COLLEEN DUONG

Bachelor of Architecture | 2021
Carnegie Mellon University

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CONTENTS

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EDUCATION

Carnegie Mellon University Pittsburgh, PA
2016 - Present
GPA 3.39/4.00
Bachelor of Architecture
Minor in Animation & Special Effects
Awards: Deans List, School Honors

SKILLS

Software
Adobe Software (Photoshop, Illustrator, InDesign, Premiere), Rhinoceros 3D, AutoCAD, Revit, SketchUp, Lumion, Keyshot, RobotStudio, AutoDesk Maya, ZBrush, Substance Painter, 130 WPM

Fabrication
CNC Machining (Mill and Lathe), Woodwork, Lasercutting, 3D Printing, Industrial Robot Arm

Programming
P5JS, Javascript, HTML, Basic Python

RELEVANT COURSEWORK

- Architectural Studios
- Analog & Digital Media
- Fundamentals of Computational Design
- Materials & Assembly
- Rapid Prototyping
- Introduction to Architectural Robotics
- Introduction to Scenic Design

WORK EXPERIENCE

G70 Architects Honolulu, HI
June 2019 to August 2019
Architectural Summer Intern I
• Worked on graphics and diagrams for submittals: AIA Honolulu Design Awards 2019, due dilligence reports, and multiple project proposals.
• Project Submittal won Award of Merit for AIA Honolulu Design Awards 2019.
• Construction Administration work done.

Carnegie Mellon University - Hazelwood Green Project Pittsburgh, PA
February 2019 to November 2019
Working with Professor Joshua Bard
Research Assistant
• Explored robotic steambending wood properties to design and fabricate five steam bent swings as part of the Hazelwood Green development plan.

Carnegie Mellon University Pittsburgh, PA
April 2017 to October 2018
CMU Ambassador
• Connect with alumni, parents, and friends of the University to gain an understanding of how their collect experience shaped their lives
• Develop strategies to encourage new or increased participation

Leadership Enterprise for a Diverse America
Fall 2017 to Spring 2018
LEDA Peer Mentor
• Mentor incoming LEDA first-year college students through hosting regular meetings focused on the adjustment to college, study skills, and social interactions.

ACTIVITIES

Alpha Phi Omega Kappa Chapter, Carnegie Mellon Pittsburgh, PA
August 2018 to Present
Fellowship VP (Fall 2019)
• Approved project proposals and in charge of planning large brotherhood bonding events such as Fall Retreat.
Spring Booth Committee Chair (Spring 2019 to Spring 2020)
• Prepare construction details for the upcoming CMU Carnival Spring Booth Concessions event and lead the actual construction and design of the booth.
PR Chair (Spring 2020 to Present)
• Update social media and the organization's website. Communicates with other organizations and advertises service activities to the campus.
PR/Rush Design Team (Spring 2019 to Spring 2020)
• Design posters, calendars, stickers, and t-shirts for the positive promotion of the fraternity.

Habitat for Humanity Houston, TX
January 2018
• Assisted in the construction of houses to help with the hurricane relief program in Texas after events with Hurricane Harvey.

LEDA Career Fellow Providence, RI
August 2017
Fellow

Split House
co-housing

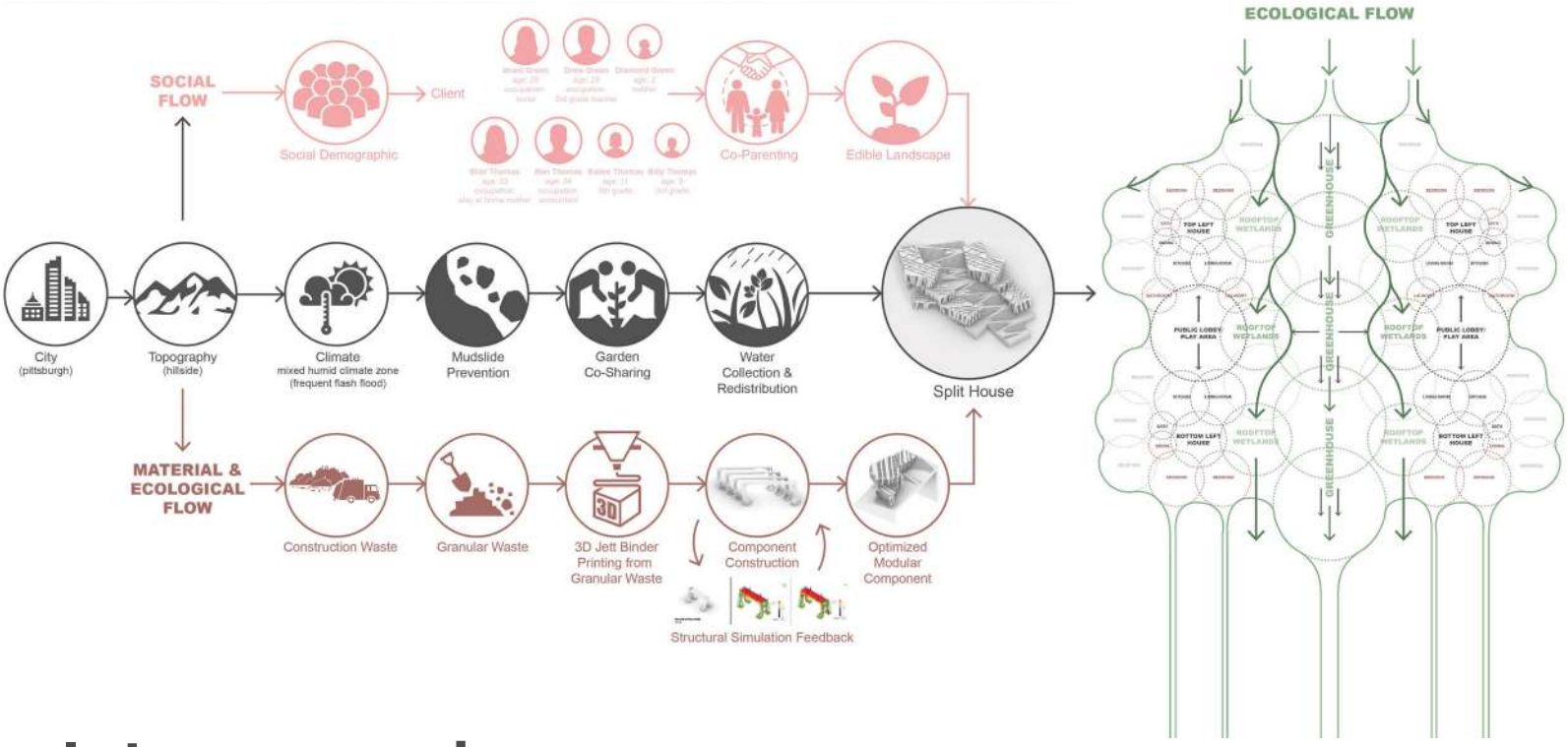
Hazelwood, PA
Lithopic_NOW Studio
advised by Dana Cupkova

Embedded in an ecological hillside, the co-house focuses on taking advantage of landslides that occur in Pittsburgh due to heavy rain and the central greenhouse and co-housing rooftops collect mud and water and redirects it over, through, and around the architecture to allow for direct interaction from the occupants.

Housing Context

Hillside Topographical Condition

Water Flow Simulation of new house-landform



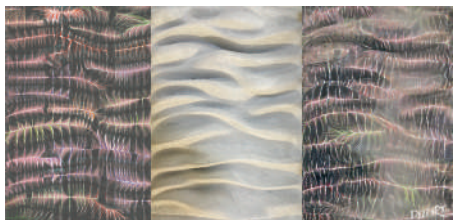
Interweaved Flows

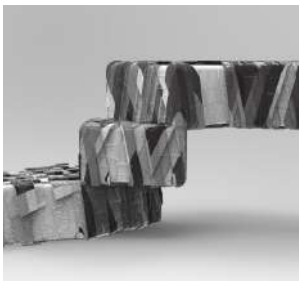
Social | Material | Ecological

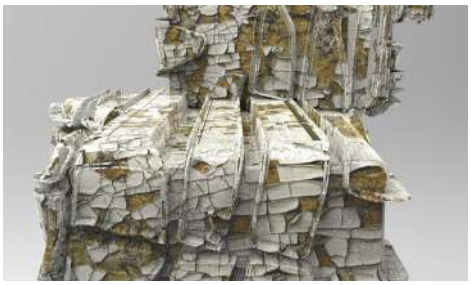
Coming out of a research studio "Lithopic (Living Stone) House: Ecologies of Earthen Matter", that was led in conjunction with a material science seminar, the design approach is underpinned by a potential of construction waste recycling through direct 3d binder-jet printing. This cradle-to-cradle method would reduce CO_2 levels by reducing the volume of new architectural materials, as well as o setting waste streams heading to industrial land lls. Shaping printable components for minimal material use aligned with structural and ecological potential is coupled with a desire to integrate new landscape and biomass directly into the architectural form, function and experience.

The image above is a flow chart that show the different properties of each flow category and how they all interweave with one another in the Split House.

The image to the right GAN (Generative Adversarial Networks) images that study how texture affects a landscape.





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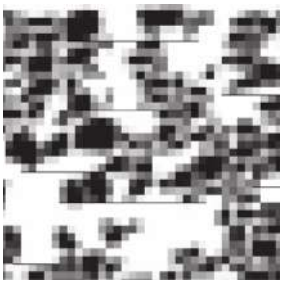
Water Flow Direction *Biosmass Texture*

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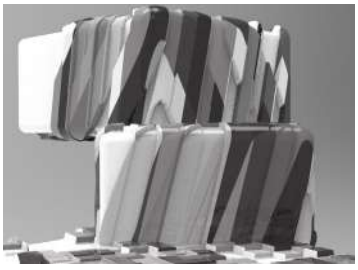
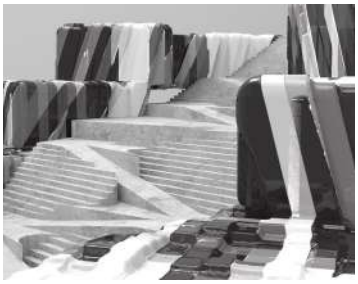
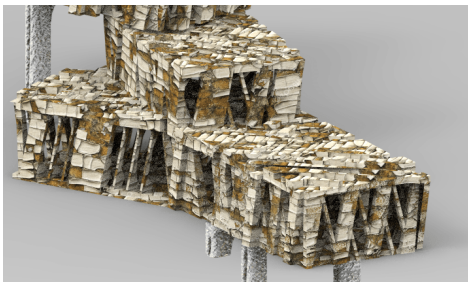
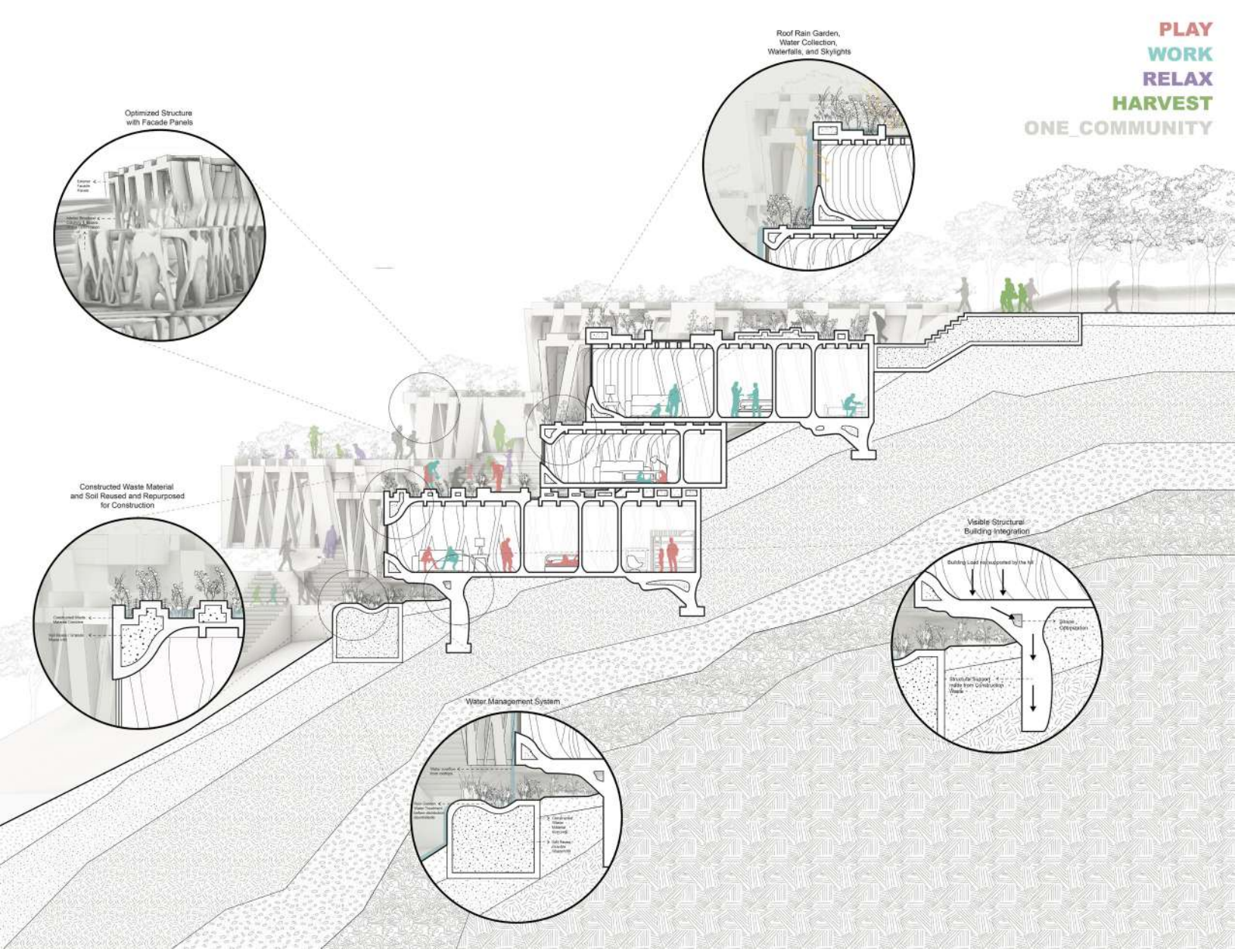






Design Process Workflow

Using artificial intelligence to identify ecological patterns that would support plant growth integrated into material form of the house.

