

XINRU TAN

Architecture Design Portfolio 2020 - 2023

Master of Architecture
University of Pennsylvania

CONTENTS



When you want to give something presence, you have to consult nature.

And there is where design comes in. If you think of brick, for instance, you say to brick,

“What do you want, brick?” And brick says to you, *“I like an arch.”*

And if you say to brick, *“Look, arches are expensive, and I can use a concrete lintel over you.*

What do you think of that, brick?”

brick says,

“I like an arch.”

- Louis Kahn

1 BATH OF MANY VAULTS

Public Bathhouse Facility *Fairmount Park, Philadelphia*

02

2 BEACONS OF HOPE

LoLux Public Housing *Brooklyn, New York*

12

3 1921 GREEN STREET - CANNO design

Multi-Family Building *Spring Garden, Philadelphia*

18

4 STONE STAGE & STAY

Quarry Theater and Hotel *Cappadocia, Turkey*

22

5 601 WASHINGTON STREET - JKRP Architects

Multi-Family Residential Apartment Community *Conshohocken, Pennsylvania*

30

6 LOGOS ANTIQUUS

Geological Research and EducationCenter *Mons Klint, Denmark*

34



BATH OF MANY VAULTS

*Public Bathhouse Facility
Fairmount Park, Philadelphia*

UPenn | ARCH 602 | Spring 2022
Critic: Daniel Markiewicz | GA: Umar Mahmood
Partner with: Qixian Zhang

A bathhouse represents the epitome of decadence, and excessive decadence is often a signal of societal decline.

Bathing has cultural roots in various rituals, from Turkish Baths to Scandinavian Saunas to Japanese Osens and Rotenburos. In some cases, notions of excess and hedonism have been associated with the decline of empires; for instance, there were 856 baths in ancient Rome just before the empire fell in the 5th century. The bath house is a flexible program that aims to produce pleasure through relaxation.

Our project is centered around the combination of barrel vaults as a form and Brutalist's focus on materiality. The barrel vault is a widely used architectural and structural element in many large and open spaces, such as art museums, train stations, and pavilions.

The Brutalist approach emphasizes the expression and emphasis of the barrel vault form through materials, textures, and construction methods.

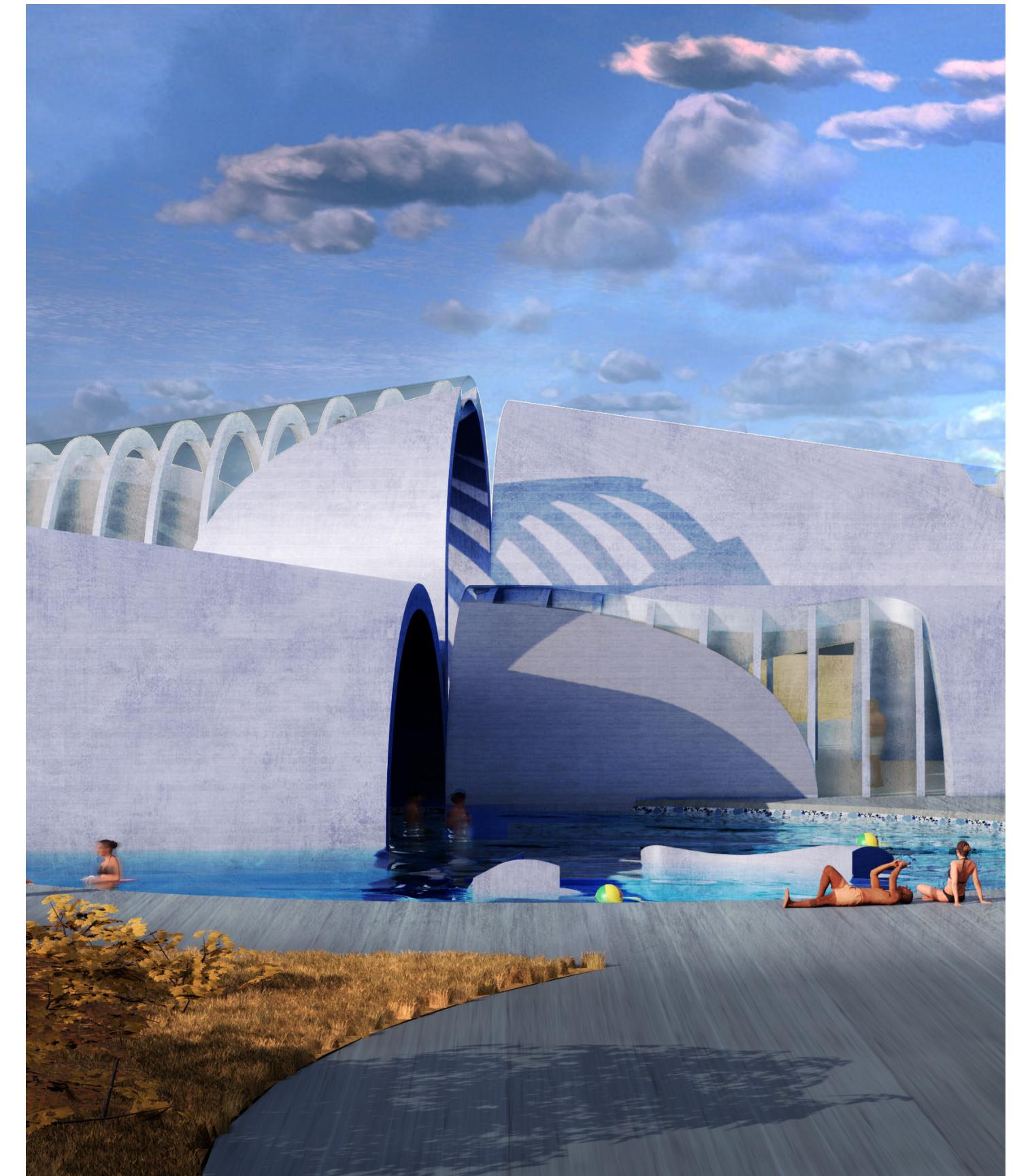
The Bath of Many Vaults aims to blur the binary of bathing experiences and create more opportunities for a spectrum of cultural and bathing activities.



