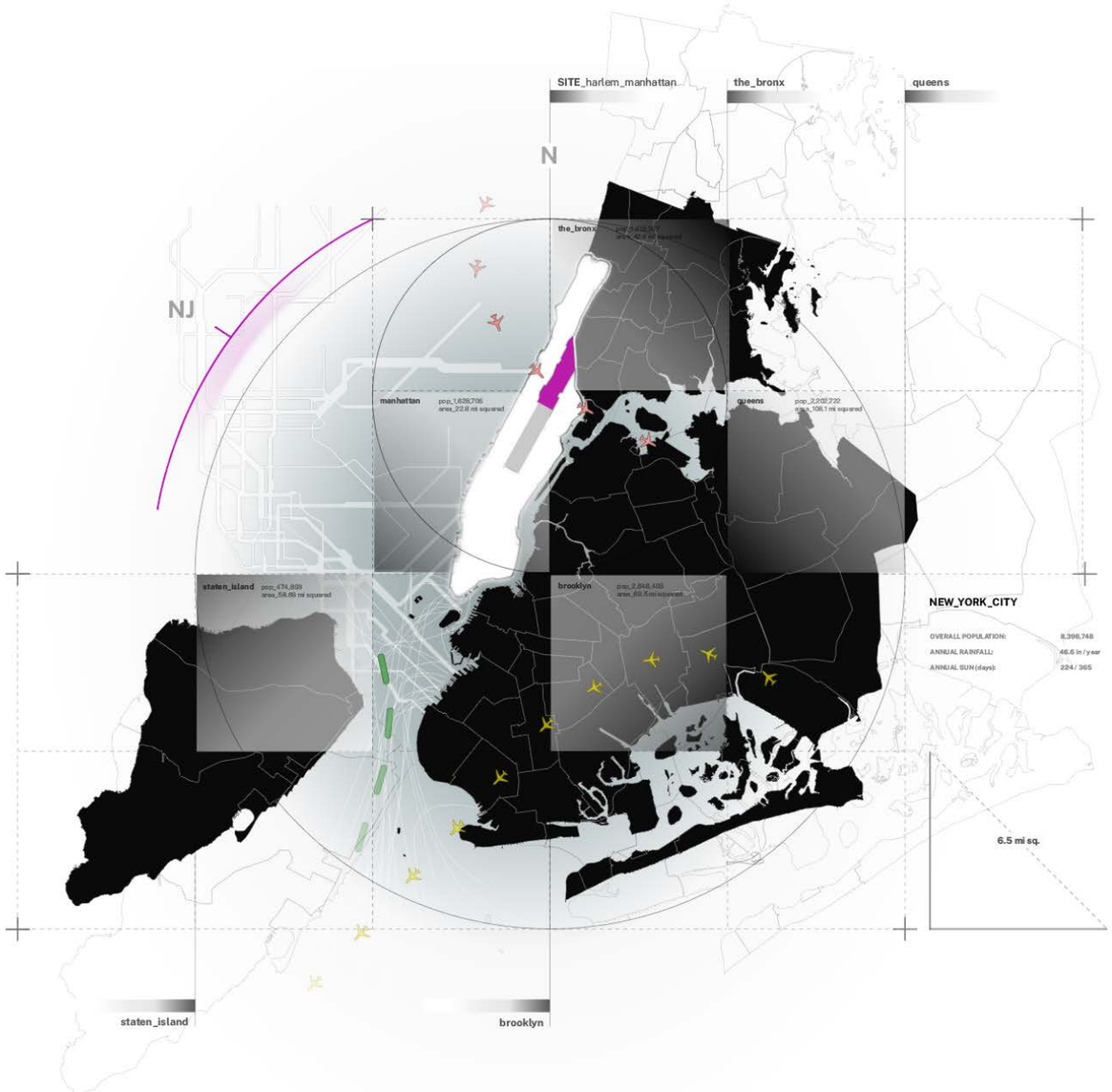
Bridge the gap between pedestrian, vegetative, and traffic zones.