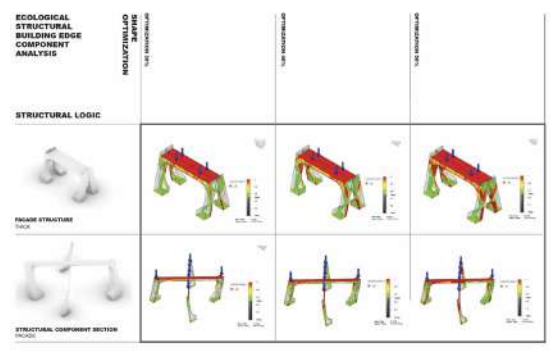


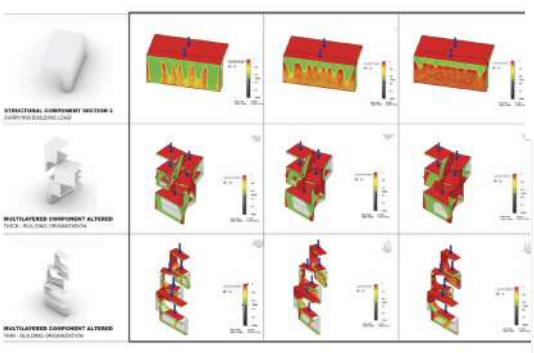
Hillside Condition

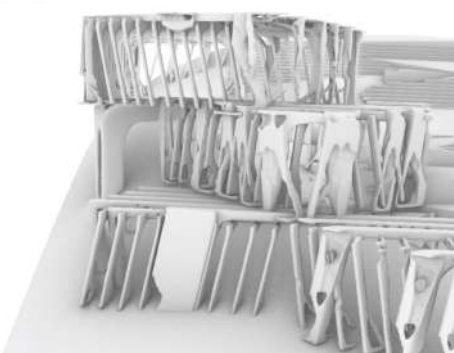
Material | Ecological Flows

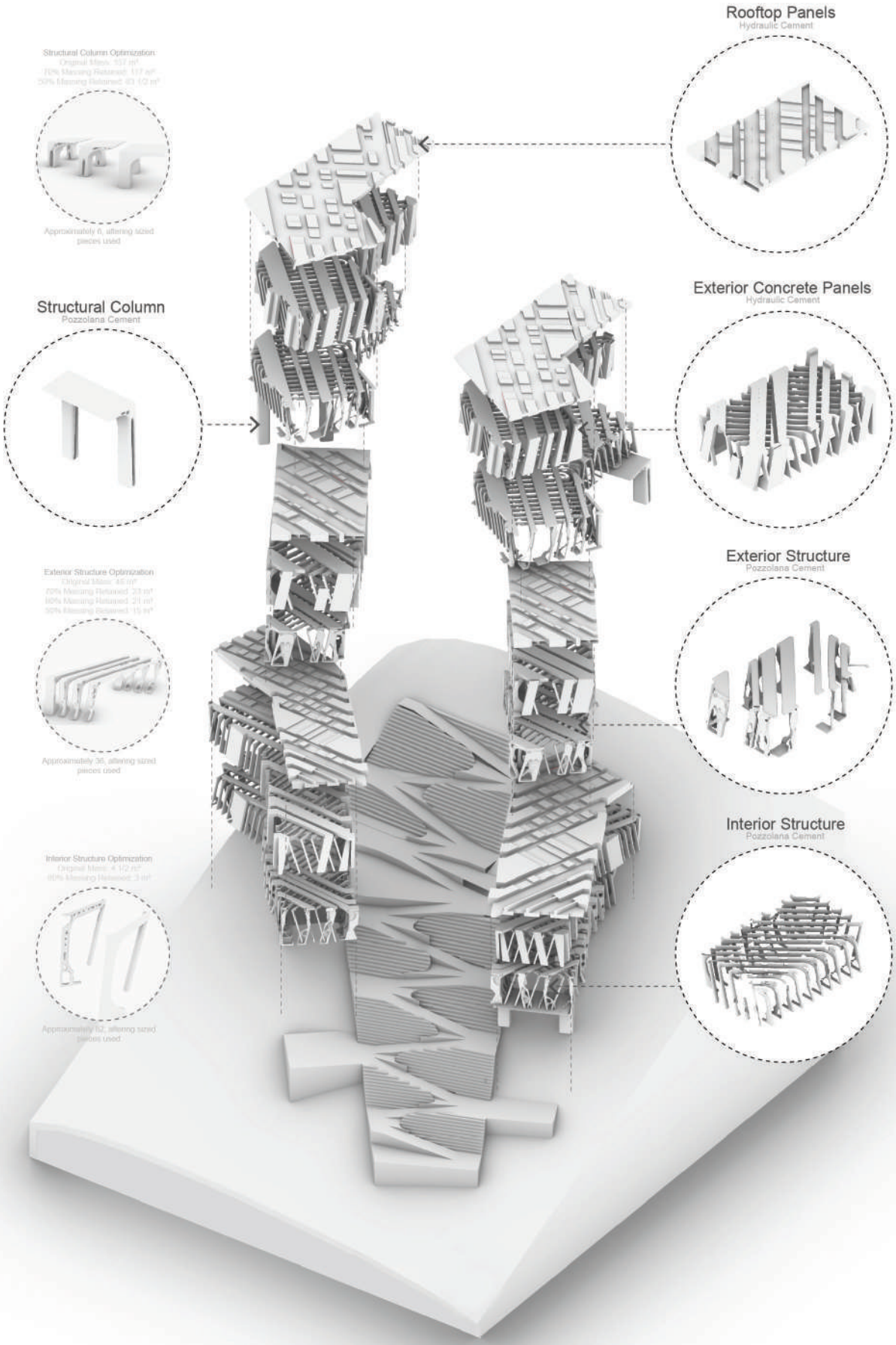
Split House is a garden embedded into a hillside. It creates a form that allows ows of mud, water, and debris to be moved through, around, and over the entire structure, capturing the sediments into a new landform. Enforced by a central split that holds a stair-ramp circulatory greenhouse this playscape manages natural ows, as well as it acts as a shared public space for families and for the community of Hazelwood.

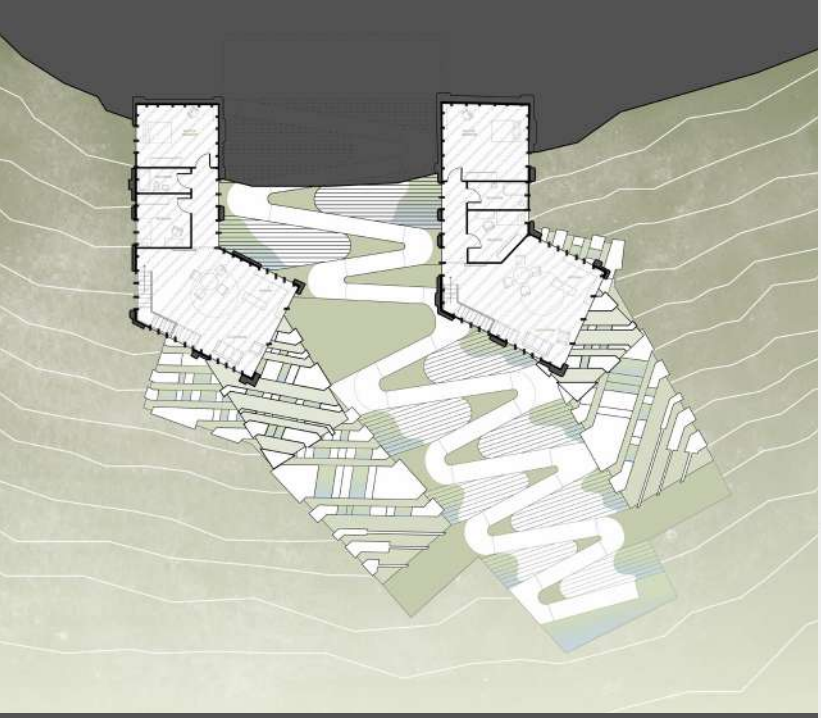
The image below displays a series of simulation studies on shape optimization to save material and reduce construction cost.