CONCRETE ARCH COLUMN

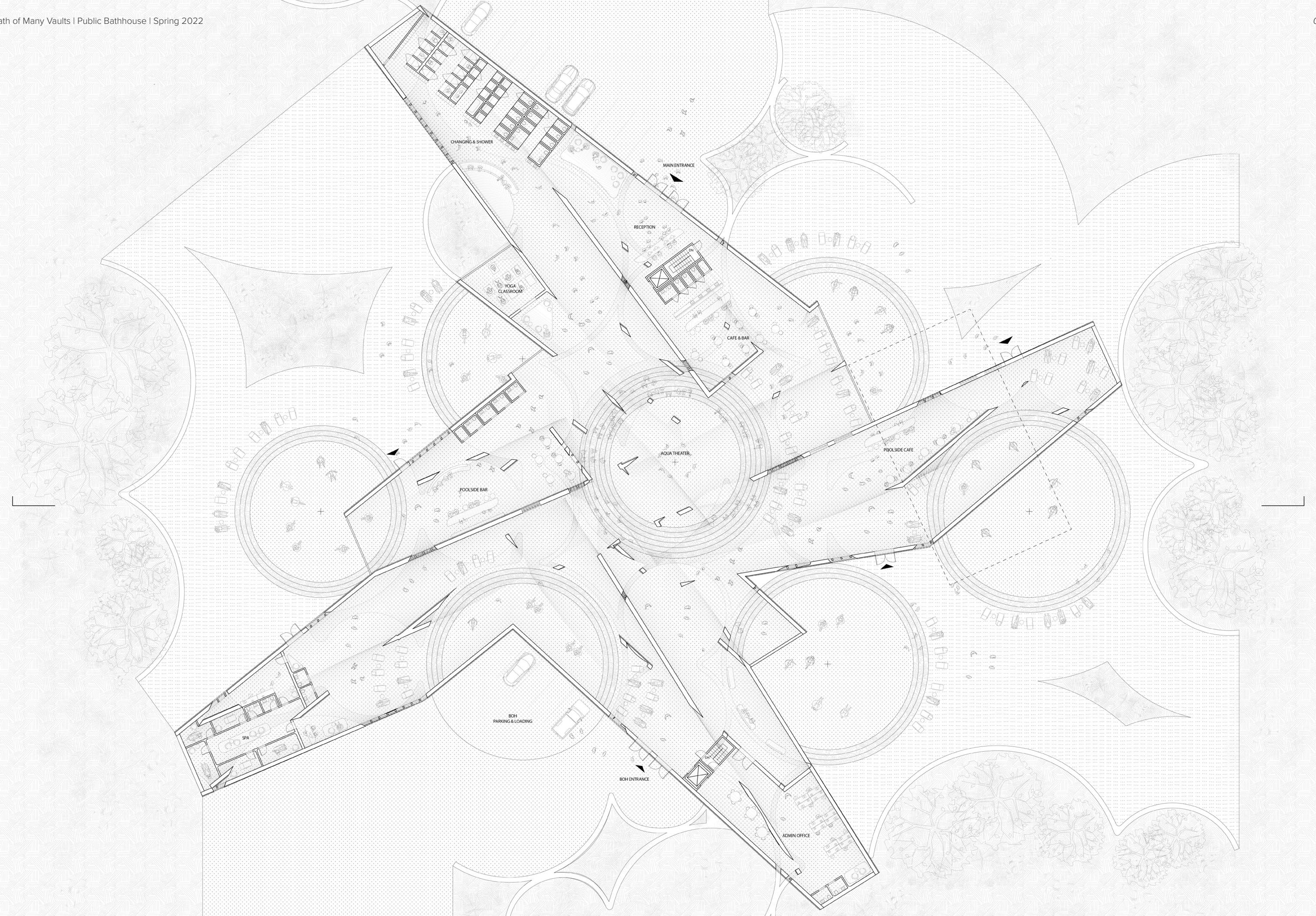


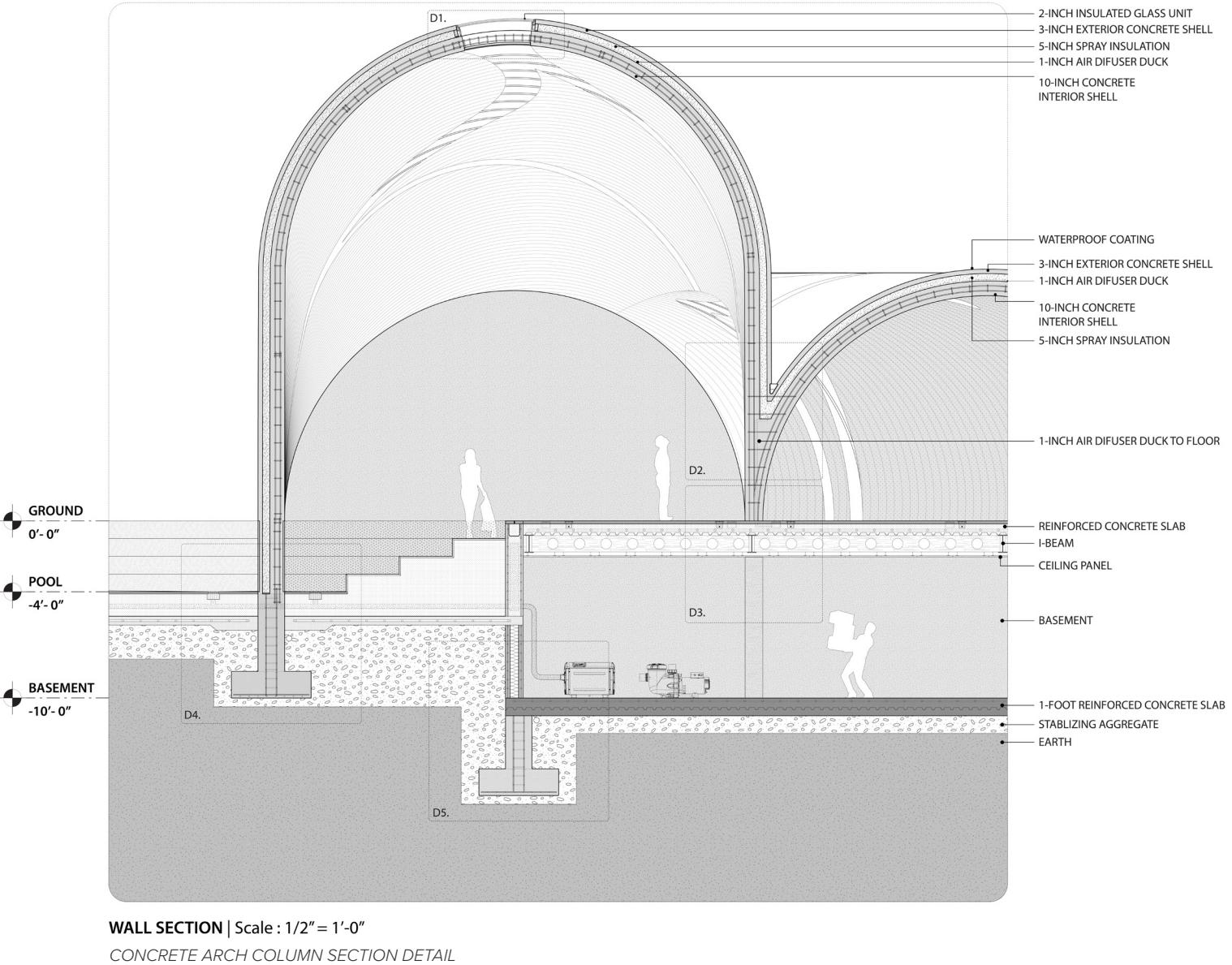
MAIN POOL AT DAY



OUTDOOR POOL VIEW

Our early studies experimented with different vault sizes, lengths, connections, and directions to create a modular unit that combines two vaults at different heights into one. The modular vault then later formed the bathhouse's overall massing.

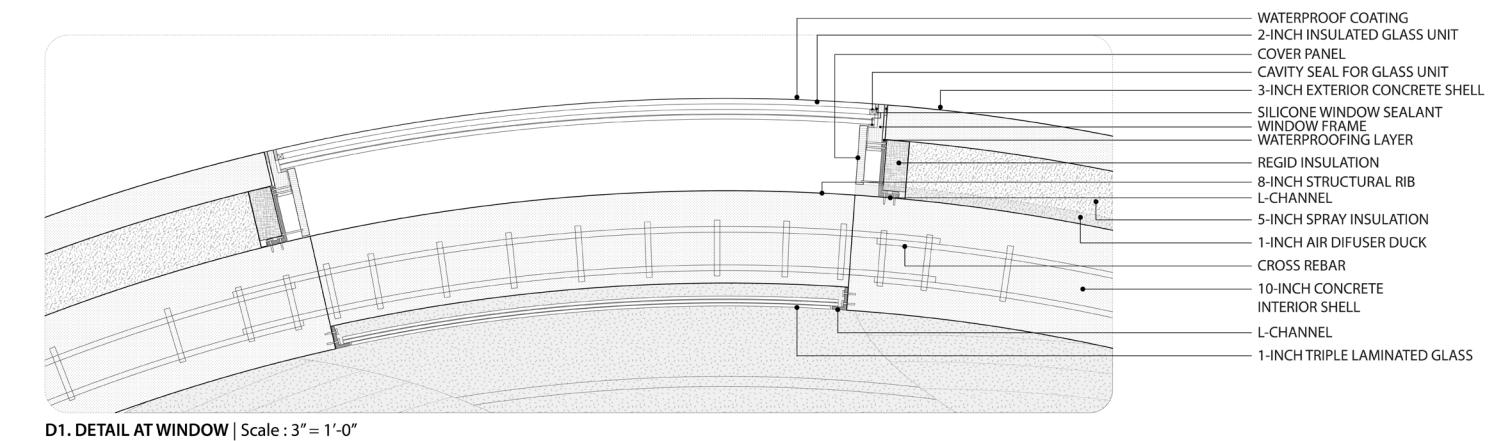
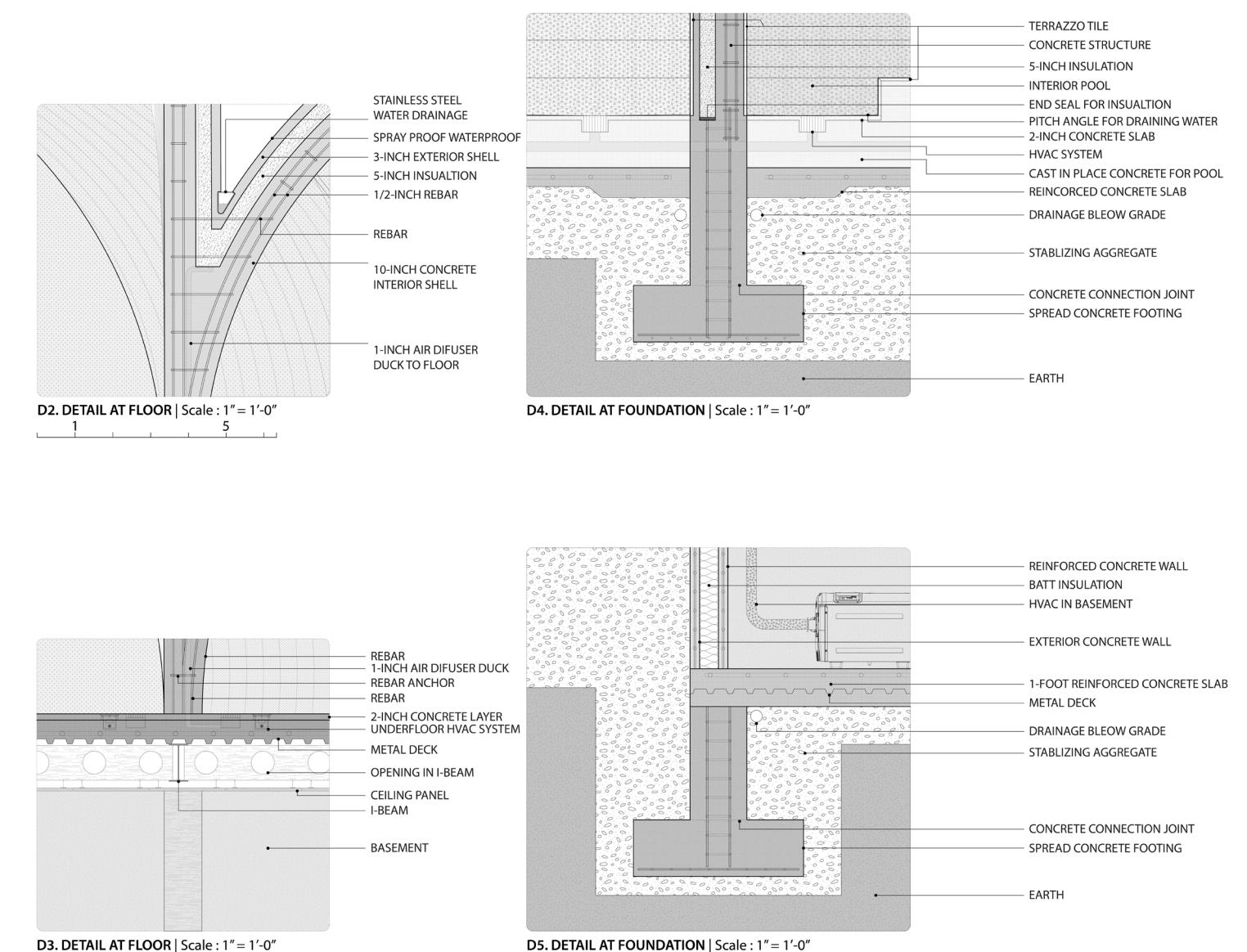




We have the vault modular as our massing and the circles as our pools. Then we introduce another language when considering letting light into the space, which is the negative pattern of different circles to carve out skylight windows on the vaults.

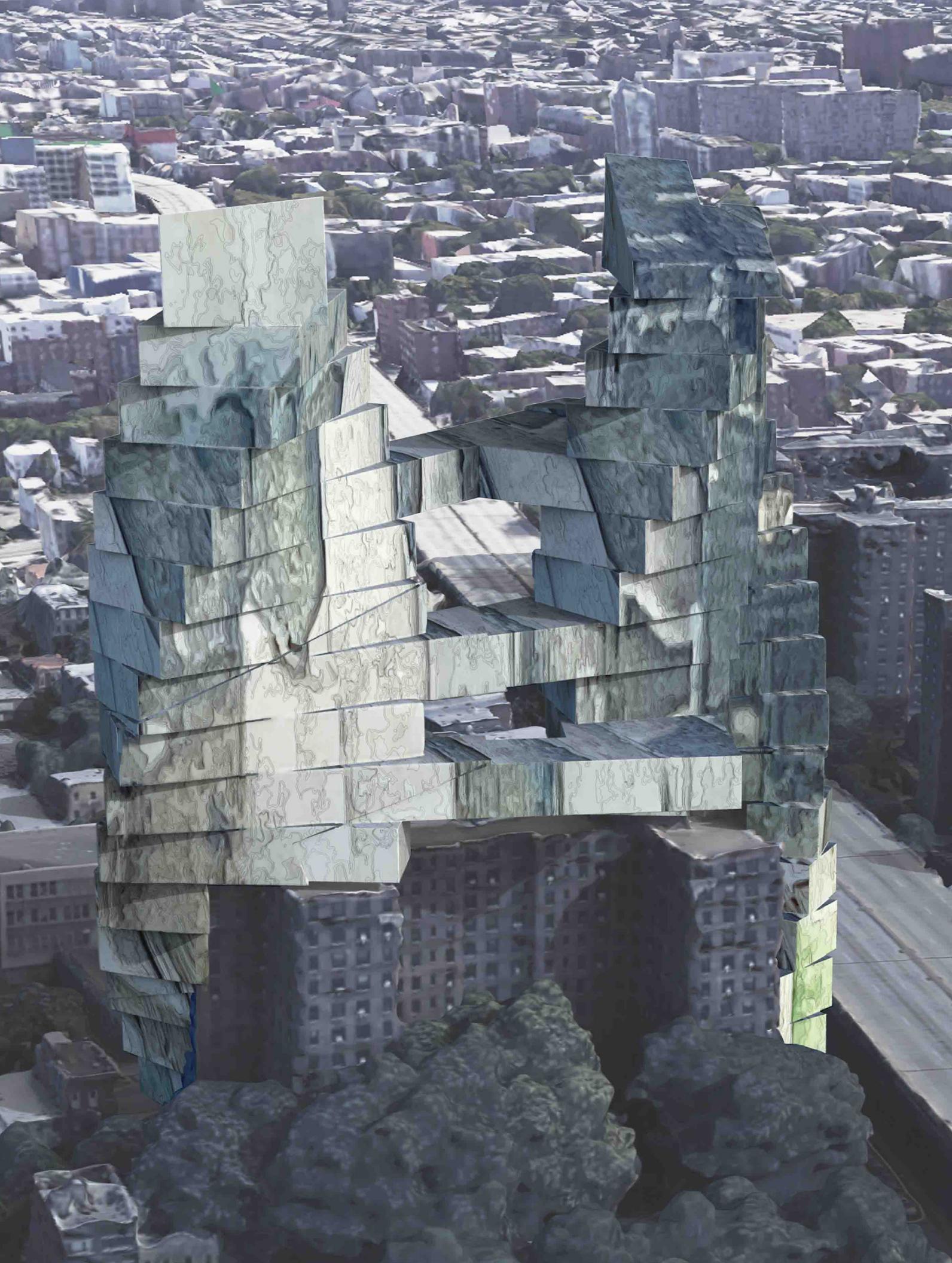
From the structural standpoint, there is a lot that we want to achieve, the consistent appearance of the concrete both on the interior and exterior side, the integrity of the vault, and the continuous opening of the skylight windows. We developed a sandwich system for the vaults. There is a 10-inch reinforced concrete shell on the interior, followed by a 5-inch insulation layer that includes occasionally needed air diffuser pipe.