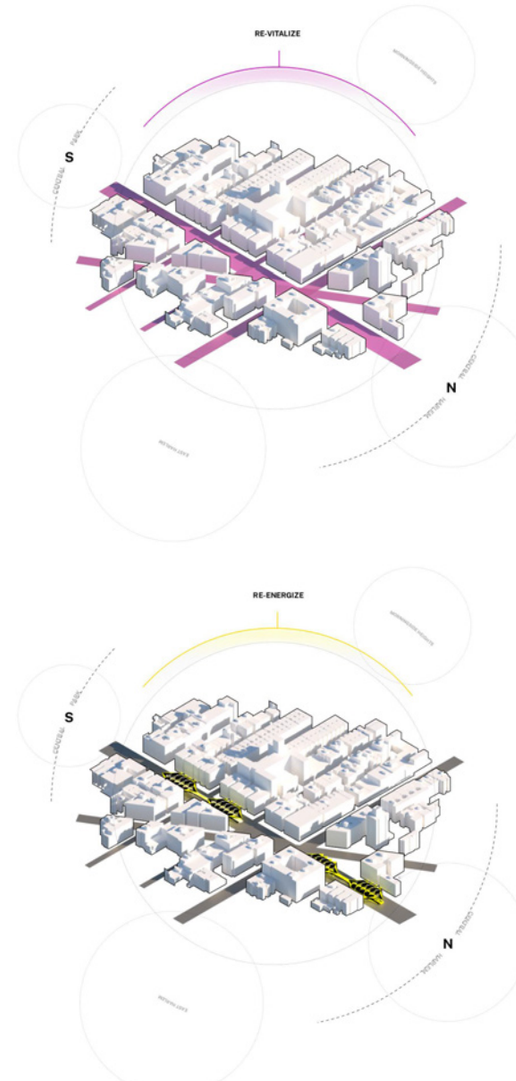
Create an infrastructure that produces communal assets such as energy, food, shade, and transit.
Use biomimic + biophilic principles to produce a novel model for sustainable infrastructure.

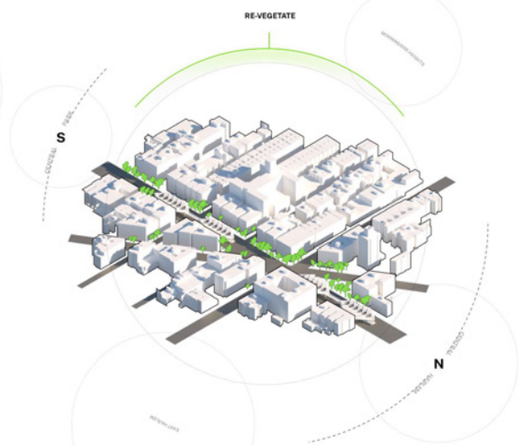
Brief:

Located in South Harlem, the project aims to reinvent the street median as an engageable, energy-producing infrastructure that connects neighborhoods along the historic Adam Clayton Powell Jr. Blvd.

Base Parameters	
Buildable Area:	Modular / Scalable
Location:	New York, New York
Program:	Infrastructure+
Context:	Urban