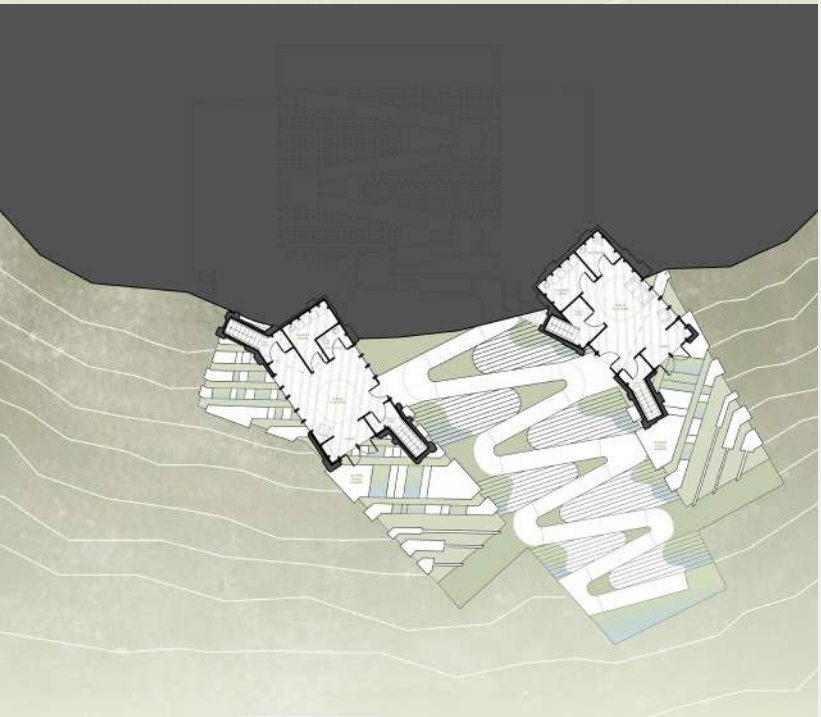


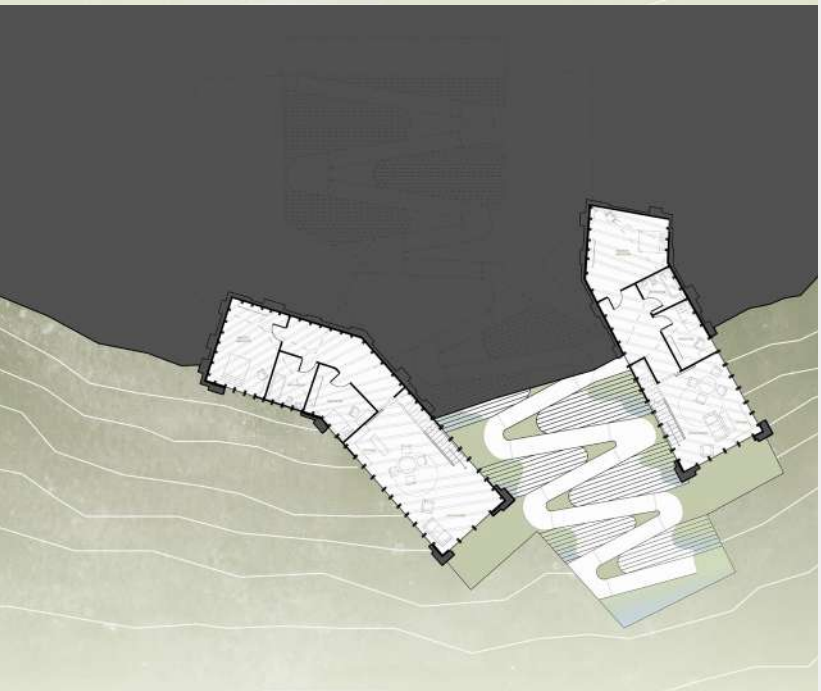


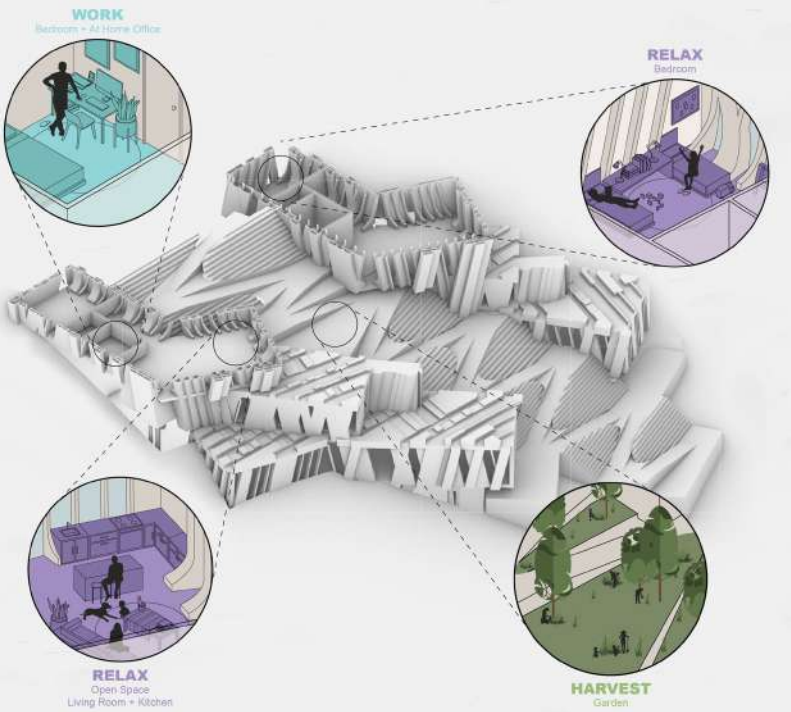


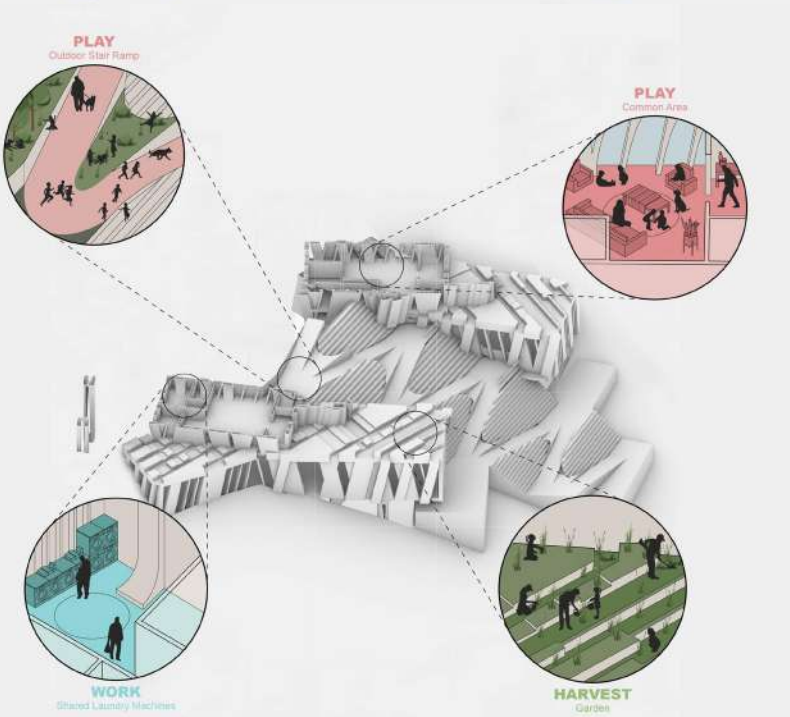

Rooftop Panels
Hydraulic Cement
Structural Column Optimization
Original Mass: 101 m³
70% Massing Retained: 117 m³
50% Massing Retained: 60 1/2 m³
Approximately 8, altering sized pieces used
Structural Column
Pozzolana Cement
Exterior Concrete Panels
Hydraulic Cement
Exterior Structure Optimization
Original Mass: 46 m³
70% Massing Retained: 33 m³
60% Massing Retained: 28 m³
50% Massing Retained: 15 m³
Approximately 36, altering sized pieces used
Exterior Structure
Pozzolana Cement
Interior Structure Optimization
Original Mass: 4 1/2 m³
60% Massing Retained: 3 m³
Approximately 62, altering sized pieces used
Interior Structure
Pozzolana Cement

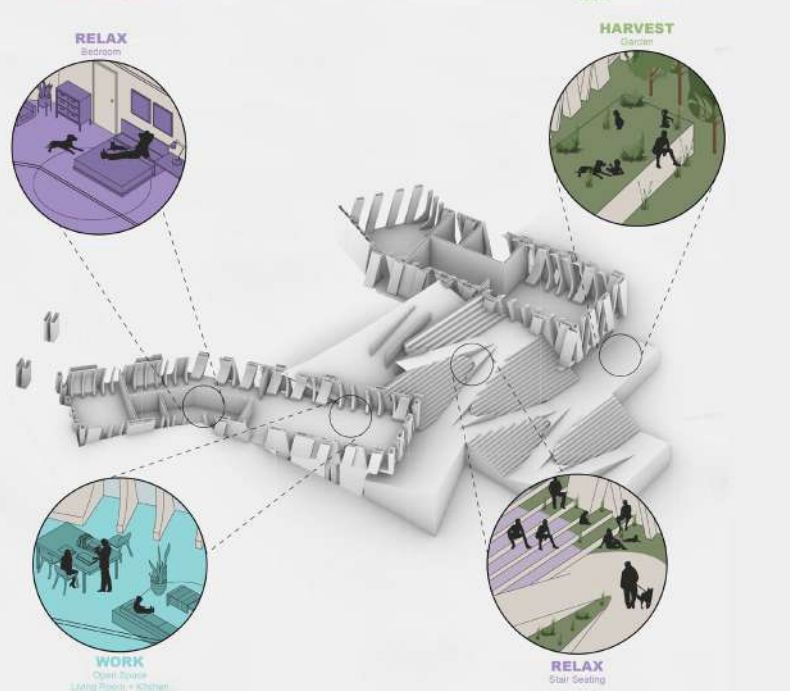


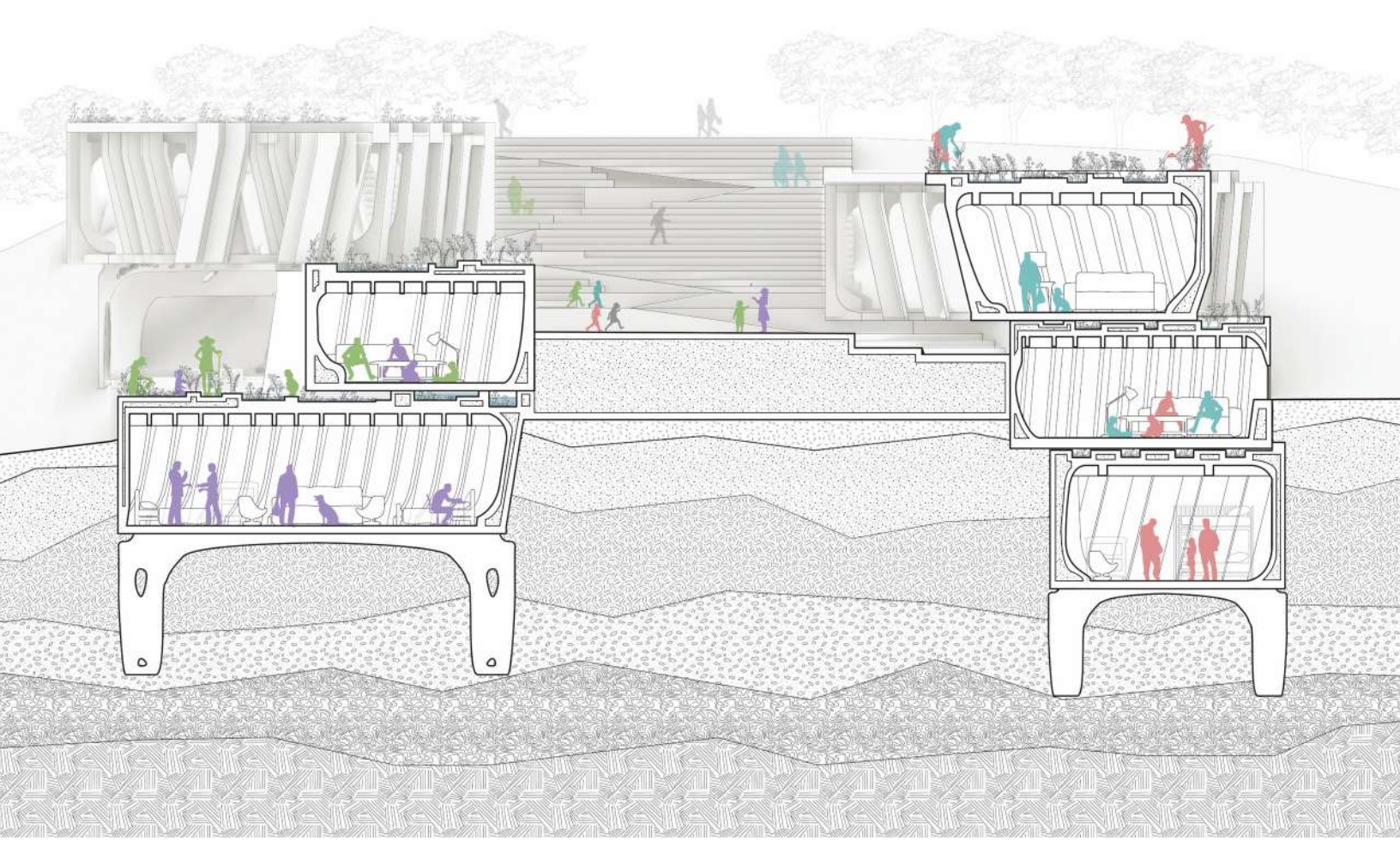





WORK
Bedroom + At Home Office
RELAX
Bedroom
RELAX
Open Space
Living Room + Kitchen
HARVEST
Garden


PLAY
Outdoor Stair Ramp
PLAY
Common Area
WORK
Shared Laundry Machines
HARVEST
Garden


RELAX
Bedroom
HARVEST
Garden
WORK
Open Space
Living Room + Kitchen
RELAX
Stair Seating



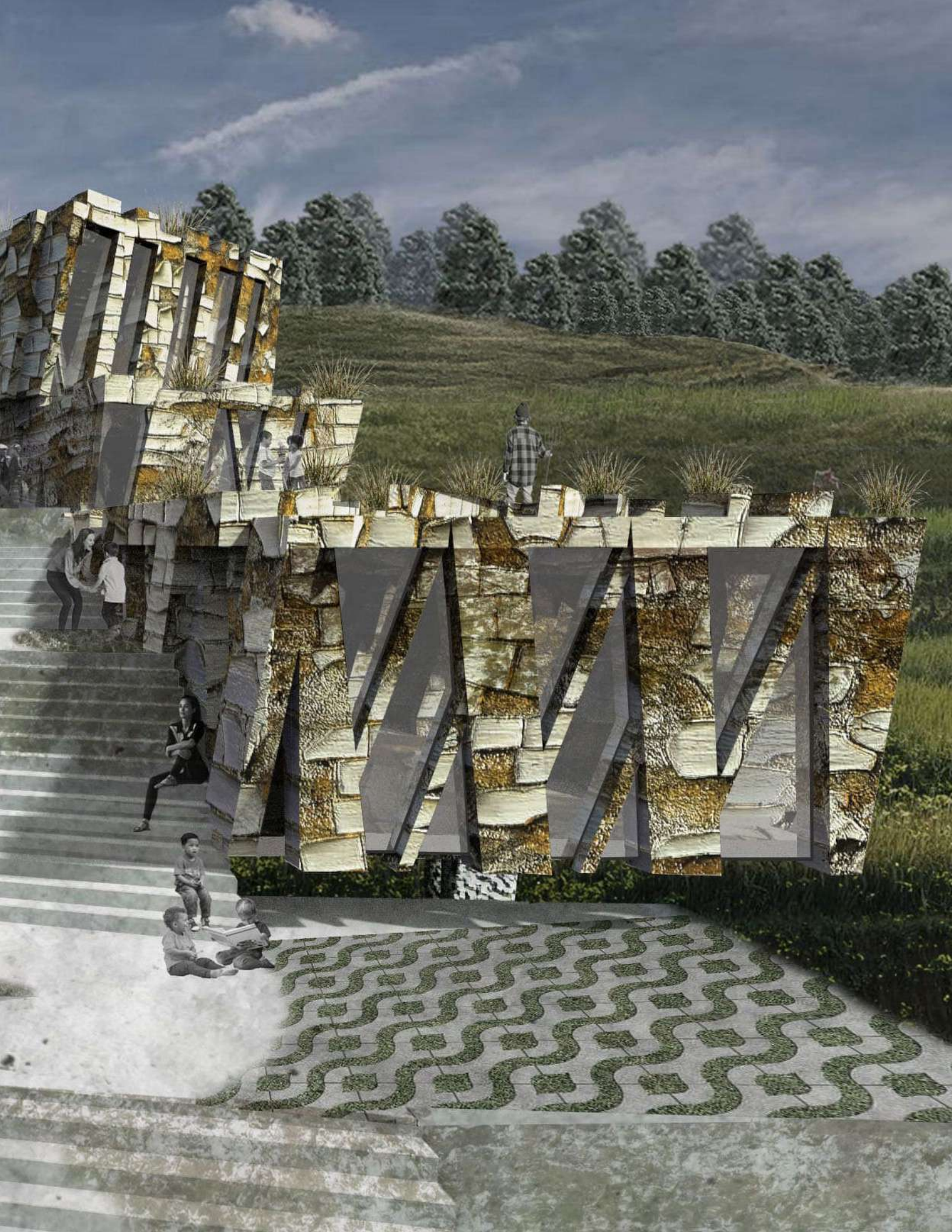
Co-Housing & Co-Parenting

Social Flows

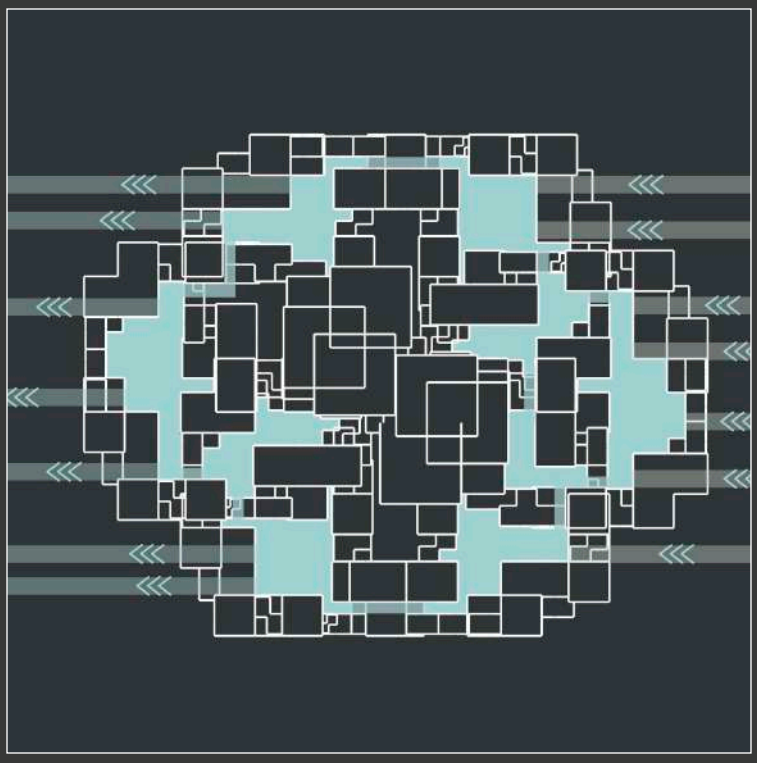
Hazelwood's primary inhabitants belong to a racially diverse, underserved, economically and socially vulnerable demographic. Split House aims to enable a better future for the children of low-socioeconomic households by stabilizing the landscape into edible playscapes.

This spatial organization of the house proposes co-living, co-sharing, and co-parenting. Double house reduces square footage by overlapping spaces to allow for co-parenting in conjunction with urban gardening and encourages collaborative decision- and place- making.