Finally, the vault will have a 3-inch exterior concrete shell to complete the consistent appearance of the material itself. Then goes into more detail about maintaining the vault's integrity while providing openings for windows; we introduced the ribbing system that bridges the opening within the vaults.





MAIN POOL AT NIGHT



BEACONS OF HOPE

LoLux Public Housing

Brooklyn, New York

UPenn | ARCH 601 | Fall 2021

Critic: Jonas Coersmeier | GA: Danny Ortega

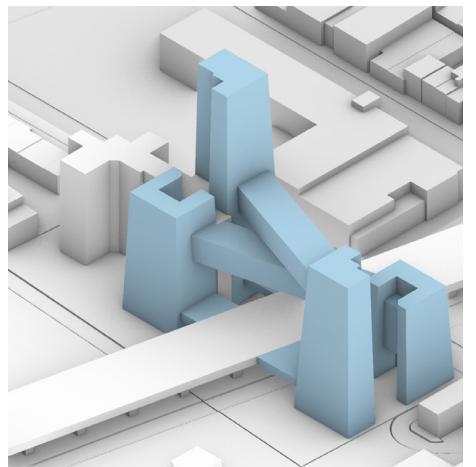
The deconstruction of highways has been used by other cities as a solution to address a variety of challenges such as climate change, environmental justice, quality of life, and urban development. Our city could adopt this approach to tackle the displacement and segregation caused by the BQE, which was designed by Robert Moses.

In 2019, the number of homeless young people in NYC was over 7,000, and in 2020, the situation had not improved. Advocates claim that these numbers are underestimated, while the second most common household in the city is single-parent families, who are responsible for nearly half a million children.

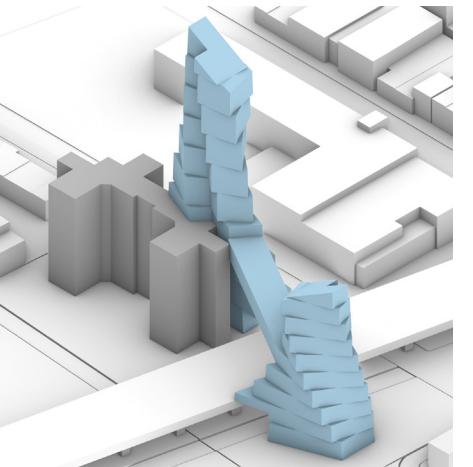
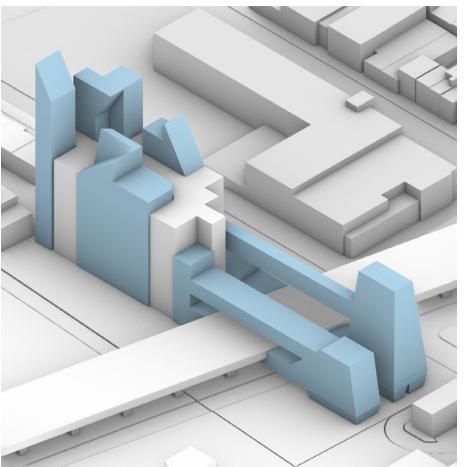
The Beacons of Hope, also known as Lolux Commons which is a combination of low-income luxury housing and public space, aims to provide homes for single-parent families and young adults who are struggling with homelessness and financial difficulties.

The project focuses on both luxury condominiums and affordable housing, which are the primary growth markets in NYC's real estate industry. The Lolux Commons project aims to explore the interaction between these two segments and find areas of synergy that can add value to various stakeholders and the community.

The Beacon towers will offer additional living, community, and public space not only for new and current residents but also for the public.



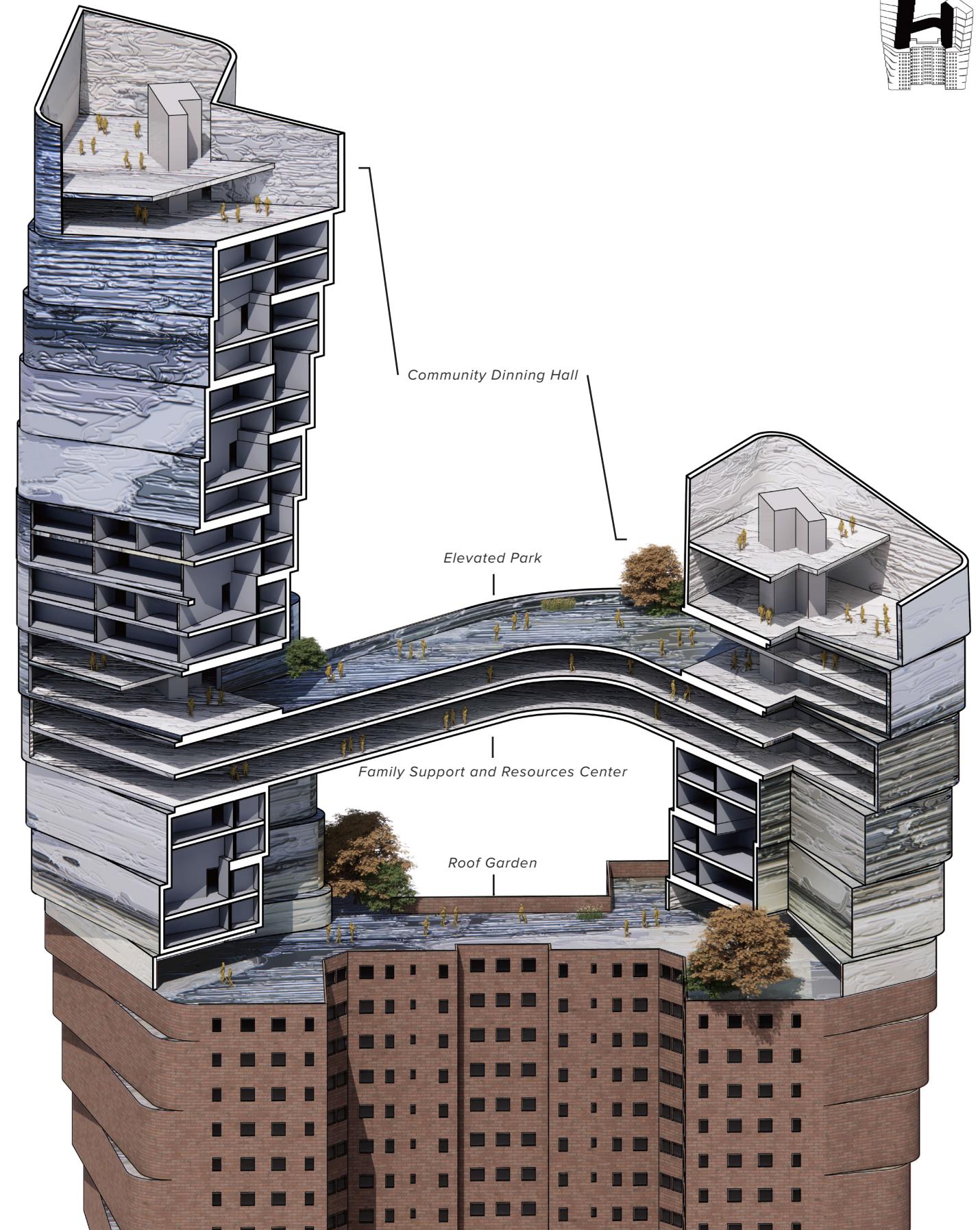
MASSING STUDIES



MATERIAL STUDIES



MATERIAL STUDIES DETAILS

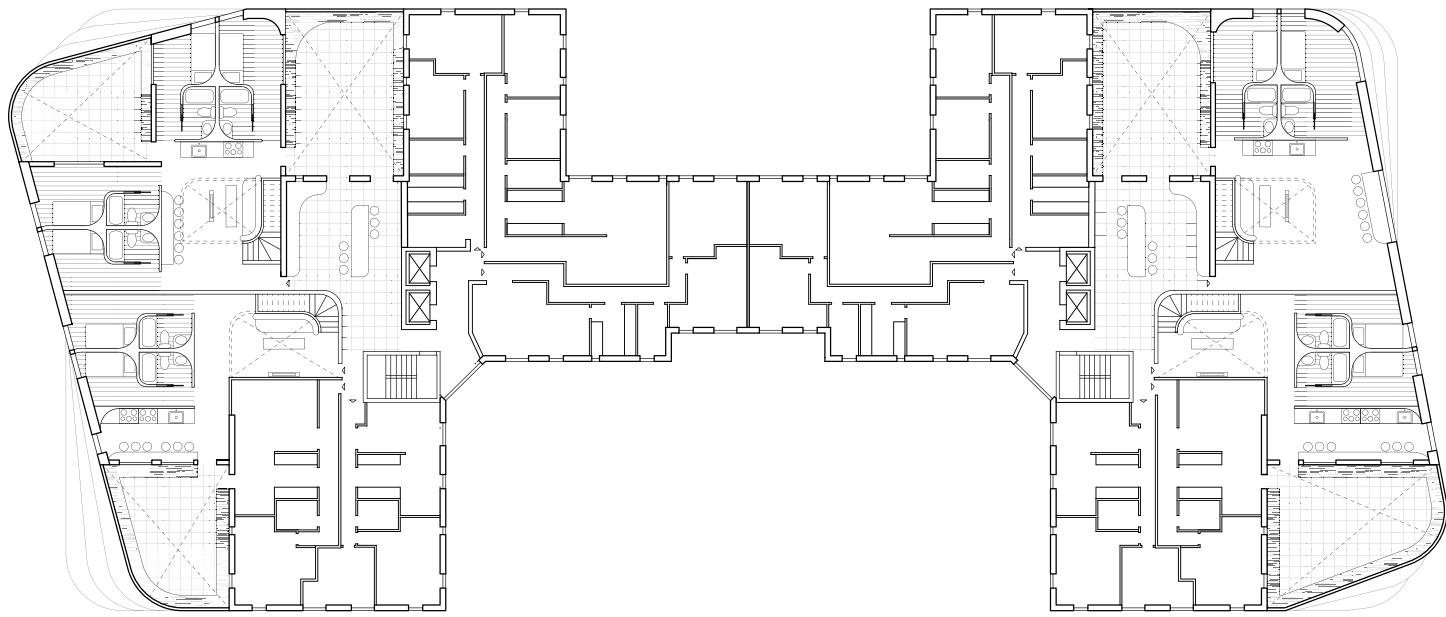


The public commons program will partner with local non-profit organizations like the Family Support and Resources Center and Garden of Eden to outreach, assist individuals and preserve the quality and happiness of families.