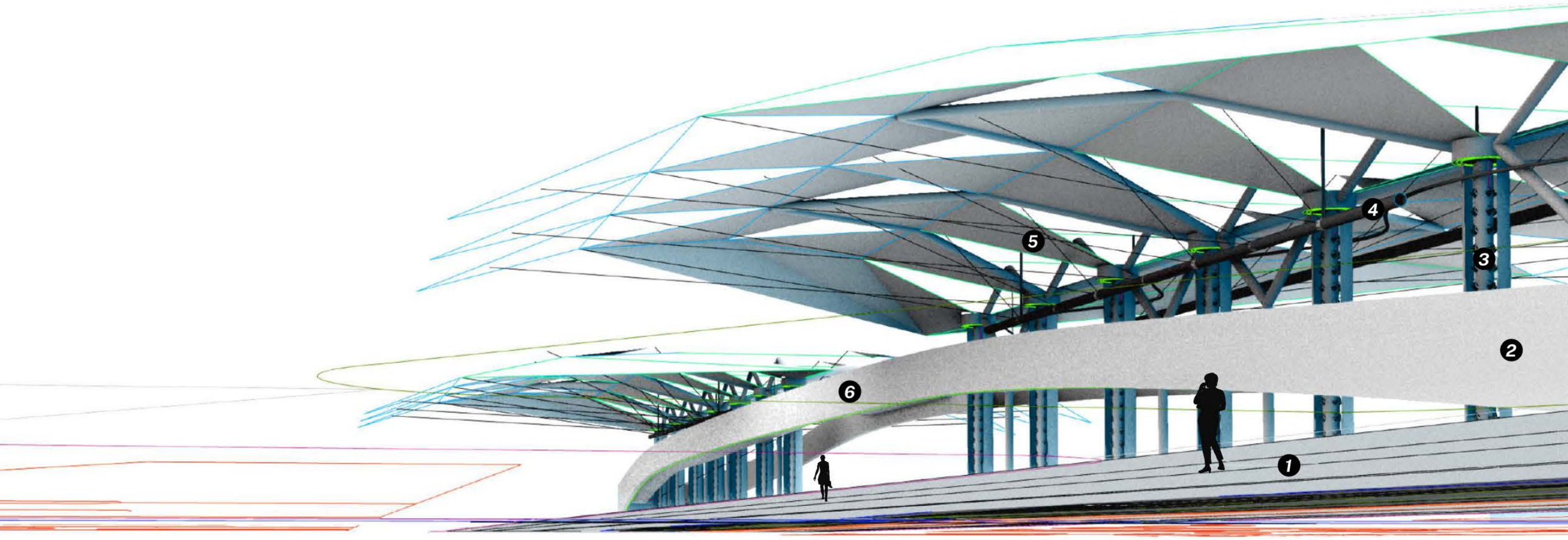






Above, the city of New York provides an abundance of neighborhoods, trade ports, transit systems and buildings. With a population over eight million, the city is dependent on external sources of food, produce, and agricultural materials. This project intends to provide a more sustainable method of agricultural trade by re-locating grow sites into the urban fabric of the city itself.

Located in South Harlem, the infrastructure project centers itself around large roadways, areas of the city that tend to cause the most disruption from a human-centric urban planning. Here, along Adam Clayton Powell Jr. Blvd, the streetscape prioritizes the convenience of motor vehicles, at the expense of the people, and shops surrounding the boulevard. If the sheer volume of this streetscape is re-allocated, the space can be shared to produce electricity, further public transit, and promote biking and walking.



PRELIMINARY Concept Drawing

1. Bus Access — Serving as both a continuous promenade, and bus stop, the lower level of the project includes garden access, and refuge from the busy streetscape.
2. Elevated Walk — Here, ramp access from the lower level wraps and rises to an upper promenade, allowing access to hydroponic towers and biophilic views.
3. Hydroponics — The functional backbone of the project, hydroponic towers collect rainwater from the canopy above and give life to a variety of vegetal plants.
4. Lights + Mech. — These tube-shaped mechanisms serve as ambient lights when dark, and systems to adjust canopy positioning with corresponding cables.
5. The Canopy — Inspired by the forest, a canopy blankets the streetscape giving life to a variety of vegetation, and collects solar energy via photovoltaic cells.
6. High-Way — A refuge from traffic, the elevated walkway provides excellent views and removes the occupant from the busy streetway below.

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For Sidewalk Detroit

INSTRUCTOR:	**NA**
COURSE:	**Self Initiated**
TERM:	**Summer 2021**
STATUS:	**Completed**

Objectives:

Create three pieces of interactive furniture for the eighth annual Sidewalk Festival in the Joy-Southfield neighborhood of Detroit, Michigan.

Base Parameters	
Buildable Area:	NA
Location:	Detroit, Michigan
Program:	Public Furniture
Context:	Urban Street Market

Using CNC fabricated plywood panels, three geometric chairs were constructed. The forms explore the solid void relationship created when two simple shapes are extruded into one another. A graphic incorporating the logo of Joy Southfield CDC was integrated into the surface of the chair through a technique of resin casting and colored paper.

Aerial photos courtesy of ARISE Detroit!

Above, community members watch a performance at the Joy-Southfield Community Development Corporation. The three constructed furniture pieces can be seen in use.

Other team members consisted of Chandler Caserta, Celia Olsen, Haley Mayes and Frank Espinosa.