Adequate housing is critical for determining the health and education of children. 49% of people that live in Hazelwood are families with children under the age of 18, with the median household income is $37,091. America struggles with creating "a ordable housing" options because of the market pressure, causing homes to rise in price. However, by sharing space for parenting time over- laps, utilities and urban gardens could help lower the housing cost.

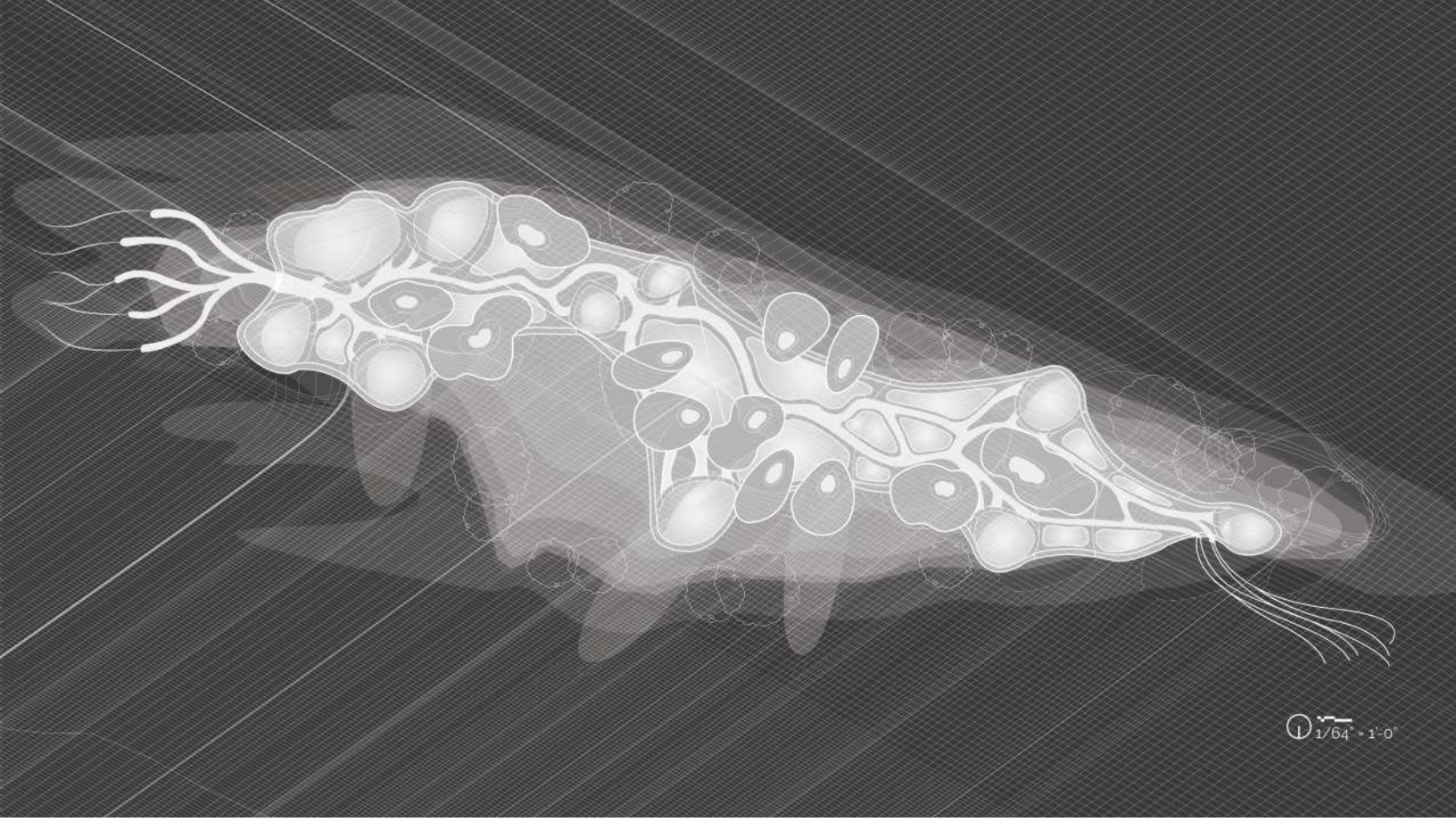


ECO-MACHINE
co-housing



Six Mile Island, PA
Environment Form & Feedback: Water Communities
advised by Matthew Huber & Dana Cupkova

Students developed urbanization strategies to create co-housing and eco-machine prototypes onto the site. The project began by allowing students to develop an unde standing and focused knowledge of a specific system's be-havior and logic to get a clear understanding of how it could be incorporated into the site and integrated into the lives of those living there. The goal of this design was to design a large biofiltration system that would take water from the Allegheny River, clean it, and return it back to the river. The biofiltration system aims to use streams, waterfalls, and gr enwalls to treat the water.



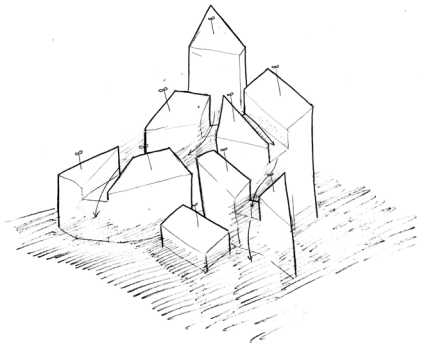
Island Over Time

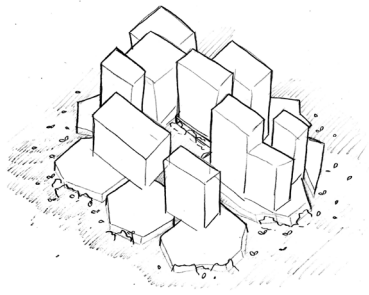
Over time the island will start to grow smaller and smaller (with the rising sea levels and erosion), but the architecture aims to still stay standing even as the island begins to fade away into the river. The architecture was carved through a wind analysis on the island.

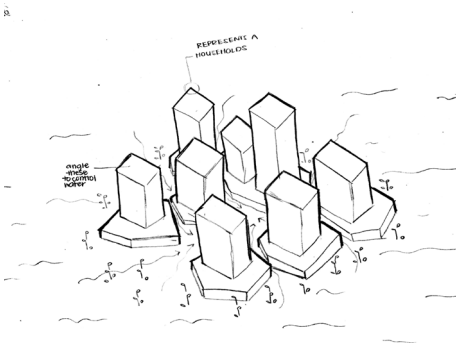
Site Plan Top Level

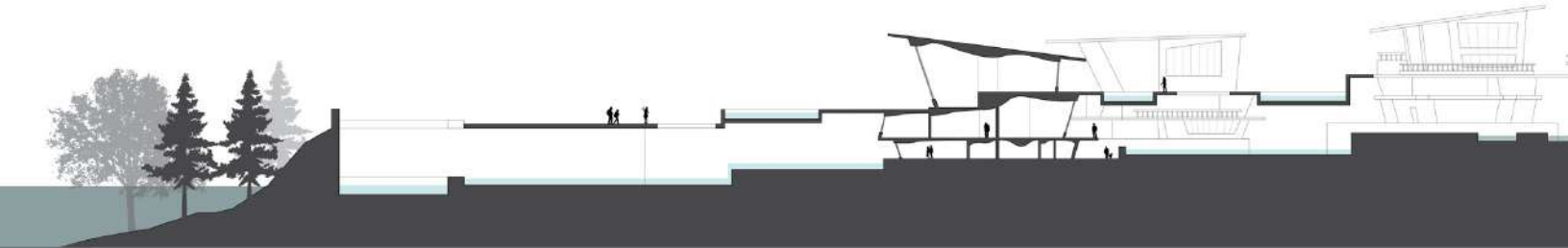
Over time the island will start to grow smaller and smaller (with the rising sea levels and erosion), but the architecture aims to still stay standing even as the island begins to fade away into the river. The architecture was carved through a wind analysis on the island.

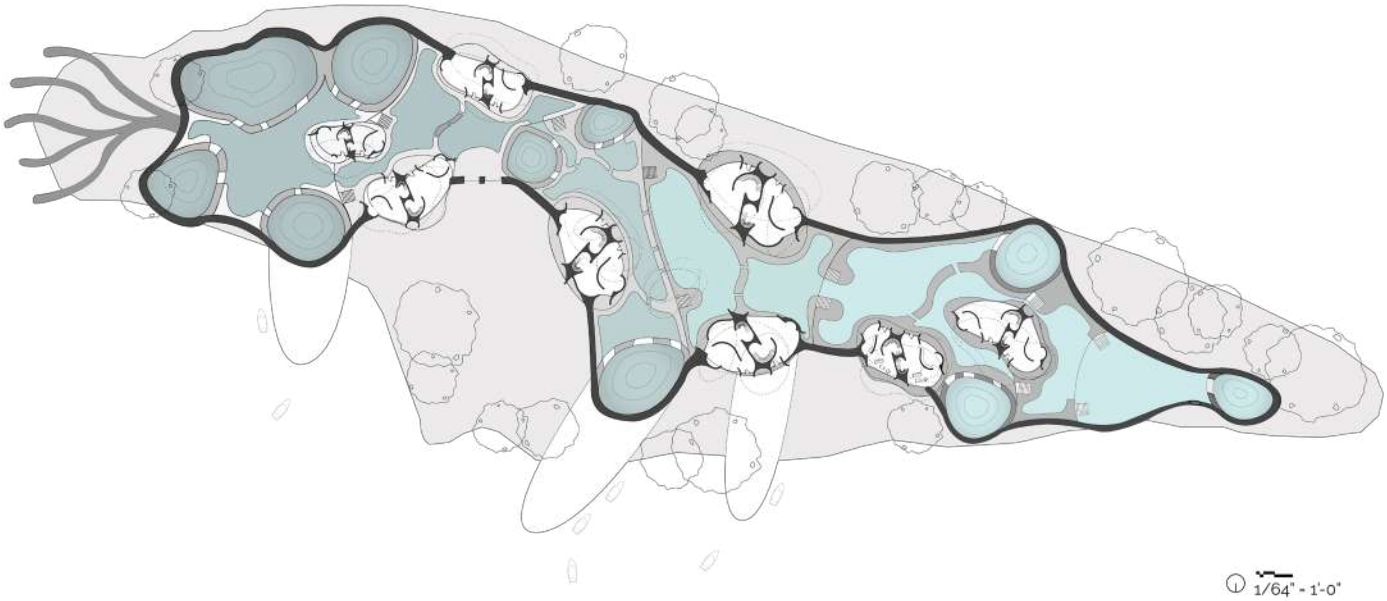
The image below displays a series of initial sketches that conveyed the idea of using streams to dictate paths and circulation of the water and the residents moving.











1/64" - 1'-0"

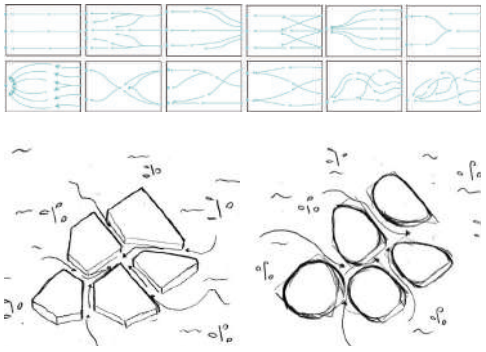
Site Plan Bottom Level

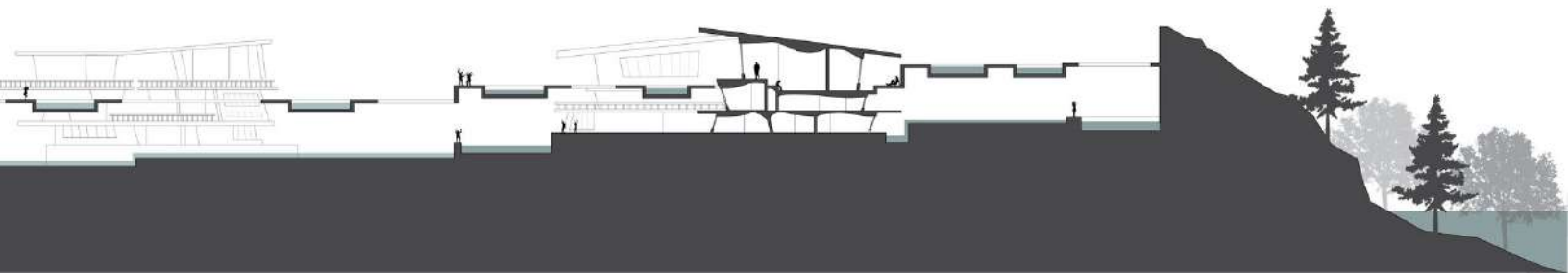
The bottom level of the system consists of a series of large pools that are surrounded by walkways to allow for residences to get into their homes. The water from the top level flows into these pools to create a waterfall effect for the residents to experience.

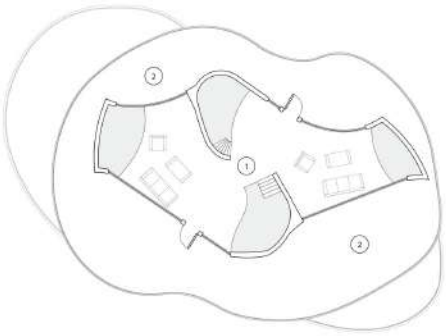
Architectural Form

The overall architectural form derived from an understanding of how water flows. Water tends to erode sharp turns and likes to free-flow through curved paths, which helped create the final form which mimicked the language of the water's movement.

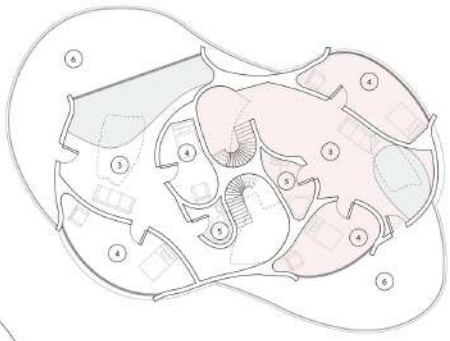
The image to the right displays a series of diagrammatic studies to understand how water flow patterns can be affected by physical objects, like buildings, and help dictate overall form.