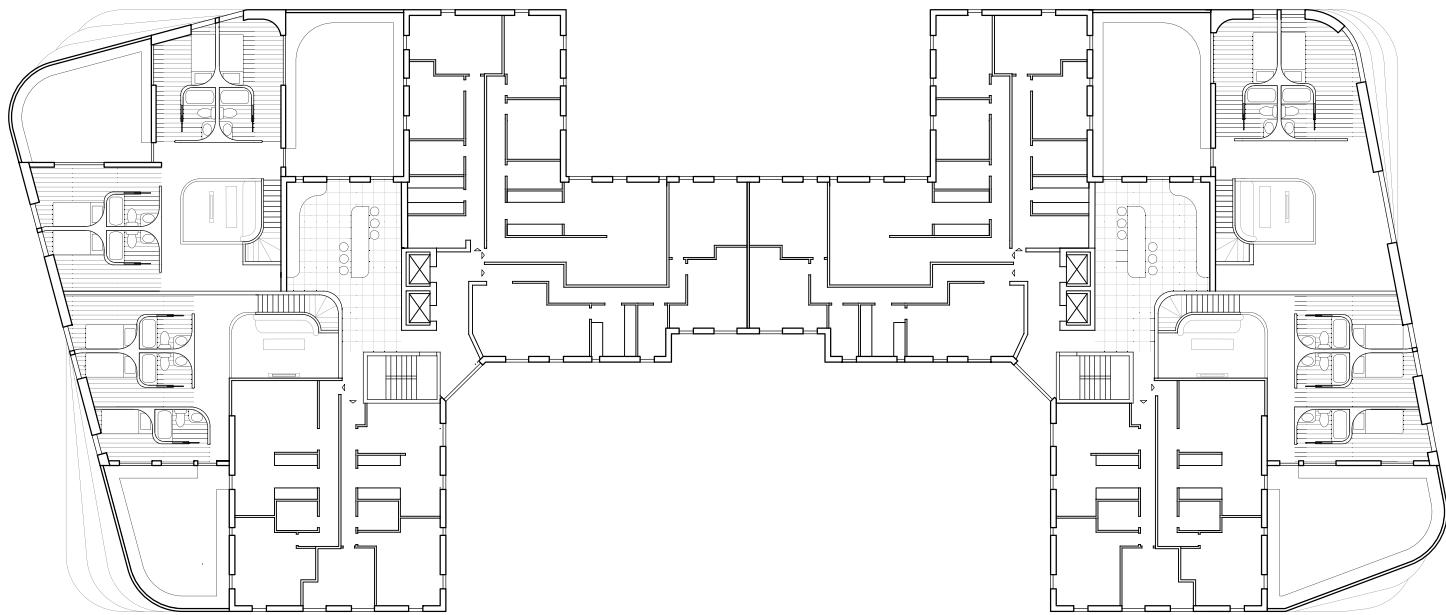
The outdoor public space of the Beacons serves as an elevated part and community garden, providing additional green space for the community that lives right next to the heavy traffic BQE.

The indoor public space of the Beacons serves as the Family Support and Resources Center with offices, classrooms, and childcare facilities.

LOLUX COMMONS POSTER



EXISTING + ADDITION 7TH FLOOR PLAN

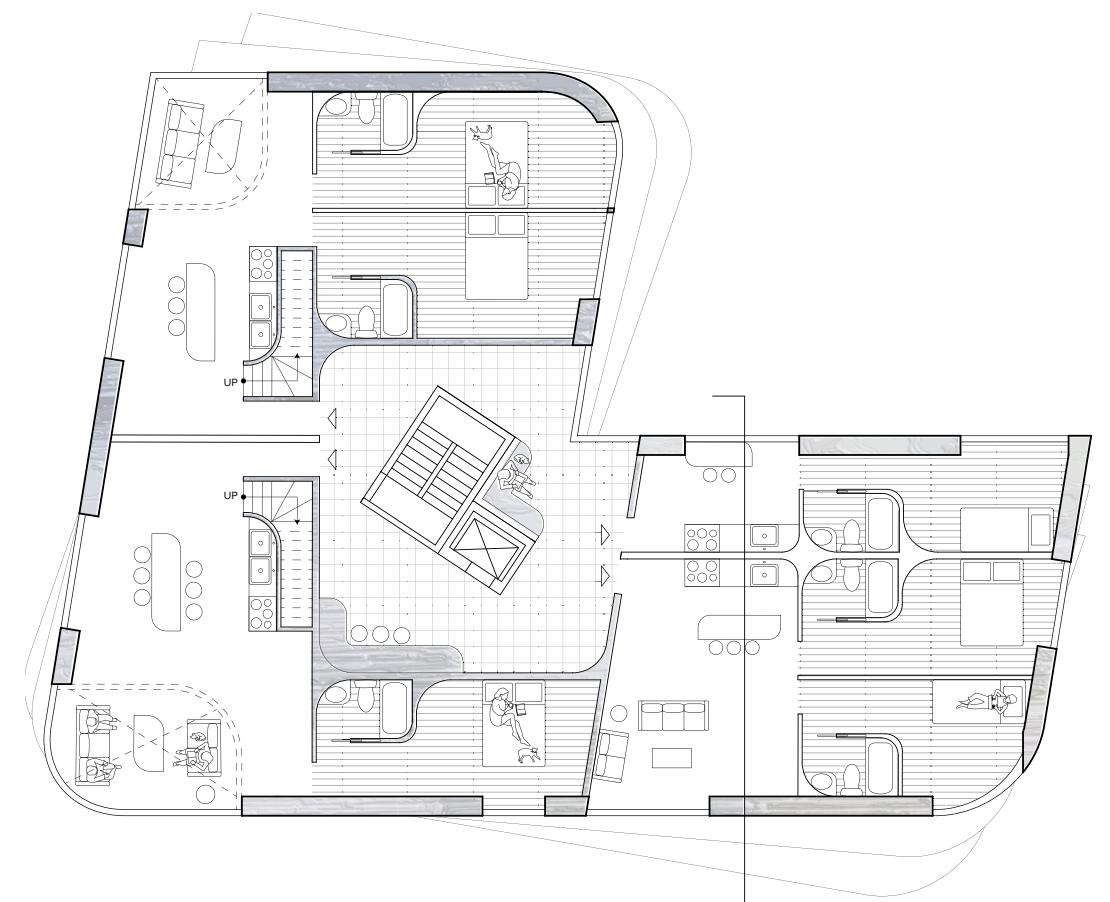


EXISTING + ADDITION 8TH FLOOR PLAN

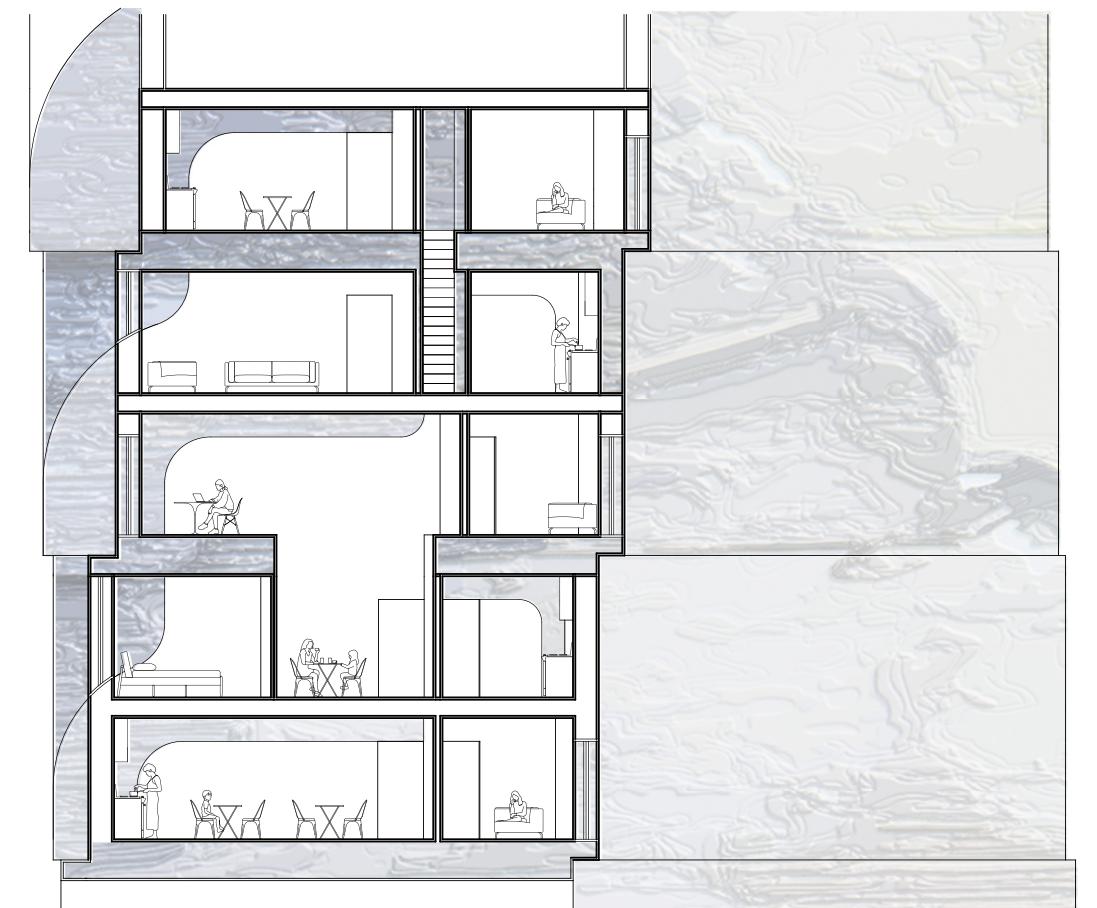
The Beacons has two housing types, one is a large scale co-living unit (connect with the existing building) and the other is a smaller scale traditional apartment unit (the towers above the existing building).

The co-living units are attached to the existing building and the additional units are for young adults who needed help. The larger co-living units aim to form a big family environment to enhance bonding between young people. The union of the existing and the additional also allows for community space on every floor, invites the current residents to meet and bond with the new. (Floor plans shown above)

The smaller scale units located on the two towers above the existing building are designed for single-parent. Units range from one bedroom to four bedroom to accommodate different family size. The core of the towers also provides meeting and working points for residents to engage and communicate (Floor plans and cluster section shown on the right).



NORTH TOWER 21ST FLOOR PLAN



NORTH TOWER CLUSTER 21ST - 25TH FLOOR SECTION



1921 GREEN STREET

*Multi-Family Building
Spring Garden, Philadelphia*

CANNO design | Summer 2021 Internship

Project Principal: Carey Jackson Yonce

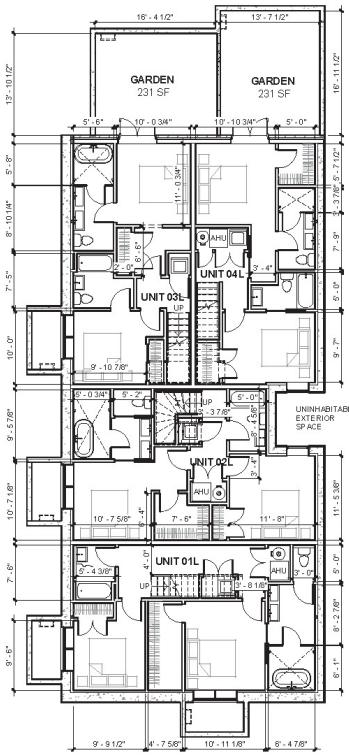
Project Coordinator: Amanda Anderson

The proposed 1921 Green Street development is situated in the Spring Garden Historic District, specifically at the northeast corner of 20th and Green Streets.

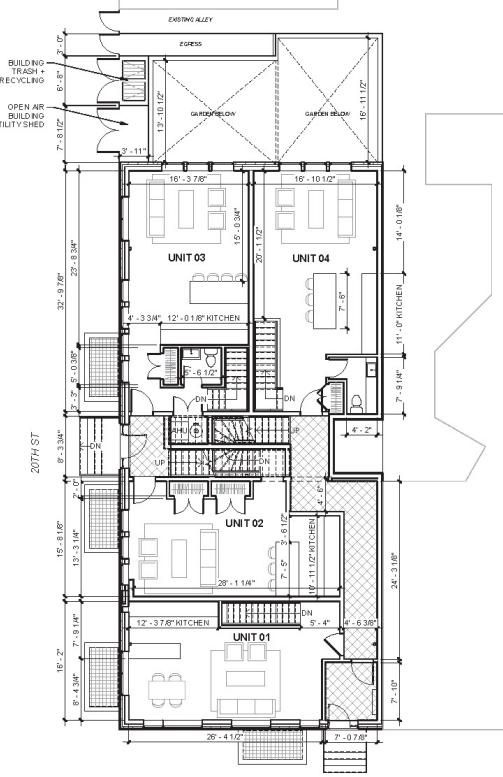
The project proposes to build a four-story structure. The facade design will feature red brick cladding with a cast stone base, as well as large double-hung windows and a metal cornice.