1. Shared interior roof (library, relaxing space, etc.)
2. Shared exterior roof



3. Living Space
4. Bedroom
5. Bathroom
6. Balcony

7. Living Room
8. Kitchen

One Housing Unit

1/8" = 1'-0"

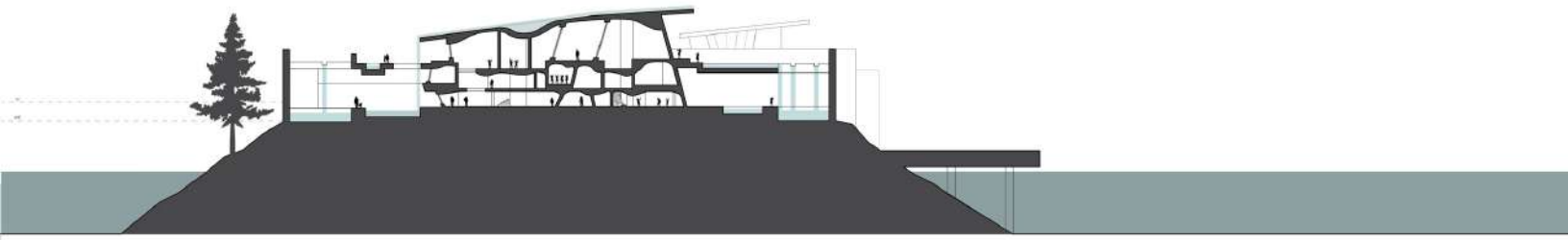
Co-Housing Plans

Each building holds multiple housing units depending on the shape of it. The core of the building consists of stairs that help inform that orient tion of each floor; each floor is rotated a specific way (the first floor is rotated to follow waterflow, the second floor is rotated to try and get as much sunlight as possible, and the third floor is shaped by the wind).

The walls of the unit help inform the circulation flow that someone would walk while

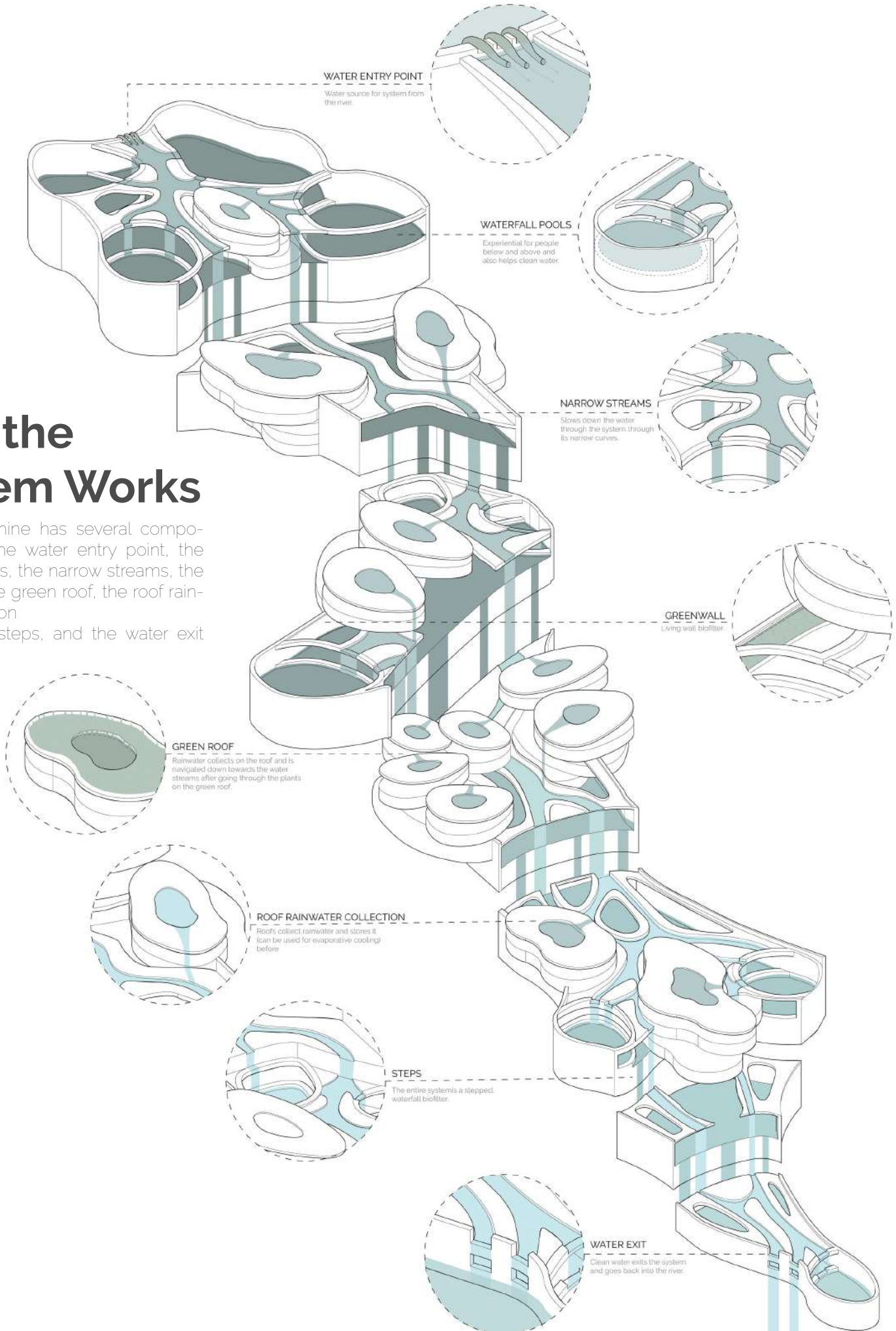
Section Series

The sections help show the main concept of the design, that water travels through both the system and the buildings.



How the System Works

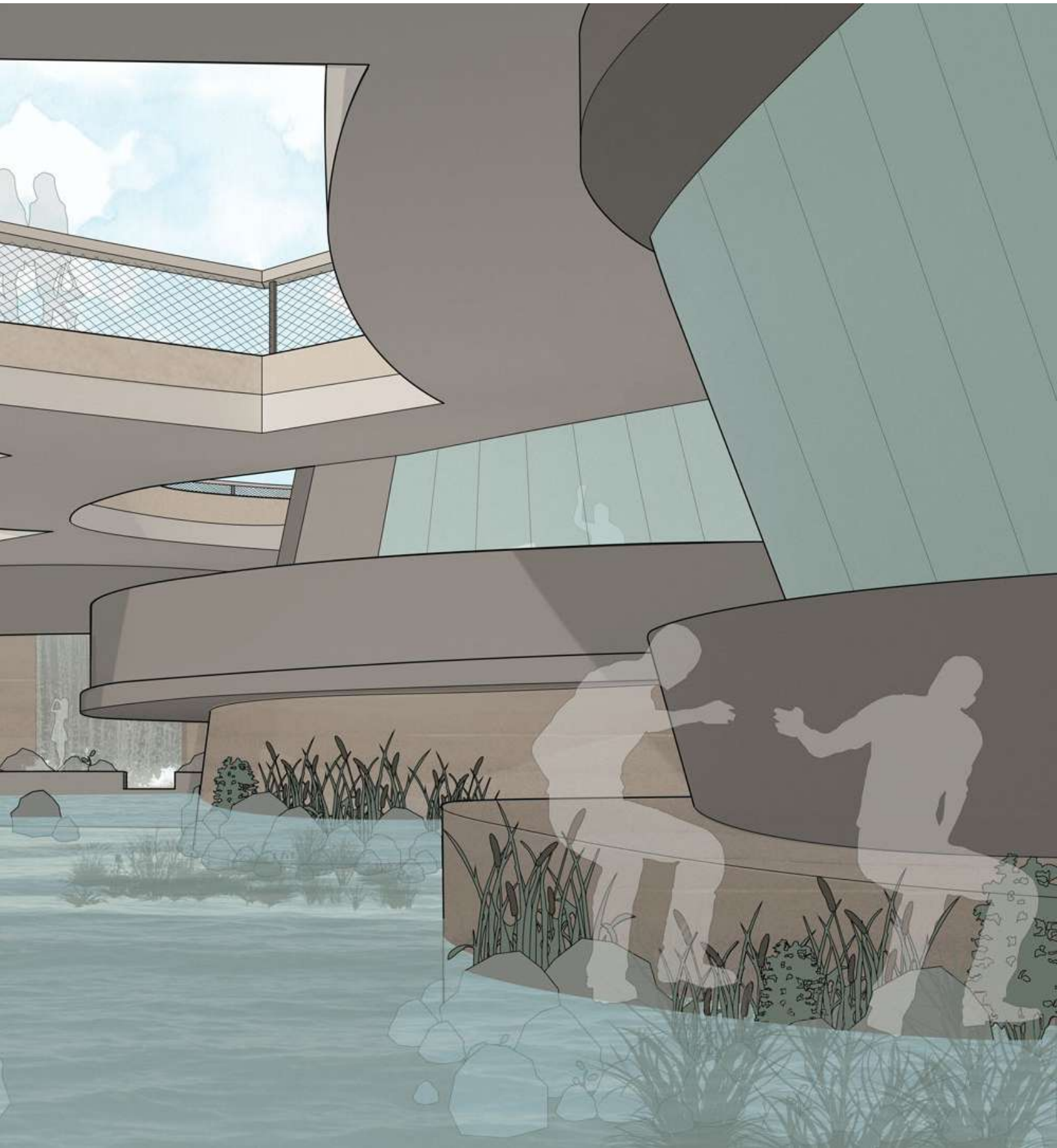
The ecomachine has several components to it: the water entry point, the waterfall pools, the narrow streams, the greenwall, the green roof, the roof rainwater collection
system, the steps, and the water exit point.



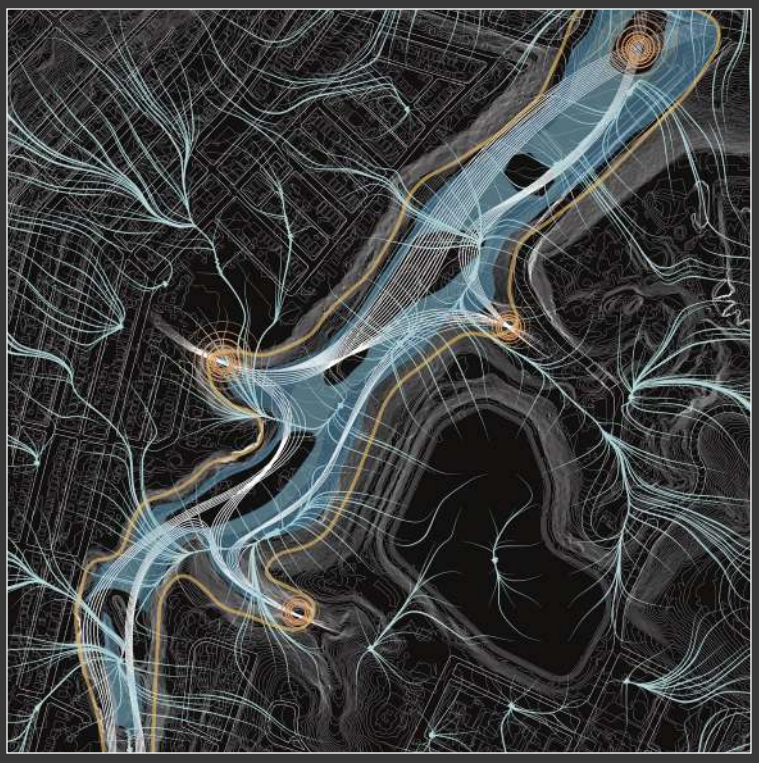
Materiality & Experience

The materiality of the architecture is mainly concrete because the goal of this structure is to make sure it doesn't erode or dissolve with the constant contact with water. However, there is also rammed earth walls and floors that is used in the structure (not the housing units) that would potentially wear away over time, but wouldn't wear away too quickly. This opens the architecture to multiple possibilities of what it could change into or become in the future. The rammed earth material is also used at the top level where residents walk to potentially wear away the streams up there and create new water

openings that would allow more water to trickle down into the bottom of the system in the future. Another potential material that couldn't be shown in this perspective view is sand, which enhances the idea of architecture changing over time; this material would be used in pools or streams to create a certain textured feel for people experiencing the clean water physically.



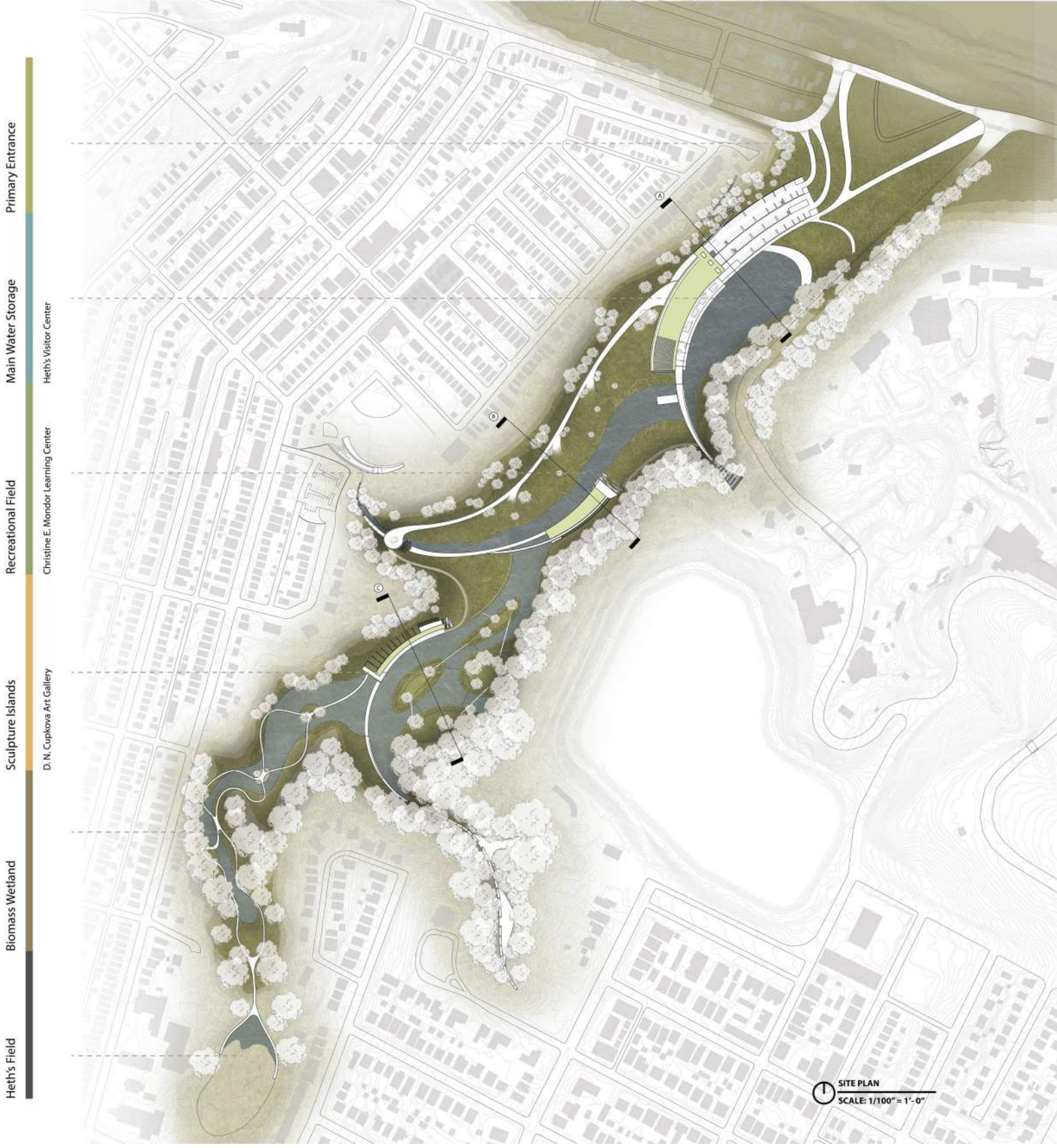
SCULPTURE PARK



Highland Park, PA
INFRAstructure Studio
advised by Christine Mondor
in collaboration with Claire Koh

This Sculpture Park aims to act as a recreational site for learning and the environment. This project assumes that the animals have been freed from the Highland Park Zoo and the existing parking lot is no longer there, leaving the valley clear for design. Taking into consideration the existing reservoirs, the Sculpture Park collects the water from the neig borhood above at various entry points and brings the water down into the site.

Throughout the park there are different ecological cond tions located on this site depending on the part of the valley it is within: wetlands, grasslands, streams, forests, etc. The site is constantly changing depending on the weather and the season conditions, which will affect the experiential a pect of the site for visitors.



Zones

The sculpture park is separated into four different zones that have four different conditions and experiences.

Hardscapes

Each zone is separated by dams that allow for water to overflow from one zone to another (each zone is at a different elevation from the last) and also acts as a bridge for the main circulatory path on the site for visitors.

These dams are also shaped in a way that guide the water and collect them into the different water channels in each zone.

Zone 1

The **First Zone** is the where the main water storage is located. It is also where the main entrance to the park is and where the main parking lot is located. This zone contains the visitor's center. The water from this water storage is collected and stored until there is an overflow of water, which will flow into an existing hill underneath the bridge at the end of the site.

Zone 2

The **Second Zone** is the recreational field. This zone contains the learning center and the ampitheater on top of the visitor center. Since this area is made up of grasslands, it is used for more flexible outdoor activities and outdoor stage performances.

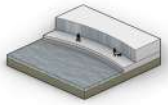
Zone 3

The **Third Zone** is the outdoor sculpture park, which also houses the indoor art center. This zone has several streams that form these sculptural islands that visitors can walk on. Depending on how much water is on the site (light, heavy, or no rain) the islands can change in size, altering the experience visitors can have. This zone is partially dry and wet.

Zone 4

The **Fourth Zone** to the south of the site is a Biosmass Wetland. Connected to this zone is a rain garden at Heth's Field, which is above the valley. This field collects the majority of the water from the neighborhood and transfers it to the wetlands with pipes. This zone is considered the wettest zone on the site since it is in the narrowest part of the valley.


Biomass Wetland


Building Edge

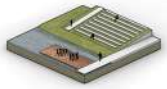

Bridge

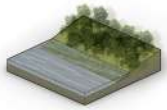

Tributary


Sculpture Islands


Soft Waterfront


Circular Plaza

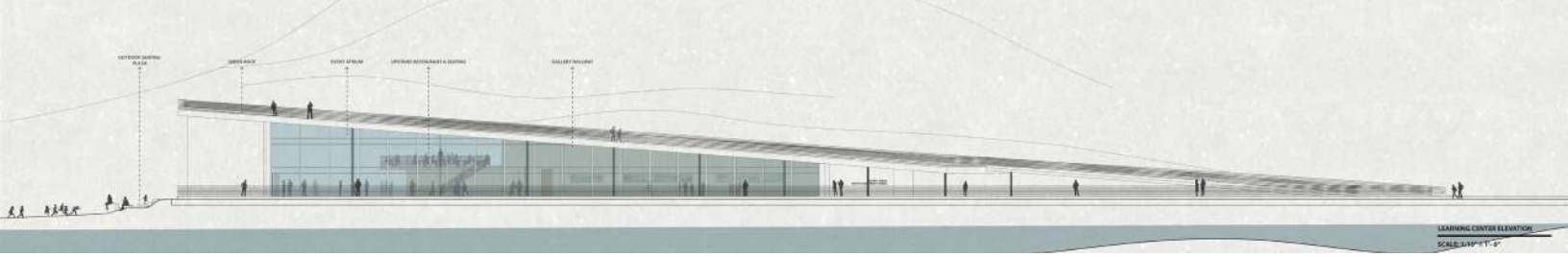

Stage + Amphitheatre

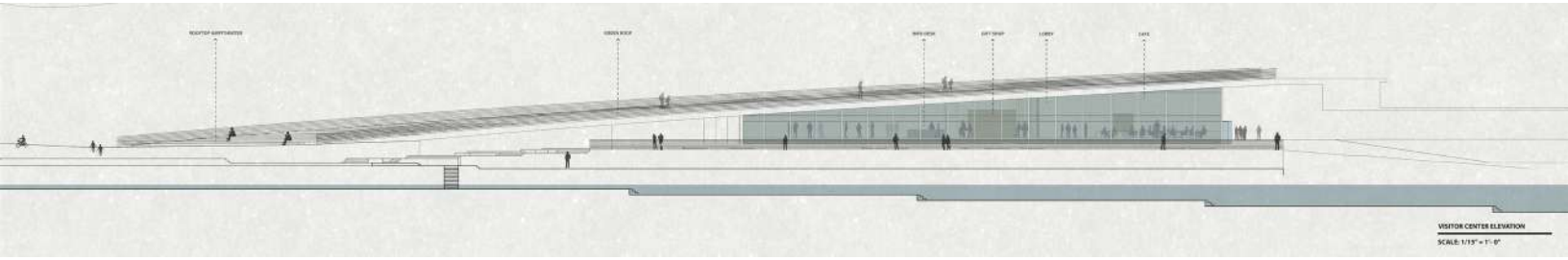

Productive Woodland

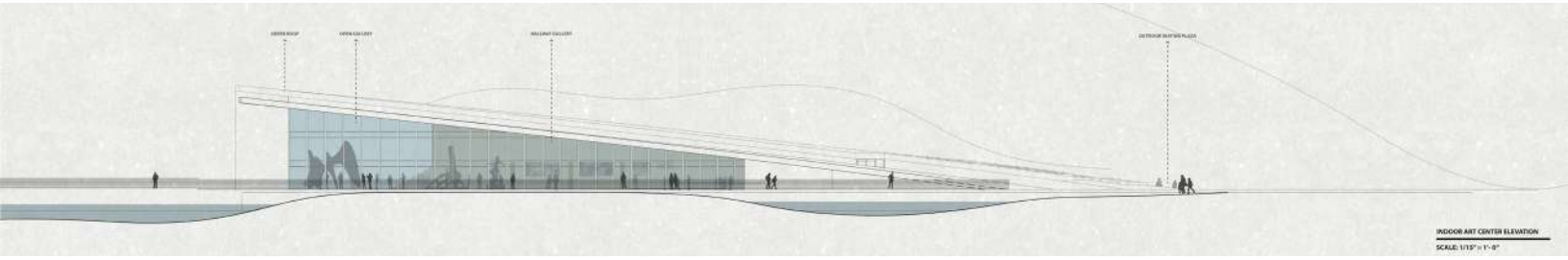

Fractured Plaza


Rainwater Stair + Filter


Natoli Rain Garden







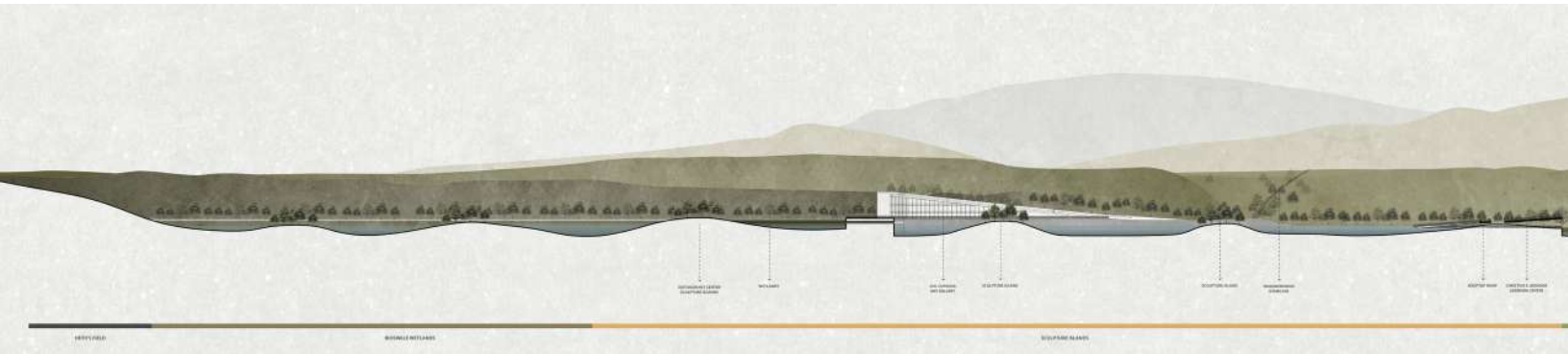
The Architecture

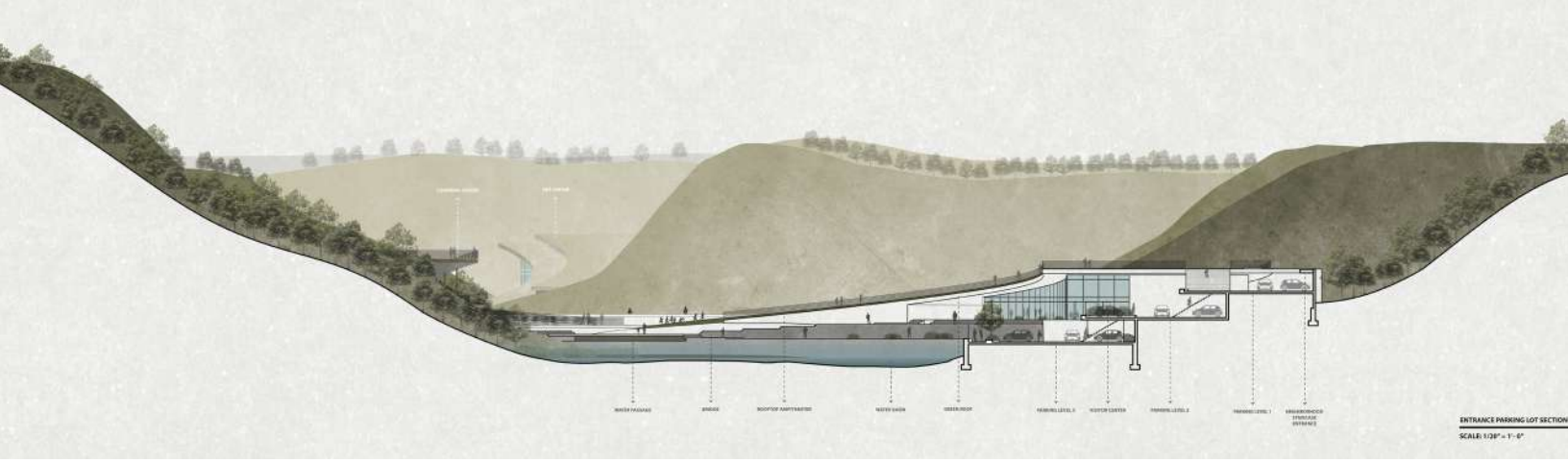
The architecture is integrated into the landscape. Each building hugs the edge of the landscape and actually brings it into the building when necessary. The side that hugs the landscape is where more private activities take place, depending on the building. The more open side of the building is a glass facade that allows for people to have a full view of the water that they are next to in the building. Each building also integrates a different roof condition.

The visitor center and learning center have a roof that slants into the landscape and becomes a part of the landscape. This allows for people to go onto the roof and see an unobstructed view of the entire site in different perspectives.

The art center's roof is split into 2 to allow for light to come into the building and hit onto the artwork.

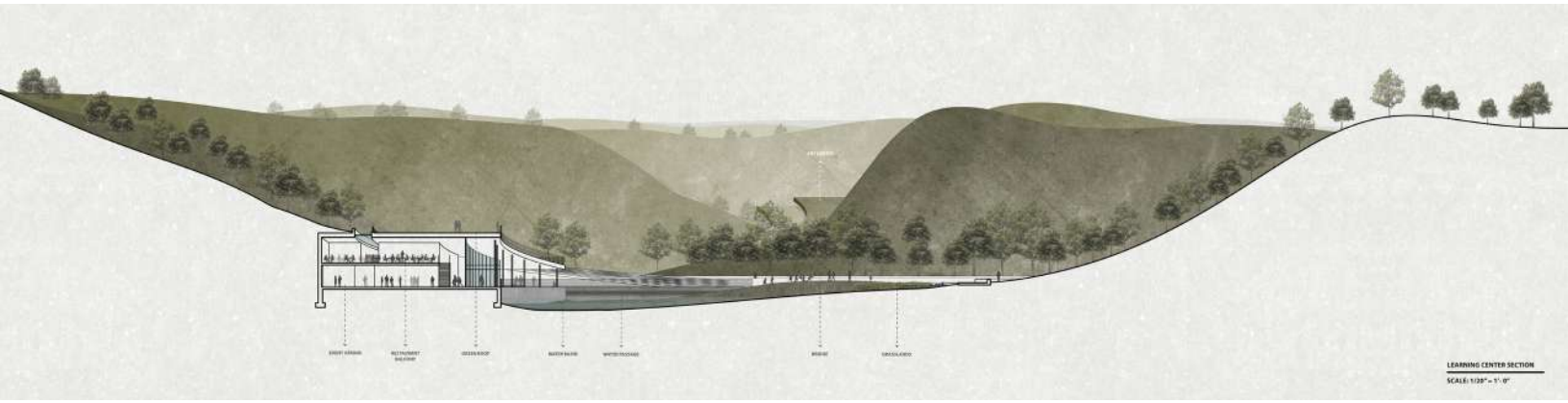
learning center's roof is also split into 2 to allow for light to filter into the hallway that is pushed against the landscape.