As part of my responsibilities, I was responsible for drafting the necessary construction documents for the project, which included creating the unit RCP, kitchen, and bathroom drawing sets.

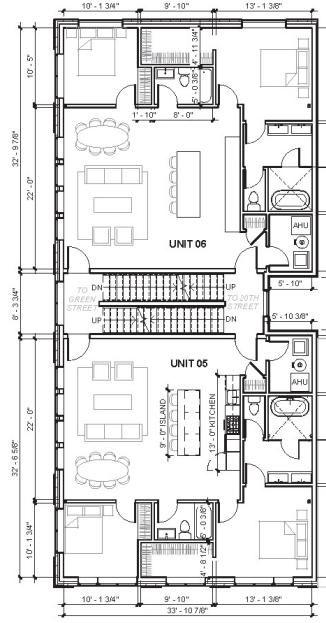
In addition to the construction documents, I contributed to the Green Street project by designing and modeling various aspects such as the in-unit stairs, the layout of the unit bathroom, and the building side entrance.



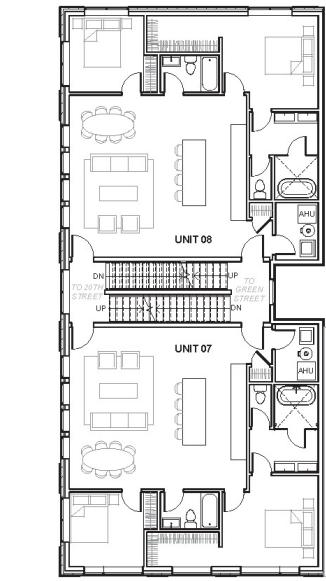
CELLAR PLAN



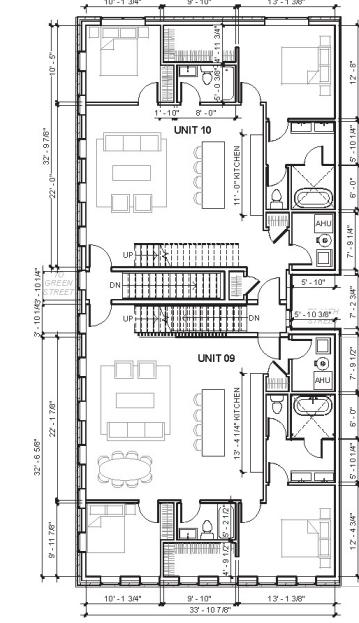
GROUND FLOOR PLAN



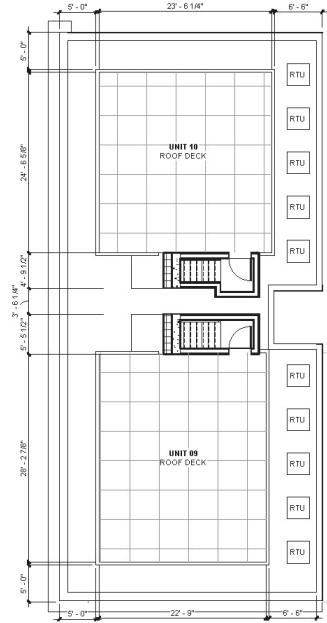
SECOND FLOOR PLAN



THIRD FLOOR PLAN



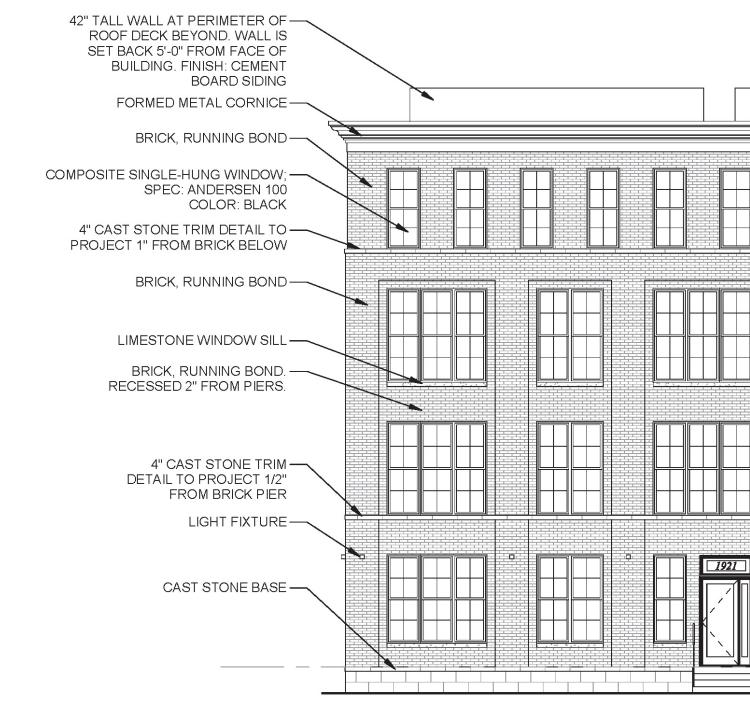
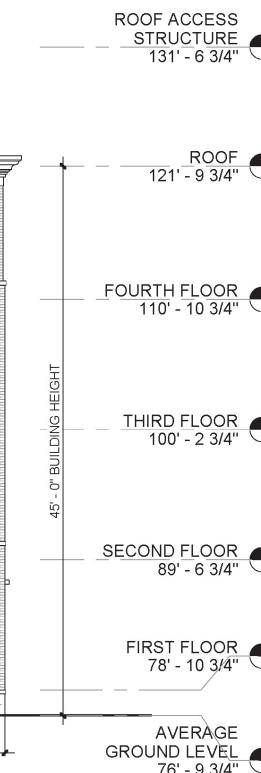
FOURTH FLOOR PLAN



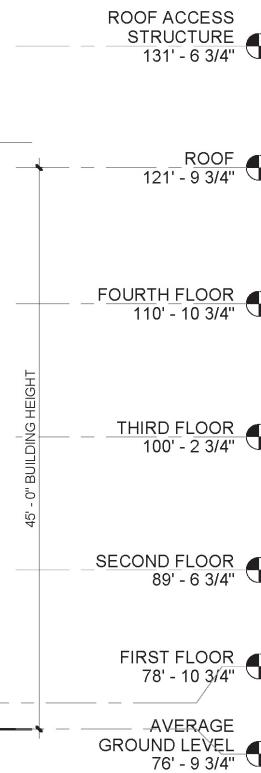
ROOF PLAN



PROPOSED NORTH 20TH STREET ELEVATION



PROPOSED GREEN STREET ELEVATION





STONE STAGE & STAY

Quarry Theater and Hotel
Cappadocia, Turkey

UPenn | ARCH 701 | Fall 2022

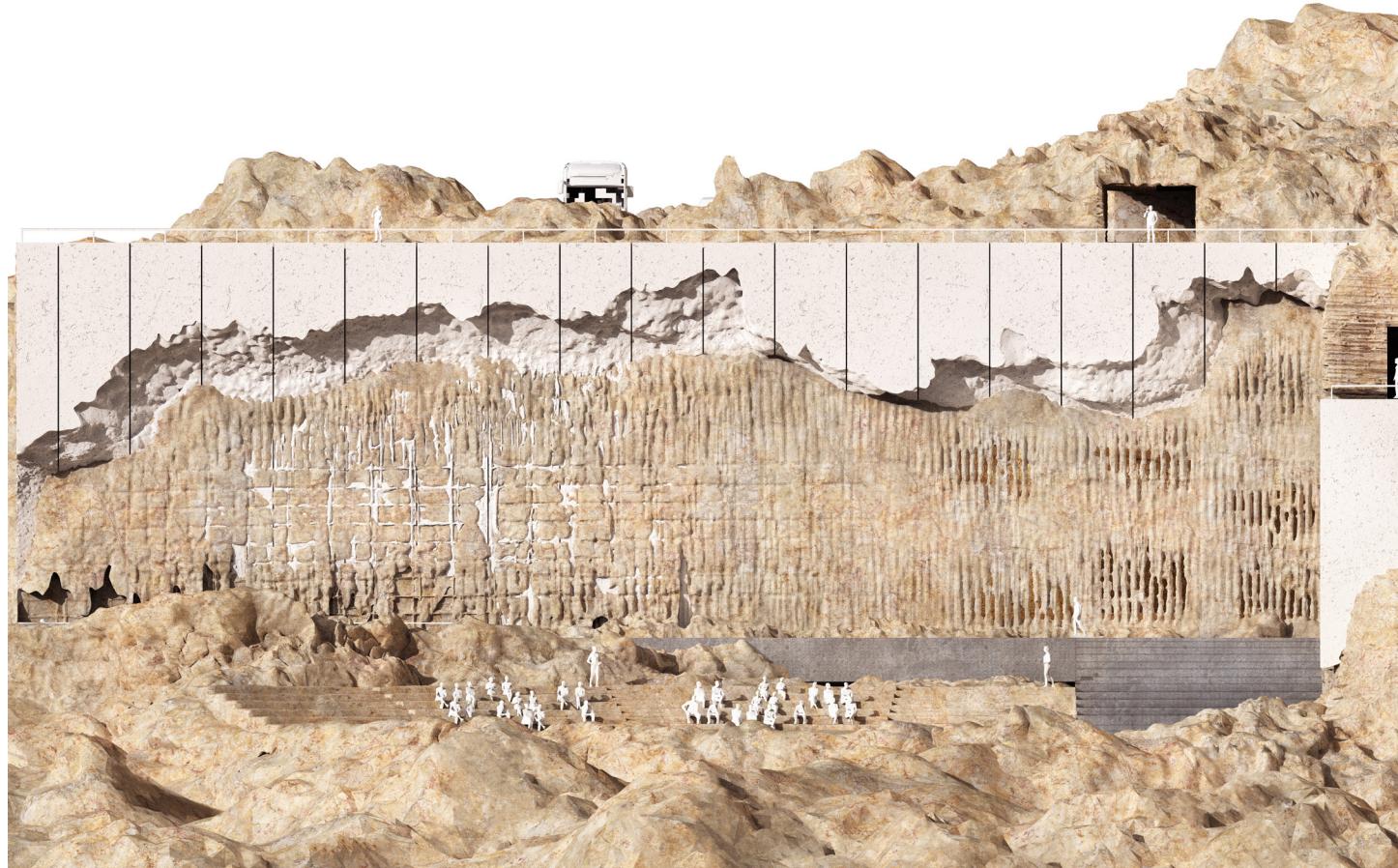
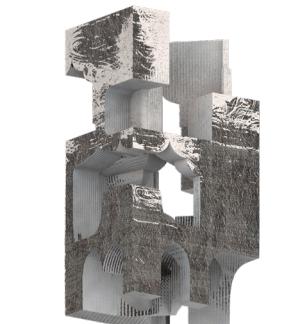
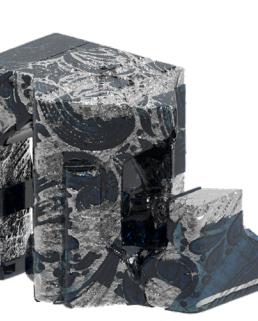
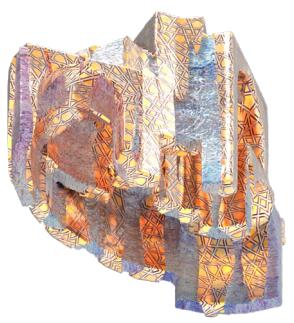
Critic: Ferda Koltan | GA: Caleb Ehly
Partner with: Hanyan Chen

Cappadocia, a region in Central Anatolia, Turkey, is known for its diverse topography, rich history, and valuable natural resources.

During our visit to Cappadocia, we came across an abandoned and destroyed stone quarry that would later be converted into a hotel. The quarry was abandoned due to illegal mining activities, with a bucket-wheel excavator carving part of the mountain into two walls with grids and lines.

Over time, pieces of the quarry wall fell off, forming a new layer of organic shapes and patterns on the wall. The textures, patterns, and color of the quarry wall reminded us of the architectural qualities of a facade.

The mountain texture, machinery lines, and pieces left on the wall told a story. This performance of machine and nature on the quarry facade inspired us to program a theater as an addition to the hotel, with the quarry facade serving as a symbolic stage backdrop.



NORTH QUARRY CONCRETE WALL ELEVATION



SOUTH EAST AERIAL VIEW



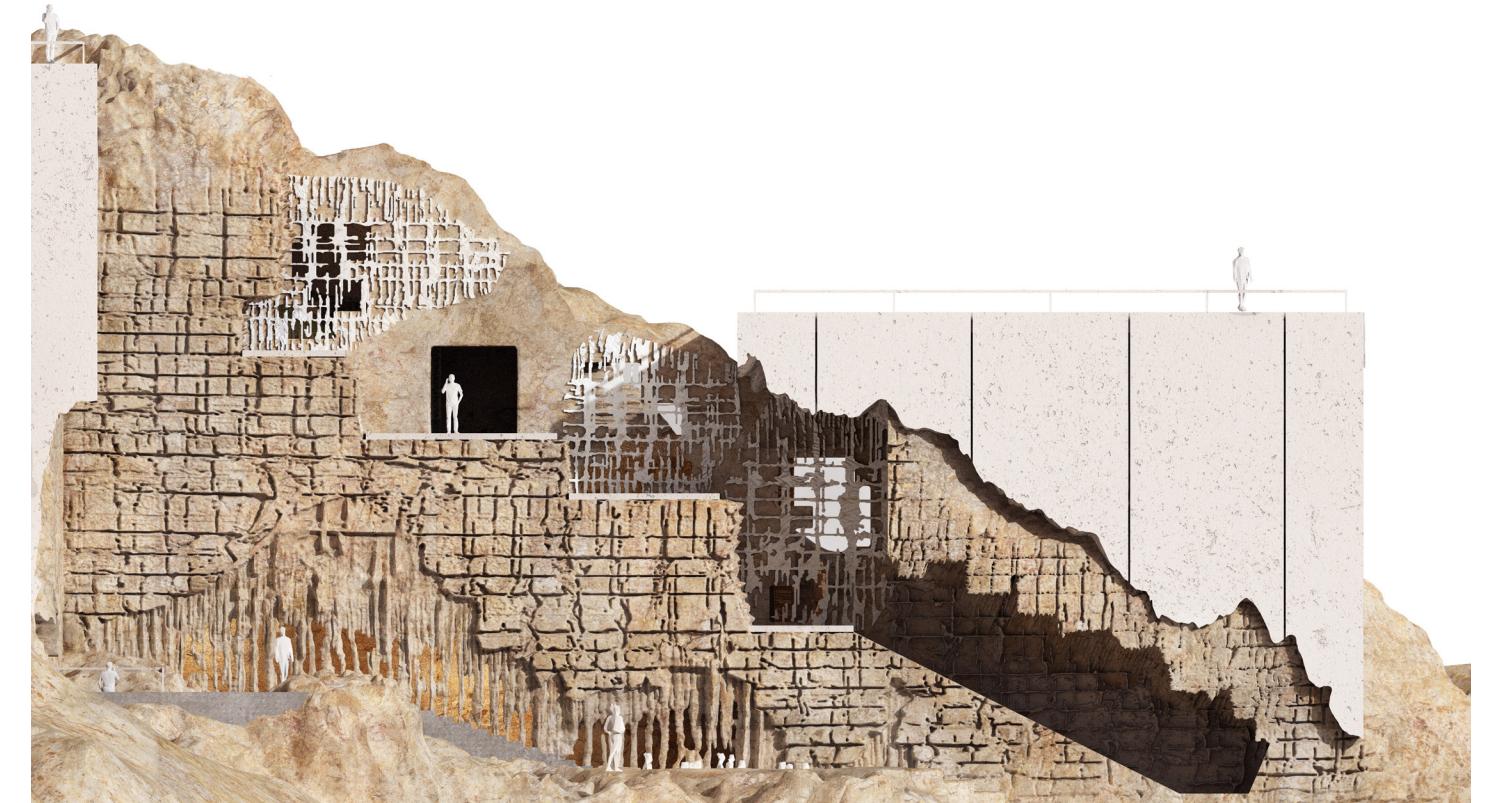
QUARRY HOTEL FACADE CLOSE-UP



QUARRY RESTAURANT



EAST QUARRY HOTEL ELEVATION



EAST QUARRY CONCRETE WALL ELEVATION





601 WASHINGTON STREET

*Multi-Family Residential Apartment Community
Conshohocken, Pennsylvania*

JKRP Architects | Summer 2022 Internship

Project Principal: Richard Stewart

Project Architect: Zach Gulick

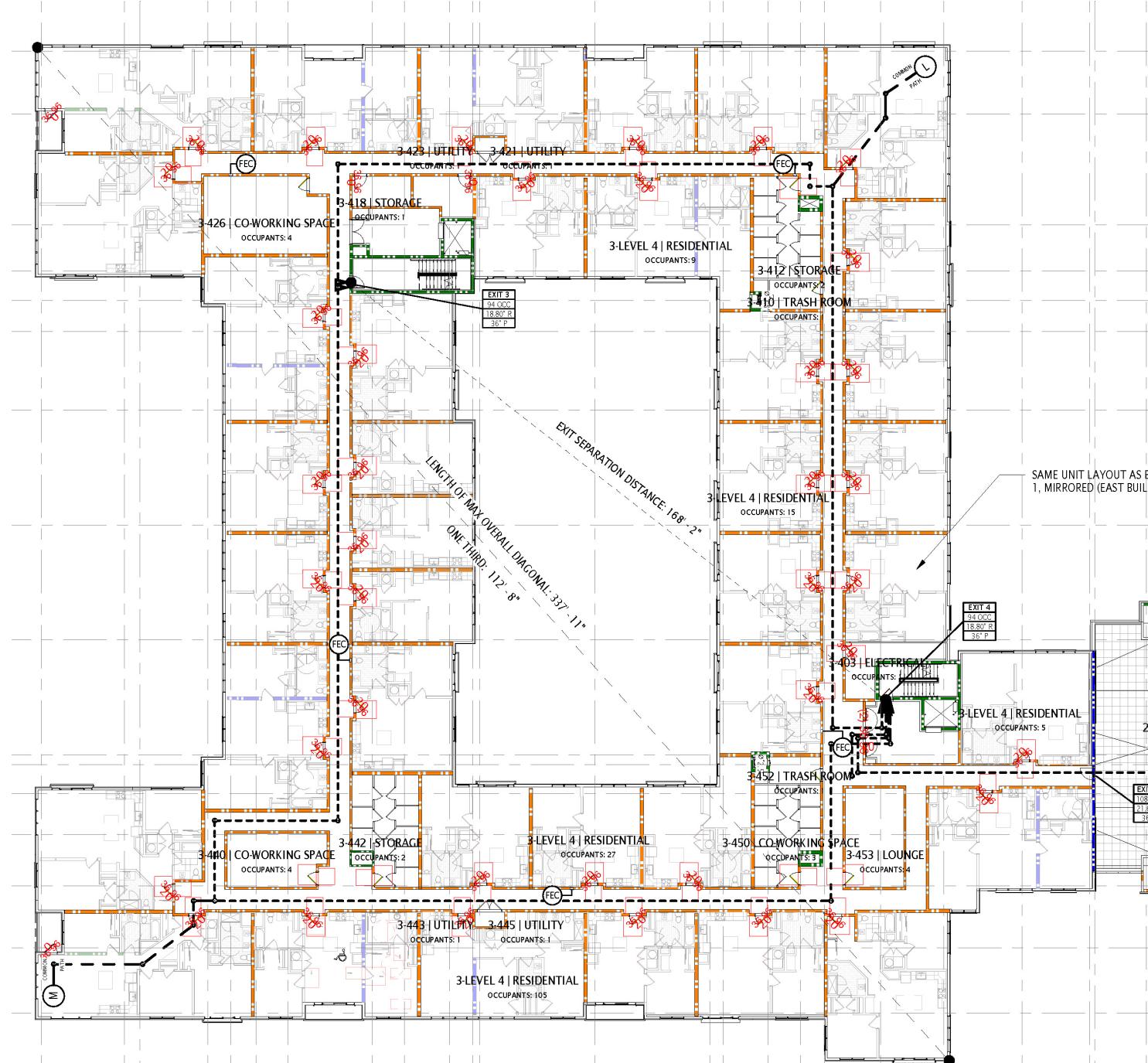
Project Coordinator: Michael Buckley

601 Washington Street project encompasses 9.02 acres and is located in Whitemarsh Township, Montgomery County PA, alongside the picturesque Schuylkill River.

601 Washington Street Project has been designated for the construction of 270 apartments, in accordance with its zoning classification.

Throughout my internship at JKRP Architects, I dedicated a substantial portion of my time to the 601 Washington Street project.

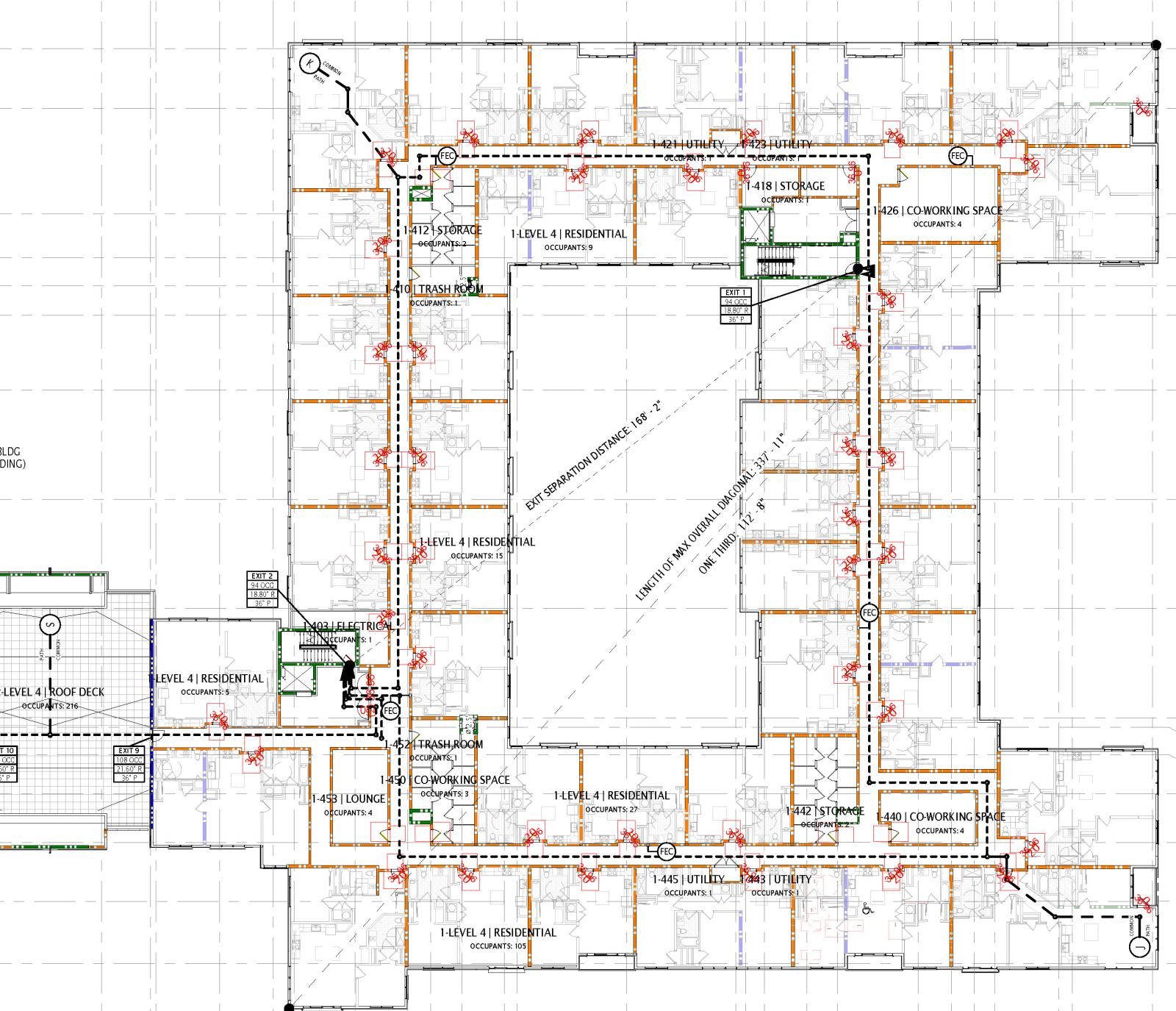
My responsibilities involved creating designs for the first floor parking lot RCP, parking lot window screens, and the layout of building facade material; developing plans for a 2 bedroom, 2 bathroom unit layout, and documenting the construction drawings for the project.