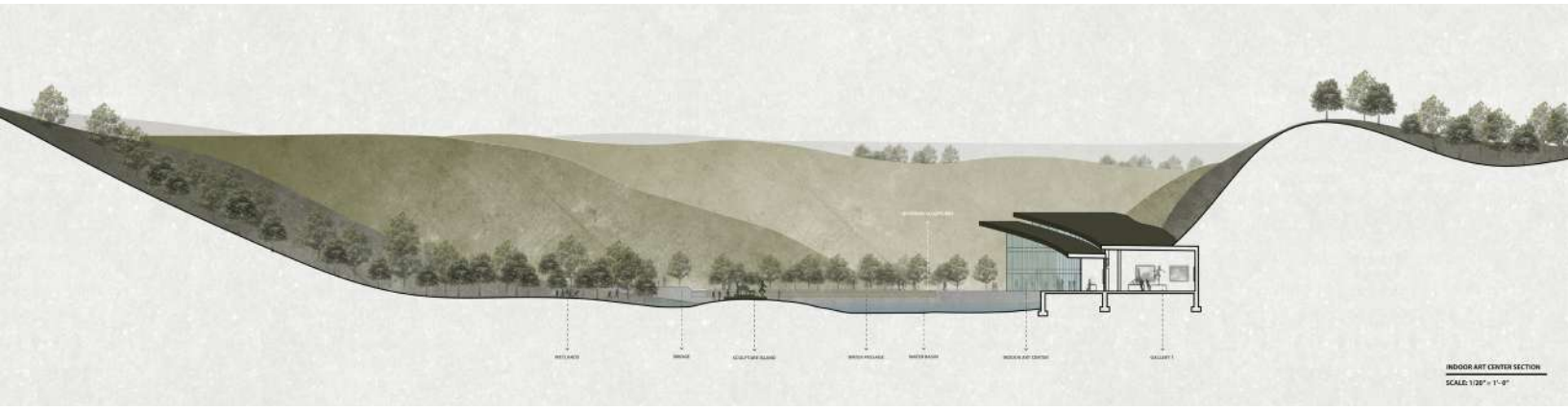
ENTRANCE PARKING LOT SECTION

SCALE: 1/28" = 1'- 0"



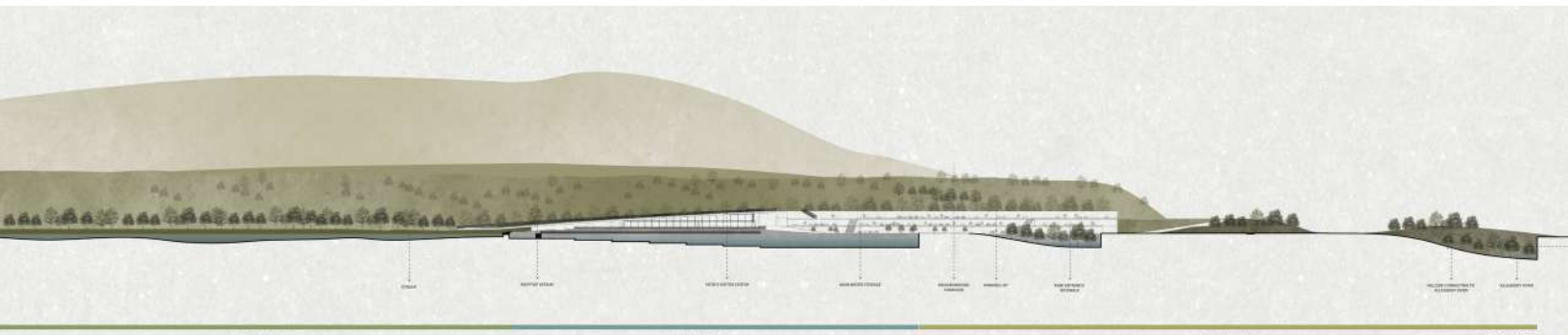
LEARNING CENTER SECTION

SCALE: 1/28" = 1'- 0"



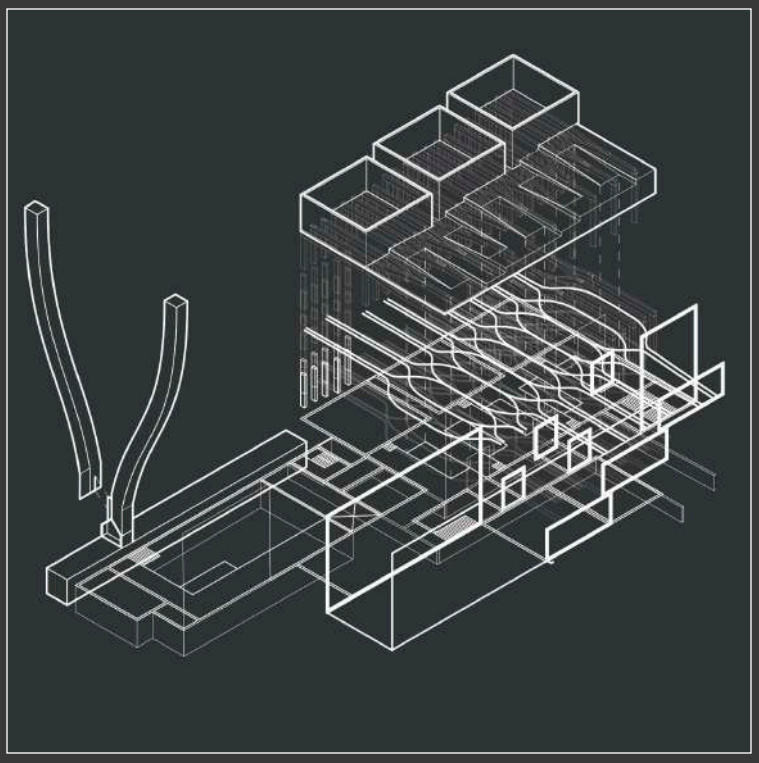
INDOOR ART CENTER SECTION

SCALE: 1/28" = 1'- 0"



SCALE: 1/64" = 1'- 0"

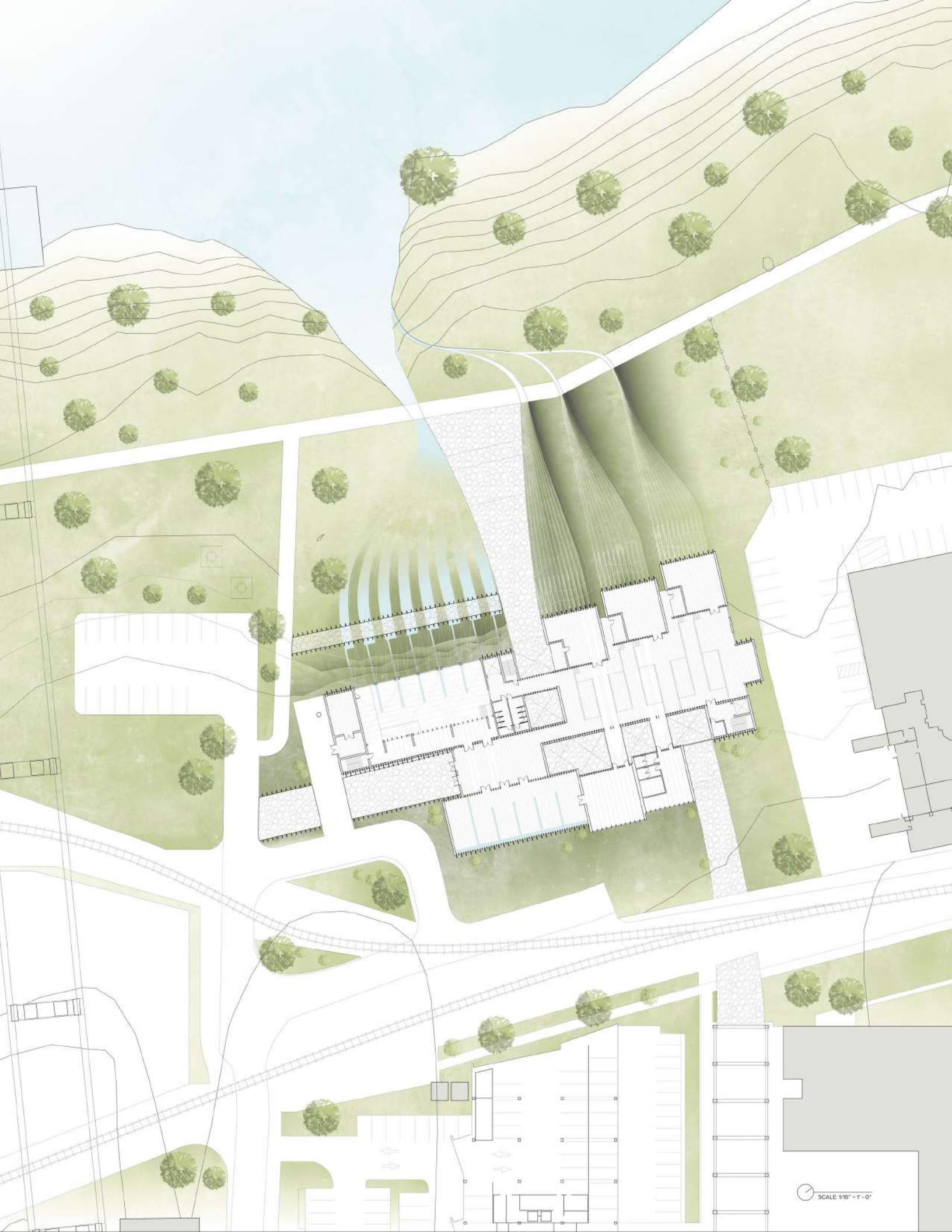
ENVIRONMENTAL CHARTER SCHOOL



Lawrenceville, PA
Advanced Construction Studio
advised by Matthew Huber & Steve Lee

Charter Schools were created to provide opportunities for teachers, parents, students, and community members to establish and maintain schools that operate independently from the existing school district structure to: improve student learning; increase learning opportunities for all students; encourage the use of different and innovative teaching methods; and create new professional opportunities for teachers.

An Environmental Charter School is a multi-disciplinary "out-the-door" learning approach that engages the students with environmental learning. The project aims to make the school into an environmental pedagogy for both the students and the public through green spaces and rainwater collection systems.


SCALE: 1/16" = 1' - 0"

The project site has five bounding conditions: The Allegheny River, The National Robotics Engineering Center (NREC), Railroad Tracks, the 40th Street Bridge, and an Industrial Passageway.

The image below displays a visual study of waterflow pathways through the building.

Water Inside

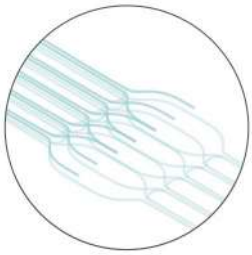
The school creates a connection with the Allegheny River. This provides an education opportunity to teach students about the environmental properties of water.

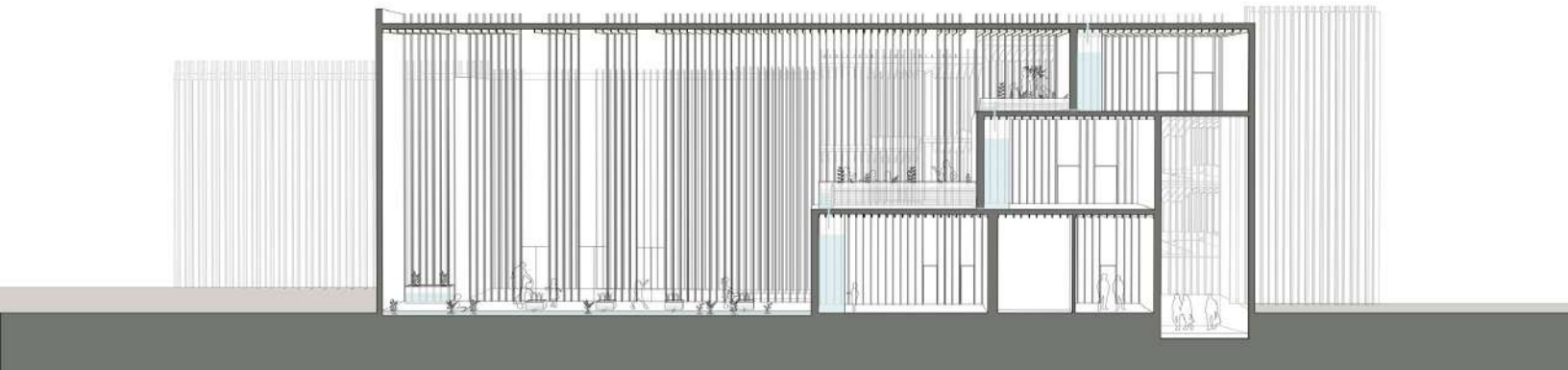
In addition to this connection, the building has an interior system that allows rainwater to collect from the roof. Then, this rainwater physically flows through the building and sustains the different levels of greenery that are located within the school's greenhouse.

Water Outside

VIR-GA (noun)
A mass of streaks of rain appearing to hang under a cloud and evaporating before reaching the ground.

To emphasize the use of rainwater within the building, the building facade mimics the visual language of water constantly falling down the building even when it is not raining.