FOURTH FLOOR PLA



NORTH EXTERIOR ELEVATION



SOUTH EXTERIOR ELEVATION



Logos Antiquus

Geological Research and Education Center
Mons Klint, Denmark

UPenn I ARCH 704 I Spring 2023

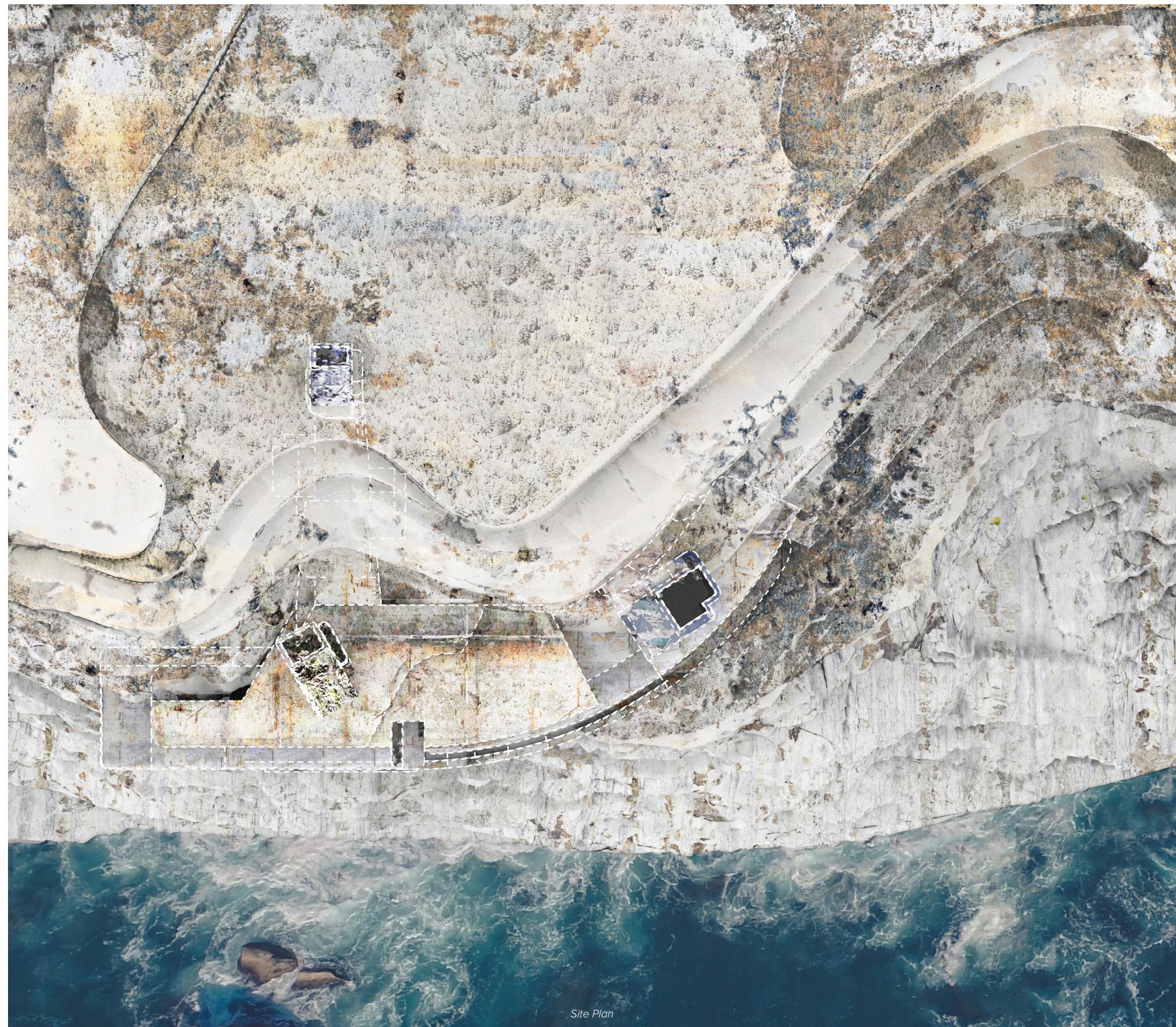
Critic: Winka Dubbeldam & Richard Garber
GA: Merrick Castillo
Partner with: Kewei Lin

Logos Antiquus, situated at the breathtaking Møns Klint Glaciotectonic Complex in southeast Denmark, is an avant-garde geology and paleontology research center. Inspired by the Latin term for “ancient word,” the project endeavors to forge a connection between historical and contemporary worlds through state-of-the-art research and design. This exceptional facility interweaves scientific discovery, environmental preservation, and public education to bridge the gap between the past and present.

Nestled within the awe-inspiring cliffs of Møns Klint, Logos Antiquus is built amidst a geological wonder that displays the intricate effects of tectonic collisions. The fold-and-thrust belt, marked by anticlines and synclines, offers an unparalleled backdrop for the research center and provides valuable insights into Earth's geological history.

A crucial aspect of the project is integrating synthetic nature, aiming to support indigenous wildlife, such as falcons, to flourish. By introducing specific materials into the concrete during material testing, the center will encourage nesting sites for falcons, enhancing the local ecosystem and nurturing a symbiotic relationship with nature.

Logos Antiquus aspires to be a trailblazing project that unites geology, paleontology, environmental conservation, and architectural design, forging a dynamic space that cultivates a profound connection between history and the contemporary world. By fostering research, education, and public engagement, this research center will stand as a testament to human ingenuity and our fascination with the natural world.



Structural development of Maglevandsfald: a key to understanding the glaciotectonic architecture of Møns Klint, SE Denmark

Stig A. Schack Pedersen and Peter Gravessen

Fig. 1. Aerial photograph of Mons Klint. The highest cliff in the centre is Dronningestolen. To the left the Maglevandsfald gorge leads down to the location of GeoCentre Mons Klint down to the beach. At the left side of Dronningestolen a wedge-shaped structure is seen (red arrow), which was formed in the first deformation phase of the glaciotectonic complex. The thrust structures to the right of Dronningestolen were thrust to the SW during the last deformation phase. The location of Mons Klint is shown on the inset map of Denmark.

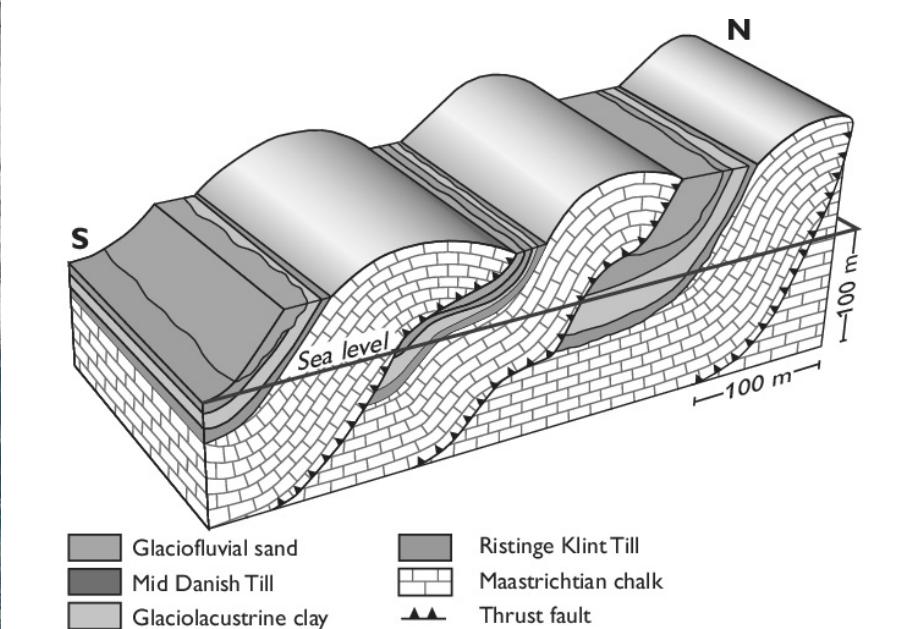
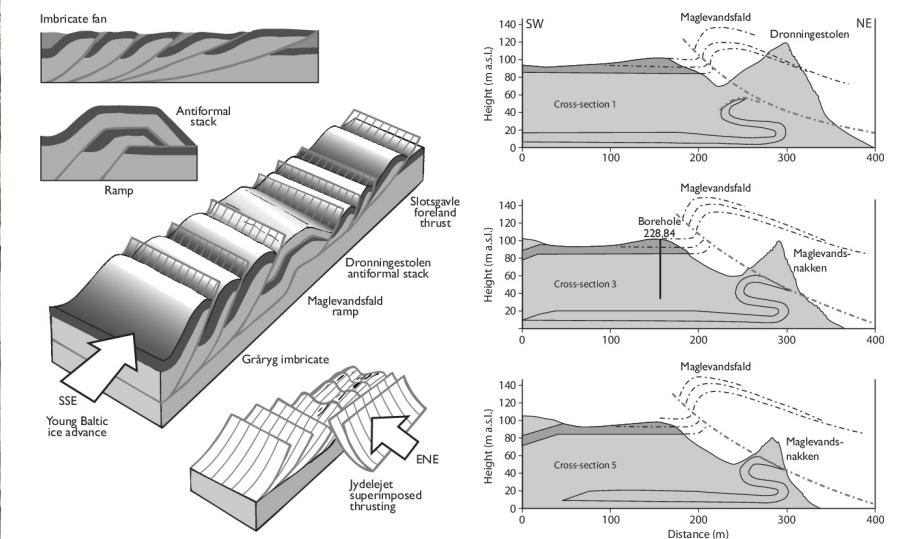
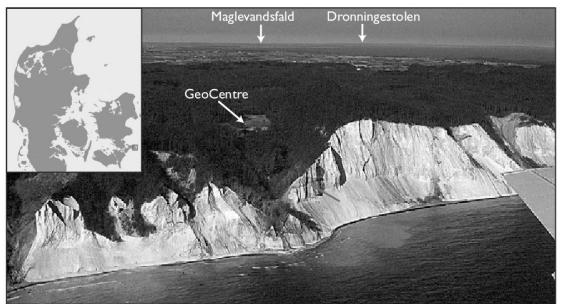


Fig. 2. Stratigraphical and structural framework of the southern imbricate fan at Møns Klint. The thickness of the lithological units is variable, and especially the glaciofluvial sand above the Mid Danish Till increases in thickness, where the sand was deposited in piggyback basins during the thrust-fault deformation. From Pedersen & Gravessen (2006).



seagrass + fiber reinforcement



seagrass + recycled glass



recycled glass + fiber reinforcement



recycled glass + wool



steel wool + seagrass



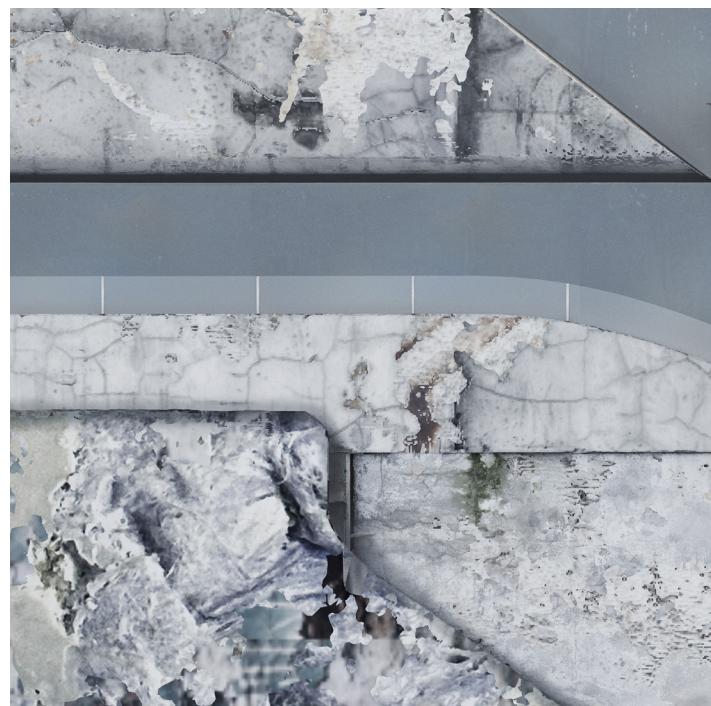
recycled glass + seagrass



fiber reinforcement + mulberry paper



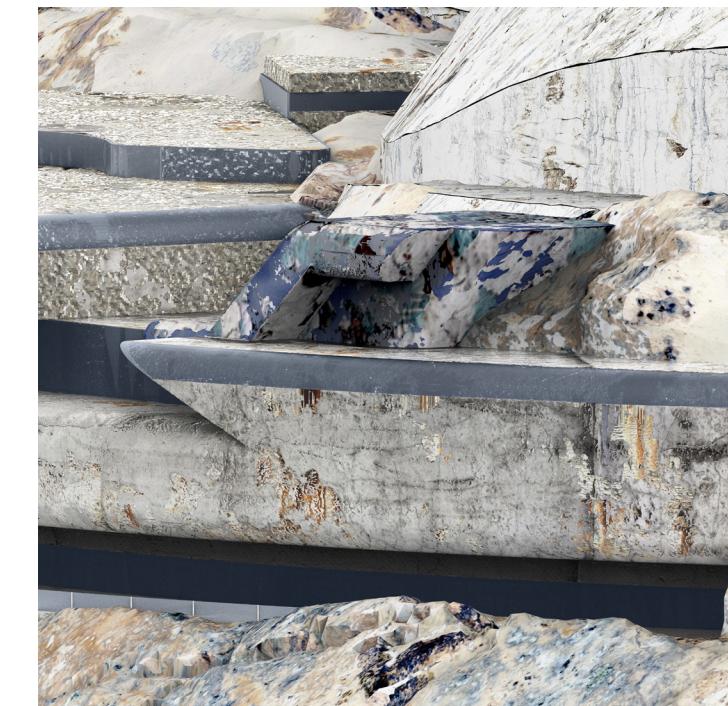
fiber reinforcement + straw bale



Facade Detail



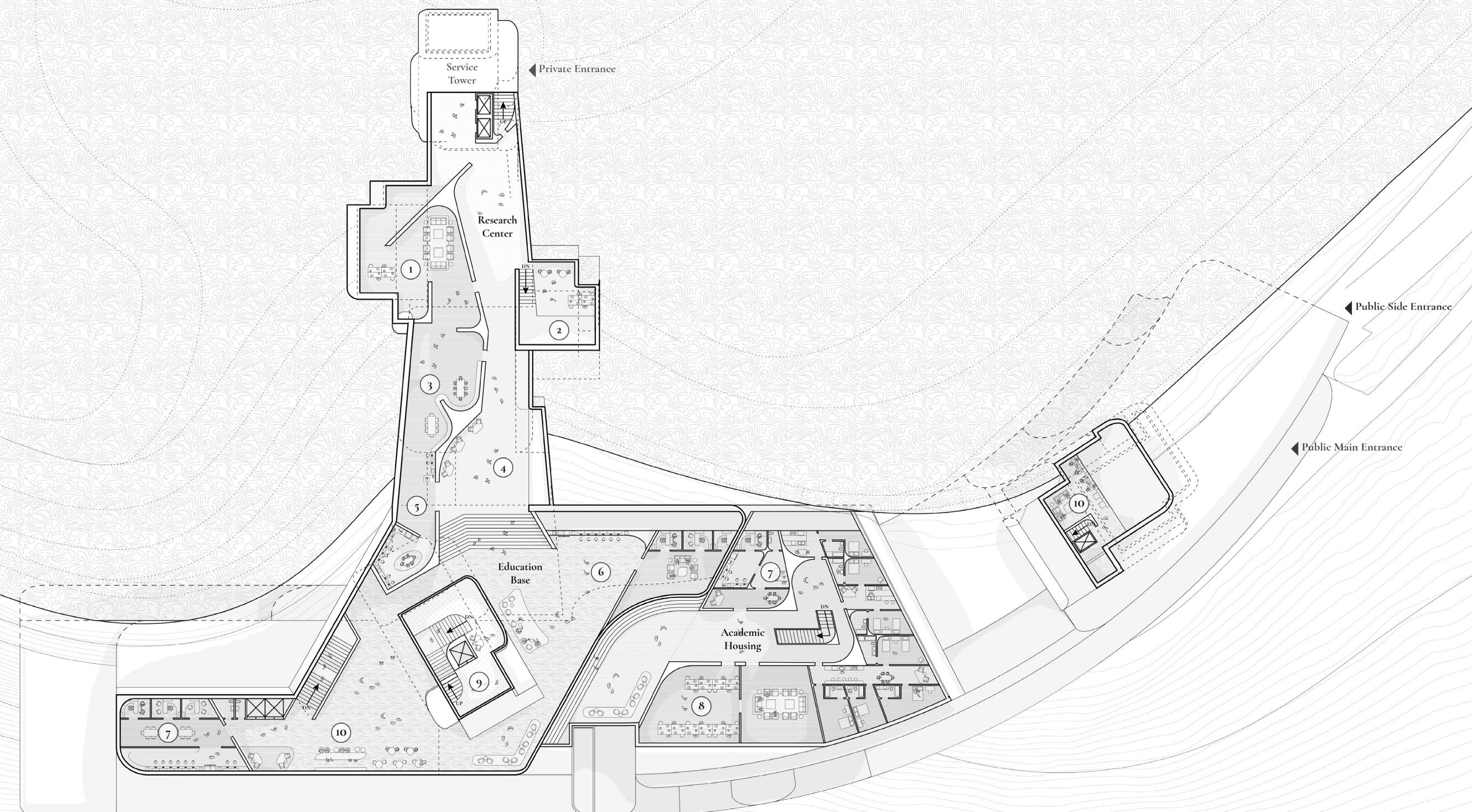
Main Entrance Detail



Monolith Detail



Aerial View Detail



Education Base & Academic Housing Plan | Scale: 1 : 300



N

1 Conference Lounge

2 Study Room

3 Study Area

4 Lounge

5 Research Lab

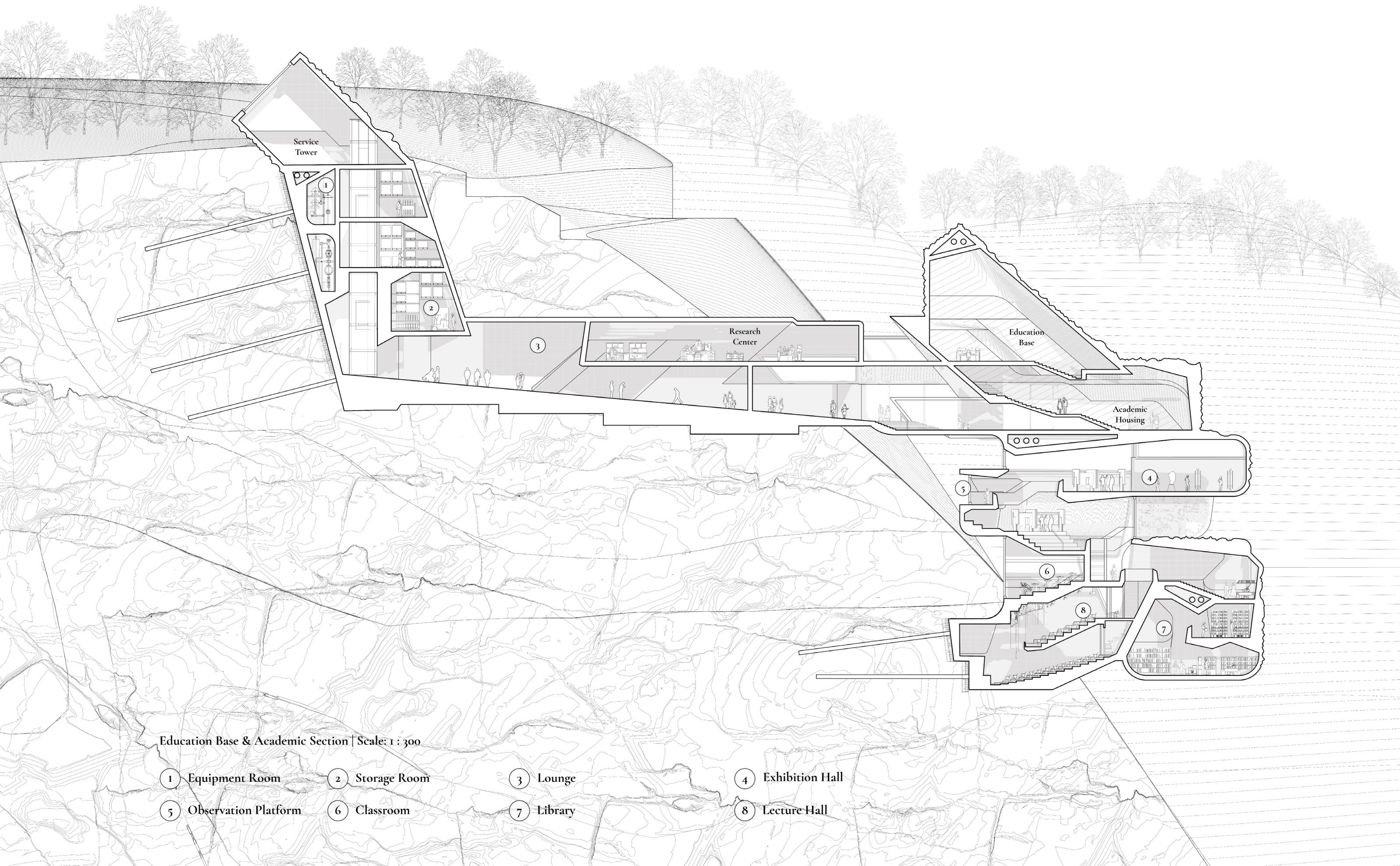
6 Open Lab

7 Office & Research Lab

8 Coworking & Meeting Room

9 Observatory

10 Visitor Cafe





Elevation

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