Structural Timber

The collaborative spaces in the building, pictured above, have structural beams that span across the space's ceiling. These beams grow deeper in the central parts of the space to hold up the weight of the floor above and also mimic the horizontal movement of water through the building.

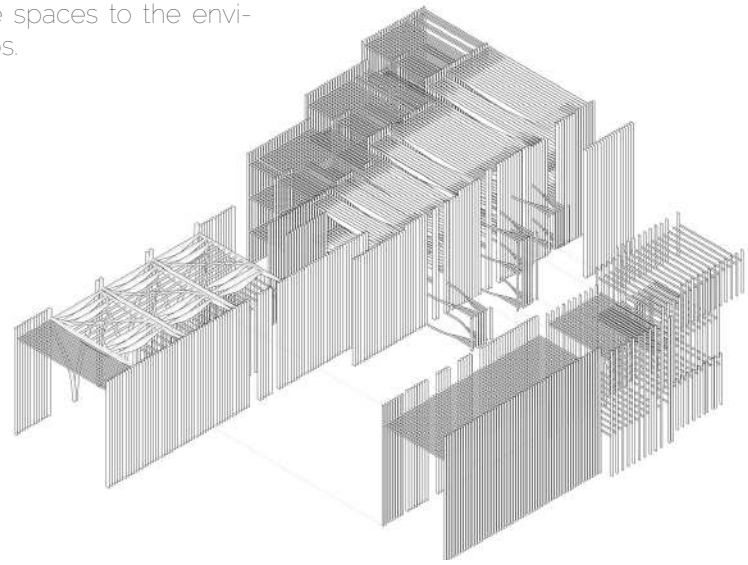
The structure of the entire building is made up of vertical and horizontal pieces of timber to create the idea of building something structural using many small pieces rather than a few large pieces.

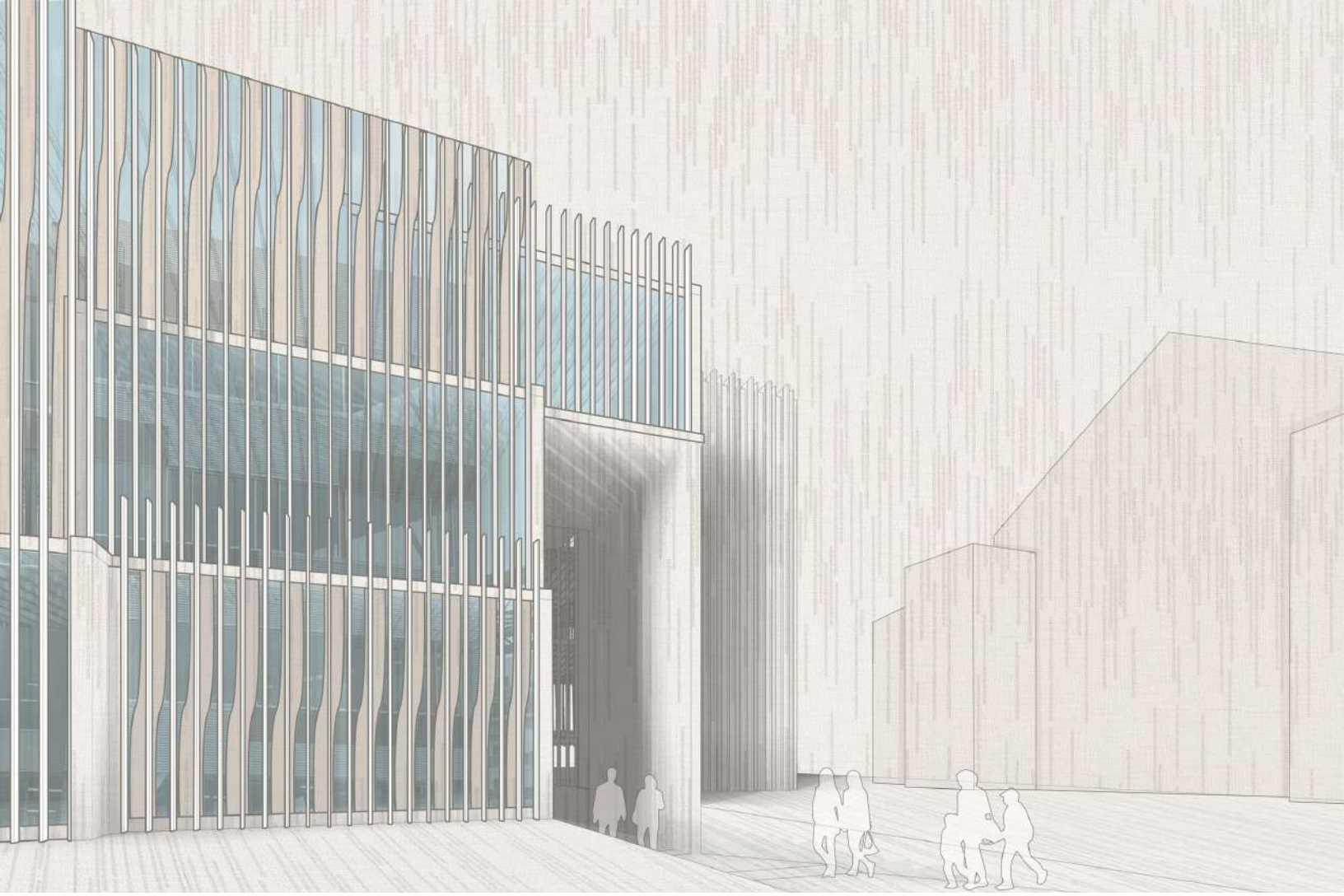
The image to the right displays the overall timber structural system of the entire building.

Circulatory Ramps

The collaborative spaces are made up of many ramps. The goal was to create a circulation throughout the entire building that the students could use more frequently to create a smooth transition from one space to another: the collaborative spaces to the environmental studios.

These ramps also act as an "endless outdoor space" by going through the entire building. This is made for rainy days when students are unable to go outside.





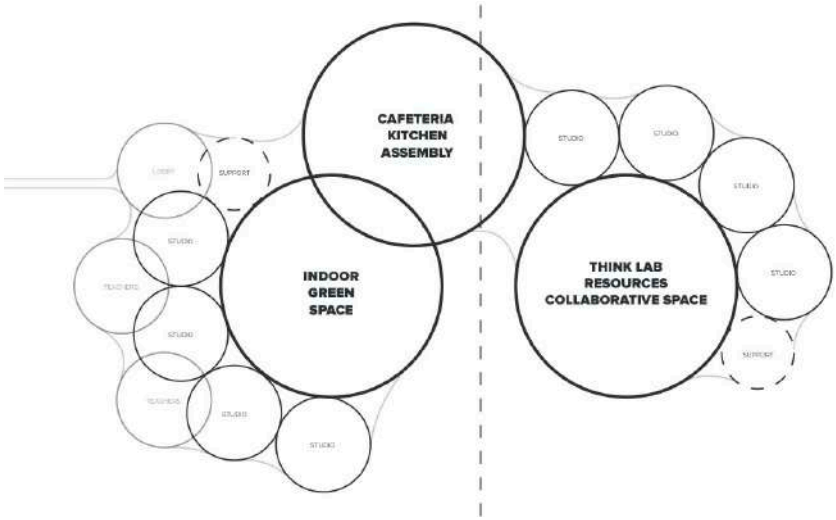
Public Passageway

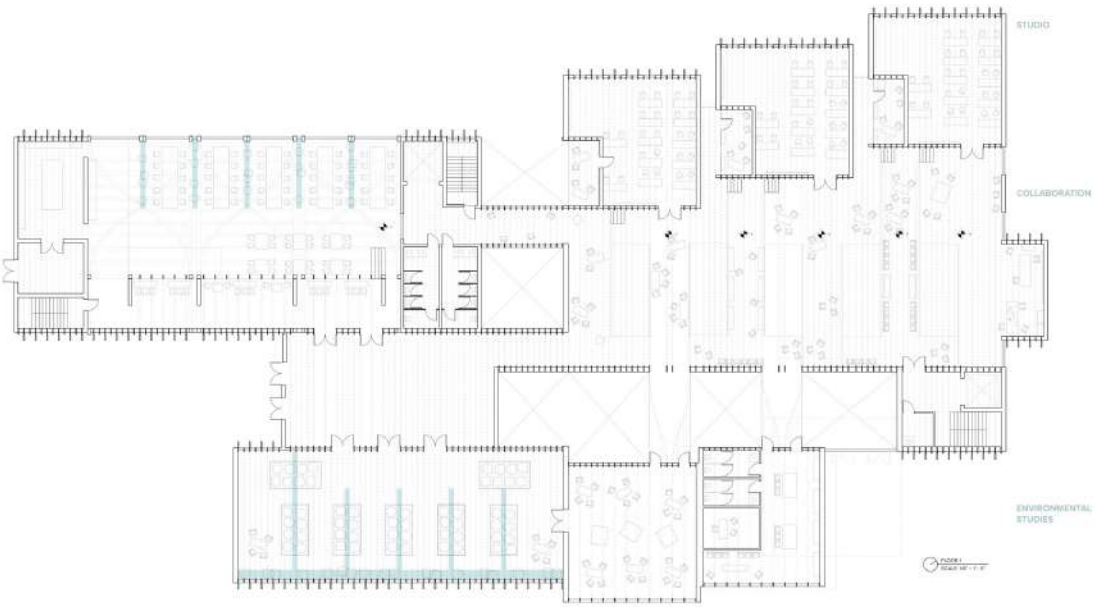
The building is divided into two major spaces by a public passageway. This public passageway directly connects with the industrial passageway across the street. It separates the green spaces and the collaborative spaces to give the opportunity to create "bridges" above this pathway to connect the two spaces.

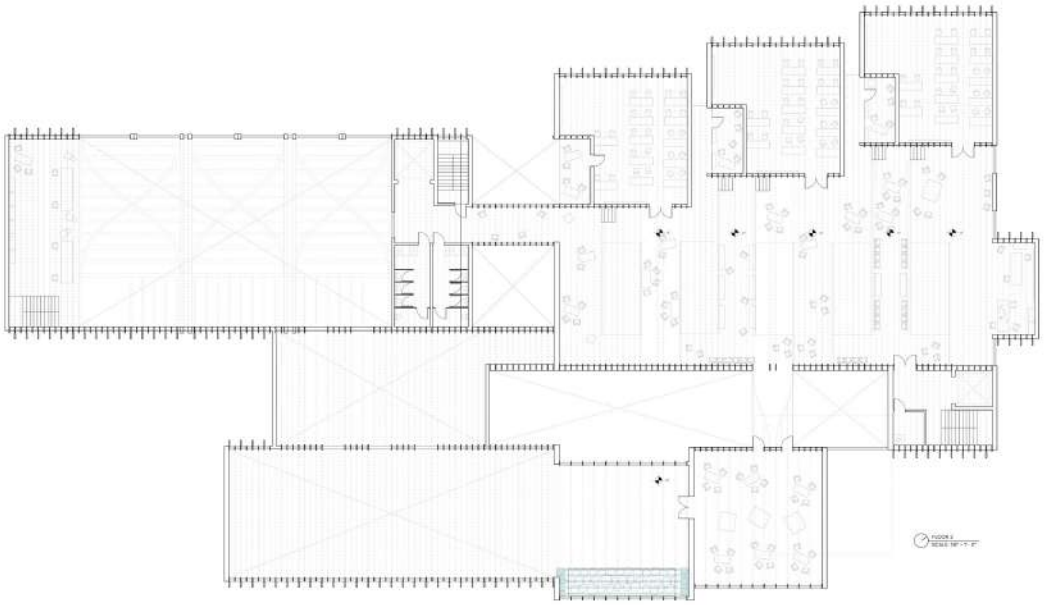
This pathway is sunken from ground level through the use of subtle ramps that go up and down the pathway. This was designed to create a distinct separation between the public and the private visitors, allowing them to interact with one another with a level of safety.

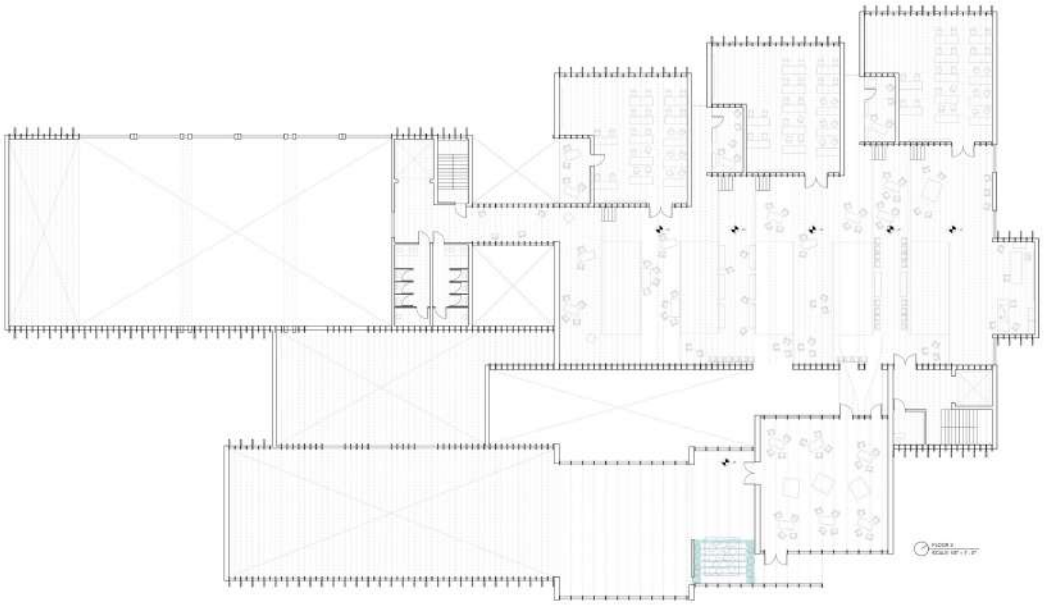
The main goal of this public passageway was to engage the community of Lawrenceville in learning about the environment by providing a passageway that leads directly to the water channels in the back.

The diagram below describes the organizational concept of the building that was separated by this central pathway.




STUDIO
COLLABORATION
ENVIRONMENTAL STUDIES





Thank you

Please feel free to contact me if you have any questions.
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